LINEAR UNITS

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In order to improve the products in this catalog the specifications are subject to change without notice.
OVERVIEW
LINEAR UNITS

BELT DRIVEN LINEAR UNITS

BR-S / BT-S

**DRIVE**

**GUIDE**

**FEATURES**
- High speed
- High acceleration
- Large stroke lengths
- Good repeatability

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Dynamic load capacity</th>
<th>Max. travel speed</th>
<th>Max. profile length</th>
<th>Max. repeatability</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$C_y$ [N]</td>
<td>$C_z$ [N]</td>
<td>[m/s]</td>
<td>[mm]</td>
<td>[mm]</td>
</tr>
<tr>
<td>BR-S 40</td>
<td>4610</td>
<td>6</td>
<td>6000</td>
<td>0.08</td>
<td>40</td>
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<tr>
<td>BR-S 90</td>
<td>9900</td>
<td>5</td>
<td>6000</td>
<td>0.08</td>
<td>90</td>
</tr>
<tr>
<td>BR-S 80</td>
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<td>6</td>
<td>6000</td>
<td>0.08</td>
<td>110</td>
</tr>
<tr>
<td>BR-S 80 L</td>
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</tr>
<tr>
<td>BR-S 110 S</td>
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<td>6000</td>
<td>0.08</td>
<td>110</td>
</tr>
<tr>
<td>BR-S 110 L</td>
<td>49600</td>
<td>6</td>
<td>6000</td>
<td>0.08</td>
<td>110</td>
</tr>
<tr>
<td>BT-S 110 L</td>
<td>31000</td>
<td>6</td>
<td>6000</td>
<td>0.08</td>
<td>110</td>
</tr>
</tbody>
</table>

For lengths over the stated value in the table above please contact us.

1 Profile
2 Profile + carriage

BR-D

**DRIVE**

**GUIDE**

**FEATURES**
- High speed
- High acceleration
- Large stroke lengths
- Good repeatability
- High load capabilities
- High flexural rigidity

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Dynamic load capacity</th>
<th>Max. travel speed</th>
<th>Max. profile length</th>
<th>Max. repeatability</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$C_y$ [N]</td>
<td>$C_z$ [N]</td>
<td>[m/s]</td>
<td>[mm]</td>
<td>[mm]</td>
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<tr>
<td>BR-D 90</td>
<td>4620</td>
<td>5</td>
<td>6000</td>
<td>0.08</td>
<td>90</td>
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<tr>
<td>BR-D 90 L</td>
<td>9240</td>
<td>5</td>
<td>6000</td>
<td>0.08</td>
<td>90</td>
</tr>
<tr>
<td>BR-D 110 S</td>
<td>19800</td>
<td>6</td>
<td>6000</td>
<td>0.08</td>
<td>110</td>
</tr>
<tr>
<td>BR-D 110 L</td>
<td>95600</td>
<td>6</td>
<td>6000</td>
<td>0.08</td>
<td>110</td>
</tr>
<tr>
<td>BR-D 145 S</td>
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<td>6000</td>
<td>0.08</td>
<td>145</td>
</tr>
<tr>
<td>BR-D 145 L</td>
<td>68400</td>
<td>6</td>
<td>6000</td>
<td>0.08</td>
<td>145</td>
</tr>
<tr>
<td>BR-D 200 S</td>
<td>46600</td>
<td>6</td>
<td>6000</td>
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</tr>
<tr>
<td>BR-D 200 L</td>
<td>99200</td>
<td>6</td>
<td>6000</td>
<td>0.08</td>
<td>200</td>
</tr>
</tbody>
</table>

For lengths over the stated value in the table above please contact us.

1 Profile
2 Profile + carriage

BR-E

**DRIVE**

**GUIDE**

**FEATURES**
- Excellent price/performance ratio
- High acceleration
- Large stroke lengths

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Dynamic load capacity</th>
<th>Max. travel speed</th>
<th>Max. profile length</th>
<th>Max. repeatability</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$C_y$ [N]</td>
<td>$C_z$ [N]</td>
<td>[m/s]</td>
<td>[mm]</td>
<td>[mm]</td>
</tr>
<tr>
<td>BR-E 40</td>
<td>9900</td>
<td>3</td>
<td>5960</td>
<td>+0.1</td>
<td>40</td>
</tr>
<tr>
<td>BR-E 40 L</td>
<td>15800</td>
<td>3</td>
<td>5960</td>
<td>+0.1</td>
<td>40</td>
</tr>
</tbody>
</table>

For lengths over the stated value in the table above please contact us.

1 Profile
2 Profile + carriage

In order to improve the products in this catalog the specifications are subject to change without notice.
**BELT DRIVEN LINEAR UNITS**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Dynamic load capacity</th>
<th>Max. travel speed</th>
<th>Max. profile length</th>
<th>Max. repeatability</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cy (N)</td>
<td>Cz (N)</td>
<td>m/s</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>BR-Z 40</td>
<td>4610</td>
<td>5</td>
<td>3000</td>
<td>+0.08</td>
<td>40</td>
</tr>
<tr>
<td>BR-Z 65</td>
<td>19800</td>
<td>5</td>
<td>6000</td>
<td>+0.08</td>
<td>65</td>
</tr>
<tr>
<td>BR-Z 80</td>
<td>34200</td>
<td>5</td>
<td>6000</td>
<td>+0.08</td>
<td>80</td>
</tr>
<tr>
<td>BR-Z 110</td>
<td>49600</td>
<td>5</td>
<td>6000</td>
<td>+0.08</td>
<td>110</td>
</tr>
</tbody>
</table>

1 For lengths over the stated value in the table above please contact us.

**BALL SCREW DRIVEN LINEAR UNITS**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Dynamic load capacity</th>
<th>Max. travel speed</th>
<th>Max. profile length</th>
<th>Max. repeatability</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cy (N)</td>
<td>Cz (N)</td>
<td>m/s</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>SR-S 40</td>
<td>4620</td>
<td>0.97</td>
<td>2920</td>
<td>+0.01</td>
<td>40</td>
</tr>
<tr>
<td>SR-S 65</td>
<td>19800</td>
<td>1.12</td>
<td>5480</td>
<td>+0.01</td>
<td>65</td>
</tr>
<tr>
<td>SR-S 80</td>
<td>34200</td>
<td>2.5</td>
<td>5850</td>
<td>+0.01</td>
<td>80</td>
</tr>
<tr>
<td>SR-S 110</td>
<td>49600</td>
<td>1.6</td>
<td>5850</td>
<td>+0.01</td>
<td>110</td>
</tr>
</tbody>
</table>

1 For lengths over the stated value in the table above please contact us.

In order to improve the products in this catalog the specifications are subject to change without notice.
BR-S and BT-S Linear Units with toothed belt drive and compact dimensions provide high performance features such as, high speed, good accuracy and repeatability. They can easily be combined to multi-axis systems.

Excellent price-/performance ratio and quick delivery time are ensured.

The compact, precision-extruded aluminum Profile from 6063 AL with integrated Zero-backlash Ball rail guide system, allows high load capacities and optimal cycles for the movement of larger masses at high speed.

For very high speeds, up to 10m/s, the Track Rollers (journal Bearings) of the type BT-S are particularly suitable.

In the Linear Units BR-S and BT-S is used a pre-tensioned steel reinforced AT polyurethane timing toothed belt. In conjunction with a Zero-backlash drive pulley high moments with alternating loads with good positioning accuracy, low wear and low noise can be realized.

The in the Profile slot driving Polyurethane timing belt protects all the parts in the Profile from dust and other contaminations. As optional, a corrosion-resistant protection strip is available.

The aluminum profile includes T-slots for fixing the Linear Unit and for attaching sensors and switches. Also, a Reed switch can be used here.

Different carriage lengths with central lubrication port, allow easy re-lubrication of the Linear Unit and allow the possibility to attach additional accessories on the side.

For the Linear Units BR-S and BT-S various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.

The aluminium profiles are manufactured according to the medium EN 12020-2 standard
Straightness = 0.35 mm/m; Max. torsion = 0.35 mm/m; Angular torsion = 0.2 mm/40 mm; Parallelism = 0.2 mm
In order to improve the products in this catalog the specifications are subject to change without notice.

**BR-S Series**

1 - Drive block with pulley  
2 - Corrosion-resistant protection strip (available also without protection strip)  
3 - AT polyurethane toothed belt with steel tension cords  
4 - Carriage; with built in Magnets  
5 - Aluminium profile-Hard anodized  
6 - Linear Ball Guideway  
7 - Central lubrication port; both sides  
8 - Tension End with integrated belt tensioning system

**BT-S Series**

1 - Drive block with pulley  
2 - Corrosion-resistant protection strip (available also without protection strip)  
3 - AT polyurethane toothed belt with steel tension cords  
4 - Carriage; with built in Magnets  
5 - Aluminium profile-Hard anodized  
6 - Track Roller (journal Bearing)  
7 - Two hardened steel Round guide (58/60 HRC)  
8 - Central lubrication port; both sides  
9 - Tension End with integrated belt tensioning system

The aluminium profiles are manufactured according to the medium EN 12020-2 standard  
Straightness = 0.35 mm/m; Max. torsion = 0.35 mm/m; Angular torsion = 0.2 mm/40 mm; Parallelism = 0.2 mm
In order to improve the products in this catalog the specifications are subject to change without notice.

**HOW TO ORDER**

Series Prefix: 
BR  
BT

Size: 
40: 0040  
65: 0065  
80: 0080  
110: 0110

Series Suffix: 
S

Absolute stroke [mm]: 
(Absolute stroke = Effective stroke + 2 x Safety stroke)

Carriage Version: 
S: Short (only for BT-S series)  
L: Long ..  
Leave blank: For BR0040, BT0040

Type of drive pulley: 
00: Pulley with through hole  
01: Pulley with journal (with Keyway)  
02: Pulley with journal on both sides (without Keyway)  
03: Without drive unit  
10: Pulley with journal (without Keyway)  
20: Pulley with journal on both sides (with Keyway)

Drive journal position: 
L: Journal on left side  
R: Journal on right side  
X: Both sided or none

Protection cover: 
0: In profile groove guided Polyurethane toothed belt  
1: Corrosion-resistant protection strip

Version: 
S: Special Version  
1: Standard Single Carriage  
2: Dual Carriage
## General Technical Data

### Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed [m/s]</th>
<th>Max. drive torque [N·m]</th>
<th>** No load torque [N·m]</th>
<th>Pulley drive ratio</th>
<th>Pulley diameter [mm]</th>
<th>Belt type</th>
<th>Belt width [mm]</th>
<th>Max. force transmitted by ball [N]</th>
<th>Specific spring Capes</th>
<th>*Max. acceleration [m/s²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-S 40</td>
<td>6</td>
<td>3.7</td>
<td>0.4 x nc</td>
<td>0.2 x rev</td>
<td>99</td>
<td>AT 3</td>
<td>20</td>
<td>235</td>
<td>225000</td>
<td>70</td>
</tr>
<tr>
<td>BT-S 40</td>
<td>10</td>
<td>3.7</td>
<td>0.4 x nc</td>
<td>0.2 x rev</td>
<td>99</td>
<td>AT 3</td>
<td>20</td>
<td>235</td>
<td>225000</td>
<td>70</td>
</tr>
</tbody>
</table>

*Max. travel speed and max. acceleration of Linear unit with the Corrosion-resistant protection strip is 1.5 m/s and 50 m/s, respectively.

*The stated values are for strokes (and for distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.

nc - Number of carriages

## Operating Conditions

**Operating temp.** 5°C ~ +60°C

Duty cycle 100%

For operating temperature out of the presented range, please contact us.

## Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0)

**Modulus of elasticity:**

\[ E = 70000 \, \text{N/mm}^2 \]

### General Technical Data for Double Carriage

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity [N]</th>
<th>Dynamic moment [N·m]</th>
<th>Forces [N]</th>
<th>Max. permissible loads [N·m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-S 40</td>
<td>2</td>
<td>3220</td>
<td>40</td>
<td>7690</td>
<td>28</td>
</tr>
<tr>
<td>BT-S 40</td>
<td>2</td>
<td>3400</td>
<td>40</td>
<td>7690</td>
<td>28</td>
</tr>
</tbody>
</table>

*A - Distance between carriages (mm). More info on following pages.

Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**TECHNICAL DATA**

### Mass and mass moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th><em>Mass of linear unit</em></th>
<th><em>Mass moment of inertia</em></th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ kg ]</td>
<td>[ 10⁻⁵ kg m² ]</td>
<td>ly [ cm⁴ ]</td>
</tr>
<tr>
<td>BR-S 40</td>
<td>1.3 + 0.0024 × (Abs. stroke + (nc - 1) × A) + 0.28 × (nc - 1)</td>
<td>9.7 + 0.0035 × (Abs. stroke + (nc - 1) × A) + 7.0 × (nc - 1)</td>
<td>9.8</td>
</tr>
<tr>
<td>BT-S 40</td>
<td>1.25 + 0.0022 × (Abs. stroke + (nc - 1) × A) + 0.26 × (nc - 1)</td>
<td>9.3 + 0.0035 × (Abs. stroke + (nc - 1) × A) + 6.5 × (nc - 1)</td>
<td></td>
</tr>
</tbody>
</table>

*Absolute stroke [mm]

A - Distance between carriages (mm). More info on following pages.

nc - Number of carriages

---

**Deflection of the linear unit**

**Fixed - fixed mounting**

**Fixed - free mounting**

\( d \)  Maximum deflection of the linear unit (mm)

\( d_{max} \)  Maximum permissible deflection of the linear unit (mm)

\( F \)  Applied force (N)

\( L_p \)  Unsupported profile length (mm)

---

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Deflection d [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unsupported profile length ( L_p ) [mm]</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>BR-S 40</td>
<td>0</td>
</tr>
<tr>
<td>BT-S 40</td>
<td>0</td>
</tr>
</tbody>
</table>

---

Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.
**DIMENSIONS**

In order to improve the products in this catalog the specifications are subject to change without notice.

**Linear Unit doesn’t include any safety stroke.**

Absolute stroke = Effective stroke + 2 x Safety stroke

**Lifetime lubrication**

**Journal with or without Keyway.**

**All dimensions in mm; Drawings scales are not equal.**

**Mass and mass moment of inertia**

**Linear Unit Mass of linear unit**

Mass moment of inertia

**Planar moment of inertia**

**Deflection of the linear unit**

**Unsupported profile length**

**Additional profile supports are needed.**

**Lifetime lubrication**

**Journal with or without Keyway.**

**All dimensions in mm; Drawings scales are not equal.**

**Technical Data**

**Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.**
In order to improve the products in this catalog the specifications are subject to change without notice.

**Mounting the drive**

- by the MOTOR ADAPTER WITH COUPLING

**Optional:**

- TAP / PIN holes available on request.

**TAP / PIN holes on bottom of the profile**

Drawing only for presentational use.

**Defining of the linear unit length**

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + 32 \text{ mm}
\]

\[
L_{\text{total}} = L + 135 \text{ mm}
\]

**Left side (L)**

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + A \times (\text{nc} - 1) + 32 \text{ mm}
\]

\[
L_{\text{total}} = L + 135 \text{ mm}
\]

**Right side (R)**

**.btn-container { display: flex; flex-wrap: wrap; gap: 10px; }**

**Multiple carriages**

- Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)

- For the case of \( A \text{ [mm]} > A_{\text{lim}} \):
  
  - a toothed belt for the connection of the carriages will be used,
  
  - the following condition must be met: \( A \text{ [mm]} = A_{\text{lim}} + 3 \times i \),
  
  where \( i \in \{1, 2, 3, \ldots\} \).

**Dimensions**

<table>
<thead>
<tr>
<th>BR-S 40</th>
<th>BT-S 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>A &gt; Lv + 24 mm</td>
<td>A &gt; Lv + 24 mm</td>
</tr>
</tbody>
</table>

**Options**

- TAP / PIN holes available on request.

**NOTE:**

All dimensions in mm; Drawings scales are not equal.

**Specifications**

<table>
<thead>
<tr>
<th>BR-S 40</th>
<th>BT-S 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.7</td>
<td>6.7</td>
</tr>
<tr>
<td>5.4</td>
<td>5.4</td>
</tr>
<tr>
<td>3.4</td>
<td>3.4</td>
</tr>
</tbody>
</table>

**Likes:**

- Available on request.
### TECHNICAL DATA

#### General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage length (Lv [mm])</th>
<th>Dynamic load capacity (C [N], Cv [N])</th>
<th>Dynamic moment (Cx [N], Cy [N], Cz [N], Mx [Nm], My [Nm], Mz [Nm])</th>
<th>Max. permissible loads (Fx [N], Fy [N], Fz [N], Mx [Nm], My [Nm], Mz [Nm])</th>
<th>Moved mass (m [kg])</th>
<th>Max. repeatability (Lmax [%])</th>
<th>Max. stroke (Lmax [mm])</th>
<th>Min. stroke (Lmax [mm])</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-S 65 S</td>
<td>140</td>
<td>9900</td>
<td>/</td>
<td>79</td>
<td>9900</td>
<td>9900</td>
<td>140</td>
<td>40</td>
</tr>
<tr>
<td>BR-S 65 L</td>
<td>190</td>
<td>19800</td>
<td>/</td>
<td>158</td>
<td>19800</td>
<td>19800</td>
<td>19800</td>
<td>40</td>
</tr>
<tr>
<td>BT-S 65 L</td>
<td>190</td>
<td>19800</td>
<td>/</td>
<td>158</td>
<td>19800</td>
<td>19800</td>
<td>19800</td>
<td>40</td>
</tr>
</tbody>
</table>

*For lengths / stroke over the stated value in the table above please contact us.

**Recommended values of loads**

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0)

Modulus of elasticity: 

\[ E = 70000 \text{ N/mm}^2 \]

#### General technical data for double carriage

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity (C [N], Cv [N])</th>
<th>Dynamic moment (Cx [N], Cy [N], Cz [N], Mx [Nm], My [Nm], Mz [Nm])</th>
<th>Max. permissible loads (Fx [N], Fy [N], Fz [N], Mx [Nm], My [Nm], Mz [Nm])</th>
<th>Moved mass (m [kg])</th>
<th>Max. repeatability (Lmax [%])</th>
<th>Max. stroke (Lmax [mm])</th>
<th>Min. stroke (Lmax [mm])</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-S 65 S</td>
<td>S2</td>
<td>19800</td>
<td>/</td>
<td>158</td>
<td>19800</td>
<td>19800</td>
<td>19800</td>
<td>19800</td>
</tr>
<tr>
<td>BR-S 65 L</td>
<td>L2</td>
<td>39600</td>
<td>/</td>
<td>316</td>
<td>39600</td>
<td>39600</td>
<td>39600</td>
<td>39600</td>
</tr>
<tr>
<td>BT-S 65 L</td>
<td>L2</td>
<td>17200</td>
<td>17200</td>
<td>250</td>
<td>17200</td>
<td>17200</td>
<td>17200</td>
<td>17200</td>
</tr>
</tbody>
</table>

*Presented values are for informational purposes only. Exact values can be calculated by contacting our sales engineers.

#### Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed (Ma) [m/s]</th>
<th>Max. drive torque (Mx) [Nm]</th>
<th><strong>No load</strong> [Nm]</th>
<th>Pulley drive ratio [mm/rev]</th>
<th>Pulley diameter [mm]</th>
<th>Belt type</th>
<th>Belt width [Nm]</th>
<th>Max. force transmitted by belt [Nm]</th>
<th>Specific spring [Nm]</th>
<th>* Max. acceleration [m/s²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-S 65 S</td>
<td>6</td>
<td>13.1</td>
<td>1.1 × nc</td>
<td>0.8 × nc</td>
<td>165</td>
<td>AT 5</td>
<td>32</td>
<td>500</td>
<td>600000</td>
<td>70</td>
</tr>
<tr>
<td>BR-S 65 L</td>
<td>10</td>
<td>13.1</td>
<td>1.2 × nc</td>
<td>0.9 × nc</td>
<td>165</td>
<td>AT 5</td>
<td>32</td>
<td>500</td>
<td>600000</td>
<td>70</td>
</tr>
<tr>
<td>BT-S 65 L</td>
<td>10</td>
<td>13.1</td>
<td>1.3 × nc</td>
<td>0.7 × nc</td>
<td>165</td>
<td>AT 5</td>
<td>32</td>
<td>500</td>
<td>600000</td>
<td>70</td>
</tr>
</tbody>
</table>

*Max. travel speed and max. acceleration of Linear unit with the Corrosion-resistant protection strip is 1.5 m/s and 50 m/s, respectively.

For travel speed and acceleration over the stated value in the table above please contact us.

*The stated values are for strokes (and for distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.

nc - Number of carriages

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**TECHNICAL DATA**

### Mass and mass moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>* Mass of linear unit</th>
<th>* Mass moment of inertia</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ kg ]</td>
<td>[ $ 10^{5} \text{ kg} \cdot \text{m}^{2} $ ]</td>
<td>$ \text{ly} \ [\text{cm}^3] $</td>
</tr>
<tr>
<td>BR-S 65 S</td>
<td>$ 4.0 \times 0.0055 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1.00 \times (\text{nc} - 1) $</td>
<td>$ 98.4 \times 0.0154 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 69.0 \times (\text{nc} - 1) $</td>
<td>59.7</td>
</tr>
<tr>
<td>BR-S 65 L</td>
<td>$ 4.6 \times 0.0055 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1.45 \times (\text{nc} - 1) $</td>
<td>$ 130.1 \times 0.0154 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 100.0 \times (\text{nc} - 1) $</td>
<td></td>
</tr>
<tr>
<td>BT-S 65 L</td>
<td>$ 4.3 \times 0.0047 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 1.31 \times (\text{nc} - 1) $</td>
<td>$ 120.4 \times 0.0154 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 90.3 \times (\text{nc} - 1) $</td>
<td></td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]
A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages

---

**Deflection of the linear unit**

**Fixed - fixed mounting**

![Fixed - fixed mounting diagram](image1)

**Fixed - free mounting**

![Fixed - free mounting diagram](image2)

<table>
<thead>
<tr>
<th>dmax</th>
<th>Displacement of the linear unit [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>Maximum deflection of the linear unit [mm]</td>
</tr>
<tr>
<td>F</td>
<td>Applied force [N]</td>
</tr>
<tr>
<td>Lp</td>
<td>Unsupported profile length [mm]</td>
</tr>
</tbody>
</table>

The maximum permissible deflection $d_{\text{max}}$ must not be exceeded. In the case that maximum deflection $d$ exceeds the maximum permissible deflection $d_{\text{max}}$ additional profile supports are needed.

---

**BR-S 65**

![Deflection graph BR-S 65](image3)

**BT-S 65**

![Deflection graph BT-S 65](image4)

Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

**LINEAR UNITS**

*Absolute stroke = Effective stroke + 2 x Safety stroke*

**Mass and mass moment of inertia**

<table>
<thead>
<tr>
<th>Linear Unit Mass of linear unit</th>
<th>Mass moment of inertia</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Deflection d [mm]**

<table>
<thead>
<tr>
<th>Unsupported profile length Lp [mm]</th>
<th>Unsupported profile length Lp [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Deflection of the linear unit**

*Maximum permissible deflection dmax [mm]*

- The maximum permissible deflection dmax must not be exceeded.
- In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.

**F**

- Applied force [N]

**Lp**

- Unsupported profile length [mm]

**d**

- Maximum deflection of the linear unit [mm]

**Absolute stroke**

- 5 mm deep

**A**

- Distance between carriages [mm]. More info on following pages.

**nc**

- Number of carriages

**Linear Unit doesn’t include any safety stroke.**

**Absolute stroke = Effective stroke + 2 x Safety stroke**

**Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.**

**All dimensions in mm; Drawings scales are not equal.**

**TYPE 0**

- Journal with or without Keyway.

**TYPE 1 L and 1 R**

- Journal with or without Keyway.

**TYPE 2**

- Journal with or without Keyway.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

**BR-S 65**

| A | A
|---|---
| 64 | 64
| 65 | 65
| 65 | 65
| 54.0 | 54.0
| 46 | 46
| 11 | 11
| 3.4 | 3.4
| 2.5 | 2.5
| 6 | 6
| 6.5 | 6.5

**BT-S 65**

| A | A
|---|---
| 64 | 64
| 65 | 65
| 65 | 65
| 54.0 | 54.0
| 46 | 46
| 11 | 11
| 3.4 | 3.4
| 2.5 | 2.5
| 6 | 6
| 6.5 | 6.5

**DIN 557 - M5**

**DIMENSIONS**

**OPTIONAL:**
- TAP / PIN holes available on request.
- TAP / PIN holes on bottom of the profile
- Drawing only for presentational use.

**Mounting the drive**

- by the MOTOR ADAPTER WITH COUPLING

**Defining of the linear unit length**

L = Effective stroke + 2 × Safety stroke + Lv + 40 mm

Ltotal = L + 185 mm

**Left side (L)**

**Right side (R)**

**Multiple carriages**

Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A).

L = Effective stroke + 2 × Safety stroke + Lv + A × (nc - 1) + 40 mm

Ltotal = L + 185 mm

For the case of A [mm] > Alim:

A > Lv + 30 mm

A = Alim + 5 × i, where i Î {1,2,3,...}.

**Defining of the linear unit length**

L = Effective stroke + 2 × Safety stroke + Lv + A × (nc - 1) + 40 mm

Ltotal = L + 185 mm

**nc** - Number of carriages

---

Alim [mm] 550 600

---

In order to improve the products in this catalog the specifications are subject to change without notice.
TECHNICAL DATA

General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
<th>Max. Repeatability</th>
<th>Max. length</th>
<th>Max. stroke</th>
<th>Min. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$C_1$ (N)</td>
<td>$C_y$ (N)</td>
<td>$C_z$ (N)</td>
<td>$M_x$ (Nm)</td>
<td>$M_y$ (Nm)</td>
<td>$M_z$ (Nm)</td>
<td>$F_{px}$ (N)</td>
<td>$F_{py}$ (N)</td>
</tr>
<tr>
<td>BR-S 80 S</td>
<td>S2</td>
<td>34200</td>
<td>/</td>
<td>/</td>
<td>370</td>
<td>17.1 x A</td>
<td>17.1 x A</td>
<td>8930</td>
<td>15060</td>
</tr>
<tr>
<td>BR-S 80 L</td>
<td>L2</td>
<td>68400</td>
<td>/</td>
<td>/</td>
<td>740</td>
<td>34.2 x A</td>
<td>34.2 x A</td>
<td>17860</td>
<td>30130</td>
</tr>
<tr>
<td>BT-S 80 L</td>
<td>L2</td>
<td>34200</td>
<td>18000</td>
<td>/</td>
<td>396</td>
<td>9.0 x A</td>
<td>17.1 x A</td>
<td>6800</td>
<td>3530</td>
</tr>
</tbody>
</table>

* A - Distance between carriages (mm). More info on following pages.

Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor ($fs = 5.0$)

Modulus of elasticity:

$E = 70000 N / mm^2$

General technical data for double carriage

Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>* Max. travel speed</th>
<th>Max. drive torque</th>
<th>** No load torque</th>
<th>Pulley drive ratio</th>
<th>Pulley diameter</th>
<th>Belt type</th>
<th>Belt width</th>
<th>Max. force transmitted by belt</th>
<th>Specific spring constant Case</th>
<th>* Max. acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><em>Ma</em> (Nm)</td>
<td>$Ma_{warp}$ (Nm)</td>
<td>$Ma_{without}$ (Nm)</td>
<td>(mm/rev)</td>
<td>(mm)</td>
<td>(m/s^2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BR-S 80 S</td>
<td>6</td>
<td>29.4</td>
<td>1.5 x nc</td>
<td>1.2 x nc</td>
<td>210</td>
<td>66.84</td>
<td>960000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BR-S 80 L</td>
<td>10</td>
<td></td>
<td>1.7 x nc</td>
<td>1.4 x nc</td>
<td>AT 5</td>
<td>50</td>
<td>880</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BT-S 80 L</td>
<td></td>
<td></td>
<td>1.8 x nc</td>
<td>1.1 x nc</td>
<td>AT 5</td>
<td>10</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The stated values are for strokes (and for distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.

nc - Number of carriages

In order to improve the products in this catalog the specifications are subject to change without notice.
**TECHNICAL DATA**

**Mass and mass moment of inertia**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit</th>
<th>Mass moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ kg ]</td>
<td>[ kg m² ]</td>
</tr>
<tr>
<td>BR-S 80 S</td>
<td>6.8 + 0.0085 x (Abs. stroke + (nc - 1) x A) + 1.72 x (nc - 1)</td>
<td>310.6 + 0.0391 x (Abs. stroke + (nc - 1) x A) + 192.1 x (nc - 1)</td>
</tr>
<tr>
<td>BR-S 80 L</td>
<td>8.4 + 0.0085 x (Abs. stroke + (nc - 1) x A) + 2.72 x (nc - 1)</td>
<td>423.3 + 0.0391 x (Abs. stroke + (nc - 1) x A) + 303.8 x (nc - 1)</td>
</tr>
<tr>
<td>BT-S 80 L</td>
<td>8.2 + 0.0075 x (Abs. stroke + (nc - 1) x A) + 2.73 x (nc - 1)</td>
<td>424.4 + 0.0391 x (Abs. stroke + (nc - 1) x A) + 304.9 x (nc - 1)</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]

A - Distance between carriages [mm]. More info on following pages.

nc - Number of carriages

---

**Deflection of the linear unit**

- **Fixed - fixed mounting**
- **Fixed - free mounting**

**BR-S 80**

**BT-S 80**

---

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

<table>
<thead>
<tr>
<th>BR-S/BT-S 80</th>
<th>LINEAR UNITS</th>
</tr>
</thead>
</table>

**BR-S 80**

- **A-A**

**BT-S 80**

- **A-A**

---

**Mounting the drive**

- by the MOTOR ADAPTER WITH COUPLING (Page 120)

---

**Defining of the linear unit length**

\[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + 42 \text{ mm} \]

\[ L_{\text{total}} = L + 215 \text{ mm} \]

- **Left side (L)**
- **Right side (R)**

---

**Multiple carriages**

- Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)

\[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + A \times (\text{nc} - 1) + 42 \text{ mm} \]

\[ L_{\text{total}} = L + 215 \text{ mm} \]

\[ A \geq \text{Lv} + 30 \text{ mm} \]

---

<table>
<thead>
<tr>
<th>BR-S 80 S</th>
<th>BR-S / BT-S 80 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>A [mm]</td>
<td>711.5</td>
</tr>
<tr>
<td>Alim [mm]</td>
<td>801.5</td>
</tr>
</tbody>
</table>

---

Optional:

- TAP / PIN holes available on request.

---

*Drawing only for presentational use.*

---

All dimensions in mm; Drawings scales are not equal.

---

Available on request.
TECHNICAL DATA

General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage length</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
<th>Max. Repeatability</th>
<th>Max. length</th>
<th>Max. stroke</th>
<th>Min. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-S 110 L</td>
<td>265</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>250</td>
<td>450</td>
<td>350</td>
<td>1283</td>
</tr>
<tr>
<td>BR-S 110 L</td>
<td>330</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>360</td>
<td>500</td>
<td>400</td>
<td>1592</td>
</tr>
</tbody>
</table>

Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0)

Modulus of elasticity:

\[ E = 70000 \text{ N/mm} \]

General technical data for double carriage

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
<th>Max. Repeatability</th>
<th>Max. length</th>
<th>Max. stroke</th>
<th>Min. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-S 110 L</td>
<td>265</td>
<td>/</td>
<td>/</td>
<td>250</td>
<td>450</td>
<td>350</td>
<td>1283</td>
<td>3075</td>
<td>735</td>
</tr>
<tr>
<td>BR-S 110 L</td>
<td>330</td>
<td>/</td>
<td>/</td>
<td>360</td>
<td>500</td>
<td>400</td>
<td>1592</td>
<td>3406</td>
<td>875</td>
</tr>
</tbody>
</table>

Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed</th>
<th>Max. drive torque</th>
<th>No load torque</th>
<th>Pulley drive ratio</th>
<th>Belt type</th>
<th>Belt width</th>
<th>Max. force transmitted by belt</th>
<th>Specific spring constant (Cspec)</th>
<th>Max. acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[m/s]</td>
<td>[Nm]</td>
<td>[Nm]</td>
<td>[mm/rev]</td>
<td>[mm]</td>
<td>[N]</td>
<td>[Nm]</td>
<td>[m/s²]</td>
<td></td>
</tr>
<tr>
<td>BR-S 110 L</td>
<td>10</td>
<td>68.5 with Keyway</td>
<td>2.2 x nc</td>
<td>300</td>
<td>95.49</td>
<td>AT 10</td>
<td>50</td>
<td>2145000</td>
<td>70</td>
</tr>
<tr>
<td>BR-S 110 S</td>
<td>6</td>
<td>82.6 without Keyway</td>
<td>2.7 x nc</td>
<td>300</td>
<td>95.49</td>
<td>AT 10</td>
<td>50</td>
<td>2145000</td>
<td>70</td>
</tr>
</tbody>
</table>

In order to improve the products in this catalog the specifications are subject to change without notice.
**BR-S/BT-S 110**

**LINEAR UNITS**

---

## TECHNICAL DATA

### Mass and mass moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit</th>
<th>Mass moment of inertia</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ kg ]</td>
<td>[ 10^-6 kg m² ]</td>
<td>ly [ cm^2 ]</td>
</tr>
<tr>
<td>BR-S 110 S</td>
<td>15.0 + 0.015 × (Abs. stroke + (nc - 1) × A) + 3.25 × (nc - 1)</td>
<td>1065.0 + 0.137 × (Abs. stroke + (nc - 1) × A) + 741.9 × (nc - 1)</td>
<td>513.0</td>
</tr>
<tr>
<td>BR-S 110 L</td>
<td>17.7 + 0.015 × (Abs. stroke + (nc - 1) × A) + 4.61 × (nc - 1)</td>
<td>1381.0 + 0.137 × (Abs. stroke + (nc - 1) × A) + 1050.9 × (nc - 1)</td>
<td>513.0</td>
</tr>
<tr>
<td>BT-S 110 L</td>
<td>16.3 + 0.0133 × (Abs. stroke + (nc - 1) × A) + 4.78 × (nc - 1)</td>
<td>1420.0 + 0.137 × (Abs. stroke + (nc - 1) × A) + 1089.6 × (nc - 1)</td>
<td>513.0</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]
A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages

---

### Deflection of the linear unit

**Fixed - fixed mounting**

**Fixed - free mounting**

\[ d = \frac{F L_p}{E I} \]

- \( d \) Maximum deflection of the linear unit [mm]
- \( d_{max} \) Maximum permissible deflection of the linear unit [mm]
- \( F \) Applied force [N]
- \( L_p \) Unsupported profile length [mm]

**BR-S 110**

**BT-S 110**

---

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

Linear Unit doesn’t include any safety stroke. Absolute stroke = Effective stroke + 2 x Safety stroke

All dimensions in mm; Drawings scales are not equal.

Journal with or without Keyway.

Short carriage only for BR-S series!

Absolute stroke = Effective stroke + 2 x Safety stroke

Journal with or without Keyway.

All dimensions in mm; Drawings scales are not equal.

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>BR-S/BT-S 110 LINEAR UNITS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Absolute stroke</th>
<th>Linear Unit Mass of linear unit</th>
<th>Mass moment of inertia</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>15.0 + 0.015 × (Abs. stroke + (nc - 1) × A) + 3.25 × (nc - 1)</td>
<td>1065.0 + 0.137 × (Abs. stroke + (nc - 1) × A) + 741.9 × (nc - 1)</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>1 L</td>
<td>17.7 + 0.015 × (Abs. stroke + (nc - 1) × A) + 4.61 × (nc - 1)</td>
<td>1381.0 + 0.137 × (Abs. stroke + (nc - 1) × A) + 1050.9 × (nc - 1)</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>1 R</td>
<td>1065.0 + 0.137 × (Abs. stroke + (nc - 1) × A) + 741.9 × (nc - 1)</td>
<td>1381.0 + 0.137 × (Abs. stroke + (nc - 1) × A) + 1050.9 × (nc - 1)</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Deflection of the linear unit**

- **dmax** Maximum permissible deflection of the linear unit [mm].
- The maximum permissible deflection dmax must not be exceeded. In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.
- **F** Applied force [N].
- **Lp** Unsupported profile length [mm].
- **d** Maximum deflection of the linear unit [mm].
In order to improve the products in this catalog the specifications are subject to change without notice.

### BR-S/BT-S 110

**DIMENSIONS**

**BR-S 110**

**BT-S 110**

**ABSOLUTE STROKE**

- **DIMENSIONS**
  - **OPTIONAL:**
    - CENTER RING holes available on request.
  - CENTER RING holes on bottom of the profile
  - Drawing only for presentational use.

- **Drawing only for presentational use.**

- **Defining of the linear unit length**

  \[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + 12 \ mm \]

  \[ \text{Ltotal} = L + 275 \ mm \]

- **Left side (L)**

- **Right side (R)**

- **Mounting the drive**

  - by the MOTOR ADAPTER WITH COUPLING

  - Available on request.

- **Carriages connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)**

  \[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + A \times (\text{nc} - 1) + 12 \ mm \]

  \[ \text{Ltotal} = L + 275 \ mm \]

- **Multiple carriages**

  - Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)

  \[ A \geq \text{Lv} \]

- **For the case of A [mm] > Alim:**

  - A toothed belt for the connection of the carriages will be used,
  - the following condition must be met:
    \[ A [\text{mm}] = \text{Alim} + 10 \times i, \text{ where } i \in \{1,2,3,\ldots\}. \]

- **BR-S 110 S**

  - **BR-S / BT-S 110 L**

<table>
<thead>
<tr>
<th>Alim [mm]</th>
<th>BR-S 110 S</th>
<th>BR-S / BT-S 110 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>716</td>
<td>806</td>
<td></td>
</tr>
</tbody>
</table>
The SR-S series describes Linear Units with precision ball screw drive, integrated guide rail and compact dimensions. They provide high performances features, such as high speeds, good accuracy and repeatability. They can easily be combined to multi-axis systems. Excellent price-performance ratio and quick delivery time are ensured.

The compact, precision-extruded aluminum Profile from 6063 AL with integrated Zero-backlash Ball rail guide system, allows high load capacities and optimal cycles for the movement of larger masses at high speed.

In the Linear Units SR-S a precision ball screw, with tolerance class ISO7 (ISO5 on request), with reduced backlash of the ball nut is used.

A corrosion-resistant protection strip, protects all the parts in the profile from dust and other contaminants. The aluminum profile includes T-slots for fixing the Linear Unit and for attaching sensors and switches. Also, a Reed switch can be used here. The carriage, with central lubrication port, allows easy central re-lubrication of ball screw and Ball rail guide and provides the possibility to attach additional accessories on the side. For the Linear Units SR-S various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.

To achieve higher speeds at the same stroke of the linear unit, the ball screw support system can be integrated. With this feature vibrations and deflections of the ball screw are reduced, therefore longer strokes are possible. The linear unit with integrated support system can have a higher axial load capacity.

Ball screw supports are made out of high quality plastic materials with high wear resistance properties. Our system enables ball screw support in horizontal or vertical positioning of the linear unit.

A 2LR version of SR-S linear unit is available, where two carriages are moving simultaneously in opposite directions. Both right and left handed precision ball screws are used, which are rigidly connected. The ball screw support system can also be integrated.
In order to improve the products in this catalog the specifications are subject to change without notice.

**STRUCTURAL DESIGN**

**Standard version**

1 - Drive block with floating bearing (SR-S 110 - fixed bearing)
2 - Corrosion-resistant protection strip
3 - Ball screw tolerance ISO7 (ISO5 available on request)
4 - Carriage; with built in Magnets
5 - Aluminium profile-Hard anodized
6 - Integrated Linear Ball Guideway
7 - Central lubrication port; both sides
8 - End block with fixed bearing (SR-S 110 - floating bearing)
9 - Screw support - SA

**2LR version**

1 - Carriage; with build in right hand ball nut
2 - Right hand ball screw
3 - Carriage; with build in left hand ball nut
4 - Left hand ball screw
5 - Central screw support - fixed
6 - Screw support - SA
HOW TO ORDER

Series Prefix: SR
Size: 40: 0040
65: 0065
80: 0080
110: 0110
Series Suffix: S
Absolute stroke [mm]:
(Absolute stroke = Effective stroke + 2 x Safety stroke)
Ball Screw Dia./Pitch:
SR0040 (Ø12): 05, 10
SR0065 (Ø16): 05, 10, 16
SR0080 (Ø20): 05, 10, 20, 50
SR0110 (Ø32): 05, 10, 20, 32
Ball Screw Tolerance:
7: ISO7
5: ISO5
Ball Screw Journal:
0: Without Keyway
1: With Keyway
Number of Screw Supports \(n_{SA}\):
X: Without
W: With
(only even #'s - 2, 4, 6, 8, 10 \(n_{SA}\)) - for SR0065, a max. of 4SA is available.
Version:
A: Both right and left screws are used, single carriage
B: Standard version, single carriage
   Available for SR0065: 16x5, 16x10
   SR0080: 20x5
C: Both right and left screws are used, multi-carriage
D: Standard version, multi-carriage
   Available for SR0065: 16x5, 16x10
   SR0080: 20x5
S: Special Version

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety.

We recommend a minimum safety factor (fs = 5.0)

Modulus of elasticity

E = 70000 N / mm²

General technical data for double carriage

Linear Unit Carriage version Dynamic load capacity C [ N ] Dynamic moment Forces Max. permissible loads

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity C [ N ]</th>
<th>Dynamic moment</th>
<th>Forces</th>
<th>Max. permissible loads</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 40</td>
<td>S2</td>
<td>19800</td>
<td>158</td>
<td>9.9 x A</td>
<td>Max. length</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>39600</td>
<td>317</td>
<td>19.8 x A</td>
<td>Moment</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valid for multiple carriages (equation of defining the linear unit length for particular size of the linear unit needs to be used).

* For minimum stroke below the stated value in the table above please contact us.

Drive and belt data

Linear Unit Max. travel speed [ m / s ] Max. drive torque [ Nm ] No load torque [ Nm ] Pulley drive ratio [ m / rev ] Pulley diameter [ mm ] Belt type Belt width [ mm ] Max. force transmitted by belt [ N ] Specific spring constant Cspec [ N / mm ] Max. acceleration [ m/s² ]

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed</th>
<th>Max. drive torque</th>
<th>No load torque</th>
<th>Pulley drive ratio</th>
<th>Pulley diameter</th>
<th>Belt type</th>
<th>Belt width</th>
<th>Max. force transmitted by belt</th>
<th>Specific spring constant Cspec</th>
<th>Max. acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 40 S</td>
<td>3</td>
<td>7.5</td>
<td>1.0 x nc</td>
<td>180</td>
<td>57.31</td>
<td>AT5</td>
<td>12</td>
<td>262</td>
<td>235000</td>
<td>70</td>
</tr>
<tr>
<td>SR-S 40 L</td>
<td><strong>5</strong></td>
<td><strong>7.5</strong></td>
<td><strong>1.1 x nc</strong></td>
<td><strong>180</strong></td>
<td><strong>57.31</strong></td>
<td><strong>AT5</strong></td>
<td><strong>12</strong></td>
<td><strong>262</strong></td>
<td><strong>235000</strong></td>
<td><strong>70</strong></td>
</tr>
</tbody>
</table>

* The stated values are for strokes (and for distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.
nc - Number of carriages

**For travel speed and acceleration over the stated value in the table above please contact us.
**TECHNICAL DATA**

**Drive and belt data**

**General technical data for double carriage**

- For minimum stroke below the stated value in the table above please contact us.
- For lengths / stroke over the stated value in the table above please contact us.
- Values for max. stroke are not valid for multiple carriages (equation of defining the linear unit length for particular size of the carriage).
- A - Distance between carriages [mm]. More info on following pages.

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Ball screw [ d x l ]</th>
<th>Number of carriages nSA</th>
<th>* Mass of linear unit [ kg ]</th>
<th>** Moved mass [ kg ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 40</td>
<td>12 x 5</td>
<td>0</td>
<td>1.2 + 0.0028 x (Abs. stroke + (nc - 1) x A) + 0.47 x (nc - 1)</td>
<td>0.47 + 0.47 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>1.3 + 0.0028 x (Abs. stroke + (nc - 1) x A) + 0.47 x (nc - 1)</td>
<td>0.50 + 0.47 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>1.4 + 0.0028 x (Abs. stroke + (nc - 1) x A) + 0.47 x (nc - 1)</td>
<td>0.53 + 0.47 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td>12 x 10</td>
<td>0</td>
<td>1.2 + 0.0028 x (Abs. stroke + (nc - 1) x A) + 0.47 x (nc - 1)</td>
<td>0.47 + 0.47 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>1.3 + 0.0028 x (Abs. stroke + (nc - 1) x A) + 0.47 x (nc - 1)</td>
<td>0.50 + 0.47 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>1.4 + 0.0028 x (Abs. stroke + (nc - 1) x A) + 0.47 x (nc - 1)</td>
<td>0.53 + 0.47 x (nc - 1)</td>
</tr>
</tbody>
</table>

---

**Deflection of the linear unit**

- **Fixed - fixed mounting**
- **Fixed - free mounting**

The maximum permissible deflection dmax must not be exceeded. In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.

---

**SR-S 40**
In order to improve the products in this catalog the specifications are subject to change without notice.

LINER UNITS

Absolute stroke = Effective stroke + 2 x Safety stroke.

Journal without keyway.

All dimensions in mm; Drawings scales are not equal.

Defining of the linear unit length

\[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + 2 \times LSA + A \times (\text{nc} - 1) + 10 \text{ mm} \]

\[ L_{\text{total}} = L + 45 \text{ mm}, \quad \text{Lv} = 150 \text{ mm} \]

Multiple carriages

Connection between the carriages must be provided by the customer

nc - Number of carriages

<table>
<thead>
<tr>
<th>( n_{SA} )</th>
<th>( L_{SA} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6.0</td>
</tr>
<tr>
<td>2SA</td>
<td>23.0</td>
</tr>
<tr>
<td>4SA</td>
<td>40.0</td>
</tr>
</tbody>
</table>

Additional length [mm]

Lubrication nipple DIN 3405D

M2.5x0.45 - 6H
5 mm Deep (4x)

M4x0.7 - 6H
7 mm Deep (8x)

Ø7 H7
1.6 mm Deep (6x)
For centering ring CR7

Connection between the carriages must be provided by the customer

nc - Number of carriages
In order to improve the products in this catalog the specifications are subject to change without notice.

SR-S 40
LINEAR UNITS

DIMENSIONS

Mounting the drive
- by the MOTOR SIDE DRIVE - MSD
- by the MOTOR ADAPTER WITH COUPLING

Available on request.

Maximum travel speed as a function of the profile length (V_max - L curves)
In order to improve the products in this catalog the specifications are subject to change without notice.

**General technical data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage length</th>
<th>Dynamic Load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 65</td>
<td>220</td>
<td>19800</td>
<td>158</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td>SR-S 65 2LR</td>
<td>220</td>
<td>19800</td>
<td>158</td>
<td>700</td>
<td>700</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us.

Values for max. stroke are not valid for multiple carriages and screw support SA (equation of defining the linear unit length for particular size of the linear unit needs to be used).

** Recommended values of loads:**

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0)

**Modulus of elasticity**

\[ E = 70000 \text{ N/mm} \]

**General technical data for double carriage**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Number of carriages</th>
<th>Dynamic Load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 65 / SR-S 65 2LR</td>
<td>2</td>
<td>39600</td>
<td>316</td>
<td>19.8 x A</td>
<td>19.8 x A</td>
</tr>
</tbody>
</table>

* A - Distance between carriages [mm]. More info on following pages.

Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.

**Ball Screw Drive data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Ball screw</th>
<th>D x I</th>
<th>Max. rotational</th>
<th>Max. load constant</th>
<th>Max. Repeatability precision</th>
<th>Dynamic load capacity</th>
<th>Max. axial load</th>
<th>Max. drive torque</th>
<th>Min. stroke</th>
<th>Max. acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>d x I</td>
<td>[ mm ]</td>
<td>(Without SA)</td>
<td>[ mm/s ]</td>
<td>[ mm ]</td>
<td>STANDARD</td>
<td>ISO5</td>
<td>BS</td>
<td>Fx [N]</td>
<td>Mx [Nm]</td>
</tr>
<tr>
<td>SR-S 65</td>
<td>16 x 5</td>
<td>4200</td>
<td>0.35</td>
<td>5</td>
<td>+ 0.02</td>
<td>0.01</td>
<td>13150</td>
<td>8700</td>
<td>5.5 with Keyway</td>
<td>7.7</td>
</tr>
<tr>
<td>SR-S 65 2LR</td>
<td>16 x 10</td>
<td></td>
<td>0.70</td>
<td>10</td>
<td>+ 0.02</td>
<td>0.01</td>
<td>11550</td>
<td>6730</td>
<td>5.5 with Keyway</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>16 x 16</td>
<td></td>
<td>1.12</td>
<td>16</td>
<td>+ 0.02</td>
<td>0.01</td>
<td>8170</td>
<td>4200</td>
<td>5.5 with Keyway</td>
<td></td>
</tr>
</tbody>
</table>

1. Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit.
2. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.
3. With SA or 2LR version the max. rotation speed is limited to 3000 rev / min.
4. For minimum stroke below the stated value in the table above please contact us.
5. In the case of 2RL version the axial load is total axial load of both carriages.
### General technical data for double carriage

- **E = 70000 N / mm**
- **Modulus of elasticity**

The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0) without considering any safety factor. The safety factor depends on the application and its requested safety.

**SR-S 65 / SR-S 65 2LR**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Ball screw [ d × l ]</th>
<th>Number of SA nSA</th>
<th>Mass of linear unit [ kg ]</th>
<th>Moved mass [ kg ]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>16 x 5</strong></td>
<td>0</td>
<td>4.0 + 0.0073 × (Abs. stroke + (nc - 1) × A) + 1.5 × (nc - 1)</td>
<td>1.90 + 1.50 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4.5 + 0.0073 × (Abs. stroke + (nc - 1) × A) + 1.5 × (nc - 1)</td>
<td>1.58 + 1.50 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5.0 + 0.0073 × (Abs. stroke + (nc - 1) × A) + 1.5 × (nc - 1)</td>
<td>1.66 + 1.50 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td><strong>16 x 5 2LR version</strong></td>
<td>0</td>
<td>7.2 + 0.0146 × (Abs. stroke + (nc - 1) × A) + 3.0 × (nc - 1)</td>
<td>3.00 + 3.00 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8.2 + 0.0146 × (Abs. stroke + (nc - 1) × A) + 3.0 × (nc - 1)</td>
<td>3.16 + 3.00 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>9.2 + 0.0146 × (Abs. stroke + (nc - 1) × A) + 3.0 × (nc - 1)</td>
<td>3.32 + 3.00 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td><strong>16 x 10</strong></td>
<td>0</td>
<td>4.0 + 0.0073 × (Abs. stroke + (nc - 1) × A) + 1.5 × (nc - 1)</td>
<td>1.50 + 1.50 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4.5 + 0.0073 × (Abs. stroke + (nc - 1) × A) + 1.5 × (nc - 1)</td>
<td>1.58 + 1.50 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5.0 + 0.0073 × (Abs. stroke + (nc - 1) × A) + 1.5 × (nc - 1)</td>
<td>1.66 + 1.50 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td><strong>16 x 10 2LR version</strong></td>
<td>0</td>
<td>7.2 + 0.0146 × (Abs. stroke + (nc - 1) × A) + 3.0 × (nc - 1)</td>
<td>3.00 + 3.00 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8.2 + 0.0146 × (Abs. stroke + (nc - 1) × A) + 3.0 × (nc - 1)</td>
<td>3.16 + 3.00 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>9.2 + 0.0146 × (Abs. stroke + (nc - 1) × A) + 3.0 × (nc - 1)</td>
<td>3.32 + 3.00 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td><strong>16 x 16</strong></td>
<td>0</td>
<td>4.0 + 0.0073 × (Abs. stroke + (nc - 1) × A) + 1.5 × (nc - 1)</td>
<td>1.50 + 1.50 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4.5 + 0.0073 × (Abs. stroke + (nc - 1) × A) + 1.5 × (nc - 1)</td>
<td>1.58 + 1.50 × (nc - 1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5.0 + 0.0073 × (Abs. stroke + (nc - 1) × A) + 1.5 × (nc - 1)</td>
<td>1.66 + 1.50 × (nc - 1)</td>
<td></td>
</tr>
</tbody>
</table>

**SR-S 65**

1. Max. travel speed depends on the length of the linear unit, see diagram for particular size of the linear unit.
2. SR-S 65 2920
3. With SA or 2LR version the max. rotation speed is limited to 3000 rev / min.

**Ball screw Dynamic load**

- **Load capacity**
- **Fpy, C**
- **Mpx, Mpz**
- **Mx, Mpy**
- **Mz, Mpz**

**Forces Moments**

- **Fpy, C**
- **Fpz, C**
- **Mx, Mpy**
- **Mx, Mpx**

**Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.**

* Absolute stroke [mm]

### Planar moment of inertia

**Linear Unit**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Planar moment of inertia [ 10⁻³ kg m² ]</th>
<th>Planar moment of inertia [ cm² ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 65</td>
<td>71.3</td>
<td>89.4</td>
</tr>
<tr>
<td>SR-S 65 2LR</td>
<td><strong>71.3</strong></td>
<td><strong>89.4</strong></td>
</tr>
</tbody>
</table>

* The stated values are for strokes (and for distances between the carriages A) up to 500mm.

**Mass, moved mass, mass moment of inertia and no load torque**

Note: No Load Torque value increases with stroke (and with A) elongation.

- Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.

The specified range, please contact us.

For operating temperature out of the limits presented range, please contact us.

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**Deflection of the linear unit**

Fixed - fixed mounting

Fixed - free mounting

![Diagram](image)

- **d**: Maximum deflection of the linear unit [mm]
- **dmax**: Maximum permissible deflection of the linear unit [mm]
- **F**: Applied force [N]
- **Lp**: Unsupported profile length [mm]

The maximum permissible deflection dmax must not be exceeded. In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.

**SR-S 65**

Maximum travel speed as a function of the profile length (Vmax - L curves)

![Graph](image)
In order to improve the products in this catalog the specifications are subject to change without notice.

## TECHNICAL DATA

### Deflection of the 2LR version

![Deflection diagram]

- **d**: Maximum deflection of the linear unit [mm]
- **dmax**: Maximum permissible deflection of the linear unit [mm]
- **F**: Applied force [N]
- **Lp**: Unsupported profile length [mm]

The maximum permissible deflection dmax must not be exceeded. In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.

### SR-S 65 2LR

<table>
<thead>
<tr>
<th>F</th>
<th>Applied force [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>125</td>
</tr>
<tr>
<td>250</td>
<td>500</td>
</tr>
<tr>
<td>750</td>
<td>1200</td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lp</th>
<th>Unsupported profile length [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>1500</td>
<td>2000</td>
</tr>
<tr>
<td>2500</td>
<td>3000</td>
</tr>
<tr>
<td>4000</td>
<td>5000</td>
</tr>
</tbody>
</table>

### Maximum travel speed as a function of the profile length (Vmax - L curves)

- **Vmax**: Maximum travel speed [m/s]
- **L**: Profile length [mm]

*Max. length Lmax* of SR-S 65 2LR linear unit with 16x10 ball screw.
DIMENSIONS

Absolute stroke = Effective stroke + 2 x Safety stroke stroke.

Journal with or without keyway.

All dimensions in mm;
Drawings scales are not equal.

2LR version
Mounting the drive

- by the MOTOR SIDE DRIVE - MSD (Page 112)
- by the MOTOR ADAPTER WITH COUPLING (Page 120)

Available on request.

Defining of the linear unit length

Standard version

L = Effective stroke + 2 × Safety stroke + Lv + 2 × LSA + A × (nc - 1)
Ltotal = L + 48 mm, Lv = 220 mm

Version 2LR

L = 2 × (Effective stroke + 2 × Safety stroke) + 2 × Lv + 2 × LSA + L2LR + A × (nc - 1)
Ltotal = L + 48 mm, Lv = 220 mm

Multiple carriages

A ≥ Lv: Connection between the carriages must be provided by the customer
nc - Number of carriages
### TECHNICAL DATA

#### General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage length</th>
<th>Dynamic Load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Operating conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>My [ Nm ]</td>
<td>Mx [ Nm ]</td>
<td>Mz [ Nm ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mx [ Nm ]</td>
<td>Mpy [ Nm ]</td>
<td>Mpz [ Nm ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mpy [ Nm ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mpz [ Nm ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR-S 80</td>
<td>290</td>
<td>34200</td>
<td>370</td>
<td>1470</td>
<td>1470</td>
</tr>
<tr>
<td>SR-S 80 2LR</td>
<td>290</td>
<td>34200</td>
<td>370</td>
<td>1470</td>
<td>1470</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us.

Values for max. stroke are not valid for multiple carriages and screw support SA (equation of defining the linear unit length for particular size of the linear unit needs to be used).

#### Recommended values of loads:

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0)

**Modulus of elasticity**

E = 70000 N / mm²

#### Operating conditions

- **Operating temp.** 0°C ~ +60°C
- **Duty cycle** 100%

For operating temperature out of the presented range, please contact us.

#### General technical data for double carriage

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Number of carriages</th>
<th>Dynamic Load capacity</th>
<th>Dynamic moment</th>
<th>*</th>
<th>Max. permissible loads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>C [ N ]</td>
<td>Mx [ Nm ]</td>
<td>My [ Nm ]</td>
<td>Mz [ Nm ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>My [ Nm ]</td>
<td>Mx [ Nm ]</td>
<td>Mz [ Nm ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mx [ Nm ]</td>
<td>Mpy [ Nm ]</td>
<td>Mpz [ Nm ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mpy [ Nm ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mpz [ Nm ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR-S 80 / SR-S 80 2LR</td>
<td>2</td>
<td>68400</td>
<td>740</td>
<td>34.2 × A</td>
<td>34.2 × A</td>
</tr>
</tbody>
</table>

* A - Distance between carriages [mm]. More info on following pages.

Presented values are for informational purposes only. Exact values can be calculated using our sizing selection tool on Unimotion web site.

#### Ball Screw Drive data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Ball screw (d × l)</th>
<th>1 Max. rotational (Without SA)</th>
<th>2 Max.</th>
<th>3 Max.</th>
<th>4 Max.</th>
<th>5 Max.</th>
<th>6 Max.</th>
<th>7 Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(rev / min)</td>
<td>Lead constant</td>
<td>Repeatability precision</td>
<td>BS</td>
<td>axial load</td>
<td>drive</td>
<td>acceleration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(mm / rev)</td>
<td>(mm)</td>
<td>[ mm ]</td>
<td>[ N ]</td>
<td>[ Nm ]</td>
<td>[ m/s² ]</td>
</tr>
<tr>
<td>SR-S 80</td>
<td>20 × 5</td>
<td>3300</td>
<td>0.28</td>
<td>5</td>
<td>+ 0.02</td>
<td>+ 0.01</td>
<td>14800</td>
<td>14800</td>
</tr>
<tr>
<td>SR-S 80 2LR</td>
<td>20</td>
<td></td>
<td>0.55</td>
<td>10</td>
<td>+ 0.02</td>
<td>+ 0.01</td>
<td>15900</td>
<td>13950</td>
</tr>
<tr>
<td></td>
<td>20 × 10</td>
<td></td>
<td>1.10</td>
<td>20</td>
<td>+ 0.02</td>
<td>+ 0.01</td>
<td>16250</td>
<td>6930</td>
</tr>
<tr>
<td></td>
<td>20 × 20</td>
<td></td>
<td>3000</td>
<td>50</td>
<td>+ 0.02</td>
<td>+ 0.01</td>
<td>13000</td>
<td>2770</td>
</tr>
<tr>
<td></td>
<td>20 × 50</td>
<td></td>
<td>2.50</td>
<td>50</td>
<td>+ 0.02</td>
<td>+ 0.01</td>
<td>16250</td>
<td>6930</td>
</tr>
</tbody>
</table>

1 Max. travel speed depends on the length of the linear unit, see diagram for particular size of the linear unit.

2 For travel speed and acceleration over the stated value in the table above or diagrams please contact us.

3 For the ball nut with the preload of 2%, please contact us.

4 With SA or 2LR version the max. rotation speed is limited to 3000 rev / min.

5 For minimum stroke below the stated value in the table above please contact us.

6 In the case of 2RL version the axial load is total axial load of both carriages.
TECHNICAL DATA

Mass, moved mass, mass moment of inertia and no load torque

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Ball screw [ d x l ]</th>
<th>Number of SA ( n_{SA} )</th>
<th>Mass of linear unit ([ \text{kg} ])</th>
<th>Moved mass ([ \text{kg} ])</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 80 2LR</td>
<td>20 x 5</td>
<td>0</td>
<td>8.2 ( + 0.0114 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.00 ( + 3.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>8.9 ( + 0.0144 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.07 ( + 3.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td>4 / 6 / 8 / 10</td>
<td>9.7 ( + 0.4^* (n_{SA} - 4) + 0.0114 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.21 ( + 0.035^* (n_{SA} - 4) + 3.00 \times (\text{nc} - 1) )</td>
<td></td>
</tr>
<tr>
<td>SR-S 80</td>
<td>20 x 5</td>
<td>0</td>
<td>14.6 ( + 0.0228 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 6.0 \times (\text{nc} - 1) )</td>
<td>6.00 ( + 6.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>15.9 ( + 0.0228 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 6.0 \times (\text{nc} - 1) )</td>
<td>6.14 ( + 6.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td>4 / 6 / 8 / 10</td>
<td>17.5 ( + 0.8^* (n_{SA} - 4) + 0.0228 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 6.0 \times (\text{nc} - 1) )</td>
<td>6.42 ( + 0.07^* (n_{SA} - 4) + 6.00 \times (\text{nc} - 1) )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 x 10</td>
<td>0</td>
<td>8.2 ( + 0.0114 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.00 ( + 3.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>8.9 ( + 0.0144 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.07 ( + 3.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td>4 / 6 / 8 / 10</td>
<td>9.7 ( + 0.4^* (n_{SA} - 4) + 0.0114 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.21 ( + 0.035^* (n_{SA} - 4) + 3.00 \times (\text{nc} - 1) )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 x 20</td>
<td>0</td>
<td>8.2 ( + 0.0114 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.00 ( + 3.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>8.9 ( + 0.0144 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.07 ( + 3.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td>4 / 6 / 8 / 10</td>
<td>9.7 ( + 0.4^* (n_{SA} - 4) + 0.0114 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.21 ( + 0.035^* (n_{SA} - 4) + 3.00 \times (\text{nc} - 1) )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 x 50</td>
<td>0</td>
<td>8.2 ( + 0.0114 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.00 ( + 3.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>8.9 ( + 0.0144 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.07 ( + 3.00 \times (\text{nc} - 1) )</td>
</tr>
<tr>
<td></td>
<td>4 / 6 / 8 / 10</td>
<td>9.7 ( + 0.4^* (n_{SA} - 4) + 0.0114 \times (\text{Abs. stroke} + (\text{nc} - 1) \times A) + 3.0 \times (\text{nc} - 1) )</td>
<td>3.21 ( + 0.035^* (n_{SA} - 4) + 3.00 \times (\text{nc} - 1) )</td>
<td></td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]  
A - Distance between carriages [mm]. More info on following pages.  
nc - Number of carriages  
** The stated values are for strokes (and for distances between the carriages A) up to 500mm  
No Load Torque value increases with stroke (and with A) elongation.

Planar moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Planar moment of inertia ( I_x ) ([ \text{cm}^4 ])</th>
<th>Planar moment of inertia ( I_y ) ([ \text{cm}^4 ])</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 80</td>
<td>144.1</td>
<td>192.3</td>
</tr>
<tr>
<td>SR-S 80 2LR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In order to improve the products in this catalog the specifications are subject to change without notice.
**TECHNICAL DATA**

Deflection of the linear unit

```
Fixed - fixed mounting

F \rightarrow \text{Applied force [N]}
\text{d} \rightarrow \text{Maximum deflection of the linear unit [mm]}
\text{d}_{\text{max}} \rightarrow \text{Maximum permissible deflection of the linear unit [mm]}
\text{L_p} \rightarrow \text{Unsupported profile length [mm]}
```

The maximum permissible deflection $d_{\text{max}}$ must not be exceeded. In the case that maximum deflection $d$ exceeds the maximum permissible deflection $d_{\text{max}}$ additional profile supports are needed.

---

**SR-S 80**

Maximum travel speed as a function of the profile length ($V_{\text{max}}$ - $L$ curves)

```
\text{V_{\text{max}} [m/s]} \rightarrow \text{Maximum travel speed [m/s]}
L \rightarrow \text{Profile length [mm]}
```

* Max. length $L_{\text{max}}$ of SR-S 80 linear unit with 20x10 ball screw.
In order to improve the products in this catalog the specifications are subject to change without notice.

TECHNICAL DATA

Deflection of the 2LR version

The maximum permissible deflection \( d_{\text{max}} \) must not be exceeded. In the case that maximum deflection \( d \) exceeds the maximum permissible deflection \( d_{\text{max}} \), additional profile supports are needed.

<table>
<thead>
<tr>
<th>F</th>
<th>Applied force [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lp</td>
<td>Unsupported profile length [mm]</td>
</tr>
<tr>
<td>d</td>
<td>Maximum deflection of the linear unit [mm]</td>
</tr>
<tr>
<td>d_{\text{max}}</td>
<td>Maximum permissible deflection of the linear unit [mm]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L [mm]</th>
<th>0 1000 2000 3000 4000 5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.00 0.05 0.10 0.15 0.20 0.25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>( 20 \times L )</th>
<th>0.00 0.05 0.10 0.15 0.20 0.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>( L ) [mm]</td>
<td>2000 4000 6000 8000 10000</td>
</tr>
</tbody>
</table>

**SR-S 80 2LR**

Maximum travel speed as a function of the profile length (\( V_{\text{max}} - L \) curves)
In order to improve the products in this catalog the specifications are subject to change without notice.

Linear Unit doesn't include any safety

Absolute stroke = Effective stroke + 2 x Safety stroke stroke.

Journal with or without keyway.

All dimensions in mm;
Drawings scales are not equal.

2LR Version
In order to improve the products in this catalog the specifications are subject to change without notice.

**Mounting the drive**
- by the MOTOR SIDE DRIVE - MSD (Page 112)
- by the MOTOR ADAPTER WITH COUPLING (Page 120)

Available on request.

**Defining of the linear unit length**

**Standard version**

\[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + 2 \times LSA + A \times (n_c - 1) + 15 \text{ mm} \]

\[ L_{\text{total}} = L + 81 \text{ mm}, \quad L_v = 290 \text{ mm} \]

**Left side (L)**

**Right side (R)**

**Multiple carriages**

\[ A \geq L_v \quad \text{Connection between the carriages must be provided by the customer} \]

\[ n_c - \text{Number of carriages} \]

**2LR version**

\[ L = 2 \times (\text{Effective stroke} + 2 \times \text{Safety stroke}) + 2 \times L_v + 2 \times LSA + L_{2LR} + A \times (n_c - 1) + 15 \text{ mm} \]

\[ L_{\text{total}} = L + 81 \text{ mm}, \quad L_v = 290 \text{ mm} \]

**Left side (L)**

**Right side (R)**

**Multiple carriages**

\[ A \geq L_v \quad \text{Connection between the carriages must be provided by the customer} \]

\[ n_c - \text{Number of carriages} \]

All dimensions in mm. Drawings scales are not equal.
In order to improve the products in this catalog the specifications are subject to change without notice.

**General technical data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage length</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 110</td>
<td>330</td>
<td>49600</td>
<td>630</td>
<td>2650</td>
<td>2650</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us. Values for max. stroke are not valid for multiple carriages and screw support SA (equation of defining the linear unit length for particular size of the linear unit needs to be used).

Recommended values of loads:

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0) Modulus of elasticity

\[ E = 70000 \text{ N} / \text{mm}^2 \]

**Linear Unit Dynamic moment**

\[ Mx \ [ \text{Nm} ] \quad My \ [ \text{Nm} ] \quad Mz \ [ \text{Nm} ] \]

\[ Mpx \ [ \text{Nm} ] \quad Mpy \ [ \text{Nm} ] \quad Mpz \ [ \text{Nm} ] \]

\[ Fpy \ [ \text{N} ] \quad Fpz \ [ \text{N} ] \]

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Number of carriages</th>
<th>Dynamic Load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 110</td>
<td>2</td>
<td>99200</td>
<td>1260</td>
<td>49.6 \times A</td>
<td>49.6 \times A</td>
</tr>
</tbody>
</table>

* A = Distance between carriages [mm]. More info on following pages.

**Ball Screw Drive data**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 110</td>
<td>32 \times 5</td>
<td>2150</td>
<td>0.18</td>
<td>5 + 0.02 + 0.01</td>
<td>18850</td>
<td>18850</td>
<td>16.7 with Keyway 16.7 without Keyway 27.3 with Keyway 52.3 without Keyway</td>
<td>65</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>32 \times 10</td>
<td>3000</td>
<td>0.60</td>
<td>10 + 0.02 + 0.01</td>
<td>37000</td>
<td>29600</td>
<td>27.3 with Keyway 52.3 without Keyway</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>32 \times 20</td>
<td>1.00</td>
<td>20</td>
<td>+ 0.02 + 0.01</td>
<td>22950</td>
<td>14800</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>32 \times 32</td>
<td>1.60</td>
<td>32</td>
<td>+ 0.02 + 0.01</td>
<td>15500</td>
<td>9240</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Max. travel speed depends on the length of the linear unit, see diagram for particular size of the linear unit.
2. For the ball nut with the preload of 2%, please contact us.
3. With SA the max. rotation speed is limited to 3000 rev / min.
4. For minimum stroke below the stated value in the table above please contact us.

**Planar moment of inertia**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Planar moment of inertia [ l \times l ]</th>
<th>Planar moment of inertia [ l \times l ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 110</td>
<td>562.0</td>
<td>669.0</td>
</tr>
</tbody>
</table>

For operating temperature out of the presented range, please contact us.

For minimum stroke below the stated value in the table above please contact us.
### TECHNICAL DATA

#### Mass, moved mass, mass moment of inertia and no load torque

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Ball screw [d x l]</th>
<th>Number of SA nSA</th>
<th>Mass of linear unit [kg] *</th>
<th>Moved mass [kg] *</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 110</td>
<td>20 x 5</td>
<td>0</td>
<td>8.2 + 0.0114 x (Abs. stroke + (nc - 1) x A) + 3.0 x (nc - 1)</td>
<td>3.00 + 3.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>8.9 + 0.0144 x (Abs. stroke + (nc - 1) x A) + 3.0 x (nc - 1)</td>
<td>3.07 + 3.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td>4 / 6 / 8 / 10</td>
<td></td>
<td>9.7 + 0.4* (nSA - 4) + 0.0114 x (Abs. stroke + (nc - 1) x A) + 3.0 x (nc - 1)</td>
<td>3.21 + 0.035* (nSA - 4) + 3.00 x (nc - 1)</td>
</tr>
<tr>
<td>SR-S 110</td>
<td>20 x 5 2LR version</td>
<td>0</td>
<td>14.6 + 0.0228 x (Abs. stroke + (nc - 1) x A) + 6.0 x (nc - 1)</td>
<td>6.00 + 6.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>15.9 + 0.0228 x (Abs. stroke + (nc - 1) x A) + 6.0 x (nc - 1)</td>
<td>6.14 + 6.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td>4 / 6 / 8 / 10</td>
<td></td>
<td>17.6 + 0.8* (nSA - 4) + 0.0228 x (Abs. stroke + (nc - 1) x A) + 6.0 x (nc - 1)</td>
<td>6.42 + 0.07* (nSA - 4) + 6.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td>20 x 10</td>
<td>0</td>
<td>8.2 + 0.0114 x (Abs. stroke + (nc - 1) x A) + 3.0 x (nc - 1)</td>
<td>3.00 + 3.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>8.9 + 0.0144 x (Abs. stroke + (nc - 1) x A) + 3.0 x (nc - 1)</td>
<td>3.07 + 3.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td>4 / 6 / 8 / 10</td>
<td></td>
<td>9.7 + 0.4* (nSA - 4) + 0.0114 x (Abs. stroke + (nc - 1) x A) + 3.0 x (nc - 1)</td>
<td>3.21 + 0.035* (nSA - 4) + 3.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td>20 x 20</td>
<td>0</td>
<td>8.2 + 0.0114 x (Abs. stroke + (nc - 1) x A) + 3.0 x (nc - 1)</td>
<td>3.00 + 3.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>8.9 + 0.0144 x (Abs. stroke + (nc - 1) x A) + 3.0 x (nc - 1)</td>
<td>3.07 + 3.00 x (nc - 1)</td>
</tr>
<tr>
<td></td>
<td>4 / 6 / 8 / 10</td>
<td></td>
<td>9.7 + 0.4* (nSA - 4) + 0.0114 x (Abs. stroke + (nc - 1) x A) + 3.0 x (nc - 1)</td>
<td>3.21 + 0.035* (nSA - 4) + 3.00 x (nc - 1)</td>
</tr>
</tbody>
</table>

- **Absolute stroke [mm]**
- A - Distance between carriages [mm]. More info on following pages.
- nSA - Number of carriages.
- * * The stated values are for strokes (and for distances between the carriages A) up to 500mm
- No Load Torque value increases with stroke (and with A) elongation.

### Deflection of the linear unit

- $\delta$ - Maximum deflection of the linear unit [mm]
- $L_{pm}$ - Maximum permissible deflection of the linear unit [mm]
- $F_p$ - Applied force [N]
- $L_{p}$ - Unsupported profile length [mm]

---

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

Linear Unit doesn’t include any safety. Absolute stroke = Effective stroke + 2 x Safety stroke.

Absolute stroke /2

Lubrication nipple DIN 3405D

Absolute stroke /2

Journal with or without keyway.

Absolute stroke /2

All dimensions in mm; Drawings scales are not equal.

### Defining of the linear unit length

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + 2 \times \text{LSA} + A \times (n_c - 1) + 15 \text{ mm}
\]

\[
L_{\text{total}} = L + 90 \text{ mm}, \quad \text{LV} = 330 \text{ mm}
\]

Multiple carriages

A ≥ Lv Connection between the carriages must be provided by the customer

nc - Number of carriages
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

All dimensions in mm. Drawings scales are not equal.

Mounting the drive
- by the MOTOR SIDE DRIVE - MSD (Page 112)
- by the MOTOR ADAPTER WITH COUPLING (Page 120)

Available on request.

Maximum travel speed as a function of the profile length (V\text{max} - L curves)
The BR-E series Linear Unit is a powerful and cost-effective Linear Unit with toothed belt drive and a Zero-backlash Ball rail guide system for easy and accurate linear movements. It can easily be combined to multi-axis systems. Excellent price-/performance ratio and quick delivery time are ensured.

An extruded aluminum Profile from 6063 AL with mounted Zero-backlash Ball rail guide system, allows high load capacities and optimal cycles for the movement of larger masses at high speed.

The linear unit BR-E uses a pre-tensioned steel reinforced AT polyurethane timing toothed belt. In conjunction with a Zero-backlash drive pulley high moments with alternating loads with good positioning accuracy, low wear and low noise can be realized.

The aluminum Profile includes T-slots for fixing the Linear Unit and for attaching sensors and switches.

Different carriage lengths of the Linear Unit allow the possibility to attach additional accessories on the side.

Lubrication holes on the carriage allow easy re-lubrication of the Ball rail guide.

For the linear unit BR-E various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.

The aluminium profiles are manufactured according to the medium EN 12020-2 standard
Straightness = 0.35 mm/m; Max. torsion = 0.35 mm/m; Angular torsion = 0.2 mm/40 mm; Parallelism = 0.2 mm
In order to improve the products in this catalog the specifications are subject to change without notice.

**STRUCTURAL DESIGN**

1 - Drive block with pulley  
2 - AT polyurethane toothed belt with steel tension cords  
3 - Carriage  
4 - Linear Ball Guideway  
5 - Belt Tensioning system  
6 - Lubrication port  
7 - Aluminium profile-Hard anodized  
8 - End block

The BR-E series Linear Unit is a powerful and cost-effective Linear Unit with toothed belt drive and a Zero-backlash Ball rail guide system for easy and accurate linear movements. It can easily be combined to multi-axis systems. Excellent price-/performance ratio and quick delivery time are ensured. An extruded aluminum Profile from 6063 AL with on it mounted Zero-backlash Ball rail guide system, allows high load capacities and optimal cycles for the movement of larger masses at high speed. The linear unit BR-E uses a pre-tensioned steel reinforced AT polyurethane timing toothed belt. In conjunction with a Zero-backlash drive pulley high moments with alternating loads with good positioning accuracy, low wear and low noise can be realized. The aluminum Profile includes T-slots for fixing the Linear Unit and for attaching sensors and switches. Different carriage lengths of the Linear Unit allow the possibility to attach additional accessories on the side. Lubrication holes on the carriage allow easy re-lubrication of the Ball rail guide. For the linear unit BR-E various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.

The aluminium profiles are manufactured according to the medium EN 12020-2 standard

- Straightness = 0.35 mm/m; Max. torsion = 0.35 mm/m; Angular torsion = 0.2 mm/40 mm; Parallelism = 0.2 mm
How to Order

Series Prefix: BR
Size: 0040: 40
Type: E

Absolute stroke [mm]:
\( \text{Absolute stroke} = \text{Effective stroke} + 2 \times \text{Safety stroke} \)

Carriage Version: S: Short, L: Long

Type of Drive Pulley:
00: Pulley with through hole
01: Pulley with journal
02: Pulley with journal on both sides
03: Without drive unit
10: Pulley with journal (without keyway)
20: Pulley with journal on both sides (without keyway)

Drive Journal Position:
L: Journal on left side
R: Journal on right side
X: Both sides or none

Version:
0S: Special version
01: Standard single carriage
02: Dual carriage
Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety.

We recommend a minimum safety factor (fs = 5.0)

Modulus of elasticity

\[ E = 70000 \text{ N/mm}^2 \]

General technical data for double carriage

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity C [N]</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Max. Repeatability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 40 S</td>
<td>S2</td>
<td>19800</td>
<td>158</td>
<td>9.9 x A</td>
<td>9.9 x A</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>39600</td>
<td>317</td>
<td>19.8 x A</td>
<td>19.8 x A</td>
</tr>
</tbody>
</table>

* A - Distance between carriages [mm]. More on page 4.030.0

Presented values are for informational purposes only. Exact values can be calculated by contacting a sales engineer.

Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed [m/s]</th>
<th>Max. drive torque [Nm]</th>
<th>No load torque [Nm]</th>
<th>Pulley drive ratio [mm/rev]</th>
<th>Pulley diameter [mm]</th>
<th>Belt type</th>
<th>Belt width [mm]</th>
<th>Max. force transmitted by belt [N]</th>
<th>Specific spring constant C [N/m]</th>
<th>Max. acceleration [m/s²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-S 40 S</td>
<td>4</td>
<td>7.5</td>
<td>1.0 x nc</td>
<td>180</td>
<td>57.31</td>
<td>AT5</td>
<td>12</td>
<td>262</td>
<td>235000</td>
<td>70</td>
</tr>
<tr>
<td>SR-S 40 L</td>
<td>3</td>
<td>7.5</td>
<td>1.1 x nc</td>
<td>180</td>
<td>57.31</td>
<td>AT5</td>
<td>12</td>
<td>262</td>
<td>235000</td>
<td>70</td>
</tr>
</tbody>
</table>

* The stated values are for strokes (and for distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.

nc - Number of carriages

**For travel speed and acceleration over the stated value in the table above please contact us.
In order to improve the products in this catalog the specifications are subject to change without notice.

Deflection of the linear unit

**Fixed - fixed mounting**

![Diagram](image1)

- $d$: Maximum deflection of the linear unit [mm]
- $d_{\text{max}}$: Maximum permissible deflection of the linear unit [mm]
- $F$: Applied force [N]
- $L_p$: Unsupported profile length [mm]

**Fixed - free mounting**

![Diagram](image2)

- $F$: Applied force [N]
- $L_p$: Unsupported profile length [mm]

**Mass and mass moment of inertia**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit</th>
<th>Mass moment of inertia</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ kg ]</td>
<td>[$ \times 10^{-5} \text{ kg}\cdot\text{m}^2$]</td>
<td>$\text{ly} [\text{cm}^2]$</td>
</tr>
<tr>
<td>BR-E 40 S</td>
<td>3.1 + 0.003 x (Abs. stroke + (nc - 1) x A) + 0.45 x (nc - 1)</td>
<td>70.1 + 0.007 x (Abs. stroke + (nc - 1) x A) + 36.9 x (nc - 1)</td>
<td>9.53</td>
</tr>
<tr>
<td>BR-E 40 L</td>
<td>3.55 + 0.003 x (Abs. stroke + (nc - 1) x A) + 0.72 x (nc - 1)</td>
<td>92.3 + 0.007 x (Abs. stroke + (nc - 1) x A) + 59.1 x (nc - 1)</td>
<td></td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]

A: Distance between carriages [mm]. More info on following pages.

nc: Number of carriages

Mass calculation doesn't include mass of motor, reduction gear, switches and clamps.

**TECHNICAL DATA**

BR-E 40

- Linear Units

---

In order to improve the products in this catalog the specifications are subject to change without notice.
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**Long Carriage**

- **Absolute stroke**: 200 mm
- **Lubrication port**: closed with thread pin M3 both sides.
- **Journal** with or without Keyway.

**Short Carriage**

- **Absolute stroke**: 100 mm
- **Lubrication port**: closed with thread pin M3 both sides.
- **Journal** with or without Keyway.

**Type 0**

- Linear Unit doesn’t include any safety stroke.
- **Absolute stroke**: Effective stroke + 2 x Safety stroke

**Type 1 L and 1 R**

- **Absolute stroke**: 22 mm
- **M6x1 - 6H**: 12 mm Deep

**Type 2**

- **Absolute stroke**: 25 mm
- **M6x1 - 6H**: 12 mm Deep

**Technical Data**

- **Unsupported profile length (Lp)**
- **Applied force (F)**
- **Deflection (d)**

<table>
<thead>
<tr>
<th>Force (N)</th>
<th>Lp (mm)</th>
<th>dmax (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>200</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>300</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>500</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>750</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Dimensions**

- All dimensions in mm:
- Drawings scales are not equal.

---

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

**Defining of the linear unit length**

\[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + 15 \text{ mm} \]

\[ L_{\text{total}} = L + 174 \text{ mm} \]

Left side (L)

Right side (R)

**Mounting the drive**

- by the MOTOR ADAPTER WITH COUPLING (Page 120)

Available on request.

**Multiple Carriages**

\[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + A \times (nc - 1) + 15 \text{ mm} \]

\[ L_{\text{total}} = L + 174 \text{ mm} \]

nc - Number of carriages

For the case of \( A [\text{mm}] \geq \text{Alim} \):

- a toothed belt for the connection of the carriages will be used,
- the following condition must be met:

\[ A [\text{mm}] = \text{Alim} + 5 \times i \]

where \( i \in \{1,2,3,...\} \).

<table>
<thead>
<tr>
<th></th>
<th>BR-E 40 S</th>
<th>BR-E 40 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alim [mm]</td>
<td>132</td>
<td>200</td>
</tr>
</tbody>
</table>

All dimensions in mm; Drawings scales are not equal.
In order to improve the products in this catalog the specifications are subject to change without notice.

---

**DIMENSIONS**

All dimensions in mm; Drawings scales are not equal.

**Slot Nut M6**

**ID: 5746**

---

**Defining of the linear unit length**

- **Left side (L)**
- **Right side (R)**

**Multiple Carriages**

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + 15 \text{ mm}
\]

\[
L_{\text{total}} = L + 174 \text{ mm}
\]

**Lv** - Long carriage = 200 mm

**Lv** - Short carriage = 132 mm

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + A \times (n_c - 1) + 15 \text{ mm}
\]

\[
L_{\text{total}} = L + 174 \text{ mm}
\]

**Mounting the drive**

- by the MOTOR ADAPTER WITH COUPLING (Page 120)
- Available on request.

**ABSOLUTE STROKE**

**NOTES**

**LINEAR UNITS**

---

**BR-E 40 S**

- **Alim [mm]**: 132

**BR-E 40 L**

- **200**

**For the case of** **A [mm]**: **> Alim**:

- a toothed belt for the connection of the carriages will be used,
- the following condition must be met:

\[
A = Alim + 5 \times i,
\]

where \( i \in \{1,2,3,\ldots\} \).

**Connection between the carriages**
CHARACTERISTICS

The BR-Z series contains Z-axis Linear Units with toothed belt drive, integrated Ball rail system and compact dimensions. This Linear Units provide high performance features such as, high speed, good accuracy and repeatability by vertical applications.

They can easily be combined to multi-axis systems.

Excellent price-/performance ratio and quick delivery time are ensured.

The compact, precision-extruded aluminum Profile from 6063 AL with integrated Zero-backlash Ball rail guide system, allows high load capacities and optimal cycles for the movement of larger masses at high speed.

In the linear units BR-Z is used a pre-tensioned steel reinforced AT polyurethane timing toothed belt. In conjunction with a Zero-backlash drive pulley high moments with alternating loads with good positioning accuracy, low wear and low noise can be realized.

The in the Profile slot driving Polyurethane timing belt protects all the parts in the Profile from dust and other contaminations.

The aluminum Profile includes T-slots for attaching sensors and switches. Also, a Reed switch can be used here.

The drive block provides the possibility to attach a Motor or Gearbox housing and additional accessories on it.

Central lubrication port on the drive block allows easy re-lubrication of the Ball rail guide.

For the linear units BR-Z various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.

Multi drive blocks, which travel independently of each other, can be applied.

The aluminium profiles are manufactured according to the medium EN 12020-2 standard
Straightness = 0.35 mm/m; Max. torsion = 0.35 mm/m; Angular torsion = 0.2 mm/40 mm; Parallelism = 0.2 mm
1 - Tension End with integrated belt tensioning system
2 - AT polyurethane toothed belt with steel tension cords
3 - Aluminium profile-Hard anodized
4 - Linear Ball Guideway
5 - Drive block with pulley, Motor flange; with built in Magnets
6 - Central lubrication port; both sides
7 - Tension End with integrated belt tensioning system
8 - Clamping and braking element for linear guideway
### HOW TO ORDER

**Series Prefix:** BR

- **Size:**
  - 0040: 40
  - 0065: 65
  - 0080: 80
  - 0110: 110

**Series Suffix:** Z

- **Absolute stroke [mm]:** (Absolute stroke = Effective stroke + 2 x Safety stroke)

**Type of Drive Pulley:**
- 00: Pulley with through hole
- 01: Pulley with journal
- 02: Pulley with journal on both sides
- 10: Pulley with journal (without keyway)
- 20: Pulley with journal on both sides (without keyway)

*Note: BR0110Z only available with option 00*

- **Number of Drive Blocks:**
  - The stated number specifies the number of drive blocks on one Linear Unit

**Clamping Element:**
- 0: Without
- 1: With (available only for BR0110Z)

**Version:**
- S: Special version
- 1: Standard single carriage
- 2: Dual carriage
TECHNICAL DATA

General technical data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 40</td>
<td>120</td>
<td>4610</td>
<td>28</td>
<td>120</td>
<td>120</td>
<td>9.5</td>
<td>1000</td>
<td>3000</td>
<td>792</td>
<td>2792</td>
<td>25</td>
</tr>
</tbody>
</table>

1 For minimum stroke below the stated value in the table above please contact us.
2 For lengths / stroke over the stated value in the table above please contact us.
3 Mounting versions

Version 1: Mounting by the drive block, profile travels

Version 2: Mounting by the profile, drive blocks travel

Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0).

Modulus of elasticity: $E = 70000 \text{ N/mm}^2$

Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed [m/s]</th>
<th>Max. drive torque [Nm]</th>
<th>No load torque of drive block [Nm]</th>
<th>Puley drive ratio</th>
<th>Pulley diameter [mm]</th>
<th>Belt type</th>
<th>Belt width [mm]</th>
<th>Max. force transmitted by belt [N]</th>
<th>Specific spring constant Cspec [N/mm]</th>
<th>Max. acceleration [m/s²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 40</td>
<td>5</td>
<td>3.6</td>
<td>0.2</td>
<td>99</td>
<td>31.51</td>
<td>AT3</td>
<td>20</td>
<td>230</td>
<td>225000</td>
<td>70</td>
</tr>
</tbody>
</table>

* For travel speed and acceleration over the stated value in the table above please contact us.

Mass and planar moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit [kg]</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 40</td>
<td>1.7 + 0.0023 x (Abs. stroke + (nb - 1) x A) + 0.95 x (nb - 1)</td>
<td>9.8, 11.6</td>
</tr>
</tbody>
</table>

*Absolute stroke [mm]
A - Distance between two drive blocks [mm]
nb - Number of drive blocks

Multiple drive blocks, which travel independently of each other, can be applied.

For lengths / stroke over the stated value in the table above please contact us.

For operating temperature out of the presented range, please contact us.

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

### TECHNICAL DATA

#### Mass moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass moment of inertia (Version 1) [10^4 kg m^2]</th>
<th>Mass moment of inertia of drive block (Version 2) [10^4 kg m^2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 40</td>
<td>2.1 + 0.0058 × (Abs. stroke + (nb - 1) × A) + 0.22 × (nb - 1)</td>
<td>2.6</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]

A - Distance between two drive blocks [mm]  

nb - Number of drive blocks

---

#### Deflection of the linear unit

**Fixed - fixed mounting**  

**Fixed - free mounting**

- d: Maximum deflection of the linear unit [mm]  

- dmax: Maximum permissible deflection of the linear unit [mm]  

- F: Applied force [N]  

- Lp: Unsupported profile length [mm]

The maximum permissible deflection dmax must not be exceeded. In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.

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### BR-Z 40

- Mass moment of inertia
- Deflection of the linear unit

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In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**ABSOLUTE STROKE**

<table>
<thead>
<tr>
<th>6.7</th>
<th>5.4</th>
<th>3.4</th>
</tr>
</thead>
</table>

**REED Switch**

Cut out for cables

---

**Defining of the linear unit length**

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + 208 \text{ mm}
\]

\[
L_{\text{total}} = L + 24 \text{ mm}
\]

---

**Multiple drive blocks**

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + A \times (nb - 1) + 208 \text{ mm}
\]

\[
L_{\text{total}} = L + 24 \text{ mm}
\]

\[ A \geq 120 \text{ mm} \]

---

i All dimensions in mm; Drawings scales are not equal.

---

**CENTERING RING CR7**

Material: 1.4305 (AISI303)

---

**Accessories** see on page 8.000.0
In order to improve the products in this catalog the specifications are subject to change without notice.

### TECHNICAL DATA

#### General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Drive block length</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lv (mm)</td>
<td>C (N)</td>
<td>Mx (Nm)</td>
</tr>
<tr>
<td>BR-Z 65</td>
<td>200</td>
<td>19800</td>
<td>158</td>
</tr>
</tbody>
</table>

1 For minimum stroke below the stated value in the table above please contact us.
2 For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valid for multiple drive blocks (equation of defining the linear unit length for particular size of the linear unit needs to be used).

### Mounting versions

**Version 1:** Mounting by the drive block, profile travels

Multiple drive blocks, which travel independently of each other, can be applied.

**Version 2:** Mounting by the profile, drive blocks travel

#### Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0).

Modulus of elasticity: $E = 70000 \text{ N / mm}^2$

#### Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed (m/s)</th>
<th>Max. drive torque (Nm)</th>
<th>No load torque of drive block (Nm)</th>
<th>Puley drive ratio</th>
<th>Pulley diameter (mm)</th>
<th>Belt type</th>
<th>Belt width (mm)</th>
<th>Max. force transmitted by belt (N)</th>
<th>Specific spring constant $C_{sp}$(N/mm)</th>
<th>Max. acceleration (m/s²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 65</td>
<td>5</td>
<td>13.1</td>
<td>0.9</td>
<td>165</td>
<td>52.52</td>
<td>AT5</td>
<td>32</td>
<td>500</td>
<td>6000000</td>
<td>70</td>
</tr>
</tbody>
</table>

* For travel speed and acceleration over the stated value in the table above please contact us.

#### Mass and planar moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit (kg)</th>
<th>Planar moment of inertia (Iy [cm⁴], Iz [cm⁴])</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 65</td>
<td>5.7 + 0.0054 × (Abs. stroke + (nb - 1) × A) + 3.2 × (nb - 1)</td>
<td>59.7, 74.4</td>
</tr>
</tbody>
</table>

* Absolute stroke (mm)
A: Distance between two drive blocks (mm)
nb: Number of drive blocks

Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.
In order to improve the products in this catalog the specifications are subject to change without notice.

** masses of inertia**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>* Mass moment of inertia (Version 1) [ 10^{-4} \text{ kg m}^2 ]</th>
<th>Mass moment of inertia of drive block (Version 2) [ 10^{-4} \text{ kg m}^2 ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 65</td>
<td>$18.9 \times 0.0374 \times (\text{Abs. stroke} + (\text{nb} - 1) \times A) + 1.7 \times (\text{nb} - 1)$</td>
<td>23.8</td>
</tr>
</tbody>
</table>

*Absolute stroke \[\text{mm}\]
A - Distance between two drive blocks \[\text{mm}\]
\[\text{nb}\] - Number of drive blocks

---

**Deflection of the linear unit**

- **Fixed - fixed mounting**
- **Fixed - free mounting**

- $d$ - Maximum deflection of the linear unit \[\text{mm}\]
- $d_{\text{max}}$ - Maximum permissible deflection of the linear unit \[\text{mm}\]
- $F$ - Applied force \[\text{N}\]
- $L_p$ - Unsupported profile length \[\text{mm}\]

The maximum permissible deflection $d_{\text{max}}$ must not be exceeded. In the case that maximum deflection $d$ exceeds the maximum permissible deflection $d_{\text{max}}$ additional profile supports are needed.

---

**BR-Z 65**

- **Mass moment of inertia**
  - \[10^{-4} \text{ kg m}^2\]
  - Version 1: $18.9 \times 0.0374 \times (\text{Abs. stroke} + (\text{nb} - 1) \times A) + 1.7 \times (\text{nb} - 1)$
  - Version 2: 23.8

- **Absolute stroke** \[\text{mm}\]
- **Distance between two drive blocks** \[\text{mm}\]
- **Number of drive blocks**

---

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

- **Linear Unit doesn't include any safety stroke.**
  - Absolute stroke = Effective stroke + 2 x Safety stroke

- **Absolute stroke /2**
  - \( \varnothing 7 \, H7 \)
  - 1.6 mm Deep (8x)
  - For centering ring CR7
  - Accessories see on page 116

- **M6x1 - 6H**
  - 8 mm Deep (15x)

- **G4x1 - 6H**
  - 9 mm Deep (4x)

- **Lubrication nipple DIN 3405D**

- **All dimensions in mm; Drawings scales are not equal.**

**TECHNICAL DATA**

- **F**  = Applied force \([N]\)
- **Lp**  = Unsupported profile length \([mm]\)
- **d**  = Maximum deflection of the linear unit \([mm]\)
- **dmax**  = Maximum permissible deflection of the linear unit \([mm]\)

The maximum permissible deflection \(d_{max}\) must not be exceeded. In the case that maximum deflection \(d\) exceeds the maximum permissible deflection \(d_{max}\) additional profile supports are needed.

<table>
<thead>
<tr>
<th>(F) (=) 0 N</th>
<th>0</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>750</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_{max})</td>
<td>0.0</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
<td>0.6</td>
<td>0.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(F)  = 10 N</th>
<th>200</th>
<th>400</th>
<th>600</th>
<th>800</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_{max})</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(F)  = 25 N</th>
<th>250</th>
<th>500</th>
<th>750</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_{max})</td>
<td>0.2</td>
<td>0.4</td>
<td>0.6</td>
<td>0.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(F)  = 50 N</th>
<th>500</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_{max})</td>
<td>0.5</td>
<td>0.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(F)  = 100 N</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_{max})</td>
<td>0.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(F)  = 250 N</th>
<th>2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_{max})</td>
<td>1.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(F)  = 500 N</th>
<th>5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_{max})</td>
<td>1.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(F)  = 750 N</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_{max})</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(F)  = 1000 N</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d_{max})</td>
</tr>
</tbody>
</table>

**TYPE 0**

- Journal with or without Keyway.

<table>
<thead>
<tr>
<th>(\varnothing 4.2 , H7)</th>
<th>2.25 mm Deep</th>
</tr>
</thead>
</table>

**TYPE 1**

- Journal with or without Keyway.

<table>
<thead>
<tr>
<th>(\varnothing 4.2 , H7)</th>
<th>2.25 mm Deep</th>
</tr>
</thead>
</table>

**TYPE 2**

- Journal with or without Keyway.

<table>
<thead>
<tr>
<th>(\varnothing 4.2 , H7)</th>
<th>2.25 mm Deep</th>
</tr>
</thead>
</table>

**LINEAR UNITS**

<table>
<thead>
<tr>
<th><strong>BR-Z 65</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass moment of inertia</td>
</tr>
<tr>
<td>(Version 1)</td>
</tr>
<tr>
<td>(Version 2)</td>
</tr>
</tbody>
</table>
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

### CENTERING RING CR7

**Material:** 1.4305 (AISI303)

### Defining of the linear unit length

- **L** = Effective stroke + 2 × Safety stroke + 320 mm
- **L_total** = **L** + 40 mm

### Multiple drive blocks

- **L** = Effective stroke + 2 × Safety stroke + A × (nb - 1) + 320 mm
- **L_total** = **L** + 40 mm

*nb* = Number of drive blocks

---

All dimensions in mm; Drawings scales are not equal.
**TECHNICAL DATA**

### General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Drive block length</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Mass of drive block</th>
<th>Maximum Repeatability</th>
<th>Max. length</th>
<th>Max. Stroke</th>
<th>Min. Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 80</td>
<td>250</td>
<td>34200</td>
<td>2565</td>
<td>2565</td>
<td>4.9</td>
<td>0.08</td>
<td>1500</td>
<td>6000</td>
</tr>
</tbody>
</table>

1. For minimum stroke below the stated value in the table above, please contact us.
2. For lengths / stroke over the stated value in the table above, please contact us.

Values for max. stroke are not valid for multiple drive blocks (equation of defining the linear unit length for particular size of the linear unit needs to be used).

3. Mounting versions

Version 1: Mounting by the drive block, profile travels

Version 2: Mounting by the profile, drive blocks travel

Multiple drive blocks, which travel independently of each other, can be applied.

#### Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor ($fs = 5.0$).

Modulus of elasticity: $E = 70000 \text{ N} / \text{mm}^2$

### Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed [m/s]</th>
<th>Max. drive torque [Nm]</th>
<th>No load torque of drive block [Nm]</th>
<th>Puley drive ratio</th>
<th>Pulley diameter [mm]</th>
<th>Belt type</th>
<th>Belt width [mm]</th>
<th>Max. force transmitted by belt [N]</th>
<th>Specific spring constant Cspec [N]</th>
<th>Max. acceleration [m/s²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 80</td>
<td>5</td>
<td>29.4</td>
<td>1.4</td>
<td>210</td>
<td>66.84</td>
<td>AT5</td>
<td>50</td>
<td>880</td>
<td>960000</td>
<td>70</td>
</tr>
</tbody>
</table>

* For travel speed and acceleration over the stated value in the table above, please contact us.

### Mass and planar moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit [kg]</th>
<th>Planar moment of inertia [Nm²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 80</td>
<td>9.7 + 0.0083 x (Abs. stroke + (nb + 1) x A) + 4.9 x (nb - 1)</td>
<td>129.1, 173.4</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]

A - Distance between two drive blocks [mm]

nb - Number of drive blocks

Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.

---

In order to improve the products in this catalog, the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

### TECHNICAL DATA

#### Mass moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass moment of inertia (Version 1) $[10^{-4} \text{ kg m}^2]$</th>
<th>Mass moment of inertia of drive block (Version 2) $[10^{-4} \text{ kg m}^2]$</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 80</td>
<td>$60.0 + 0.0922 \times (\text{Abs. stroke} + (\text{nb} - 1) \times A) + 6.4 \times (\text{nb} - 1)$</td>
<td>61.1</td>
</tr>
</tbody>
</table>

*Absolute stroke [mm]

A - Distance between two drive blocks [mm]

nb - Number of drive blocks

#### Deflection of the linear unit

The maximum permissible deflection $\delta_{\text{max}}$ must not be exceeded. In the case that maximum deflection $\delta$ exceeds the maximum permissible deflection $\delta_{\text{max}}$ additional profile supports are needed.

---

**BR-Z 80**

- **Linear Units**

- **Mass moment of inertia**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass moment of inertia (Version 1) $[10^{-4} \text{ kg m}^2]$</th>
<th>Mass moment of inertia of drive block (Version 2) $[10^{-4} \text{ kg m}^2]$</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 80</td>
<td>$60.0 + 0.0922 \times (\text{Abs. stroke} + (\text{nb} - 1) \times A) + 6.4 \times (\text{nb} - 1)$</td>
<td>61.1</td>
</tr>
</tbody>
</table>

*Absolute stroke [mm]

A - Distance between two drive blocks [mm]

nb - Number of drive blocks

---

**Mass moment of inertia**

![Graph showing deflection vs unsupported profile length](image)

- **Fixed - fixed mounting**
- **Fixed - free mounting**
In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

Defining of the linear unit length

**L** = Effective stroke + 2 x Safety stroke + 382 mm

Ltotal = L + 44 mm

Multiple drive blocks

**L** = Effective stroke + 2 x Safety stroke + A x (nb - 1) + 382 mm

Ltotal = L + 44 mm

nb = Number of drive blocks

A ≥ 250 mm

i All dimensions in mm; Drawings scales are not equal.
TECHNICAL DATA

General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Drive block length</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Mass of drive block</th>
<th>Maximum Repeatability</th>
<th>Max. length</th>
<th>Max. length</th>
<th>Max. Stroke</th>
<th>Min. Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lv [mm]</td>
<td>C [N]</td>
<td>Mx [Nm]</td>
<td>My [Nm]</td>
<td>Mz [Nm]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BR-Z 110</td>
<td>300</td>
<td>49600</td>
<td>630</td>
<td>3470</td>
<td>3470</td>
<td>11.3</td>
<td>±0.08</td>
<td>1800</td>
<td>6000</td>
</tr>
</tbody>
</table>

1 For minimum stroke below the stated value in the table above please contact us.

2 For lengths / stroke over the stated value in the table above please contact us.

Values for max. stroke are not valid for multiple drive blocks (equation of defining the linear unit length for particular size of the linear unit needs to be used).

3 Mounting versions

Version 1: Mounting by the drive block, profile travels

Version 2: Mounting by the profile, drive blocks travel

Multiple drive blocks, which travel independently of each other, can be applied.

Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0).

Modulus of elasticity: E = 70000 N / mm²

Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed [m/s]</th>
<th>Max. drive torque [Nm]</th>
<th>No load torque of drive block [Nm]</th>
<th>Puley drive ratio [mm/rev]</th>
<th>Pulley diameter [mm]</th>
<th>Belt type</th>
<th>Belt width [mm]</th>
<th>Max. force transmitted by belt [N]</th>
<th>Specific spring constant Cspec [N]</th>
<th>* Max. acceleration [m/s²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 110</td>
<td>5</td>
<td>110.0</td>
<td>2.6</td>
<td>300</td>
<td>95.49</td>
<td>AT10</td>
<td>70</td>
<td>2300</td>
<td>2450000</td>
<td>70</td>
</tr>
</tbody>
</table>

* For travel speed and acceleration over the stated value in the table above please contact us.

Mass and planar moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit [kg]</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ly [cm⁴]</td>
<td>Iz [cm⁴]</td>
</tr>
<tr>
<td>BR-Z 110</td>
<td>21.7 + 0.0147 x (Abs. stroke + (nb - 1) x A) + 11.3 x (nb - 1)</td>
<td>513.0</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]

A: Distance between two drive blocks (mm)

nb: Number of drive blocks

Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.

Operating conditions

<table>
<thead>
<tr>
<th>Operating temp.</th>
<th>Duty cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°C ~ +60°C</td>
<td>100%</td>
</tr>
</tbody>
</table>

For operating temperature out of the presented range, please contact us.

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

### TECHNICAL DATA

#### Mass moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass moment of inertia (Version 1) [ 10^{-4} \text{ kg m}^2 ]</th>
<th>Mass moment of inertia of drive block (Version 2) [ 10^{-4} \text{ kg m}^2 ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 110</td>
<td>(282.4 + 0.3358 \times (\text{Abs. stroke} + (\text{nb} - 1) \times A) + 45.3 \times (\text{nb} - 1))</td>
<td>(302.9)</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]
A - Distance between two drive blocks [mm]
nb - Number of drive blocks

#### Deflection of the linear unit

<table>
<thead>
<tr>
<th>Fixed - fixed mounting</th>
<th>Fixed - free mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F</strong></td>
<td><strong>F</strong></td>
</tr>
<tr>
<td><strong>d</strong></td>
<td><strong>d</strong></td>
</tr>
<tr>
<td><strong>Lp</strong></td>
<td><strong>Lp</strong></td>
</tr>
</tbody>
</table>

- **d**: Maximum deflection of the linear unit [mm]
- **dmax**: Maximum permissible deflection of the linear unit [mm]
- **F**: Applied force [N]
- **Lp**: Unsupported profile length [mm]

The maximum permissible deflection **dmax** must not be exceeded. In the case that maximum deflection **d** exceeds the maximum permissible deflection **dmax** additional profile supports are needed.

---

## BR-Z 110 LINEAR UNITS

### BR-Z 110

#### Mass moment of inertia

\[\begin{align*}
\text{Mass moment of inertia} & = 282.4 + 0.3358 \times (\text{Abs. stroke} + (\text{nb} - 1) \times A) + 45.3 \times (\text{nb} - 1) \\
\text{Mass moment of inertia of drive block} & = 302.9
\end{align*}\]

* Absolute stroke [mm]
A - Distance between two drive blocks [mm]
nb - Number of drive blocks

---

#### Deflection of the linear unit

**Fixed - fixed mounting**

**Fixed - free mounting**

- **d**: Maximum deflection of the linear unit [mm]
- **dmax**: Maximum permissible deflection of the linear unit [mm]
- **F**: Applied force [N]
- **Lp**: Unsupported profile length [mm]

The maximum permissible deflection **dmax** must not be exceeded. In the case that maximum deflection **d** exceeds the maximum permissible deflection **dmax** additional profile supports are needed.

---

### BR-Z 110

#### Mass moment of inertia

\[\begin{align*}
\text{Mass moment of inertia} & = 282.4 + 0.3358 \times (\text{Abs. stroke} + (\text{nb} - 1) \times A) + 45.3 \times (\text{nb} - 1) \\
\text{Mass moment of inertia of drive block} & = 302.9
\end{align*}\]

* Absolute stroke [mm]
A - Distance between two drive blocks [mm]
nb - Number of drive blocks

---

#### Deflection of the linear unit

**Fixed - fixed mounting**

**Fixed - free mounting**

- **d**: Maximum deflection of the linear unit [mm]
- **dmax**: Maximum permissible deflection of the linear unit [mm]
- **F**: Applied force [N]
- **Lp**: Unsupported profile length [mm]

The maximum permissible deflection **dmax** must not be exceeded. In the case that maximum deflection **d** exceeds the maximum permissible deflection **dmax** additional profile supports are needed.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

Linear Unit doesn't include any safety stroke.
Absolute stroke = Effective stroke + 2 x Safety stroke

---

**Drive block with clamping element**

Clamping by spring-loaded energy
Opened by air pressure

Air pressure = 0 bar
Holding force = 1400 N

Holding force is tested on clamping element using a slightly lubricated rail (ISO VG 68).

---

**Accessories see on page 116**

---

**Mass of drive block**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of drive block [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-Z 110</td>
<td>12.9</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]  
A - Distance between two drive blocks [mm]  
nb - Number of drive blocks

---

**Mass of linear unit**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23.3 + 0.0147 x (Abs. stroke + (nb - 1) x A) + 12.9 x (nb - 1)

---

The air pressure opens clamping pistons. Free movement is allowed.

Purified and oiled air shall be used (according to ISO 8573-1 Class 4). Recommended filter size is 25 µm.

---

All dimensions in mm; Drawings scales are not equal.
In order to improve the products in this catalog the specifications are subject to change without notice.

**ABSOLUTE STROKE CENTERING RING CR9**

Material: 1.4305 (AISI303)

**DIMENSIONS**

Accessories see on page 116.

**Defining of the linear unit length**

L = Effective stroke + 2 × Safety stroke + 496 mm

L_total = L + 46 mm

**Multiple drive blocks**

L = Effective stroke + 2 × Safety stroke + A × (nb - 1) + 496 mm

L_total = L + 46 mm

nb = Number of drive blocks

In case of using the drive blocks with clamping element

A ≥ 300 mm

A ≥ 410 mm

All dimensions in mm; Drawings scales are not equal.
The BR-D series includes Linear Units with a toothed belt drive and two parallel, integrated, Zero-backlash rail guides. Compact dimensions allow high performance features such as, high speed and repeatability.

They can easily be combined to multi-axis systems. Excellent price-/performance ratio and quick delivery time are ensured.

A compact, precision-extruded aluminum Profile from AL 6063, with two parallel, integrated Zero-backlash rail guide systems, allows high load capacities and an optimal sequence for the movement of larger masses at high speed.

In the linear units BR-D is used a pre-tensioned steel reinforced AT polyurethane timing toothed belt. In conjunction with a Zero-backlash drive pulley high moments with alternating loads with good positioning accuracy, low wear and low noise can be realized.

The in the Profile slot driving Polyurethane timing belt, protects all the parts in the Profile from dust and other contaminations.

Different carriage lengths with lubrication port allows for easy re-lubrication of the Ball rail guide system and allows the possibility to attach additional accessories. The re-lubrication can also be done through maintenance holes on the side of the Profile.

The aluminum profile includes T-slots for fixing the Linear Unit and for attaching sensors and switches. Also, a Reed switch can be used here.

For the linear units BR-D various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.

---

**CHARACTERISTICS**

The aluminium profiles are manufactured according to the medium EN 12020-2 standard

Straightness = 0.35 mm/m; Max. torsion = 0.35 mm/m; Angular torsion = 0.2 mm/40 mm; Parallelism = 0.2 mm
1 - Drive block with floating bearing
2 - Gap-type seal of antistatic PU strip (recirculating)
3 - Ball screw tolerance ISO7 (ISO5 available on request)
4 - Carriage; with built in Magnets
5 - Aluminum cover
6 - Aluminium profile-Hard anodized
7 - Two integrated Linear Ball Guideways
8 - Central lubrication port; both sides
9 - End block with fixed bearing
HOW TO ORDER

Series Prefix: BR

Size:
- 0090: 90
- 0110: 110
- 0145: 145
- 0200: 200

Series Suffix: D

Absolute stroke [mm]:
(Absolute stroke = Effective stroke + 2 x Safety stroke)

Carriage Version:
- S: Short
- L: Long

Type of Drive Pulley:
- 01: Pulley with journal
- 02: Pulley with journal on both sides
- 03: Without drive unit
- 10: Pulley with journal (without keyway)
- 20: Pulley with journal on both sides (without keyway)

Note: For BR0200D with option 01 or 02, the drive position left (L) or right (R) must also be specified - motor/gearbox attachment side.

Drive Journal Position:
- L: Journal on left side
- R: Journal on right side
- X: Both sides or none

Connection Plate:
- 0: Without
- 1: With

Version:
- S: Special version
- 1: Standard single carriage
- 2: Dual carriage

In order to improve the products in this catalog the specifications are subject to change without notice.
**TECHNICAL DATA**

### General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Forces</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
<th>Max. Repeatability</th>
<th>* Max. length</th>
<th>* Max. stroke</th>
<th>** Min. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 90 S</td>
<td>S2</td>
<td>9320</td>
<td>250</td>
<td>30</td>
<td>4.6 x A</td>
<td>4000</td>
<td>0.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>18440</td>
<td>500</td>
<td>9.2</td>
<td>2.0 x A</td>
<td>8000</td>
<td>0.35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us.

** For minimum stroke below the stated value in the table above please contact us.

---

**Recommended values of loads**

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs =5.0)

Modulus of elasticity

\[ E = 70000 \text{ N/mm}^2 \]

---

**General technical data for double carriage**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Forces</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
<th>Max. Repeatability</th>
<th>* Max. length</th>
<th>* Max. stroke</th>
<th>** Min. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 90 S</td>
<td>S2</td>
<td>9320</td>
<td>250</td>
<td>30</td>
<td>4.6 x A</td>
<td>4000</td>
<td>0.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>18440</td>
<td>500</td>
<td>9.2</td>
<td>2.0 x A</td>
<td>8000</td>
<td>0.35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* A - Distance between carriages (mm). More info on following pages.

---

**Drive and belt data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed</th>
<th>Max. drive torque</th>
<th>* No load torque</th>
<th>Pulley drive ratio</th>
<th>Pulley diameter</th>
<th>Belt type</th>
<th>Belt width</th>
<th>Max. force transmitted by belt</th>
<th>Specific spring constant Cspec</th>
<th>** Max. acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 90 S</td>
<td>5</td>
<td>7.5</td>
<td>0.40 x nc</td>
<td>90</td>
<td>28.65</td>
<td>AT 3</td>
<td>35</td>
<td>520</td>
<td>402500</td>
<td>70</td>
</tr>
<tr>
<td>BR-D 90 L</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The stated values are for strokes (and distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (A) and with A elongation.

nc - Number of carriages

** For travel speed and acceleration over the stated value in the table above please contact us.
### DIMENSIONS

**Defining of the linear unit length**

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + A \times (n_c - 1) + 25 \text{ mm}
\]

\[
L_{\text{total}} = L + 108.5 \text{ mm}
\]

- **Left side (L)**
- **Right side (R)**

<table>
<thead>
<tr>
<th>Carriage</th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short carriage</td>
<td>156</td>
<td></td>
</tr>
<tr>
<td>Long carriage</td>
<td>102</td>
<td></td>
</tr>
</tbody>
</table>

### Multiple carriages

- Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A).

- A [mm] = \(A_{\text{lim}} + 3 \times i\)

<table>
<thead>
<tr>
<th>BR-D 90 S</th>
<th>BR-D 90 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A_{\text{lim}}) [mm]</td>
<td>401.5</td>
</tr>
</tbody>
</table>

In order to improve the products in this catalog the specifications are subject to change without notice.
## Linear Units

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Plate Length [mm]</th>
<th>Weight [kg]</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 90 S</td>
<td>60</td>
<td>0.2</td>
<td>103661</td>
</tr>
<tr>
<td>BR-D 90 L</td>
<td>125</td>
<td>0.4</td>
<td>103660</td>
</tr>
</tbody>
</table>

Mounting elements for mounting the connection plate on the Linear unit are included.

## Mounting the drive

- by the MOTOR ADAPTER WITH COUPLING (Page 120)

Available on request.

---

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

### General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity (C [N])</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Max. repeatability</th>
<th>Lmax [mm]</th>
<th>Max. stroke</th>
<th>Min. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 110 S</td>
<td>S2</td>
<td>39600</td>
<td>1220</td>
<td>19.8 x A</td>
<td>12940</td>
<td>16770</td>
<td>520</td>
<td>6.5 x A</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>79200</td>
<td>2450</td>
<td>39.6 x A</td>
<td>26150</td>
<td>37600</td>
<td>1050</td>
<td>13.1 x A</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us. Values for max. stroke are not valid for multiple carriages (equation of defining the linear unit length for particular size of the linear unit needs to be used).

** For minimum stroke below the stated value in the table above please contact us.

---

** Recommended values of loads **

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0)

Modulus of elasticity

\[ E = 70000 \text{ N/mm}^2 \]

---

** General technical data for double carriage **

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity (C [N])</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Max. Repeatability</th>
<th>Lmax</th>
<th>Max. Stroke</th>
<th>Min. Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 110 S</td>
<td>S2</td>
<td>39600</td>
<td>1220</td>
<td>19.8 x A</td>
<td>12940</td>
<td>16770</td>
<td>520</td>
<td>6.5 x A</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>79200</td>
<td>2450</td>
<td>39.6 x A</td>
<td>26150</td>
<td>37600</td>
<td>1050</td>
<td>13.1 x A</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us. Values for max. stroke are not valid for multiple carriages (equation of defining the linear unit length for particular size of the linear unit needs to be used).

** For minimum stroke below the stated value in the table above please contact us.

---

** Drive and belt data **

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed [m/s]</th>
<th>Max. drive torque [Nm]</th>
<th>No load torque [Nm]</th>
<th>Pulley drive ratio</th>
<th>Pulley diameter [mm]</th>
<th>Belt type</th>
<th>Belt width [mm]</th>
<th>Max. force transmitted by belt [N]</th>
<th>Specific spring constant Cspec [N/mm]</th>
<th>Max. acceleration [m/s²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 110 S</td>
<td>6</td>
<td>15.7</td>
<td>0.98 x nc</td>
<td>120</td>
<td>38.20</td>
<td>AT 5</td>
<td>50</td>
<td>820</td>
<td>960000</td>
<td>70</td>
</tr>
<tr>
<td>BR-D 110 L</td>
<td>1.00 x nc</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mass and mass moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit [kg]</th>
<th>Mass moment of inertia [10⁻⁵ kg m²]</th>
<th>Planar moment of inertia ly [cm⁴]</th>
<th>iz [cm⁴]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 110 S</td>
<td>3.6 + 0.0072 × (Abs. stroke + (nc - 1) × A) + 0.64 × (nc - 1)</td>
<td>36 + 0.0125 × (Abs. stroke + (nc - 1) × A) + 23.3 × (nc - 1)</td>
<td>31.1</td>
<td>217.2</td>
</tr>
<tr>
<td>BR-D 110 L</td>
<td>4.2 + 0.0072 × (Abs. stroke + (nc - 1) × A) + 0.98 × (nc - 1)</td>
<td>49 + 0.0125 × (Abs. stroke + (nc - 1) × A) + 35.8 × (nc - 1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A* Absolute stroke [mm]
A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages

Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.

Deflection of the linear unit

- **Fixed - fixed mounting**
- **Fixed - free mounting**

\[ d_{\text{max}} \] Maximum permissible deflection of the linear unit [mm]

The maximum permissible deflection \( d_{\text{max}} \) must not be exceeded. In the case that maximum deflection \( d \) exceeds the maximum permissible deflection \( d_{\text{max}} \) additional profile supports are needed.

---

**BR-D 110 LINEAR UNITS**

- **Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.**
- **Deflection of the linear unit**
- **BR-D 110**

---

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**Dimensions**

**Absolute stroke** /2

Absolute stroke = Effective stroke + 2 x Safety stroke

**Journal with or without Keyway.**

**Absolute stroke** /2

Linear unit doesn't include any safety stroke.

**Multiple carriages**

A > L

Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)

For the case of A [mm] > Alim:
- a toothed belt for the connection of the carriages will be used.

- the following condition must be met:
  A [mm] = Alim + 5 x i.
  where i Î {1,2,3,...}

For lubrication port positions in the case of multiple carriages please contact us.

Defining of the linear unit length

L = Effective stroke + 2 x Safety stroke + Lp + A x (nc - 1) + 25 mm

Ltotal = L + 126 mm

nc - Number of carriages

A* Absolute stroke [mm]

A - Distance between carriages [mm]. More info on following pages.

nc - Number of carriages

A* Absolute stroke [mm]

Absolute stroke /2

Lubrication port position:
Long carriage: L/2
Short carriage: L/2 - 42.5 mm

**Linear Unit Mass of linear unit**

<table>
<thead>
<tr>
<th>Mass [kg]</th>
<th>Mass moment of inertia [kg m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Planar moment of inertia**

Iy [cm²] Iz [cm²]

4 4

**Deflection of the linear unit**

F          Applied force [N]
Lp        Unsupported profile length [mm]
D          Maximum deflection of the linear unit [mm]
Dmax   Maximum permissible deflection of the linear unit [mm]

**Table**

<table>
<thead>
<tr>
<th>F</th>
<th>Dmax</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 N</td>
<td>0.0</td>
</tr>
<tr>
<td>10 N</td>
<td>0.1</td>
</tr>
<tr>
<td>25 N</td>
<td>0.2</td>
</tr>
<tr>
<td>50 N</td>
<td>0.3</td>
</tr>
<tr>
<td>100 N</td>
<td>0.4</td>
</tr>
<tr>
<td>200 N</td>
<td>0.5</td>
</tr>
<tr>
<td>500 N</td>
<td>0.6</td>
</tr>
<tr>
<td>1200 N</td>
<td>0.7</td>
</tr>
<tr>
<td>0 N</td>
<td>D</td>
</tr>
<tr>
<td>10 N</td>
<td>D</td>
</tr>
<tr>
<td>25 N</td>
<td>D</td>
</tr>
<tr>
<td>50 N</td>
<td>D</td>
</tr>
<tr>
<td>100 N</td>
<td>D</td>
</tr>
<tr>
<td>200 N</td>
<td>D</td>
</tr>
<tr>
<td>500 N</td>
<td>D</td>
</tr>
</tbody>
</table>

**Technical data**

** Unsupported profile length Lp**

<table>
<thead>
<tr>
<th>Unsupported profile length Lp [mm]</th>
<th>Deflection d [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>100</td>
<td>0.1</td>
</tr>
<tr>
<td>200</td>
<td>0.2</td>
</tr>
<tr>
<td>300</td>
<td>0.3</td>
</tr>
<tr>
<td>400</td>
<td>0.4</td>
</tr>
<tr>
<td>500</td>
<td>0.5</td>
</tr>
<tr>
<td>600</td>
<td>0.6</td>
</tr>
<tr>
<td>700</td>
<td>D</td>
</tr>
<tr>
<td>800</td>
<td>D</td>
</tr>
<tr>
<td>900</td>
<td>D</td>
</tr>
<tr>
<td>1000</td>
<td>D</td>
</tr>
</tbody>
</table>

**Carriages connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A)**

In order to improve the products in this catalog the specifications are subject to change without notice.
**DIMENSIONS**

All dimensions in mm; Drawings scales are not equal.

**OPTIONAL: TAP / PIN holes available on request.**

**CONNECTION PLATE**

**BR-D 110 L**

**BR-D 110 S**

---

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Plate length [mm]</th>
<th>Weight [kg]</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 110 S</td>
<td>60</td>
<td>0.35</td>
<td>103663</td>
</tr>
<tr>
<td>BR-D 110 L</td>
<td>155</td>
<td>0.60</td>
<td>103662</td>
</tr>
</tbody>
</table>

Mounting elements for mounting the connection plate on the Linear unit are included.

Mounting the drive

- by the MOTOR ADAPTER WITH COUPLING (Page120)
GENERAL TECHNICAL DATA

**General technical data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage length [mm]</th>
<th>Dynamic load capacity [N]</th>
<th>Dynamic moment [Nm]</th>
<th>Max. permissible loads [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 145 S</td>
<td>180</td>
<td>34200</td>
<td>1500 260 520</td>
<td>8930 15320 674</td>
</tr>
<tr>
<td>BR-D 145 L</td>
<td>240</td>
<td>68400</td>
<td>3005 3420 3420</td>
<td>17870 30640 1200</td>
</tr>
</tbody>
</table>

* For lengths/stroke over the stated value in the table above please contact us.
** For minimum stroke below the stated value in the table above please contact us.

**Recommended values of loads**

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0)

Modulus of elasticity

\[ E = 70000 \text{ N/mm}^2 \]

**General technical data for double carriage**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 145 S</td>
<td>S2</td>
<td>68400</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>136800</td>
</tr>
</tbody>
</table>

* A - Distance between carriages [mm]. More info on following pages.

**Drive and belt data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed [m/s]</th>
<th>Max. drive torque [Nm]</th>
<th>No load torque [Nm]</th>
<th>Pulley drive ratio</th>
<th>Pulley diameter [mm]</th>
<th>Belt type</th>
<th>Belt width [mm]</th>
<th>Max. force transmitted by belt [N]</th>
<th>Specific spring constant ( C_{\text{sp}} ) [N]</th>
<th><strong>Max. acceleration [m/s^2]</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 145 S</td>
<td>6</td>
<td>33.6</td>
<td>1.48 \times \text{nc}</td>
<td>165</td>
<td>52.52</td>
<td>AT 5</td>
<td>70</td>
<td>1280</td>
<td>1360000</td>
<td>70</td>
</tr>
<tr>
<td>BR-D 145 L</td>
<td>6</td>
<td>33.6</td>
<td>1.50 \times \text{nc}</td>
<td>165</td>
<td>52.52</td>
<td>AT 5</td>
<td>70</td>
<td>1280</td>
<td>1360000</td>
<td>70</td>
</tr>
</tbody>
</table>

* The stated values are for strokes (and distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A elongation).
nc - Number of carriages
* For travel speed and acceleration over the stated value in the table above please contact us.
In order to improve the products in this catalog the specifications are subject to change without notice.

**Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.**

### TECHNICAL DATA

#### Mass and mass moment of inertia

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit</th>
<th>Mass moment of inertia</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ kg ]</td>
<td>[ 10⁻⁵ kg m² ]</td>
<td>ly [ cm¹ ]</td>
</tr>
<tr>
<td>BR-D 145 S</td>
<td>7.2 (\times) 0.0127 (\times) (\text{Abs. stroke} + (\text{nc} - 1) \times \text{A}) + 1.35 (\times) (\text{nc} - 1)</td>
<td>145 (\times) 0.0338 (\times) (\text{Abs. stroke} + (\text{nc} - 1) \times \text{A}) + 93.1 (\times) (\text{nc} - 1)</td>
<td>78.9</td>
</tr>
<tr>
<td>BR-D 145 L</td>
<td>8.8 (\times) 0.0127 (\times) (\text{Abs. stroke} + (\text{nc} - 1) \times \text{A}) + 2.25 (\times) (\text{nc} - 1)</td>
<td>208 (\times) 0.0338 (\times) (\text{Abs. stroke} + (\text{nc} - 1) \times \text{A}) + 155.2 (\times) (\text{nc} - 1)</td>
<td></td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]

A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages

- Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.

#### Deflection of the linear unit

<table>
<thead>
<tr>
<th>Unsupported profile length (L_p) [mm]</th>
<th>Deflection (d) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1000</td>
<td>0.1</td>
</tr>
<tr>
<td>2000</td>
<td>0.2</td>
</tr>
<tr>
<td>3000</td>
<td>0.3</td>
</tr>
<tr>
<td>4000</td>
<td>0.4</td>
</tr>
</tbody>
</table>

The maximum permissible deflection \(d_{\text{max}}\) must not be exceeded. In the case that maximum deflection \(d\) exceeds the maximum permissible deflection \(d_{\text{max}}\) additional profile supports are needed.

**BR-D 145**
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

- Lubrication port position:
  - Long carriage: L/2
  - Short carriage: L/2 - 47.5 mm

**SHORT CARRIAGE**

- Lubrication port; closed with thread pin M4.

**LONG CARRIAGE**

- Lubrication port; closed with thread pin M4.

All dimensions in mm; Drawings scales are not equal.

**Defining of the linear unit length**

\[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + A \times (n_c - 1) + 25 \text{ mm} \]

\[ L_{\text{total}} = L + 138 \text{ mm} \]

- Left side (L)
- Right side (R)

**Multiple carriages**

- For the case of \( A \geq L_v \):
  - Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances \( A \)).
  - A toothed belt for the connection of the carriages will be used.
  - The following condition must be met:
    \[ A \geq L_v + 5 \times i \]
    where \( i \in \{1, 2, 3, \ldots\} \).

**Linear Unit Mass of linear unit**

- Planar moment of inertia
  - \( I_y \) [cm^2] [kg m^2]
  - \( I_z \) [cm^2] [kg m^2]

- Mass and mass moment of inertia
  - Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.
In order to improve the products in this catalog the specifications are subject to change without notice.

### Mounting the drive

- by the MOTOR ADAPTER WITH COUPLING (Page 120)

Mounting the drive is available on request.

### Linear Units

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Plate length [mm]</th>
<th>Weight [kg]</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 145 S</td>
<td>125</td>
<td>0.8</td>
<td>395-103665</td>
</tr>
<tr>
<td>BR-D 145 L</td>
<td>190</td>
<td>1.3</td>
<td>395-103664</td>
</tr>
</tbody>
</table>

Mounting elements for mounting the connection plate on the Linear unit are included.
In order to improve the products in this catalog the specifications are subject to change without notice.

TECHNICAL DATA

General technical data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 200 S</td>
<td>265</td>
<td>49600</td>
<td>3235</td>
<td>450</td>
<td>900</td>
<td>1000</td>
<td>24520</td>
<td>1600</td>
<td>450</td>
<td>308</td>
<td>3.05</td>
<td>0.08</td>
<td>6000</td>
<td>5710</td>
</tr>
<tr>
<td>BR-D 200 L</td>
<td>405</td>
<td>99200</td>
<td>6470</td>
<td>8680</td>
<td>8680</td>
<td>20000</td>
<td>50900</td>
<td>3250</td>
<td>4550</td>
<td>1750</td>
<td>5.70</td>
<td>0.08</td>
<td>5570</td>
<td>65</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us.

** For minimum stroke below the stated value in the table above please contact us.

Recommended values of loads

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0)

Modulus of elasticity

\[ E = 70000 \text{ N / mm}^2 \]

General technical data for double carriage

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 200 S</td>
<td>S2</td>
<td>99200</td>
<td>6470</td>
<td>49.6 x A</td>
<td>49.6 x A</td>
<td>20000</td>
<td>49040</td>
<td>3200</td>
<td>24.5 x A</td>
<td>19.0 x A</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>198400</td>
<td>129400</td>
<td>99.2 x A</td>
<td>99.2 x A</td>
<td>40000</td>
<td>101800</td>
<td>6500</td>
<td>50.9 x A</td>
<td>23.0 x A</td>
</tr>
</tbody>
</table>

* A - Distance between carriages [mm]. More info on following pages.

Drive and belt data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Max. travel speed [m/s]</th>
<th>Max. drive torque [Nm]</th>
<th>No load torque [Nm]</th>
<th>Pulley drive ratio</th>
<th>Pulley diameter [mm]</th>
<th>Belt type</th>
<th>Belt width [mm]</th>
<th>Max. force transmitted by belt [N]</th>
<th>Specific spring constant [N/mm]</th>
<th>Max. acceleration [m/s²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 200 S</td>
<td>6</td>
<td>3.5 x nc</td>
<td>3.5 x nc</td>
<td>113</td>
<td>79.58</td>
<td>AT 10</td>
<td>2850</td>
<td>4350000</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>BR-D 200 L</td>
<td>6</td>
<td>4.5 x nc</td>
<td>4.5 x nc</td>
<td>113</td>
<td>79.58</td>
<td>AT 10</td>
<td>2850</td>
<td>4350000</td>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>

* The stated values are for strokes (and distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.

nc - Number of carriages

** For travel speed and acceleration over the stated value in the table above please contact us.
In order to improve the products in this catalog the specifications are subject to change without notice.

Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.

Mass and mass moment of inertia

### TECHNICAL DATA

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Mass of linear unit</th>
<th>Mass moment of inertia</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[ kg ]</td>
<td>[ 10^-5 kg m^2 ]</td>
<td>ly [ cm^4 ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>lz [ cm^4 ]</td>
</tr>
<tr>
<td>BR-D 200 S</td>
<td>20.2 + 0.0245 × (Abs. stroke + (nc - 1) × A) + 3.1 × (nc - 1)</td>
<td>778 + 0.1868 × (Abs. stroke + (nc - 1) × A) + 482.9 × (nc - 1)</td>
<td>376.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BR-D 200 L</td>
<td>26.2 + 0.0245 × (Abs. stroke + (nc - 1) × A) + 5.7 × (nc - 1)</td>
<td>1210 + 0.1868 × (Abs. stroke + (nc - 1) × A) + 902.4 × (nc - 1)</td>
<td>2744.6</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]
A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages

Deflection of the linear unit

**Fixed - fixed mounting**

**Fixed - free mounting**

- **d** Maximum deflection of the linear unit [mm]
- **dmax** Maximum permissible deflection of the linear unit [mm]
- **F** Applied force [N]
- **Lp** Unsupported profile length [mm]

The maximum permissible deflection dmax must not be exceeded. In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.

---

**BR-D 200**

---

Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

- **Absolute stroke**
  - Long carriage: \( \frac{L}{2} \)
  - Short carriage: \( \frac{L}{2} - 56 \text{ mm} \)

- **Lubrication port**
  - Closed with thread pin M4.

- **Journal with or without Keyway.**

- **All dimensions in mm; Drawings scales are not equal.**

---

**Defining of the linear unit length**

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + A \times (\text{nc} - 1) + 25 \text{ mm}
\]

\[
L_{\text{total}} = L + 218 \text{ mm}
\]

- **Left side (L)**
  - \( L_v - \text{Long carriage} = 405 \text{ mm} \)
  - \( L_v - \text{Short carriage} = 265 \text{ mm} \)

---

**Multiple carriages**

\[
A \geq \text{Lv}
\]

- Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A).

---

**For the case of \( A [\text{mm}] > \text{Alim} \):**

- a toothed belt for the connection of the carriages will be used.

- the following condition must be met:
  \[
  A [\text{mm}] = \text{Alim} + 10 \times i,
  \]
  where \( i \in \{1, 2, 3, \ldots\} \).

---

**Table: Linear Unit Mass and Mass Moment of Inertia**

<table>
<thead>
<tr>
<th>Unsupported Profile Length ( L_p ) [mm]</th>
<th>Deflection ( d ) [mm]</th>
<th>Material Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1000 2000 3000 4000 5000 6000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.0 0.2 0.4 0.6 0.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**BR-D 200 S**

- **Mass calculation doesn’t include mass of motor, reduction gear, switches and clamps.**

- **Linear Unit**
  - Includes any safety stroke.
  - Absolute stroke = Effective stroke + \( 2 \times \text{Safety stroke} \)

---

**Technical Data**

- ** Unsupported Profile Length**
  - Mass and mass moment of inertia
  - Deflection of the linear unit

---

For more information on the carriages and their connections, please refer to the following pages.
In order to improve the products in this catalog the specifications are subject to change without notice.

BR-D 200 LINEAR UNITS

**DIMENSIONS**

All dimensions in mm; Drawings scales are not equal.

**OPTIONAL:** CENTERING RING holes available on request.

CENTERING RING holes on the bottom of the Profile.

Drawing only for presentational use.

**CONNECTION PLATE**

BR-D 200 L  

BR-D 200 S

Lubrication nipple DIN 3405D (both sides)

Mounting the drive

- by the MOTOR ADAPTER WITH COUPLING (Page 120)

Available on request.

Mounting elements for mounting the connection plate on the Linear unit are included.

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Plate length [mm]</th>
<th>Weight [kg]</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-D 200 S</td>
<td>190</td>
<td>2.3</td>
<td>395-103667</td>
</tr>
<tr>
<td>BR-D 200 L</td>
<td>305</td>
<td>3.7</td>
<td>395-103666</td>
</tr>
</tbody>
</table>
The SR-D series describes Linear Units with a precision ball screw drive and two parallel, integrated, Zero-backlash rail guides. Compact dimensions allow high performance features such as, high speeds, good accuracy and repeatability. They can easily be combined to multi-axis systems. Excellent price-/performance ratio and quick delivery time are ensured.

The compact, precision-extruded aluminum Profile from AL 6063, with two parallel, integrated, Zero-backlash rail guide systems, allows high load capacities and optimal cycles for the movement of larger masses at high speed.

In the Linear Units SR-D a precision ball screw, with tolerance class ISO7 (ISO5 on request), with reduced backlash of the ball nut is used.

Two parallel circulating antistatic polyurethane sealing strips and an aluminum cover are ensuring to protect all the parts in the profile from dust and other contaminations.

Different carriage lengths with lubrication port allows for easy re-lubrication of the ball screw and Ball rail guide system and allows the possibility to attach additional accessories. The re-lubrication can also be done through maintenance holes on the side of the Profile.

The aluminum profile includes T-slots for fixing the Linear Unit and for attaching sensors and switches. Also, a Reed switch can be used here.

For the linear units SR-D various adaptation options, for attaching (or redirecting), for Motors or Gearboxes are available.

---

The aluminium profiles are manufactured according to the medium EN 12020-2 standard

- Straightness = 0.35 mm/m; Max. torsion = 0.35 mm/m; Angular torsion = 0.2 mm/40 mm; Parallelism = 0.2 mm
1 - Drive block with floating bearing
2 - Gap-type seal of antistatic PU strip (recirculating)
3 - Ball screw tolerance ISO7 (ISO5 available on request)
4 - Carriage; with built in Magnets
5 - Aluminum cover
6 - Aluminium profile-Hard anodized
7 - Two integrated Linear Ball Guideways
8 - Central lubrication port; both sides
9 - End block with fixed bearing
HOW TO ORDER

Series Prefix: SR
Size: 0090: 90
0110: 110
0145: 145
0200: 200
Series Suffix: D
Absolute stroke [mm]: (Absolute stroke = Effective stroke + 2 x Safety stroke)
Ball Screw Dia./Pitch: SR0090 (Ø12): 05, 10
SR0110 (Ø16): 05, 10, 16
SR0145 (Ø20): 05, 10, 20, 50
SR0200 (Ø32): 05, 10, 20, 32
Ball Screw Tolerance:
7: ISO7
5: ISO5
Ball Screw Journal: 0: Without
1: With (available only for BR0110Z)
Note: SR0090 only available with option 0
Carriage Version: S: Short
L: Long
Version: A: Without connection plate, without antistatic PU Gap-type seal strip, single carriage
B: Without connection plate, with antistatic PU Gap-type seal strip, single carriage
C: Without connection plate, with corrosion-resistant protection strip, single carriage
D: With connection plate, without antistatic PU Gap-type seal strip, single carriage
E: With connection plate, with antistatic PU Gap-type seal strip, single carriage
F: With connection plate, with corrosion-resistant protection strip, single carriage
G: Without connection plate, without antistatic PU Gap-type seal strip, multi-carriage
H: Without connection plate, with antistatic PU Gap-type seal strip, multi-carriage
I: Without connection plate, with corrosion-resistant protection strip, multi-carriage
J: With connection plate, without antistatic PU Gap-type seal strip, multi-carriage
K: With connection plate, with antistatic PU Gap-type seal strip, multi-carriage
L: With connection plate, with corrosion-resistant protection strip, multi-carriage
S: Special Version
* Specify the number of carriages and distance between in special notes
**General technical data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage length</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 90 S</td>
<td>35</td>
<td>4620</td>
<td>125</td>
<td>17</td>
<td>34</td>
</tr>
<tr>
<td>SR-D 90 L</td>
<td>100</td>
<td>9240</td>
<td>250</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us.

Values for max. stroke are not valid for multiple carriages (equation of defining the linear unit length for particular size of the linear unit needs to be used).

---

**Recommended values of loads:**

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0)

Modulus of elasticity

\[ E = 70000 \text{ N/mm}^2 \]

---

**Operating conditions**

<table>
<thead>
<tr>
<th>Operating temp.</th>
<th>0°C ~ +60°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duty cycle</td>
<td>100%</td>
</tr>
</tbody>
</table>

For operation temperature out of the presented range, please contact us.

---

**General technical data for double carriage**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Carriage length</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 90</td>
<td>S2</td>
<td>9240</td>
<td>250</td>
<td>4.6 × A</td>
<td>4.6 × A</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>18480</td>
<td>500</td>
<td>9.2 × A</td>
<td>9.2 × A</td>
</tr>
</tbody>
</table>

*A - Distance between carriages [mm]. More info on following pages.

---

**Presented values are for informational purposes only. Exact values can be calculated by contacting our engineers.**

---

**Ball Screw Drive data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Ball screw</th>
<th>Max. rotational speed</th>
<th>Max. travel speed</th>
<th>Lead constant</th>
<th>Max. repetitive precision</th>
<th>Dynamic load capacity</th>
<th>Max. Axial load</th>
<th>Max. drive torque</th>
<th>Min. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>d × l</td>
<td>[mm/min]</td>
<td>[m/s]</td>
<td>[mm/rev]</td>
<td>[mm]</td>
<td>[µm]</td>
<td>[Nm]</td>
<td>[N]</td>
<td>[Nm]</td>
</tr>
<tr>
<td>SR-D 90</td>
<td>12 × 5</td>
<td>5800</td>
<td>0.49</td>
<td>0.08 × nc</td>
<td>10</td>
<td>5</td>
<td>± 0.02</td>
<td>± 0.01</td>
<td>5000</td>
</tr>
<tr>
<td></td>
<td>12 × 10</td>
<td>0.97</td>
<td>0.09 × nc</td>
<td>0.11 × nc</td>
<td>10</td>
<td>10</td>
<td>± 0.02</td>
<td>± 0.01</td>
<td>3800</td>
</tr>
</tbody>
</table>

1. Max. travel speed depends on the length of the linear unit, see diagram for particular size of the linear unit.
2. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.
3. The stated values are for strokes (and distances between the carriages A) up to 500mm.
4. No Load Torque value increases with stroke (and with A) elongation.
5. Number of carriages
6. For the ball nut with the preload of 2% please contact us
7. For minimum stroke below the stated value in the table above please contact us.
Mass and mass moment of inertia

### Linear unit

<table>
<thead>
<tr>
<th>Linear unit</th>
<th>Mass of linear unit</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 90 L</td>
<td>2.2 + 0.006 × (Abs. stroke + (nc - 1) × A) + 0.50 × (nc - 1)</td>
<td>10.26</td>
</tr>
<tr>
<td>SR-D 90 S</td>
<td>1.6 + 0.006 × (Abs. stroke + (nc - 1) × A) + 0.30 × (nc - 1)</td>
<td>13.6</td>
</tr>
</tbody>
</table>

### Ball screw

<table>
<thead>
<tr>
<th>Linear unit</th>
<th>Ball screw</th>
<th>Mass moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 90 L</td>
<td>12 × 5</td>
<td>0.53 + 0.002 × (Abs. stroke + (nc - 1) × A) + 0.13 × (nc - 1)</td>
</tr>
<tr>
<td>SR-D 90 S</td>
<td>12 × 5</td>
<td>0.32 + 0.002 × (Abs. stroke + (nc - 1) × A) + 0.02 × (nc - 1)</td>
</tr>
</tbody>
</table>

*Absolute stroke [mm]

A - Distance between carriages [mm]. More info on following pages.

nc - Number of carriages

### Deflection of the linear unit

**Fixed - fixed mounting**

- **F** - Applied force (N)
- **d** - Maximum deflection of the linear unit [mm]
- **Lp** - Unsupported profile length [mm]

**Fixed - free mounting**

- **F** - Applied force (N)
- **d** - Maximum permissible deflection of the linear unit [mm]

The maximum permissible deflection dmax must not be exceeded. In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

### Linear Unit doesn’t include any safety stroke.
- Absolute stroke = Effective stroke + 2 x Safety stroke

### All dimensions in mm.
- Drawings scales are not equal.

### Defining of the linear unit length

**L** = Effective stroke + 2 x Safety stroke + $L_v$ + $A$ x (nc - 1) + 50 mm

$L_{total}$ = $L$ + 65.5 mm

- $nc$ - Number of carriages

### Multiple carriages

**A_{min} \leq A \leq A_{lim}**

- Carriages are connected with non-rigid galvanized steel plates.

<table>
<thead>
<tr>
<th>Carriage Type</th>
<th>SR-D 90 S</th>
<th>SR-D 90 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A_{min}$ (mm)</td>
<td>65</td>
<td>130</td>
</tr>
<tr>
<td>$A_{lim}$ (mm)</td>
<td>800</td>
<td>665</td>
</tr>
</tbody>
</table>

**Lubrication port position:**
- Long carriage: $L/2$
- Short carriage: $L/2 - 24.2$ mm

For lubrication port positions in the case of multiple carriages please contact us.

---

![Diagram Image]

---

![Diagram Image]
In order to improve the products in this catalog the specifications are subject to change without notice.

## DIMENSIONS

**SR-D 90 L**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Plate length [mm]</th>
<th>Weight [kg]</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 90 S</td>
<td>60</td>
<td>0.21</td>
<td>395-103669</td>
</tr>
<tr>
<td>SR-D 90 L</td>
<td>125</td>
<td>0.44</td>
<td>395-103668</td>
</tr>
</tbody>
</table>

Mounting elements for mounting the connection plate on the Linear unit are included.

Mounting the drive

- by the MOTOR SIDE DRIVE - MSD (Page 112)
- by the MOTOR ADAPTER WITH COUPLING (Page 120)

### CONNECTION PLATE

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Plate length [mm]</th>
<th>Weight [kg]</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 90 S</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR-D 90 L</td>
<td>125</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Connection Plate**

- Available on request.
- TAP / PIN holes available on request.
- TAP / PIN holes on the bottom of the profile. Drawing only for presentational use.

### Maximum travel speed as a function of the profile length ($V_{\text{max}} - L$ curves)

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**General technical data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage length</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Max. length</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 110 S</td>
<td>39</td>
<td>19800</td>
<td>650 118 235</td>
<td>4670 9390 310 90 50</td>
<td>1500</td>
<td>1410</td>
</tr>
<tr>
<td>SR-D 110 L</td>
<td>124</td>
<td>39600</td>
<td>1305 1680 1680</td>
<td>13080 18800 620 800 550</td>
<td>100</td>
<td>105</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us. Values for max. stroke are not valid for multiple carriages (equation of defining the linear unit length for particular size of the linear unit needs to be used).

**Recommended values of loads:**

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs = 5.0)

Modulus of elasticity

\[ E = 70000 \, \text{N} / \, \text{mm}^2 \]

**Operating conditions**

- Operating temp.: 0°C ~ +60°C
- Duty cycle: 100%

For operating temperature out of the presented range please contact us.

**General technical data for double carriage**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Max. length</th>
<th>Max. stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 110</td>
<td>S2</td>
<td>39600</td>
<td>1300 19.8 × A 19.8 × A</td>
<td>12940 18790 620 9.4 × A 6.5 × A</td>
<td>1500</td>
<td>1410</td>
</tr>
<tr>
<td>L2</td>
<td>79200</td>
<td>2600</td>
<td>39.6 × A 39.6 × A</td>
<td>26100 37600 1240 18.8 × A 13.0 × A</td>
<td>100</td>
<td>105</td>
</tr>
</tbody>
</table>

* A - Distance between carriages [mm]. More info on following pages.

**Presented values are for informational purposes only.** Exact values can be calculated by contacting a sales engineer.

**Ball Screw Drive data**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Ball screw</th>
<th>Max. rotational speed</th>
<th>Max. travel speed</th>
<th>No load torque Carriage:</th>
<th>Load constant</th>
<th>Max repeatability precision [mm]</th>
<th>Dynamic load capacity [N]</th>
<th>Max. Axial load [N]</th>
<th>Max. drive torque [N·m]</th>
<th>Min. stroke [mm]</th>
<th>Max. acceleration [m/s²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 110</td>
<td>4200</td>
<td>16 × 5</td>
<td>0.35</td>
<td>0.17 × nc 0.20 × nc 5</td>
<td>± 0.02</td>
<td>± 0.01</td>
<td>13150 8700</td>
<td>5.5 with Keyway 7.7 without Keyway</td>
<td>40</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 × 10</td>
<td>0.70</td>
<td>0.18 × nc 0.21 × nc 10</td>
<td>± 0.02</td>
<td>± 0.01</td>
<td>11500 6700</td>
<td>5.5 with Keyway 11.9 without Keyway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 × 16</td>
<td>1.12</td>
<td>0.23 × nc 0.26 × nc 16</td>
<td>± 0.02</td>
<td>± 0.01</td>
<td>8770 4200</td>
<td>5.5 with Keyway 11.9 without Keyway</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Max. travel speed depends on the length of the linear unit. see diagram for particular size of the linear unit. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.

2 The stated values are for strokes (and distances between the carriages A) up to 500mm. No Load Torque value increases with stroke (and with A) elongation.

nc - Number of carriages

3 For the ball nut with the preload of 2% please contact us

4 For minimum stroke below the stated value in the table above please contact us.
## TECHNICAL DATA

### Mass and mass moment of inertia

<table>
<thead>
<tr>
<th>Linear unit</th>
<th>Mass of linear unit</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 110 S</td>
<td>3.3 + 0.008 \times (\text{Abs. stroke} \times (\text{nc - 1}) \times A) + 0.63 \times (\text{nc - 1})</td>
<td>ly [ cm^4 ]</td>
</tr>
<tr>
<td>SR-D 110 L</td>
<td>4.6 + 0.008 \times (\text{Abs. stroke} \times (\text{nc - 1}) \times A) + 1.36 \times (\text{nc - 1})</td>
<td>29.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Linear unit</th>
<th>Ball screw</th>
<th>Mass moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 110 S</td>
<td>16 \times 5</td>
<td>0.70 + 0.005 \times (\text{Abs. stroke} \times (\text{nc - 1}) \times A) + 0.04 \times (\text{nc - 1})</td>
</tr>
<tr>
<td>SR-D 110 S</td>
<td>16 \times 10</td>
<td>0.82 + 0.005 \times (\text{Abs. stroke} \times (\text{nc - 1}) \times A) + 0.16 \times (\text{nc - 1})</td>
</tr>
<tr>
<td>SR-D 110 L</td>
<td>16 \times 16</td>
<td>1.07 + 0.005 \times (\text{Abs. stroke} \times (\text{nc - 1}) \times A) + 0.41 \times (\text{nc - 1})</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Linear unit</th>
<th>Ball screw</th>
<th>Mass moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 110 S</td>
<td>16 \times 5</td>
<td>1.19 + 0.005 \times (\text{Abs. stroke} \times (\text{nc - 1}) \times A) + 0.09 \times (\text{nc - 1})</td>
</tr>
<tr>
<td>SR-D 110 L</td>
<td>16 \times 10</td>
<td>1.45 + 0.005 \times (\text{Abs. stroke} \times (\text{nc - 1}) \times A) + 0.34 \times (\text{nc - 1})</td>
</tr>
<tr>
<td>SR-D 110 L</td>
<td>16 \times 16</td>
<td>1.99 + 0.005 \times (\text{Abs. stroke} \times (\text{nc - 1}) \times A) + 0.88 \times (\text{nc - 1})</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]
A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages

**Mass calculation doesn't include mass of motor, reduction gear, switches and clamps.**

---

### Deflection of the linear unit

**Fixed - fixed mounting**

**Fixed - free mounting**

<table>
<thead>
<tr>
<th>d</th>
<th>dmax</th>
<th>Lp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum deflection of the linear unit (mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum permissible deflection of the linear unit (mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsupported profile length (mm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The maximum permissible deflection dmax must not be exceeded. In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.

---

**SR-D 110**

In order to improve the products in this catalog the specifications are subject to change without notice.
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**DIMENSIONS**

**Defining of the linear unit length**

\[
L = \text{Effective stroke} + 2 \times \text{Safety stroke} + \text{Lv} + A \times (n_c - 1) + 51 \text{ mm} \]

\[
L_{\text{total}} = L + 74 \text{ mm}
\]

\(n_c\) - Number of carriages

- Left side (L)
  - \(L_v\) - Long carriage = 124 mm
  - \(L_v\) - Short carriage = 39 mm

- Right side (R)
  - Carriages are connected with non-rigid galvanized steel plates.

**Multiple carriages**

\(A_{\text{min}} \leq A \leq A_{\text{lim}}\)

<table>
<thead>
<tr>
<th></th>
<th>SR-D 110 S</th>
<th>SR-D 110 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A_{\text{min}}) (mm)</td>
<td>85</td>
<td>175</td>
</tr>
<tr>
<td>(A_{\text{lim}}) (mm)</td>
<td>800</td>
<td>885</td>
</tr>
</tbody>
</table>
In order to improve the products in this catalog the specifications are subject to change without notice.

**SR-D 110 L**

- **Connection Plate**
- **Linear Unit**
- **Plate length**
- **Weight**
- **Code**

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Plate length [mm]</th>
<th>Weight [kg]</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 110 S</td>
<td>60</td>
<td>0.37</td>
<td>395-000103671</td>
</tr>
<tr>
<td>SR-D 110 L</td>
<td>155</td>
<td>0.74</td>
<td>395-000103670</td>
</tr>
</tbody>
</table>

Mounting elements for mounting the connection plate on the Linear unit are included.

**Maximum travel speed as a function of the profile length (Vmax - L curves)**

**Mounting the drive**
- by the MOTOR SIDE DRIVE - MSD (Page 112)
- by the MOTOR ADAPTER WITH COUPLING (Page 120)

Available on request.
**TECHNICAL DATA**

### General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$C$ [N]</td>
<td>$M_x$ [Nm]</td>
<td>$M_y$ [Nm]</td>
<td>$M_z$ [Nm]</td>
</tr>
<tr>
<td>SR-D 145 S</td>
<td>S2</td>
<td>68400</td>
<td>3000</td>
<td>34.2 × A</td>
<td>34.2 × A</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>136800</td>
<td>6000</td>
<td>68.4 × A</td>
<td>68.4 × A</td>
</tr>
</tbody>
</table>

* For lengths / stroke over the stated value in the table above please contact us.
Values for max. stroke are not valid for multiple carriages (equation of defining the linear unit length for particular size of the linear unit needs to be used).

**Recommended values of loads:**

All the data of dynamic moments and load capacities stated in the upper table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor ($fs = 5.0$)

Modulus of elasticity

$$E = 70000 \text{ N/mm}^2$$

### General technical data for double carriage

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$C$ [N]</td>
<td>$M_x$ [Nm]</td>
<td>$M_y$ [Nm] $M_z$ [Nm]</td>
<td>$M_{max}$ [Nm]</td>
</tr>
<tr>
<td>SR-D 145 S</td>
<td>S2</td>
<td>68400</td>
<td>3000</td>
<td>34.2 × A $M_{max}$</td>
<td>34.2 × A $M_{max}$</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>136800</td>
<td>6000</td>
<td>68.4 × A $M_{max}$</td>
<td>68.4 × A $M_{max}$</td>
</tr>
</tbody>
</table>

* $A$ - Distance between carriages [mm]. More info on following pages.

**Presented values are for informational purposes only. Exact values can be calculated by contacting a sales engineer.**

### Ball Screw Drive data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Ball screw</th>
<th>Max. rotational speed</th>
<th>Max. travel speed</th>
<th>No load torque</th>
<th>Load constant</th>
<th>Max. repeatability precision</th>
<th>Dynamic load capacity</th>
<th>Max. Axial load</th>
<th>Max. drive torque</th>
<th>Min. stroke</th>
<th>Max. acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[d x l]</td>
<td>[rev/min]</td>
<td>[m/s]</td>
<td>$S$ [Nm]</td>
<td>$L$ [mm/rev]</td>
<td>[mm] ISO 7085-1</td>
<td>$C$ [N]</td>
<td>[N]</td>
<td>[N]</td>
<td>[mm]</td>
<td>[m/s²]</td>
</tr>
<tr>
<td>SR-D 145 L</td>
<td>20 x 5</td>
<td>3300</td>
<td>0.28</td>
<td>0.30 x nc</td>
<td>0.35 x nc</td>
<td>5 $\pm$ 0.02  $\pm$ 0.01</td>
<td>14800</td>
<td>14800</td>
<td>11.9 with Keyway</td>
<td>55</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>20 x 10</td>
<td>0.55</td>
<td>0.32 x nc</td>
<td>0.37 x nc</td>
<td>10 $\pm$ 0.02 $\pm$ 0.01</td>
<td>15900</td>
<td>13850</td>
<td>13.0 without Keyway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 x 20</td>
<td>1.10</td>
<td>0.45 x nc</td>
<td>0.50 x nc</td>
<td>20 $\pm$ 0.02 $\pm$ 0.01</td>
<td>16250</td>
<td>6930</td>
<td>13.0 with Keyway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 x 50</td>
<td>2.50</td>
<td>0.80 x nc</td>
<td>0.85 x nc</td>
<td>50 $\pm$ 0.02 $\pm$ 0.01</td>
<td>13000</td>
<td>2770</td>
<td>24.5 with Keyway</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Max. travel speed depends of the length of the linear unit, see diagram for particular size of the linear unit.
2. For travel speed and acceleration over the stated value in the table above or diagrams please contact us.
3. No Load Torque value increases with stroke (and with A) elongation.
4. Number of carriages
5. For the ball nut with the preload of 2% please contact us.
6. For minimum stroke below the stated value in the table above please contact us.

---

In order to improve the products in this catalog the specifications are subject to change without notice.
**TECHNICAL DATA**

**Mass and mass moment of inertia**

<table>
<thead>
<tr>
<th>Linear unit</th>
<th>Mass of linear unit</th>
<th>Planar moment of inertia</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 145 S</td>
<td>5.7 + 0.015 × (Abs. stroke + (nc - 1) × A) + 1.19 × (nc - 1)</td>
<td>85.3</td>
</tr>
<tr>
<td>SR-D 145 L</td>
<td>8.4 + 0.015 × (Abs. stroke + (nc - 1) × A) + 2.61 × (nc - 1)</td>
<td></td>
</tr>
</tbody>
</table>

**Ball screw Dynamic load**

<table>
<thead>
<tr>
<th>Version</th>
<th>Linear unit</th>
<th>Load capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2</td>
<td>34.2 × A</td>
<td>68400, 3000</td>
</tr>
</tbody>
</table>

**Max. travel speed**

Max. travel speed depends on the length of the linear unit, see diagram for particular size of the linear unit.

**Deflection of the linear unit**

The maximum permissible deflection \( d_{\text{max}} \) must not be exceeded. In the case that maximum deflection \( d \) exceeds the maximum permissible deflection \( d_{\text{max}} \) additional profile supports are needed.

**SR-D 145**

[Graphs and diagrams related to deflection and mass calculations are shown here.]

---

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

**DIMENSIONS**

**SR-D 145 LINEAR UNITS**

**Defining of the linear unit length**

\[ L = \text{Effective stroke} + 2 \times \text{Safety stroke} + L_v + A \times (n_c - 1) + 61 \text{ mm} \]

\[ L_{\text{total}} = L + 88.5 \text{ mm} \]

\( n_c \) - Number of carriages

**Multiple carriages**

<table>
<thead>
<tr>
<th>( A_{\text{min}} ) (mm)</th>
<th>( A \geq \text{Aim} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 145 S</td>
<td>100</td>
</tr>
<tr>
<td>SR-D 145 L</td>
<td>200</td>
</tr>
<tr>
<td>AIM (mm)</td>
<td>800</td>
</tr>
<tr>
<td>AIM (mm)</td>
<td>900</td>
</tr>
</tbody>
</table>

Carriages are connected with non-rigid galvanized steel plates.

**Left side (L)**

**Right side (R)**

Lv - Long carriage = 149 mm
Lv - Short carriage = 49 mm
In order to improve the products in this catalog the specifications are subject to change without notice.

**SR-D 145**

**LINEAR UNITS**

### DIMENSIONS

![Diagram of SR-D 145 Linear Units]

#### CONNECTION PLATE

**SR-D 145 L**

- **SR-D 145 S**
  - Plate length: 80 mm
  - Weight: 0.78 kg
  - Code: 395-000103673

- **SR-D 145 L**
  - Plate length: 190 mm
  - Weight: 1.54 kg
  - Code: 395-000103672

Mounting elements for mounting the connection plate on the Linear unit are included.

**SR-D 145**

- **Lubrication nipple DIN 3405D (both sides)**
- **Lubrication port position:**
  - Long carriage: L/2
  - Short carriage: L/2 - 46 mm

### Maximum travel speed as a function of the profile length (Vmax - L curves)

![Graphs showing maximum travel speed vs. profile length]

Mounting the drive:
- by the MOTOR SIDE DRIVE - MSD (Page 112)
- by the MOTOR ADAPTER WITH COUPLING (Page 120)

Available on request.
General technical data

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage length</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
<th>Max. stroke</th>
<th>Max. length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>C [N]</td>
<td>Mx [Nm]</td>
<td>My [Nm]</td>
<td>Mz [Nm]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR-D 200 S</td>
<td>80</td>
<td>49600</td>
<td>3220</td>
<td>450</td>
<td>800</td>
<td>10000</td>
<td>24510</td>
</tr>
<tr>
<td>SR-D 200 L</td>
<td>255</td>
<td>95200</td>
<td>6445</td>
<td>860</td>
<td>8680</td>
<td>20000</td>
<td>51540</td>
</tr>
</tbody>
</table>

* For lengths/stroke over the stated value in the table above please contact us.

Values for max. stroke are not valid for multiple carriages (equation of defining the linear unit length for particular size of the linear unit needs to be used).

Recommended values of loads:

All the data of dynamic moments and load capacities stated in the table are theoretical without considering any safety factor. The safety factor depends on the application and its requested safety. We recommend a minimum safety factor (fs > 5.0)

Modulus of elasticity

E = 70000 N / mm²

Operating conditions

<table>
<thead>
<tr>
<th>Operating temp.</th>
<th>Duty cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°C ~ +60°C</td>
<td>100%</td>
</tr>
</tbody>
</table>

For operating temperature out of the present range, please contact us.

General technical data for double carriage

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Carriage version</th>
<th>Dynamic load capacity</th>
<th>Dynamic moment</th>
<th>Max. permissible loads</th>
<th>Moved mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR-D 200</td>
<td>S2</td>
<td>99200</td>
<td>6440</td>
<td>49.6 x A</td>
<td>49.6 x A</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>198400</td>
<td>12980</td>
<td>99.2 x A</td>
<td>99.2 x A</td>
</tr>
</tbody>
</table>

* A - Distance between carriages (mm). More info on following pages.

Presented values are for informational purposes only. Exact values can be calculated by contacting a sales engineer.

Ball Screw Drive data

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>32 x 5</td>
<td>2150</td>
<td>0.18</td>
<td>0.60 x nc</td>
<td>0.70 x nc</td>
<td>5</td>
<td>10000</td>
<td>1600</td>
<td>450</td>
<td>308</td>
<td>3.11</td>
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<tr>
<td></td>
<td>32 x 10</td>
<td>3000</td>
<td>0.50</td>
<td>0.70 x nc</td>
<td>0.80 x nc</td>
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<td>4550</td>
<td>1750</td>
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<td>0.80 x nc</td>
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<td>3350</td>
<td>4550</td>
<td>1750</td>
<td>6.21</td>
</tr>
</tbody>
</table>

1 Max. travel speed depends on the length of the linear unit, see diagram for particular size of the linear unit.

2 The stated values are for strokes (and distances between the carriages A) up to 500mm.

No Load Torque value increases with stroke (and with A) elongation.

nc: Number of carriages

3 For the ball nut with the preload of 2% please contact us

4 For minimum stroke below the stated value in the table above please contact us.
### TECHNICAL DATA

**Mass and mass moment of inertia**

<table>
<thead>
<tr>
<th>Linear unit</th>
<th>Mass of linear unit</th>
<th>Planar moment of inertia</th>
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<td></td>
<td>[ kg ]</td>
<td>[ d × I ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[ cm² ]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[ cm² ]</td>
</tr>
<tr>
<td>SR-D 200 S</td>
<td>15.4 + 0.031 × (Abs. stroke + (nc - 1) × A) + 3.11 × (nc - 1)</td>
<td>417.4</td>
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<tr>
<td>SR-D 200 L</td>
<td>23.8 + 0.031 × (Abs. stroke + (nc - 1) × A) + 6.21 × (nc - 1)</td>
<td>3007.3</td>
</tr>
</tbody>
</table>

**Linear unit**

- **Ball screw**

<table>
<thead>
<tr>
<th>d × I</th>
<th>Mass moment of inertia [ 10^-6 kg m² ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 × 5</td>
<td>21.17 + 0.069 × (Abs. stroke + (nc - 1) × A) + 0.20 × (nc - 1)</td>
</tr>
<tr>
<td>32 × 10</td>
<td>21.76 + 0.069 × (Abs. stroke + (nc - 1) × A) + 0.79 × (nc - 1)</td>
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<tr>
<td>32 × 20</td>
<td>24.12 + 0.069 × (Abs. stroke + (nc - 1) × A) + 3.15 × (nc - 1)</td>
</tr>
<tr>
<td>32 × 32</td>
<td>29.04 + 0.069 × (Abs. stroke + (nc - 1) × A) + 8.07 × (nc - 1)</td>
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<tr>
<td>32 × 5</td>
<td>33.41 + 0.069 × (Abs. stroke + (nc - 1) × A) + 0.39 × (nc - 1)</td>
</tr>
<tr>
<td>32 × 10</td>
<td>34.59 + 0.069 × (Abs. stroke + (nc - 1) × A) + 1.57 × (nc - 1)</td>
</tr>
<tr>
<td>32 × 20</td>
<td>39.31 + 0.069 × (Abs. stroke + (nc - 1) × A) + 6.28 × (nc - 1)</td>
</tr>
<tr>
<td>32 × 32</td>
<td>49.12 + 0.069 × (Abs. stroke + (nc - 1) × A) + 16.11 × (nc - 1)</td>
</tr>
</tbody>
</table>

* Absolute stroke [mm]
A - Distance between carriages [mm]. More info on following pages.
nc - Number of carriages

**Deflection of the linear unit**

- **Fixed - fixed mounting**

- **Fixed - free mounting**

  
  The maximum permissible deflection dmax must not be exceeded. In the case that maximum deflection d exceeds the maximum permissible deflection dmax additional profile supports are needed.

**SR-D 200**

In order to improve the products in this catalog the specifications are subject to change without notice.
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**DIMENSIONS**

### Absolute stroke

- **LONG CARRIAGE**
  - Absolute stroke /2
  - M8x1.25 - 6H
  - 12 mm Deep (4x)

- **SHORT CARRIAGE**
  - Absolute stroke /2
  - M8x1.25 - 6H
  - 12 mm Deep (4x)

**Journal with or without Keyway.**

All dimensions in mm; Drawings scales are not equal.

**Defining of the linear unit length**

- **L** = Effective stroke + 2 × Safety stroke + Lv + A × (nc - 1) + 25 mm
- **L_{total}** = L + 218 mm

**Multiple carriages**

- **A ≥ Lv**

For the case of **A [mm] > Alim**:

- a toothed belt for the connection of the carriages will be used.

- the following condition must be met:
  - \( A [\text{mm}] = Alim + 10 \times i \)
  - where \( i \in \{1, 2, 3, \ldots\} \)

<table>
<thead>
<tr>
<th>BR-D 200 S</th>
<th>BR-D 200 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alim [mm]</td>
<td>1006</td>
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</tbody>
</table>

**Linear Unit doesn't include any safety stroke.**

- **Lubrication port position:**
  - Effective stroke = 2 × Safety stroke

For lubrication port positions in the case of multiple carriages please contact us.

Carriages are connected inside the profile with an aluminium plate (or a toothed belt for the case of longer distances A).

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**SR-D 200 LINEAR UNITS**

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## SR-D 200 LINEAR UNITS

### DIMENSIONS

![Diagram of SR-D 200 L and SR-D 200 S linear units]

- **SR-D 200 S**
  - Linear Unit: SR-D 200 S
  - Plate length: 190 mm
  - Weight: 2.32 kg
  - Code: 395-000103675

- **SR-D 200 L**
  - Linear Unit: SR-D 200 L
  - Plate length: 305 mm
  - Weight: 3.75 kg
  - Code: 395-000103674

*Mounting elements for mounting the connection plate on the Linear unit are included. Please consider our advice in our Maintenance- and assembly instructions.*

### CONNECTION PLATE

- **SR-D 200 L**
  - Slot nut T-10
  - DIN 562 - M5

- **SR-D 200 S**
  - Slot nut T-10
  - DIN 557 - M8

### Maximum travel speed as a function of the profile length (Vmax - L curves)

![Graph showing maximum travel speed as a function of profile length](image)

- **SR-D 200 S**
  - Maximum travel speed as a function of the profile length (Vmax - L curves)
  - Available on request.

### OPTIONAL: CENTERING RING

- **Centering Ring holes available on request.**
- **Centering Ring holes on the bottom of the Profile.**
  - Drawing only for presentational use.

---

<i>All dimensions in mm; Drawings scales are not equal.</i>
In order to improve the products in this catalog the specifications are subject to change without notice.

**STRUCTURAL DESIGN**

1. Cover
2. Attachment of pulley with clamping set
3. Anodized aluminium housing
4. Toothed belt
5. Belt tensioning system (elongation and frequency of belt span provided with delivery of unit)
6. Motor
7. Linear unit: SR-D / SR-S

The linear unit must be executed with drive journal without keyway, so that the MSD belt drive can be mounted on it.

**HOW TO ORDER**

Motor Side Drive:
- 395SD, SR0110D, 2B, 1.5, M40

Linear Unit:
- e.g. - SR0110D

Type:
- According to customer’s drawing

Motor type:
- See next page

Gear ratio:
- See next page

**TECHNICAL DATA AND DIMENSIONS**

SR-D / SR-S MOTOR SIDE DRIVE UNIT

LINEAR UNITS
### Linear Units

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Type</th>
<th>Gear ratio</th>
<th>Max. drive torque (linear unit)</th>
<th>Mass moment of inertia</th>
<th>Mass ***</th>
<th>øB</th>
<th>øC</th>
<th>ØG1</th>
<th>ØG2</th>
<th>øK</th>
<th>øL1</th>
<th>Keyway</th>
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<td>175</td>
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<td>70</td>
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<td>210</td>
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<td>4</td>
<td></td>
<td>35</td>
<td>59</td>
<td>&gt;10</td>
</tr>
</tbody>
</table>

- **: Max. radial load on shaft
- ***: Mass ***
- **M**: Gear ratio
- **L1**: Clamping set
- **øK**: Keyway

**Note:**
- For a bigger value an additional adapter plate is used. For the case of SR0040S a thicker plate may be used.
- **This is the load which is linearly dependent on the max. drive torque and is generated by the correct pretension of the belt. This load needs to be reduced in accordance with the capabilities of the motor.
- *****: This is an average value. It could differ depending to the motor dimensions.
- ******: Minimum dimension L1 depends on the size of particular clamping set. Values can be found in the table on page 114.

### Technical Data and Dimensions

#### Technical Data

- **Type Motor size limits (mm)**
  - **Max. drive torque (linear unit) | E (± 0.5) | L | F | G | G2 | K | N**
  - SR0040S
    - 1A 1 58.5 113 52 39 33 26 6
    - 1B 1.5 59
    - 2A 1 65 135 68 42 36 31 8
    - 2B 1.5 64.5
  - SR0060S
    - 1A 1 100 135 68 42 36 31 8
    - 1B 1.5 102 179 70 41 31 2
  - SR0090D
    - 1A 1 100 179 70 41 31 2
    - 1B 1.5 112
  - SR0110D
    - 2A 1 145 250 90 51 43 2
    - 2B 1.5 139
  - SR0145D
    - 1A 1 145 250 90 51 43 2
    - 1B 1.5 180 282
  - SR0150D
    - 2A 1 160 297 120 61 56 2.5
    - 2B 2 158
  - SR0200D
    - 1A 1 268 403 120 61 56 2.5
    - 1B 2 267

  * This is a standard value. It could differ depending to the motor dimensions M and L1.
In order to improve the products in this catalog the specifications are subject to change without notice.

## TECHNICAL DATA AND DIMENSIONS

Minimum dimension L1 [mm] depends on the motor shafts diameter øD

<table>
<thead>
<tr>
<th>Linear Unit</th>
<th>Type</th>
<th>Gear ratio</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>6.35</th>
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In order to improve the products in this catalog the specifications are subject to change without notice.
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General

The linear units are mounted by using fixtures which are placed in the slot on the side of the profile.

Linear Unit must be mounted by the aluminium profile!
CENTERING RINGS

CR 7
CR 9
CR 7 / 9
CR 9 / 12

SLOT NUTS

LINEAR UNITS - PROFILE

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LINEAR UNITS - CONNECTION PLATES

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In order to improve the products in this catalog the specifications are subject to change without notice.
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**BR-S / BT-S / SR-S**

- Magnetic field sensor
- Sensor holder

**SR-D / BR-D**

Mounting of Magnetic field sensor on SR-D and BR-D series requires a HOM sensor holder.
For SR-S 40 a HOM sensor holder is also needed. For SR-D/BR-D 200 a HOM sensor holder is not needed.

### SMT-65TP-K N0 / NC

**Code** | **Type** | **Compatibility**
--- | --- | ---
395-000043851 | HOM Sensor holder | SR-S 40, SR-D90, SR-D110, SR-D145, BR-D90, BR-D110, BR-D145
395-000077075 | SMT-65TP-K NC + HOM | SR-S 40, SR-D90, SR-D110, SR-D145, BR-D90, BR-D110, BR-D145

### TECHNICAL DATA

| Sensor Type | SMT-65TP-K NC | SMT-65TP-K NO |
--- | --- | ---
GMR sensor | GMR sensor |
NC | NO |
PNP | PNP |
10 ~ 28 V DC | 10 ~ 28 V DC |
200 mA max. | 200 mA max. |
5.5 W max. | 5.5 W max. |
1.5 V / 200mA max. | 1.5 V / 200mA max. |
10 mA / 24 V max. | 10 mA / 24 V max. |
1000 Hz | 1000 Hz |
-10 ~ +70°C | -10 ~ +70°C |
50 G / 9 G | 50 G / 9 G |
IP 67 | IP 67 |
yellow | Yellow |
M8, 3-pin | M8, 3-pin |
PU - 0.3 m | PU - 0.3 m |
Energy chain compliant | Energy chain compliant |

---

In order to improve the products in this catalog the specifications are subject to change without notice.
### BR-S / BT-S / SR-S

#### TECHNICAL DATA

- **Cable material length**: PU - 0.3 m
- **Electrical connection**: M8, 3-pin
- **LED indicator**: 1000 Hz
- **Protection class**: IP 67
- **Ambient temperature**: -10 ~ +70°C
- **Voltage Drop**: 1.5 V / 200 mA max.
- **Power rating**: 5.5 W max.
- **Switching Current**: 200 mA max.
- **Operating voltage**: 10 ~ 28 V DC
- **Switching function**: NC
- **Sensor Type**: Magnetic field sensor
- **Extension cable with connector**: Energy chain compliant - bending radius = 75 mm

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### SR-D / BR-D

#### TECHNICAL DATA

- **Protection class**: IEC 60529
- **Ambient temperature**: -5°C ... +80°C
- **Operating point accuracy**: ± 0.05 mm
- **Approach speed max.**: 45 m/min
- **Approach speed min.**: 0.01 m/min
- **Switching contact**: 1 changeover
- **Switching principle**: Snap-action
- **Rated voltage**: 250 V AC
- **Switching current, min. at**: 10 mA
- **Switching voltage**: 24 V DC
- **Cable entry**: M12 x 1.5

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### MS- Mechanical switch

#### TECHNICAL DATA

- **Protection class**: IP 67
- **Ambient temperature**: -25°C ... +70°C
- **Rated voltage**: 10 - 30 V DC
- **Switching Current**: 150 mA max.
- **Ambient temperature**: -25°C ... +70°C
- **Switching Frequency**: 800 Hz max.
- **Voltage Drop**: 3.5 V
- **Protection class**: IP 67
- **Electrical connection**: M8. 3-pin
- **Extension cable**: Energy chain compliant - bending radius = 75 mm
- **Cable material-length**: PU
- **Cable length**: 2m / 5m
- **Cable length**: M8. 3-pin Straight or Angled connector

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<td>Mechanical switch with</td>
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<td>BR-S/BT-S/SR-S/BR-Z 40</td>
</tr>
</tbody>
</table>

### IS- Inductive switch

#### TECHNICAL DATA

- **Sensor Type**: PNP
- **Switching function**: NC / NO
- **Rated voltage**: 10 ~ 30 V DC
- **Switching Current**: 150 mA max.
- **Ambient temperature**: -25°C ... +70°C
- **Switching Frequency**: 800 Hz max.
- **Voltage Drop**: 3.5 V
- **Protection class**: IP 67
- **Electrical connection**: M8. 3-pin
- **Extension cable**: Energy chain compliant - bending radius = 75 mm
- **Cable material-length**: PU
- **Cable length**: 2m / 5m
- **Cable length**: M8. 3-pin Straight or Angled connector

#### ORDERING CODES

<table>
<thead>
<tr>
<th>Component</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation block with fixing screws</td>
<td>395-000043256</td>
<td>SR-D/BR-D 60</td>
</tr>
<tr>
<td>Mechanical switch only</td>
<td>395-0000047921</td>
<td>SR-D/BR-D 60</td>
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<tr>
<td>Mechanical switch with</td>
<td>395-000040683</td>
<td>SR-D/BR-D 60</td>
</tr>
</tbody>
</table>

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In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

Motor adapter: __________
Linear Unit: __________
Motor type: __________
According to customer’s specification
Coupling type: __________
See below

**COUPLINGS**

Coupling type / size:
**7, 9, 14, 19/24, 24/28, 28/38, 38/45**

- **C**: with keyway
- Leave blank: without keyway

The maximum transmittable torque of the clamping hub depends on the bore diameter (see the upper table on page 121).

The values of nominal $T_{Kn}$** and max. $T_{kmax}$** transmissible torque in the upper table are valid for coupling with Keyway!

**for legend see page 121**

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### Recommended coupling bore diam. and Transmissible Torque [Nm] - valid for shaft tolerances k6 without Keyway

<table>
<thead>
<tr>
<th>Size</th>
<th>Ø4</th>
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<th>Ø6</th>
<th>Ø7</th>
<th>Ø8</th>
<th>Ø9</th>
<th>Ø10</th>
<th>Ø11</th>
<th>Ø12</th>
<th>Ø15</th>
<th>Ø16</th>
<th>Ø19</th>
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<tr>
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<td>1.7</td>
<td>1.9</td>
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</tbody>
</table>

**Ms** - Screw tightening torque

**W** - Weight

**J** - Coupling moment of inertia

**nmax** - Maximum rpm

**TKN** - Coupling nominal torque

**Tkmax** - Coupling maximum torque

The operating temperature range for the coupling is between -30 and +90°C

### SYNCHRONIZATION SHAFT OSL

The maximum transmissible torque of the clamping hub depends on the bore diameter (see the upper table on page 121).

### ACCESSORIES

**LINEAR UNITS**

![Image of linear unit](image)

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

The maximum transmittable torque of the clamping hub depends on the bore diameter (see the upper table on page 8.025.0).

<table>
<thead>
<tr>
<th>Size</th>
<th>d min [mm]</th>
<th>d max [mm]</th>
<th>Ws [Nm]</th>
<th>Mf [Nm]</th>
<th>L [mm]</th>
<th>I [mm]</th>
<th>H [mm]</th>
<th>Lw [mm]</th>
<th>Lt [mm]</th>
<th>D [mm]</th>
<th>r [mm]</th>
<th>e [mm]</th>
<th>dR [mm]</th>
<th>Weight [kg]</th>
<th>Moment of inertia [10^4 kg * m²]</th>
</tr>
</thead>
<tbody>
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<td>10</td>
<td>20</td>
<td>10</td>
<td>39</td>
<td>1630</td>
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<td>18</td>
<td>96</td>
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<td>14</td>
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<td>14540</td>
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<td>138</td>
<td>84</td>
<td>20</td>
<td>30</td>
<td>68</td>
</tr>
</tbody>
</table>

Ms  Screw tightening torque   Nm
MT  Maximum transmissible torque  Nm
CT  Torsional rigidity per meter  Nm/rad

**INSTALLATION**

The overall length Lt is best determined as the distance between shaft ends - length Lw plus 2x dimension H.

Ideal execution for long distance shaft connections. Torque transmission is zero backlash. Designed for lengths up to 4m without bearing support (depending on rotation speed).

Standard lengths available till 3m, for longer lengths please contact us.

**SELECTION DIAGRAM**

**HOW TO ORDER**

Type: 395SSL, 395SSR

Size:
SSL: 14, 19/24, 24/28, 28/38, 38/45
SSR: 19, 24, 28, 38

Linear unit series:
BR-S/BT-S/BR-E: 40, 65, 80, 110
BR-D: 90, 110, 145, 200
Leave blank: not for linear unit

Length type:
LM (Middle distance of the linear units)
Lt (Production length of the sync. shaft)

Option:
C: with keyway
Leave blank: w/o keyway

Hole diameter:
--- one side end hub¹
--- other side end hub²

Length [mm]
<table>
<thead>
<tr>
<th>X-Axis</th>
<th>Y-Axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-S, BT-S, SR-S 65</td>
<td>CP M40 0 M65 0</td>
</tr>
<tr>
<td>BR-S, BT-S, SR-S 80</td>
<td>CP M65 0 M80 0</td>
</tr>
<tr>
<td>BR-S, BT-S, SR-S 110</td>
<td>CP M110 0 M110 0</td>
</tr>
<tr>
<td>BR-E 40</td>
<td>CP E40 0 E40 0</td>
</tr>
<tr>
<td>SR-D, BR-D 90</td>
<td>CP C90 0 C90 0</td>
</tr>
<tr>
<td>SR-D, BR-D 110</td>
<td>CP C110 0 C110 0</td>
</tr>
<tr>
<td>SR-D, BR-D 145</td>
<td>CP C145 0 C145 0</td>
</tr>
<tr>
<td>SR-D, BR-D 200</td>
<td>CP C200 0 C200 0</td>
</tr>
</tbody>
</table>

In order to improve the products in this catalog the specifications are subject to change without notice.
In order to improve the products in this catalog the specifications are subject to change without notice.

Y- Axis BR-S, BT-S, SR-S, BR-E, SR-D, BR-D = 0°  Z-Axis = 90°

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>BR-S, BT-S, SR-S 40</td>
<td>CP M40 0 Z40</td>
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</tr>
<tr>
<td>BR-S, BT-S, SR-S 65</td>
<td>CP M65 0 Z40</td>
<td>CP M65 0 ZM65</td>
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<tr>
<td>BR-S, BT-S, SR-S 80</td>
<td>CP M80 0 Z40</td>
<td>CP M80 0 ZM80</td>
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<tr>
<td>BR-S, BT-S, SR-S 110</td>
<td>CP M110 0 Z40</td>
<td>CP M110 0 ZM110</td>
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<tr>
<td>BR-E 40</td>
<td>CP E40 0 Z40</td>
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<tr>
<td>SR-D, BR-D 90</td>
<td>CP C90 0 Z40</td>
<td>CP C90 0 ZM90</td>
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<tr>
<td>SR-D, BR-D 110</td>
<td>CP C110 0 Z40</td>
<td>CP C110 0 ZM110</td>
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<td>SR-D, BR-D 145</td>
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<tr>
<td>SR-D, BR-D 200</td>
<td>CP C200 0 Z200</td>
<td>CP C200 0 ZM200</td>
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</tbody>
</table>

Linear Unit must be mounted by the aluminium profile and not at the end blocks!
MULTI AXIS SYSTEMS

We offer all necessary fittings including brackets, clamping fixtures and adapter plates in order to build multi-axis systems. Beside standard elements we supply also custom fixing and connection elements manufactured in our workshop.
Mean load comparison factor $f_{vm}$ as a function of service life $L_{km}$

Diagrams and equations are valid for:
- BR-S series
- SR-S series
- BR-E series
- BR-Z series
- BR-D series
- SR-D series

Presented diagrams are showing theoretically determined service life of the linear guiding when mean load comparison factor $f_{vm}$ is taken into consideration.

Load comparison factor $f_v$:

$\text{Service life calculation:}$

$L_{km} = \left( \frac{1}{f_{vm}} \right)^3 \cdot 10^2$

$L_{km}$ Service life [km]

Safety factor $f_s$:

$f_s = \frac{1}{f_{vm}}$

$f_s$ Safety factor

The safety factor depends on the application and its requested safety. We recommend a minimum safety factor $f_s = 5.0$

Mean load comparison factor $f_{vm}$ calculation:

$f_{vm} = \sqrt[3]{\frac{\sum_i (f_{v1}^3 \times S1 + f_{v2}^3 \times S2 + \ldots + f_{vn}^3 \times Sn)}{S1 + S2 + \ldots + Sn}}$

$S_i$ i-th travel path of a given loading regime $f_v (s)$, $i \in \{1,2,\ldots,n\}$

Loading regime $f_v (s)$:

$\text{PERMISSIBLE LOAD FACTOR } f_p - \text{LINEAR GUIDING}$

$f_p = \frac{|F_{y1}|}{F_{py}} + \frac{|F_{z1}|}{F_{pz}} + \frac{|M_{x1}|}{M_{px}} + \frac{|M_{y1}|}{M_{py}} + \frac{|M_{z1}|}{M_{pz}} \leq 1$

$F_{py}$ Max. permissible force in the y axis N
$F_{pz}$ Max. permissible force in the z axis N
$M_{px}$ Max. permissible moment about the x axis Nm
$M_{py}$ Max. permissible moment about the y axis Nm
$M_{pz}$ Max. permissible moment about the z axis Nm
Applied mean axial force $F_{am}$ as a function of service life $L_{km}$

\[ F_{am} = \frac{3 \sum |F_{a1}|^3 s_1 + |F_{a2}|^3 s_2 + \ldots + |F_{an}|^3 s_n}{s_1 + s_2 + \ldots + s_n} \]

$F_{am}$: Mean axial force
$F_{ai}$: i-th axial force of a given loading regime $F_a(s)$, $i \in \{1,2,\ldots,n\}$
$s_i$: i-th travel path of a given loading regime $F_a(s)$, $i \in \{1,2,\ldots,n\}$

Diagrams presented above are showing theoretically determined service life of the ball screw when mean axial force $F_{am}$ is taken into consideration.

Diagrams and equations are valid for:
- SR-S series
- SR-D series

In order to improve the products in this catalog the specifications are subject to change without notice.
Mean axial force $F_{am}$ calculation:

$$\left|F_{a1}\right| \cdot x_{s1} + \left|F_{a2}\right| \cdot x_{s2} + \ldots + \left|F_{an}\right| \cdot x_{sn}$$

$$s_1 + s_2 + \ldots + s_n$$

$$F_{am} = \frac{\sum_{i=1}^{n} \left|F_{ai}\right| \cdot x_{si}}{\sum_{i=1}^{n} s_i}$$

Loading regime $F_{a}(s)$:

Diagrams presented above are showing theoretically determined service life of the ball screw when mean axial force $F_{am}$ is taken into consideration.

Diagrams and equations are valid for:

- SR-S series
- SR-D series