Linear Drive with Toothed Belt and Integrated Guide
– with Recirculating Ball Bearing Guide
– with Roller Guide
Series OSP-E..BHD

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The latest generation of high capacity linear drives, the OSP-E..BHD series combines robustness, precision and high performance. The aesthetic design is easily integrated into any machine constructions by virtue of extremely adaptable mountings.

Linear Drive with Toothed Belt - selective with Integrated Recirculating Ball Bearing Guide or Integrated Roller Guide

Advantages:
- Accurate path and position control
- High force output
- High speed operation
- High load capacity
- Easy installation
- Low maintenance
- Ideal for multi-axis applications

Features:
- Integrated recirculating ball bearing guide or integrated roller guide
- Diverse range of multi-axis connection elements
- Diverse range of accessories and mountings
- Complete motor and control packages
- Optional integrated planetary gearbox
- Special options on request

To simplify design work OSP-E system CAD files are available, which are compatible with most common CAD systems.
**Features**

**Drive Shaft Versions**
- Clamp Shaft
- Plain Shaft

**Drive Shaft OPTIONS**
- Clamp Shaft and Plain Shaft

- Hollow Shaft with Keyway

**OPTION**
- Integrated planetary gearbox

- Highly compact and rigid solution fully integrated in the drive cap housing
- Purpose designed for the BHD series
- Available with three standard ratios (3, 5 and 10)
- Very low backlash
- A wide range of available motor flanges

The dovetailed mounting rails of the new linear actuator expand its function into that of a universal system carrier. Modular system components are simply clamped on.

**OSP-E Series Electric Linear Drives and Guides**

**Toothed Belt**

- **Clamp Shaft**
- **Plain Shaft**
- **Hollow Shaft with Keyway**

**Corrosion resistant steel sealing band**

**Threaded mounting holes**
compatible with Proline series

**Steel runner block**
with integrated scraper system and grease nipples

**Carriage**

**Rollers on needle bearings**
for smooth operation up to 10 m/s.

**Slotted profile with dovetail grooves**

**Permanent magnet**
for contactless position sensing

**MULTI-AXIS SYSTEMS**
A wide range of adapter plates and intermediate drive shafts simplify engineering and installation

**BI-PARTING Version**
for perfectly synchronised bi-parting movements.

**Version with Integrated Recirculating Ball Bearing Guide**

**Version with Integrated Roller guide**

**Catalog 0950**

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parkeroriga.com
SERIES OSP-E, LINEAR DRIVE WITH TOOTHED BELT AND INTEGRATED GUIDE

STANDARD VERSIONS
OSP-E..BHD
Version with Recirculating Ball Bearing Guide
Pages 15-19
Version with Roller Guide
Pages 20-23

Standard carrier with integrated guide and magnets for contactless position sensing. Dovetail profile for mounting of accessories and the actuator itself.

OPTIONS
TANDEM
Page 18
For higher moment support.

BI-PARTING VERSION
Page 18
For perfectly synchronised bi-parting movements.

END CAP MOUNTING
Page 128
For mounting the drives on the end cap.

MID-SECTION SUPPORT
Page 134
For supporting long drives or mounting the linear drives on dovetail grooves.

MAGNETIC SWITCHES
TYPE RS AND ES
Page 153
For contactless position sensing of end stop and intermediate carrier positions.

MULTI-AXIS SYSTEMS
Page 86
For modular assembly of linear drives up to multi-axis systems.

ACCESSORIES
MOTOR MOUNTINGS
Page 120

DRIVE SHAFT WITH CLAMP SHAFT

DRIVE SHAFT WITH PLAIN SHAFT

ACTUATING DIRECTION
Page 172
Important in parallel operations, e.g. with intermediate drive shaft

HOLLOW SHAFT WITH KEYWAY
For close coupling of motors and external gears.

MAGNETIC SWITCHES
TYPE RS AND ES
Page 153
For contactless position sensing of end stop and intermediate carrier positions.

MULTI-AXIS SYSTEMS
Page 86
For modular assembly of linear drives up to multi-axis systems.

INTEGRATED PLANETARY GEARBOX
Page 19
For compact installation and very low backlash.

The right to introduce technical modifications is reserved.
### Linear Drive with Toothed Belt and Integrated Recirculating Ball Bearing Guide

**Series** OSP-E..BHD  
**Size** 20 to 50

#### General Features

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symbol</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Series</strong></td>
<td>OSP..BHD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Name</strong></td>
<td></td>
<td></td>
<td>Linear Drive with Toothed Belt and integrated recirculating ball bearing guide</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td></td>
<td></td>
<td>See drawings</td>
</tr>
<tr>
<td><strong>Ambient-</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td></td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td><strong>θ_min</strong></td>
<td></td>
<td></td>
<td>-30</td>
</tr>
<tr>
<td><strong>θ_max</strong></td>
<td></td>
<td></td>
<td>+80</td>
</tr>
<tr>
<td><strong>Weight (mass)</strong></td>
<td></td>
<td>kg</td>
<td>See table</td>
</tr>
<tr>
<td><strong>Installation</strong></td>
<td></td>
<td></td>
<td>In any position</td>
</tr>
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</table>

#### Material

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slotted profile</td>
<td>Extruded anodized aluminium</td>
</tr>
<tr>
<td>Toothed belt</td>
<td>Steel-corded polyurethane</td>
</tr>
<tr>
<td>Pulley</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Guide</td>
<td>Recirculating Ball Bearing Guide</td>
</tr>
<tr>
<td>Guide rail</td>
<td>Hardened steel rail with high precision, accuracy class N</td>
</tr>
<tr>
<td>Guide carrier</td>
<td>Steel carrier with integrated wiper system, grease nipples, preloaded 0.02 x C, accuracy class H</td>
</tr>
<tr>
<td>Sealing band</td>
<td>Hardened, corrosion resistant steel</td>
</tr>
<tr>
<td>Screws, nuts</td>
<td>Zinc plated steel</td>
</tr>
<tr>
<td>Mountings</td>
<td>Zinc plated steel and aluminium</td>
</tr>
<tr>
<td><strong>Encapsulation class</strong></td>
<td>IP 54</td>
</tr>
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</table>

#### Weight (mass) and Inertia

<table>
<thead>
<tr>
<th>Series</th>
<th>Weight [kg]</th>
<th>Add per metre stroke Moving mass</th>
<th>Inertia [x 10^6 kgm^2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSP-E20BHD</td>
<td>2.8</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td>OSP-E25BHD</td>
<td>4.3</td>
<td>4.5</td>
<td>1.5</td>
</tr>
<tr>
<td>OSP-E32BHD</td>
<td>8.8</td>
<td>7.8</td>
<td>2.6</td>
</tr>
<tr>
<td>OSP-E50BHD</td>
<td>26</td>
<td>17</td>
<td>7.8</td>
</tr>
<tr>
<td>OSP-E20BHD*</td>
<td>4.3</td>
<td>4</td>
<td>1.5</td>
</tr>
<tr>
<td>OSP-E25BHD*</td>
<td>6.7</td>
<td>4.5</td>
<td>2.8</td>
</tr>
<tr>
<td>OSP-E32BHD*</td>
<td>13.5</td>
<td>7.8</td>
<td>5.2</td>
</tr>
<tr>
<td>OSP-E50BHD*</td>
<td>40</td>
<td>17</td>
<td>15</td>
</tr>
</tbody>
</table>

* Version: Tandem and Bi-parting (Option)

#### Installation Instructions

Use the threaded holes in the end cap for mounting the linear drive. Check if mid-section supports are needed using the maximum allowable unsupported length graph on page 17. At least one end cap must be secured to prevent axial sliding when mid-section support is used.

#### Maintenance

Depending on operating conditions, inspection of the linear drive is recommended after 12 months or 3000 km operation. Please refer to the operating instructions supplied with the drive.

**First service start-up**

The maximum values specified in the technical data sheet for the different products must not be exceeded. Before taking the linear drive machine into service, the user must ensure the adherence to the EC Machine Directive 91/368/EEC.

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Parker Hannifin Corporation  
Parker-Origa  
Glendale Heights, Illinois  
www.parkeroriga.com
Sizing Performance Overview

Maximum Loadings

Sizing of Linear Drive

The following steps are recommended:

1. Determination of the lever arm length \( l_x \), \( l_y \), and \( l_z \) from \( m_e \) to the center axis of the linear drive.

2. Calculation of the load \( F_x \) or \( F_y \) to the carrier caused by \( m_e \):

\[
F = m_e \cdot g
\]

3. Calculation of the static and dynamic force \( F_A \) which must be transmitted by the toothed belt:

\[
F_{A_{\text{horizontal}}} = F_x + F_y = m_y \cdot a + M_0 \cdot \frac{2\pi}{UZR}
\]

\[
F_{A_{\text{vertical}}} = F_x + F_y + F_0 = m_y \cdot g + m_y \cdot a + M_0 \cdot \frac{2\pi}{UZR}
\]

4. Calculation of all static and dynamic moments \( M_x \), \( M_y \), and \( M_z \) which occur in the application:

\[
M = F \cdot l
\]

5. Selection of maximum permissible loads via Table T3.

6. Calculation and checking of the combined load, which must not be higher than 1.

7. Checking of the maximum torque that occurs at the drive shaft in Table T2.

8. Checking of the required action force \( F_A \) with the permissible load value from Table T1.

For motor sizing, the effective torque must be determined, taking into account the cycle time.

Legend

- \( l \) = distance of a mass in the \( x \)-, \( y \)- and \( z \)-direction from the guide [m]
- \( m_e \) = external moved mass [kg]
- \( m_L \) = moved mass of linear drive [kg]
- \( m_y \) = total moved mass \( (m_e + m_L) \) [kg]
- \( F_x \) = load exerted on the carrier in dependence of the installation position [N]
- \( F_A \) = action force [N]
- \( M_0 \) = no-load torque [Nm]
- \( U_{ZR} \) = circumference of the pulley (linear movement per revolution) [m]
- \( g \) = gravity [m/s²]
- \( a_{\text{max}} \) = maximum acceleration [m/s²]

Maximum Permissible Torque on Drive Shaft

<table>
<thead>
<tr>
<th>Speed / Stroke</th>
<th>OSP-E20BHD</th>
<th>OSP-E25BHD</th>
<th>OSP-E32BHD</th>
<th>OSP-E50BHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed [m/s]</td>
<td>Torque [Nm]</td>
<td>Stroke [m]</td>
<td>Torque [Nm]</td>
<td>Stroke [m]</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>2</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>8</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>22</td>
</tr>
</tbody>
</table>

Important:
The maximum permissible moment on the drive shaft is the lowest value of the speed- or stroke-dependent moment value.

Example above:
OSP-E25BHD, stroke 5 m, required speed 3 m/s from table T2
speed 3 m/s gives 25 Nm and stroke 5 m gives 21 Nm. Max. torque for this application is 21 Nm.
When sizing Bi-parting units: for ordering stroke see page 18.

Maximum Permissible Loads

<table>
<thead>
<tr>
<th>Series</th>
<th>Max. applied load Fy[N]</th>
<th>Max. moments [Nm]</th>
<th>Max. moments [Nm]</th>
<th>Max. moments [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSP-E20BHD</td>
<td>1600</td>
<td>20</td>
<td>25</td>
<td>32</td>
</tr>
<tr>
<td>OSP-E25BHD</td>
<td>2000</td>
<td>9.5</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>OSP-E32BHD</td>
<td>5000</td>
<td>4.8</td>
<td>9.5</td>
<td>17</td>
</tr>
<tr>
<td>OSP-E50BHD</td>
<td>12000</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Tightening for Clamp Hub

<table>
<thead>
<tr>
<th></th>
<th>20</th>
<th>25</th>
<th>32</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHD</td>
<td>4.8</td>
<td>9.5</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>BHDII</td>
<td>4.8</td>
<td>9.5</td>
<td>17</td>
<td>40</td>
</tr>
<tr>
<td>BV</td>
<td>4.8</td>
<td>9.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Combined Loads
If the linear drive is subjected to several forces, loads and moments at the same time, the maximum load is calculated with the equation shown here. The maximum permissible loads must not be exceeded.

**Equation for Combined Loads**

\[
\frac{F_y}{F_y \text{ (max)}} + \frac{F_z}{F_z \text{ (max)}} + \frac{M_x}{M_x \text{ (max)}} + \frac{M_y}{M_y \text{ (max)}} + \frac{M_z}{M_z \text{ (max)}} \leq 1
\]

The total of the loads must not exceed >1 under any circumstances.

**Maximum Permissible Unsupported Length – Placing of Mid-Section Support**

*For Bi-parting version the max. load \( F \) is the total load of both carriers

\[F = F_{\text{carrier } 1} + F_{\text{carrier } 2}\]

\[k = \text{Max. permissible distance between mountings/mid-section support for a given load } F.\]

When loadings are below or up to the curve in the graph below the deflection will be max. 0.01 % of distance \( k \).

---

**Maximum Permissible Unsupported Length**

**Stroke Length**

The stroke lengths of the linear drives are available in multiples of 1 mm up to 5700 mm.

Other stroke lengths are available on request.

The end of stroke must not be used as a mechanical stop.

Allow an additional safety clearance at both ends equivalent to the linear movement of one revolution of the drive shaft, but at least 100 mm.

The use of an AC motor with frequency converter normally requires a larger clearance than that required for servo systems.

For advice, please contact your local PARKER-ORIGA technical support department.

* For Bi-parting version the max. load \( F \) is the total load of both carriers

\[F = F_{\text{carrier } 1} + F_{\text{carrier } 2}\]

\[k = \text{Max. permissible distance between mountings/mid-section support for a given load } F.\]
## Technical Data

### Linear Drive with Toothed Belt and integrated Recirculating Ball Bearing Guide – Basic Unit

**Series OSP-E..BHD**

Drive Shaft versions with:
- clamp shaft
- plain shaft
- clamp shaft with plain shaft (Option)

### Dimension Table [mm]

<table>
<thead>
<tr>
<th>Series</th>
<th>KB*</th>
<th>KC</th>
<th>KL</th>
<th>KT</th>
<th>KU x KJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSP-E20BHD</td>
<td>12°</td>
<td>13.8</td>
<td>4</td>
<td>65.7</td>
<td>M6 x 8</td>
</tr>
<tr>
<td>OSP-E25BHD</td>
<td>16°</td>
<td>18.3</td>
<td>5</td>
<td>82</td>
<td>M8 x 8</td>
</tr>
<tr>
<td>OSP-E32BHD</td>
<td>22°</td>
<td>24.8</td>
<td>6</td>
<td>106</td>
<td>M10 x 12</td>
</tr>
<tr>
<td>OSP-E50BHD</td>
<td>32°</td>
<td>35.3</td>
<td>10</td>
<td>144</td>
<td>M12 x 19</td>
</tr>
</tbody>
</table>

### Hollow shaft with keyway (Option)

**Dimension Table [mm]**

<table>
<thead>
<tr>
<th>Series</th>
<th>KB*</th>
<th>KC</th>
<th>KL</th>
<th>KT</th>
<th>KU x KJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSP-E20BHD</td>
<td>12°</td>
<td>13.8</td>
<td>4</td>
<td>65.7</td>
<td>M6 x 8</td>
</tr>
<tr>
<td>OSP-E25BHD</td>
<td>16°</td>
<td>18.3</td>
<td>5</td>
<td>82</td>
<td>M8 x 8</td>
</tr>
<tr>
<td>OSP-E32BHD</td>
<td>22°</td>
<td>24.8</td>
<td>6</td>
<td>106</td>
<td>M10 x 12</td>
</tr>
<tr>
<td>OSP-E50BHD</td>
<td>32°</td>
<td>35.3</td>
<td>10</td>
<td>144</td>
<td>M12 x 19</td>
</tr>
</tbody>
</table>

### Hollow shaft with keyway (Option)

#### Option – Tandem

**Series OSP-E..BHD**

**Order stroke** = required travel + KM min + 2 x safety distance

#### Option – Bi-Parting

**Series OSP-E..BHD**

**Order stroke** = 2 x required travel + KM min + 2 x safety distance

### Notes:

1) The mechanical end position must not be used as a mechanical end stop. Allow an additional safety clearance at both ends equivalent to the linear movement of one revolution of the drive shaft, but at least 100 mm.

2) The use of an AC motor with a frequency converter normally requires a larger safety clearance than that required for servo systems.

For further information please contact your local PARKER-ORIGA representative.

### Other dimensions for KS and KB for special drive shafts on request – see order instructions.
Series OSP-E..BHD – with Integrated Planetary Gearbox (Option)

Performance Overview

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Unit Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>OSP-E25BHD</td>
</tr>
<tr>
<td>Ratio (1-stage)</td>
<td>i</td>
</tr>
<tr>
<td>Max. axial load</td>
<td>$F_{\text{max}}$ [N]</td>
</tr>
<tr>
<td>Torsional rigidity (i=5)</td>
<td>$C_{\text{t,21}}$ [Nm/arcmin]</td>
</tr>
<tr>
<td>Torsional rigidity (i=3/10)</td>
<td>$C_{\text{t,21}}$ [Nm/arcmin]</td>
</tr>
<tr>
<td>Torsional backlash</td>
<td>$J_t$ [arcmin]</td>
</tr>
<tr>
<td>Linear motion per revolution of drive shaft</td>
<td>[mm]</td>
</tr>
<tr>
<td>Nominal input speed</td>
<td>$n_{\text{nom}}$ [min$^{-1}$]</td>
</tr>
<tr>
<td>Max. input speed</td>
<td>$n_{\text{max}}$ [min$^{-1}$]</td>
</tr>
<tr>
<td>No-load torque at Nominal input speed</td>
<td>$T_{\text{diz}}$ [Nm]</td>
</tr>
<tr>
<td>Lifetime</td>
<td>[h]</td>
</tr>
<tr>
<td>Efficiency</td>
<td>$\eta$ [%]</td>
</tr>
<tr>
<td>Noise level</td>
<td>$L_{PA}$ [db]</td>
</tr>
</tbody>
</table>

Dimensions

Dimension Table [mm] and additional Weight

<table>
<thead>
<tr>
<th>Series</th>
<th>NA</th>
<th>NB</th>
<th>NC</th>
<th>Weight (Mass) [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSP-E25BHD</td>
<td>49</td>
<td>43</td>
<td>76</td>
<td>2.6</td>
</tr>
<tr>
<td>OSP-E32BHD</td>
<td>62</td>
<td>47</td>
<td>92</td>
<td>4.9</td>
</tr>
<tr>
<td>OSP-E50BHD</td>
<td>79.5</td>
<td>49.5</td>
<td>121</td>
<td>9.6</td>
</tr>
</tbody>
</table>

Integrated Planetary Gearbox

Features
- Highly compact and rigid solution fully integrated in the drive cap housing
- Purpose designed for the BHD series.
- Available with three standard ratios (3, 5 and 10)
- Very low backlash
- A wide range of available motor flanges

Please contact your local PARKER-ORIGA technical support for available motor flanges.

For motors and controllers, see separate catalogue “Drive technology for electric linear drives OSP-E”.

Material:
Aluminium (AL-H) / Steel (St-H)

Standard Version:
- Gearbox on opposite side to carrier.

Note:
When ordering, specify model/type of motor and manufacturer for correct motor flange.
Linear Drive with Toothed Belt and Integrated Roller Guide

Series OSP-E..BHD
Size 25, 32, 50

Standard Versions
• Toothed Belt Drive with integrated Recirculating Ball Bearing Guide
• Drive Shaft with clamp shaft or plain shaft
• Choice of motor mounting side
• Dovetail profile for mounting of accessories and the drive itself

Options
• Tandem version for higher moments
• Bi-parting version for synchronised movements
• Integrated planetary gearbox
• Drive shaft with
  – clamp shaft and plain shaft
  – hollow shaft with keyway
• Special drive shaft versions on request

Material

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Symbol</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slotted profile</td>
<td></td>
<td></td>
<td>Extruded anodized aluminium</td>
</tr>
<tr>
<td>Toothed belt</td>
<td></td>
<td></td>
<td>Steel-corded polyurethane</td>
</tr>
<tr>
<td>Pulley</td>
<td></td>
<td></td>
<td>Aluminium</td>
</tr>
<tr>
<td>Guide</td>
<td></td>
<td></td>
<td>Roller Guide</td>
</tr>
<tr>
<td>Guide rail</td>
<td></td>
<td></td>
<td>Aluminium</td>
</tr>
<tr>
<td>Track</td>
<td></td>
<td></td>
<td>High alloyed steel</td>
</tr>
<tr>
<td>Roller cartridge</td>
<td></td>
<td></td>
<td>Steel rollers in aluminium housing</td>
</tr>
<tr>
<td>Sealing band</td>
<td></td>
<td></td>
<td>Hardened, corrosion resistant steel</td>
</tr>
<tr>
<td>Screws, nuts</td>
<td></td>
<td></td>
<td>Zinc plated steel</td>
</tr>
<tr>
<td>Mountings</td>
<td></td>
<td></td>
<td>Zinc plated steel and aluminium</td>
</tr>
</tbody>
</table>

Encapsulation class
IP 54

Weight (mass) and Inertia

<table>
<thead>
<tr>
<th>Series</th>
<th>Weight (mass) [kg] at stroke 0 m ad per metre stroke</th>
<th>Moving mass at stroke 0 m ad per metre stroke</th>
<th>Inertia [x 10^4 kgm^2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSP-E25BHD</td>
<td>3.8 4.3</td>
<td>1.0</td>
<td>984 197</td>
</tr>
<tr>
<td>OSP-E32BHD</td>
<td>7.7 6.7</td>
<td>1.9</td>
<td>3498 438</td>
</tr>
<tr>
<td>OSP-E50BHD</td>
<td>22.6 15.2</td>
<td>4.7</td>
<td>19690 1489</td>
</tr>
<tr>
<td>OSP-E25BHD*</td>
<td>5.7 4.3</td>
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<td>1805 197</td>
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<td>OSP-E32BHD*</td>
<td>11.3 6.7</td>
<td>3.8</td>
<td>6358 438</td>
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<td>OSP-E50BHD*</td>
<td>31.7 15.2</td>
<td>9.4</td>
<td>34274 1489</td>
</tr>
</tbody>
</table>

*Version: Tandem and Bi-parting (Option)

Installation Instructions

Use the threaded holes in the end cap for mounting the linear drive.
Check if mid-section supports are needed using the maximum allowable unsupported length graph on page 17. At least one end cap must be secured to prevent axial sliding when mid-section support is used.

Maintenance

All moving parts are lifetime-lubricated. Depending on operating conditions, inspection of the linear drive is recommended after 12 months or 3000 km operation. Please refer to the operating instructions supplied with the drive.

First service start-up

The maximum values specified in the technical data sheet for the different products must not be exceeded. Before taking the linear drive machine into service, the user must ensure the adherence to the EC Machine Directive 91/368/EEC.
## Performance Overview
### Characteristics

<table>
<thead>
<tr>
<th>Series</th>
<th>Unit Description</th>
<th>OSP-E25BHD</th>
<th>OSP-E32BHD</th>
<th>OSP-E50BHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. speed [m/s]</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Linear motion per revolution drive shaft [mm]</td>
<td>180</td>
<td>240</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>Max. rpm. drive shaft [min⁻¹]</td>
<td>3000</td>
<td>2500</td>
<td>1700</td>
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</tr>
<tr>
<td>Max. effective action force $F_a$ &lt; 1 m/s: [N]</td>
<td>1070</td>
<td>1870</td>
<td>3120</td>
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<tr>
<td>at speed &gt; 3-10 m/s: [N]</td>
<td>890</td>
<td>1560</td>
<td>2660</td>
<td></td>
</tr>
<tr>
<td>No-load torque [Nm]</td>
<td>1.2</td>
<td>2.2</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>Max. acceleration/deceleration [m/s²]</td>
<td>±0.05</td>
<td>±0.05</td>
<td>±0.05</td>
<td></td>
</tr>
<tr>
<td>Max. standard stroke length [mm]</td>
<td>7000</td>
<td>7000</td>
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</tr>
</tbody>
</table>

## Maximum Permissible Torque on Drive Shaft Speed and Stroke

<table>
<thead>
<tr>
<th>Speed [m/s]</th>
<th>Torque [Nm]</th>
<th>Stroke [m]</th>
<th>Torque [Nm]</th>
<th>Stroke [m]</th>
<th>Torque [Nm]</th>
<th>Stroke [m]</th>
<th>Torque [Nm]</th>
<th>Stroke [m]</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>31</td>
<td>1</td>
<td>31</td>
<td>1</td>
<td>71</td>
<td>1</td>
<td>71</td>
<td>1</td>
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<tr>
<td>2</td>
<td>28</td>
<td>2</td>
<td>31</td>
<td>2</td>
<td>65</td>
<td>2</td>
<td>71</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>3</td>
<td>31</td>
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<td>59</td>
<td>3</td>
<td>60</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>23</td>
<td>4</td>
<td>25</td>
<td>4</td>
<td>56</td>
<td>4</td>
<td>47</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>22</td>
<td>5</td>
<td>21</td>
<td>5</td>
<td>52</td>
<td>5</td>
<td>38</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>21</td>
<td>6</td>
<td>17</td>
<td>6</td>
<td>50</td>
<td>6</td>
<td>32</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>19</td>
<td>7</td>
<td>15</td>
<td>7</td>
<td>47</td>
<td>7</td>
<td>28</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>18</td>
<td>8</td>
<td>13</td>
<td>8</td>
<td>44</td>
<td>8</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>17</td>
<td>9</td>
<td>11</td>
<td>9</td>
<td>42</td>
<td>9</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>16</td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>39</td>
<td>10</td>
<td>21</td>
<td>10</td>
</tr>
</tbody>
</table>

**Important:**
The maximum permissible moment on the drive shaft is the lowest value of the speed- or stroke-dependent moment value.

**Example above:**
OSP-E25BHD, stroke 5 m, required speed 3 m/s from table T2.
Speed 3 m/s gives 25 Nm and stroke 5 m gives 21 Nm. Max. torque for this application is 21 Nm.

When sizing Bi-parting units: for ordering stroke see page 23.

## Maximum Permissible Loads

<table>
<thead>
<tr>
<th>Series</th>
<th>Max. applied load $F_y$, $F_z$ [N]</th>
<th>Max. moments [Nm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mx</td>
</tr>
<tr>
<td>OSP-E25BHD</td>
<td>986</td>
<td>11</td>
</tr>
<tr>
<td>OSP-E32BHD</td>
<td>1348</td>
<td>19</td>
</tr>
<tr>
<td>OSP-E50BHD</td>
<td>3704</td>
<td>87</td>
</tr>
</tbody>
</table>

## Sizing Performance Overview
### Maximum Loads

**Sizing of Linear Drive**

The following steps are recommended:
1. Determination of the lever arm length $l_x$, $l_y$ and $l_z$ from $m_e$ to the center axis of the linear drive.
2. Calculation of the load $F_x$ or $F_y$ to the carrier caused by $m_e$.
   $$F = m_e \cdot g$$
3. Calculation of the static and dynamic force $F_a$ which must be transmitted by the toothed belt.
   $$F_{A(\text{horizontal})} = F + F_a = m_g \cdot a + M_0 \cdot \frac{2\pi}{UZR}$$
   $$F_{A(\text{vertical})} = F + F_a + F_0 = m_g \cdot g + m_g \cdot a + M_0 \cdot \frac{2\pi}{UZR}$$
4. Calculation of all static and dynamic bending moments $M_x$, $M_y$ and $M_z$ which occur in the application.
   $$M = F \cdot l$$
5. Selection of maximum permissible loads via Table T3.
6. Calculation and checking of the combined load, which must not be higher than 1.
7. Checking of the maximum torque that occurs at the drive shaft in Table T2.
8. Checking of the required action force $F_a$ with the permissible load value from Table T1.

For motor sizing, the effective torque must be determined, taking into account the cycle time.

**Legend**

- $l$ = distance of a mass in the x-, y- and z-direction from the guide [m]
- $m_e$ = external moved mass [kg]
- $m_{LA}$ = moved mass of linear drive [kg]
- $m_g$ = total moved mass
  $$(m_e + m_{LA})$$ [kg]
- $F_x/y$ = load exerted on the carrier in dependence of the installation position [N]
- $F_a$ = action force [N]
- $M_0$ = no-load torque [Nm]
- $U_{ZR}$ = circumference of the pulley (linear movement per revolution) [m]
- $g$ = gravity [m/s²]
- $a_{\text{max}}$ = maximum acceleration [m/s²]
Combined Loads
If the linear drive is subjected to several forces, loads and moments at the same time, the maximum load is calculated with the equation shown here. The maximum permissible loads must not be exceeded.

\[
\frac{F_y}{(\text{max})} + \frac{F_z}{(\text{max})} + \frac{M_x}{(\text{max})} + \frac{M_y}{(\text{max})} + \frac{M_z}{(\text{max})} \leq 1
\]

The total of the loads must not exceed \( >1 \) under any circumstances.

Maximum Permissible Unsupported Length – Placing of Mid-Section Support

**Stroke Length**

The stroke lengths of the linear drives are available in multiples of 1 mm up to 5700 mm.

Other stroke lengths are available on request.

**The end of stroke must not be used as a mechanical stop.**

Allow an additional safety clearance at both ends equivalent to the linear movement of one revolution of the drive shaft, but at least 100 mm.

The use of an AC motor with frequency converter normally requires a larger clearance than that required for servo systems.

For advice, please contact your local PARKER-ORIGA technical support department.

- For the bi-parting version the maximum load \( F \) complies with the total of the load at both carriers.
  \[ F = F_{\text{carriage 1}} + F_{\text{carriage 2}} \]

- \( k \) = Maximum permissible distance between mountings/mid-section support for a given load \( F \).

If the loads are below or up to the curve in the graph the deflection will be max. 0.01 % of distance \( k \).
### Linear Drive with Toothed Belt and Integrated Roller Guide – Basic Unit

**Series OSP-E..BHD**

Drive Shaft versions with:
- clamp shaft
- plain shaft or
- clamp shaft with plain shaft

*(Option)*

**Mounting holes for motor flange or external planetary gearbox**

- KU x KJ (4x)

**Options – Bi-Parting**

**Series OSP-E..BHD**

**Options – Tandem**

**Series OSP-E..BHD**

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**Option – Tandem**

**Series OSP-E..BHD**

**Options – Bi-Parting**

**Series OSP-E..BHD**

---

**Dimension Table [mm]**

<table>
<thead>
<tr>
<th>Series</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>GxH</th>
<th>J</th>
<th>K</th>
<th>M</th>
<th>S</th>
<th>V</th>
<th>X</th>
<th>YxZZ</th>
<th>CE</th>
<th>CF</th>
<th>EC</th>
<th>EF</th>
<th>FB</th>
<th>FH</th>
<th>KF</th>
<th>KM</th>
<th>KN</th>
<th>KO</th>
<th>KR</th>
<th>KS</th>
<th>KT</th>
<th>KUxKJ</th>
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</thead>
<tbody>
<tr>
<td>OSP-E25BHD</td>
<td>218</td>
<td>89</td>
<td>93</td>
<td>25</td>
<td>M6x10</td>
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<td>51</td>
<td>85</td>
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<td>210</td>
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<tr>
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<td>116</td>
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<td>22''</td>
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<td>35</td>
<td>32</td>
<td>32''</td>
<td>144</td>
</tr>
</tbody>
</table>

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*(Other dimensions for KS and KB for special drive shafts on request – see order instructions.)*