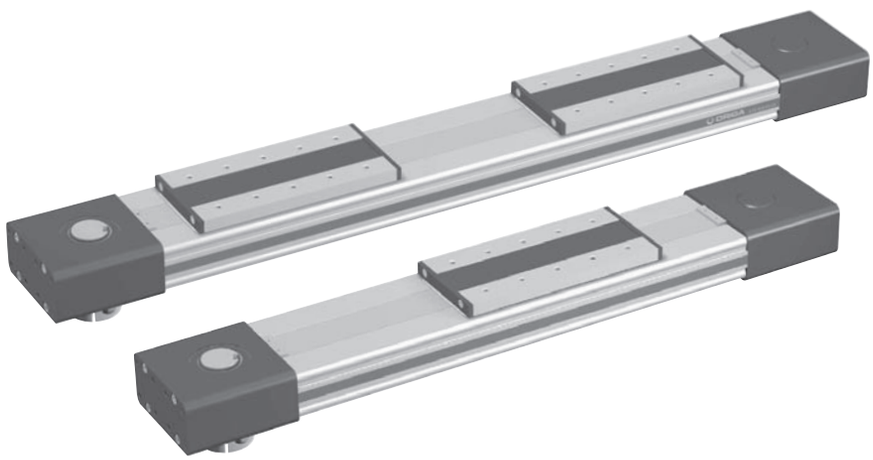
Linear Drive with Toothed Belt and Integrated Guide

– with Recirculating Ball Bearing Guide
– with Roller Guide

Series OSP-E..BHD



Contents

LINEAR DRIVE WITH TOOTHED BELT FOR HEAVY DUTY APPLICATIONS

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.

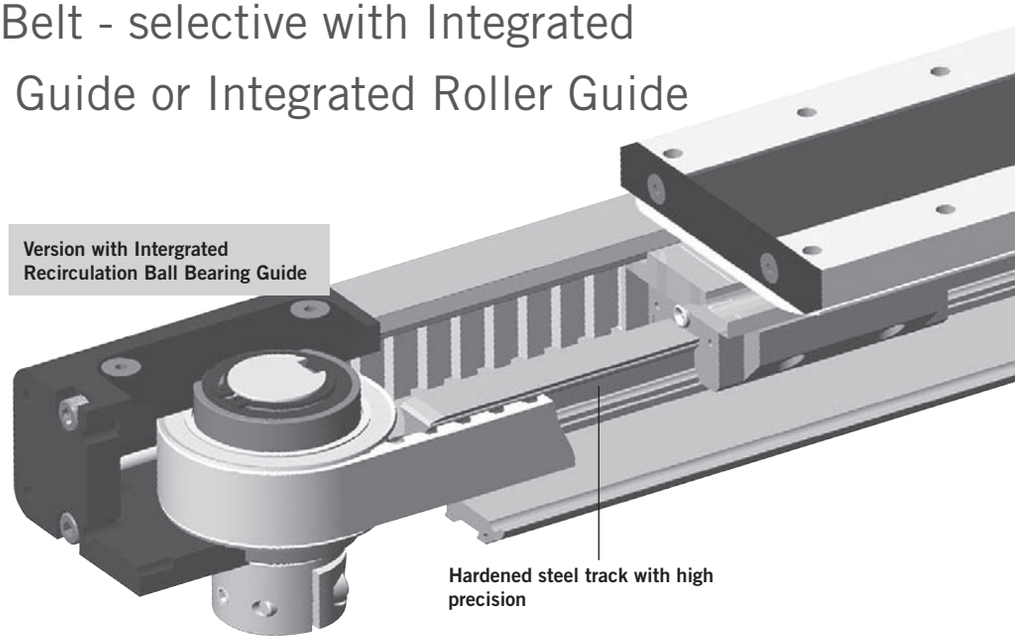
Linear Drive with Toothed Belt - selective with Integrated Recirculating Ball Bearing Guide or Integrated Roller Guide

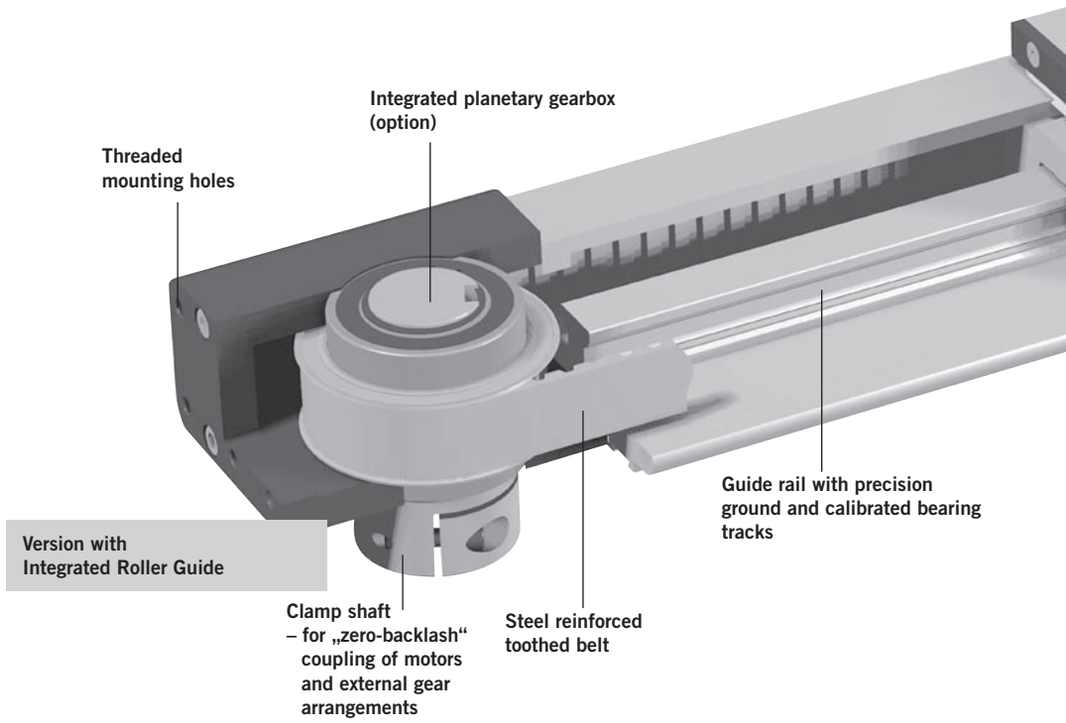
Advantages:

- 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

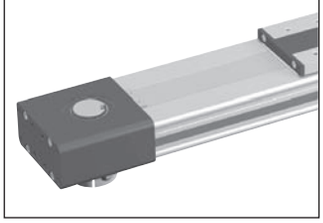




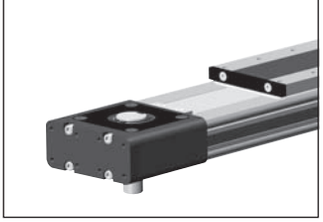
Take the easy route and load all the dimensions into your system. The file is suitable for all current CAD systems – available on CD-Rom or at www.parker-origa.com

Drive Shaft Versions

Clamp Shaft

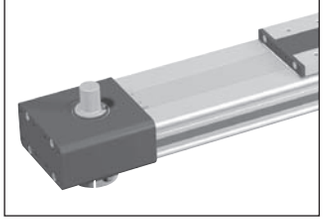


Plain Shaft

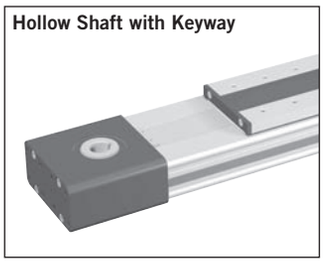


Drive Shaft OPTIONS

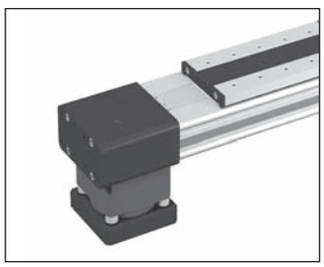
Clamp Shaft and Plain Shaft



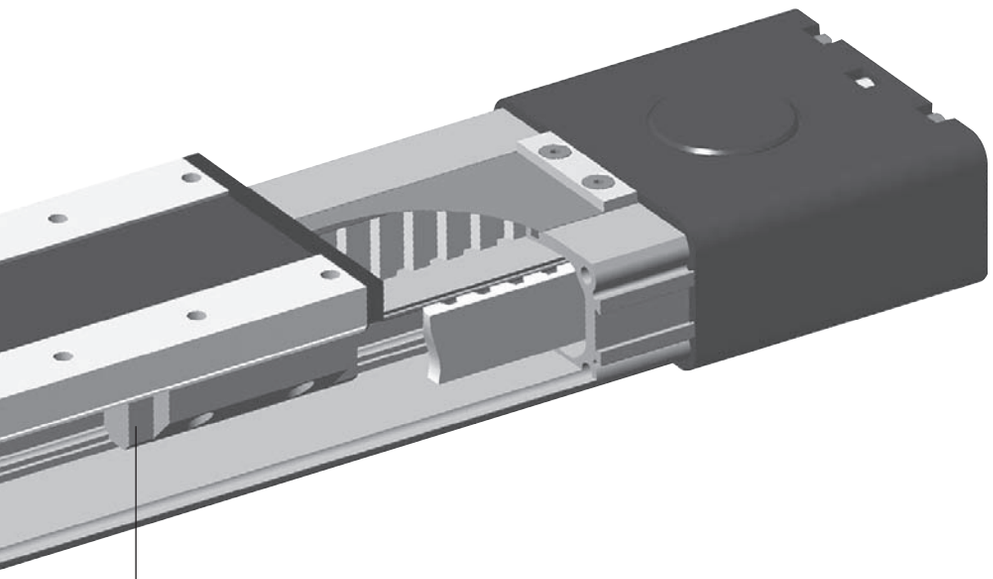
Hollow Shaft with Keyway



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

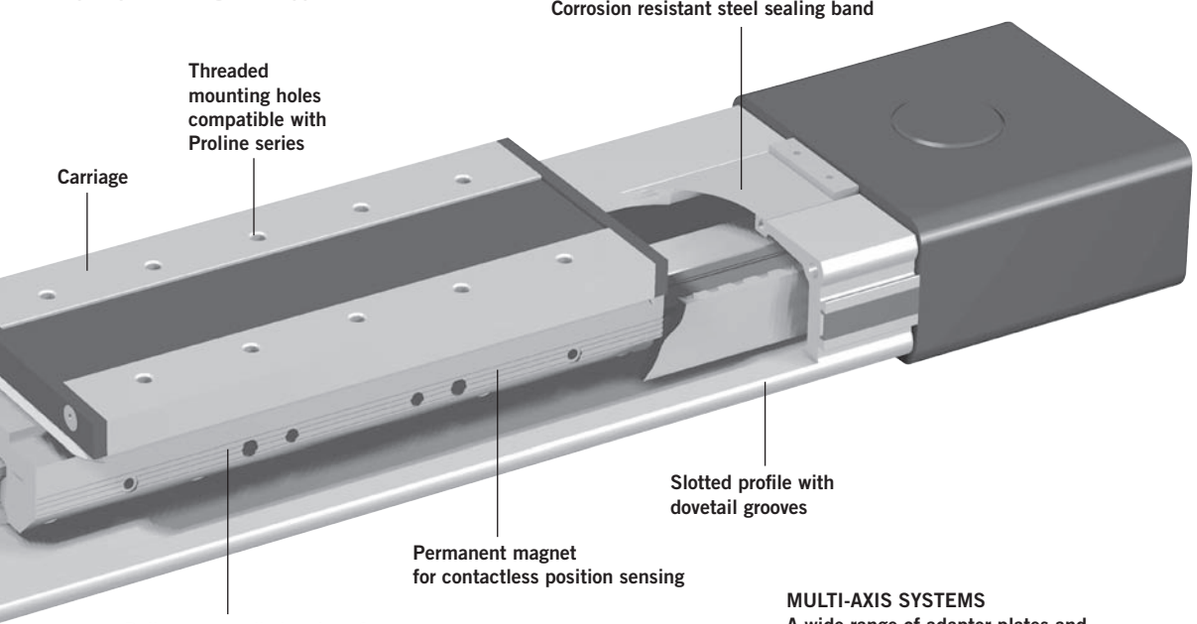


Steel runner block with integrated scraper system and grease nipples

Corrosion resistant steel sealing band

Threaded mounting holes compatible with Proline series

Carriage



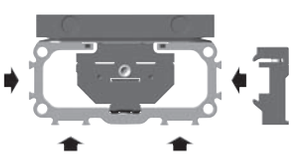
Slotted profile with dovetail grooves

Permanent magnet for contactless position sensing

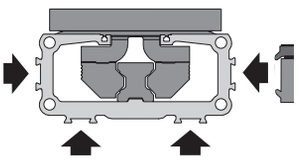
Rollers on needle bearings for smooth operation up to 10 m/s.

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

Version with Integrated Recirculating Ball Bearing Guide

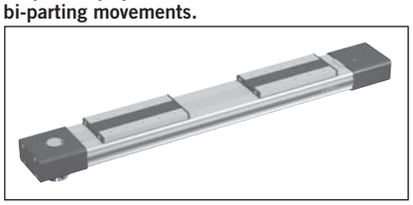


Version with Integrated Roller guide



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.



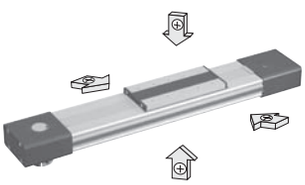
OPTIONS AND ACCESSORIES

SERIES OSP-E, LINEAR DRIVE WITH TOOTHED BELT AND INTEGRATED GUIDE

STANDARD VERSIONS OSP-E..BHD

Version with Recirculating Ball Bearing Guide
Data sheets 1.15.002E-1 to 5, 10
Version with Roller Guide
Data sheets1.15.002E-6 to 10

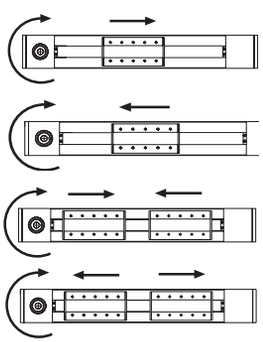
Standard carrier with integrated guide and magnets for contactless position sensing. Dovetail profile for mounting of accessories and the actuator itself.



DRIVE SHAFT WITH CLAMP SHAFT

DRIVE SHAFT WITH PLAIN SHAFT

ACTUATING DIRECTION
Data sheet 1.15.002E-10
Important in parallel operations, e.g. with intermediate drive shaft

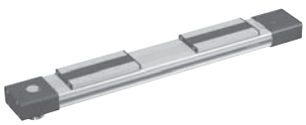


Standard

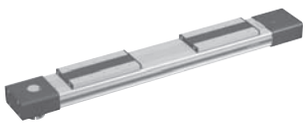
Standard – Bi-Parting Version

OPTIONS

TANDEM
Data sheet 1.15.002E
For higher moment support.

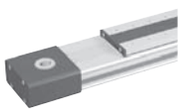


BI-PARTING VERSION
Data sheet 1.15.002E
For perfectly synchronised bi-parting movements.



DRIVE SHAFT WITH
CLAMP SHAFT AND PLAIN SHAFT
For connections with intermediate drive shaft
(Data sheet 1.38.004E)

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

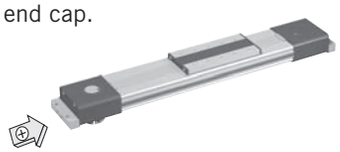


INTEGRATED PLANETARY GEARBOX
Data sheet 1.15.002E-5
For compact installation and very low backlash.

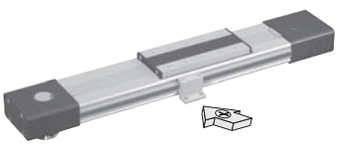
ACCESSORIES

MOTOR MOUNTINGS
Data sheet 1.44.00E

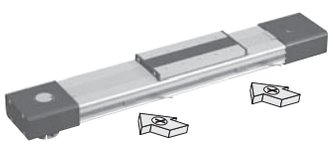
END CAP MOUNTING
Data sheet 1.44.010E-2
For mounting the drives on the end cap.



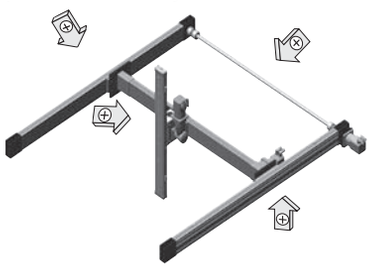
MID-SECTION SUPPORT
Data sheet 1.44.010E-7
For supporting long drives or mounting the linear drives on dovetail grooves.



MAGNETIC SWITCHES
TYPE RS AND ES
Data sheet 1.44.030E
For contactless position sensing of end stop and intermediate carrier positions.



MULTI-AXIS SYSTEMS
Data sheet 1.38.001E
For modular assembly of linear drives up to multi-axis systems.



Linear Drive with Toothed Belt
and
Integrated Recirculating Ball Bearing Guide
Series OSP-E..BHD
Size 20 to 50

OSP
ORIGA SYSTEM PLUS

Characteristics

Characteristics			Symbol	Unit	Description
General Features					
Series					OSP-E..BHD
Name					Linear Drive with Toothed Belt and integrated recirculating ball bearing guide
Mounting					See drawings
Ambient-Temperature range		ϑ_{min} ϑ_{max}		°C °C	-30 +80
Weight (mass)				kg	See table
Installation					In any position
Material	Slotted profile				Extruded anodized aluminium
	Toothed belt				Steel-corded polyurethane
	Pulley				Aluminium
	Guide				Recirculating Ball Bearing Guide
	Guide rail				Hardened steel rail with high precision, accuracy class N
	Guide carrier				Steel carrier with integrated wiper system, grease nipples, preloaded 0.02 x C, accuracy class H
	Sealing band				Hardened, corrosion resistant steel
	Screws, nuts				Zinc plated steel
	Mountings				Zinc plated steel and aluminium
Encapsulation class				IP	54

Weight (mass) and Inertia

Series	Weight (mass)[kg] At stroke 0 m	Add per metre stroke	Moving mass	Inertia [x 10^{-6} kgm^2] At stroke 0 m	Add per metre stroke	per kg mass
OSP-E20BHD	2.8	4	0.8	280	41	413
OSP-E25BHD	4.3	4.5	1.5	1229	227	821
OSP-E32BHD	8.8	7.8	2.6	3945	496	1459
OSP-E50BHD	26	17	7.8	25678	1738	3103
OSP-E20BHD*	4.3	4	1.5	540	41	413
OSP-E25BHD*	6.7	4.5	2.8	2353	227	821
OSP-E32BHD*	13.5	7.8	5.2	7733	496	1459
OSP-E50BHD*	40	17	15	49180	1738	3103

* 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 data sheet 1.15.002E-3.
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

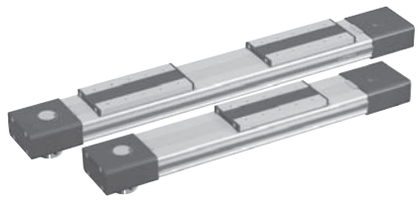
The maximum values specified in the technical data sheet for the different products must not be exceeded. Before taking the linear drive machine into service, the user must ensure the adherence to the EC Machine Directive 91/368/EEC.

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



Magnetic Switches see 1.44.030E
Mountings and **Accessories** see 1.44.006E, 1.44.010E
Multi-Axis Systems see 1.38.001E

Data Sheet No. 1.15.002E-1

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 centre 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.
   $F_{A(horizontal)} = F_a + F_0 = m_g \cdot a + M_0 \cdot 2\pi / U_{ZR}$
   $F_{A(vertical)} = F_g + F_a + F_0$
   $= m_g \cdot g + m_g \cdot a + M_0 \cdot 2\pi / U_{ZR}$
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_{LA} = moved mass of linear drive [kg]
- m_g = total moved mass ($m_e + m_{LA}$) [kg]
- $F_{x/y}$ = load excerted 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]
- $a_{max.}$ = maximum acceleration [m/s²]

Performance Overview (T1)

Characteristics		Unit	Description			
Series			OSP-E20BHD	OSP-E25BHD	OSP-E32BHD	OSP-E50BHD
Max. speed		[m/s]	3[1)]	5[1)]	5[1)]	5[1)]
Linear motion per revolution of drive shaft		[mm]	125	180	240	350
Max. rpm on drive shaft		[min⁻¹]	2000	1700	1250	860
Max. effective Action force F_A at speed	< 1 m/s:	[N]	550	1070	1870	3120
	1-3 m/s:	[N]	450	890	1560	2660
	> 3 m/s:	[N]	–	550	1030	1940
No-load torque		[Nm]	0.6	1.2	2.2	3.2
Max. acceleration/deceleration		[m/s²]	50	50	50	50
Repeatability		[mm/m]	±0.05	±0.05	±0.05	±0.05
Max. standard stroke length		[mm]	5760[2)]	5700[2)]	5600[2)]	5500[2)]

[1)] up to 10 m/s on request
[2)] longer strokes on request

Maximum Permissible Torque on Drive Shaft Speed / Stroke (T2)

OSP-E20BHD				OSP-E25BHD				OSP-E32BHD				OSP-E50BHD			
Speed [m/s]	Torque [Nm]	Stroke [m]	Torque [Nm]	Speed [m/s]	Torque [Nm]	Stroke [m]	Torque [Nm]	Speed [m/s]	Torque [Nm]	Stroke [m]	Moment [Nm]	Speed [m/s]	Torque [Nm]	Stroke [m]	Torque [Nm]
1	11	1	11	1	31	1	31	1	71	1	71	1	174	1	174
2	10	2	11	2	28	2	31	2	65	2	71	2	159	2	174
3	9	3	8	3	(25)	3	31	3	59	3	60	3	153	3	138
4		4	7	4	23	4	25	4	56	4	47	4	143	4	108
5		5	5	5	22	5	(21)	5	52	5	38	5	135	5	89

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 data sheet 1.15.002E-4.

Maximum Permissible Loads (T3)

Series	Max. applied load Fy[N]	Fz[N]	Max. moments [Nm] Mx	My	Mz
OSP-E20BHD	1600	1600	21	150	150
OSP-E25BHD	2000	3000	50	500	500
OSP-E32BHD	5000	10000	120	1000	1400
OSP-E50BHD	12000	15000	180	1800	2500

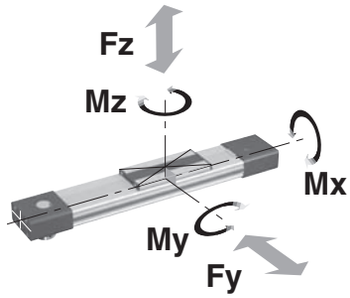
Combined Loads
If the linear drive is subjected to several forces, loads and moments at the same time, the maximum load is calculated with the equation shown here. The maximum permissible loads must not be exceeded.

Equation for Combined Loads

$$\frac{Fy}{Fy\,(max)} + \frac{Fz}{Fz\,(max)} + \frac{Mx}{Mx\,(max)} + \frac{My}{My\,(max)} + \frac{Mz}{Mz\,(max)} \leq 1$$

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

Forces, loads and moments

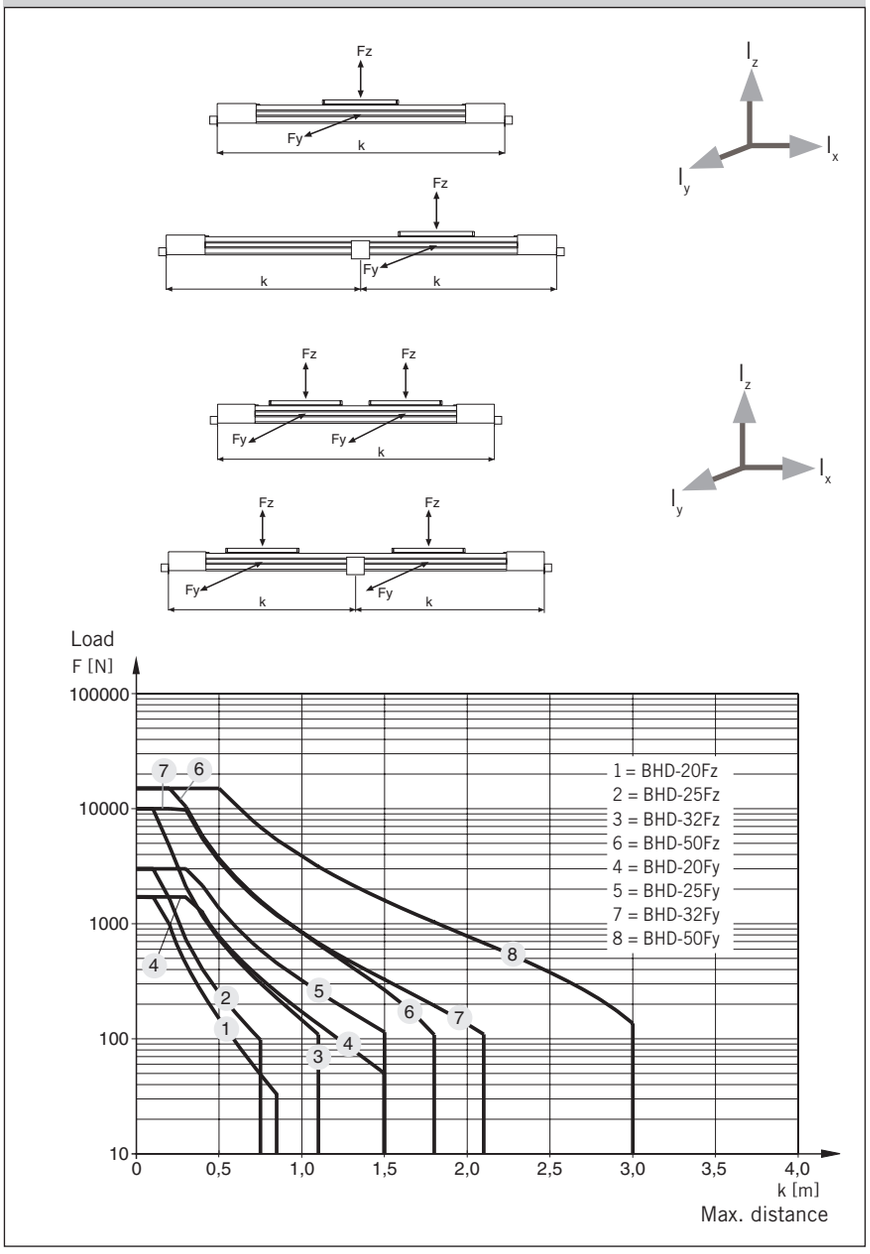


The distance (l_x, l_y, l_z) for calculation of moments relates to the centre axis of the linear drive. Bending moments are calculated from the centre of the linear drive and F indicates actual force.

$M = F \cdot l$ [Nm]

$M_x = M_{x\,static} + M_{x\,dynamic}$
$M_y = M_{y\,static} + M_{y\,dynamic}$
$M_z = M_{z\,static} + M_{z\,dynamic}$

Maximum Permissible Unsupported Length – Placing of Mid-Section Support



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 clear-ance 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.

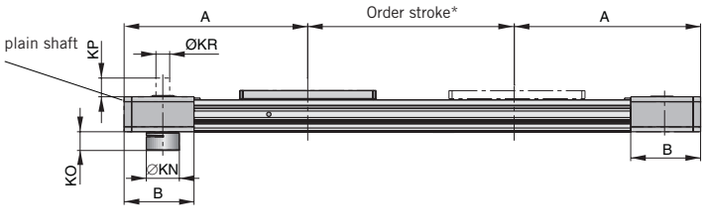
* For Bi-parting version the max. load (F) is the total load of both carriers $F = F_{carrier\ 1} + F_{carrier\ 2}$

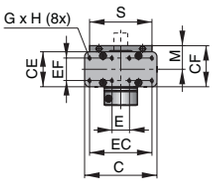
k = Max. permissible distance between mountings/mid-section support for a given load F.

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

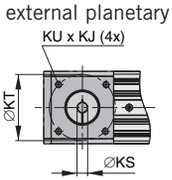
Linear Drive with Toothed Belt and integrated Recirculating Ball Bearing Guide – Basic Unit
Series OSP-E..BHD

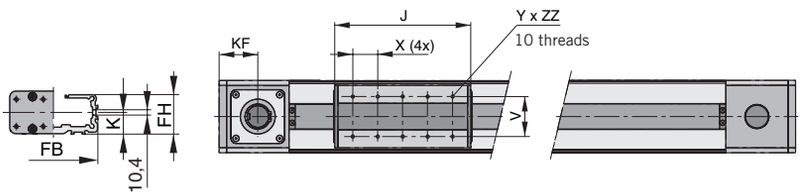
Drive Shaft versions with
- clamp shaft
- plain shaft or
- clamp shaft with plain shaft (Option)





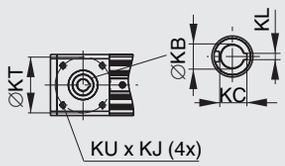
Mounting holes for motor flange or external planetary gearbox [1)]





Hollow shaft with keyway (Option)
Dimension Table [mm]

Series	KB*	KC	KL	KT	KU x KJ
OSP-E20BHD	12^{H7}	13.8	4	65,7	M6 x 8
OSP-E25BHD	16^{H7}	18.3	5	82	M8 x 8
OSP-E32BHD	22^{H7}	24.8	6	106	M10 x 12
OSP-E50BHD	32^{H7}	35.3	10	144	M12 x 19



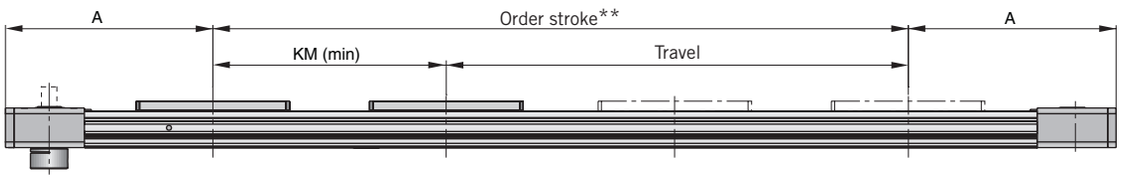
[1)] Note:
The mounting holes for the coupling housing / motor flange / gearbox are located on the opposite side to the carrier (motor mounting standard).
They also can be located on the same side as the carrier (motor mounting 180° standard).

*** Note:**
The mechanical end position must not be used as a mechancial 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.

Order stroke = required travel + 2 x safety distance.

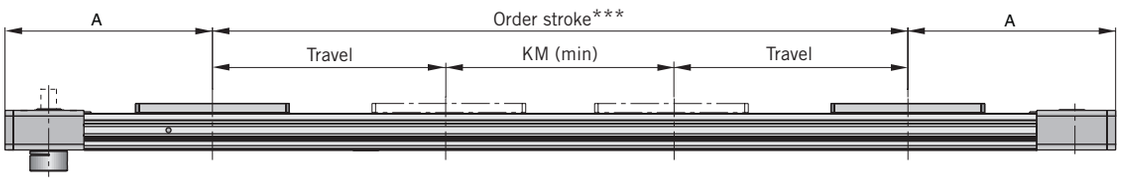
The use of an AC motor with frequency converter normally requires a larger safety clearance than that required for servo systems.
For further information please contact you local Parker Origa representative.

Option – Tandem
Series OSP-E..BHD



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

Option – Bi-Parting
Series OSP-E..BHD



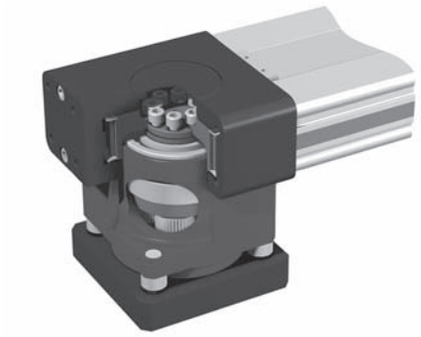
*** Order stroke = 2 x required travel + KM min + 2 x safety distance

Dimension Table [mm]

Series	A	B	C	E	GxH	J	K	M	S	V	X	YxZZ	CE	CF	EC	EF	FB	FH	KF	KM_{min}	$KM_{rec.}$	KN	KO	KP	KR	KS	KT	KUxKJ
OSP-E20BHD	185	76.5	73	18	M5x8.5	155	21.1	27.6	67	51	30	M5x8	38	49	60	27	73	36	42.5	180	220	27	18	25	12_{h7}	12^{H7}	65.7	M6x8
OSP-E25BHD	218	88	93	25	M5x10	178	21.5	31	85	64	40	M6x8	42	52.5	79	27	92	39.5	49	210	250	34	21.7	30	16_{h7}	16^{H7}	82	M8x8
OSP-E32BHD	262	112	116	28	M6x12	218	28.5	38	100	64	40	M6x10	56	66.5	100	36	116	51.7	62	250	300	53	30	30	22_{h7}	22^{H7}	106	M10x12
OSP-E50BHD	347	147	175	18	M6x12	288	43	49	124	90	60	M6x10	87	92.5	158	70	164	77	79.5	354	400	75	41	35	32_{h7}	32^{H7}	144	M12x19

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

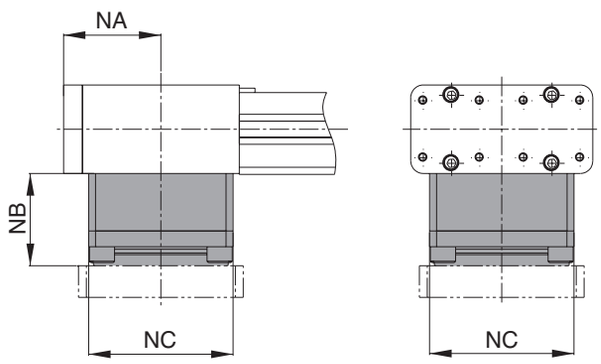
Series OSP-E..BHD – with Integrated Planetary Gearbox (Option)



Performance Overview

Characteristics		Unit	Description		
Series			**OSP-E25BHD**	**OSP-E32BHD**	**OSP-E50BHD**
Ratio (1-stage)	i		3/5/10		
Max. axial load	F_{amax}	[N]	1550	1900	4000
Torsional rigidity (i=5)	$C_{t.21}$	[Nm/arcmin]	3.3	9	24
Torsional rigidity (i=3/10)	$C_{t.21}$	[Nm/arcmin]	2.8	7.5	20.5
Torsional backlash	J_t	[arcmin]	<12		
Linear motion per revolution of drive shaft		[mm]	220	280	360
Nominal input speed	n_{nom}	[min^{-1}]	3700	3400	2600
Max. input speed	n_{1max}	[min^{-1}]	6000		
No-load torque at Nominal input speed	T_{012}	[Nm]	<0.14	<0.51	<1.5
Lifetime		[h]	20 000		
Efficiency	η	[%]	>97		
Noise level (n_1=3000 min^{-1})	L_{PA}	[db]	<70	<72	<74

Dimensions



Dimension Table [mm] and additional Weight

Series	NA	NB	NC	Weight (Mass) [kg]
OSP-E25BHD	49	43	76	2.6
OSP-E32BHD	62	47	92	4.9
OSP-E50BHD	79.5	49.5	121	9.6

Data Sheet No. 1.15.002E-5

Integrated Planetary Gearbox

Features
- Highly compact and rigid solutio 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

OSP
ORIGA SYSTEM PLUS

Characteristics

Characteristics		Symbol	Unit	Description
General Features				
Series				OSP-E..BHD
Name				Linear Drive with Toothed Belt and integrated Roller Guide
Mounting				see drawings
Ambient Temperatur range		ϑ_{min} ϑ_{max}	°C °C	-30 +80
Weight (Mass)			kg	see table
Installation				In any position
Material	Slotted profile			Extruded anodized aluminium
	Toothed belt			Steel-corded polyurethane
	Pulley			Aluminium
	Guide			Roller Guide
	Guide rail			Aluminium
	Track			high alloyed steel
	Roller cartridge			Steel rollers in aluminium housing
	Sealing band			Hardened, corrosion resistant steel
	Screws, nuts			Zinc plated steel
	Mountings			Zinc plated steel and aluminium
Encapsulation class			IP	54

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

Weight (mass) and Inertia

Series	Weight (mass)[kg] at stroke 0 m	ad per metre stroke	Moving mass	Inertia [x 10^{-6} kgm^2] at stroke 0 m	ad per metre stroke
OSP-E25BHD	3.8	4.3	1.0	984	197
OSP-E32BHD	7.7	6.7	1.9	3498	438
OSP-E50BHD	22.6	15.2	4.7	19690	1489
OSP-E25BHD*	5.7	4.3	2.0	1805	197
OSP-E32BHD*	11.3	6.7	3.8	6358	438
OSP-E50BHD*	31.7	15.2	9.4	34274	1489

*Version: Tandem and Bi-parting (Option)

Installation Instructions

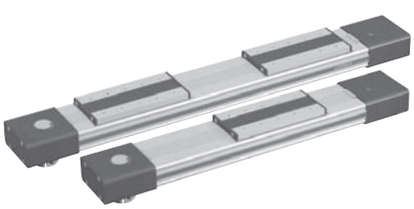
Use the threaded holes in the end cap for mounting the linear drive.
Check if mid-section supports are needed using the maximum allowable unsupported length graph on data sheet 1.15.002E-3.
At least one end cap must be secured to prevent axial sliding when mid-section support is used.

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.



Magnetic Switches Proximity Sensors see 1.44.030E
Mountings and Accessories see 1.44.006E, 1.44.010E
Multi-Axis Connections see 1.38.001E

Performance Overview (T1)

Characteristics		Unit	Description		
Series			**OSP-E25BHD**	**OSP-E32BHD**	**OSP-E50BHD**
Max. speed		[m/s]	10	10	10
Linear motion per revolution drive shaft		[mm]	180	240	350
Max. rpm. drive shaft		[min^{-1}]	3000	2500	1700
Max. effective action force F_A at speed	< 1 m/s:	[N]	1070	1870	3120
	1-3 m/s:	[N]	890	1560	2660
	> 3-10 m/s:	[N]	550	1030	1940
No-load torque [Nm]		1.2	2.2	3.2	
Max. acceleration/deceleration		[m/s^2]	40	40	40
Repeatability		[mm/m]	±0.05	±0.05	±0.05
Max. standard stroke length		[mm]	7000	7000	7000

Maximum Permissible Torque on Drive Shaft Speed and Stroke (T2)

OSP-E25BHD				**OSP-E32BHD**				**OSP-E50BHD**			
Speed [m/s]	Torque [Nm]	**Stroke** [m]	Torque [Nm]	**Speed.** [m/s]	Torque [Nm]	**Stroke** [m]	Torque [Nm]	**Speed.** [m/s]	Torque [Nm]	**Stroke** [m]	Torque [Nm]
1	31	1	31	1	71	1	71	1	174	1	174
2	28	2	31	2	65	2	71	2	159	2	174
3	(25)	3	31	3	59	3	60	3	153	3	138
4	23	4	25	4	56	4	47	4	143	4	108
5	22	5	(21)	5	52	5	38	5	135	5	89
6	21	6	17	6	50	6	32	6	132	6	76
7	19	7	15	7	47	7	28	7	126	7	66
8	18			8	46			8	120		
9	17			9	44			9	116		
10	16			10	39			10	108		

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 data sheet 1.15.002E-9.

Maximum Permissible Loads (T3)

Series	Max. applied load Fy, Fz [N]	Max. moments [Nm] Mx	My	Mz
OSP-E25BHD	986	11	64	64
OSP-E32BHD	1348	19	115	115
OSP-E50BHD	3704	87	365	365

Sizing Performance Overview Maximum Loadings

Sizing of Linear Drive

The following steps are recommended:

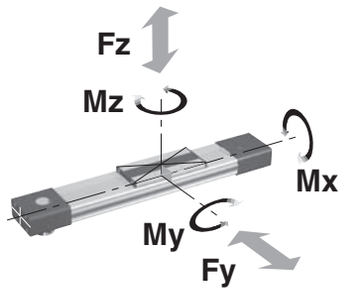
1. Determination of the lever arm length l_x, l_y and l_z from m_e to the centre axis of the linear drive.
2. Calculation of the load F_x or F_y to the carrier caused by m_e
   $F = m_e \cdot g$
3. Calculation of the static and dynamic force F_A which must be transmitted by the toothed belt.
   $F_{A(horizontal)} = F_a + F_0$
   $= m_g \cdot a + M_0 \cdot 2\pi / U_{ZR}$
   $F_{A(vertical)} = F_g + F_a + F_0$
   $= m_g \cdot g + m_g \cdot a + M_0 \cdot 2\pi / U_{ZR}$
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 excerted 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/s^2]
- $a_{max.}$ = maximum acceleration [m/s^2]

Forces, loads and moments



$M = F \cdot l$ [Nm]

$M_x = M_{x\,static} + M_{x\,dynamic}$

$M_y = M_{y\,static} + M_{y\,dynamic}$

$M_z = M_{z\,static} + M_{z\,dynamic}$

The distance l (lx, ly, lz) for calculation of moments relates to the centre axis of the linear drive.

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

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.

Combined Loads

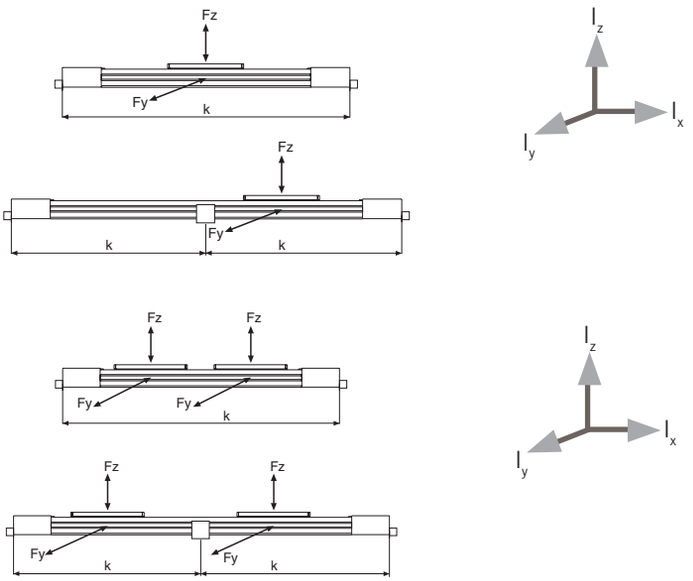
If the linear drive is subjected to several forces, loads and moments at the same time, the maximum load is calculated with the equation shown here. The maximum permissible loads must not be exceeded.

Equatation for Combined Loads

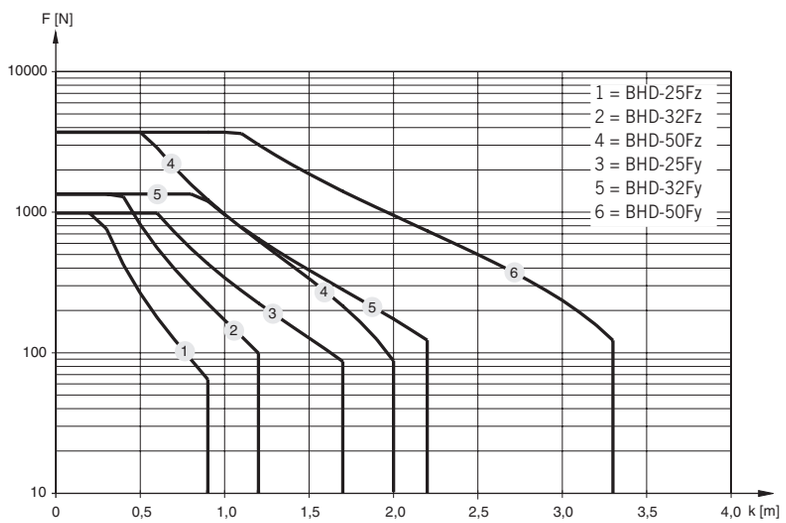
$$\frac{Fy}{Fy\,(max)} + \frac{Fz}{Fz\,(max)} + \frac{Mx}{Mx\,(max)} + \frac{My}{My\,(max)} + \frac{Mz}{Mz\,(max)} \leq 1$$

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

Maximum Permissible Unsupported Length – Placing of Mid-Section Support

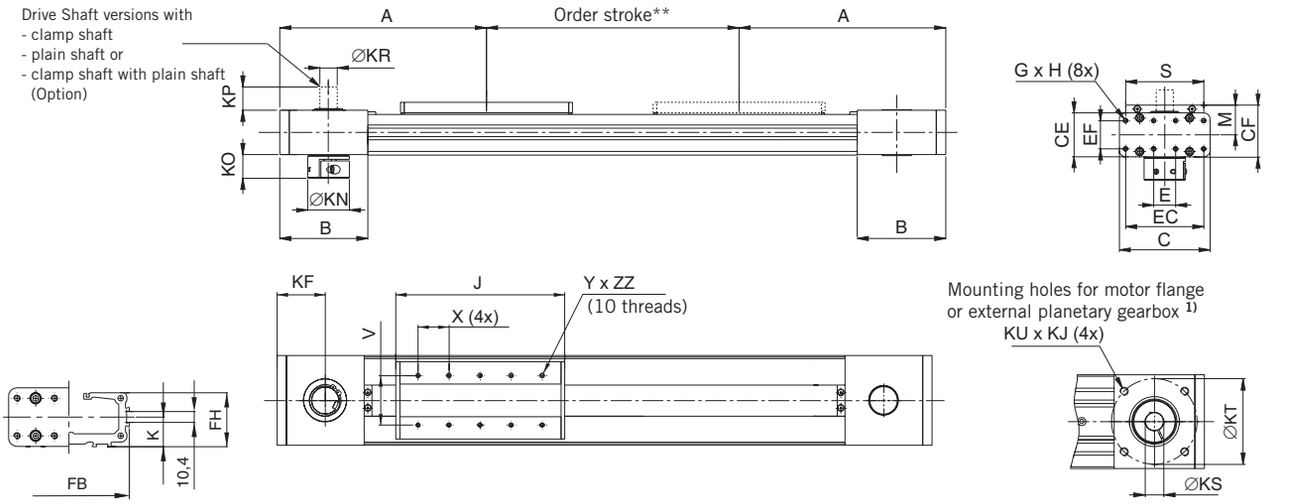


Loads

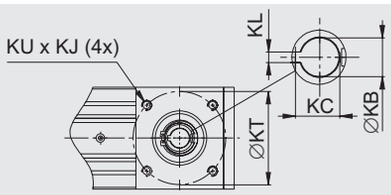


Max. distance

Linear Drive with Toothed Belt and Integrated Roller Guide – Basic Unit
Series OSP-E..BHD



Hollow shaft with keyway (Option)
Dimension table [mm]



Series	KB	KC	KL	KT	KUxKJ
OSP-E25BHD	16^{H7}	18.3	5	82	M8x8
OSP-E32BHD	22^{H7}	24.8	6	106	M10x12
OSP-E50BHD	32^{H7}	35.3	10	144	M12x19

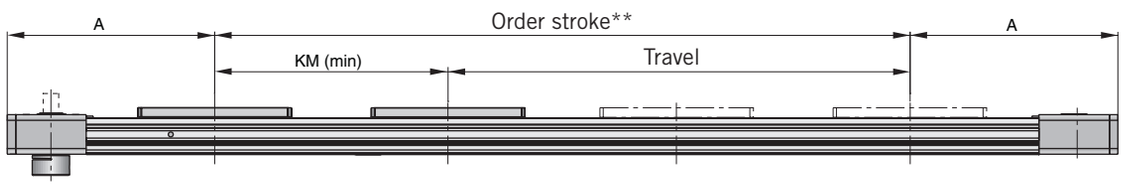
1) Note:
The mounting holes for the coupling housing / motor flange / gearbox are located on the opposite side to the carrier (motor mounting standard).
They also can be located on the same side as the carrier (motor mounting 180° standard).

*** Note:**
The mechanical end position must not be used as a mechancial 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.

Order stroke = required travel + 2 x safety distance.

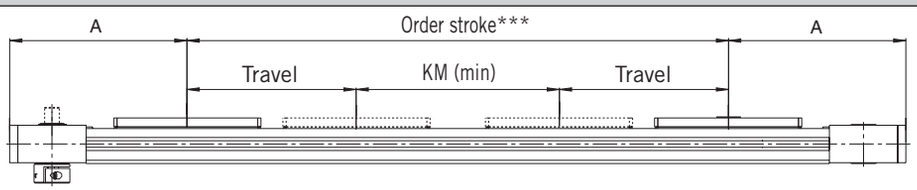
The use of an AC motor with frequency converter normally requires a larger safety clearance than that required for servo systems.
For further information please contact you local Parker Origa representative.

Option – Tandem
Series OSP-E..BHD



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

Options – Bi-Parting
Series OSP-E..BHD



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

Dimension Table [mm]

Series	A	B	C	E	GxH	J	K	M	S	V	X	YxZZ	CE	CF	EC	EF	FB	FH	KF	KM_{min}	$KM_{rec.}$	KN	KO	KP	KR	KS	KT	KUxKJ
OSP-E25BHD	218	88	93	25	M5x10	178	21.5	31	85	64	40	M6x8	42	52.5	79	27	92	39.5	49	210	250	34	21.7	30	16_{h7}	16^{H7}	82	M8x8
OSP-E32BHD	262	112	116	28	M6x12	218	28.5	38	100	64	40	M6x10	56	66.5	100	36	116	51.7	62	250	300	53	30	30	22_{h7}	22^{H7}	106	M10x12
OSP-E50BHD	347	147	175	18	M6x12	263	43	49	124	90	60	M6x10	87	92.5	158	70	164	77	79.5	295	350	75	41	35	32_{h7}	32^{H7}	144	M12x19

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

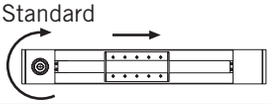
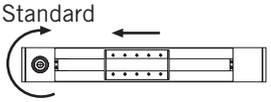
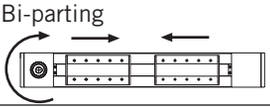
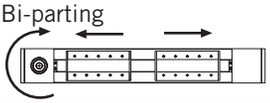
Order Instructions

	OSP-E	25	-	6	0	0	0	2	-	00500	

Size	
20	Size 20 (only drive 6)
25	Size 25
32	Size 25
50	Size 25

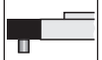
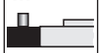
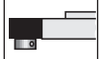
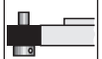
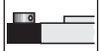
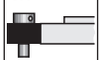
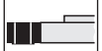
Type of Drive	
5	Toothed Belt with integrated roller guide
6	Toothed Belt with integrated recirculating ball bearing guide

Carrier Mounting	
0	Standard
1	Tandem (Option)
2	Bi-parting (Option)

Operating direction	
0	Standard 
1	Standard 
2	Bi-parting 
3	Bi-parting 

Intergrated Gearbox (Option) for size 25 to 50		
0	without	
1	ratio i=3	 **M**
2	ratio i=5	
3	ratio i=10	
4	ratio i=3	**M** 
5	ratio i=5	
6	ratio i=10	

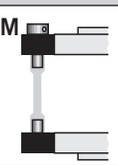
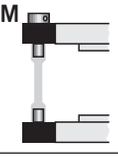
Stroke
Input (five digits) in mm

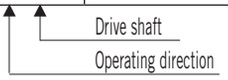
Drive Shaft		
Side where motor is fitted see **M**		
A	Plain shaft	 **M**
B	Plain shaft	**M** 
2	Clamp shaft	 **M**
3	Clamp shaft with plain shaft (Option)	 **M**
4	Clamp shaft	**M** 
5	Clamp shaft with plain shaft (Option)	**M** 
6	Hollow shaft with keyway (Option)	 **M**
7	Hollow shaft with keyway (Option)	**M** 
Special drive shaft on request		

Accessories - please order separately

Description	Data Sheet No.
Coupling Housing	**1.44.006E-2**
Motor Flange for Planetary Gearbox LP	**1.44.006E-2**
End Cap Mountings	**1.44.010E-2, -3**
Mid-Section Support	**1.44.010E-8**
Adaptor Profile	**1.44.010E-10**
T-Nut Profile	**1.44.010E-11**
Magnetic Switches	**1.44.030E**
Multi-Axis Systems for linear drives	**1.38.001E**
Drive Systems and components for electric linear drives OSP-E	**A4P019E**

OSP-E.. BHD as parallel drive with intermediate drive shaft MAS-..

OSP-E..60**0**0**5**-..	**M** 
OSP-E..60**1**0**A**-..	
OSP-E..60**0**0**3**-..	**M** 
OSP-E..60**1**0**B**-..	



Data Sheet No. 1.15.002E-10