Vertical Linear Drive with Toothed Belt and Integrated Recirculating Ball Bearing Guide Series OSP-E..BV

ORIGA

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Technical Data

Characteristics				
Characteristics		Symbol	Unit	Description
General Features				
Series				OSP-E..BV
Name				Vertical linear drive with toothed Belt and integrated recirculating ball bearing guide
Mounting				See drawings
Temperature range		ϑ_{min} ϑ_{max}	°C °C	-30 +80
Weight (mass)			kg	See table
Installation				vertical
Material	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 0.08 x C, accuracy class N
	Screws, nuts			Zinc plated steel
Encapsulating class			IP	20

Weight (mass) and Inertia

Series	Total weight (Mass) [kg]		Moving mass [kg]		Inertia [x 10^{-6} kgm^2]		
	At stroke 0 m	Drive head	At stroke 0 m	Add per metre stroke	At Stroke 0 m	Add per metre stroke	Add per kg mass
OSP-E20BV	3.4	1.9	1.6	4.0	486	1144	289
OSP-E25BV	7.7	5.3	2.4	4.4	1695	2668	617.5
OSP-E20BV*	5.3	2 x 1.9	1.6	4.0	533	1144	289
OSP-E25BV*	13	2 x 5.3	2.4	4.4	1915	2668	617.5

* Version: Tandem (Option)

Installation Instructions

Make sure that the OSP-E..BV is always operated with a brake on the drive side. For the mounting of the external mass to be moved there are threaded holes in the end caps. Before mounting, check the correct center of gravity distance from the table onpage 31.
Mount the external mass on the toothed belt fixed end, so that the belt tension can be checked and adjusted at the toothed belt tensioning end without dismantling.

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.

Vertical Linear Drive with Toothed Belt

and Integrated Recirculating Ball Bearing Guide

Series OSP-E..BV
Size 20, 25

OSP
ORIGA SYSTEM PLUS

Standard Version:

- Toothed Belt drive with integrated recirculating ball bearing guide
- Drive shaft with clamp shaft or plain shaft
- Choice of motor mounting side

Options:

- Tandem version for higher moments
- Drive shaft with
  - clamp shaft and plain shaft or double plain shaft
  - hollow shaft with keyway
- Special drive shaft versions on request.

A1P749E00FAG00X

The right to introduce technical modifications is reserved

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 static and dynamic force F_A which must be transmitted by the toothed belt.
   $FA = F_g + F_a + F_0$
   $= m_g \cdot g + m_g \cdot a + M_0 \cdot 2\pi / U_{ZR}$
3. Calculation of all static and dynamic moments M_x, M_y and M_z which occur in the application.
   $M = F \cdot l$
4. Selection of maximum permissible loads via Table T3.
5. Calculation and checking of the combined load, which must not be higher than 1.
6. Checking of the maximum moment that occurs at the drive shaft in Table T2.
7. 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_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-E20BV	OSP-E25BV
Max. Speed		[m/s]	3.0	5.0
Linear motion per revolution of drive shaft		[mm/U]	108	160
Toothed Belt			35ATL3	40 ATL5
Max. rpm. drive shaft		[min^{-1}]	1700	1875
Max. effective action force F_A at speed	1m/s	[N]	650	1430
	1 - 2 m/s	[N]	450	1200
	> 3 - 5 m/s	[N]	–	1050
No-load torque [2]		[Nm]	0.6	1.2
Max. acceleration/deceleration		[m/s²]	20	20
Repeatability		+/- [mm/m]	0.05	0.05
Max. standard stroke length [1]		[mm]	1000	1500
Max. recomended permissible mass [3]		[kg]	10	20

[1] Longer strokes on request and only with profile stiffening
[2] As a result of static friction force
[3] vertical

Max. Permissible Torque on Drive Shaft Speed / Stroke (T2)

OSP-E-20BV				OSP-E-25BV			
Speed [m/s]	Torque [Nm]	Stroke [m]	Torque [Nm]	Speed [m/s]	Torque [Nm]	Stroke [m]	Torque [Nm]
1	19	1	17	1	36	1	(36)
2	17	2	10.5	2	30	2	36
3	15.5			3	(30)		
				4	28		
				5	27		

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

Example above:
OSP-E25BV required speed v = 3 m/s and stroke = 1 m.

Accordingly Table T2 shows permissible moments of 30 Nm for the speed and 36 Nm for the stroke. Therefore the maximum moment at the drive shaft is determined by the speed and must not exceed 30 Nm.

Tightening for Clamp Hub

	20	25	32	50
BHD	—	9.5	17	40
BHDII	4.8	9.5	17	40
BV	4.8	9.5	—	—

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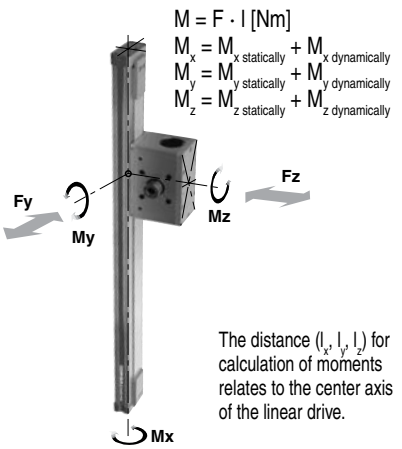
Technical Data

Maximum Permissible Loads

T3

Series	Max. applied load		Max. moments		
	Fy [N]	Fz [N]	Mx [Nm]	My [Nm]	Mz [Nm]
OSP-E20BV	1600	1600	20	100	100
OSP-E25BV	2000	3000	50	200	200

Forces, loads and moments



Equation for Combined Loads

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

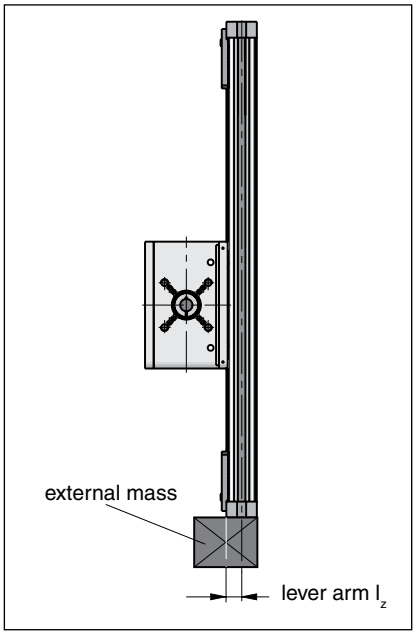
The total of the loads must not exceed >1 under any circumstances.

Combined Loads

If the linear drive is subjected to several forves, 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.

Distance of Center of Gravity of External Mass from Mid-Point of Drive

Mass [kg]	OSP-E20BV		OSP-E25BV	
	Lever arm l_z [mm]	Max. permissible acceleration/ deceleration [m/s²]	Lever arm l_z [mm]	Max. permissible acceleration/ deceleration [m/s²]
> 3 to 5	0	20	50	20
> 5 to 10	0	20	40	20
> 10 to 15	-	-	35	20
> 15 to 20	-	-	30	15



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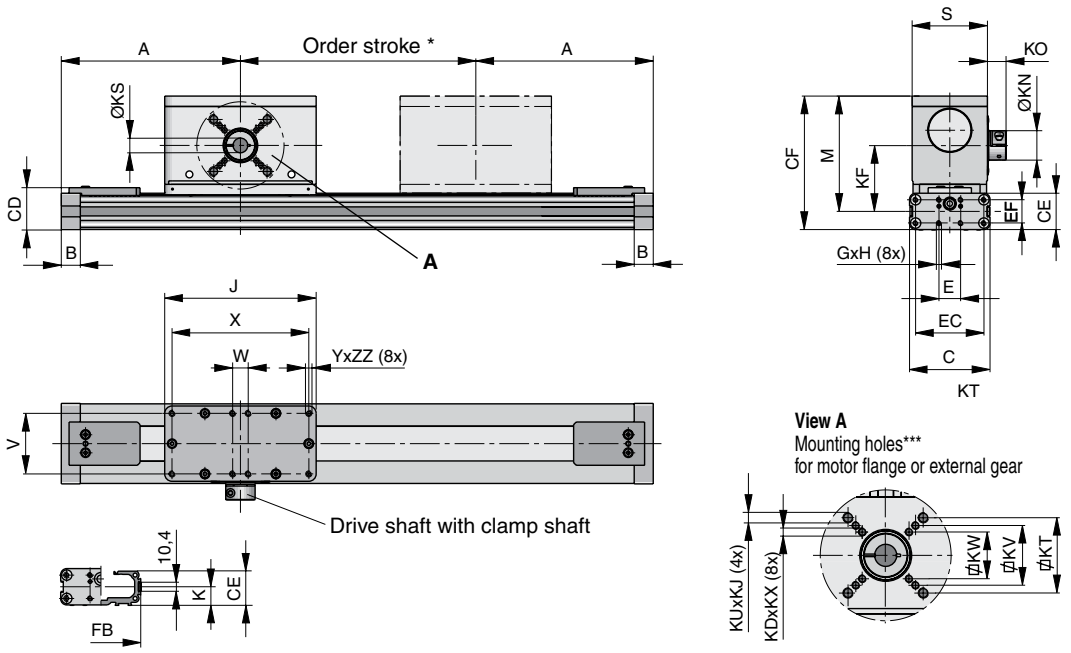
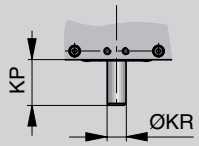
Dimensions

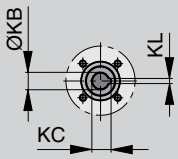
Vertical Linear Drive with Toothed Belt and integrated Recirculating Ball Bearing – Basic Unit Series OSP-E.. BV



Plain shaft



Hollow shaft with keyway (Option)

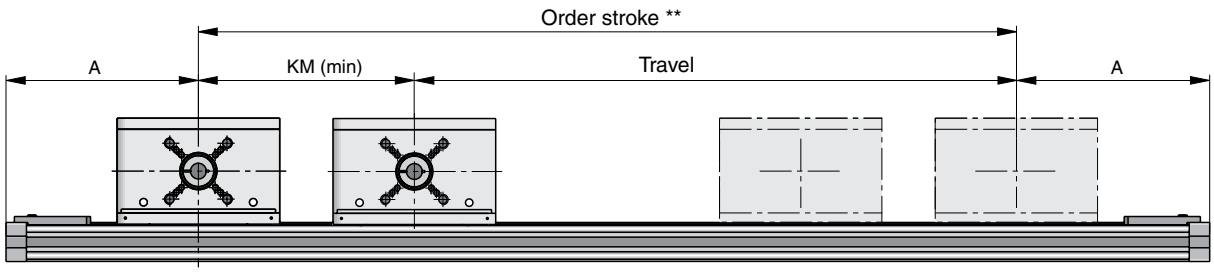


Series	ØKB	KC	KL	KP	ØKR
OSP-E22BV	12^{H7}	13.8	4	28.5	12_{h7}
OSP-E25BV	16^{H7}	18.3	5	31.5	16_{h7}

*** 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.. BV



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

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Dimensions

Dimension Table [mm]

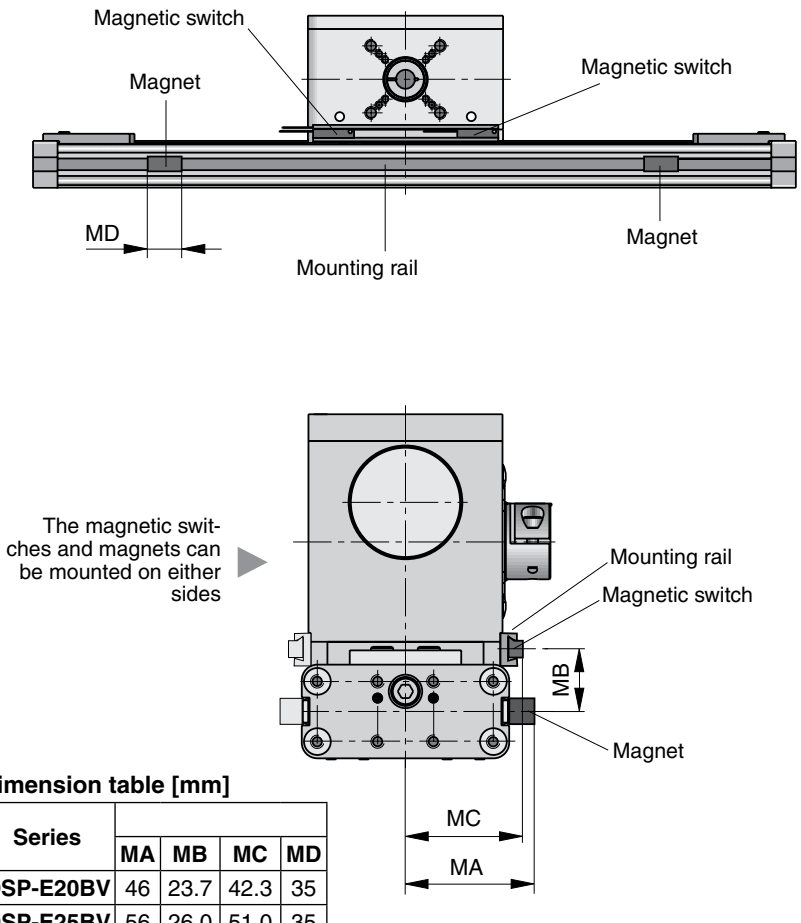
Series	A	B	C	E	GxH	J	K	M	S	V	W	X	Y	CD	CE	CF
OSP-E20BV	148	22	93	25	M5x12	139	21.1	102.3	68	51	40	120	M6	40.4	34	123.3
OSP-E25BV	210	22	93	25	M5x12	175	21.5	133.5	87	70	18	158	M6	49	42	154.5

Series	EC	EF	FB	FH	KDxKX	KF	KM_{min}	KN	KO	KS	KT	KUxKJ	KV	KW	ZZ
OSP-E20BV	59	21	73	36.0	–	61.3	155	27	16	12^{H7}	46.5	M6x10	36	–	10
OSP-E25BV	79	27	92	39.5	M6x16	76	225	34	21.5	16^{H7}	58	M8x16	46	36	10

*** The mounting holes for the coupling housing are on the motor-mounting side. Therefore please ensure that the motor-mounting side is correctly stated when ordering the drive.

(For special drive shafts, other dimensions for KS and KB are available on request – see Order Instructions.)

Dimensions



Dimension table [mm]

Series	MA	MB	MC	MD
OSP-E20BV	46	23.7	42.3	35
OSP-E25BV	56	26.0	51.0	35

Contactless Position Sensing with Magnetic Switches

The magnetic switch set, comprising two magnetic switches, a mounting rail and two magnets, is for contactless sensing of the end positions. The mounting rail and magnetic switches are mounted on the drive head and the magnets are mounted in the dovetail slot on the profile.
The magnetic switches are the RS-S type (connector version).
For the connecting cable PARKER-ORIGA recommends the use of cable suitable for cable chain.

Order instructions

Description	Ident-No.
Magnetic switch set, obtaining: - 2 magnetic switches - KL3087, TypRS-S - 1 mounting rail - 2 magnets	**15886**
Connecting cable, suitable for cable chain	
5 m	**KL3186**
10 m	**KL3217**
15 m	**KL3216**

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