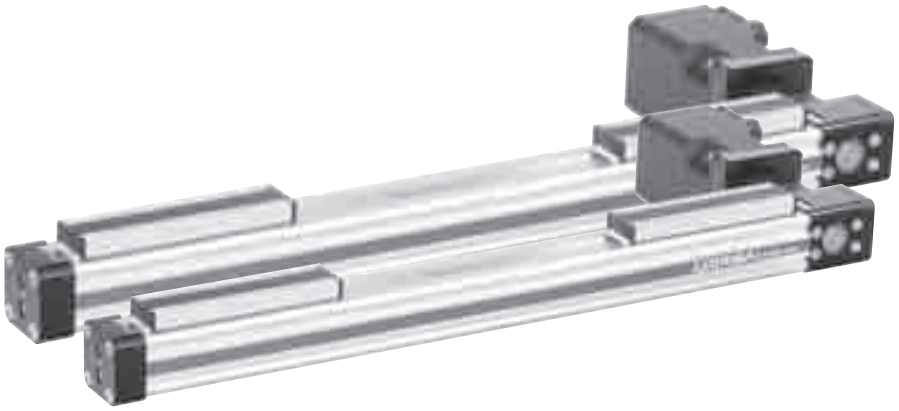
Linear Actuator with Toothed Belt and Bi-Parting Carriers Series OSP-E..BP



Contents

HOERBIGER ORIGA

ELECTRIC LINEAR ACTUATOR FOR SYNCHRONIZED BI-PARTING APPLICATIONS

A completely new generation of linear drives which can be integrated into any machine layout neatly and simply.

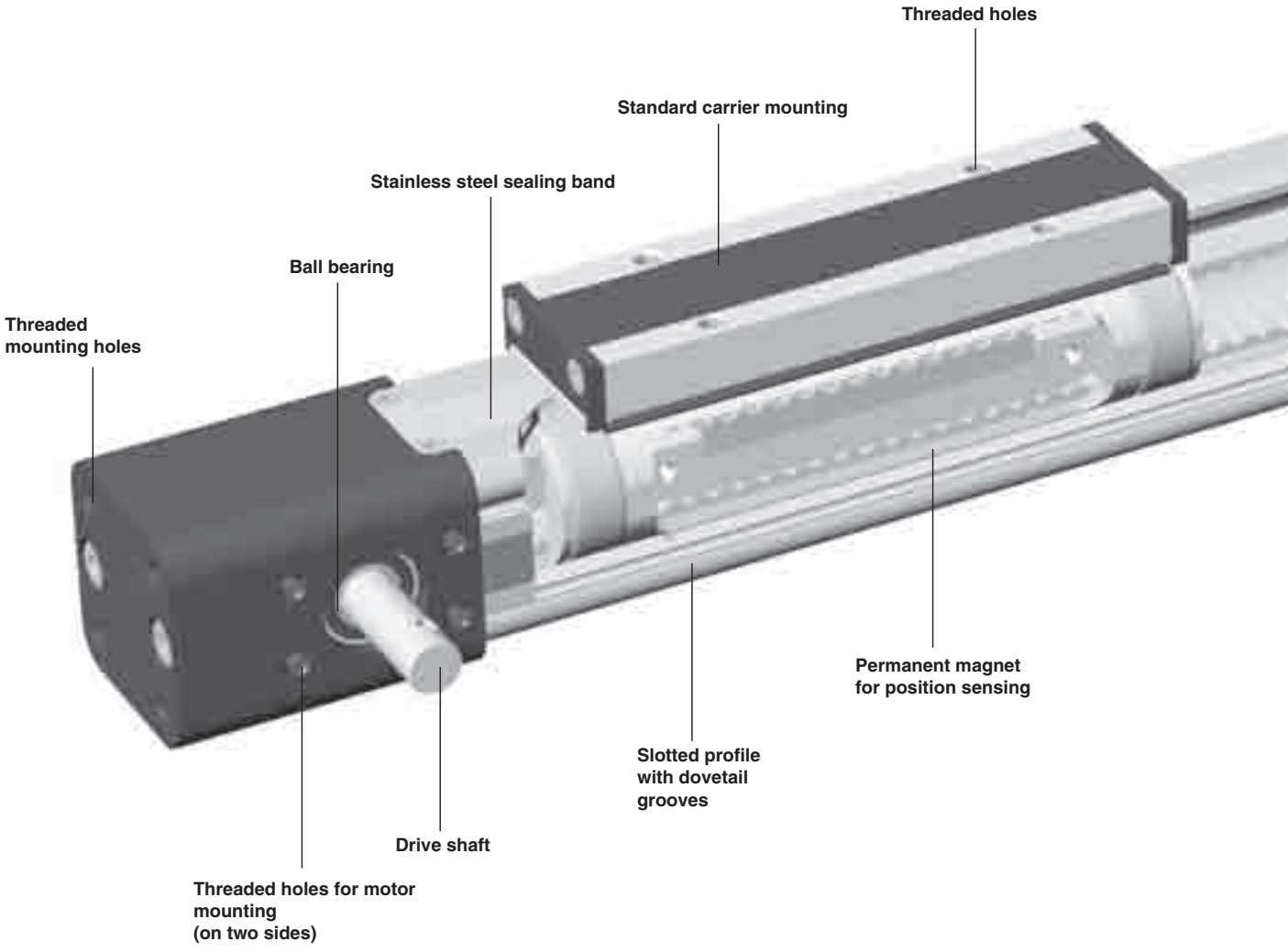
Linear Actuator with Toothed Belt and Bi-Parting Carriers

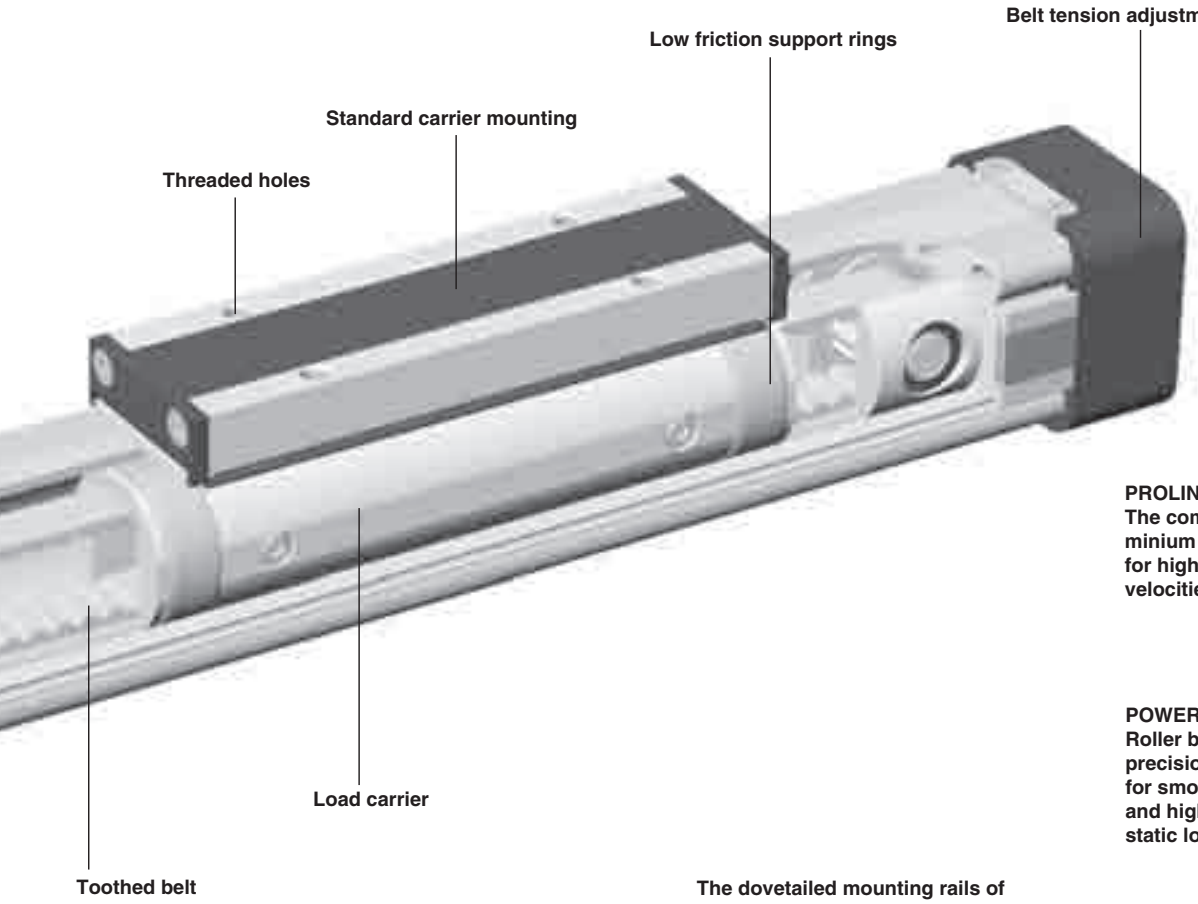
Advantages:

- Precise synchronized bi-parting movements
- Precise path and position control
- High speed operation
- Easy installation
- Low maintenance
- Ideal for centering and door operating applications

Features:

- Integrated drive and guidance system
- Complete motor and control packages
- Diverse range of accessories and mountings
- Special options available



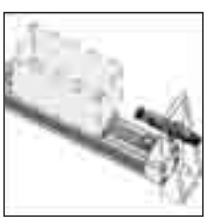


PROLINE
The compact aluminium roller guide for high loads and velocities.

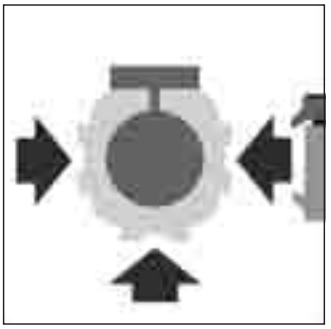
POWERSLIDE
Roller bearing precision guidance for smooth travel and high dynamic or static loads.

GUIDELINE linear guides for heavy duty applications.

Shock Absorbers for smooth absorption of kinetic energy.



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.

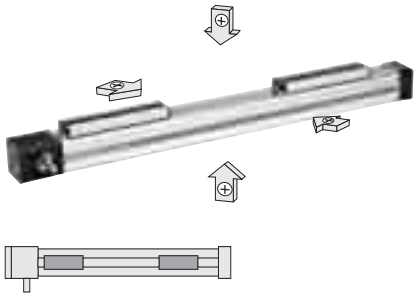


OPTIONS AND ACCESSORIES

SERIES OSP-E, BI-PARTING BELT DRIVEN

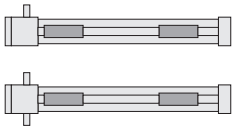
STANDARD VERSIONS OSP-E..BP

Standard carrier with integral guidance.
Dovetail profile for mounting of accessories and the actuator itself.



BASIC ACTUATOR OPTIONS

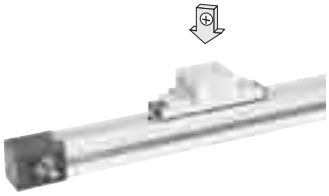
DRIVE SHAFT OPTIONS



MOUNTINGS FOR OSP-E25 TO E50

CLEVIS MOUNTING

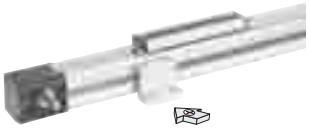
Page 68-69
Carrier mounting for driving loads supported by external linear guides.



END CAP MOUNTING
Pages 70
For end-mounting of the actuator

MID-SECTION SUPPORT

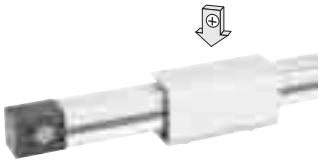
Page 71
For supporting long actuators or mounting the actuator on the dovetail grooves.



INVERSION MOUNTING

Page 75

The inversion mounting, mounted on the carrier, transfers the driving force to the opposite side, e.g. for dirty environments..



Linear Actuator with Toothed Belt and Bi-Parting Carriers

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

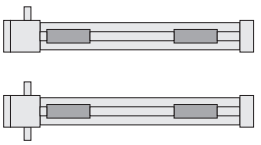
OSP
ORIGA SYSTEM PLUS

Standard Versions:

- Standard carrier with integral guidance.
- Dovetail profile for mounting of accessories and the actuator itself.

Special Versions:

- Position of Drive Shafts



Characteristics

Characteristics		Symbol	Unit	Description
General Features				
Type				Bi-Parting Belt-Driven for synchronized bi-parting movements
Series				OSP-E..BP
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
	Belt wheels			Aluminium
	Sealing band			Hardened stainless steel
	Screws, nuts			Zinc plated steel
	Mountings			Zinc plated steel and aluminium
Encapsulation class			IP	54

Weight (mass) kg and Inertia

Series	Weight (mass)[kg]			Inertia [x 10^{-6}/kgm^2]	
	At stroke 0 m	Add per metre stroke	Moving mass	At stroke 0 m	Add per metre
OSP-E25BP	1.15	1.6	0.5	48	6.6
OSP-E32BP	2.23	3.2	0.86	83	10
OSP-E50BP	6.38	6.3	2.16	585	45

Installation Instructions

Use the threaded holes in the end cap for mounting the linear actuator. See if mid-section supports are needed using the maximum allowable un-supported length graph on page 63.
At least one end cap must be secured to prevent axial sliding when mid-section support is used.
When the linear actuator is moving an externally guided load, the clevis mounting should be used (see page 68).

The linear actuators can be fitted with the standard carrier mounting facing in any direction.
To prevent contamination such as fluid ingress, the actuator should be fitted with its sealing band facing downwards.
The inversion mounting can be fitted to transfer the driving force to the opposite side (see page 75).

Maintenance

All moving parts are long-term lubricated for a normal operational environment. We recommend a check and lubrication of the linear actuator, and if necessary a change of the toothed belt and wear parts, after an operation time of 4 000 hours of operation or 3 000 km, depending on the type of application.

Start Up

The products in this datasheet should not be operated until the machine/ application in which they are used has passed necessary inspection.

HOERBIGER ORIGA

Sizing Performance Overview Maximum Loadings

Sizing of Linear Actuator

The following steps are recommended for selection:

1. Required acceleration is shown in graphs on page 64.
2. Required torque is shown on page 65.
3. Check that maximum values in the adjacent charts are not exceeded.
4. Check max. allowable torque on drive shaft by using table T2. (Pay attention to note under table) If value is lower than required, overview the moving profile or select if possible a bigger unit.
5. Before sizing and specifying the motor, the average torque must be calculated using the cycle time of the application.
6. Check that the maximum allowable unsupported length is not exceeded (see on page 63).

Performance Overview

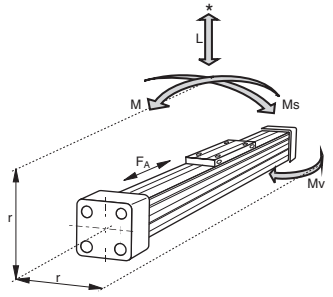
Characteristics		Unit	Description		
Size			**OSP-E25BP**	**OSP-E32BP**	**OSP-E50BP**
Max. speed		[m/s]	2	3	5
Linear motion per revolution, drive shaft		[mm]	60	60	100
Max. rpm, drive shaft		[min^{-1}]	2 000	3 000	3 000
Max. effective	< 1 m/s:	[N]	50	150	425
action force	1- 2 m/s:	[N]	50	120	375
F_A at speed	> 2 m/s:	[N]	–	100	300
No-load torque		[Nm]	0.4	0.5	0.6
Max. acceleration/deceleration		[m/s^2]	10	10	10
Repeatability		[mm/m]	±0.05	±0.05	±0.05
Max. standard stroke length		[mm]	2 x 1500	2 x 2500	2 x 2500

Maximum Allowable Torque on Drive Shaft Speed and Stroke* (T2)

OSP-E25BP				**OSP-E32BP**				**OSP-E50BP**			
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	0.9	1	0.9	1	2.3	1	2.3	1	10.0	1	10.0
2	0.9	2	0.9	2	2.0	2	(2.3)	2	9.5	2	10.0
		3	0.9	3	(1.8)	3	2.3	3	9.0	3	9.0
						4	2.3	4	8.0	4	7.0
						5	1.8	5	7.5	5	6.0

Important:
The maximum permissible moment on the drive shaft is the lowest value of the speed- or stroke-dependent moment value.
Example above: OSP-E32B-stroke 2 m, required speed 3 m/s;
From table T2: speed 3 m/s gives 1.8 Nm and stroke 2 m gives 2.3 Nm.
Max. torque for this application is 1.8 Nm.
* The stroke is the ordering stroke, see page 66.

Maximum Allowable Static Loadings



M = F · r.
Bending moments are calculated from the centre of the linear actuator

Size	*Max. applied load L [N]	Max. moments [Nm] M*	M_s	M_v
OSP-E25BP	160	12	2	8
OSP-E32BP	300	25	8	16
OSP-E50BP	850	80	16	32

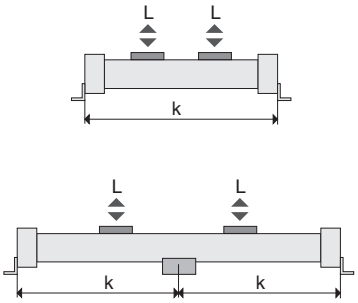
*The max. load and the max. moments is the total values of both carriers.

Combined Loadings

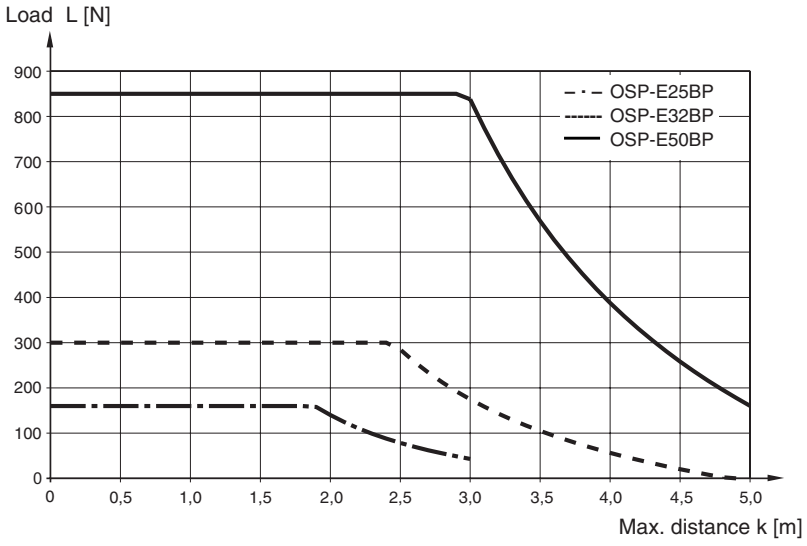
If several forces and moments are applied to the linear actuator simultaneously, then the following equation must be fulfilled in addition to the maximum loadings stated beside.

$$\frac{L}{L\,(max)} + \frac{M}{M\,(max)} + \frac{M_s}{M_s\,(max)} + \frac{M_v}{M_v\,(max)} \leq 1$$

Maximum Allowable Unsupported Length – Placing of Mid-Section Support



k = maximum allowable distance between end cap mounting and mid-section support for a given loading L.
The maximum force L must be distributed equally on the two carriers.



(Up to the curve in the above graph the deflection will be max. 0.2 % of distance k.)

Maximum Allowable Unsupported Length

Stroke Length

Stroke Lengths

The stroke lengths of linear actuators are available in multiples of 5 mm up max. 2 x 2500 mm
(OSP-E25BP: max. 10 x 1500 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.
The use of an AC motor with frequency converter normally requires a larger safety clearance than that required for servo systems.
For advise, please contact your local HOERBIGER-ORIGA technical support department.

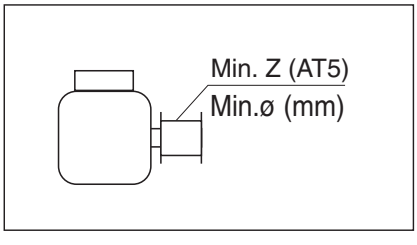
When mechanical stops are required, external shock absorbers should be used (see separate catalogue).
Align the centre line of the shock absorber as closely as possible with the object's centre of gravity.

Mounting on the Drive Shaft

Do not expose the drive shaft to uncontrolled axial or radial forces when mounting coupler or belt wheel, a steadying block should be used.

Belt wheels

Minimum allowable number of teeth Z (AT5) at maximum applied torque.



Size	Min. Z	Min. ø
OSP-E25BP	24	38
OSP-E32BP	24	38
OSP-E50BP	36	57

Required Acceleration

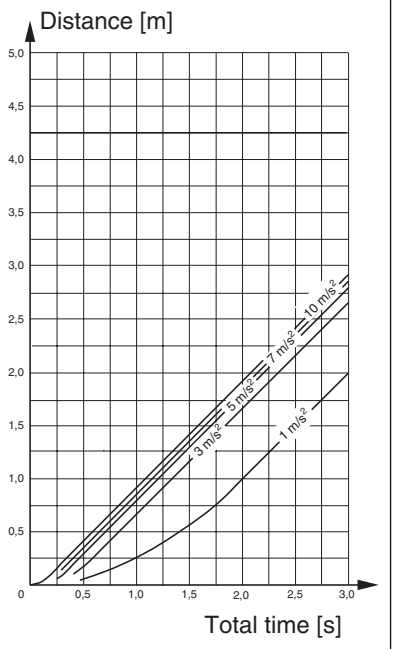
Distance-Time Graph

Using the required travel distance and total time, the adjacent graphs show the required acceleration based on maximum speed.

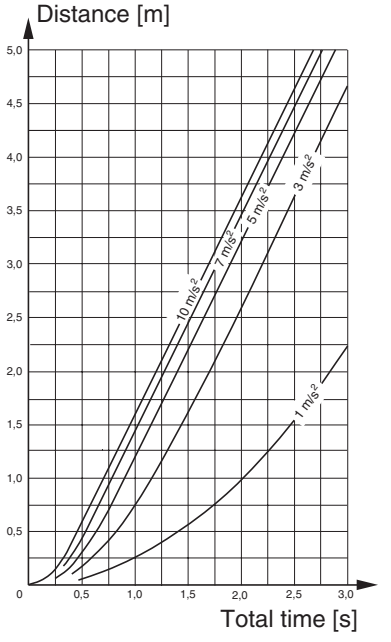
The graphs assume that acceleration and deceleration are equal.

Please note that specifying non-essential high acceleration or short cycle time will result in an oversized motor.

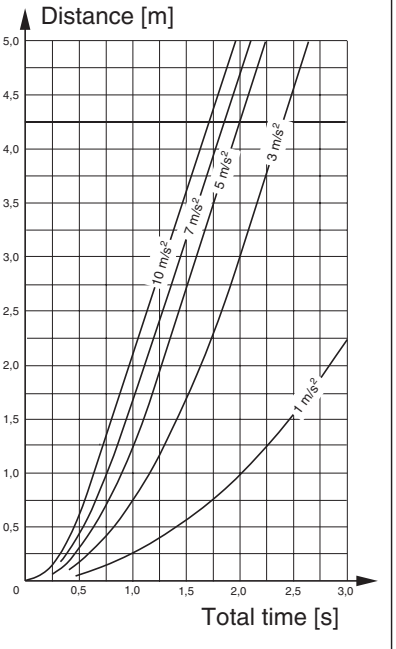
Max. speed 1 m/s



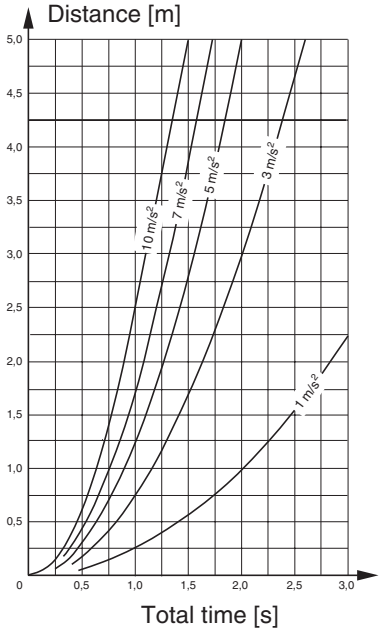
Max. speed 2 m/s



Max. speed 3 m/s



Max. speed 5 m/s

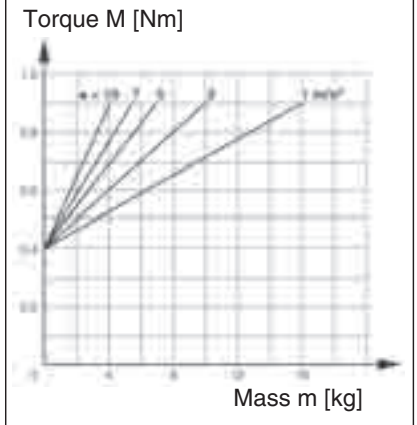


Required Torque

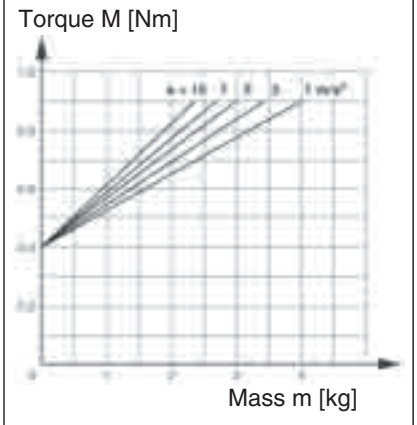
Using the known mass, the direction of the application and the required acceleration from the distance-time graphs, the linear actuator can be sized and the required torque is shown in the adjacent graphs.
Mass in graphs = Load + moving mass of the linear actuator (according to the weight chart on page 61).

Please note:
When using an additional guide, please add the mass of the carriage to the total moving mass.

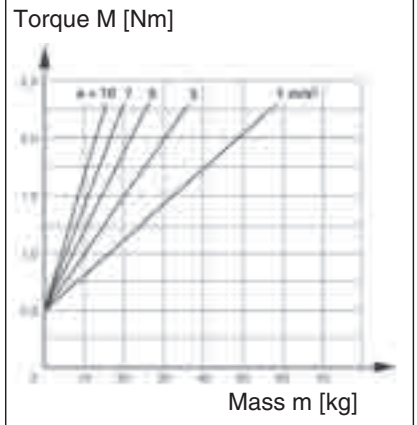
Size OSP-E25, Horizontal Application



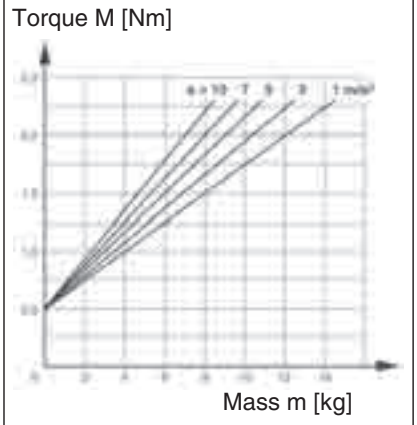
Size OSP-E25, Vertical Application



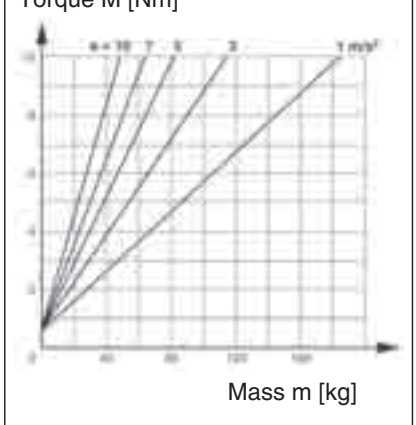
Size OSP-E32, Horizontal Application



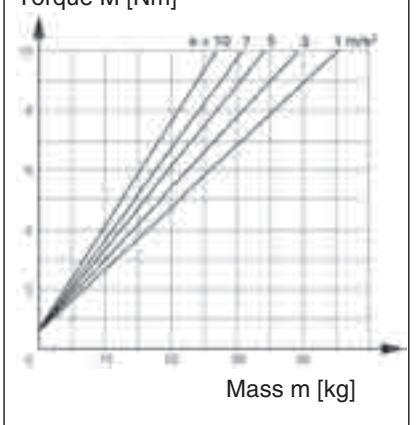
Size OSP-E32, Vertical Application



Size OSP-E50, Horizontal Application

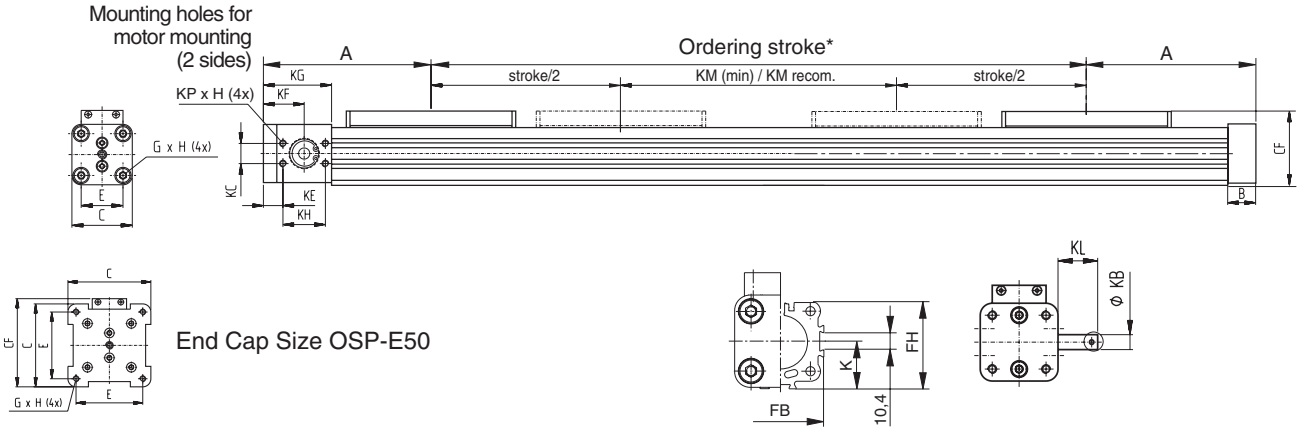


Size OSP-E50, Vertical Application



Belt Driven Linear Actuator - Basic Unit
Series OSP-E25BP, -E32BP, -E50BP

Overall length = (2 x A) + stroke (does not include any safety stroke)



End Cap Size OSP-E50

Drive Shaft Options

0 = (Standard)

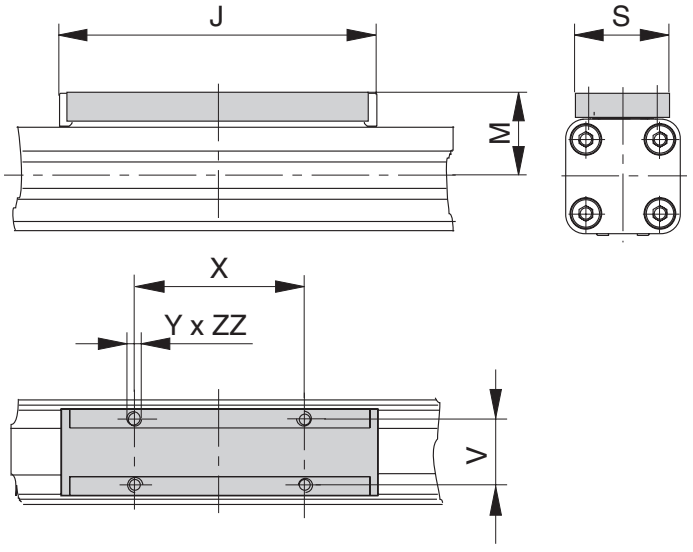
1 =

2 =

(For options on drive shaft, see ordering information on page 144)

*** The end of stroke must not be used as a mechanical stop. Add to both ends, a minimum extra length, corresponding to the linear motion per one revolution of the drive shaft. The use of AC motor with frequency converter drives normally requires a larger 'extra length' than that required for servo systems. For advise, please contact your local HOERBIGER-ORIGA technical support department.**

Standard Carrier Mounting
Series OSP-E25, -E32, -E50



Dimension KM (mm)

Size	KM_{min}	$KM_{rec.}$
25	130	190
32	170	230
50	220	320

Dimension Table (mm)

Series	A	B	C	E	G	H	J	K	M	S	V	X	Y	CF	FB	FH	KB	KC	KE	KF	KG	KH	KJ	KL	KM_{min}	KP	ZZ
OSP-E25BP	125	22	41	27	M5	10	117	21.5	31	33	25	65	M5	52.5	40	39.5	10_{j6}	15	22	37	57	30	19^{H7}	24	130	M5	8
OSP-E32BP	150	25	52	36	M6	12	152	28.5	38	36	27	90	M6	66.5	52	51.7	10_{j6}	18	17.5	36.5	61	38	26^{H7}	26	170	M6	10
OSP-E50BP	200	25	87	70	M6	12	200	43	49	36	27	110	M6	92,.5	76	77	16_{h8}	32	23.5	48.5	85	50	40^{H7}	34	220	M8	10