Linear Actuator with Ball Screw
Series OSP-E..S

Contents

HOERBIGER ORIGA

ELECTRIC LINEAR ACTUATOR FOR HIGH ACCURACY APPLICATIONS

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

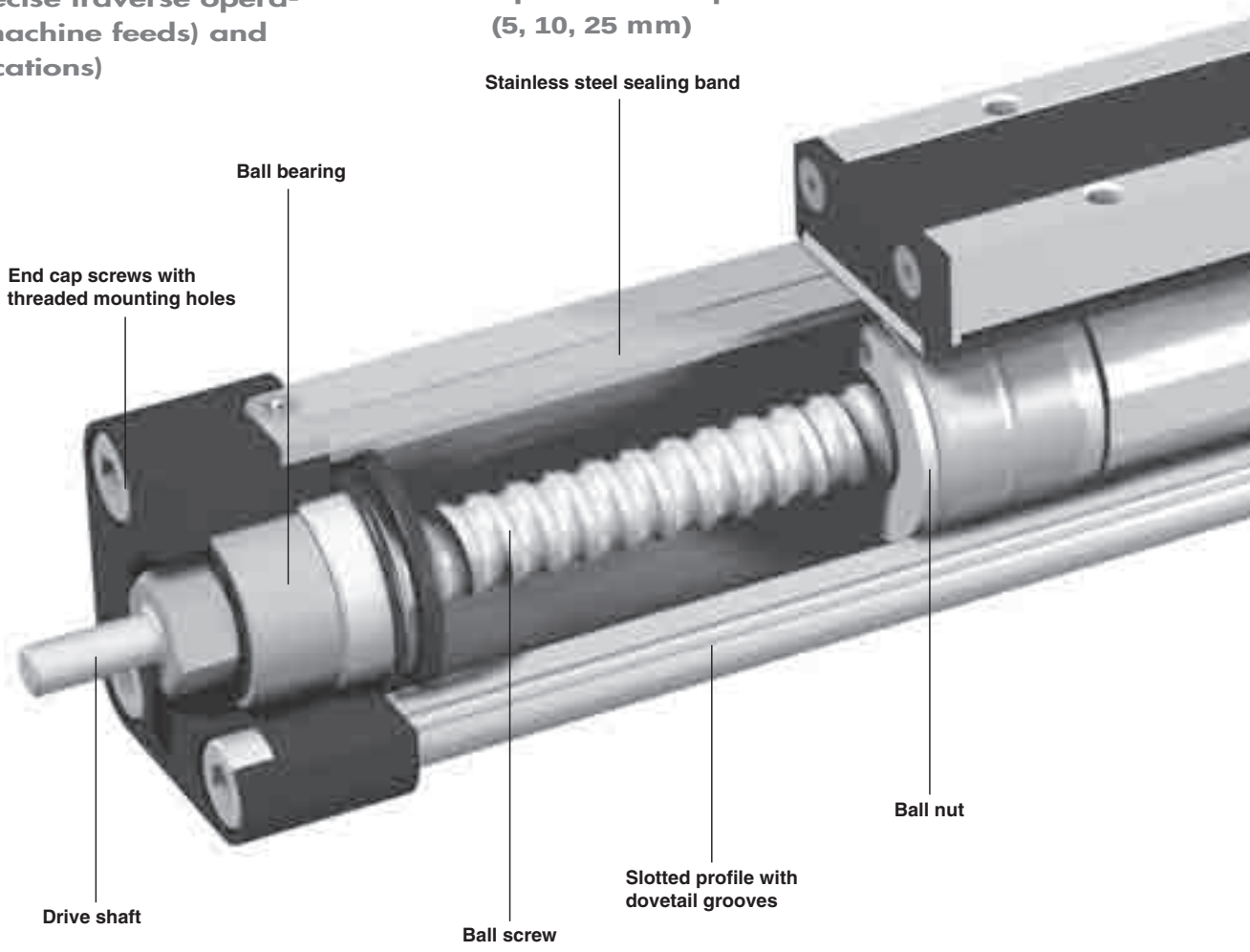
Linear Actuator with Ball Screw

Advantages:

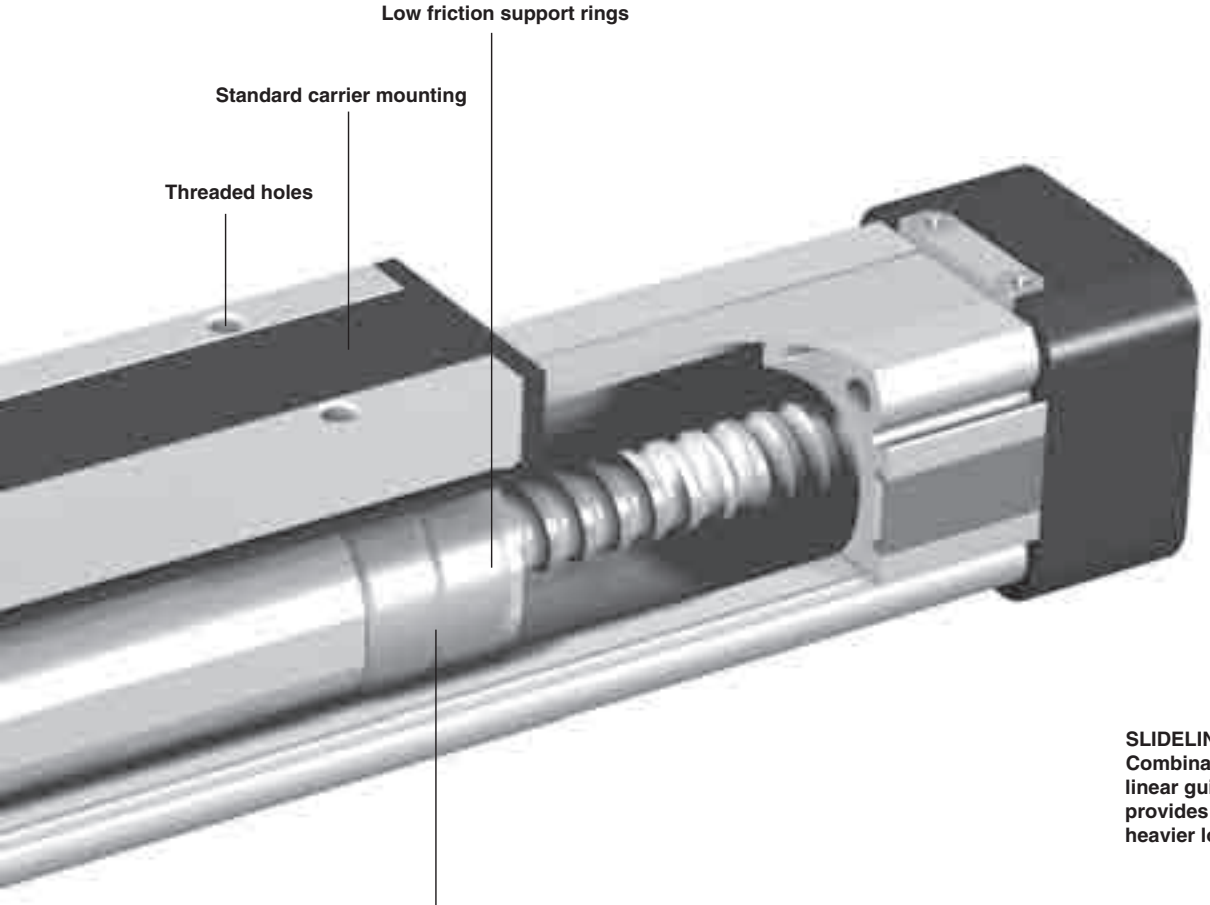
- Accurate path and position control
- High force output
- Easy installation
- Low maintenance
- Excellent slow speed characteristics
- Ideal for precise traverse operations (e.g. machine feeds) and lifting applications)

Features:

- Integrated drive and guidance system
- Complete motor and control packages
- Diverse range of accessories and mountings
- Optimal screw pitches (5, 10, 25 mm)



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

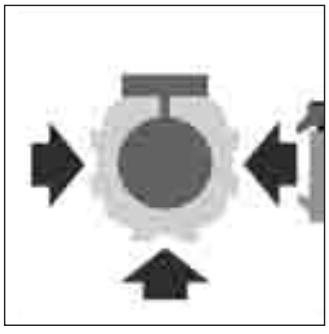


SLIDELINE
Combination with linear guides provides for heavier loads.

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

GUIDELINE
linear guides for heavy duty applications

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.

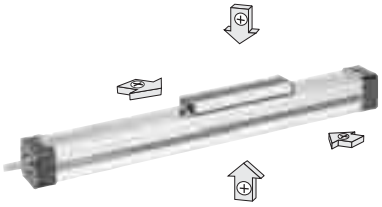


OPTIONS AND ACCESSORIES

SERIES OSP-E, SCREW-DRIVEN

STANDARD VERSIONS OSP-E..S

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



BASIC ACTUATOR OPTIONS

BALL SCREW PITCH

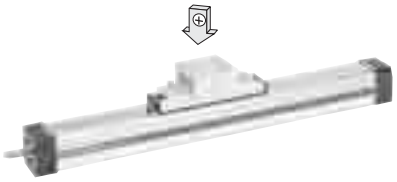
The ball screws are available in various pitches. OSP-E25 in 5 mm, OSP-E32 in 5 or 10 mm and OSP-E50 in 5, 10, 25, 50 mm pitch.

MOUNTINGS FOR OSP-E25 TO E50

CLEVIS MOUNTING

Page 92

Carrier mounting for driving loads supported by external linear guides.



END CAP MOUNTING

Page 94

For end-mounting of the actuator

MID-SECTION SUPPORT

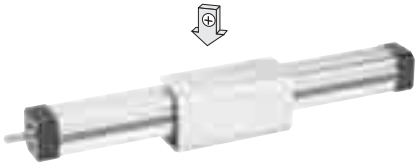
Page 95

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

INVERSION MOUNTING

Page 99

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



Linear Actuator with Ball Screw

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

OSP
ORIGA SYSTEM PLUS

Characteristics				
Characteristics		Symbol	Unit	Description
General Features				
Type				Linear Actuator with Ball Screw
Series				OSP-E..S
Mounting				See drawings
Operating temperature range		ϑ_{min} ϑ_{max}	°C °C	-20 +80
Weight (mass)			kg	See table
Installation				In any position
Material	Slotted profile			Extruded anodized aluminium
	Ball screw			Hardened steel
	Ball nut			Hardened steel
	Sealing band			Hardened stainless steel
	Guide bearings			Low friction plastic
	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-E25S	0.8	2.3	0.2	2.2	11.3
OSP-E32S	2.0	4.4	0.4	8.4	32
OSP-E50S	5.2	9.4	1.2	84	225

Standard Version:

- Standard carrier with own internal guidance
- Dovetail grooves for mounting accessories and the drive itself
- Travel per rotation of threaded spindle:
  Type OSP-E25 : 5 mm
  Type OSP-E32: 5 ,10 mm
  Type OSP-E50: 5 ,10, 25 mm

Installation Instructions

Use the threaded holes in the free end cap and a mid-section support close to the motor end for mounting the linear actuator.
See if mid-section supports are needed using the maximum allowable unsupported length graph on page 85.
At least one end cap must be secured to prevent axial sliding when mid-section support is used (see page 94).
When the linear actuator is moving an externally guided load, the clevis mounting should be used.
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 99).

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 worn parts, after every 12 months or 3000 km travel of distance, depending on the type of application. Please see separate instructions.

Commissioning

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

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Sizing Performance Overview Maximum Loadings

Sizing of Linear Actuator

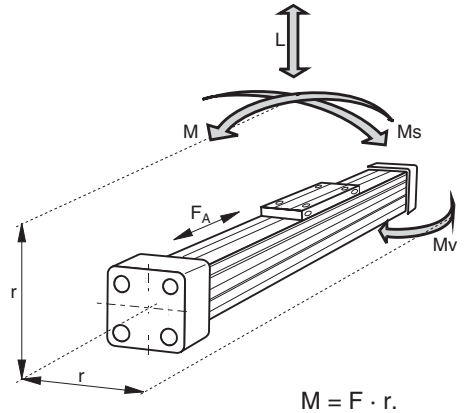
The following steps are recommended for selection:

1. Recommended maximum acceleration is shown in graphs on page 86.
2. Required torque is shown in graphs on page 87.
3. Check that maximum values in the adjacent charts are not exceeded.
4. When sizing and specifying the motor, the RMS-average torque must be calculated using the cycle time of the application.
5. Check that the maximum allowable unsupported length is not exceeded (see on page 85).

Performance Overview

Characteristics	Unit	Description					
Series		**OSP-E25S**	**OSP-E32S**		**OSP-E50S**		
Pitch	[mm]	5	5	10	5	10	25
Max. speed	[m/s]	0.25	0.25	0.5	0.25	0.5	1.25
Linear motion per revolution, drive shaft	[mm]	5	5	10	5	10	25
Max. rpm, drive shaft	[min^{-1}]	3 000	3 000		3 000		
Max. effective action force F_A	[N]	250	600		1 500		
Corresponding torque on drive shaft	[Nm]	0.35	0.75	1.3	1.7	3.1	7.3
No-load torque	[Nm]	0,2	0,2	0,3	0,3	0,4	0,5
Max. allowable torque on drive shaft	[Nm]	0.6	1.5	2.8	4.2	7.5	20
Typical repeatability	[mm/m]	±0.05	±0.05		±0.05		
Max. Standard stroke length	[mm]	1100	2000		3200		

Maximum Allowable Loadings



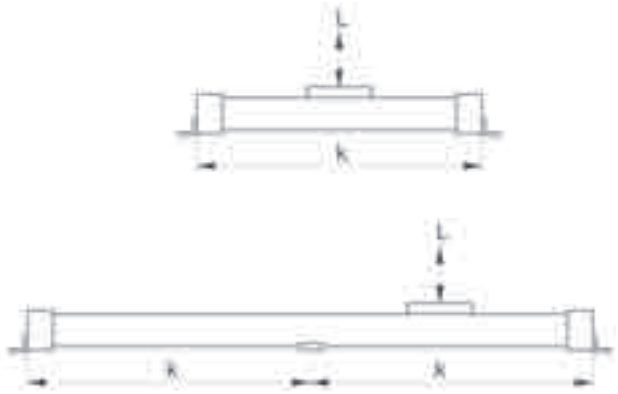
M = F · r.
Bending moments are calculated from the centre of the linear actuator and F indicates actual force.

Size	Max. applied load [N] L	Max. moments [Nm] M	M_s	M_v
OSP-E25	500	12	2	8
OSP-E32	1 200	25	8	16
OSP-E50	3 000	80	16	32

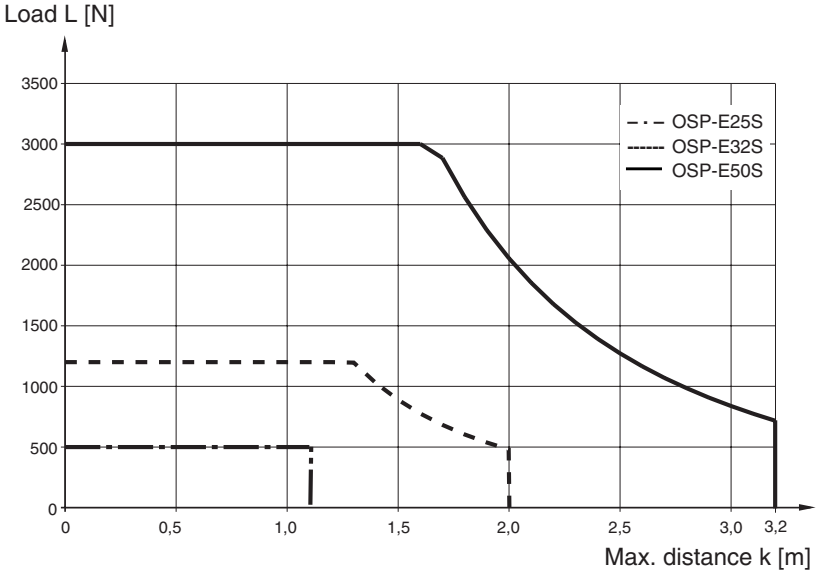
Combined Loadings.
If several forces and moments are applied to the linear actuator simultaneously, then the following equation must be fulfilled in addition to the above stated maximum loadings.

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

Maximum Allowable Unsupported Length – Placing of Mid-Section Support



k = Maximum allowable distance between mountings/mid-section support for a given load (L)



(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 the linear actuators are available in multiples of 1 mm up to above maximum stroke lengths.
OSP-E25: max. 1100 mm
OSP-E32: max. 2000 mm
OSP-E50: max. 3200 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 of minimum 25 mm at both ends.
The use of an AC motor with frequency converter normally requires a larder safety clearance than that required for servo systems. For advise, please contact your local HOERBIGER-ORIGA technical support department.

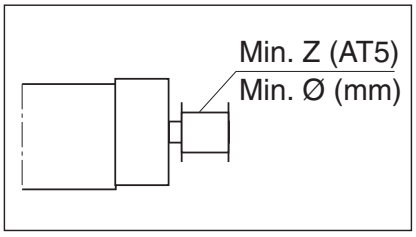
When mechanical stops are required, external shock absorbers should be used. Align the centreline of the shock absorber as closely as possible with the object's centre of gravity.

Mounting on the Drive Shaft

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

Belt wheels

Minimum allowable number of teeth (AT5) and diameter of belt wheel at maximum applied torque.

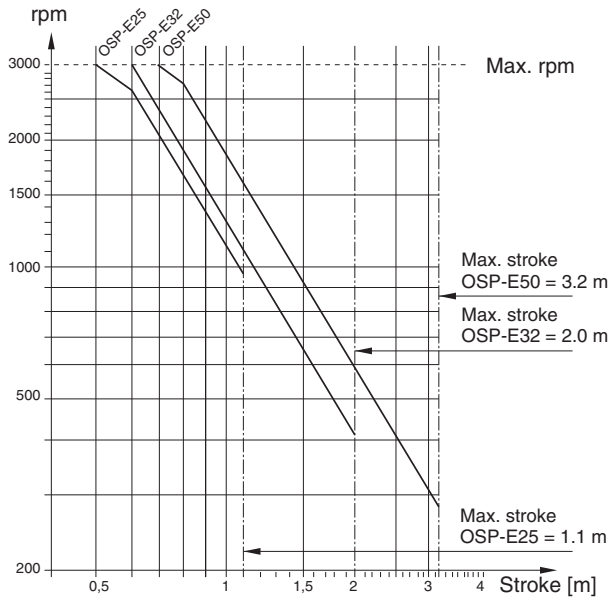


Size	Min. Z	Min. Ø
OSP-E25S	24	38
OSP-E32S	24	38
OSP-E50S	36	57

Maximum rpm – Stroke

At longer strokes the speed has to be reduced according to the adjacent graphs.

Maximum rpm – Stroke

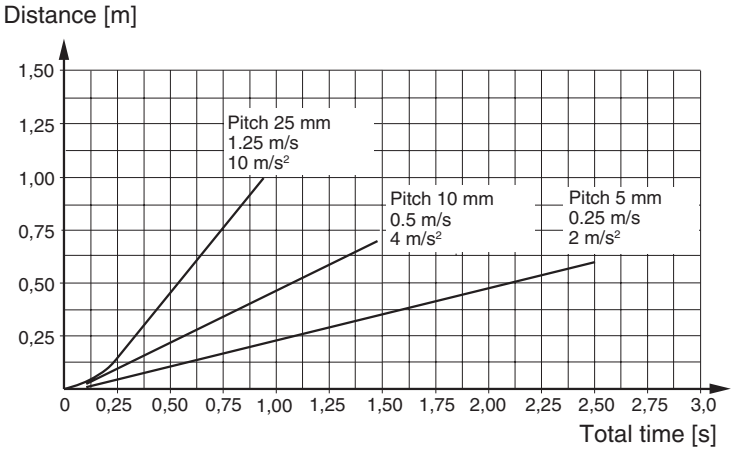


The maximum rpm shown in the graph, is 80% of the critical rpm.

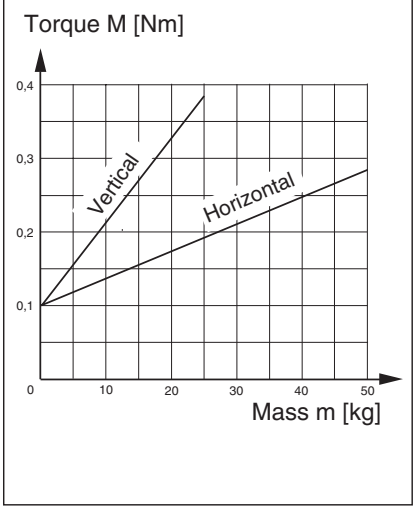
Distance-Time Graph

The adjacent graphs show travel distance and total time at maximum speed and recommended maximum acceleration. The graph assumes that acceleration and deceleration are equal.

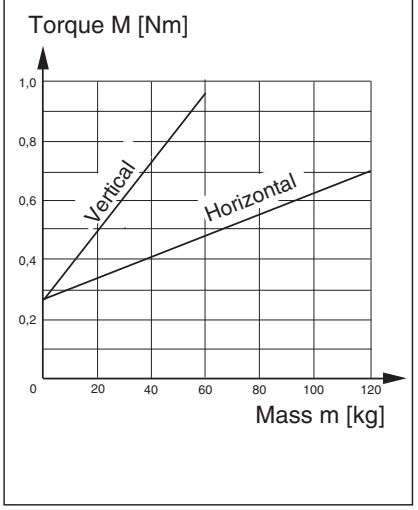
Distance-Time Graph



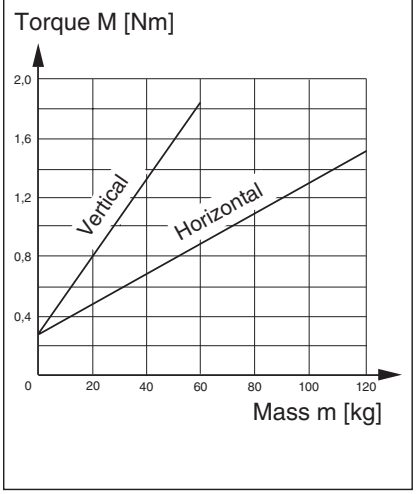
Size OSP-E25, Pitch 5 mm
Acceleration 2 m/s²



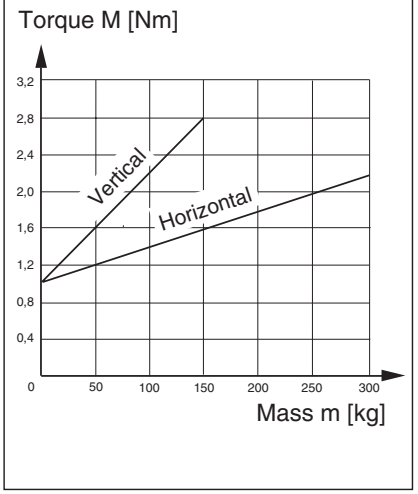
Size OSP-E32, Pitch 5 mm
Acceleration 2 m/s²



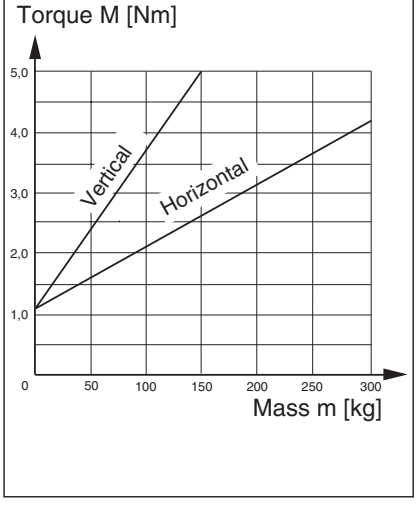
Size OSP-E32, Pitch 10 mm
Acceleration 4 m/s²



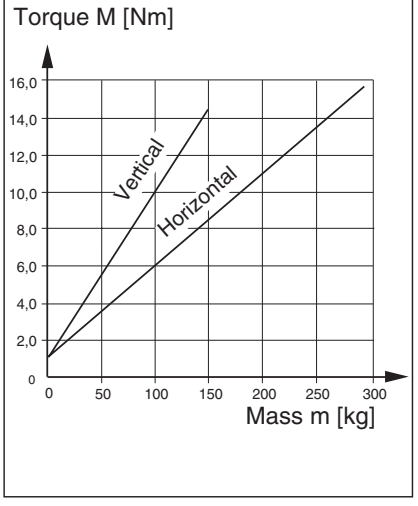
Size OSP-E50, Pitch 5 mm
Acceleration 2 m/s²



Size OSP-E50, Pitch 10 mm
Acceleration 4 m/s²



Size OSP-E50, Pitch 25 mm
Acceleration 10 m/s²



Required Torque

Using the known mass, the direction of the application and the recommended acceleration, 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 (see on page 83).

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

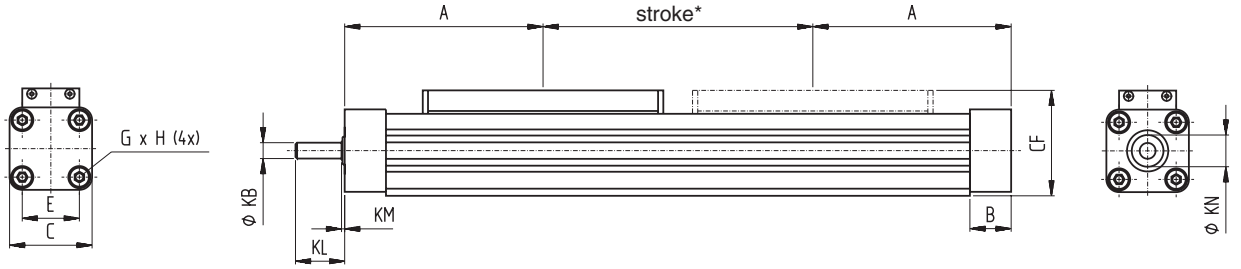
Maximum RPM per Stroke for Critical Speed

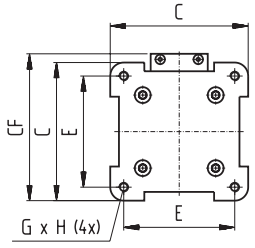
	OSPE	Speed [mm/s]	OSPE	Speed [mm/s]		OSPE	Speed [mm/s]		
Stroke	25	pitch	32	pitch	pitch	50	pitch	pitch	pitch
	rpm	5	rpm	5	10	rpm	5	10	25
200	3000	250	3000	250	500	3000	250	500	1250
300	3000	250	3000	250	500	3000	250	500	1250
400	3000	250	3000	250	500	3000	250	500	1250
500	3000	250	3000	250	500	3000	250	500	1250
600	2667	222	2996	250	499	3000	250	500	1250
700	2089	174	2378	198	396	3000	250	500	1250
800	1680	140	1933	161	322	2745	229	458	1144
900	1381	115	1603	134	267	2311	193	385	963
1000	1155	96	1350	113	225	1972	164	329	822
1100	980	82	1153	96	192	1703	142	284	709
1200			996	83	166	1485	124	247	619
1300			869	72	145	1306	109	218	544
1400			765	64	127	1158	97	193	483
1500			678	57	113	1034	86	172	431
1600			606	50	101	929	77	155	387
1700			544	45	91	839	70	140	349
1800			491	41	82	761	63	127	317
1900			446	37	74	694	58	116	289
2000			407	34	68	635	53	106	265
2100						583	49	97	243
2200						538	45	90	224
2300						498	41	83	207
2400						462	38	77	192
2500						429	36	72	179
2600						400	33	67	167
2700						374	31	62	156
2800						351	29	58	146
2900						329	27	55	137
3000						309	26	52	129
3100						292	24	49	121
3200						275	23	46	115

stroke [mm]
rpm [rev/min]
Speed [mm/s]

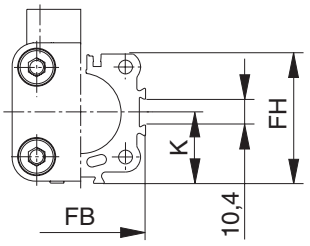
Screw-Driven Linear Actuator – Basic Unit
Series OSP-E25S, -E32S, -E50S

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



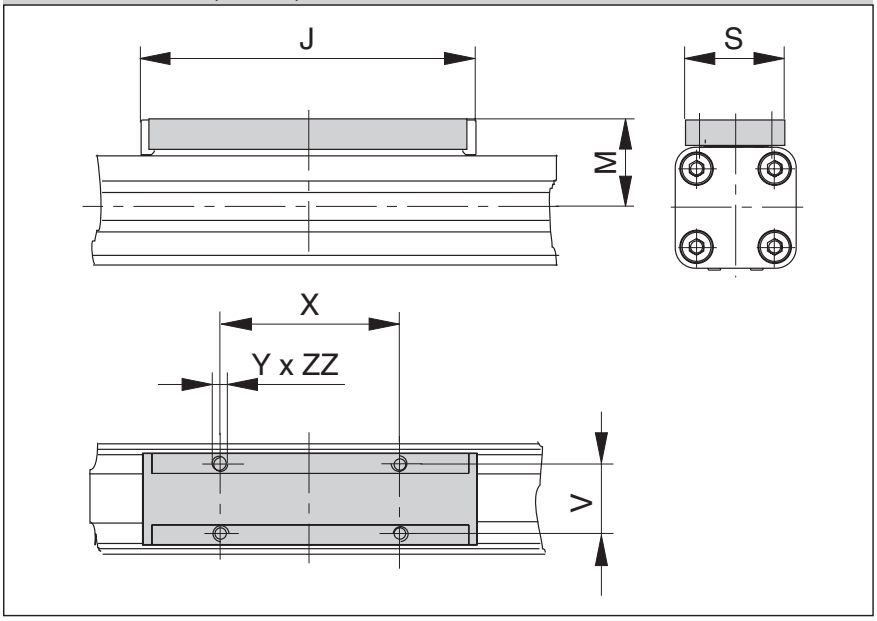


End Cap Size OSP-E50



*** The end of stroke must not be used as a mechanical stop. Add to both ends, a minimum extra length of 25 mm to the stroke.**
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-E25S, -E32S, -E50S



Dimension Table (mm)

Series	A	B	C	E	G	H	J	K	M	S	V	X	Y	CF	FB	FH	KB	KL	KM	KN	ZZ
OSP-E25S	100	22	41	27	M5	10	117	21.5	31	33	25	65	M5	52.5	40	39.5	6_{h7}	17	2	13	8
OSP-E32S	125	25.5	52	36	M6	12	152	28.5	38	36	27	90	M6	66.5	52	51.7	10_{h7}	31	2	20	10
OSP-E50S	175	33	87	70	M6	12	200	43	49	36	27	110	M6	92.5	76	77	15_{h7}	43	3	28	10