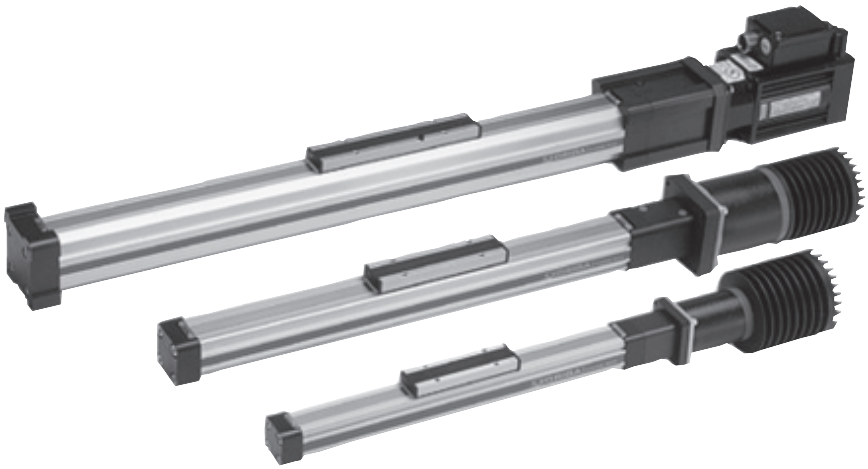
Linear Actuator with Ball Screw
Series OSP-E..S



Contents

HOERBIGER ORIGA

The System Concept

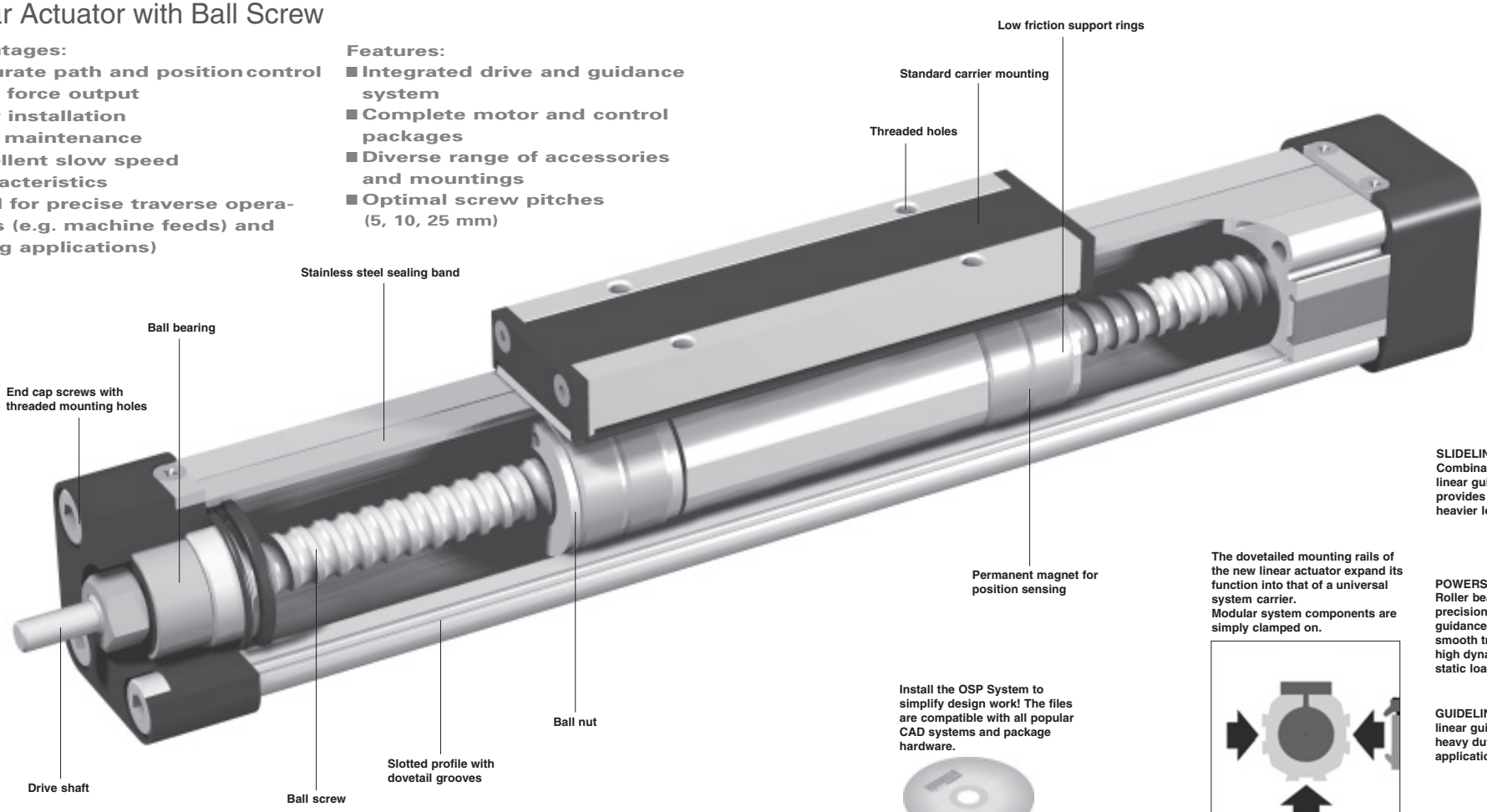
ELECTRIC LINEAR ACTUATOR FOR HIGH ACCURACY APPLICATIONS

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)



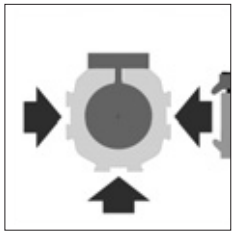
PROLINE
The compact aluminium roller guide for high loads and velocities.

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.



Install the OSP System to simplify design work! The files are compatible with all popular CAD systems and package hardware.

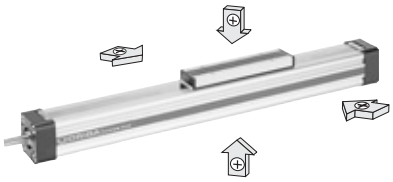
OPTIONS AND ACCESSORIES

SERIES OSP-E, SCREW-DRIVEN

STANDARD VERSIONS OSP-E..S

Data Sheet 1.30.002E

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



BASIC ACTUATOR OPTIONS

BALL SCREW PITCH

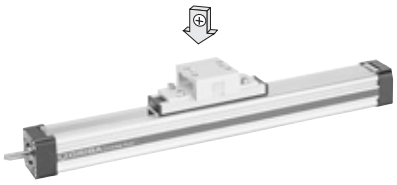
The ball screws are available in various pitches. OSP-E25 in 5 mm, OSP-E32 in 5 or 10 mm and OSP-E50 in 5, 10, 25 mm pitch.

MOUNTINGS FOR OSP-E25 TO E50

CLEVIS MOUNTING

Data Sheet 1.45.021E

Carrier mounting for driving loads supported by external linear guides.



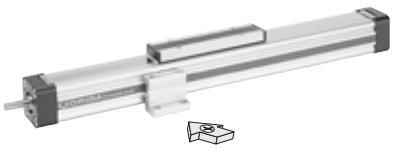
END CAP MOUNTING
Data Sheet 1.45.022E

For end-mounting of the actuator

MID-SECTION SUPPORT

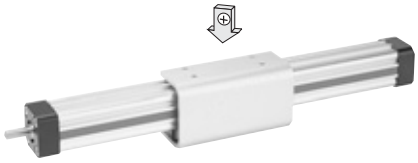
Data Sheet 1.45.023E

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



INVERSION MOUNTING

Data Sheet 1.45.025E
The inversion mounting, mounted on the carrier, transfers the driving force to the opposite side, e.g. for dirty environments.



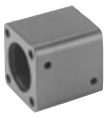
ACCESSORIES

PROXIMITY SENSOR SERIES RS AND ES

Data Sheet 1.45.101E
For electrical sensing of end and intermediate carrier positions.

MOTOR MOUNTINGS

Data Sheet 1.45.029E



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

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

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

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 data sheet 1.30.002E-3. At least one end cap must be secured to prevent axial sliding when mid-section support is used (see data sheet 1.45.023E).
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 data sheet 1.45.025E).

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.

For **linear guides** see 1.40.020E to 024E
For **proximity sensors** see 1.45.101E,
For **mountings** and **accessories** see 1.45.020E to 029E

HOERBIGER ORIGA

Sizing
Performance Overview
Maximum Loadings

Sizing of Linear Actuator

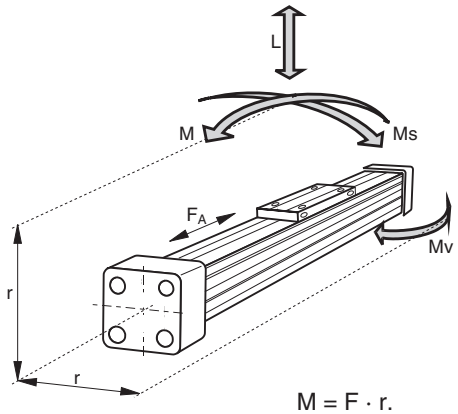
The following steps are recommended for selection :

1. Recommended maximum acceleration is shown in graphs on data sheet 1.30.002E-4.
2. Required torque is shown in graphs on data sheet 1.30.002E-5.
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 data sheet 1.30.002E-3).

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



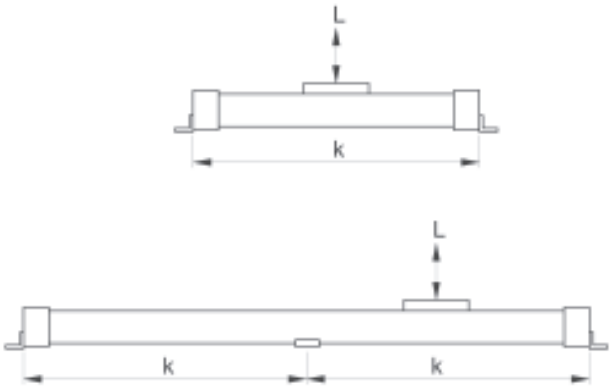
M = F · r.
Bending moments are calculated from the centre of the linear actuator and F indicates actual force.

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

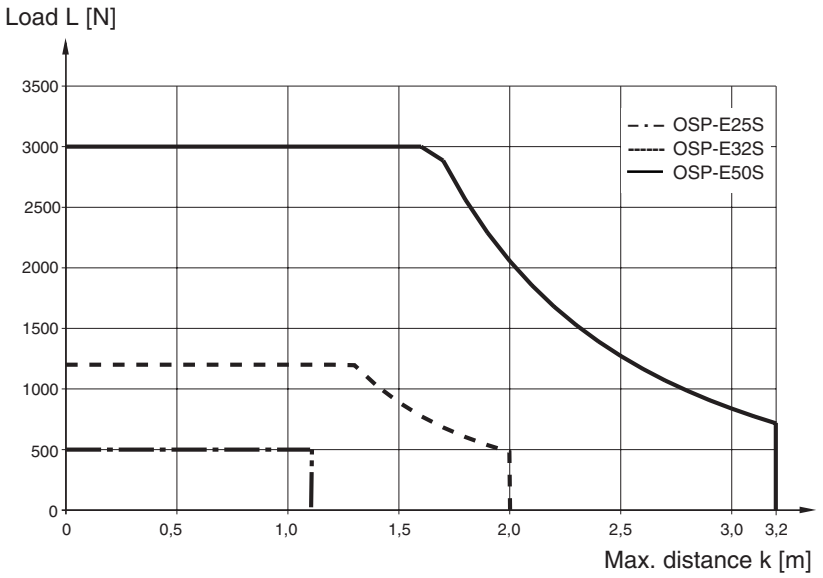
Combined Loadings.
If several forces and moments are applied to the linear actuator simultaneously, then the following equation must be fulfilled in addition to the above stated maximum loadings.

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

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.

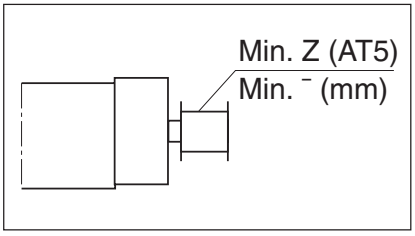
When mechanical stops are required, external shock absorbers should be used (see separate catalogue).
Align the centreline of the shock absorber as closely as possible with the object's centre of gravity.

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.

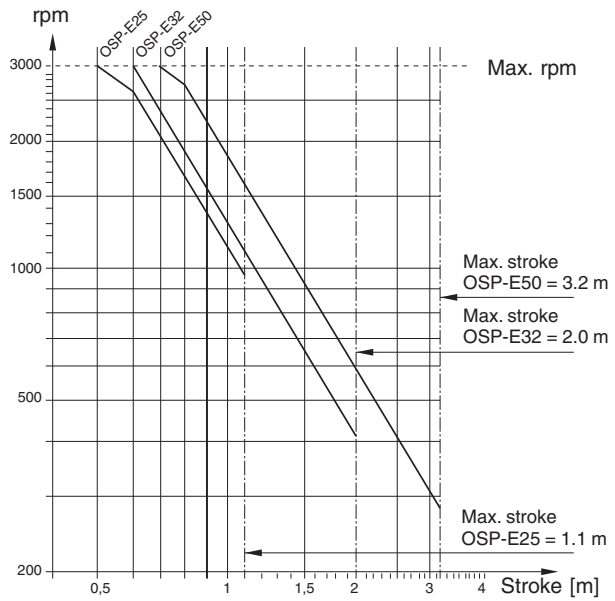


Size	Min. Z	Min. Ø
OSP-E25S	24	38
OSP-E32S	24	38
OSP-E50S	36	57

Maximum rpm – Stroke

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

Maximum rpm – Stroke

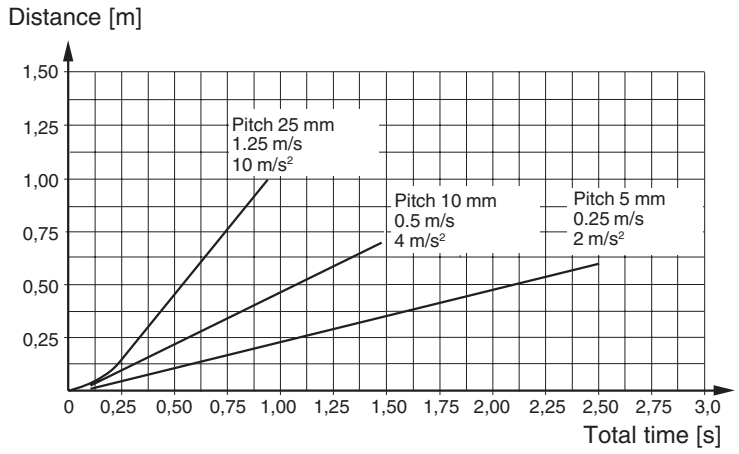


The maximum rpm shown in the graph, is 80% of the critical rpm.

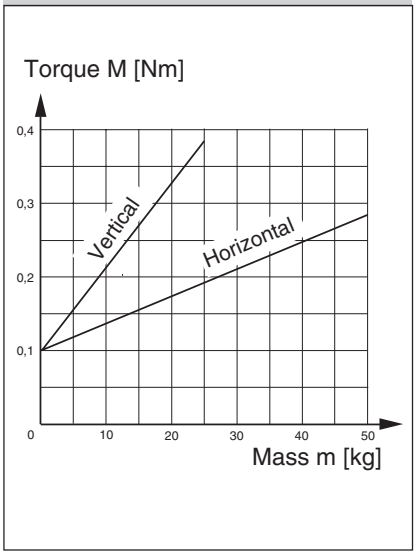
Distance-Time Graph

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.

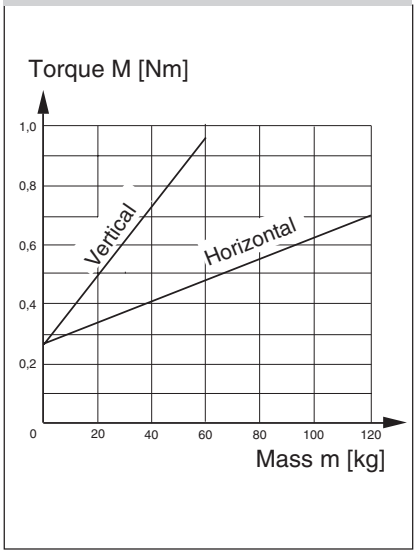
Distance-Time Graph



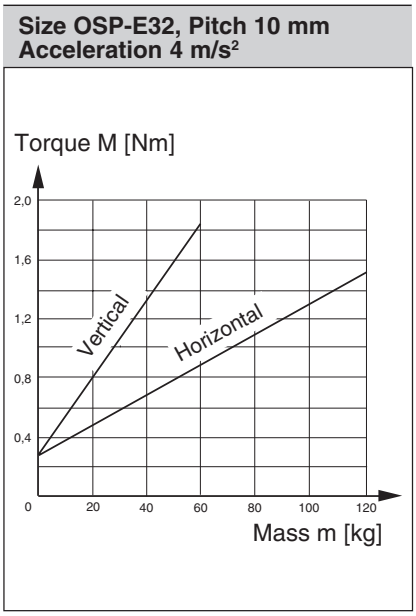
Size OSP-E25, Pitch 5 mm
Acceleration 2 m/s²



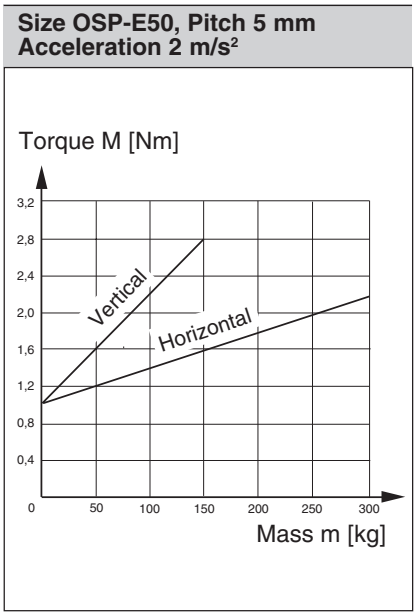
Size OSP-E32, Pitch 5 mm
Acceleration 2 m/s²



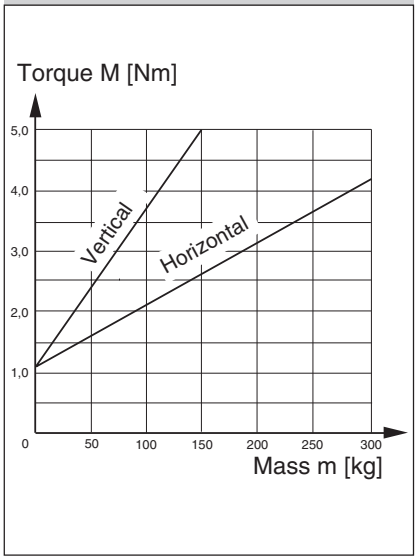
Size OSP-E32, Pitch 10 mm
Acceleration 4 m/s²



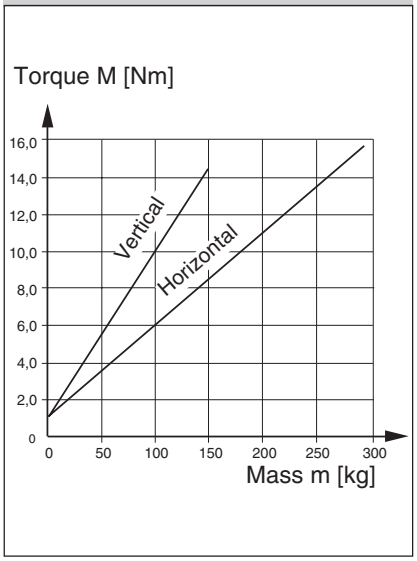
Size OSP-E50, Pitch 5 mm
Acceleration 2 m/s²



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



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

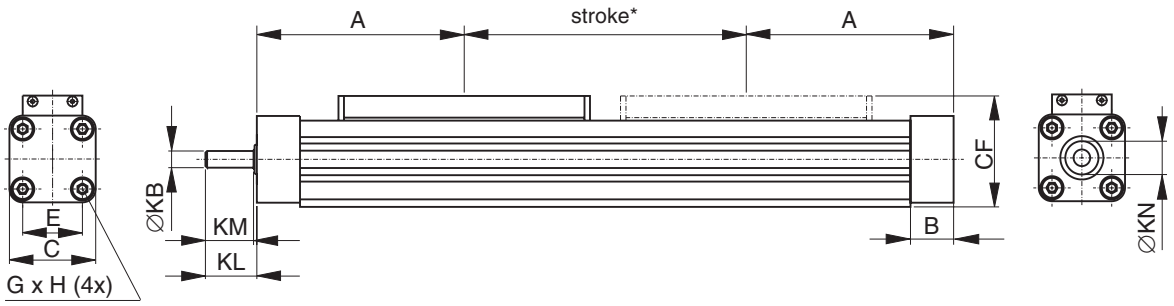


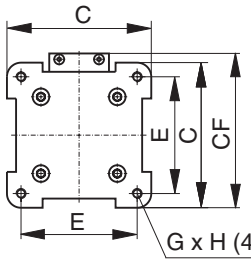
Required Torque

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 data sheet 1.30.002E-1).

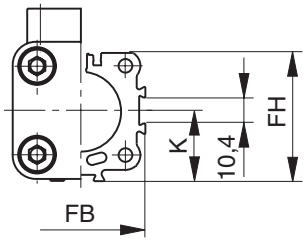
Please note:
When using an additional guide, please add the mass of carriage to the total moving mass.

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

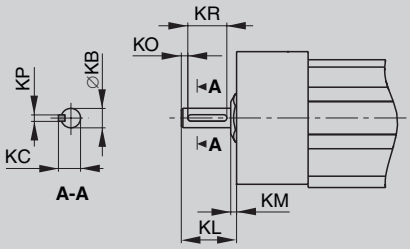




End Cap Size OSP-E50



Hollow shaft with keyway (option)



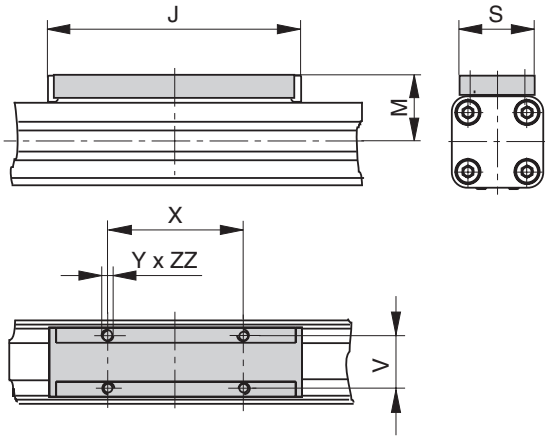
Dimension Table (mm)

Series	ØKB_{h7}	KC	KL Opt.3	KL Opt.4	KM	KO	KP^{P9}	KR
OSP-E25S	6	6.8	17	24	2	2	2	12
OSP-E32S	10	11.2	31	41	2	5	3	16
OSP-E50S	15	17	43	58	3	6	5	28

Option 3: Keyway
Option 4: Keyway, long version

*** 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.

Standard Carrier Mounting
Series OSP-E25S, -E32S, -E50S

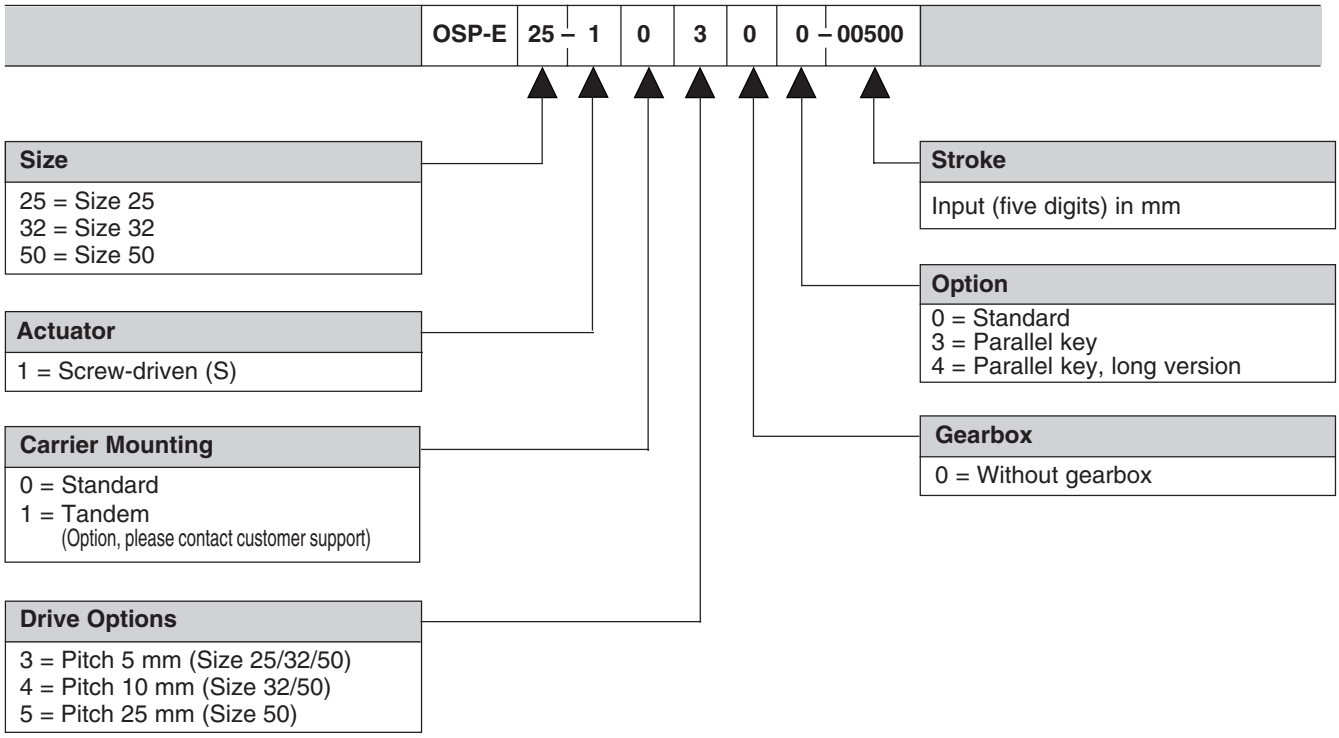


Dimension Table (mm)

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

Order Instruction – Basic Electric Linear Actuator OSP-E..S

Electric Linear Actuator



Accessories - please order separately

Description	Data Sheet No.
Clevis Mounting	**1.45.021E**
End Cap Mountings	**1.45.022E**
Mid-Section Support	**1.45.023E**
Inversion Mounting	**1.45.025E**
Adapter Profile	**1.45.026E-1**
T-Nut Profile	**1.45.026E-2**
Coupling Housing (for motor)	**1.45.029E**
Proximity Sensors	**1.45.101E**
Stepper Motor and Controller	**1.60.001E-1.60.004E**
Servo Motor and Controller	**1.60.001E-1.60.004E**