

## Rodless Design Pneumatic Cylinders

### OSP-P Series - Band Type Rodless

System Concept & Components	G2-G8
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#### Standard Series

Features	G9-G10
Ordering Information	G11
Options / Technical Data	G12-G15
Dimensional Data	G16-G19
3/2 Way Valves VOE	G20-G21
Active Brake	G22-G23
Accessories	G24-G35
Clean Room	G36-G39
Bi-Parting	G40-G42

#### Linear Guides

Features	G43-G44
SLIDELINE	G45-G49
POWERSLIDE	G50-G53
PROLINE	G54-G58
STARLINE	G59-G63
KF	G64-G70
HD	G71-G78
Accessories	G79-G86
Sensors	G87-G94
Sensoflex	G95-G97

### P1X Series - Band Type Rodless

Features	G98
Ordering Information	G99
Specifications / Technical Data	G100-G104
Dimensional Data	G105-G114
Accessories	G115

### P1Z Series - Magnetically Coupled Rodless

Basic Features	G116
Ordering Information	G117
Specifications / Technical Data	G118-G119
Dimensional Data	G120
Accessories	G121
Guided Features	G122
Ordering Information	G123
Specifications / Technical Data	G124-G125
Dimensional Data	G126
Accessories	G127

### GDL Series - Rails & Cassettes

Features	G130-G131
Ordering Information / Stroke Lengths	G132
Specification	G133
Dimensional Data	G134
Accessories	G135-G142



## ATTen TiOn!

Contact PARKER-ORIGA for sizing software and/or technical assistance 877-321-4736

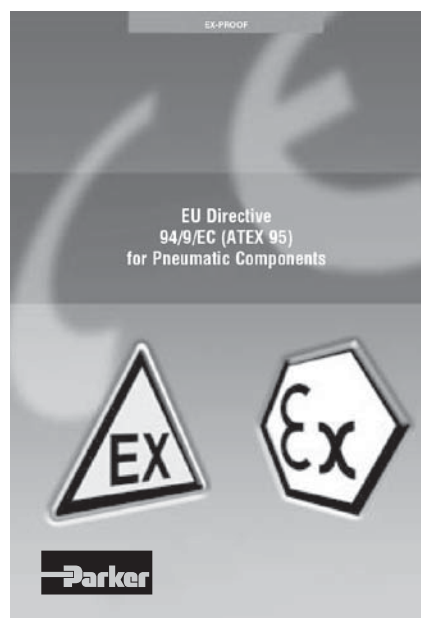
All dimensions are in European-Standard.  
 Please convert all in US-Standard.

PARKER-ORIGA rodless pneumatic cylinders are the first rodless cylinders that have been approved for use in potentially explosive atmospheres in Equipment Group II, Category 2 GD

The Cylinders are to the ATEX Certification 94/9/EG (ATEX 95) for Pneumatic Components.

## Conversion Table

Multiply	By	To Obtain
millimeters	.03937	inches
newtons	.2248	lbs.(F)
newton-meters	8.8512	in-lbs
kilograms	2.205	lbs.
inches	25.4	millimeters
lbs.(F)	4.448	newtons
in-lbs	.113	newtons-meters
lbs.	.45359	kilograms



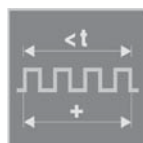
for use in Ex-Areas



for Clean Room Applications certified to DIN EN ISO 14644-1



Stainless steel hardware for special applications



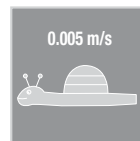
with special pneumatic cushioning system for cycle time optimization, for Ø 16 to 50 mm – on request



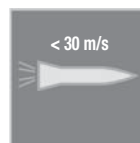
High Temperature Version for temperatures up to +100°C



Low Temperature Version for temperatures up to -40°C (25, 32, 40mm Ø)



Slow Speed Version v = 0.005 – 0.2 m/s



High Speed Version v<sub>max.</sub> = 30 m/s (16, 25, 32mm Ø)

2D & 3D CAD Drawings can be downloaded from website [www.parker.com/pneu/rodless](http://www.parker.com/pneu/rodless)

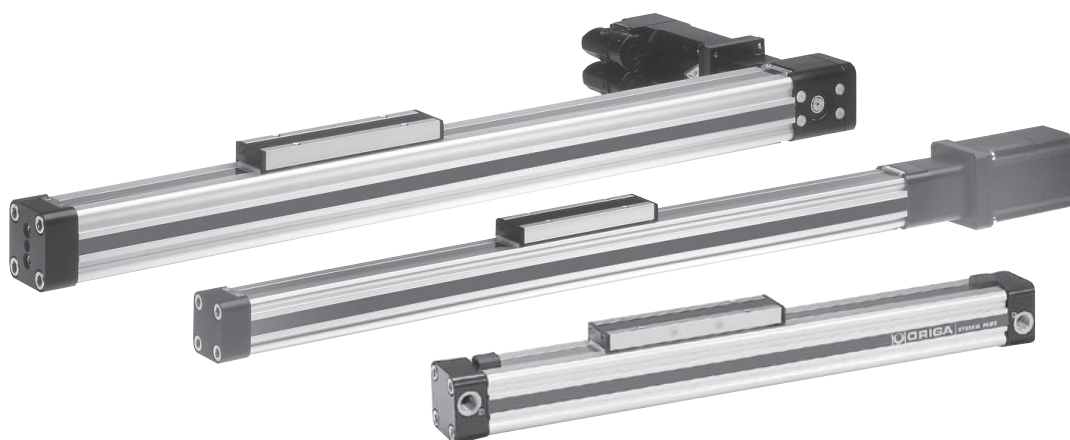
**One Concept – Pneumatic**

Based on the ORIGA rodless cylinder, proven in world wide markets, PARKER-ORIGA now offers the complete pneumatic solution for linear systems. Designed for absolute reliability, high performance, ease of use and optimized engineering the ORIGA SYSTEM PLUS satisfies even the most demanding applications

**ORiGA SYSTeM PLUS**

is a totally modular concept which offers pneumatic actuation, with guidance options to suit the exact needs of individual installations.

The actuators at the core of the system all have a common aluminum extruded profile, with double dovetail mounting rails on three sides, these are the principle building blocks of the system to which all modular options are directly attached.

**SYSTeM MODULARiTY**

- **Pneumatic Drive**
  - For all round versatility and convenience, combining ease of control and broad performance capability. Ideally suited for point-to point operations, reciprocating movements and simple traverse / transfer applications.
- Different guidance options provide the necessary level of precision, performance and duty for various applications.
- Compact solutions, which are simple to install and can be easily retrofitted
- Valves and control options can be directly mounted to the actuator system.
- Diverse mounting options to provide total installation flexibility .



**Rodless Pneumatic  
Cylinders**

**OSP-P  
Series**

**P1X  
Series**

**P1Z  
Series**

**GDL  
Series**



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**G3**

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Pneumatic Division  
Richland, Michigan  
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# The System Concept

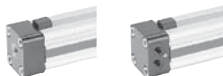
## Basic Linear Drive



### STANDARD VERSION

- OSP-P

## Air Connection on the end-face or both at One end



- OSP-P

## Clean Room Cylinder certified to in en ISO 146644-1



- Series OSP-P

## Bi-parting Version



- OSP-P

## integrated 3/2 Way Valves



- OSP-P

## Clevis Mounting



- OSP-P

## end Cap Mounting



- OSP-P

## Mid-Section Support



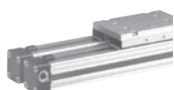
- OSP-P

## inversion Mounting



- OSP-P

## Joint Clamp Connection



- OSP-P

## Multiplex Connection



- OSP-P

# Rodless Pneumatic Cylinders

## OSP-P Series

## Linear Guides



### SLIDELINE

- OSP-P



### POWERSLIDE

- OSP-P



### PROLINE

- OSP-P



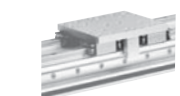
### STARLINE

- OSP-P



### KF - Recirculating Ball Bearing

- OSP-P



### HD - Heavy Duty

- OSP-P

## intermediate Stop Module



### ZSM

- OSP-P

## Brakes



- Active Brakes
- Passive Brakes

## Magnetic Switches



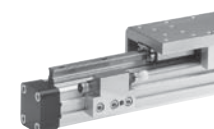
- OSP-P

## Sen SOFLex – Measuring System



- SFI-plus

## Variable Stop VS



- OSP-P with Linear Guide  
STL, KF, HD

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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

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G4

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## Modular Components Overview

## Rodless Pneumatic Cylinders

## OSP-P Series

Linear Drives	OSP-P10	OSP-P16	OSP-P25	OSP-P32	OSP-P40	OSP-P50	OSP-P63	OSP-P80
<b>Specification</b>								
Theoretical Force at 6 bar (N)	47	120	295	483	754	1178	1870	3010
Effective Force at 6 bar (N)	32	78	250	420	640	1000	1550	2600
Velocity v (m/s)	> 0.005	> 0.005	> 0.005	> 0.005	> 0.005	> 0.005	> 0.005	> 0.005
Magnetic Piston (three sides)		□	□	□	□	□	□	□
Lubrication - Prelubricated	□	□	□	□	□	□	□	□
Multiple Air Ports ( 4 x 90°)		□	□	□	□	□	□	□
Both Air Connections at End-face		○	○	○	○	○	○	○
Air Connection on the End-face		○	○	○	○	○	○	○
Cushioning	□	□	□	□	□	□	□	□
Cushioning Length (mm)	2,50	11	17	20	27	30	32	39
Stroke Length (mm) ▲	1 - 5500	1 - 5500	1 - 5500	1 - 5500	1 - 5500	1 - 5500	1 - 5500	1 - 5500
Pressure Range pmax (bar)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Temperature Range (°C) *	-10 – + 80	-10 – + 80	-10 – + 80	-10 – + 80	-10 – + 80	-10 – + 80	-10 – + 80	-10 – + 80
Fluorocarbon / Chemical Resistance	○	○	○	○	○	○	○	○
Stainless Steel Parts	○	○	○	○	○	○	○	○
Clevis Mounting	○	○	○	○	○	○	○	○
Slow Speed Lubrication	○	○	○	○	○	○	○	○
Duplex Connection / Multiplex Connection		on request	○	○	○	○	on request	on request
Tandem Piston	○	○	○	○	○	○	○	○
<b>Basic Cylinder</b>								
F (N)	20	120	300	450	750	1200	1650	2400
Mx (Nm)	0.2	0.45	1.5	3	6	10	12	24
My (Nm)	1	4	15	30	60	115	200	360
Mz (Nm)	0.3	0.5	3	5	8	15	24	48
<b>SLiDeLine</b>								
F (N)		325	675	925	1500	2000	2500	2500
Mx (Nm)		6	14	29	50	77	120	120
My (Nm)		11	34	60	110	180	260	260
Mz (Nm)		11	34	60	110	180	260	260
<b>PROLine</b>								
F (N)		542	857	1171	2074	3111		
Mx (Nm)		8	16	29	57	111		
My (Nm)		12	39	73	158	249		
Mz (Nm)		12	39	73	158	249		
<b>POWeRSLiDe</b>								
F (N)		1400	1400 - 3000	1400 - 3000	3000	3000 - 4000		
Mx (Nm)		14	14 - 65	20 - 65	65 - 90	90 - 140		
My (Nm)		45	63 - 175	70 - 175	175 - 250	250 - 350		
Mz (Nm)		45	63 - 175	70 - 175	175 - 250	250 - 350		
<b>STARLine</b>								
F (N)		1000	3100	3100	4000-7500	4000-7500		
Mx (Nm)		15	50	62	150	210		
My (Nm)		30	110	160	400	580		
Mz (Nm)		30	110	160	400	580		
- Variable Stop		○	○	○	○	○		

□ = Standard Version

▲ = Longer Strokes on Request

\* = Other Temperature Ranges on Request

○ = Option

X = Not Applicable

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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

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## Modular Components Overview

## Rodless Pneumatic Cylinders

## OSP-P Series

Linear Drives		OSP-P10	OSP-P16	OSP-P25	OSP-P32	OSP-P40	OSP-P50	OSP-P63	OSP-P80
<b>KF Guide</b>									
F (N)			1000	3100	3100	4000-7500	4000-7500		
Mx (Nm)			12	35	44	119	170		
My (Nm)			25	90	133	346	480		
Mz (Nm)			25	90	133	346	480		
– Variable Stop			○	○	○	○	○		
<b>HD Heavy Duty Guide</b>									
F (N)				6000	6000	15000	18000		
Mx (Nm)				260	285	8000	1100		
My (Nm)				320	475	1100	1400		
Mz (Nm)				320	475	1100	1400		
– Variable Stop				○	○	○	○		
– Intermediate Stop Module				○					
<b>Active Brake</b>									
Braking Force at 6 bar (brake surface dry) (N)									
<b>SLiDeLine SL / PROLine PL with Brakes</b>									
<b>Active Brake</b>									
SL Braking Force at 6 bar (brake surface dry) (N)				325	545	825	1200		
PL Braking Force at 6 bar (brake surface dry) (N)				on request	on request	on request	on request		
<b>Passive Brake Multibrake</b>									
SL Braking Force at 6 bar (brake surface dry) (N)				470	790	1200	1870	2900	2900
PL Braking Force at 6 bar (brake surface dry) (N)				315	490	715	1100		
<b>Magnetic Switches</b>									
Standard Version		○	○	○	○	○	○	○	○
T-Nut Version		○	○	○	○	○	○	○	○
<b>Displacement Measuring Systems</b>									
SFI-plus Incremental				○	○	○	○	○	○
<b>integrated Valves 3/2 WV n O VOe</b>									
				○	○	○	○	on request	on request
<b>Mountings</b>									
End Cap Mounting / Mid-Section Support		○	○	○	○	○	○	○	○
Inversion Mounting			○	○	○	○	○	○	○
Shock Absorber for Intermediate Positioning				on request	on request	on request	on request		
Adaptor Profile / -Nut Profil			○	○	○	○	○		
<b>Special Cylinders</b>									
Special Pneumactical Cushioning System			on request	on request	on request	on request	on request		
Clean Room Cylinders to DIN EN ISO 14644-1			○	○	○				
Bi-parting Version						○			
High-Speed up to 30 m/s			on request	on request	on request				
□ = Standard Version ▲ = Longer Strokes on Request * = Other Temperature Ranges on Request ○ = Option X = Not Applicable									

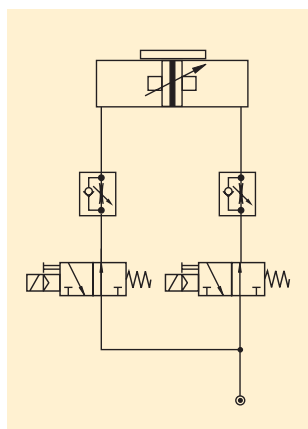
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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

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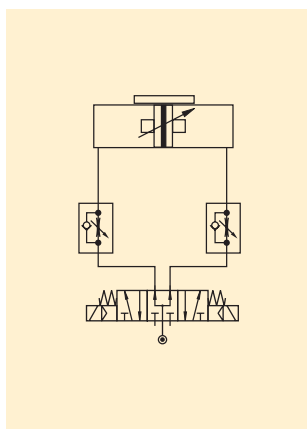
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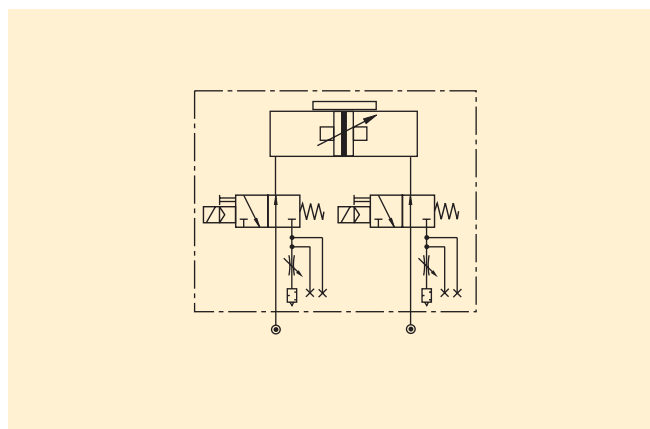
Circuit diagram for end of stroke application. Intermediate positioning is also possible.

The cylinder is controlled by two 3/2-way valves (normally open). The speed can be adjusted independently for both directions.

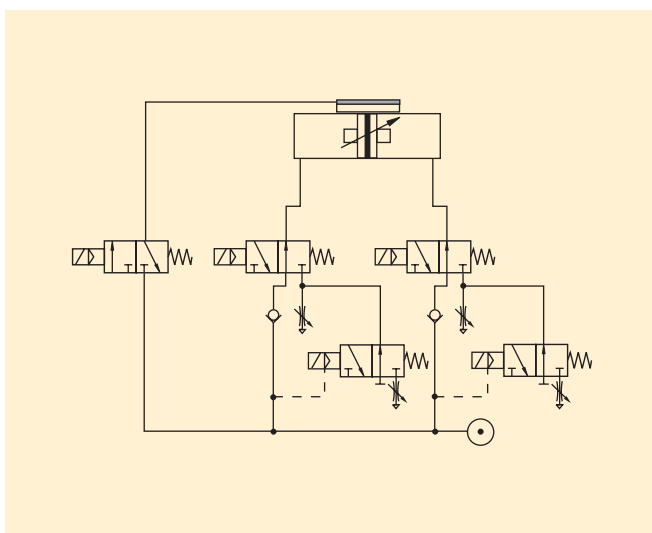


Circuit diagram for end of stroke application. Intermediate positioning is also possible.

The cylinder is controlled by a 5/3-way valve (middle position pressurized). The speed can be adjusted independently for both directions.

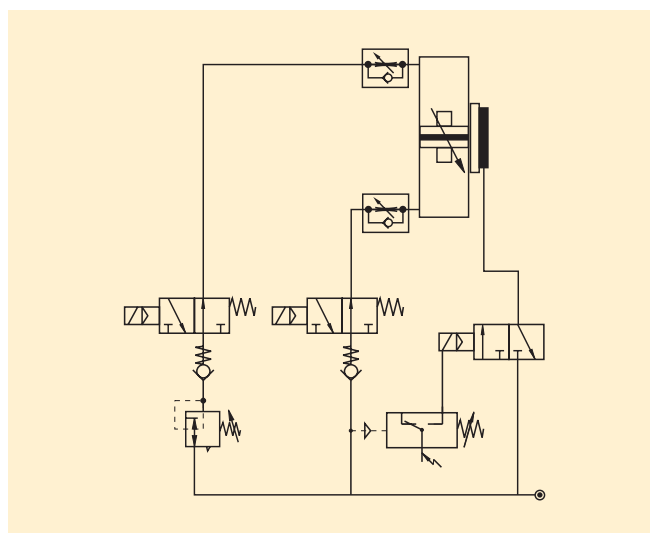


The optional integrated VOE Valves offer optimal control, and allow accurate positioning of intermediate positions and the lowest possible speeds.



Fast/Slow speed cycle control with pneumatic brake for accurate positioning at high velocities. Additional 3/2-way valves with adjustable throttle valves at the exhaust of the standard directional control valves for two displacement speeds in each direction of the piston's travel.

The valve controlling the brake is activated after the slow speed cycle is activated.

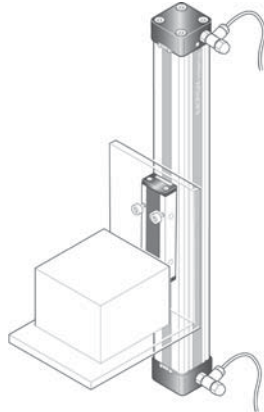


The combination of an OSP-cylinder with the passive MULTIBRAKE as shown here, allows accurate positioning and safety in case of loss of pneumatic air pressure.

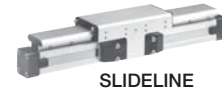


**ORiGA SYSTeM PLUS – rodless linear drives offer maximum flexibility for any application.**

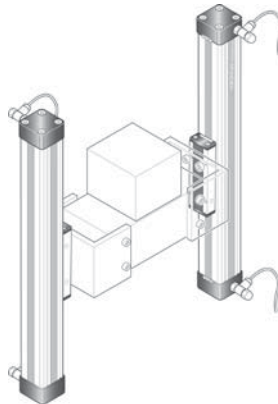
The high load capacity of the piston can cope with high bending moments without additional guides.



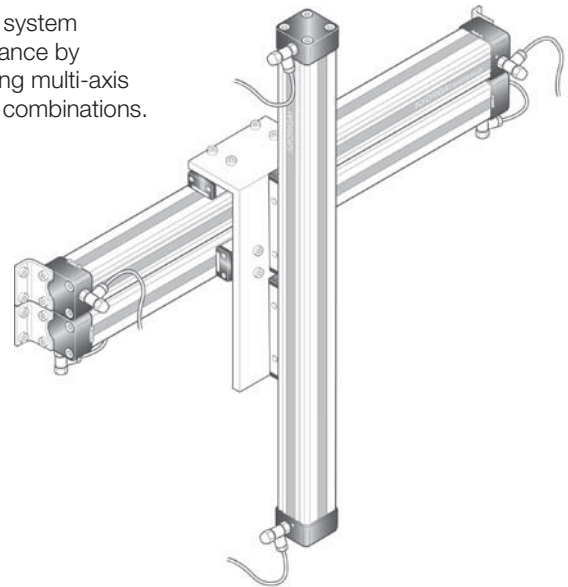
Integrated guides offer optimal guidance for applications requiring high performance, easy assembly and maintenance free operation.

**SLIDELINE****PROLINE****POWERSLIDE****STARLINE****HD-Guide**

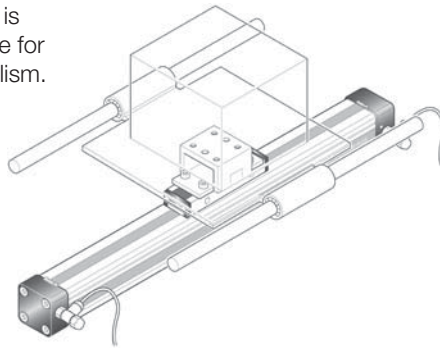
The mechanical design of the OSP-P allows synchronized movement of two cylinders.



Optimal system performance by combining multi-axis cylinder combinations.



When using external guides, the clevis mounting is used to compensate for deviations in parallelism.



**For further information and assembly instructions, please contact your local  
PARKER-ORiGA dealer.**



**Rodless Pneumatic  
Cylinders**

**OSP-P  
Series**

**P1X  
Series**

**P1Z  
Series**

**GDL  
Series**



## OSP-P Series

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

### A new modular linear drive system

With this second generation linear drive the OSP-P series offers design engineers complete flexibility.

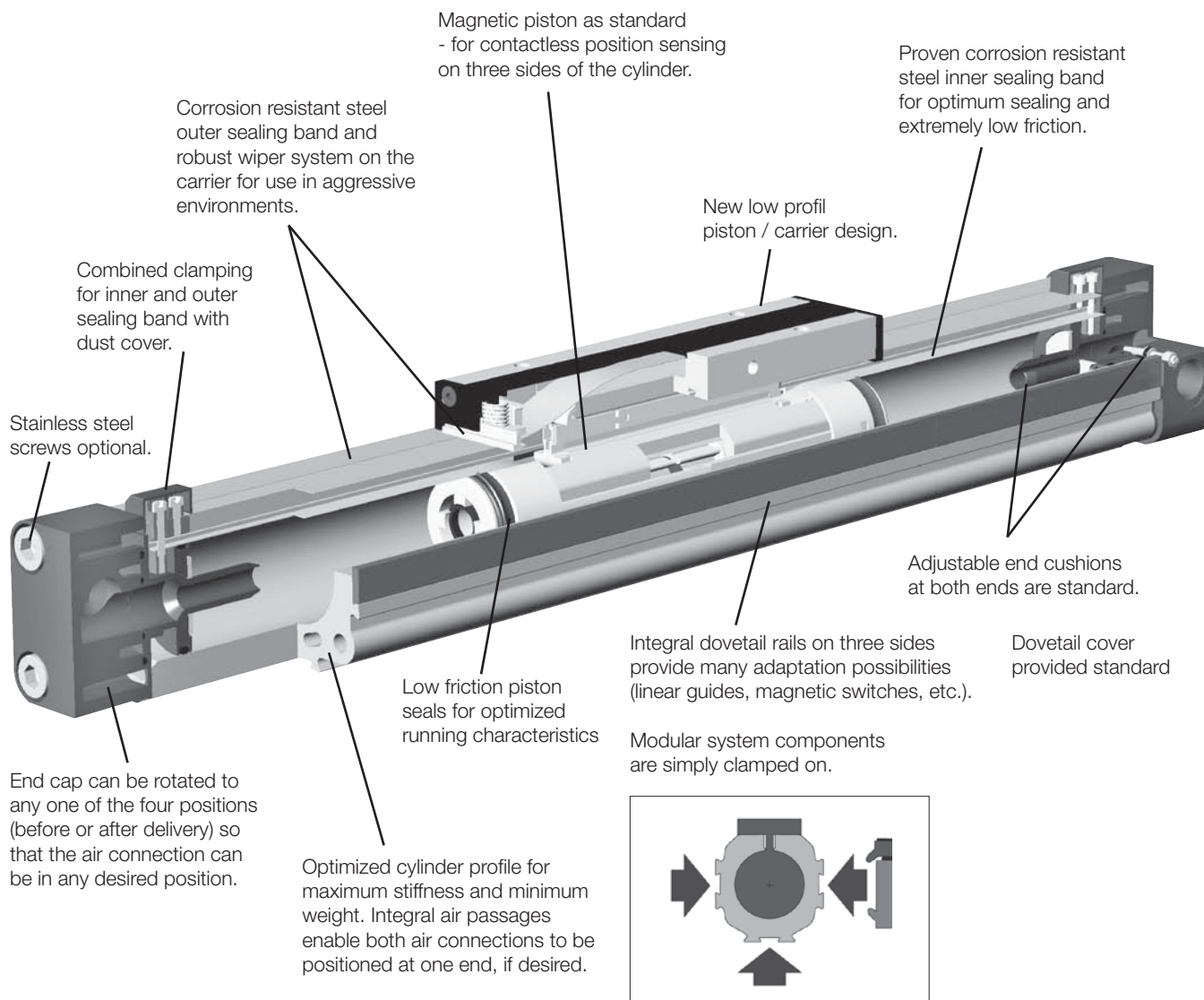
The well known ORIGA cylinder has been further developed into a combined linear actuator, guidance and control package. It forms the basis for the OSP-P linear drive system.

All additional functions are designed into modular system components which replace the previous series of cylinders.

### Mounting rails on 3 sides

Mounting rails on 3 sides of the cylinder enable modular components such as linear guides, brakes, valves, magnetic switches etc. to be fitted to the cylinder itself. This solves many installation problems, especially where space is limited.

The modular system concept forms an ideal basis for additional customer-specific functions



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SeriesGDL  
Series

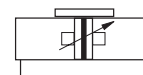
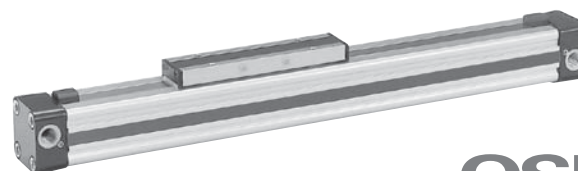
## Features

### Standard Features:

- Double-acting with adjustable cushions
- With magnetic piston for position sensing
- Standard stroke lengths to 5500mm, long stroke versions available upon request
- End cap can be rotated 4 x 90° to position ports as desired

### Optional Features:

- Clean room cylinders
- Stainless steel screws
- Slow speed lubrication
- Fluorocarbon seals -14°F to 212°F (-10°C to 100°C)
- Single end porting
- Integrated valves
- Integrated bearing options



**OSP**  
ORIGA  
SYSTEM  
PLUS

### Operating information

Operating pressure:	116 PSIG (8 bar)
Temperature range:	14°F to 176°F (-10°C to 80°C)
Filtration requirements:	Filtered, nonlubricated compressed air

### Specification

- Type: Rodless cylinder
- Series: OSP-P
- Stroke length: 5.5m (216 inches)
- System: Double-acting, with cushions and magnetic piston
- Mounting: See drawings
- Air connection: Threaded
- Weight (mass): See table
- Installation: In any position
- Lubrication: Prelubricated at the factory (additional oil mist lubrication not required)
- Option: special slow speed grease

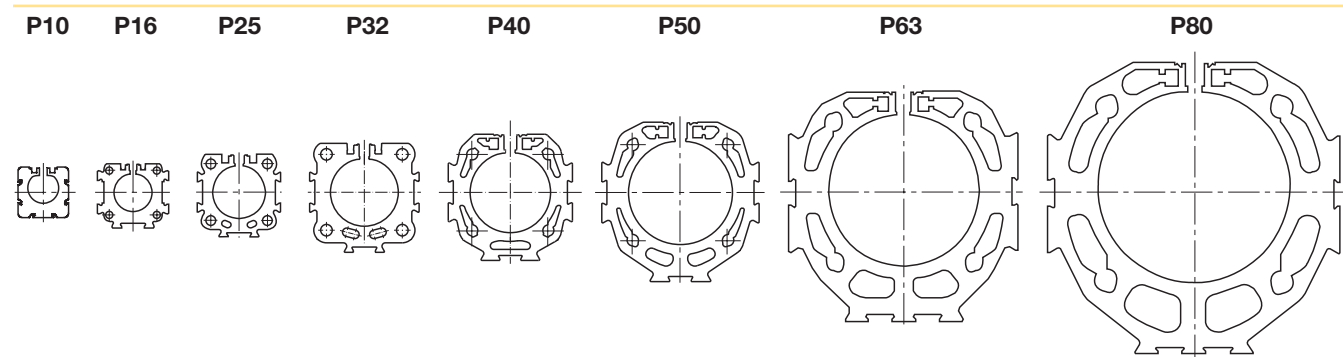
### Material specification

Cylinder profil	Anodized aluminum
Carrier (piston)	Anodized aluminum
End caps	Aluminum, lacquered / plastic (P10)
Sealing bands	Corrosion resistant steel
Seals	NBR (Option: Fluorocarbon)
Screws	Galvanized steel Option: stainless steel
Dust covers, wipers	Composite

### Weight (mass) kg

Cylinder series (Basic cylinder)	Weight (Mass) kg	
	at 0mm stroke	per 100mm stroke
OSP-P10	0.087	0.052
OSP-P16	0.22	0.1
OSP-P25	0.65	0.197
OSP-P32	1.44	0.354
OSP-P40	1.95	0.415
OSP-P50	3.53	0.566
OSP-P63	6.41	0.925
OSP-P80	12.46	1.262

### Size Comparison



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G10

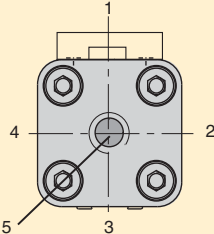
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## Ordering Information

Rodless Pneumatic Cylinders  
OSP-P Series, Standard 10 to 80mm

## Ordering information for OSP-P rodless standard pneumatic series


1-4	5-6	7	8	9	10	11	12-16	17	18	19	20	21	22	23	24	25			
<b>OSP-P</b>				<b>25</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>01100</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>		
<b>Bore</b>				<b>Lubrication</b>				<b>Stroke</b>				<b>Cushioning &amp; stops</b>				<b>Dovetail cover</b>			
10 16 25 32 40 50 63 80				0 Standard 1 Slow speed 4 Food 5 Clean room				5 digits in whole millimeters (ex. 1100mm = 01100)				0 Standard 1 Long cushions (25,32,40)				0 Standard X Without cover rail			
<b>Piston style</b>				<b>Seals</b>				<b>Hardware</b>				<b>Piston mounting</b>				<b>Additional carriages</b>			
0 Standard 1 Tandem C Classic T Tandem Classic				0 Standard / Buna-N 1 Fluorocarbon				0 Standard / zinc 1 Stainless steel 3 Xylan coating with stainless fasteners				0 Standard 1 Floating mount				0 None			
<b>Porting configurations †</b>				<b>Endcap position</b>				<b>Guides / brakes</b>				<b>Endcap mounting</b>				<b>Switches ♦</b>			
0 Standard 1 End face (16,25,32,40,50,63,80) 2 Single end porting (25,32,40,50,63,80) 3 Left std pos #2, Right pos #5 (16,25,32,40,50,63,80) 4 Left pos #5, Right std pos #2 (16,25,32,40,50,63,80) 6 Single end porting at #5 (50,63,80) 8 Inner band temp compensation (25,32,40,80) A 24VDC VOE valves (25,32,40,50) B 220VAC VOE valves (25,32,40,50) C 48VDC VOE valves (25,32,40,50) E 110VAC VOE valves (25,32,40,50)				0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1				0 None A Activebrake (16 thru 80) M Inversion (NR30) (16 thru 80mm bore only)				0 None 1 A1 (10,16,25,32) 2 A2 (16,25,32) 3 A3 (25,32) 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) 9 C1 (40,50,63,80) A C2 (40,50,63,80) B C3 (40,50,63,80) C C4 (40,50,63,80)				0 None 1 Normally open reed switch (16 thru 80) 2 Normally closed reed switch (16 thru 80) 3 PNP Hall sensor w/extension cables (16 thru 80) 4 NPN Hall sensor w/extension cables (16 thru 80) 5 NO Reed, w/10mm bracket (10 only) 6 PNP Hall sensor w/extension cables & 10mm brackets (10mm only) 7 NPN Hall sensor w/extension cables & 10mm brackets (10mm only) X SFI 0.1mm RES (25 thru 80) Y SFI 1mm RES (25 thru 80)			
Notes: 10mm bore can only have standard port locations. Single end porting on 16mm bore, then end caps cannot be rotated.				Notes: 10mm bore only available on option "0".				♦ Note: 2 switches will be supplied. For different quantity, please order as a separate line item.											



**Note: Position #2 is the standard location.**

† Single end ports can not be rotated in the field

**Sensors**  
See section L for sensors.



G

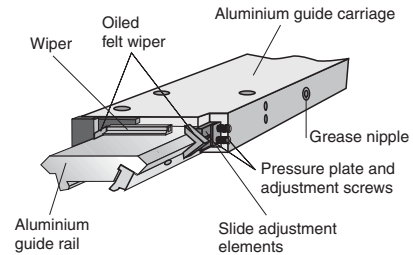
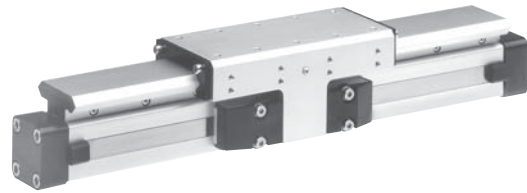
Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

**Plain Bearing Guide SLiDeLine**

Available on 16 to 80mm bore

**Features:**

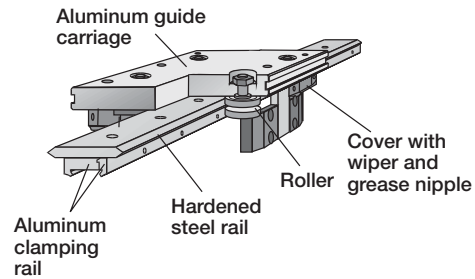
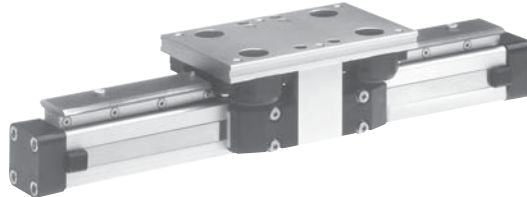
- Adjustable composite slide elements
  - optional integral brake
- Integrated sealing system with wiper elements to remove dirt and lubricate the slideways
- Any length of stroke up to 5500mm

**Roller Guide POWeRSLiDe**

Available on 16 to 50mm bore

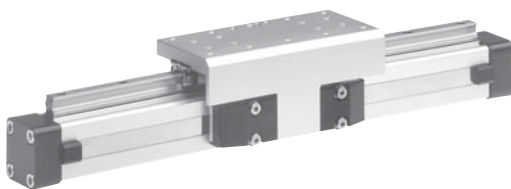
**Features:**

- Anodized aluminum guide carriage with vee rollers
- Hardened steel guide rail
- Multiple guide sizes can be used on the same drive
- Max. Speed  $v = 3 \text{ m/s}$
- Integrated wiper and grease nipple
- Any length of stroke up to 3500mm

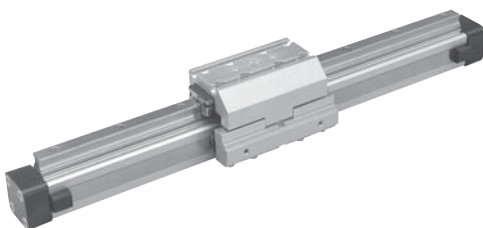
**G****Rodless Pneumatic  
Cylinders****OSP-P  
Series****P1X  
Series****P1Z  
Series****GDL  
Series**

**Other Options****PROLine**

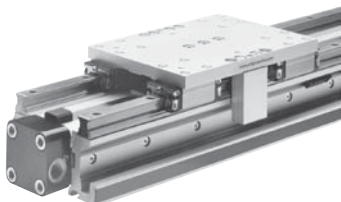
The compact aluminum roller guide for high loads and velocities and utilizes the GDL Guide Bearing

**STARLine**

Recirculating ball bearing guide for very high loads and precision

**KF Guide**

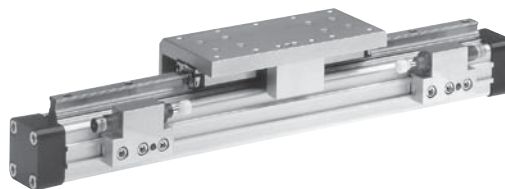
Recirculating ball bearing guide – the mounting dimensions correspond to FESTO Type: DGPL-KF

**Heavy Duty Guide HD**

For heavy duty applications

**integrated V0e Valves****Sen SOFLeX SFi-plus**

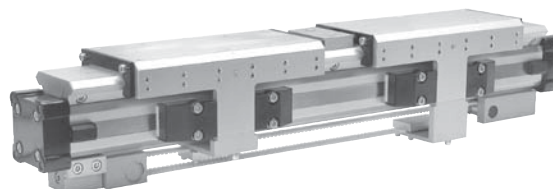
Incremental measuring system with 0.1 (1.0) mm resolution

**Variable Stop VS**

The variable stop provides simple stroke limitation  
Available on STARLINE, KF and Heavy duty guide

**Clean Room Version**

Certified to DIN EN ISO 14644-

**Rodless Cylinder**

For synchronized bi-parting movements  
Available on SLIDELINE Guide Bearing only

**G****Rodless Pneumatic  
Cylinders****OSP-P  
Series****P1X  
Series****P1Z  
Series****GDL  
Series**

## Loads, Forces and Moments

When sizing an OSP cylinder, consideration must be given to:

- Loads, forces and moments
- Performance of the pneumatic end cushions. The main factors are the mass to be cushioned and the piston speed (unless external cushioning is used, e. g. hydraulic shock absorbers)

To determine the maximum values for light, shock-free operation, which must not be exceeded even in dynamic operation.

**Load and moment data are based on speeds  $v \leq 0.5$  m/s.**

When working out the action force required, it is essential to take into account the friction forces generated by the specific application or load.

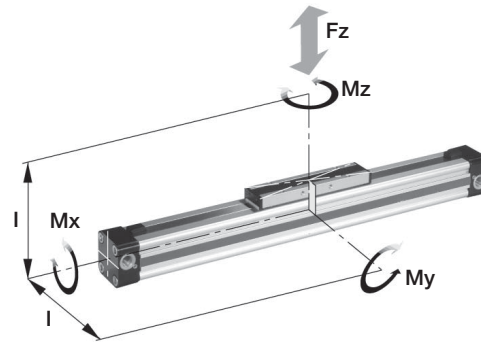
The sum total of each of these types of moments, divided by each of the maximum values, determines a Load-Moment Factor (LMF) should be equal to or less than 1.0. On horizontal mountings, the total load (L) should also be divided by the maximum load allowable and factored into the equation.

**Horizontal Mountings:**

$$\frac{L}{[L]} + \frac{M}{[M]} + \frac{Ms}{[Ms]} + \frac{Mv}{[Mv]} = LMF \leq 1.0$$

**Vertical Mountings:**

$$\frac{M}{[M]} + \frac{Ms}{[Ms]} + \frac{Mv}{[Mv]} = LMF \leq 1.0$$



$$M = F \cdot l$$

Bending moments are calculated from the center of the linear actuator

Cylinder series (mm Ø)	Theoretical output force at 6 bar N (lb)	Actual output force $F_A$ at 6 bar N (lb)	Max. moments			Max. load $F_N$ (lb)	Cushion length (mm)
			$M_x$ Nm (in lb)	$M_y$ Nm (in lb)	$M_z$ Nm (in lb)		
<b>OSP-P10</b>	47 (10.6)	32 (7.2)	0.2 (1.8)	1 (8.9)	0.3 (2.7)	20 (4.5)	2.5 * (.09)
<b>OSP-P16</b>	120 (26.9)	78 (17.5)	0.45 (3.9)	4 (35.4)	0.5 (4.4)	120 (26.9)	11 (.43)
<b>OSP-P25</b>	295 (66.3)	250 (56.2)	1.5 (13.3)	15 (132.8)	3 (26.6)	300 (67.4)	17 (.67)
<b>OSP-P32</b>	483 (108.6)	420 (94.4)	3 (26.6)	30 (265.5)	5 (44.3)	450 (101.2)	20 (.79)
<b>OSP-P40</b>	754 (169.5)	640 (143.9)	6 (53.1)	60 (531)	8 (70.8)	750 (168.6)	27 (1.06)
<b>OSP-P50</b>	1178 (264.8)	1000 (224.8)	10 (88.5)	115 (1017.8)	15 (132.8)	1200 (269.8)	30 (1.18)
<b>OSP-P63</b>	1870 (420.4)	1550 (348.5)	12 (106.2)	200 (1771)	24 (212.4)	1650 (370.9)	32 (1.26)
<b>OSP-P80</b>	3016 (678)	2600 (584.5)	24 (212.4)	360 (3186)	48 (424.8)	2400 (539.5)	39 (1.54)

\* A rubber element (non-adjustable) is used for end cushioning.

To deform the rubber element enough to reach the absolute end position would require a  $\Delta p$  of 4 bar!

## Cushioning diagram

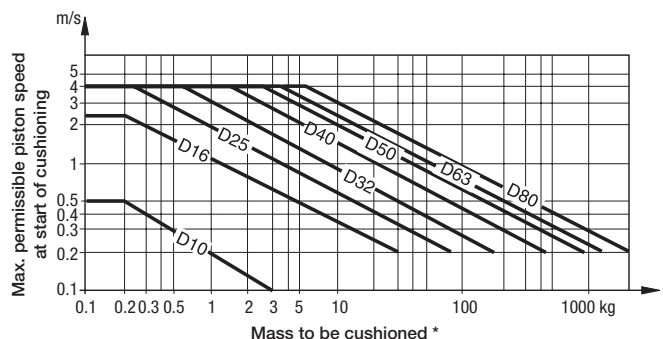
Determine the moving mass and follow the chart below to determine the maximum cylinder velocity.

Alternatively, take your desired velocity and moving mass to determine the required cylinder diameter.

If these maximum permissible values are exceeded, additional shock absorbers must be used.

For sizing a basic cylinder, use the adjacent chart. To size a cylinder with guide bearing, use the charts on the following page.

The peak piston velocity can be determined by assuming it is 50% greater than the average velocity. The peak velocity should be used in sizing the cylinder cushions.



Includes piston mass.

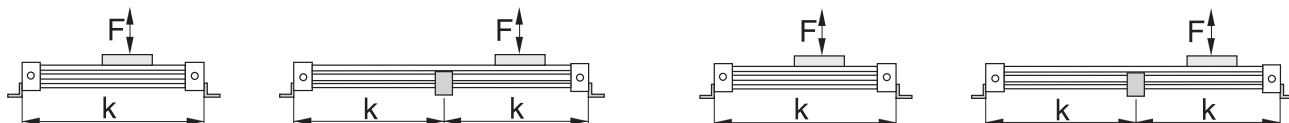
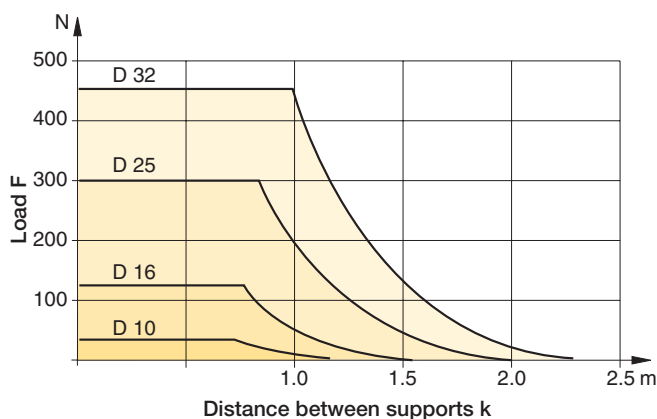
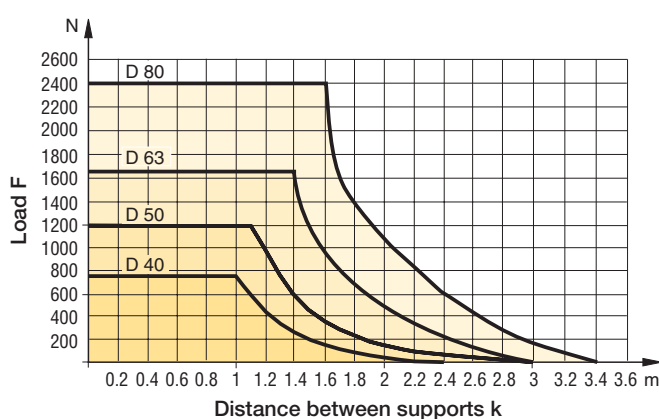
\* For cylinders with linear guides or brakes, please be sure to take the mass of the carriage or the brake housing into account.



## Mid-Section Supports

To avoid excessive bending and oscillation of the cylinder, intermediate supports may be required. The diagrams below show the maximum permissible support spacing based upon load.

Bending up to 0.5 mm is permissible between supports. The mid-section supports are clamped on to the dovetail profile of the cylinder tube. They are also able to take the axial forces.

Basic cylinder 10 to 32mm bore  
mid-section supportsBasic cylinder 40 to 80mm bore  
mid-section supports

G

Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series



Cylinder Stroke and Dead Length A

- Free choice of stroke length up to 5500mm in 1mm steps.
- Longer strokes available on request.

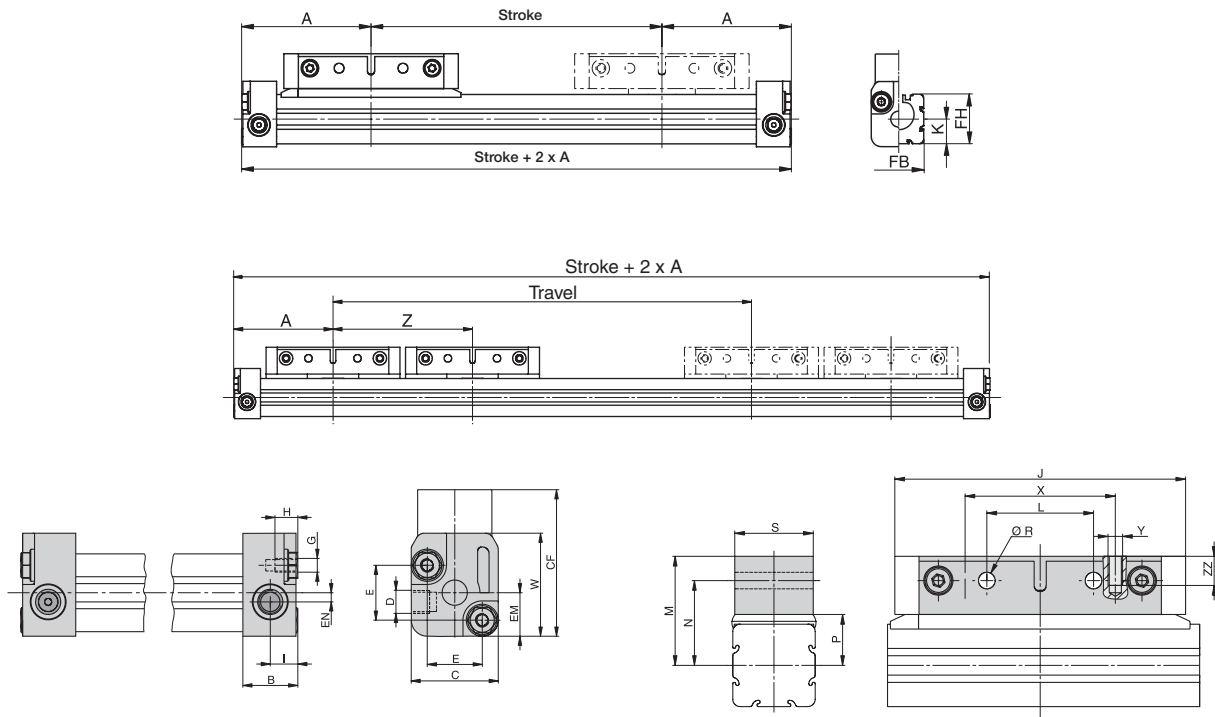
Tandem Cylinder

Two pistons are fitted : dimension “Z” is optional. Please note minimum distance “Zmin”.

- Free choice of stroke length up to 5500mm in 1mm steps.
- Longer strokes available on request.
- Stroke length to order is stroke + dimension “Z”.

**Please note:**  
To avoid multiple actuation of magnetic switches, the second piston is not equipped with magnets.

Basic cylinder – 10mm bore



Dimensions (mm)

Series	A	B	C	D	E	G	H	I	J	K	L	M	N	P	R	S	W	X	Y	Zmin	CF	EM	EN	FB	FH	ZZ
OSP-P10	44.5	12	19	M5	12	M3	5	6	60	8.5	22	22.5	17.5	10.5	3.4	16	22.5	31	M3	64	32	9.5	2	17	17	6

## Cylinder Stroke and Dead Length A

- Free choice of stroke length up to 5500mm in 1mm steps.
- Longer strokes available on request.

## Tandem Cylinder

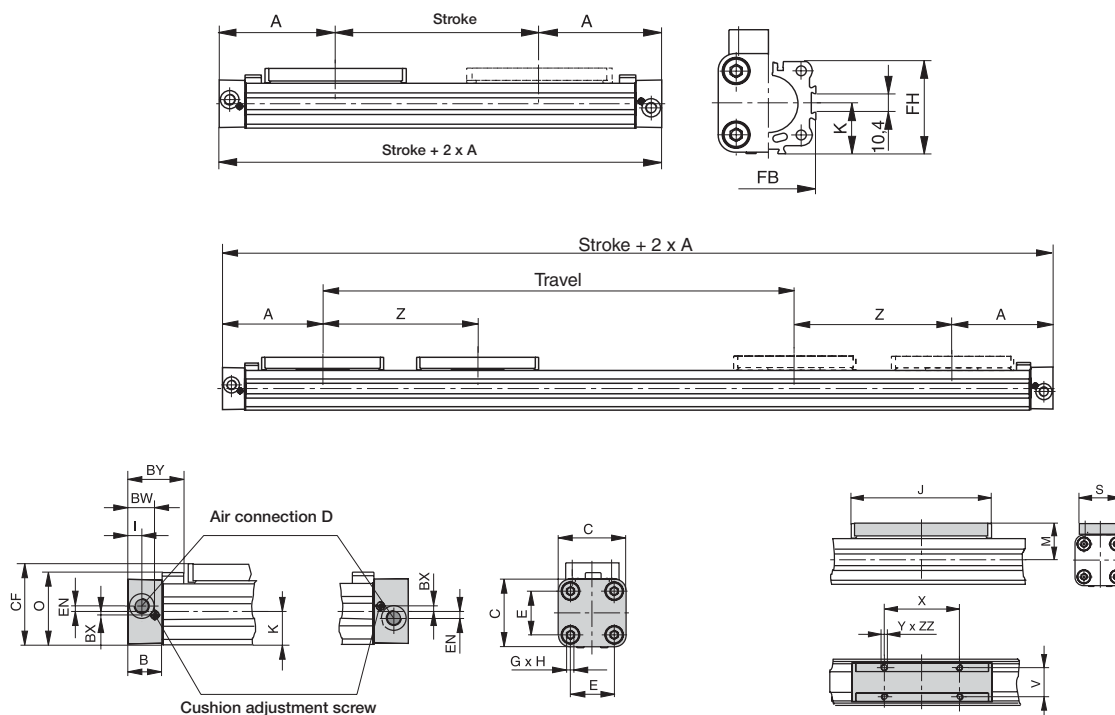
Two pistons are fitted : dimension "Z" is optional. Please note minimum distance "Zmin".

- Free choice of stroke length up to 5500mm in 1mm steps.
- Longer strokes available on request.
- Stroke length to order is stroke + dimension "Z".

## Please note:

To avoid multiple actuation of magnetic switches, the second piston is not equipped with magnets.

## Basic cylinder – 16 to 80mm bore



## Dimensions (mm)

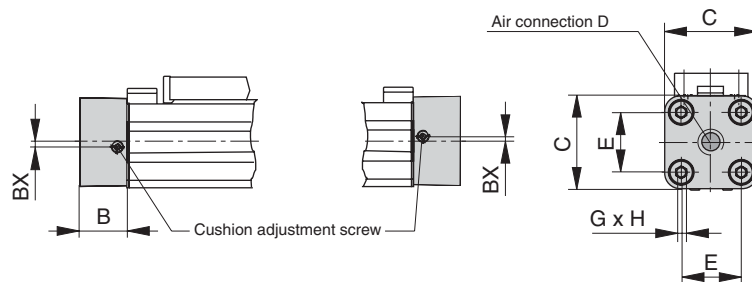
Series	A	B	C	D	E	G	H	I	J	K	M	O	S	V	X	Y	Z	BW	BX	BY	CF	EN	FB	FH	ZZ
OSP-P16	65	14	30	M5	18	M3	9	5.5	69	15	23	33.2	22	16.5	36	M4	81	10.8	1.8	28.4	38	3	30	27.2	7
OSP-P25	100	22	41	G1/8	27	M5	15	9	117	21.5	31	47	33	25	65	M5	128	17.5	2.2	40	52.5	3.6	40	39.5	8
OSP-P32	125	25.5	52	G1/4	36	M6	15	11.5	152	28.5	38	59	36	27	90	M6	170	20.5	2.5	44	66.5	5.5	52	51.7	1
OSP-P40	150	28	69	G1/4	54	M6	15	12	152	34	44	72	36	27	90	M6	212	21	3	54	78.5	7.5	62	63	10
OSP-P50	175	33	87	G1/4	70	M6	15	14.5	200	43	49	86	36	27	110	M6	251	27	–	59	92.5	11	76	77	10
OSP-P63	215	38	106	G3/8	78	M8	21	14.5	256	54	63	107	50	34	140	M8	313	30	–	64	117	12	96	96	16
OSP-P80	260	47	132	G1/2	96	M10	25	22	348	67	80	133	52	36	190	M10	384	37.5	–	73	147	16.5	122	122	20

### Air Connection on the end-Face #5

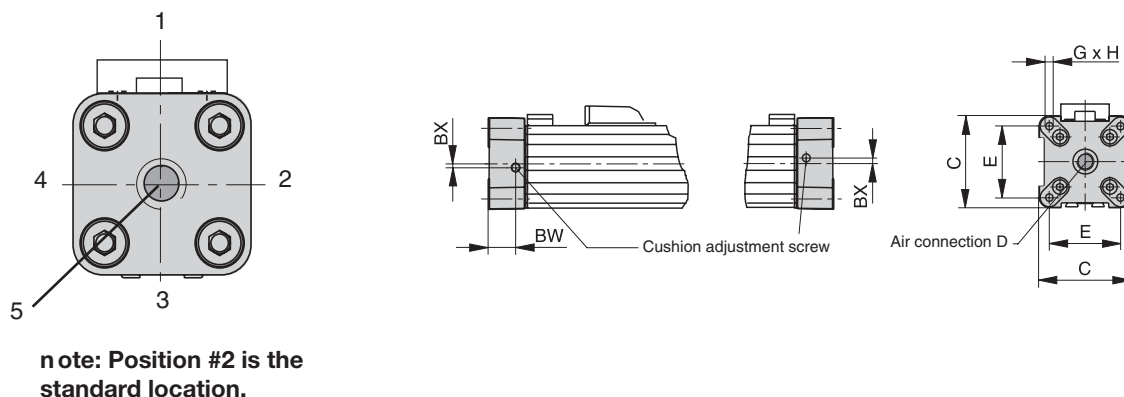
In some situations it is necessary or desirable to fit a special end cap with the air connection on the end-face instead of the standard end cap with the air connection on the side. The special end cap can also be rotated 4 x 90° to locate the cushion adjustment screw as desired.



### Series OSP-P16 to P32



### Series OSP-P40 to P80



#### Dimension (mm)

Series	B	C	D	E	G	H	BX	BW
OSP-P16	14	30	M5	18	M3	9	1.8	10.8
OSP-P25	22	41	G1/8	27	M5	15	2.2	17.5
OSP-P32	25.5	52	G1/4	36	M6	15	2.5	20.5
OSP-P40	28	69	G1/4	54	M6	15	3	21
OSP-P50	33	87	G1/4	70	M6	15	–	27
OSP-P63	38	106	G3/8	78	M8	21	–	30
OSP-P80	47	132	G1/2	96	M10	25	–	37.5

## Single end Porting

A special end cap with both air connections on one side is available for situations where shortage of space, simplicity of installation or the nature of the process make it desirable. Air supply to the other end is via internal air passages (OSP-P25 to P80) or via a hollow aluminum profile fitte externally (OSP-P16).

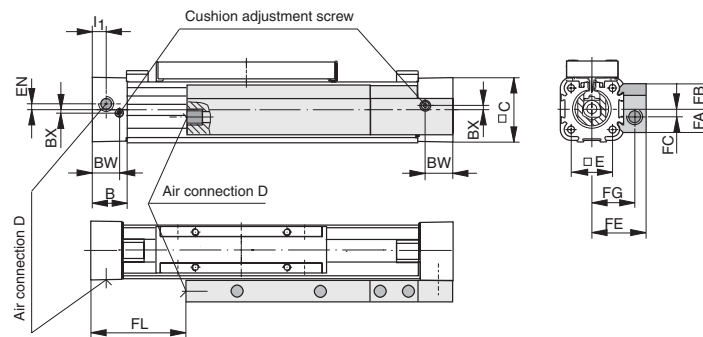
In this case the end caps cannot be rotated.

Please note:

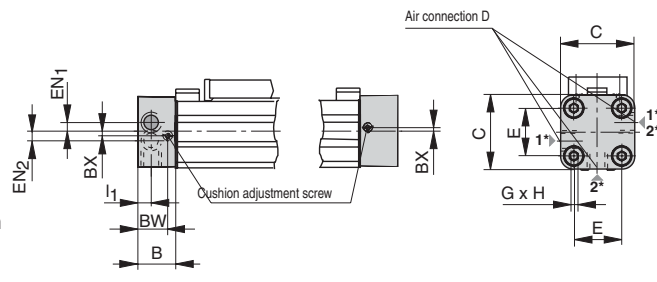
When combining the OSP-P16 single end porting with inversion mountings, RS magnetic switches can only be mounted directly opposite to the external air-supply profile.



### Series OSP-P16

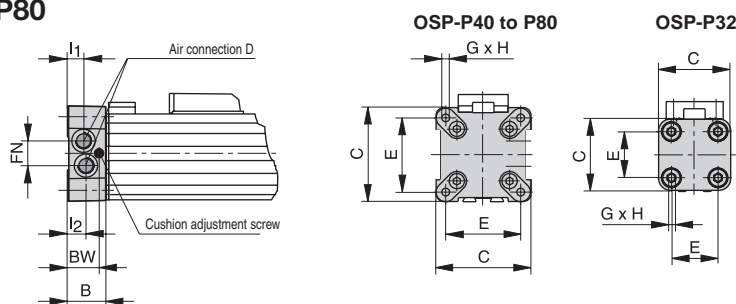


### Series OSP-P25



\* Versions of Air Connection  
 Positions: 1 → 1 or  
 2 → 2

### Series OSP-P32 to P80



#### Dimension (mm)

Series	B	C	D	E	G	H	I1	I2	BX	BW	EN	EN1	EN2	FA	FB	FC	FE	FG	FL	FN
OSP-P16	14	30	M5	18	M3	9	5.5	—	1.8	10.8	3	—	—	12.6	12.6	4	27	21	36	—
OSP-P25	22	41	G1/8	27	M5	15	9	—	2.2	17.5	—	3.6	3.9	—	—	—	—	—	—	—
OSP-P32	25.5	52	G1/8	36	M6	15	12.2	10.5	—	20.5	—	—	—	—	—	—	—	—	—	15.2
OSP-P40	28	69	G1/8	54	M6	15	12	12	—	21	—	—	—	—	—	—	—	—	—	17
OSP-P50	33	87	G1/4	70	M6	15	14.5	14.5	—	—	—	—	—	—	—	—	—	—	—	22
OSP-P63	38	106	G3/8	78	M8	21	16.5	13.5	—	30	—	—	—	—	—	—	—	—	—	25
OSP-P80	47	132	G1/2	96	M10	25	22	17	—	37.5	—	—	—	—	—	—	—	—	—	34.5

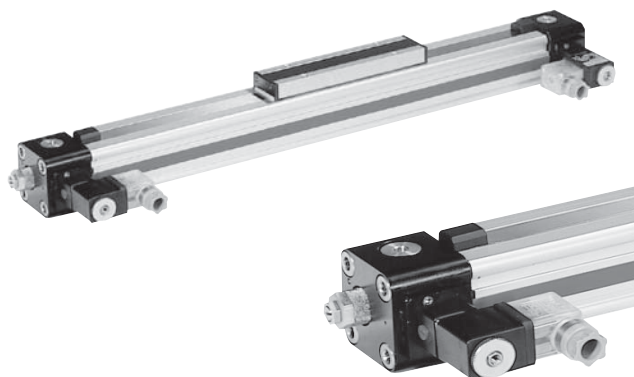
**integrated 3/2 Way Valves VOe Series OSP-P25, P32, P40 and P50**

For optimal control of the OSP-P cylinder, 3/2 way valves integrated into the cylinder's end caps can be used as a compact and complete solution.

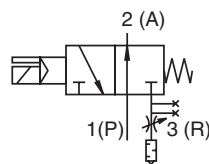
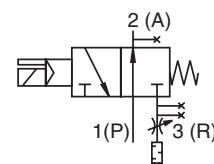
They allow for easy positioning of the cylinder, smooth operation at the lowest speeds and fast response, making them ideally suited for the direct control of production and automation processes.

**Characteristics:**

- Complete compact solution
- Various connection possibilities:  
Free choice of air connection with rotating end caps with VOE valves, Air connection can be rotated 4 x 90°, Solenoid can be rotated 4 x 90°, Pilot Valve can be rotated 180°
- High piston velocities can be achieved with max. 3 exhaust ports
- Minimal installation requirements
- Requires just one air connection per valve
- Optimal control of the OSP-P cylinder
- Excellent positioning characteristics
- Integrated operation indicator
- Integrated exhaust throttle valve
- Manual override - indexed
- Adjustable end cushioning
- Easily retrofitted – please note the increase in the overall length of the cylinder!

**Operating information**

Operating pressure:	116 PSIG (8 bar)
Temperature range:	-14°F to 122°F (10°C to 50°C)
Filtration requirements:	Filtered, nonlubricated compressed air

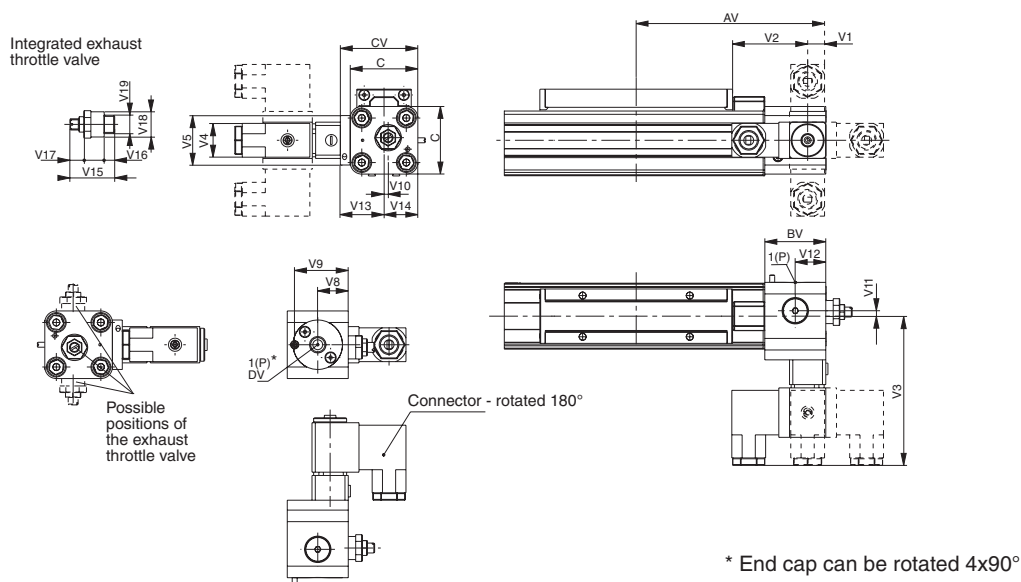
**VOe-25 / VOe-32****VOe-40 / VOe-50****Specification**

• Characteristics	3/2 Way Valves with spring return
• Actuation	electrical
• Basic position	P → A open, R closed
• Type	Poppet valve, non overlapping
• Mounting	integrated in end cap
• Installation	in any position
• Port size	G 1/8 VOE-25      G 1/4 VOE-32 G 3/8 VOE-40      G 3/8 VOE-50
• Temperature	-10°C to 50°C *
• Operating pressure	2-8 bar
• Nominal voltage	24 V DC / 230 V AC, 50 Hz
• Power consumption	2,5 W / 6 VA
• Duty cycle	100%
• Electrical Protection	IP65 DIN 40050

\* Other temperature ranges on request

**G**Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

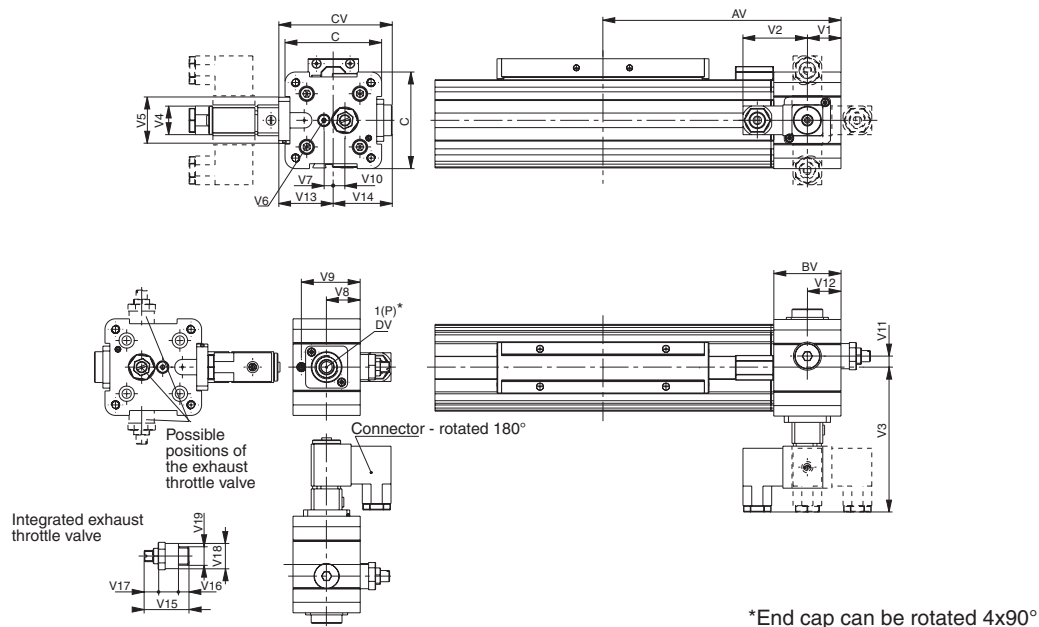
## Dimensions VOe Valves OSP-P25 and P32



## Dimension (mm)

Series	AV	BV	C	CV	DV	V1	V2	V3	V4	V5	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19
OSP-P25	115	37	41	47	G1/8	11	46	90.5	22	30	18.5	32.5	2.5	3.3	18.5	26.5	20.5	24	5	4	14	G1/8
OSP-P32	139	39.5	52	58	G1/4	20.5	46	96	22	32	20.5	34.7	6	5	20.5	32	26	32	7.5	6	18	G1/4

## Dimensions VOe Valves OSP-P40 and P50



## Dimension (mm)

Series	AV	BV	C	CV	DV	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19
OSP-P40	170	48	69	81	G3/8	24	46	103	22	33	M5	6.7	24	42	8.3	8.3	24	39	42	32	7.5	6	18	G1/4
OSP-P50	190	48	87	82	G3/8	24	46	102	22	33	M5	4.5	24	42	12.2	12.2	24	38	44	32	7.5	6	18	G1/4



For inventory, lead time, and kit  
lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G21

**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

G

Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

## Active Brake

### Series AB 25 to 80 for linear drive

- Series OSP-P
- Can be used with Sensofle

#### Features:

- Actuated by pressurization
- Released by spring actuation
- Completely stainless version
- Holds position, even under changing load conditions

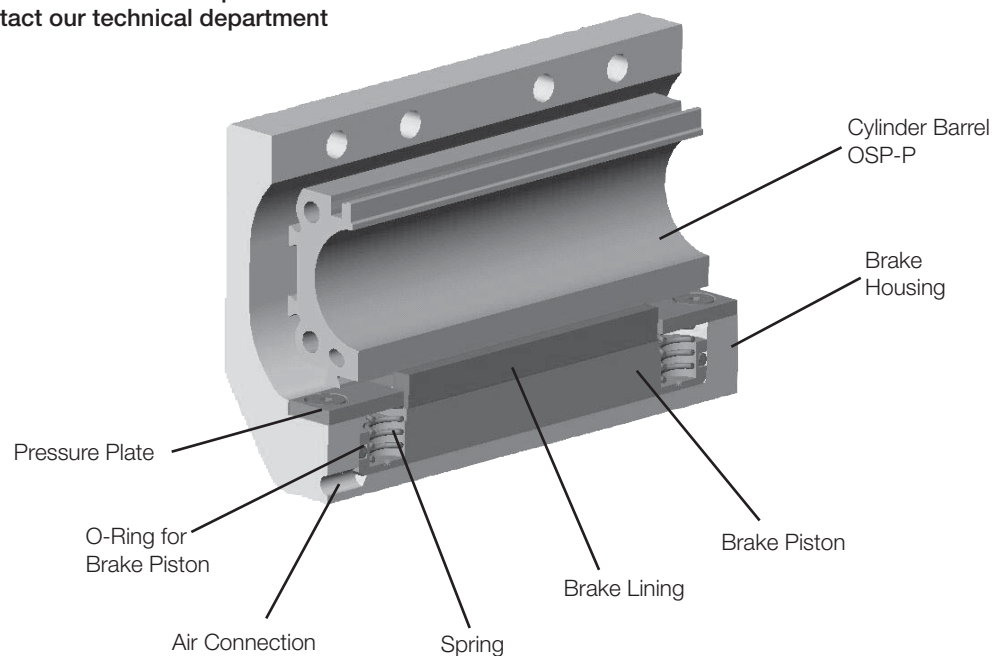
For further technical data, please refer to the data sheets for linear drives OSP-P (page G10)

#### Note:

For combinations Active Brake AB + SFI-plus + Magnetic Switch contact our technical department please.



**OSP**  
 — ORIGA  
 — SYSTEM  
 — PLUS



## Forces and Weights

				Mass (kg)			Part number Active brake (includes carriage)
				Linear drive with brake			
Series	For linear drive	Max. braking force (N) †	Brake pad way (mm)	0 mm stroke	increase per 100mm stroke	Brake*	
AB 25	OSP-P25	350	2.5	1.0	0.197	0.35	20806FiL
AB 32	OSP-P32	590	2.5	2.02	0.354	0.58	20807FiL
AB 40	OSP-P40	900	2.5	2.83	0.415	0.88	20808FiL
AB 50	OSP-P50	1400	2.5	5.03	0.566	1.50	20809FiL
AB 63	OSP-P63	2170	3.0	9.45	0.925	3.04	20810FiL
AB 80	OSP-P80	4000	3.0	18.28	1.262	5.82	20811FiL

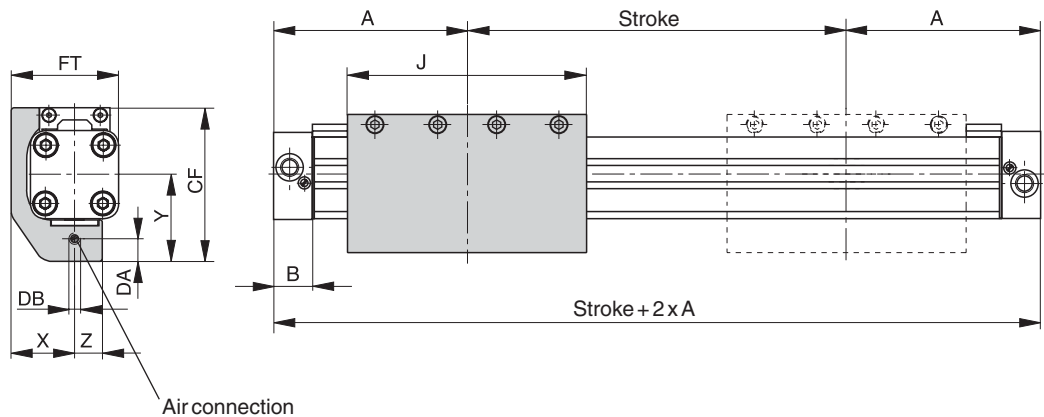
† – at 6 bar both chambers pressurized with 6 bar Braking surface dry  
 – oil on the braking surface will reduce the braking force

#### \* Please Note:

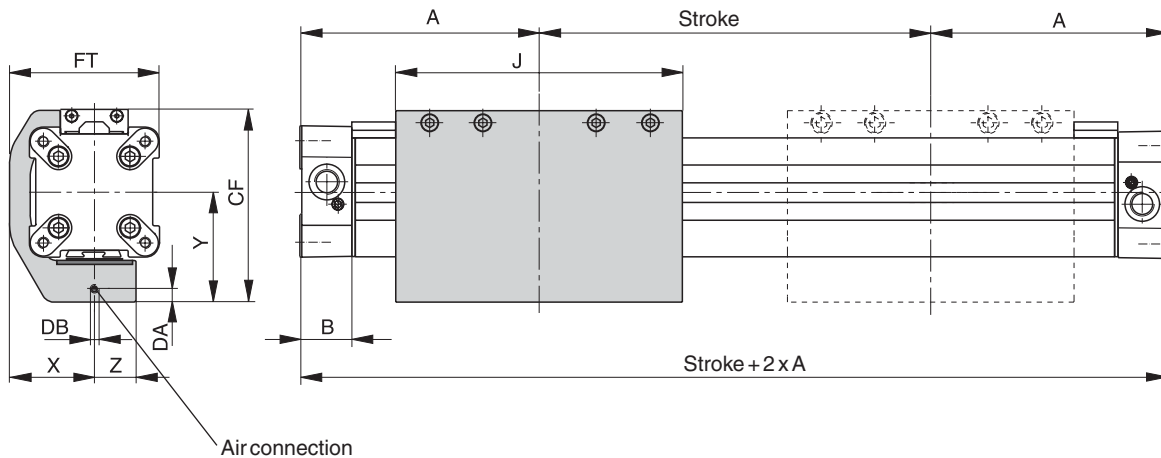
The mass of the brake has to be added to the total moving mass when using the cushioning diagram.



**Series OSP-P25 and P32 with Active Brake AB**



**Series OSP-P40, P50, P63, P80 with Active Brake AB**



**Dimension (mm)**

Series	A	B	J	X	Y	Z	CF	DA	DB	FT
AB 25	100	22	117	29.5	43	13	74	4	M5	50
AB 32	125	25.5	151.4	36	50	15	88	4	M5	62
AB 40	150	28	151.4	45	58	22	102	7	M5	79.5
AB 50	175	33	200	54	69.5	23	118.5	7.5	M5	97.5
AB 63	215	38	256	67	88	28	151	9	G1/8	120
AB 80	260	47	348	83	105	32	185	10	G1/8	149

## end Cap Mountings

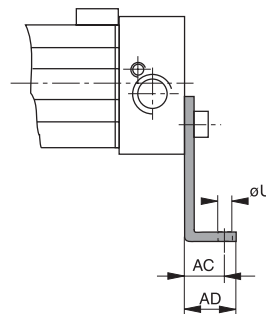
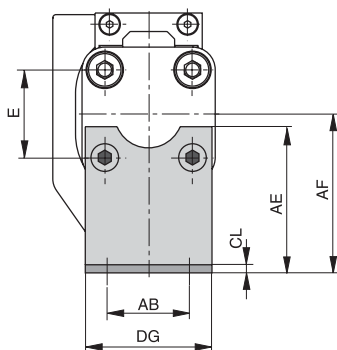
On the end-face of each cylinder end cap there are four threaded holes for mounting the cylinder. The hole layout is square, so that the mounting can be fitted to the bottom, top or either side.

## Series OSP – P25 and P32 with Active Brake AB: Type A3

## Material:

Galvanized steel

The mountings are supplied in pairs.



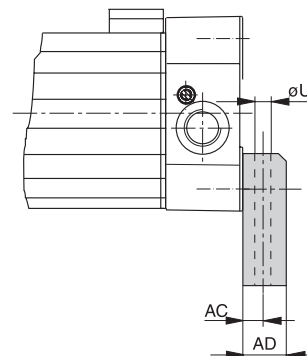
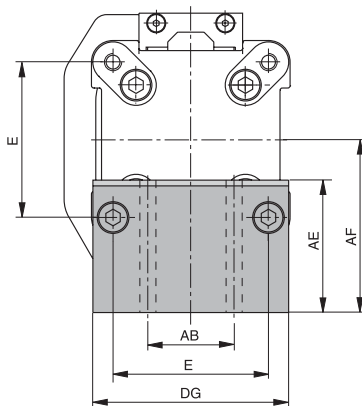
## Series OSP – P40 , P50, P63, P80 with Active Brake AB: Type C3

## Material:

Anodized aluminum

The mountings are supplied in pairs.

Stainless steel version on request.



## Dimension (mm)

Series	E	øU	AB	AC	AD	AE	AF	CL	DG	Part number	
										Type A3	Type C3
AB 25	27	5.8	27	16	22	45	49	2.5	39	2060FiL	–
AB 32	36	6.6	36	18	26	42	52	3	50	3060FiL	–
AB 40	54	9	30	12.5	24	46	60	–	68	–	20339FiL
AB 50	70	9	40	12.5	24	54	72	–	86	–	20350FiL
AB 63	78	11	48	15	30	76	93	–	104	–	20821FiL
AB 80	96	14	60	17.5	35	88	110	–	130	–	20822FiL

G

Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

## Mid-Section Supports

Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive.

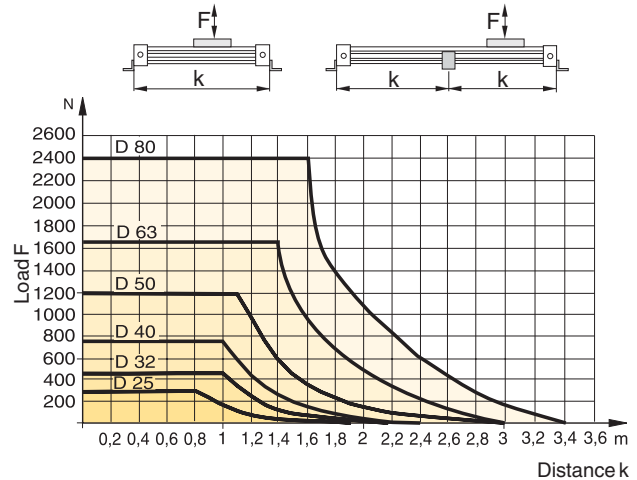
The diagrams show the maximum permissible unsupported length in relation to loading. Deflection of 0.5mm max. between supports is permissible.

The Mid-Section supports are attached to the dovetail rails, and can take axial loads.

### Note to Type E3:

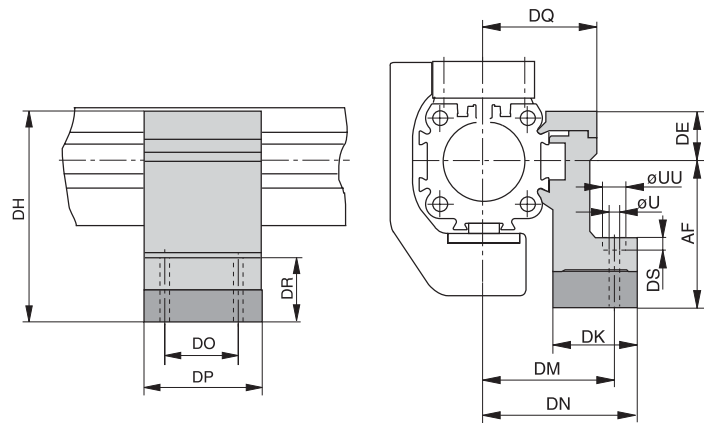
Mid-Section supports can only be mounted opposite of the brake housing.

Stainless steel version available on request.



## Series OSP-P25 to P80 with Active Brake AB: Type e3

(Mounting from above / below with through-bolt)



### Dimension (mm)

Series	U	UU	AF	DE	DH	DK	DM	DN	DO	DP	DQ	DR	DS	Type E3 part number
AB 25	5.5	10	49	16	65	26	40	47.5	36	50	34.5	35	5.7	20353FiL
AB 32	5.5	10	52	16	68	27	46	54.5	36	50	40.5	32	5.7	20356FiL
AB 40	7	–	60	23	83	34	53	60	45	60	45	32	–	20359FiL
AB 50	7	–	72	23	95	34	59	67	45	60	52	31	–	20362FiL
AB 63	9	–	93	34	127	44	73	83	45	65	63	48	–	20453FiL
AB 80	11	–	110	39.5	149.5	63	97	112	55	80	81	53	–	20819FiL

## Accessories for linear drives with Active Brakes – please order separately

Description	For detailed information, see page no.
Clevis mounting	F27
Adaptor profil	F31
T-groove profil	F32
Connection profil	F33
Magnetic switch (can only be mounted opposite of the brake housing)	F87-F92
Incremental displacement measuring system SFI-plus	F95-F97

## Clevis Mount ø 10mm

### For Linear-drive

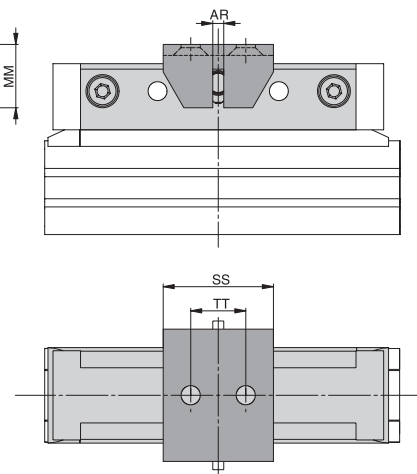
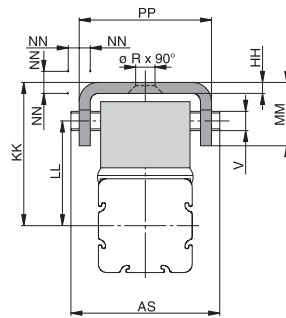
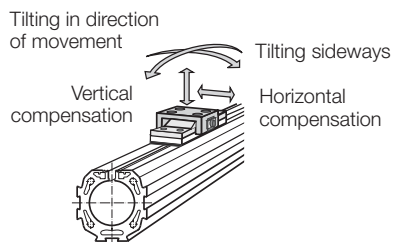
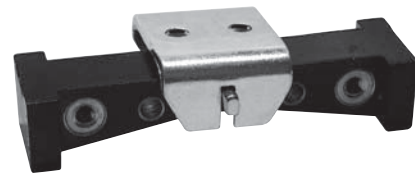
- Series OSP-P

When external guides are used, parallelism deviations can lead to mechanical strain on the piston. This can be avoided by the use of a clevis mounting.

In the drive direction, the mounting has very little play.

Freedom of movement is provided as follows:

- Tilting in direction of movement
- Vertical compensation
- Tilting sideways
- Horizontal compensation



**Dimension (mm)**

													Part number	
Series	ø R	V	AR	AS	HH	KK	LL	MM	NN*	PP	SS	TT	Standard	Stainless
OSP-P10	3.4	3.5	2	27	2	26	19	11.5	1	24	20	10	20971FiL	–

\* Dimension NN gives the possible plus and minus play in horizontal and vertical movement, which also makes tilting sideways possible.

Clevis Mount  $\varnothing 16$  to 80mm

## For Linear-drive

- Series OSP-P

When external guides are used, parallelism deviations can lead to mechanical strain on the piston. This can be avoided by the use of a clevis mounting.

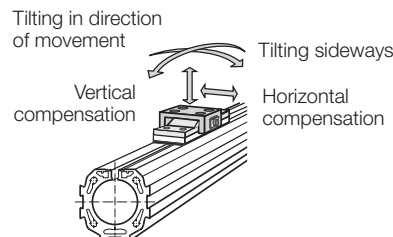
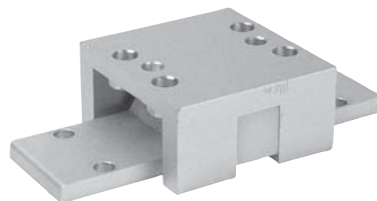
In the drive direction, the mounting has very little play.

Freedom of movement is provided as follows:

- Tilting in direction of movement
- Vertical compensation
- Tilting sideways
- Horizontal compensation

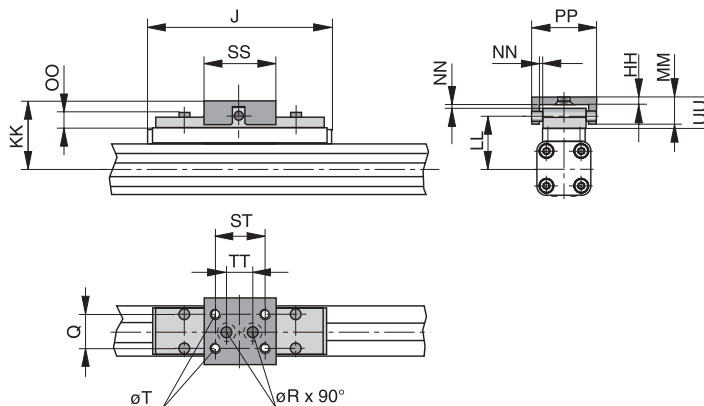
A stainless steel version is also available.

**OSP**  
— ORIGA  
— SYSTEM  
— PLUS

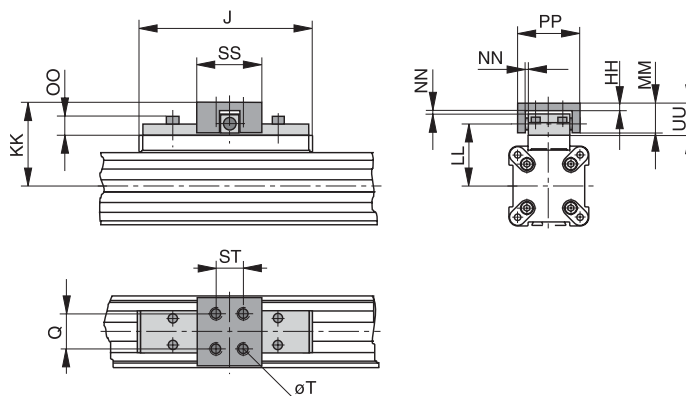


**Please note:**  
When using additional inversion mountings, take into account the dimensions in page G28.

## Series OSP-P16 to 32



## Series OSP-P40 to 80



Dimension (mm)

Series	J	Q	T	$\varnothing R$	HH	KK	LL	MM	NN*	OO	PP	SS	ST	TT	UU	Part number	
																Standard	Stainless
OSP-P16	69	10	M4	4.5	3	34	26.6	10	1	8.5	26	28	20	10	11	20462FiL	20463FiL
OSP-P25	117	16	M5	5.5	3.5	52	39	19	2	9	38	40	30	16	21	20005FiL	20092FiL
OSP-P32	152	25	M6	6.6	6	68	50	28	2	13	62	60	46	40	30	20096FiL	20094FiL
OSP-P40	152	25	M6	—	6	74	56	28	2	13	62	60	46	—	30	20024FiL	20093FiL
OSP-P50	200	25	M6	—	6	79	61	28	2	13	62	60	46	—	30	20097FiL	20095FiL
OSP-P63	256	37	M8	—	8	100	76	34	3	17	80	80	65	—	37	20466FiL	20467FiL
OSP-P80	348	38	M10	—	8	122	96	42	3	16	88	90	70	—	42	20477FiL	20478FiL

\* Dimension NN gives the possible plus and minus play in horizontal and vertical movement, which also makes tilting sideways possible.



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G27

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Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

**G**

Rodless Pneumatic  
Cylinders

OSP-P  
Series

P1X  
Series

P1Z  
Series

GDL  
Series

## inversion Mount ø 16 to 80mm

## For Linear-drive

- Series OSP-P

In dirty environments, or where there are special space problems, inversion of the cylinder is recommended.

The inversion bracket transfers the driving force to the opposite side of the cylinder. The size and position of the mounting holes are the same as on the standard cylinder.

**Please note:**

Other components of the OSP system such as mid-section supports, magnetic switches and the external air passage for the P16, can still be mounted on the free side of the cylinder.

When combining single end porting with inversion mountings,

**OSP**  
— ORIGA  
— SYSTEM  
— PLUS

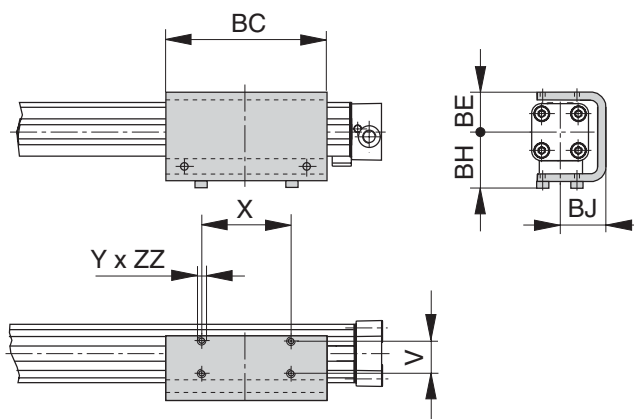


RS magnetic switches can only be mounted directly opposite to the external air-supply profile

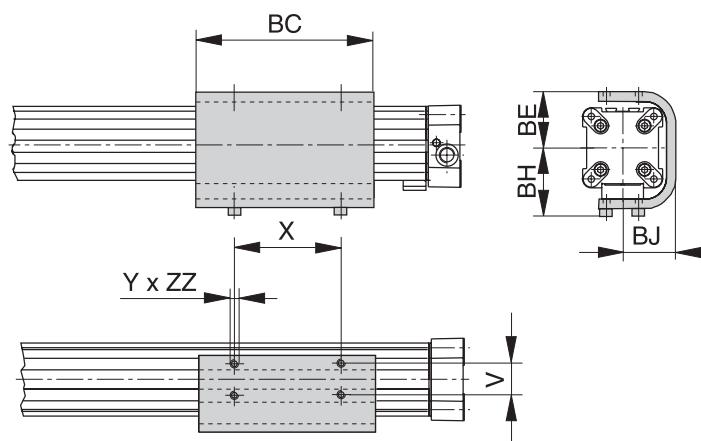
**Important Note:**

May be used in combination with Clevis Mounting, reference dimensions in pages G32-G33.

## Series OSP-P16 to 32



## Series OSP-P40 to 80



## Dimension (mm)

Series	V	X	Y	BC	BE	BH	BJ	ZZ	Part number
OSP-P16	16.5	36	M4	69	23	33	25	4	20446FiL
OSP-P25	25	65	M5	117	31	44	33.5	6	20037FiL
OSP-P32	27	90	M6	150	38	52	39.5	6	20161FiL
OSP-P40	27	90	M6	150	46	60	45	8	20039FiL
OSP-P50	27	110	M6	200	55	65	52	8	20166FiL
OSP-P63	34	140	M8	255	68	83.5	64	10	20459FiL
OSP-P80	36	190	M10	347	88	107.5	82	15	20490FiL

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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G28

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Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

## end Cap Mounting $\varnothing$ 10 to 80mm

### For Linear-drive

- Series OSP-P



On the end-face of each end cap there are four threaded holes for mounting the actuator.

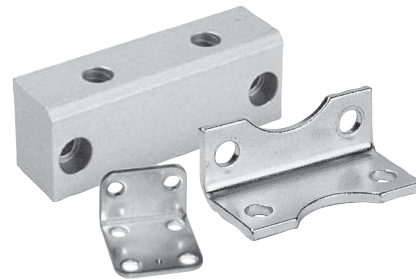
The hole layout is square, so that the mounting can be fitted to the bottom, top or either side, regardless of the position chosen for the air connection.

### Material:

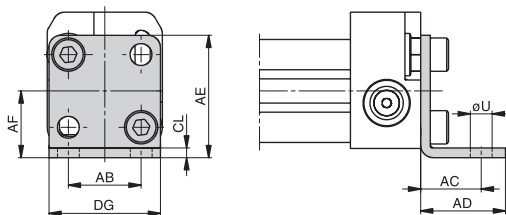
Series OSP-P10 – P32: Galvanized steel.

Series OSP-P40 – P80: Anodized aluminum.

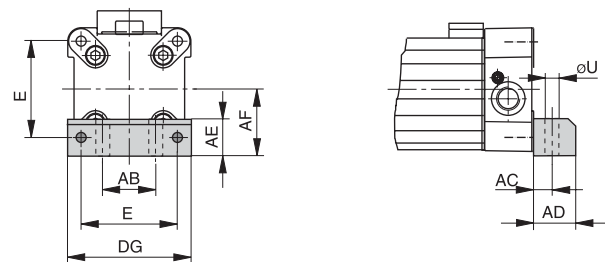
The mountings are supplied in pairs.



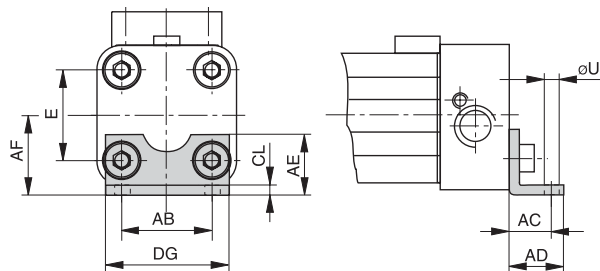
### Series OSP-P10: Type A1



### Series OSP-P40 to 80: Type C1



### Series OSP-P16 to 32: Type A1



### Dimension (mm)

Series	E	ØU	AB	AC	AD	AE	AF	CL	DG	Part number (pair)	
										Type A1	Type C1
OSP-P10	-	3.6	12	10	14	20.2	11	1.6	18.4	0240	-
OSP-P16	18	3.6	18	10	14	12.5	15	1.6	26	20408FiL	-
OSP-P25	27	5.8	27	16	22	18	22	2.5	39	2010	-
OSP-P32	36	6.6	36	18	26	20	30	3	50	3010	-
OSP-P40	54	9	30	12.5	24	24	38	-	68	-	4010FiL
OSP-P50	70	9	40	12.5	24	30	48	-	86	-	5010FiL
OSP-P63	78	11	48	15	30	40	57	-	104	-	6010FiL
OSP-P80	96	14	60	17.5	35	50	72	-	130	-	8010FiL



## Mid-Section Support ø 10 to 80mm

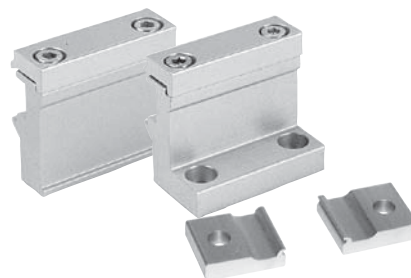
For Linear-drive

- Series OSP-P

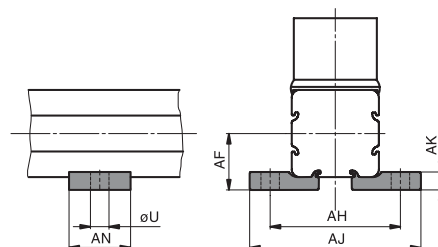

**note on Types e1 and D1  
(P16 – P80):**

The mid-section support can also be mounted on the underside of the actuator, in which case its distance from the center of the actuator is different.

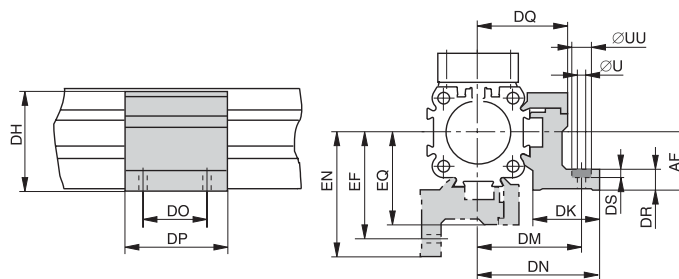
Stainless steel version on demand.

**Series OSP-10, Type e1**

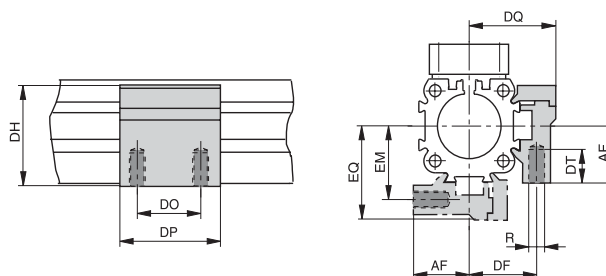
(Mounting from above / below using a cap screw)

**Series OSP-P16 to P80: Type e1**

(Mounting from above / below using a cap screw)

**Series OSP-16 to 80, Type D1**

(Mountings from below with 2 screws)

**Dimension (mm)**

Series	U	AF	AH	AJ	AK	AN	Part number	
							Type E1	Type D1
OSP-P10	3.6	11	25.4	33.4	3.5	12	0250	–

Series	R	U	UU	AF	DF	DH	DK	DM	DN	DO	DP	DQ	DR	DS	DT	EF	EM	EN	EQ	Part number	
																				Type E1	Type D1
OSP-P16	M3	3.4	6	15	20	29.2	24	32	36.4	18	30	27	6	3.4	6.5	32	20	36.4	27	20435FiL	20434FiL
OSP-P25	M5	5.5	10	22	27	38	26	40	47.5	36	50	34.5	8	5.7	10	41.5	28.5	49	36	20009FiL	20008FiL
OSP-P32	M5	5.5	10	30	33	46	27	46	54.5	36	50	40.5	10	5.7	10	48.5	35.5	57	43	20158FiL	20157FiL
OSP-P40	M6	7	–	38	35	61	34	53	60	45	60	45	10	–	11	56	38	63	48	20028FiL	20027FiL
OSP-P50	M6	7	–	48	40	71	34	59	67	45	60	52	10	–	11	64	45	72	57	20163FiL	20162FiL
OSP-P63	M8	9	–	57	47.5	91	44	73	83	45	65	63	12	–	16	79	53.5	89	69	20452FiL	20451FiL
OSP-P80	M10	11	–	72	60	111.5	63	97	112	55	80	81	15	–	25	103	66	118	87	20482FiL	20480FiL



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G30

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Adaptor Profile ø 16 to 50m

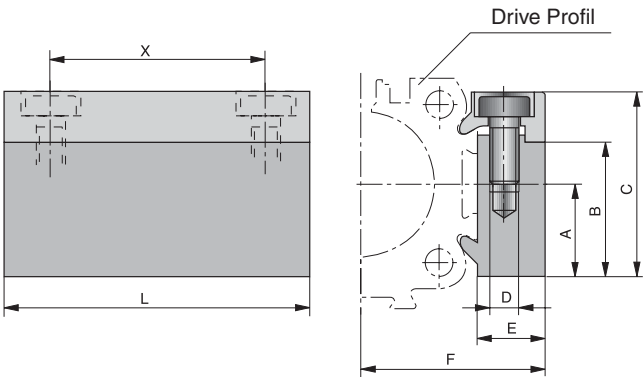
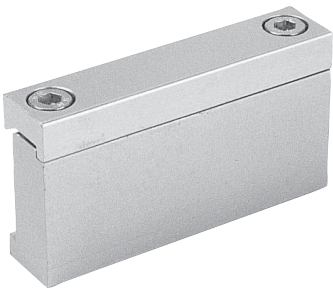
For Linear-drive

- Series OSP-P



Adaptor Profile OSP

- A universal attachment for mounting of valves etc.
- Solid material



Dimension (mm)

Series	A	B	C	D	E	F	L	X	Part number	
									Standard	Stainless
OSP-P16	14	20.5	28	M3	12	27	50	38	20432FiL	20438FiL
OSP-P25	16	23	32	M5	10.5	30.5	50	36	20006FiL	20186FiL
OSP-P32	16	23	32	M5	10.5	36.5	50	36	20006FiL	20186FiL
OSP-P40	20	33	43	M6	14	45	80	65	20025FiL	20267FiL
OSP-P50	20	33	43	M6	14	52	80	65	20025FiL	20267FiL

**T-Slot Profile ø 16 to 50mm**

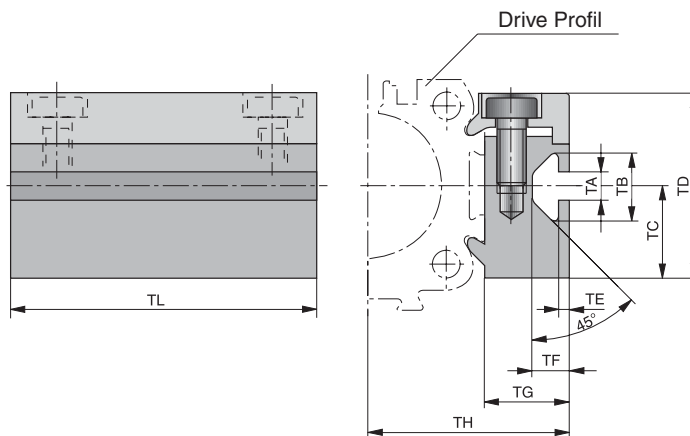
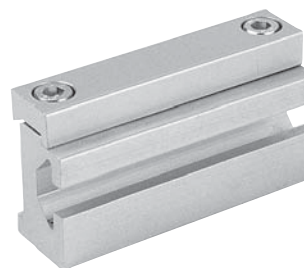
For Linear-drive

- Series OSP-P



**T-Slot Profile OSP**

- A universal attachment for mounting with standard T-Nuts



**Dimension (mm)**

Series	TA	TB	TC	TD	TE	TF	TG	TH	TL	Part number	
										Standard	Stainless
OSP-P16	5	11.5	14	28	1.8	6.4	12	27	50	20433FiL	20439FiL
OSP-P25	5	11.5	16	32	1.8	6.4	14.5	34.5	50	20007FiL	20187FiL
OSP-P32	5	11.5	16	32	1.8	6.4	14.5	40.5	50	20007FiL	20187FiL
OSP-P40	8.2	20	20	43	4.5	12.3	20	51	80	20026FiL	20268FiL
OSP-P50	8.2	20	20	43	4.5	12.3	20	58	80	20026FiL	20268FiL

**G**

**Rodless Pneumatic Cylinders**

**OSP-P Series**

**P1X Series**

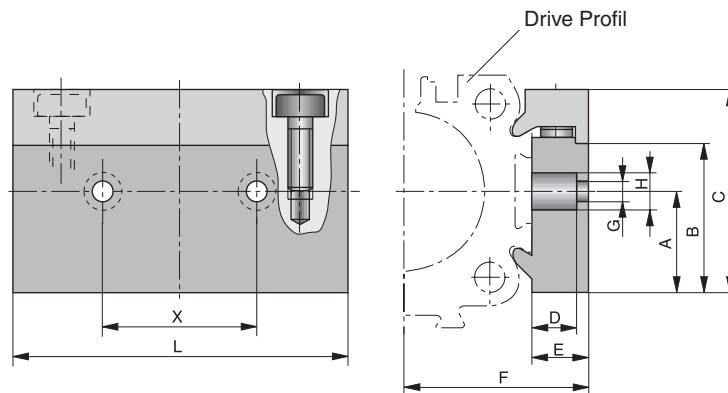
**P1Z Series**

**GDL Series**

**Connection Profile  $\varnothing$  16 to 50m**

**For combining**

- Series OSP-P with system profile
- Series OSP-P with Series OSP-P

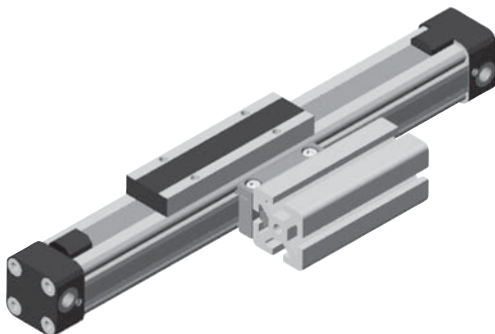


**Dimension (mm)**

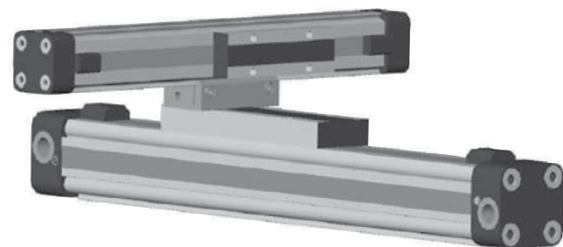
Cylinder Series	For mounting on the carrier of	A	B	C	D	E	F	G	H	L	X	Part number
OSP-P16	OSP25	14	20.5	28	8.5	12	27	5.5	10	50	25	20849FiL
OSP-P25	OSP32-50	16	23	32	8.5	10.5	30.5	6.6	11	60	27	20850FiL
OSP-P32	OSP32-50	16	23	32	8.5	10.5	36.5	6.6	11	60	27	20850FiL
OSP-P40	OSP32-50	20	33	43	8	14	45	6.6	11	60	27	20851FiL
OSP-P50	OSP32-50	20	33	43	8	14	52	6.6	11	60	27	20851FiL

**Possible Combinations**

**Combination of Series OSP-P with system profile**



**Combination of Series OSP-P with Series OSP-P**



Joint Clamp Connection  $\varnothing$  25 to 50mm

For connection of cylinders of the  
Series OSP-P

The joint clamp connection combines two  
OSP-P cylinders of the same size into a  
compact unit with high performance.

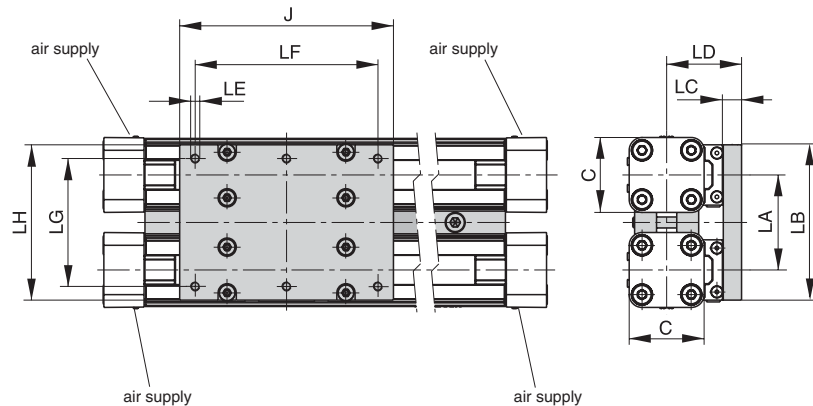
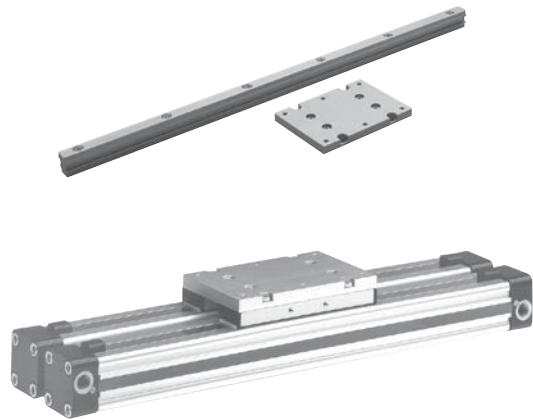
**OSP**  
— ORIGA  
— SYSTEM  
— PLUS

## Features

- Increased load and torque capacity
- Higher driving forces

## Included in delivery:

- 2 clamping profiles with screws
- 1 mounting plate with fixing



## Dimension (mm)

Series	C	J	LA	LB	LC	LD	LE	LF	LG	LH	Part number
OSP-P25	41	117	52	86	10	41	M5	100	70	85	Consult factory
OSP-P32	52	152	64	101	12	50	M6	130	80	100	
OSP-P40	69	152	74	111	12	56	M6	130	90	110	
OSP-P50	87	200	88	125	12	61	M6	180	100	124	

G

Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

Multiplex Connection  $\varnothing$  25 to 50mm

For connection of cylinders of the  
Series OSP-P

**OSP**  
— ORIGA  
— SYSTEM  
— PLUS

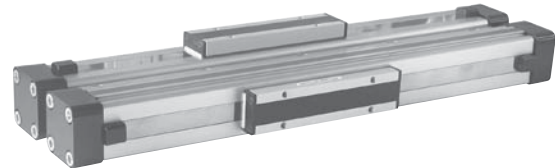
The multiplex connection combines two  
or more OSP-P cylinders of the same size  
into one unit.

## Features

- The orientation of the carriers can be freely selected

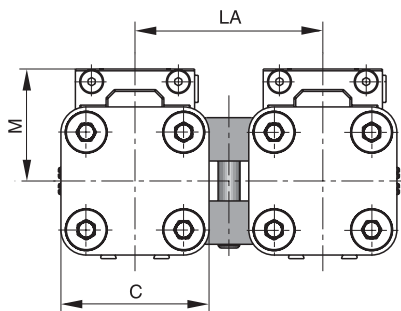
## Included in delivery:

2 clamping profiles with clamping screws

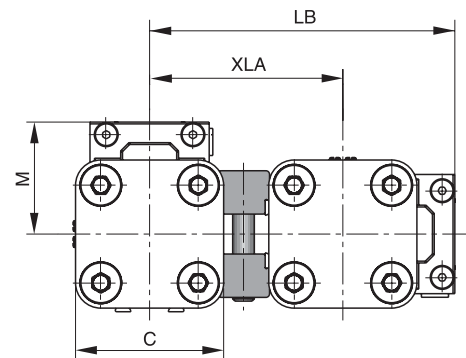


## Installation:

Top carrier/Top carrier



Top carrier/Side carrier



## Dimension (mm)

Series	C	M	LA	LE	XLA	Part number
OSP-P25	41	31	52	84.5	53.5	Consult factory
OSP-P32	52	38	64	104.5	66.5	
OSP-P40	69	44	74	121.5	77.5	
OSP-P50	87	49	88	142.5	93.5	

G

Rodless Pneumatic  
Cylinders

OSP-P  
Series

P1X  
Series

P1Z  
Series

GDL  
Series

### Features

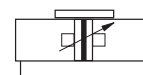
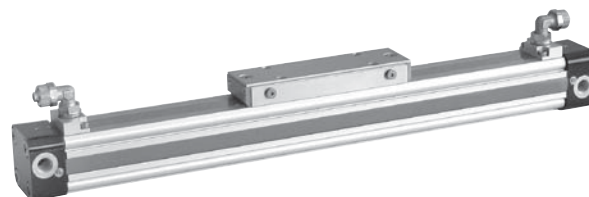
### Clean Room Cylinder ø 16 – 32 mm Rodless Cylinder certified to in en ISO 14644-1

#### Standard Features:

- Double-acting with adjustable end cushioning
- With magnetic piston for position sensing
- Clean Room classification  
ISO Class 4 at  $v_m = 0.14$  m/s  
ISO Class 5 at  $v_m = 0.5$  m/s
- Suitable for smooth slow speed operation up to  $v_{min} = 0.005$  m/s
- Optional stroke length up to 1200mm (longer strokes on request)
- Low maintenance
- Compact design with equal force and velocity in both directions
- Aluminum piston with bearing rings to support high direct and cantilever loads
- Stainless steel screws

#### Optional Features:

- Slow speed lubrication
- Fluorocarbon (FKM) seals



**OSP**  
— ORIGA  
— SYSTEM  
— PLUS

#### Operating information

Operating pressure:	116 PSIG (8 bar)
Temperature range:	14°F to 176°F (10°C to 80°C)
Filtration requirements:	Filtered, nonlubricated compressed air

#### Specification

- Type Rodless cylinder
- Series OSP-P
- Stroke length 5.5m (216 inches)
- System Double-acting, with cushioning, position sensing capability
- Mounting See drawings
- Air connection Threaded
- Weight (mass) See table
- Installation In any position
- Lubrication Prelubricated at the factory (additional oil mist lubrication not required)
- Option: special slow speed grease

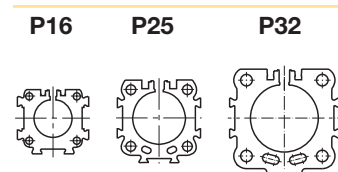
#### Material specification

Cylinder profil	Anodized aluminum
Carrier (piston)	Anodized aluminum
End caps	Aluminum, lacquered
Sealing bands	Corrosion resistant steel
Seals	NBR (Option: Fluorocarbon)
Screws	Stainless steel
Covers	Anodized aluminum
Guide plate	Plastic

#### Weight (mass) kg

Cylinder series (Basic cylinder)	Weight (Mass) kg	
	at 0mm stroke	per 100mm stroke
OSP-P16	0.22	0.1
OSP-P25	0.65	0.197

#### Size Comparison



**G**

Rodless Pneumatic  
Cylinders

OSP-P  
Series

P1X  
Series

P1Z  
Series

GDL  
Series



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G36

**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)



Ordering information for OSP-P rodless Clean Room pneumatic series

1-4	5-6	7	8	9	10	11	12-16	17	18	19	20	21	22	23	24	25
OSPP	32	0	1	0	0	0	01100	0	0	0	0	0	0	1	0	0
<b>Bore</b> 16 25 32				<b>Lubrication</b> 5 Clean room		<b>Stroke</b> x x x x x 5 digits in whole millimeters (ex. 1100mm = 01100)		<b>Cushions / stops</b> 0 Standard				<b>Dovetail cover</b> 0 Standard X Without cover rail		<b>Version</b> 0 Standard		
<b>Piston style</b> 0 Standard		<b>Seals</b> 0 Buna-N 1 Fluorocarbon				<b>Hardware</b> 0 Standard 1 Stainless steel 3 Xylan coating & stainless steel fasteners		<b>Piston mounting</b> 0 None				<b>Additional carriages</b> 0 None				
<b>Porting configurations</b> 7 Clean Room										<b>Guides / brakes</b> 0 None		<b>Endcap mounting</b> 0 None 1 A1 (16,25,32) 2 A2 (16,25,32) 3 A3 (25,32) 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) Note: Comes in pairs				
						<b>Endcap position</b> 0 Both pos #2										
												<b>Switches</b> 0 None 1 Normally open reed switch 2 Normally closed reed switch 3 PNP Hall sensor w/extension cables 4 NPN Hall sensor w/extension cables Note: 2 switches will be supplied. For different quantity, please order as a separate line item.				
<b>Sensors</b> See section L for sensors.																

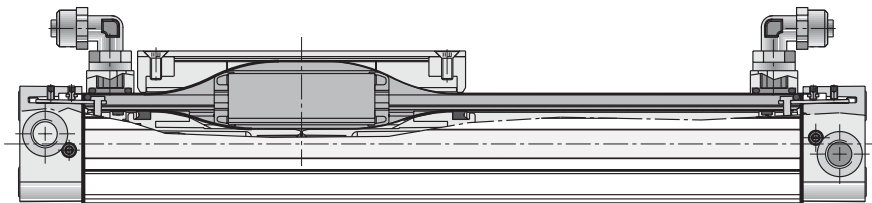
Certificatio

Based on the PARKER-ORIGA rodless cylinder, proven in world wide markets, PARKER-ORIGA now offers the only rodless cylinder on the market with a certification f om IPA Institute for the clean room specification acco ding to DIN EN ISO 14644-1.



Function

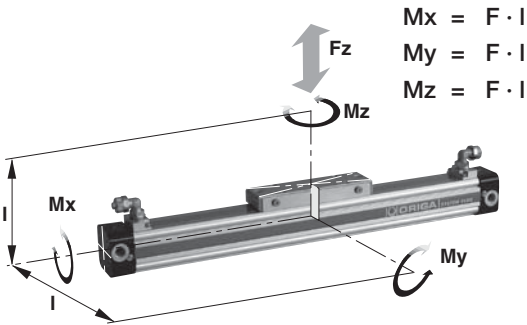
The clean room cylinders of the ORIGA SYSTEM PLUS (OSP-P) combines the efficiency of the ARKER-ORIGA slot seal system with vacuum protection against progressive wear and contamination from the sliding components. A partial vacuum drawn between inner and outer sealing bands prevents emission into the clean room. To achieve the necessary vacuum a suction flow of ca. 4<sup>-3</sup>/h is required.



Loads, Forces and Moments

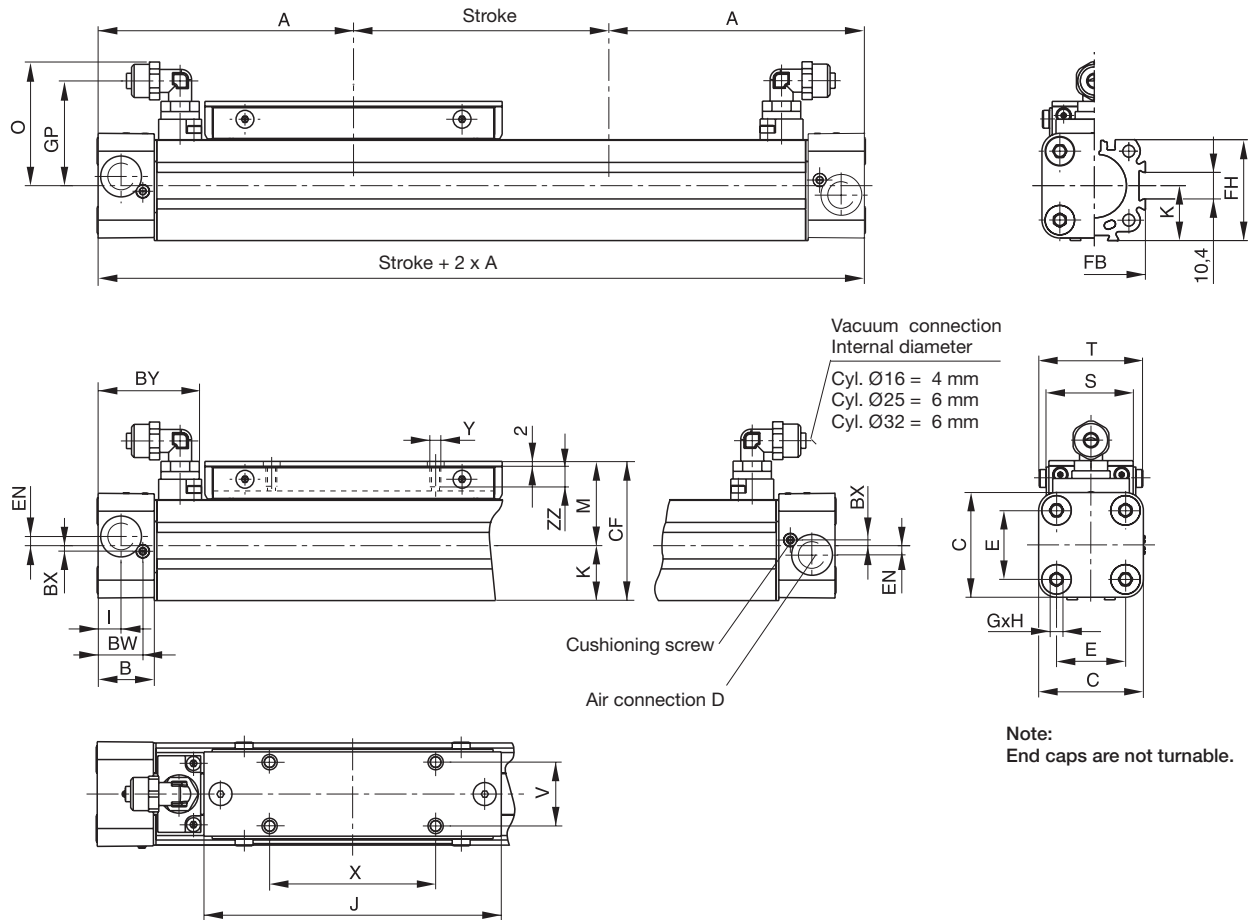
Cylinder Series (mm Ø)	Effective Force at 6 bar (N)	Max. Moment			Max. Load Fz (N)	Cushion length (mm)
		Mx (Nm)	My (Nm)	Mz (Nm)		
OSP-P16	78	0.45	4	0.5	120	11
OSP-P25	250	1.5	15	3.0	300	17
OSP-P32	420	3.0	30	5.0	450	20

Load and moment data are based on speeds  $v \leq 0.2$  m/s. The adjacent table shows the maximum values for light, shock-free operation which must not be exceeded even in dynamic operation.



$$\begin{aligned} M_x &= F \cdot l \\ M_y &= F \cdot l \\ M_z &= F \cdot l \end{aligned}$$

**Clean Room Cylinders ø 16-32 mm**



**Dimension (mm)**

Series	A	B	C	D	E	G	H	I	J	K	M	O	S
OSP-P16	65	14	30	M5	18	M3	9	5.5	69	15	25	31	24
OSP-P25	100	22	41	G1/8	27	M5	15	9	117	21.5	33	48.5	35
OSP-P32	125	25.5	52	G1/4	36	M6	15	11.5	152	28.5	40	53.6	38

Series	T	V	X	Y	BW	BX	BY	CF	EN	FB	FH	GP	ZZ
OSP-P16	29.6	16.5	36	M4	10.8	1.8	28.5	40	3	30	27.2	25.7	7
OSP-P25	40.6	25	65	M5	17.5	2.2	40.5	54.5	3.6	40	39.5	41	8
OSP-P32	45	27	90	M6	20.5	2.5	47.1	68.5	5.5	52	51.7	46.2	10

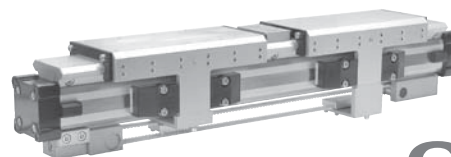
## Synchronized Bi-Parting movements Type OSP-P40-SL-BP for Rodless Cylinder ø 40mm

## Standard Features:

- Accurate bi-parting movement through toothed belt synchronization
- Optimum slow speed performance
- Increased action force
- Anodized aluminum guide rail with prism-form slideway arrangement
- Adjustable polymer slide units
- Combined sealing system with
- polymer and felt elements to remove dirt and lubricate the slideway
- Integrated grease nipples for guide lubrication

## Applications:

- Opening and closing operations
- Gripping of workpieces – outside
- Gripping of hollow workpieces – inside
- Gripping underneath larger objects
- Clamping force adjustable via pressure regulator



**OSP**  
— ORIGA  
— SYSTEM  
— PLUS

## Operating information

Operating pressure:	116 PSIG (8 bar)
Temperature range:	14°F to 140°F (-10°C to 60°C)
Filtration requirements:	Filtered, nonlubricated compressed air

## Material specification

Belt wheel	Aluminum
Toothed belt	Steel-corded polyurethane

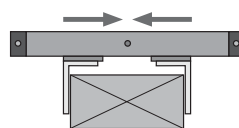
## Specification

- Type Rodless cylinder for synchronized bi-parting movements
- Series OSP-P
- System Double-acting, with end cushioning, for contactless position sensing
- Guide Slideline SL40
- Synchronization Toothed belt
- Mounting See drawing
- Weight (mass) See table
- Lubrication Special slow speed grease (additional oil mist lubrication not required)
- Cushioning middle position Elastic buffer
- Maximum speed 0.2 m/s  $V_{max}$
- Maximum stroke of each stroke 500 mm
- Maximum mass per guide carrier
  - lateral moment 25 Nm  $M_{x_{max}}$
  - axial moment 46 Nm  $M_{y_{max}}$
  - rotating moment 46 Nm  $M_{z_{max}}$
- Option: special slow speed grease

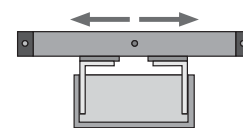
## Weight (mass) kg

Cylinder series (Basic cylinder)	Weight (Mass) kg	
	at 0mm stroke	per 100mm stroke
OSP-P40-SL-BP	10.334	2.134

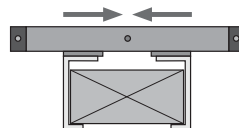
## Applications



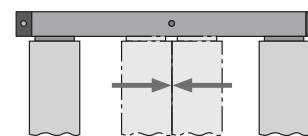
Gripping – outside



Gripping – inside



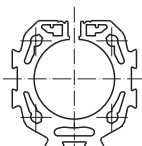
Gripping – underneath



Door opening and closing

## Size

P40



GDL Series	P1Z Series	P1X Series	OSP-P Series	Rodless Pneumatic Cylinders	G
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**Function:**

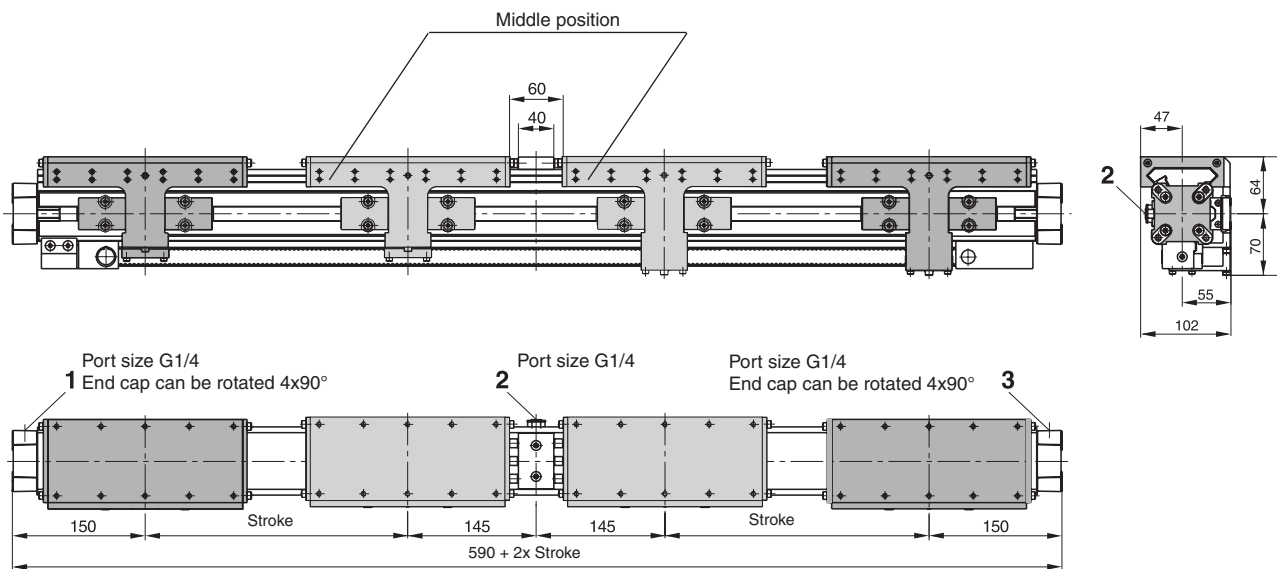
The OSP-P40-SL-BP bidirectional linear drive is based on the OSP-P40 rodless pneumatic cylinder and adapted SLIDELINE SL40 polymer plain-bearing guides.

Two pistons in the cylinder bore are connected via yokes and carriers to the SLIDELINE guide carriers, which handle the forces and moments generated.

The bi-parting movements of the guide carriers are accurately synchronized by a recirculating toothed belt.

The two pistons are driven from the middle to the end positions via a common G1/4 air connection in the middle of the cylinder, and are driven from the end positions to the middle via an air connection in each end cap.

End position cushioning is provided by adjustable air cushioning in the end caps, and middle position cushioning by rubber buffers.

**Dimensions (mm)****Air connections:**

To drive the guide carriers to the middle position: pressurize ports 1 and 3.

To drive the guide carriers to the end positions: pressurize port 2.

For more dimensions see pages G18 and G19.

G

Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

## Linear Guides for OSP-P Series



## Adaptive modular system

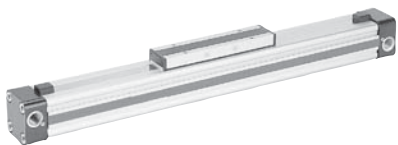
The Origa system plus – OSP – provides a comprehensive range of linear guides for the pneumatic OSP-P.

## Advantages:

- Takes high loads and forces
- High precision
- Smooth operation
- Can be retrofitted
- Can be installed in any position

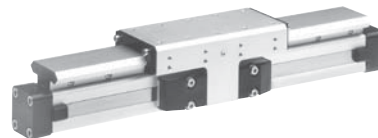
## Series OSP-P - Standard

- Piston diameters 10 to 80mm



## SLiDeLine

- The cost-effective plain bearing guide for medium loads.
- Active/ Passive Brake optional.
- Piston diameters 16 to 80mm



## POWeRSLiDe

- The roller guide for heavy loads and hard application conditions
- Piston diameters 16 to 50mm



## PROLine

- The compact aluminum roller guide for high loads and velocities.
- Active / Passive Brake optional.
- Piston diameters 16 to 50mm



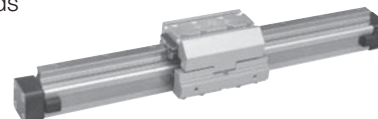
## STARLine

- Recirculating ball bearing guide for very high loads and precision
- Piston diameters 16 to 50mm



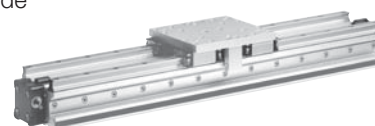
## KF GUIDe

- Recirculating ball bearing guide for highest loads and precision.
- Correspond to FESTO dimensions (Type DGPL-KF)
- Piston diameters 16 to 50mm



## HD HeAVY DUTY GUIDe

- The ball bushing guide for the heavy loads and greatest accuracy.
- Piston diameters 25 to 50mm

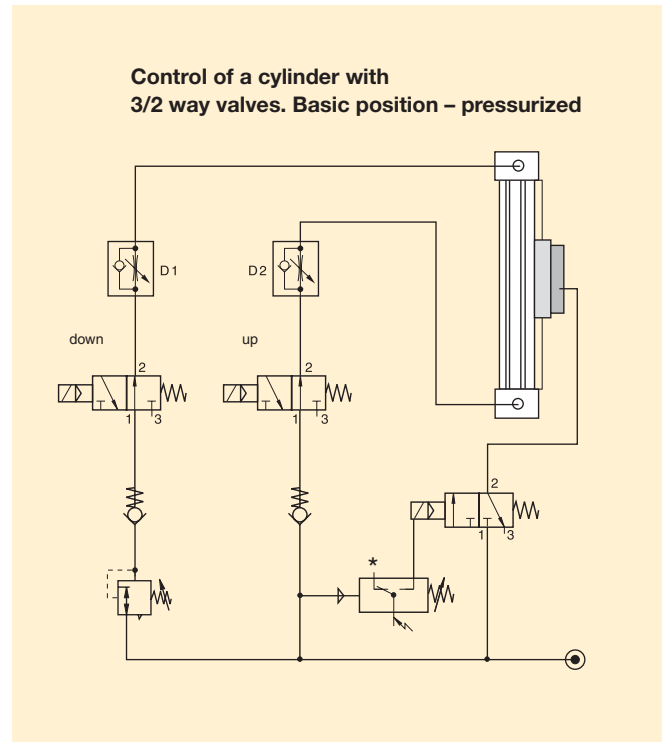
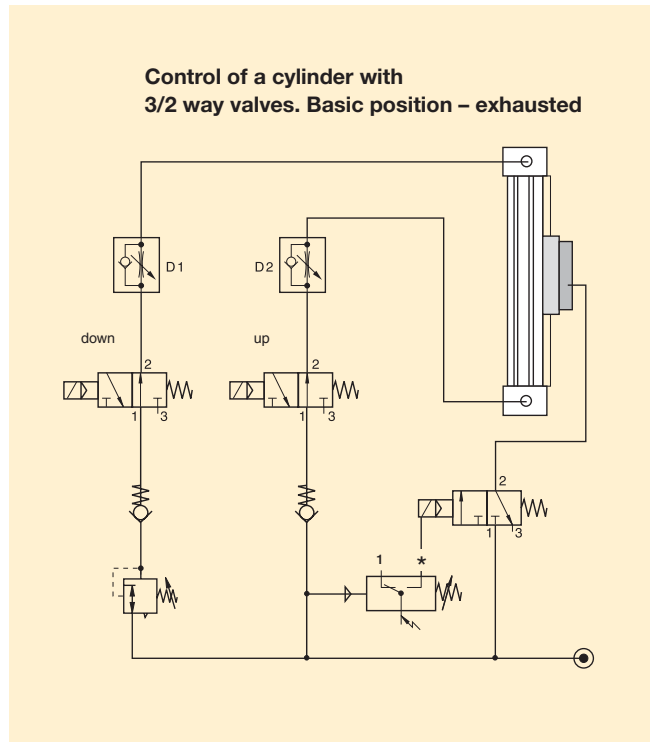


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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series



**Application example - Vertical Application**



**Control examples**

Under normal operating circumstances the pressure switch is closed and the air flows through the 3/2 way solenoid valves from port 1 to 2, thus lifting the brake from the rail (operating condition).

The brake is pressurized by means of a 3/2 way valve in combination with a pressure switch. When there is a pressure loss, the brake is actuated by the pressure switch.

When the air pressure is restored to both cylinder chambers, the brake is lifted and the linear drive can be moved again.

The speed regulating valves D1 and D2 control the speed of the linear drive, and have no influence on the brake. The two non-return valves give the system a higher stability.

The pressure regulating valve is used to compensate for the downward force in this vertical application.

**Please note:**



**Before the brake is lifted, make sure that both air chambers of the linear drive are pressurized.**

**Small diameter tubing, fittings and valves with a nominal diameter, and tubing that is too long all change the reaction time of the brake!**

**\*Tip:**

The pressure switch actuates the brake when the pressure drops below the set value.

For accessories, such as tubing and fittings, please refer to our separate catalog.

**Required Components**

- Three, Three-Way Valves
- Port size  
M5, G1/8, G1/4, G1/2
- Pressure Regulator  
G1/8 - G3/8
- Pneumatic Accessories
- P/E-Switch
- Check Valves  
G1/8 - G3/8
- Flow Control Valves  
M5 - G1/4

Contact factory for literature on the above valves/accessories

## SLIDELINE, Plain Bearing Guide SL ø 16 to 80mm bore

## For Linear-drive

- Series OSP-P



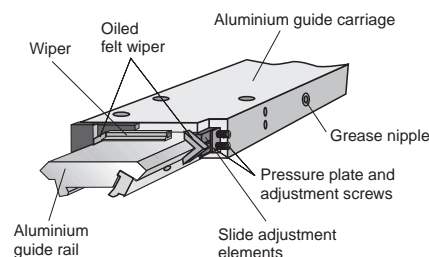
## Features

- Maximum speed < 1 m/s
- Adjustable plastic slide elements  
– optional with integral brake
- Composite sealing system with plastic and felt wiper elements to remove dirt and lubricate the slideways
- Corrosion resistant version available on request
- Any length of stroke up to 5500mm  
(longer strokes on request)

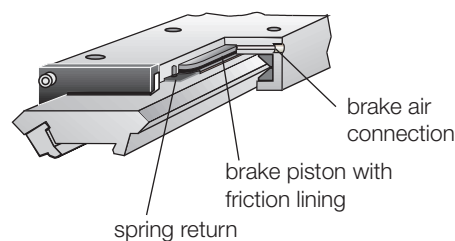
Integrated Brake (optional)  
for series OSP-P25 to OSP-P50:

- Actuated by pressure
- Released by exhausting and spring return

For further technical data see also  
linear drives OSP-P, see page G14.



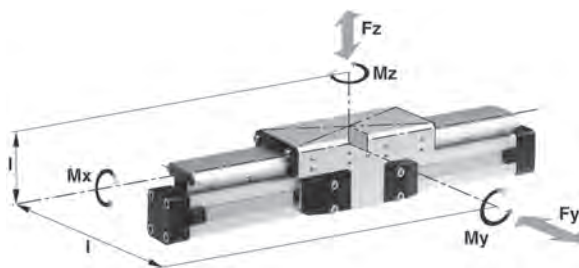
## Option – Integrated Brake



## Loads, Forces and Moments

The table shows the maximum permissible values for smooth operation, which should not be exceeded even under dynamic conditions.

The load and moment figures apply to speeds  $v < 0.2$  m/s.



Series	For linear drive	Max. moments (Nm)			Max. loads (N)	Maximum braking force at 6 bar (N)†	Mass of linear drive with guide (kg)		
		Mx	My	Mz			With 0mm stroke	Increase per 100mm stroke	Mass * of guide carriage (kg)
SL16	OSP-P16	6	11	11	325	–	0.57	0.22	0.23
SL25	OSP-P25	14	34	34	675	325	1.55	0.39	0.61
SL32	OSP-P32	29	60	60	925	545	2.98	0.65	0.95
SL40	OSP-P40	50	110	110	1500	835	4.05	0.78	1.22
SL50	OSP-P50	77	180	180	2000	1200	6.72	0.97	2.06
SL63	OSP-P63	120	260	260	2500	–	11.66	1.47	3.32
SL80	OSP-P80	120	260	260	2500	–	15.71	1.81	3.32

\* Add the mass of the guide carriage to the mass to be cushioned.

† Only with integrated brake: Braking force on dry oil-free surface values are decreased for lubricated slideways.

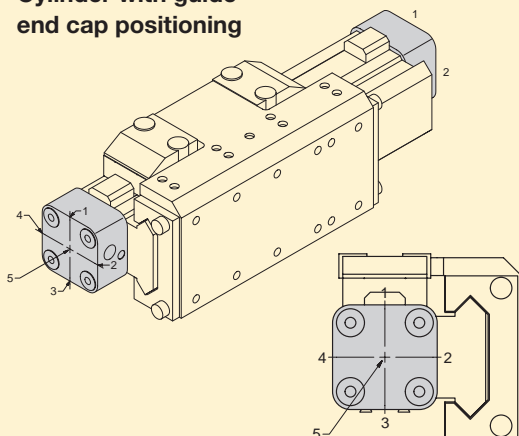
## Ordering Information

Rodless Pneumatic Cylinders  
OSP-P Series, SLIDELINE 16 to 80mm

## Ordering information for OSP-P rodless SLIDELINE pneumatic series

1-4	5-6	7	8	9	10	11	12-16	17	18	19	20	21	22	23	24	25			
<b>OSP-P</b>				<b>25</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>01100</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>		
<b>Bore</b>				<b>Lubrication</b>				<b>Stroke</b>				<b>Cushioning &amp; stops</b>				<b>Dovetail cover</b>			
16 25 32 40 50 63 80				0 Standard 1 Slow speed 4 Food 5 Clean room				xxxxx 5 digits in whole millimeters (ex. 1100mm = 01100)				0 Standard 1 Long cushions (25,32,40)				0 Standard X Without cover rail			
<b>Piston style</b>				<b>Seals</b>				<b>Piston mounting</b>				<b>Endcap mounting</b>				<b>Version</b>			
0 Standard 1 Tandem				0 Standard 1 Fluorocarbon				0 None				0 None 1 A1 (16,25,32) 2 A2 (16,25,32) 3 A3 (25,32) 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) 9 C1 (40,50,63,80) A C2 (40,50,63,80) B C3 (40,50,63,80) C C4 (40,50,63,80)				0 Standard			
<b>Porting configurations<sup>†</sup></b>				<b>Hardware</b>				<b>Guides / brakes</b>				<b>Additional carriages<sup>**</sup></b>				<b>Switches<sup>◇</sup></b>			
0 Standard 1 End face (16,25,32,40,50,63,80) 2 Single end porting (25,32,40,50,63,80) 3 Left std pos #2, Right pos #5 (16,25,32,40,50,63,80) 4 Left pos #5, Right std pos #2 (16,25,32,40,50,63,80) 6 Single end porting at #5 (50,63,80) A 24VDC VQE valves (25,32,40,50) B 220VAC VQE valves (25,32,40,50) C 48VDC VQE valves (25,32,40,50) E 110VAC VQE valves (25,32,40,50)				0 Standard 1 Stainless steel 3 Xylan coated & stainless steel fasteners				2 Slideline guide 3 Activebrake (25,32,40,50) 4 Slideline with multibrake (25,32,40,50,63,80)				0 None 2 Slideline guide M Guide carriage SL-MB with foot brake function				0 None 1 Normally open reed switch (16 thru 80) 2 Normally closed reed switch (16 thru 80) 3 PNP Hall sensor w/extension cables (16 thru 80) 4 NPN Hall sensor w/extension cables (16 thru 80) X SFI 0.1mm RES (25 thru 80) Y SFI 1mm RES (25 thru 80)			
<b>Endcap position</b>				<b>Note:</b> Single end porting on 16mm bore, then end caps cannot be rotated.				<b>** Note available on tandem piston only</b>				<b>◇ Note:</b> 2 switches will be supplied. For different quantity, please order as a separate line item.							
0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1																			

Cylinder with guide end cap positioning

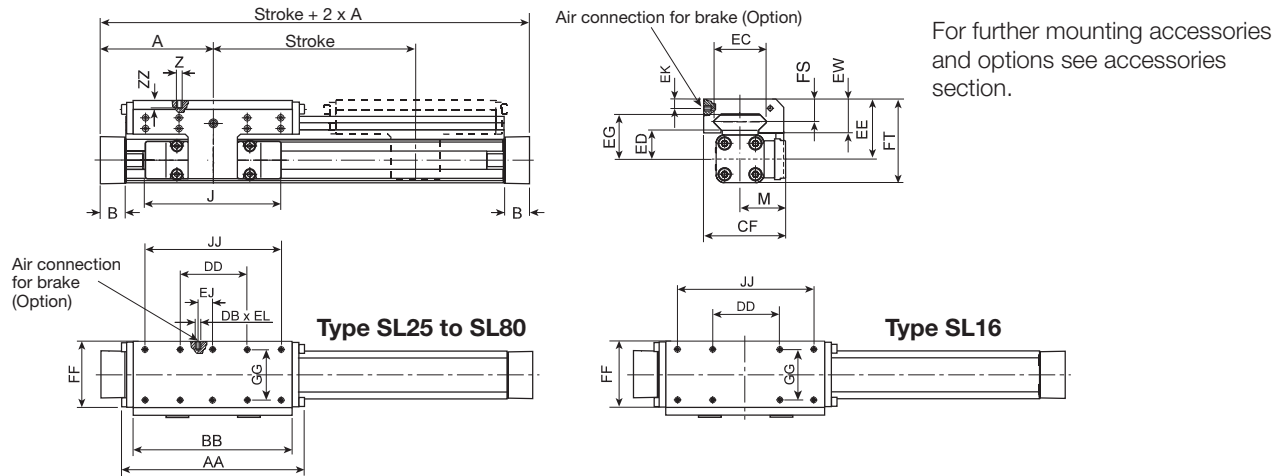


## Sensors

See section L for sensors.



**SLIDELINE ø 16 to 80mm**



**Dimensions (mm)**

Series	A	B	J	M	Z	AA	BB	DB	DD	CF	EC	ED	EE	EG	EJ	EK	EL	EW	FF	FT	FS	GG	JJ	ZZ
SL 16	65	14	69	31	M4	106	88	—	30	55	36	8	40	30	—	—	—	22	48	55	14	36	70	8
SL 25	100	22	117	40.5	M6	162	142	M5	60	72.5	47	12	53	39	22	6	6	30	64	73.5	20	50	120	12
SL 32	125	25.5	152	49	M6	205	185	M5	80	91	67	14	62	48	32	6	6	33	84	88	21	64	160	12
SL 40	150	28	152	55	M6	240	220	M5	100	102	77	14	64	50	58	6	6	34	94	98.5	21.5	78	200	12
SL 50	175	33	200	62	M6	284	264	M5	120	117	94	14	75	56	81	6	6	39	110	118.5	26	90	240	16
SL 63	215	38	256	79	M8	312	292	—	130	152	116	18	86	66	—	—	—	46	152	139	29	120	260	14
SL 80	260	47	348	96	M8	312	292	—	130	169	116	18	99	79	—	—	—	46	152	165	29	120	260	14

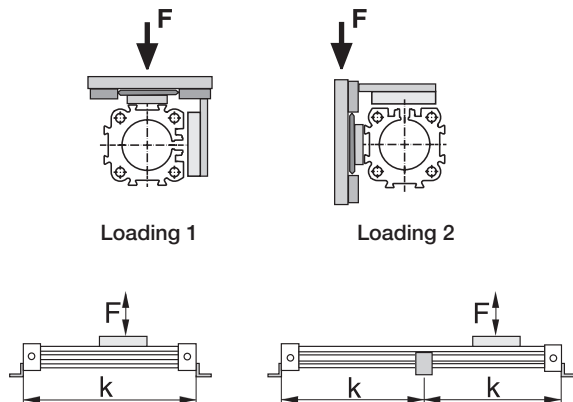
**Mid-Section Support**

(for versions see page G83)

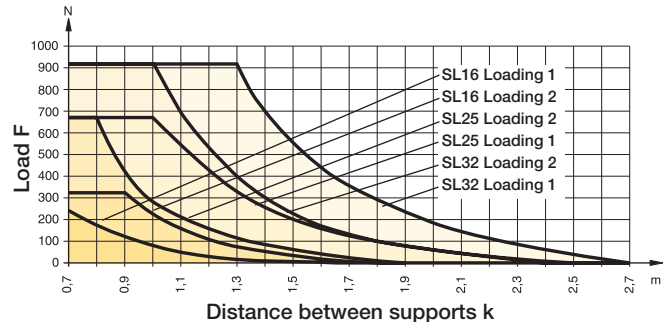
Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2.

Deflection of 0.5 mm max. between supports is permissible.

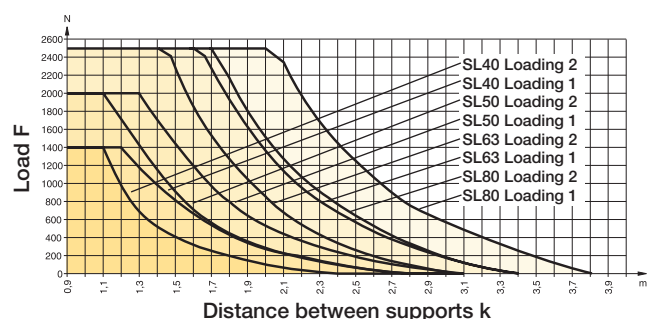
**Note:** For speeds  $v > 0.5$  m/s the distance between supports should not exceed 1 m.



**SLIDELINE 16 to 32mm bore**



**SLIDELINE 40 to 80mm bore**



## Multi-Brake Passive Brakes MB-SL ø 25 to 80mm bore

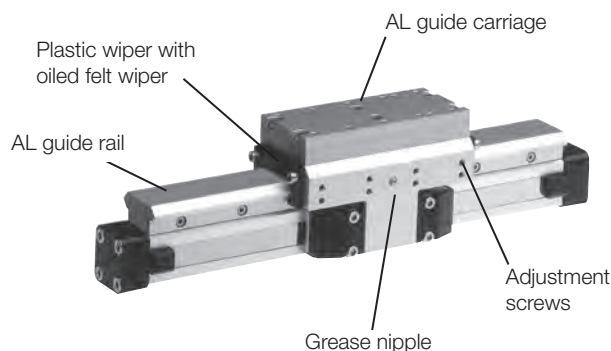
## Series MB-SL 25 to 80 for Linear-drive

- Series OSP-P



## Features

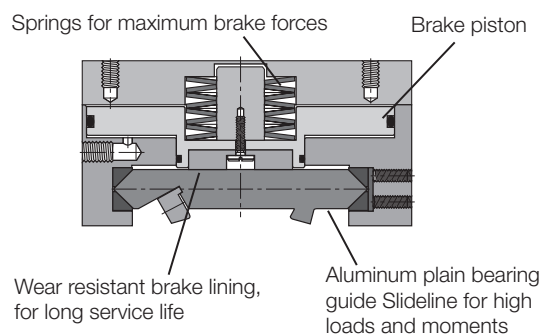
- Brake operated by spring actuation
- Brake release by pressurization
- Anodized aluminum rail, with prism shaped slide elements
- Adjustable plastic slide elements
- Composite sealing system with plastic and felt wiper elements to remove dirt and lubricate the slideway
- Replenishable guide lubrication by integrated grease nipples
- Blocking function in case of pressure loss
- Intermediate stops possible



## Function

The Multi-Brake is a passive device. When the air pressure is removed the brake is actuated and movement of the cylinder is blocked. The brake is released by pressurization.

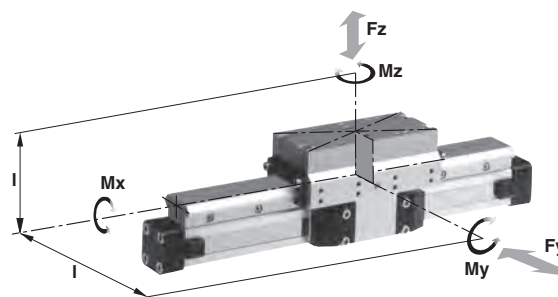
The high friction, wear resistant brake linings allow the Multi-Brake to be used as a dynamic brake to stop cylinder movement in the shortest possible time. The powerful springs also allow the Multi-Brake to be used effectively in positioning applications.



## Loads, Forces and Moments

The table shows the maximum values for light, shock-free operation, which must not be exceeded even in dynamic operation.

Load and moment data are based on speeds  $v < 0.2$  m/s.

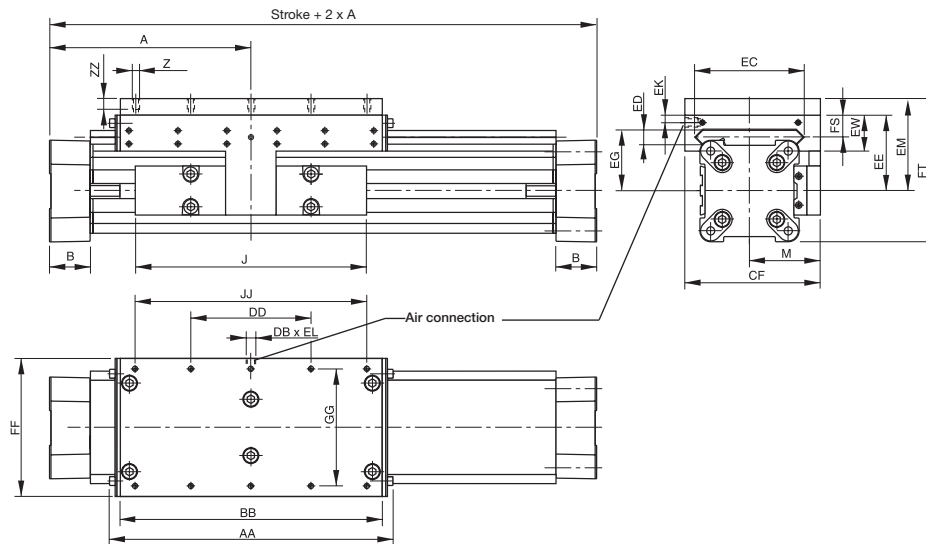


Series	For linear drive	Max. moments (Nm)			Max. loads (N)	Maximum braking force a 6 bar (N) †	Mass of linear drive with guide (kg)		
		Mx	My	Mz			With 0mm stroke	Increase per 100mm stroke	Mass * guide carriage (kg)
MB-SL25	OSP-P25	14	34	34	675	470	2.04	0.39	1.10
MB-SL32	OSP-P32	29	60	60	925	790	3.82	0.65	1.79
MB-SL40	OSP-P40	50	110	110	1500	1200	5.16	0.78	2.34
MB-SL50	OSP-P50	77	180	180	2000	1870	8.29	0.97	3.63
MB-SL63	OSP-P63	120	260	260	2500	2900	13.31	1.47	4.97
MB-SL80	OSP-P80	120	260	260	2500	2900	17.36	1.81	4.97

\* Add the mass of the guide carriage to the mass to be cushioned.

† Braking surface dry – oil on the braking surface will reduce the braking force.

**OSP-P with Passive Brake MB-SL**



**Dimension (mm)**

Series	A	B	J	M	Z	AA	BB	DB	DD	CF	EC	ED	EE	EG	EK	EL	EM	EW	FF	FT	FS	GG	JJ	JZ
MB-SL25	100	22	117	40,5	M6	162	142	M5	60	72.5	47	12	53	39	9	5	73	30	64	93.5	20	50	120	12
MB-SL32	125	25.5	152	49	M6	205	185	G1/8	80	91	67	14	62	48	7	10	82	33	84	108	21	64	160	12
MB-SL40	150	28	152	55	M6	240	220	G1/8	100	102	77	14	64	50	6.5	10	84	34	94	118.5	21.5	78	200	12
MB-SL50	175	33	200	62	M6	284	264	G1/8	120	117	94	14	75	56	10	12	95	39	110	138.5	26	90	240	12
MB-SL63	215	38	256	79	M8	312	292	G1/8	130	152	116	18	86	66	11	12	106	46	152	159	29	120	260	13
MB-SL80	260	47	348	96	M8	312	292	G1/8	130	169	116	18	99	79	11	12	119	46	152	185	29	120	260	13

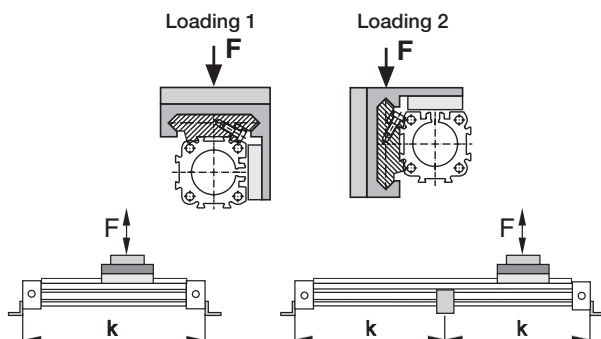
**Mid-Section Support**

(for versions see page G83)

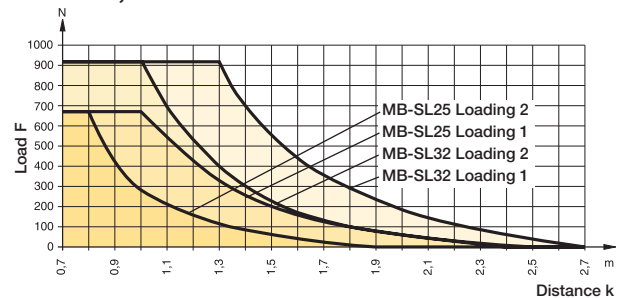
Mid-Section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive.

The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2. Deflection of 0.5 mm max. between supports is permissible.

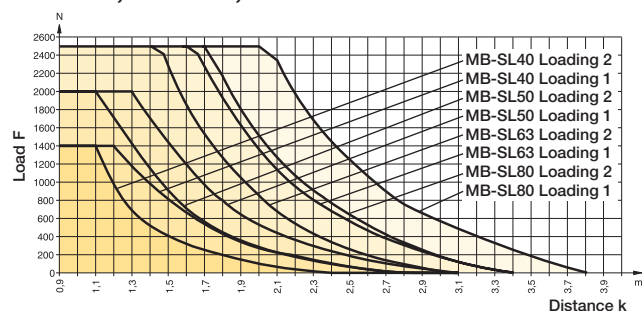
**Note:** For speeds  $v > 0.5$  m/s the distance between supports should not exceed 1 m.



**Permissible Unsupported Length**  
**MB-SL25, MB-SL32**



**Permissible Unsupported Length**  
**MB-SL40, MB-SL50, MB-SL63 and MB-SL80**





### Features

### Multi-Brake Passive Brakes PS ø 16 to 50mm bore

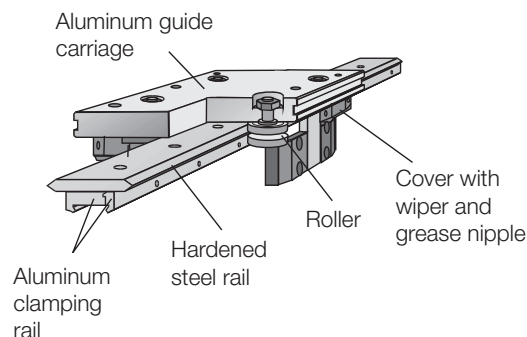
#### Series PS 16 to 50 for Linear-drive

- Series OSP-P



#### Features

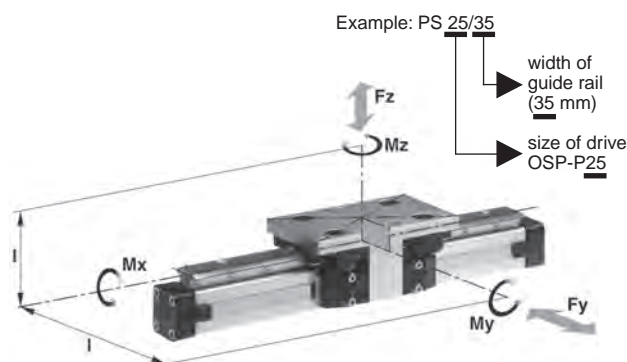
- Anodized aluminum guide carriage with vee rollers having 2 rows of ball bearings
- Hardened steel guide rail
- Several guide sizes can be used on the same drive
- Corrosion resistance version available on request
- Max. Speed  $v = 3 \text{ m/s}$
- Tough roller cover with wiper and grease nipple
- Any length of stroke up to 3500mm



### Loads, Forces and Moments

The table shows the maximum permissible values for smooth operation, which should not be exceeded even under dynamic conditions.

For further information and technical data see linear drives OSP-P.



	For linear drive	Max. moments (Nm)			Max. load (N)	Mass of linear drive with guide (kg)		Mass * of guide carriage (kg)
Series		Mx	My	Mz		Fy, Fz	With 0mm stroke	
PS 16/25	OSP-P16	14	45	45	1400	0.93	0.24	0.7
PS 25/25	OSP-P25	14	63	63	1400	1.5	0.4	0.7
PS 25/35	OSP-P25	20	70	70	1400	1.7	0.4	0.8
PS 25/44	OSP-P25	65	175	175	3000	2.6	0.5	1.5
PS 32/35	OSP-P32	20	70	70	1400	2.6	0.6	0.8
PS 32/44	OSP-P32	65	175	175	3000	3.4	0.7	1.5
PS 40/44	OSP-P40	65	175	175	3000	4.6	1.1	1.5
PS 40/60	OSP-P40	90	250	250	3000	6	1.3	2.2
PS 50/60	OSP-P50	90	250	250	3000	7.6	1.4	2.3
PS 50/76	OSP-P50	140	350	350	4000	11.5	1.8	4.9

\* Add the mass of the guide carriage to the mass to be cushioned.

## Ordering Information

Rodless Pneumatic Cylinders  
OSP-P Series, POWERSLIDE 16-50mm

## Ordering information for OSP-P rodless POWERSLIDE pneumatic series

1-4	5-6	7	8	9	10	11	12-16	17	18	19	20	21	22	23	24	25							
<b>OSP-P</b>				<b>25</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>						
<b>Bore</b>				<b>Lubrication</b>				<b>Stroke</b>				<b>Cushioning &amp; stops</b>				<b>Dovetail cover</b>							
16 25 32 40 50				0 Standard 1 Slow speed 4 Food 5 Clean room				xxxxx 5 digits in whole millimeters (ex. 1100mm = 01100)				0 Standard 1 Long cushions (25,32,40)				0 Standard X Without cover rail							
<b>Piston style</b>				<b>Seals</b>				<b>Piston mounting</b>				<b>Endcap mounting</b>				<b>Version</b>							
0 Standard 1 Tandem				0 Standard 1 Fluorocarbon				0 None				0 None 1 A1 (16,25,32) 2 A2 (16,25,32) 3 A3 (25,32) 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) 9 C1 (40,50) A C2 (40,50) B C3 (40,50) C C4 (40,50) Note: Comes in pairs				0 Standard							
<b>Porting configurations</b>				<b>Hardware</b>				<b>Guides / brakes</b>				<b>Additional carriages**</b>				<b>Switches <sup>◇</sup></b>							
0 Standard 1 End face (16,25,32,40,50) 2 Single end porting (25,32,40,50) 3 Left std pos #2, Right pos #5 (16,25,32,40,50) 4 Left pos #5, Right std pos #2 (16,25,32,40,50) 6 Single end porting at #5 (50) A 24VDC VOE valves (25,32,40,50) B 220VAC VOE valves (25,32,40,50) C 48VDC VOE valves (25,32,40,50) E 110VAC VOE valves (25,32,40,50)				0 Standard 1 Stainless steel 3 Xylan coated & stainless steel fasteners				E PSXX/25 (16,25) F PSXX/35 (25,32) G PSXX/44 (25,32,40) H PSXX/60 (40,50) I PSXX/76 (50)				0 None E PSXX/25 (16,25) F PSXX/35 (25,32) G PSXX/44 (25,32,40) H PSXX/50 (40,50) I PSXX/76 (50) ** Note available on tandem piston only				0 None 1 Normally open reed switch (16 thru 50) 2 Normally closed reed switch (16 thru 50) 3 PNP Hall sensor w/extension cables (16 thru 50) 4 NPN Hall sensor w/extension cables (16 thru 50) X SFI 0.1mm RES (25 thru 50) Y SFI 1mm RES (25 thru 50) <sup>◇</sup> Note: 2 switches will be supplied. For different quantity, please order as a separate line item.							
<b>Endcap position</b>				<b>Endcap position</b>				<b>Endcap position</b>				<b>Endcap position</b>				<b>Endcap position</b>							
0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1				0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1				0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1				0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1				0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1				0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1			

Note: Single end porting on 16mm bore, then end caps cannot be rotated.

**Cylinder with guide end cap positioning**

**Sensors**  
See section L for sensors.

G

Rodless Pneumatic Cylinders

OSP-P Series

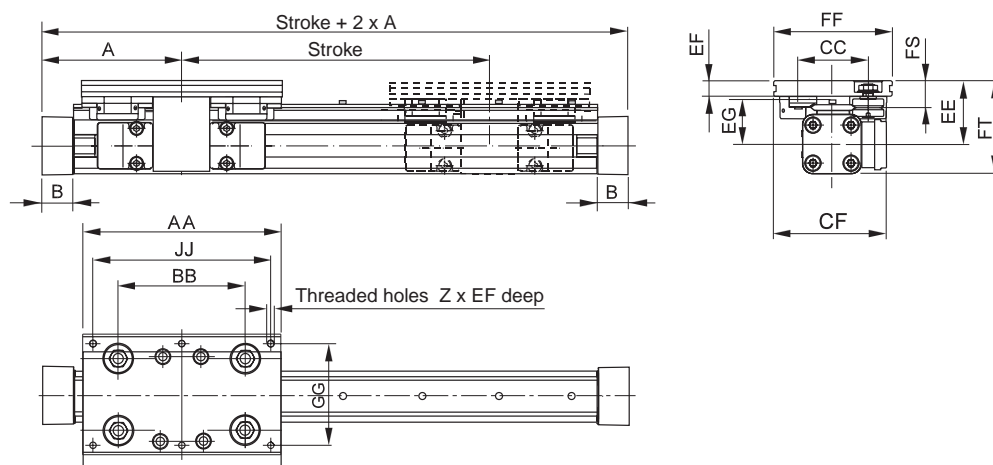
P1X Series

P1Z Series

GDL Series



## POWERSLIDE Dimensions



## Dimensions (mm)

Series	A	B	Z	AA	BB	CC	CF	EE	EF	EG	FF	FS	FT	GG	JJ
PS 16/25	65	14	4xM6	120	65	47	80	49	12	35	80	21	64	64	100
PS 25/25	100	22	6xM6	145	90	47	79.5	53	11	39	80	20	73.5	64	125
PS 25/35	100	22	6xM6	156	100	57	89.5	52.5	12.5	37.5	95	21.5	73	80	140
PS 25/44	100	22	6xM8	190	118	73	100	58	15	39	116	26	78.5	96	164
PS 32/35	125	25.5	6xM6	156	100	57	95.5	58.5	12.5	43.5	95	21.5	84.5	80	140
PS 32/44	125	25.5	6xM8	190	118	73	107	64	15	45	116	26	90	96	164
PS 40/44	150	28	6xM8	190	118	73	112.5	75	15	56	116	26	109.5	96	164
PS 40/60	150	28	6xM8	240	167	89	122.5	74	17	54	135	28.5	108.5	115	216
PS 50/60	175	33	6xM8	240	167	89	130.5	81	17	61	135	28.5	123.5	115	216
PS 50/76	175	33	6xM10	280	178	119	155.5	93	20	64	185	39	135.5	160	250

## Service Life

Calculation of service life is achieved in two stages:

- Determination of load factor  $L_F$  from the loads to be carried
- Calculation of service life in km

1. Calculation of load factor  $L_F$ 

$$L_F = \frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}} + \frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}}$$

with combined loads,  $L_F$  should not exceed the value 1.

## Lubrication

For maximum system life, lubrication of the rollers must be maintained at all times.

Only high quality Lithium based greases should be used.

Lubrication intervals are dependent on environmental conditions (temperature, running speed, grease quality etc.) therefore the installation should be regularly inspected.

## 2. Service life calculation

- For PS 16/25, PS 25/25, PS 25/35, and PS 32/35

$$\text{Service life (km)} = \frac{106}{(L_F + 0,02)^3}$$

- For PS 25/44, PS 32/44, PS 40/44, PS 40/60 and PS 50/60:

$$\text{Service life (km)} = \frac{314}{(L_F + 0,015)^3}$$

- For PS 50/76:

$$\text{Service life (km)} = \frac{680}{(L_F + 0,015)^3}$$

G

Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

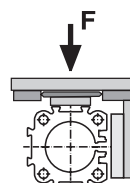
## Mid-Section Support

(for versions see page G83)

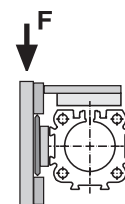
Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2.

Deflection of 0.5 mm max. between supports is permissible.

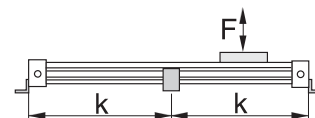
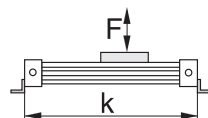
**Note:** For speeds  $v > 0.5$  m/s the distance between supports should not exceed 1 m.



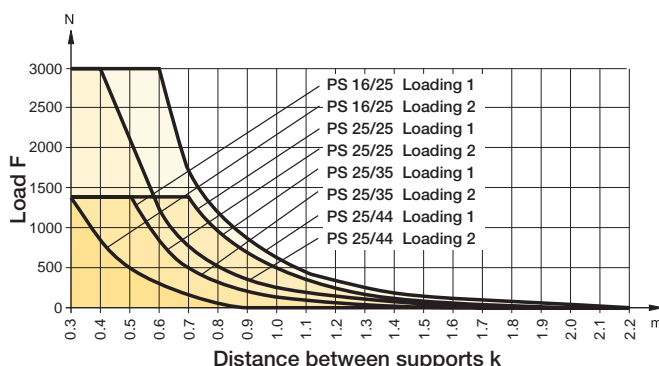
Loading 1



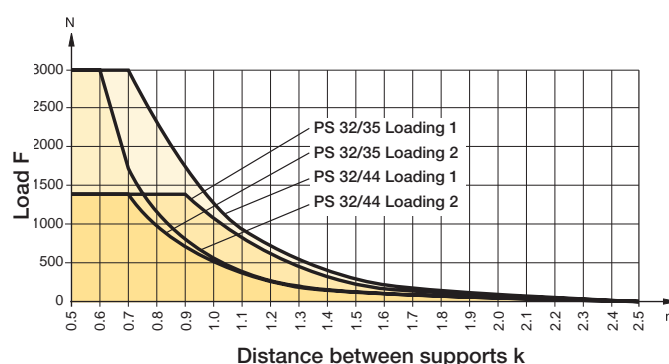
Loading 2



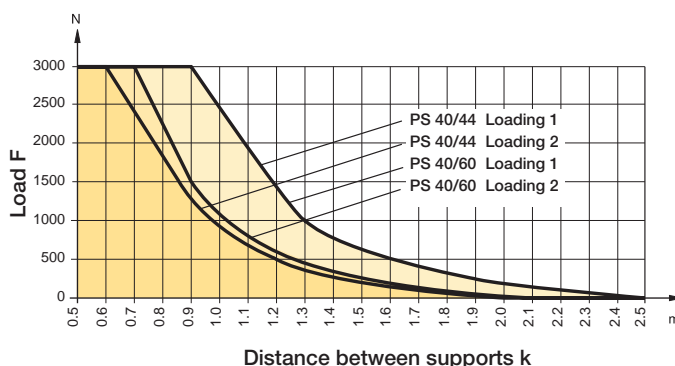
**Permissible unsupported length:  
 POWERSLIDE 16/25, 25/25, 25/35, 25/44mm bore**



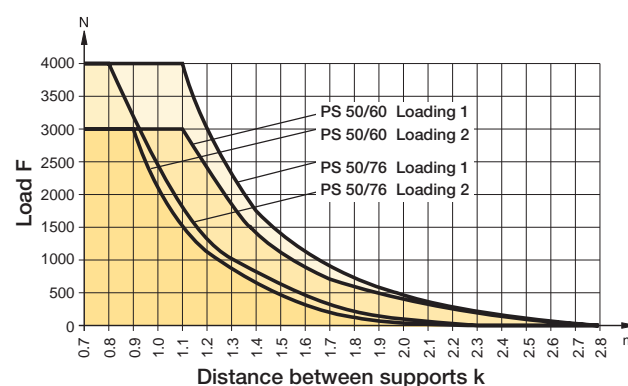
**Permissible unsupported length:  
 POWERSLIDE 2/35, 32/44mm bore**



**Permissible unsupported length:  
 POWERSLIDE 40/44, 40/60mm bore**



**Permissible unsupported length:  
 POWERSLIDE 50/60, 50/76mm bore**



## Aluminum Roller Guide PROLINE PL ø 16 to 50mm bore

## Series PL 16 to 50 for Linear-drive

- Series OSP-P



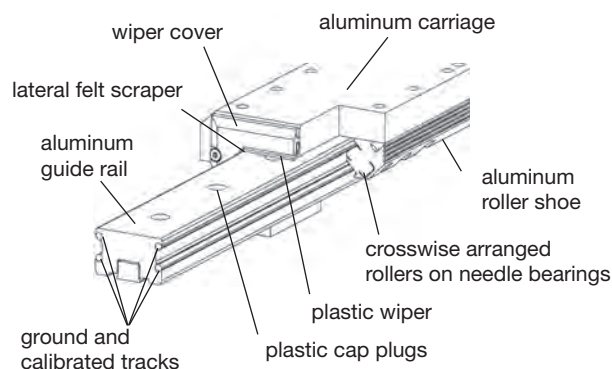
## Features

- High precision
- High velocities (10 m/s)
- Smooth operation - low noise
- Integrated wiper system
- Long life lubrication
- Compact dimensions - compatible to Slideline plain bearing guide
- Any length of stroke up to 3750mm

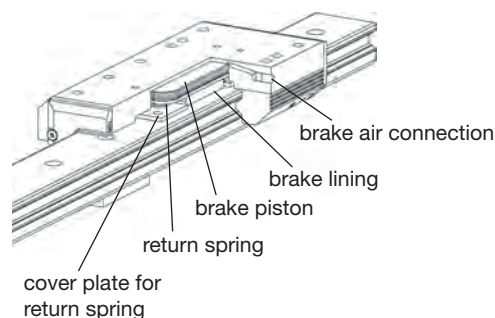


## Integrated Brake (optional) for Series OSP-P25 to OSP-P50:

- Actuated by pressurization
- Release by depressurization and spring actuation



## Option – Integrated Brake



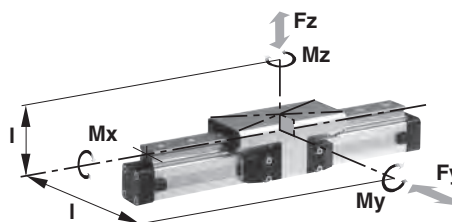
## Loads, Forces and Moments

The table shows the maximal permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

$$\frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}} + \frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}} \leq 1$$

The sum of the loads should not exceed >1. With a load factor of less than 1, service life is 8000 km

The table shows the maximum permissible values for light, shock-free operation, which must not be exceeded even under dynamic conditions.



		Max. moments (Nm)			Max. loads (N)		Mass of linear drive with guide (kg)		
Series	For linear drive	Mx	My	Mz	Fy, Fz	Maximum braking force at 6 bar (N) †	with 0mm stroke	increase per 100mm stroke	Mass * guide carriage (kg)
PL 16	OSP-P16	8	12	12	542	–	0.55	0.19	0.24
PL 25	OSP-P25	16	39	39	857	on request	1.65	0.40	0.75
PL 32	OSP-P32	29	73	73	1171	on request	3.24	0.62	1.18
PL 40	OSP-P40	57	158	158	2074	on request	4.35	0.70	1.70
PL 50	OSP-P50	111	249	249	3111	on request	7.03	0.95	2.50

\* Add the mass of the guide carriage to the mass to be cushioned.

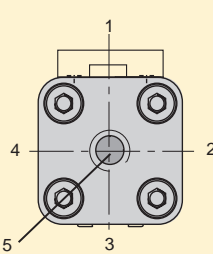
† Only for version with brake: Braking surface dry – oiled surface reduces the effective braking force.

## Ordering Information

Rodless Pneumatic Cylinders  
OSP-P Series, PROLINE 16 to 50mm


## Ordering information for OSP-P rodless PROLINE pneumatic series

1-4	5-6	7	8	9	10	11	12-16	17	18	19	20	21	22	23	24	25			
<b>OSP-P</b>				<b>25</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>01100</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>		
<b>Bore</b>				<b>Lubrication</b>				<b>Stroke</b>				<b>Cushioning &amp; stops</b>				<b>Dovetail cover</b>			
16 25 32 40 50				0 Standard 1 Fluorocarbon				XXXXX 5 digits in whole millimeters (ex. 1100mm = 01100)				0 Standard 1 Long cushions (25,32,40)				0 Standard X Without cover rail			
<b>Piston style</b>				<b>Seals</b>				<b>Hardware</b>				<b>Piston mounting</b>				<b>Endcap mounting</b>			
0 Standard 1 Tandem				0 Standard 1 Fluorocarbon				0 Standard 1 Stainless steel 3 Xylan coated & stainless steel fasteners				0 None				0 None 1 A1 (16,25,32) 2 A2 (16,25,32) 3 A3 (25,32) 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) 9 C1 (40,50) A C2 (40,50) B C3 (40,50) C C4 (40,50)			
<b>Porting configurations</b>				<b>Guides / brakes</b>				<b>Endcap position</b>				<b>Additional carriages**</b>				<b>Switches <sup>◇</sup></b>			
0 Standard 1 End face (16,25,32,40,50) 2 Single end porting (25,32,40,50) 3 Left std pos #2, Right pos #5 (16,25,32,40,50) 4 Left pos #5, Right std pos #2 (16,25,32,40,50) 6 Single end porting at #5 (50) A 24VDC VOE valves (25,32,40,50) B 220VAC VOE valves (25,32,40,50) C 48VDC VOE valves (25,32,40,50) E 110VAC VOE Valve (25,32,40,50)				6 Proline guide (16,25,32,40,50) 7 Proline with activebrake (25,32,40,50) 8 Proline with multibrake (25, 32,40,50)				0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1				0 None 6 Proline guide M Guide carriage PL-MB with foot brake function				0 None 1 Normally open reed switch (16 thru 50) 2 Normally closed reed switch (16 thru 50) 3 PNP Hall sensor w/extension cables (16 thru 50) 4 NPN Hall sensor w/extension cables (16 thru 50) X SFI 0.1mm RES (25 thru 50) Y SFI 1mm RES (25 thru 50)			
Note: Single end porting on 16mm bore, then end caps cannot be rotated.												** Note available on tandem piston only				◇ Note: 2 switches will be supplied. For different quantity, please order as a separate line item.			



**Note: Position #2 is the standard location.**

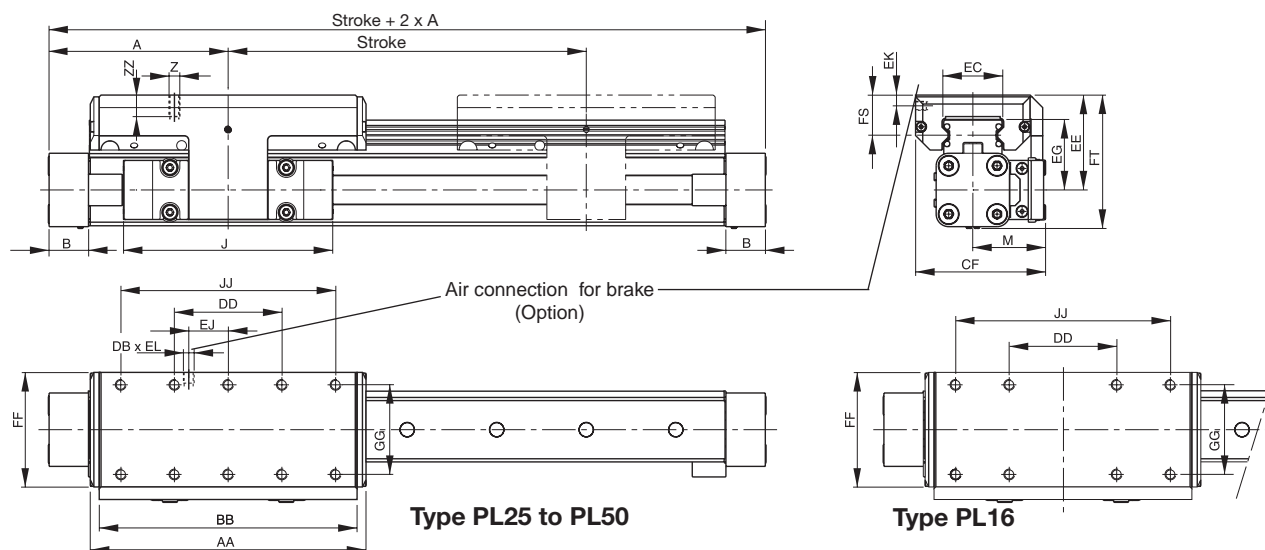
**Sensors**  
See section L for sensors.



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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

**OSP-P PROLINE PL16, PL25, PL32, PL40, PL50**



**Dimension (mm)**

Series	A	B	J	M	Z	AA	BB	DB	DD	CF	EC	EE	EG	EJ	EK	EL	FF	FS	FT	GG	JJ	ZZ
PL16	65	14	69	31	M4	98	88	-	30	55	23	40	30	-	-	-	48	17	55	36	70	8
PL25	100	22	117	40.5	M6	154	144	M5	60	72.5	32.5	53	39	22	6	6	64	23	73.5	50	120	12
PL32	125	25.5	152	49	M6	197	187	M5	80	91	42	62	48	32	6	6	84	25	88	64	160	12
PL40	150	28	152	55	M6	232	222	M5	100	102	47	64	50.5	58	6	6	94	23.5	98.5	78	200	12
PL50	175	33	200	62	M6	276	266	M5	120	117	63	75	57	81	6	6	110	29	118.5	90	240	16

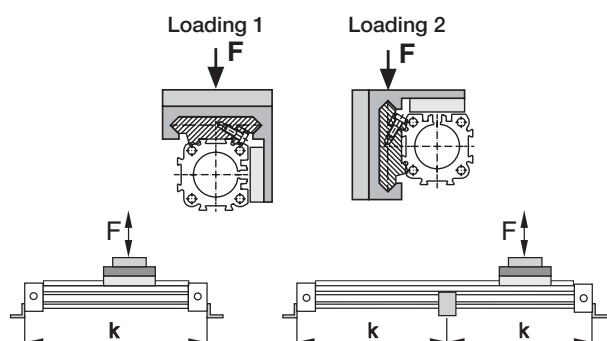
**Mid-Section Support**

(For versions, see page G83)

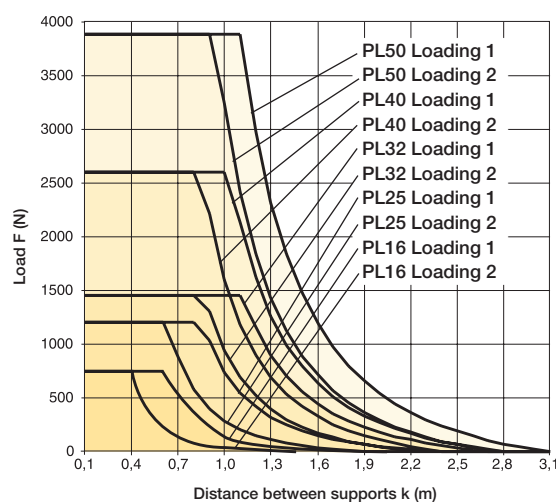
Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams

show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2. Deflection of 0.5 mm max. between supports is permissible.

**Note:** For speeds  $v > 0.5$  m/s the distance between supports should not exceed 1 m.



**Permissible Unsupported Length**  
**PL16, PL25, PL32, PL40 and PL50**



## Multi-Brake Passive Brake with Aluminum Roller Guide PROLINE PL 25 to 50mm bore

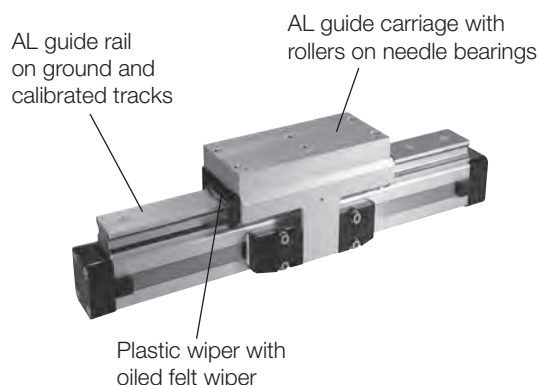
## Series MB-PL 25 to 50 for Linear-drive

- Series OSP-P



## Features

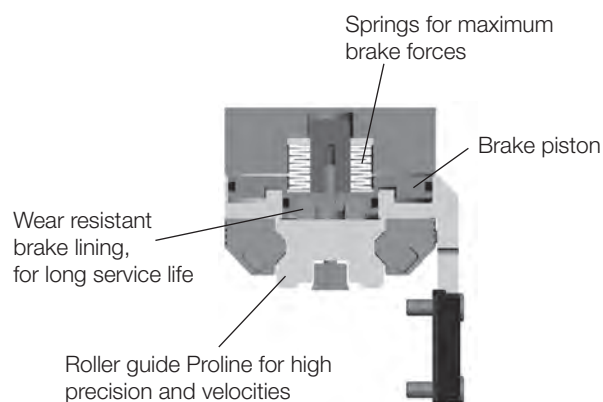
- Brake operated by spring actuation
- Brake release by pressurization
- Optional sensor to indicate brake lining wear
- Composite sealing system with plastic and felt wiper elements to remove dirt and lubricate the slideway
- Blocking function in case of pressure loss
- Intermediate stops possible



## Function

The Multi-Brake is a passive device. When the air pressure is removed the brake is actuated and movement of the cylinder is blocked. The brake is released by pressurization.

The high friction, wear resistant brake linings allow the Multi-Brake to be used as a dynamic brake to stop cylinder movement in the shortest possible time. The powerful springs also allow the Multi-Brake to be used effectively in positioning applications.



## Loads, Forces and Moments

The table shows the maximal permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

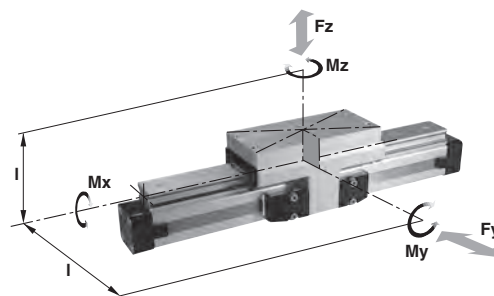
$$\frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}} + \frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}} \leq 1$$

**The sum of the loads should not exceed >1. With a load factor of less than 1, service life is 8000 km**

The table shows the maximum permissible values for light, shock-free operation, which must not be exceeded even under dynamic conditions.

Operating Pressure 4.5 - 8 bar.

A pressure of min. 4.5 bar release the brake.



Series	For linear drive	Max. moments (Nm)			Max. loads (N)		Mass of linear drive with guide (kg)		
		Mx	My	Mz	Fy, Fz	Max. braking force (N) †	With 0mm stroke	Increase per 100mm stroke	Mass* guide carriage (kg)
MB-PL25	OSP-P25	16	39	39	857	315	2.14	0.40	1.24
MB-PL32	OSP-P32	29	73	73	1171	490	4.08	0.62	2.02
MB-PL40	OSP-P40	57	158	158	2074	715	5.46	0.70	2.82
MB-PL50	OSP-P50	111	249	249	3111	1100	8.60	0.95	4.07

\* Add the mass of the guide carriage to the mass to be cushioned.

† Only for version with brake: Braking surface dry – oiled surface reduces the effective braking force.



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

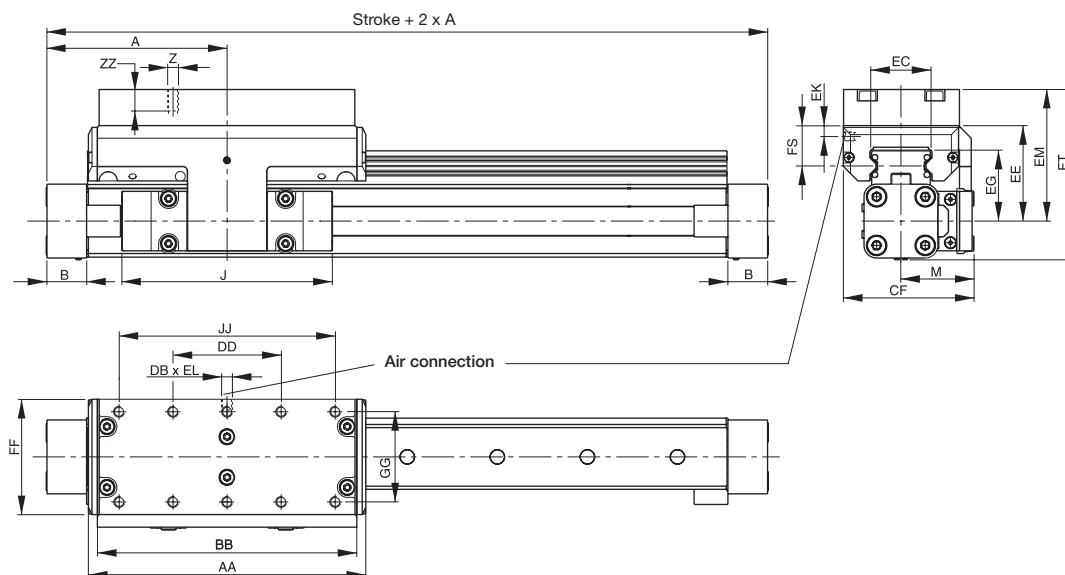
G57

**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

**OSP-P with PROLINE Passive Brake MB-PL25, PL32, PL40, PL50**



**Dimension (mm)**

Series	A	B	J	M	Z	AA	BB	DB	DD	CF	EC	EE	EG	EK	EL	EM	FF	FS	FT	GG	JJ	ZZ
MB-PL25	100	22	117	40.5	M6	154	144	M5	60	72.5	32.5	53	39	9	5	73	64	23	93.5	50	120	12
MB-PL32	125	25.5	152	49	M6	197	187	G1/8	80	91	42	62	48	7	10	82	84	25	108	64	160	12
MB-PL40	150	28	152	55	M6	232	222	G1/8	100	102	47	64	50.5	6.5	10	84	94	23.5	118.5	78	200	12
MB-PL50	175	33	200	62	M6	276	266	G1/8	120	117	63	75	57	10	12	95	110	29	138.5	90	240	16

**Mid-Section Support**

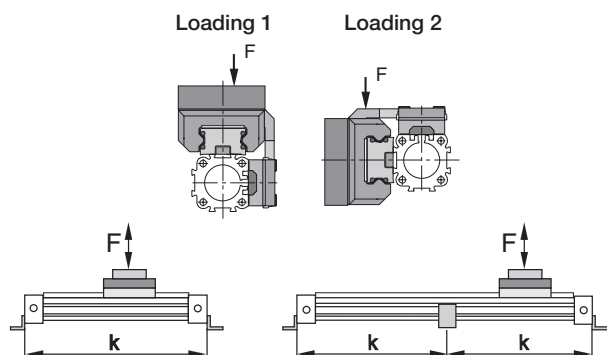
(for versions see page G83)

Mid-Section supports are required from a certain stroke length to prevent

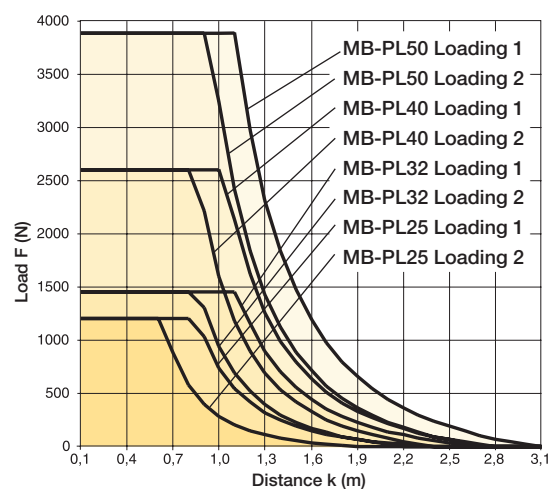
excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading.

A distinction must be drawn between loading 1 and loading 2. Deflection of 0.5 mm max. between supports is permissible.

**Note:** For speeds  $v > 0.5$  m/s the distance between supports should not exceed 1 m.



**Permissible Unsupported Length OSP-P  
 MB-PL25, MB-PL32, MB-PL40, MB-PL50**





## Recirculating Ball Bearing Guide STARLINE PL 16 to 50mm bore

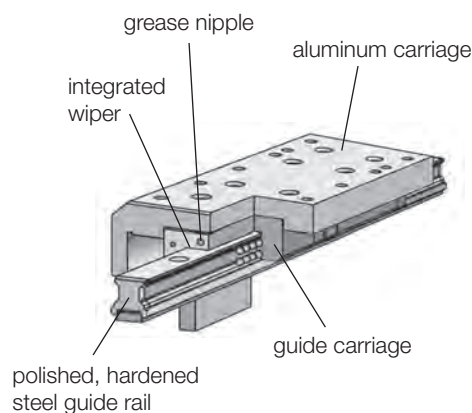
## Series PL 16 to 50 for Linear-drive

- Series OSP-P



## Features

- Polished and hardened steel guide rail
- For very high loads in all directions
- High precision
- Integrated wiper system
- Integrated grease nipples
- Any length of stroke up to 3700 mm
- Anodized aluminum guide carriage – dimensions compatible with OSP guides SLIDELINE and PROLINE
- Installation height (STL16 - 32) compatible with OSP guides SLIDELINE and PROLINE
- Maximum speed  
STL16:  $v = 3 \text{ m/s}$   
STL25 to 50:  $v = 5 \text{ m/s}$



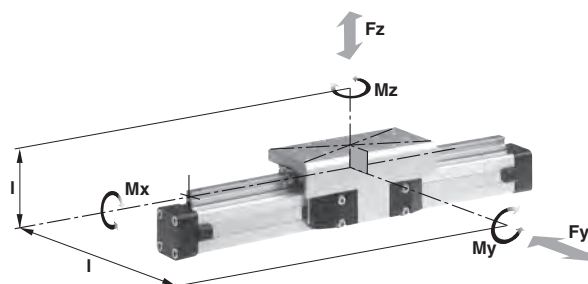
## Loads, Forces and Moments

The table shows the maximum permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

$$\frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}} + \frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}} \leq 1$$

The sum of the loads should not exceed >1.

The table shows the maximum permissible values for light, shock-free operation, which must not be exceeded even under dynamic conditions.



Series	For linear drive	Max. moments (Nm)		Max. loads (N)			Mass of linear drive with guide (kg)		
		Mx	My	Mz	Fy	Fz	with 0mm stroke	increase per 100mm stroke	Mass * guide carriage (kg)
STL16	OSP-P16	15	30	30	1000	1000	0.598	0.210	0.268
STL25	OSP-P25	50	110	110	3100	3100	1.733	0.369	0.835
STL32	OSP-P32	62	160	160	3100	3100	2.934	0.526	1.181
STL40	OSP-P40	150	400	400	4000	7500	4.452	0.701	1.901
STL50	OSP-P50	210	580	580	4000	7500	7.361	0.936	2.880

\* Add the mass of the guide carriage to the mass to be cushioned.



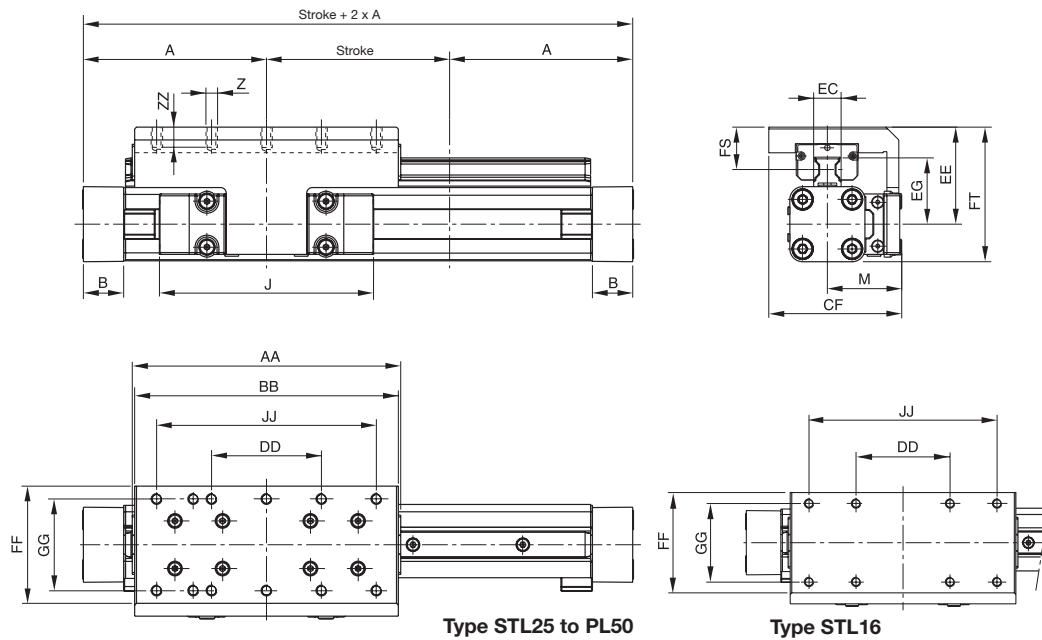
## Ordering information for OSP-P rodless STARLINE pneumatic series

1-4	5-6	7	8	9	10	11	12-16	17	18	19	20	21	22	23	24	25	
<b>OSPP</b>	<b>25</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>01100</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	
<b>Bore</b>						<b>Lubrication</b>		<b>Stroke</b>				<b>Piston mounting</b>		<b>Dovetail cover</b>		<b>Version</b>	
16 25 32 40 50						0 Standard		x x x x x <small>5 digits in whole millimeters (ex. 1100mm = 01100)</small>				0 None		0 Standard X Without cover rail		0 Standard	
				<b>Seals</b>						<b>Cushioning &amp; stops</b>							
				0 Standard 1 Fluorocarbon						0 Standard 1 Long cushions (25,32,40) 2 VS soft left 3 VS hard left 4 VS soft right 5 VS hard right 6 VS soft both sides 7 VS hard both sides							
<b>Piston style</b>						<b>Hardware</b>											
0 Standard 1 Tandem						0 Standard											
<b>Porting configurations</b>																	
0 Standard																	
1 End face (16,25,32,40,50)																	
2 Single end porting (25,32,40,50)																	
3 Left std pos #2, Right pos #5 (16,25,32,40,50)																	
4 Left pos #5, Right std pos #2 (16,25,32,40,50)																	
6 Single end porting at #5 (50)																	
A 24VDC VOE valves (25,32,40,50)																	
B 220VAC VOE valves (25,32,40,50)																	
C 48VDC VOE valves (25,32,40,50)																	
E 110VAC VOE valves (25,32,40,50)																	
<small>Note: Single end porting on 16mm bore, then end caps cannot be rotated.</small>																	
<b>Endcap position</b>																	
0 Both pos #2																	
1 Both pos #3																	
2 Both pos #4																	
3 Both pos #1																	
4 Left #3 / right #2																	
5 Left #4 / right #2																	
6 Left #1 / right #2																	
7 Left #2 / right #3																	
8 Left #4 / right #3																	
9 Left #1 / right #3																	
A Left #2 / right #4																	
B Left #3 / right #4																	
C Left #1 / right #4																	
D Left #2 / right #1																	
E Left #3 / right #1																	
F Left #4 / right #1																	
S Special																	
<b>Guides / brakes</b>																	
B Starline guide																	
<b>Additional carriages**</b>																	
0 None																	
B Starline																	
<small>** Note available on tandem piston only</small>																	
<b>Endcap mounting</b>																	
0 None																	
4 B1 (25,32)																	
6 B3 (16)																	
7 B4 (25,32)																	
8 B5 (32)																	
9 C1 (40,50)																	
A C2 (40,50)																	
B C3 (40,50)																	
C C4 (40,50)																	
<small>Note: Comes in pairs</small>																	
<b>Switches †</b>																	
0 None																	
1 Normally open reed switch (16 thru 50)																	
2 Normally closed reed switch (16 thru 50)																	
3 PNP Hall sensor w/extension cables (16 thru 50)																	
4 NPN Hall sensor w/extension cables (16 thru 50)																	
X SFI 0.1mm RES (25 thru 50)																	
Y SFI 1mm RES (25 thru 50)																	
<small>† Note: 2 switches will be supplied. For different quantity, please order as a separate line item.</small>																	

**Note: Position #2 is the standard location.**

**Sensors**  
 See section L for sensors.

**OSP-P with STARLINE Recirculating Ball Bearing Guide STL16, STL25, STL32, STL40, STL50**



**Dimension (mm)**

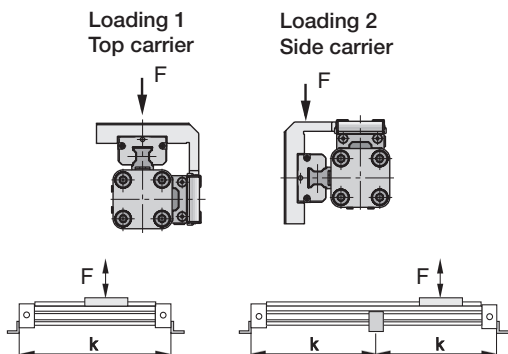
Series	A	B	J	M	Z	AA	BB	CF	DD	EC	EE	EG	FF	FS	FT	GG	JJ	ZZ
STL16	65	14	69	31	M4	93	90	55	30	15	40	24.6	48	18	55	36	70	8
STL25	100	22	117	40.5	M6	146.6	144	72.5	60	15	53	36.2	64	23.2	73.5	50	120	12
STL32	125	25.5	152	49	M6	186.6	184	91	80	15	62	42.2	84	26.2	88	64	160	12
STL40	150	28	152	55	M6	231	226	102	100	20	72	51.6	94	28.5	106.5	78	200	12
STL50	175	33	200	62	M6	270.9	266	117	120	23	85	62.3	110	32.5	128.5	90	240	16

**Mid-Section Support**

(For versions, see pages G83-G84)

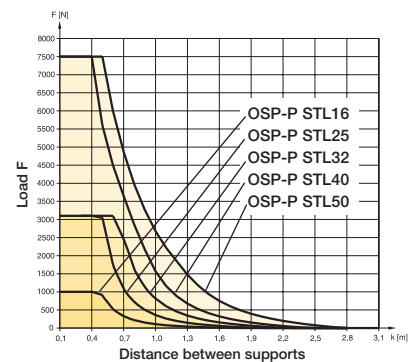
Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2. Deflection of 0.5 mm max. between supports is permissible.

**Note:** For speeds  $v > 0.5$  m/s the distance between supports should not exceed 1 m.



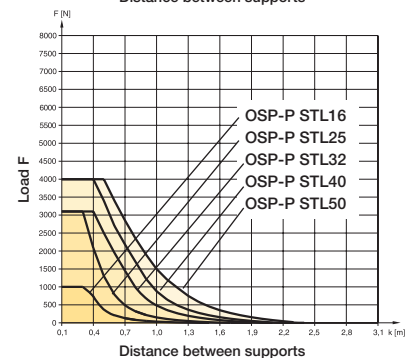
**Permissible Unsupported Length  
STL16 to STL50**

**Loading 1  
Top carrier**



**Permissible Unsupported Length  
STL16 to STL50**

**Loading 2  
Side carrier**



## Variable Stop Type VS16 to VS50

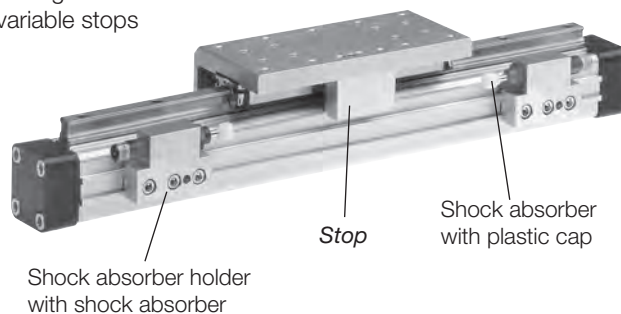
The variable stop Type VS provides simple stroke limitation. It can be retrofitted and positioned anywhere along the stroke length.

For every cylinder diameter two types of shock absorber are available – see “Shock Absorber Selection” below.

Mid-section supports and magnetic switches can still be fitted on the same side as the variable stop.

Depending on the application, two variable stops can be fitted if required.

Arrangement with two variable stops



Shock absorber holder with shock absorber

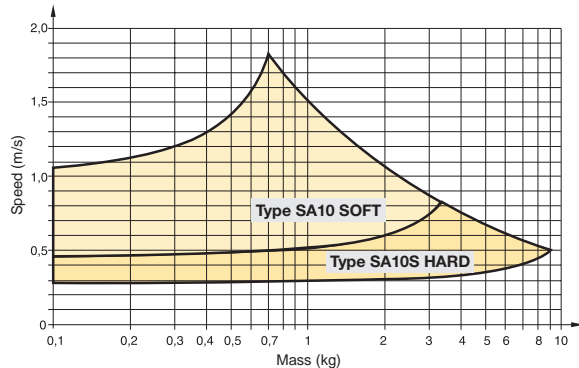
## Shock Absorber Selection

The shock absorber is selected in dependence on the mass and speed.

The mass of the carrier itself must be taken into account.

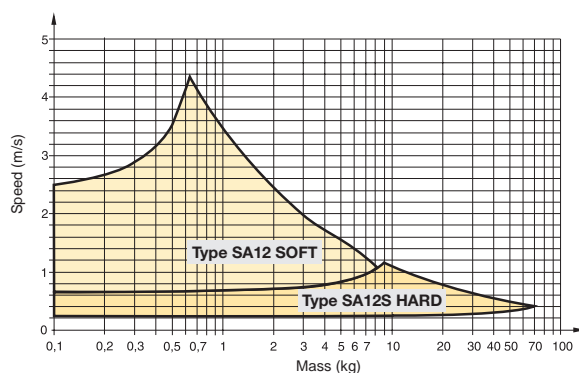
### Series OSP-STL16

The values relate to an effective driving force of 78 N (6 bar)



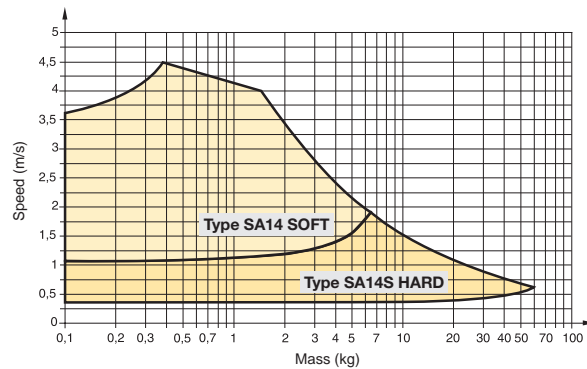
### Series OSP-STL25

The values relate to an effective driving force of 250 N (6 bar)



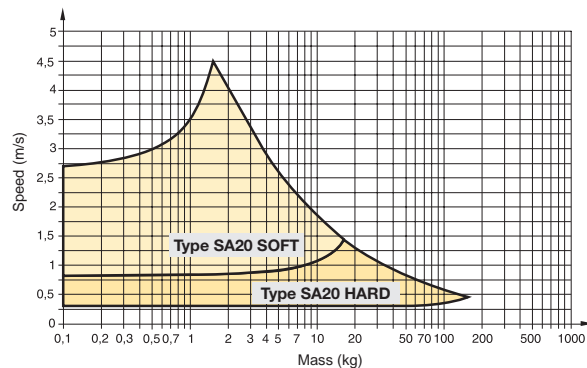
### Series OSP-STL32

The values relate to an effective driving force of 420 N (6 bar)



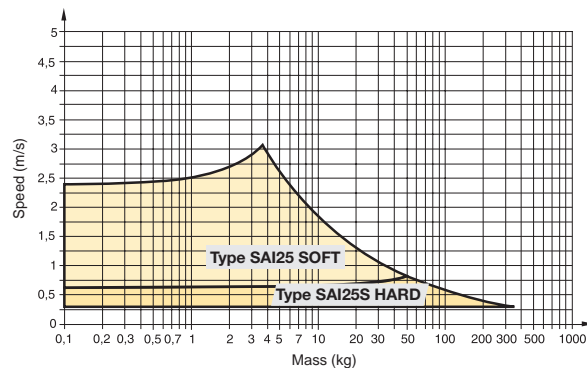
### Series OSP-STL40

The values relate to an effective driving force of 640 N (6 bar)

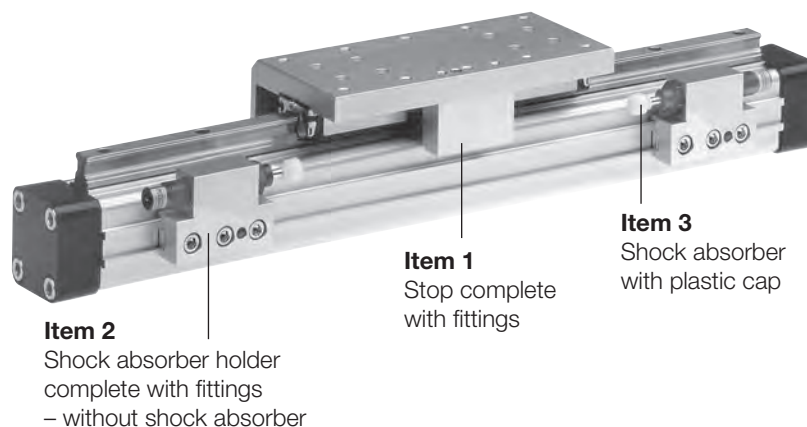


### Series OSP-STL50

The values relate to an effective driving force of 1000 N (6 bar)



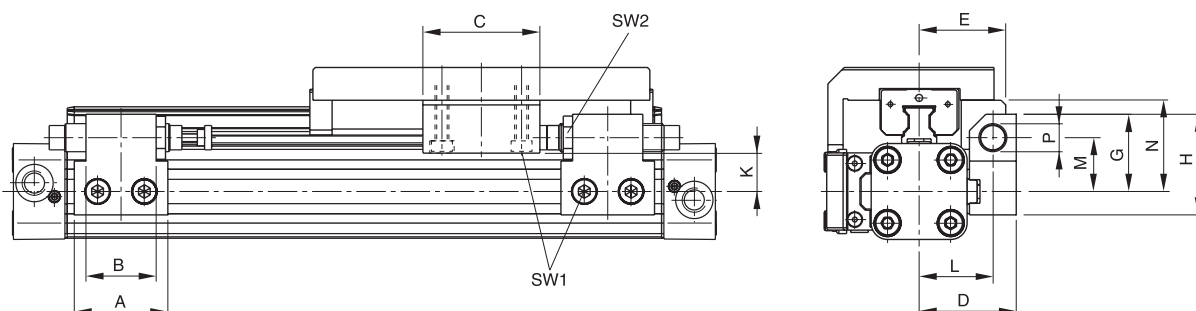
## Ordering Information – Variable Stop Type VS16 to VS50



Item	Description	Size VS16		VS25		VS32		VS40		VS50	
		Type	Part number	Type	Part number	Type	Part number	Type	Part number	Type	Part number
1	Stop, complete	–	21196FIL	–	21197FIL	–	21198FIL	–	21199FIL	–	21200FIL
2	Shock absorber holder, complete	–	21201FIL	–	21202FIL	–	21203FIL	–	21204FIL	–	21205FIL
3 *	Shock absorber, standard	SA10	MC25M	SA12	MC75M-1	SA14	MC150M-B	SA20	MC225M	SAI25	MC600M
	Shock absorber, version S	SA10S	MC25MH	SA12S	MC75M-2	SA14S	MC150MH-B	SA20S	MC225MH	SAI25S	MC600MH

\* Shock absorber with plastic cap

## Dimension – Variable Stop Type VS16 to VS50



Series	Type	A	B	C	D	E	G	H	K	L	M	N	P	SW1	SW2
OSP-STL16	VS16	30	14	25	33	30	28	38	16.2	25.5	20.5	30	M10x1	4	12.5
OSP-STL25	VS25	40	30	50	41.5	37	33	43	18	31.5	23	39	M12x1	5	16
OSP-STL32	VS32	60	40	50	45.5	42	35	45	19	35.5	25	48	M14x1.5	5	17
OSP-STL40	VS40	84	52	60	64	59	48	63	25.6	50	34	58.6	M20x1.5	5	24
OSP-STL50	VS50	84	-	60	75	69	55	70	26.9	57	38	66.9	M25x1.5	5	30

## Recirculating Ball Bearing Guide KF 16 to 50mm bore

## Series KF16 to KF50 for Linear-drive

- Series OSP-P CLASSIC



## Features

- Anodized aluminum guide carriage, the mounting dimensions correspond to FESTO Type: DGPL-KF
- Polished and hardened steel guide rail
- For high loads in all directions
- High precision
- Integrated wiper system
- Integrated grease nipples
- Any length of stroke up to 3700 mm
- Maximum speed  
KF16, KF40:  $v = 3 \text{ m/s}$   
KF25, KF32, KF50:  $v = 5 \text{ m/s}$



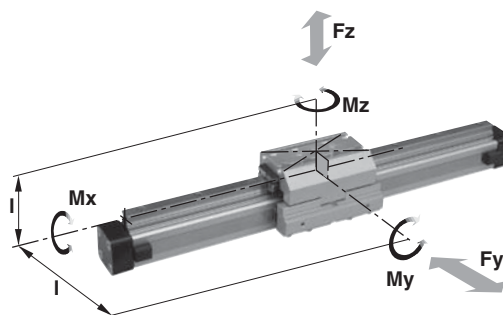
## Loads, Forces and Moments

The table shows the maximum permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

$$\frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}} + \frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}} \leq 1$$

The sum of the loads should not exceed >1.

The table shows the maximum permissible values for light, shock-free operation, which must not be exceeded even under dynamic conditions.



Series	for linear drive	Max. Moments (Nm)			Max. Load (N)		Mass of drive with guide (kg)			
		Mx	My	Mz	Fy	Fz	with 0mm stroke	increase per 100mm stroke	Mass * guide carriage (kg)	Groove stone thread size
KF16	OSP-P16	12	25	25	1000	1000	0.558	0.21	0.228	—
KF25	OSP-P25	35	90	90	3100	3100	1.522	0.369	0.607	M5
KF32	OSP-P32	44	133	133	3100	3100	2.673	0.526	0.896	M5
KF40	OSP-P40	119	346	346	4000	7100	4.167	0.701	1.531	M6
KF50	OSP-P50	170	480	480	4000	7500	7.328	0.936	2.760	M8

\*Add the mass of the guide carriage to the mass to be cushioned.

G

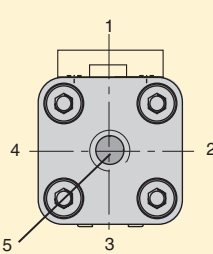
Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

## Ordering Information

Rodless Pneumatic Cylinders  
OSP-P Series, Ball Bearing Guide KF

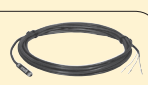
## Ordering information for OSP-P rodless KF pneumatic series

1-4	5-6	7	8	9	10	11	12-16	17	18	19	20	21	22	23	24	25	
<b>OSP-P</b>		<b>25</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>01100</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
<b>Bore</b>		<b>Lubrication</b>		<b>Stroke</b>		<b>Piston mounting</b>		<b>Dovetail cover</b>		<b>Version</b>		<b>Seals</b>		<b>Cushions / stops</b>		<b>Endcap mounting</b>	
16 25 32 40 50		0 Standard 1 Fluorocarbon		XXXXX 5 digits in whole millimeters (ex. 1100mm = 01100)		0 None		0 Standard X Without cover rail		0 Standard		0 Standard 1 Fluorocarbon		0 Standard 1 Long cushions (25,32,40) 2 VS soft left 3 VS hard left 4 VS soft right 5 VS hard right 6 VS soft both sides 7 VS hard both sides		0 None 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) 9 C1 (40,50) A C2 (40,50) B C3 (40,50) C C4 (40,50) Note: Comes in pairs	
<b>Piston style</b>		<b>Hardware</b>		<b>Porting configurations</b>		<b>Endcap position</b>		<b>Guides / brakes</b>		<b>Additional carriages**</b>		<b>Switches</b>		<b>Endcap mounting</b>		<b>Version</b>	
C Classic T Tandem Classic		0 Standard		0 Standard 1 End face (16,25,32,40,50) 2 Single end porting (25,32,40,50) 3 Left std pos #2, Right pos #5 (16,25,32,40,50) 4 Left pos #5, Right std pos #2 (16,25,32,40,50) 6 Single end porting at #5 (50) A 24VDC VOE valves (25,32,40,50) B 220VAC VOE valves (25,32,40,50) C 48VDC VOE valves (25,32,40,50) E 110VAC VOE valves (25,32,40,50) Note: Single end porting on 16mm bore, then end caps cannot be rotated.		0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1		C KF guide		0 None C KF ** Note available on tandem piston only		0 None 1 Normally open reed switch (16 thru 50) 2 Normally closed reed switch (16 thru 50) 3 PNP Hall sensor w/extension cables (16 thru 50) 4 NPN Hall sensor w/extension cables (16 thru 50) Note: 2 switches will be supplied. For different quantity, please order as a separate line item.		0 None 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) 9 C1 (40,50) A C2 (40,50) B C3 (40,50) C C4 (40,50) Note: Comes in pairs		0 Standard 1 Fluorocarbon	

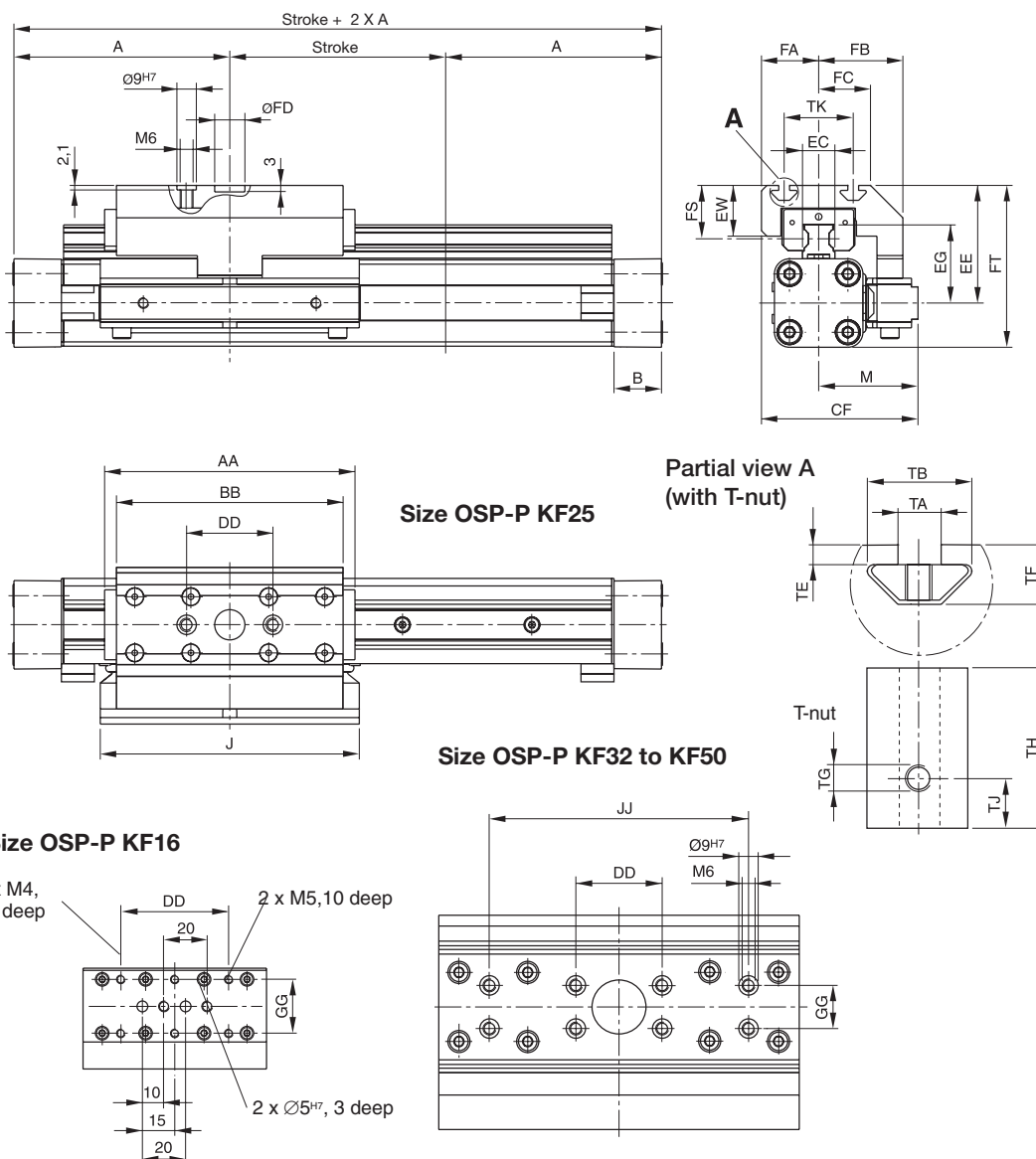


**Note: Position #2 is the standard location.**

**Sensors**  
See section L for sensors.



## Series OSP-P KF16 to KF50



Dimension (mm) Series OSP-P KF16, KF25, KF32, KF40, KF50

Series	A	B	J	AA	BB	CF	DD	EC	EE	EG	EW	JJ	GG	M
KF16	65	14	76	93	85	48	50	15	41	24.6	10	—	25	30
KF25	100	22	120	120.2	105	72.5	40	15	54.5	36.2	23.5	—	—	46
KF32	125	25.5	160	146.2	131	93.8	40	15	60.5	42.2	23.5	—	20	59.8
KF40	150	28	150	188.5	167	103.3	40	20	69.5	51.6	26.5	120	20	60.8
KF50	175	33	180	220.2	202	121	40	23	90.5	62.3	32.5	120	40	69

Series	FA	FB	FC	FD	FT	FS	TA	TB	TE	TF	TG	TH	TJ	TK
KF16	17.7	29	16.5	—	56	19	—	—	—	—	—	—	—	—
KF25	26.5	39	24	14 G7	75	24.7	5	12.1	2.3	6.9	M5	11.5	4	32
KF32	34	53.8	34	25 G7	86.5	24.7	5	12.1	1.8	6.4	M5	11.5	4	47
KF40	42.5	56.8	41	25 G7	104	26	6	12.8	1.8	8.4	M6	17	5.5	55
KF50	52	65	50	25 G7	134	38	8	21.1	4.5	12.5	M8	23	7.5	72



## Mid-Section Support

(For versions, see pages G84-G85)

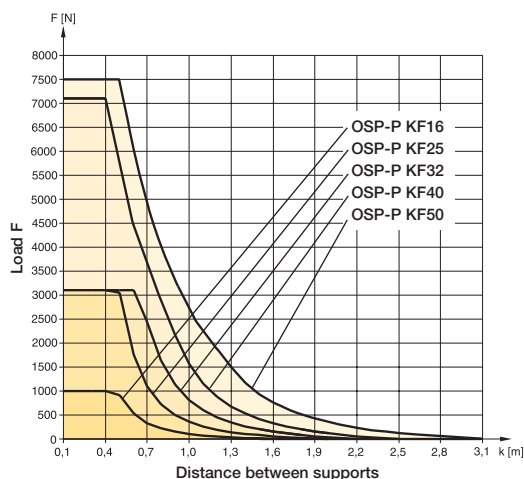
Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2.

Deflection of 0.5 mm max. between supports is permissible

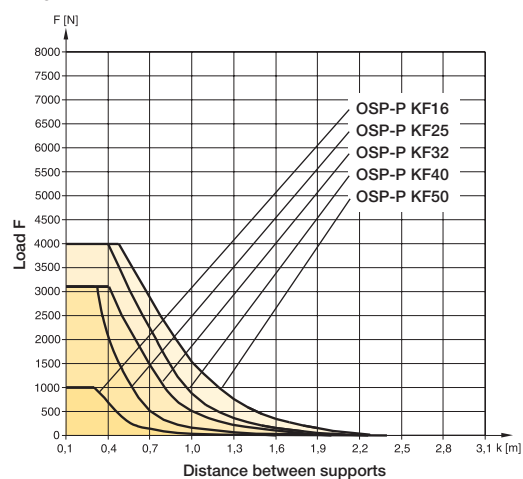
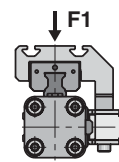
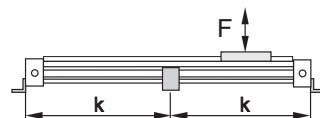
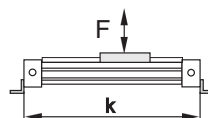
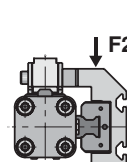
**Note:** For speeds  $v > 0.5$  m/s the distance between supports should not exceed 1 m.

Permissible Unsupported Length OSP-P KF16 to KF50  
Loading 1 – Top carrier

Loading 1 – Top carrier

Permissible Unsupported Length OSP-P KF16 to KF50  
Loading 2 – Side carrier

Loading 2 – Side carrier

Loading 1  
Top carrierLoading 2  
Side carrier



## Variable Stop Type VS16 to VS50

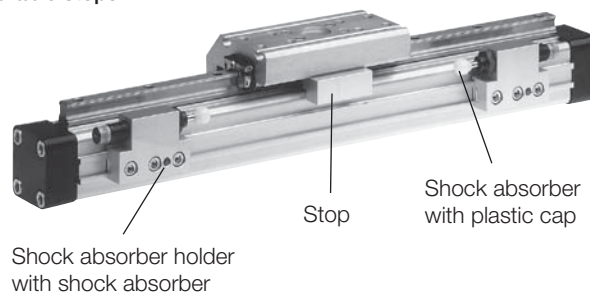
The variable stop Type VS provides simple stroke limitation.

It can be retrofitted and positioned anywhere along the stroke length. For every cylinder diameter two types of shock absorber are available – see “Shock Absorber Selection” below.

Mid-section supports and magnetic switches can still be fitted on the same side as the variable stop.

Depending on the application, two variable stops can be fitted if required.

**Arrangement with two variable stops**



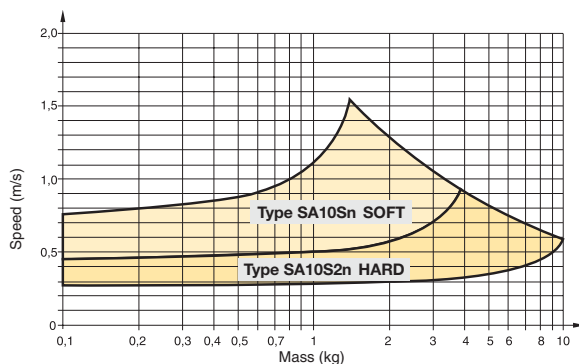
## Shock Absorber Selection

The shock absorber is selected in dependence on the mass and speed.

The mass of the carrier itself must be taken into account.

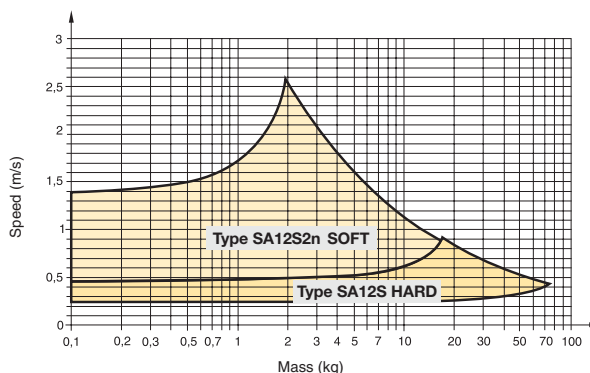
### Series OSP-KF16

The values relate to an effective driving force of 78 N (6 bar)



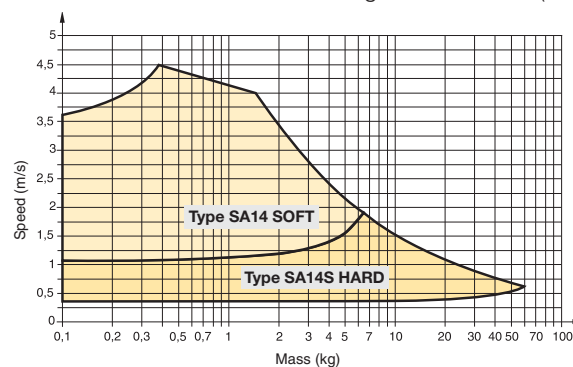
### Series OSP-KF25

The values relate to an effective driving force of 250 N (6 bar)



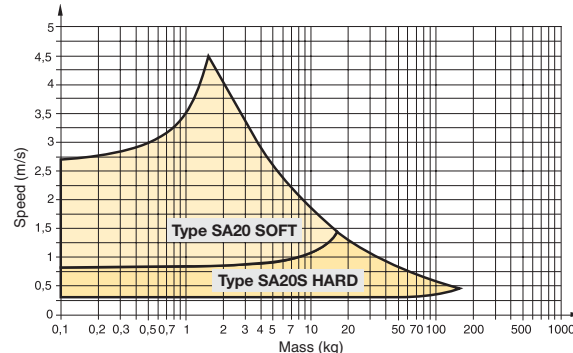
### Series OSP-KF32

The values relate to an effective driving force of 420 N (6 bar)



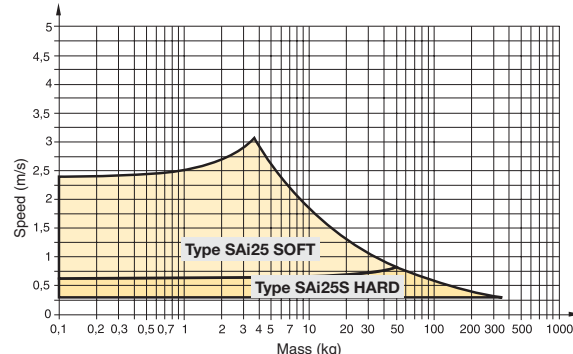
### Series OSP-KF40

The values relate to an effective driving force of 640 N (6 bar)

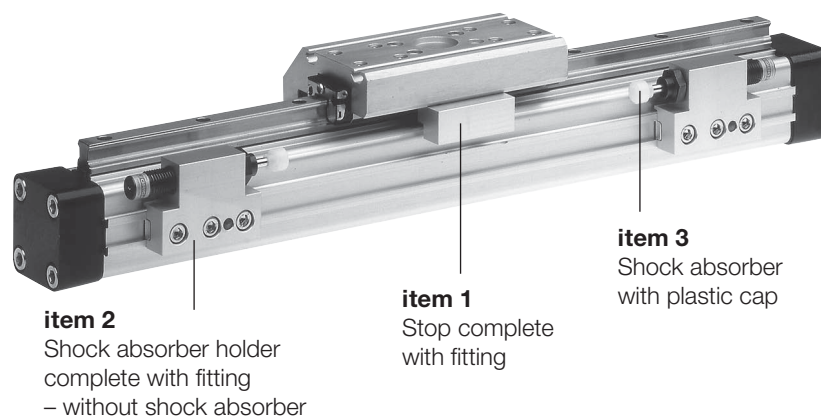


### Series OSP-KF50

The values relate to an effective driving force of 1000 N (6 bar)



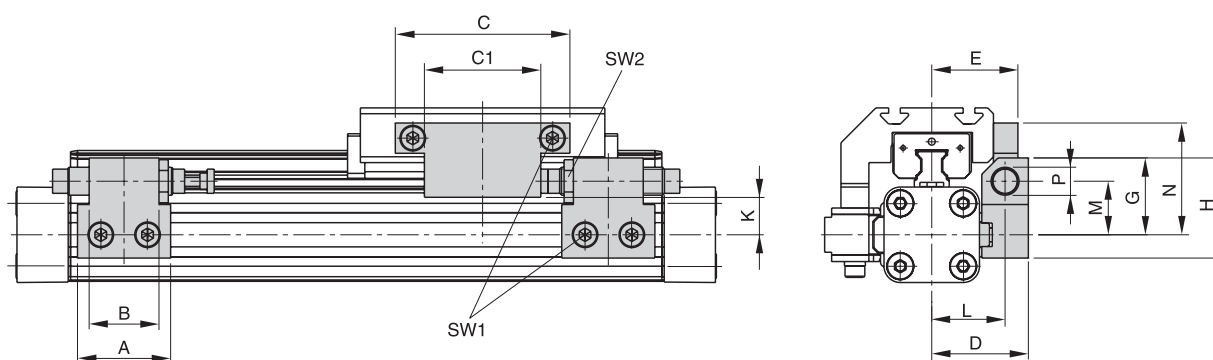
## Ordering information – Variable Stop Type VS16 to VS50



Item	Description	VS16		VS25		VS32		VS40		VS50	
		Type	Part number	Type	Part number	Type	Part number	Type	Part number	Type	Part number
1	Stop, complete	–	21186FiL	–	21187FiL	–	21188FiL	–	21189FiL	–	21290FiL
2	Shock absorber holder, complete	–	21201FiL	–	21202FiL	–	21203FiL	–	21204FiL	–	21205FiL
3 *	Shock absorber, standard	SA10SN	MC25M	SA12S2N	MC75M-1	SA14	MC150M-B	SA20	MC225M	SAI25	MC600M
	Shock absorber, version S	SA10S2N	MC25MH	SA12S	MC75M-2	SA14S	MC150MH-B	SA20S	MC225MH	SAI25S	MC600MH

\* Shock absorber with plastic cap

## Dimension – Variable Stop Type VS16 to VS50



## Dimension (mm) – Variable Stop Type VS16 to VS50

Series	Type	A	B	C	C1	D	E	G	H	K	L	M	N	P	SW1	SW2
OSP-KF16	VS16	30	14	50	25	33	29.7	28	38	16.2	25.5	20.5	40.5	M10 x 1	4	12.5
OSP-KF25	VS25	40	30	75	50	41.5	37	33	43	18	31.5	23	48	M12 x 1	5	16
OSP-KF32	VS32	60	40	50	-	45.5	41.5	35	45	19	35.5	25	37	M14 x 1.5	5	17
OSP-KF40	VS40	84	52	60	-	64	59	48	63	25.5	50	34	43	M20 x 1.5	5	24
OSP-KF50	VS50	84	-	60	-	75	69	55	70	26.9	57	38	58	M25 x 1.5	5	30

**end Cap Mounting – Type HP Ø 25 to 50mm (correspond to FeSTO dimensions)**

For Linear-drive with Recirculating Ball Bearing Guide

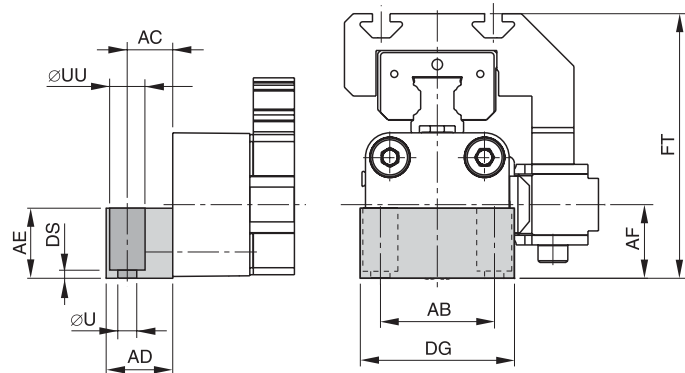
- Series OSP-P KF

On the end-face of each end cap there are four threaded holes for mounting the actuator.

**Material:**

- Anodized aluminum.

The mountings are supplied in pairs.



**Note:** Correspond to FESTO DGPL-KF, when the End Cap Mountings HP are mounted on the opposite side to the carriage (see drawing)

**Dimension (mm)**

Series	ØU	AB	AC	AD	AE	AF	DG	DS	FT	ØUU	Part number
HP25	5.5	32.5	13	19	20	21	44	2	75.5	10	21107FiL
HP32	6.6	38	17	24	24	27	52	3	87.5	11	21108FiL
HP40	6.6	45	17.5	24	24	35	68	2	104.5	11	21109FiL
HP50	9	65	25	35	35	48	86	6	138.5	15	21110FiL

G

Rodless Pneumatic  
Cylinders

OSP-P  
Series

P1X  
Series

P1Z  
Series

GDL  
Series

## Heavy Duty Guide HD 25 to 50mm bore

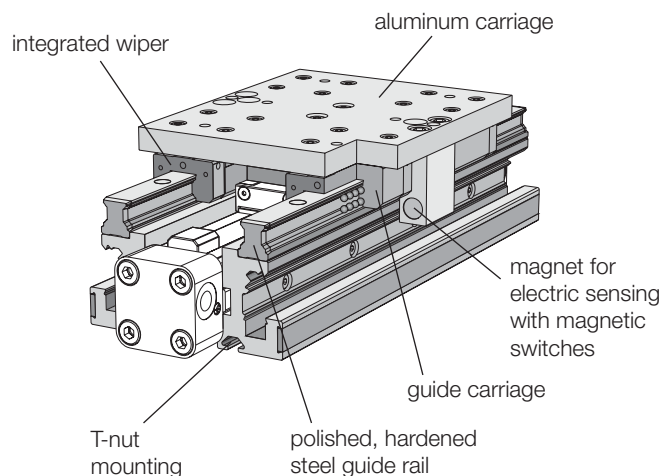
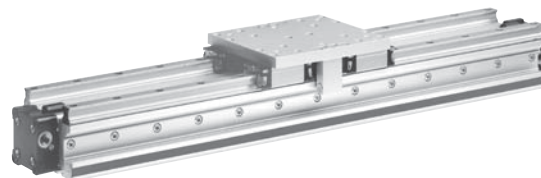
## Series HD 25 to 50 for Linear-drive

- Series OSP-P



## Features

- Guide system:  
4-row recirculating ball bearing guide
- Polished and hardened steel guide rail
- For highest loads in all directions
- Highest precision
- Integrated wiper system
- Integrated grease nipples
- Any lengths of stroke up to 3700 mm  
(longer strokes on request)
- Anodized aluminum guide carriage  
– dimensions compatible with OSP guide GUIDELINE
- Maximum speed  $v = 5 \text{ m/s}$



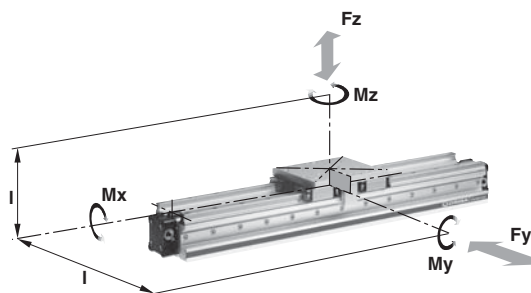
## Loads, Forces and Moments

The table shows the maximum permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

$$\frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}} + \frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}} \leq 1$$

The sum of the loads should not exceed >1.

The table shows the maximum permissible values for light, shock-free operation which must not be exceeded even under dynamic conditions.



Series	for linear drive	Max. moments (Nm)			Max. loads (N)		Mass of the linear drive with guide (kg)		
		Mx	My	Mz	Fz	Fy	with 0mm stroke	increase per 100mm stroke	Mass * guide carriage (kg)
HD 25	OSP-P25	260	320	320	6000	6000	3.065	0.924	1.289
HD 32	OSP-P32	285	475	475	6000	6000	4.308	1.112	1.367
HD 40	OSP-P40	800	1100	1100	15000	15000	7.901	1.748	2.712
HD 50	OSP-P50	1100	1400	1400	18000	18000	11.648	2.180	3.551

\*Add the mass of the guide carriage to the mass to be cushioned.

## Ordering Information

Rodless Pneumatic Cylinders  
OSP-P Series, Heavy Duty Guide HD

## Ordering information for OSP-P rodless HD pneumatic series

1-4	5-6	7	8	9	10	11	12-16	17	18	19	20	21	22	23	24	25
OSPP	25	0	1	0	0	0	01100	0	0	0	0	0	0	1	0	0
<b>Bore</b>				<b>Lubrication</b>		<b>Stroke</b>		<b>Piston mounting</b>				<b>Dovetail cover</b>		<b>Version</b>		
25 32 40 50				0 Standard 1 Fluorocarbon		XXXXX 5 digits in whole millimeters (ex. 1100mm = 01100)		0 None				0 Standard X Without cover rail		0 Standard		
<b>Piston style</b>								<b>Cushions / stops</b>						<b>Endcap mounting</b>		
0 Standard 1 Tandem								0 Standard 1 Long cushions (25,32,40) 2 VS soft left 3 VS hard left 4 VS soft right 5 VS hard right 6 VS soft both sides 7 VS hard both sides						0 None		
						<b>Hardware</b>										
						0 Standard										

Porting configurations	
0	Standard
1	End face (25,32,40,50)
2	Single end porting (25,32,40,50)
3	Left std pos #2, Right pos #5 (25,32,40,50)
4	Left pos #5, Right std pos #2 (25,32,40,50)
6	Single end porting at #5 (50)
A	24VDC VOE valves (25,32,40,50)
B	220VAC VOE valves (25,32,40,50)
C	48VDC VOE valves (25,32,40,50)
E	110VAC VOE valves (25,32,40,50)

Note: Single end porting on 16mm bore, then end caps cannot be rotated.

Endcap position	
0	Both pos #2
1	Both pos #3
2	Both pos #4
3	Both pos #1
4	Left #3 / right #2
5	Left #4 / right #2
6	Left #1 / right #2
7	Left #2 / right #3
8	Left #4 / right #3
9	Left #1 / right #3
A	Left #2 / right #4
B	Left #3 / right #4
C	Left #1 / right #4
D	Left #2 / right #1
E	Left #3 / right #1
F	Left #4 / right #1

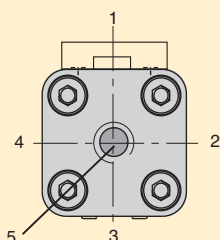
Guides / brakes	
D	Heavy duty

Additional carriages**	
0	None
D	Heavy duty guide

\*\* Note available on tandem piston only

Switches <sup>◇</sup>	
0	None
1	Normally open reed switch (25 thru 50)
2	Normally closed reed switch (25 thru 50)
3	PNP Hall sensor w/extension cables (25 thru 50)
4	NPN Hall sensor w/extension cables (25 thru 50)

◇ Note: 2 switches will be supplied. For different quantity, please order as a separate line item.



Note: Position #2 is the standard location.

## Sensors

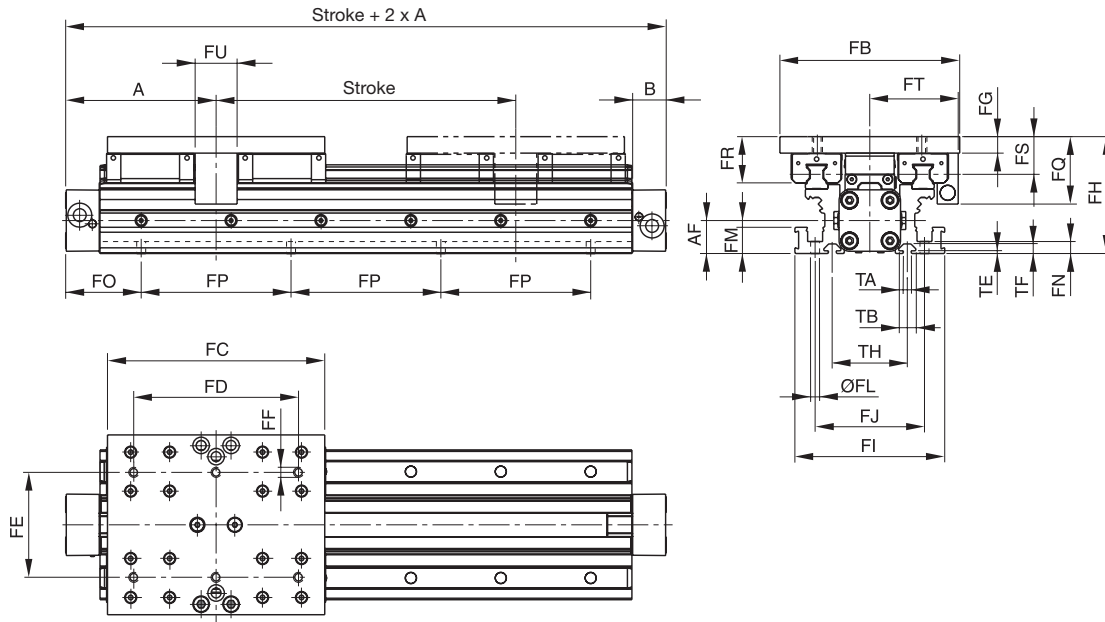
See section L for sensors.



**Series OSP-P HD 25 to 50mm**

**Note:** The HD heavy duty guide must be mounted on a flat surface for its entire length.

If T-grooves or T-bolts are used, the distance between them should not exceed 100 mm.



**Variable Stop**  
**Type VS25 to VS50**

The variable stop provides simple stroke limitation and can be supplied mounted on the right or left, as required.

For further information see Variable Stop page G75.

For shock absorber selection see page G62.

**incremental displacement measuring system**  
**ORiGA-Sensofle**

Series SFI-plus can be supplied mounted on the right or left, as required.

For further information see page G95.

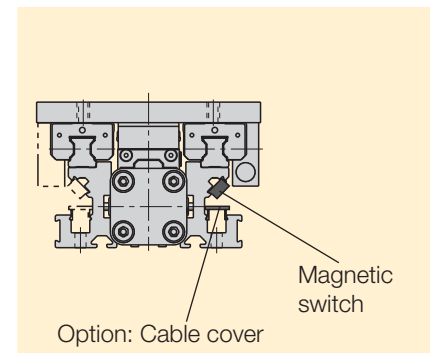
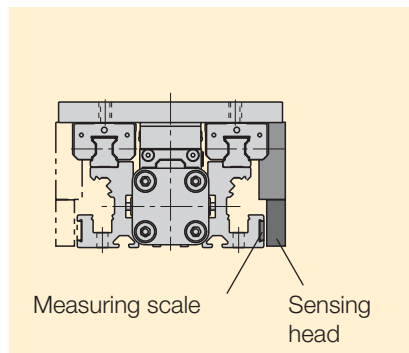
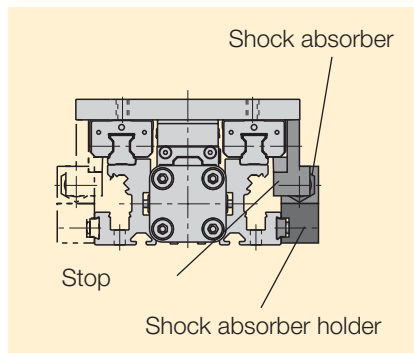
**Arrangement of magnetic switches:**

Magnetic switches can be fitted anywhere on either side.

For further information see following data sheets:

Magnetic Switches see pages G87-G92.

Dovetail Cover see page G93



## Dimensional Data

Rodless Pneumatic Cylinders  
OSP-P Series, Heavy Duty Guide HD

Series	A	B	AF	FB	FC	FD	FE	FF	FG	FH	FI	FJ	ØFL
HD25	100	22	22	120	145	110	70	M6	11	78	100	73	6
HD32	125	25.5	30	120	170	140	80	M6	11	86	112	85	6
HD40	150	28	38	160	180	140	110	M8	14	108	132	104	7.5
HD50	175	33	48	180	200	160	120	M8	14	118	150	118	7.5

Series	FM	FN	FP	FQ	FR	FS	FT	FU	TA	TB	TE	TF	TH
HD25	17.5	8	100	45	31	25	59	28	5.2	11.5	1.8	6.4	50
HD32	17.5	8	100	45	31	25	63	30	5.2	11.5	1.8	6.4	60
HD40	22	10	100	58	40	31.5	76	30	8.2	20	4.5	12.3	66
HD50	22	10	100	58	44	35.5	89	30	8.2	20	4.5	12.3	76

## Note:

The dimension FO is derived from the last two digits of the stroke:

For a cylinder OSP-P25 the adjacent table indicates that for x = 25 mm:

FO = 62.5 mm

## Example:

Stroke 15 **25** mm



FO  
OSP-P

FO  
OSP-P

FO  
OSP-P

X	HD25	HD32	HD40	HD50
00	50.0	75.0	50.0	75.0
01	50.5	75.5	50.5	75.5
02	51.0	76.0	51.0	76.0
03	51.5	76.5	51.5	76.5
04	52.0	77.0	52.0	77.0
05	52.5	77.5	52.5	77.5
06	53.0	78.0	53.0	78.0
07	53.5	78.5	53.5	78.5
08	54.0	79.0	54.0	79.0
09	54.5	79.5	54.5	79.5
10	55.0	80.0	55.0	80.0
11	55.5	80.5	55.5	80.5
12	56.0	81.0	56.0	81.0
13	56.5	81.5	56.5	81.5
14	57.0	82.0	57.0	82.0
15	57.5	82.5	57.5	82.5
16	58.0	83.0	58.0	83.0
17	58.5	83.5	58.5	83.5
18	59.0	84.0	59.0	84.0
19	59.5	84.5	59.5	84.5
20	60.0	85.0	60.0	85.0
21	60.5	85.5	60.5	85.5
22	61.0	86.0	61.0	86.0
23	61.5	86.5	61.5	86.5
24	62.0	87.0	62.0	87.0
25	62.5	87.5	62.5	87.5
26	63.0	88.0	63.0	88.0
27	63.5	88.5	63.5	88.5
28	64.0	89.0	64.0	89.0
29	64.5	89.5	64.5	89.5
30	65.0	90.0	65.0	90.0
31	65.5	90.5	65.5	90.5
32	66.0	91.0	66.0	91.0
33	66.5	91.5	66.5	91.5

X	HD25	HD32	HD40	HD50
34	67.0	92.0	67.0	92.0
35	67.5	92.5	67.5	92.5
36	68.0	93.0	68.0	93.0
37	68.5	93.5	68.5	93.5
38	69.0	94.0	69.0	94.0
39	69.5	94.5	69.5	94.5
40	70.0	95.0	70.0	95.0
41	70.5	95.5	70.5	95.5
42	71.0	96.0	71.0	96.0
43	71.5	96.5	71.5	96.5
44	72.0	97.0	72.0	97.0
45	72.5	97.5	72.5	97.5
46	73.0	98.0	73.0	98.0
47	73.5	98.5	73.5	98.5
48	74.0	99.0	74.0	99.0
49	74.5	99.5	74.5	99.5
50	75.0	100.0	75.0	100.0
51	75.5	100.5	75.5	100.5
52	76.0	101.0	76.0	101.0
53	76.5	101.5	76.5	101.5
54	77.0	102.0	77.0	102.0
55	77.5	102.5	77.5	102.5
56	78.0	103.0	78.0	103.0
57	78.5	103.5	78.5	103.5
58	79.0	104.0	79.0	104.0
59	79.5	104.5	79.5	104.5
60	80.0	105.0	80.0	105.0
61	80.5	105.5	80.5	105.5
62	81.0	106.0	81.0	106.0
63	81.5	106.5	81.5	106.5
64	82.0	107.0	82.0	107.0
65	82.5	107.5	82.5	107.5
66	83.0	108.0	83.0	108.0
67	83.5	108.5	83.5	108.5

X	HD25	HD32	HD40	HD50
68	34.0	59.0	84.0	59.0
69	34.5	59.5	84.5	59.5
70	35.0	60.0	85.0	60.0
71	35.5	60.5	85.5	60.5
72	36.0	61.0	86.0	61.0
73	36.5	61.5	86.5	61.5
74	37.0	62.0	87.0	62.0
75	37.5	62.5	87.5	62.5
76	38.0	63.0	88.0	63.0
77	38.5	63.5	88.5	63.5
78	39.0	64.0	89.0	64.0
79	39.5	64.5	89.5	64.5
80	40.0	65.0	90.0	65.0
81	40.5	65.5	90.5	65.5
82	41.0	66.0	91.0	66.0
83	41.5	66.5	91.5	66.5
84	42.0	67.0	92.0	67.0
85	42.5	67.5	92.5	67.5
86	43.0	68.0	93.0	68.0
87	43.5	68.5	93.5	68.5
88	44.0	69.0	94.0	69.0
89	44.5	69.5	94.5	69.5
90	45.0	70.0	95.0	70.0
91	45.5	70.5	95.5	70.5
92	46.0	71.0	96.0	71.0
93	46.5	71.5	96.5	71.5
94	47.0	72.0	97.0	72.0
95	47.5	72.5	97.5	72.5
96	48.0	73.0	98.0	73.0
97	48.5	73.5	98.5	73.5
98	49.0	74.0	99.0	74.0
99	49.5	74.5	99.5	74.5

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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

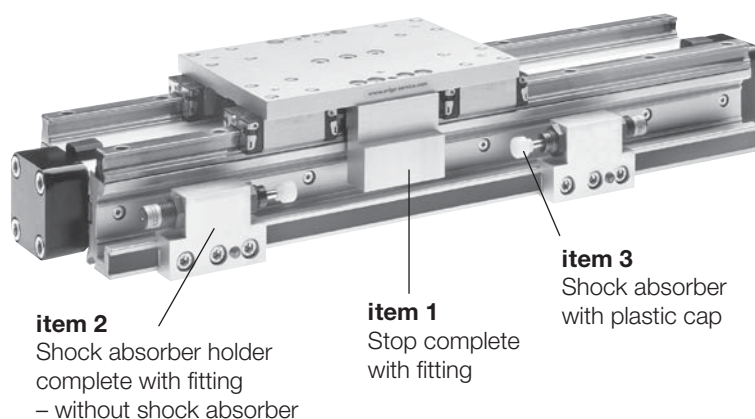
For inventory, lead times, and kit  
lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G74

**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)



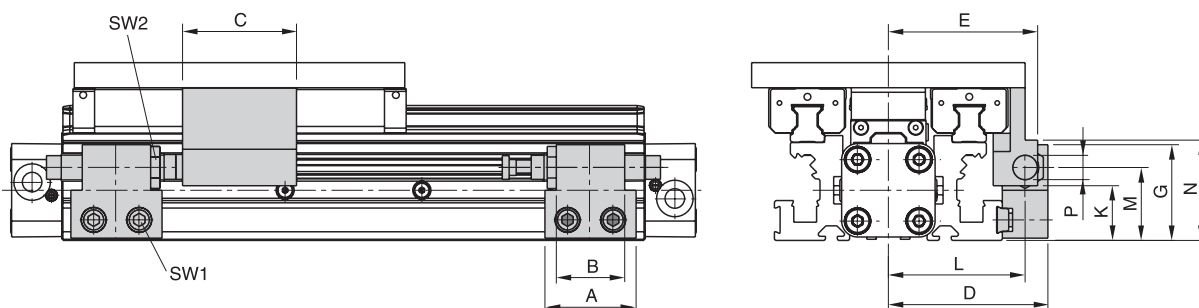
## Ordering information – Variable Stop Type VS25 to VS50



Size		VS25		VS32		VS40		VS50	
Item	Description	Type	Part number	Type	Part number	Type	Part number	Type	Part number
1	Stop, complete	–	21257FiL	–	21158FiL	–	21159FiL	–	21260FiL
2	Shock absorber holder, complete	–	21202FiL	–	21203FiL	–	21204FiL	–	21205FiL
3 *	Shock absorber, standard	SA12	MC75M-1	SA14	MC150M-B	SA20	MC225M	SAI25	MC600M
	Shock absorber, version S	SA12S	MC75M-2	SA14S	MC150MH-B	SA20S	MC225MH	SAI25S	MC600MH

\* Shock absorber with plastic cap

## Dimension – Variable Stop Type VS16 to VS50



Series	Type	A	B	C	D	E	G	K	L	M	N	P	SW1	SW2
OSP-HD25	VS25	40	30	50	70	65.5	42	26	60	32	42	M12 x 1	5	16
OSP-HD32	VS32	60	40	54	73	71	44	28	63	34	53	M14 x 1.5	5	17
OSP-HD40	VS40	84	52	55	96	92	59	35	82	45	61	M20 x 1.5	5	24
OSP-HD50	VS50	84	-	60	107	105	66	37	89	49	66	M25 x 1.5	5	30

## Shock Absorber Selection

For shock absorber selection in dependence on mass and speed see page G68.



**intermediate Stop Module – 25mm only**

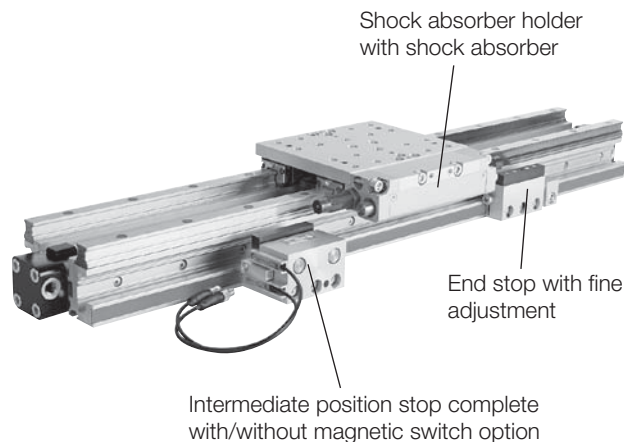
The intermediate stop module ZSM allows the guide carriage to stop at any desired intermediate positions with high accuracy. It can be retrofitted. Depending on the application, i.e. the number of intermediate stops, one or more intermediate position stops can be used.

The intermediate position stops can be retracted and extended without the need for the guide carriage to be moved back out of position.

Therefore the guide carriage can be made to stop at the defined intermediate positions in any order.

**ORIGA intermediate stop module ZSM:**

- Allows stopping at any intermediate positions
- Intermediate position stops can be located steplessly anywhere along the whole stroke length
- Movement to the next position without reverse stroke
- Compact unit
- Cost-effective positioning module without electrical or electronic components
- Option: end stop with fine adjustment

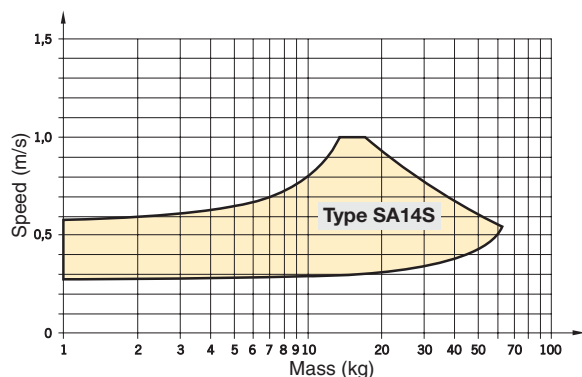
**Operating information**

Operating pressure:	87 to 116 PSIG (4 to 8 bar)
Temperature range:	14°F to 158°F (-10°C to 70°C)
Intermediate position grid:	85mm

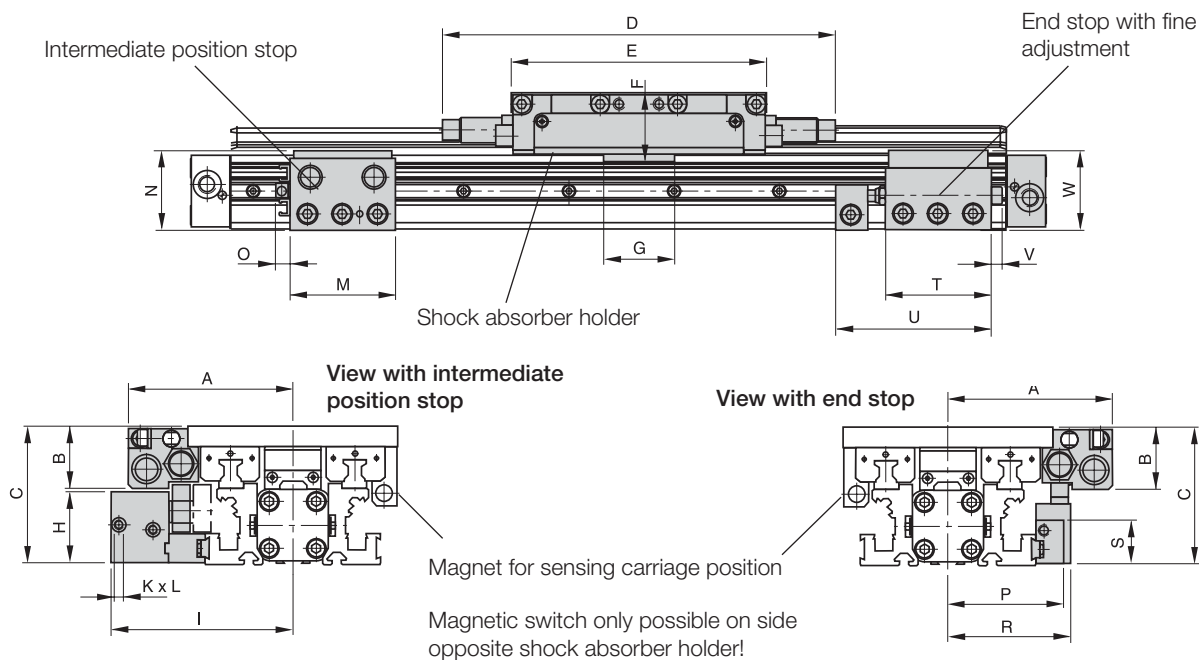
G

**Shock Absorber****Type SA14S**

The values relate to an effective driving force of 250 N (6 bar)

Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

## intermediate Stop Module – Type ZSM..HD

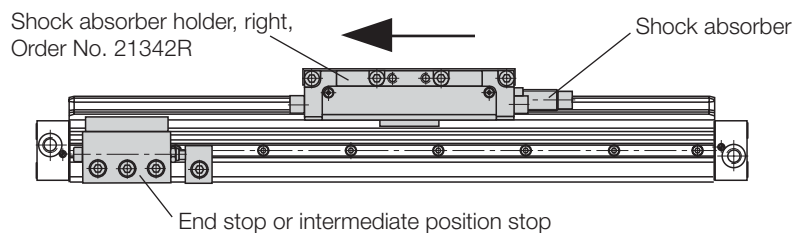


## Dimension (mm)

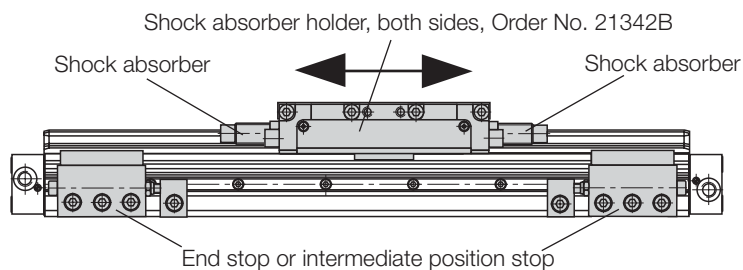
Series	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S	T	U	V	W
ZSM25	94	35	78	224	145	39	40	41	104	M5	5	60	45	8	66	70	26	60	93	6	45

## Shock Absorber Arrangement in Dependence on Direction of Movement

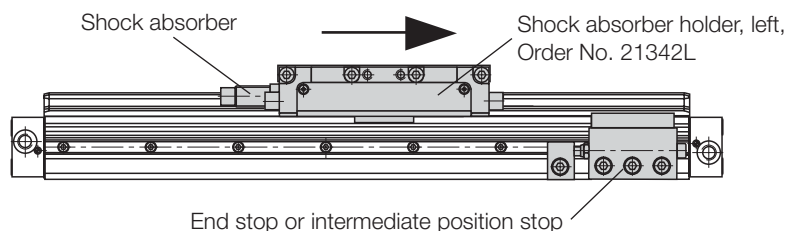
## From right to left



## in both directions



## From left to right

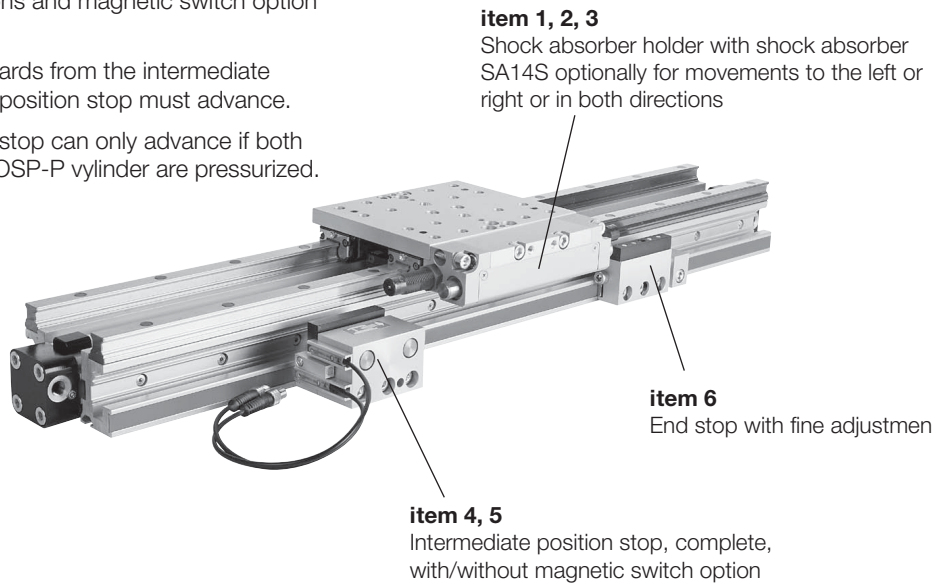


Order instructions – intermediate Stop Module Type ZSM..HD

Illustration shows version with shock absorber holder for movement in both directions and magnetic switch option with T-slot switches.

**Note:** For movement onwards from the intermediate position, the intermediate position stop must advance.

The intermediate position stop can only advance if both cylinder chambers of the OSP-P cylinder are pressurized.



Order instructions – intermediate stop module Type ZSM..HD 25mm Only

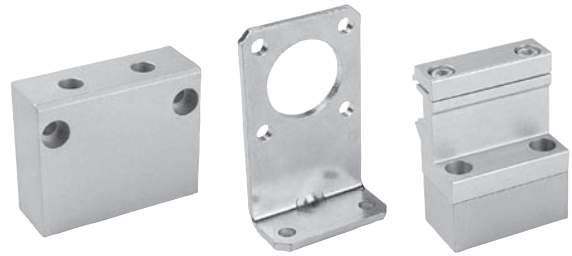
For intermediate stop module	Item	Description	Part number
ZSM25HD	1*	Shock absorber holder with shock absorber SA14S, both sides	21342BFIL
ZSM25HD	2*	Shock absorber holder with shock absorber SA14S, left	21342LFIL
ZSM25HD	3*	Shock absorber holder with shock absorber SA14S, right	21342RFIL
ZSM25HD	4	Intermediate position stop complete, without magnetic switch option	21343FIL
ZSM25HD	5	Intermediate position stop complete, with magnetic switch option	21344FIL
ZSM25HD	6	End stop with fine adjustment	21346FIL

\* The shock absorbers are installed in the shock absorber holder and adjusted in our workshop.



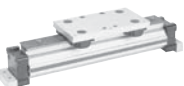

## Mountings for Linear Drives fitted with OSP-Guide

## For Linear-drive

- Series OSP-P



Type – OSP Guides

Mounting Type	Type	SLIDELINE PROLINE MULTIBRAKE							POWERSLIDE									
		16 †	25	32	40	50	63 †	80 †	16/ 25	25/ 25	25/ 35	25/ 44	32/ 35	32/ 44	40/ 44	40/ 60	50/ 60	50/ 76
End cap mounting 	Type A1	X							X									
	Type A2	O	O	O														
	Type A3									O	O		O					
End cap mounting, reinforced 	Type B1		X	X						X	X	X	X	X				
	Type B3								O									
	Type B4											O		O				
	Type B5																	
End cap mounting 	Type C1				X	X	X	X							X	X	X	X
	Type C2				O	O												
	Type C3						O	O							O		O	
	Type C4															O		O
Mid-Section support, small	Type D1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mid-Section support, wide 	Type E1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Type E2	O	O	O	O	O												
	Type E3						O	O	O	O	O		O		O		O	
	Type E4											O		O		O		O
	Type E5																	

X = carriage mounted in top (12 o'clock position)

O = carriage mounted in lateral (3 or 9 o'clock position)

 = available components

† = not available for all sizes

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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

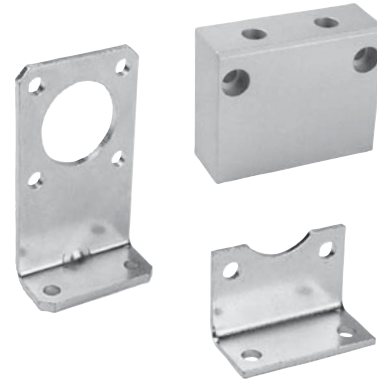
## end Cap Mountings

Four internal screw threads are located in the end faces of all OSP actuators for mounting the drive unit. End cap mountings may be secured across any two adjacent screws.

**Material:**

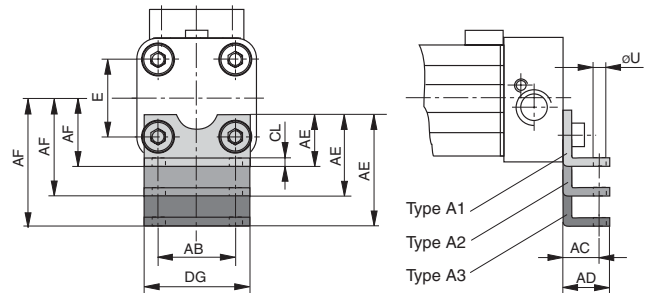
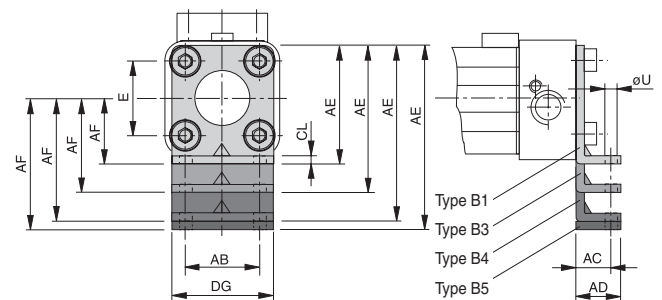
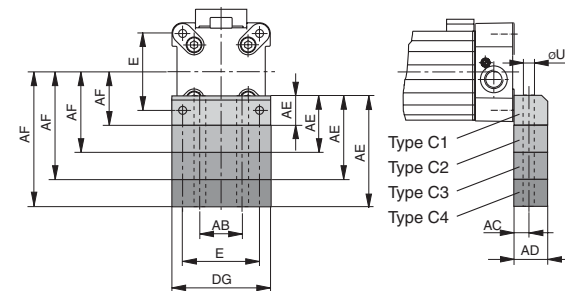
- Series OSP-16, 25, 32: Galvanized steel
- Series OSP-40, 50, 63, 80: Anodized aluminum

The mountings are supplied in pairs.

**Dimension (mm)****Ae and AF (Dependent on the mounting type)**

Mount. type	Dimensions AE for size							AF for size						
	16	25	32	40	50	63	80	16	25	32	40	50	63	80
A1	12.5	18	20	-	-	-	-	15	22	30	-	-	-	-
A2	27.5	33	34	-	-	-	-	30	37	44	-	-	-	-
A3	-	45	42	-	-	-	-	-	49	52	-	-	-	-
B1	-	42	55	-	-	-	-	-	22	30	-	-	-	-
B3	55	-	-	-	-	-	-	42	-	-	-	-	-	-
B4	-	80	85	-	-	-	-	-	60	60	-	-	-	-
B5	-	-	90	-	-	-	-	-	-	65	-	-	-	-
C1	-	-	-	24	30	40	50	-	-	-	38	48	57	72
C2	-	-	-	37	39	-	-	-	-	-	51	57	-	-
C3	-	-	-	46	54	76	88	-	-	-	60	72	93	110
C4	-	-	-	56	77	-	-	-	-	-	70	95	-	-

Series	E	øU	AB	AC	AD	CL	DG
OSP-P16	18	3.6	18	10	14	1.6	26
OSP-P25	27	5.8	27	16	22	2.5	39
OSP-P32	36	6.6	36	18	26	3	50
OSP-P40	54	9	30	12.5	24	-	68
OSP-P50	70	9	40	12.5	24	-	86
OSP-P63	78	11	48	15	30	-	104
OSP-P80	96	14	60	17.5	35	-	130

**Series OSP-P16, 25, 32: Type A****Series OSP-P16, 25, 32: Type B****Series OSP-P40, 50, 63, 80: Type C**

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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

For inventory, lead times, and kit  
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G80

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## end Cap Mountings – Type B Ø 16 to 32mm

For Linear-drive with Recirculating Ball Bearing Guide

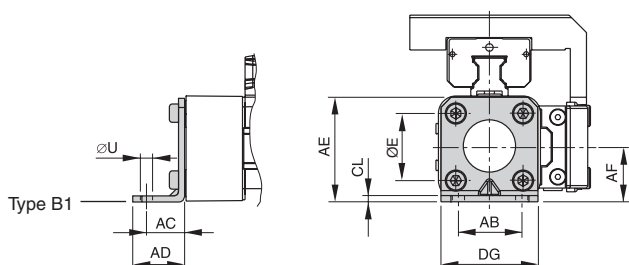
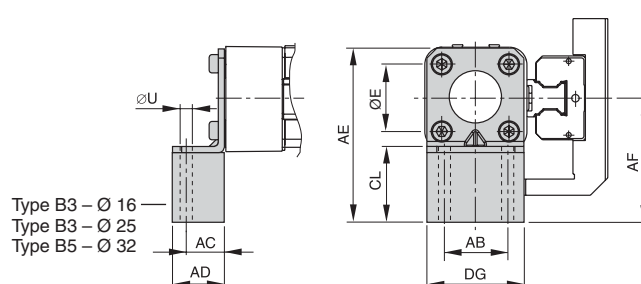
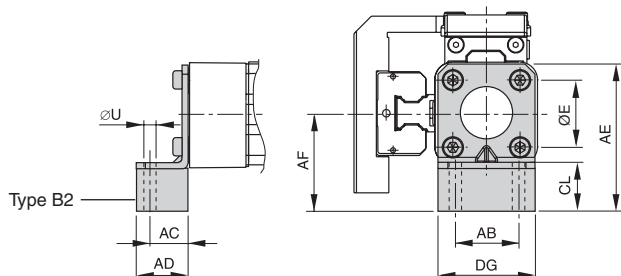
- Series OSP-P STL
- Series OSP-P KF

## Material:

- Galvanized steel
- Anodized aluminum

The mountings are supplied in pairs.

Drawing shows: Mounting with Guide Type STL


**Type B1: 16, 25, 32mm**  
 Series OSP-P STL and KF
Installation: Top carrier  
Side piston
**Type B3: 16, 25mm**  
**Type B5: 32mm**  
 Series OSP-P STL and KF
Installation: Side carrier  
Piston below
**Type B2: 16, 25, 32mm**  
 Series OSP-P STL and KF
Installation: Side carrier  
Top piston

## Dimension (mm), Type B

Series Type	Mounting	E	ØU	AB	AC	AD	AE	AF	CL	DG	Part number (pair)
OSP-P STL16	B1	18	3.6	18	10	14	28	15	2	26	21135FiL
OSP-P KF16	B2	18	3.6	18	10	14	43	30	17	26	21136FiL
	B3	18	3.6	18	10	14	55	42	29	26	21137FiL
OSP-P STL25	B1	27	5.8	27	16	22	42	22	2.5	39	20311FiL
OSP-P KF25	B2	27	5.8	27	16	22	57	37	17.5	39	21138FiL
	B3	27	5.8	27	16	22	69	49	29.5	39	21139FiL
OSP-P STL32	B1	36	6.6	36	18	26	55	30	3	50	20313FiL
OSP-P KF32	B2	36	6.6	36	18	26	69	44	17	50	21140FiL
	B5	36	6.6	36	18	26	90	65	9	50	21141FiL

**Mid-Section Support – Type D1ST Ø 16 to 50mm**

For Linear-drive with Recirculating Ball  
Bearing Guide

- Series OSP-P STL
- Series OSP-P KF

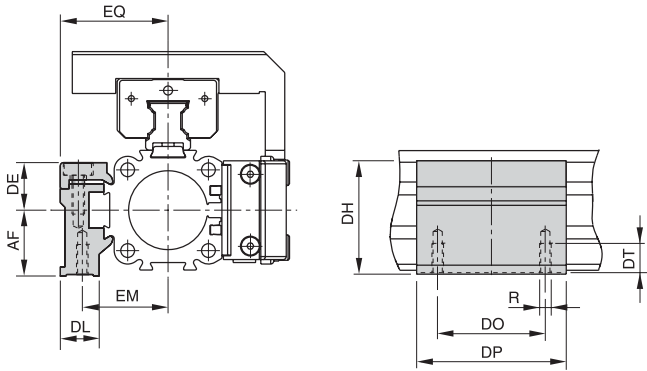
**Note:** on Types D1ST

The mid-section support can also be mounted  
on the underside of the actuator, in which case  
its distance from the center of the actuator is  
different.



Drawing shows: Mounting with Guide Type STL  
Mountings from below with 2 screws

**Type D1ST: 16 to 50mm**  
**Series OSP-P STL and KF**



**Dimension (mm), Type D1ST**

Series OSP-P ...	Mounting	R	AF	DE	DH	DL	DO	DP	DT	EM	EQ	Part number
STL/KF16	D1ST	M3	15	14.2	29.2	14.6	18	30	6.5	20	27	21125FiL
STL/KF25	D1ST	M5	22	16	38	13	36	50	10	28.5	36	21126FiL
STL/KF32	D1ST	M5	30	16	46	13	36	60	10	35.5	43	21127FiL
STL/KF40	D1ST	M6	38	23	61	19	45	60	11	38	48	21128FiL
STL/KF50	D1ST	M6	48	23	71	19	45	60	11	45	57	21129FiL

Order example: Type D1ST16    **Part number: 21125FiL**



## Mid-Section Support

## Information regarding type E1 and D1:

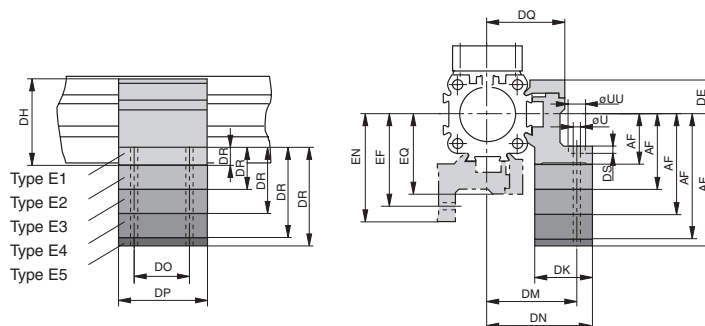
Mounting of the Mid-Section supports is also possible on the lower side of the drive. In this case, please note the new center line dimensions.

Stainless steel version on request.



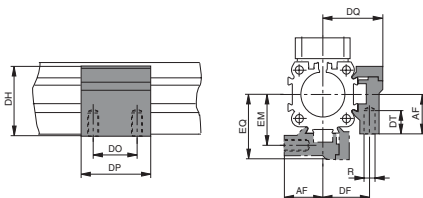
## Series OSP-P16 to 80: Type e

(Mounting from above / below using a cap screw)



## Series OSP-P16 to 80: Type D1

(Mounting from below with thread screw)



## Dimension (mm) - AF and DR (Dependent on the mounting type)

Mount. type	DR for size								AF for size							
	16	25	32	40	50	63	80		16	25	32	40	50	63	80	
D1	-	-	-	-	-	-	-		15	22	30	38	48	57	72	
E1	6	8	10	10	10	12	15		15	22	30	38	48	57	72	
E2	21	23	24	23	19	-	-		30	37	44	51	57	-	-	
E3	33	35	32	32	34	48	53		42	49	52	60	72	93	110	
E4	-	46	40	42	57	-	-		60	60	70	95	-	-	-	
E5	-	-	45	-	-	-	-		-	-	65	-	-	-	-	

## Dimension Table (mm)

Series	R	U	UU	DE	DF	DH	DK	DM	DN	DO	DP	DQ	DS	DT	EF	EM	EN	EQ
OSP-P16	M3	3.4	6	14.2	20	29.2	24	32	36.4	18	30	27	3.4	6.5	32	20	36.4	27
OSP-P25	M5	5.5	10	16	27	38	26	40	47.5	36	50	34.5	5.7	10	41.5	28.5	49	36
OSP-P32	M5	5.5	10	16	33	46	27	46	54.5	36	50	40.5	5.7	10	48.5	35.5	57	43
OSP-P40	M6	7	-	23	35	61	34	53	60	45	60	45	-	11	56	38	63	48
OSP-P50	M6	7	-	23	40	71	34	59	67	45	60	52	-	11	64	45	72	57
OSP-P63	M8	9	-	34	47.5	91	44	73	83	45	65	63	-	16	79	53.5	89	69
OSP-P80	M10	11	-	39.5	60	111.5	63	97	112	55	80	81	-	25	103	66	118	87

## Ordering information for mountings – Type A, Type B, Type C, Type D, Type e

Mounting type (versions)	Part number						
	16	25	32	40	50	63	80
A1 †	20408FiL	2010	3010	-	-	-	-
A2 †	20464FiL	2040	3040FiL	-	-	-	-
A3 †	-	2060FiL	3060FiL	-	-	-	-
B1 †	-	20311FiL	20313FiL	-	-	-	-
B3 †	20465FiL	-	-	-	-	-	-
B4 †	-	20312FiL	20314FiL	-	-	-	-
B5 †	-	-	20976FiL	-	-	-	-
C1 †	-	-	-	4010FiL	5010FiL	6010FiL	8010FiL
C2 †	-	-	-	20338FiL	20349FiL	-	-
C3 †	-	-	-	20339FiL	20350FiL	20821FiL	20822FiL
C4 †	-	-	-	20340FiL	20351FiL	-	-
D1	20434FiL	20008FiL	20157FiL	20027FiL	20162FiL	20451FiL	20480FiL
E1	20435FiL	20009FiL	20158FiL	20028FiL	20163FiL	20452FiL	20482FiL
E2	20436FiL	20352FiL	20355FiL	20358FiL	20361FiL	-	-
E3	20437FiL	20353FiL	20356FiL	20359FiL	20362FiL	20453FiL	20819FiL
E4	-	20354FiL	20357FiL	20360FiL	20363FiL	-	-
E5	-	-	20977FiL	-	-	-	-

† Pair



For inventory, lead time, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G83

Parker Hannifin Corporation  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

G

Rodless Pneumatic  
Cylinders

OSP-P  
Series

P1X  
Series

P1Z  
Series

GDL  
Series

## Mid-Section Support – Type e1ST to e5ST Ø 16 to 50mm

For Linear-drive with Recirculating Ball Bearing Guide

- Series OSP-P STL
- Series OSP-P KF

Drawing shows: Mounting with Guide Type STL  
Mountings from below with 2 screws

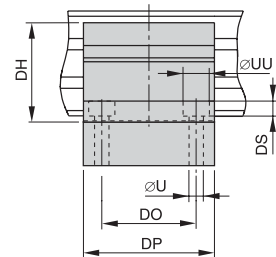
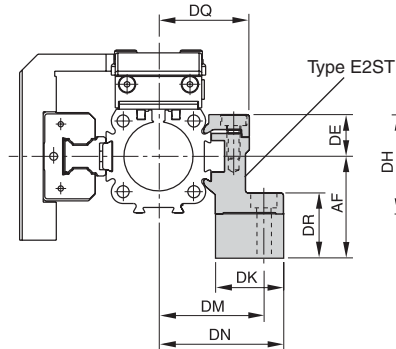
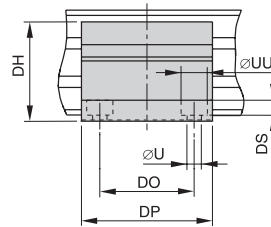
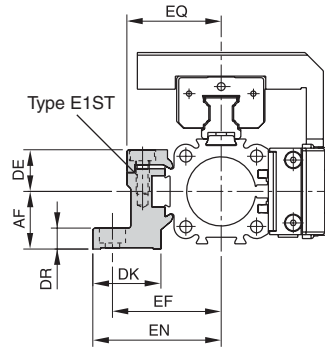


**Type e1ST: 16 to 50mm**  
Series OSP-P STL and KF

Installation: Top carrier  
Side position

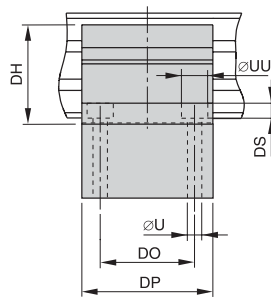
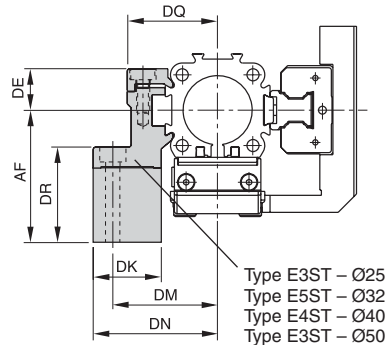
**Type e2ST: 16 to 50mm**  
Series OSP-P STL and KF

Installation: Side carrier  
Top piston



**Type e3ST, e4ST, e5ST: 25 to 50mm**  
Series OSP-P STL and KF

Installation: Side carrier  
Piston below



## Dimension (mm), Type e1ST to e5ST

Series	OSP-P ...	Mounting	ØU	ØUU	AF	DE	DH	DK	DM	DN	DO	DP	DR	DQ	DS	EF	EN	EQ	Part number
OSP-P Series	STL/KF16	E1ST	3.4	6	15	14.2	29.2	24	32	36.4	18	30	6	27	3.4	32	36.4	27	21130FiL
	STL/KF16	E2ST	3.4	6	30	14.2	29.2	24	32	36.4	18	30	21	27	3.4	32	36.4	27	21142FiL
P1X Series	STL/KF25	E1ST	5.5	10	22	16	38	26	40	47.5	36	50	8	34.5	5.7	41.5	49	36	21131FiL
	STL/KF25	E2ST	5.5	10	37	16	38	26	40	47.5	36	50	23	34.5	5.7	41.5	49	36	21143FiL
	STL/KF25	E3ST	5.5	10	49	16	38	26	40	47.5	36	50	35	34.5	5.7	41.5	49	36	21148FiL
P1Z Series	STL/KF32	E1ST	5.5	10	30	16	46	27	46	54.5	36	60	10	40.5	5.7	48.5	57	43	21132FiL
	STL/KF32	E2ST	5.5	10	44	16	46	27	46	54.5	36	60	24	40.5	5.7	48.5	57	43	21144FiL
	STL/KF32	E5ST	5.5	10	65	16	46	27	46	54.5	36	60	45	40.5	5.7	48.5	57	43	21151FiL
GDL Series	STL/KF40	E1ST	7	-	38	23	61	34	53	60	45	60	10	45	-	56	63	48	21133FiL
	STL/KF40	E2ST	7	-	51	23	61	34	53	60	45	60	23	45	-	56	63	48	21145FiL
	STL/KF40	E4ST	7	-	70	23	61	34	53	60	45	60	42	45	-	56	63	48	21150FiL
	STL/KF50	E1ST	7	-	48	23	71	34	59	67	45	60	10	52	-	64	72	57	21134FiL
	STL/KF50	E2ST	7	-	57	23	71	34	59	67	45	60	19	52	-	64	72	57	21146FiL
	STL/KF50	E3ST	7	-	72	23	71	34	59	67	45	60	34	52	-	64	72	57	21149FiL

Order example: Type E1ST16 Part number: 21130FiL



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

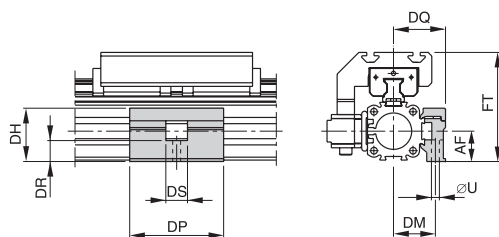
## Mid-Section Support – Type MUP Ø 25 to 50mm (correspond to FeSTO dimensions)

For Linear-drive with Recirculating Ball Bearing Guide

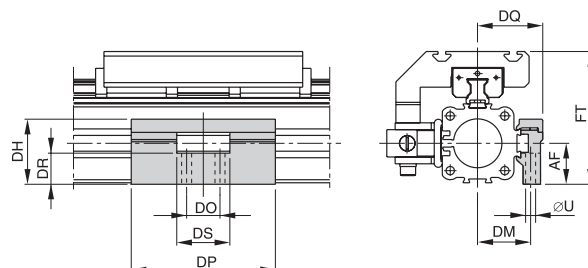
- Series OSP-P KF

**Note:** Correspond to FESTO DGPL-KF, when the Mid-Section Support MUP are mounted on the 90° side to the carriage (see drawings).

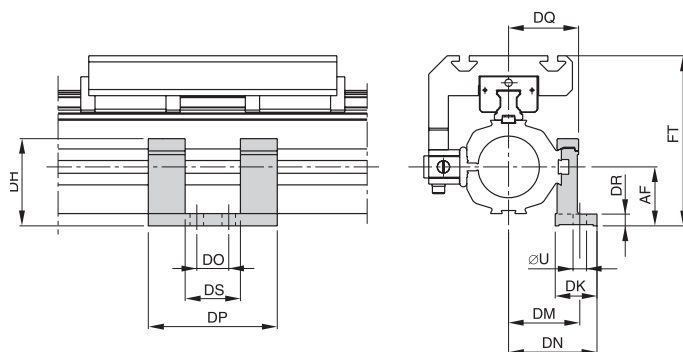
**Series OSP-P KF25: Type MUP**  
(Mounting over through holes)



**Series OSP-P KF32 to KF40: Type MUP**  
(Mounting over through holes)



**Series OSP-P KF50: Type MUP**  
(Mounting over through holes)



## Dimension (mm)

Series	ØU	AF	DH	DK	DM	DN	DO	DP	DQ	DR	DS	FT	Part number
MUP25	5.5	21	36.9	–	29	–	–	65	36	14.5	15	75.5	21119FiL
MUP32	6.6	27	42.9	–	35	–	22	95	43	20.5	35	87.5	21120FiL
MUP40	6.6	35	58	–	40	–	22	95	48	28.5	35	104.5	21121FiL
MUP50	11	48	71	34	58	72	26	105	57	10	45	138.5	21122FiL

G

Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

## end Cap Mountings – Type C Ø 40 to 50mm

For Linear-drive with Recirculating Ball Bearing Guide

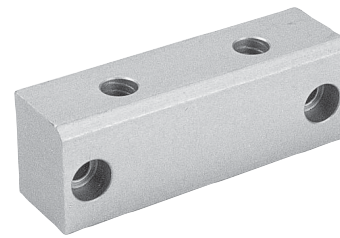
- Series OSP-P STL
- Series OSP-P KF

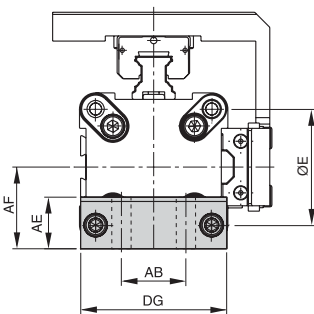
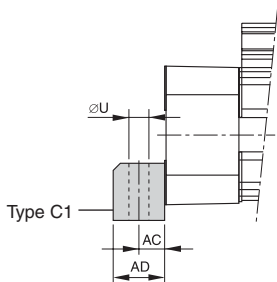
## Material:

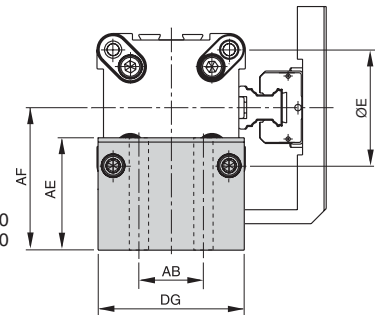
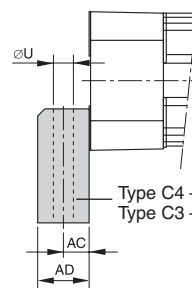
- Anodized aluminum

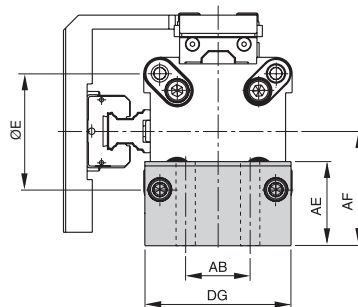
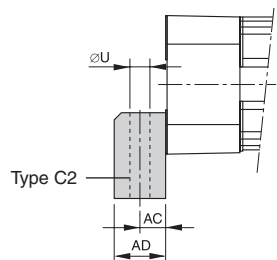
The mountings are supplied in pairs.

Drawing shows: Mounting with Guide Type STL


**Type C1: 40, 50mm**  
 Series OSP-P STL and KF

 Installation Top carrier  
 Side piston

**Type C4: 40mm**  
**Type C3: 50mm**  
 Series OSP-P STL and KF

 Installation: Side carrier  
 Piston below

**Type C2: 40, 50mm**  
 Series OSP-P STL and KF

 Installation: Side carrier  
 Top piston


## Dimension (mm), Type C

Series Type	Mounting	E	$\varnothing U$	AB	AC	AD	AE	AF	DG	Part number (pair)
OSP-P STL40	C1	54	9	30	12.5	24	24	38	68	4010FiL
OSP-P KF40	C2	54	9	30	12.5	24	37	51	68	20338FiL
	C4	54	9	30	12.5	24	56	70	68	20340FiL
OSP-P STL50	C1	70	9	40	12.5	24	30	48	86	5010FiL
OSP-P KF50	C2	70	9	40	12.5	24	39	57	86	20349FiL
	C3	70	9	40	12.5	24	54	72	86	20350FiL

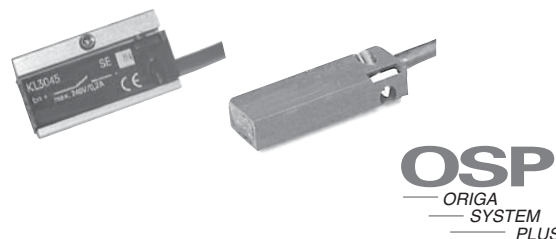
**Magnetic Switches, Ø10 to 80mm**

- Series RS
- Series ES

For electrical sensing of the carrier position, e.g. at the end positions, magnetic switches may be fitted

Position sensing is contactless and is based on magnets fitted as standard to the carrier. A yellow LED indicates operating status.

The universal magnetic switches are suitable for all PARKER-ORIGA OSP-Actuators and aluminum profile rod type cylinders.



**Piston, speed and switching distance affect signal duration and should be considered in conjunction with the minimum reaction time of ancillary control equipment.**

$$\text{Min. reaction time} = \frac{\text{Switching distance}}{\text{Piston speed}}$$

**Electrical Characteristics**

	Type RS	Type ES
Switching output	Reed	PNP, NPN
Operating voltage	10-240 VAC/DC (NO) 10-150 VAC/DC (NC)	10-30 VDC
Residual voltage	< 3 V	< 3 V
Connection	Two wire	Three wire
Output function	normally open normally closed	normally open
Permanent current	200 mA	200 mA
Max. switching capacity	10 VA (W)	—
Power consumption without load	—	< 20 mA
Function indicator	LED, yellow	LED, yellow
Typical switching time	On: < 2 ms	On: < 2 ms
Switch-off delay	—	ca. 25 ms
Pole reversal does not work	LED	—
Pole reversal protection	—	Built in
Short-circuit protection	—	Built in
Switchable capacity load	µF	µF 0.1 at 100 Ω, 24 VDC
Switching point accuracy	± 0.2mm	± 0.2mm
Switching distance	ca. 15mm	ca. 15mm
Hysteresis for OSP	ca. 8mm	ca. 3mm
Lifetime	3 x 10 <sup>6</sup> , up to 6 x 10 <sup>6</sup> cycles	Theoretically unlimited

**Mechanical Characteristics**

	Type RS	Type ES
Housing	Makrolon, smoke color	
Cable cross section	2 x 0.14 mm <sup>2</sup>	3 x 0.14 mm <sup>2</sup>
Cable type *	PVC	PUR, black
Bending radius	fixe ≥ 20mm moving ≥ 70mm	
Weight (Mass)	0.012 kg	
Degree of protection	IP67 to DIN EN 60529	
Ambient temperature range * †	-25°C to 80°C	
Shock resistance	100 m/s <sup>2</sup> (contact switches)	500 m/s <sup>2</sup>

\* Other versions on request

† For the magnetic switch temperature range, please take into account the surface temperature and the self-heating properties of the linear drive. On request other temperature ranges available.

**G**Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

## Magnetic Switches RS and eS

## electrical Service Life Protective Measures

Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

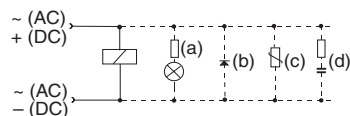
With **resistive and capacitive loads** with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths and voltages over 100 V.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

## Connection examples

Load with protective circuits

- (a) Protective resistor for light bulb
- (b) Freewheel diode on inductively
- (c) Varistor on inductively
- (d) RC element on inductively



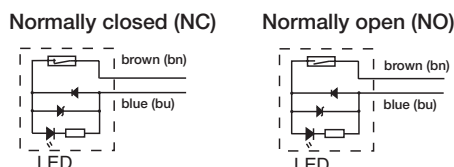
For the type ES, external protective circuits are not normally needed.

## Type RS

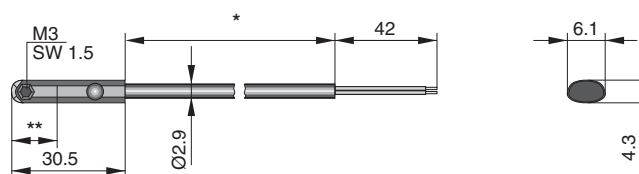
In the type RS contact is made by a mechanical reed switch encapsulated in glass.

Direct connection with 2-pole cable, 5 m long, open ended (Type RS-K).

## electrical Connection:



## Dimensions (mm) – Type RS-K



\* Length with possible minus tolerance, see chart below

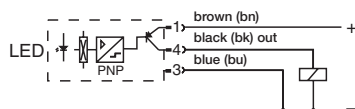
## Type eS

In the type ES contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations. Connection is by 3-pole connector for easy disconnection. Fitted with connection cable 100 mm long with connector.

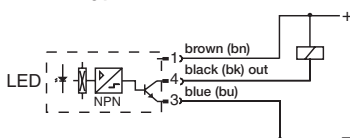
A 5 m cable with connector and open end can be ordered separately, or use the Order No. for the complete Type ES with 5 m cable.

## electrical Connection:

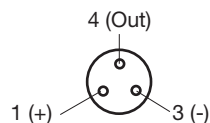
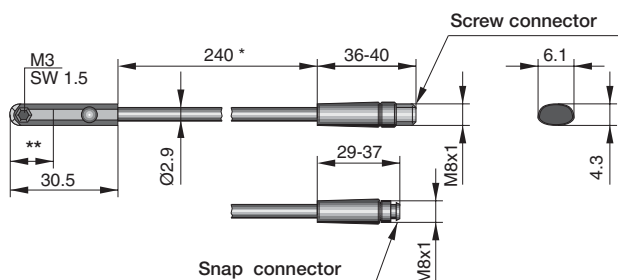
Standard Version: Type PNP



Optional Version: Type NPN



## Dimensions (mm) – Type eS-S



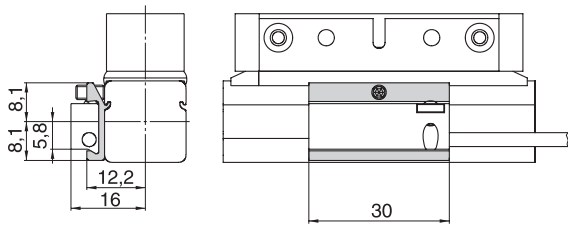
PIN assignment (view of pins)  
according to DIN EN 50044

\* Length with possible minus tolerance, see chart below

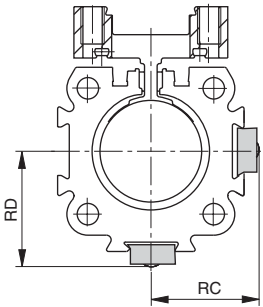
## Length of connection cable with length tolerance

Magnetic switch Part number	Nominal cable length	Length tolerance
<b>P8S-GRFDX2</b>	5000mm	- 50mm
<b>P8S-GeFRX1</b>	5000mm	- 50mm
<b>P8S-GPCHX</b>	100mm	- 20mm
<b>P8S-Gn CHX</b>	145mm	± 5mm

**Dimensions Series OSP-P10**



**Dimensions Series OSP-P16 to 80**



Note:  
Sensors can not be mounted directly opposite of the carrier

**Dimensions (mm) and Order information**

			Part number						
	Dimensions		RS closer Normally open	RS opener Normally closed	ES		ES compl. with 5 m cable		Adapter only for OSP-P10
Series	RC	RD			PNP	NPN	PNP	NPN	
OSP-P10	–	–	Type:	Type:	Type:	Type:	Type:	Type:	8872FIL (Global)  please order separately
OSP-P16	20	20.5	RS-K	RS-K	ES-S	ES-S	ES-S	ES-S	
OSP-P25	25	27	P8S-GRFDX2	P8S-GEFRX1	P8S-GPCHX	P8S-GNCHX	P8S-GRFDX2 + 4041	P8S-GNCHX + 4041	
OSP-P32	31	34							
OSP-P40	36	39							
OSP-P50	43	48							
OSP-P63	53	59							
OSP-P80	66	72							
Cable 5 m with connector and with open end for magnetic switches Type ES-S					4041				



**Magnetic Switches for T-Slot, Ø10 to 80mm**

- Series RST
- Series EST

Magnetic switches are used for electrical sensing of the position of the piston, e.g. at its end positions. They can also be used for sensing of intermediate positions.

Sensing is contactless, based on magnets which are built-in as standard. A yellow LED indicates operating status.

The universal magnetic switches are suitable for all PARKER-ORIGA OSP-Actuators and aluminum profile rod type cylinders.



**OSP**  
— ORIGA  
— SYSTEM  
— PLUS

**Electrical Characteristics**

	Type RST	Type EST
Switching output	Reed	PNP
Operating voltage	10-30 VAC/DC	10-30 VDC
Ripple	–	≤ 10%
Voltage drop	≤ 3 V	≤ 2 V
Electrical configuration	2 wire	3 wire
Output function	normally open normally closed	normally open
Permanent current	≤ 100 mA	≤ 100 mA
Breaking capacity	≤ 6 peak W	–
Power consumption, at U <sub>B</sub> = 24V, switched on, without load	–	≤ 10 mA
Function indicator	LED, yellow (not for normally closed)	LED, yellow (not for normally closed)
Response time	≤ 2 ms	≤ 0.5 ms
Sensitivity	2 – 4 mT	2 – 4 mT
Time delay before availability	–	≤ 2 ms
Reverse polarity prot.	yes	yes
Short-circuit protection	no	yes (pulsed)
Switchable capacity load	µF	0.1 at 100 Ω, 24 VDC
Switching frequency	≤ 400 Hz	≤ 5 k
Repeatability	≤ 0.2mm	≤ 0.2mm
Hysteresis	≤ 1.5mm	≤ 1.5mm
EMC	EN 60947-5-2	EN 60947-5-2
Lifetime	≥ 35 Mio. cycles with PLC load	unlimited
Power-up pulse suppression	–	yes
Protection for inductive load	–	yes

**Mechanical Characteristics**

	Type RST	Type EST
Housing	Plastic / PA66 + PA6I red	
Cable cross section	2 x 0.14 mm <sup>2</sup>	3 x 0.14 mm <sup>2</sup>
Cable type	PUR, black	PUR, black
Bending radius	≥ 36mm	≥ 30mm
Weight (Mass)	ca. 0.030 kg (RST-K) ca. 0.010 kg (RST-S)	ca. 0.030 kg (EST-K) ca. 0.010 kg (EST-S)
Degree of protection	IP67 to EN 60529	
Ambient temperature range †	-25 to 80°C	-25 to 75°C at U <sub>B</sub> =10 – 30 V
– with adapter	-25 to 60°C	-25 to 80 °C at U <sub>B</sub> =10 – 28 V
Adapter tightening torque	0.15 Nm (tightening torque of screwing adapter)	
Shock resistance		
Vibration to EN 60068-2-6	G 15, 11 ms, 10 to 55 Hz, 1 mm	
Shock to EN 60068-2-27	G 50, 11 ms	
Bump to EN 60068-2-29	G 30, 11 ms, 1000 bumps each axis	

† For the magnetic switch temperature range, please take into account the surface temperature and the self-heating properties of the linear drive.

## Magnetic Switches RST and eST

### electrical Service Life Protective Measures

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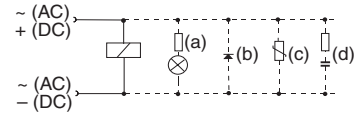
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- (a) Protective resistor for light bulb
- (b) Freewheel diode on inductively
- (c) Varistor on inductively
- (d) RC element on inductively



For the type EST, external protective circuits are not normally needed.

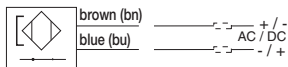
## Type RST

In the type RST contact is made by a mechanical reed switch encapsulated in glass.

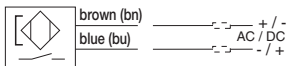
### electrical Connection

Type RST-K

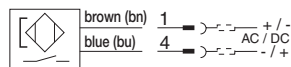
**n**ormally closed



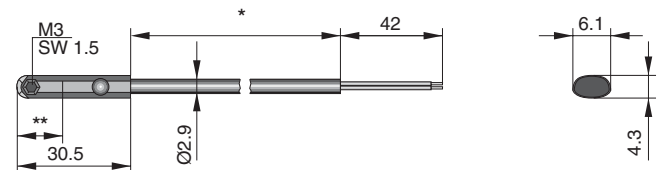
**n**ormally open



Type RST-S



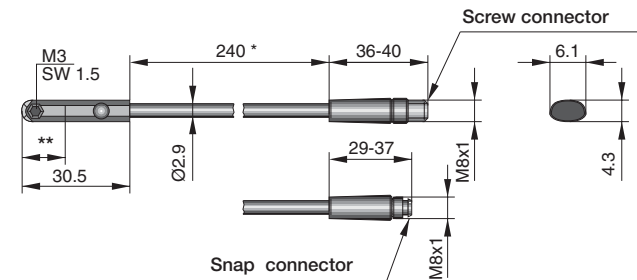
### Dimensions (mm) – Type RST-K, eST-K



\* Cable lengths available: 5000 mm ± 75 mm  
 2000 mm ± 40 mm

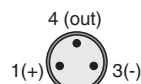
\*\* Switching point: Type RST-K Normally closed 14 mm  
 Type RST-K Normally open 12.3 mm  
 Type EST-K Normally open 8.1 mm

### Dimensions (mm) – Type RST-S, eST-S



\* ± 6 mm

\*\* Switching point: Type RST-K Normally closed 14 mm  
 Type RST-K Normally open 12.3 mm  
 Type EST-K Normally open 8.1 mm



**PIN assignment**  
 (view of pins)  
 to DIN EN 50044

## Type eST

In the type EST contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations. Connection is by 3-pole connector for easy disconnection. Fitted with connection cable 100 mm long with connector.

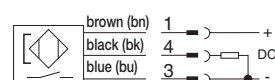
A 5 m cable with connector and open end can be ordered separately, or use the Order No. for the complete Type ES with 5 m cable.

### electrical Connection

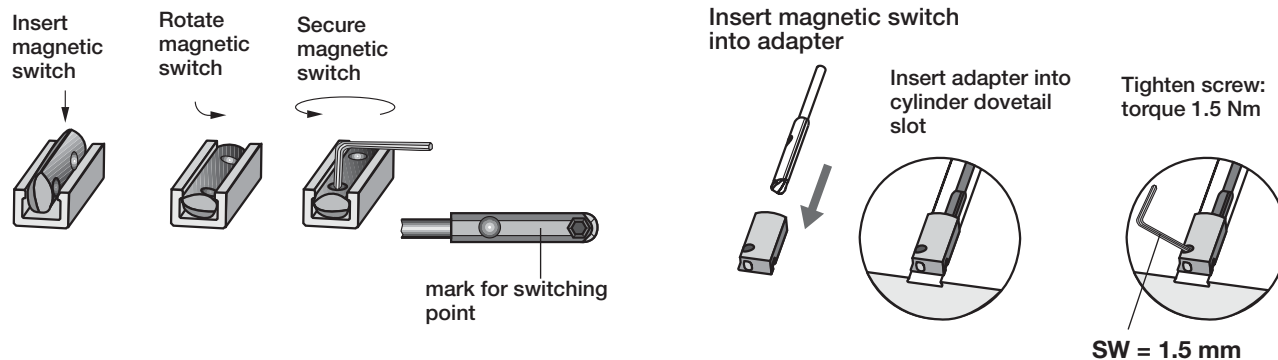
Type EST-K



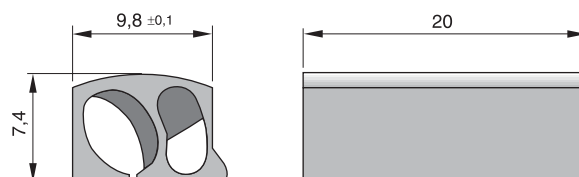
Type EST-S



## installation



## Dimensions of Adapter for Magnetic Switch



## Order instructions

Version	Voltage	Type	Part number
Magnetic switch, reed contact, normally open, LED indicator, cable 2 m	10-30 V AC / DC	RST-K	<b>P8S-GRFAX</b>
Magnetic switch, reed contact, normally open, LED indicator, cable 5 m	10-30 V AC / DC	RST-K	<b>P8S-GRFDX</b>
Magnetic switch, reed contact, normally open, snap connector M8, LED indicator, cable 0.24 m	10-30 V AC / DC	RST-S	<b>P8S-GRCHX</b>
Magnetic switch, reed contact, normally open, screw connector M8, LED indicator, cable 0.24 m	10-30 V AC / DC	RST-S	<b>P8S-GRCHX</b>
Magnetic switch, reed contact, normally closed, cable 5 m	10-30 V AC / DC	RST-K	<b>P8S-GeFRX</b>
Magnetic switch, electronic, PNP LED indicator, cable 2 m	10-30 V DC	EST-K	<b>P8S-GPFAX</b>
Magnetic switch, electronic, PNP LED indicator, cable 5 m	10-30 V DC	EST-K	<b>P8S-GPFDX</b>
Magnetic switch, electronic, PNP snap connector M8, LED indicator	10-30 V DC	EST-S	<b>P8S-GPCHX</b>
Magnetic switch, electronic, PNP screw connector M8, LED indicator	10-30 V DC	EST-S	<b>P8S-GPCHX</b>

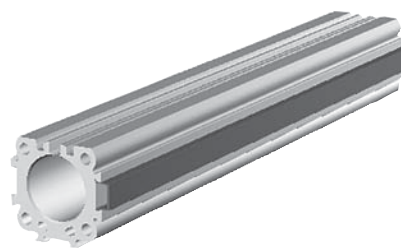
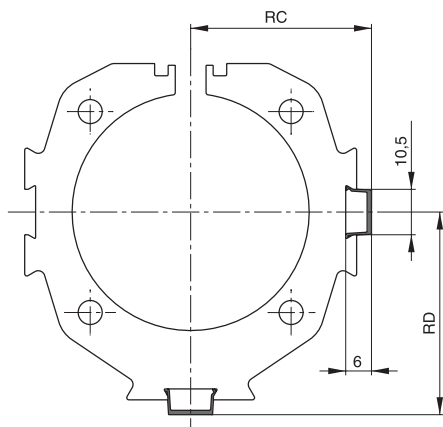
Included in delivery:  
1 magnetic switch and 1 adapter for dovetail groove mounting

## Accessories

Description	Type	Part number
Cable M8, 2.5 m without lock nut	KS25	<b>KY3240</b>
Cable M8, 5.0 m without lock nut	KS50	<b>KY3241</b>
Cable M8, 10.0 m without lock nut	KS100	<b>086620T010</b>
Cable M8, 2.5 m with lock nut	KSG25	<b>4041</b>
Cable M8, 5.0 m with lock nut	KSG50	<b>KC3104</b>
Adapter for dovetail groove (pack of 10)		<b>KL3333</b>

### Dovetail Cover, Ø16 to 80mm

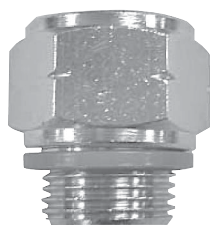
- For clean guidance of magnetic switch cables along the cylinder body.
- Contains a maximum of 3 cables with diameter 3 mm.
- Material: Plastic
- Color: Red
- Temperature Range: -10 to 80°C



#### Dimension (mm) and Order instructions

Series	Dimensions (mm)		Part number
	RC	RD	
OSP-P16	18.5	19	<b>13039FiL</b>  Minimal length: 1m Max. profile length: 2  Multiple profiles can be used.
OSP-P25	23.5	25.5	
OSP-P32	29.5	32	
OSP-P40	34.5	37.5	
OSP-P50	41.5	46.5	
OSP-P63	51.5	57.5	
OSP-P80	64.5	70.5	

### Metric Conversion Fittings



Bore Size	Port Size	Part number
P25	G1/8 to 1/8" NPT	<b>2521-1/8-02</b>
P32, P40, P50	G1/4 to 1/4" NPT	<b>2521-1/4-04</b>
P63	G3/8 to 3/8" NPT	<b>2521-3/8-06</b>
P80	G1/2 to 1/2" NPT	<b>2521-1/2-08</b>



Rodless Pneumatic  
Cylinders

OSP-P  
Series

P1X  
Series

P1Z  
Series

GDL  
Series

## Service Packs

	Bore sizes							
	10mm	16mm	25mm	32mm	40mm	50mm	63mm	80mm
BUNA service pack single piston	3085x(stroke)	11111x(stroke)	11112x(stroke)	11113x(stroke)	11114x(stroke)	11115x(stroke)	11116x(stroke)	11118x(stroke)
Fluorocarbon service pack, single piston	3086x(stroke)	11121x(stroke)	11122x(stroke)	11123x(stroke)	11124x(stroke)	11125x(stroke)	11126x(stroke)	11128x(stroke)
BUNA service pack single piston - slow speed grease	—	11131x(stroke)	11132x(stroke)	11133x(stroke)	11134x(stroke)	11135x(stroke)	11136x(stroke)	11138x(stroke)
Fluorocarbon service pack, single piston - slow speed grease	—	11141x(stroke)	11142x(stroke)	11143x(stroke)	11144x(stroke)	11145x(stroke)	11146x(stroke)	11148x(stroke)

**Note:** (stroke) = stroke of cylinder in mm

## Service Pack information

Service Packs contain all the components necessary to completely rebuild a Parker rodless cylinder, are available. Each pack contains a complete seal kit, inner and outer bands, Parker grease tube, cleaning tool and repair instructions. It's all packaged in an easy-to-ship, easy-to-store box clearly labeled to indicate the cylinder type, bore and stroke for which it is intended. Contact your local Parker distributor for more information.

## Seal &amp; Service Kits

	Bore sizes						
	16mm	25mm	32mm	40mm	50mm	63mm	80mm
BUNA seal kit - standard cylinder	11052	11053	11054	11055	11056	11057	11058
Fluorocarbon seal kit - standard cylinder	11059	11060	11061	11062	11063	11064	11065
Service kit active brake - sideline carriage	—	11095	11096	11097FiL	11098FiL	—	—
Service kit active brake - standard cylinder	—	11822FiL	11823FiL	11824FiL	11825FiL	11826FiL	11827FiL
Service kit - multibrake	—	11089FiL	11090FiL	11091FiL	11092FiL	11093FiL	—

## Seal Kit information

Seal Kits include all seals, a tube of grease, bearing shoe, scraper and cleaning tool.

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Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G94

**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

## Displacement Measuring System for Automated Movement

Series SFi-plus (incremental measuring system)  
for cylinder series

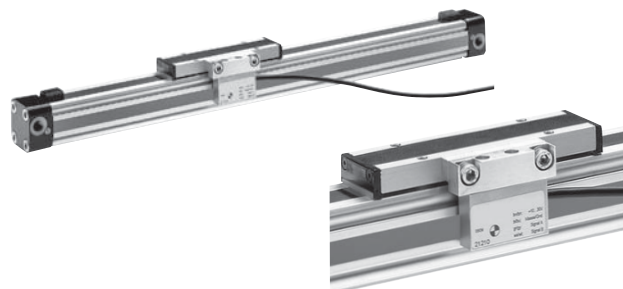
- OSP-P...

## Characteristics

- Contactless magnetic displacement measurement system
- Displacement length up to 5.5 m
- Resolution 0.1 mm (option: 1 mm)
- Displacement speed up to 10 m/s
- For linear and non-linear rotary motion
- Suitable for almost any control or display unit with a counter input

The SFi-plus magnetic displacement measuring system consists of 2 main components.

- **Measuring Scale**, self-adhesive magnetic measuring scale



- **Sensing Head**, converts the magnetic poles into electrical signals which are then processed by counter inputs downstream (e.g. PLC, PC, digital counter)

**Note:** For combinations Active Brake AB + SFi-plus + Magnetic Switch contact our technical department please.

## Characteristics

	Type 21210FIL	Type 21211FIL
<b>Output Function</b>		
Resolution	0.1mm	1mm
Pole lengths magnetic scale	5mm	5mm
Maximum speed	10 m/s	10 m/s
Repeat accuracy	± 1 Increment	± 1 Increment
Distance between sensor and scale	≤ 4mm	≤ 4mm
Tangential deviation	≤ 5°	≤ 5°
Lateral deviation	≤ ± 1.5 mm	≤ ± 1.5 mm
Switching output	PNP	PNP
<b>electrical Characteristics</b>		
Operating voltage $U_b$	18 – 30 V DC	18 – 30 V DC
Voltage drop	≤ 2 V	≤ 2 V
Continuous current for each output	≤ 20 mA	≤ 20 mA
Power consumption at $U_b = 24V$ , switched on, without load	≤ 50 mA	≤ 50 mA
Short-circuit protection	yes	yes
Reverse polarity protection	–	yes
Protection from inductive load	yes	yes
Power-up pulse suppression	yes	yes

	Type 21210FIL / 21211FIL
<b>eMC</b>	
Electrostatic discharge immunity	6, B, to EN 61000-4-2 kV
Electromagnetic field immunity	10, A, to EN61000-4-3 V/m
Electrical fast transient/burst immunity (for signal connections)	1, B, to EN 61000-4-4 kV
Electrical fast transient/burst immunity (for DC connections)	2, B, to EN 61000-4-4 kV
Surge immunity (for signal connections)	1, B, to EN 61000-4-5 kV
Surge immunity (for DC connections)	0,5, B, to EN 61000-4-5 kV
Immunity to conducted disturbances	10, A, to EN 61000-4-6 V
Power frequency magnetic field immunity at 50 Hz	30, A, to EN 61000-4-8 A/m
Emission standard for residential	to EN 61000-6-4
Radio disturbance characteristics	to EN 55011, Group 1, A

## Mechanical Characteristics

Housing	Aluminum
Cable length	5.0 m – fixed, open en
Cable cross section	4 x 0.14 mm <sup>2</sup>
Cable type	PUR, black
Bending radius	≥ 36 mm
Weigh (mass)	ca. 0.165 kg

## environmental Conditions / Shock Resistance

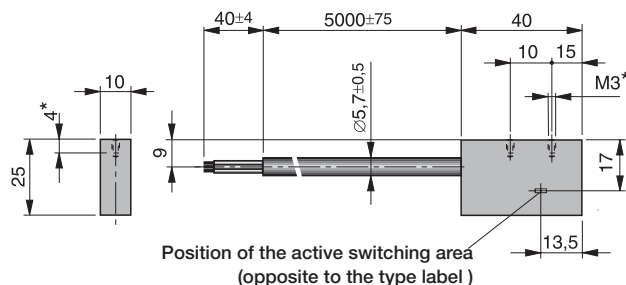
Degree of protection	IP67 to EN60529
Ambient temperature range	-25°C to 80°C
Broad-band random vibration to EN 60068-2-64	5 g, 5 Hz to 2 kHz, 0.5 h each axis
Vibration stress to EN 60068-2-6	12 g, 10 Hz to 2 kHz, 2 mm, 5 h each axis
Shock to EN 60068-2-27	100 g, 6 ms, 50 bumps each axis
Bump to EN 60068-2-29	5 g, 2 ms, 8000 bumps each axis

**Sensing Head**

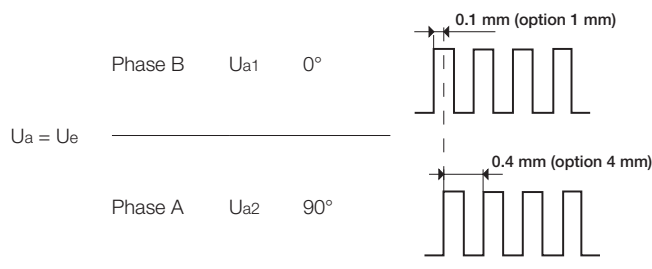
The sensing head provides two pulsating, 90° out of phase counter signals (phase A/B) with a 0.4 mm resolution (option 4 mm).

External processing can improve the resolution to 0.1 mm (option 1 mm).

The counting direction can be determined automatically from the phase variance of the counter signals.

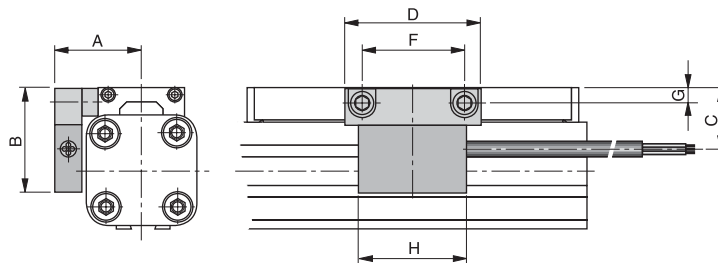
**electrical Connection**

Color7	Description
RD = Red	10-30 VDC
BL = Black	Ground
YE = Yellow	Phase A
GN = Green	Phase B

**Output signal – Sensing Head****SFi-plus mounted on a rodless cylinder series OSP-P**

The SFi-plus system can be mounted directly on a rodless OSP-P cylinder with the special mounting kit.

The position of the sensing head is generally 90° to the carrier.



**Combinations consisting of SFi-plus and OSP-P Cylinders with guides are available on request.**

**Dimension (mm)**

Series	A	B	C	D	F	G	H
OSP-P25	32	39	23	50	38	5.5	40
OSP-P32	37.5	46	30	50	38	6.5	40
OSP-P40	42.5	50	34	50	38	6.5	40
OSP-P50	49.5	55	39	50	38	6.5	40
OSP-P63	59.5	65	49	50	38	10	40
OSP-P80	72.5	80	64	50	38	12	40



## Order instructions

Description	Part number
Sensing head with measuring scale – Resolution 0.1 mm (scale length = required measuring distance + a minimum of – see table below)	<b>21240x(stroke)</b>
Option: Sensing head with measuring scale – Resolution 1 mm (scale length = required measuring distance + a minimum of – see table below)	<b>21241x(stroke)</b>
Sensing head – Resolution 0.1 mm (spare part)	<b>21210FiL</b>
Option: Sensing head – Resolution 1 mm (spare part)	<b>21211FiL</b>
Measuring scale per meter (spare part)	<b>21235FiL</b>
Mounting kit for OSP-P25	<b>21213FiL</b>
Mounting kit for OSP-P32	<b>21214FiL</b>
Mounting kit for OSP-P40	<b>21215FiL</b>
Mounting kit for OSP-P50	<b>21216FiL</b>
Mounting kit for OSP-P63	<b>21217FiL</b>
Mounting kit for OSP-P80	<b>21218FiL</b>

\* Overall length of the measuring scale results from stroke length of the cylinder + dead length  
Dead length for linear drives series OSP-P see table.

Series	Dead length (mm)
<b>OSP-P 25</b>	154
<b>OSP-P 32</b>	196
<b>OSP-P 40</b>	240
<b>OSP-P 50</b>	280
<b>OSP-P 63</b>	350
<b>OSP-P 80</b>	422

## Example:

Cylinder OSP-P, Ø25 mm, stroke length 1000 mm

$$\begin{array}{rclclcl}
 \text{dead length} & + & \text{stroke length} & = & \text{overall length of the measuring scale} \\
 154 \text{ mm} & + & 1000 \text{ mm} & = & 1154 \text{ mm}
 \end{array}$$



Rodless Pneumatic  
Cylinders

OSP-P  
Series

P1X  
Series

P1Z  
Series

GDL  
Series

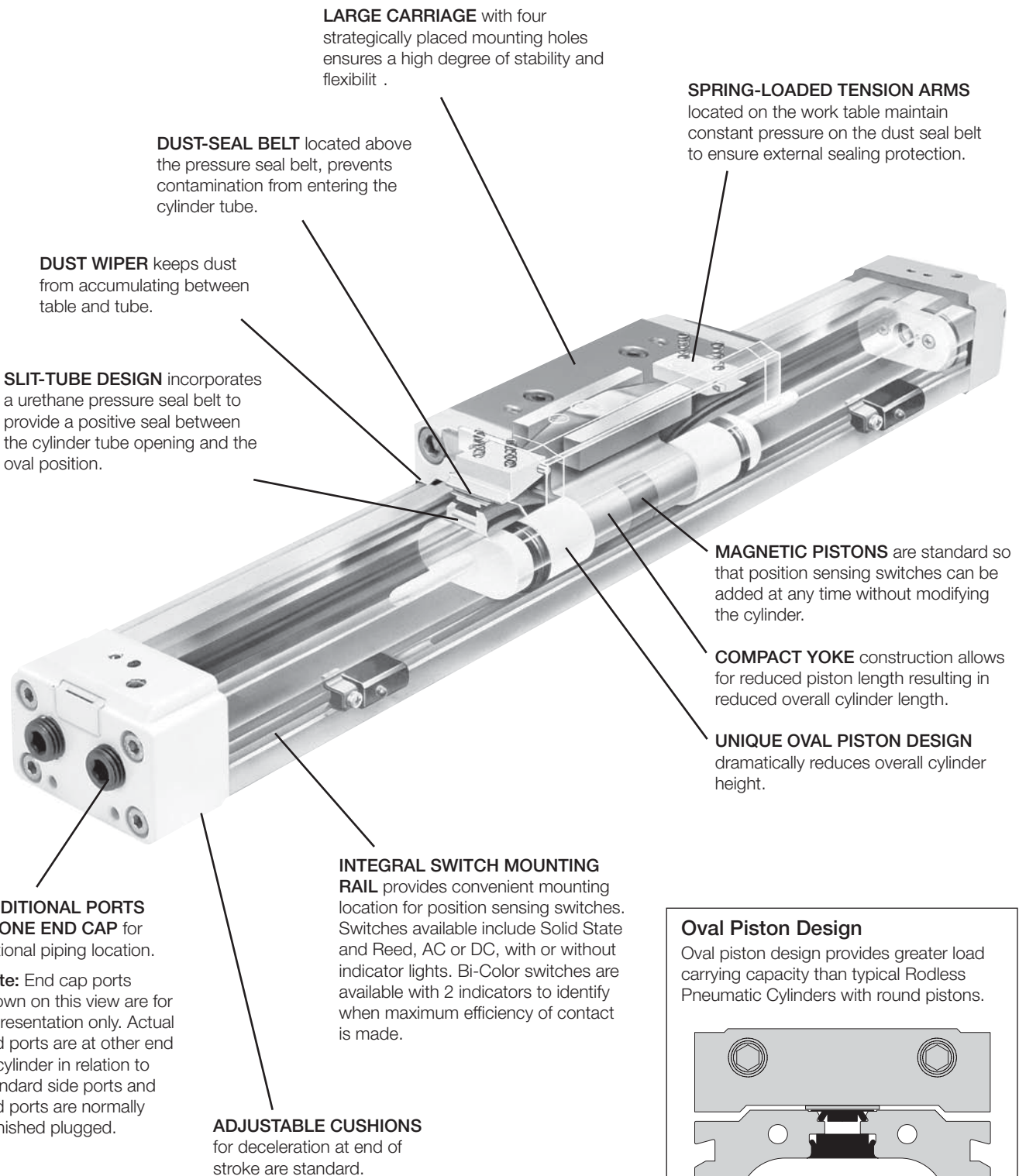


For inventory, lead time, and kit  
lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G97

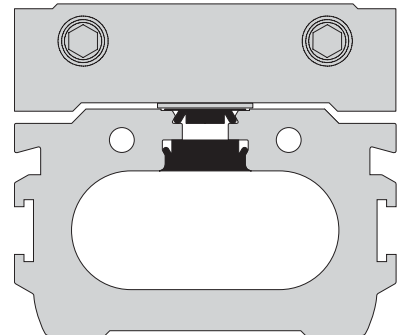
**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

## P1X Series



## Oval Piston Design

Oval piston design provides greater load carrying capacity than typical Rodless Pneumatic Cylinders with round pistons.



<b>G</b> Rodless Pneumatic Cylinders	OSP-P Series
	P1X Series
	P1Z Series
	GDL Series

## Features

- 7 bore sizes – 16mm through 63mm
- Two port locations standard
- Large carriage for stability
- Integral sensor mounting rail
- Optional adjustable stroke and shock absorbers
- Maximum stroke 5000mm

## Rodless Pneumatic Cylinders P1X Series



### Operating information

Maximum pressure:	100 PSIG (7 bar)
Minimum pressure:	<div> <div> <div>Ø16, Ø20 bores</div> <div>29 PSI (2 bar)</div> </div> <div> <div>Ø25, Ø32, Ø40 bores</div> <div>14.5 PSI (1 bar)</div> </div> <div> <div>Ø50, Ø63 bores</div> <div>7 PSI (0.5 bar)</div> </div> </div>
Proof pressure:	152 PSI (10.5 bar)
Temperature range:	40°F to 140°F (5°C to 60°C)
Filtration requirements:	Filtered, nonlubricated compressed air

### Ordering information

<b>P1X</b>	<b>n</b>	<b>032</b>	<b>D</b>	<b>A</b>	<b>n</b>	<b>0500</b>	<b>W</b>	<b>D</b>	<b>n</b>	<b>n</b>	<b>n</b>	<b>-B</b>																			
<b>Series</b> <b>P1X</b> Global Rodless	<b>Construction</b> <b>N</b> Inch <b>M</b> Metric	<b>Bore size</b> <b>016</b> 16mm <b>020</b> 20mm <b>025</b> 25mm <b>032</b> 32mm <b>040</b> 40mm <b>050</b> 50mm <b>063</b> 63mm	<b>Carriage</b> <b>D</b> Double acting	<b>Piston / Shock style</b> <b>A</b> Cushions both ends (standard) <b>R</b> Cushion right end only* <b>L</b> Cushion left end only* <b>N</b> No cushions or shock absorbers <b>H</b> Shock absorber both ends <b>B</b> Shock absorber right end only <b>C</b> Shock absorber left end only	<b>Seal material</b> <b>N</b> Standard	<b>Stroke length*</b> <b>0500</b>	<b>Basic or options</b> <b>B</b> <sup>†</sup> Standard <b>W</b> <sup>†</sup> With options <b>/</b> Special (for factory use only)	<b>Porting options</b> <b>N</b> NPTF (Std) <b>G</b> BSPP <b>Q</b> BSPT* <small>* Not available with N construction</small>	<b>Carriage mounting style</b> <b>D</b> Basic mount <b>A</b> Swivel mount <b>G</b> Inverted swivel mount	<b>Mounting options</b> <table border="1"> <tr> <th>No Foot mount</th> <th>End mount foot bracket</th> <th>Bottom mount foot bracket</th> <th>Intermediate supports</th> </tr> <tr> <td><b>N</b> (std)</td> <td><b>F</b></td> <td><b>A</b><sup>††</sup></td> <td>No support</td> </tr> <tr> <td><b>H</b></td> <td><b>M</b></td> <td><b>B</b><sup>††</sup></td> <td>One support</td> </tr> <tr> <td><b>K</b></td> <td><b>P</b></td> <td><b>C</b><sup>††</sup></td> <td>Two supports</td> </tr> <tr> <td><b>T</b></td> <td><b>R</b></td> <td><b>D</b><sup>††</sup></td> <td>Three supports</td> </tr> </table>	No Foot mount	End mount foot bracket	Bottom mount foot bracket	Intermediate supports	<b>N</b> (std)	<b>F</b>	<b>A</b> <sup>††</sup>	No support	<b>H</b>	<b>M</b>	<b>B</b> <sup>††</sup>	One support	<b>K</b>	<b>P</b>	<b>C</b> <sup>††</sup>	Two supports	<b>T</b>	<b>R</b>	<b>D</b> <sup>††</sup>	Three supports	<b>Fastener Type</b> <b>N</b> Standard - zinc-plated <b>S</b> Stainless steel
No Foot mount	End mount foot bracket	Bottom mount foot bracket	Intermediate supports																												
<b>N</b> (std)	<b>F</b>	<b>A</b> <sup>††</sup>	No support																												
<b>H</b>	<b>M</b>	<b>B</b> <sup>††</sup>	One support																												
<b>K</b>	<b>P</b>	<b>C</b> <sup>††</sup>	Two supports																												
<b>T</b>	<b>R</b>	<b>D</b> <sup>††</sup>	Three supports																												

\* Stroke is ALWAYS in mm.

† When "B" is specified, the remaining digits in the part number are not necessary. If "W" is used, the remaining digits in the part number must be filled out.

†† Not available on 40, 50 and 63mm bore sizes.

☐ Essential Information  
☒ Optional Features

**Sensors**  
 See section L for sensors.

**G**

 Rodless Pneumatic  
Cylinders

 OSP-P  
Series

 P1X  
Series

 P1Z  
Series

 GDL  
Series

## Specifications - P1X (standard with switch)

- Operating Medium: Compressed Air
- Bore Size mm (inch nominal): 16 (5/8) 20 (3/4), 25 (1) 32 (1-1/4), 40 (1-1/2) 50 (2), 63 (2-1/2)
- Port Size – N Series: M5 (10-32) 1/8 NPT 1/4 NPT 3/8 NPT
- Port Size – M Series: M5 (10-32) 1/8 Rc 1/4 Rc 3/8 Rc
- Stroke Tolerance in.:  $\pm 0.080$  to 39"  $\pm 0.100$  to 118"  $\pm 0.120$  to 196"
- Piston Speed, \*in./sec.: 2-80 IPS with side ports on each end  
( $\varnothing 16$  &  $\varnothing 20$  bores 2-40 IPS with single end porting with 39" stroke)  
( $\varnothing 25$ ,  $\varnothing 32$ ,  $\varnothing 40$ ,  $\varnothing 50$  &  $\varnothing 63$  bores 2-40 IPS with single end porting with 78" stroke)
- Cushion: Air Cushion Standard
- Lubrication: Not Required (if you choose to lubricate your system, continuing lubrication will be required.)

\*Note: Actual piston speed with one end ports will vary depending on stroke length.

## Weight &amp; Theoretical Force Characteristics

		Weights								Theoretical Force (lbs)				
		Weight at Zero Stroke								at Pressure (PSI)				
Bore	Area In <sup>2</sup>	M00		MLB		MLB1		Weight per 1" (25.4mm) Stroke						
		lbs	kg	lbs	kg	lbs	kg	lbs	kg	30	40	60	80	100
16	0.31	0.70	0.3	0.73	0.3	0.77	0.4	0.07	0.03	9	12	19	25	31
20	0.49	1.15	0.5	1.19	0.5	1.28	0.6	0.10	0.04	15	20	29	39	49
25	0.84	2.21	1.0	2.43	1.1	2.43	1.1	0.15	0.07	23	30	46	61	76
32	1.26	3.31	1.5	3.53	1.6	3.75	1.7	0.20	0.09	38	50	69	100	125
40	1.96	5.29	2.4	5.51	2.5	—	—	0.27	0.12	59	78	117	156	195
50	3.08	7.94	3.6	8.16	3.7	—	—	0.40	0.18	91	122	182	243	304
63	4.86	13.67	6.2	14.33	6.5	—	—	0.63	0.28	145	193	290	386	483

## Replacement Seal Kits

(includes inner &amp; outer bands)

Bore (mm)	Part number
16	L079020016-(stroke)
20	L079020020-(stroke)
25	L080100025-(stroke)
32	L080100032-(stroke)
40	L080100040-(stroke)
50	L080100050-(stroke)
63	L080100063-(stroke)

## Moments

Figure 1 shows the maximum allowable moments for each of the three types of loading: pitch, roll and yaw.

The sum total of each of these types of moments, divided by each of the maximum values, determines a Load-Moment Factor (LMF) should be equal to or less than 1.0. On horizontal mountings, the total load (L) should also be divided by the maximum load allowable (Figure 2) and factored into the equation.

Horizontal mountings:

$$\frac{L}{[L]} + \frac{M}{[M]} + \frac{M_s}{[M_s]} + \frac{M_v}{[M_v]} = LMF \leq 1.0$$

Vertical mountings:

$$\frac{M}{[M]} + \frac{M_s}{[M_s]} + \frac{M_v}{[M_v]} = LMF \leq 1.0$$

**Figure 1**

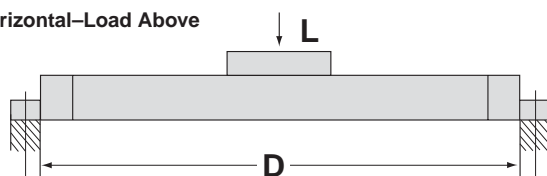
Maximum allowable moments n-m (lb-in)

Bore size	[M]		[Ms]		[Mv]	
	Pitch moment		Roll moment		Yaw moment	
	Std.	Inverted	Std.	Inverted	Std.	Inverted
16	5 (44)	3.5 (31)	1 (9)	0.5 (4)	1 (9)	1 (9)
20	10 (89)	7 (62)	1.5 (13)	0.7 (6)	3 (27)	3 (27)
25	17 (150)	12 (106)	5 (44)	2.5 (22)	10 (89)	10 (89)
32	36 (319)	25 (221)	10 (89)	5 (44)	21 (186)	21 (186)
40	77 (682)	54 (478)	23 (204)	11.5 (102)	26 (230)	26 (230)
50	154 (1363)	108 (956)	32 (283)	16 (142)	42 (372)	42 (372)
63	275 (2434)	193 (1708)	52 (460)	26 (230)	76 (673)	76 (673)

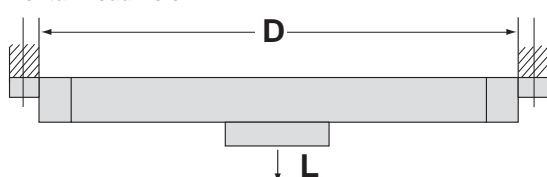
## Load and Deflectio

Figure 2 shows the maximum load [L] that the cylinder can accept, as well as the maximum length [D] between supports at the maximum load.

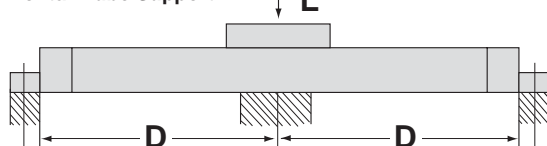
Horizontal—Load Above



Horizontal—Load Below



Horizontal—Tube Support

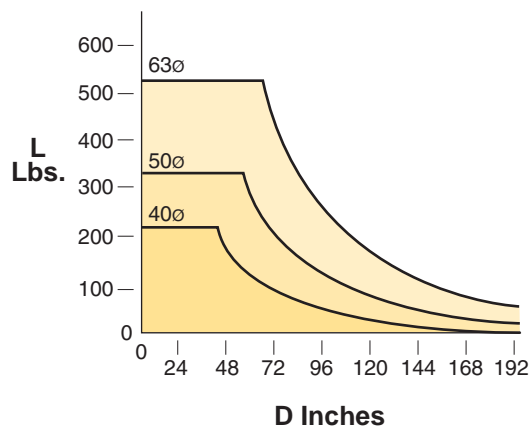
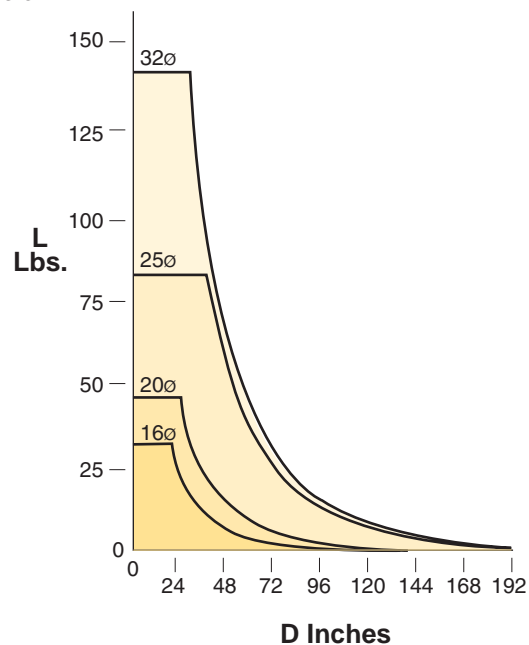


**Figure 2**

Bore size	Max. allowable load [L] N (lbs)		Max. unsupported length mm (in) at max. load
	Std.	Inverted	
16	141 (32)	70 (16)	450 (17.7)
20	198 (45)	101 (23)	551 (21.7)
25	356 (81)	180 (41)	899 (35.4)
32	616 (140)	308 (70)	749 (29.5)
40	959 (218)	480 (109)	1000 (39.4)
50	1456 (331)	726 (165)	1300 (51.2)
63	2297 (522)	1148 (261)	1600 (63.0)

Acceptable length and load combinations for various bore sizes can be determined from the charts in Figure 3.

**Figure 3**



To determine cylinder deflections under the load (or resistive force perpendicular to the piston table) without mid-support, see the graphs on page G103.

## Inertia Moment Consideration

When the weight is stopped at the end of the stroke by the cylinder cushion, inertial force is created. This inertial force ( $F_i$ ) can be determined by using the formula:

$$F_i = LG$$

**L** = Load attached to the cylinder carriage (lbs.)

**G** = Inertia factor (Figure 1)

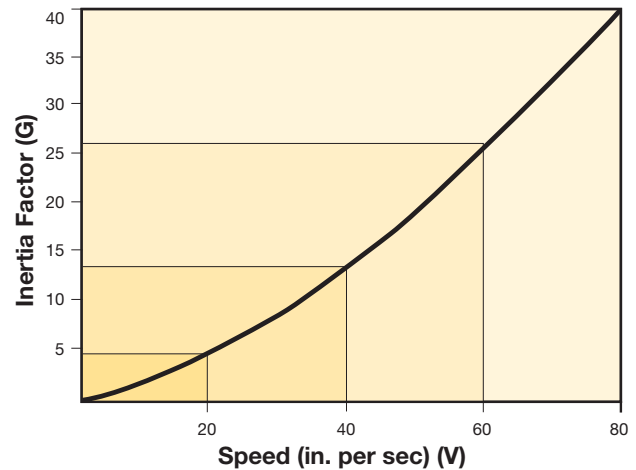
### Example:

A speed of 40 in/sec corresponds to an inertia factor G of 13.

The inertial force calculated would then be multiplied by the distance from the center of gravity of the load to the centerline of the cylinder, and added to the previously calculated M and Mv moments. This will give an M Total and Mv Total. Ensure that the M Total and the Mv Total do not exceed the [M] and [Mv] values shown in Figure 5 (previous page). If they exceed these values, consult the factory.

See pages G112-G114 for additional information on shock absorbers.

**Figure 1**

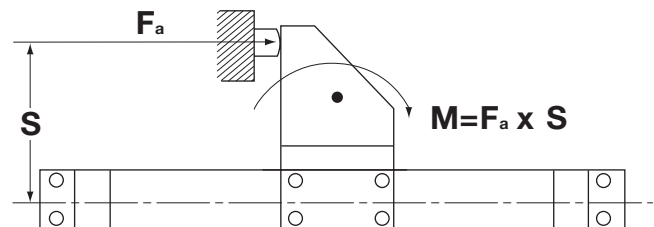


## external Stops

When the load attached to the cylinder is stopped externally, it creates an additional moment equal to the cylinder force ( $F_a$ ) times the distance ( $S$ ). This additional moment, plus the previously calculated Load-Moment factor, should not exceed the allowable values. See previous page.

When reducing the stroke with external stops, remember that the cushion length and the energy absorption capacity are not directly proportional. Reducing the cushioning distance by 50% corresponds to a reduction of 60-70% in cushion effectiveness.

**Figure 9**



**G**

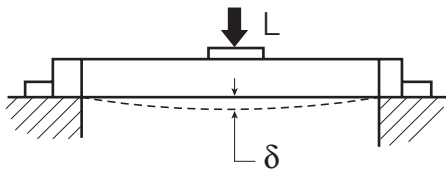
Rodless Pneumatic  
Cylinders

OSP-P  
Series

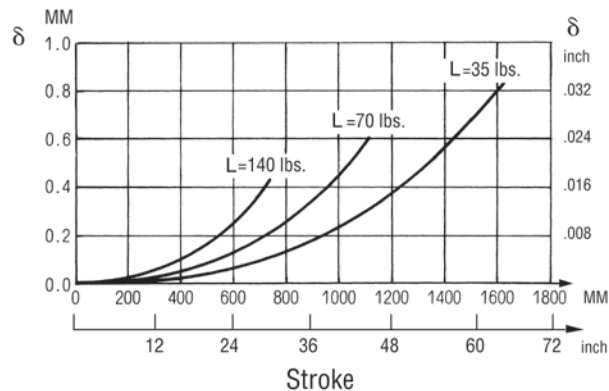
P1X  
Series

P1Z  
Series

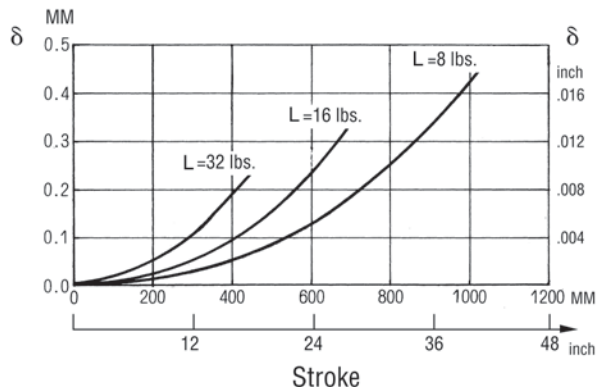
GDL  
Series



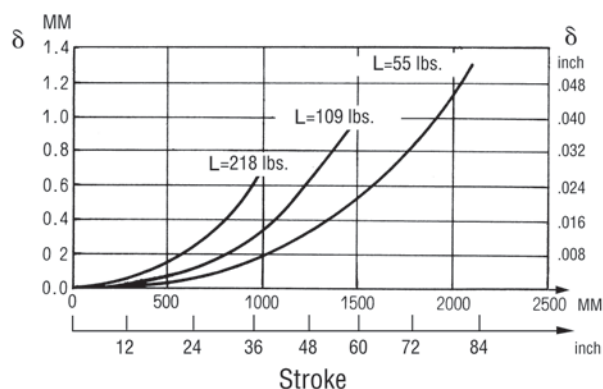
**32 mm Bore**



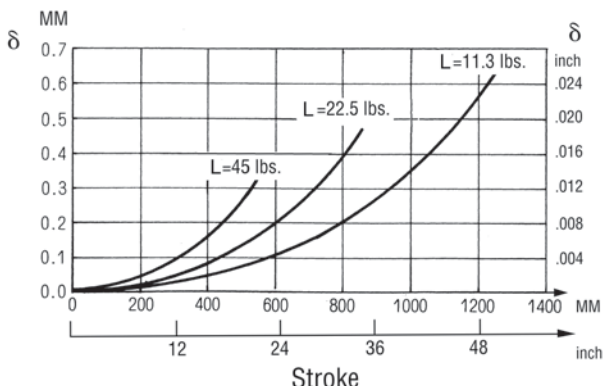
**16 mm Bore**



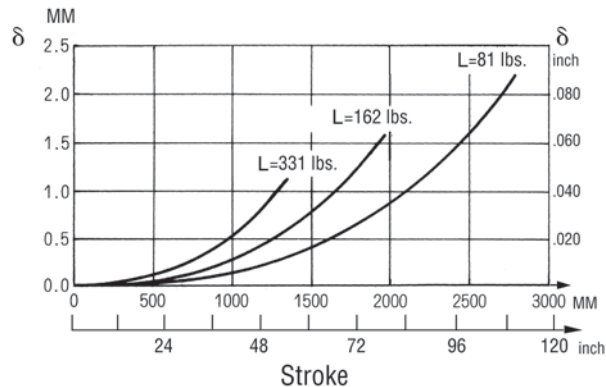
**40 mm Bore**



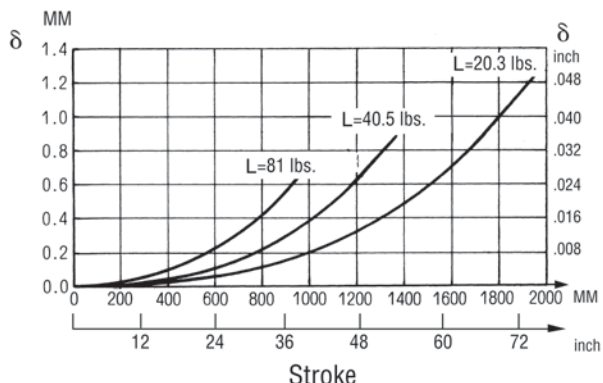
**20 mm Bore**



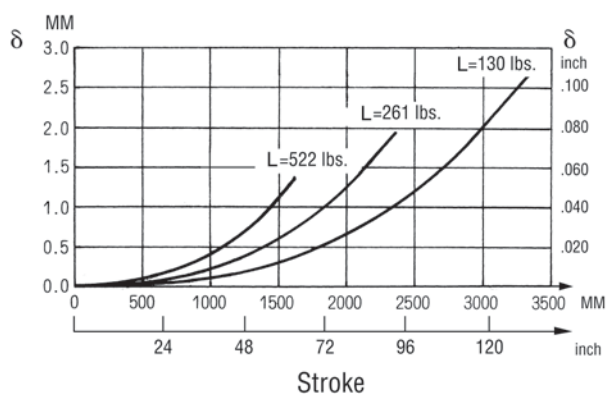
**50 mm Bore**



**25 mm Bore**

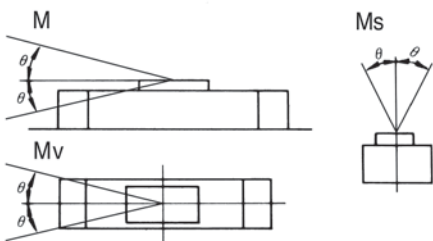


**63 mm Bore**

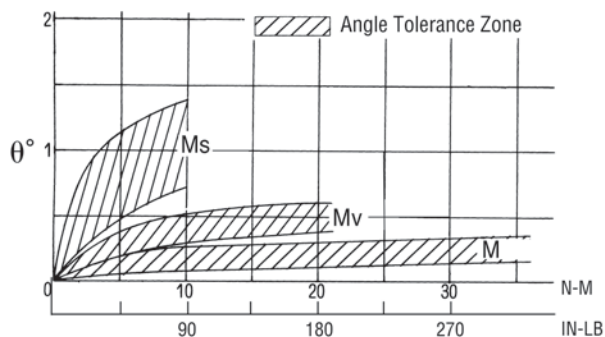




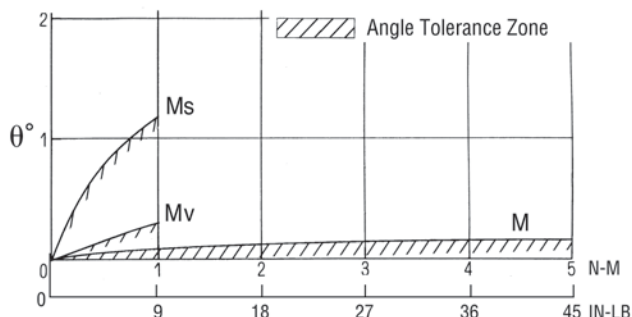
**Piston Table Angular Deflection Due o Load Moments Applied**



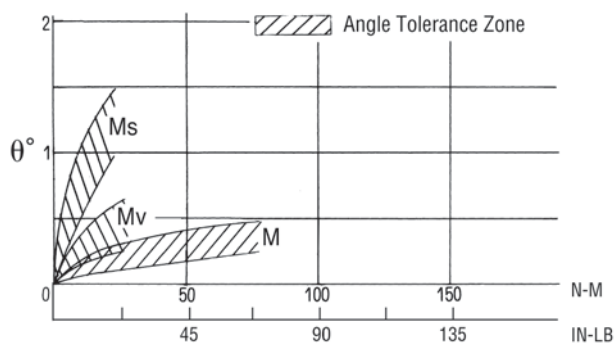
**32 mm Bore**



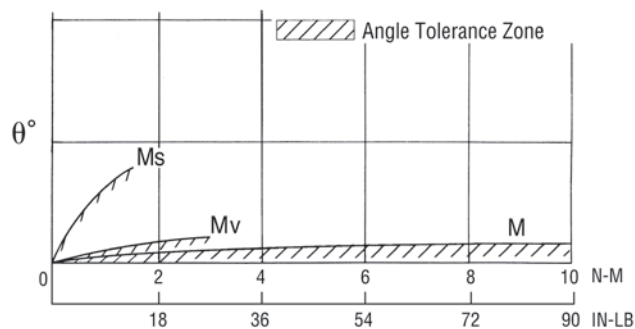
**16 mm Bore**



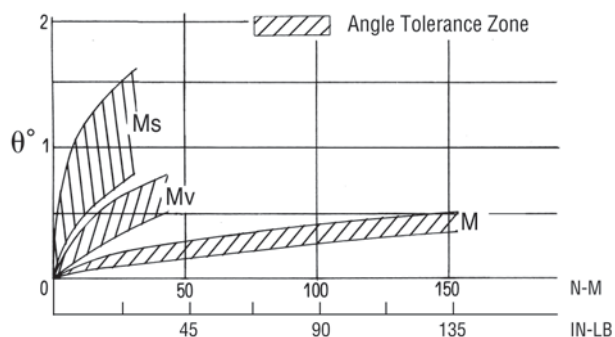
**40 mm Bore**



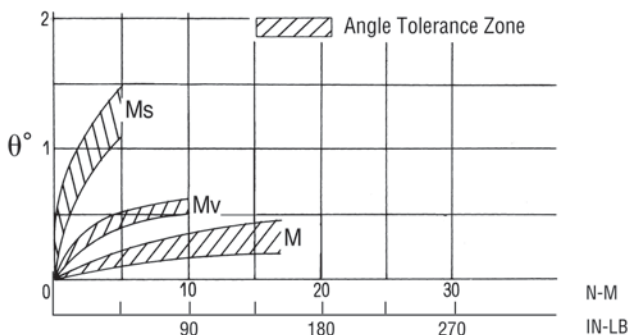
**20 mm Bore**



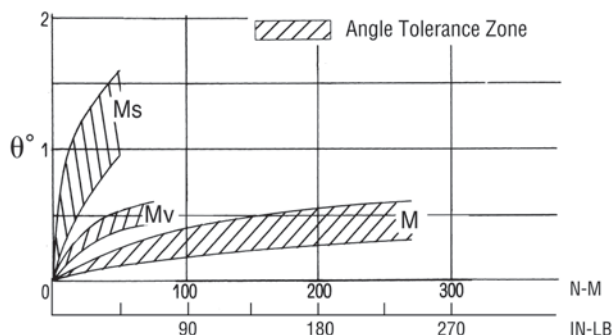
**50 mm Bore**



**25 mm Bore**



**63 mm Bore**



G

Rodless Pneumatic  
Cylinders

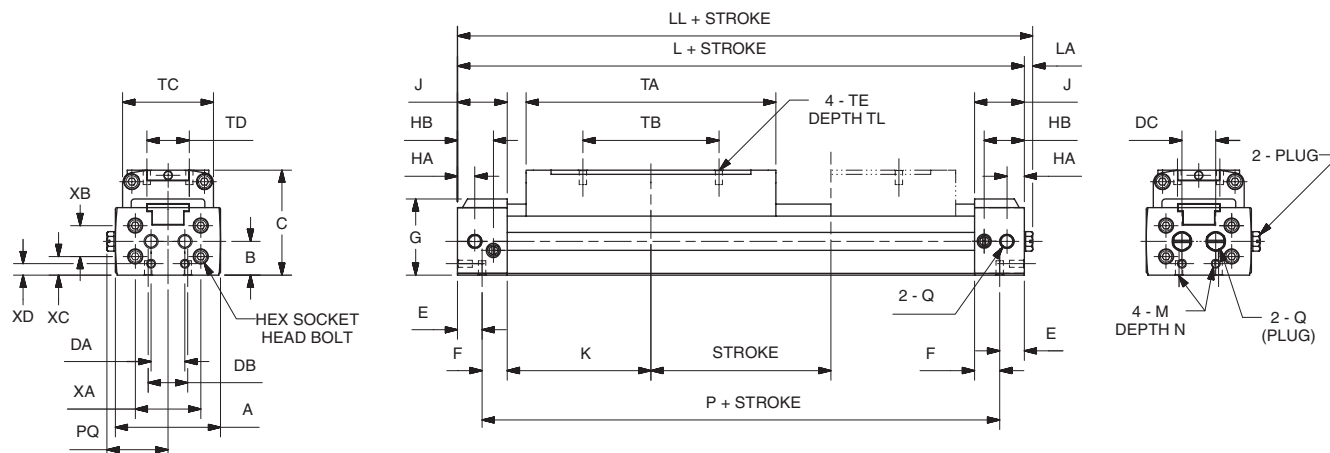
OSP-P  
Series

P1X  
Series

P1Z  
Series

GDL  
Series

**Basic Cylinder**



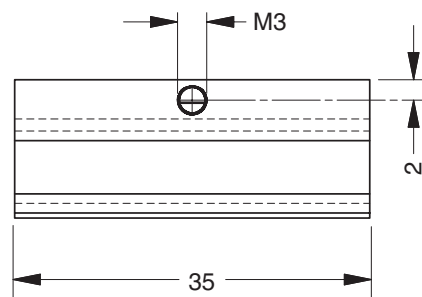
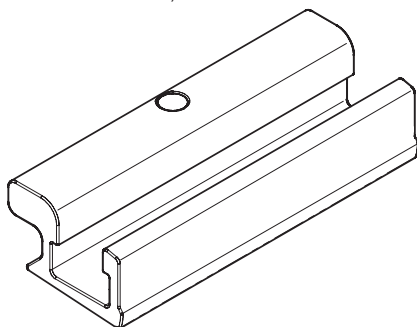
Bore (mm)	A	B	C	DA	DB	DC	E	F	G	HA	HB	J	K	L	LL	LA	M	N
16	1.46 (37)	0.47 (12)	1.46 (37)	0.47 (12)	0.55 (14)	0.47 (12)	0.34 (8.5)	0.35 (9)	1.06 (27)	0.24 (6)	0.55 (14)	0.69 (17.5)	2.24 (57)	5.87 (149)	5.98 (152)	0.12 (3)	5-40 (M3)	0.20 (5)
20	1.73 (44)	0.55 (14)	1.65 (42)	0.55 (14)	0.63 (16)	0.63 (16)	0.41 (10.5)	0.45 (11.5)	1.22 (31)	0.34 (8.5)	0.73 (18.5)	0.87 (22)	2.46 (62.5)	6.65 (169)	6.75 (171.5)	0.10 (2.5)	8-32 (M4)	0.26 (6.5)

Bore (mm)	P	PQ	Q	TA	TB	TC	TD	TE	TL	XA	XB	XC	XD
16	5.20 (132)	0.83 (21)	10-32 NPT (M5)	3.47 (88)	1.89 (48)	1.26 (32)	0.59 (15)	5-40 (M3)	0.20 (5)	0.91 (23)	0.43 (11)	0.26 (6.5)	0.16 (4)
20	5.83 (148)	0.97 (24.5)	1/8 NPT (1/8 Rc)	3.94 (100)	2.36 (60)	1.50 (38)	0.71 (18)	8-32 (M4)	0.24 (6)	1.10 (28)	0.63 (16)	0.24 (6)	0.20 (5)

inches (mm)

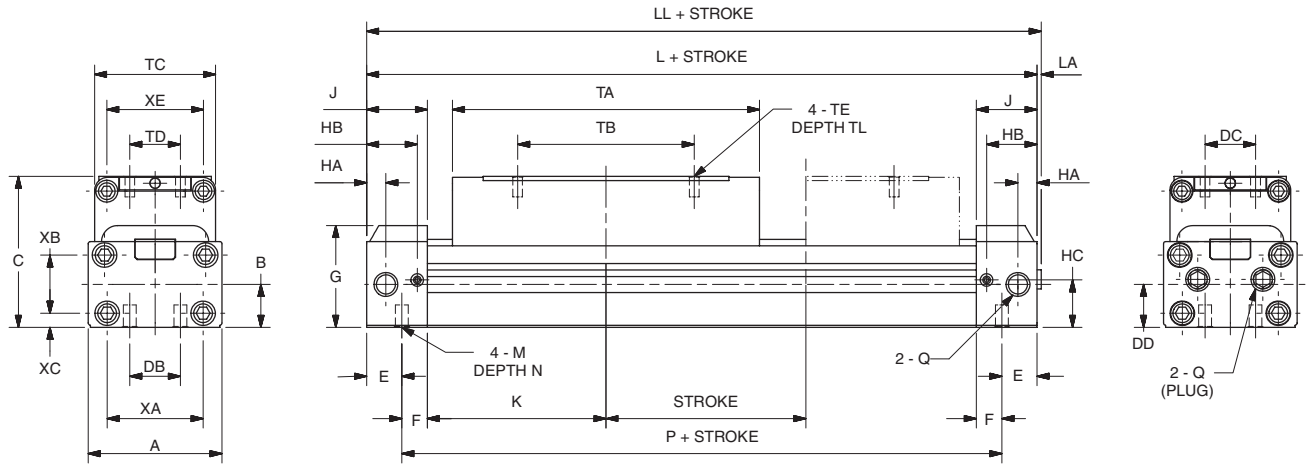
**Sensor adapter bracket**

**Part number P8S-TMA0Y**  
 (Shown larger than actual size)



**NOTE:** Must be ordered separately when ordering sensors.

Basic Cylinder



Bore (mm)	A	B	C	DB	DC	DD	E	F	G	HA	HB	HC	J	K	L	LL	LA	M	N
25	2.09 (53)	0.67 (17)	2.09 (53)	0.79 (20)	1.02 (26)	0.75 (19)	0.55 (14)	0.39 (10)	1.59 (40.5)	0.30 (7.5)	0.79 (20)	0.74 (18.9)	0.95 (24)	2.80 (71)	7.48 (190)	7.56 (192)	0.08 (2)	1/4-20 (M6)	0.35 (9)
32	2.60 (66)	0.73 (18.5)	2.24 (57)	1.26 (32)	1.06 (27)	0.83 (21)	0.59 (15)	0.51 (13)	1.71 (43.5)	0.39 (10)	0.93 (23.5)	0.85 (21.5)	1.10 (28)	3.35 (85)	8.90 (226)	9.00 (228.5)	0.10 (2.5)	1/4-20 (M6)	0.35 (9)
40	3.15 (80)	0.87 (22)	2.64 (67)	1.42 (36)	1.38 (35)	1.10 (28)	0.67 (17)	0.55 (14)	2.03 (51.5)	0.51 (13)	1.02 (26)	1.06 (27)	1.22 (31)	3.58 (91)	9.61 (244)	9.71 (246.5)	0.10 (2.5)	5/16-18 (M8)	0.47 (12)
50	3.78 (96)	1.10 (28)	3.23 (82)	1.77 (45)	1.38 (35)	1.38 (35)	0.91 (23)	0.63 (16)	2.40 (61)	0.59 (15)	1.30 (33)	1.39 (35.3)	1.54 (39)	3.54 (90)	10.16 (258)	10.26 (260.5)	0.10 (2.5)	5/16-18 (M8)	0.47 (12)
63	4.65 (118)	1.38 (35)	3.74 (95)	1.97 (50)	1.54 (39)	1.65 (42)	0.75 (19)	0.79 (20)	2.91 (74)	0.59 (15)	1.26 (32)	1.69 (43)	1.54 (39)	4.29 (109)	11.65 (296)	11.75 (298.5)	0.10 (2.5)	3/8-16 (M10)	0.59 (15)

Bore (mm)	P	Q	TA	TB	TC	TD	TE	TL	XA	XB	XC	XE
25	6.38 (162)	1/8 NPT (1/8 Rc)	4.80 (122)	2.76 (70)	1.89 (48)	0.79 (20)	10-24 (M5)	0.32 (8)	1.50 (38)	0.91 (23)	0.22 (5.5)	1.58 (40)
32	7.72 (196)	1/4 NPT (1/4 Rc)	5.28 (134)	3.15 (80)	2.21 (56)	0.79 (20)	1/4-20 (M6)	0.35 (9)	1.89 (48)	0.98 (25)	0.24 (6)	1.85 (47)
40	8.27 (210)	1/4 NPT (1/4 Rc)	5.83 (148)	3.54 (90)	2.68 (68)	1.18 (30)	1/4-20 (M6)	0.43 (11)	2.36 (60)	1.18 (30)	0.28 (7)	2.28 (58)
50	8.35 (212)	3/8 NPT (3/8 Rc)	5.98 (152)	3.94 (100)	3.15 (80)	1.18 (30)	5/16-18 (M8)	0.51 (13)	2.91 (74)	1.42 (36)	0.39 (10)	2.76 (70)
63	10.16 (258)	3/8 NPT (3/8 Rc)	6.61 (168)	4.33 (110)	4.02 (102)	1.58 (40)	5/16-18 (M8)	0.51 (13)	3.78 (96)	1.65 (42)	0.55 (14)	3.54 (90)

inches (mm)

G  
Rodless Pneumatic  
Cylinders  
OSP-P  
Series  
P1X  
Series  
P1Z  
Series  
GDL  
Series



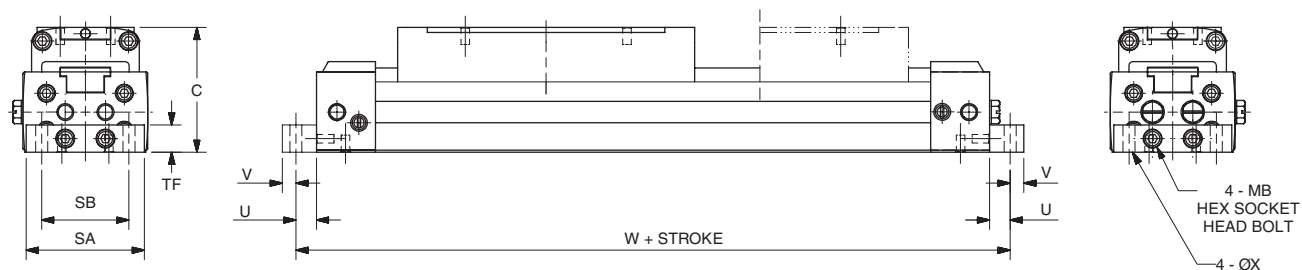
For inventory, lead times, and kit  
lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G106

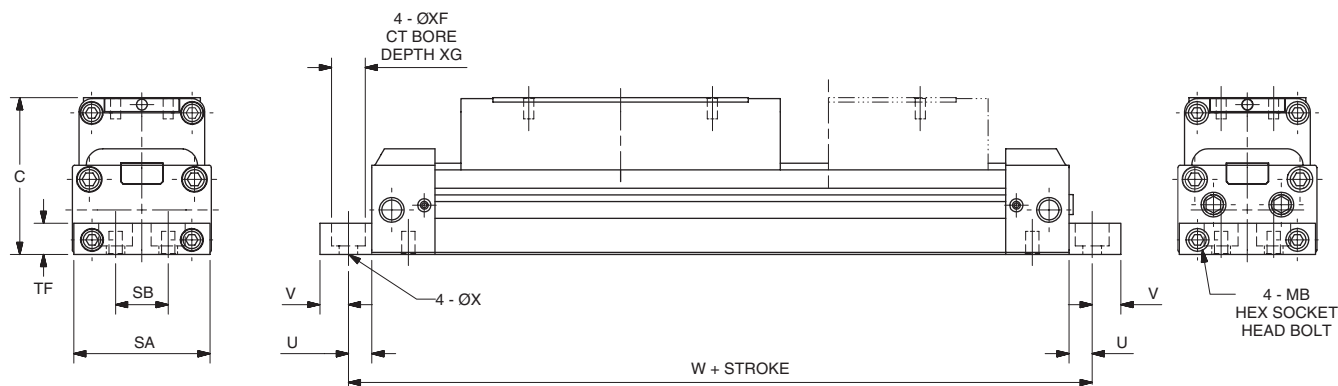
Parker Hannifin Corporation  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

## end Mount Foot Bracket

16 to 32 mm bore sizes



40 to 63 mm bore sizes

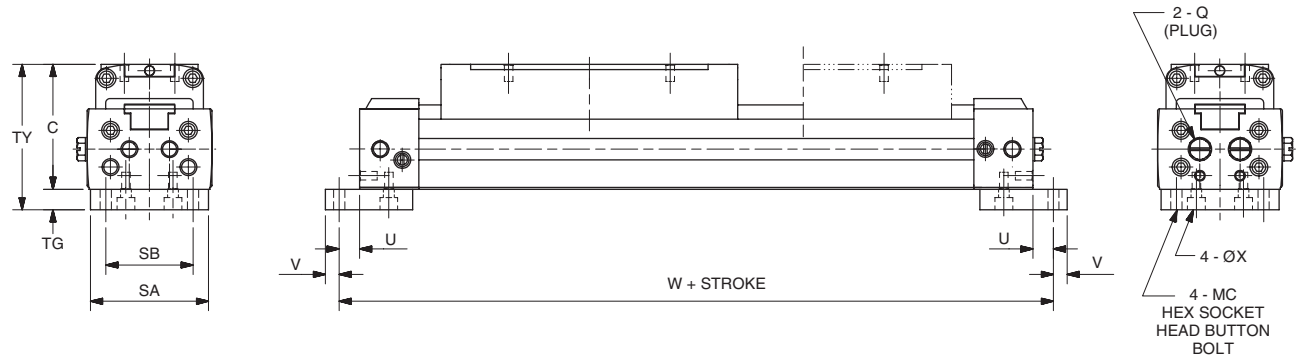


Bore (mm)	C	SA	SB	TF	U	V	W	X	XF	XG	MB
16	1.46 (37)	1.38 (35)	1.02 (26)	0.32 (8)	0.24 (6)	0.16 (4)	6.34 (161)	0.14 (3.6)	—	—	M3x10
20	1.65 (42)	1.69 (43)	1.30 (33)	0.39 (10)	0.24 (6)	0.24 (6)	7.13 (181)	0.19 (4.7)	—	—	M4x12
25	2.09 (53)	2.05 (52)	0.79 (20)	0.47 (12)	0.35 (9)	0.43 (11)	8.19 (208)	0.28 (7)	—	—	M5x50
32	2.24 (57)	2.52 (64)	1.26 (32)	0.47 (12)	0.35 (9)	0.43 (11)	9.61 (244)	0.28 (7)	—	—	M5x50
40	2.64 (67)	3.15 (80)	1.18 (30)	0.59 (15)	0.49 (12.5)	0.45 (11.5)	10.60 (269)	0.35 (9)	0.51 (13)	0.34 (8.7)	M6x55
50	3.23 (82)	3.70 (94)	1.57 (40)	0.79 (20)	0.49 (12.5)	0.45 (11.5)	11.10 (283)	0.35 (9)	0.51 (13)	0.34 (8.7)	M8x65
63	3.74 (95)	4.57 (116)	1.89 (48)	0.98 (25)	0.59 (15)	0.59 (15)	12.80 (326)	0.43 (11)	0.61 (15.5)	0.41 (10.5)	M8x70

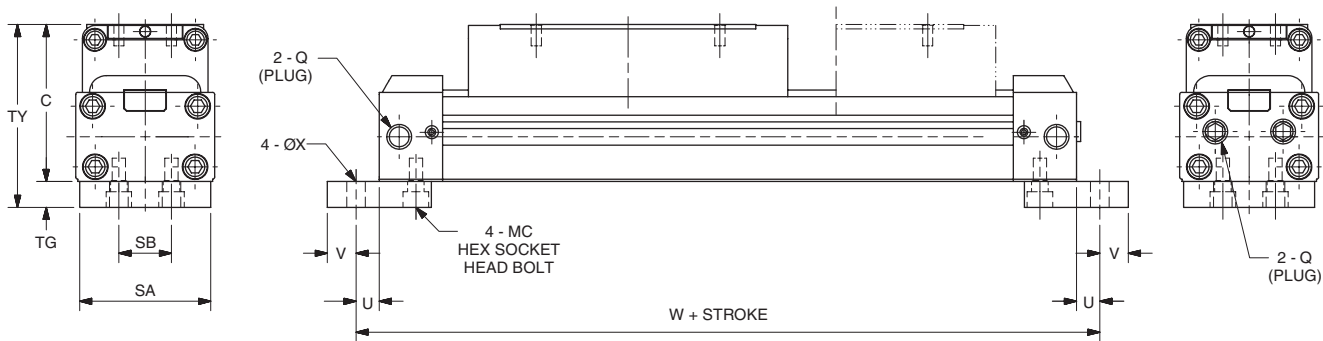
inches (mm)

**Bottom Mount Foot Bracket**

**16 to 20 mm bore sizes**



**25 to 32 mm bore sizes**

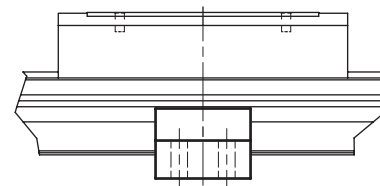
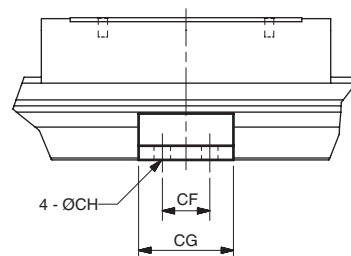
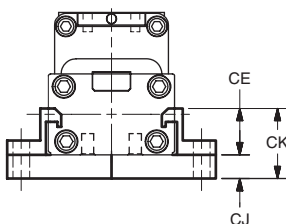
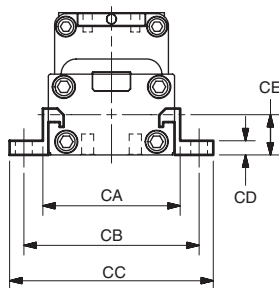
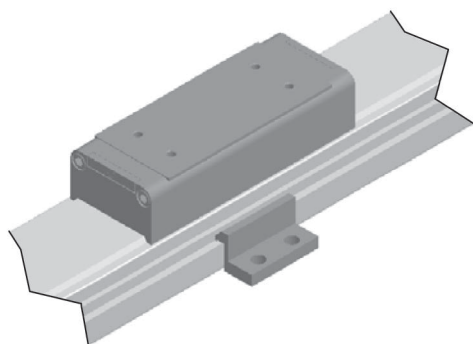


Bore (mm)	C	Q	SA	SB	TG	TY	U	V	W	X	MC
16	1.46 (37)	10-32 (M5)	1.38 (35)	1.02 (26)	0.24 (6)	1.69 (43)	0.24 (6)	0.16 (4)	6.34 (161)	0.13 (3.4)	5-40, 1/4 LG
20	1.65 (42)	1/8 NPT (1/8 Rc)	1.69 (43)	1.30 (33)	0.32 (8)	1.97 (50)	0.24 (6)	0.24 (6)	7.13 (181)	0.18 (4.5)	8-32, 3/8 LG
25	2.09 (53)	1/8 NPT (1/8 Rc)	1.97 (50)	0.79 (20)	0.39 (10)	2.48 (63)	0.35 (9)	0.43 (11)	8.19 (208)	0.28 (7)	1/4-20 x 1/2 LG
32	2.24 (57)	1/4 NPT (1/4 Rc)	2.52 (64)	1.26 (32)	0.39 (10)	2.64 (67)	0.35 (9)	0.43 (11)	9.61 (244)	0.28 (7)	1/4-20 x 1/2 LG
40	2.64 (67)	1/4 NPT (1/4 Rc)	—	—	—	—	—	—	—	—	—
50	3.23 (82)	3/8 NPT (3/8 Rc)	—	—	—	—	—	—	—	—	—
63	3.74 (95)	3/8 NPT (3/8 Rc)	—	—	—	—	—	—	—	—	—

inches (mm)

## intermediate support brackets (2 per kit)

## end mount



Bore (mm)	CA	CB	CC	CD	CE	CF	CG	CH
16	1.654 (42)	2.205 (56)	2.52 (64)	0.118 (3)	0.472 (12)	0.787 (20)	1.378 (35)	0.157 (4)
20	1.929 (49)	2.52 (64)	2.953 (75)	0.157 (4)	0.551 (14)	0.787 (20)	1.496 (38)	0.197 (5)
25	2.362 (60)	2.992 (76)	3.465 (88)	0.236 (6)	0.768 (19.5)	0.787 (20)	1.575 (40)	0.276 (7)
32	2.913 (74)	3.465 (88)	3.937 (100)	0.236 (6)	0.846 (21.5)	0.787 (20)	1.575 (40)	0.276 (7)
40	3.543 (90)	4.252 (108)	4.882 (124)	0.236 (6)	0.965 (24.5)	1.181 (30)	2.362 (60)	0.354 (9)
50	4.173 (106)	4.882 (124)	5.512 (140)	0.315 (8)	1.201 (30.5)	1.181 (30)	2.362 (60)	0.354 (9)
63	5.118 (130)	5.984 (152)	6.772 (172)	0.394 (10)	1.516 (38.5)	1.969 (50)	3.543 (90)	0.433 (11)

Bore (mm)	CJ	CK	Kit part number	
			End mount or no mount	Bottom mount
16	0.236 (6)	0.709 (18)	<b>L080180016</b>	<b>L080190016</b>
20	0.315 (8)	0.866 (22)	<b>L080180020</b>	<b>L080190020</b>
25	0.394 (10)	1.161 (29.5)	<b>L080180025</b>	<b>L080190025</b>
32	0.394 (10)	1.24 (31.5)	<b>L080180032</b>	<b>L080190032</b>
40	—	—	<b>L080180040</b>	
50	—	—	<b>L080180050</b>	
63	—	—	<b>L080180063</b>	

inches (mm)

G

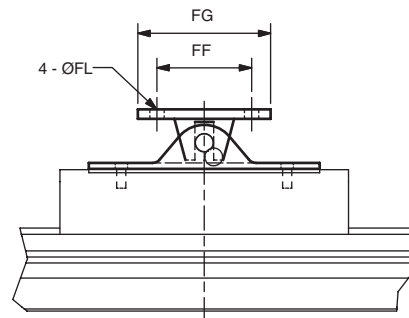
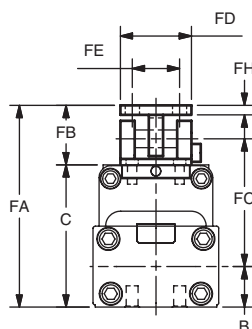
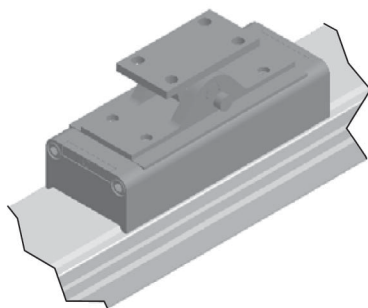
Rodless Pneumatic  
CylindersOSP-P  
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SeriesFor inventory, lead time, and kit  
lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

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Pneumatic Division  
Richland, Michigan  
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**Swivel mount**

Absorbs misalignment between cylinder and load



FJ dimension is the maximum horizontal floa

FK dimension is the maximum vertical floa

Bore (mm)	FA	FB	FC	FD	FE	FF	FG	FH
16	2.238 (58)	0.827 (21)	1.339 (34)	0.945 (24)	0.673 (16)	1.181 (30)	1.575 (40)	0.118 (3)
20	2.638 (67)	0.984 (25)	1.535 (39)	1.181 (30)	0.787 (20)	1.575 (40)	2.205 (56)	0.157 (4)
25	3.071 (78)	0.984 (25)	1.85 (47)	1.181 (30)	0.787 (20)	1.575 (40)	2.205 (56)	0.157 (4)
32	3.74 (95)	1.496 (38)	2.185 (55.5)	1.772 (45)	1.181 (30)	1.969 (50)	2.756 (70)	0.236 (6)
40	4.134 (105)	1.496 (38)	2.441 (62)	1.772 (45)	1.181 (30)	1.969 (50)	2.756 (70)	0.236 (6)
50	4.961 (126)	1.732 (44)	2.874 (73)	2.362 (60)	1.575 (40)	2.756 (70)	3.543 (90)	0.315 (8)
63	5.472 (139)	1.732 (44)	3.11 (79)	2.362 (60)	1.575 (40)	2.756 (70)	3.543 (90)	0.315 (8)

Bore (mm)		FJ	FK	FL	B	C	Part number
16	inches	0.118	0.118	0.134	0.472	1.457	L078930016
	mm	3	3	3.4	12	37	L078930016
20	inches	0.118	0.118	0.177	0.551	1.654	L080160020
	mm	3	3	4.5	14	42	L08016M020
25	inches	0.118	0.118	0.236	0.669	2.087	L080160025
	mm	3	3	6	17	53	L08016M025
32	inches	0.197	0.197	0.276	0.728	2.244	L080160032
	mm	5	5	7	18.5	57	L08016M032
40	inches	0.197	0.197	0.276	0.866	2.638	L080160040
	mm	5	5	7	22	67	L08016M040
50	inches	0.197	0.197	0.354	1.102	3.228	L080160050
	mm	5	5	9	28	82	L08016M050
63	inches	0.197	0.197	0.354	1.378	3.74	L080160063
	mm	5	5	9	35	95	L08016M063

inches (mm)

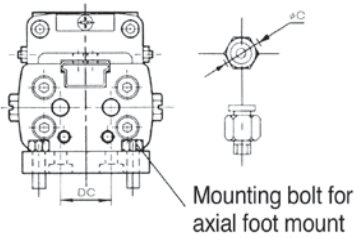


**end Port Piping**

Refer to chart below to determine when end port piping can be used with various types of mountings relative to fitting clearance.

On all bore sizes with foot mounting, the end port pipe fittings will obstruct the mounting holes. To avoid this problem, mount the cylinder first and tighten the mounting bolts and then attach the pipe fittings to the cylinder ports

Bore (mm)	øC [O.D. of fittings - mm (in.)]		
	No mount	End mount	Bottom mount
16	12 (0.472)		12 (0.472)
20	16 (0.630)	End Port Piping	16 (0.630)
25	26 (1.024)	Not Available	26 (1.024)
32	27 (1.065)		27 (1.063)
40	35 (1.378)	26 (1.024)	
50	35 (1.378)	30 (1.181)	
63	39 (1.535)	34 (1.339)	



## Shock Absorbers Selection Criteria

## The Shock Absorber Advantage

- Increase equipment throughput
- Smoother deceleration of loads
- Adjustable end of stroke positioning
- Prevents impact damage
- Minimize shock loads on equipment
- Improves product performance

## Four Steps to Great Performance

## Step 1. Gather the Application Parameters

- Total load weight (pounds)
- Final velocity at impact (inches/second)\*
- Cycle rate (cycles per hour)

## Step 2. Verify Shock Absorber Performance

- See charts on the following pages
- Determine that shock absorber will do the job

## Step 3. Verify the Cycle Rate

- See shock specifications below and verify application is within cycle rate

## Step 4. Choose the Appropriate Option in Model Code

\*If final velocity cannot be easily calculated, double the average velocity.

## Shock absorber specifications

Cylinder	16mm	20mm	25mm	32mm	40mm	50, 63mm
Shock absorber number	109556	109559	109560	109561	109562	MC600MH
Max. energy absorption - in-lbs (kgf-m)	26.0 (0.3)	60.8 (0.7)	104.2 (1.2)	226 (2.6)	608 (7.0)	1042 (12)
Stroke - inches	0.236	0.315	0.394	0.590	0.787	0.984
Energy absorption / hour - in.-lbs / hour	54,700	109,380	187,510	338,560	729,200	750,000
Max. impact velocity - in. / sec.	59	59	78.7	78.7	98.4	118.1
Max. cycle rate per hour	2100	1800	1800	1500	1200	720
Ambient temperature - °F (°C)	41-140 (5-60)					
Spring return force - lb.	Extended	0.65	0.45	0.65	1.33	2.20
	Compressed	1.01	0.97	1.33	2.65	4.86
Return time - Sec.	0.3	0.3	0.3	0.3	0.4	0.4

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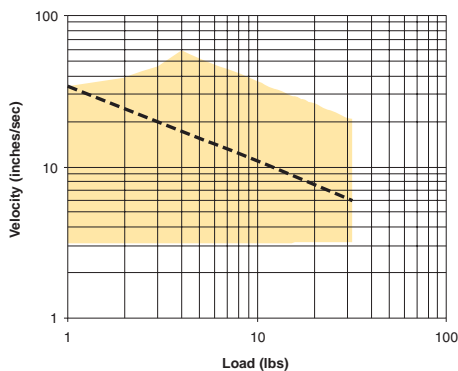
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Performance data (16 to 32mm bores)

16 mm Bore

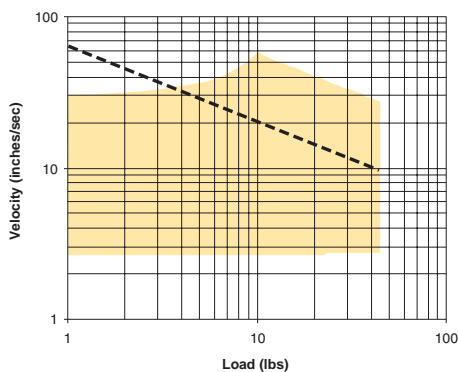


--- Air Cushion w/back pressure (flow controls or other meter out device)

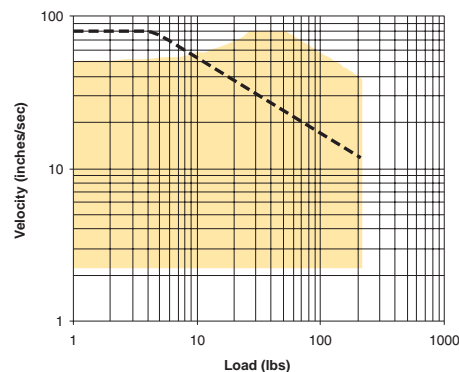
Shock Absorber

- Notes:**
1. If the cylinder is vertical in orientation, double the total load for bottom shock absorber.
  2. Use the total load that is being moved by shock absorber. If a weight transfer application, this would include La.
  3. If final velocity cannot be easily determined, use two times the stroke divided by the stroke time.

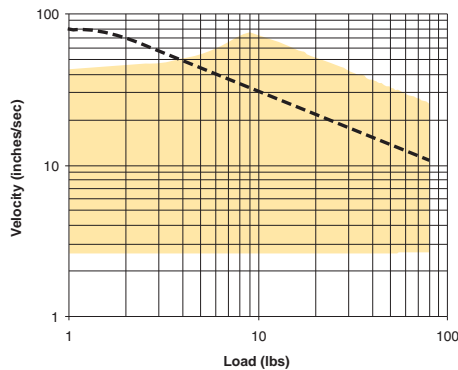
20 mm Bore



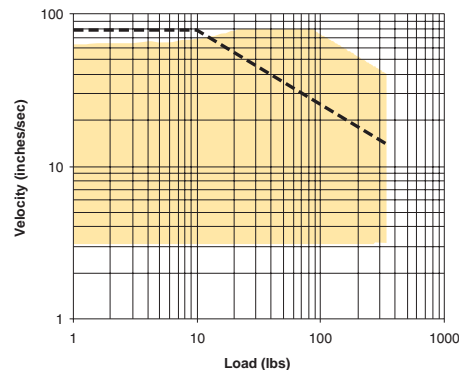
40 mm Bore



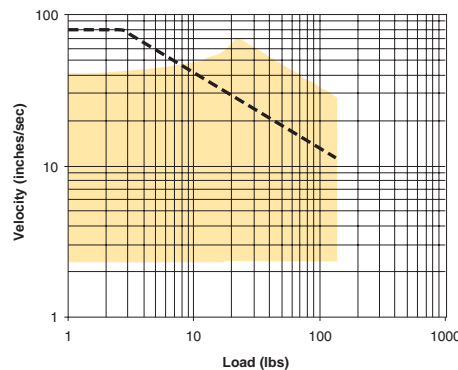
25 mm Bore



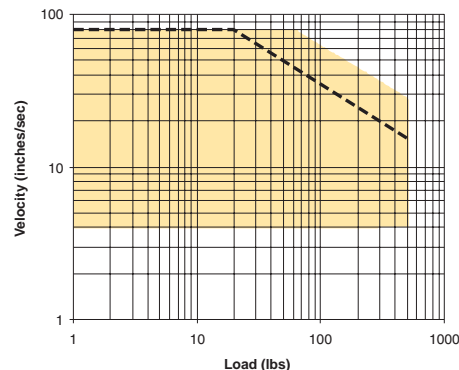
50 mm Bore



32 mm Bore

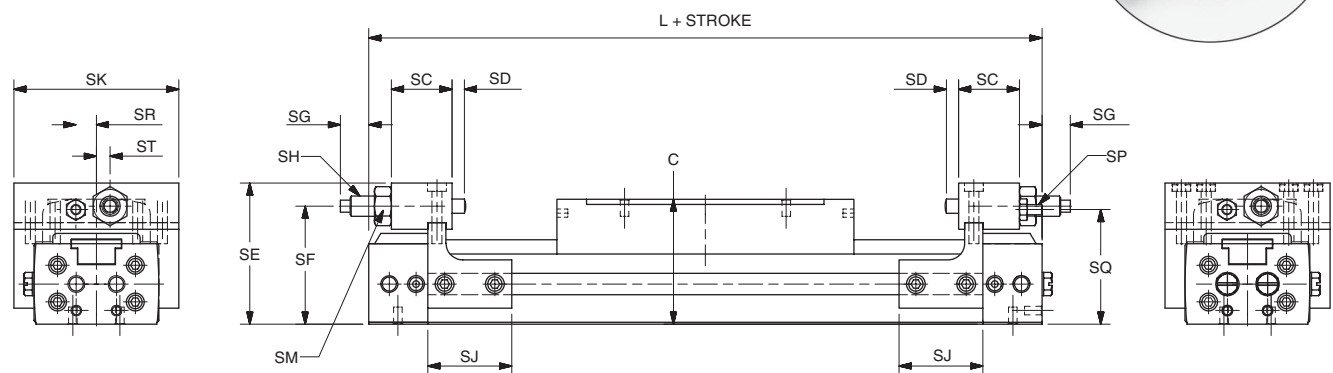
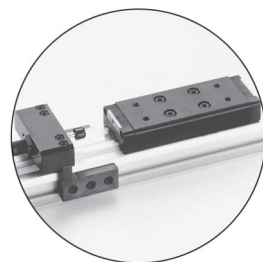


63 mm Bore



## Stroke Adjustments and Shock Absorber Dimensions

## 16 to 25mm bore sizes

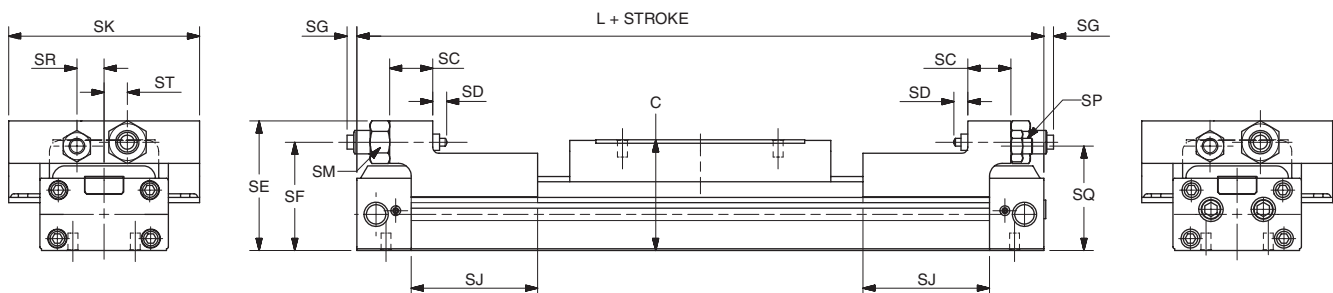


Bore (mm)	SC	SD	SE	SF	SG		SH in-lbs	SJ	SK	SP	SQ	SR	ST	C	L
					Max	Min									
16	0.71 (18)	0.16 (4)	1.65 (42)	1.38 (35)	0.57 (14.5)	0.18 (4.5)	26	0.98 (25)	1.93 (49)	M3	1.34 (34)	0.24 (6)	0.16 (4)	1.46 (37)	5.87 (149)
20	0.89 (22.5)	0.14 (3.5)	1.89 (48)	1.57 (40)	0.57 (14.5)	0.18 (4.5)	61	1.54 (39)	2.24 (57)	M4	1.50 (38)	0.32 (8)	0.20 (5)	1.65 (42)	6.65 (169)
25	0.79 (20)	0.10 (2.5)	2.46 (62.5)	2.03 (51.5)	0.57 (14.5)	0.18 (4.5)	104	1.97 (50)	3.03 (77)	M6	1.97 (50)	0.47 (12)	0.39 (10)	2.09 (53)	7.48 (190)

inches (mm)

SH = max. energy absorption

## 32 to 63mm bore sizes



Bore (mm)	SC	SD	SE	SF	SG		SH in-lbs	SJ	SK	SP	SQ	SR	ST	C	L
					Max	Min									
32	0.87 (22)	0.28 (7)	2.62 (66.5)	2.19 (55.5)	1.06 (27)	0.67 (17)	226	2.56 (65)	3.86 (98)	M8	2.11 (53.5)	0.55 (14)	0.47 (12)	2.24 (57)	8.90 (226)
40	1.26 (32)	0.28 (7)	3.09 (78.5)	2.58 (65.5)	1.34 (34)	0.94 (24)	608	2.56 (65)	4.41 (112)	M10	2.50 (63.5)	0.67 (17)	0.47 (12)	2.64 (67)	9.61 (244)
50	1.50 (38)	0.32 (8)	3.90 (99)	3.15 (80)	2.17 (55)	1.77 (45)	1042	2.76 (70)	5.35 (136)	M12	3.05 (77.5)	0.87 (22)	0.67 (17)	3.23 (82)	10.16 (258)
63	1.50 (38)	0.32 (8)	4.41 (112)	3.68 (93.5)	1.73 (44)	1.34 (34)	1042	2.76 (70)	6.22 (158)	M16	3.50 (89)	0.98 (25)	0.79 (20)	3.74 (95)	11.65 (296)

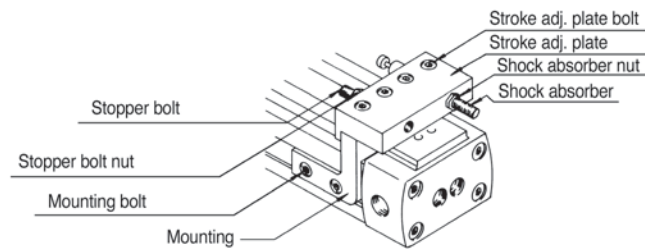
inches (mm)

SH = max. energy absorption

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## Positioning of stroke adjustment unit



### ø16-ø25

- (1) Moving the stroke adjustment unit.  
 The stroke adjustment unit can be moved by loosening the mounting bolts.
- (2) Locking of stroke adjustment unit.  
 After moving the stroke adjustment unit to the appropriate position, lock it there by tightening the mounting bolts to the torque values shown in Figure 1. Insufficient to que may cause the stroke adjustment unit to slip out of position.

**Figure 1**

### Torque values for tightening stroke adjustment unit.

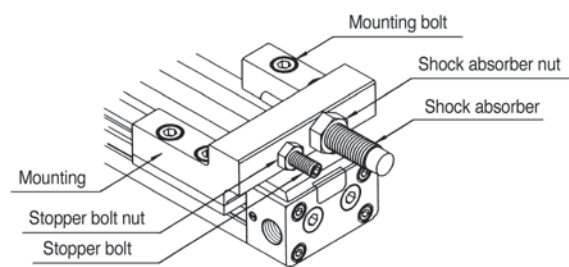
Bore size	Tightening torque	
	Mounting bolt (lb-in)	Stroke adj. plate bolt (lb-in)
16mm	9-11	4-6
20mm	22-24	
25mm	46-50	22-24
32mm	195-213	—
40mm	390-415	—
50, 63mm	682-735	—

- (3) Stroke adjustment using the stopper bolt.  
 Adjust the stroke by loosening the stopper bolt nut and turning the stopper bolt. After adjusting the stroke, tighten the stopper bolt nut to the torque values shown in Figure 2. When adjusting the 16-25 mm cylinders, due to the small amount of clearance between the table and the stroke adjustment plate, adjust the stroke by moving the complete stroke adjustment unit.

**Figure 2**

### Torque values for tightening stopper bolt nut and shock absorber nut.

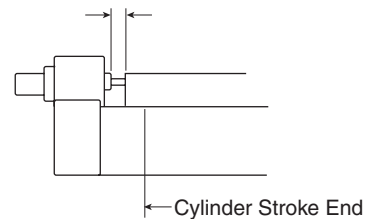
Bore size	Tightening torque	
	Stopper bolt nut (lb-in)	Shock absorber nut (lb-in)
16mm	10-11	12-16
20mm	22-24	26-35
25mm	73-84	40-53
32mm	195-213	66-89
40mm	390-425	195-266
50mm	682-735	487-620
63mm	1772-1914	487-620



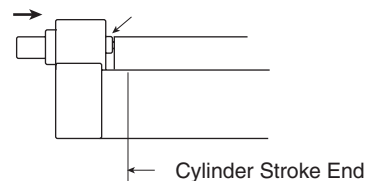
### ø32-ø63

- (4) Adjustment of shock absorber.  
 Adjust the absorption energy of the shock absorber by changing the operating stroke of the shock absorber. This is done by loosening the shock absorber nut and turning the unit. When adjustment is complete, tighten the shock absorber nut to the torque values shown in Figure 2.
- (5) Notes on usage.  
 The shock absorber absorbs rated energy with rated stroke. The factory setting allows a small amount of shock absorber stroke before it bottoms out. Readjust the location of the shock absorber so that the complete stroke of the absorber is utilized.

Absorption energy as set at factory:  
 Small margin with stroke of shock absorber.



Adjust the position of the shock absorber until the plunger of the shock absorber is fully depressed.



## P1Z Series

### Basic Version

The magnetic rodless cylinder is a pneumatic cylinder featuring a mobile piston fitted with annular magnets.

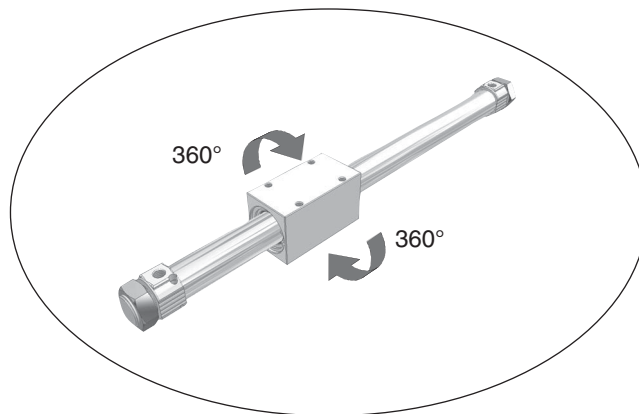
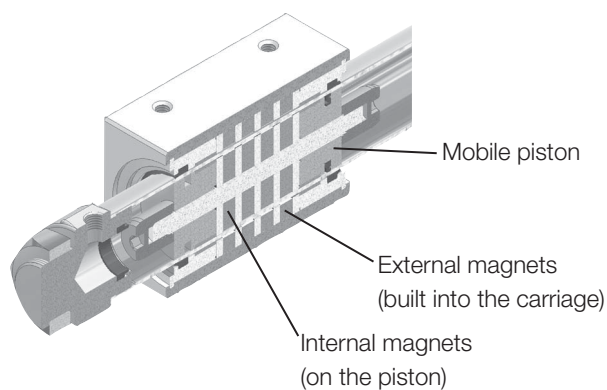
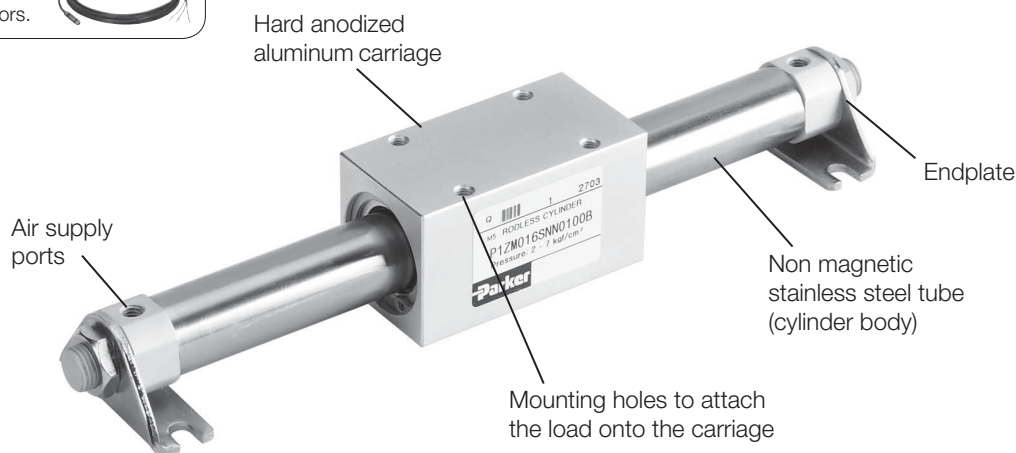
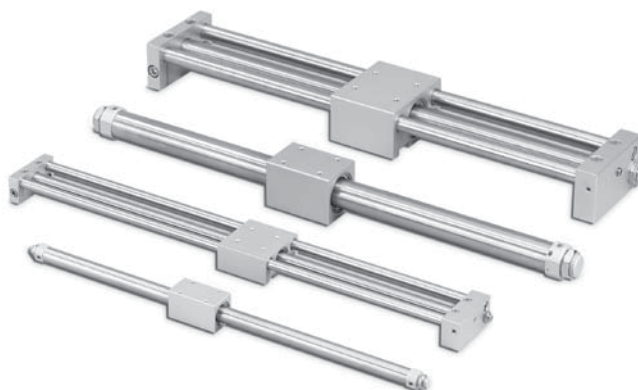
The mobile carriage is also equipped with magnets to provide magnetic coupling between the piston and carriage.

It incorporates the following features:

- End of stroke cushioning/bumpers
- Mounting:
  - threaded endcaps
  - optional foot mount
  - optional flange mount

#### Sensors

See section L for sensors.



### Cushioning

Ø 16 mm: non-adjustable bumper or adjustable pneumatic cushioning

Ø 20 and 32 mm: adjustable pneumatic cushioning

### Mounting

The mobile carriage is free to rotate 360° around the cylinder axis. This feature facilitates the adaptation of the cylinder to various mounting arrangements.

The load must be guided by an external device.

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Series

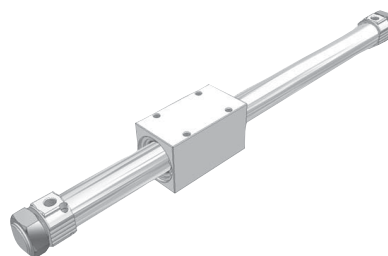
## P1Z Series - Basic Version

- Available in 3 bores with stroke lengths up to 2000mm
- Adjustable air cushioning is available on all cylinders
- The load is fixed onto the mobile carriage by 4 tapped hole
- The cylinder is attached by the ends with jam nuts, flanges or foot mounts

## Operating information

Maximum pressure:	100 PSIG (7 bar)
Minimum pressure:	29 PSI (2 bar)
Temperature range:	14°F to 140°F (-10°C to 60°C)

If external lubrication is added, this must always be continued.



## Ordering information

Standard cylinder (15 positions)										Options (16 positions)																																	
<b>P</b>	<b>1</b>	<b>Z</b>	<b>M</b>	<b>0</b>	<b>1</b>	<b>6</b>	<b>S</b>	<b>n</b>	<b>n</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>B</b>	<b>F</b>	<b>M</b>	<b>n</b>																										
				<b>Bore</b> <table border="1"> <tr><td><b>016</b></td><td>Ø 16mm</td></tr> <tr><td><b>020</b></td><td>Ø 20mm</td></tr> <tr><td><b>032</b></td><td>Ø 32mm</td></tr> </table>		<b>016</b>	Ø 16mm	<b>020</b>	Ø 20mm	<b>032</b>	Ø 32mm	<b>Cushioning</b> <table border="1"> <tr><td><b>N</b></td><td>None (Ø 16 only)</td></tr> <tr><td><b>A</b></td><td>Adjustable cushions</td></tr> </table>		<b>N</b>	None (Ø 16 only)	<b>A</b>	Adjustable cushions			<b>Strokes</b> <table border="1"> <tr><td><b>0200</b></td><td>200mm</td></tr> <tr><td><b>1000</b></td><td>1000mm</td></tr> </table>		<b>0200</b>	200mm	<b>1000</b>	1000mm			<b>Mounting kit*</b> <table border="1"> <tr><td><b>F</b></td><td>Foot mount</td></tr> <tr><td><b>L</b></td><td>Flanges</td></tr> <tr><td><b>N</b></td><td>None (std.)</td></tr> </table>		<b>F</b>	Foot mount	<b>L</b>	Flanges	<b>N</b>	None (std.)	<b>Cylinder port type</b> <table border="1"> <tr><td><b>M†</b></td><td>Metric (Ø 16 only)</td></tr> <tr><td><b>B†</b></td><td>BSPP (Ø 20 &amp; 32)</td></tr> <tr><td><b>N</b></td><td>NPTF (Ø 20 &amp; 32)</td></tr> </table>		<b>M†</b>	Metric (Ø 16 only)	<b>B†</b>	BSPP (Ø 20 & 32)	<b>N</b>	NPTF (Ø 20 & 32)
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										<b>Options *</b> <table border="1"> <tr><td><b>B†</b></td><td>None</td></tr> <tr><td><b>W</b></td><td>With options</td></tr> </table>		<b>B†</b>	None	<b>W</b>	With options																												
<b>B†</b>	None																																										
<b>W</b>	With options																																										

\* Cylinders are supplied with mounting nuts fitted on each endplate.

Ø	Stroke (mm)	(in)
<b>16</b>	0 to 1000	0 to 39.4
<b>20</b>	0 to 1500	0 to 59.1
<b>32</b>	0 to 2000	0 to 78.7

Part number examples:

- P1ZM016SNN0100B      Ø 16 mm bore 100mm stroke cylinder supplied with mounting nut on each endplate
- P1ZM020SAN1000WFBN      Ø 20 mm bore 1m stroke cylinder with foot mount on each endplate

† Standard when "B" option is used.

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Series



**Specifications - P1Z (magnetically coupled rodless)**

• Bore size mm (inch nominal):	16 (5/8)	20 (3/4)	32 (1-1/4)
• Port size:	M5 BSPP, 10-32 NPT	1/8 BSPP, 1/8 NPT	1/8 BSPP, 1/8 NPT
• Maximum stroke mm (inch):	1000 (39.4)	1500 (59.1)	2000 (78.7)
• Max. coupling force N (lbs):	157 (35)	236 (53)	703 (158)
• Stroke tolerance mm:	+1.5/-0	<=1000 +1.5/-0; >1000 +2/-0	
• Piston speed m/s (inch/sec):	0.1 to 0.4 (4 to 15.75)		
• Cushion:	Air cushion standard		
• Lubrication:	Not required (If you choose to lubricate your system, continuing lubrication will be required.)		

**Weights**

Bore size		Weight at zero stroke		Weight per 25mm of stroke	
mm	inch	kg	lbs	kg	lbs
16	5/8	0.28	0.62	0.01	0.02
20	3/4	0.46	1.01	0.02	0.05
32	1-1/4	1.35	2.98	0.04	0.08

**Conditions of Use**

If external lubrication is added, this must always be continued.

**Working medium, air quality**

Working medium: Dry, filtered compressed air to ISO 8573-1 class 3.4.3 or better

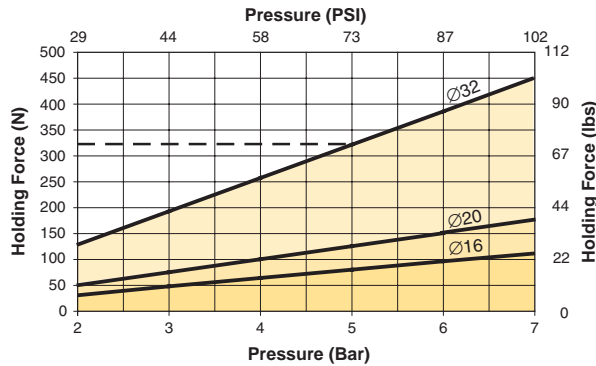
**Recommended air quality for cylinders**

For best possible service life and trouble-free operation, ISO 8573-1, quality class 3.4.3 should be used. This means 5 µm filter (standard filter), dew point 3°C for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard compressor with a standard filter gives

**ISO 8573-1 Quality Classes**

Quality Class	Max. Pollution		Water	Oil
	particle size (µm)	max. concentration (mg/m³)	max. pressure dew point (°C)	max. concentration (mg/m³)
1	0.1	0.1	-70	0.01
2	1	1	-40	0.1
3	5	5	-20	1.0
4	15	8	+3	5.0
5	40	10	+7	25
6	—	—	+10	—

**Pressure in the Cylinder / Pneumatic Holding Force**



**example:**

Pressure: 5 bar

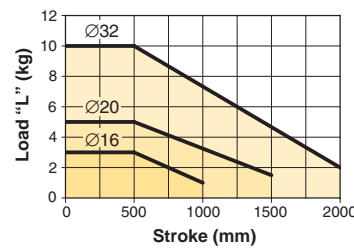
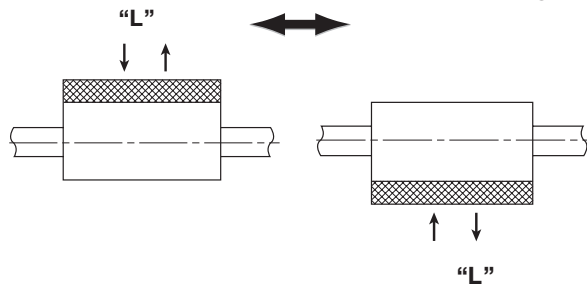
$F_{max} = 322 \text{ N}$  for Ø 32 mm cylinder

⚠ Calculate the kinetic energy due to the load moved

Acceleration or deceleration should not exceed the magnetic coupling force of cylinder

**Load diagrams**

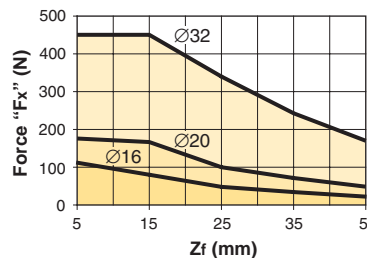
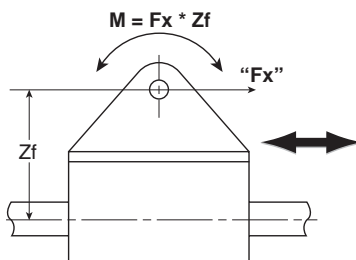
**Permissible radial loads, horizontal mounting**



Ø	L Max. (kg)	(lbs.)
16	3	6.6
20	5	11.0
32	10	22.0

⚠ The load must be guided by a device from outside the cylinder

**Permissible axial loads, horizontal mounting**

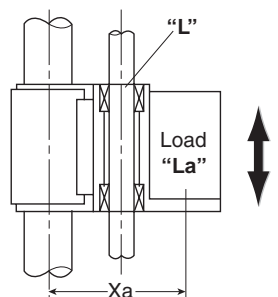


Ø	Max. Moment M		Max. Fx*	
	(Nm)	(in-lbs.)	(N)	(lbs.)
16	1.2	11	112	25
20	2.5	22	175	39
32	8.5	75	450	101

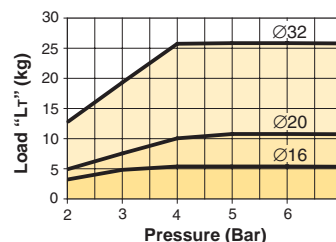
\* at 7 bar

⚠ The load must be guided by a device from outside the cylinder

**Permissible axial loads, vertical mounting**



\* If force due friction is unknown, use  $0.1 \times (L + La)$ .



Ø	Max. load T		Max. XA	
	(kg)	(lbs.)	(mm)	(in.)
16	5	11	122	4.8
20	10	22	142	5.6
32	24	53	174	6.8

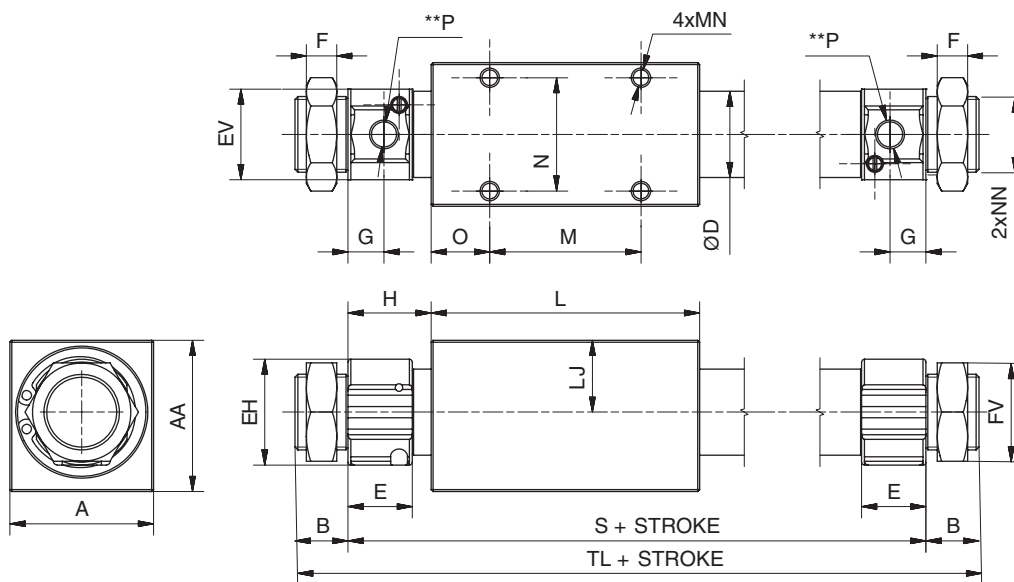
\* at 6.5 bar

**L** = Load guided by external device  
**La** = Direct mounting onto the cylinder  
**Ff** = Force due to friction\*

**LT** = Load weight + guiding device weight + force due to friction

**Basic Version**

\*\* = Air supply Ports



Ø	A	AA	B	ØD	E	ØEH	ØEV	F	FV	G	H	L	LJ	M	N	O
16	32 (1.26)	34 (1.34)	10 (0.39)	18 (0.71)	11 (0.43)	18 (0.71)	18 (0.71)	4 (0.16)	14 (0.55)	5.5 (0.22)	15.5 (0.61)	61 (2.40)	16 (0.63)	34 (1.34)	25 (0.98)	13.5 (0.53)
20	38 (1.50)	40 (1.57)	14 (0.55)	22.8 (0.90)	17 (0.67)	28 (1.10)	24 (0.94)	8 (0.31)	26 (1.02)	9.5 (0.37)	22 (0.87)	71 (2.80)	19 (0.75)	40 (1.57)	30 (1.18)	15.5 (0.61)
32	60 (2.36)	60 (2.36)	16 (0.63)	35 (1.38)	17 (0.67)	40 (1.57)	36 (1.42)	8 (0.31)	32 (1.26)	9.5 (0.37)	23 (0.91)	87 (3.43)	30 (1.18)	50 (1.97)	40 (1.57)	18.5 (0.73)

Ø	P	MN	NN	S	TL
16	M5 x 0.8 (10-32)	M4 x 0.7 x 6	M10 x 1 x 6	92 (3.62)	112 (4.41)
20	G 1/8 (1/8)	M5 x 0.8 x 8	M20 x 1.5 x 7	115 (4.53)	143 (5.63)
32	G 1/8 (1/8)	M6 x 1 x 10	M26 x 1.5 x 7	133 (5.24)	165 (6.50)

**G**

Rodless Pneumatic  
Cylinders

OSP-P  
Series

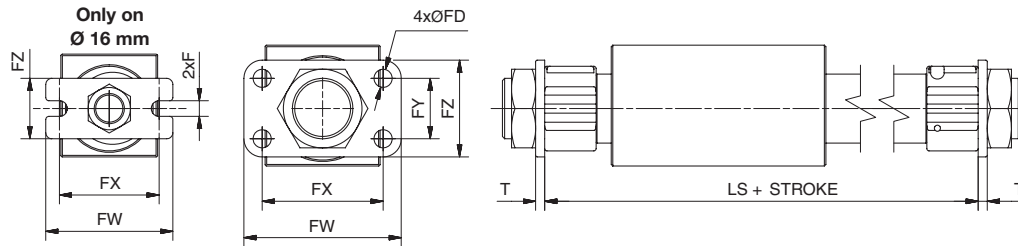
P1X  
Series

P1Z  
Series

GDL  
Series

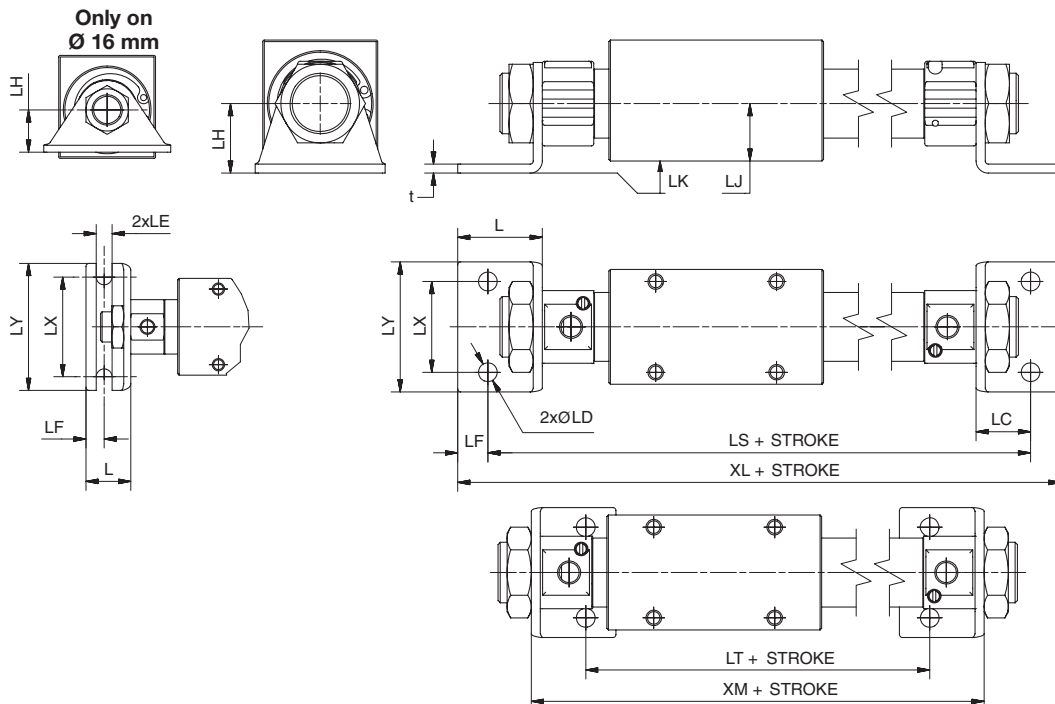
## Mountings

## Flanges



Ø	F	ØFD	FW	FX	FY	FZ	T	LS	Part number
16	5.2 (0.20)	—	42 (1.65)	33 (1.30)	—	20 (0.79)	2.3 (0.09)	92 (3.62)	<b>PDC15-FH</b>
20	—	6 (0.24)	52 (2.05)	40 (1.57)	20 (0.78)	32 (1.26)	3 (0.12)	115 (4.53)	<b>PK1A20-FH</b>
32	—	7 (0.28)	80 (3.15)	64 (2.52)	28 (1.10)	44 (1.73)	5 (0.20)	133 (5.24)	<b>PK1A25-FH</b>

## Brackets



Ø	t	L	LC	ØLD	LE	LF	LH	LJ	LK	LX	LY	LS	LT	XL	XM	Part number
16	2.3 (0.09)	14.8 (0.58)	8.8 (0.35)	—	5.2 (0.20)	6 (0.24)	14 (0.55)	16 (0.63)	-2 (-0.08)	33 (1.30)	42 (1.65)	109.6 (4.32)	79 (3.11)	121.6 (4.79)	96.6 (3.80)	<b>PDC15-LB*</b>
20	3 (0.12)	28 (1.10)	18 (0.71)	6.2 (0.24)	—	10 (0.39)	23 (0.91)	19 (0.75)	4 (0.16)	30 (1.18)	43 (1.69)	151 (5.94)	85 (3.35)	171 (6.73)	121 (4.76)	<b>PK1A20-LB*</b>
32	3 (0.12)	35 (1.38)	23 (0.91)	7 (0.28)	—	12 (0.47)	30 (1.18)	30 (1.18)	0 (0)	46 (1.81)	62 (2.44)	179 (7.05)	**	203 (7.99)	**	<b>PK1A25-LB*</b>

\* Set of 2 pcs

\*\* Impossible mounting

## P1Z Series - Guided Version

The magnetic rodless cylinder is a pneumatic cylinder featuring a mobile piston with annular magnets.

The mobile carriage is also equipped with magnets to give magnetic coupling between the piston and carriage. The carriage slides along the main tube and is guided by two guide rods.

It incorporates the following features:

- Built-in guide rods
- Adjustable end-of-stroke bumpers
- Optional magnetic piston sensing
- Optional transfer porting

**Guidance**

The guided version consists of a carriage fitted with 4 plain bearings, guided on 2 rods.

This design provides high rigidity, accurate guidance and smooth movement of the carriage.

**end of stroke**

Each endplate can be fitted with an adjustable bumper or self-compensating shock absorbers.

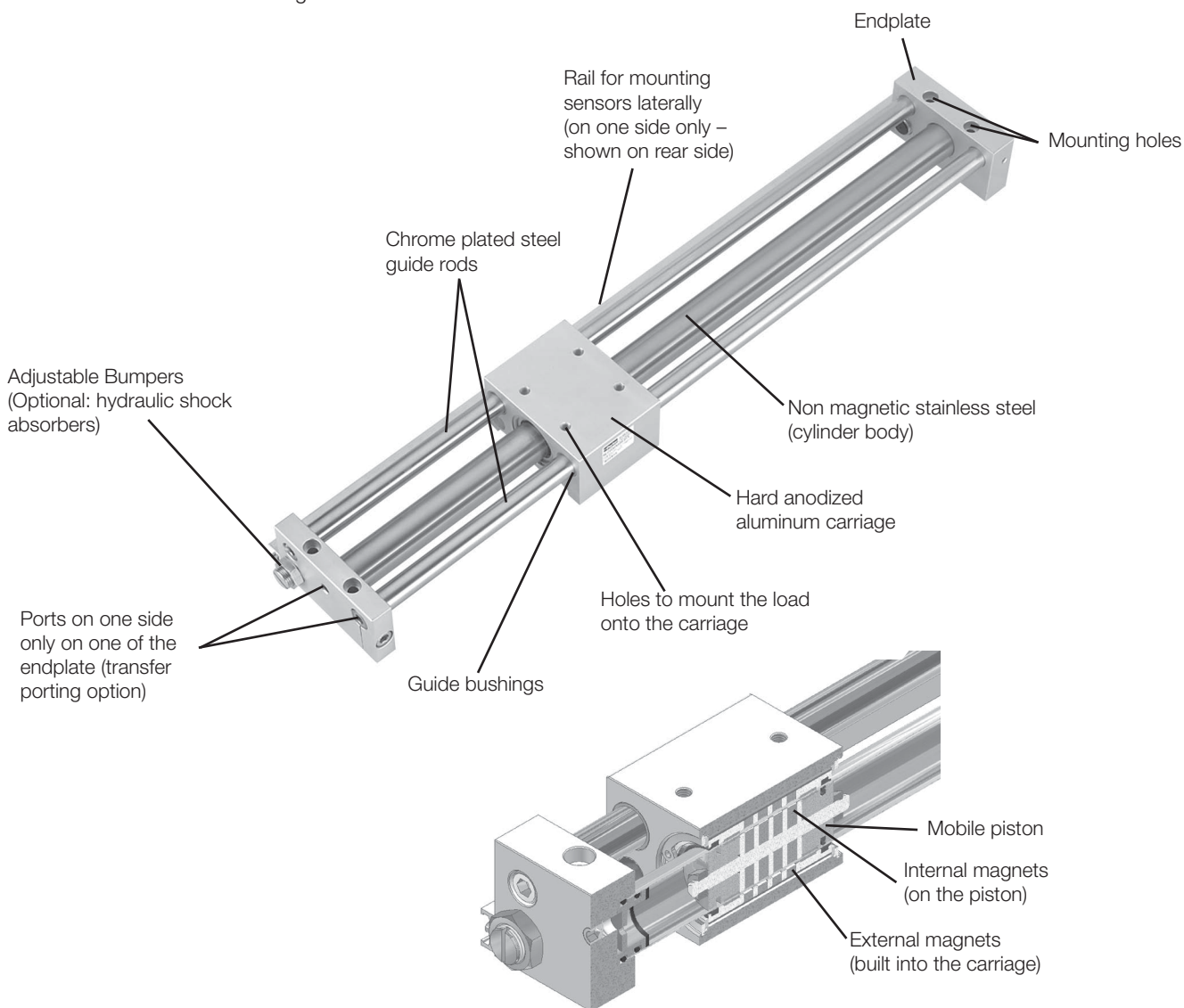
**Optional transfer porting**

Cylinder air supply is located on one end only to facilitate cylinder installation and avoid long tube lengths for longer strokes.

**Options**

The following options are available to enhance the Magnetic Rodless cylinder functions:

- External bumpers: when low operating pressure, light loads and short strokes.
- External hydraulic shock absorbers: recommended for arduous applications.
- Reed and solid state sensors: provide sensing at an adjustable position along the entire stroke of the cylinder.



<b>G</b> Rodless Pneumatic Cylinders	OSP-P
	Series P1X
	Series P1Z
	Series GDL

## P1Z Series - Guided Version

## Operating information

Maximum pressure:	100 PSIG (7 bar)
Minimum pressure:	29 PSI (2 bar)
Temperature range:	14°F to 140°F (-10°C to 60°C)

If external lubrication is added, this must always be continued.



## Ordering information

Standard cylinder (15 positions)				Options (16 positions)																													
<b>P</b>	<b>1Z</b>	<b>M</b>	<b>016</b>	<b>T</b>	<b>C</b>	<b>n</b>	<b>0500</b>	<b>B</b>	<b>n</b>	<b>M</b>	<b>L</b>																						
		<b>Bore</b> <table border="1"> <tr><td>016</td><td>Ø 16 mm</td></tr> <tr><td>020</td><td>Ø 20 mm</td></tr> <tr><td>032</td><td>Ø 32 mm</td></tr> </table>		016	Ø 16 mm	020	Ø 20 mm	032	Ø 32 mm	<b>Cushioning</b> <table border="1"> <tr><td>C</td><td>Adjustable stop</td></tr> <tr><td>H</td><td>Hydraulic shock absorber</td></tr> </table>		C	Adjustable stop	H	Hydraulic shock absorber			<b>Strokes</b> <table border="1"> <tr><td>0200</td><td>200 mm</td></tr> <tr><td>1000</td><td>1000 mm</td></tr> </table>		0200	200 mm	1000	1000 mm			<b>Cylinder port type</b> <table border="1"> <tr><td>M†</td><td>Metric (Ø 16 only)</td></tr> <tr><td>B†</td><td>BSPP (Ø 20 &amp; 32)</td></tr> <tr><td>N</td><td>NPTF (Ø 20 &amp; 32)</td></tr> </table>		M†	Metric (Ø 16 only)	B†	BSPP (Ø 20 & 32)	N	NPTF (Ø 20 & 32)
016	Ø 16 mm																																
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H	Hydraulic shock absorber																																
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N	NPTF (Ø 20 & 32)																																
		<b>Function</b> <table border="1"> <tr><td>G</td><td>Guided</td></tr> <tr><td>T</td><td>Guided with transfer porting</td></tr> </table>		G	Guided	T	Guided with transfer porting			<b>Options</b> <table border="1"> <tr><td>B†</td><td>None</td></tr> <tr><td>W</td><td>With options</td></tr> </table>		B†	None	W	With options			<b>End of stroke sensing</b> <table border="1"> <tr> <th>NPN</th> <th>PNP</th> <th>Reed</th> <th>Sensors type (Qty: 2)</th> </tr> <tr> <td>L</td> <td></td> <td></td> <td>With rail, no sensor</td> </tr> <tr> <td>N† (std.)</td> <td></td> <td></td> <td>No sensor rail</td> </tr> </table>		NPN	PNP	Reed	Sensors type (Qty: 2)	L			With rail, no sensor	N† (std.)			No sensor rail		
G	Guided																																
T	Guided with transfer porting																																
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NPN	PNP	Reed	Sensors type (Qty: 2)																														
L			With rail, no sensor																														
N† (std.)			No sensor rail																														
										<b>Note:</b> Order Sensors separately.																							

Ø	Stroke (mm)	(in)
16	0 to 750	0 to 29.5
20	0 to 1000	0 to 39.4
32	0 to 1000	0 to 59.1

Part number examples:

- P1ZM016GCN0100B      Ø 16 mm bore 100mm stroke cylinder supplied with adjustable stop
- P1ZM020GHN1000WNBL      Ø 20 mm bore 1m stroke cylinder with hydraulic shock absorbers and rail for sensors

## Range

## Magnetic rodless cylinder, guided version

Available in 3 diameters with possible strokes up to 1500 mm (59 in).

4 tapped mounting holes on the carriage.

Endcap mounting provided by 4 tapped and counterbored holes.

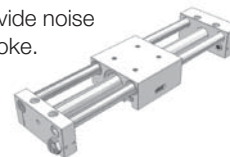


## Options

## external adjustable bumpers

Can be fitted on cylinder endcaps and provide noise reduction and adjustment at the end of stroke.

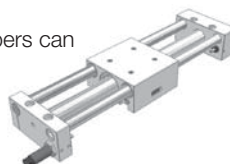
Used when light loads and short strokes. Pneumatic air supply on one side only (transfer porting option).



## external hydraulic shock absorbers

Self-compensating hydraulic shock absorbers can be used instead of bumpers for a greater cushioning effect at the end of stroke.

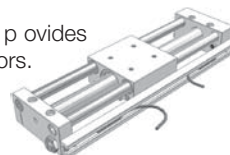
They are recommended for arduous applications.



## Reed or solid state sensors:

A rail fitted on one side only of the cylinder provides mounting and position adjustment of sensors.

The rail is located on same side as the end of stroke stops.



**Specifications - P1Z (magnetically coupled rodless)**

• Bore size mm (inch nominal):	16 (5/8)	20 (3/4)	32 (1-1/4)
• Port size:	M5 BSPP, 10-32 NPT	1/8 BSPP, 1/8 NPT	1/8 BSPP, 1/8 NPT
• Maximum stroke mm (inch):	750 (29.5)	1000 (39.4)	1500 (59.1)
• Max. coupling force N (lbs):	157 (35)	236 (53)	703 (158)
• Stroke tolerance mm:	+1.5/-0	<=1000 +1.5/-0; >1000 +2/-0	
• Piston speed m/s (inch/sec):	0.1 to 0.4 (4 to 15.75)		
• Cushion:	Air cushion standard		
• Lubrication:	Not required (If you choose to lubricate your system, continuing lubrication will be required.)		

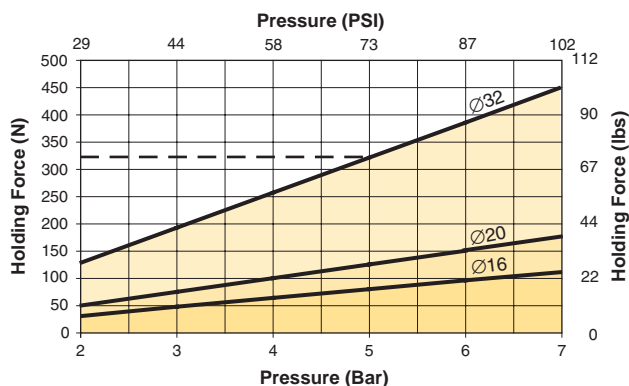
**Weights**

Bore size		Weight at zero stroke		Weight per 25mm of stroke	
mm	inch	kg	lbs	kg	lbs
16	5/8	0.9	1.98	0.05	0.11
20	3/4	1.52	3.35	0.08	0.17
32	1-1/4	3.63	8.00	0.13	0.29

**Options**

Function	Description
Detection	Sensors mounting in T-slot
	Reed or solid state sensors (PNP or NPN)
External rubber bumpers	Supplied pre-fitted in endplates if chose
Hydraulic shock absorbers	Self-compensating shock absorbers supplied pre-fitted in endplates if chose

**Pressure in the Cylinder / Pneumatic Holding Force**



**example:**

Pressure: 5 bar

$F_{max} = 322 \text{ N}$  for Ø 32 mm cylinder

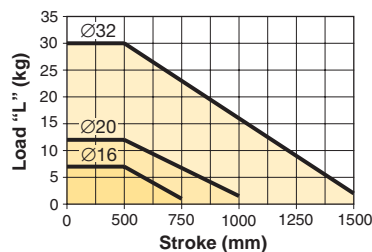
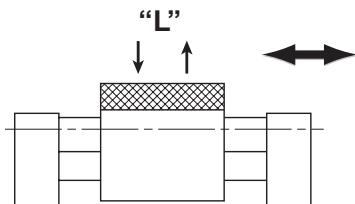
⚠ Calculate the kinetic energy due to the load moved

Acceleration or deceleration should not exceed the magnetic coupling force of cylinder



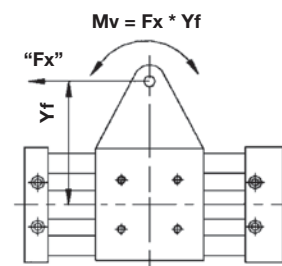
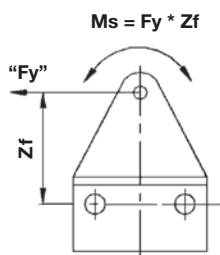
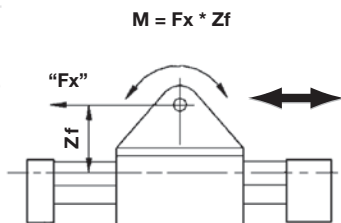
## Load Diagrams

### Permissible radial loads, horizontal mounting



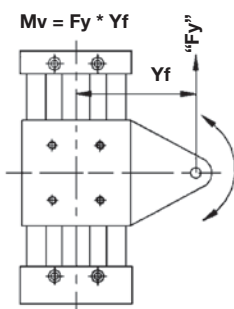
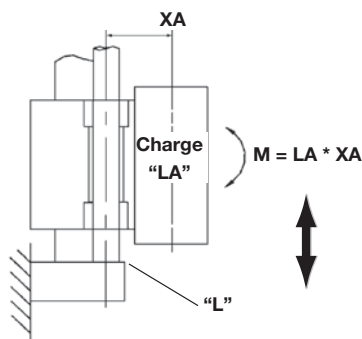
Ø	L Max.	
	(kg)	(lbs.)
16	7	15
20	12	26
32	30	66

### Permissible axial loads, horizontal mounting

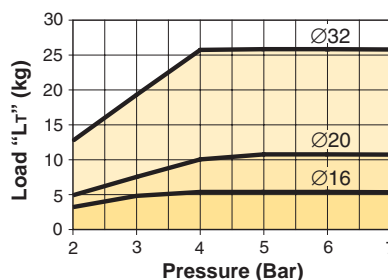


Ø	Max. moment M		Max. moment Ms		Max. moment Mv	
	(Nm)	(in-lbs.)	(Nm)	(in-lbs.)	(Nm)	(in-lbs.)
16	2.4	21	0.5	4.4	2.4	21
20	5	44	1	8.9	5	44
32	15	133	3	26.6	15	133

### Permissible axial loads, vertical mounting



**L** = Load guided by external device  
**LA** = Mounting direct onto cylinder  
**LT** = Load weight + guiding device weight + force due to friction  
**Ff\*** = Force due to friction  
 \*If force due to friction is unknown, use  $0.1 * (L + LA)$

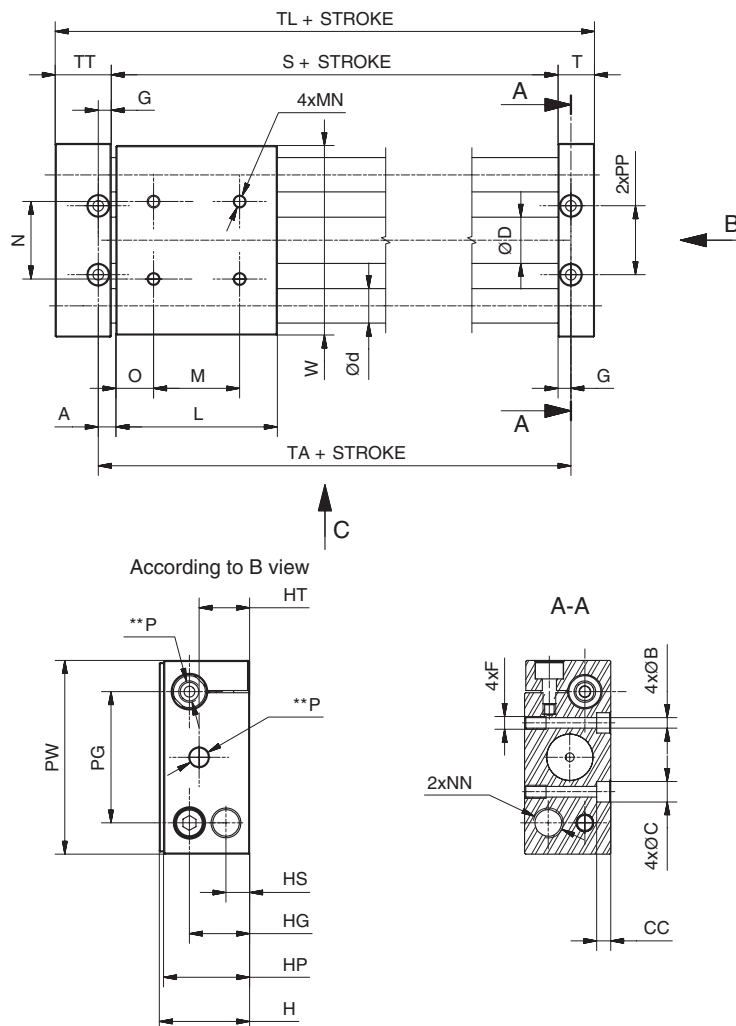


Ø	Max. load LT*	Max. XA
	(kg)	(mm)
16	5	122
20	10	142
32	24	174

\* at 6.5 bar

**Guided Version**

\*\* = Air supply ports

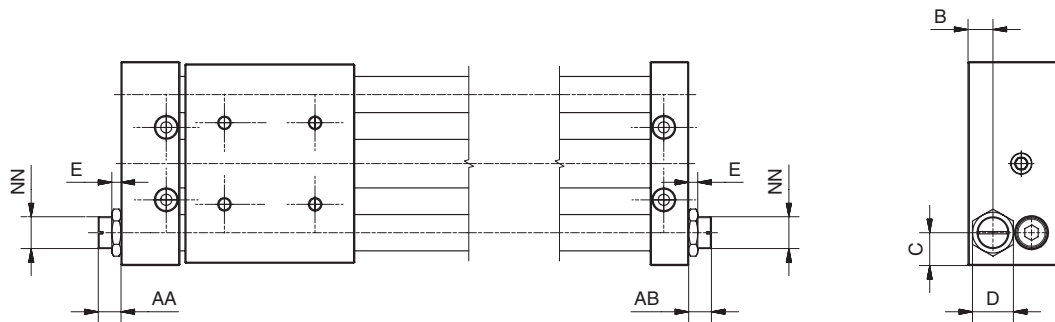


Ø	A	ØB	ØC	CC	ØD	Ød	F	G	H	HP	HG	HS	HT	L	M	N	MN
16	8 (.31)	4.3 (.17)	8 (.31)	4.5 (.18)	17.4 (.69)	12 (.47)	M5x0.8 x 10	6 (.24)	34 (1.34)	33.5 (1.32)	25 (0.98)	12 (.47)	21.5 (0.85)	65 (2.56)	34 (1.34)	30 (1.18)	M5 x 0.8 x 8
20	8 (.31)	5.5 (.22)	9.5 (.37)	6.5 (.26)	21.4 (.84)	16 (.63)	M6x1 x 10	6 (.24)	42 (1.65)	40 (1.57)	28 (1.10)	12 (.47)	23.5 (.93)	75 (2.95)	40 (1.57)	36 (1.42)	M6 x 1 x 10
32	13.5 (.53)	8.7 (.34)	14 (.55)	8 (.31)	33.6 (1.32)	20 (.79)	M10x1.5 x 15	10 (.39)	66 (2.60)	64 (2.52)	46 (1.81)	20 (.79)	41 (1.61)	91 (3.58)	60 (2.36)	50 (1.97)	M8 x 1.25 x 12

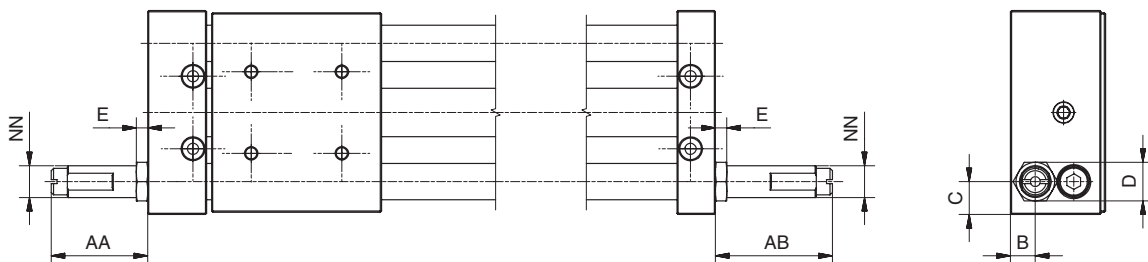
Ø	NN	O	P	PG	PW	PP	T	TT	S	TA	TL	W	XA	XB
16	M10 x 1 x 6	15.5 (0.61)	M5 x 0.8	50 (1.97)	70 (2.76)	27 (1.06)	14 (0.55)	23 (0.91)	69 (2.76)	81 (3.19)	106 (4.17)	68 (2.68)	17 (0.67)	8 (0.31)
20	M14 x 1.5 x 7	17.5 (0.69)	G1/8	61 (2.40)	90 (3.54)	32 (1.26)	17 (0.67)	26 (1.02)	79 (3.11)	91 (3.58)	122 (4.80)	88 (3.46)	20 (0.79)	11 (0.43)
32	M20 x 1.5 x 7	15.5 (0.61)	G1/8	86 (3.39)	122 (4.80)	50 (1.97)	20 (0.79)	28 (1.10)	97 (3.82)	117 (4.61)	145 (5.71)	118 (4.65)	22 (0.87)	14 (0.55)

### Optional external Adjustable Bumpers



Ø	AA	AB	B	C	D	E	NN
16	7.5 (0.30)	6.5 (0.26)	12 (0.47)	10 (0.39)	14 (0.55)	4 (0.16)	M10 x 1
20	10 (0.39)	10 (0.39)	11 (0.43)	14.5 (0.57)	18 (0.71)	4 (0.16)	M14 x 1.5
32	11 (0.43)	12 (0.47)	20 (0.79)	18 (0.71)	26 (1.02)	8 (0.31)	M20 x 1.5

### Optional external Hydraulic Shock Absorbers



Ø	AA	AB	B	C	D	E	NN
16	18 (0.71)	27 (1.06)	12 (0.47)	10 (0.39)	13 (0.51)	3 (0.12)	M10 x 1
20	50 (1.97)	59 (2.32)	11 (0.43)	14.5 (0.57)	17 (0.67)	5 (0.20)	M14 x 1.5
32	56 (2.20)	66 (2.60)	20 (0.79)	18 (0.71)	24 (0.94)	6 (0.24)	M20 x 1.5

### Loads / speeds diagram

The diagram to the right exhibits the P1Z cylinders maximum capacities with an adjustable bumper.

If the intersection exhibits between speed and load is above the curves, it is imperative to use hydraulic shock absorbers to prevent cylinder damage.

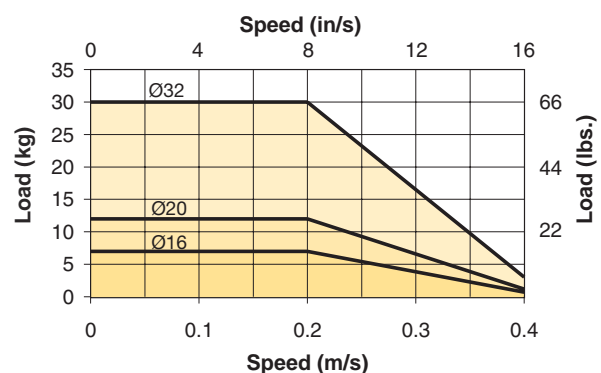
#### example:

Ø 32 mm cylinder with a 0.3 m/s speed and 25 kg load

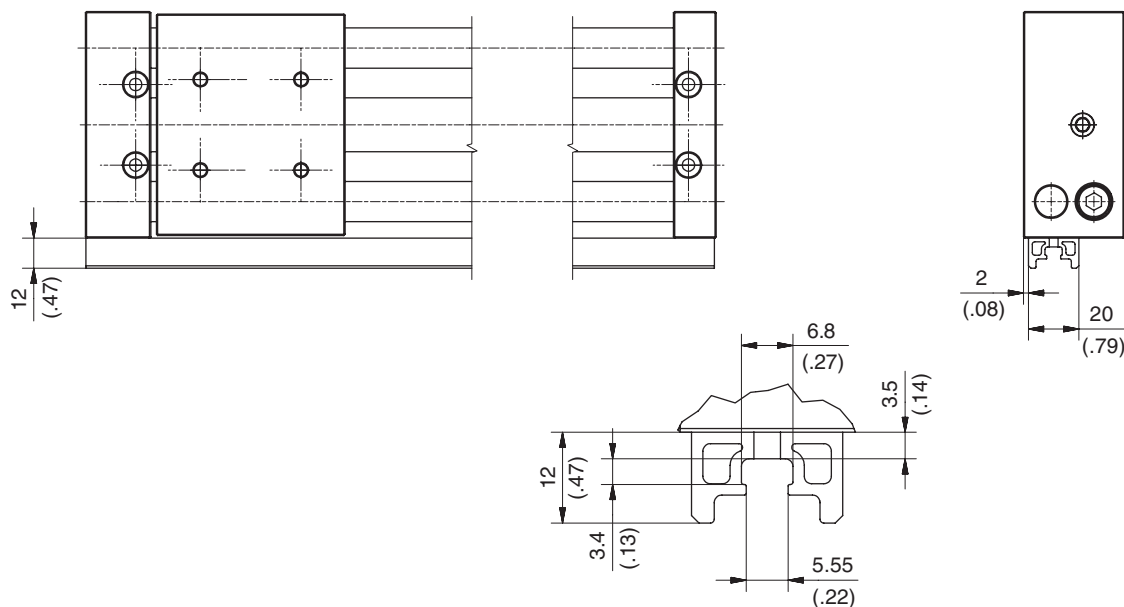
Choose the hydraulic shock absorber option

Ø 20mm cylinder with 0.2 m/s speed and 10 kg load

Choose the adjustable bumpers option



## Optional Sensor Rail

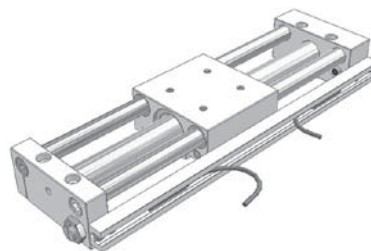


## Detection

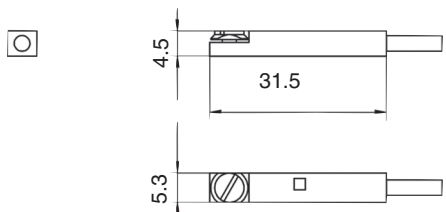
Reed or solid state sensor mounting is possible on one cylinder side only.

External aluminum profile integrates 1 -slot for sensor mounting.

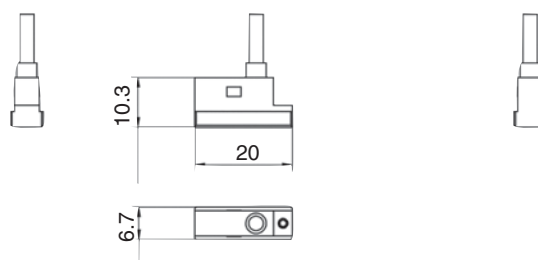
## Dimensions (mm)



## Drop-in Global Sensor



## Sensors with connection at 90°



## Technical Data (see electronic Sensors Section)

<div style="text-align: center;"> <b>G</b>            Rodless Pneumatic            Cylinders         </div>	
	OSP-P Series
	P1X Series
	P1Z Series
	GDL Series

**end of stroke rubber bumpers (2 pieces)**

Ø	Part number
16	<b>9129609AS</b>
20	<b>9129610AS</b>
32	<b>9129611AS</b>

**end of Stroke Hydraulic Shock Absorber**  
 (1 piece)

Ø	Part number
16	<b>MC25MH-n B</b>
20	<b>MC150MH</b>
32	<b>SC300M-3 n B</b>

**Flow Controls (1 piece)**

Ø	Part number		
	BSP Ports	NPT Ports	Metric Ports
16	–	–	<b>0876300300</b>
20	<b>PTFL4PB6-1/8</b>	<b>0876300400</b>	–
32	<b>PTFL4PB6-1/8</b>	<b>0876300400</b>	–

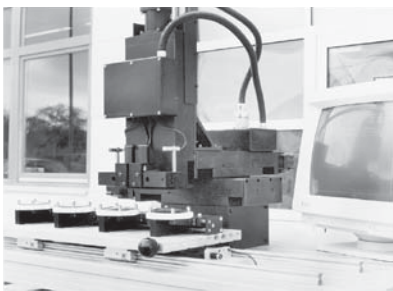
**Repair kits**

Ø	Basic version	Guided version
16 (Cushioned)	<b>P1ZM016SAn -R</b>	–
16 (Non-cushioned)	<b>P1ZM016Snn -R</b>	<b>P1ZM016Gnn -R</b>
20	<b>P1ZM020SAn -R</b>	<b>P1ZM020Gnn -R</b>
32	<b>P1ZM032SAn -R</b>	<b>P1ZM032Gnn -R</b>

## GDL Series

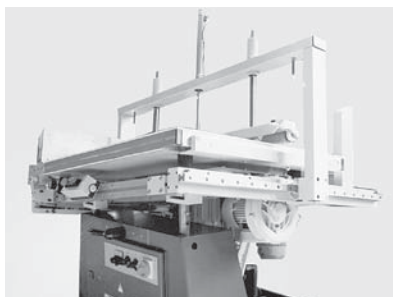
### Light, Smooth and FAST

Aluminum roller guides in a cutting machine for spectacle lenses. Both the work piece carriers and the motorized X - Y table axis are equipped with roller guides. The smooth operation and precision of the equipment ensures a fine cutting action



Aluminum roller guides in an automatic vibrator for flattening printed sheets of paper. To guarantee even pressure on the sheets of paper, the roller bridge is supported by precision roller guides.

(Baumann company photo)



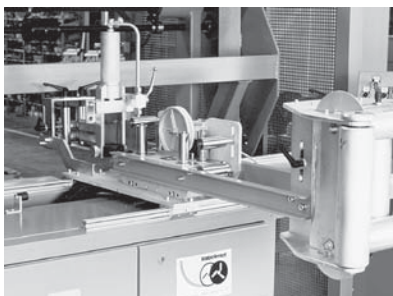
Handling units for medical equipment. Smooth, easy movement with guideline roller guides.

(Dräger company photo)



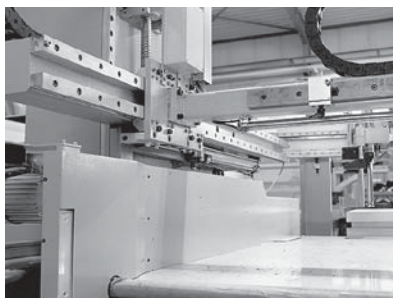
Aluminum roller guides in the sliding carriage of a machine for producing cables. The projecting arm of the carriage is guided by two double rails each with two roller cassettes and can be moved manually with minimal force because of the low friction properties.

(Kabelmat company photo)



Single rail and roller shoe versions of the aluminum roller guide in a handling arrangement for stacks of paper. Various fittings and limit stops for stacking are moved on two axes horizontally and vertically. The robustness and reliability of the roller guides allows for continuous operation under high load conditions.

(Solms company photo)



- Light weight (anodized aluminum)
- Smooth and quiet operation
- Speeds up to 10 m/s
- Acceleration/deceleration up to 40 m/s<sup>2</sup>
- Loading from any direction
- Permanently lubricated guidance system
- Broad product range in various series high performance, standard and stainless steel versions
- High load and moment capacities
- Very cost effective
- Flexible mounting dimensions

G

Rodless Pneumatic  
CylindersOSP-P  
SeriesP1X  
SeriesP1Z  
SeriesGDL  
Series

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lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G130

**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

**GDL Linear Guides Offer a Variety of Series and Options —  
High Performance... “Smooth Guidance”**

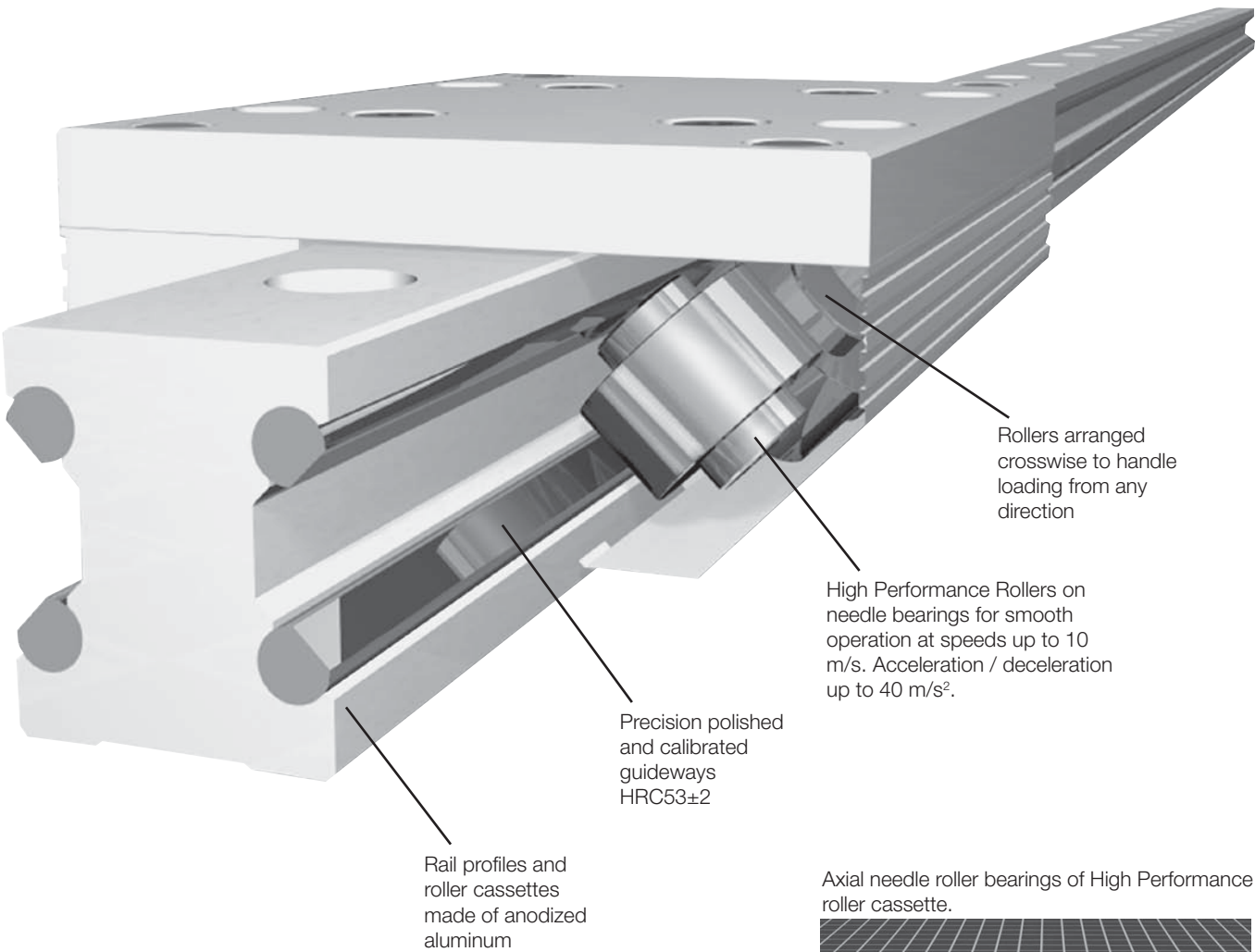
Aluminum roller guides provide smooth operation and high load carrying capacity for industrial automation.

By the use of lightweight aluminum components the moving masses are minimized, travel speeds are increased and actuation energy is saved.

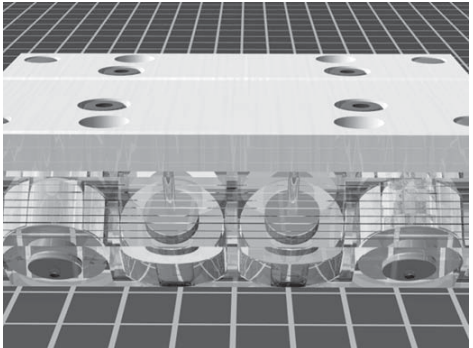
Aluminum roller guides are designed to carry medium weight loads economically. Their smooth action and speeds up to 10 m/s make them ideal for widespread use in many areas of application.

Aside from a main featured High Performance guide, others such as the Standard, Corrosion Resistant, High Dynamics and Grease-free versions are also available.

Aluminum roller guides are available in sizes 12, 15, 20, 25, 35 and 45mm. Rail lengths are from 200 mm to 4000 mm. For longer travel lengths, guide rails can be butt-jointed together.



Axial needle roller bearings of High Performance roller cassette.



G	Rodless Pneumatic Cylinders	
	OSP-P Series	P1X Series
	P1Z Series	GDL Series



## Features

### High Performance Series:

(Sizes FDC12HP-... thru FDC45HP-...)

The High Performance series is the basis for GDL's development, which is used in the majority of applications. High Performance guides consist of 8 axial needle roller bearings, running on precision polished and hardened alloy spring steel guideways. These guide bearings are grease packed and shielded, while offering the highest load and moment rating capacities within the GDL product line.

### Standard Performance Series:

## Rodless Pneumatic Cylinders GDL Series

(Sizes FDC12SP-... thru FDC45SP-...)

The Standard Performance series is intended for minor loads and moments for particularly economical guidance solutions. Standard Performance guides consist of 8 radial ball roller bearings, running on precision polished and hardened alloy spring steel guideways. These guide bearings are grease packed and sealed, while offering the lowest load and moment ratings available within the GDL product line, with the exception of the Grease-Free and the Anti-Friction / Corrosion Resistant series. Standard Performance series is the second most commonly used GDL guides for various applications and also provides excellent running behavior.

### Ordering Information for GDL Rails

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
F	D	R	1	2	H	0	0	0	0	0	0	-	0	0	0	0	0
<b>Series</b>			<b>Rail Size</b>		<b>"L11" Dimension</b>				<b>Length (mm)</b>								
FD Double sided rail guide* (standard)			1 2* 1 5* 2 0* 2 5* 3 5* 4 5*		00 Equal on both sides* (standard) ?? Actual dimension (mm)**				- 0 0 0 0 0								
<b>Rail</b>			<b>Guideway Material</b>		<b>Mounting Holes</b>				<b>Screw Covers</b>								
R Standard			H High performance alloy steel* (standard) S Stainless steel		0 Topside thru hole* (standard) 1 Underside blind thread Z Custom (consult factory)				0 None* (standard) 1 Yes*								
<b>Coatings</b>			<b>Long Rail Joining Option</b>		<b>Lubrication Options</b>				<b>Locking Mechanism</b>								
0 Anodized aluminum* (standard)			0 None* (standard) 1 Keyed butt joint (size 25-45 only) 2 Unkeyed butt joint		0 None* (standard) 1 Central lube 2 Central lube (no nipple) Z Custom (consult factory)**				0 None* (standard) 1 "L" ratchet handle* 2 Star grip handle*								
									* Locking mechanism only available on FD Series size 15 thru 45 with Axial Needle Bearing - High Performance - Alloy Steel.								

\*\* As measured from left side while viewing the depth groove line.

Note: Maximum length is 4 meters on Size 12.

Note: Quantity supplied to cover all rail holes.

\*Stocked Item

### Ordering Information for GDL Cassettes

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
F	D	C	1	2	H	P	-	0	0	0	0	0	0	0	0	
<b>Series</b>			<b>Rail Size</b>		<b>Grease</b>				<b>Mounting Holes</b>				<b>Adjustment</b>			
FD Double sided rail cassette* (standard)			1 2* 1 5* 2 0* 2 5* 3 5* 4 5*		0 High performance* (standard) Z Custom (consult factory)				0 Topside threaded thru* (standard) 1 Underside hole thru (unthreaded) 2 Underside hole thru (threaded)				0 None* (standard) 1 Adjusted to specific rail*			
<b>Cassette</b>			<b>Bearing Options</b>		<b>Lubrication Options</b>				<b>Coatings</b>				<b>Cassette Length</b>			
C Standard			AM Non-magnetic (bearing only) HC Axial needle - high performance alloy steel, non-corrosive* HP Axial needle - high performance alloy steel* (standard) SP Single row radial ball - standard performance - alloy steel* (standard) ZZ Factory** (consult factory)		0 None* (standard) 1 Central lube 2 Central lube (no nipple) Z Custom (consult factory)**				0 Anodized and standard hardware* (standard) 1 Anodized and stainless steel hardware* Z Custom (consult factory)				0 Normal length* (standard) Z Custom (consult factory)**			
									<b>Wiper Options</b>							
									0 None* (standard) 1 "L" ratchet handle* 2 Star grip handle*				0 With felt wipers* (standard) 1 Without* 2 With felt wipers and scrapers*			

\*Stocked Item

\*\*Minimum Order Quantity Required



For inventory, lead times, and kit lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G132

**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)



## Product Line Overview

Characteristic	Unit	Description
Full profile wiper		Rollershoes and cassette are provided with snap-on full profile wipers. The snap-on full profile wipers are easily replaceable with available wipers kits.
Acceleration and deceleration	m/s <sup>2</sup> (ft/sec <sup>2</sup> )	40 m/s <sup>2</sup> maximum (131 ft/s <sup>2</sup> maximum)
Guide installation		Possible in any position.
Drag adjustment set screw		Cassettes can be adjusted at the factory or by the customer. Rollershoes can be set-up by the customer to incorporate the drag adjustment set screw feature. The drag adjustment set screw components are supplied with each pair of rollershoes.
Standard lubrication		Lifetime lubrication with standard grease-packed roller bearings.
Speed	m/s (ft/s)	Up to 10 m/s (or up to 33 ft/s)
Bearing types		Steel axial needle, Specials on request (ex: anti-magnetic, grease free, high dynamics) - consult factory
Operating temperature	C (F)	-10°C to 80°C (14°F to 176°F) temperature range
Specials available		Custom length cassettes and rollershoes for 100 piece lots minimum. Keyed butt-jointed rail sections for continuous rail lengths of 3900mm and above. Solid continuous length rails up to 3900mm. Offset or non-standard "L11" dimensions on opposite ends of cut rails. Integrated metal scraper with standard full profile wiper currently available. Rail underside blind mounting holes.

## Material specification

Rail		Aluminum alloy
Guideways	Standard	High alloy spring steel HRC 53 +/- 2
	Corrosive resistant	Stainless steel guideway 46 HRC
Cassettes / rollershoes / top plates		Aluminum alloy
Rollers		Bearing steel / Stainless steel bearing steel

## General Facts Pertaining to All Series:

Snap-on full profile wipers:	Rollershoes and cassettes can be provided with snap-on full profile wipers. The snap-on full profile wipers are easily replaceable with available wiper kits. See page G139 for respective wiper kit part numbers.
Cassette adjustment:	Cassettes can be adjusted at the factory or by the customer.
Fasteners:	Rollershoes and cassettes use ISO screw quality 8.8 and DIN 433 washers. ISO screw quality 8.8 is recommended for mounting the rails also. Special stainless steel fasteners can be requested as necessary.
Carrying Capacity:	See load and moment rating tables on next page for your guide series of interest.
Guide mounting position:	Optional.
Lengths:	For longer than standard rail lengths, see keyed butt-jointed rail option on page G136.
Lubrication:	GDL Aluminum Roller Guides are permanently lubricated with contained roller bearings grease.

See ordering information on previous page to define your desired GDL guide features for ordering.

**G**

**Rodless Pneumatic  
Cylinders**

**OSP-P  
Series**

**P1X  
Series**

**P1Z  
Series**

**GDL  
Series**

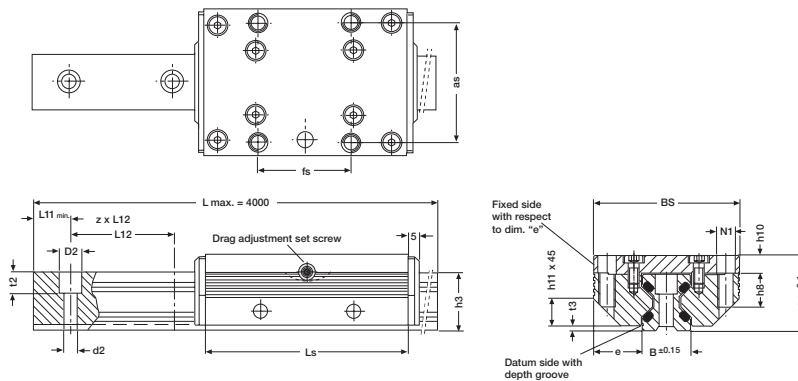


For inventory, lead time, and kit  
lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

**G133**

**Parker Hannifin Corporation**  
Pneumatic Division  
Richland, Michigan  
[www.parker.com/pneumatics](http://www.parker.com/pneumatics)

**Cassette with double sided rail**



**Both standard FDC version guides**

Size	Length			h3	h9	as	d2	D2	e	fs	h8	h10	h11	L11 min.	L12	t2	t3	N1
	Ls	B	BS															
12	64	12.0	37	14.7	19	30	3.4	6	12.50	25	8	4.0	6	10	40	5.5	1.4	M4
15	78	15.5	47	18.7	24	38	4.5	8	15.75	30	10	5.0	8	10	60	6.0	2.0	M5
20	92	21.0	63	22.6	30	53	5.5	10	21.00	40	12	7.0	11	10	60	7.0	2.0	M6
25	98	23.0	70	27.0	36	57	6.6	11	23.50	45	16	8.5	13	10	60	10.0	2.5	M8
35	135	32.0	100	37.0	48	82	9.0	15	34.00	62	20	10.5	20	12	80	11.5	3.5	M10
45	165	45.0	120	46.0	60	100	11.0	18	37.50	80	24	13.5	22	16	105	14.5	4.0	M12

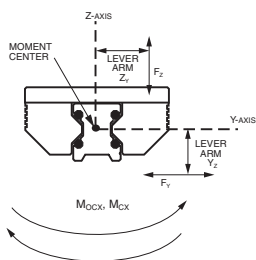
Dimensions (mm)

**Both underside mounting hole FDC version guides (Ref. ordering instructions)**

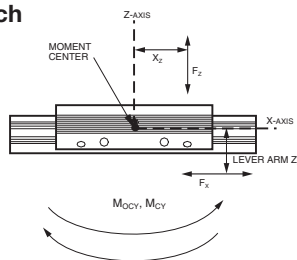
Size	Length			h3	h9	as	d2	D2	e	fs	h8	h10	h11	L11 min.	L12	t2	t3	N1
	Ls	B	BS															
12	64	12.0	37	14.7	19	30	3.4	6	12.50	29	8	4.0	6	10	40	5.5	1.4	M4
15	78	15.5	47	18.7	24	38	4.5	8	15.75	34	10	5.0	8	10	60	6.0	2.0	M5
20	92	21.0	63	22.6	30	53	5.5	10	21.00	40	12	7.0	11	10	60	7.0	2.0	M6
25	98	23.0	70	27.0	36	57	6.6	11	23.50	45	16	8.5	13	10	60	10.0	2.5	M8
35	135	32.0	100	37.0	48	82	9.0	15	34.00	62	20	10.5	20	12	80	11.5	3.5	M10
45	165	45.0	120	46.0	60	100	11.0	18	37.50	90	24	13.5	22	16	105	14.5	4.0	M12

Dimensions (mm)

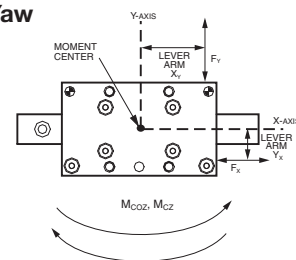
**Roll**



**Pitch**



**Yaw**



**Load & moment rating capacities (for cassettes on double sided rail)**

Dynamic load rating C (N)	Static load rating Co (N)	Static moment rating capacities:			Dynamic moment rating capacities:			Cassette weight (kg)	Rail weight (kg) per “M”	Cassette series
		Roll Mocx (Nm)	Pitch Mocy (Nm)	Yaw Mocz (Nm)	Roll Mcx (Nm)	Pitch Mcy (Nm)	Yaw Mcz (Nm)			
High performance series										
2800	3000	27	43	43	25	40	40	0.1	0.4	FDC12HP-...
4200	3400	37	58	58	45	72	72	0.3	0.8	FDC15HP-...
5400	5400	76	111	111	76	111	111	0.4	0.9	FDC20HP-...
9000	10100	158	222	222	142	198	198	0.6	1.8	FDC25HP-...
12500	18000	423	559	559	294	388	388	1.5	3.2	FDC35HP-...
21200	25900	827	983	983	678	806	806	2.9	5.5	FDC45HP-...

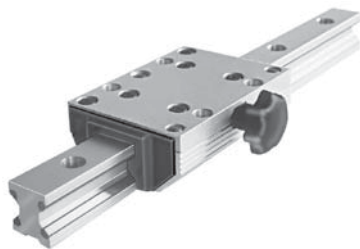


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 lookup, visit [www.pdnplu.com](http://www.pdnplu.com)

G134

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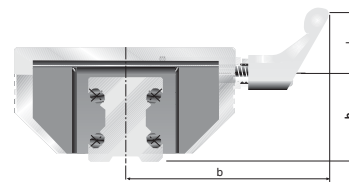
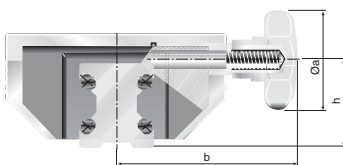
## GDL Aluminum Roller Guides

High performance cassettes  
with lock device

The locking cassette with star grip handle can be stopped at any desired location on the rail. The clamping device does not exert forces on the rail guideways.

The clamping device is used in fixtures which are movable manually, clamping and stop ledgers, feeding of tools and work pieces. Also available with L-ratchet handle.

## Special cassette types



## Star grip handle dimensions

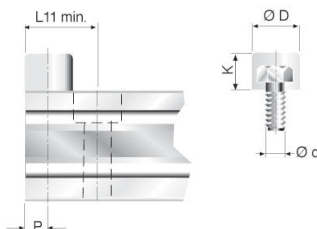
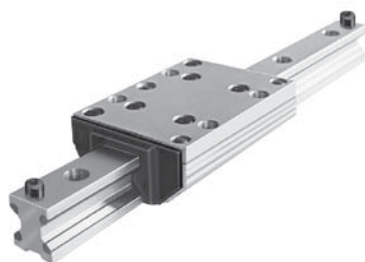
Size	Øa	b	h	Clamp force	Part numbers star grip knob
12	N/A				
15	25	41	19.0	200	<b>FDC15HP-00020000</b>
20	25	49	23.0	250	<b>FDC20HP-00020000</b>
25	32	56	28.0	250	<b>FDC25HP-00020000</b>
35	50	83	38.5	350	<b>FDC35HP-00020000</b>
45	63	101	48.0	750	<b>FDC45HP-00020000</b>

Dimensions (mm), Force (N) with normal manual tightening.

## L-ratchet handle dimensions

Size	l	b	h	Clamp force	Part numbers L-ratchet handle
12	N/A				
15	45	59.5	19.0	200	<b>FDC15HP-00010000</b>
20	45	67.5	23.0	250	<b>FDC20HP-00010000</b>
25	45	71	28.0	250	<b>FDC25HP-00010000</b>
35	63	96	38.5	350	<b>FDC35HP-00010000</b>
45	78	116	48.0	750	<b>FDC45HP-00010000</b>

## end of stroke stop screws



The stop screws are screwed into threads (option) on the guide rails. The end of stroke stopping energy is reduced by a rubber cap. With guide rails where the L11 is less than the standard minimum, we offset the mounting hole by half of its diameter.

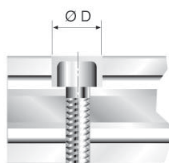
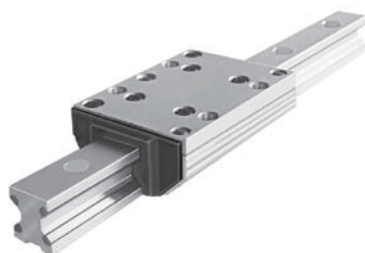
**Note:** Customer must drill and tap the holes for the stop screws.

Size	Ød	ØD	K	L11 min.	P	Part number
12	M5	12	8	15.0	6.0	<b>63504A</b>
15	M5	12	8	16.0	6.0	<b>63504A</b>
20	M5	12	8	17.0	6.0	<b>63504A</b>
25	M6	15	10	20.5	7.5	<b>63505A</b>
35	M8	19	13	26.5	9.5	<b>63506A</b>
45	M10	24	16	33.0	12.0	<b>63507A</b>

Dimensions (mm)

## GDL Accessories

## Rail mounting screw covers



**Material:** Wear resistant plastic, resistant to oil and aging.

**Mounting:** Put a plastic plate on top and pound in uniformly. Remove residual burrs with a soft brush or finger nail.

**Note:** Use respective part numbers for ordering separately or include in rail part number.

Size	Cylindrical screw DIN912	Ø D	Part number
12	M3	6	<b>87752A</b>
15	M4	8	<b>42074FiL</b>
20	M5	10	<b>87754A</b>
25	M6	11	<b>87755A</b>
35	M8	15	<b>6973</b>
45	M10	18	<b>87757A</b>

Dimensions (mm)

## GDL Aluminum roller guides with wipers

### Version with wipers

Integrated into an additional cover, a felt wiper is saturated with oil. Although dependent on the degree of contaminants, these wipers last for some 6000km, after which the felt wipers can either be washed or replaced.

For optimal cassette rolling performance, all holes in the guide rails should be filled with the plastic rail mounting screw covers.

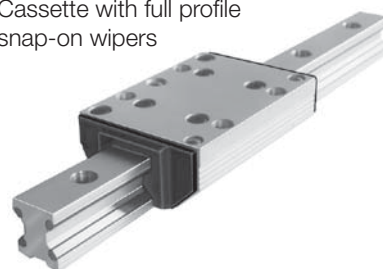
### Part numbers for replacement wiper kits

FDC series and size	Respective part number
12	<b>84457B</b>
15	<b>84480B</b>
20	<b>84481B</b>
25	<b>84482B</b>
35	<b>84483B</b>
45	<b>84484B</b>

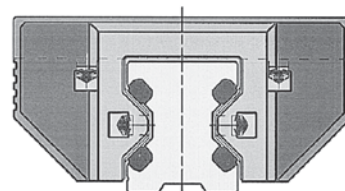
\*wiper kits are sold in pairs

NOTE: Use respective part numbers for ordering separately as replacements, or specify in cassette part number.

Cassette with full profile snap-on wipers



Full profile snap-on wiper



## GDL's keyed butt-jointed rail option

GUIDELINE rails can be precisely fastened together using a factory offered keyed butt-joint option for continuous rail lengths, as shown in Figures 1 & 2.

Two rail sections are clamped together with mating round bar stock pieces that seat tangent to both rail section guideways on each side of the rail. While the rail sections are clamped together, a keyway slot is machined in the top and bottom sides of the rail, across the butt-joint. Screw holes are then drilled through the rail inside the keyway slot, so the opposing keyways can be drawn together tightly with screws. The round bar stock clamp is then removed, providing a rigid and well aligned keyed butt-joint.

The keyed butt-joint option provides optimum alignment of all guideways from one rail section to the next. This allows for optimum "smooth" guidance of the cassette bearings, while crossing rail butt-joints.

The keyed butt-jointed rail option is currently available in the FDR version 25, 35, & 45 mm rail sizes. For a keyed butt-joint on rail sizes 25, 35 or 45 mm, specify P/N:# GDL-BJK

Consult factory for other size possibilities.

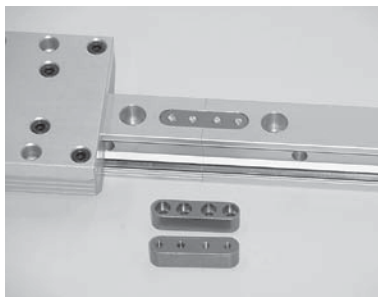


Figure 1

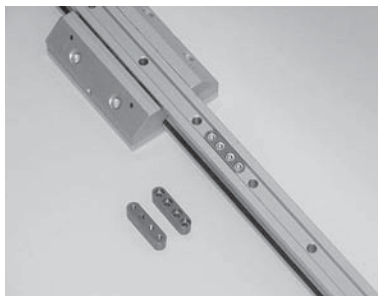


Figure 2

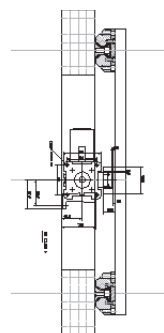


Figure 3

GDL linear guides couple well with various structural aluminum extrusions and Parker-Origa OSP-P actuators. Mounting can be easily accomplished using standard fasteners and mounting brackets. See Figure 3 above.



## 1. Features of the Guide System

Aluminum roller guides consist of a double sided rail and a roller cassette or two single sided rails and two roller shoes. Aluminum roller guide rails and cassettes are made of aluminum alloy. The rollers are very smooth running on precision polished guideways made of high alloy spring steel. The special cross pattern orientation of the running rollers provides high load and moment capacity in all directions.

Their special features are: light weight, small dimensions, and high speed of displacement. Aluminum roller guides are economical and universal handling components, which are mostly or all corrosion-resistant and available at a favorable price.

## 2. Size of the Guide System

To select the right guide size, first the moments and forces acting on the bearing have to be determined.

Recommended safety factors (with ISO screws quality 8.8):

Thrust load  $S > 1.3$

Tensile load  $S > 4.0$

Moment load  $S > 6.0$

## 3. Material

The basic body of GDL aluminum roller guides is made of aluminum alloy. The guideways consist of hardened, high alloy spring steel or of stainless steel. By using basic bodies of aluminum, the moved masses are reduced which allows light-weight construction requiring lower moving forces and reduced energy consumption. Still the integrated GDL system sustains high load and moment ratings.

## 4. Operating Temperature

GDL linear guides can be operated within a temperature range from -10° C up to 80°C. For other temperatures, please consult factory.

## 5. Screwed Connections

GDL linear guides are fixed to the mating structure by the mounting holes in the rails and the cassettes. ISO screw quality 8.8 should be used with DIN 433 washers.

To secure the screwed connections, we recommend that suitable locking means be utilized as necessary.

Mounting screw torque specifications

Screw	Quality 8.8 [Nm]
M3	1.1
M4	2.5
M5	5.0
M6	8.5
M8	21.0
M10	41.0
M12	71.0

## 6. Wipers

The guideways of aluminum roller guides are equipped with wipers to protect against coarse environmental contamination.

# Rodless Pneumatic Cylinders GDL Series

## 7. Slide Resistance / Adjustment

Follow the steps on how to adjust GDL cassettes to the rail.

The new GDL catalog has many changes due to an expanded product line. The change to feature descriptive part numbering was done to accommodate all current and future offerings of the GDL product. The goal is to have standard features and options available, for a perfect fit into your application.

Included in the chart below are hex sizes, drag resistance and torque ratings for adjusting the cassette.

GDL Chart

	FDC 12	FDC 15	FDC 20	FDC 25	FDC 35	FDC 45
Top plate hex (mm)	2	3	4	4	5	6
Top plate torque (in lbs)	n/a	22.1	44.3	44.3	75.2	186
Adjustment hex (mm)	1	3	3	4	4	4
Drag resistance (oz) HP, HC, GF, VA	1.8-7.9	3.6-10.8	5.4-16.2	7.2-21.6	10.8-32.4	12.6-37.7
Drag resistance (oz) SP & SC	.7-1.8	1.8-3.6	3.6-7.2	5.4-10.8	7.2-14.4	9-18
Drag resistance (oz) HD	n/a	n/a	n/a	9-18	14.4-25	18-28.7

### 7.1 GDL Adjustment Procedure

**Do not measure sliding resistance with wipers on.**

- 1) Lay the rail out on the flat surface with the **datum** line facing away from you. Anchor the rail to keep it from shifting when sliding resistance is applied to the cassette.

*The datum line is a reference groove on one side of the rail.*

- 2) Set the roller cassette on the rail with the adjustment screw facing towards you, while the datum line on the rail is away from you. Do not install the wipers on the cassette yet.

**Do not install the wipers yet.**

- 3) Make sure the four bolts on the adjustable side of the cassette are slightly loose and the bolts on the fixed side are tight before adjusting the drag screw.

**One side of the cassette is fixed and the other side is floating.**

- 4) The drag hex screw is located on one side of the cassette. Adjust the screw in for more drag and out for less. Do not try to adjust cassette with top plates bolts tight.

**See the chart for drag adjustment hex screw size.**

- 5) Adjust the drag on the cassette by sliding as it slides down the rail. Feel for an even amount of resistance as you turn the hex screw in and out.
- 6) Tighten down the top plate bolts to the proper torque specification. The tightening of the top plate bolts will add some resistance. If necessary, the adjustment procedure can be repeated for better sliding resistance for your application.

**See the chart for top plate hex size and torque rating.**

- 7) If the adjustment is done without a scale, it should move evenly. Some examples of improper adjustment are: If the

cassette “hops”, it is too tight. If it is too loose, the top plate of the cassette will have play. Try to be in the middle.

- 8) To check your settings use a pull or push style scale. Slide the cassette down the entire rail at an even speed, measuring the drag resistance. Your highest drag rating should be referenced when looking at the chart.

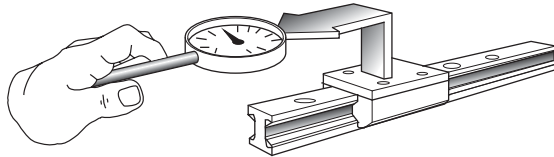
*See the chart for drag resistance ratings for the size and type of cassette.*

- 9) Install the clip on wipers. The wipers will add between 1-3 ounces of resistance. The wipers do not add any additional roller preload to the rail.

*The clip on wipers can be installed at this time.*

## 7.2 Double Sided Rail and Cassette

Aluminum roller guides are adjusted in such a way that the required stiffness under load is obtained. If self adjustment is preferred, we recommend that you measure the slide resistance as shown below. Before doing so, the mating structure should be checked for dimensional accuracy and flatness



The cassettes which are mounted on the rails are adjusted clearance-free, without play. This adjusting method is required at the point on the rail where the cassette travels with the least slide resistance. Adjustment is completed in the non-loaded condition. The tolerances below refer to this condition.

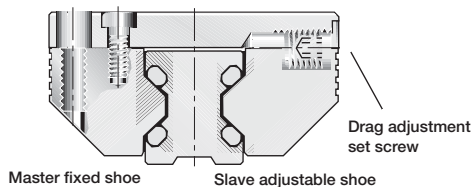
### Slide resistance adjustment tolerance [N]

Series	FDC_HP, FDC_HC, FDC_AM, FDC_GF, FDC_VA						FDC_SP, FDC_SC						FDC_HD		
	12	15	20	25	35	45	12	15	20	25	35	45	25	35	45
Adjust. value	0.5	1.0	1.5	2.0	3.0	3.5	0.2	0.5	1.0	1.5	2.0	2.5	2.5	4.0	5.0
Max. value	2.0	3.0	4.5	6.0	9.0	10.5	0.5	1.0	2.0	3.0	4.0	5.0	5.0	7.0	8.0

All values are without wipers

Tolerances in the guide system may cause slight variations in the slide resistance, when the adjusted cassette is moved along the guide rail.

## 7.3 Double Sided Rail and Roller Cassette



To change the clearance setting, first the slave adjustable shoe screws on the cassette top plate are slightly loosened.

# Rodless Pneumatic Cylinders GDL Series

Afterwards, the drag adjustment set screw is turned to increase or decrease slide resistance of the cassette. Turning the drag adjustment set screw effects a displacement of the roller shoe in relation to the cassette top plate.

After re-tightening of the cassette top plate, the slide resistance can be checked. This procedure can be repeated until the desired slide resistance is achieved.

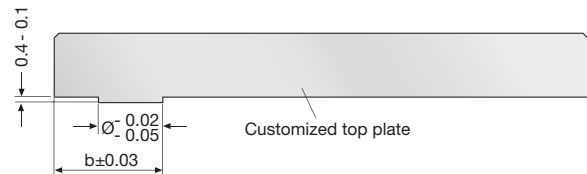
## 7.4 Rails and Rollershoes

When installing, it is important to distinguish between the master fixed side and the slave adjustable side rollershoe and rail. The rail on the master fixed side is aligned to the mating structure and fastened securely by all screws.

The rail on the slave adjustable side should be lightly tightened and movable with light force during initial alignment of parallel rails. Gauge blocks should be used between the parallel rails, by locating off the aligned and mounted master rail, in order to align the slave rail parallel to the master rail. Slave rail mounting bolts should be tightened as the slave rail is aligned at each bolt position. See paragraph 11.3 for further instructions on mounting parallel single sided rails.

## 7.5 Centering Groove on the Master Fixed Shoe and Custom Top Plate

Each pair of rollershoes are provided with centering grooves for optimum alignment to their mating top plate during mounting. One rollershoe should be designated as the master fixed rollershoe, even though both are designed with a centering groove on their top surface. The other shoe will serve as the slave adjustable side rollershoe. The mating customized top plate should be machined with a centering shoulder according to the following data.



Size	a	b
12	4,5	9,6
15	5,0	12,6
20	7,5	16,1
25	10,5	17,6
35	12,5	26,1

## 7.6 Adjusting Cassette Built with Rollershoes and Custom Top Plate

The centering shoulder on the top plate should be assembled with its respective fixed rollershoe centering groove and securely torqued to recommended specification. See cassette screw torque specifications under step 5, on previous page.

Assemble the adjustable rollershoe to the top plate also, parallel to the fixed rollershoe on the same side of the top plate. Its fasteners should be lightly tightened so that the adjustable rollershoe can be moved with light finger pressure.



As assembled cassette can then be slid onto parallel rails, while keeping the fixed rollershoe on the master fixed rail side. The incorporated drag adjustment set screw can then be turned clockwise to remove cassette play, or counter clockwise to reduce slide resistance while maintaining zero play.

Once the desired slide resistance is achieved with no cassette play, the adjustable rollershoe fasteners can also be torqued to specification

## 8. Running accuracy

The running accuracy is measured from the top plate surface of the cassette, to the ideal straight line of travel. Running accuracy of the cassette to the rail is  $\pm .03\text{mm}$  (.0012") per meter, granted no greater than (.0024") straightness deviation per meter is maintained when mounting the rail.

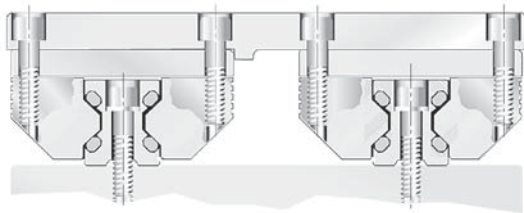
## 9. Contact and support surfaces

The contact and support surfaces have a substantial influence on functioning and precision of linear guides. Depending on the functional requirements of the system, the mating structure has to be machined with the corresponding degree of precision.

Machining errors on the mating structure will otherwise add to the running error of the guide system. In order to assure troublefree functioning, we recommend that a max. straightness deviation of  $\leq 0.1\text{ mm}$  (.0039") per running meter be maintained when mounting the rail.

## 10. Design hints

### 10.1 Parallel double sided rails and cassettes



The master fixed rail should always be established straight and true first, within the maximum straightness deviation specified in paragraph 9. With parallel rail arrangements, both rails should be mounted on the same mounting surface elevation and treated with equal surface preparation and tolerancing practices. Precise alignment in terms of spacing, parallelism and height is very important.

When coupled parallel to a driving actuator system, the adjustable side of the cassette should be placed on the side closest to the driving actuator. This will minimize driving actuator torque transferred to the adjustable side of the cassette.

## 11. Guide mounting instructions

The useable load capacity is influenced by the connection between the guide elements and the mating structure. For this reason, a flat, straight and solid secure mounting surface should be provided. Adequate support of qualified loads and moments can then be achieved, along with desired running accuracy.

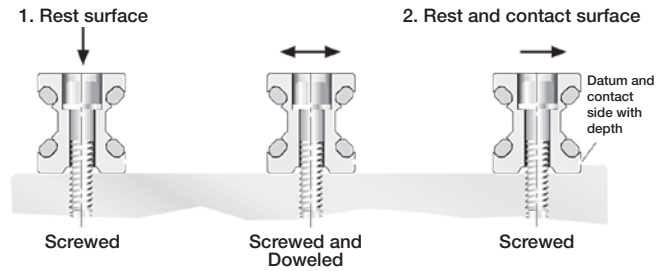
### 11.1 Mounting Double Sided Rails and Cassette

Depending on the load situation, certain double sided rails

## Rodless Pneumatic Cylinders GDL Series

should either be screwed or screwed and dowelled, and respectively put into grooves or against a shoulder.

The rails can be secured best against shoulders and are screwed or screwed and dowelled to the mating structure.



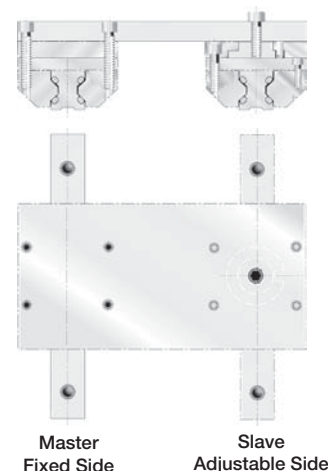
After final adjustment of rail straightness and parallelism, the rail mounting screws are tightened starting in the middle of the rail length. Rail mounting bolts should be torqued to specification by alternating between each bolt. The installer should start with the bolt in the center of the rail length and proceed by alternating between each bolt left of center and each bolt right of center, while working towards both ends of the rail.

Afterwards, the cassette should be moved back and forth along the total stroke distance of the rail. If the cassette travels smoothly, the mounting process can proceed or be completed.

### 11.2 Mounting Parallel Double Sided Rails and Cassettes

With parallel double sided rail arrangements, we recommend that the master fixed rail side and slave adjustment rail sides of the guide system be identified. This allows optimum tolerances in parallelism to be achieved best by adjusting the slave adjustable rail, parallel to the master rail. The master fixed rail side should be mounted first to achieve the initial line of straight travel.

The example below displays a convenient method for adjusting the slave adjustable rail parallel to the fixed master rail. Once the cassette travel is smooth, without play, one can proceed with rail mounting.



Note that the top plate spanning across the cassettes on opposite rails is completely bolted down to the cassette on the master fixed side only. The top plate end over the slave adjustable side is only bolted in one location, in the center of the slave adjustment side cassette. With one bolt holding the

top plate to the slave adjustment side cassette, this cassette can pivot while the slave adjustable rail self-aligns parallel to the fixed master rail side. The floating top plate setup is s ooked along the entire rail length, to establish the parallelism between the two rails.

Calibrated gauge blocks can also be used to establish equal integrity in rail parallelism. The installer should seat and temporarily clamp short pieces of precision ground round stock, tangent to the two guideways on the inside of each rail.

Rail Size	Precision Round Stock Sizes Ø mm
12	11
15	11
20	14
25	16
35	27
45	35

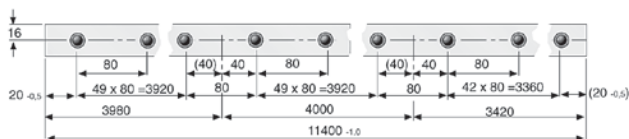
The calibrated gauge blocks can then be used, to locate off the precision round stock on the master fixed rail, in o der to set the slave adjustable rail parallel. The gauge blocks are then locating the same way that the floating top plate is, b referencing both the master and slave rail guideway surfaces to establish parallelism.

Once the slave adjustable rail has been self-aligned, its bolts should also be torqued to specification in the o der mentioned in paragraph 11.1. The top spanning across both cassettes on opposite rails, can then be securely fastened using all cassette mounting bolt holes.

## 12. Keyed Butt-jointing of Rail Sections

### 12.1 Rail Hole Spacing

Butt-jointed rails over L = 4000 mm are sectioned together according to the GDL standard. See "GDL's Keyed Butt-Jointed Rail Option" on page G136. Butt-jointed rails sections are cut so that the standard rail mounting hole spacing is maintained across all butt-joints.



Keyed butt-jointed rails are usually shipped completely assembled, but sometimes must be shipped partially assembled, due to shipping length limitations and shipping care. Partially assembled butt-jointed rails are supplied with a butt-jointing clamping fixture and the keyways and screws for fastening rail section together.

### 12.2 Mounting of butt-jointed rails

Clean mounting surfaces, then place rail sections loose on the guide path, one behind the other. Lay the rails in their correct sequence of the system design (i.e.: 1, 2, 3, 4...etc.). The orientation of the depth groove on the lower surface of the rail should always be on the same side for all rail sections being butt-jointed.

## Rodless Pneumatic Cylinders GDL Series

Any non-assembled rail sections should be aligned with the factory supplied butt-joint clamping fixture as displayed below.



See explanation of "GDL's Keyed Butt-Jointed Rail Option" on page G136.

Once all rail sections are assembled, the complete guide path can be aligned and fastened. Alignment and fastening should be conducted according to the applicable guide arrangement and steps previously described in this technical information section.

## Units Conversion Tables

### Force Conversions:

Multiply	By Conversion Factor	Result
pound-force	4.448	Newton
Newton	0.225	pound-force
kilogram-force	9.807	Newton
Newton	0.102	kilogram-force

### Acceleration Conversions:

Multiply	By Conversion Factor	Result
feet/second <sup>2</sup>	0.305	meter/second <sup>2</sup>
meter/second <sup>2</sup>	3.281	feet/second <sup>2</sup>
inch/second <sup>2</sup>	0.025	meter/second <sup>2</sup>
meter/second <sup>2</sup>	39.370	inch/second <sup>2</sup>

### Mass Conversions:

Multiply	By Conversion Factor	Result
ounce	28.349	gram
gram	0.035	ounce
kilogram	35.279	ounce
gram	0.001	kilogram
pound	0.453	kilogram
kilogram	2.205	pound

### Bending Moment or Torque Conversions:

Multiply	By Conversion Factor	Result
pound-foot	1.356	Newton-meter
Newton-meter	0.737	pound-foot
Newton-meter	0.102	kilogram-meter
Kilogram-meter	9.807	Newton-meter

### Velocity conversions:

Multiply	By Conversion Factor	Result
mile/hour	1.609	kilometer/hour
kilometer/hour	0.621	mile/hour
feet/second	0.305	meter/second
meter/second	3.281	feet/second
inch/minute	0.025	meter/minute
meter/minute	39.370	inch/minute

### Length conversions:

Multiply	By Conversion Factor	Result
inch	25.4	millimeter
millimeter	0.039	inch
inch	0.025	meter
meter	39.370	inch
foot	0.305	meter
meter	3.281	foot



# GDL Application Sheet

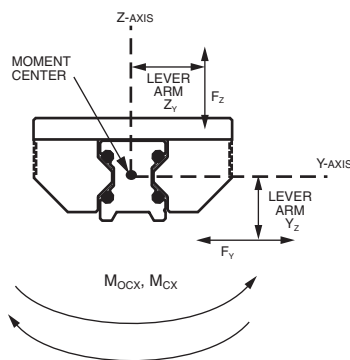
Distributor: \_\_\_\_\_ End-User: \_\_\_\_\_

Salesperson: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ e-mail: \_\_\_\_\_

Other Information: \_\_\_\_\_

## Roll



Roll load \_\_\_\_\_

X - Distance \_\_\_\_\_

Y - Distance \_\_\_\_\_

Z - Distance \_\_\_\_\_

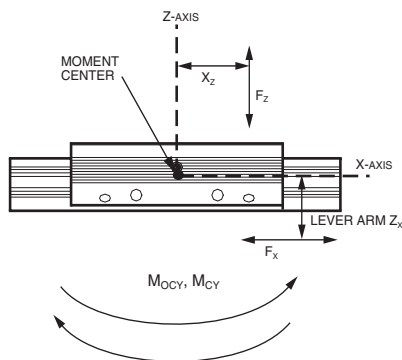


Length of rails \_\_\_\_\_

Distance between rails \_\_\_\_\_

Distance between cassettes on each rail \_\_\_\_\_

## Pitch



Pitch load \_\_\_\_\_

X - Distance \_\_\_\_\_

Y - Distance \_\_\_\_\_

Z - Distance \_\_\_\_\_



### Technical Data:

Stroke \_\_\_\_\_

Horizontal \_\_\_\_\_

Vertical \_\_\_\_\_

Velocity / Speed \_\_\_\_\_

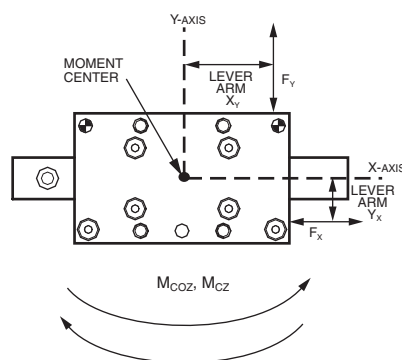
Acceleration \_\_\_\_\_

Load / Mass \_\_\_\_\_

Load Distances \_\_\_\_\_

Lifetime Desired \_\_\_\_\_

## Yaw



Yaw load \_\_\_\_\_

X - Distance \_\_\_\_\_

Y - Distance \_\_\_\_\_

Z - Distance \_\_\_\_\_

### Environment:

(Dirt, Humidity...)

G

Rodless Pneumatic  
Cylinders

OSP-P  
Series

P1X  
Series

P1Z  
Series

GDL  
Series



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