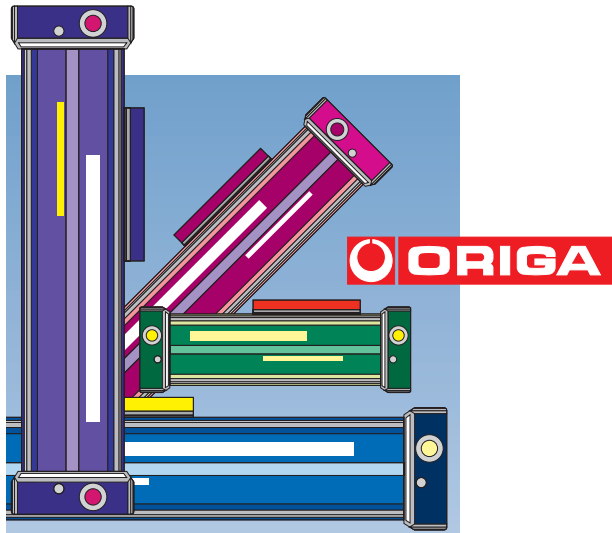


AUTOMATION
TECHNOLOGY

RODLESS CYLINDERS



HOERBIGER


DYSTRYBUTOR PARKER PREMIUM

ARA[®]
 PNEUMATIK

| arapneumatik.pl

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 pneumatyka@arapneumatik.pl
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 katowice@arapneumatik.pl
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1. General Information

2. Application Data

3. Technical Data

4. Proximity Sensors

5. Spare Parts

6. Assembly Instructions

Introduction

Origa Corporation, the US operation of Hoerbiger International's Origa Division, is the principle manufacturer of rodless pneumatic cylinders for the United States, South American and Canadian markets.

As part of a global organization, Origa's world wide sales and service network is supported by manufacturing and assembly locations in Europe, Australia and Asia. The parent company, Hoerbiger International, is a world-wide manufacturer and developer of industrial products, including pneumatic and hydraulic automation components.

Origa is committed to developing the rodless cylinder technology with innovations that can facilitate greater penetration into the linear motion market. In particular, new developments have reduced or eliminated the need for additional support and secondary engineering associated with alternative systems.

Through market specialization Origa dominates the international market for rodless cylinders and has cultivated unparalleled expertise in their application. The company operates with an extensive distributor network, a worldwide sales force, and a complete application engineering staff dedicated to customer and technical services.

Origa strives to provide customers with products tailored to their needs, with consistent high quality and reliability. If you require further information or assistance, please complete the attached business reply card or contact us directly at any of the locations listed in section 1 page 1.1/7

DYSTRYBUTOR PARKER PREMIUM

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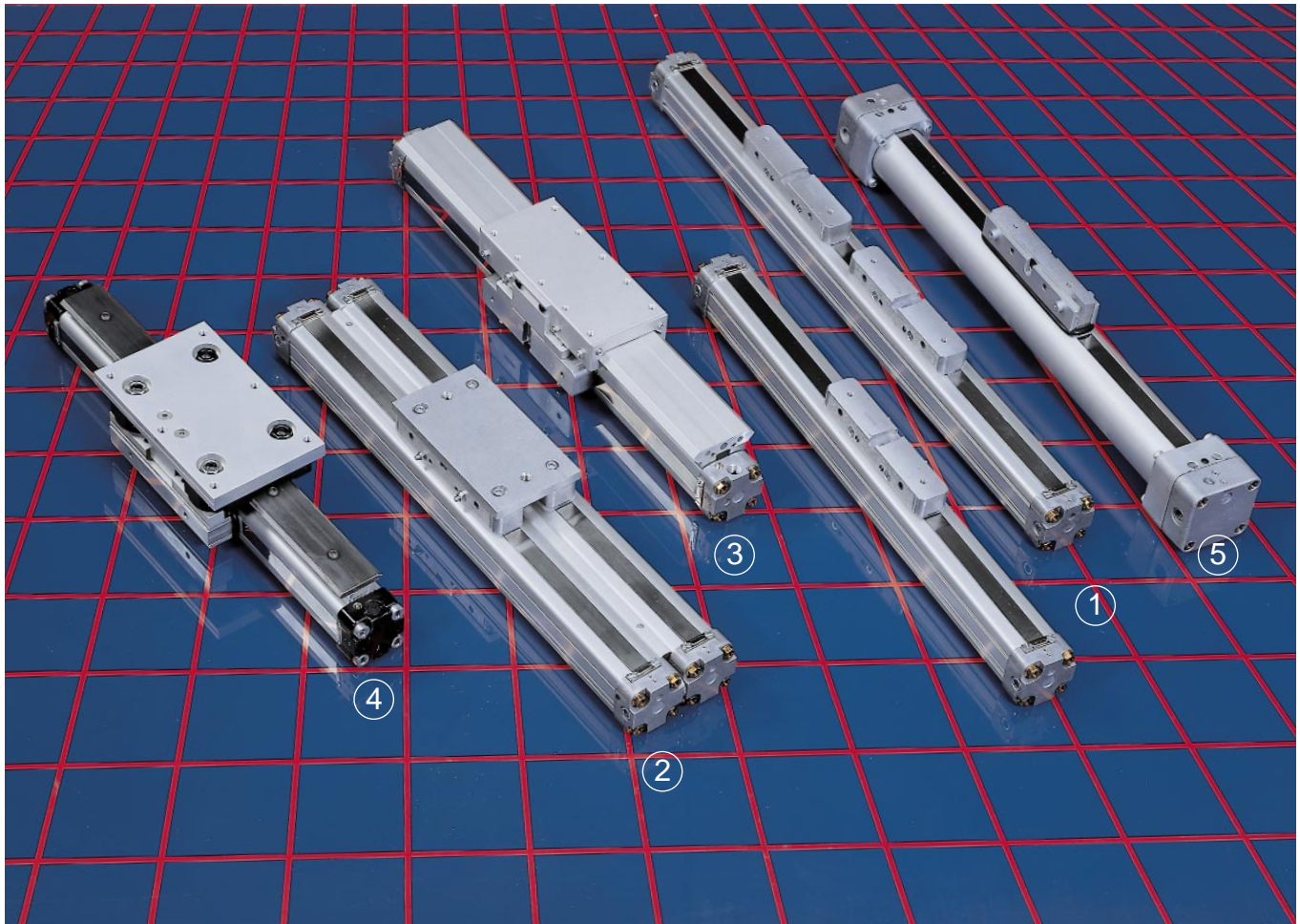
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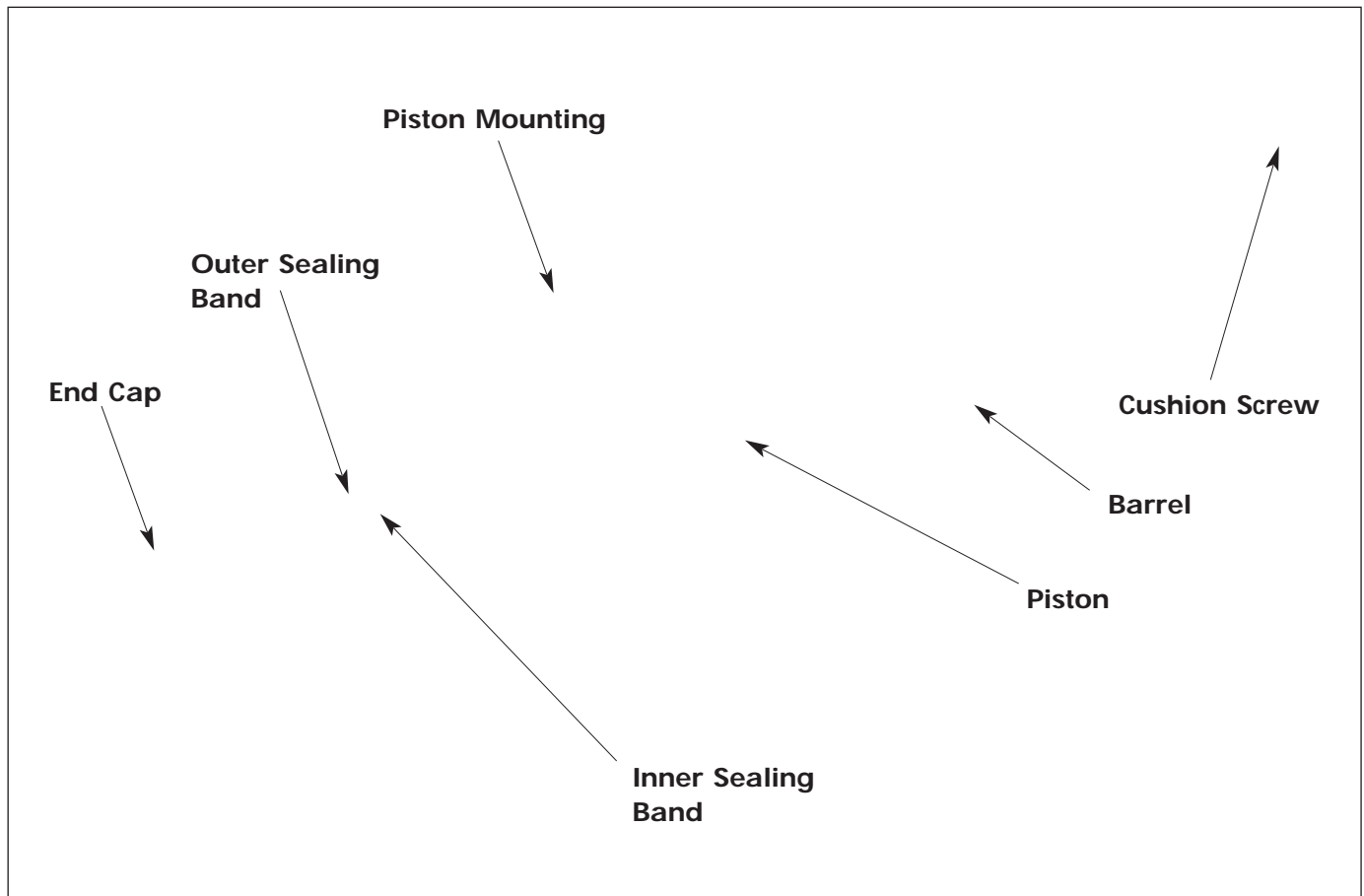
The Pneumatic Rodless Cylinder



The following cylinder types are available:

1. **Series 2000 - Basic Cylinder**
Available in the following bore sizes: 10mm, 16mm, 25mm, 32mm, 40mm, 50mm
Single Piston and Double Piston configurations
2. **Series 2000 - Joint Clamp**
Available in the following bore sizes: 25mm, 32mm, 40mm, 50mm
Single Piston and Double Piston configurations
3. **Series 2000 - NR50**
Available in the following bore sizes: 16mm, 25mm, 32mm, 40mm, 50mm
Single Piston and Double Piston configurations
4. **Series 2000 - Powerguide™**
Available in the following bore sizes: 25mm, 32mm, 50mm
5. **Series P120 - Basic Cylinder**
Available in the following bore sizes: 40mm, 63mm, 80mm
Short and Long Piston configurations

The ORIGA Principle



Features

1. The cylinder barrel of extruded anodized aluminum has a slot along its entire length. To provide rigidity the bore is eccentric to the outside diameter.
 2. A flexible hardened stainless steel inner band running the entire length of the bore and passing through the piston provides a near-zero-leakage metal to metal seal. An outer band of the same material acts as a cover over the slot preventing foreign particles from entering into the cylinders interior.
 3. The aluminum piston is fitted with synthetic bearing rings. The power transmission outward takes place through a positive, physical connection through the slot to the external piston mounting. This solid guide permits the acceptance of external forces and moments and minimizes frictional losses.
 4. The extensive experience in the development and production of rodless cylinders, as well as the use of high quality components and materials, ensure a very serviceable design lending itself to high operating safety and optimum performance.
 5. This unique design, using only 4 main components, makes ORIGA cylinders reliable in operation and simple to maintain, providing long trouble free service.
 6. ORIGA is the specialist in the rodless cylinder field. ORIGA has the largest range of bore diameters and can offer the longest stroke lengths with application oriented accessories for cost effective designs. ORIGA has experience in all conceivable areas of industry, attributable to the thousands of applications in which ORIGA rodless cylinders are used.
- The ORIGA system is protected by worldwide patents.

Technical Benefits

Design Options

ORIGA cylinders can be supplied as a basic model, or as a basic model with external guides depending on the application requirements.

Cylinder Mountings

Various types of piston mounting are available including one which allows the cylinder to be inverted under adverse operating conditions thus protecting the sealing bands. End mounting brackets and mid-section supports are also available.

Operating Pressure

Max. 120 P.S.I.

End Of Stroke Cushioning

Adjustable cushioning is provided as standard and ensures the piston stops smoothly - even at high speeds. (10 mm not adjustable.)

Oil Free Operation

The ORIGA permanent lubricating grease eliminates the need for regular oil mist lubrication and provides long service life.

Cylinders can be used in applications where maximum cleanliness is required. (e.g. electronics pharmaceutical and food processing industries).

Slow Speed Applications

The construction of the ORIGA rodless cylinder allows for a low friction characteristic permitting extremely slow traversing speeds. For speeds below 4 inches/second we recommend that ORIGA "slow speed" lubrication is specified.

Temperature Range/Piston Speed

Standard Buna-N seals are suitable for temperatures from 15° F to +175° F. Viton seals are required for higher temperatures as well as for use when piston speeds exceed 5 ft./sec. Please contact the ORIGA Technical Department if the required operating temperature is above 175° F.

Magnetic Pistons

All Series 2000 cylinders are supplied as standard with magnetic pistons for proximity switch actuation.

Proximity Switches

Magnetically operated Hall Effect switches (IS) or Reed switches (RS) are available to sense piston position at any point over the entire stroke length.

Corrosive Environments

All screws are plated. In extreme applications stainless steel can be supplied. Special aluminum coatings are available for added protection against chemical or caustic wash down of equipment or in environments where corrosive gases are present.

Cylinder Loading

Values are based on shock-free duty and should not be exceeded during piston acceleration.

Note:

Seal life can be significantly influenced by extremes of speed, load and temperature which exceed the approved limits. Contact the ORIGA Technical Department for assistance with special applications.

All specifications are subject to change without notice.

Ordering Procedure

Series 2000

32-2020/20X50-B-M

Cylinder Bore Size: _____
10, 16, 25, 32, 40 or 50

Configuration: _____
- = Single Cylinder
J = Joint Clamp Unit
C=Clean Room Cylinder

Piston Quantity: _____
20 = Single Piston
22 = Double Piston

End Cap Cushion Placement: _____
20 = Standard Cushion Location (21 for Ø25 & 50mm)
30 = Cushion at Rear of Cap (31 for Ø25 & 50mm)
Note: Rear cushions are available on Ø25mm - Ø50mm only.

*Note: When entering total stroke length for 2220/2230 (double piston) cylinders be sure to first add the "CL" distance to the actual, effective stroke length. Enter this total in the cylinder part number. Follow the same procedure for pricing.

Prelube Specification (optional):
M = Standard
C = Cleanroom
F = Food Grade
S = Slow Speed

Seal Type:
B = Buna-N
V = Viton

***Stroke Length:**
Enter metric strokes followed by "mm" (i.e. 200MM)

Piston Mounting Type:
20 = Standard Mount 35 = Inverted Floating Mount
25 = Floating Mount 50 = External Guided Mount
30 = Inverted Mount(Not available for 10mm)
PG = Powerguide

For Joint Clamp Cylinders:
24 = Platform Mount 34 = Inverted Platform Mount

Series P120

P124-S/20X50-B-M

Cylinder Series P120 _____

Cylinder Bore Size: _____
4 = 40mm
6 = 63mm
8 = 80mm

Piston/Mount Configuration:

| | |
|--------------------------------|--------------------------------|
| <u>Short Piston</u> | <u>Long Piston</u> |
| S/20 = Standard Mount | L/26 = Standard Mount |
| S/22 = Platform Mount | L/28 = Platform Mount |
| S/25 = Floating Mount | L/36 = Inverted Mount |
| S/30 = Inverted Mount | L/38 = Inverted Platform Mount |
| S/32 = Inverted Platform Mount | |
| S/35 = Inverted Floating Mount | |

Prelube Specification (optional):
M = Standard
C = Cleanroom
F = Food Grade
S = Slow Speed

Seal Type:
B = Buna-N
V = Viton

Stroke Length:
Enter metric strokes followed by "mm" (i.e. 200MM)

Service Packs

Series 2000
SP32-B-1 X S-M

Service Pack _____
Bore Size=10, 16, 25, 32, 40, 51
(Use "50" for 2020 versions)
B= Buna-N, V= Viton _____
1 = Single Piston _____
2 = Double Piston _____
Enter Stroke Length _____
Grease Requirements
M= Standard _____
S= Slow Speed _____

Series P120
SP124-B-S X S-M

Service Pack _____
Bore Size: 124=40mm, 126=63mm, 128=80mm _____
B= Buna-N, V= Viton _____
S = Short Piston _____
L = Long Piston _____
Enter Stroke Length _____
Grease Requirements
M= Standard _____
S= Slow Speed _____

ORIGA International Representation

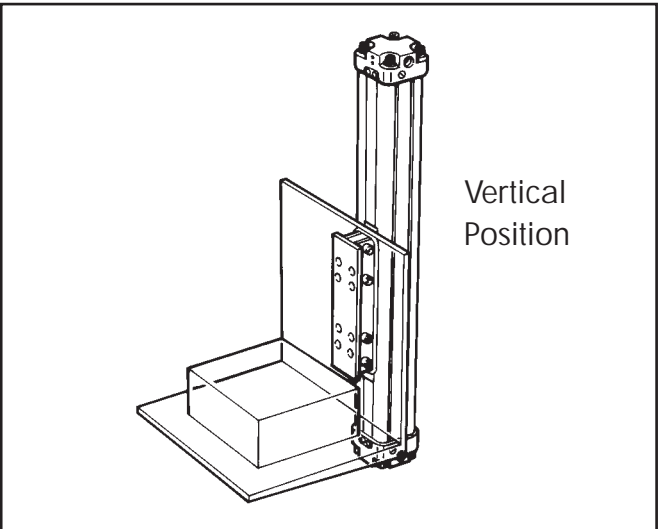
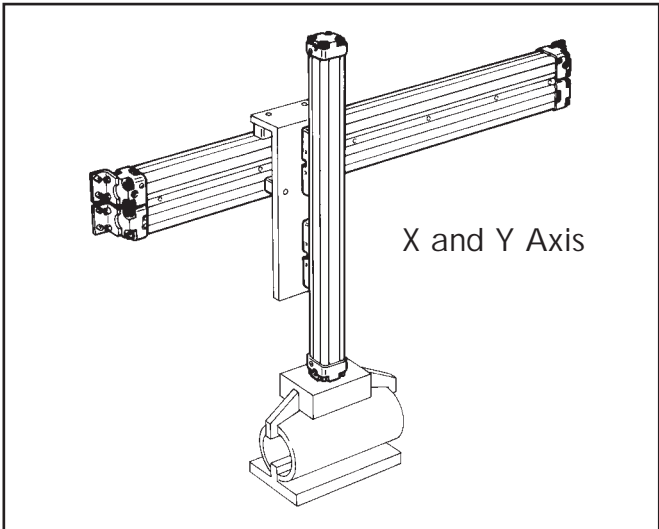
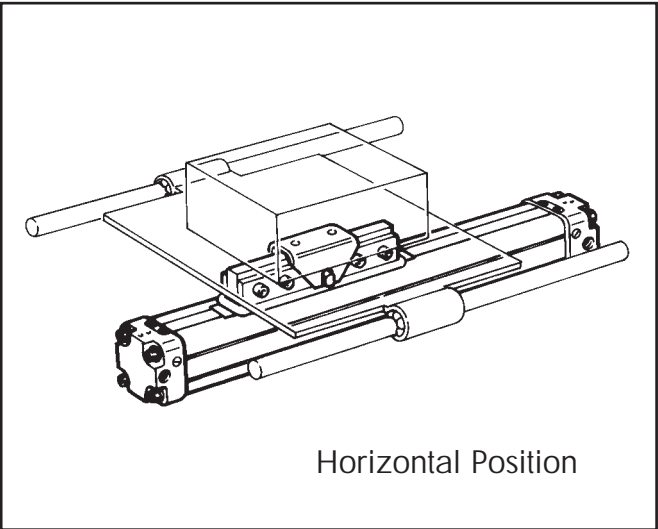
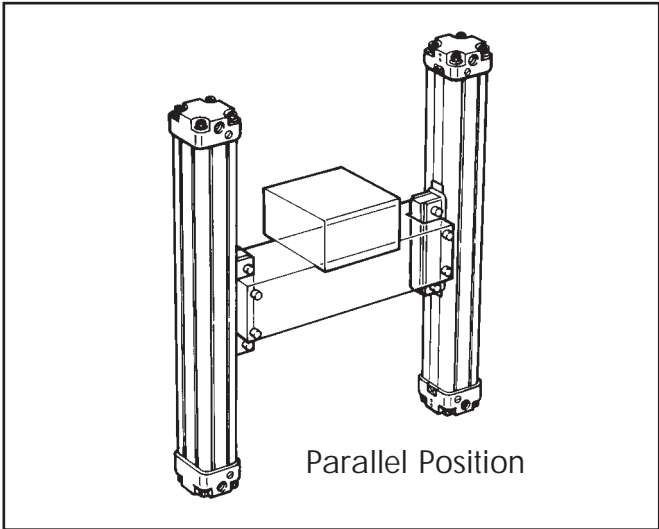
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HOERBIGER-ORIGA CORPORATION
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Tel. 630-871-8300
FAX: 630-871-1515

NOTE: All listings include country codes and city codes.

Installation

The versatility of the Origa rodless cylinder is demonstrated in a wide range of applications.

Proven technology, used worldwide in all areas where lifting and transfer operations are required.



Valving

The unique, mechanical design of the Origa rodless cylinder allows for a variety of valves and pneumatic circuit configurations. The diagrams shown below illustrate circuit examples used to obtain a particular output function.

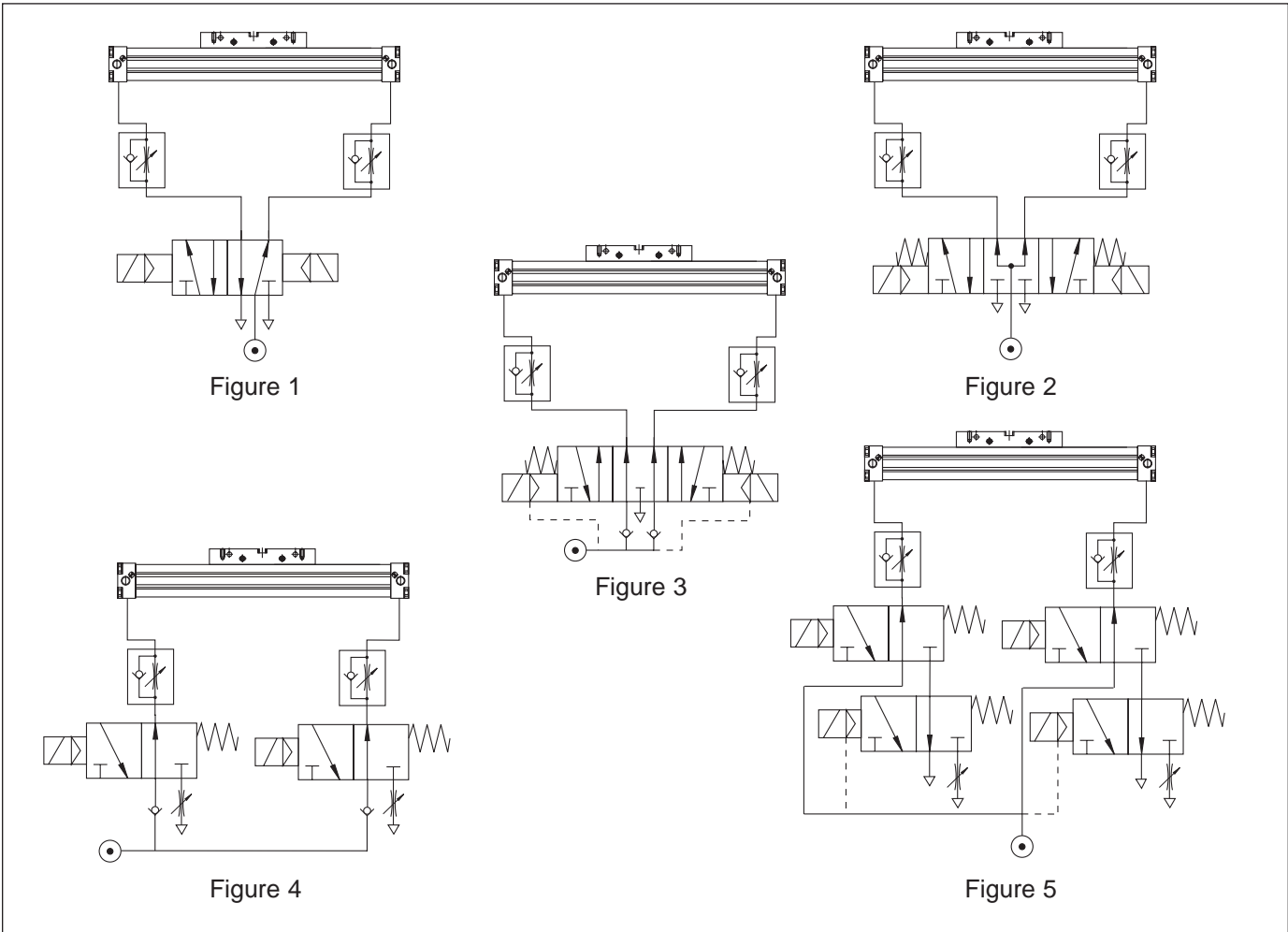


Figure 1. Speed controlled forward and backward motion.

Figure 2. For positioning when no external forces are present.

Figure 3. For accurate positioning. Check valves prevent external forces from moving the piston. Recommended for short stroke cylinders.

Figure 4. For accurate positioning. The valves should be located directly at the connection ports of the cylinder. Recommended for long stroke cylinders.

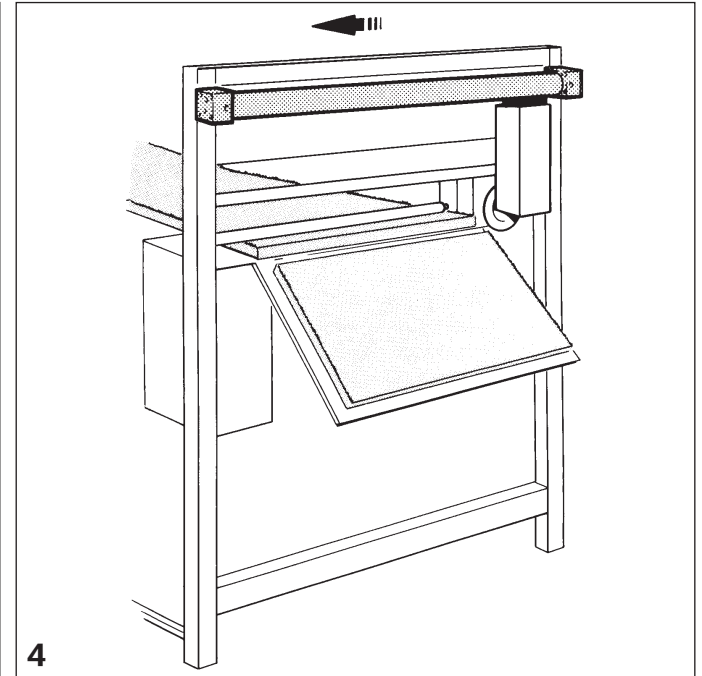
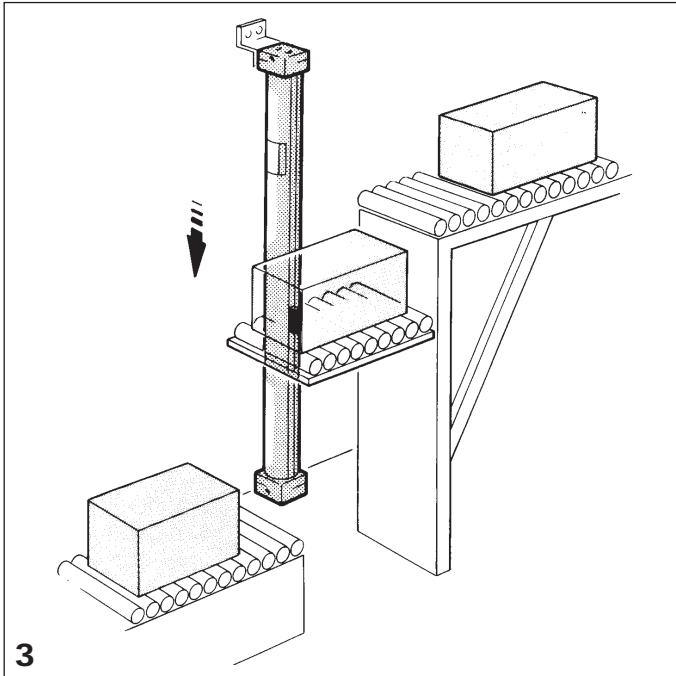
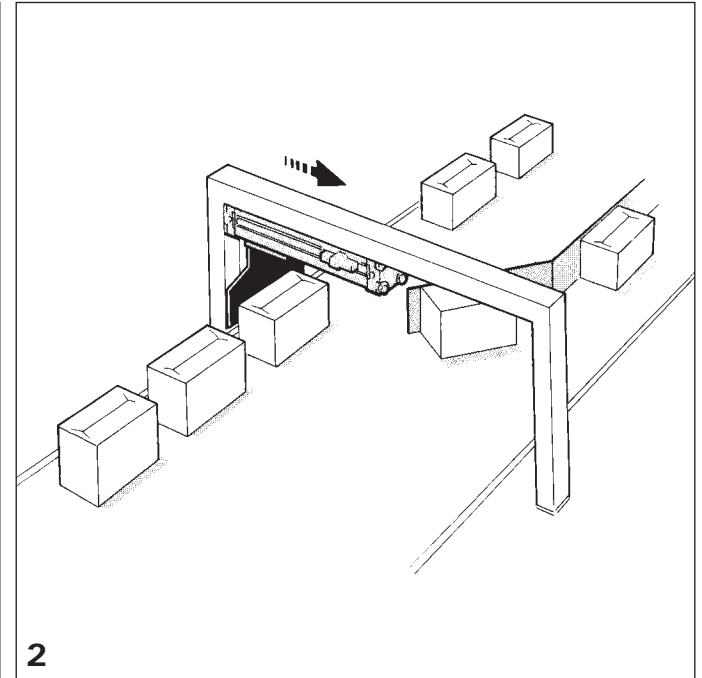
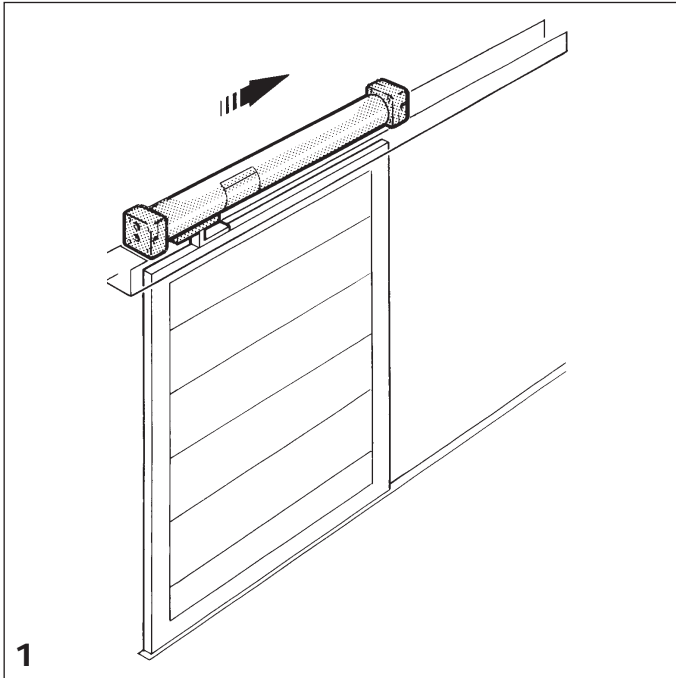
Figure 5. Recommended for accurate positioning at high velocities. Also when the load is too large to be handled by the standard cushions. An additional 3/2 way valve, including throttle control, connected to the exhaust port of the ordinary valve is used. This makes it possible to increase the throttling of the airflow before reaching positioning points or end positions. This allows a higher positioning repeatability and improved cushioning.

Applications

For more than 20 years
Origa cylinders have provided solutions
to linear motion problems
in all types of industry.

Offering simple designs,
easy installation, clean operation
and maintenance free duty,
Origa cylinders are suitable for
a diversity of applications and
environments. A variety of examples
are shown on the following pages.

For more information or
assistance with your linear
motion tasks. Please call an
authorized distributor or
Origa direct.

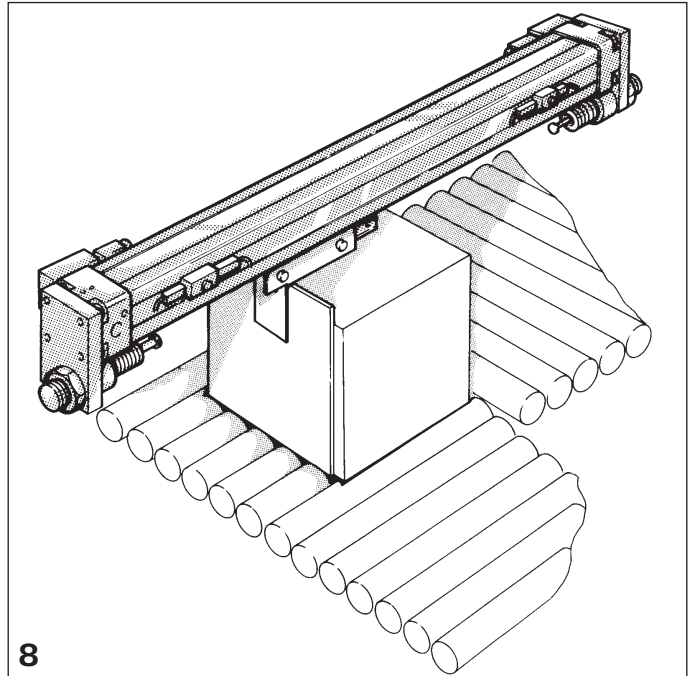
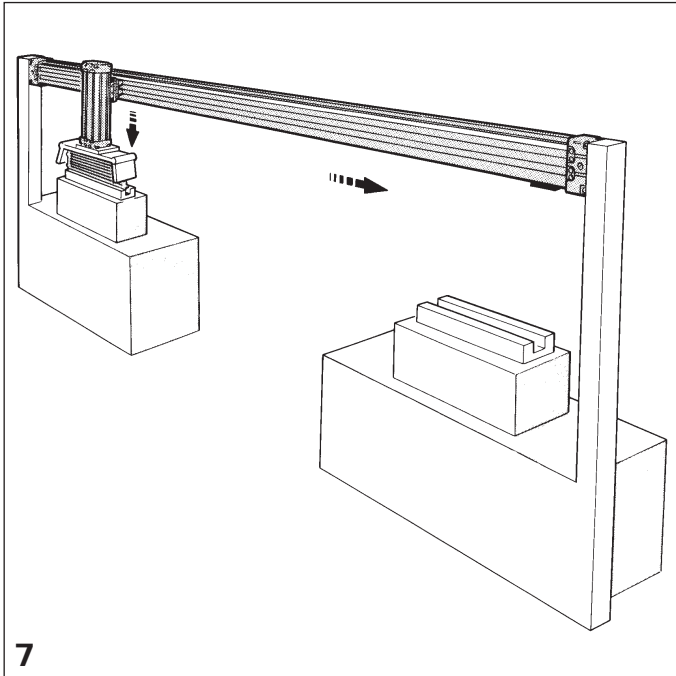
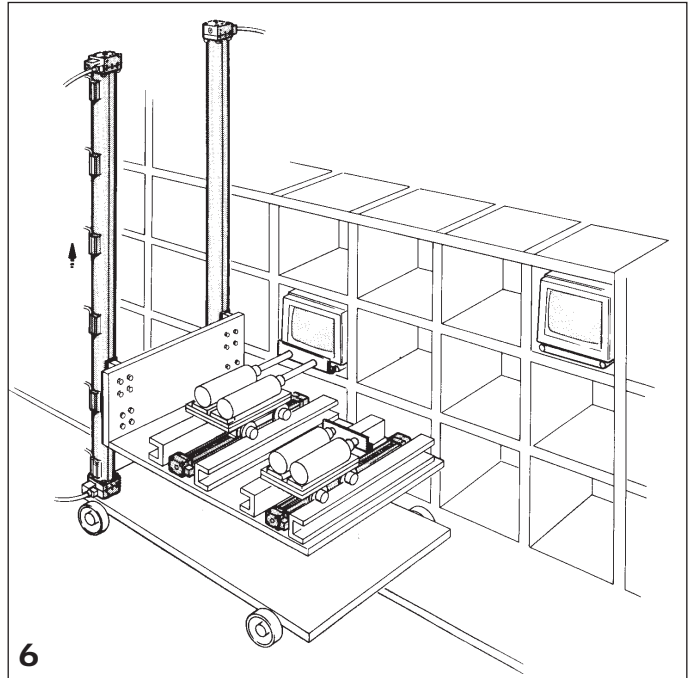
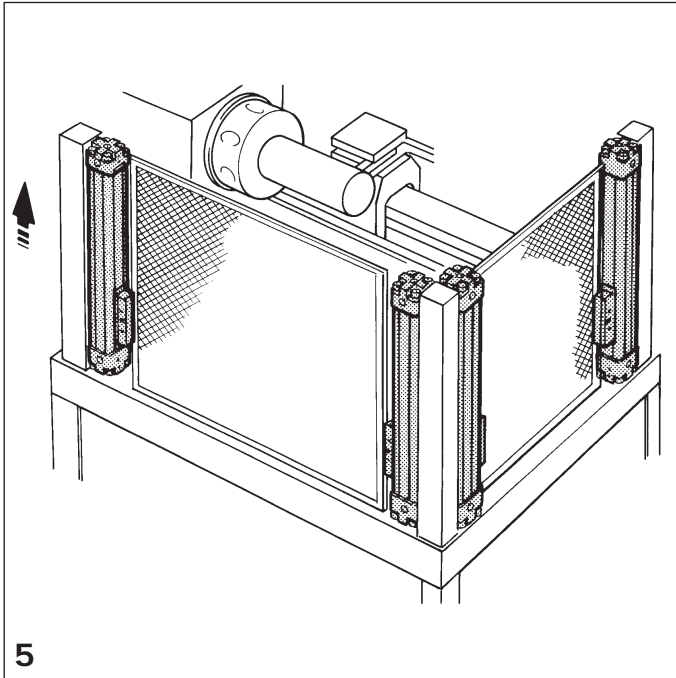


Application Descriptions

- No.1 Door Traverse -
- No.2 Conveyor Reject Systems -
- No.3 Conveyor Elevator -
- No.4 Flying Cutter -

Benefits

- Long strokes, equal forces in both directions, smooth consistent movement, space savings and ease of installation.
- Self-guiding, high-speed operation and compact design.
- Cantilever loading, self-guiding, long strokes, space saving and forms a part of the structure.
- High speeds, self-guiding, space saving, forms main structure of assembly. Made to any stroke length.



Application Descriptions

No.5 Machine Guards -

No.6 Auto-Handling Systems -

No.7 X-Y Axis, Pick and Place -

No.8 Conveyor Transfer -

Benefits

-Parallel operation, self-guiding, compact design.

-Parallel operation, self-guiding, cantilever loading, space savings and controlability.

-Self-guiding, compact design, no additional structural supports.

-Self-guiding, compact design, equal force in both directions, no additional support or guidance.

9

10

11

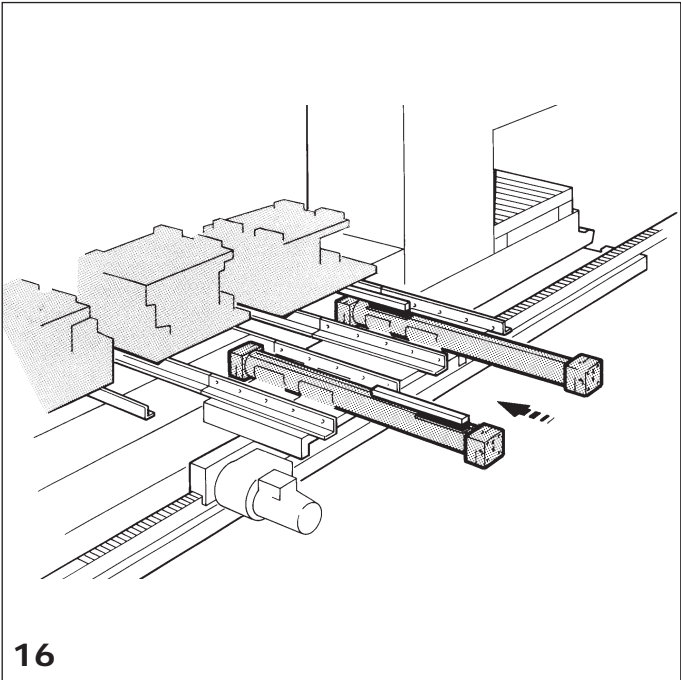
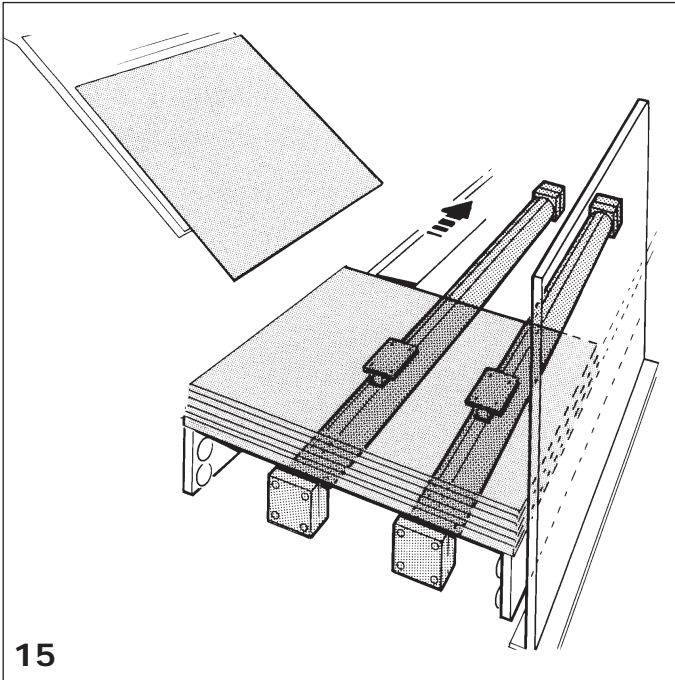
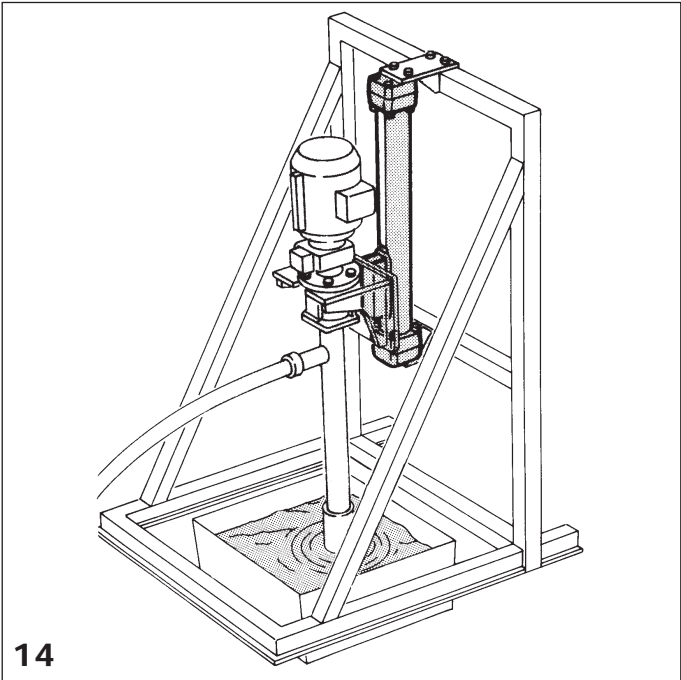
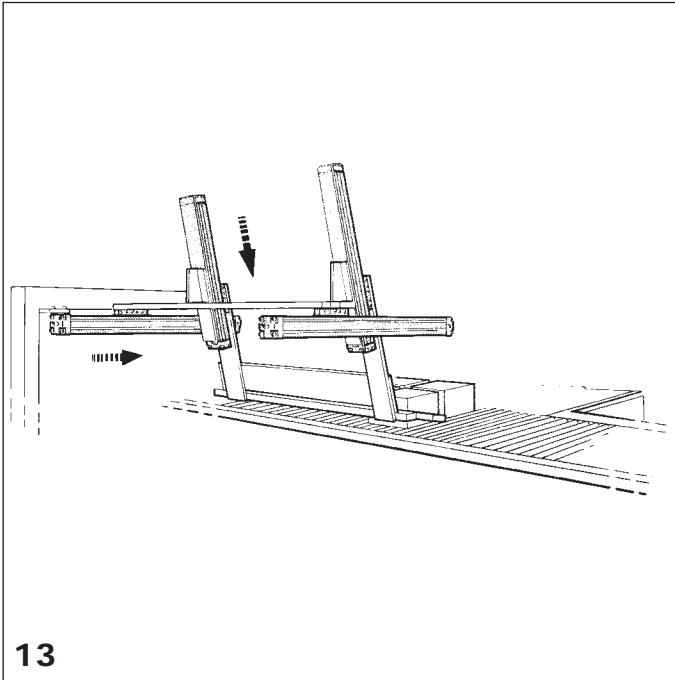
12

Application Descriptions

- No.9 Process Dipping -
- No.10 Belt Tracking -
- No.11 Steel Mill - Roll Wiper -
- No.12 Autohandling Systems -

Benefits

- Cantilever loading, internally guided, high load capability, slow speed controlability, design simplicity.
- Self-guiding, intermediate positioning capability, maintenance-free operation.
- Self-guiding, suitable for high-cycle duty, reliable in arduous environments.
- Multi-axis capability, intermediate positioning, no auxiliary guides or structural support, simple design.



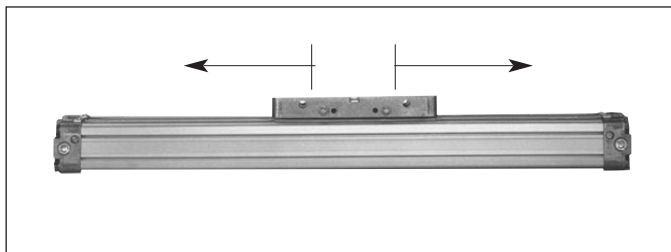
Application Descriptions

- No.9 Palletizing -
- No.10 Pump Elevator -
- No.11 Pallet Handling -
- No.12 Tool Die Handling -

Benefits

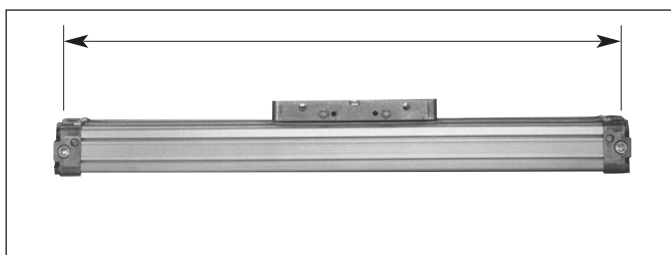
- Parallel operation, self-guiding, accepts high cantilever loads, inherently rigid construction.
- Accepts high cantilever loads, simple construction, minimal engineering.
- Parallel operation, controlled motion of high loads, reliability in arduous environments.
- Controlled movement of heavy loads, equal force in both directions, simple and space saving design.

Six Unique Advantages



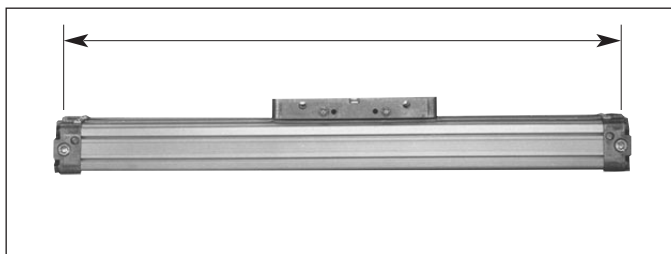
Equal Force and Speed

Equal piston area on each side of the piston allows for equal force and speed in both directions of travel. Additionally, the ability to “pneumatically lock” the piston at various points along the stroke is possible through the use of special valve configurations. (See page 2.0/2)



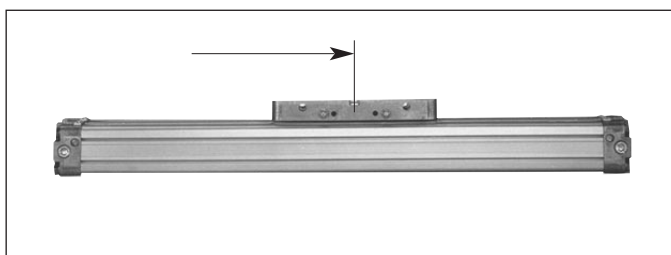
Any Length of Stroke

Infinitely variable strokes are available up to 480 inches and each cylinder is custom manufactured to customer requirements without incurring extended delivery times.



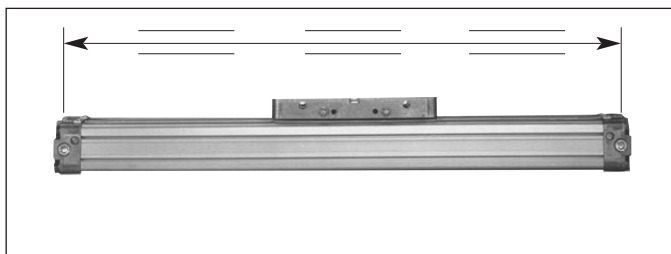
Space Saving

The lack of a piston rod allows for nearly half the space requirement of a “rod type” pneumatic cylinder. The result is a simpler, less costly installation reducing the amount of hardware and design time.



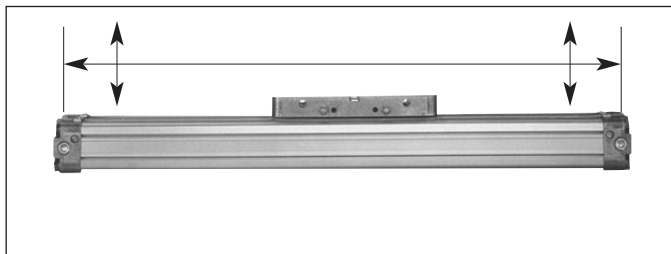
Accepts Cantilever Loads

The unique piston design and barrel rigidity allows the Origa cylinder to accept high direct and bending moment loads without the need for additional support hardware.



Self Guiding

The internal self-supporting characteristics of the Origa rodless cylinder provides guidance of the piston throughout the stroke. High priced guidance mechanisms (roundway bearings, precision slideways, etc.) are not required.



Inherent Rigidity

Integral strength and rigidity of the complete cylinder assembly will accommodate the heaviest of loads enabling the cylinder to form part of a structure or framework. This eliminates the need for expensive and bulky I-beams, channels and fabrications.

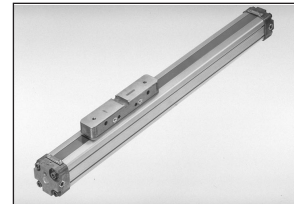
The Product Range

Section 3.1

Series 2000 - Basic Cylinder

Bore sizes (mm): 10, 16, 25, 32, 40, 50

The basic cylinder series satisfies the support and guidance requirements of a great diversity of applications. Various mounting and control options are available for specific application needs.

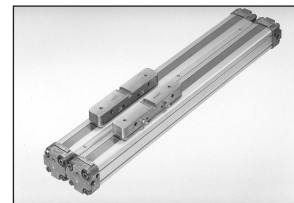


Section 3.2

Series 2000 - Joint Clamp

Bore sizes (mm): 25, 32, 40, 50

Two cylinders mounted in a tandem configuration for increased load and force requirements. The arrangement enhances lateral support and bending moment capabilities.

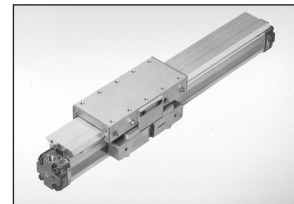


Section 3.3

Series 2000 - NR50

Bore sizes (mm): 16, 25, 32, 40, 50

An attached slide bearing option for increased load and bending moment capability, enabling greater design flexibility. Four full-face bearings running on a "V" guide provide for greater lateral support and increased system rigidity.

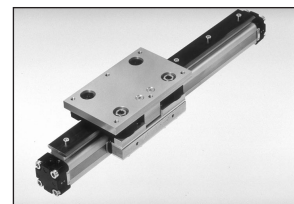


Section 3.4

Series 2000 - Powerguide™

Bore sizes (mm): 25, 32, 50

Designed for the most demanding applications, Powerguide offers an integral "V" guide with precision roller bearings. Hardened steel bearings provide long life and excellent resistance to wear, even in the most arduous conditions. The carriage is adjustable to eliminate free-play and is supplied in a factory pre-set condition.

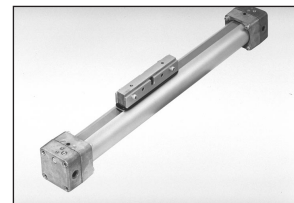


Section 3.5

Series P120 - Basic Cylinder

Bore sizes (mm): 40, 63, 80

For high force and load requirements, the P120 series provides optimal strength and a unique package of options.



DYSTRYBUTOR PARKER PREMIUM

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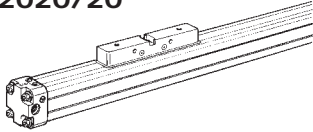
PARKER STORE WROCLAW
pneumatyka@arapneumatik.pl
TEL. 71 364 72 80

PARKER STORE KATOWICE
katowice@arapneumatik.pl
TEL. 32 779 76 40

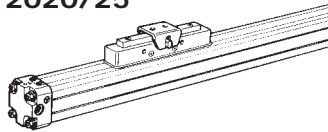


Technical Summary

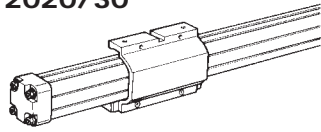
2020/20



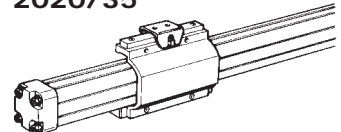
2020/25



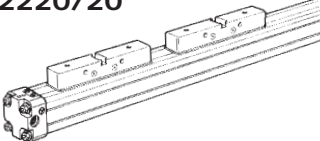
2020/30



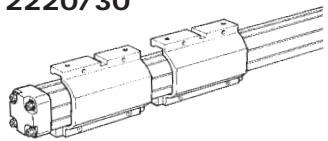
2020/35



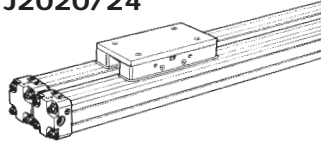
2220/20



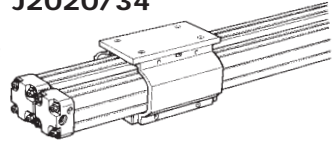
2220/30



J2020/24

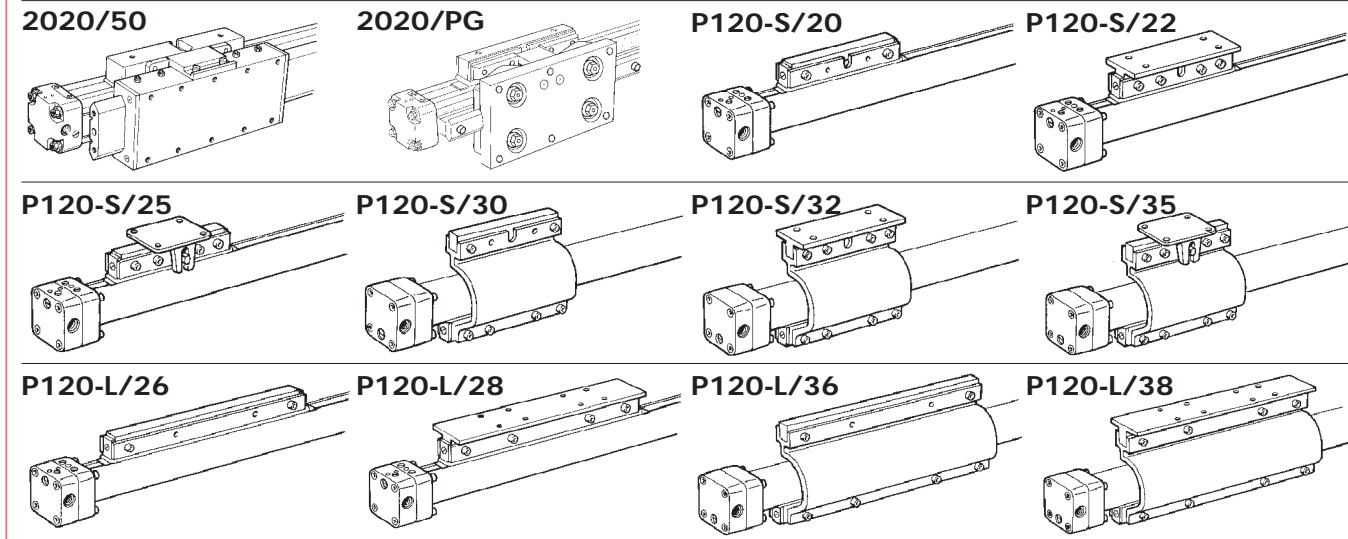


J2020/34



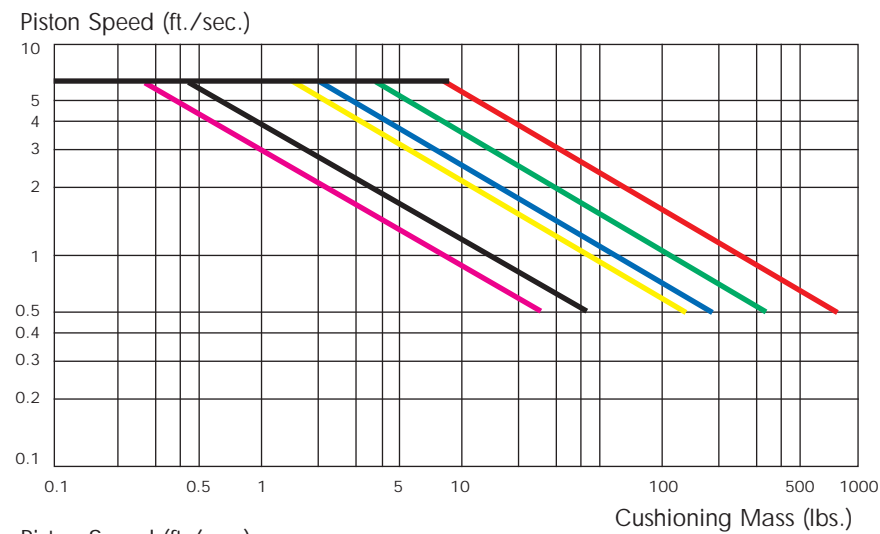
| Series | Cyl. Ø (mm) | Theoretical Force at 87 PSI (lbs. force) | Cushion Length (in.) | Max. Allowed Bending Moment Ma (in./lbs.) | Max. Allowed Bending Moment Ms (in./lbs.) | Max. Allowed Bending Moment Mv (in./lbs.) | Max. Allowed Load L (lbs.) |
|--|-------------|--|----------------------|---|---|---|----------------------------|
| Series 2000 Single Piston | 10 | 11 | 0.10 | 9 | 2 | 3 | 5 |
| | 16 | 27 | 0.59 | 35 | 3 | 5 | 30 |
| | 25 | 66 | 0.55 | 132 | 9 | 27 | 65 |
| | 32 | 108 | 1.10 | 318 | 36 | 120 | 115 |
| | 40 | 169 | 1.42 | 575 | 53 | 156 | 195 |
| 50 | 265 | 1.50 | 1017 | 98 | 312 | 270 | |
| Series 2000 Double Piston | 10 | 11 | 0.10 | 21 | 4 | 5 | 10 |
| | 16 | 27 | 0.59 | 81 | 6 | 9 | 60 |
| | 25 | 66 | 0.55 | 336 | 18 | 45 | 130 |
| | 32 | 108 | 1.10 | 720 | 72 | 600 | 230 |
| | 40 | 169 | 1.42 | 1320 | 106 | 792 | 390 |
| 50 | 265 | 1.50 | 2304 | 196 | 1464 | 540 | |
| Joint Clamp Single Piston | 25 | 132 | 0.55 | 264 | 115 | 54 | 130 |
| | 32 | 216 | 1.10 | 636 | 248 | 240 | 230 |
| | 40 | 338 | 1.42 | 1150 | 444 | 312 | 390 |
| | 50 | 530 | 1.50 | 2034 | 859 | 624 | 540 |
| Joint Clamp Double Piston | 25 | 132 | 0.55 | 672 | 230 | 90 | 260 |
| | 32 | 216 | 1.10 | 1440 | 496 | 1200 | 460 |
| | 40 | 338 | 1.42 | 2640 | 888 | 1584 | 780 |
| | 50 | 530 | 1.50 | 4608 | 1718 | 2928 | 1080 |
| NR50 External Guide | 16 | 27 | 0.59 | 100 | 54 | 100 | 81 |
| | 25 | 66 | 0.55 | 252 | 216 | 252 | 325 |
| | 32 | 108 | 1.10 | 576 | 504 | 576 | 500 |
| | 40 | 169 | 1.42 | 792 | 648 | 792 | 575 |
| | 50 | 265 | 1.50 | 1584 | 1080 | 1584 | 750 |
| Powerguide External Slideway | 25 | 66 | 0.55 | 451 | 98 | 451 | 263 |
| | 32 | 108 | 1.42 | 1200 | 451 | 1200 | 526 |
| | 50 | 265 | 1.50 | 3850 | 1566 | 3850 | 900 |
| Series P120 Short Piston | 40 | 169 | 1.26 | 528 | 36 | 72 | 170 |
| | 63 | 420 | 1.57 | 1776 | 72 | 216 | 370 |
| | 80 | 677 | 1.73 | 3192 | 144 | 420 | 590 |
| Series P120 Long Piston | 40 | 169 | 1.26 | 1200 | 72 | 216 | 170 |
| | 63 | 420 | 1.57 | 3984 | 144 | 660 | 370 |
| | 80 | 677 | 1.73 | 6372 | 288 | 1236 | 590 |

Technical Summary



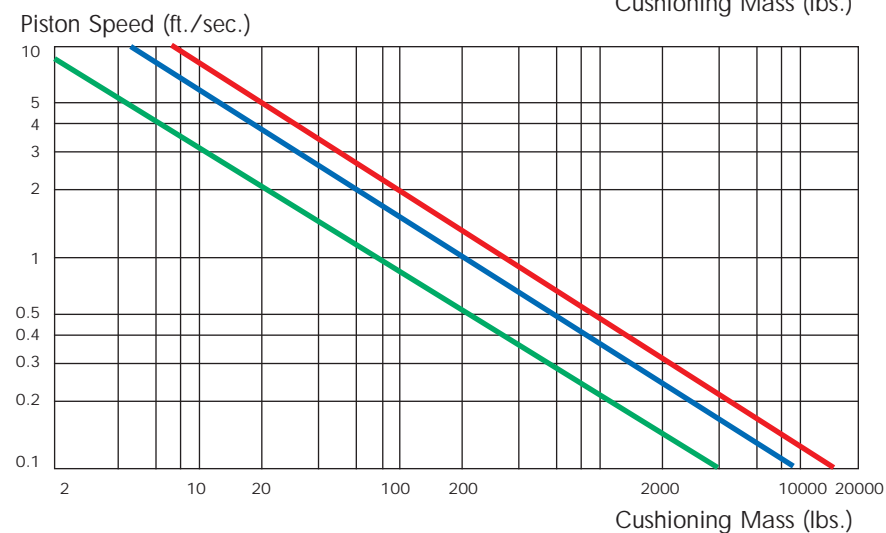
Cushion Diagram Series 2000

| Bore | Color Key |
|------|-----------|
| 10mm | Magenta |
| 16mm | Black |
| 25mm | Yellow |
| 32mm | Blue |
| 40mm | Green |
| 50mm | Red |

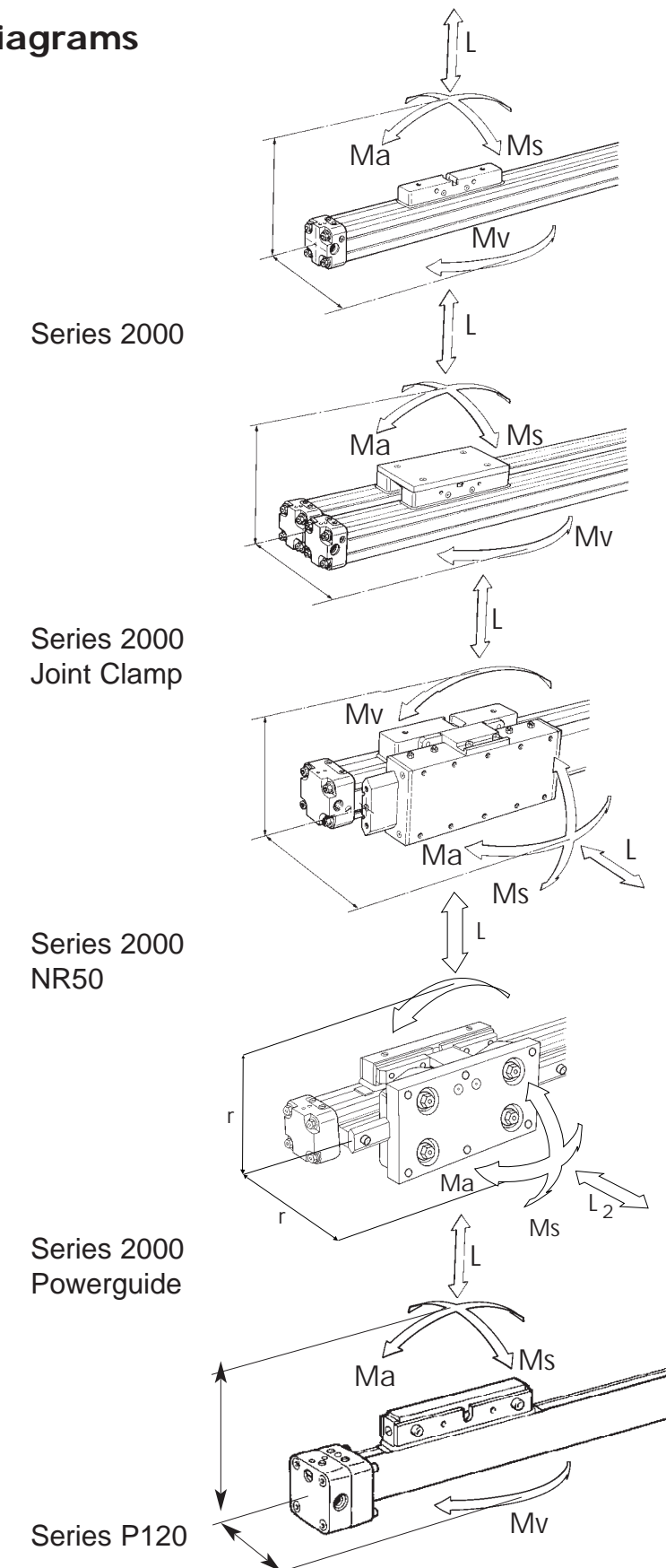


Cushion Diagram Series P120

| Bore | Color Key |
|------|-----------|
| 40mm | Green |
| 63mm | Blue |
| 80mm | Red |



Loading Diagrams



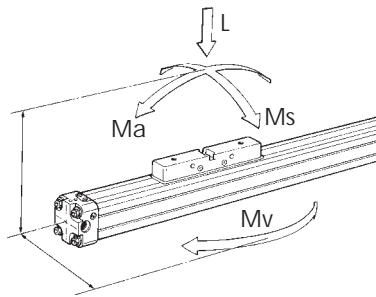
Series 2000 Basic Cylinder

Bore sizes: 10mm, 16mm, 25mm, 32mm, 40mm and 50mm
Stroke lengths available up to 480"



Technical Data

Loads, forces, moments



Single Piston Values

| Cyl. Ø (mm) | Theoretical Force at 87 PSI (lbs. force) | Cushion Length (in.) | Max. Allowed Bending Moment Ma (in./lbs.) | Max. Allowed Bending Moment Ms (in./lbs.) | Max. Allowed Bending Moment Mv (in./lbs.) | Max. Allowed Load L (lbs.) |
|-------------|--|----------------------|---|---|---|----------------------------|
| 10 | 11 | 0.10 | 9 | 2 | 3 | 5 |
| 16 | 27 | 0.59 | 35 | 3 | 5 | 30 |
| 25 | 66 | 0.55 | 132 | 9 | 27 | 65 |
| 32 | 108 | 1.10 | 318 | 36 | 120 | 115 |
| 40 | 169 | 1.42 | 575 | 53 | 156 | 195 |
| 50 | 265 | 1.50 | 1017 | 98 | 312 | 270 |

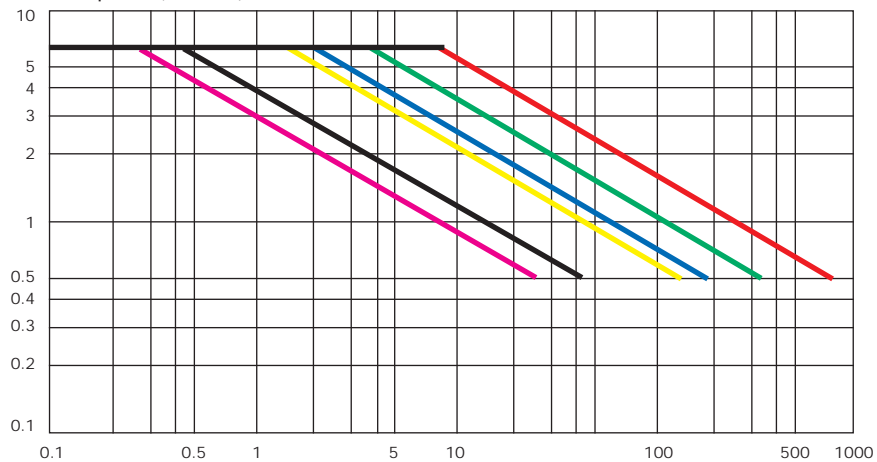
Double Piston Values

| Cyl. Ø (mm) | Theoretical Force at 87 PSI (lbs.) | Cushion Length (in.) | Max. Allowed Bending Moment Ma (in./lbs.) | Max. Allowed Bending Moment Ms (in./lbs.) | Max. Allowed Bending Moment Mv (in./lbs.) | Max. Allowed Load L (lbs.) |
|-------------|------------------------------------|----------------------|---|---|---|----------------------------|
| 10 | 11 | 0.10 | 21 | 4 | 5 | 10 |
| 16 | 27 | 0.59 | 81 | 6 | 9 | 60 |
| 25 | 66 | 0.55 | 336 | 18 | 45 | 130 |
| 32 | 108 | 1.10 | 720 | 72 | 600 | 230 |
| 40 | 169 | 1.42 | 1320 | 106 | 792 | 390 |
| 50 | 265 | 1.50 | 2304 | 196 | 1464 | 540 |

Cushioning Diagram

| Bore | Color Key |
|------|--|
| 10mm | █ |
| 16mm | █ |
| 25mm | █ |
| 32mm | █ |
| 40mm | █ |
| 50mm | █ |

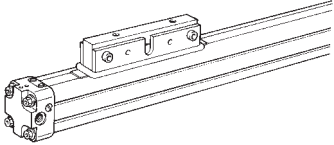
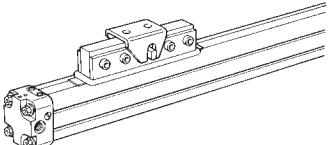
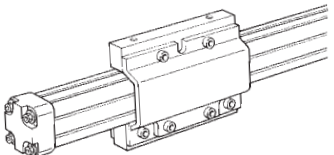
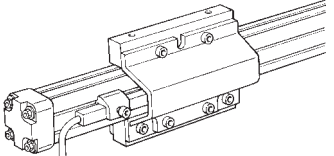
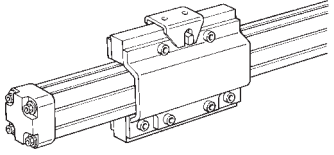
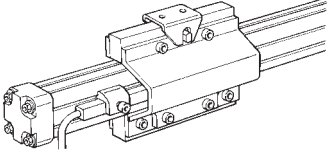
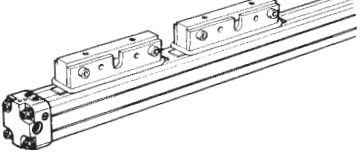
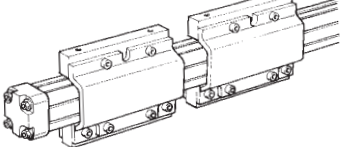
Piston Speed (ft./sec.)



Cushioning Mass (lbs.)

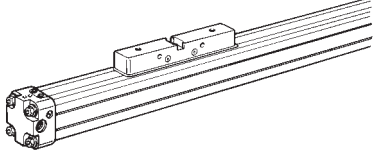
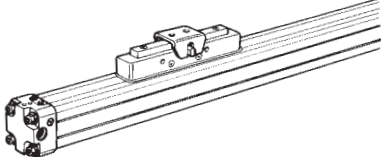
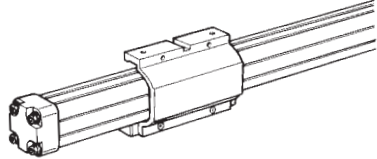
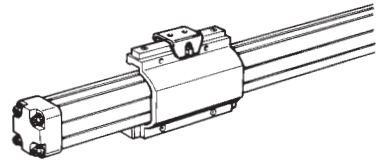
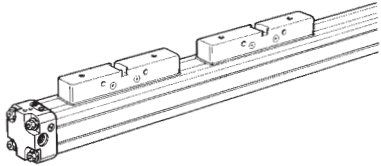
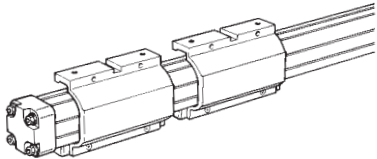
Piston Mountings

Ø 10mm and 16mm

| Designation | Pictorial Representation | Description | Cyl. Ø | Weight 0" stroke (lbs.) | Weight per inch (lbs.) |
|--------------|---|---|--------|-------------------------------|------------------------------|
| Type 2020/20 |  | Piston Mounting NR20 | 10 | 0.20 | 0.03 |
| | | Standard mounting. Mounted during cylinder assembly. | 16 | 0.51 | 0.05 |
| Type 2020/25 |  | Piston Mounting NR25 | 10 | 0.22 | 0.03 |
| | | Allows for a floating connection between the cylinder and an externally guided device. | 16 | 0.55 | 0.05 |
| Type 2020/30 |  | Piston Mounting NR30 | 10 | -- | 0.03 |
| | | Transfers power to the back of the cylinder. Protects the band surface from foreign particles. | 16 | 0.73 | 0.05 |
| Type 2020/34 |  | Piston Mounting NR34 | 10 | -- | 0.03 |
| | | Same features as the NR30. For use with cylinders which have sensors on both sides of the barrel. | 16 | 0.77 | 0.05 |
| Type 2020/35 |  | Piston Mounting NR35 | 10 | -- | 0.03 |
| | | Combines the features of the NR25 mounting and the NR30 mounting. | 16 | 0.77 | 0.05 |
| Type 2020/37 |  | Piston Mounting NR37 | 10 | -- | 0.03 |
| | | Same features as the NR35. For use with cylinders which have sensors on both sides of the barrel. | 16 | 0.80 | 0.05 |
| Type 2220/20 |  | Double Piston Mounting NR20 | 10 | 0.27 | 0.03 |
| | | Two pistons in a single barrel using the standard NR20 mounting. | 16 | 0.67 | 0.05 |
| Type 2220/30 |  | Double Piston Mounting NR30 | 10 | -- | 0.03 |
| | | Two pistons in a single barrel using the NR30 mounting. | 16 | 1.11 | 0.05 |

Piston Mountings

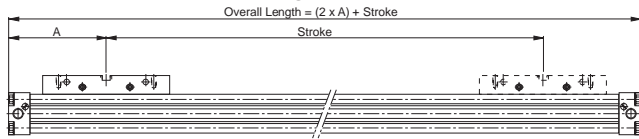
Ø 25mm, 32mm, 40mm and 50mm

| Designation | Pictorial Representation | Description | Cyl. Ø | Weight 0" stroke (lbs.) | Weight per inch (lbs.) |
|--------------|---|--|--------|-------------------------------|------------------------------|
| Type 2020/20 |  | Piston Mounting NR20 Standard mounting. Mounted during cylinder assembly. | 25 | 1.32 | 0.11 |
| | | | 32 | 3.19 | 0.20 |
| | | | 40 | 5.17 | 0.29 |
| | | | 50 | 7.70 | 0.43 |
| Type 2020/25 |  | Piston Mounting NR25 Allows for a floating connection between the cylinder and an externally guided device. | 25 | 1.54 | 0.11 |
| | | | 32 | 3.85 | 0.20 |
| | | | 40 | 5.83 | 0.29 |
| | | | 50 | 9.46 | 0.43 |
| Type 2020/30 |  | Piston Mounting NR30 Transfers power to the back of the cylinder. Protects the band surface from foreign particles. | 25 | 1.87 | 0.11 |
| | | | 32 | 4.40 | 0.20 |
| | | | 40 | 6.60 | 0.29 |
| | | | 50 | 10.45 | 0.43 |
| Type 2020/35 |  | Piston Mounting NR35 Combines the features of the NR25 mounting and the NR30 mounting. | 25 | 2.09 | 0.11 |
| | | | 32 | 5.06 | 0.20 |
| | | | 40 | 7.26 | 0.29 |
| | | | 50 | 12.22 | 0.43 |
| Type 2220/20 |  | Double Piston Mounting NR20 Two pistons in a single barrel using the standard NR20 mounting. | 25 | 2.05 | 0.11 |
| | | | 32 | 5.15 | 0.20 |
| | | | 40 | 9.10 | 0.29 |
| | | | 50 | 13.2 | 0.43 |
| Type 2220/30 |  | Double Piston Mounting NR30 Two pistons in a single barrel using the NR30 mounting. | 25 | 2.60 | 0.11 |
| | | | 32 | 6.37 | 0.20 |
| | | | 40 | 10.31 | 0.29 |
| | | | 50 | 15.95 | 0.43 |

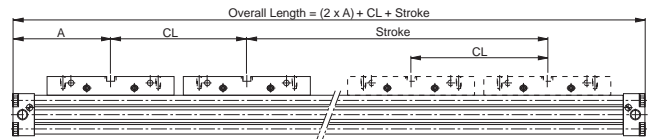
Overall Dimensions

Ø 10mm and 16mm

Basic Dimensions (Single Piston)

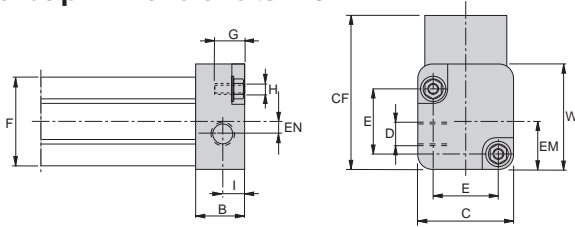


Basic Dimensions (Double Piston)

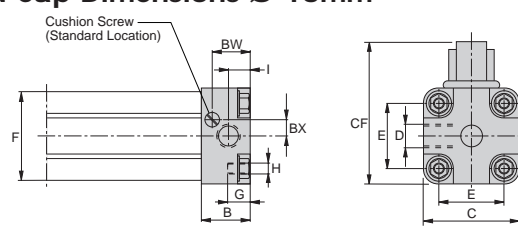


Min. CL Distances: Ø10mm = 2.50, Ø16mm = 3.60

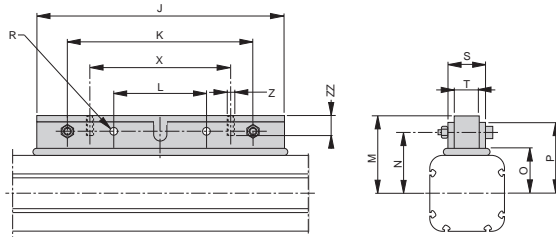
End Cap Dimensions Ø 10mm



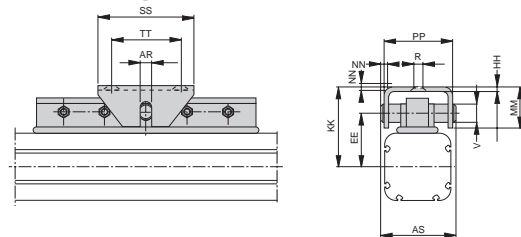
End Cap Dimensions Ø 16mm



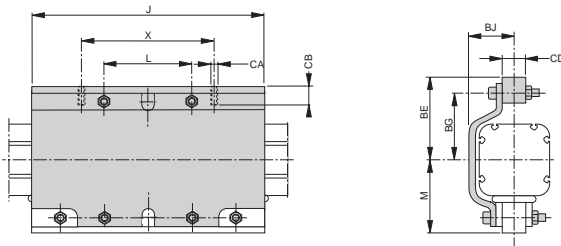
Piston Mounting NR20



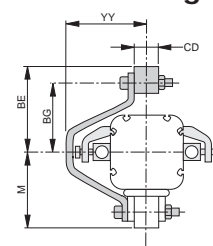
Piston Mounting NR25



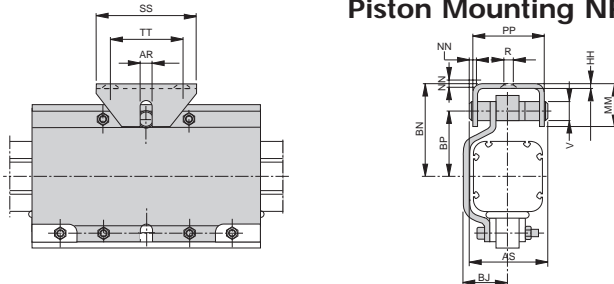
Piston Mounting NR30



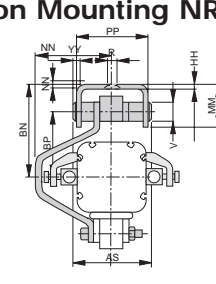
Piston Mounting NR34



Piston Mounting NR35



Piston Mounting NR37

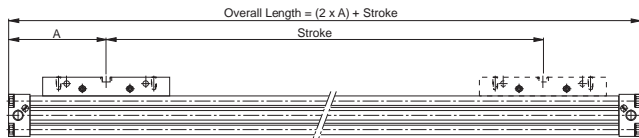


| Cyl. Ø | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | R | S | T | V | W | X | Z | AR |
|--------|------|------|------|-----|------|-----|-----|-----|-----|------|------|------|------|-----|-----|------|-----|-----|-----|-----|-----|------|------|-----|
| 10 | 1.75 | .47 | .75 | M5 | .47 | .67 | .20 | M3 | .24 | 2.36 | --- | .87 | .89 | .69 | .41 | .85 | .13 | .63 | .39 | .14 | .85 | 1.22 | M3 | .08 |
| 16 | 2.56 | .59 | 1.06 | M5 | .71 | .94 | .20 | M3 | .22 | 2.99 | 2.52 | 1.26 | 1.18 | .94 | .63 | 1.14 | .18 | .71 | .39 | .20 | --- | 1.89 | M4 | .12 |
| Cyl. Ø | AS | BE | BG | BJ | BN | BP | BW | BX | CA | CB | CD | CF | EM | EN | HH | KK | LL | MM | NN | PP | SS | TT | YY | ZZ |
| 10 | 1.06 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1.26 | .37 | .08 | .08 | 1.02 | .73 | .45 | .04 | .94 | .79 | .39 | --- | .24 |
| 16 | 1.10 | 1.14 | .91 | .71 | 1.30 | .91 | .47 | .16 | M4 | .47 | .63 | 1.71 | --- | --- | .08 | 1.34 | .96 | .51 | .06 | .98 | .79 | .39 | 1.34 | .31 |

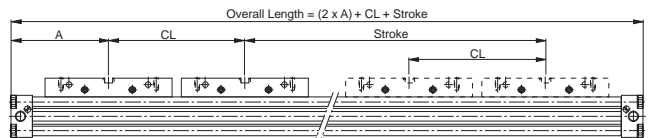
Overall Dimensions

Ø 25mm, 32mm, 40mm and 50mm

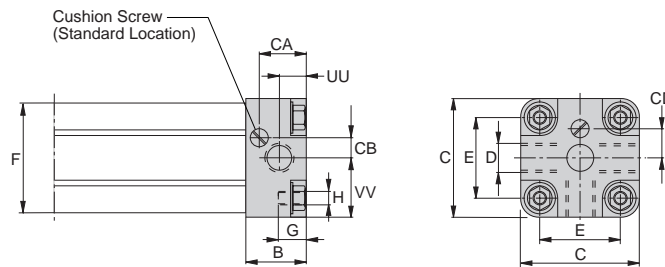
Basic Dimensions (Single Piston)



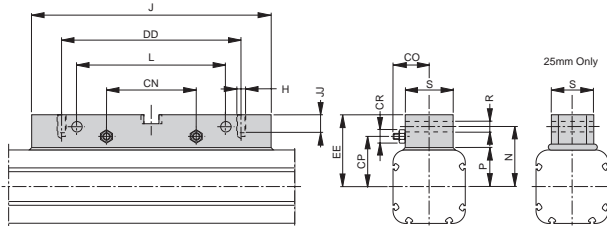
Basic Dimensions (Double Piston)



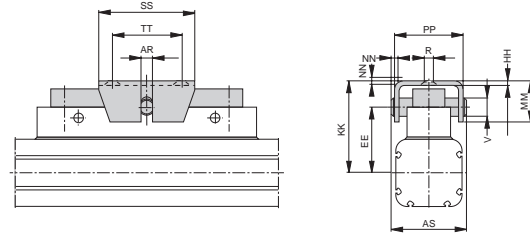
End Cap Dimensions



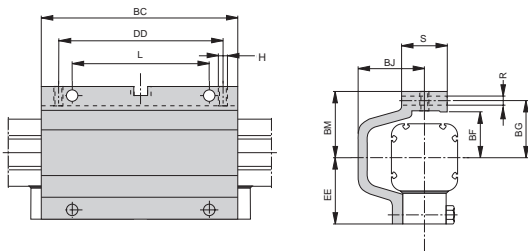
Piston Mounting NR20



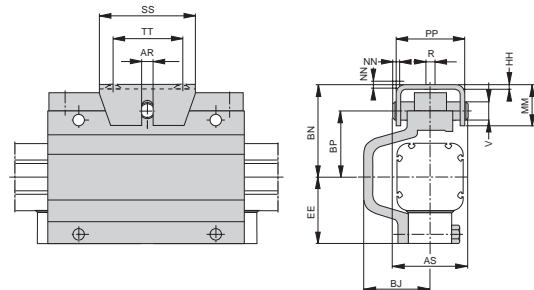
Piston Mounting NR25



Piston Mounting NR30



Piston Mounting NR35



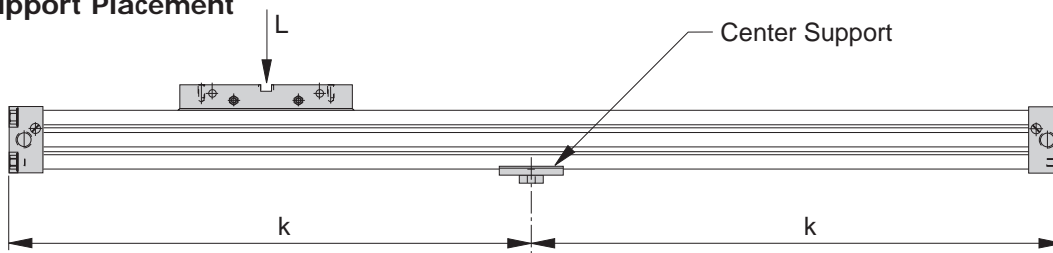
| Cyl. Ø | A | B | C | D | E | F | G | H | J | L | N | P | R | S | U | V | DD | EE | HH | JJ |
|--------|------|------|------|---------|------|------|-----|---------|------|------|------|------|-----|------|-----|-----|------|------|-----|-----|
| 25 | 3.94 | .91 | 1.57 | 1/8 NPT | 1.06 | 1.42 | .35 | 10-32 | 4.72 | 1.97 | 1.30 | .75 | .22 | .91 | .22 | .31 | 3.15 | 1.50 | .12 | .35 |
| 32 | 4.92 | 1.06 | 2.09 | 1/4 NPT | 1.42 | 1.93 | .47 | 1/4-20 | 6.30 | 3.94 | 1.57 | 1.10 | .26 | 1.26 | .26 | .47 | 4.72 | 1.89 | .16 | .47 |
| 40 | 5.91 | 1.06 | 2.48 | 1/4 NPT | 1.81 | 2.32 | .47 | 1/4-20 | 6.30 | 3.94 | 1.81 | 1.34 | .26 | 1.26 | .26 | .47 | 4.72 | 2.13 | .16 | .47 |
| 50 | 6.70 | 1.26 | 3.07 | 3/8 NPT | 2.13 | 2.83 | .47 | 5/16-18 | 7.87 | 5.51 | 2.17 | 1.57 | .35 | 1.34 | .35 | .63 | 6.30 | 2.56 | .20 | .63 |

| Cyl. Ø | KK | LL | MM | NN | PP | SS | TT | UU | VV | AR | AS | BC | BF | BG | BJ | BM | BN | BP | CA | CB | CD | CL (min.) |
|--------|------|------|------|------|------|------|------|-----|------|-----|------|------|------|------|------|------|------|------|-----|-----|-----|-----------|
| 25 | 2.05 | 1.50 | .79 | ±.10 | 1.46 | 1.26 | .63 | .33 | .81 | .20 | 1.65 | 4.25 | 1.10 | 1.30 | 1.50 | 1.50 | 2.05 | 1.50 | .71 | .26 | .35 | 5.12 |
| 32 | 2.60 | 1.89 | 1.18 | ±.16 | 1.97 | 2.76 | 1.97 | .41 | 1.04 | .31 | 2.28 | 5.67 | 1.26 | 1.57 | 1.89 | 1.89 | 2.60 | 1.89 | .83 | .35 | .51 | 6.90 |
| 40 | 2.83 | 2.13 | 1.18 | ±.16 | 1.97 | 2.76 | 1.97 | .41 | 1.24 | .31 | 2.28 | 5.67 | 1.50 | 1.81 | 2.13 | 2.13 | 2.83 | 2.13 | .71 | .51 | .65 | 8.75 |
| 50 | 3.54 | 2.56 | 1.77 | ±.24 | 2.28 | 3.94 | 3.15 | .49 | 1.54 | .39 | 2.83 | 7.24 | 1.77 | 2.17 | 2.56 | 2.56 | 3.54 | 2.56 | .83 | .59 | .73 | 10.00 |

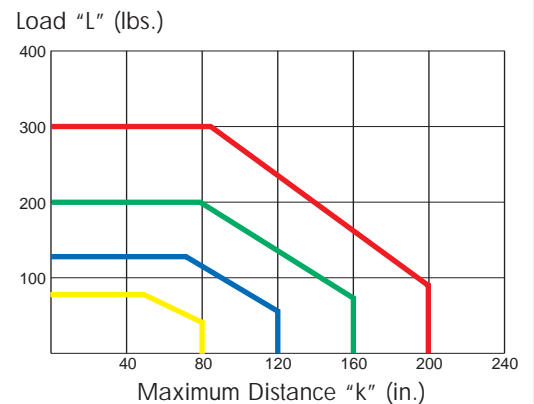
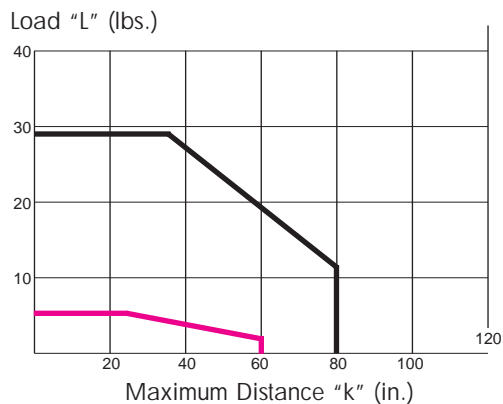
Cylinder Mountings

| Designation | Pictorial Representation | Description | Cyl. Ø | Part Number | Weight (lbs.) |
|---|--------------------------|------------------|--------|-------------|---------------|
| Type NR4 | | End Cap Mounting | 10 | 2172-0001 | 0.02 |
| | | | 16 | 2172-0101 | 0.02 |
| | | | 25 | 2172-0201 | 0.07 |
| | | | 32 | 2172-0351 | 0.11 |
| | | | 40 | 2172-0451 | 0.13 |
| | | | 50 | 2172-0551 | 0.26 |
| Type NR7 (Ø 10mm & 16mm only) | | Center Support | 10 | 2176-0001 | 0.01 |
| | | | 16 | 2176-0101 | 0.01 |
| Type NR7 (Ø 25mm - 50mm only) | | Center Support | 25 | 2176-0202 | 0.07 |
| | | | 32 | 2176-0351 | 0.13 |
| | | | 40 | 2176-0451 | 0.15 |
| | | | 50 | 2176-0551 | 0.44 |
| Type NR8 (Ø 25mm - 50mm only) | | Center Support | 25 | 2175-0201 | 0.04 |
| | | | 32 | 2175-0351 | 0.07 |
| | | | 40 | 2175-0451 | 0.07 |
| | | | 50 | 2175-0551 | 0.26 |

Center Support Placement

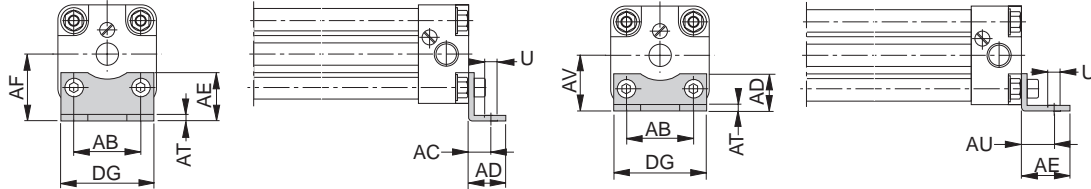


| Bore | Color Key |
|------|--|
| 10mm | █ |
| 16mm | █ |
| 25mm | █ |
| 32mm | █ |
| 40mm | █ |
| 50mm | █ |



Dimensions - Cylinder Mountings

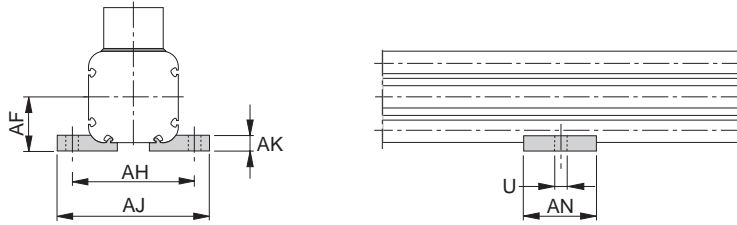
End Cap Mounting NR4



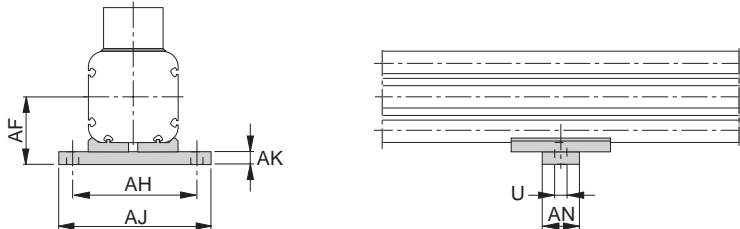
NR4 Mounting Bracket - Mtg. Style "A"

NR4 Mounting Bracket - Mtg. Style "B"

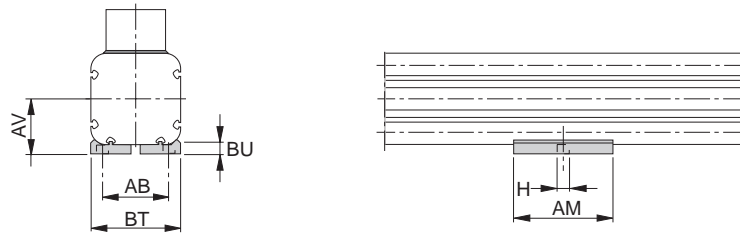
Center Support Mounting NR7 (Ø10mm - 16mm)



Center Support Mounting NR7 (Ø25mm - 50mm)



Center Support Mounting NR8



| Cyl. Ø | U | AB | AC | AD | AE | AF | AH | AJ | AK | AM | AN | AT | AU | AV | BT | BU | DG | H |
|--------|-----|------|-----|------|------|------|------|------|-----|------|------|-----|-----|------|------|-----|------|---------|
| 10 | .14 | .47 | .39 | .55 | .80 | .43 | 1.00 | 1.31 | .14 | - | .47 | .06 | - | - | - | - | .72 | - |
| 16 | .14 | .71 | .39 | .55 | .49 | .59 | 1.26 | 1.57 | .18 | - | .47 | .06 | - | - | - | - | 1.02 | - |
| 25 | .22 | 1.06 | .41 | .71 | .87 | 1.10 | 1.89 | 2.36 | .16 | 1.26 | .79 | .08 | .57 | .94 | 1.42 | .21 | 1.54 | 10-32 |
| 32 | .26 | 1.42 | .47 | .79 | 1.02 | 1.42 | 2.60 | 3.23 | .24 | 1.57 | .79 | .12 | .71 | 1.18 | 1.89 | .22 | 1.97 | 1/4-20 |
| 40 | .26 | 1.81 | .47 | .79 | 1.02 | 1.61 | 2.99 | 3.62 | .24 | 1.57 | .79 | .12 | .71 | 1.38 | 2.28 | .22 | 2.36 | 1/4-20 |
| 50 | .35 | 2.13 | .71 | 1.10 | 1.34 | 2.01 | 3.70 | 4.49 | .24 | 2.48 | 1.57 | .16 | .94 | 1.77 | 2.83 | .33 | 2.91 | 5/16-18 |

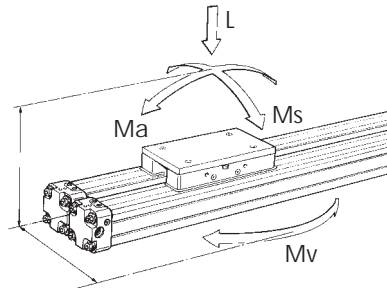
Series 2000 Joint Clamp

Bore sizes: 25mm, 32mm, 40mm and 50mm
Stroke lengths available up to 480"



Technical Data

Loads, forces, moments



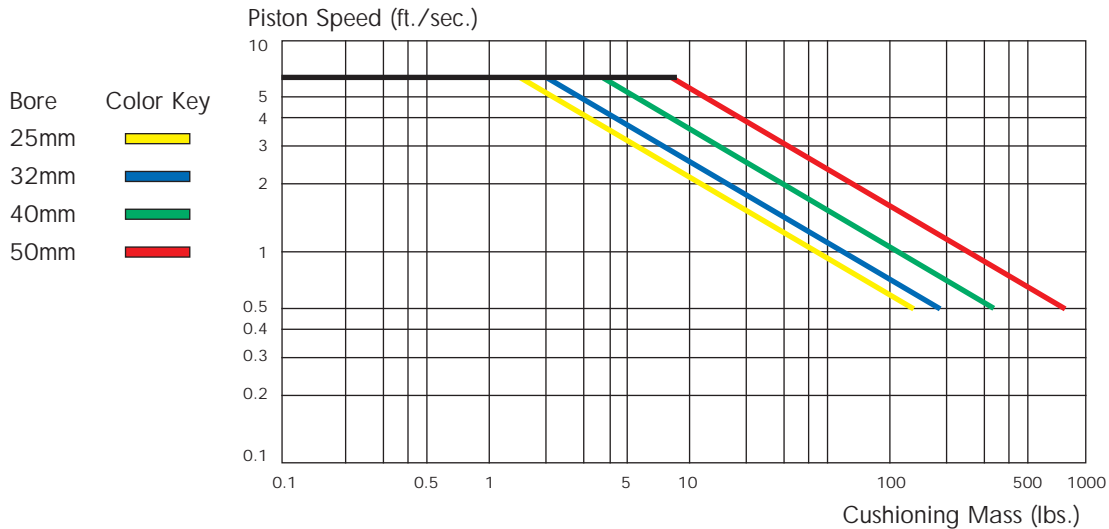
Single Piston Values

| Cyl. Ø (mm) | Theoretical Force at 87 PSI (lbs.) | Cushion Length (in.) | Max. Allowed Bending Moment Ma (in./lbs.) | Max. Allowed Bending Moment Ms (in./lbs.) | Max. Allowed Bending Moment Mv (in./lbs.) | Max. Allowed Load L (lbs.) |
|-------------|------------------------------------|----------------------|---|---|---|----------------------------|
| 25 | 132 | 0.55 | 264 | 115 | 54 | 130 |
| 32 | 216 | 1.10 | 636 | 248 | 240 | 230 |
| 40 | 338 | 1.42 | 1150 | 444 | 312 | 390 |
| 50 | 530 | 1.50 | 2034 | 859 | 624 | 540 |

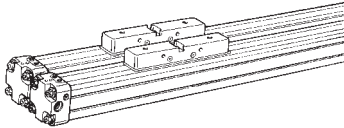
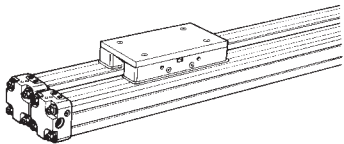
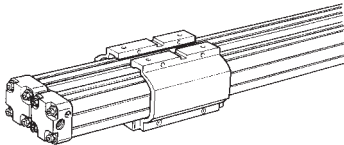
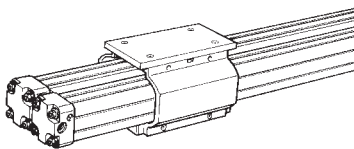
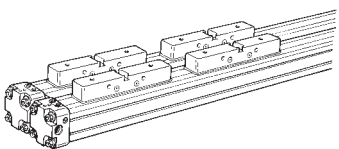
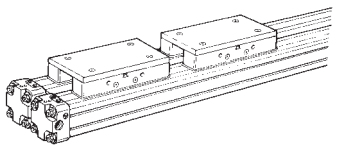
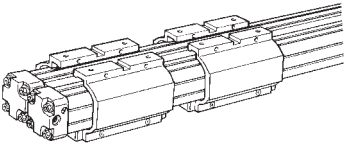
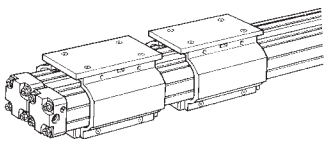
Double Piston Values

| Cyl. Ø (mm) | Theoretical Force at 87 PSI (lbs.) | Cushion Length (in.) | Max. Allowed Bending Moment Ma (in./lbs.) | Max. Allowed Bending Moment Ms (in./lbs.) | Max. Allowed Bending Moment Mv (in./lbs.) | Max. Allowed Load L (lbs.) |
|-------------|------------------------------------|----------------------|---|---|---|----------------------------|
| 25 | 132 | 0.55 | 672 | 230 | 90 | 260 |
| 32 | 216 | 1.10 | 1440 | 496 | 1200 | 460 |
| 40 | 338 | 1.42 | 2640 | 888 | 1584 | 780 |
| 50 | 530 | 1.50 | 4608 | 1718 | 2928 | 1080 |

Cushioning Diagram

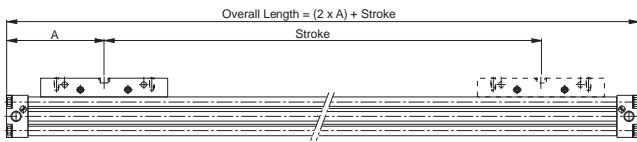


Piston Mountings

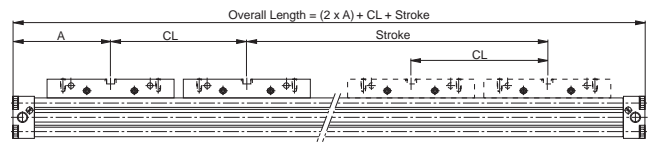
| Designation | Pictorial Representation | Description | Cyl. Ø | Weight 0" stroke | Weight per inch |
|---------------|---|--|--------|---------------------|--------------------|
| Type J2020/20 |  | Piston Mounting NR20 Standard mounting. Mounted during cylinder assembly. | 25 | 2.82 | 0.24 |
| | | | 32 | 6.84 | 0.46 |
| | | | 40 | 10.92 | 0.63 |
| | | | 50 | 16.50 | 0.97 |
| Type J2020/24 |  | Piston Mounting NR24 Flat, platform mounting. Provides a common connection across both pistons. | 25 | 3.24 | 0.24 |
| | | | 32 | 7.72 | 0.46 |
| | | | 40 | 11.91 | 0.63 |
| | | | 50 | 18.70 | 0.97 |
| Type J2020/30 |  | Piston Mounting NR30 Transfers power to the back of the cylinder. Protects the band surface from foreign particles. | 25 | 3.92 | 0.24 |
| | | | 32 | 9.26 | 0.46 |
| | | | 40 | 13.77 | 0.63 |
| | | | 50 | 22.00 | 0.97 |
| Type J2020/34 |  | Piston Mounting NR34 Combines the features of the NR24 mounting and the NR30 mounting. | 25 | 4.34 | 0.24 |
| | | | 32 | 10.14 | 0.46 |
| | | | 40 | 14.76 | 0.63 |
| | | | 50 | 24.20 | 0.97 |
| Type J2220/20 |  | Piston Mounting NR20 Two pistons in each barrel using the standard NR20 mounting. | 25 | 4.44 | 0.24 |
| | | | 32 | 11.11 | 0.46 |
| | | | 40 | 19.37 | 0.63 |
| | | | 50 | 28.60 | 0.97 |
| Type J2220/24 |  | Piston Mounting NR24 Two pistons in each barrel. Provides a common connection across each set of pistons. | 25 | 5.28 | 0.24 |
| | | | 32 | 12.87 | 0.46 |
| | | | 40 | 21.35 | 0.63 |
| | | | 50 | 33.00 | 0.97 |
| Type J2220/30 |  | Piston Mounting NR30 Two pistons in each barrel using the NR30 mounting. Transfers power to the back of the cylinder. | 25 | 5.54 | 0.24 |
| | | | 32 | 13.55 | 0.46 |
| | | | 40 | 21.76 | 0.63 |
| | | | 50 | 34.10 | 0.97 |
| Type J2220/34 |  | Piston Mounting NR34 Two pistons in each barrel Combines the features of the NR24 mounting and the NR30 mounting. | 25 | 6.38 | 0.24 |
| | | | 32 | 15.31 | 0.46 |
| | | | 40 | 23.74 | 0.63 |
| | | | 50 | 38.50 | 0.97 |

Overall Dimensions

Basic Dimensions (Single Piston)

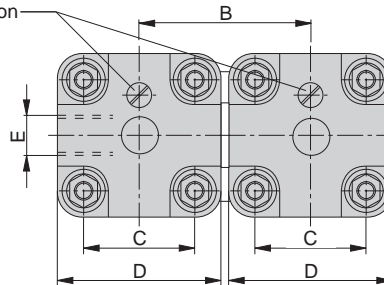


Basic Dimensions (Double Piston)

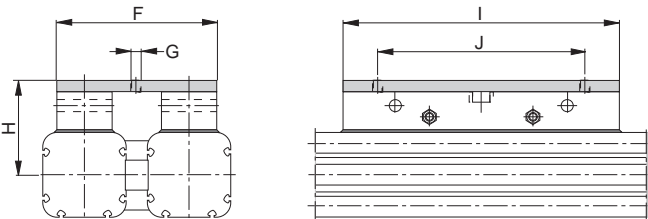


End Cap Cross Section

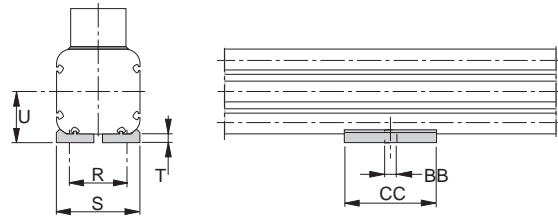
Alternate Cushion Position



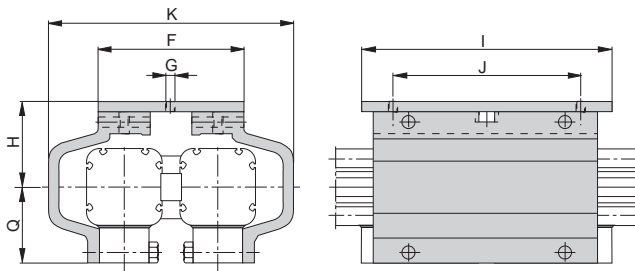
Piston Mounting NR24



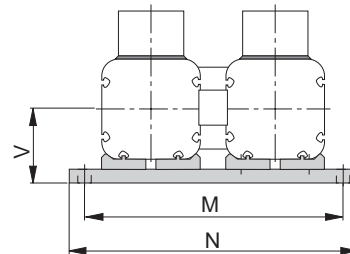
Cylinder Mounting NR8



Piston Mounting NR34



Cylinder Mounting NR17



| Cyl. Ø | A | B | C | D | E | F | G | H | I | J | K |
|--------|------|------|------|------|---------|------|---------|------|------|------|------|
| 25 | 3.94 | 1.73 | 1.06 | 1.57 | 1/8 NPT | 2.76 | 1/4-20 | 1.81 | 4.72 | 3.15 | 4.72 |
| 32 | 4.92 | 2.20 | 1.42 | 2.09 | 1/4 NPT | 3.54 | 5/16-18 | 2.28 | 6.30 | 4.73 | 5.98 |
| 40 | 5.91 | 2.60 | 1.81 | 2.48 | 1/4 NPT | 3.94 | 5/16-18 | 2.52 | 6.30 | 4.73 | 6.86 |
| 50 | 6.70 | 3.19 | 2.13 | 3.07 | 3/8 NPT | 4.73 | 3/8-16 | 3.15 | 7.88 | 6.30 | 8.31 |

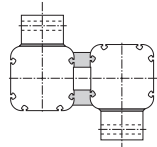
| Cyl. Ø | M | N | Q | R | S | T | U | V | BB | CC | CL(min.) |
|--------|------|------|------|------|------|-----|------|------|---------|------|----------|
| 25 | 3.62 | 4.09 | 1.50 | 1.06 | 1.42 | .21 | .94 | 1.10 | 10-32 | .79 | 5.12 |
| 32 | 4.81 | 5.44 | 1.89 | 1.42 | 1.89 | .22 | 1.18 | 1.42 | 1/4-20 | 1.57 | 6.90 |
| 40 | 5.59 | 6.22 | 2.13 | 1.81 | 2.28 | .22 | 1.38 | 1.61 | 1/4-20 | 1.57 | 8.75 |
| 50 | 6.89 | 7.68 | 2.56 | 2.13 | 2.83 | .33 | 1.77 | 2.01 | 5/16-18 | 2.48 | 10.00 |

Cylinder Mountings

| Designation | Pictorial Representation | Description | Cyl. Ø | Part Number | Weight (lbs.) |
|--|--------------------------|---|--------|-------------|---------------|
| Type NR4 | | End Cap Mounting | 25 | 2172-0201 | 0.07 |
| | | Provides rigid end mounting of the cylinder. | 32 | 2172-0351 | 0.11 |
| | | | 40 | 2172-0451 | 0.13 |
| | | | 50 | 2172-0551 | 0.26 |
| Type NR8 (Ø 25mm - 50mm only) | | Center Support | 25 | 2175-0201 | 0.04 |
| | | Provides stability at cylinder center when heavy loads are traversed over long distances. | 32 | 2175-0351 | 0.07 |
| | | | 40 | 2175-0451 | 0.07 |
| | | | 50 | 2175-0551 | 0.26 |
| Type NR17 (Ø 25mm - 50mm only) | | Center Support | 25 | 2736-0201 | 0.13 |
| | | Provides stability at cylinder center when heavy loads are traversed over long distances. | 32 | 2736-0351 | 0.25 |
| | | | 40 | 2736-0451 | 0.28 |
| | | | 50 | 2736-0551 | 0.84 |

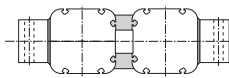
Orientation Examples

Orientation #1



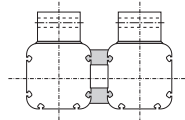
12-6 O'clock

Orientation #2



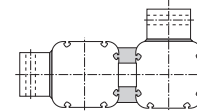
9-3 O'clock

Orientation #3



12-12 O'clock

Orientation #4



9-12 O'clock

Note: Joint Clamp cylinder loadings will vary depending on the above orientation used. Consult the factory for design assistance.

DYSTRYBUTOR PARKER PREMIUM

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TEL. 32 779 76 40



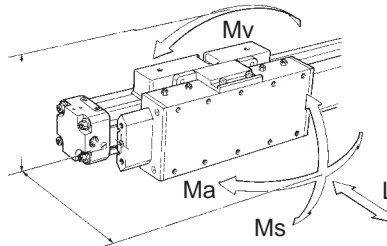
Series 2000 NR50

Bore sizes: 16mm, 25mm, 32mm, 40mm and 50mm
Stroke lengths available up to 480"



Technical Data

Loads, forces, moments



Single Piston Values

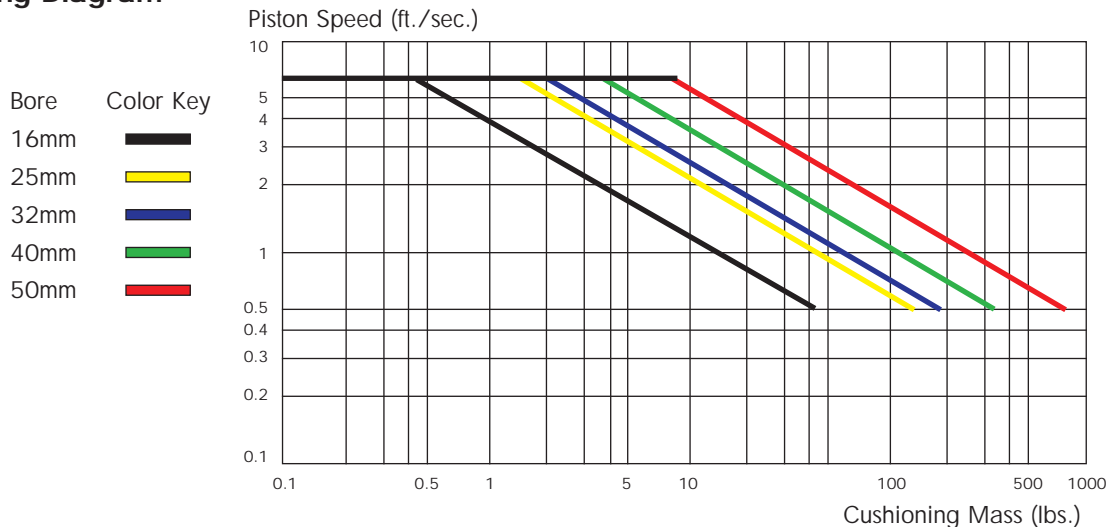
| Cyl. Ø (mm) | Theoretical Force at 87 PSI (lbs.) | Cushion Length (in.) | Max. Allowed Bending Moment Ma (in./lbs.) | Max. Allowed Bending Moment Ms (in./lbs.) | Max. Allowed Bending Moment Mv (in./lbs.) | Max. Allowed Load L (lbs.) |
|-------------|------------------------------------|----------------------|---|---|---|----------------------------|
| 16 | 27 | 0.59 | 100 | 54 | 100 | 81 |
| 25 | 66 | 0.55 | 252 | 216 | 252 | 325 |
| 32 | 108 | 1.10 | 576 | 504 | 576 | 500 |
| 40 | 169 | 1.42 | 792 | 648 | 792 | 575 |
| 50 | 265 | 1.50 | 1584 | 1080 | 1584 | 750 |

Double Piston Values

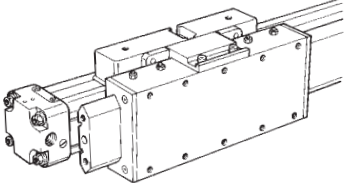
| Cyl. Ø (mm) | Theoretical Force at 87 PSI (lbs.) | Cushion Length (in.) | Max. Allowed Bending Moment Ma (in./lbs.) | Max. Allowed Bending Moment Ms (in./lbs.) | Max. Allowed Bending Moment Mv (in./lbs.) | Max. Allowed Load L (lbs.) |
|-------------|------------------------------------|----------------------|---|---|---|----------------------------|
| 16 | 27 | 0.59 | 230 | 108 | 230 | 162 |
| 25 | 66 | 0.55 | 580 | 432 | 580 | 650 |
| 32 | 108 | 1.10 | 1325 | 1008 | 1325 | 1000 |
| 40 | 169 | 1.42 | 1822 | 1296 | 1822 | 1150 |
| 50 | 265 | 1.50 | 3643 | 2160 | 3643 | 1500 |

Note: Above loading data is valid for traverse speeds not exceeding 8 in./sec.
For traverse speeds in excess of 8 in./sec. please consult the factory.

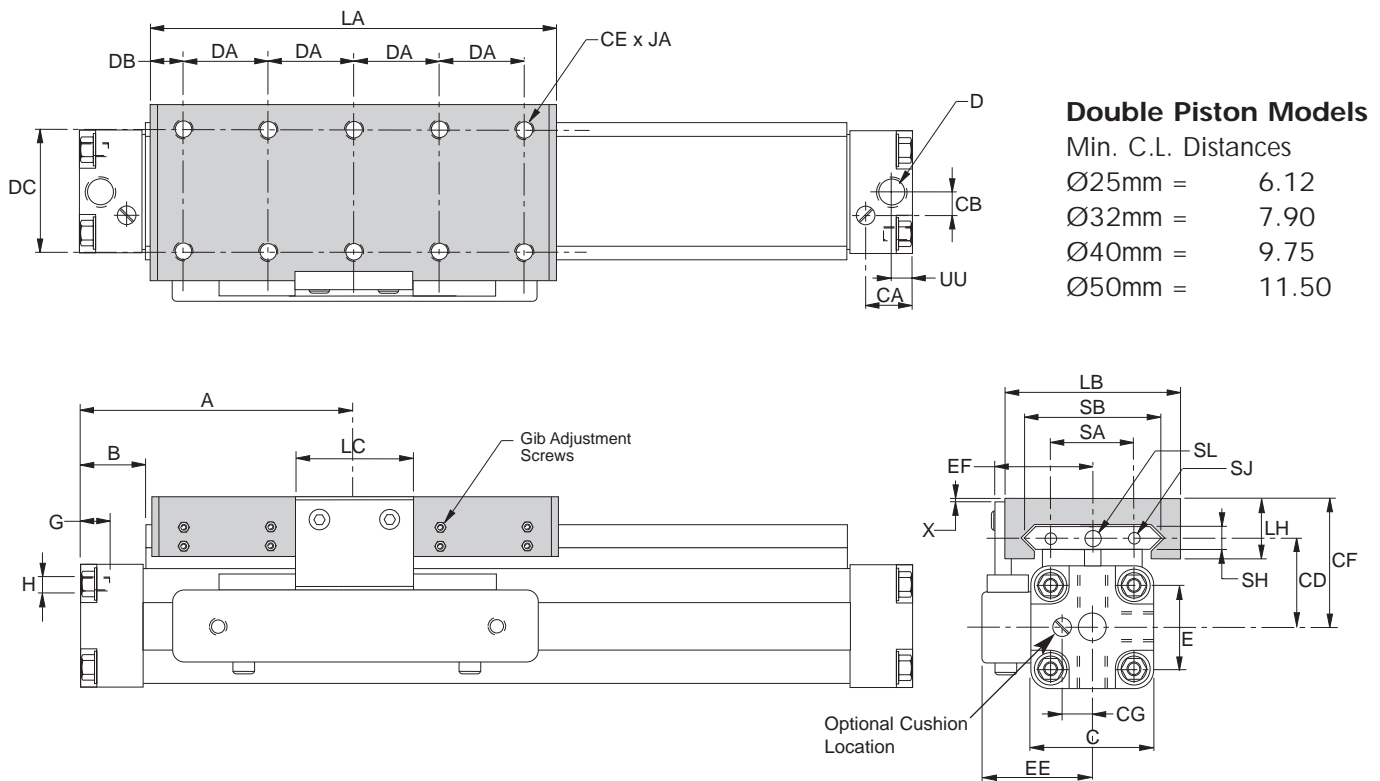
Cushioning Diagram



Piston Mountings

| Designation | Pictorial Representation | Description | Cyl. Ø | Weight 0" stroke | Weight per inch |
|--------------|---|---|--------|---------------------|--------------------|
| Type 2020/50 |  | Piston Mounting NR50 | 25 | 3.37 | 0.20 |
| | | External Guide Option. Mounted during cylinder assembly or in-field retrofit. | 32 | 6.97 | 0.36 |
| | | | 40 | 10.70 | 0.70 |
| | | | 50 | 16.20 | 1.06 |

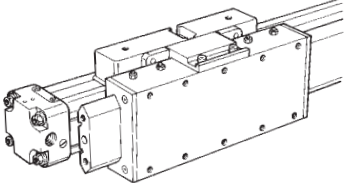
Overall Dimensions (Ø25mm - Ø50mm)



| Cyl. Ø | A | B | C | D | E | G | H | CA | CB | CD | CE | CF | CG | DA | DB |
|--------|------|------|------|---------|------|-----|---------|-----|-----|------|---------|------|-----|------|-----|
| 25 | 3.94 | .91 | 1.62 | 1/8 NPT | 1.06 | .35 | 10-32 | .71 | .26 | 1.26 | 1/4-20 | 2.05 | .35 | 1.18 | .55 |
| 32 | 4.92 | 1.06 | 2.09 | 1/4 NPT | 1.42 | .47 | 1/4-20 | .83 | .35 | 1.60 | 1/4-20 | 2.44 | .51 | 1.57 | .63 |
| 40 | 5.91 | 1.06 | 2.48 | 1/4 NPT | 1.81 | .47 | 1/4-20 | .71 | .51 | 1.80 | 1/4-20 | 2.63 | .65 | 1.97 | .67 |
| 50 | 6.70 | 1.26 | 3.07 | 3/8 NPT | 2.13 | .47 | 5/16-18 | .83 | .59 | 2.21 | 5/16-18 | 3.07 | .73 | 2.36 | .83 |

| Cyl. Ø | DC | EE | EF | JA | LA | LB | LC | LH | SA | SB | SH | SJ | SL | UU | X |
|--------|------|------|------|-----|-------|------|------|------|------|------|-----|-----|-----|-----|-----|
| 25 | 1.97 | 1.50 | 1.50 | .39 | 5.83 | 2.52 | 1.57 | 1.18 | 1.10 | 1.85 | .47 | .16 | .24 | .33 | .08 |
| 32 | 2.68 | 1.89 | 1.89 | .47 | 7.56 | 3.31 | 2.17 | 1.30 | 1.38 | 2.64 | .55 | .24 | .31 | .41 | .08 |
| 40 | 3.07 | 2.13 | 2.13 | .47 | 9.21 | 3.70 | 2.17 | 1.30 | 1.97 | 3.03 | .55 | .24 | .31 | .41 | .08 |
| 50 | 3.54 | 2.56 | 2.48 | .47 | 11.10 | 4.33 | 2.56 | 1.34 | 2.20 | 3.58 | .55 | .24 | .31 | .49 | .08 |

Piston Mountings

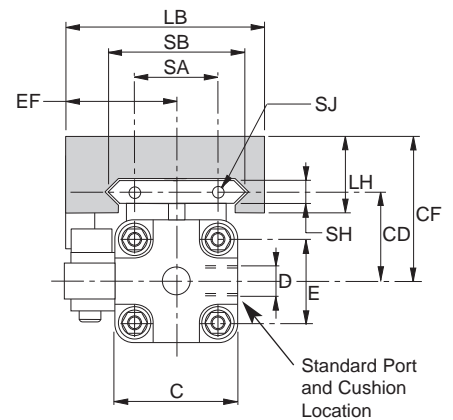
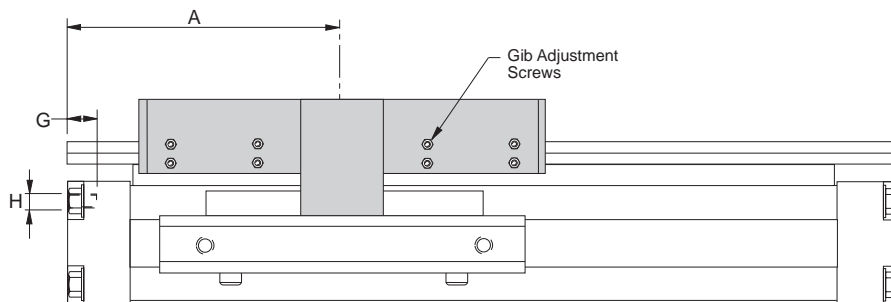
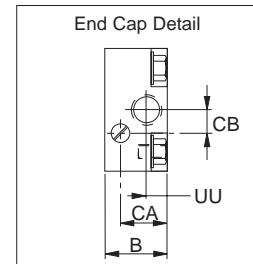
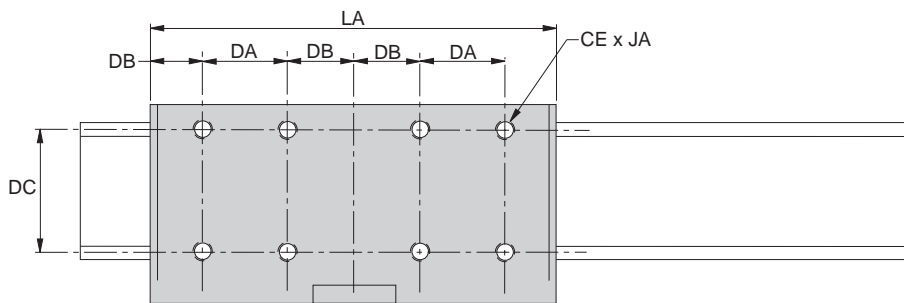
| Designation | Pictorial Representation | Description | Cyl. Ø | Weight 0" stroke | Weight per inch |
|--------------|---|---|--------|---------------------|--------------------|
| Type 2020/50 |  | Piston Mounting NR50 External Guide Option. Mounted during cylinder assembly or in-field retrofit. | 16 | 1.54 | 0.10 |

Overall Dimensions

Double Piston Models

Min. C.L. Distances

Ø16mm = 4.50

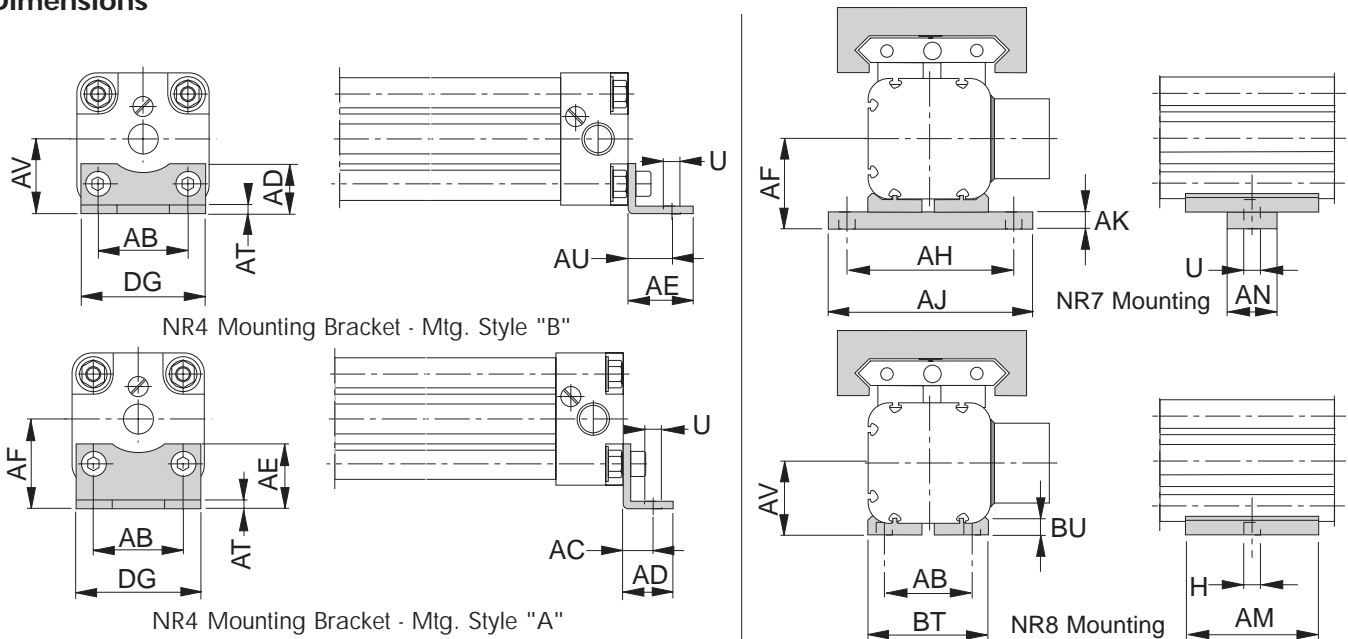


| Cyl. Ø | A | B | C | D | E | G | H | CA | CB | CD | CE | CF | CG | DA | DB |
|--------|------|-----|------|-------|------|------|-----|------|-----|------|-----|------|-----|-----|-----|
| 16 | 2.56 | .59 | 1.06 | 10-32 | .71 | .20 | M3 | .47 | .19 | .94 | M4 | 1.73 | --- | .79 | .59 |
| Cyl. Ø | DC | EE | EF | JA | LA | LB | LC | LH | SA | SB | SH | SJ | SL | UU | X |
| 16 | 1.42 | --- | 1.18 | .31 | 3.94 | 2.13 | --- | 1.10 | .71 | 1.42 | .31 | M3 | --- | .20 | --- |

Cylinder Mountings

| Designation | Pictorial Representation | Description | Cyl. Ø | Part Number | Weight (lbs.) |
|---|--------------------------|------------------|--------|-------------|---------------|
| Type NR4 | | End Cap Mounting | 16 | 2172-0101 | 0.02 |
| | | | 25 | 2172-0201 | 0.07 |
| | | | 32 | 2172-0351 | 0.11 |
| | | | 40 | 2172-0451 | 0.13 |
| | | | 50 | 2172-0551 | 0.26 |
| Type NR7 | | Center Support | 16 | 2176-0101 | 0.01 |
| | | | 25 | 2176-0202 | 0.07 |
| | | | 32 | 2176-0351 | 0.13 |
| | | | 40 | 2176-0451 | 0.15 |
| | | | 50 | 2176-0551 | 0.44 |
| Type NR8 (Ø 25mm - 50mm only) | | Center Support | 25 | 2175-0201 | 0.04 |
| | | | 32 | 2175-0351 | 0.07 |
| | | | 40 | 2175-0451 | 0.07 |
| | | | 50 | 2175-0551 | 0.26 |

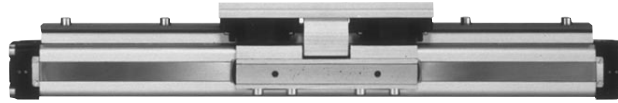
Dimensions



| Cyl. Ø | U | AB | AC | AD | AE | AF | AH | AJ | AK | AM | AN | AT | AU | AV | BT | BU | DG | H |
|--------|-----|------|-----|------|------|------|------|------|-----|------|------|-----|-----|------|------|-----|------|---------|
| 16 | .14 | .71 | .39 | .55 | .49 | .59 | 1.26 | 1.57 | .18 | - | .47 | .06 | - | - | - | - | 1.02 | - |
| 25 | .22 | 1.06 | .41 | .71 | .87 | 1.10 | 1.89 | 2.36 | .16 | 1.26 | .79 | .08 | .57 | .94 | 1.42 | .21 | 1.54 | 10-32 |
| 32 | .26 | 1.42 | .47 | .79 | 1.02 | 1.42 | 2.60 | 3.23 | .24 | 1.57 | .79 | .12 | .71 | 1.18 | 1.89 | .22 | 1.97 | 1/4-20 |
| 40 | .26 | 1.81 | .47 | .79 | 1.02 | 1.61 | 2.99 | 3.62 | .24 | 1.57 | .79 | .12 | .71 | 1.38 | 2.28 | .22 | 2.36 | 1/4-20 |
| 50 | .35 | 2.13 | .71 | 1.10 | 1.34 | 2.01 | 3.70 | 4.49 | .24 | 2.48 | 1.57 | .16 | .94 | 1.77 | 2.83 | .33 | 2.91 | 5/16-18 |

Series 2000 Powerguide™

Bore sizes: 25mm, 32mm and 50mm
Stroke lengths available up to 120". Longer strokes available upon request.



The Powerguide Principle

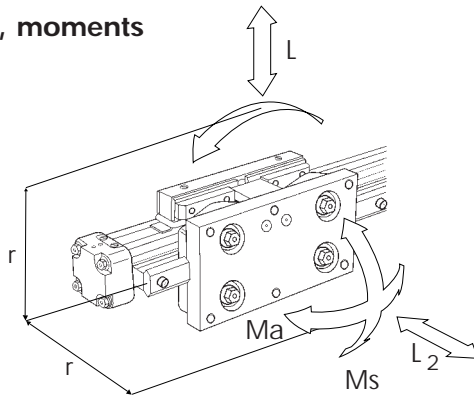
The Powerguide comprises two proven technologies, an ORIGA rodless cylinder and a HEPCO precision ball bearing based slideway. The result is a prime mover and guide combined, providing optimum linear precision and load capacity to satisfy the most demanding applications across a broad industry base. This simple method of providing controlled linear movement eliminates the need for separate supports and guidance hardware, so reducing design and manufacturing costs.

SYSTEM FEATURES:

- Prime mover and guide combined.
- Equal load capacity in all directions.
- Hardened slideway for long life.
- Precision double row bearings for maximum loads and rigidity.
- Purpose made carriage plate has a large adaptable mounting surface.
- Suitable for harsh environments.
- Requires no additional support hardware.
- High speed and cycle capability.
- Factory-set adjustable bearings to eliminate play.

Technical Data

Loads, forces, moments



$M_a = F \cdot r$
 $M_s = F \cdot r$
 $M_v = F \cdot r$

The maximum moment and direct load capacities are given in the table below. To calculate the life of a given Powerguide the LOAD FACTOR L_F should be calculated using the equation below.

$$L_F = \frac{M_a}{M_a \text{ (max.)}} + \frac{M_s}{M_s \text{ (max.)}} + \frac{M_v}{M_v \text{ (max.)}} + \frac{L_1}{L_1 \text{ (max.)}} + \frac{L_2}{L_2 \text{ (max.)}}$$

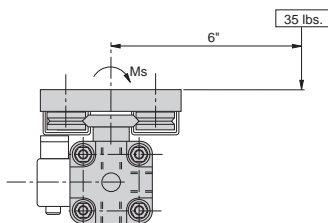
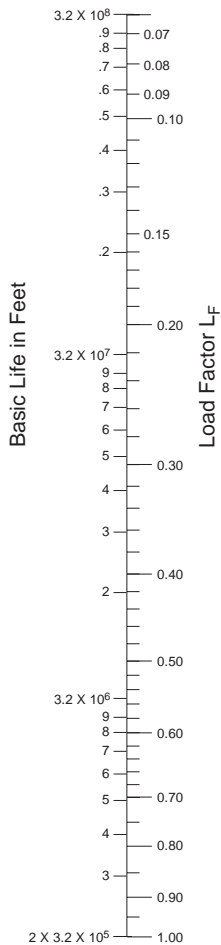
L_F should not exceed 1 for any combination of loads.

| Cyl. Ø | Force (lbs. f) at 87 PSI | Cushion Length (in.) | Max. Allowed Moment Load (in.-lbs.) | | Max. Allowed Torque (in.-lbs.) Mv | Max. Allowed Direct Load (lbs.) | | Powerguide Weight (lbs.) for 0" stroke increase ea. add. in. | |
|--------|--------------------------|----------------------|-------------------------------------|------|-----------------------------------|---------------------------------|-----|--|-----|
| | | | Ma | Ms | | L1 | L2 | | |
| 25 | 66 | .55 | 451 | 98 | 451 | 263 | 263 | 3.75 | .24 |
| 32 | 108 | 1.10 | 1200 | 451 | 1200 | 526 | 526 | 6.83 | .43 |
| 50 | 265 | 1.50 | 3850 | 1566 | 3850 | 900 | 900 | 24.23 | .85 |

Relating load applied to life

It is important to satisfy both load and life requirements when looking at an application. In many instances it will not be necessary to calculate the life of a system, but if a high number of strokes coupled with a heavy load are evident then life can be an important factor. This is also particularly relevant in short stroke or moment load applications. (See LOAD/LIFE example below)

Note: LOAD/LIFE capacities are based on linear speeds up to 5 feet/sec. and lubrication being evident at the bearing and slide contact faces.



Example: 32-2020/PG (at left)
 Moment $M_s = 35 \text{ lbs.} \times 6 = 210 \text{ in.-lbs.}$
 $L_2 = 35 \text{ lbs.}$

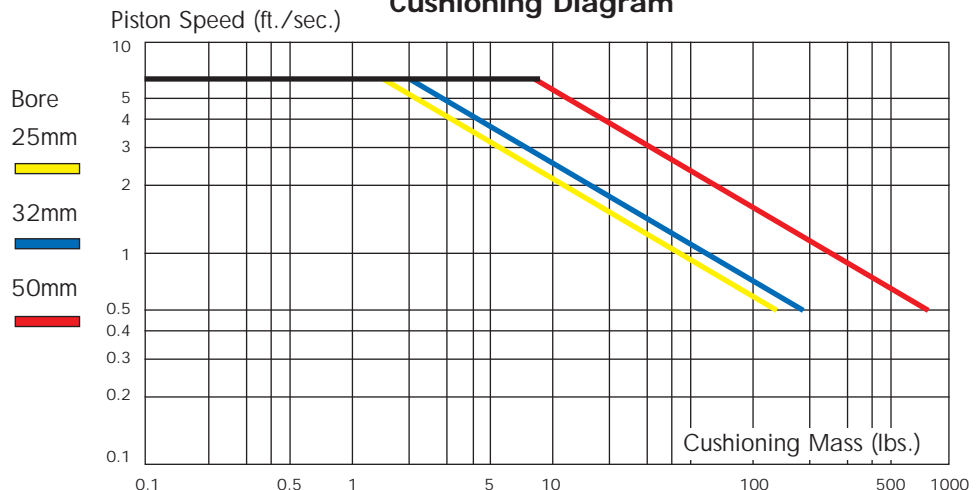
Applying formula

$$L_F = \frac{M_s}{M_s \text{ (max.)}} + \frac{L_2}{L_2 \text{ (max.)}}$$

$$L_F = \frac{35}{451} + \frac{35}{526} = .532$$

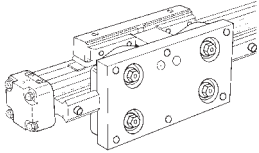
Basic Life $\geq (3.2 \times 10^6) = 3,200,000$ Feet

Cushioning Diagram

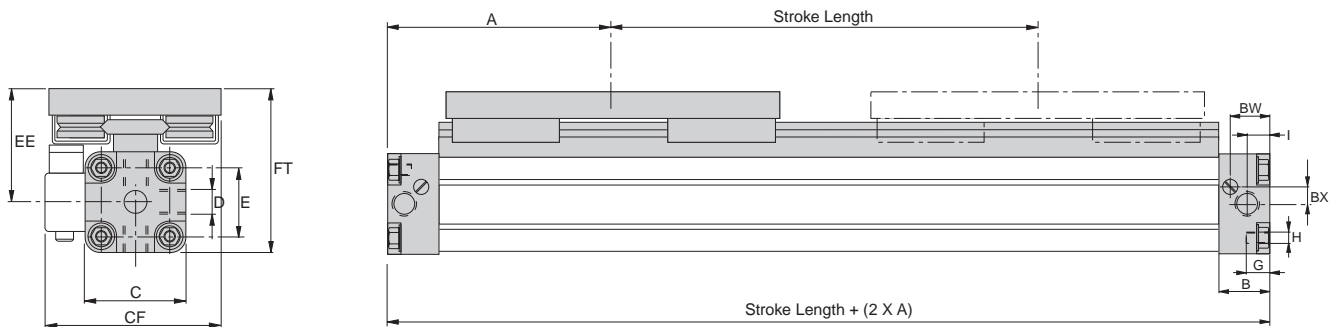


Piston Mountings

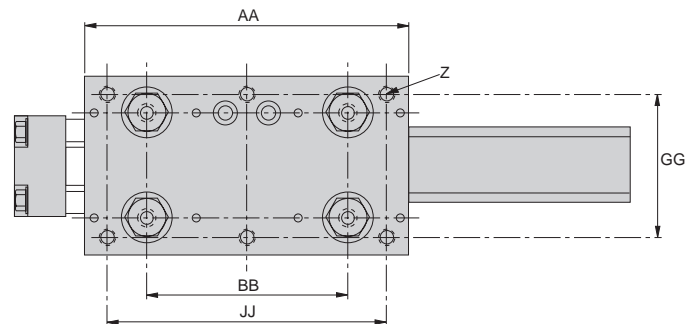
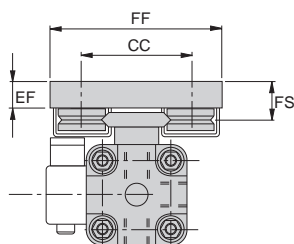
Ø 25mm, 32mm and 50mm

| Designation | Pictorial Representation | Description | Cyl. Ø | Weight 0" stroke (lbs.) | Weight per inch (lbs.) |
|--------------|---|--|--------|-------------------------------|------------------------------|
| Type 2020/PG |  | Piston Mounting PG | 25 | 3.75 | 0.95 |
| | | Standard mounting. Mounted during cylinder assembly. | 32 | 6.80 | 0.44 |
| | | | 50 | 19.50 | 0.90 |

Overall Dimensions



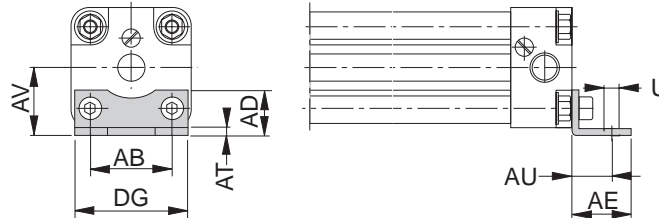
| Cyl.Ø | A | B | C | D | E | G | H | I | BW | BX | CF | EE | FT |
|-------|------|------|------|-----|------|-----|---------|-----|-----|-----|------|------|------|
| 25 | 3.94 | .91 | 1.57 | 1/8 | 1.06 | .35 | 10-32 | .33 | .71 | .26 | 3.31 | 2.09 | 2.87 |
| 32 | 4.92 | 1.06 | 2.05 | 1/4 | 1.42 | .55 | 1/4-20 | .41 | .85 | .35 | 4.45 | 2.52 | 3.54 |
| 50 | 6.70 | 1.26 | 3.07 | 3/8 | 2.13 | .47 | 5/16-18 | .49 | .83 | .59 | 6.20 | 3.66 | 5.20 |



| Cyl.Ø | Z | AA | BB | CC | EF | FF | FS | GG | JJ |
|-------|---------|-------|------|------|-----|------|------|------|-------|
| 25 | 1/4-20 | 5.71 | 3.54 | 1.85 | .51 | 3.15 | .87 | 2.52 | 4.92 |
| 32 | 5/16-18 | 7.48 | 4.65 | 2.87 | .59 | 4.57 | 1.02 | 3.78 | 6.46 |
| 50 | 3/8-16 | 11.02 | 6.89 | 4.71 | .83 | 7.28 | 1.58 | 6.00 | 10.00 |

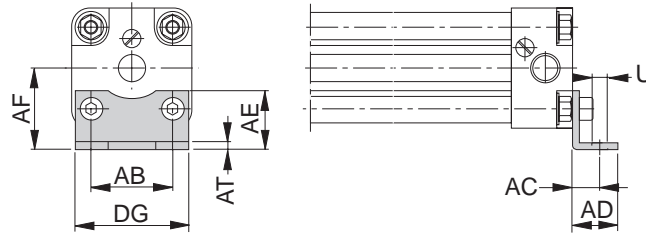
Dimensions - Cylinder Mountings - Powerguide™

NR4 Mounting
Mtg. Style "A"



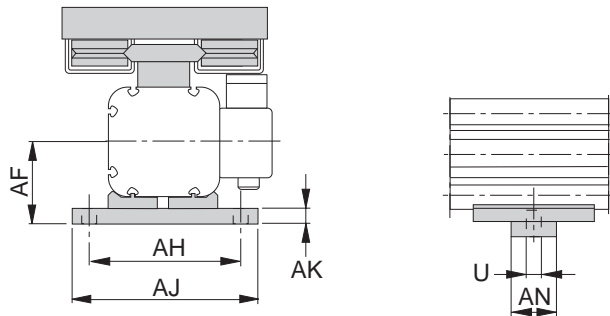
Note: Part numbers
see page 3.3/4
NR4

NR4 Mounting
Mtg. Style "B"



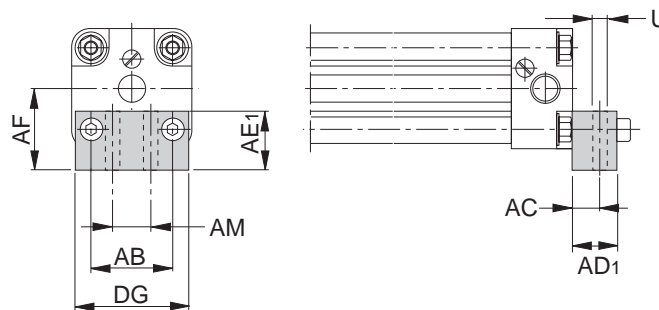
Note: Part numbers
see page 3.3/4
NR4

NR7 Mounting



Note: Part numbers
see page 3.3/4
NR7

NR3 Mounting



| Bore | Part Number |
|------|-------------|
| 25 | 2170-0201 |
| 32 | 2170-0301 |
| 50 | 2170-0501 |

| Cyl. Ø | U | AB | AC | AD | AD ₁ | AE | AE ₁ | AF | AH | AJ | AK | AM | AN | AT | AU | AV | DG |
|--------|-----|------|-----|------|-----------------|------|-----------------|------|------|------|-----|------|------|-----|-----|------|------|
| 25 | .22 | 1.06 | .41 | .71 | .75 | .87 | 1.00 | 1.10 | 1.89 | 2.36 | .16 | 0.50 | .79 | .08 | .57 | .94 | 1.54 |
| 32 | .26 | 1.42 | .47 | .79 | .75 | 1.02 | 1.00 | 1.42 | 2.60 | 3.23 | .24 | 0.75 | .79 | .12 | .71 | 1.18 | 1.97 |
| 50 | .35 | 2.13 | .71 | 1.10 | 1.00 | 1.34 | 1.25 | 2.01 | 3.70 | 4.49 | .24 | 1.25 | 1.57 | .16 | .94 | 1.77 | 2.91 |

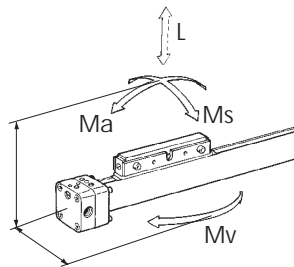
Series P120

Bore sizes: 40mm, 63mm and 80mm
Stroke lengths available up to 480"



Technical Data

Loads, forces, moments



Short Piston Values

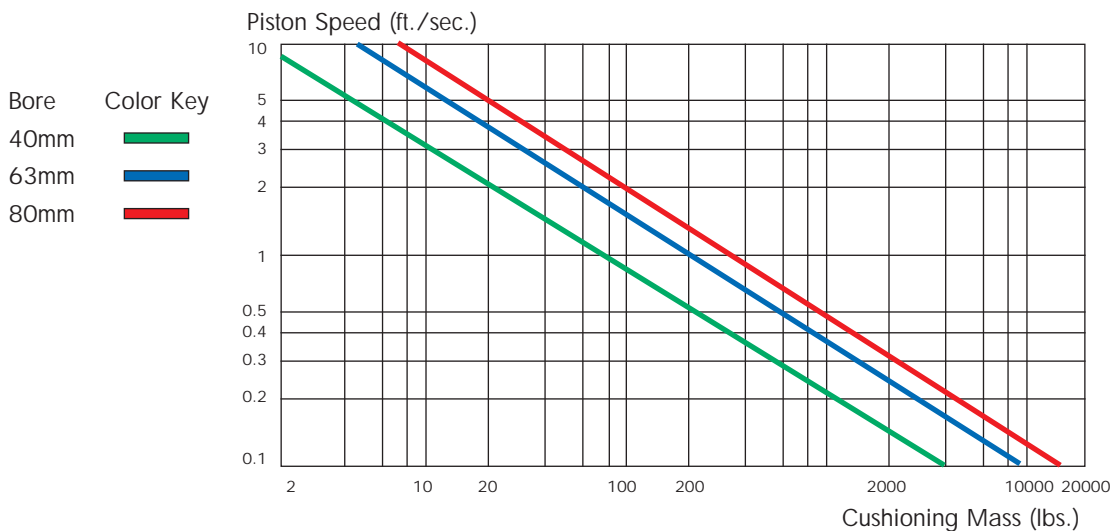
| Cyl. Ø (mm) | Theoretical Force at 87 PSI (lbs.) | Cushion Length (in.) | Max. Allowed Bending Moment Ma (in./lbs.) | Max. Allowed Bending Moment Ms (in./lbs.) | Max. Allowed Bending Moment Mv (in./lbs.) | Max. Allowed Load L (lbs.) |
|-------------|------------------------------------|----------------------|---|---|---|----------------------------|
| 40 | 169 | 1.26 | 528 | 36 | 72 | 170 |
| 63 | 420 | 1.57 | 1776 | 72 | 216 | 370 |
| 80 | 677 | 1.73 | 3192 | 144 | 420 | 590 |

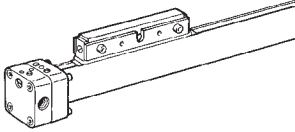
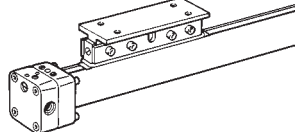
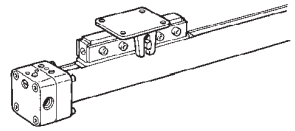
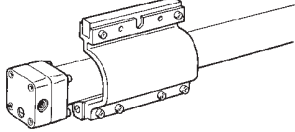
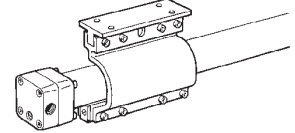
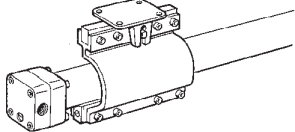
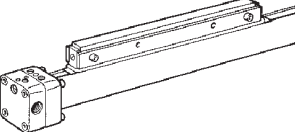
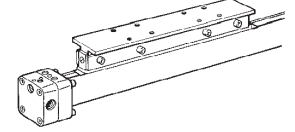
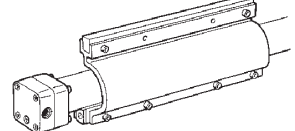
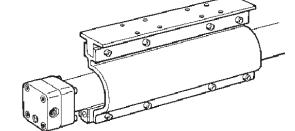
Long Piston Values

| Cyl. Ø (mm) | Theoretical Force at 87 PSI (lbs.) | Cushion Length (in.) | Max. Allowed Bending Moment Ma (in./lbs.) | Max. Allowed Bending Moment Ms (in./lbs.) | Max. Allowed Bending Moment Mv (in./lbs.) | Max. Allowed Load L (lbs.) |
|-------------|------------------------------------|----------------------|---|---|---|----------------------------|
| 40 | 169 | 1.26 | 1200 | 72 | 216 | 170 |
| 63 | 420 | 1.57 | 3984 | 144 | 660 | 370 |
| 80 | 677 | 1.73 | 6372 | 288 | 1236 | 590 |

Values are based on light, shock-free duty and should not be exceeded during piston acceleration.

Cushioning Diagram

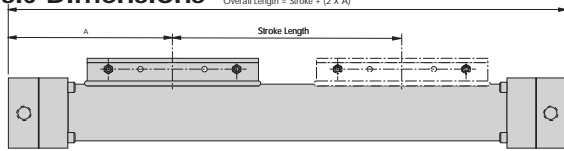


| Designation | Pictorial Representation | Description | Cyl. Ø | Weight 0" stroke | Weight per inch |
|----------------|---|--|--------|---------------------|--------------------|
| Type P120-S/20 |  | Piston Mounting S/20 Standard mounting. Mounted during cylinder assembly. | 40 | 7.26 | 0.20 |
| | | | 63 | 20.46 | 0.45 |
| | | | 80 | 35.42 | 0.71 |
| Type P120-S/22 |  | Piston Mounting S/22 Flat, platform mounting | 40 | 7.48 | 0.20 |
| | | | 63 | 20.90 | 0.45 |
| | | | 80 | 36.74 | 0.71 |
| Type P120-S/25 |  | Piston Mounting S/25 Allows for a floating connection between the cylinder and an externally guided device. | 40 | 7.92 | 0.20 |
| | | | 63 | 22.66 | 0.45 |
| | | | 80 | 38.06 | 0.71 |
| Type P120-S/30 |  | Piston Mounting S/30 Transfers power to the back of the cylinder. Protects the band surface from foreign particles. | 40 | 9.24 | 0.20 |
| | | | 63 | 25.74 | 0.45 |
| | | | 80 | 44.88 | 0.71 |
| Type P120-S/32 |  | Piston Mounting S/32 Combines the features of the S/22 mounting and the S/30 mounting. | 40 | 9.46 | 0.20 |
| | | | 63 | 26.18 | 0.45 |
| | | | 80 | 46.20 | 0.71 |
| Type P120-S/35 |  | Piston Mounting S/35 Combines the features of the S/25 mounting and the S/30 mounting. | 40 | 9.90 | 0.20 |
| | | | 63 | 27.94 | 0.45 |
| | | | 80 | 47.52 | 0.71 |
| Type P120-L/26 |  | Piston Mounting L/26 Standard mounting. Mounted during cylinder assembly. | 40 | 11.00 | 0.20 |
| | | | 63 | 30.58 | 0.45 |
| | | | 80 | 51.04 | 0.71 |
| Type P120-L/28 |  | Piston Mounting L/28 Flat, platform mounting. | 40 | 11.44 | 0.20 |
| | | | 63 | 32.12 | 0.45 |
| | | | 80 | 53.68 | 0.71 |
| Type P120-L/36 |  | Piston Mounting L/36 Transfers power to the back of the cylinder. Protects the band surface from foreign particles. | 40 | 14.74 | 0.20 |
| | | | 63 | 42.02 | 0.45 |
| | | | 80 | 70.40 | 0.71 |
| Type P120-L/38 |  | Piston Mounting L/38 Combines the features of the L/28 mounting and the L/36 mounting. | 40 | 15.18 | 0.20 |
| | | | 63 | 43.56 | 0.45 |
| | | | 80 | 73.04 | 0.71 |

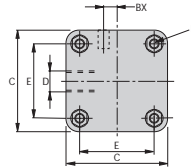
Overall Dimensions

Basic Dimensions

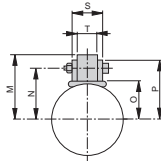
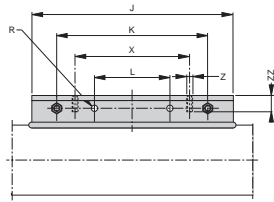
Overall Length = Stroke + (2 X A)



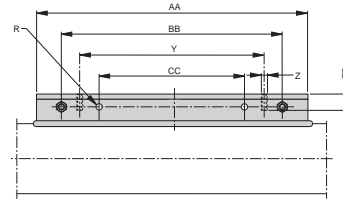
End Cap Dimensions



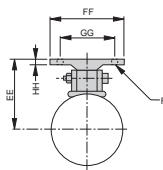
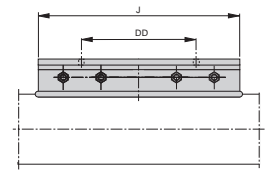
Piston Mounting S/20



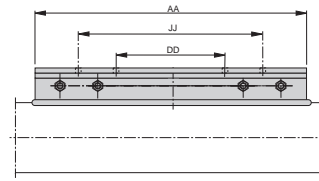
Piston Mounting L/26



Piston Mounting S/22



Piston Mounting L/28



Piston Mounting S/25

S/30

L/36

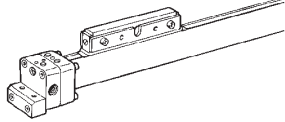
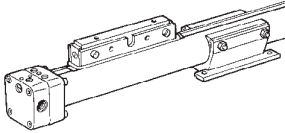
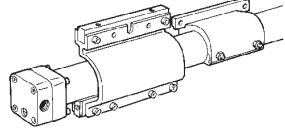
Piston Mounting S/35

S/32

L/38

| Cyl. Ø | A (S/) | A (L/) | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | R | | |
|--------|--------|--------|------|-------|---------|------|------|-------|---------|-------|-------|------|------|------|------|------|------|------|------|-----|
| 40 | 5.91 | 9.91 | 2.36 | 2.83 | 1/4 NPT | 2.13 | 2.28 | .59 | 1/4-20 | .59 | 5.91 | 4.33 | 2.17 | 2.40 | 1.93 | 1.28 | 2.24 | .28 | | |
| 63 | 8.46 | 14.46 | 3.15 | 4.17 | 3/8NPT | 3.07 | 3.46 | .79 | 5/16-18 | .79 | 8.66 | 7.09 | 3.54 | 3.27 | 2.68 | 1.89 | 3.07 | .35 | | |
| 80 | 10.24 | 16.24 | 3.94 | 5.20 | 1/2NPT | 3.78 | 4.41 | .98 | 3/8-16 | .98 | 11.02 | 9.45 | 4.72 | 3.98 | 3.27 | 2.36 | 3.74 | .43 | | |
| Cyl. Ø | S | T | V | Y | AA | AR | AS | BB | BC | BD | BE | BF | BG | BH | BJ | BK | BL | BM | BN | |
| 40 | 1.10 | .71 | .47 | 7.09 | 11.81 | .31 | 3.31 | 9.45 | 5.43 | 11.34 | 3.35 | 2.30 | 2.87 | 3.19 | 2.09 | 1.65 | 1.89 | 3.54 | 3.90 | |
| 63 | 1.18 | .75 | .63 | 11.81 | 18.90 | .39 | 3.54 | 15.75 | 8.19 | 18.43 | 4.61 | 3.23 | 4.02 | 4.41 | 3.03 | 2.44 | 2.80 | 4.84 | 5.28 | |
| 80 | 1.26 | .79 | .79 | 14.17 | 22.05 | .51 | 4.33 | 18.90 | 10.55 | 21.57 | 5.63 | 4.02 | 4.92 | 5.39 | 3.78 | 3.07 | 3.46 | 5.91 | 6.42 | |
| Cyl. Ø | BP | BW | BX | CC | DD | EE | FF | GG | HH | JJ | KK | LL | MM | NN | PP | RR | SS | TT | ZZ | α |
| 40 | 2.95 | .59 | .43 | 4.72 | 3.15 | 2.60 | 2.36 | 1.77 | .24 | 6.30 | 2.95 | 2.00 | 1.26 | ±.32 | 2.76 | 2.17 | 3.54 | 2.95 | .47 | 22° |
| 63 | 4.11 | .79 | .59 | 7.87 | 5.12 | 3.50 | 3.15 | 2.36 | .28 | 10.24 | 3.94 | 2.76 | 1.54 | ±.39 | 3.54 | 2.76 | 4.72 | 3.94 | .63 | 15° |
| 80 | 5.04 | .98 | .63 | 9.45 | 7.09 | 4.25 | 3.94 | 2.95 | .31 | 14.17 | 4.80 | 3.39 | 1.89 | ±.47 | 4.33 | 3.35 | 5.91 | 4.92 | .79 | 15° |

Cylinder Mountings

| Designation | Pictorial Representation | Description | Cyl. Ø | Part Number | Weight (lbs.) |
|-------------|---|-------------------|--------|-------------|---------------|
| Type NR3 |  | End Cap Lug Mount | 40 | 2170-0451 | 0.22 |
| | | | 63 | 2170-0651 | 0.66 |
| | | | 80 | 2170-0851 | 1.32 |
| Type NR7 |  | Center Support | 40 | 2176-0402 | 1.32 |
| | | | 63 | 2176-0602 | 3.74 |
| | | | 80 | 2176-0802 | 6.38 |
| Type NR9 |  | Center Support | 40 | 2177-0401 | 1.32 |
| | | | 63 | 2177-0601 | 3.74 |
| | | | 80 | 2177-0801 | 7.26 |

End Cap Lug Mount NR3

Center Support NR7

Position of Cylinder Mountings

Center Support NR9

| Cyl. Ø | C | R | U | AB | AC | AD | AE | AF | AG | AH | AJ | AK | AL | AM | AN | AP | BR | BS | BY |
|--------|------|-----|-----|------|-----|------|------|------|------|------|------|-----|------|------|-------|------|------|------|------|
| 40 | 2.83 | .28 | .35 | 1.18 | .49 | .94 | .94 | 1.50 | 2.99 | 2.76 | 3.35 | .31 | 2.32 | 4.72 | 6.30 | 5.71 | 3.15 | .83 | 1.50 |
| 63 | 4.17 | .35 | .43 | 1.89 | .59 | 1.18 | 1.57 | 2.24 | 4.49 | 3.74 | 4.49 | .39 | 3.50 | 6.30 | 8.27 | 7.48 | 3.94 | 1.26 | 2.24 |
| 80 | 5.20 | .43 | .55 | 2.36 | .69 | 1.38 | 1.97 | 2.83 | 5.67 | 4.72 | 5.67 | .47 | 4.41 | 7.87 | 10.23 | 9.25 | 4.72 | 1.57 | 2.83 |

Proximity Switches RS (Reed Switch)

General

Pneumatic systems can often be combined with electric control circuits. The position of the piston in the cylinder can then be sensed by means of a proximity switch which delivers signals to the control system. The ORIGA type RS proximity switch is a non-contacting, electric sensor integrated with the cylinder. No external cams or other mechanical actuating devices are necessary. The cylinder, incorporating the required number of switches, is a complete unit which is ready for installation.

Operation

The type RS proximity switch consists of a reed switch which is actuated by a permanent magnet in the piston. The snap action of the contacts on closure ensures distinct and reliable operation.

Design

The reed switch is encapsulated and is enclosed in an aluminium case, to which the connecting cables are securely clamped. The design is very sturdy and the reed switches used can withstand high mechanical and electrical loads. The proximity switch consists of an encapsulated reed switch and an associated mounting. The proximity switches can therefore be very easily adjusted to operate at the required point along the piston stroke. All parts of the proximity switch are made of corrosion resistant materials.

Accuracy

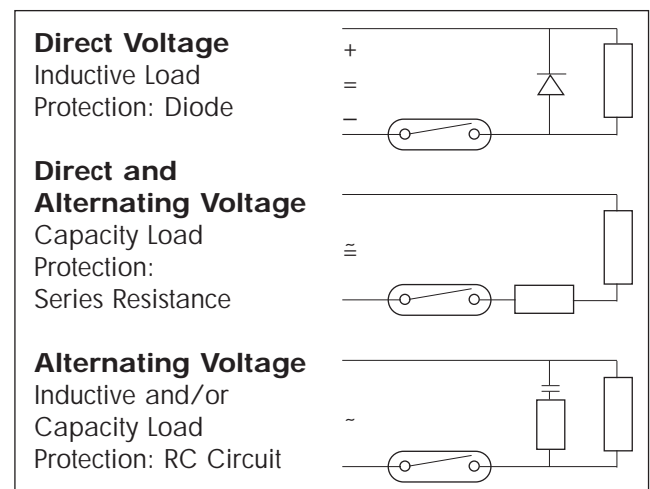
The accuracy of a control system is dependent on the repeatability, hysteresis and dynamic error of the components. The repeatability of the reed switches used for the ORIGA proximity switches is excellent ± 0.0004 in. In practice, the repeatability of a control system is determined by other components, such as by the variations in the operating points of associated relays and valves. The variations in the operating points of relays, valves and sensors are additive. Hysteresis is the directional dependence of the operating point, i.e. the switch is actuated at a slightly different piston position when the piston is moving in one direction than it is when the piston is moving in the opposite direction. An inherent feature of the reed switch is that the distance between these operating points is large. If an identical operating point is required, regardless of the direction of travel, two proximity switches - one on each side of the cylinder - can be used. These switches

can then be connected across logic circuits which will select the appropriate switch when the piston is moving to the right or to the left. Positional deviations in the positioning of the piston, for instance, will occur when the piston speed, its load or the compressed air supply pressure is varied (dynamic error).

Electrical Useful Life

The electrical useful life of the reed switch is determined by a number of factors, such as the breaking load, type of load and the type of electric power. The reed switches used have a high nominal rating of 35 watts ($\varnothing 10:10$ Watt). The electrical useful life is normally $3 - 6 \times 10^6$ switching operations at 35 Watt ($\varnothing 10:10$ Watt). At a lower load, the useful life is extremely high (more than 100×10^6 switching operations). The transients occurring in switching inductive loads (relay coils, solenoid valves, contactors) should be suppressed by means of diodes, RC circuits or varistors (voltage-dependent resistors). A diode connected in parallel with the load offers an inexpensive and reliable method of spark-suppression, although this can only be used on D.C. RC circuits and varistors can be used for A.C. and D.C., but these are more expensive and must be carefully matched to the circuit. Note that all types of spark-suppression devices across solenoid valves and relays cause some measure of drop-out delay. In the case of resistive loading with high inrush current (such as incandescent lamps), a protective resistor should be fitted in series with the load. Protective resistors should also be used when the cables are very long and the voltage is in excess of 100 V.

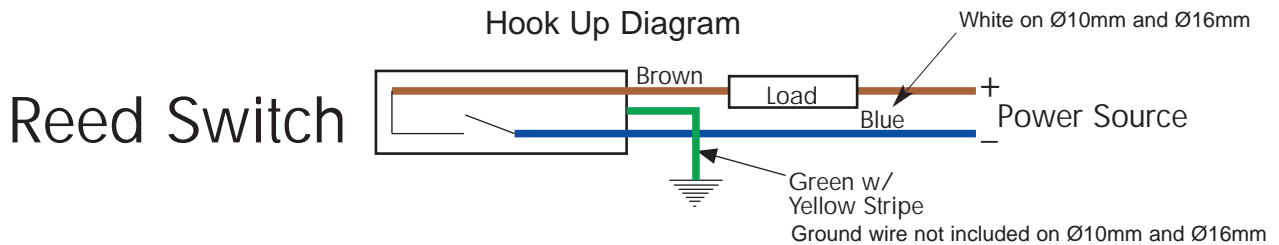
For the above reasons, a universal instrument (ohmmeter) or LEDs should be used for adjustment and checking of ORIGA proximity switches.



Technical Data

Proximity Switch RS

| | |
|--------------------------|---------------------------------|
| Manufacturer | ORIGA |
| Type | RS |
| Switching Configuration | Normally Open |
| Maximum Contact Rating | 35 Watts (Ø 10mm = 10 Watts) |
| Maximum Voltage | 250 Volts AC/DC |
| Maximum Starting Current | 1.5 Amps (Ø 10mm = .5 Amps) |
| Hysteresis (integral) | Approx. 8mm |
| Temperature Range | -20° F to +175° F |
| Enclosure Class | IP 65 |
| Housing Material | Anodized Aluminum |

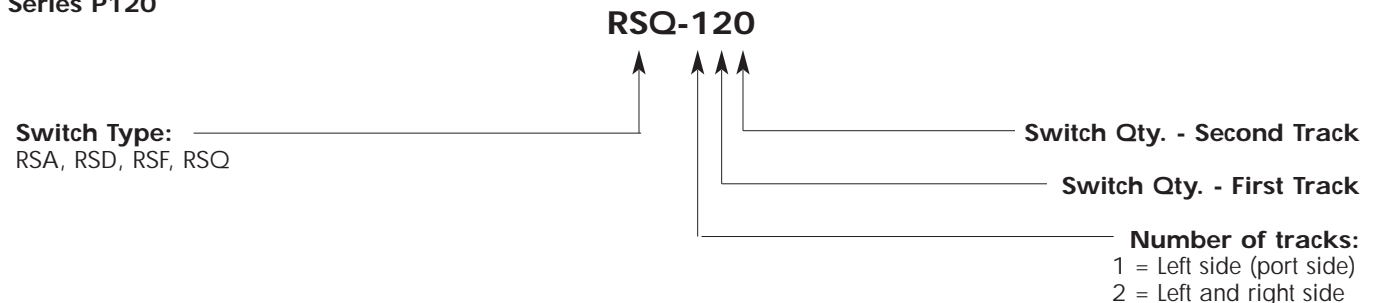


Reed Switches (RS) - Series 2000 (ref. page 4.1/5)

| Designation | | Bore Sizes | | | | | |
|-----------------------|-------------|------------|------|-------------|-------------|-------------|-------------|
| | | 10mm | 16mm | 25mm | 32mm | 40mm | 50mm |
| Type RS (without LED) | Part Number | 3047 | 1723 | 2676-0201/5 | 2676-0301/5 | 2676-0301/5 | 2676-0501/5 |
| 5 Meter Cable | | | | | | | |
| Type RS (with LED) | Part Number | N/A | N/A | N/A | 2690-0301/5 | 2690-0301/5 | 2690-0501/5 |
| 5 Meter Cable | | | | | | | |
| Sensor Clamp | Part Number | N/A | 1271 | 2689-0201 | N/A | N/A | N/A |
| w/Set Screw | | | | | | | |

Ordering Procedure - Reed Switches (RS) - Series P120 (ref. page 4.1/7)

Series P120



Proximity Switches IS (Hall Effect Switch with LED)

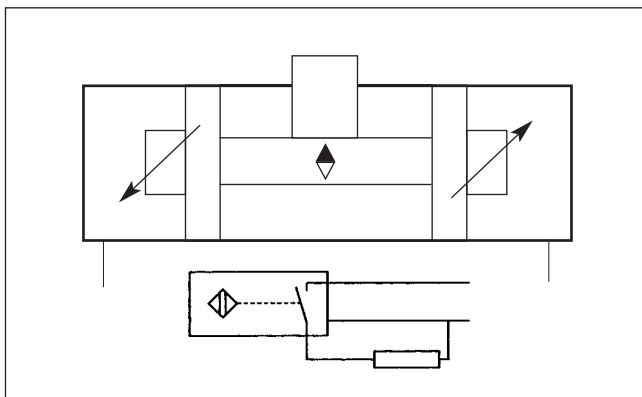
General

Pneumatic systems can often be combined with electric control circuits. The position of the piston in the cylinder can then be sensed by means of a proximity switch which delivers signals to the control system.

The ORIGA Type IS proximity switch is a non-contacting electric sensor integrated with the cylinder. No external cams or other mechanical actuating devices are necessary. The cylinder, incorporating the required number of switches, is a complete unit which is ready for installation.

Operation

The basic principle of the hall effect sensing element is a high frequency oscillator circuit which is influenced by the magnetic field of the piston. With a defined magnetic field density the bounce free output signal is supplied via a flip-flop and an output stage and is indicated by the LED. The output signal can be processed into a control signal and is particularly suitable for signal input in programmable controllers.



Advantages

Full electrical operation—no moving parts—wear free. Bounce-free signal output. Unaffected by shaking and vibration. High switching frequency. Built-in LED. Short circuit protected switching output with integral protective circuit. Low switching hysteresis.

Design

The IS switch is enclosed in an aluminium case to which the connecting cables are securely clamped. The proximity switch and its associated mounting

clamp is mounted in the grooves along the cylinder. The proximity switches can therefore very easily be adjusted to operate at the required point along the piston stroke. All parts of the proximity switch are made of corrosion resistant materials.

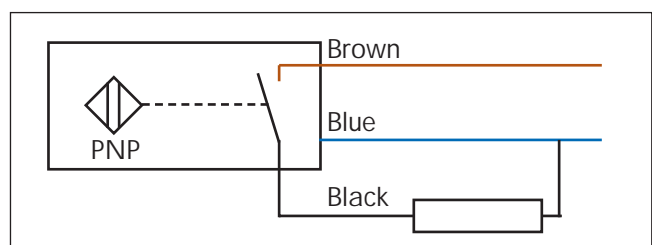
Accuracy

The accuracy of a control system is dependent on the repeatability, hysteresis and dynamic error of the components. The repeatability of the hall effect switches used for the ORIGA IS proximity switches is excellent - .0004 in. In practice the repeatability of a control system is determined by other components such as by the variations in the operating points or relays and valves and sensors are additive. Hysteresis is the directional dependency of the operating point i.e. the switch is actuated at slightly different piston position when the piston is moving in one direction than it is when the piston is moving in the opposite direction. With hall effect switches the difference between those operating points is very small. If an identical operating point is required, regardless of the direction of travel, two proximity switches (one on each side of the cylinder) can be used. These switches can then be connected across logic circuits which will select the appropriate switch when the piston is moving to the right or the left. Positional deviations in the positioning of the piston, for instance, will occur when the piston speed, its load or the compressed air supply pressure is varied (dynamic error).

Electrical Service Life

Because of the fully electronic mode of operation the electrical service life is theoretically unlimited. The IS sensor has integrated protection against inductive voltage peaks and is short circuit protected. Electrical protective circuits are not required.

Connection Diagram



Technical Data

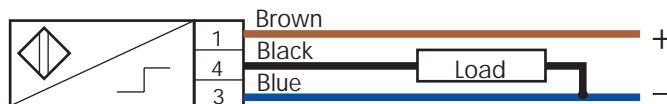
Proximity Switch (Hall Effect)

| | |
|----------------------------|--------------------------------|
| Manufacturer | ORIGA |
| Type | IS |
| Switching Configuration | Normally Open |
| Output Type | PNP |
| Maximum Continuous Current | 200 mA |
| Maximum Voltage | 10 - 30 Volt DC |
| Switch Indicator | LED |
| Maximum Closing Frequency | 1 kHz (approx.) |
| Maximum Starting Current | 1.5 Amps (Ø 10mm = .5 Amps) |
| Hysteresis (mounted) | Approx. .8mm |
| Temperature Range | -20° F to +175° F |
| Enclosure Class | IP 67 |
| Housing Material | Anodized Aluminum |
| Connection Cable | 3 X .25mm ² |

Note: Connection leads are polarity protected.
Protection against inductive voltage peaks.
Short circuit protected.

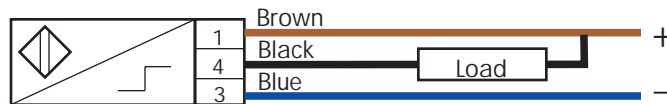
Hall Effect

Hook Up Diagram



PNP (Sourcing)

Hall Effect



NPN (Sinking)

Inductive Switches (IS) - Series 2000/PowerGuide

| Designation | | Bore Sizes | | | | | |
|-------------------------------|-------------|------------|------|------------|------------|-----------|-----------|
| | | 10mm | 16mm | 25mm | 32mm | 40mm | 50mm |
| Type IS PNP (with LED) | Part Number | 3049 | 1724 | 0223* | 0223-0301* | 0223-0301 | 0223-0501 |
| 5 Meter Cable | | | | | | | |
| Type IS NPN (with LED) | Part Number | 3753 | 3754 | 3755* | 3755-0301* | 3755-0301 | 3755-0501 |
| 5 Meter Cable | | | | | | | |
| Sensor Clamp | Part Number | N/A | 1271 | 2689-0201* | 2689-0301 | 2689-0301 | 2689-0501 |
| w/Set Screw | | | | | | | |

*Note: For 32mm PowerGuide cylinders use 25mm sensors and clamp.

Proximity Switch Series 2000 cylinders

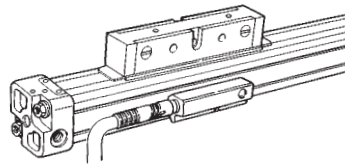
For non-contact sensing of piston position on Origa rodless cylinders.

Type IS (Hall Effect Switch)

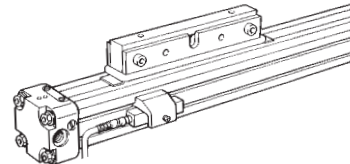
Available for Ø 10mm, 16mm and 50mm

- Proximity switch with cable connection for sensing end or intermediate positions.
- LED indicator
- Cable length 16 ft.

Ø10mm



Ø16mm - 50mm

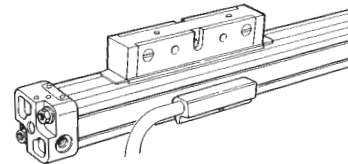


Type RS (Reed Switch)

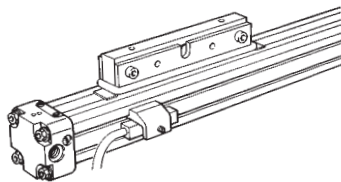
Available for Ø 10mm, 16mm, 25mm, 32mm, 40mm and 50mm

- Proximity switch with cable connection for sensing end or intermediate positions.
- Cable length 16 ft.

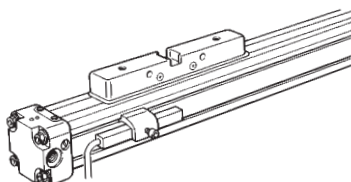
Ø10mm



Ø16mm



Ø25mm



Ø32mm - 50mm

Advantages of Proximity Switches (RS and IS)

Simple Installation

The proximity switch is clamped in the required position simply by means of the clamp attachment. The sensor and clamp fit anywhere along the barrel grooves as illustrated in the above drawing.

Compact

The proximity switches are mounted directly to the side of the barrel and require minimal additional space - compact in design, the overall length of the cylinder does not change.

Safe in Operation

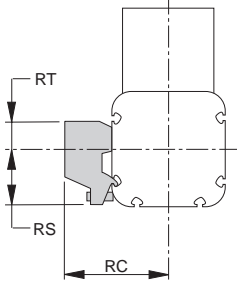
The proximity switch encapsulated in the aluminum housing has IP 65 (RS) and IP 67 (IS) protection and therefore can be used under adverse environmental conditions.

Cost Effective

Eliminates the need for cam and switch mountings. Maintenance free, no wearing parts.

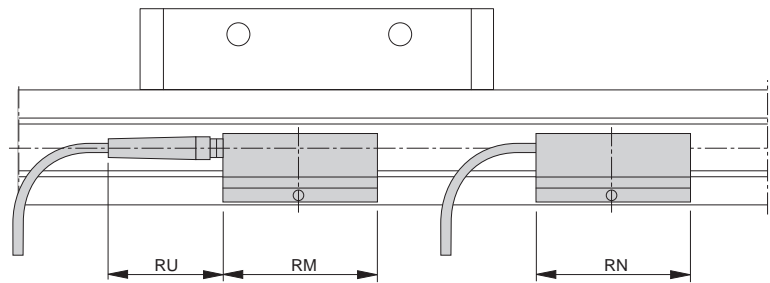
Dimensions

Ø10mm

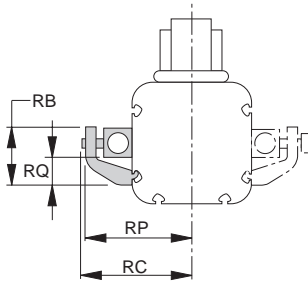


Ø10mm (IS)

Ø10mm (RS)

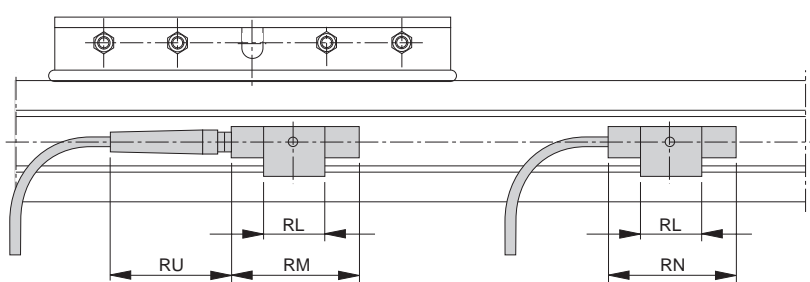


Ø16mm

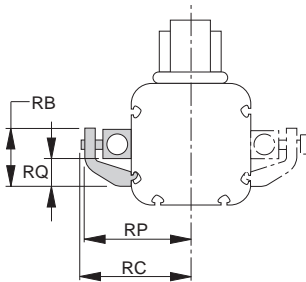


Ø16mm (IS)

Ø16mm (RS)

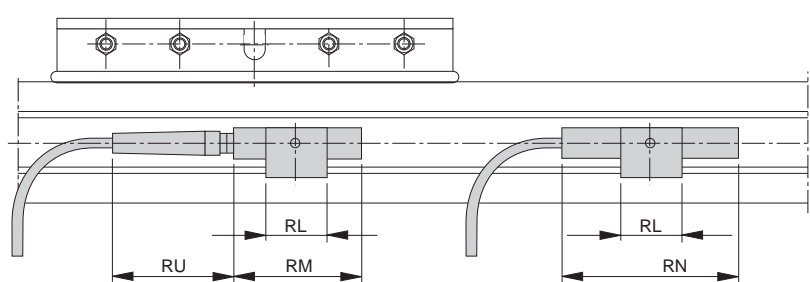


Ø25mm - Ø50mm



Ø25mm - Ø50mm (IS)

Ø25mm (RS only)



Ø32mm - 50mm

(RS version only)

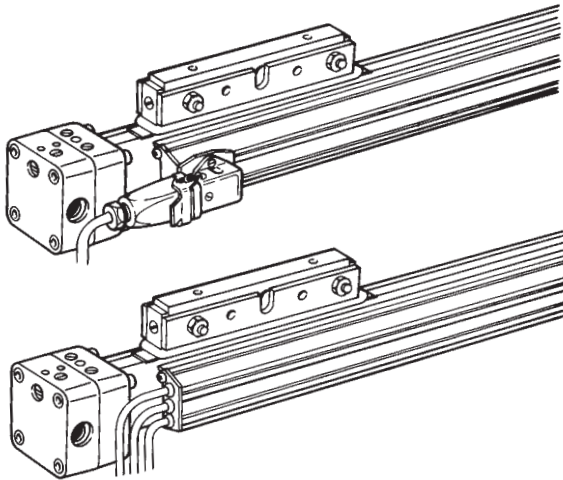
| Cyl. Ø | RB | RC | RL | RM | RN | RP | RQ | RS | RT | RU |
|--------|------|------|-----|------|------|------|-----|-----|-----|------|
| 10 | --- | .67 | --- | 1.38 | 1.38 | --- | --- | .35 | .20 | 1.38 |
| 16 | .67 | 1.10 | .79 | 1.38 | 1.57 | 1.06 | .43 | --- | --- | 1.38 |
| 25 | .79 | 1.46 | .79 | 1.38 | 3.15 | 1.32 | .43 | --- | --- | 1.38 |
| 32 | .98 | 1.72 | .79 | 1.38 | 3.15 | 1.58 | .22 | .43 | --- | 1.38 |
| 40 | .98 | 1.91 | .79 | 1.38 | 3.15 | 1.77 | .22 | .43 | --- | 1.38 |
| 50 | 1.26 | 2.17 | .79 | 1.38 | 3.15 | 2.03 | .22 | .43 | --- | 1.38 |

Proximity Switch Series P120 cylinders

For non-contact sensing of piston position on Origa rodless cylinders. Note: Series P120 cylinders ordered without Reed Switches are supplied with non-magnetic pistons.

Available for use on Series P120 cylinders.

Ø 40mm, 63mm and 80mm - Switches can be mounted on both sides of cylinder upon request.

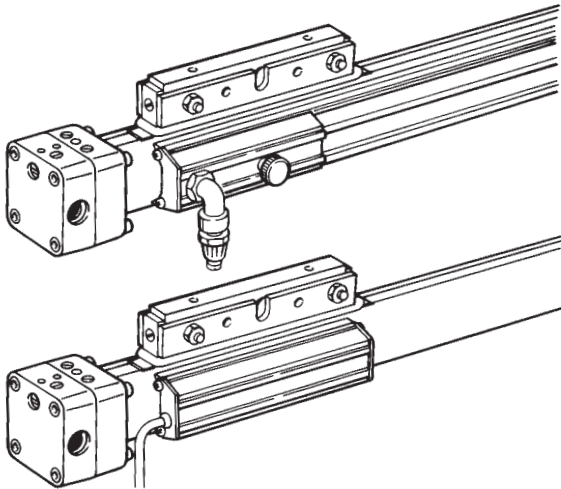


RSA: with RS (Reed Switch) ISA: with IS (Inductive Switch)

- Proximity switch connected across multi-pole connector.
- Operating points freely adjustable along the entire piston stroke length.

RSD: with RS (Reed Switch) ISD: with IS (Inductive Switch)

- Proximity switch with permanently connected cable.
- Operating points freely adjustable along the entire piston stroke length.



RSQ: with RS (Reed Switch) ISQ: with IS (Inductive Switch)

- Proximity switch with permanently connected cable protected by flexible conduit.
- Quick, adjustable settings along the entire piston stroke length.

RSF: with RS (Reed Switch) ISF: with IS (Inductive Switch)

- Proximity switch with permanently connected cable designed to serve as a fixed limit switch.

Advantages of Proximity Switches (RS and IS) Simple Installation

The proximity switch track is permanently fixed to the side of the cylinder barrel. The switch assemblies are installed within the track at the desired positions.

Safe in Operation

The proximity switch encapsulated in the aluminum housing has IP 65 (RS) and IP 67 (IS) protection and therefore can be used under adverse conditions.

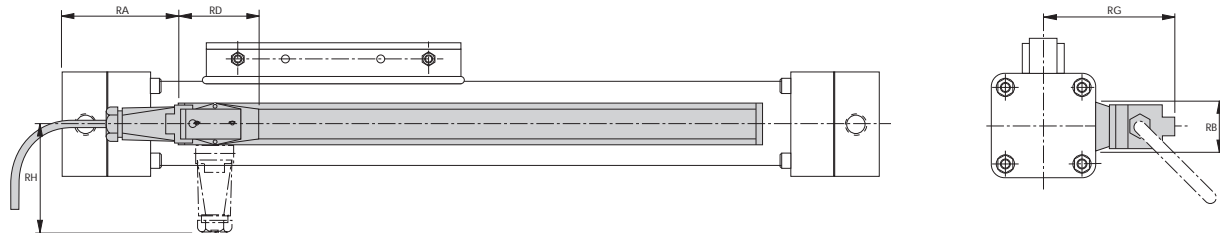
Compact

With the switches mounted directly to the side of the barrel minimal additional space is required in terms of cylinder width. The overall length of the cylinder does not change.

Cost Effective

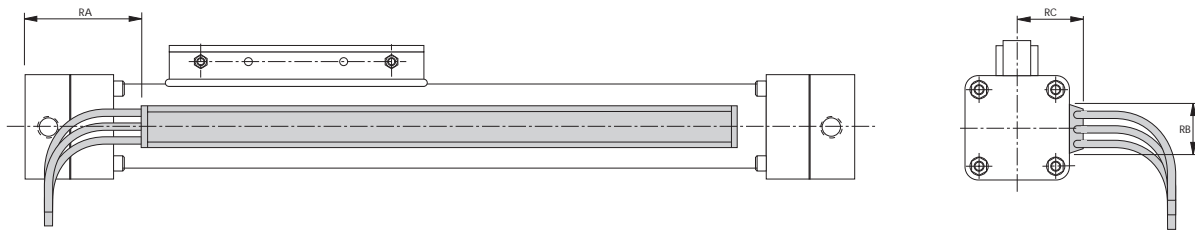
Eliminates the need for cam and switch mountings. Maintenance free, no wearing parts.

Type RSA/ISA



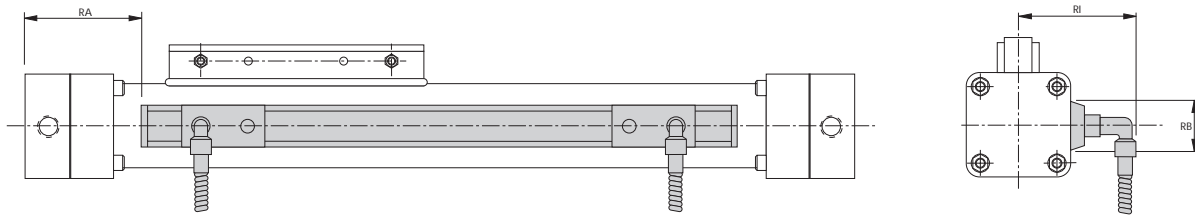
- A maximum of 6 proximity switches can be connected to each plug connection.
- The plug connection consists of a socket and plug ready for wiring.
- The plug connection is delivered assembled onto the end of the track.
- The plug connection can be mounted in 4 different directions.

Type RSD/ISD



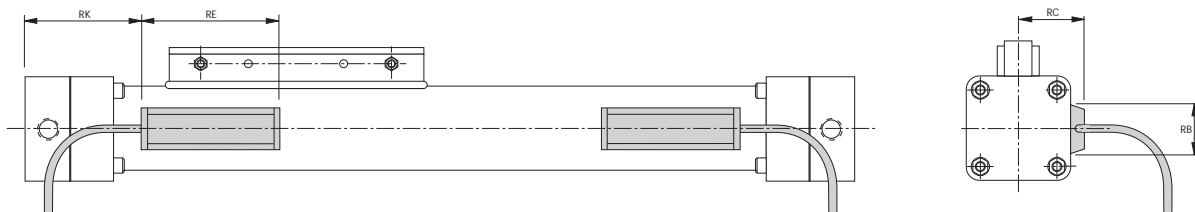
- A maximum of 6 proximity switches per switch track with cable outlet optional, 3 x left and 3 x right.
- Cable length 5 meters

Type RSQ/ISQ



- For quick adjustment of switches.
- Optional number of switches.
- Cable length 5 meters with protective conduit.

Type RSF/ISF



- End of stroke sensing
- Cable length 5 meters

| Cyl. Ø | RA (S/) | RA (L/) | RK (S/) | RK (L/) | RB | RC | RD | RE | RG | RH | RI |
|--------|---------|---------|---------|---------|------|------|------|------|------|------|------|
| 40 | 3.35 | 7.28 | 3.46 | 7.40 | 1.69 | 1.93 | 2.05 | 4.53 | 4.06 | 3.54 | 3.07 |
| 63 | 4.13 | 10.04 | 5.83 | 11.73 | 1.69 | 2.52 | 2.05 | 4.53 | 4.65 | 3.54 | 3.66 |
| 80 | 4.92 | 10.83 | 7.40 | 13.31 | 1.69 | 2.99 | 2.05 | 4.53 | 5.12 | 3.54 | 4.13 |

Spare Parts

| <u>Spare Part Groups</u> | | | <u>Page</u> |
|--------------------------|------------------|---------------------|-------------|
| Series 2000 - | Basic Cylinder - | Ø10mm - Ø50mm | 5.1/2 |
| Series 2000 - | Piston - | Ø10mm - Ø25mm | 5.1/4 |
| Series 2000 - | Piston - | Ø32mm - Ø50mm | 5.1/6 |
| Series 2000 - | Joint Clamp - | Ø25mm - Ø50mm | 5.1/8 |
| Series 2000 - | NR50 - | Ø16mm - Ø50mm | 5.1/10 |
| Series 2000 - | Powerguide - | Ø25mm, Ø32mm, Ø50mm | 5.1/12 |
| Series P120 - | Basic Cylinder - | Ø40mm - Ø80mm | 5.1/14 |
| Series P120 - | Short Piston - | Ø40mm - Ø80mm | 5.1/16 |
| Series P120 - | Long Piston - | Ø40mm - Ø80mm | 5.1/18 |
| All Series- | Service Packs- | Ø10mm - Ø80mm | 5.1/20 |

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TEL. 32 779 76 40



Spare Parts

Series 2000 - Basic Cylinder - Ø10mm - Ø50mm

| Item | Description | 10mm | 16mm | 25mm | 32mm | 40mm | 50mm |
|-------|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1 | Cylinder Barrel | 2152-0001+S | 2152-0101+S | 2152-0201+S | 2152-0301+S | 2152-0404+S | 2152-0502+S |
| 2 | Outer Band | 2080-0001+S | 2080-0101+S | 2080-0201+S | 2080-0301+S | 2080-0404+S | 2080-0502+S |
| 3 | Inner Band | 2192-0001+S | 2192-0101+S | 2192-0201+S | 2192-0301+S | 2192-0403+S | 2192-0502+S |
| 4 | End Cap - Right (B) | 3016 | 2164-0154 | 2164-0258 | 2164-0352 | 2164-0456 | 2164-0552 |
| 4.1 | End Cap - Right (V) | 3028 | 2714-0154 | 2714-0258 | 2714-0352 | 2714-0454 | 2714-0552 |
| 5 | O-Ring - Cushion Screw (B) | N/A | 0766 | 1252-1102 | 1252-1102 | 1252-1102 | 1252-1102 |
| 5.1 | O-Ring - Cushion Screw (V) | N/A | 0767 | 1262-1102 | 1262-1102 | 1262-1102 | 1262-1102 |
| 6 | Cushion Screw | N/A | 0734 | 0409 | 2072-0202 | 2072-0202 | 2072-0202 |
| 7 | N/A | | | | | | |
| 8 | O-Ring - Cushion Pipe (B) | 3023 | 0732 | 1250-0301 | 1250-0304 | 1250-0307 | 1250-0311 |
| 8.1 | O-Ring - Cushion Pipe (V) | 3029 | 0733 | 1261-0301 | 1261-0304 | 1261-0307 | 1261-0311 |
| 9 | End Cap - Left (B) | 3015 | 2164-0153 | 2164-0257 | 2164-0351 | 2164-0455 | 2164-0551 |
| 9.1 | End Cap - Left (V) | 3027 | 2714-0153 | 2714-0257 | 2714-0351 | 2714-0453 | 2714-0551 |
| 10* | O-Ring/Gasket End Cap (B) | N/A | N/A | 3119 | 2060-0301 | 1252-0123 | 1252-0126 |
| 10.1* | O-Ring/Gasket End Cap (V) | N/A | N/A | 2061-0201 | 2061-0301 | 1262-0123 | 1262-0126 |
| 11 | Outer Band Lock Screws | 2809 | 0847 | 1033-0304 | 1033-0404 | 1033-0404 | 1033-0404 |
| 12 | Outer Band Lock | 3022 | 0738 | 2062-0201 | 2062-0301 | 2062-0301 | 2062-0301 |
| 13 | Inner Band Lock Screws | 0846 | 0846 | 1024-0304 | 1024-0405 | 1024-0405 | 1024-0405 |
| 14 | Inner Band Lock | 3021 | 0736 | 2078-0201 | 2078-0301 | 2078-0301 | 2078-0501 |
| 15 | End Cap Screw | 0735 | 0735 | 2014-0201 | 2014-0351 | 2014-0351 | 2014-0551 |
| 19 | Cushion Pipe | N/A | N/A | 2211-0202 | 2211-0301 | 2211-0401 | 2211-0501 |
| ** | Service Pack-1 Piston (B) | SP10-B-1 xS | SP16-B-1 xS | SP25-B-1 xS | SP32-B-1 xS | SP40-B-1 xS | SP51-B-1 xS |
| ** | Service Pack-1 Piston (V) | SP10-V-1 xS | SP16-V-1 xS | SP25-V-1 xS | SP32-V-1 xS | SP40-V-1 xS | SP51-V-1 xS |
| ** | Service Pack-2 Piston (B) | SP10-B-2 xS | SP16-B-2 xS | SP25-B-2 xS | SP32-B-2 xS | SP40-B-2 xS | SP51-B-2 xS |
| ** | Service Pack-2 Piston (V) | SP10-V-2 xS | SP16-V-2 xS | SP25-V-2 xS | SP32-V-2 xS | SP40-V-2 xS | SP51-V-2 xS |
| | Seal Kit-1 Piston (B) | 2790-0001 | 2790-0101 | 2790-0202 | 2790-0301 | 2790-0402 | 2790-0502 |
| | Seal Kit-1 Piston (V) | 2791-0001 | 2791-0101 | 2791-0202 | 2791-0301 | 2791-0402 | 2791-0502 |
| | Seal Kit-2 Piston (B) | 2790-0001-2 | 2790-0101-2 | 2790-0202-2 | 2790-0301-2 | 2790-0402-2 | 2790-0502-2 |
| | Seal Kit-2 Piston (V) | 2791-0001-2 | 2791-0101-2 | 2791-0202-2 | 2791-0301-2 | 2791-0402-2 | 2791-0502-2 |

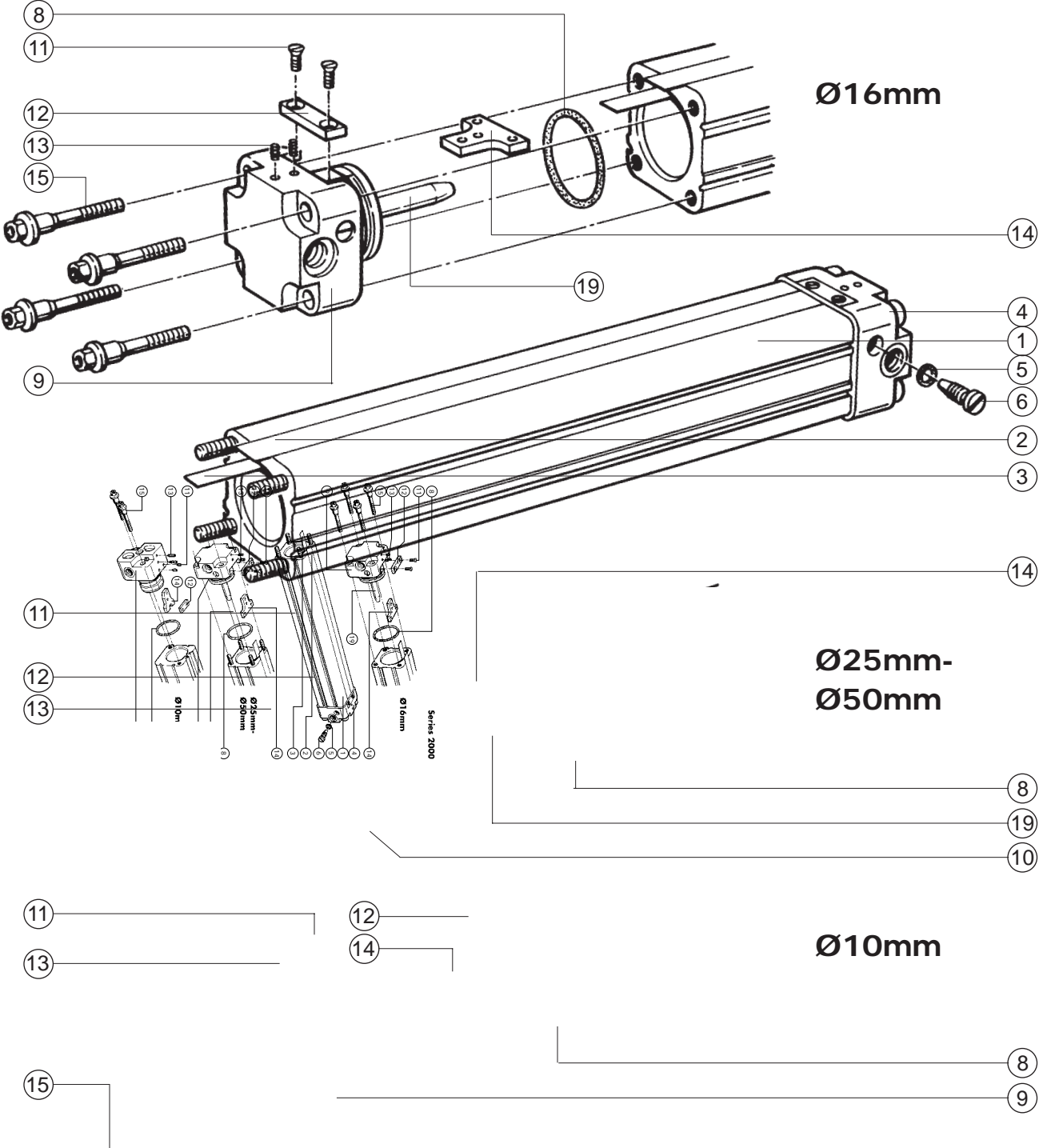
(B) = Buna-N

(V) = Viton

*Note: Ø25mm - Ø50mm cylinders have a two-part end cap/cushion pipe assembly.
A gasket (Ø25mm - Ø32mm) or O-Ring (Ø40mm - Ø50mm) is fitted between the two parts.
(These components are not shown in the illustration on page 5.1/3)

**Note: Please identify stroke "S" required when ordering.

Series 2000



Spare Parts

Series 2000 - Piston - Ø10mm - Ø25mm

| Item | Description | 10mm | 16mm | 25mm |
|------|----------------------|-----------|-----------|-----------|
| 20 | Piston Seal (B) | 3035 | 0745 | 2050-0201 |
| 20.1 | Piston Seal (V) | 3096 | 0746 | 2052-0201 |
| 21 | Cushion Seal (B) | N/A | 0751 | 2054-0201 |
| 21.1 | Cushion Seal (V) | N/A | 0752 | 2056-0201 |
| 22* | Complete Piston | 3053 | 1853 | 0896 |
| 23 | Screw - Piston Mount | 3583 | 0754 | 2702 |
| 24 | Bearing Strip | 2798-0001 | 2798-0101 | 2798-0202 |
| 25 | Nut - Piston Mount | N/A | 0796 | N/A |
| 26 | Scraper | 2238-0001 | 2238-0101 | 0155 |
| 27 | Piston Mount - NR20 | 3052 | 1815 | 0898 |
| 28 | Bracket - NR25 Mount | N/A | N/A | 2115-0202 |
| 29 | Fork Bracket | 3056 | 0758 | 2120-0202 |
| 31 | O-Ring - Yoke (B) | N/A | 0747 | 1045 |
| 31.1 | O-Ring - Yoke (V) | N/A | 0748 | 1046 |
| 39 | Carrier Pin | | | |

(B) = Buna-N

(V) = Viton

Note: Ø25mm cylinders purchased after 1994 with floating mount NR25, utilize items 28, 29, 33 and 39 detailed on page 5.1/7.

*Note: P/N: 0896 refers to new piston design introduced 10/94. Consult factory for earlier constructed cylinders.

Spare Parts

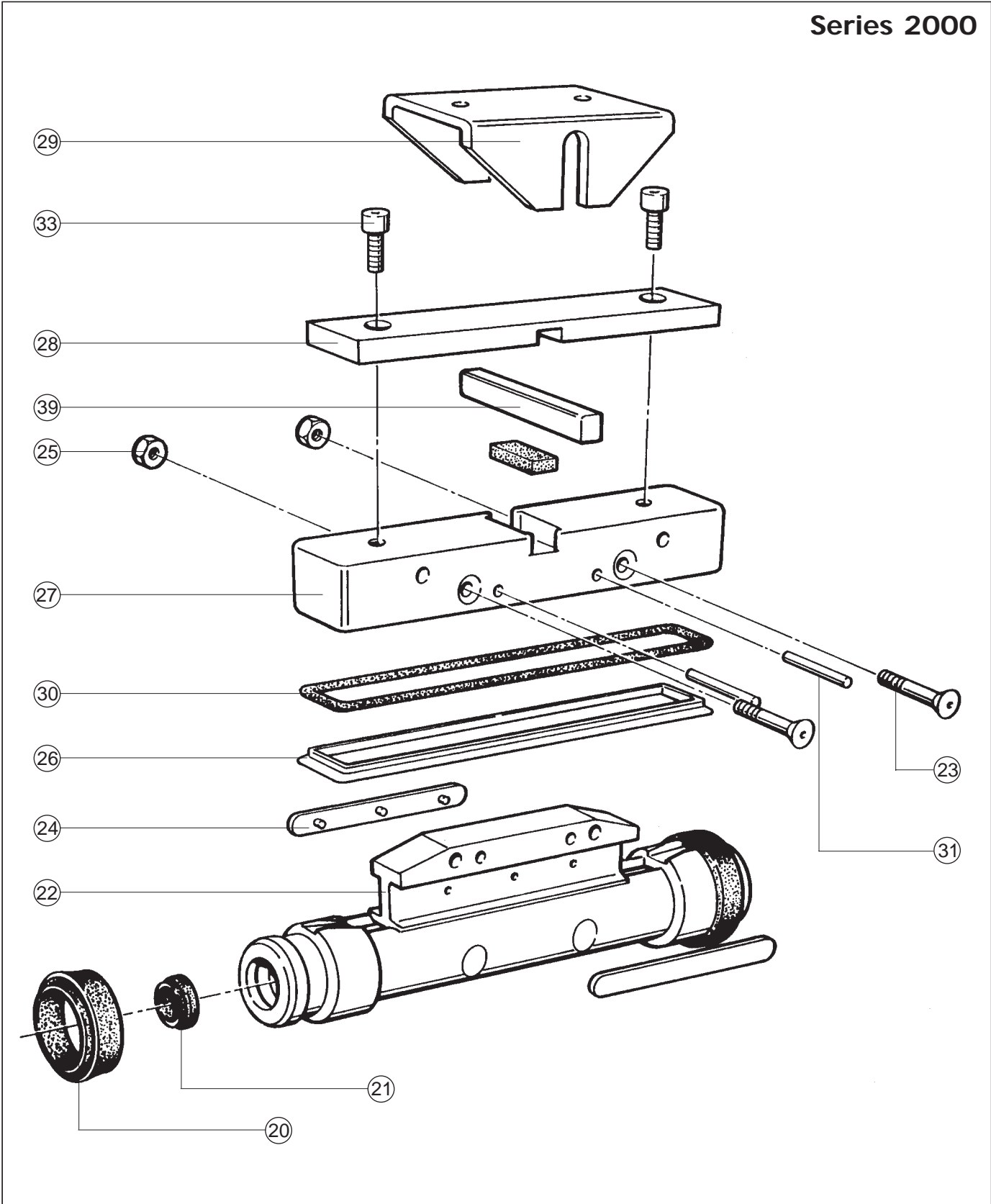
Series 2000 - Piston - Ø32mm - Ø50mm

| Item | Description | 25mm | 32mm | 40mm | 50mm |
|------|----------------------|-----------|------------|------------|------------|
| 20 | Piston Seal (B) | | 2050-0301 | 2050-0403 | 2050-0502 |
| 20.1 | Piston Seal (V) | | 2052-0301 | 2052-0401 | 2052-0502 |
| 21 | Cushion Seal (B) | | 1235-1000 | 1235-1200 | 1235-1600 |
| 21.1 | Cushion Seal (V) | | 1236-1000 | 1236-1200 | 1236-1600 |
| 22 | Complete Piston | | 2664-0302 | 2664-0404 | 2664-0502 |
| 23 | Screw - Piston Mount | | 1008-0517 | 1008-0517 | 1008-0517 |
| 24 | Bearing Strip | | 2798-0301 | 2798-0402 | 2798-0501 |
| 25 | Nut - Piston Mount | | 1046-0500 | 1046-0500 | 1046-0500 |
| 26 | Scraper | | 2238-0301 | 2238-0301 | 2238-0501 |
| 27 | Piston Mount - NR20 | | 2110-0351 | 2110-0351 | 2110-0552 |
| 28 | Bracket - NR25 Mount | 2115-0202 | 2115-0301 | 2115-0301 | 2115-0501 |
| 29 | Fork Bracket | 2120-0202 | 2120-0301 | 2120-0301 | 2120-0501 |
| 30 | O-Ring - Yoke (B) | | 1270-0253 | 1270-0253 | 1270-0265 |
| 30.1 | O-Ring - Yoke (V) | | 1261-0253 | 1261-0253 | 1261-0265 |
| 31 | Tension Pin | | 1108-0532P | 1108-0532P | 1108-0532P |
| 33 | Screw - NR25 Mount | 1000-0506 | 1004-0710 | 1004-0710 | 1004-0912 |
| 39 | Carrier Pin | 2786-0202 | 2786-0301 | 2786-0301 | 2786-0501 |

(B) = Buna-N

(V) = Viton

Series 2000



Spare Parts

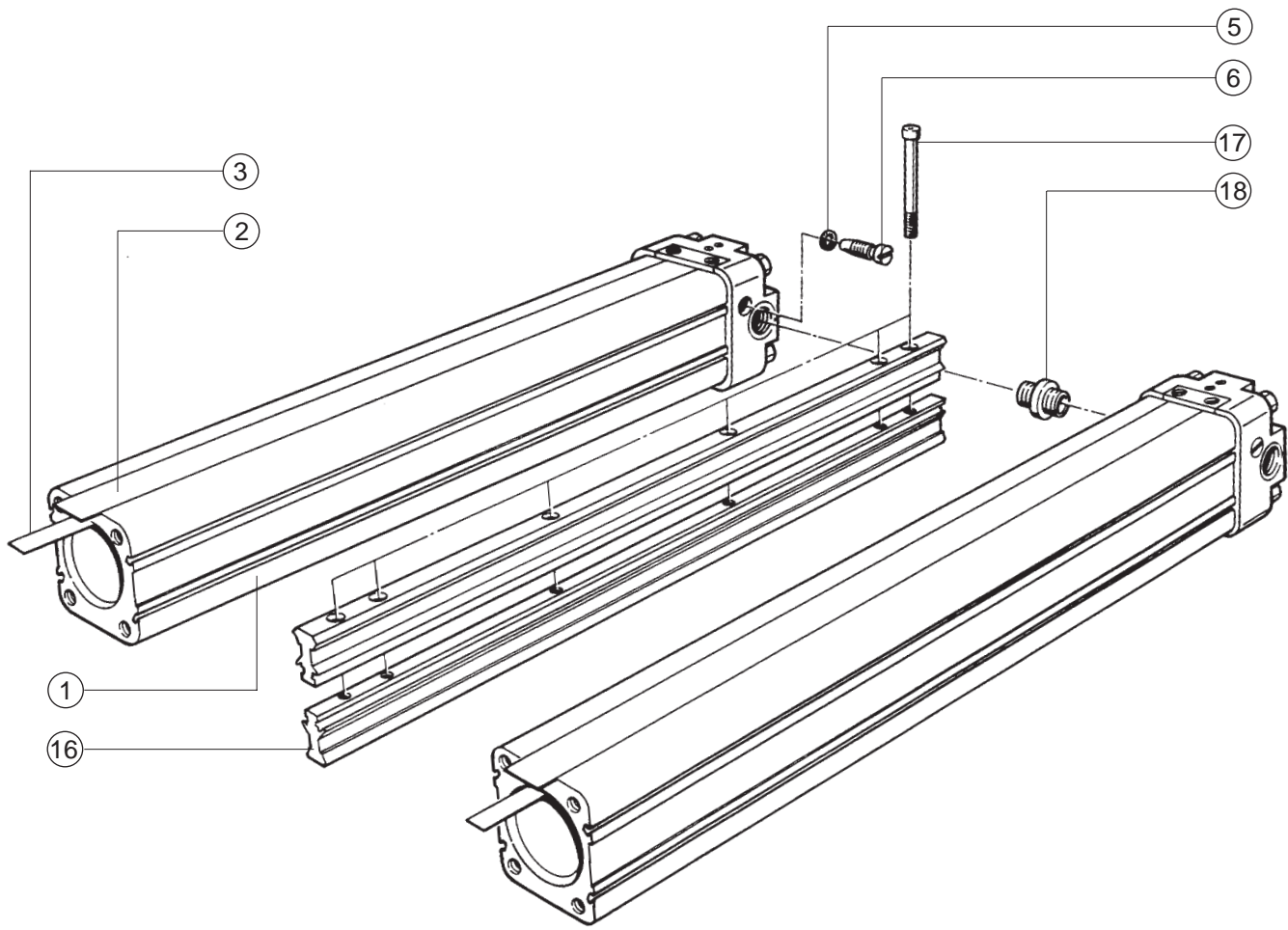
Series 2000 - Joint Clamp - Ø25mm - Ø50mm

| Item | Description | 25mm | 32mm | 40mm | 50mm |
|------|----------------------------|-------------|-------------|-------------|-------------|
| 1 | Cylinder Barrel | 2152-0201+S | 2152-0301+S | 2152-0404+S | 2152-0502+S |
| 2 | Outer Band | 2080-0201+S | 2080-0301+S | 2080-0404+S | 2080-0502+S |
| 3 | Inner Band | 2192-0201+S | 2192-0301+S | 2192-0403+S | 2192-0502+S |
| 5 | O-Ring - Cushion Screw (B) | 1252-1102 | 1252-1102 | 1252-1102 | 1252-1102 |
| 5.1 | O-Ring - Cushion Screw (V) | 1262-1102 | 1262-1102 | 1262-1102 | 1262-1102 |
| 6 | Cushion Screw | 2072-0202 | 2072-0202 | 2072-0202 | 2072-0202 |
| 16 | Joint Clamp Rail - NR6 | 2746-0201+S | 2746-0301+S | 2746-0401+S | 2746-0502+S |
| 17 | Screw - Joint Clamp Rail | 1000-0314 | 1000-0315 | 1000-0317 | 1000-0517 |
| 18 | Connection Pipe | 2774-0201 | 2774-0301 | 2774-0301 | 2774-0501 |

(B) = Buna-N

(V) = Viton

Series 2000



Spare Parts

Series 2000 - NR50 - Ø16mm - Ø50mm

| Item | Description | 16mm | 25mm | 32mm | 40mm | 50mm |
|-------|--------------------------------|-----------|-----------|-----------|-----------|-----------|
| 45 | Link Plate | 3328 | 2845-0201 | 2845-0301 | 2845-0401 | 2845-0501 |
| 45.1* | Link Plate | N/A | 2845-0202 | 2845-0302 | 2845-0402 | 2845-0502 |
| 46 | Guide Rail | 3265 | 2263-0201 | 2263-0301 | 2263-0401 | 2263-0501 |
| 47 | End Plate | 3323 | 2847-0201 | 2847-0301 | 2847-0401 | 2847-0501 |
| 47.1* | End Plate | N/A | 2847-0201 | 2847-0302 | 2847-0402 | 2847-0502 |
| 48 | Connection Plate | 3331 | 2846-0201 | 2846-0301 | 2846-0301 | 2846-0501 |
| 49 | Screw - Guide Rail Clamp | 3306 | 1000-0315 | 1000-0416 | 1000-0418 | 1000-0518 |
| 50 | Guide Rail Clamp | 2227-0101 | 2227-0201 | 2227-0301 | 2227-0301 | 2227-0501 |
| 51 | Adjustment Screw | 1041 | 1020-0506 | 1020-0506 | 1020-0506 | 1020-0506 |
| 51.1* | Adjustment Screw | N/A | 1020-0406 | 1020-0406 | 1020-0406 | 1020-0506 |
| 52 | Bearing Strips/Pressure Plates | 2799-0101 | 2799-0201 | 2799-0301 | 2799-0401 | 2799-0501 |
| 52.1* | Bearing Strips/Pressure Plates | N/A | 2799-0202 | 2799-0302 | 2799-0402 | 2799-0502 |
| 53 | Screw - End Plate | 3278 | 1036-0305 | 1036-0406 | 1036-0406 | 1036-0406 |
| 54 | Screw - Connection Plate | 3307 | 1016-0516 | 1016-0618 | 1016-0618 | 1016-0819 |
| 55 | Shuttle | 3321 | 2842-0201 | 2842-0351 | 2842-0451 | 2842-0551 |
| 55.1* | Shuttle | N/A | 2842-0252 | 2842-0352 | 2842-0452 | 2842-0552 |
| 56 | Lock Nut | N/A | 1040-0500 | 1040-0500 | 1040-0500 | 1040-0500 |
| 56.1* | Lock Nut | N/A | 1040-0400 | 1040-0400 | 1040-0400 | 1040-0500 |
| ** | Conversion Kit | N/A | 2660-0252 | 2660-0352 | 2660-0452 | 2660-0552 |

(B) = Buna-N

(V) = Viton

*Cylinders supplied after 06/94 are fitted with these updated items.

**Conversion of old style NR50 shuttle to new style NR50 shuttle, replacing items 45, 47, 48, 51, 52, 53, 54, 55 and 56 can be accomplished using the "Conversion Kit" part numbers detailed above.

Spare Parts

Series 2000 - Powerguide™ - Ø25mm, 32mm, Ø50mm

| Item | Description | 25mm | 32mm | 50mm |
|------|------------------------|------------------------|------------|------------|
| 1 | Carriage Plate | USCP-25/25 | USCP-32/44 | USCP-50/76 |
| 2 | Concentric Journal | 4007 | 4015 | OSJ-54-C |
| 3 | Eccentric Journal | 4008 | 4016 | OSJ-54-E |
| 4 | Journal Cap Seals | 4009 | 4017 | OCS-54 |
| 5 | Slide Plate | 3462 | 3482 | C-50/76 |
| 6 | Back Plate | 3461 | 3481 | BP-50/76 |
| 7 | Drive Block | 4006 | 4014 | SDB-50/76 |
| 8 | Screw | 0163 | 1000-0616 | 1006-0913 |
| 8.1 | Screw, stainless steel | 0164 | 1002-0616 | 1006-0913 |
| 9 | Screw | 4042 | 4043 | 9427-1020 |
| 9.1 | Screw, stainless steel | N/A | N/A | N/A |
| 10 | Screw | Included in Item No. 4 | | |
| 11 | Washer | Included in Item No. 4 | | |
| 12 | Location Bracket | 4005 | 4013 | SLB-50/76 |
| 13 | Countersunk Screw | 4011 | 1323 | N/A |

Spare Parts

Series P120 - Basic Cylinder - Ø40mm - Ø80mm

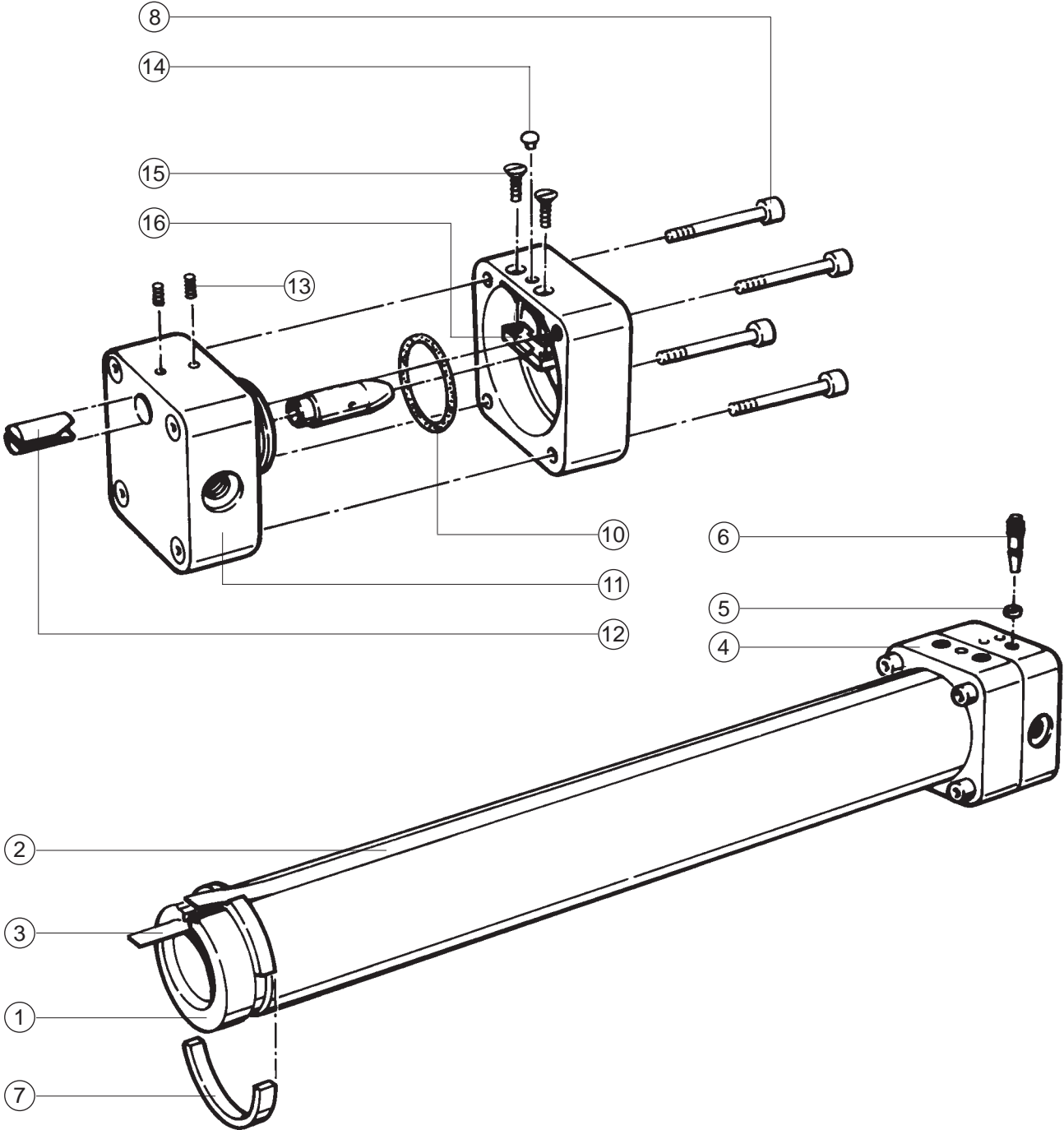
| Item | Description | 40mm | 63mm | 80mm |
|------|-------------------------------|--------------|--------------|--------------|
| 1 | Cylinder Barrel S/ | 2152-0403+S | 2152-0602+S | 2152-0801+S |
| 1.1 | Cylinder Barrel L/ | 2153-0452+S | 2153-0651+S | 2153-0851+S |
| 1.2 | Magnet Strip | 2244+0401+S | 2244-0601+S | 2074-0801 |
| 2 | Outer Band S/ | 2080-0403+S | 2080-0603+S | 2080-0801+S |
| 2.1 | Outer Band L/ | 2081-0451+S | 2081-0651+S | 2081-0851+S |
| 3 | Inner Band S/ | 2192-0402+S | 2192-0602+S | 2192-0802+S |
| 3.1 | Inner Band L/ | 2193-0451+S | 2193-0652+S | 2193-0851+S |
| 4 | End Cap - Right (B) | 2164-0454-R | 2164-0654-R | 2164-0852-R |
| 4.1 | End Cap - Right (V) | 2714-0452-R | 2714-0652-R | 2714-0851-R |
| 5 | O-Ring - Cushion Screw (B) | 1252-0101 | 1252-0101 | 1252-0101 |
| 5.1 | O-Ring - Cushion Screw (V) | 1262-0101 | 1262-0101 | 1262-0101 |
| 6 | Cushion Screw | 2072-0301 | 2072-0601 | 2072-0601 |
| 7 | Lock Ring - Upper/Lower | 2012-0404 | 2012-0604 | 2012-0802 |
| 8 | Screw - End Cap | 1004-0718 | 1004-0920 | 1004-1124 |
| 9 | Cap Ring | 2008-0406 | 2008-0606 | 2008-0802 |
| 10 | O-Ring - End Cap (B) | 1250-0307 | 1250-0503 | 1250-0506 |
| 10.1 | O-Ring - End Cap (V) | 1261-0307 | 1261-0503 | 1261-0506 |
| 11 | End Cap - Left (B) | 2164-0454-L | 2164-0654-L | 2164-0852-L |
| 11.1 | End Cap - Left (V) | 2714-0452-L | 2714-0652-L | 2714-0851-L |
| 12 | Inner Band Lock Set | 2078-0403 | 2078-0603 | 2078-0803 |
| 13 | Screw - Inner Band Lock | 1024-0605 | 1024-0605 | 1024-0807 |
| 14 | Plug - Cap Ring | 2068-0401 | 2068-0401 | 2068-0401 |
| 15 | Screw - Outer Band Lock | 1033-0505 | 1033-0506 | 1033-0506 |
| 16 | Outer Band Lock | 2062-0401 | 2062-0401 | 2062-0401 |
| ** | Service Pack-Short Piston (B) | SP124-B-S xS | SP126-B-S xS | SP128-B-S xS |
| ** | Service Pack-Short Piston (V) | SP124-V-S xS | SP126-V-S xS | SP128-V-S xS |
| ** | Service Pack-Long Piston (B) | SP124-B-L xS | SP126-B-L xS | SP128-B-L xS |
| ** | Service Pack-Long Piston (V) | SP124-V-L xS | SP126-V-L xS | SP128-V-L xS |
| | Seal Kit-Short Piston (B) | 2790-0401 | 2790-0601 | 2790-0801 |
| | Seal Kit-Short Piston (V) | 2791-0401 | 2791-0601 | 2791-0801 |
| | Seal Kit-Long Piston (B) | 2792-0401 | 2792-0601 | 2792-0801 |
| | Seal Kit-Long Piston (V) | 2793-0401 | 2793-0601 | 2793-0801 |

(B) = Buna-N

(V) = Viton

**Note: Please identify stroke "S" required when ordering.

Series P120



Spare Parts

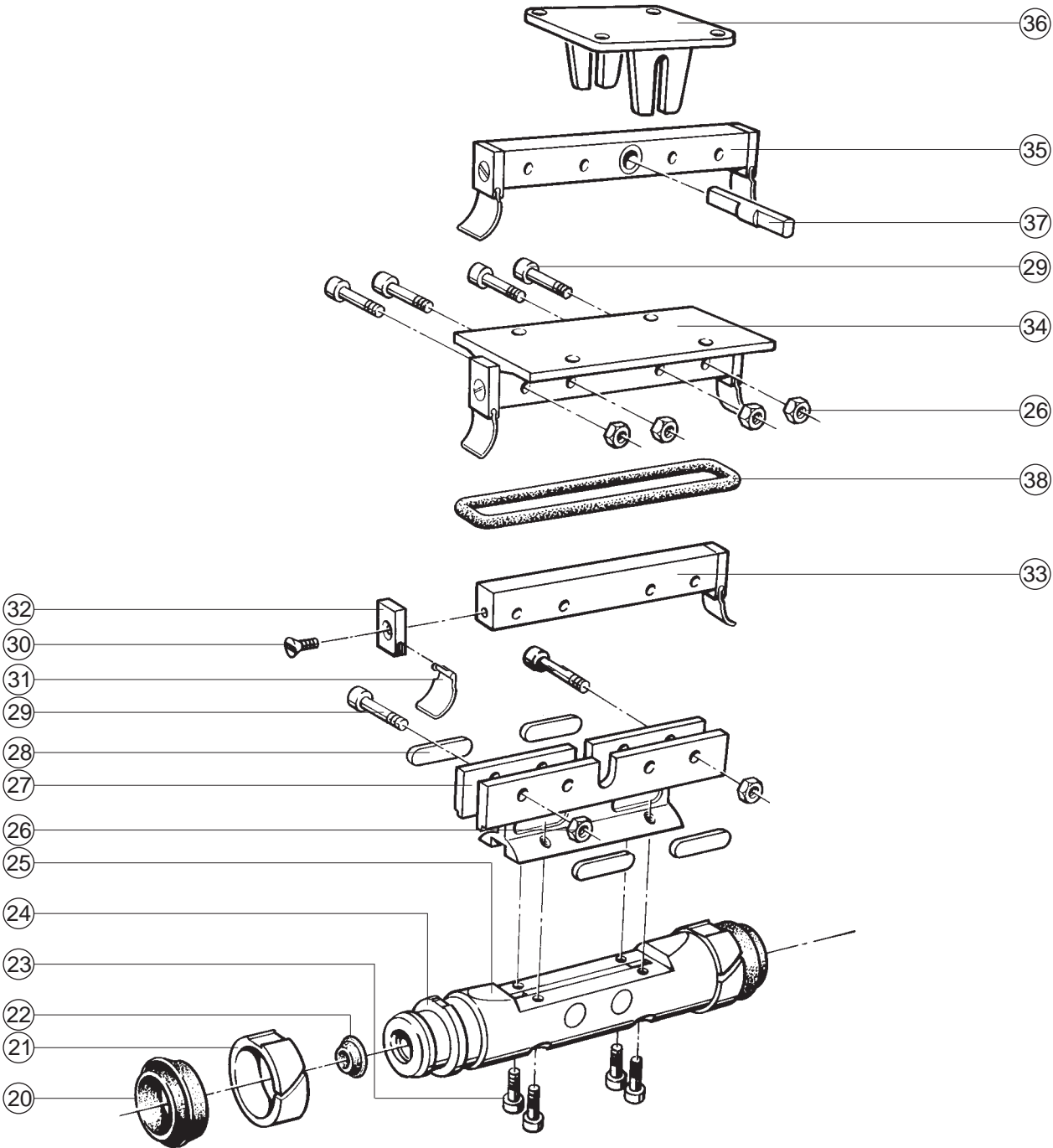
Series P120 - Short Piston - Ø40mm - Ø80mm

| Item | Description | 40mm | 63mm | 80mm |
|------|--------------------------------|-----------|-------------|-------------|
| 20 | Piston Seal (B) | 2050-0403 | 2050-0603 | 2050-0802 |
| 20.1 | Piston Seal (V) | 2052-0401 | 2052-0601 | 2052-0801 |
| 21 | Bearing Ring | 2042-0402 | 2042-0602 | 2042-0801 |
| 22 | Cushion Seal (B) | 2054-0403 | 2054-0604 | 2054-0802 |
| 22.1 | Cushion Seal (V) | 2056-0403 | 2056-0604 | 2056-0802 |
| 23 | Screw - Yoke | 1000-0612 | 1000-0816 | 1000-0818 |
| 24 | Piston Axle (non-magnetic) S/ | 2154-0404 | 2154-0604 | 2154-0802 |
| 24.1 | Piston Axle (magnet 1 side) S/ | N/A | 2664-0602 | 2664-0802 |
| 25 | Piston Axle (magnet 2 side) S/ | 2664-0402 | 2664-0602/D | 2664-0802/D |
| 26 | Nut - Piston Mount | 1040-0600 | 1040-0800 | 1040-1000 |
| 27 | Piston Yoke | 2031-0403 | 2031-0603 | 2031-0801 |
| 28 | Bearing Strip | 2798-0401 | 2798-0601 | 2798-0801 |
| 29 | Screw - Piston Mount | 1000-0616 | 1000-0816 | 1000-1018 |
| 30 | Screw - Piston Mount End | 1038-0507 | 1038-0507 | 1038-0507 |
| 31 | Scraper | 2067-0403 | 2067-0602 | 2067-0801 |
| 32 | Piston Mount End Plate | 2040-0404 | 2040-0604 | 2040-0801 |
| 33 | Piston Mount - S/20 | 2778-0401 | 2778-0601 | 2778-0801 |
| 34 | Piston Mount - S/22 | 2782-0401 | 2782-0601 | 2782-0801 |
| 35 | Piston Mount - S/25 | 2186-0404 | 2186-0604 | 2186-0802 |
| 36 | Fork Bracket | 2120-0401 | 2120-0601 | 2120-0802 |
| 37 | Carrier Pin | 2122-0401 | 2122-0601 | 2122-0801 |
| 38 | O-Ring - Yoke (B) | 1272-0510 | 1272-0518 | 1272-0524 |
| 38.1 | O-Ring - Yoke (V) | 1262-0510 | 1262-0518 | 1262-0524 |

(B) = Buna-N

(V) = Viton

Series P120



Spare Parts

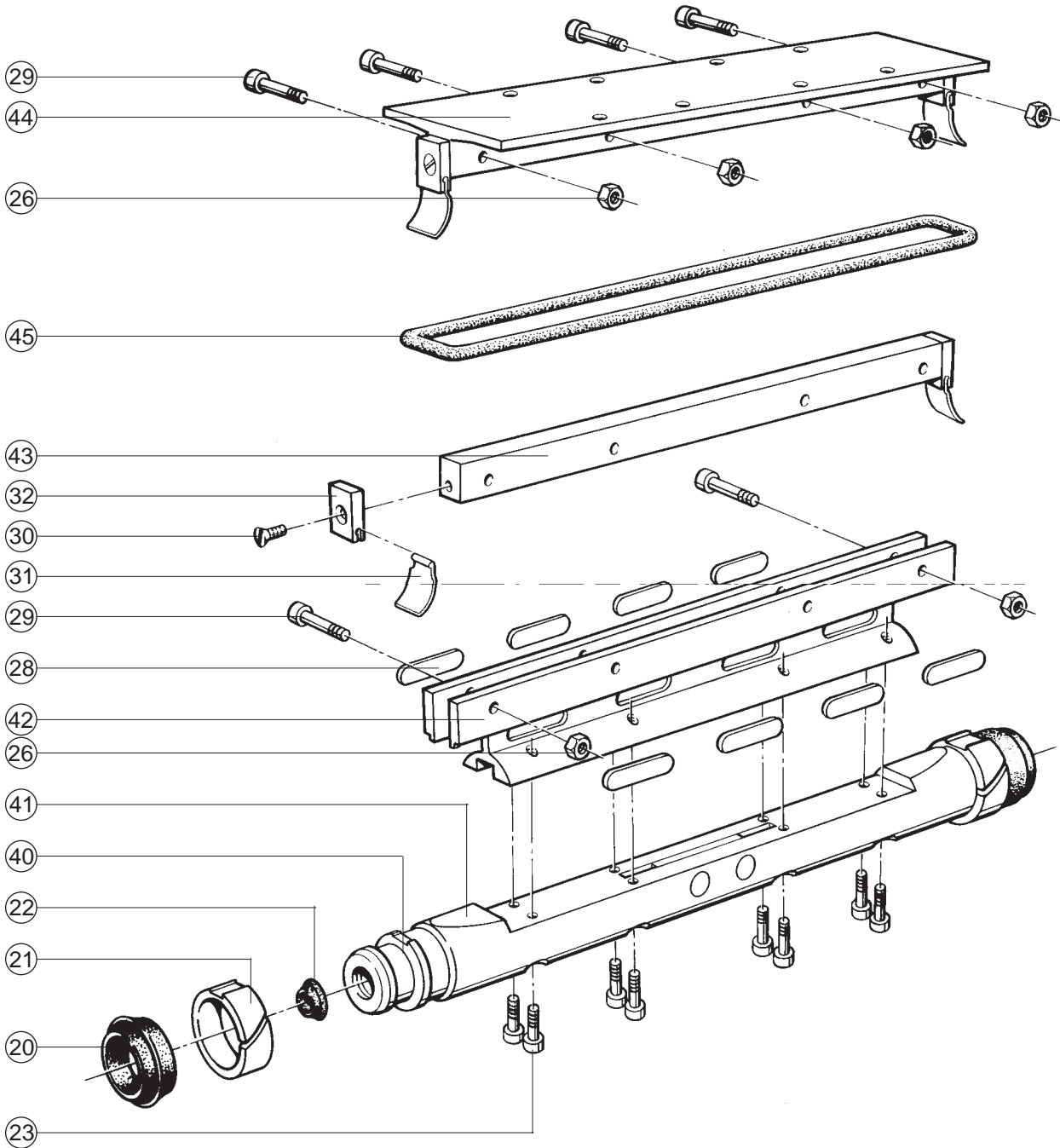
Series P120 - Long Piston - Ø40mm - Ø80mm

| Item | Description | 40mm | 63mm | 80mm | |
|------|--------------------------------|-----------|-------------|-------------|--|
| 20 | Piston Seal (B) | 2050-0403 | 2050-0603 | 2050-0802 | |
| 20.1 | Piston Seal (V) | 2052-0401 | 2052-0601 | 2052-0801 | |
| 21 | Bearing Ring | 2042-0402 | 2042-0602 | 2042-0801 | |
| 22 | Cushion Seal (B) | 2054-0403 | 2054-0604 | 2054-0802 | |
| 22.1 | Cushion Seal (V) | 2056-0403 | 2056-0604 | 2056-0802 | |
| 23 | Screw - Yoke | 1000-0612 | 1000-0816 | 1000-0818 | |
| 26 | Nut - Piston Mount | 1040-0600 | 1040-0800 | 1040-1000 | |
| 28 | Bearing Strip | 2798-0401 | 2798-0601 | 2798-0801 | |
| 29 | Screw - Piston Mount | 1000-0616 | 1000-0816 | 1000-1018 | |
| 30 | Screw - Piston Mount End | 1038-0507 | 1038-0507 | 1038-0507 | |
| 31 | Scraper | 2067-0403 | 2067-0602 | 2067-0801 | |
| 32 | Piston Mount End | 2040-0404 | 2040-0604 | 2040-0801 | |
| 40 | Piston Axle (non-magnetic) L/ | 2156-0452 | 2156-0652 | 2156-0852 | |
| 40.1 | Piston Axle (magnet 1 side) L/ | N/A | 2666-0651 | 2666-0851 | |
| 41 | Piston Axle (magnet 2 side) L/ | 2666-0451 | 2666-0651/D | 2666-0851/D | |
| 42 | Piston Yoke | 2033-0403 | 2033-0603 | 2033-0801 | |
| 43 | Piston Mount - L/26 | 2780-0401 | 2780-0601 | 2780-0801 | |
| 44 | Piston Mount - L/28 | 2784-0401 | 2784-0601 | 2784-0801 | |
| 45 | O-Ring - Yoke (B) | 1272-0526 | 1272-0538 | 1272-0542 | |
| 45.1 | O-Ring - Yoke (V) | 1262-0526 | 1262-0538 | 1262-0542 | |

(B) = Buna-N

(V) = Viton

Series P120



Spare Parts

Service Packs - Series 2000 / Series P120 - All bore sizes.

| Designation | | Bore Sizes | | | | | |
|----------------------------|-------------|------------|----------|----------|----------|----------|----------|
| Series 2000 | | 10mm | 16mm | 25mm | 32mm | 40mm | 50mm* |
| Buna-N Service Pack | Part Number | SP10-B-1 | SP16-B-1 | SP25-B-1 | SP32-B-1 | SP40-B-1 | SP51-B-1 |
| Single Piston | | | | | | | |
| Viton Service Pack | Part Number | SP10-V-1 | SP16-V-1 | SP25-V-1 | SP32-V-1 | SP40-V-1 | SP51-V-1 |
| Single Piston | | | | | | | |
| Buna-N Service Pack | Part Number | SP10-B-2 | SP16-B-2 | SP25-B-2 | SP32-B-2 | SP40-B-2 | SP51-B-2 |
| Double Piston | | | | | | | |
| Viton Service Pack | Part Number | SP10-V-2 | SP16-V-2 | SP25-V-2 | SP32-V-2 | SP40-V-2 | SP51-V-2 |
| Double Piston | | | | | | | |

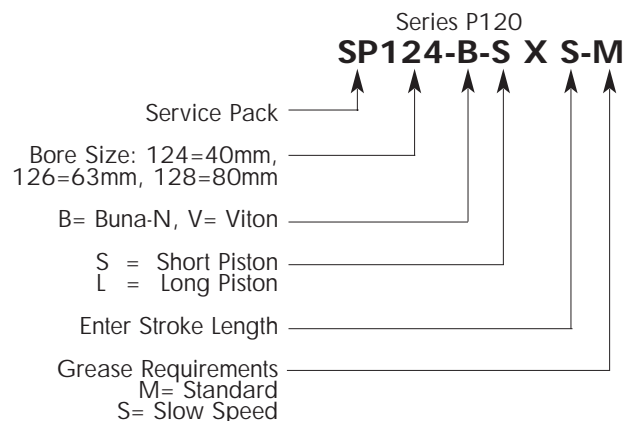
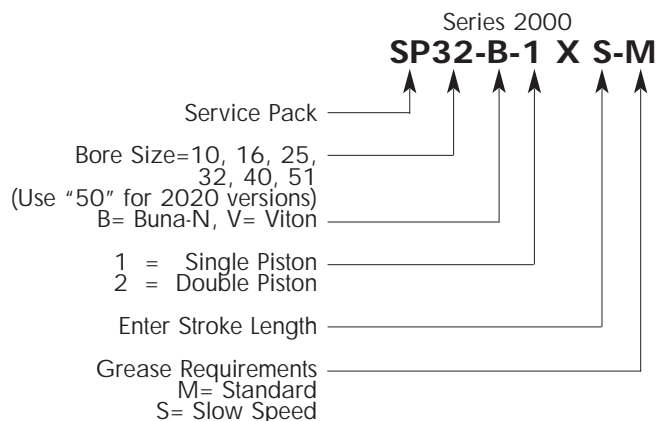
*Use SP50... for 2020 (old style) versions of 50mm cylinders only.

| Designation | | Bore Sizes | | |
|----------------------------|-------------|------------|-----------|-----------|
| Series P120 | | 40mm | 63mm | 80mm |
| Buna-N Service Pack | Part Number | SP124-B-S | SP126-B-S | SP128-B-S |
| Short Piston | | | | |
| Viton Service Pack | Part Number | SP124-V-S | SP126-V-S | SP128-V-S |
| Short Piston | | | | |
| Buna-N Service Pack | Part Number | SP124-B-L | SP126-B-L | SP128-B-L |
| Long Piston | | | | |
| Viton Service Pack | Part Number | SP124-V-L | SP126-V-L | SP128-V-L |
| Long Piston | | | | |

Service Pack Information

Service Packs, containing all the components necessary to completely rebuild an Origa rodless cylinder, are available. Each pack contains a complete seal kit, inner and outer bands, Origa 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 it is intended for. Contact your local Origa distributor for more information.

Ordering Information

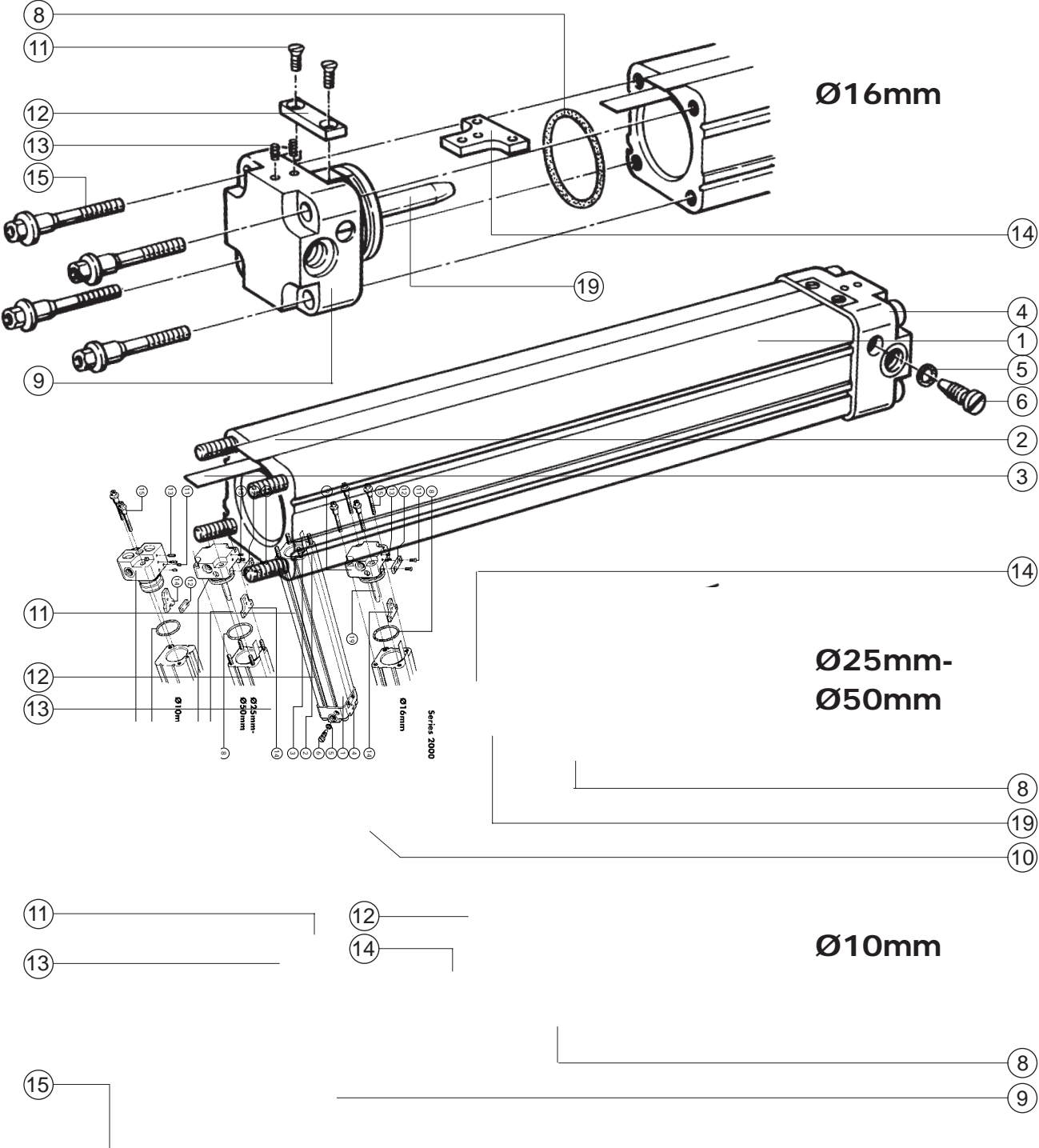


Assembly Instructions



| <u>Cylinder Types</u> | | | <u>Page</u> |
|-----------------------|------------------|---------------|---------------|
| Series 2000 - | Basic Cylinder - | Ø10mm - Ø50mm | 6.0/2 - 6.0/3 |
| Series P120 - | Basic Cylinder - | Ø40mm - Ø80mm | 6.0/2 - 6.0/3 |
| Series 2000 - | Powerguide™ - | Ø25mm - Ø50mm | 6.0/4 - 6.0/5 |
| Series 2000 - | NR50 - | Ø16mm - Ø50mm | 6.0/6 - 6.0/7 |
| All Series - | Service Packs - | Ø10mm - Ø80mm | 6.0/8 |

Series 2000



Assembly Instructions (Series P120, Series 2000)

Typified by ideally matched materials and fully developed design details, Origa cylinders have a very long operational life. However, the service life may be reduced by extreme and demanding environmental conditions, therefore occasional maintenance is recommended.

Dismantling of the cylinder

Comply with local safety regulations:

1. Disconnect air and electrical supplies.
2. Remove cylinder from framework.
3. Remove piston mounting
4. Remove outer band by removing band locking screws at each end.
5. Loosen inner band locking screws at each end.
6. Remove screws, nuts and bolts at each end.
7. Gently remove end caps - avoid tilting.
8. For series **P120**. Push inboard cap rings. Remove locking rings and slide the cap ring off the barrel.
9. Slide out piston and inner band (4). Use caution when handling the inner band - edges are sharp.

Inspection

1. Clean and inspect all parts
 - seals for wear.
 - bands for nicks and dents
 - tube for wear along the slot and damage to the bore.
2. Replace worn parts.

Pre-Assembly

1. Apply ample grease to seals and O-rings.
2. Lightly grease cylinder bore with grease.
3. Ensure that all bearing rings/piston ends and bearing strips are in position.

Assembly

1. Insert inner band into the bore with the band washer facing up towards the slot.
2. Draw sufficient band out to thread through the piston, slide the piston into the bore and move to a mid-stroke position.

Note: A very small piece of old inner band can be used as a threading strip. Additionally, bend up the first 20mm of band to approx. 30°. This will allow the band to pass freely through the piston.

3. Pull the inner band through until evenly positioned in the tube.
4. For series **P120**. Fit cap rings lock rings outer band locks fit end cap and tighten retaining screws.
5. Check that the inner band washers are visible through the cap ring top center hole.
6. Fit inner band locks.
7. Tighten inner band lock screws on one end only.
8. Insert a small screwdriver through the cap rings top center hole. Gently apply leverage to remove any slackness in the band. Release and tighten the remaining inner band lock screws.

Series 2000

9. Fit end caps
10. Check inner band washer up to one end cap. Tighten locking screws.
11. At the opposite end use a small screwdriver, gently push the inner band washer towards the end cap. Release and tighten the locking screws.

Series P120

12. Check that the inner band is laying smooth and that there is no sag. Note: to check for proper tension, depress the band through the slot about 3/16", ensure that it springs back.
13. Fit the outer band and the piston mounting. Tighten the locking screws on the mounting and then each end cap.
14. Fit yoke/mounting O-ring.
15. Manually move the piston through it's full stroke to insure there is no resistance to it's movement.

Cleaning if inner band (use eye protection)

During assembly dirt particles may become lodged between the sealing band and the cylinder tube contact surfaces. These particles can cause leaks and must be removed.

1. Remove mounting and outer band.
2. Apply 30 PSI (2 bar) air pressure.
3. Insert cleaning tool into the slot and depress where it is leaking. The expelled air will "blow out" any foreign particles, if present.
4. When complete, reinstall the outer band and mounting

Note:

If the band continues to leak a full cylinder inspection is recommended.

Defect Diagnosis

| Defect | Cause | Correction |
|----------------------------------|---------------------------------------|---|
| Audible leak in stopped position | Leakage at inner band due to dirt | Clean inner band with LRF cleaning tool |
| | Leakage at inner band due to abrasion | Replace inner band |
| | Leakage at end cap | Replace end cap O-ring |
| | Leakage at piston | Replace piston seals |
| Cylinder speed is inconsistent | Insufficient lubrication | Relubricate |
| | Piston seals worn out | Replace piston seals |
| Cylinder impacts in end position | Overloaded | Reduce overload or install hydraulic shocks |
| | Incorrect setting of cushion screws | Reset |
| | Insufficient buildup of backpressure | Install flow controls or readjust existing ones |
| | Cushion seal defect | Replace cushion seals |

Assembly Instructions - Powerguide™

Repair the basic cylinder as per Series P120/Series 2000 assembly instructions.

Slide system adjustment

Important:- Excessive pre-load must not be applied during the adjustment process.

All Powerguide™ components associated with the slide system are factory set prior to delivery and should not require adjustment. If however, play should occur requiring re-adjustment the following procedure should be followed:

1. Remove non-Powerguide™ components attached to carriage plate **(1)**.
2. Remove one of the drive blocks **(7)** to free the carriage assembly.
3. Remove the complete carriage assembly from the slide **(5)**.
4. Remove cap seals **(4)** and return carriage assembly to the slide.
5. Slacken eccentric bearing assembly fixing nuts **(3)** slightly using a socket.
25 Dia. Size 13mm
32 Dia. Size 17mm
50 Dia. Size 22mm
6. Rotate each eccentric bearing assembly **(3)** using the special wrench until play is removed taking care to induce only minimal pre-load. Re-tighten fixing nuts whilst preventing the eccentric stud from rotating using the special wrench.

7. Check one of each pair of opposing bearing assemblies for correct pre-load by rotating the bearings between forefinger and thumb so that the bearing skids against the slide. A degree of resistance should be felt, but the bearings should rotate without difficulty.
8. Remove carriage assembly from the slide and refit cap seals.
9. Return carriage assembly to the slide and adjust cap seals to just make contact with the slide until smearing of the lubricant is observed whilst operating.
NB: Excess adjustment will result in increased friction.
10. Replace drive block and adjust for no play condition against location bracket.
11. Re-lubricate cap seals according to "lubrication instructions".

| Powerguide™ Part No | Special Wrench |
|------------------------|----------------|
| 25-2021/PG | AT 25 |
| 32-2020/PG | AT 34 |
| 50-2020/PG | AT 54 |

Addendum

The following is an update to the information contained within this catalog

| Page | Correction | | | | | | | | | | | | |
|-------------|---|-------------|----------|----------|------|-------|----|------|-------|----|------|-------|-----|
| 3.5/3 | <p>Referencing the drawing for "Piston Mounting S/20" the values for dimensions "X" and "Z" are as follows.</p> <table border="0" style="margin-left: 40px;"> <thead> <tr> <th style="text-align: left;">Bore</th> <th style="text-align: left;">X</th> <th style="text-align: left;">Z</th> </tr> </thead> <tbody> <tr> <td>40mm</td> <td>3.54"</td> <td>M6</td> </tr> <tr> <td>63mm</td> <td>5.51"</td> <td>M8</td> </tr> <tr> <td>80mm</td> <td>7.09"</td> <td>M10</td> </tr> </tbody> </table> | Bore | X | Z | 40mm | 3.54" | M6 | 63mm | 5.51" | M8 | 80mm | 7.09" | M10 |
| Bore | X | Z | | | | | | | | | | | |
| 40mm | 3.54" | M6 | | | | | | | | | | | |
| 63mm | 5.51" | M8 | | | | | | | | | | | |
| 80mm | 7.09" | M10 | | | | | | | | | | | |
| 5.1/4 | The part number for Item 29, 10mm bore cylinder has been changed to 3033. | | | | | | | | | | | | |
| 5.1/7 | The tension pins (item 31) have been eliminated from all Series 2000 cylinders and are no longer required. | | | | | | | | | | | | |
| 5.1/11 | When ordering item 50, both the top and bottom rails are included. | | | | | | | | | | | | |
| 5.1/16 | When ordering item 33, items 30 and 32 are included as an assembly. | | | | | | | | | | | | |

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