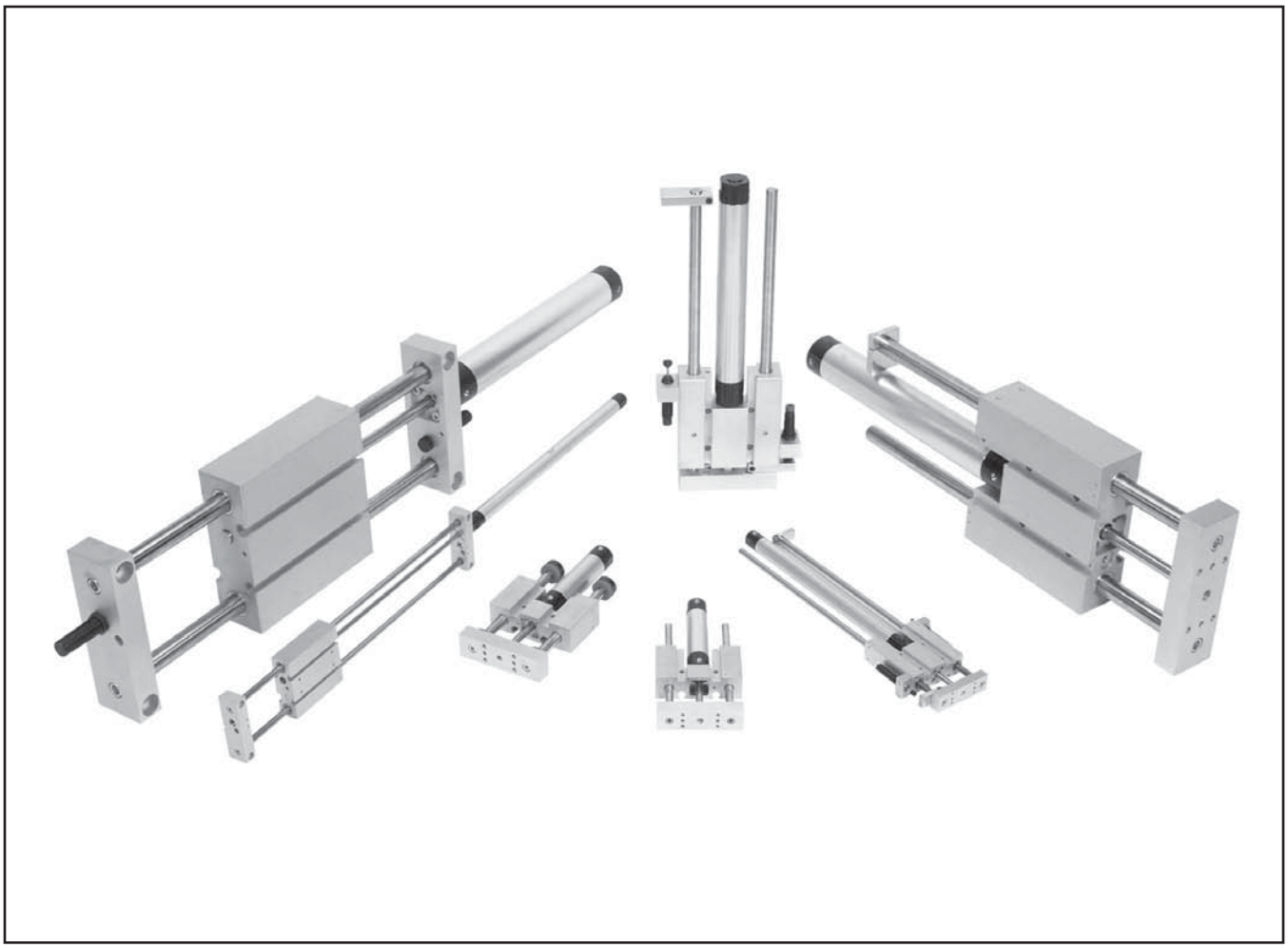
P5L Series

Guided Cylinders



F

P5T

P5T2

P5L

HB

P5E

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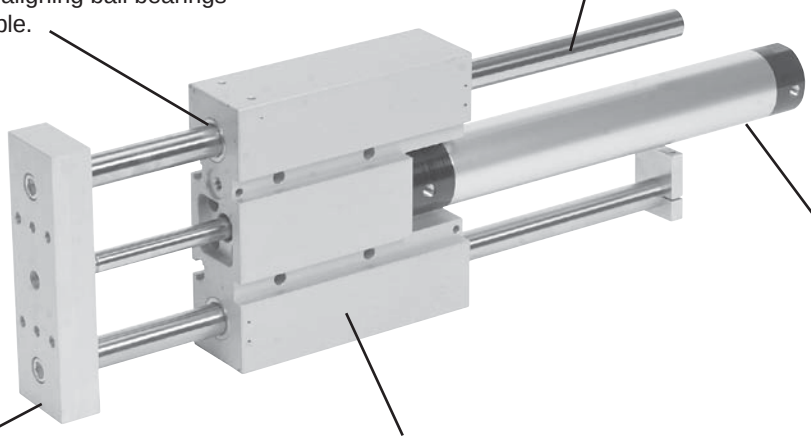
P5L-R Reach Slide Shown

Support Rods
High strength, case hardened support rods available in chrome plated, carbon or stainless steel. The chrome plated and stainless steel shafts are available in oversized versions for high load applications.

Bushings
Composite bushings with standard or oversized shafts are available. For precision applications optional recirculating ball bearings can be specified and for extremely high loads self-aligning ball bearings are available.

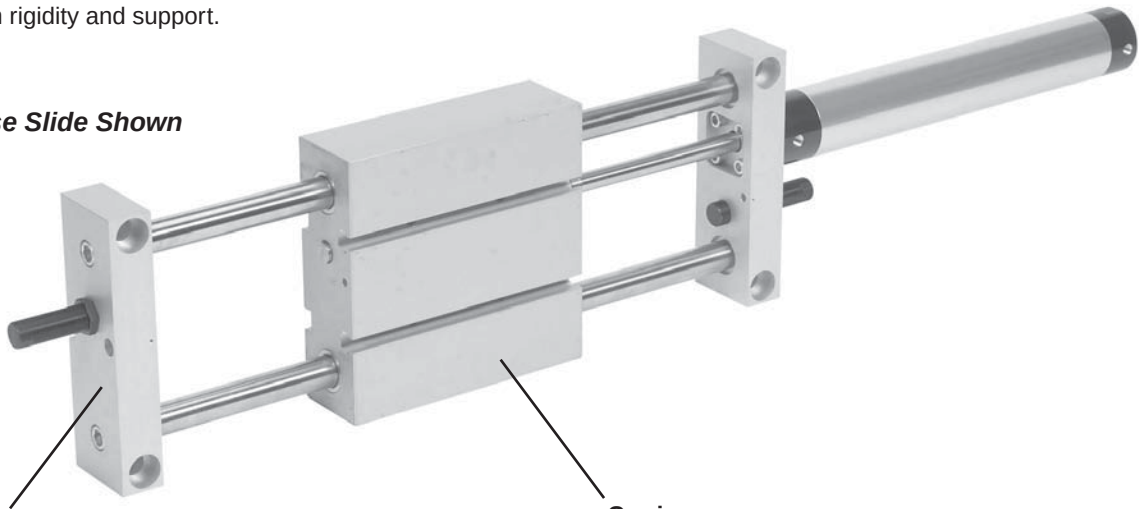


Cylinder
The all new P1L round body repairable cylinder (available in 20 to 100mm bore) is the driving force behind the P5L guided cylinder product line. Parker guided cylinders come standard with a magnetic piston for easy installation of reed or solid state sensors.

Tooling Plate
A precision machined, anodized aluminum tooling plate with standard tapped and counterbored mounting holes provides mounting from two faces. Dowel pin holes are also included for accurate positioning of custom tooling. The support rods are attached to the tooling plate using two socket head cap screws, providing maximum rigidity and support.

Body
Extruded aluminum and anodized body with recessed through holes. Standard dowel pin holes to provide mounting accuracy. Integrated T-slots provide mounting flexibility and quick set up. T-slots are standard on 20mm to 40mm bore models and optional on 50mm to 100mm bore models.

P5L-B Base Slide Shown



End Plates
Precision machined, anodized aluminum end plates have counterbored through holes for mounting. For precision, one keyway and one dowel pin are included. The support rods are attached to the tooling plate using two socket head cap screws providing maximum rigidity and support.

Carriage
Extruded aluminum and anodized carriage with recessed through holes. Standard dowel pin holes to provide mounting accuracy. Integrated t-slots provide mounting flexibility and quick set up. T-slots are standard on 20-40mm bore models and optional on 50-100mm bore models.

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Model Number Code

Example: P5L-RL100J1AANFN-0900-A

P5L	–	R	L	100	J1	A	A	N	F	N	–	0900	–	A

Series

T	Thrust Slide
R	Reach Slide
B	Base Slide

Cylinder Type

L	P1L Cylinder

Bore Size

020	20mm Bore
025	25mm Bore
032	32mm Bore
040	40mm Bore
050	50mm Bore
063	63mm Bore
080	80mm Bore
100	100mm Bore

Bushings

J1	Composite Bushing, Chrome Plated Shafts
J2	Composite Bushing, Oversized Chrome Plated Shafts
J3	Composite Bushing, Stainless Steel Shafts
J4	Composite Bushing, Oversized Stainless Steel Shafts
G1	Composite Bushing, Chrome Plated Shafts, Contaminent Tolerant Seals
G3	Composite Bushing, Stainless Steel Shafts, Contaminent Tolerant Seals
H3	Linear Ball Bearings, Stainless Steel Shafts
H5	Linear Ball Bearings, Carbon Steel Shafts
S3*	Self Aligning Linear Ball Bearings, Stainless Steel Shafts
S5*	Self Aligning Linear Ball Bearings, Carbon Steel Shafts

Extend Options

N	None
A	Shock/Stroke Adjusters
B	Bumpers (Base Slides only)
C	Cushions Both Ends
E	Micro-adjusters and Cushions (both ends only)
H	Cushions and Bumpers (includes Options C & K)
K	Bumpers and Adjustable stop collars
L	Shock absorbers and bumpers (N/A on Base Slides)

Retract Options

N	None
A	Shock/Stroke Adjusters
B	Bumpers Only
C	Cushions Both Ends
E	Micro-adjusters and Cushions (both ends only)
H	Cushions and Bumpers (includes Options C & K)
K	Bumpers and Adjustable stop collars
L	Shock absorbers and bumpers (N/A on Base Slides)

Cylinder Seals

N	Nitrile (Standard)
V	Fluorocarbon (High Temperature)

Cylinder Port Style

G	BSPT Ports
H	NPTF Ports
P	BSPT Ports w/ Presto-lok Flow Controls (mm)
F	NPTF Ports w/ Presto-lok Flow Controls (inch)
B	BSPT Ports w/ Flow Controls
N	NPTF Ports w/ Flow Controls

Proximity Sensor Options

N	No Sensor
P	PNP, Lead Type
R	NPN, Lead Type
S	PNP, Plug in Type
T	NPN, Plug in Type
W	Prox Ready, 8mm (No sensor supplied)
Z	Prox Ready, 12mm (No sensor supplied)

Note: Piston magnet is standard on all cylinders. Inductive proximity sensors are included with Options P, R, S & T.

T-Slots

–	Standard (Extruded T-slots on sizes 20-40, no T-slots on sizes 50-100)
A	Machined T-slots (Sizes 50-100)**

** N/A on sizes 20-40

Stroke

Order in 1mm increments.

Design Series

A	Current Design

** Not available on 20mm bore models*

Order P8S Series reed and solid state sensors separately from Electronic Sensors Section.

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Specifications

- Maximum operating pressure: 10 bar (145 PSI)
- Operating characteristics: double acting
- Support rod sizes from 10mm to 60mm
- Operating temperature range (cylinder):
  Standard seals -17° to 74°C (0 to 165°F)
  Fluorocarbon seals* -17° to 121°C (0 to 250°F)
- Filtration requirement: 40 micron filtered, dry air

*See fluorocarbon seal option for high temperature applications.

Quick Reference Data

Bore	Standard Support Rod Diameter		Oversized Support Rod Diameter		Output Force on Extension @5.5 Bar (80 psi)		Output Force on Retract @5.5 Bar (80 psi)		Maximum Suggested Stroke**	
	mm	(in)	mm	in	N	lbs	N	lbs	mm	in
20	10	0.39	12	0.47	173	39	147	33	400	16
25	12	0.47	16	0.63	271	61	227	51	400	16
32	16	0.63	20	0.79	445	100	383	86	450	18
40	20	0.79	25	0.98	694	156	583	131	550	22
50	25	0.98	30	1.18	1081	243	907	204	750	30
63	30	1.18	40	1.57	1717	386	1548	348	900	35
80	40	1.57	50	1.97	2771	623	2500	562	1000	39
100	50	1.97	60	2.36	4332	974	3888	874	1000	39

**Longer stroke lengths are available, but load capacities are greatly reduced. Consult factory with application parameters.

Weights

Bore	Actuator Weights (Standard Shaft)								Actuator Weights (Oversized Shaft)							
	Zero Stroke Unit Weight						Per Inch Stroke		Zero Stroke Unit Weight						Per Inch Stroke	
	Thrust		Reach		Base				Thrust		Reach		Base			
	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs
20	0.69	1.5	0.96	2.1	1.09	2.4	0.04	0.09	0.77	1.7	1.07	2.3	1.04	2.3	0.05	0.11
25	1.24	2.7	1.77	3.9	2.12	4.7	0.06	0.13	1.45	3.2	2.05	4.5	1.99	4.4	0.08	0.17
32	1.99	4.4	2.84	6.3	3.26	7.2	0.09	0.20	2.32	5.1	3.25	7.2	3.15	6.9	0.11	0.25
40	3.5	7.7	4.9	10.9	5.6	12.4	0.14	0.31	4.1	9.1	5.9	13.0	5.75	12.7	0.17	0.39
50	7.3	16.2	11.2	24.6	12.1	26.7	0.21	0.47	8.5	18.8	12.8	28.1	12.50	27.6	0.25	0.56
63	12.6	27.8	18.6	41.0	21.8	48.1	0.27	0.59	15.1	33.3	22.3	49.2	21.92	48.3	0.38	0.83
80	22.5	49.5	34.4	75.8	39.4	86.9	0.44	0.96	26.8	59.2	40.5	89.3	40.47	89.2	0.58	1.27
100	40.7	89.8	61.7	136.0	72.4	159.7	0.66	1.45	42.1	92.8	63.9	140.9	65.49	144.4	0.83	1.83

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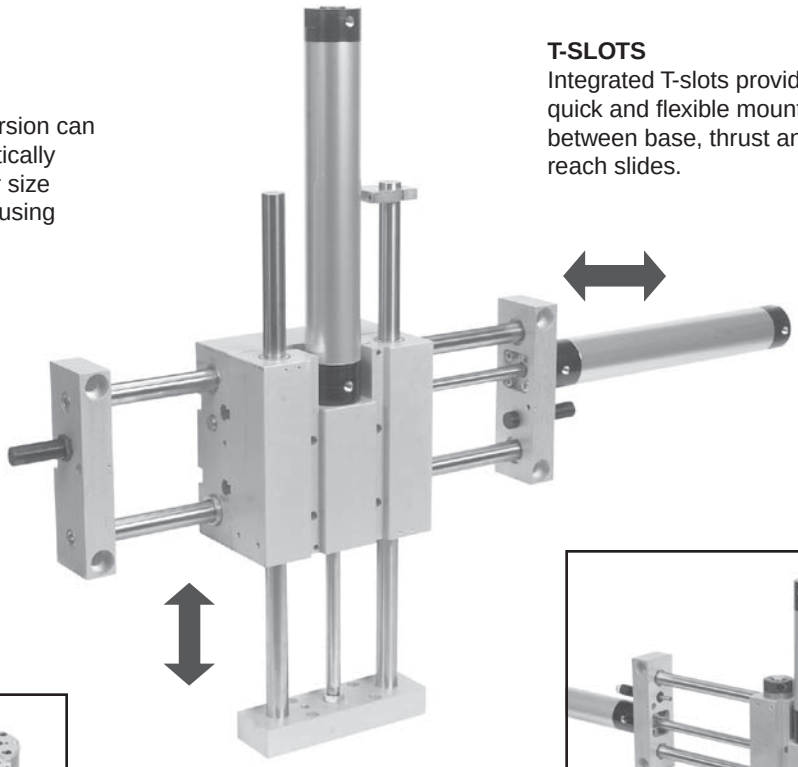
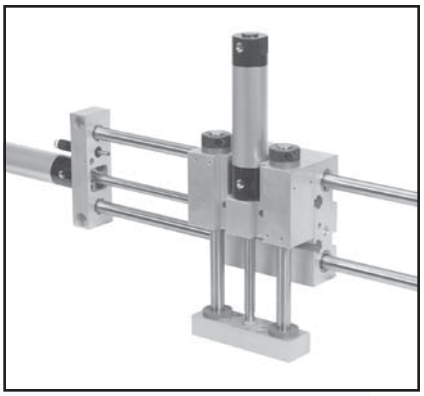
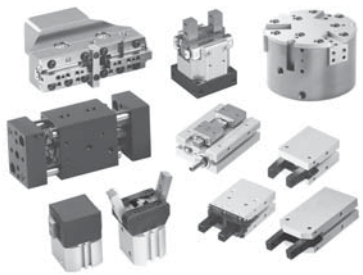
DIRECT MOUNTING
Each thrust and reach version can direct mount to the indentically sized base version. Other size combinations can mount using transition plates.

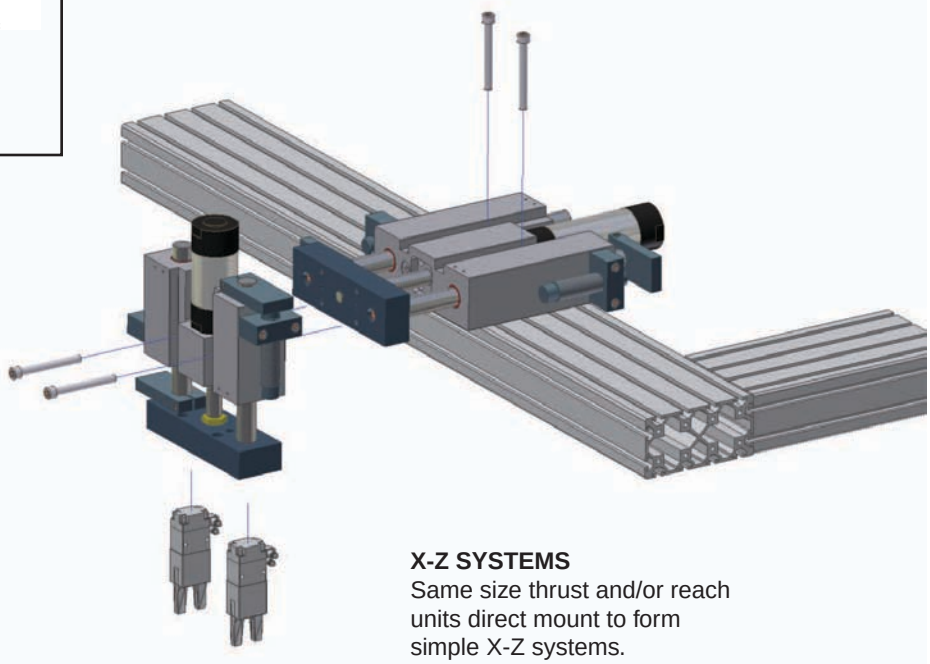


T-SLOTS
Integrated T-slots provide quick and flexible mounting between base, thrust and reach slides.





Parker has a complete line of pneumatic grippers for pick & place applications. Consult Parker Catalog 1900-2.



X-Z SYSTEMS
Same size thrust and/or reach units direct mount to form simple X-Z systems.

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Horizontal Load Capacity & Deflection with Standard Shafting

- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Recirculating Ball Bearings w/ Carbon or Stainless Steel Rods
- Self Aligning Ball Bearings w/ Carbon or Stainless Steel Rods

The graphs on these two pages illustrate the maximum suggested side load at a given actuator stroke and distance (d) from the face of the tooling plate. The graphs include the weight of the support rods and tooling plate and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

See the P5L options section of this catalog for more bearing selection information.

Dynamic loading is defined as a load which is affixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

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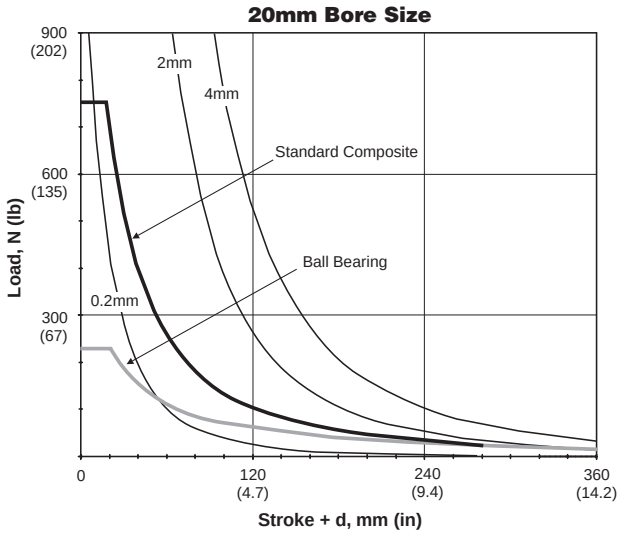
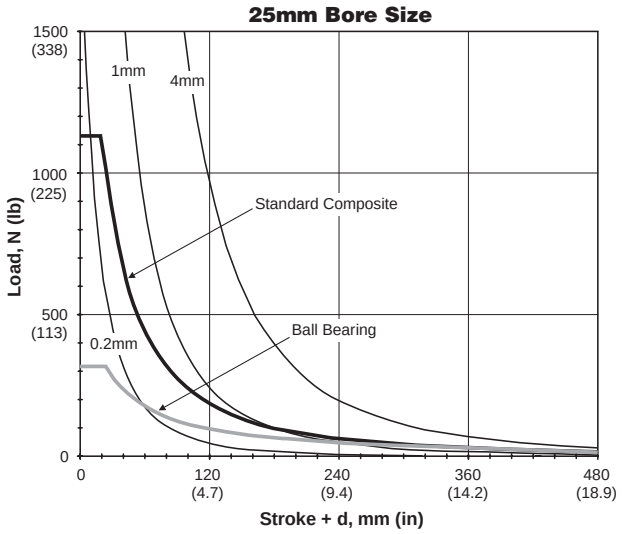
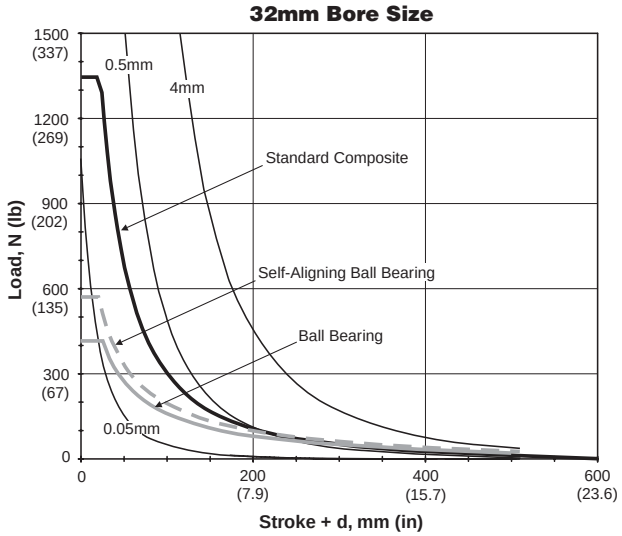
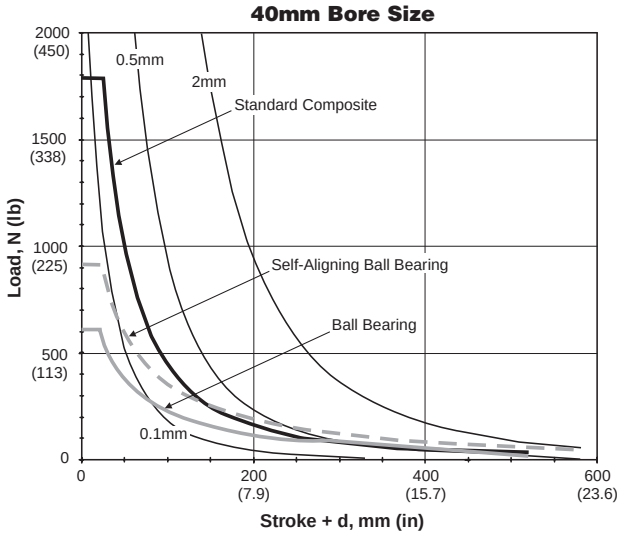
P5L Thrust Slides









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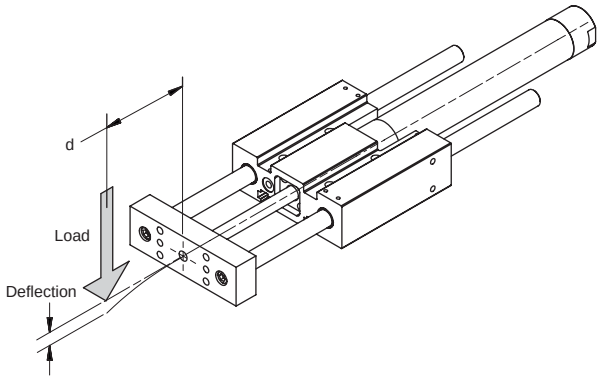
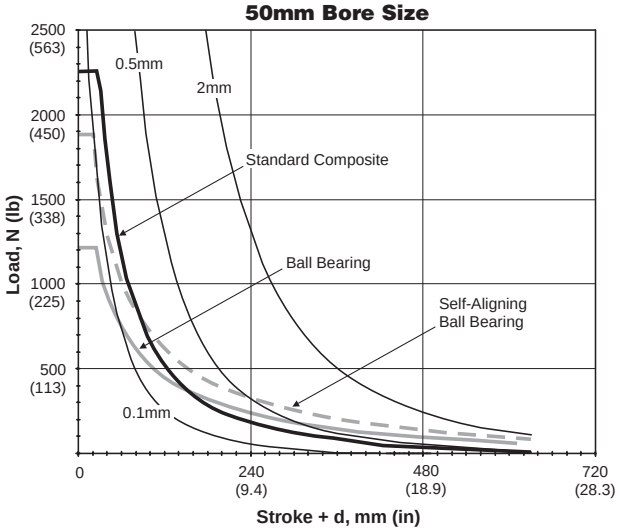
Horizontal Load Capacity & Deflection with Standard Shafting

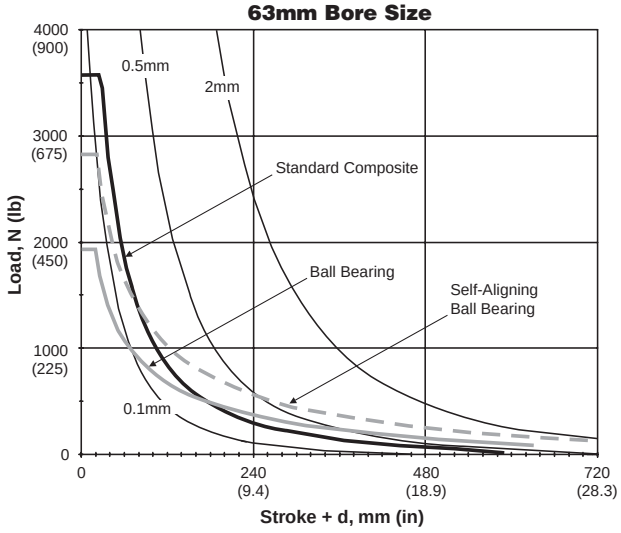


P5L Thrust Slides

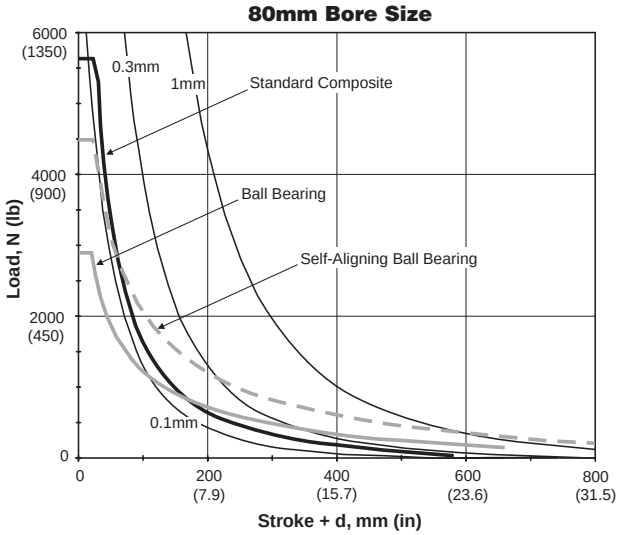
50mm Bore Size



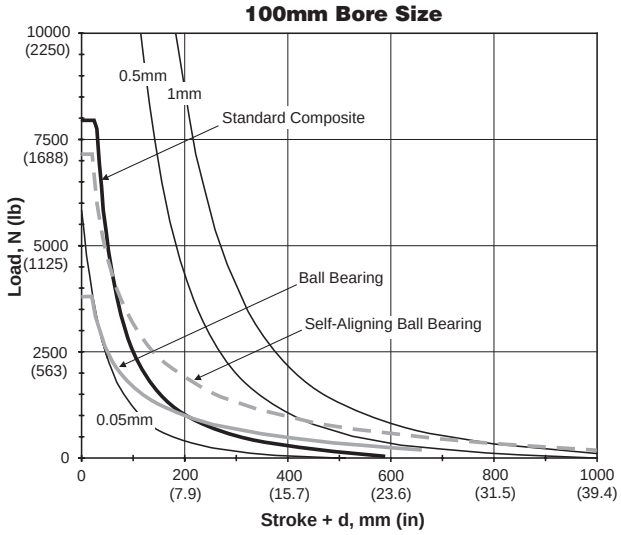
63mm Bore Size



80mm Bore Size



100mm Bore Size



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Horizontal Load Capacity & Deflection with Oversized Shafting

- Oversized Composite w/ Chrome Plated or Stainless Steel Rods

The graphs on these two s illustrate the maximum suggested side load at a given actuator stroke and distance (d) from the face of the tooling plate. The graphs include the weight of the support rods and tooling plate and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

See the P5L options section of this catalog for more bearing selection information.

Dynamic loading is defined as a load which is affixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

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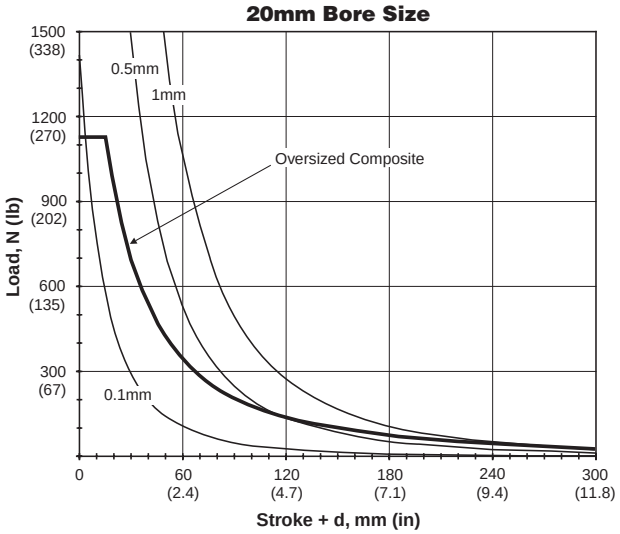
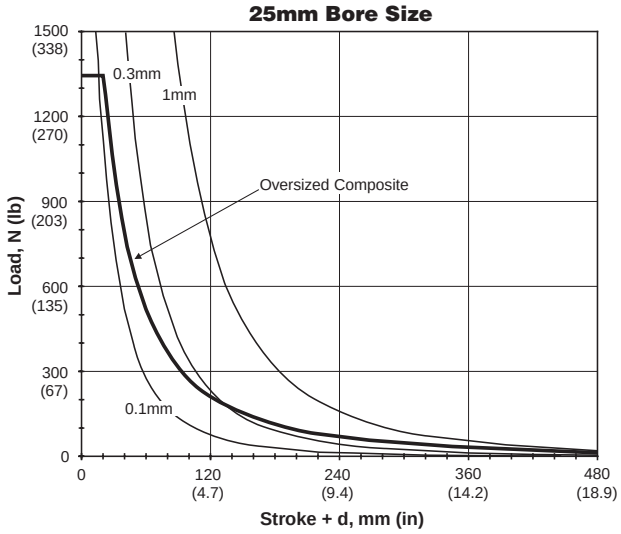
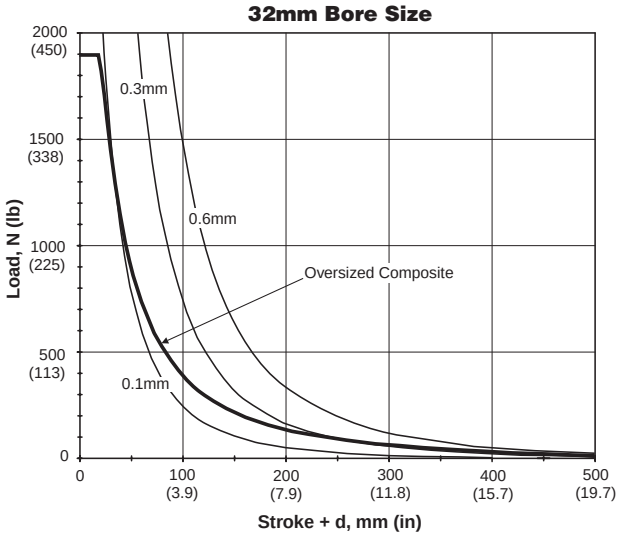
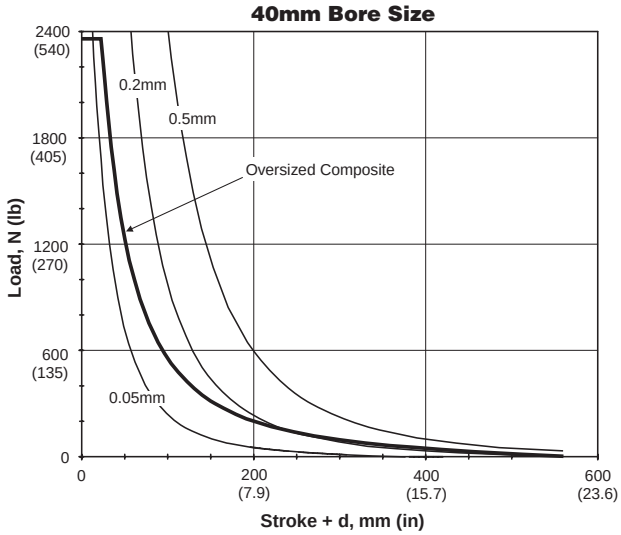
P5L Thrust Slides









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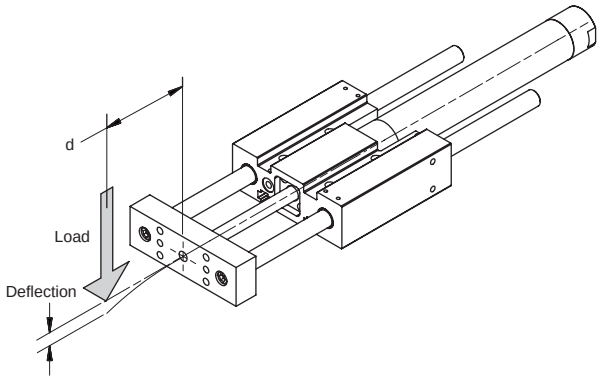
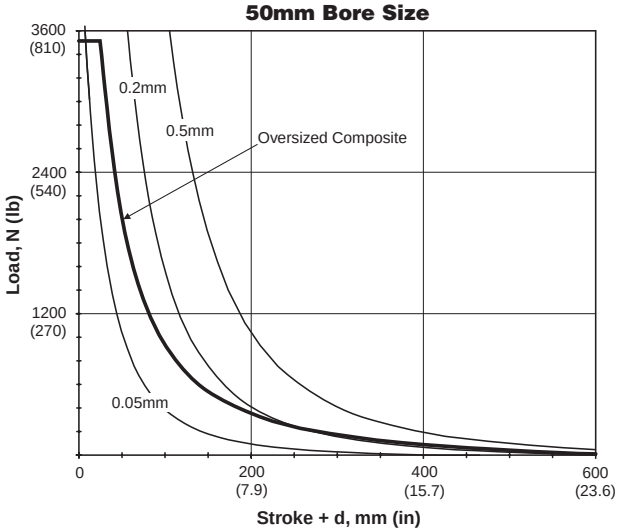
Horizontal Load Capacity & Deflection with Oversized Shafting

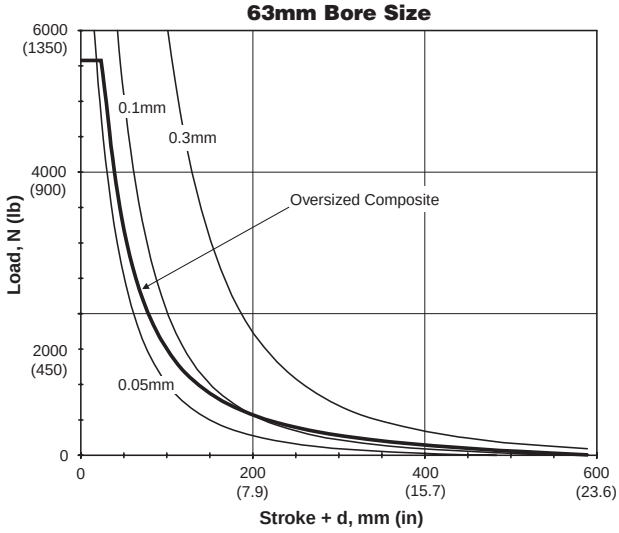


P5L Thrust Slides

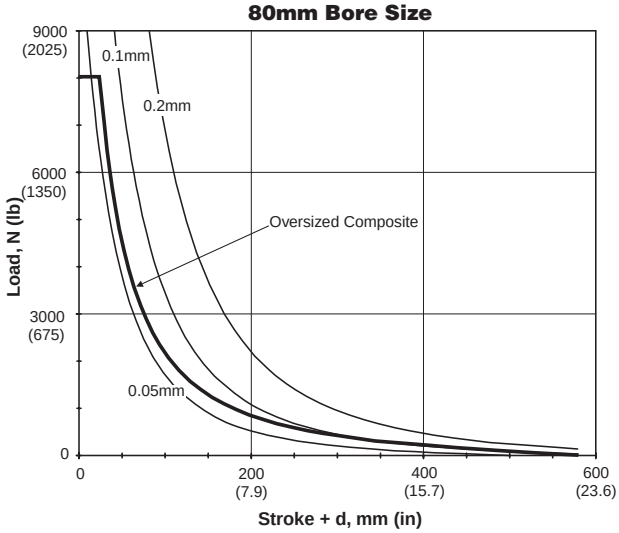
50mm Bore Size



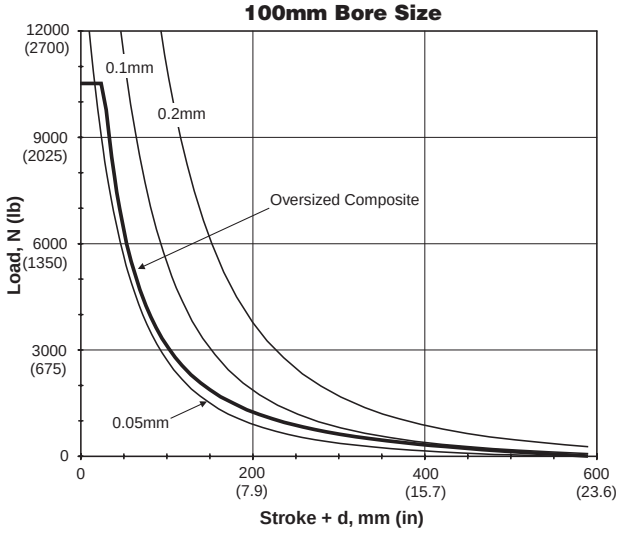
63mm Bore Size



80mm Bore Size



100mm Bore Size



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Horizontal Load Capacity & Deflection with Standard Shafting

- Recirculating Ball Bearings w/ Carbon or Stainless Steel Rods
- Self Aligning Ball Bearings w/ Carbon or Stainless Steel Rods

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Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

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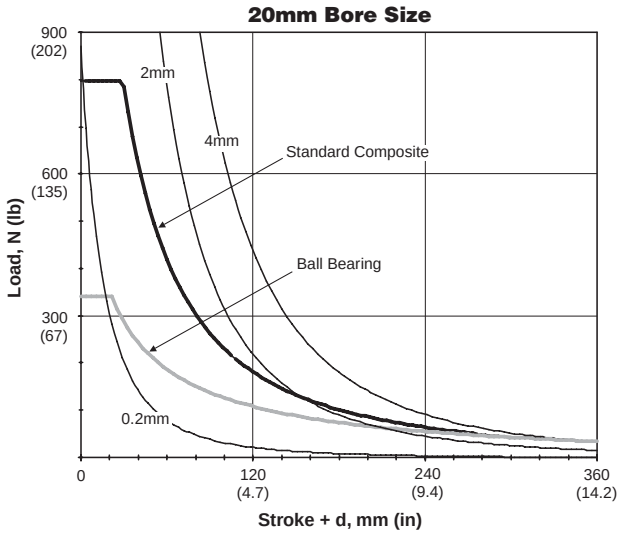
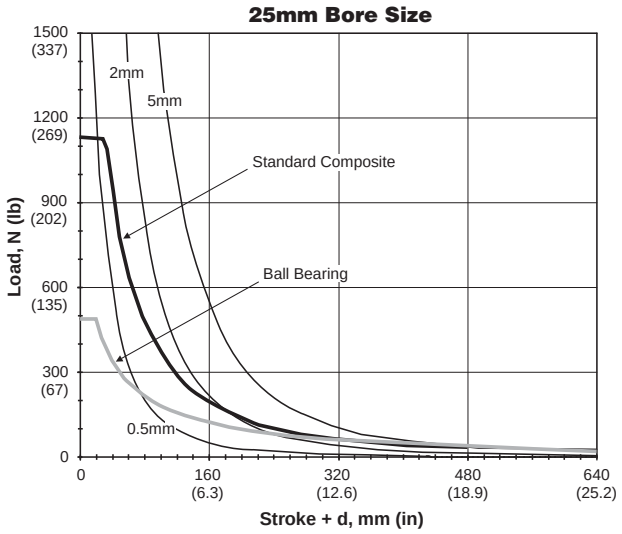
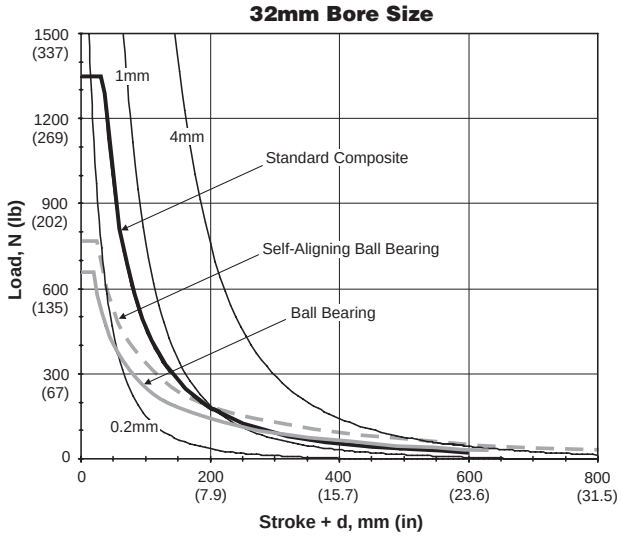
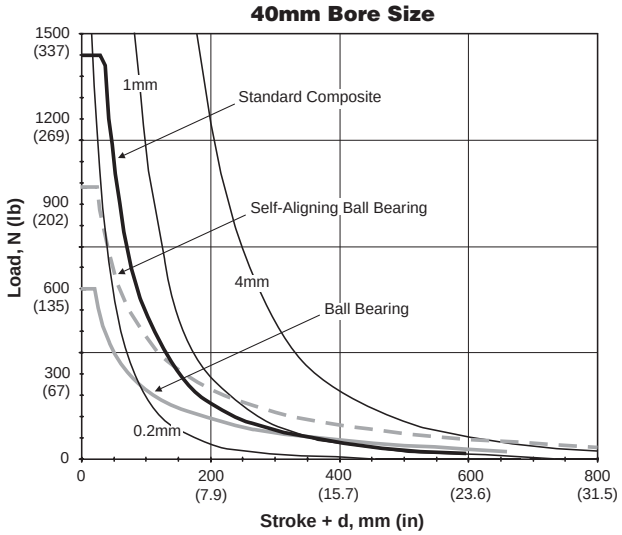
P5L Reach Slides









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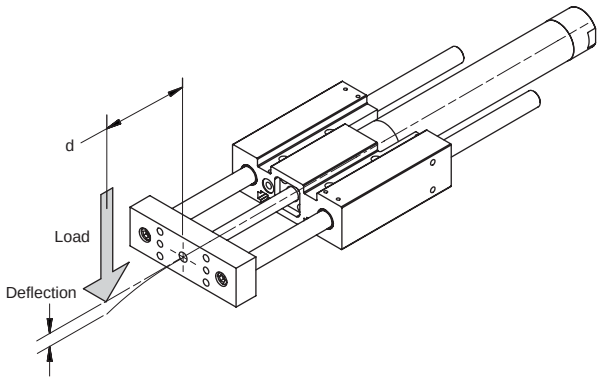
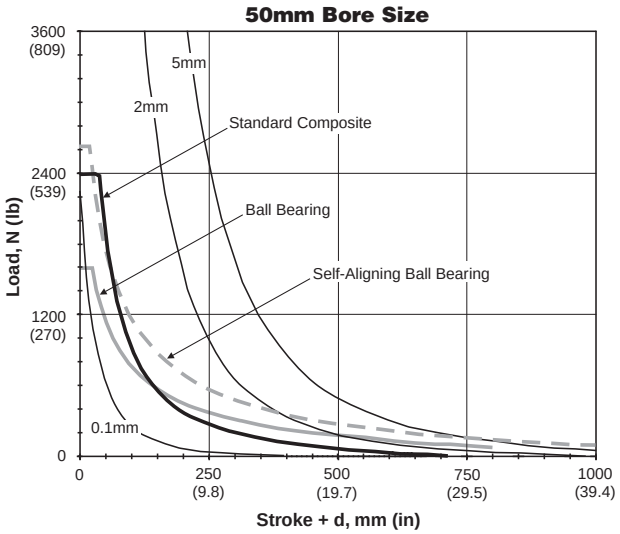
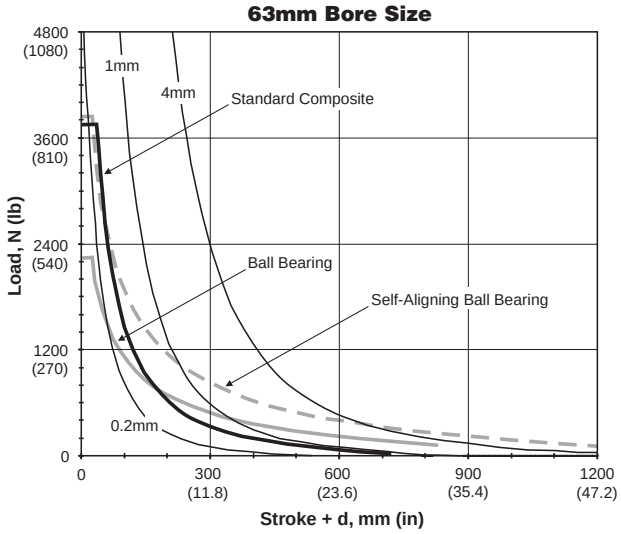
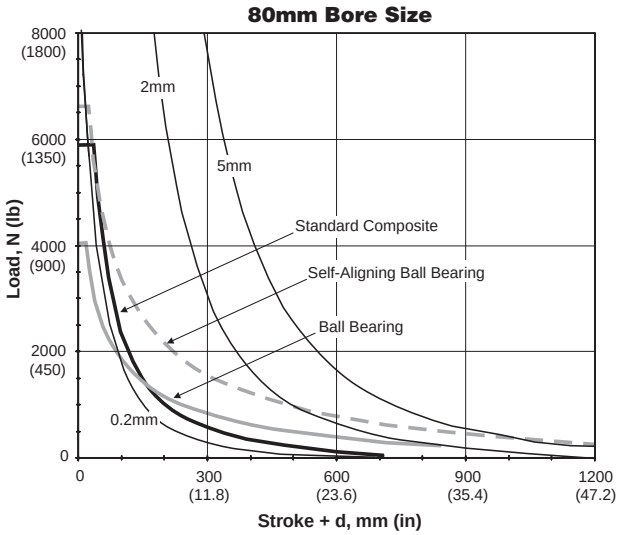
Horizontal Load Capacity & Deflection with Standard Shafting

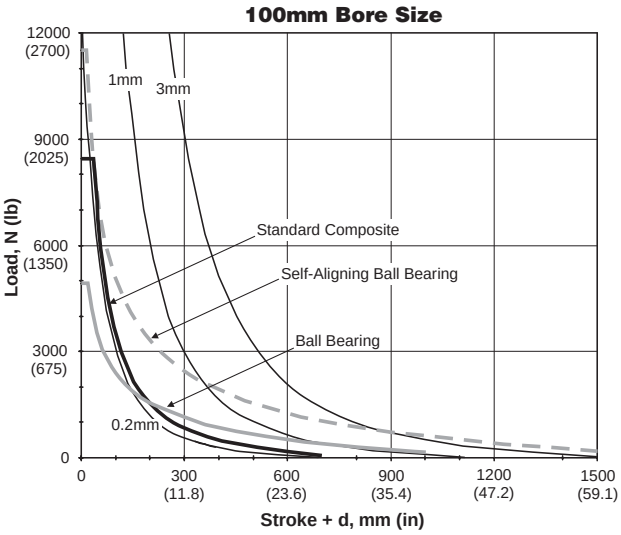


P5L Reach Slides









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Horizontal Load Capacity & Deflection with Oversized Shafting

- Oversized Composite w/ Chrome Plated or Stainless Steel Rods

The graphs on these two pages illustrate the maximum suggested side load at a given actuator stroke and distance (d) from the face of the tooling plate. The graphs include the weight of the support rods and tooling plate and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

See the P5L options section of this catalog for more bearing selection information.

Dynamic loading is defined as a load which is affixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

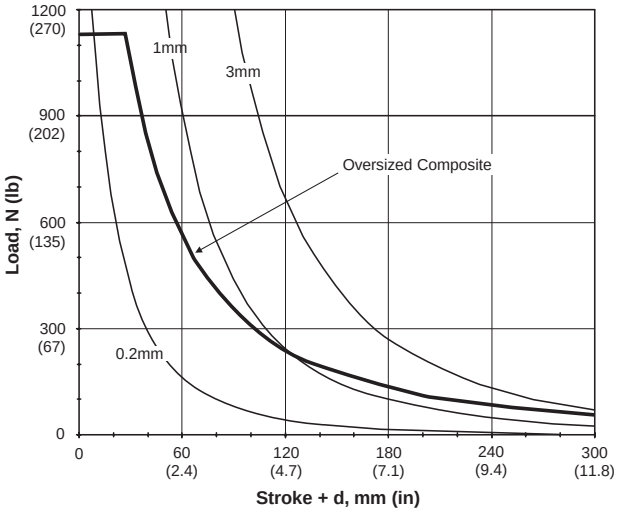
Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

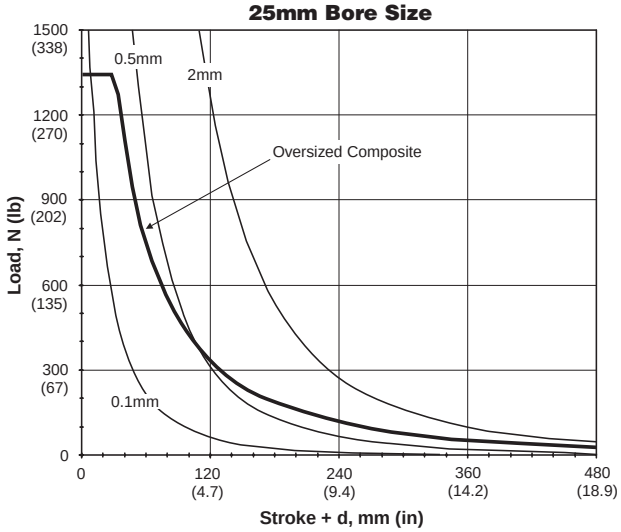
F

P5L Reach Slides

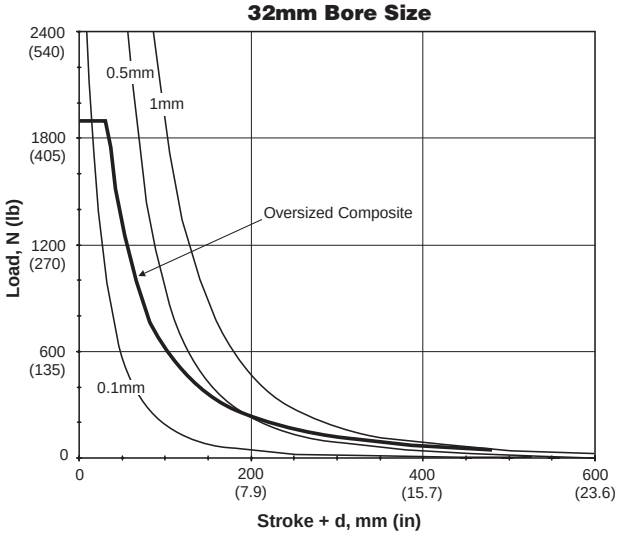
20mm Bore Size



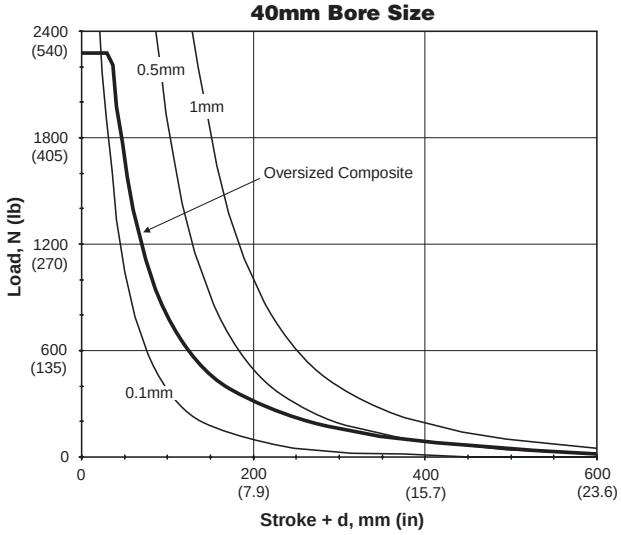
25mm Bore Size



32mm Bore Size



40mm Bore Size



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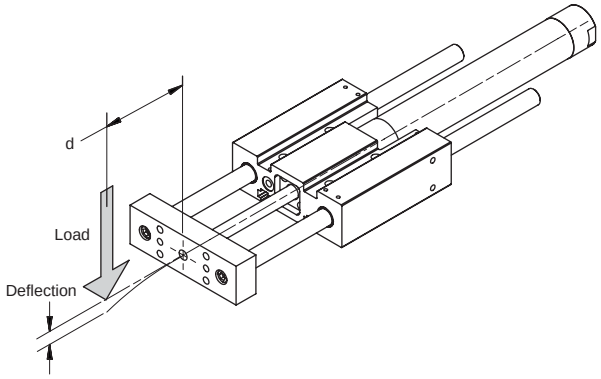
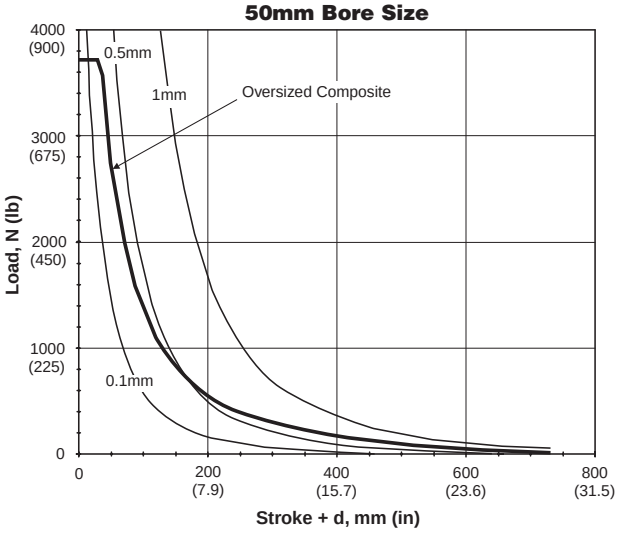
Horizontal Load Capacity & Deflection with Oversized Shafting

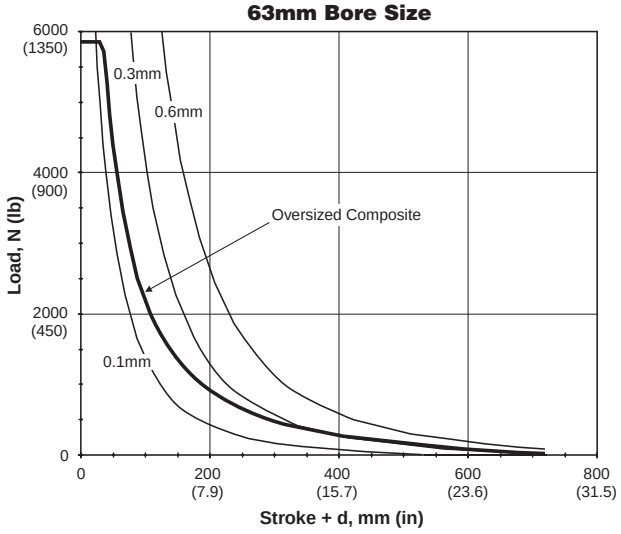


P5L Reach Slides

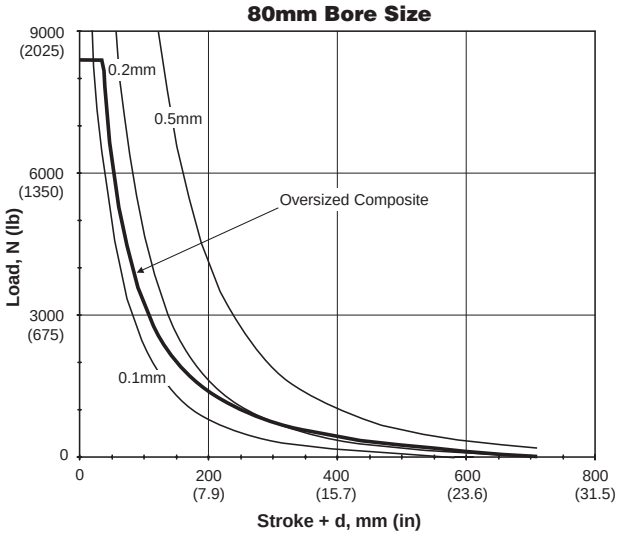
50mm Bore Size



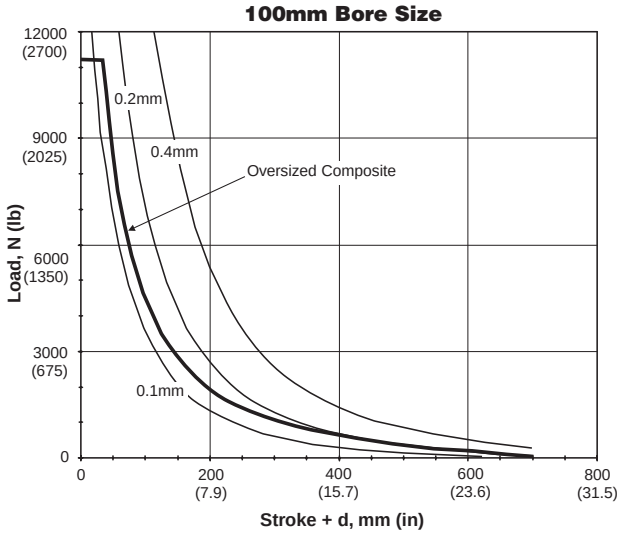
63mm Bore Size



80mm Bore Size



100mm Bore Size



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Asymmetrical Torque Capacity

- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Oversized Composite w/ Chrome Plated or Stainless Steel Rods
- Recirculating Ball Bearings w/ Carbon or Stainless Steel Rods
- Self Aligning Ball Bearings w/ Carbon or Stainless Steel Rods

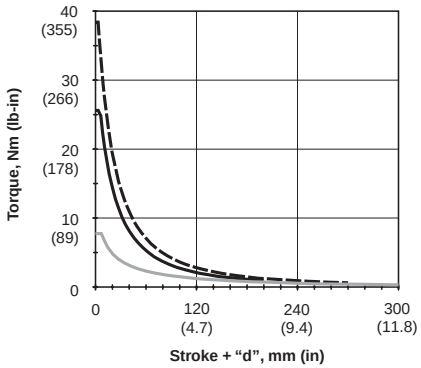
The graphs on these two pages illustrate the maximum suggested asymmetrical load at a given actuator stroke and distance (d) from the face of the tooling plate. The graphs include the weight of the support rods and tooling plate and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

Dynamic loading is defined as a load which is affixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application. An asymmetrical load is defined as a perpendicular load applied at some horizontal distance, "m" from the center of the tooling plate.

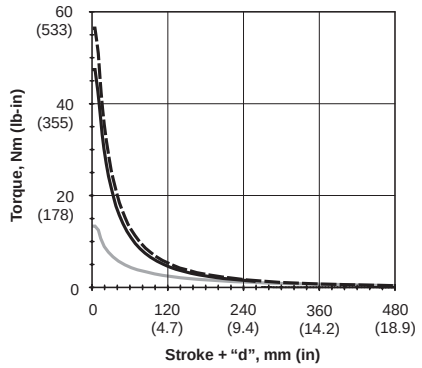
F

P5L Thrust Slides

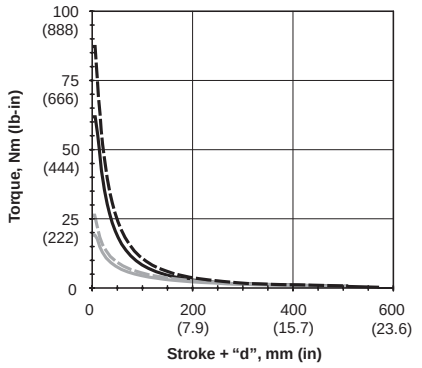
20mm Bore Size



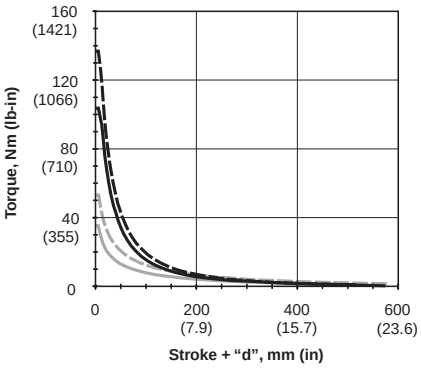
25mm Bore Size



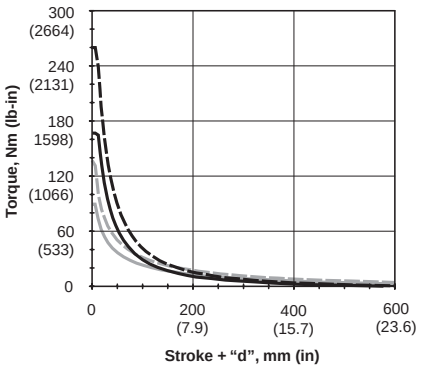
32mm Bore Size



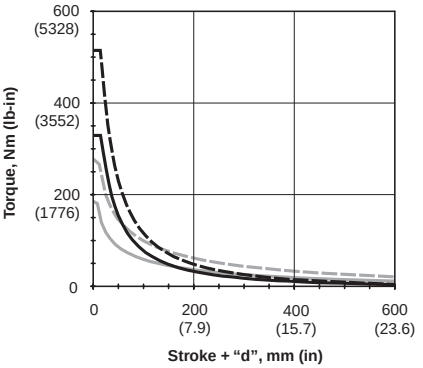
40mm Bore Size



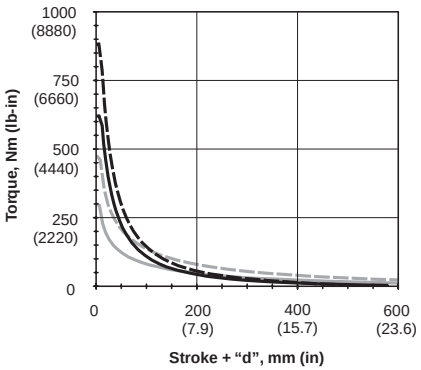
50mm Bore Size



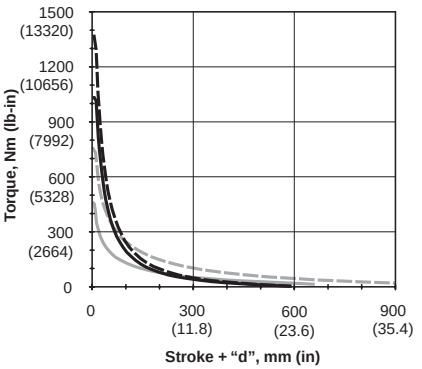
63mm Bore Size

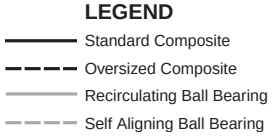


80mm Bore Size



100mm Bore Size





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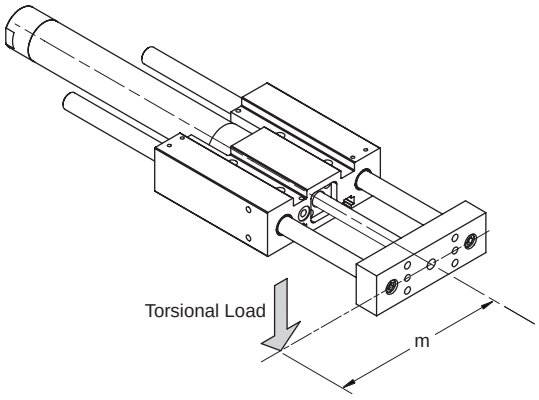
Asymmetrical Torque Capacity

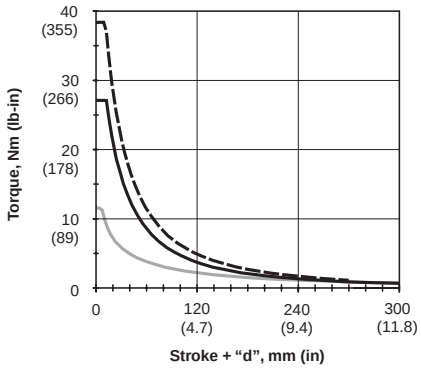
Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

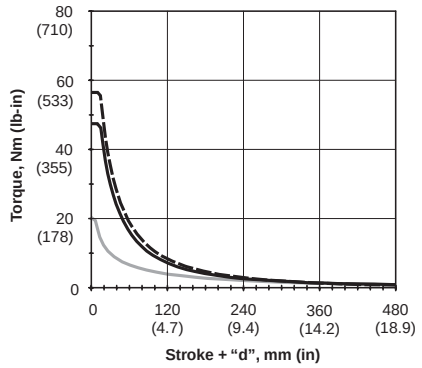


P5L Reach Slides

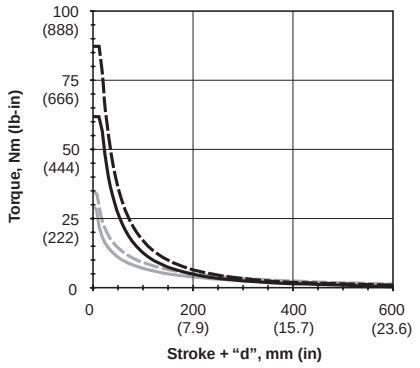
20mm Bore Size



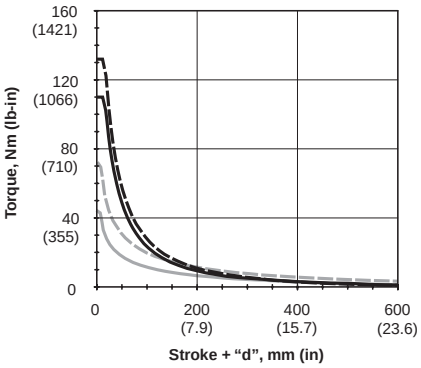
25mm Bore Size



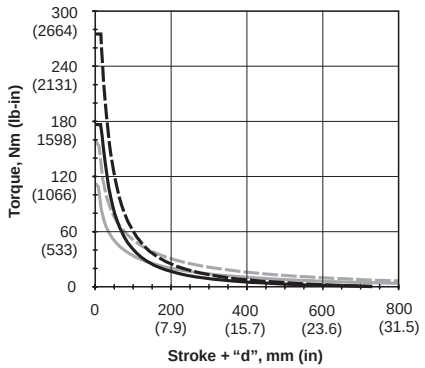
32mm Bore Size



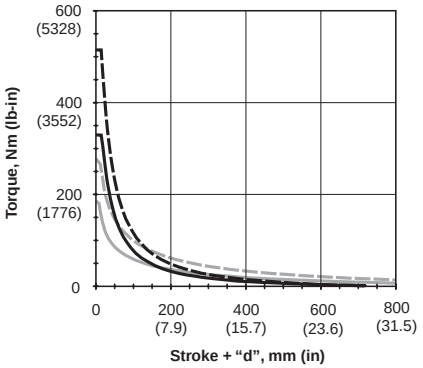
40mm Bore Size



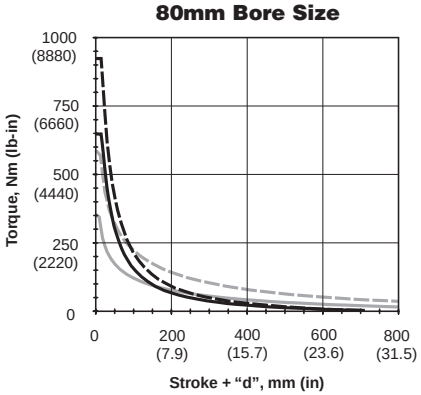
50mm Bore Size



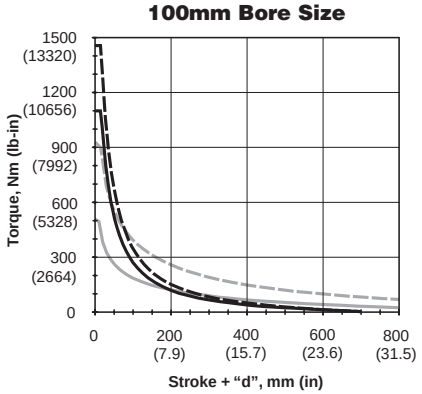
63mm Bore Size



80mm Bore Size



100mm Bore Size



LEGEND

- Standard Composite
- Oversized Composite
- Recirculating Ball Bearing
- Self Aligning Ball Bearing

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Vertical Eccentric Load Capacity

- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Oversized Composite w/ Chrome Plated or Stainless Steel Rods
- Recirculating Ball Bearings w/ Carbon or Stainless Steel Rods
- Self Aligning Ball Bearings w/ Carbon or Stainless Steel Rods

The graphs on these two pages illustrate the maximum suggested eccentric load based on a stroke of 100mm (4 inches).

An eccentric load is defined as a load applied in the same direction as the motion of the cylinder however, acting at some distance (eccentricity "h") from the center of the tooling plate. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

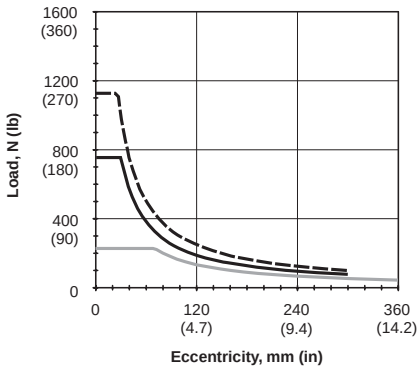
Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

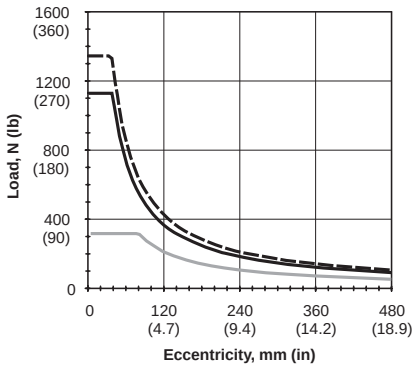
F

P5L Thrust Slides

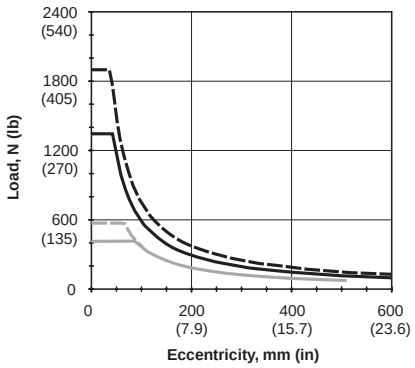
20mm Bore Size



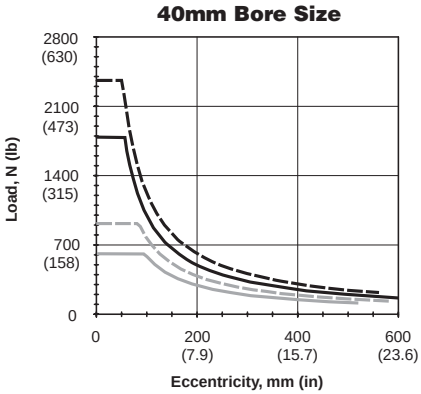
25mm Bore Size



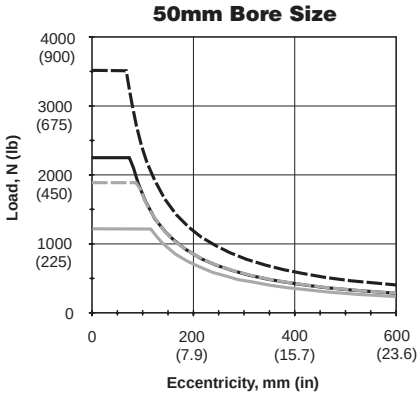
32mm Bore Size



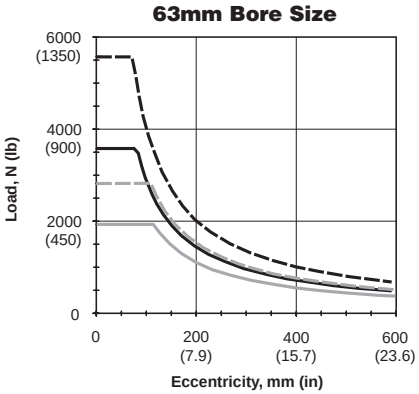
40mm Bore Size



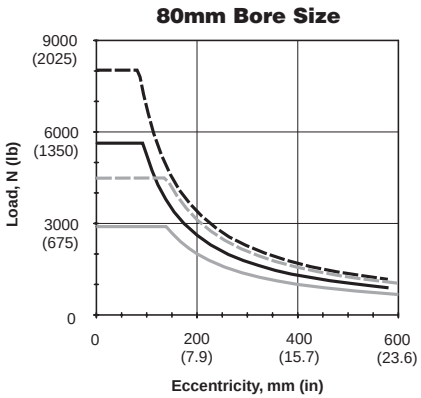
50mm Bore Size



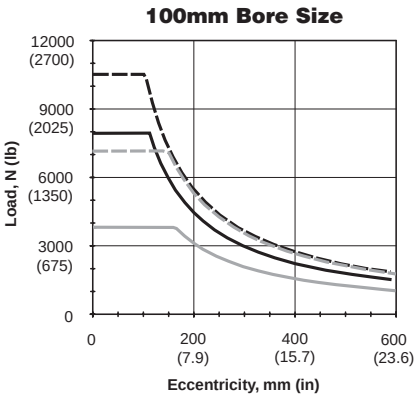
63mm Bore Size

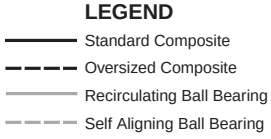


80mm Bore Size



100mm Bore Size





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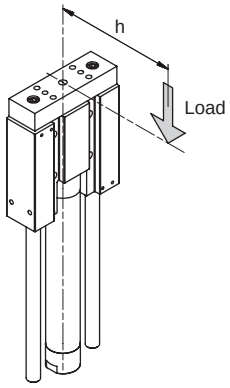
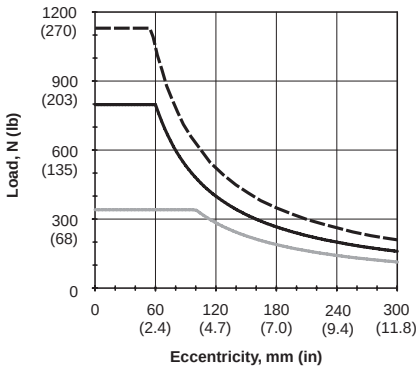
Vertical Eccentric Load Capacity

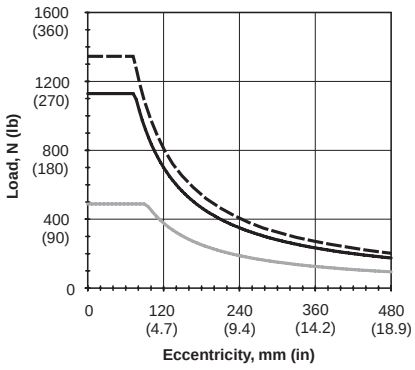


P5L Reach Slides

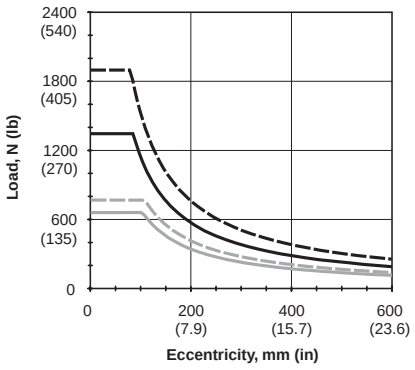
20mm Bore Size



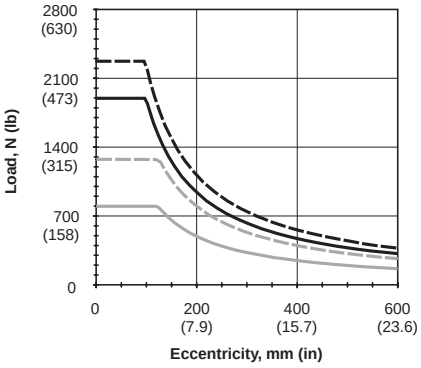
25mm Bore Size



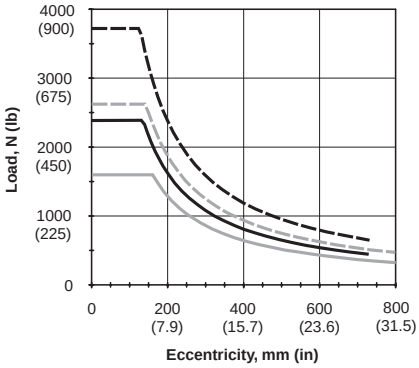
32mm Bore Size



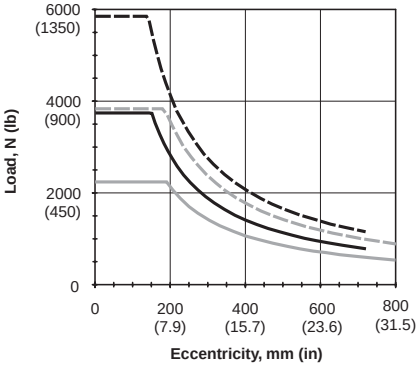
40mm Bore Size



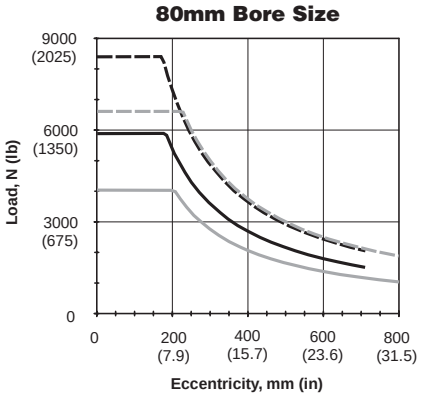
50mm Bore Size



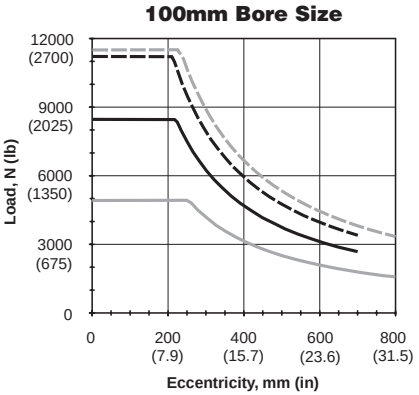
63mm Bore Size



80mm Bore Size



100mm Bore Size



LEGEND

- Standard Composite
- Oversized Composite
- Recirculating Ball Bearing
- Self Aligning Ball Bearing

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Load Stopping Capacity

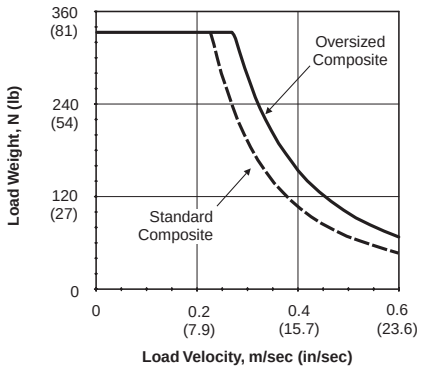
- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Oversized Composite w/ Chrome Plated or Stainless Steel Rods

The P5L series can be used in conveyor stopping applications. The graphs on these two pages illustrate the maximum stopping or impact capacity for the P5L Series. The maximum stopping capacity will vary with actuator stroke. These graphs are based on a stroke of 50mm (2 inches), assuming that the moving load is moving perpendicularly to the support rods. Care should be taken to ensure that the support rods are not damaged during this type of loading. The load should also be centered on the tooling plate.

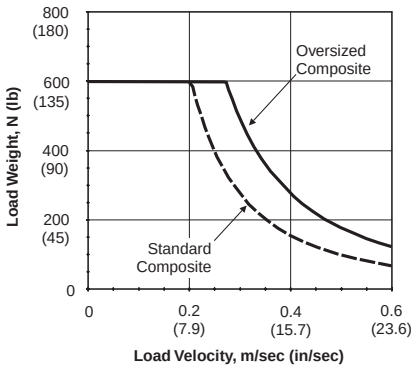
Note: Ball bearings should not be used in this type of application.

P5L Thrust Slides

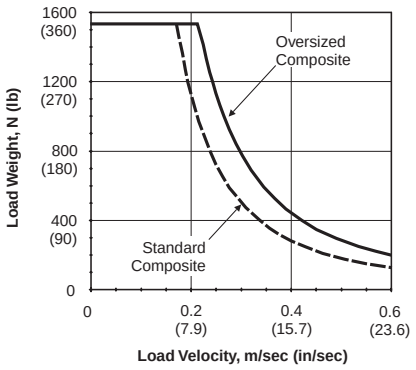
20mm Bore Size



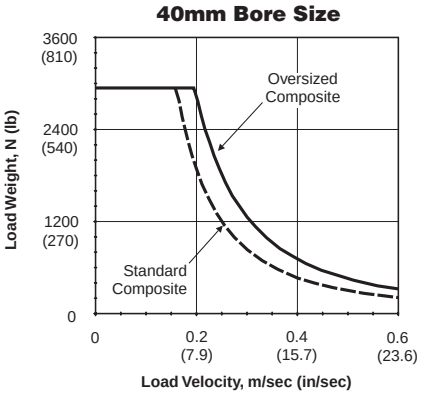
25mm Bore Size



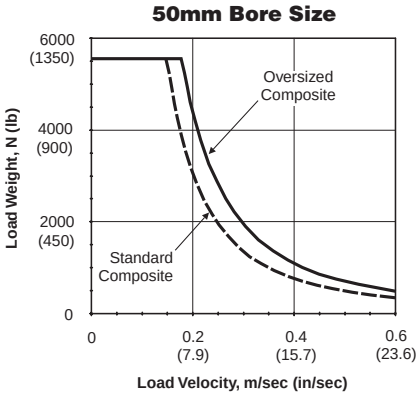
32mm Bore Size



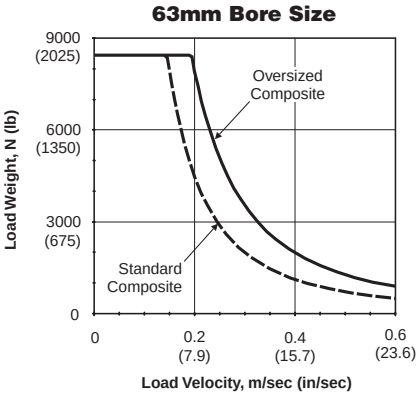
40mm Bore Size



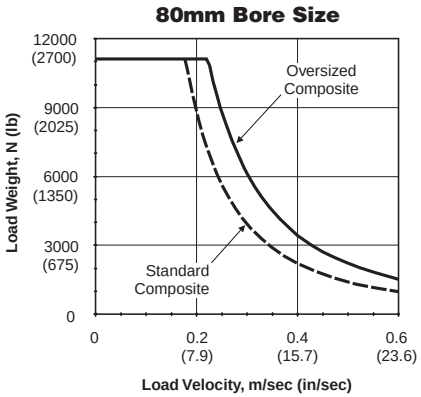
50mm Bore Size



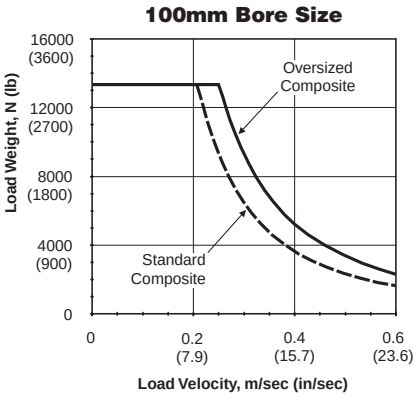
63mm Bore Size



80mm Bore Size



100mm Bore Size



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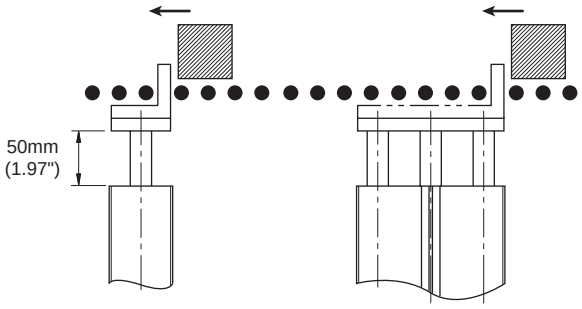
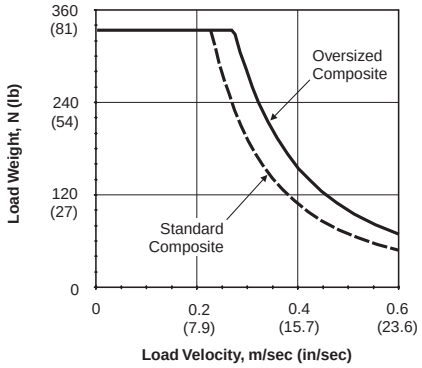
Load Stopping Capacity

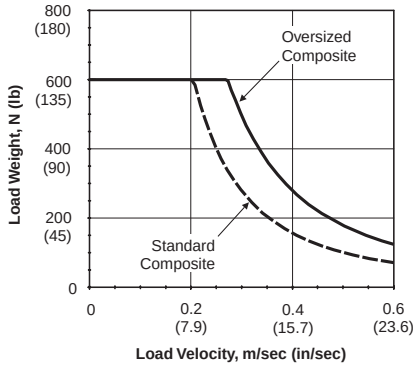


P5L Reach Slides

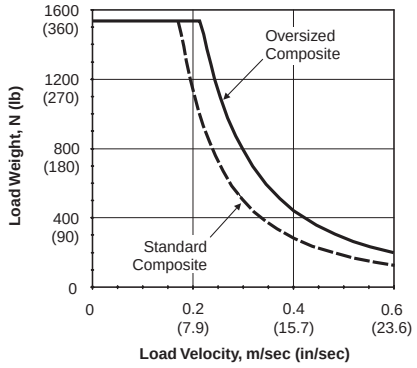
20mm Bore Size



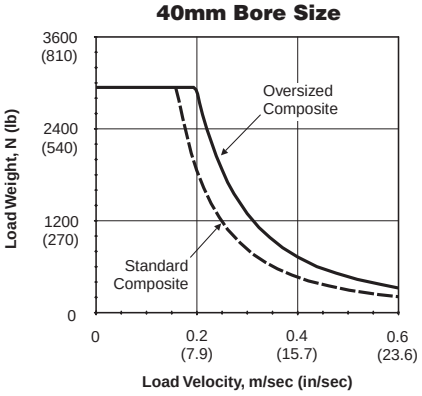
25mm Bore Size



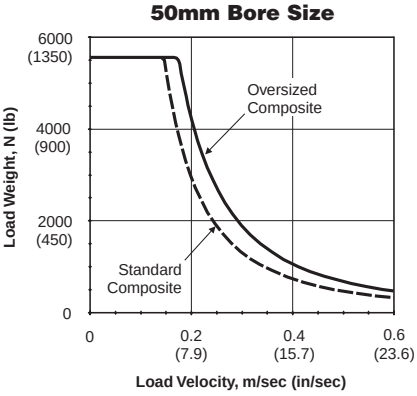
32mm Bore Size



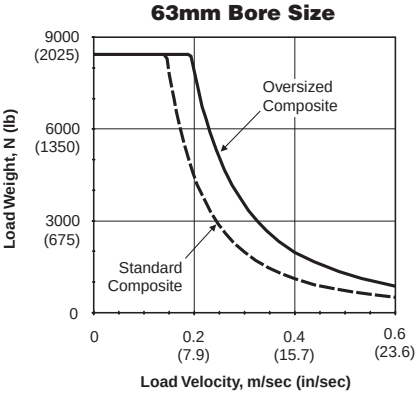
40mm Bore Size



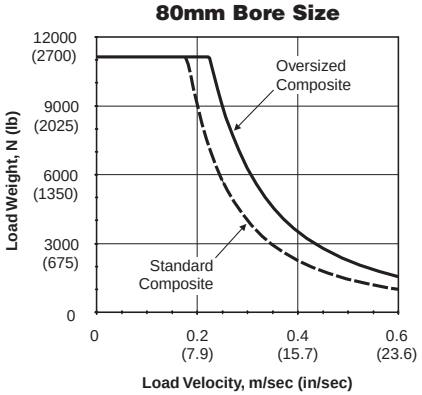
50mm Bore Size



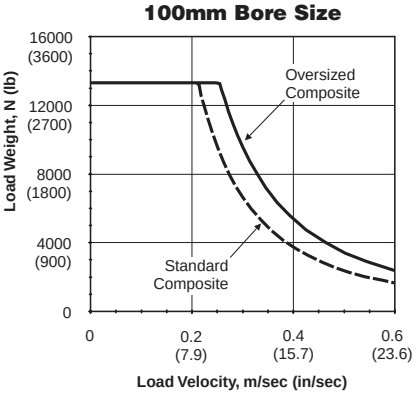
63mm Bore Size



80mm Bore Size



100mm Bore Size



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Kinetic Energy

These graphs illustrate the kinetic energy absorption of the P5L series as a total moving weight versus speed chart for both air cushions and shock absorbers.

Moving weight is defined as the weight of the carried load and the weight of any moving parts of the actuator (support rods, tooling plate, etc.). The moving weight from the charts on page F73 should be considered.

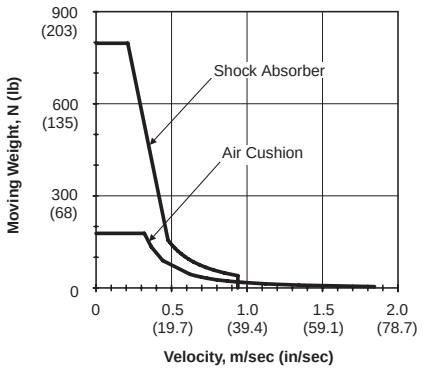
Actuator Moving Weight =
Base Unit Weight + (Stroke × Per Inch Weight)

Total Moving Weight =
Actuator Moving Weight + Carried Load

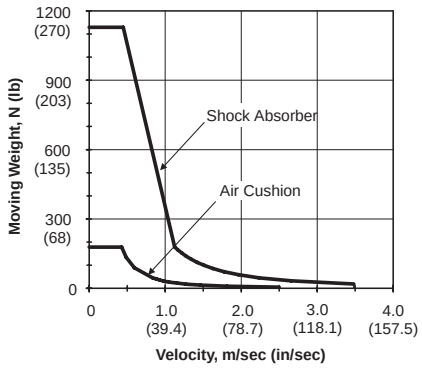
Note: These charts are to be used only to determine the energy absorption of each guided cylinder and to determine if shocks or cushions are needed.

P5L Thrust Slides

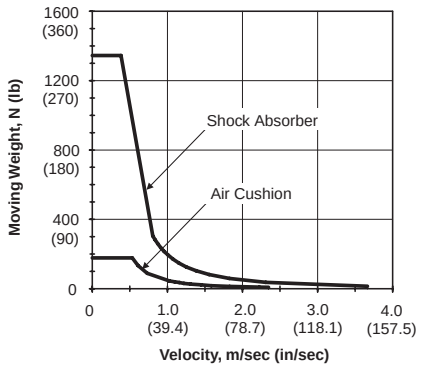
20mm Bore Size



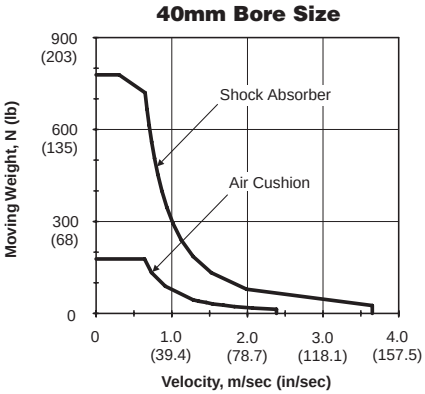
25mm Bore Size



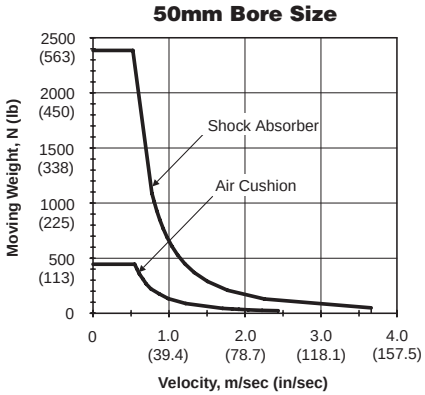
32mm Bore Size



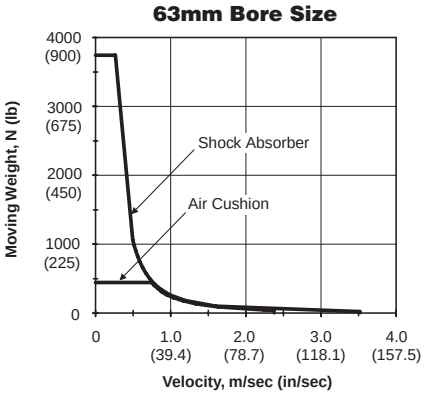
40mm Bore Size



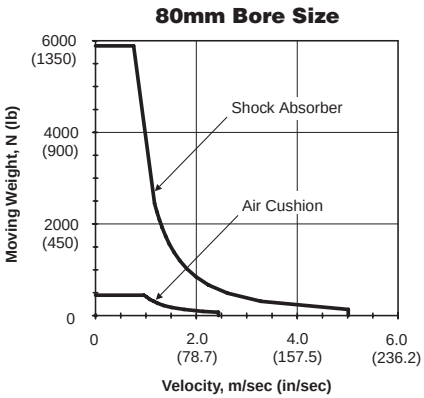
50mm Bore Size



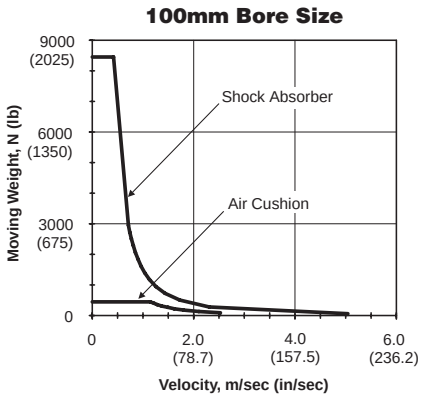
63mm Bore Size



80mm Bore Size



100mm Bore Size



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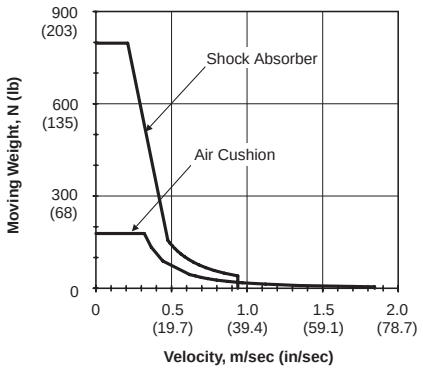
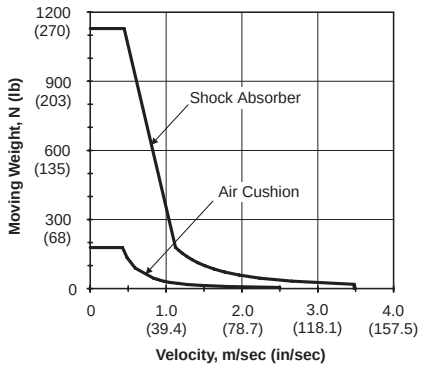
Bore	Moving Weights (Standard Shaft)						Moving Weights (Oversized Shaft)					
	Basic Thrust Unit		Basic Reach Unit		Per Inch		Basic Thrust Unit		Basic Reach Unit		Per Inch	
	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs
20	0.27	0.6	0.32	0.7	0.02	0.05	0.35	0.8	0.43	0.96	0.03	0.07
25	0.45	1.0	0.53	1.2	0.03	0.07	0.68	1.5	0.85	1.88	0.06	0.13
32	0.78	1.7	0.95	2.1	0.06	0.13	1.15	2.5	1.45	3.20	0.09	0.21
40	1.4	3.2	1.7	3.8	0.09	0.21	2.2	4.7	2.82	6.2	0.15	0.32
50	2.8	6.1	3.4	7.5	0.15	0.32	4.0	8.8	5.21	11.5	0.21	0.47
63	4.7	10.5	6.0	13.2	0.21	0.47	7.5	16.6	10.27	22.6	0.38	0.83
80	9.0	19.7	11.7	25.8	0.26	0.58	13.9	30.7	19.08	42.1	0.59	1.29
100	16.4	36.2	21.6	47.6	0.59	1.29	18.1	40.0	25.57	56.4	0.84	1.86

P5L Reach Slides

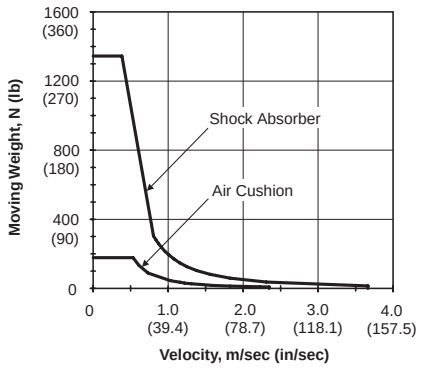
20mm Bore Size



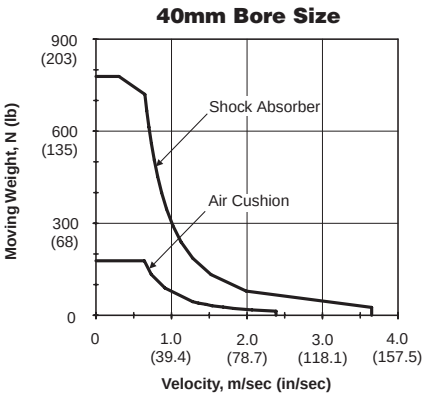
25mm Bore Size



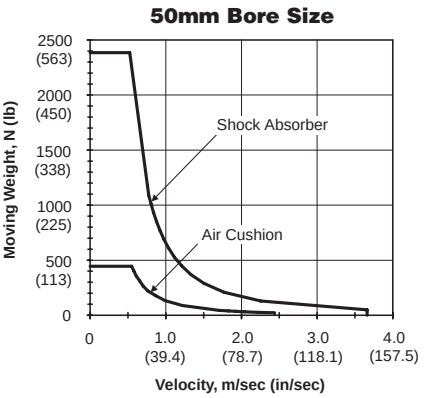
32mm Bore Size



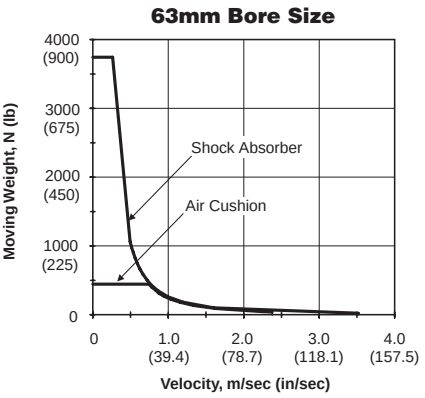
40mm Bore Size



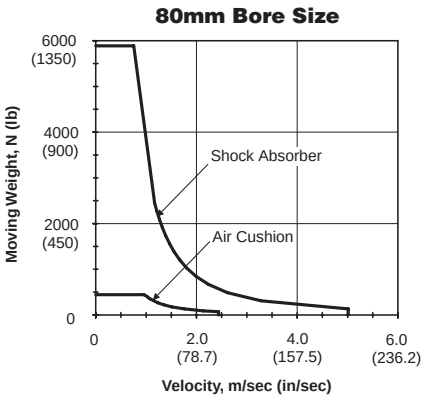
50mm Bore Size



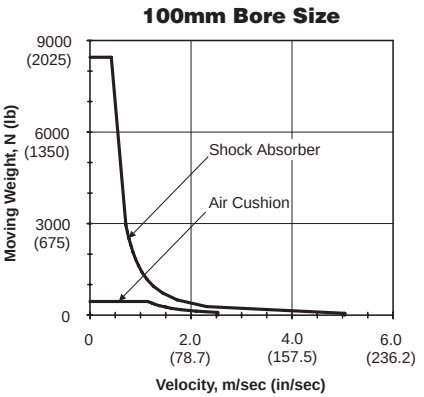
63mm Bore Size



80mm Bore Size



100mm Bore Size



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Horizontal Load Capacity & Deflection with Standard Shafting

- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Recirculating Ball Bearings w/ Carbon or Stainless Steel Rods
- Self Aligning Ball Bearings w/ Carbon or Stainless Steel Rods

The graphs on these two pages illustrate the maximum suggested side load at a given actuator stroke. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

See the P5L options section of this catalog for more bearing selection information.

Dynamic loading is defined as a load which is affixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

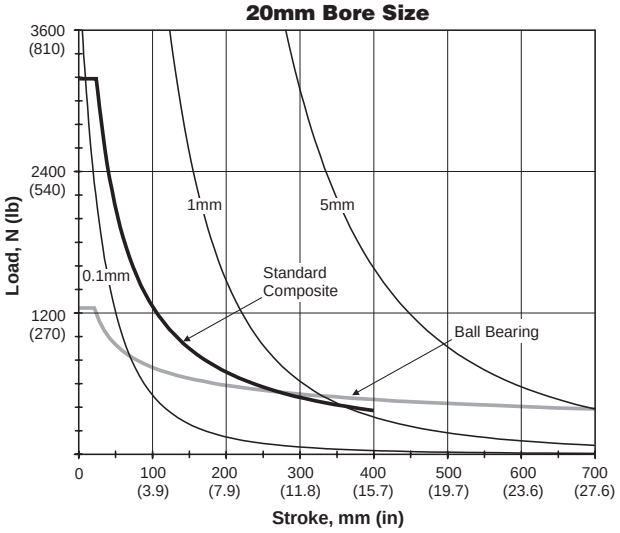
Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

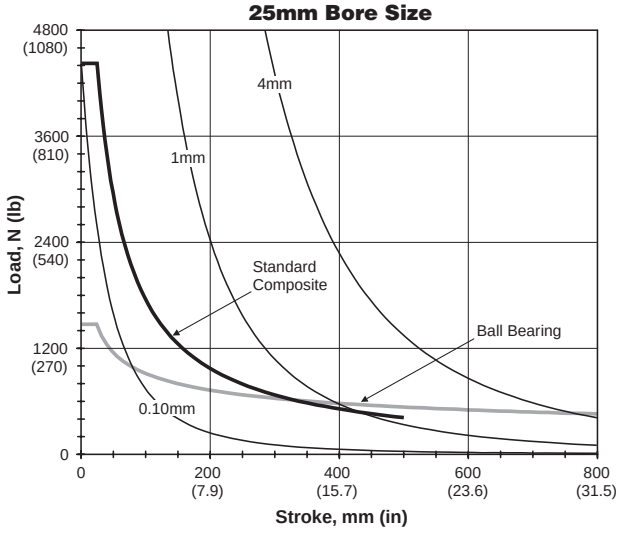
F

P5L Base Slides

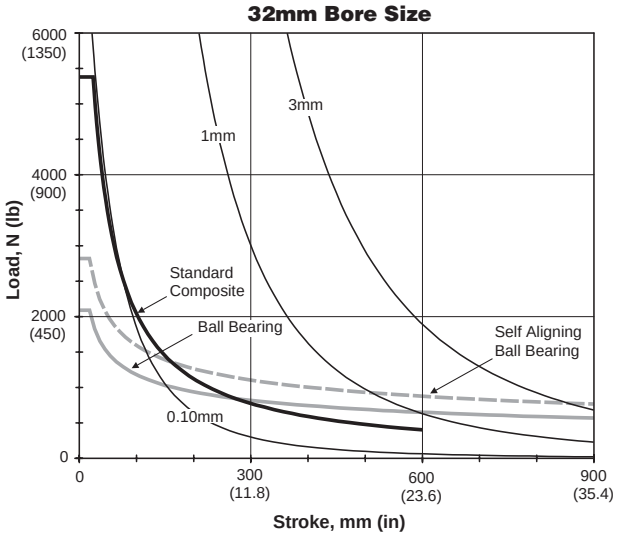
20mm Bore Size



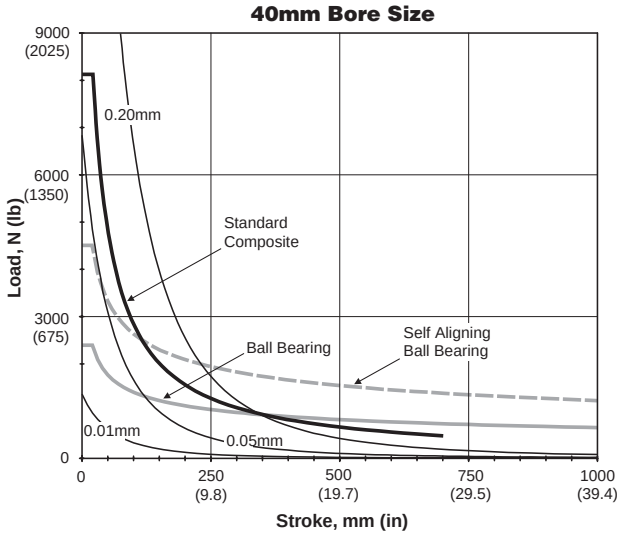
25mm Bore Size



32mm Bore Size



40mm Bore Size



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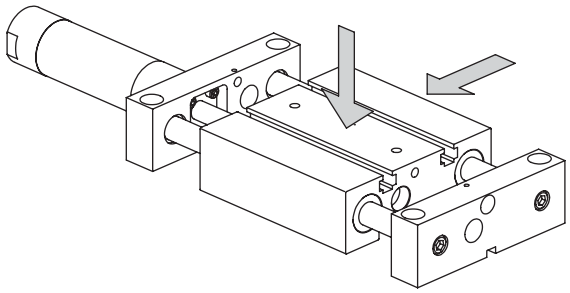
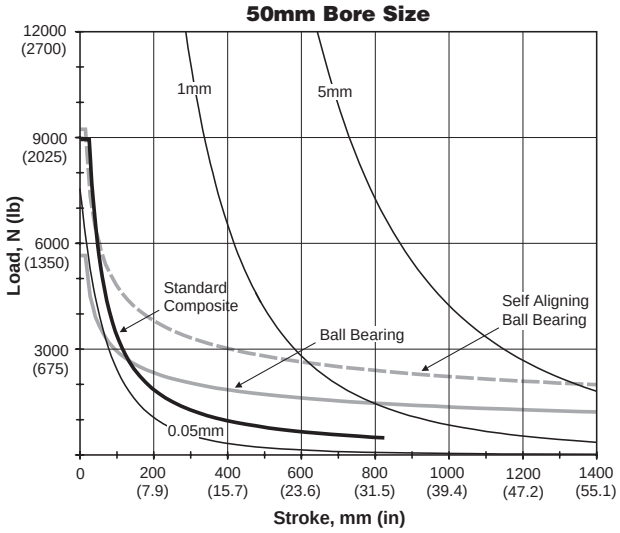
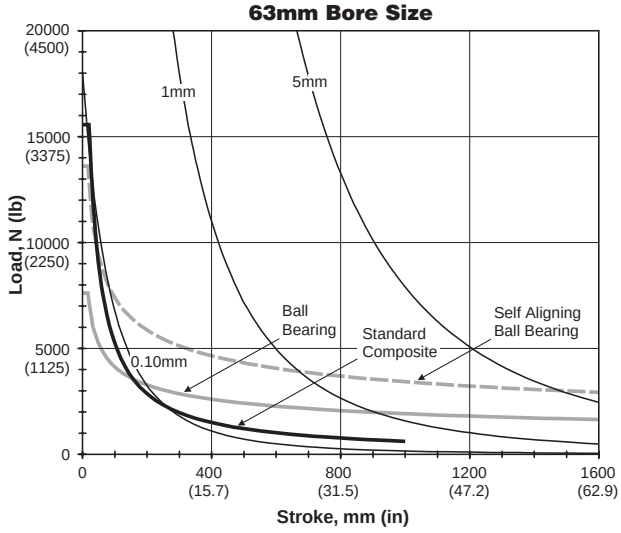
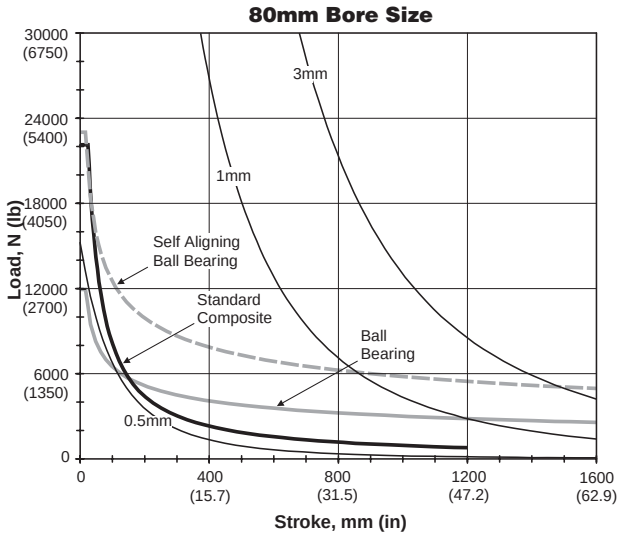
Horizontal Load Capacity & Deflection with Standard Shafting

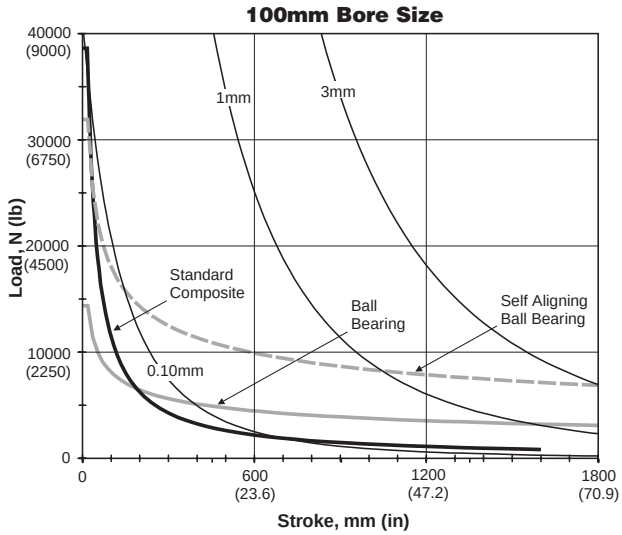


P5L Base Slides









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Horizontal Load Capacity & Deflection with Oversized Shafting

- Oversized Composite w/ Chrome Plated or Stainless Steel Rods

The graphs on these two pages illustrate the maximum suggested side load at a given actuator stroke. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

See the P5L options section of this catalog for more bearing selection information.

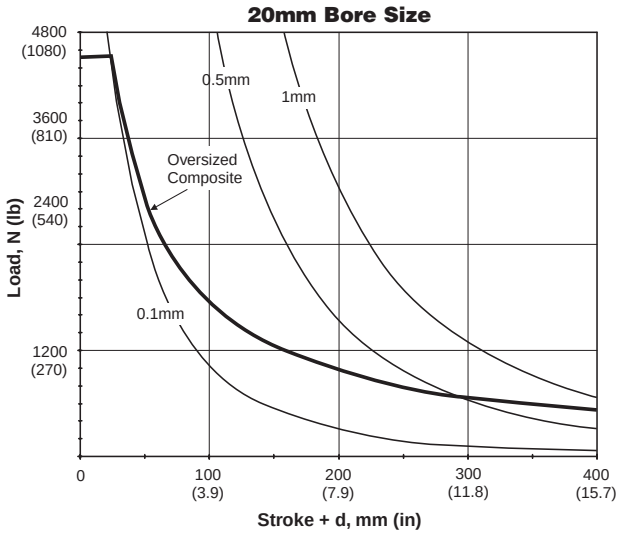
Dynamic loading is defined as a load which is affixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

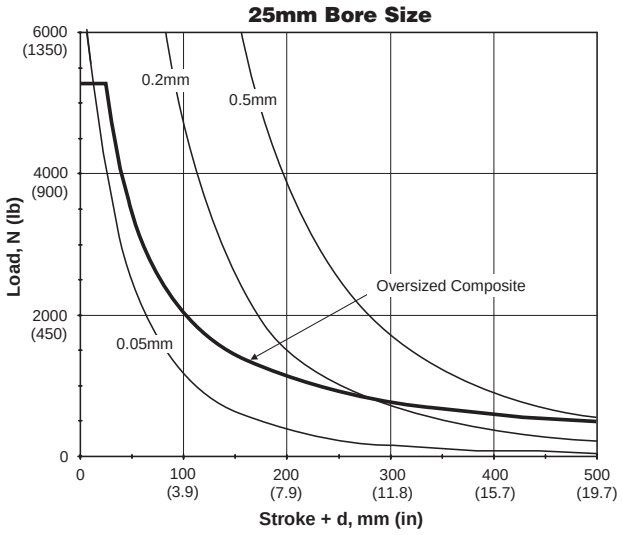
Note: The following variables commonly affect the bearing life of a guided cylinder:

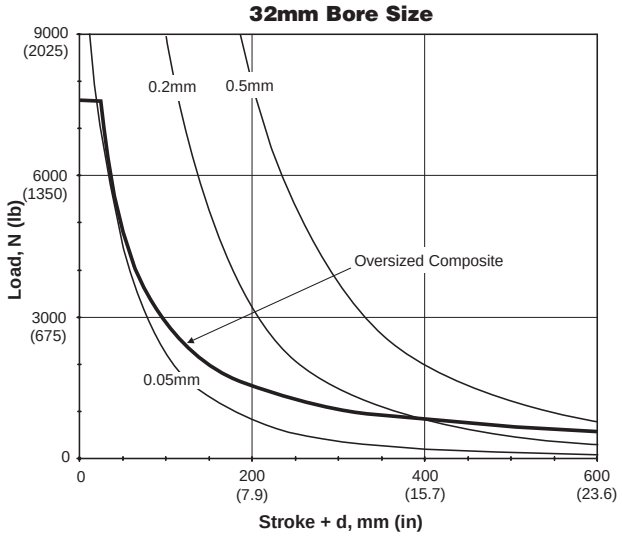
- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

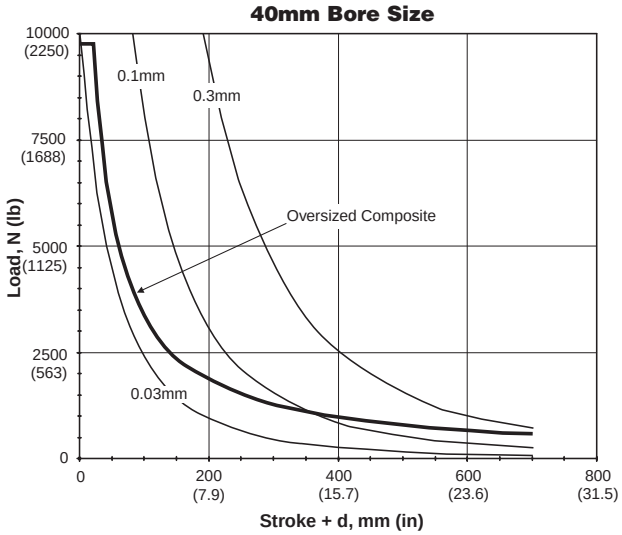
F

P5L Base Slides









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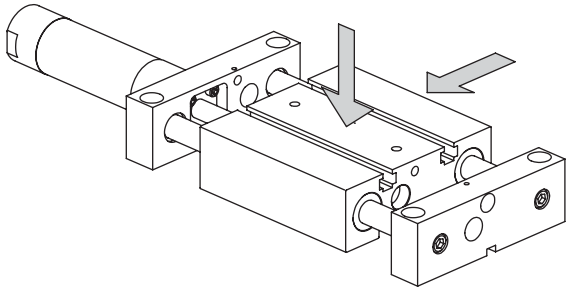
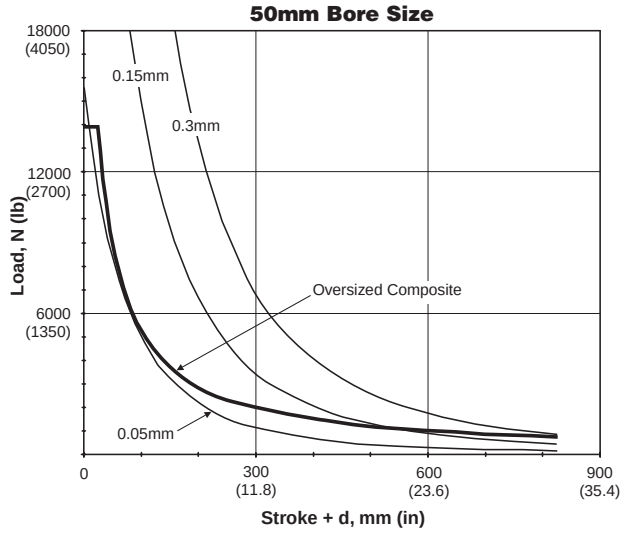
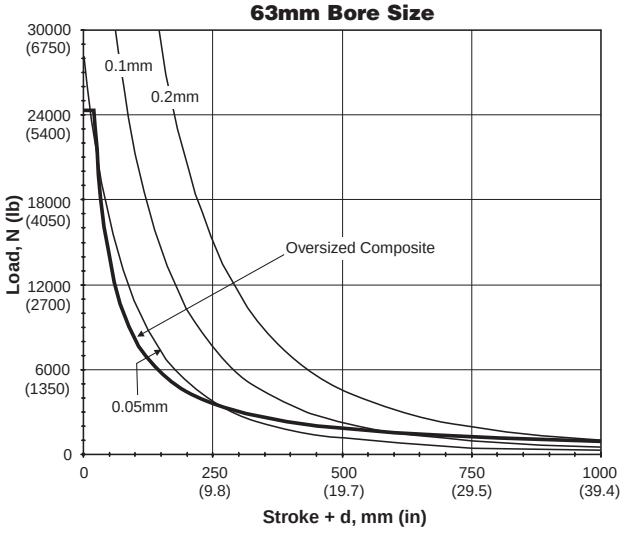
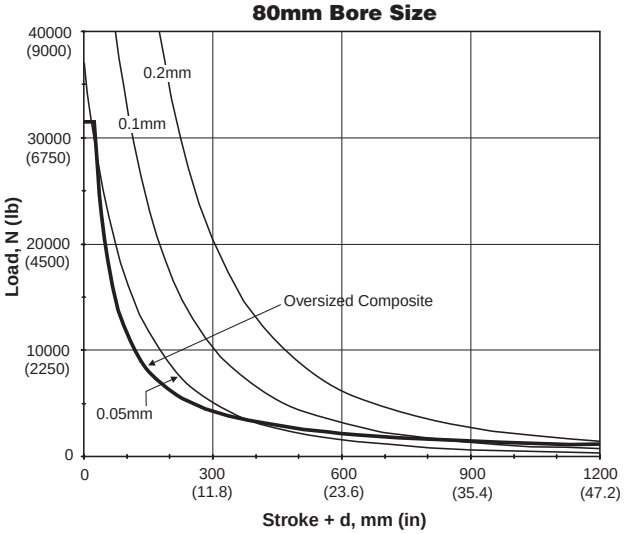
Horizontal Load Capacity & Deflection with Oversized Shafting

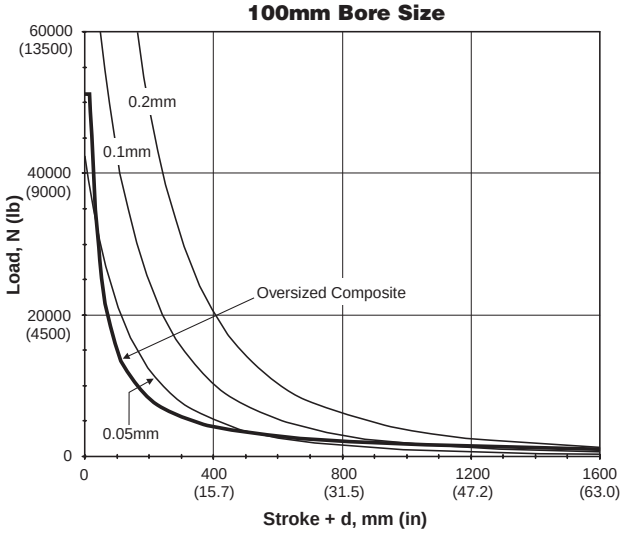


P5L Base Slides









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Symmetrical Roll Torsional Loading

The graphs on these two pages illustrate the maximum suggested roll load at a given actuator stroke. It is assumed that the moment loading is acting about the centerline of the carriage. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application. For an equivalent static load capacity multiply the information in these graphs by 1.5.

Heavy lines show loading; lighter lines show various degrees of deflection.

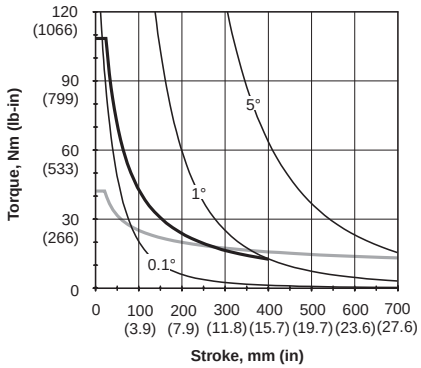
Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

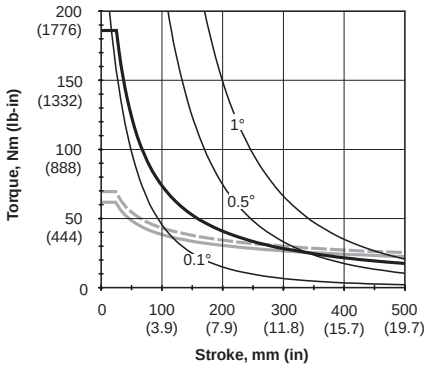
F

Standard Shafting

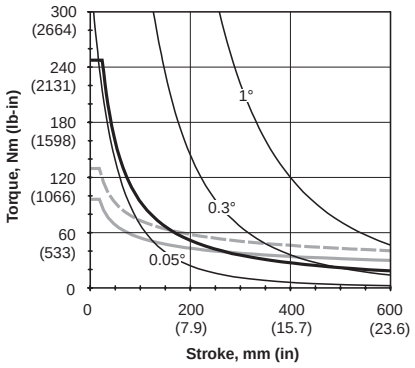
20mm Bore Size



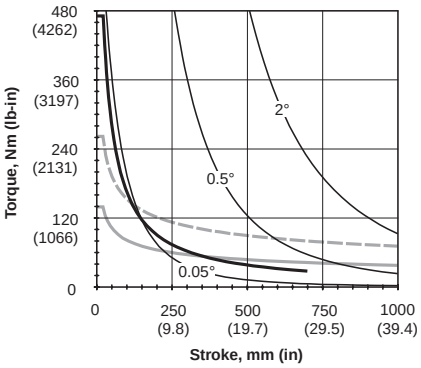
25mm Bore Size



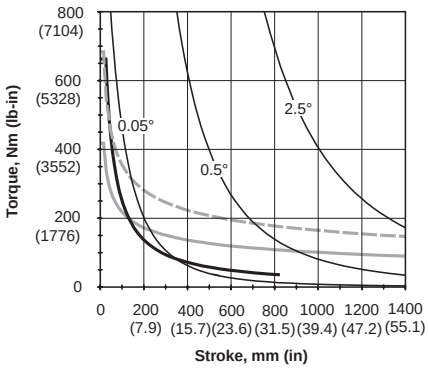
32mm Bore Size



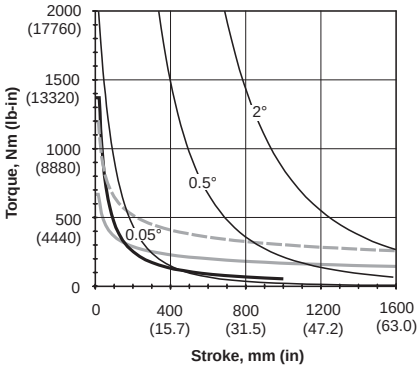
40mm Bore Size



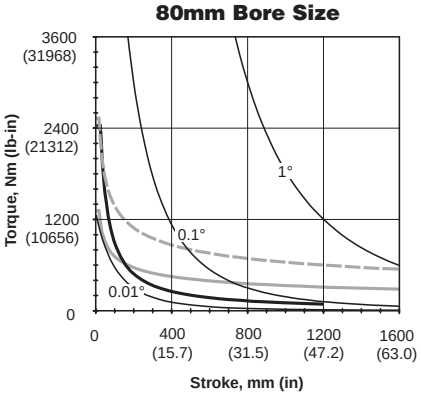
50mm Bore Size



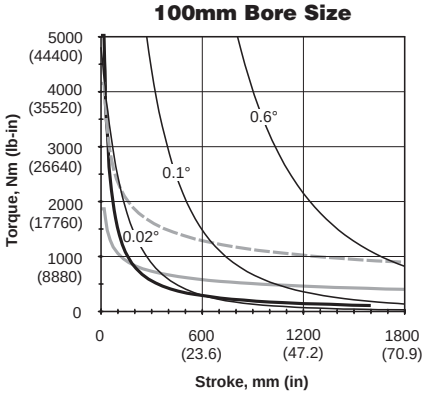
63mm Bore Size



80mm Bore Size



100mm Bore Size



LEGEND

- Standard Composite
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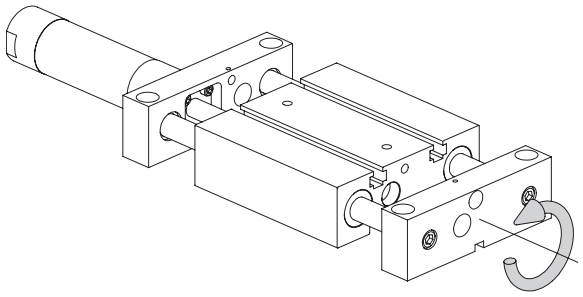
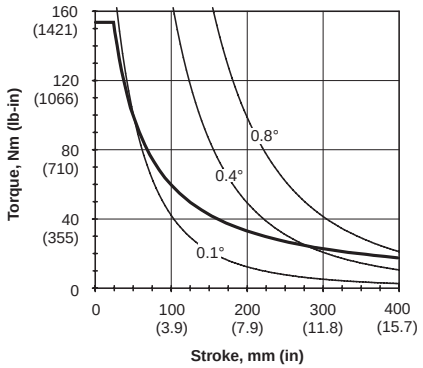
Symmetrical Roll Torsional Loading

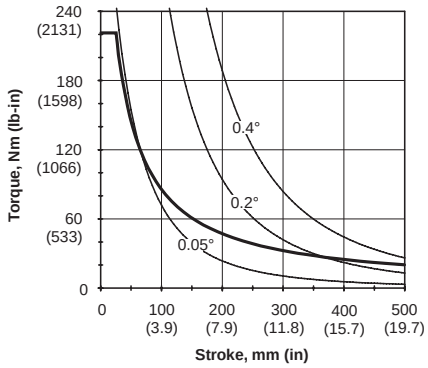


Oversized Shafting

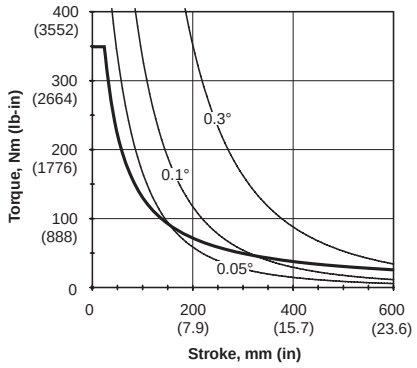
20mm Bore Size



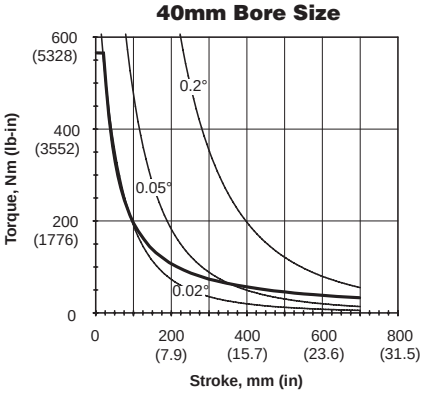
25mm Bore Size



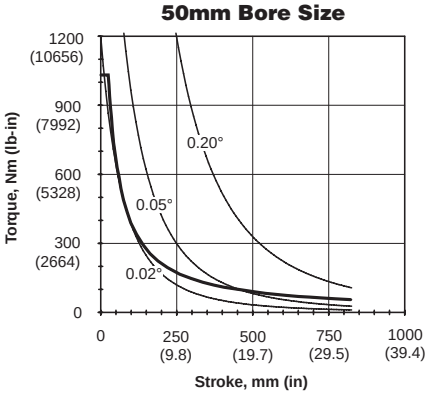
32mm Bore Size



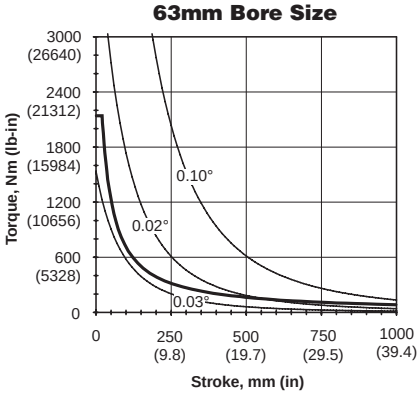
40mm Bore Size



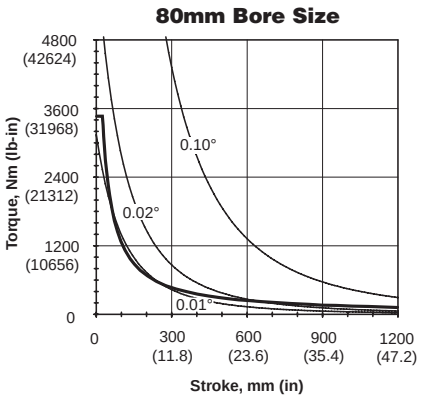
50mm Bore Size



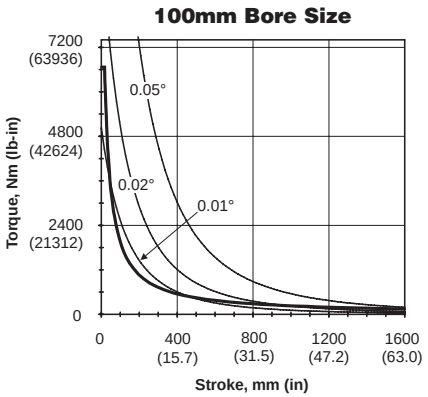
63mm Bore Size



80mm Bore Size



100mm Bore Size



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Symmetrical Pitch Torsional Loading

The graphs on these two pages illustrate the maximum suggested pitch load at a given actuator stroke. It is assumed that the moment loading is acting about the centerline of the carriage. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application. For an equivalent static load capacity multiply the information in these graphs by 1.5.

Heavy lines show loading; lighter lines show various degrees of deflection.

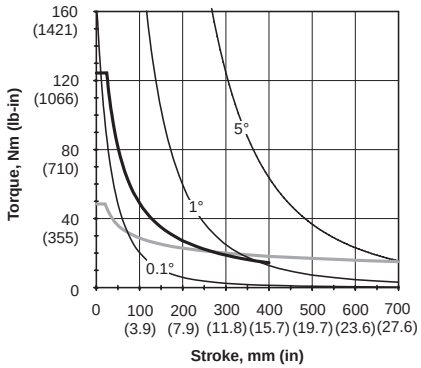
Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

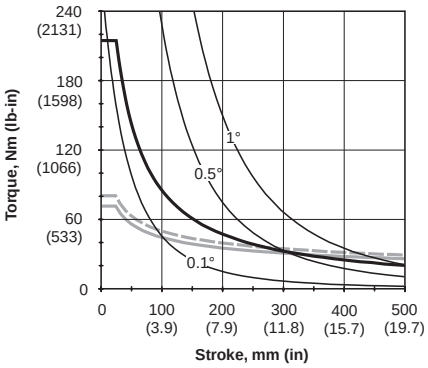
F

Standard Shafting

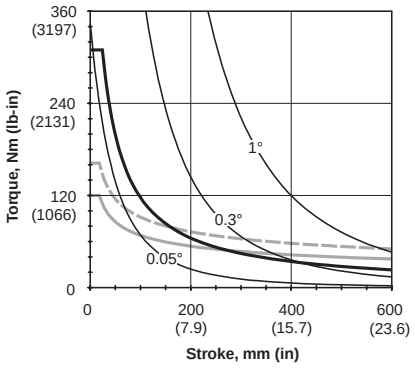
20mm Bore Size



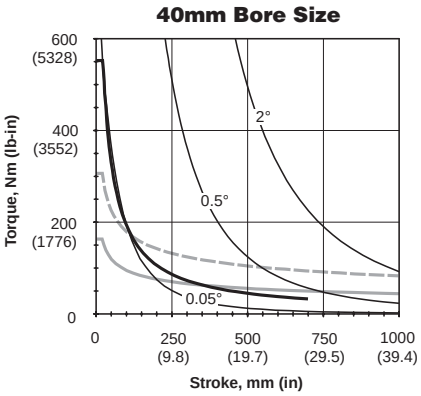
25mm Bore Size



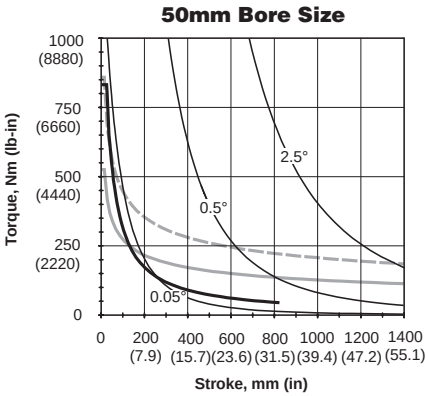
32mm Bore Size



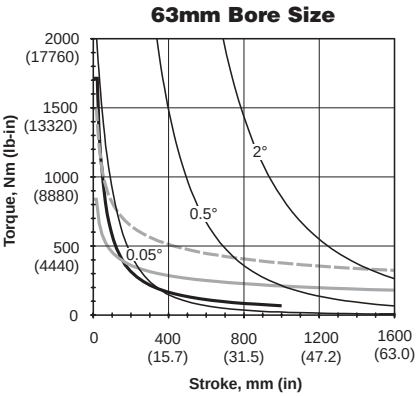
40mm Bore Size



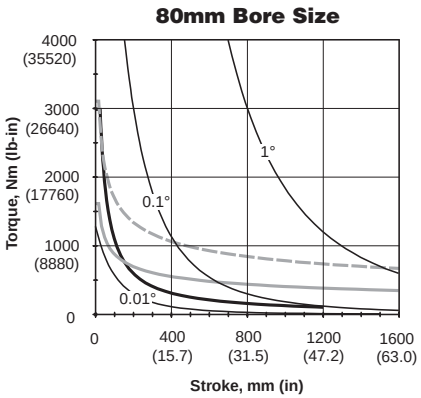
50mm Bore Size



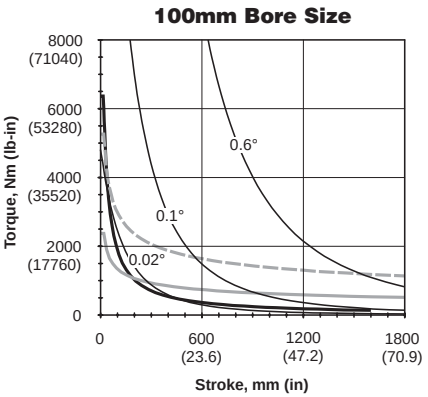
63mm Bore Size



80mm Bore Size



100mm Bore Size



LEGEND

- Standard Composite
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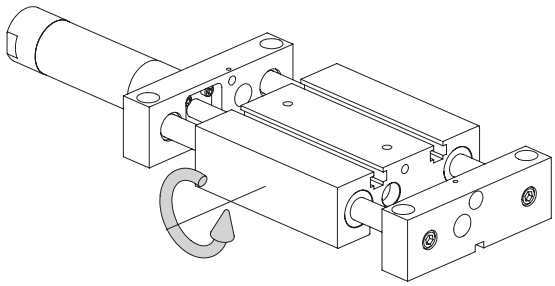
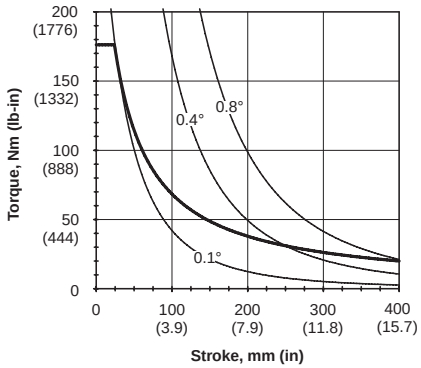
Symmetrical Pitch Torsional Loading

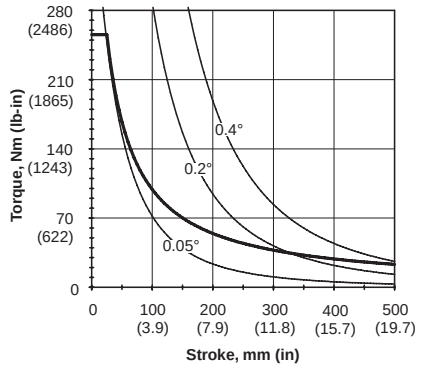


Oversized Shafting

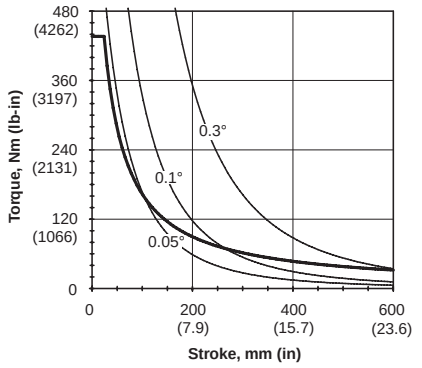
20mm Bore Size



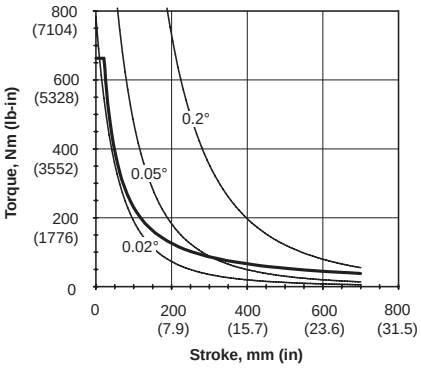
25mm Bore Size



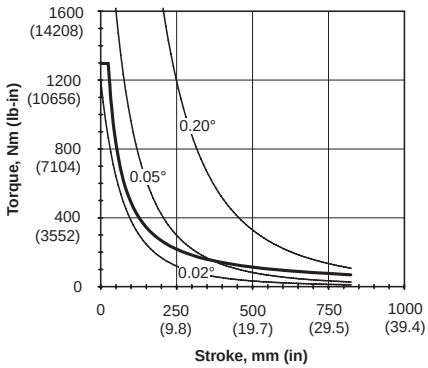
32mm Bore Size



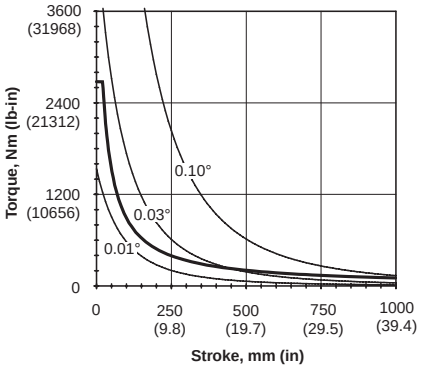
40mm Bore Size



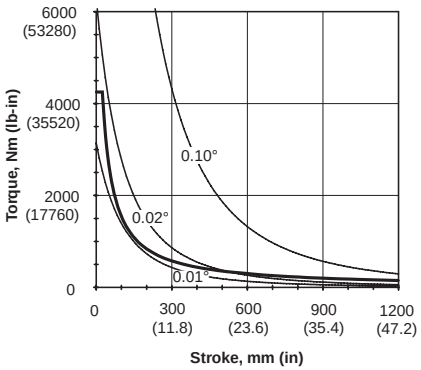
50mm Bore Size



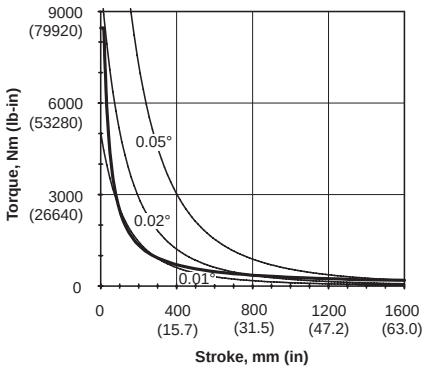
63mm Bore Size



80mm Bore Size



100mm Bore Size



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Symmetrical Yaw Torsional Loading

The graphs on these two pages illustrate the maximum suggested yaw load at a given actuator stroke. It is assumed that the moment loading is acting about the centerline of the carriage. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application. For an equivalent static load capacity multiply the information in these graphs by 1.5.

Heavy lines show loading; lighter lines show various degrees of deflection.

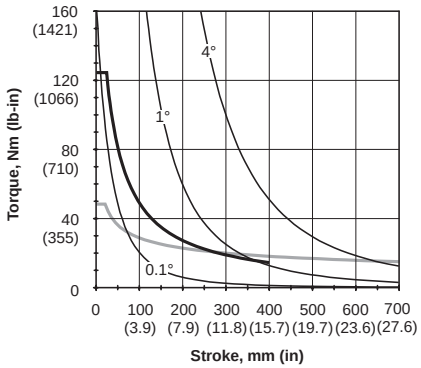
Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

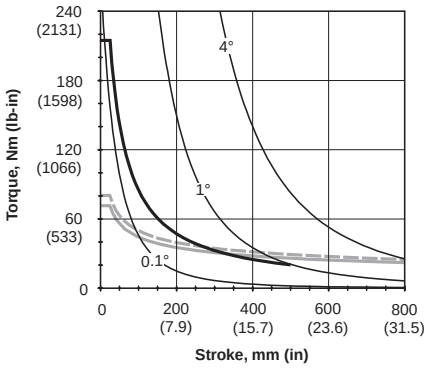
F

Standard Shafting

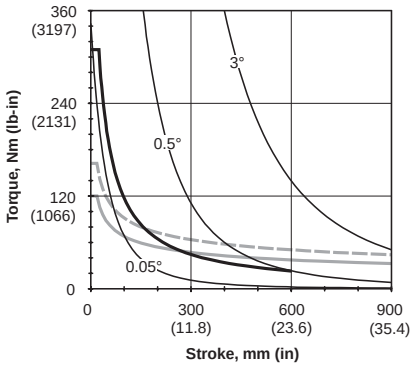
20mm Bore Size



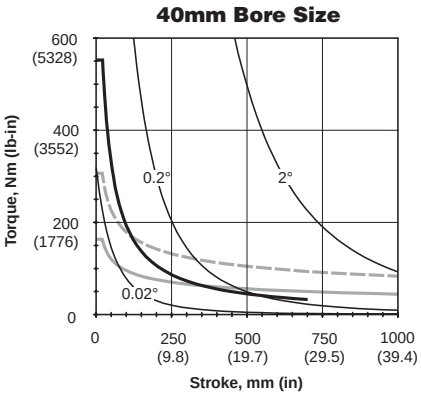
25mm Bore Size



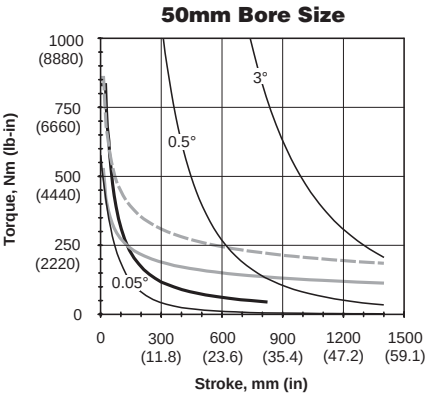
32mm Bore Size



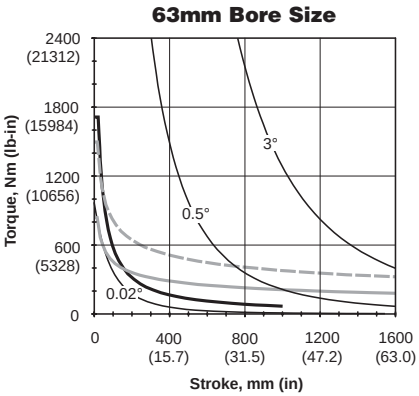
40mm Bore Size



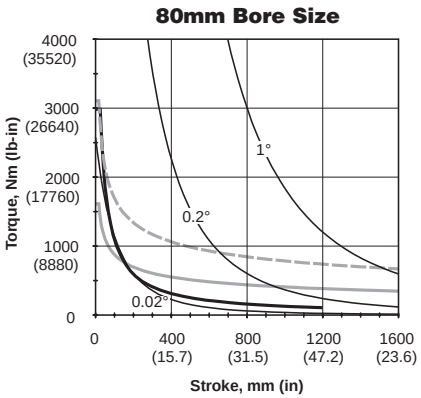
50mm Bore Size



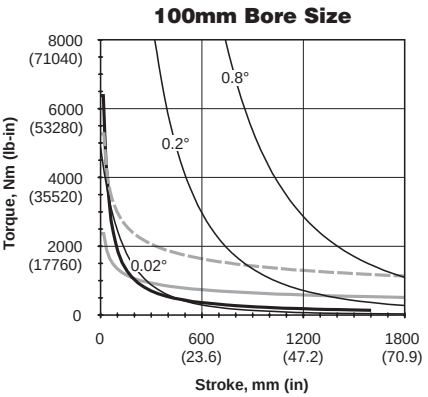
63mm Bore Size

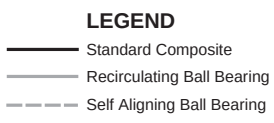


80mm Bore Size



100mm Bore Size





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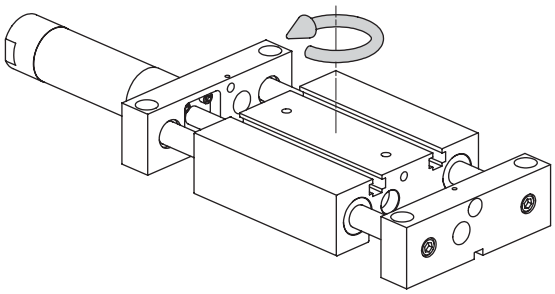
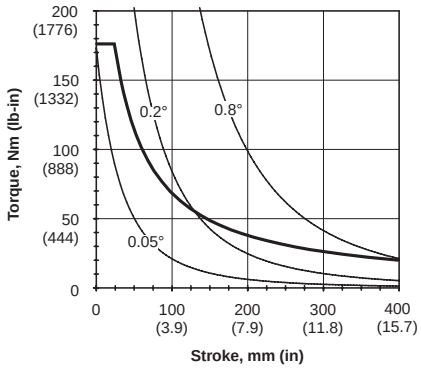
Symmetrical Yaw Torsional Loading

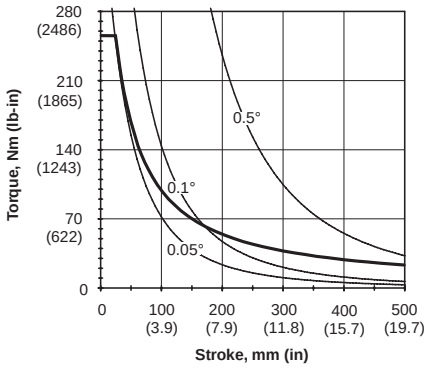


Oversized Shafting

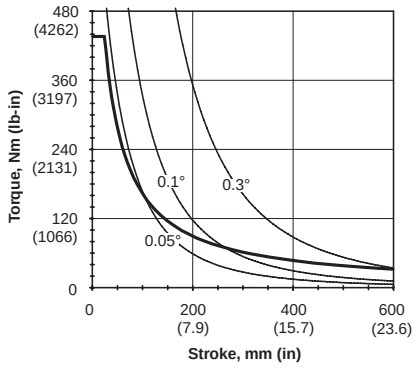
20mm Bore Size



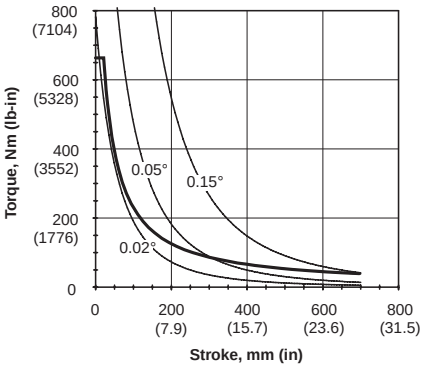
25mm Bore Size



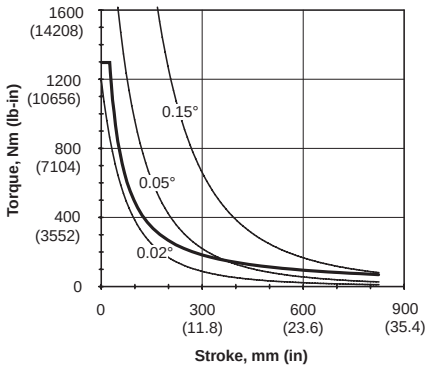
32mm Bore Size



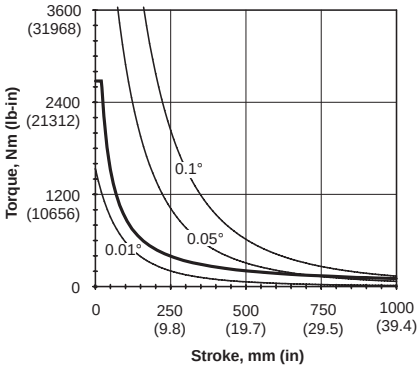
40mm Bore Size



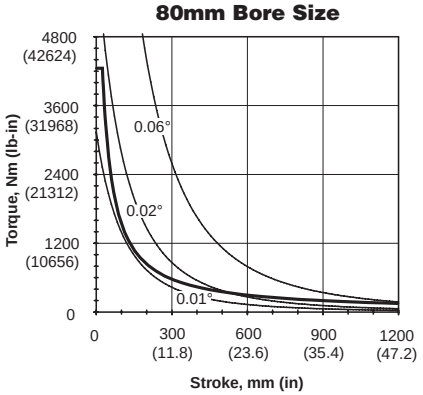
50mm Bore Size



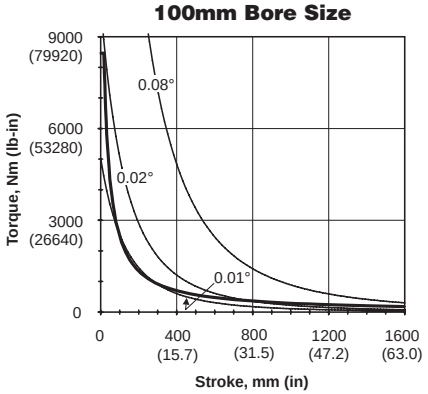
63mm Bore Size



80mm Bore Size



100mm Bore Size



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Kinetic Energy

These graphs illustrate the kinetic energy absorption of the P5L series as a weight versus speed chart for both air cushions and shock absorbers.

Moving weight is defined as the weight of the carried load and the weight of any moving parts of the actuator (support rods, tooling plate, etc.). The moving weight from the chart to the right should be considered.

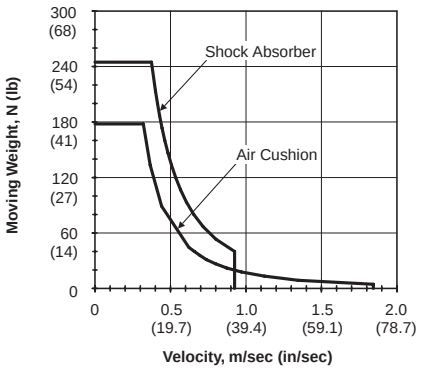
Note: These charts are to be used only to determine the energy absorption of each guided cylinder and to determine if shocks or cushions are needed.

Bore	Moving Weights (Standard Shaft)		Moving Weights (Oversized Shaft)	
	kg	lbs	kg	lbs
20	0.60	1.3	0.51	1.1
25	1.17	2.6	1.01	2.2
32	1.77	3.9	1.51	3.3
40	3.10	6.8	2.70	5.9
50	7.10	15.7	6.70	14.8
63	13.4	29.5	10.9	24.0
80	22.5	49.6	19.3	42.6
100	41.9	92.4	33.9	746.5

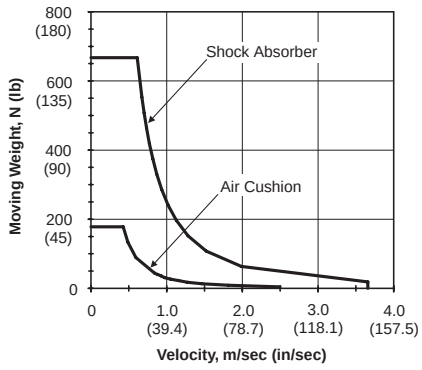
Note: Cylinder moving parts considered negligible.

P5L Base Slides

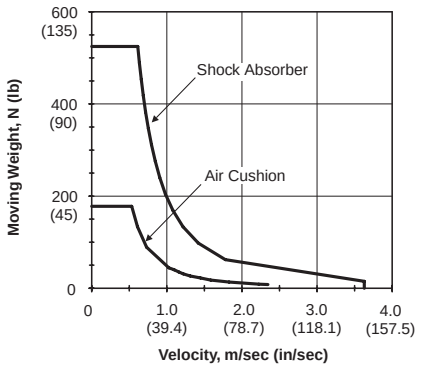
20mm Bore Size



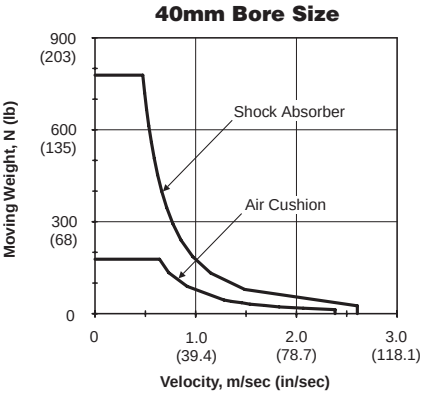
25mm Bore Size



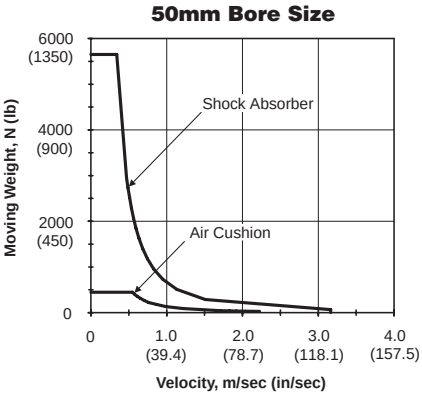
32mm Bore Size



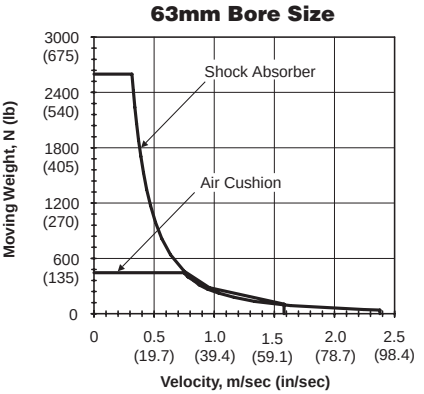
40mm Bore Size



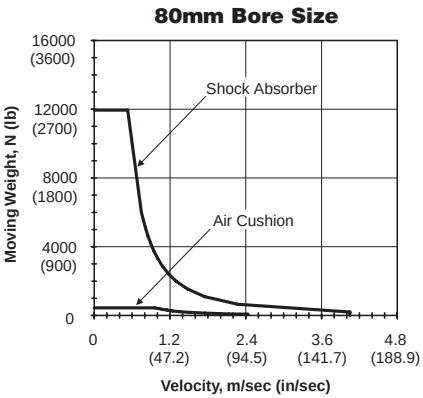
50mm Bore Size



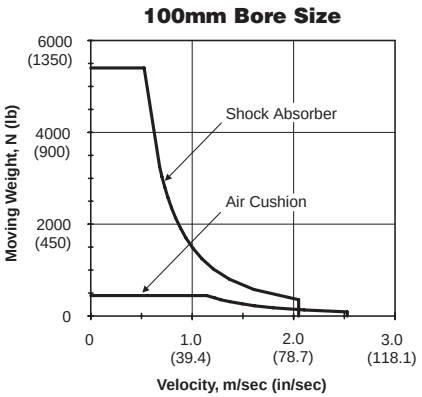
63mm Bore Size



80mm Bore Size



100mm Bore Size



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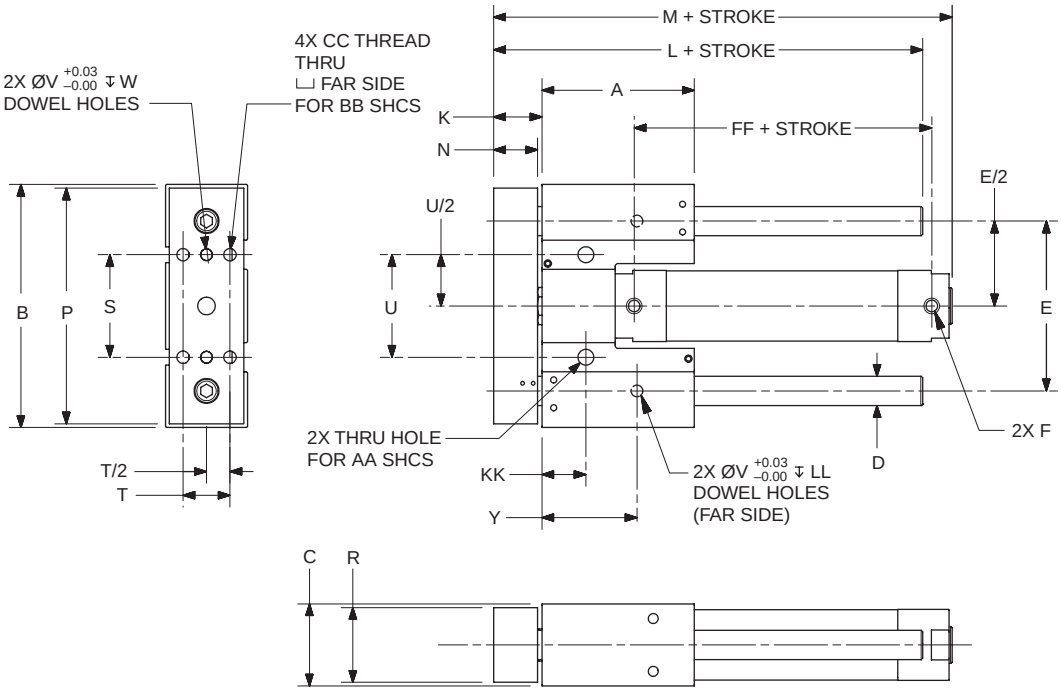
Thrust Slides



Bore	A	B	C	Ds*	Do*	E	F**	K	L	M	N	P	R
20	60 (2.4)	98 (3.9)	30 (1.2)	10 (0.4)	12 (0.5)	68 (2.7)	1/8†	20 (0.8)	86 (3.4)	114 (4.5)	17 (0.7)	96 (3.8)	26 (1.0)
25	76 (3.0)	122 (4.8)	38 (1.5)	12 (0.5)	16 (0.6)	84 (3.3)	1/8†	25 (1.0)	107 (4.2)	126 (5.0)	22 (0.9)	119 (4.7)	33 (1.3)
32	84 (3.3)	140 (5.5)	44 (1.7)	16 (0.6)	20 (0.8)	92 (3.6)	1/8	27 (1.1)	117 (4.6)	140 (5.5)	24 (0.9)	137 (5.4)	39 (1.5)
40	104 (4.1)	166 (6.5)	56 (2.2)	20 (0.8)	25 (1.0)	116 (4.6)	1/8	33 (1.3)	143 (5.6)	163 (6.4)	30 (1.2)	161 (6.3)	51 (2.0)
50	130 (5.1)	216 (8.5)	70 (2.8)	25 (1.0)	30 (1.2)	148 (5.8)	1/4	39 (1.5)	175 (6.9)	195 (7.7)	36 (1.4)	211 (8.3)	63 (2.5)
63	152 (6.0)	260 (10.2)	84 (3.3)	30 (1.2)	40 (1.6)	176 (6.9)	1/4	43 (1.7)	203 (8.0)	219 (8.6)	40 (1.6)	255 (10.0)	77 (3.0)
80	180 (7.1)	320 (12.6)	102 (4.0)	40 (1.6)	50 (2.0)	220 (8.7)	3/8	49 (1.9)	237 (9.3)	249 (9.8)	46 (1.8)	315 (12.4)	95 (3.7)
100	222 (8.7)	390 (15.4)	120 (4.7)	50 (2.0)	60 (2.4)	260 (10.2)	1/2	59 (2.3)	289 (11.4)	306 (12.0)	56 (2.2)	383 (15.1)	111 (4.4)

Bore	S	T	U	V	W	Y	AA	BB	CC	FF	KK	LL
20	40 (1.6)	16 (0.6)	40 (1.6)	4.03 (0.2)	4 (0.2)	36 (1.4)	M5	M4	M5x0.8	45 (1.8)	16 (0.6)	4 (0.2)
25	48 (1.9)	20 (0.8)	48 (1.9)	5.03 (0.2)	5 (0.2)	46 (1.8)	M6	M5	M6x1.0	46 (1.8)	22 (0.9)	5 (0.2)
32	50 (2.0)	24 (0.9)	50 (2.0)	6.03 (0.2)	6 (0.2)	53 (2.1)	M8	M6	M8x1.25	43 (1.7)	28 (1.1)	6 (0.2)
40	70 (2.8)	32 (1.3)	70 (2.8)	8.03 (0.3)	8 (0.3)	65 (2.6)	M10	M8	M10x1.5	49 (1.9)	30 (1.2)	8 (0.3)
50	80 (3.1)	42 (1.7)	80 (3.1)	8.03 (0.3)	8 (0.3)	83 (3.3)	M10	M8	M10x1.5	53 (2.1)	43 (1.7)	8 (0.3)
63	100 (3.9)	52 (2.0)	100 (3.9)	10.03 (0.4)	10 (0.4)	101 (4.0)	M12	M10	M12x1.75	52 (2.0)	51 (2.0)	10 (0.4)
80	124 (4.9)	62 (2.4)	124 (4.9)	12.03 (0.5)	12 (0.5)	127 (5.0)	M16	M14	M16x1.5	64 (2.5)	65 (2.6)	12 (0.5)
100	148 (5.8)	72 (2.8)	148 (5.8)	12.03 (0.5)	12 (0.5)	154 (6.1)	M20	M16	M20x2.5	66 (2.6)	80 (3.1)	12 (0.5)

Dimensions in mm (in) ** s = standard, o = oversized* *** NPTF or BSPT* *† w/cushions M5/10-32*

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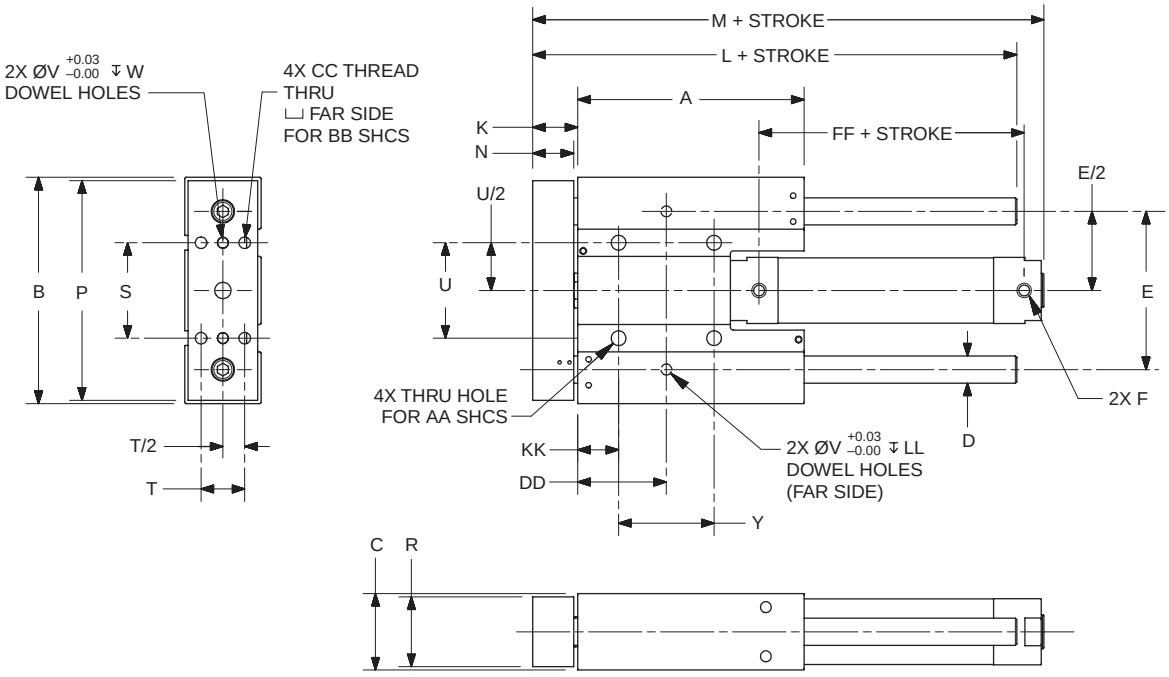
Reach Slides



Bore	A	B	C	Ds*	Do*	E	F**	K	L	M	N	P	R
20	98 (3.9)	98 (3.9)	30 (1.2)	10 (0.4)	12 (0.5)	68 (2.7)	1/8†	20 (0.8)	124 (4.9)	152 (6.0)	17 (0.7)	96 (3.8)	26 (1.0)
25	122 (4.8)	122 (4.8)	38 (1.5)	12 (0.5)	16 (0.6)	84 (3.3)	1/8†	25 (1.0)	153 (6.0)	172 (6.8)	22 (0.9)	119 (4.7)	33 (1.3)
32	140 (5.5)	140 (5.5)	44 (1.7)	16 (0.6)	20 (0.8)	92 (3.6)	1/8	27 (1.1)	173 (6.8)	196 (7.7)	24 (0.9)	137 (5.4)	39 (1.5)
40	166 (6.5)	166 (6.5)	56 (2.2)	20 (0.8)	25 (1.0)	116 (4.6)	1/8	33 (1.3)	205 (8.1)	225 (8.9)	30 (1.2)	161 (6.3)	51 (2.0)
50	216 (8.5)	216 (8.5)	70 (2.8)	25 (1.0)	30 (1.2)	148 (5.8)	1/4	39 (1.5)	261 (10.3)	281 (11.1)	36 (1.4)	211 (8.3)	63 (2.5)
63	260 (10.2)	260 (10.2)	84 (3.3)	30 (1.2)	40 (1.6)	176 (6.9)	1/4	43 (1.7)	311 (12.2)	327 (12.9)	40 (1.6)	255 (10.0)	77 (3.0)
80	320 (12.6)	320 (12.6)	102 (4.0)	40 (1.6)	50 (2.0)	220 (8.7)	3/8	49 (1.9)	377 (14.8)	389 (15.3)	46 (1.8)	315 (12.4)	9 (3.7)
100	390 (15.4)	390 (15.4)	120 (4.7)	50 (2.0)	60 (2.4)	260 (10.2)	1/2	59 (2.3)	457 (18.0)	474 (18.7)	56 (2.2)	383 (15.1)	111 (4.4)

Bore	S	T	U	V	W	Y	AA	BB	CC	DD	FF	KK	LL
20	40 (1.6)	16 (0.6)	40 (1.6)	4.03 (0.2)	4 (0.2)	40 (1.6)	M5	M4	M5X0.8	36 (1.4)	45 (1.8)	16 (0.6)	4 (0.2)
25	48 (1.9)	20 (0.8)	48 (1.9)	5.03 (0.2)	5 (0.2)	48 (1.9)	M6	M5	M6X1.0	46 (1.8)	46 (1.8)	22 (0.9)	5 (0.2)
32	50 (2.0)	24 (0.9)	50 (2.0)	6.03 (0.2)	6 (0.2)	50 (2.0)	M8	M6	M8X1.25	53 (2.1)	43 (1.7)	28 (1.1)	6 (0.2)
40	70 (2.8)	32 (1.3)	70 (2.8)	8.03 (0.3)	8 (0.3)	70 (2.8)	M10	M8	M10X1.5	65 (2.6)	49 (1.9)	30 (1.2)	8 (0.3)
50	80 (3.1)	42 (1.7)	80 (3.1)	8.03 (0.3)	8 (0.3)	80 (3.1)	M10	M8	M10X1.5	83 (3.3)	53 (2.1)	43 (1.7)	8 (0.3)
63	100 (3.9)	52 (2.0)	100 (3.9)	10.03 (0.4)	10 (0.4)	100 (3.9)	M12	M10	M12X1.75	101 (4.0)	52 (2.0)	51 (2.0)	10 (0.4)
80	124 (4.9)	62 (2.4)	124 (4.9)	12.03 (0.5)	12 (0.5)	124 (4.9)	M16	M14	M16X1.5	127 (5.0)	64 (2.5)	65 (2.6)	12 (0.5)
100	148 (5.8)	72 (2.8)	148 (5.8)	12.03 (0.5)	12 (0.5)	148 (5.8)	M20	M16	M20X2.5	154 (6.1)	66 (2.6)	80 (3.1)	12 (0.5)

Dimensions in mm (in) ** s = standard, o = oversized* *** NPTF or BSPT* *† w/cushions M5/10-32*

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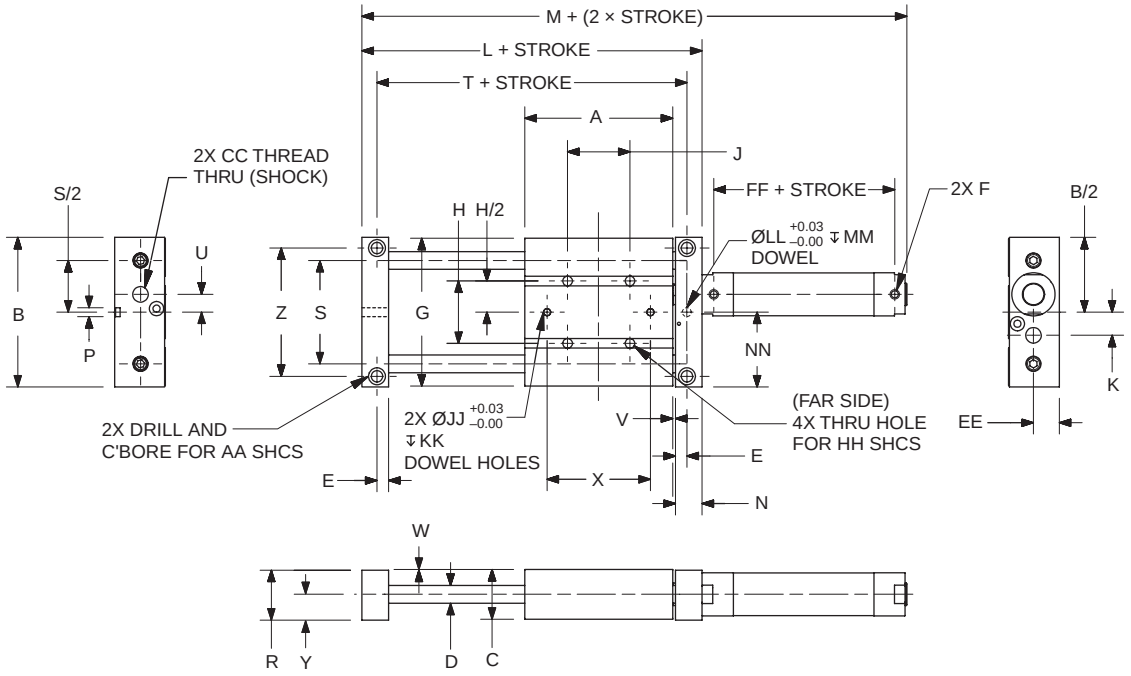
Base Slides



Bore	A	B	C	Ds*	Do*	E	F**	G	H	J	K	L	M	N	P+.03	R	S
20	98 (3.9)	100 (3.9)	30 (1.2)	10 (0.4)	12 (0.5)	8 (0.3)	1/8†	98 (3.9)	40 (1.6)	40 (1.6)	18 (0.7)	140 (5.5)	211 (8.3)	18 (0.7)	5.03 (0.2)	30 (1.2)	68 (2.7)
25	122 (4.8)	124 (4.9)	38 (1.5)	12 (0.5)	16 (0.6)	14 (0.6)	1/8†	122 (4.8)	48 (1.9)	48 (1.9)	22 (0.9)	176 (6.9)	247 (9.7)	24 (0.9)	6.03 (0.2)	38 (1.5)	84 (3.3)
32	140 (5.5)	142 (5.6)	44 (1.7)	16 (0.6)	20 (0.8)	12 (0.5)	1/8	140 (5.5)	50 (2.0)	50 (2.0)	22 (0.9)	198 (7.8)	271 (10.7)	26 (1.0)	6.03 (0.2)	44 (1.7)	92 (3.6)
40	166 (6.5)	168 (6.6)	56 (2.2)	20 (0.8)	25 (1.0)	13 (0.5)	1/8	166 (6.5)	70 (2.8)	70 (2.8)	26 (1.0)	232 (9.1)	312 (12.3)	30 (1.2)	10.03 (0.4)	56 (2.2)	116 (4.6)
50	216 (8.5)	218 (8.6)	70 (2.8)	25 (1.0)	30 (1.2)	16 (0.6)	1/4	216 (8.5)	80 (3.1)	80 (3.1)	28 (1.1)	292 (11.5)	384 (15.1)	35 (1.4)	10.03 (0.4)	70 (2.8)	148 (5.8)
63	260 (10.2)	262 (10.3)	84 (3.3)	30 (1.2)	40 (1.6)	19 (0.7)	1/4	260 (10.2)	100 (3.9)	100 (3.9)	42 (1.7)	350 (13.8)	442 (17.4)	42 (1.7)	12.03 (0.5)	84 (3.3)	176 (6.9)
80	320 (12.6)	322 (12.7)	102 (4.0)	40 (1.6)	50 (2.0)	24 (0.9)	3/8	320 (12.6)	124 (4.9)	124 (4.9)	42 (1.7)	434 (17.1)	545 (21.5)	54 (2.1)	16.03 (0.6)	102 (4.0)	220 (8.7)
100	390 (15.4)	392 (15.4)	120 (4.7)	50 (2.0)	60 (2.4)	28 (1.1)	1/2	390 (15.4)	148 (5.8)	148 (5.8)	62 (2.4)	528 (20.8)	639 (25.2)	66 (2.6)	16.03 (0.6)	120 (4.7)	260 (10.2)

Bore	T	U	V***	W	X	Y	Z	AA	CC	EE	FF	HH	JJ	KK	LL	MM	NN
20	120 (4.7)	11 (0.4)	3 (0.1)	1 (0.0)	68 (2.7)	14 (0.6)	86 (3.4)	M6	M12	16 (0.6)	45 (1.8)	M5	4.03 (0.2)	4 (0.2)	5.03 (0.2)	5 (0.2)	50 (2.0)
25	156 (6.1)	12 (0.5)	3 (0.1)	1 (0.0)	84 (3.3)	18 (0.7)	104 (4.1)	M8	M14	20 (0.8)	46 (1.8)	M6	5.03 (0.2)	5 (0.2)	6.03 (0.2)	6 (0.2)	62 (2.4)
32	170 (6.7)	11 (0.4)	3 (0.1)	1 (0.0)	92 (3.6)	21 (0.8)	120 (4.7)	M10	M14	23 (0.9)	43 (1.7)	M8	6.03 (0.2)	6 (0.2)	6.03 (0.2)	6 (0.2)	71 (2.8)
40	198 (7.8)	20 (0.8)	3 (0.1)	1 (0.0)	116 (4.6)	27 (1.1)	144 (5.7)	M12	M20	29 (1.1)	49 (1.9)	M10	8.03 (0.3)	8 (0.3)	10.03 (0.4)	10 (0.4)	84 (3.3)
50	254 (10.0)	22 (0.9)	3 (0.1)	1 (0.0)	148 (5.8)	34 (1.3)	188 (7.4)	M16	M25	36 (1.4)	53 (2.1)	M10	8.03 (0.3)	8 (0.3)	10.03 (0.4)	10 (0.4)	109 (4.3)
63	304 (12.0)	30 (1.2)	3 (0.1)	1 (0.0)	176 (6.9)	41 (1.6)	224 (8.8)	M20	M25	43 (1.7)	52 (2.0)	M12	10.03 (0.4)	10 (0.4)	12.03 (0.5)	12 (0.5)	131 (5.2)
80	374 (4.7)	36 (1.4)	3 (0.1)	1 (0.0)	220 (8.7)	50 (2.0)	276 (10.9)	M24	M33	52 (2.0)	64 (2.5)	M16	12.03 (0.5)	12 (0.5)	16.03 (0.6)	16 (0.6)	161 (6.3)
100	452 (17.8)	36 (1.4)	3 (0.1)	1 (0.0)	260 (10.2)	59 (2.3)	336 (13.2)	M30	M36	61 (2.4)	66 (2.6)	M20	12.03 (0.5)	12 (0.5)	16.03 (0.6)	16 (0.6)	196 (7.7)

** s = standard; o = oversized* *** NPTF or BSPT* *† w/cushions M5/10-32*
**** Space between housing and end plate in both extend and retract positions.*

Dimensions in mm (in)

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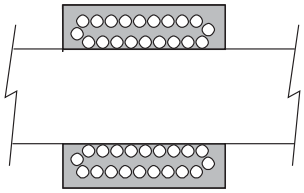
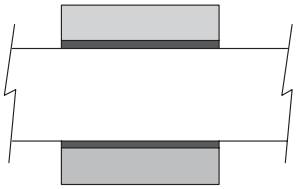
Bushings (J*, G*, H*, S*)

Several bushing, bearing and shaft options are available. To assure maximum life from the P5L guidance system, it is critical to match the bearing and shaft type to the application and environment it will be used in.

For bushing load capacities, reference the Engineering Data pages of this section.



Recirculating Ball Bearing



Composite Bushing

Bearing Type	Load Capacity		Stroke Lengths	Wet Environment	Wear Characteristics
	Short Stroke	Long Strokes			
Composite	Very Good	Average	Short	Excellent	Good
Recirculating Ball Bearings	Good*	Very Good	Long	Poor	Excellent
Self-Aligning Recirculating Ball Bearings	Good*	Excellent	Longest	Poor	Excellent

*It is not recommended to use ball bearings in extremely short strokes subject to rapid cycling

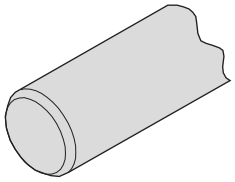
Note: Stainless steel shafts should be used in damp or wet environments

F

Stainless Steel Shafts

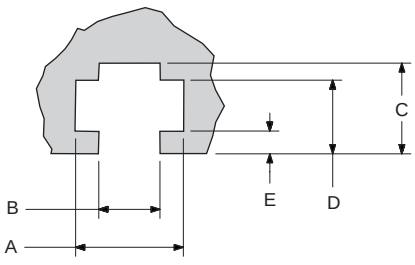
Case hardened, high carbon alloy steel shafting is utilized for standard slides. Stainless steel shafting can be specified for corrosive applications.

Note: Carbon steel rods should not be used in any application subject to any amount of moisture.



T-Slots (-, A)

Mounting T-slots provide quick and flexible mounting between base, thrust and reach slides. Extruded T-slots are standard on models with bore sizes 20-40mm. Machined T-slots are optional on models with bore sizes from 50-100mm.



Dimensions in mm (in)

Bore	A	B	C	D	E
20	10.0 (0.39)	5.8 (0.23)	9.0 (0.35)	7.0 (0.28)	2.0 (0.08)
25	12.0 (0.47)	6.8 (0.27)	12.0 (0.47)	9.0 (0.35)	3.0 (0.12)
32	15.0 (0.59)	8.8 (0.35)	14.0 (0.55)	11.0 (0.43)	3.5 (0.14)
40	19.0 (0.75)	10.8 (0.43)	15.0 (0.59)	12.0 (0.47)	3.0 (0.12)
50	19.0 (0.75)	10.8 (0.43)	16 (0.63)	13 (0.51)	4.0 (0.16)
63	21 (0.83)	12.8 (0.50)	21.5 (0.85)	18.5 (0.73)	7.5 (0.30)
80	27 (1.06)	16.8 (0.66)	29.5 (1.16)	24.5 (0.96)	9.5 (0.37)
100	33 (1.30)	21 (0.83)	35 (1.38)	30 (1.18)	12.5 (0.49)

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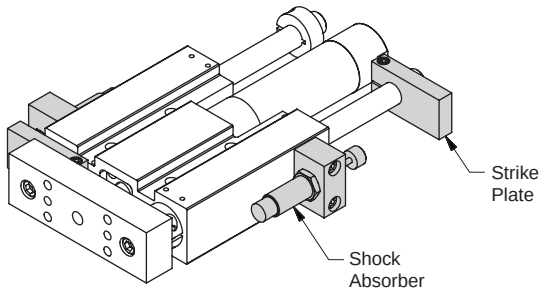
Shock Absorbers

Optional adjustable shock absorbers are available on the P5L series. When specifying this option verify the kinetic energy on pages F72-F73.

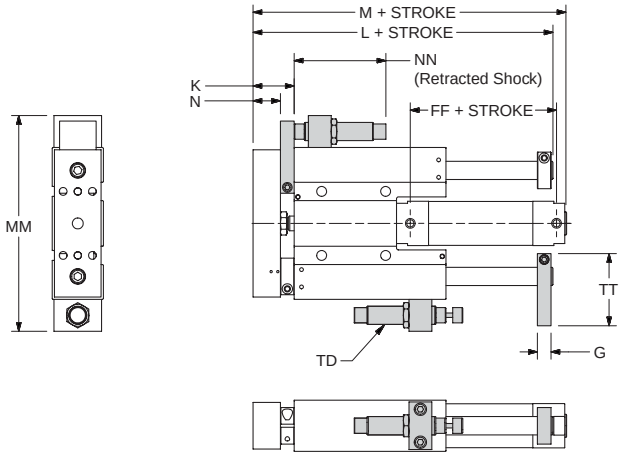
To achieve proper operation it is important to adjust the shock absorber per the application. To properly adjust the shock absorber, cycle the guided cylinder to impact the shock absorber. Rotate the shock adjustment knob, located on the front or the rear of the shock, to achieve a smooth deceleration. Reducing the setting (achieved by rotating the adjustment knob in the counterclockwise direction or towards 9) decreases the resistance. Increasing the setting (achieved by rotating the adjustment in the clockwise direction of towards 0) increases the resistance. A properly adjusted shock absorber will provide smooth deceleration through the stroke of the shock.

The shock absorber option can also be used as a stroke adjuster. To adjust the stroke of the actuator, loosen the socket head cap screw on the striker plate.

Note: Using the shock absorber option as a stroke adjuster will only reduce the actuator stroke from a maximum value given in the actuator part number and cannot add additional stroke.



Shock Absorbers
Extend and Retract (AA)



Bore	Gs*	Ks*	Go*	Ko*	Thrust			Reach			N	FF	MM	NN	TD	TT
					Ls*	Lo*	M	Ls*	Lo*	M						
20	9 (0.4)	26 (1.0)	11 (0.4)	28 (1.1)	100 (3.9)	102 (4.0)	126 (5.0)	138 (5.4)	140 (5.5)	164 (6.5)	17 (0.7)	51 (2.0)	136 (5.4)	74 (2.9)	M12X1.0	48 (1.9)
25	11 (0.4)	33 (1.3)	13 (0.5)	35 (1.4)	123 (4.8)	127 (5.0)	140 (5.5)	169 (6.7)	173 (6.8)	186 (7.3)	22 (0.9)	52 (2.0)	170 (6.7)	80.1 (3.2)	M14X1.5	57 (2.2)
32	13 (0.5)	37 (1.5)	15 (0.6)	39 (1.5)	136 (5.4)	140 (5.5)	156 (6.1)	192 (7.6)	196 (7.7)	212 (8.3)	24 (0.9)	49 (1.9)	188 (7.4)	80.1 (3.2)	M14X1.5	66 (2.6)
40	15 (0.6)	45 (1.8)	15 (0.6)	45 (1.8)	166 (6.5)	166 (6.5)	181 (7.1)	228 (9.0)	228 (9.0)	243 (9.6)	30 (1.2)	55 (2.2)	236 (9.3)	99.5 (3.9)	M20X1.5	79 (3.1)
50	15 (0.6)	51 (2.0)	15 (0.6)	51 (2.0)	198 (7.8)	198 (7.8)	213 (8.4)	284 (11.2)	284 (11.2)	299 (11.8)	36 (1.4)	59 (2.3)	296 (11.7)	117.3 (4.6)	M25X1.5	98 (3.9)
63	15 (0.6)	55 (2.2)	15 (0.6)	55 (2.2)	224 (8.8)	224 (8.8)	237 (9.3)	332 (13.1)	332 (13.1)	345 (13.6)	40 (1.6)	58 (2.3)	340 (13.4)	117.3 (4.6)	M25X1.5	108 (4.3)
80	15 (0.6)	61 (2.4)	19 (0.7)	65 (2.6)	258 (10.2)	266 (10.5)	267 (10.5)	398 (15.7)	406 (15.6)	407 (16.0)	46 (1.8)	70 (2.8)	416 (16.4)	140.5 (5.5)	M33X1.5	126 (5.0)
100	19 (0.7)	75 (3.0)	19 (0.7)	75 (3.0)	318 (12.5)	318 (12.5)	328 (12.9)	486 (19.1)	486 (19.1)	496 (19.5)	56 (2.2)	72 (2.8)	498 (19.6)	140.5 (5.5)	M36X1.5	157 (6.2)

Dimensions in mm (in) ** s = standard, o = oversized*

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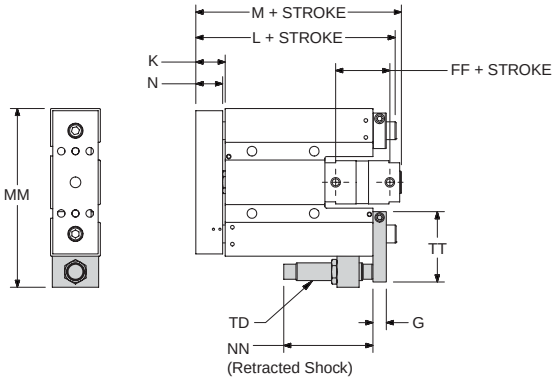
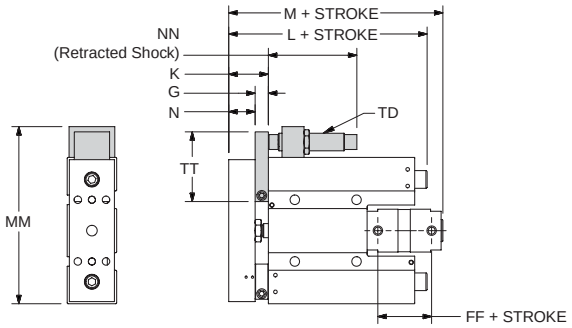
Shock Absorbers
Extend Only (AN)



Bore	Gs*	Go*	K	Thrust Ls*	Thrust Lo*	Thrust M	Reach Ls*	Reach Lo*	Reach M	N	FF	MM	NN	TD	TT
20	9 (0.4)	11 (0.4)	20 (0.8)	100 (3.9)	102 (4.0)	117 (4.6)	138 (5.4)	140 (5.5)	153 (6.0)	17 (0.7)	48 (1.9)	117 (4.6)	74 (2.9)	M12x1.0	48 (1.9)
25	11 (0.4)	13 (0.5)	25 (1.0)	123 (4.8)	127 (5.0)	129 (5.1)	169 (6.7)	173 (6.8)	185 (7.3)	22 (0.9)	49 (1.9)	146 (5.7)	80.1 (3.2)	M14x1.5	57 (2.2)
32	13 (0.5)	15 (0.6)	27 (1.1)	136 (5.4)	140 (5.5)	143 (5.6)	192 (7.6)	196 (7.7)	197 (7.8)	24 (0.9)	46 (1.8)	164 (6.5)	80.1 (3.2)	M14x1.5	66 (2.6)
40	15 (0.6)	15 (0.6)	33 (1.3)	166 (6.5)	166 (6.5)	166 (6.5)	228 (9.0)	228 (9.0)	228 (9.0)	30 (1.2)	52 (2.0)	201 (7.9)	99.5 (3.9)	M20x1.5	79 (3.1)
50	15 (0.6)	15 (0.6)	39 (1.5)	198 (7.8)	198 (7.8)	198 (7.8)	284 (11.2)	284 (11.2)	284 (11.2)	36 (1.4)	56 (2.2)	256 (10.1)	117.3 (4.6)	M25x1.5	98 (3.9)
63	15 (0.6)	15 (0.6)	43 (1.7)	224 (8.8)	224 (8.8)	222 (8.7)	332 (13.1)	332 (13.1)	330 (13.0)	40 (1.6)	55 (2.2)	300 (11.8)	117.3 (4.6)	M25x1.5	108 (4.3)
80	15 (0.6)	19 (0.7)	49 (1.9)	258 (10.2)	266 (10.5)	252 (9.9)	398 (15.7)	406 (15.6)	388 (15.3)	46 (1.8)	67 (2.6)	368 (14.5)	140.5 (5.5)	M33x1.5	126 (5.0)
100	19 (0.7)	19 (0.7)	59 (2.3)	318 (12.5)	318 (12.5)	309 (12.2)	486 (19.1)	486 (19.1	477 (18.8)	56 (2.2)	69 (2.7)	444 (17.5)	140.5 (5.5)	M36x1.5	157 (6.2)

Shock Absorbers
Retract Only (NA)



Bore	Gs*	Ks*	Go*	Ko*	Thrust Ls*	Thrust Lo*	Thrust M	Reach Ls*	Reach Lo*	Reach M	N	FF	MM	NN	TD	TT
20	9 (0.4)	26 (1.0)	11 (0.4)	28 (1.1)	100 (3.9)	102 (4.0)	123 (4.8)	138 (5.4)	140 (5.5)	161 (6.3)	17 (0.7)	48 (1.9)	117 (4.6)	74 (2.9)	M12x1.0	48 (1.9)
25	11 (0.4)	33 (1.3)	13 (0.5)	35 (1.4)	123 (4.8)	127 (5.0)	137 (5.4)	169 (6.7)	173 (6.8)	183 (7.2)	22 (0.9)	49 (1.9)	146 (5.7)	80.1 (3.2)	M14x1.5	57 (2.2)
32	13 (0.5)	37 (1.5)	15 (0.6)	39 (1.5)	136 (5.4)	140 (5.5)	153 (6.0)	192 (7.6)	196 (7.7)	209 (8.2)	24 (0.9)	46 (1.8)	164 (6.5)	80.1 (3.2)	M14x1.5	66 (2.6)
40	15 (0.6)	45 (1.8)	15 (0.6)	45 (1.8)	166 (6.5)	166 (6.8)	178 (7.0)	228 (9.0)	228 (9.0)	240 (9.4)	30 (1.2)	52 (2.0)	201 (7.9)	99.5 (3.9)	M20x1.5	79 (3.1)
50	15 (0.6)	51 (2.0)	15 (0.6)	51 (2.0)	198 (7.8)	198 (7.8)	210 (8.3)	284 (11.2)	284 (11.2)	296 (11.7)	36 (1.4)	56 (2.2)	256 (10.1)	117.3 (4.6)	M25x1.5	98 (3.9)
63	15 (0.6)	55 (2.2)	15 (0.6)	55 (2.2)	224 (8.8)	224 (8.8)	234 (9.2)	332 (13.1)	332 (13.1)	342 (13.5)	40 (1.6)	55 (2.2)	300 (11.8)	117.3 (4.6)	M25x1.5	108 (4.3)
80	15 (0.6)	61 (2.4)	19 (0.7)	65 (2.6)	258 (10.2)	266 (10.5)	264 (10.4)	398 (15.7)	406 (15.6)	404 (15.9)	46 (1.8)	67 (2.6)	368 (14.5)	140.5 (5.5)	M33x1.5	126 (5.0)
100	19 (0.7)	75 (3.0)	19 (0.7)	75 (3.0)	318 (12.5)	318 (12.5)	325 (12.8)	486 (19.1)	486 (19.1)	493 (19.4)	56 (2.2)	69 (2.7)	444 (17.5)	140.5 (5.5)	M36x1.5	157 (6.2)

Dimensions in mm (in)

** s = standard, o = oversized*

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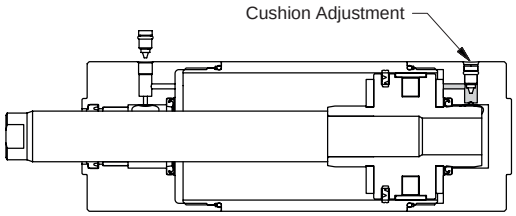
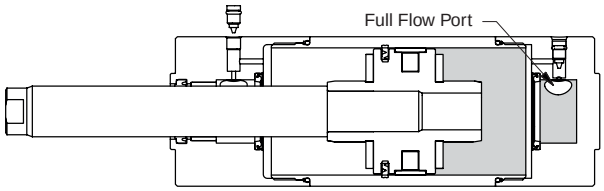
Cylinder Cushions

Fully adjustable cylinder cushions can be provided to reduce speed and energy at the end of cylinder stroke.

Note: If stroke adjustment is used in conjunction with cylinder cushions, the cushion effectiveness may be affected.



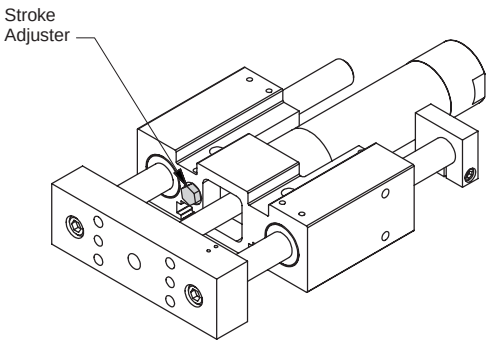


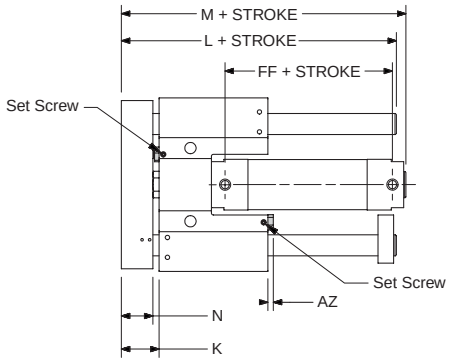
Micro Adjust (EE)

Micro adjusters can be used as an accurate and fine adjustment of end of stroke position. Actual per end stroke adjustment depends on model size. See chart below.

Micro adjusters must be ordered as both ends only. Caution should be used as cushion effectiveness may be affected.

Note: Using micro adjusters will only reduce the actuator stroke from a maximum value given in the actuator part number and cannot add additional stroke.





Bore	Kmin	Kmax	Thrust			Reach			N	AZmin	AZmax	FF
			Ls*	Lo*	M	Ls*	Lo*	M				
20	23 (0.9)	28 (1.1)	100 (3.9)	102 (4.0)	123 (4.8)	138 (5.4)	140 (5.5)	161 (6.3)	17 (0.7)	3.5 (0.1)	8.5 (0.3)	51 (2.0)
25	28 (1.1)	37 (1.5)	123 (4.8)	127 (5.0)	135 (5.3)	169 (6.7)	173 (6.8)	181 (7.1)	22 (0.9)	3.5 (0.1)	12.5 (0.5)	52 (2.0)
32	30 (1.2)	38 (1.5)	136 (5.4)	140 (5.5)	149 (5.9)	192 (7.6)	196 (7.7)	205 (8.1)	24 (0.9)	4 (0.2)	12 (0.5)	49 (1.9)
40	36 (1.4)	48 (1.9)	166 (6.5)	166 (6.5)	172 (6.8)	228 (9.0)	228 (9.0)	234 (9.2)	30 (1.2)	5.3 (0.2)	17.3 (0.7)	55 (2.2)
50	42 (1.7)	57 (2.2)	198 (7.8)	198 (7.8)	204 (8.0)	284 (11.2)	284 (11.2)	290 (11.4)	36 (1.4)	6.4 (0.3)	21.4 (0.8)	59 (2.3)
63	46 (1.8)	63 (2.5)	224 (8.8)	224 (8.8)	228 (9.0)	332 (13.1)	332 (13.1)	336 (13.2)	40 (1.6)	7.5 (0.3)	24.5 (1.0)	58 (2.3)
80	52 (2.0)	69 (2.7)	258 (10.2)	266 (10.5)	258 (10.2)	398 (15.7)	406 (15.6)	398 (15.7)	46 (1.8)	7.5 (0.3)	24.5 (1.0)	70 (2.8)
100	62 (2.4)	76 (3.0)	318 (12.5)	318 (12.5)	315 (12.4)	486 (19.1)	486 (19.1)	483 (19.0)	56 (2.2)	10 (0.4)	24 (0.9)	72 (2.8)

Dimensions in mm (in) ** s = standard, o = oversized*

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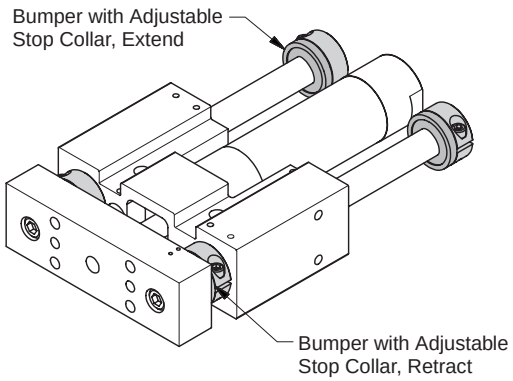
Bumpers and Adjustable Stop Collars

Bumpers provide end of stroke noise reduction. Bumpers can be used in conjunction with adjustable stop collars to provide adjustment. When a bumper is specified in the extend stroke a stop collar is provided.

Bumpers provide minimal energy absorption. If high speeds are present consult the kinetic energy section of this catalog to determine if cylinder cushions or shock absorbers are recommended.

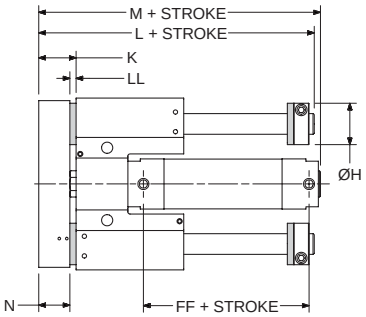
A properly adjusted bumper and stop collar will prevent the cylinder from bottoming on the cylinder end cap thus increasing cylinder life.



P5L-T thrust slide shown

F

Bumpers Both Ends (KB)



Bore	Hs*	Ho*	K	Thrust			Reach			N	FF	LL
				Ls*	Lo*	M	Ls*	Lo*	M			
20	24 (0.9)	28 (1.1)	23 (0.9)	100 (3.9)	102 (4.0)	123 (4.8)	138 (5.4)	140 (5.5)	161 (6.3)	17 (0.7)	51 (2.0)	6 (0.2)
25	28 (1.1)	34 (1.3)	28 (1.1)	123 (4.8)	127 (5.0)	135 (5.3)	169 (6.6)	173 (6.8)	181 (7.1)	22 (0.9)	52 (2.0)	6 (0.2)
32	34 (1.3)	40 (1.6)	30 (1.2)	136 (5.4)	140 (5.5)	149 (5.9)	192 (7.6)	248 (9.8)	205 (8.1)	24 (0.9)	49 (1.9)	6 (0.2)
40	40 (1.6)	45 (1.8)	36 (1.4)	166 (6.5)	166 (6.5)	172 (6.8)	228 (9.0)	290 (11.4)	234 (9.2)	30 (1.2)	55 (2.2)	6 (0.2)
50	45 (1.8)	54 (2.1)	42 (1.7)	198 (7.8)	198 (7.8)	204 (8.0)	284 (11.2)	370 (14.6)	290 (11.4)	36 (1.4)	59 (2.3)	6 (0.2)
63	54 (2.1)	60 (2.4)	46 (1.8)	224 (8.8)	224 (8.8)	228 (9.0)	332 (13.1)	440 (17.3)	336 (13.2)	40 (1.6)	58 (2.3)	6 (0.2)
80	60 (2.4)	78 (3.1)	52 (2.0)	258 (10.1)	266 (10.5)	258 (10.2)	398 (15.7)	538 (21.2)	398 (15.7)	46 (1.8)	70 (2.8)	6 (0.2)
100	78 (3.1)	88 (3.5)	62 (2.4)	318 (12.5)	318 (12.5)	315 (12.4)	486 (19.1)	654 (25.7)	483 (19.0)	56 (2.2)	72 (2.8)	6 (0.2)

Dimensions in mm (in) ** s = standard, o = oversized*

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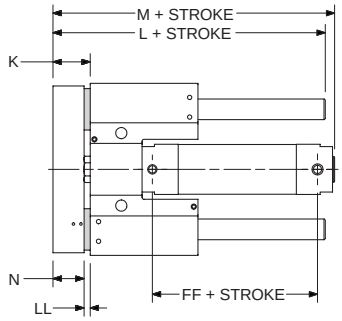
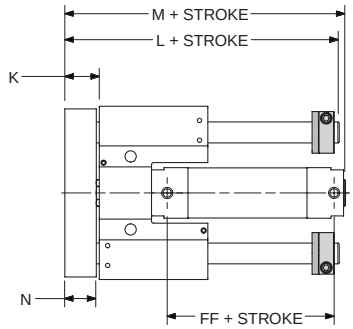
Bumpers on Retract Only (NB)

Bore	K	Thrust			Reach			N	FF	LL
		Ls*	Lo*	M	Ls*	Lo*	M			
20	23 (0.9)	100 (3.9)	102 (4.0)	120 (4.7)	138 (5.4)	140 (5.5)	158 (6.2)	17 (0.7)	48 (1.9)	6 (0.2)
25	28 (1.1)	123 (4.8)	127 (5.0)	132 (5.2)	169 (6.7)	173 (6.8)	178 (7.0)	22 (0.9)	49 (1.9)	6 (0.2)
32	30 (1.2)	136 (5.4)	140 (5.5)	146 (5.7)	192 (7.6)	196 (7.7)	202 (8.0)	24 (0.9)	46 (1.8)	6 (0.2)
40	36 (1.4)	166 (6.5)	166 (6.5)	169 (6.7)	228 (9.0)	228 (9.0)	231 (9.1)	30 (1.2)	52 (2.0)	6 (0.2)
50	42 (1.7)	198 (7.8)	198 (7.8)	201 (7.9)	284 (11.2)	284 (11.2)	287 (11.3)	36 (1.4)	56 (2.2)	6 (0.2)
63	46 (1.8)	224 (8.8)	224 (8.8)	225 (8.9)	332 (13.1)	332 (13.1)	333 (13.1)	40 (1.6)	55 (2.2)	6 (0.2)
80	52 (2.0)	258 (10.2)	266 (10.5)	255 (10.0)	398 (15.7)	406 (16.0)	395 (15.6)	46 (1.8)	67 (2.6)	6 (0.2)
100	62 (2.4)	318 (12.5)	318 (12.5)	312 (12.3)	486 (19.1)	486 (19.1)	480 (18.9)	56 (2.2)	69 (2.7)	6 (0.2)



Bumpers and Adjustable Stop Collars, Extend Only (KN)

Bore	K	Thrust			Reach			N	FF
		Ls*	Lo*	M	Lo*	Ls*	M		
20	20 (0.8)	109 (4.3)	111 (4.4)	117 (4.6)	147 (5.8)	149 (5.9)	155 (6.1)	17 (0.7)	48 (1.9)
25	25 (1.0)	134 (5.3)	138 (5.4)	129 (5.1)	180 (7.1)	184 (7.2)	175 (6.9)	22 (0.9)	49 (1.9)
32	27 (1.1)	148 (5.8)	152 (6.0)	143 (5.6)	204 (8.0)	208 (8.2)	199 (7.8)	24 (0.9)	46 (1.8)
40	33 (1.3)	178 (7.0)	178 (7.0)	166 (6.5)	240 (9.4)	240 (9.4)	228 (9.0)	30 (1.2)	52 (2.0)
50	39 (1.5)	210 (8.3)	210 (8.3)	198 (7.8)	296 (11.7)	296 (11.7)	284 (11.2)	36 (1.4)	56 (2.2)
63	43 (1.7)	236 (9.3)	236 (9.3)	222 (8.7)	344 (13.5)	344 (13.5)	330 (13.0)	40 (1.6)	55 (2.2)
80	49 (1.9)	271 (10.7)	279 (11.0)	252 (9.9)	411 (16.2)	419 (16.5)	392 (15.4)	46 (1.8)	67 (2.6)
100	59 (2.3)	330 (13.0)	330 (13.0)	309 (12.2)	498 (19.6)	498 (19.6)	478 (18.8)	56 (2.2)	69 (2.7)



Dimensions in mm (in)

** s = standard, o = oversized*

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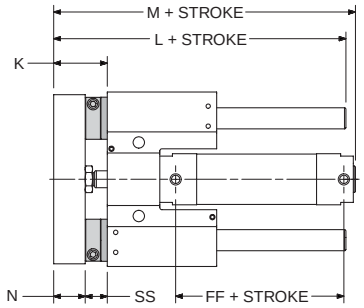
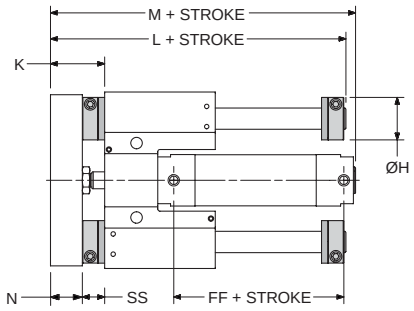
Bumpers and Adjustable Stop Collars, Retract Only (NK)



Bore	Ks	Ko	Thrust				Reach				N	FF	SSs*	SSo*
			Ls*	Lo*	Ms*	Mo*	Ls*	Lo*	Ms*	Mo*				
20	32 (1.3)	34 (1.3)	109 (4.3)	111 (4.4)	129 (5.1)	131 (5.2)	147 (5.8)	149 (5.9)	167 (6.6)	169 (6.7)	17 (0.7)	48 (1.9)	15 (0.6)	17 (0.7)
25	39 (1.5)	41 (1.6)	134 (5.3)	138 (5.4)	143 (5.6)	145 (5.7)	180 (7.1)	184 (7.2)	189 (7.4)	191 (7.5)	22 (0.9)	49 (1.9)	17 (0.7)	19 (0.7)
32	43 (1.7)	45 (1.8)	148 (5.8)	152 (6.0)	159 (6.3)	161 (6.3)	204 (8.0)	208 (8.2)	215 (8.5)	217 (8.5)	24 (0.9)	46 (1.8)	19 (0.7)	21 (0.8)
40	51 (2.0)	51 (2.0)	178 (7.0)	178 (7.0)	184 (7.2)	184 (7.2)	240 (9.4)	240 (9.4)	246 (9.7)	246 (9.7)	30 (1.2)	52 (2.0)	21 (0.8)	21 (0.8)
50	57 (2.2)	57 (2.2)	210 (8.3)	210 (8.3)	216 (8.5)	216 (8.5)	296 (11.7)	296 (11.7)	302 (11.9)	302 (11.9)	36 (1.4)	56 (2.2)	21 (0.8)	21 (0.8)
63	61 (2.4)	61 (2.4)	236 (9.3)	236 (9.3)	240 (9.4)	240 (9.4)	344 (13.5)	344 (13.5)	348 (13.7)	348 (13.7)	40 (1.6)	55 (2.2)	21 (0.8)	21 (0.8)
80	67 (2.6)	71 (2.8)	271 (10.7)	279 (11.0)	270 (10.6)	274 (10.8)	411 (16.2)	419 (16.5)	410 (16.1)	414 (16.3)	46 (1.8)	67 (2.6)	21 (0.8)	25 (1.0)
100	81 (3.2)	81 (3.2)	330 (13.0)	330 (13.0)	331 (13.0)	331 (13.0)	492 (19.4)	492 (19.4)	499 (19.6)	499 (19.6)	56 (2.2)	69 (2.7)	25 (1.0)	25 (1.0)

Bumpers and Adjustable Stop Collars, Both Ends (KK)



Bore	Hs*	Ho*	Ks*	Ko*	Thrust				Reach				N	FF	SSs*	SSo*
					Ls*	Lo*	Ms*	Mo*	Ls*	Lo*	Ms*	Mo*				
20	24 (0.9)	28 (1.1)	32 (1.3)	34 (1.3)	109 (4.3)	111 (4.4)	132 (5.2)	134 (5.3)	147 (5.8)	149 (5.9)	170 (6.7)	172 (6.8)	17 (0.7)	51 (2.0)	15 (0.6)	17 (0.7)
25	28 (1.1)	34 (1.3)	39 (1.5)	41 (1.6)	134 (5.3)	138 (5.4)	146 (5.7)	148 (5.8)	180 (7.1)	184 (7.2)	192 (7.6)	194 (7.6)	22 (0.9)	52 (2.0)	17 (0.7)	19 (0.7)
32	34 (1.3)	40 (1.6)	43 (1.7)	45 (1.8)	148 (5.8)	152 (6.0)	162 (6.4)	164 (6.5)	204 (8.0)	208 (8.2)	218 (8.6)	220 (8.7)	24 (0.9)	49 (1.9)	19 (0.7)	21 (0.8)
40	40 (1.6)	45 (1.8)	51 (2.0)	51 (2.0)	178 (7.0)	178 (7.0)	187 (7.4)	187 (7.4)	240 (9.4)	240 (9.4)	249 (9.8)	249 (9.8)	30 (1.2)	55 (2.2)	21 (0.8)	21 (0.8)
50	45 (1.8)	54 (2.1)	57 (2.2)	57 (2.2)	210 (8.3)	210 (8.3)	219 (8.6)	219 (8.6)	296 (11.7)	296 (11.7)	305 (12.0)	305 (12.0)	36 (1.4)	59 (2.3)	21 (0.8)	21 (0.8)
63	54 (2.1)	60 (2.4)	61 (2.4)	61 (2.4)	236 (9.3)	236 (9.3)	243 (9.6)	243 (9.6)	344 (13.5)	344 (13.5)	351 (13.8)	351 (13.8)	40 (1.6)	55 (2.2)	21 (0.8)	21 (0.8)
80	60 (2.4)	78 (3.1)	67 (2.6)	71 (2.8)	271 (10.7)	279 (11.0)	273 (10.7)	277 (10.9)	411 (16.2)	419 (16.5)	413 (16.3)	417 (16.4)	46 (1.8)	69 (2.7)	21 (0.8)	25 (1.0)
100	78 (3.1)	88 (3.5)	81 (3.2)	71 (2.8)	330 (13.0)	330 (13.0)	334 (13.1)	334 (13.1)	498 (19.6)	498 (19.6)	502 (19.8)	502 (19.8)	56 (2.2)	71 (2.8)	25 (1.0)	25 (1.0)

Dimensions in mm (in) ** s = standard, o = oversized*

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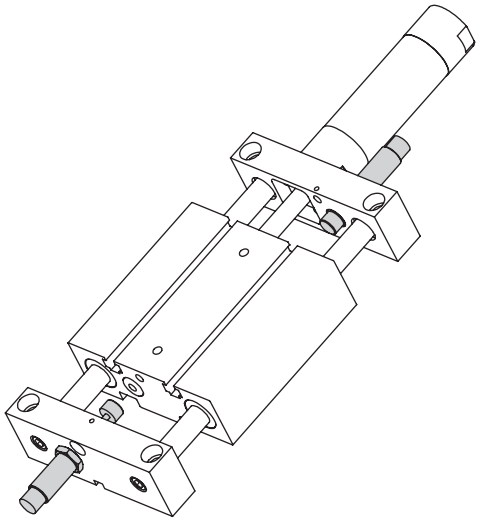
Shock Absorbers

Optional adjustable shock absorbers are available on the P5L series. When specifying this option verify the kinetic energy on page F84.

To achieve proper operation it is important to adjust the shock absorber per the application. To properly adjust the shock absorber, cycle the guided cylinder to impact the shock absorber. Rotate the shock adjustment knob, located on the front or the rear of the shock, to achieve a smooth deceleration. Reducing the setting (achieved by rotating the adjustment knob in the counterclockwise direction or towards 9) decreases the resistance. Increasing the setting (achieved by rotating the adjustment in the clockwise direction of towards 0) increases the resistance. A properly adjusted shock absorber will provide smooth deceleration through the stroke of the shock.

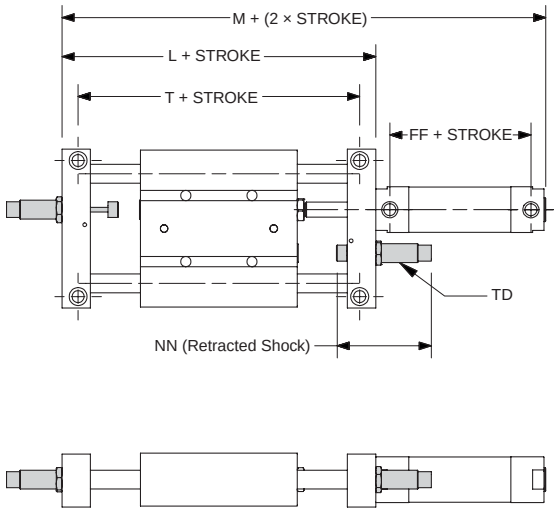
The shock absorber option can also be used as a stroke adjuster. To adjust the stroke of the actuator, loosen the jam nut and thread shock in/out.

Note: Using the shock absorber option as a stroke adjuster will only reduce the actuator stroke from a maximum value given in the actuator part number and cannot add additional stroke.



Shock Absorbers Both Ends (AA)

Bore	L	M	T	FF	NN	TD
20	140 (5.5)	217 (8.5)	120 (4.7)	51 (2.0)	74 (2.9)	M12X1.0
25	176 (6.9)	253 (10.0)	156 (6.1)	52 (2.0)	80.1 (3.2)	M14X1.5
32	198 (7.8)	277 (10.9)	170 (6.7)	49 (1.9)	80.1 (3.2)	M14X1.5
40	232 (9.1)	318 (12.5)	198 (7.8)	55 (2.2)	99.5 (3.9)	M20X1.5
50	292 (11.5)	390 (15.4)	254 (10.0)	59 (2.3)	117.3 (4.6)	M25X1.5
63	350 (13.8)	448 (17.6)	304 (12.0)	58 (2.3)	117.3 (4.6)	M25X1.5
80	434 (17.1)	551 (21.7)	374 (14.7)	70 (2.8)	140.5 (5.5)	M33X1.5
100	528 (20.8)	645 (25.4)	452 (17.8)	72 (2.8)	140.5 (5.5)	M36X1.5



Dimensions in mm (in)

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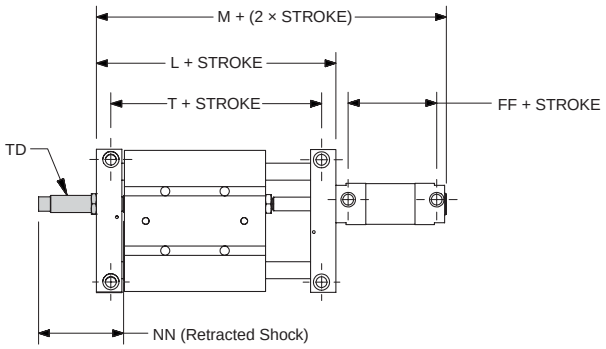
Shock Absorber Extend Only (AN)

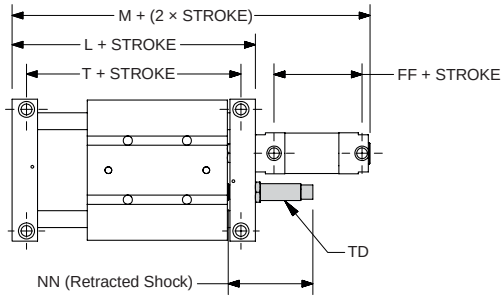
Bore	L	M	T	FF	NN	TD
20	140 (5.5)	214 (8.4)	120 (4.7)	48 (1.9)	74 (2.9)	M12x1.0
25	176 (6.9)	250 (9.8)	156 (6.1)	49 (1.9)	80.1 (3.2)	M14x1.5
32	198 (7.8)	274 (10.8)	170 (6.7)	46 (1.8)	80.1 (3.2)	M14x1.5
40	232 (9.1)	315 (12.4)	198 (7.8)	52 (2.0)	99.5 (3.9)	M20x1.5
50	292 (11.5)	387 (15.2)	254 (10.0)	56 (2.2)	117.3 (4.6)	M25x1.5
63	350 (13.8)	445 (17.5)	304 (12.0)	55 (2.2)	117.3 (4.6)	M25x1.5
80	434 (17.1)	548 (21.6)	374 (14.7)	67 (2.6)	140.5 (5.5)	M33x1.5
100	528 (20.8)	642 (25.3)	452 (17.8)	69 (2.7)	140.5 (5.5)	M36x1.5



F

Shock Absorber Retract Only (NA)

Bore	L	M	T	FF	NN	TD
20	140 (5.5)	214 (8.4)	120 (4.7)	48 (1.9)	74 (2.9)	M12x1.0
25	176 (6.9)	250 (9.8)	156 (6.1)	49 (1.9)	80.1 (3.2)	M14x1.5
32	198 (7.8)	274 (10.8)	170 (6.7)	46 (1.8)	80.1 (3.2)	M14x1.5
40	232 (9.1)	315 (12.4)	198 (7.8)	52 (2.0)	99.5 (3.9)	M20x1.5
50	292 (11.5)	387 (15.2)	254 (10.0)	56 (2.2)	117.3 (4.6)	M25x1.5
63	350 (13.8)	445 (17.5)	304 (12.0)	55 (2.2)	117.3 (4.6)	M25x1.5
80	434 (17.1)	548 (21.6)	374 (14.7)	67 (2.6)	140.5 (5.5)	M33x1.5
100	528 (20.8)	642 (25.3)	452 (17.8)	69 (2.7)	140.5 (5.5)	M36x1.5



Dimensions in mm (in)

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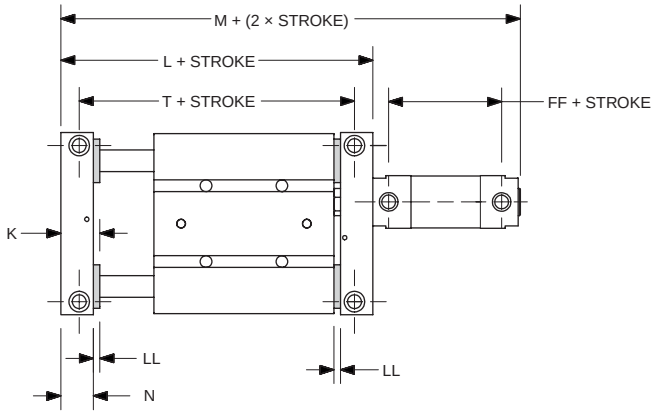
Bumpers (B)

Bumpers absorb shock, reduce noise and permit faster cycle times, thereby increasing production rates. They can be placed on the extend, retract or both positions.

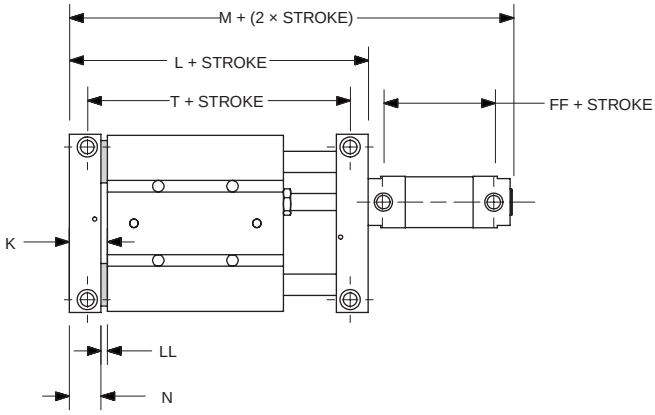
Bumpers Both Ends (BB)

Bore	K	L	M	N	T	FF	LL
20	24 (0.9)	146 (5.7)	223 (8.8)	18 (0.7)	126 (5.0)	51 (2.0)	6 (0.2)
25	30 (1.2)	182 (7.2)	259 (10.2)	24 (0.9)	163 (6.4)	52 (2.0)	6 (0.2)
32	32 (1.3)	204 (8.0)	283 (11.1)	26 (1.0)	176 (6.9)	49 (1.9)	6 (0.2)
40	36 (1.4)	238 (9.4)	324 (12.8)	30 (1.2)	204 (8.0)	55 (2.2)	6 (0.2)
50	41 (1.6)	298 (11.7)	396 (15.6)	35 (1.4)	260 (10.2)	59 (2.3)	6 (0.2)
63	48 (1.9)	356 (14.0)	454 (17.9)	42 (1.7)	310 (12.2)	58 (2.3)	6 (0.2)
80	60 (2.4)	440 (17.3)	557 (21.9)	54 (2.1)	380 (15.0)	70 (2.8)	6 (0.2)
100	72 (2.8)	534 (21.0)	651 (25.6)	66 (2.6)	458 (18.0)	72 (2.8)	6 (0.2)



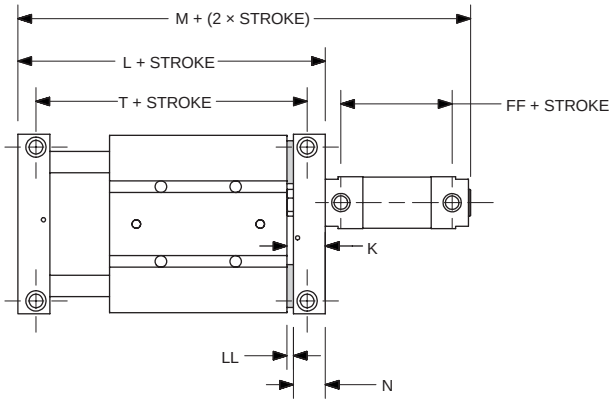
Bumpers, Extend Only (BN)

Bore	K	L	M	N	T	FF	LL
20	24 (0.9)	143 (5.6)	217 (8.5)	18 (0.7)	123 (4.8)	48 (1.9)	6 (0.2)
25	30 (1.2)	179 (7.0)	253 (10.0)	24 (0.9)	159 (6.3)	49 (1.9)	6 (0.2)
32	32 (1.3)	201 (7.9)	277 (10.9)	26 (1.0)	173 (6.8)	46 (1.8)	6 (0.2)
40	36 (1.4)	235 (9.3)	318 (12.5)	30 (1.2)	201 (7.9)	52 (2.0)	6 (0.2)
50	41 (1.6)	295 (11.6)	390 (15.4)	35 (1.4)	257 (10.1)	56 (2.2)	6 (0.2)
63	48 (1.9)	353 (13.9)	448 (17.6)	42 (1.7)	307 (12.1)	55 (2.2)	6 (0.2)
80	60 (2.4)	437 (17.2)	551 (21.7)	54 (2.1)	377 (14.8)	67 (2.6)	6 (0.2)
100	72 (2.8)	531 (20.9)	645 (25.4)	66 (2.6)	455 (17.9)	69 (2.7)	6 (0.2)



Bumpers on Retract Only (NB)

Bore	K	L	M	N	T	FF	LL
20	24 (0.9)	143 (5.6)	217 (8.5)	18 (0.7)	123 (4.8)	48 (1.9)	6 (0.2)
25	30 (1.2)	179 (7.0)	253 (10.0)	24 (0.9)	159 (6.3)	49 (1.9)	6 (0.2)
32	32 (1.3)	201 (7.9)	277 (10.9)	26 (1.0)	173 (6.8)	46 (1.8)	6 (0.2)
40	36 (1.4)	235 (9.3)	318 (12.5)	30 (1.2)	201 (7.9)	52 (2.0)	6 (0.2)
50	41 (1.6)	295 (11.6)	390 (15.4)	35 (1.4)	257 (10.1)	56 (2.2)	6 (0.2)
63	48 (1.9)	353 (13.9)	448 (17.6)	42 (1.7)	307 (12.1)	55 (2.2)	6 (0.2)
80	60 (2.4)	437 (17.2)	551 (21.7)	54 (2.1)	377 (14.8)	67 (2.6)	6 (0.2)
100	72 (2.8)	531 (20.9)	645 (25.4)	66 (2.6)	455 (17.9)	69 (2.7)	6 (0.2)



Dimensions in mm (in)

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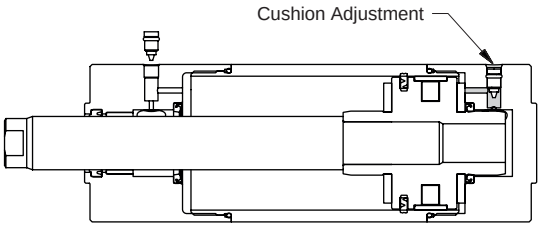
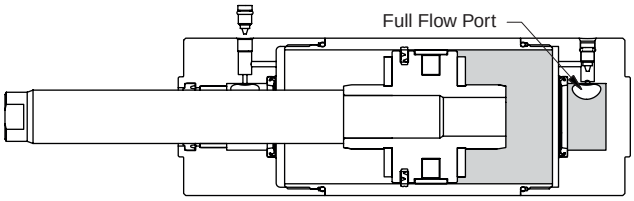
Cylinder Cushions (CC)

Fully adjustable cylinder cushions can be provided to reduce speed and energy at the end of cylinder stroke.

Cushions must be ordered as both ends only.

Note: If stroke adjustment is used in conjunction with cylinder cushions, the cushion effectiveness may be affected.



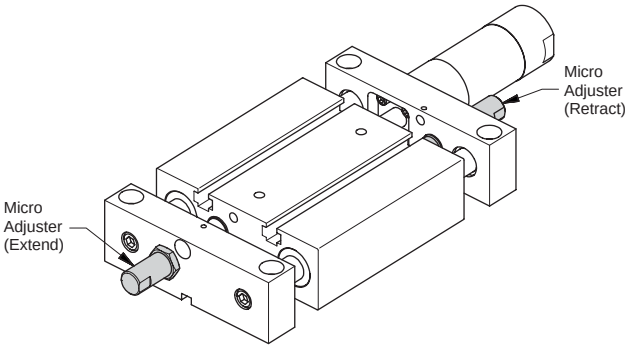


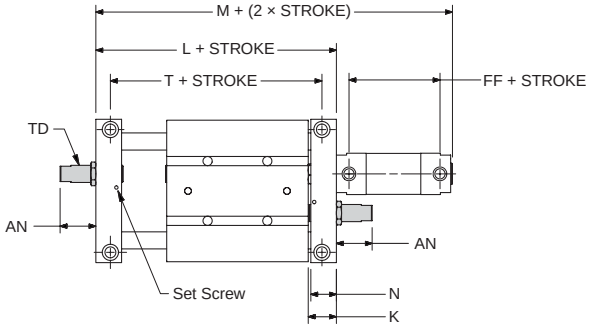
Micro Adjusters (EE)

Micro adjusters can be used as an accurate and fine adjustment of end of stroke position. Actual per end stroke adjustment depends on model size. See chart below.

Micro adjusters must be ordered as both ends only. Caution should be used as cushion effectiveness may be affected.

Note: Using micro adjusters will only reduce the actuator stroke from a maximum value given in the actuator part number and cannot additional stroke.





Bore	Kmin	Kmax	L	M	N	T	TD	FF	AN
20	21 (0.8)	48 (1.9)	140 (5.5)	217 (8.5)	18 (0.7)	120 (4.7)	M12x1.5	51 (2.0)	42 (1.7)
25	27 (1.1)	45 (1.8)	176 (6.9)	253 (10.0)	24 (0.9)	156 (6.1)	M14x1.5	52 (2.0)	36 (1.4)
32	29 (1.1)	45 (1.8)	198 (7.8)	277 (10.9)	26 (1.0)	170 (6.7)	M14x1.5	49 (1.9)	34 (1.3)
40	33 (1.3)	56 (2.2)	232 (9.1)	318 (12.5)	30 (1.2)	198 (7.8)	M20x1.5	55 (2.2)	42 (1.7)
50	38 (1.5)	71 (2.8)	292 (11.5)	390 (15.4)	35 (1.4)	254 (10.0)	M25x1.5	59 (2.3)	53 (2.1)
63	45 (1.8)	104 (4.1)	350 (13.8)	448 (17.6)	42 (1.7)	304 (12.0)	M25x1.5	55 (2.2)	77 (3.0)
80	57 (2.2)	87 (3.4)	434 (17.1)	551 (21.7)	54 (2.1)	374 (14.7)	M33x1.5	69 (2.7)	52 (2.0)
100	69 (2.7)	87 (3.4)	528 (20.8)	645 (25.4)	66 (2.6)	452 (17.8)	M36x1.5	71 (2.8)	40 (1.6)

Dimensions in mm (in)

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Wadsworth, Ohio
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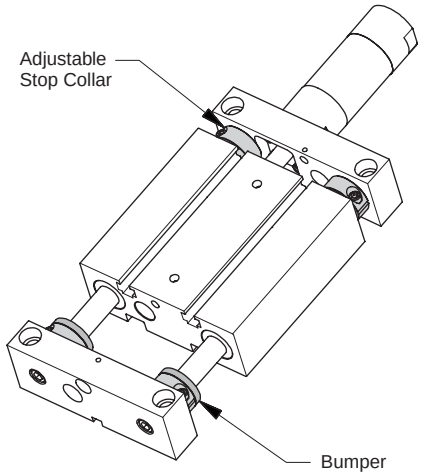
Bumpers and Adjustable Stop Collars

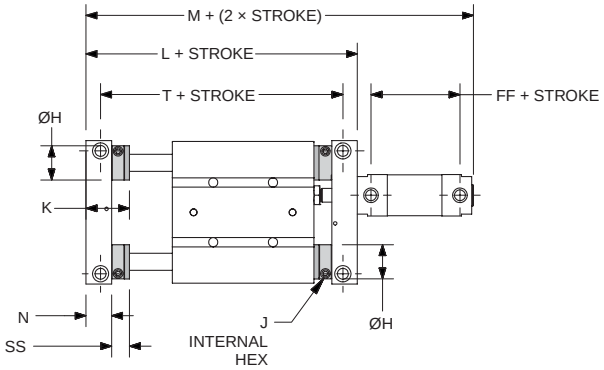
Bumpers provide end of stroke noise reduction. Bumpers can be used in conjunction with adjustable stop collars to provide adjustment. When a bumper is specified in the extend stroke a stop collar is provided.

Bumpers provide little energy absorption. If high speeds are present consult the kinetic energy section of this catalog to determine if cylinder cushions or shock absorbers are recommended.

A properly adjusted bumper and stop collar will prevent the cylinder from bottoming on the cylinder end cap thus increasing cylinder life.



Bumpers and Adjustable Stop Collars, Both Ends (KK)



Bore	Hs*	Ho*	Js*	Jo*	Ks*	Ko*	Ls*	Lo*	Ms*	Mo*	N	Ts*	To*	FF	SSs*	SSo*
20	24 (0.9)	28 (1.1)	2.5 (0.1)	3 (0.1)	33 (1.3)	35 (1.4)	164 (6.5)	170 (6.7)	241 (9.5)	245 (9.6)	18 (0.7)	144 (5.7)	148 (5.8)	51 (2.0)	15 (0.6)	17 (0.7)
25	28 (1.1)	34 (1.3)	3 (0.1)	4 (0.2)	41 (1.6)	43 (1.7)	204 (8.0)	208 (8.2)	281 (11.1)	285 (11.2)	24 (0.9)	184 (7.2)	188 (7.4)	52 (2.0)	17 (0.7)	19 (0.7)
32	34 (1.3)	40 (1.6)	4 (0.2)	5 (0.2)	45 (1.8)	47 (1.9)	230 (9.1)	234 (9.2)	309 (12.2)	313 (12.3)	26 (1.0)	202 (8.0)	206 (8.1)	49 (1.9)	19 (0.7)	21 (0.8)
40	40 (1.6)	45 (1.8)	5 (0.2)	5 (0.2)	51 (2.0)	51 (2.0)	268 (10.6)	268 (10.6)	354 (13.9)	354 (13.9)	30 (1.2)	234 (9.2)	234 (9.2)	55 (2.2)	21 (0.8)	21 (0.8)
50	45 (1.8)	54 (2.1)	5 (0.2)	5 (0.2)	56 (2.2)	56 (2.2)	328 (12.9)	328 (12.9)	426 (16.8)	426 (16.8)	35 (1.4)	290 (11.4)	290 (11.4)	59 (2.3)	21 (0.8)	21 (0.8)
63	54 (2.1)	60 (2.4)	5 (0.2)	5 (0.2)	63 (2.5)	63 (2.5)	396 (15.6)	396 (15.6)	484 (19.1)	484 (19.1)	42 (1.7)	340 (13.4)	340 (13.4)	58 (2.3)	21 (0.8)	21 (0.8)
80	60 (2.4)	78 (3.1)	5 (0.2)	6 (0.2)	75 (3.0)	79 (3.1)	470 (18.5)	478 (18.8)	587 (23.1)	595 (23.4)	54 (2.1)	410 (16.1)	418 (16.5)	70 (2.8)	21 (0.8)	25 (1.0)
100	78 (3.1)	88 (3.5)	6 (0.2)	6 (0.2)	91 (3.6)	91 (3.6)	572 (22.5)	572 (22.5)	689 (27.1)	689 (27.1)	66 (2.6)	496 (19.5)	496 (19.5)	72 (2.8)	25 (1.0)	25 (1.0)

Dimensions in mm (in)

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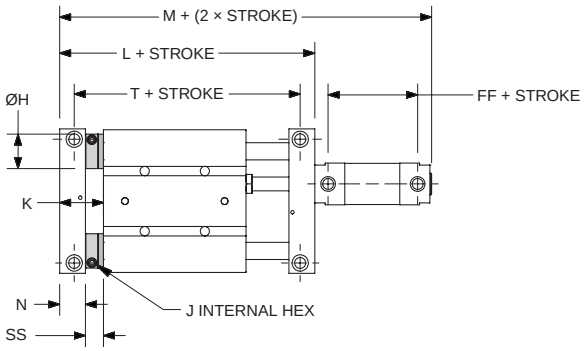
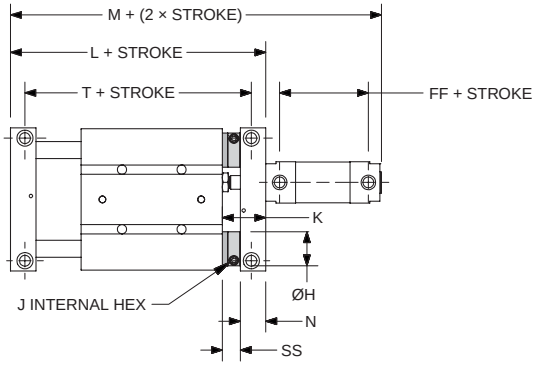
Bumpers and Adjustable Stop Collars, Extend Only (KN)



Bore	Hs*	Ho*	Js*	Jo*	Ks*	Ko*	Ls*	Lo*	Ms*	Mo*	N	Ts*	To*	FF	SSs*	SSo*
20	24 (0.9)	28 (1.1)	2.5 (0.1)	3 (0.1)	33 (1.3)	35 (1.4)	152 (6.0)	156 (6.1)	226 (8.9)	230 (9.1)	18 (0.7)	132 (5.2)	136 (5.4)	48 (1.9)	15 (0.6)	17 (0.7)
25	28 (1.1)	34 (1.3)	3 (0.1)	4 (0.2)	41 (1.6)	43 (1.7)	190 (7.5)	194 (7.6)	264 (10.4)	268 (10.6)	24 (0.9)	170 (6.7)	174 (6.9)	49 (1.9)	17 (0.7)	19 (0.7)
32	34 (1.3)	40 (1.6)	4 (0.2)	5 (0.2)	45 (1.8)	47 (1.9)	214 (8.4)	218 (8.6)	290 (11.4)	294 (11.6)	26 (1.0)	186 (7.3)	190 (7.5)	46 (1.8)	19 (0.7)	21 (0.8)
40	40 (1.6)	45 (1.8)	5 (0.2)	5 (0.2)	51 (2.0)	51 (2.0)	250 (9.8)	250 (9.8)	333 (13.1)	333 (13.1)	30 (1.2)	216 (8.5)	216 (8.5)	52 (2.0)	21 (0.8)	21 (0.8)
50	45 (1.8)	54 (2.1)	5 (0.2)	5 (0.2)	56 (2.2)	56 (2.2)	310 (12.2)	310 (12.2)	405 (15.9)	405 (15.9)	35 (1.4)	272 (10.7)	272 (10.7)	56 (2.2)	21 (0.8)	21 (0.8)
63	54 (2.1)	60 (2.4)	5 (0.2)	5 (0.2)	63 (2.5)	63 (2.5)	368 (14.5)	368 (14.5)	463 (18.2)	463 (18.2)	42 (1.7)	322 (12.7)	322 (12.7)	55 (2.2)	21 (0.8)	21 (0.8)
80	60 (2.4)	78 (3.1)	5 (0.2)	6 (0.2)	75 (3.0)	79 (3.1)	452 (17.8)	460 (18.1)	566 (22.3)	574 (22.6)	54 (2.1)	392 (15.4)	400 (15.7)	67 (2.6)	21 (0.8)	25 (1.0)
100	78 (3.1)	88 (3.5)	6 (0.2)	6 (0.2)	91 (3.6)	91 (3.6)	550 (21.7)	550 (21.7)	664 (26.1)	664 (26.1)	66 (2.6)	474 (18.7)	474 (18.7)	69 (2.7)	25 (1.0)	25 (1.0)

Bumpers and Adjustable Stop Collars, Retract Only (NK)



Bore	Hs*	Ho*	Js*	Jo*	Ks*	Ko*	Ls*	Lo*	Ms*	Mo*	N	Ts*	To*	FF	SSs*	SSo*
20	24 (0.9)	28 (1.1)	2.5 (0.1)	3 (0.1)	33 (1.3)	35 (1.4)	152 (6.0)	156 (6.1)	226 (8.9)	230 (9.1)	18 (0.7)	132 (5.2)	136 (5.4)	48 (1.9)	15 (0.6)	17 (0.7)
25	28 (1.1)	34 (1.3)	3 (0.1)	4 (0.2)	41 (1.6)	43 (1.7)	190 (7.5)	194 (7.6)	264 (10.4)	268 (10.6)	24 (0.9)	170 (6.7)	174 (6.9)	49 (1.9)	17 (0.7)	19 (0.7)
32	34 (1.3)	40 (1.6)	4 (0.2)	5 (0.2)	45 (1.8)	47 (1.9)	214 (8.4)	218 (8.6)	290 (11.4)	294 (11.6)	26 (1.0)	186 (7.3)	190 (7.5)	46 (1.8)	19 (0.7)	21 (0.8)
40	40 (1.6)	45 (1.8)	5 (0.2)	5 (0.2)	51 (2.0)	51 (2.0)	250 (9.8)	250 (9.8)	333 (13.1)	333 (13.1)	30 (1.2)	216 (8.5)	216 (8.5)	52 (2.0)	21 (0.8)	21 (0.8)
50	45 (1.8)	54 (2.1)	5 (0.2)	5 (0.2)	56 (2.2)	56 (2.2)	310 (12.2)	310 (12.2)	405 (15.9)	405 (15.9)	35 (1.4)	272 (10.7)	272 (10.7)	56 (2.2)	21 (0.8)	21 (0.8)
63	54 (2.1)	60 (2.4)	5 (0.2)	5 (0.2)	63 (2.5)	63 (2.5)	368 (14.5)	368 (14.5)	463 (18.2)	463 (18.2)	42 (1.7)	322 (12.7)	322 (12.7)	55 (2.2)	21 (0.8)	21 (0.8)
80	60 (2.4)	78 (3.1)	5 (0.2)	6 (0.2)	75 (3.0)	79 (3.1)	452 (17.8)	460 (18.1)	566 (22.3)	574 (22.6)	54 (2.1)	392 (15.4)	400 (15.7)	67 (2.6)	21 (0.8)	25 (1.0)
100	78 (3.1)	88 (3.5)	6 (0.2)	6 (0.2)	91 (3.6)	91 (3.6)	550 (21.7)	555 (21.9)	664 (26.1)	664 (26.1)	66 (2.6)	474 (18.7)	474 (18.7)	69 (2.7)	25 (1.0)	25 (1.0)

Dimensions in mm (in)

** s = standard; o = oversized*

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Fluorocarbon Seals (V)

Standard nitrile seals are used for applications within the temperatures of -18° to 74°C (0° to 165°F). For high temperature applications, up to 121°C (250° F), fluorocarbon seals are available.

When temperatures exceed 60°C (140°F) other components may not be applicable. See chart for temperature ratings of other commonly used components.

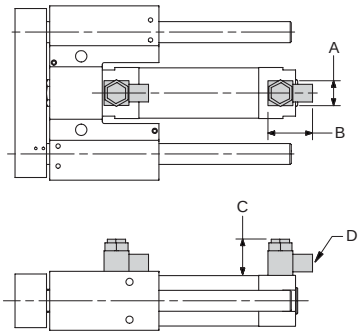
Option	Temperature Range	
Shock Absorbers	0° to 66°C	32° - 150°F
Bumpers	-18° to 93°C	0° - 200°F
Piston Magnets	-18° to 74°C	0° - 165°F
Sensors	-10° to 60°C	14° - 140°F

Flow Controls (P, F, B, N)

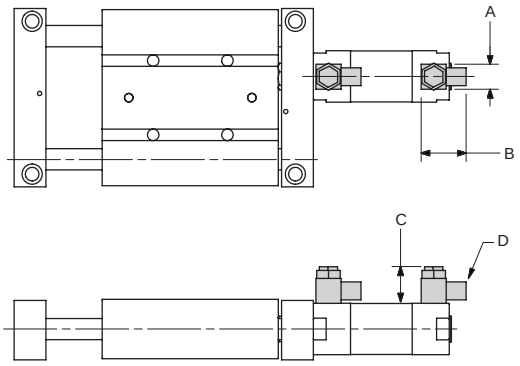
Right angle flow controls provide speed control. It is recommended that applications involving heavy loads use flow controls to provide maximum cylinder life.

Parker flow controls are available in Prestolok (push-in) and threaded style connections with the ability to rotate the head 360°.

Thrust Reach



Base

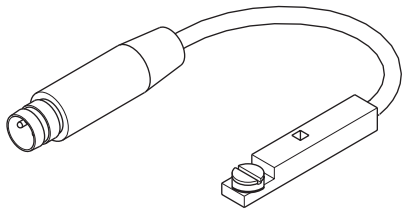


Bore	NPT Cylinder Port								BSPT Cylinder Port							
	Threaded (N)				Presto-lok (F)				Threaded (B)				Presto-lok (P)			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
20, 25, 32, 40	17.2 (0.68)	28.4 (1.12)	55.4 (2.18)	1/8	17.2 (0.68)	25.2 (0.99)	55.4 (2.18)	1/4"* tube	14.4 (0.57)	25.4 (1.00)	28.5 (1.12)	1/8	14.4 (0.57)	31.6 (1.24)	28.5 (1.12)	6mm tube
50, 63	17.2 (0.68)	32.4 (1.27)	65.2 (2.57)	1/4	17.2 (0.68)	38.3 (1.51)	65.2 (2.57)	3/8" tube	18.4 (0.72)	34.3 (1.35)	27.4 (1.08)	1/4	18.4 (0.72)	41.3 (1.63)	34 (1.34)	10mm tube
80	25.0 (0.98)	39.0 (1.54)	80.2 (3.16)	3/8	30.0 (1.18)	47.4 (1.87)	98.0 (3.86)	3/8" tube	21.6 (0.85)	40.2 (1.58)	34.0 (1.34)	3/8	21.6 (0.85)	46.7 (1.84)	44 (1.73)	12mm tube
100	30.0 (1.18)	45.5 (1.79)	98.0 (3.86)	1/2	30.0 (1.18)	51.4 (2.02)	98.0 (3.86)	1/2" tube	26.5 (1.04)	49.1 (1.93)	42.0 (1.65)	1/2	26.5 (1.04)	52.1 (2.05)	52 (2.05)	12mm tube

*1/8" on 20 and 25mm bore

Reed and Solid State Sensors

The P5L series guided cylinder includes a standard magnetic piston to allow for field installation of reed or solid state sensors. The sensor, bracket and cable must be ordered separately from the Electronic Sensors section of this catalog.



Dimensions in mm (in)

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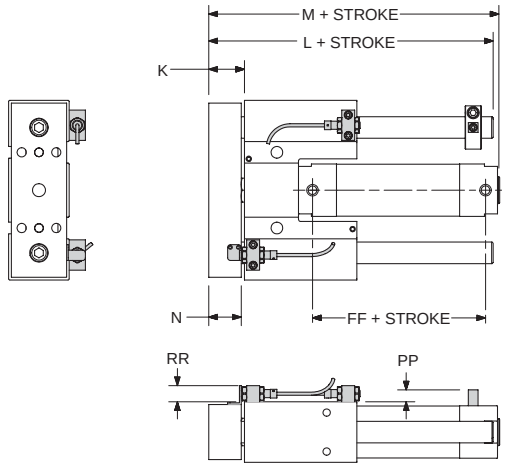
Proximity Sensors

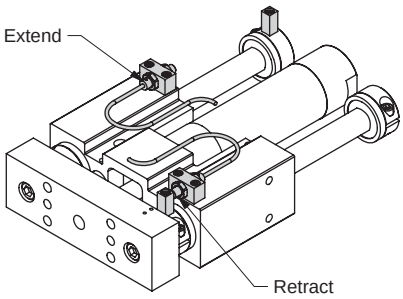
8mm proximity sensors may be ordered as part of the P5L ordering code.

A P5L can also be ordered prepared for proximity sensors which would include all the brackets necessary to mount either 8mm or 12mm proximity sensors. See Electronic Sensors section for specifications and part numbers.

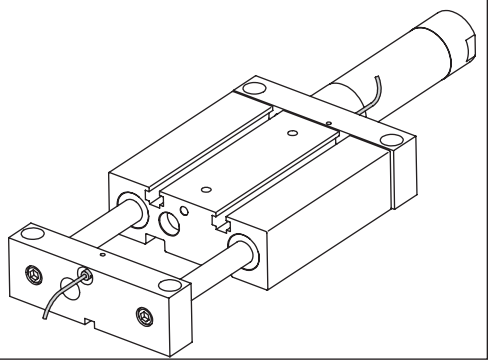


Thrust/Reach

Drawing illustrates proximity sensor and bumper options.



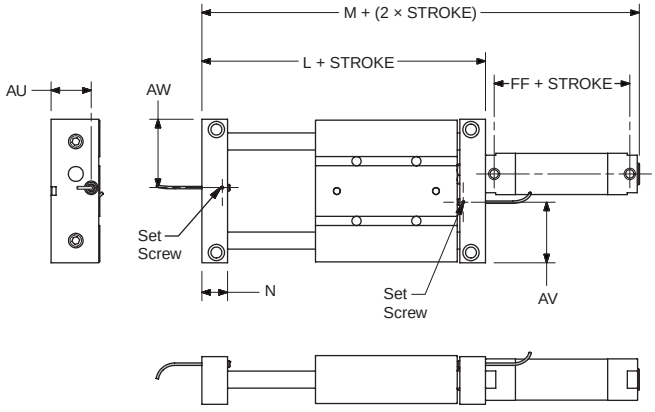
Base Slide



F

Dimensions – Thrust / Reach

Bore	K	Thrust			Reach			N	FF	PP	RR	
		Ls*	Lo*	M	Ls*	Lo*	M				8mm	12mm
20	20 (0.8)	100 (3.9)	102 (4.0)	120 (4.7)	138 (5.4)	140 (5.5)	158 (6.2)	17 (0.7)	45 (1.8)	13 (0.5)	17 (0.7)	NA
25	25 (1.0)	123 (4.8)	127 (5.0)	132 (5.2)	169 (6.7)	173 (6.8)	178 (7.0)	22 (0.9)	46 (1.8)	13 (0.5)	15 (0.6)	22 (0.9)
32	27 (1.1)	136 (5.4)	140 (5.5)	146 (5.7)	192 (7.6)	196 (7.7)	202 (8.0)	24 (0.9)	43 (1.7)	12.5 (0.5)	15 (0.6)	22 (0.9)
40	33 (1.3)	166 (6.5)	166 (6.5)	169 (6.7)	228 (9.0)	228 (9.0)	231 (9.1)	30 (1.2)	49 (1.9)	13 (0.5)	15 (0.6)	22 (0.9)
50	39 (1.5)	198 (7.8)	198 (7.8)	201 (7.9)	284 (11.2)	284 (11.2)	287 (11.3)	36 (1.4)	53 (2.1)	13.5 (0.5)	15 (0.6)	22 (0.9)
63	43 (1.7)	224 (8.8)	224 (8.8)	225 (8.9)	332 (13.1)	332 (13.1)	333 (13.1)	40 (1.6)	52 (2.0)	13 (0.5)	15 (0.6)	22 (0.9)
80	49 (1.9)	258 (10.2)	266 (10.5)	255 (10.0)	398 (15.7)	406 (16.0)	395 (15.6)	46 (1.8)	64 (2.5)	13.5 (0.5)	15 (0.6)	22 (0.9)
100	59 (2.3)	318 (12.5)	318 (12.5)	312 (12.3)	486 (19.1)	486 (19.1)	480 (18.9)	56 (2.2)	66 (2.6)	13 (0.5)	15 (0.6)	22 (0.9)



Dimensions in mm (in)

** s = standard, o = oversized*

Dimensions – Base Slides

Bore	L	M	N	AU	AV	AW	FF
20	140 (5.5)	211 (8.3)	18 (0.7)	22 (0.9)	43 (1.7)	51 (2.0)	45 (1.8)
25	176 (6.9)	247 (9.7)	24 (0.9)	29 (1.1)	51 (2.0)	62 (2.4)	46 (1.8)
32	198 (7.8)	271 (10.7)	26 (1.0)	35 (1.4)	58 (2.3)	69 (2.7)	43 (1.7)
40	232 (9.1)	312 (12.3)	30 (1.2)	47 (1.9)	71 (2.8)	80 (3.1)	49 (1.9)
50	292 (11.5)	384 (15.1)	35 (1.4)	60 (2.4)	95 (3.7)	101 (4.0)	53 (2.1)
63	350 (13.8)	442 (17.4)	42 (1.7)	73 (2.9)	114 (4.5)	121 (4.8)	52 (2.0)
80	434 (17.1)	545 (21.5)	54 (2.1)	92 (3.6)	144 (5.7)	145 (5.7)	64 (2.5)
100	528 (20.8)	639 (25.2)	66 (2.6)	109 (4.3)	169 (6.7)	180 (7.1)	66 (2.6)

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Seal Kits for Cylinder Only*

Bore	Nitrile	Fluorocarbon
20mm	P1L020D001	P1L020D005
25mm	P1L025D001	P1L025D005
32mm	P1L032D001	P1L032D005
40mm	P1L040D001	P1L040D005
50mm	P1L050D001	P1L050D005
63mm	P1L063D001	P1L063D005
80mm	P1L080D001	P1L080D005
100mm	P1L0100D001	P1L0100D005

* Additional Information on page D90 of P1L Series Section.

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