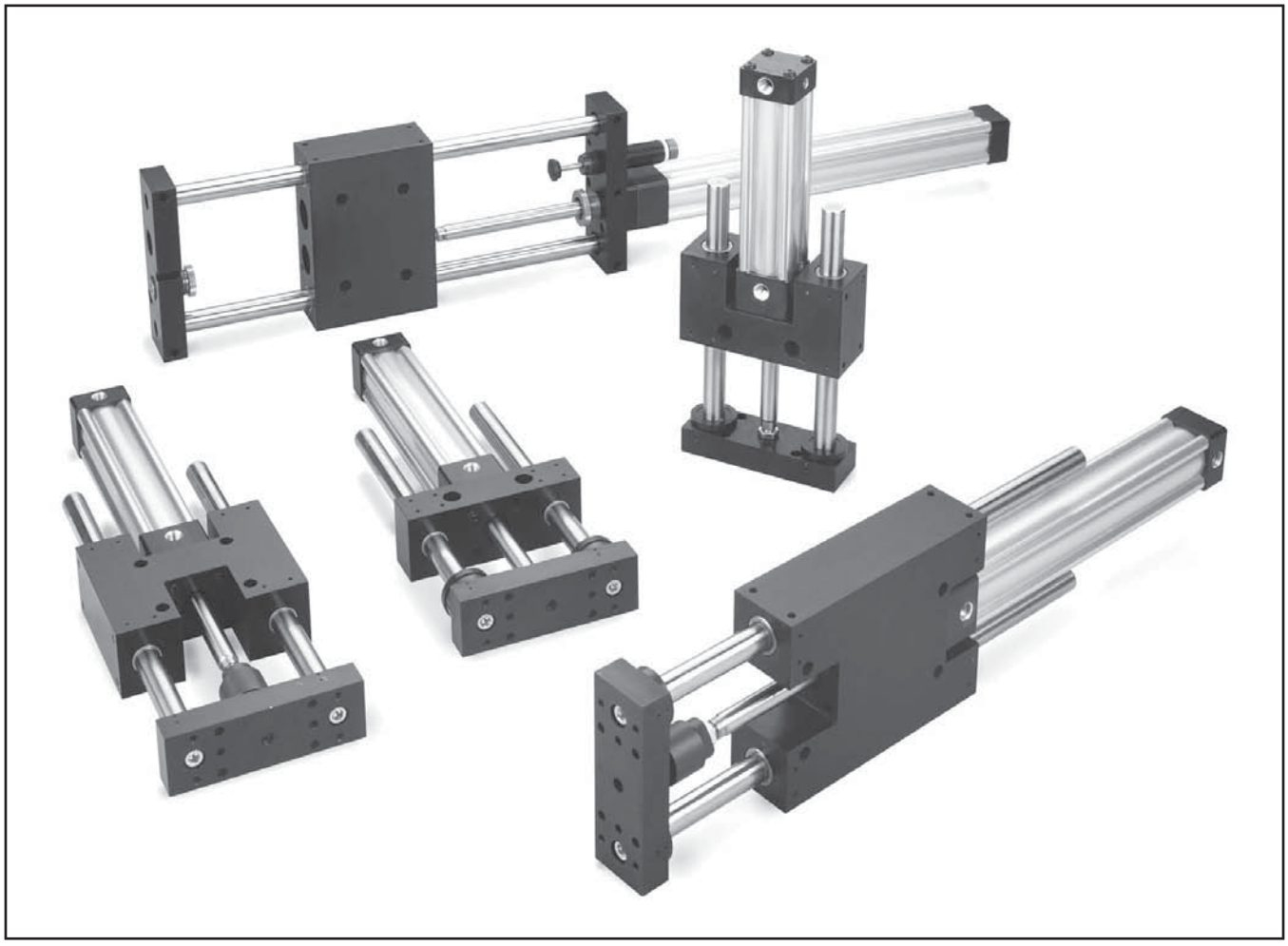
HB Series

Guided Cylinders



Contents

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Model HBT Shown

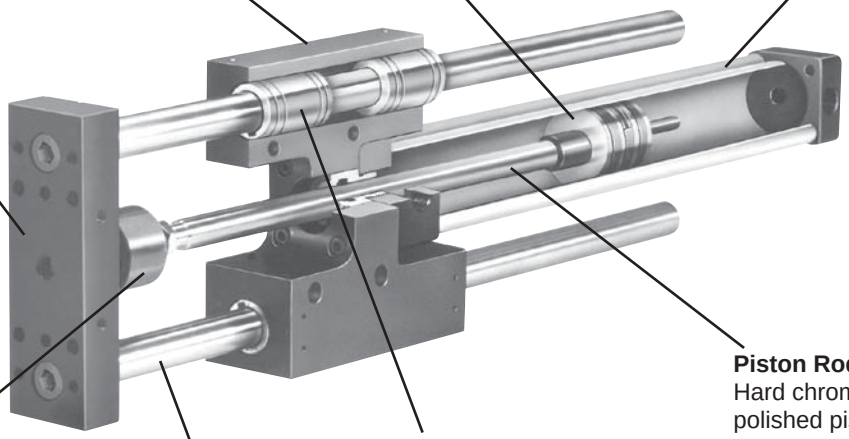
Tooling Plate
Precision machined from aluminum and then anodized, the tooling plate allows mounting on two sides. Standard dowel pin holes provide accurate mounting.

Body
A machined aluminum one-piece anodized body with tapped and counterbored through holes on three faces for mounting flexibility. Standard dowel pin holes provide accurate mounting.

Cylinder Piston
Aluminum piston with nylon wearband eliminates metal-to-metal contact. This increases cylinder life especially when the support shafts deflect under load. Magnetic piston is standard on all HB slides.

Cylinder Body
Extruded aluminum profile cylinder body offers integrated sensor grooves to minimize sensor installation time, maximize sensor protection and eliminate the need for brackets. Grooves readily accept both Global and Mini-Global Sensors. Single corner lobe of extrusion will accept legacy 2MA sensor brackets. Anodized and bright-dipped for corrosion resistance, maximum seal life and lower friction.

3D CAD FILES
available for download at parker.com/pneumatics



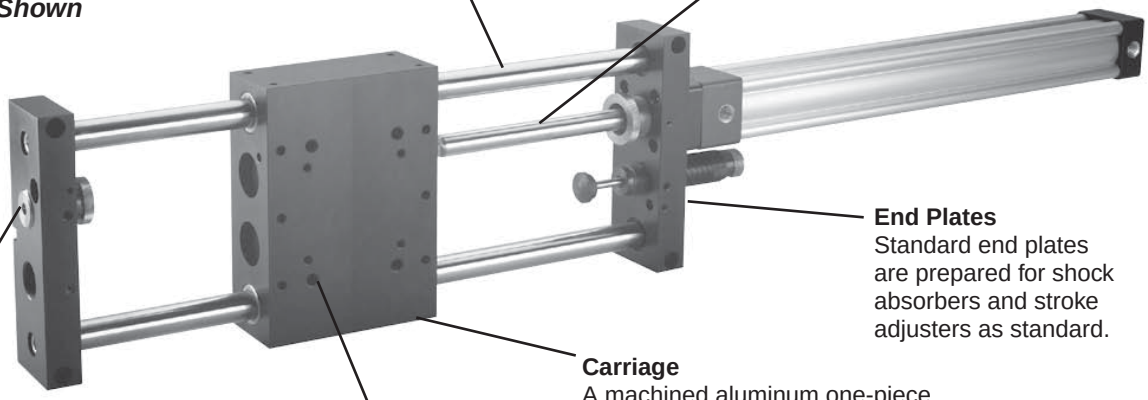
Alignment Coupler
For long stroke or heavy load applications, the alignment coupler allows the piston rod to self-center, thus increasing cylinder life. Not available for HBC Series due to shorter strokes.

Support Shafts
Case hardened to Rc 60 - 65, support shafts are machined from high carbon alloy steel and chrome plated. Stainless steel and oversized shafting are available.

Bushings
Composite bushings with oversized shafting are available for higher loads and lower cost. Sealed recirculating ball bearings provide precise alignment with very low friction and wear.

Piston Rod
Hard chrome plated and polished piston rod of 100,000 PSI yield, high tensile strength steel, case hardened to Rc 50-54 for reliable performance, reduced friction and long rod seal life.

Model HBB Shown



End Plates
Standard end plates are prepared for shock absorbers and stroke adjusters as standard.

Carriage
A machined aluminum one-piece anodized body with tapped and counterbored through holes on three faces for mounting flexibility. Standard dowel pin holes provide accurate mounting.

Threaded Stroke Adjusters
Used to achieve precise end of stroke adjustment. Available with shock absorbers and optional shock pads to reduce noise.

Direct Mounting
Tapped holes provide direct mounting capabilities to HBC Series.

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Model Number Code for HBC, HBT and HBR

Example: HBT25-08AP1T1FEV-B

HBT	25	–	08	A	P1	T1	F	E	V	–	B	

Series

HBC	Compact Slide
HBT	Thrust Slide
HBR	Reach Slide

Model

15	1-1/2" Bore, 20mm Shaft
20	2" Bore, 25mm Shaft
25	2-1/2" Bore, 30mm Shaft

Stroke

Order in 1" increments. [4]

For 3-position units, specify intermediate and total stroke separated by a "/", i.e. 02/06.

Consult factory for strokes over 36".

Slide Configuration Options

Blank	None
A	Shock Absorber, Both Ends
A1	Shock Absorber, Extend only
A2	Shock Absorber, Retract only
A3	Shock Ready, Both Ends
A4	Shock Ready, Extend
A5	Shock Ready, Retract
B	Bumpers Both Ends [1]
B1	Bumper & Adjustable Stop Collar, Extend only
B2	Bumper Retract only
B3	Bumper & Adjustable Stop Collar, Retract only
B4	Bumper & Adjustable Stop Collar, Both Ends
C	Cushions on Cylinder, Both Ends [2]
C1	Cushion on Cylinder, Extend only [2]
C2	Cushion on Cylinder, Retract only [2]
X	Special Slide Configuration (Please specify)

Proximity Sensor Options

Blank	None
P	PNP, Flying Lead Type
N	NPN, Flying Lead Type
P1	PNP, Plug-in Connector
N1	NPN, Plug-in Connector
J	8mm Sensor Mounting Bracket, no sensor supplied
J1	12mm Sensor Mounting Bracket, no sensor supplied

Note: 8mm inductive proximity sensors are included with Options P, N, P1, N1. Magnetic piston is standard for 3MA, 4MA, 4MAJ, 4ML and P1D cylinders. Order reed and solid state sensors separately for these cylinders from the Electronic Sensors section.

Bushings

T	Composite (Standard)
D	Linear Ball Bearing
T1	Composite with Oversized Support Shafts
TC	Composite with Contaminant-tolerant Seals

Other Options
(More than one selection is possible)

Blank	None
F	Flow Controls (Presto-Lok)
G	Flow Controls (NPT)
K	Stainless Steel Support Shafting

Cylinder Type

3A	3MA NFPA Air Cylinder, NPTF Ports [2]
4A	4MA NFPA Air Cylinder, NPTF Ports
4J	4MAJ NFPA Air Cylinder with Manual Override Rodlock, NPTF Ports, 100 PSIG max.
D	P1D ISO Cylinder w/Removable Gland, BSPP Ports
D1	P1D ISO Cylinder w/Removable Gland, Standard Rodlock, BSPP Ports
D2	P1D ISO Cylinder w/Removable Gland, Manual Override Rodlock, BSPP Ports
E	P1D ISO Cylinder w/Removable Gland, NPTF Ports
E1	P1D ISO Cylinder w/Removable Gland, Standard Rodlock, NPTF Ports
E2	P1D ISO Cylinder w/Removable Gland, Manual Override Rodlock, NPTF Ports
4L	4ML NFPA Hydraulic Cylinder, NPTF Ports, 400 PSIG max. [2]
S	2A NFPA Steel Air Cylinder, 250 PSIG max.
S1	3L NFPA Steel Hydraulic Cylinder, 750 PSIG max.
Q	No Cylinder, NFPA Cylinder Mounting
Q1	No Cylinder, ISO Cylinder Mounting
X	Special Cylinder Type (Please specify)

Cylinder Options
(More than one selection is possible)

Blank	None
V	Fluorocarbon cylinder seals [3]
L1	Left hand assembly
L3	Cylinder ports at position 3

Design Series

B	Current Design Level

Special Options

Blank (STD)

(Two digit code assigned by factory and applies when any "X" appears in the model number or when special options or features are required.)

NOTES

1 Option B includes Options B1 and B2.

2 Cushions are not available with 4ML cylinders or 3MA cylinders on HB products.

3 Fluorocarbon seals not available with 3MA or rodlock cylinders.

4 P1D cylinders have strokes only in whole mm. The HB inch stroke will be changed (rounded up) to reflect this.

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Model Number Code for HBB

Example: HBB25-08AP1T1FLV-B

HBB	25	–	08	A	P1	T1	F	3A	V	–	B	

Series

HBB	Base Slide

Model

15	1½" Bore, 20mm Shaft
20	2" Bore, 25mm Shaft
25	2½" Bore, 30mm Shaft

Stroke

Order in 1" increments. [4]

For 3-position units, specify intermediate and total stroke separated by a "/", i.e. 02/06.

Consult factory for strokes over 36".

Slide Configuration Options

Blank	None
A	Shock Absorber, Both Ends
A1	Shock Absorber, Extend only
A2	Shock Absorber, Retract only
A3	Shock Ready, Both Ends
B	Bumpers Both Ends
B1	Bumper & Adjustable Stop Collar, Extend only
B2	Bumper Retract only
B3	Bumper & Adjustable Stop Collar, Retract only
B4	Bumpers & Adjustable Stop Collar, Extend only
B5	Bumper & Adjustable Stop Collar, Both Ends
C	Cushions on Cylinder, Both Ends [2]
C1	Cushion on Cylinder, Extend only [2]
C2	Cushion on Cylinder, Retract only [2]
E	Threaded Stroke Adjusters, Both Ends
E1	Stroke Adjusters with Shock Pads, Both Ends
E2	Stroke Adjusters with Shock Pads, Extend only
E3	Stroke Adjusters with Shock Pads, Retract only
X	Special Slide Configuration (Please specify)

Proximity Sensor Options

Blank	None
P	PNP, Flying Lead Type
N	NPN, Flying Lead Type
P1	PNP, Plug-in Connector
N1	NPN, Plug-in Connector
J	8mm Sensor Mounting Bracket, no sensor supplied
J1	12mm Sensor Mounting Bracket, no sensor supplied

Note: 8mm inductive proximity sensors are included with Options P, N, P1, N1. Magnetic piston is standard for 3MA, 4MA, 4MAJ, 4ML and P1D cylinders. Order reed and solid state sensors separately for these cylinders from the Electronic Sensors section.

Bushings

T	Composite (Standard)
D	Linear Ball Bearings
T1	Composite with Oversized Support Shafts
TC	Composite with Contaminant-tolerant Seals

Other Options
(More than one selection is possible)

Blank	None
F	Flow Controls (Presto-Lok)
G	Flow Controls (NPT)
K	Stainless Steel Guide Shafting

Cylinder Type

3A	3MA NFPA Air Cylinder, NPTF Ports [2]
4A	4MA NFPA Air Cylinder, NPTF Ports
4J	4MAJ NFPA Air Cylinder with Manual Override Rodlock, NPTF Ports, 100 PSIG max.
D	P1D ISO Cylinder w/Removable Gland, BSPP Ports
D1	P1D ISO Cylinder w/Removable Gland, Standard Rodlock, BSPP Ports
D2	P1D ISO Cylinder w/Removable Gland, Manual Override Rodlock, BSPP Ports
E	P1D ISO Cylinder w/Removable Gland, NPTF Ports
E1	P1D ISO Cylinder w/Removable Gland, Standard Rodlock, NPTF Ports
E2	P1D ISO Cylinder w/Removable Gland, Manual Override Rodlock, NPTF Ports
4L	4ML NFPA Hydraulic Cylinder, NPTF Ports, 400 PSIG max. [2]
S	2A NFPA Steel Air Cylinder, 250 PSIG max.
S1	3L NFPA Steel Hydraulic Cylinder, 750 PSIG max.
Q	No Cylinder, NFPA Cylinder Mounting
Q1	No Cylinder, ISO Cylinder Mounting
X	Special Cylinder Type (Please specify)

Cylinder Options
(More than one selection is possible)

Blank	None
V	Fluorocarbon Cylinder Seals [3]
L3	Cylinder Ports at Position 3

Design Series

B	Current Design Level

Special Options

Blank (STD)

(Two digit code assigned by factory applies when any "X" appears in the model number or when special options or features are required.)

NOTES

1 Option B includes Options B1 and B2.

2 Cushions are not available with 4ML cylinders or 3MA cylinders on HB products.

3 Fluorocarbon seals not available with 3MA or rodlock cylinders.

4 P1D cylinders have strokes only in whole mm. The HB inch stroke will be changed (rounded up) to reflect this.

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Specifications

- Maximum operating pressure: 100 psi (air) – 4MAJ cylinder
  150 psi (air) – P1D cylinder
  250 psi (air) – 3MA, 4MA and 2A cylinders
  400 psi (oil) – 4ML cylinder only
  750 psi (oil) – 3L cylinder only
- Operating characteristics: double acting
- Four support shaft sizes: 20, 25, 30 and 35 mm
- Stroke tolerance: +.030, -.000
- Mounting: unrestricted
- Operating temperature range (cylinder):
  Standard seals 0 to 165°F
  Fluorocarbon seals* 0 to 250°F
- Filtration requirement:
  40 micron filtered, dry air or
  filtered hydraulic oil (4ML or 3L)

* See fluorocarbon seal option for high temperature applications. Not available for 3MA or rod lock cylinders.

Quick Reference Data

Model	Support Shaft Diameter mm (in)	Oversized Shaft Diameter mm (in)	3MA, 4MA, 4MAJ, 4ML NFPA Cylinder Bore Size (in)	P1D ISO Cylinder Bore Size (mm)	Force Output on Extend at 80 PSI (lb)	Force Output on Retract at 80 PSI (lb)
15	20 (0.79)	25 (0.98)	1½	40	142	117
20	25 (0.98)	30 (1.18)	2	50	251	226
25	30 (1.18)	35 (1.38)	2½	63	393	368

Model	Maximum Suggested Stroke, inches*				Weights, Standard Shaft (lb)					Weights, Oversized Shaft (lb)				
					Base Unit				Per Inch Stroke	Base Unit				Per Inch Stroke
	HBC	HBT	HBR	HBB	HBC	HBT	HBR	HBB		HBC	HBT	HBR	HBB	
15	8	24	30	30	6.54	8.86	12.76	11.05	0.48	7.24	9.83	14.20	11.92	0.63
20	10	30	36	36	11.57	14.35	24.02	18.65	0.64	12.60	15.67	26.19	19.81	0.83
25	12	36	42	42	20.57	24.45	42.03	31.78	0.85	22.03	25.69	44.50	33.32	1.08

*Consult factory for longer strokes.

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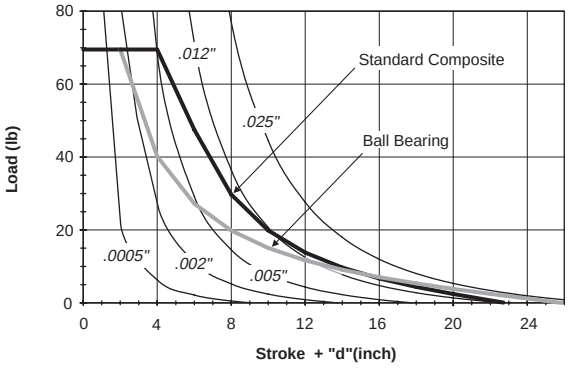
Horizontal Load Capacity & Deflection with Standard Shafting

The plots on these two pages illustrate the side load vs. actuator stroke for the three HB slide sizes. Applied loads will cause a slight deflection of the support rods. Deflection distance is also shown except for HBN, which should be used on non-rotating applications. The graphs include the weight of the support rods and tooling plate and are based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic loads will reduce cycle life. For static loads, multiply the information in the graph by 1.5. The vertical load for HBN does not include the weight of the tool plate and support rods.

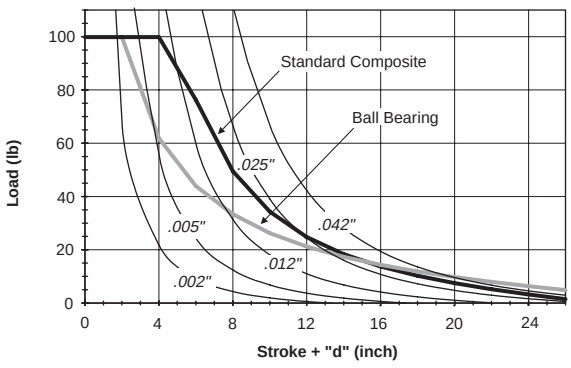
Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

HBC15



HBT15



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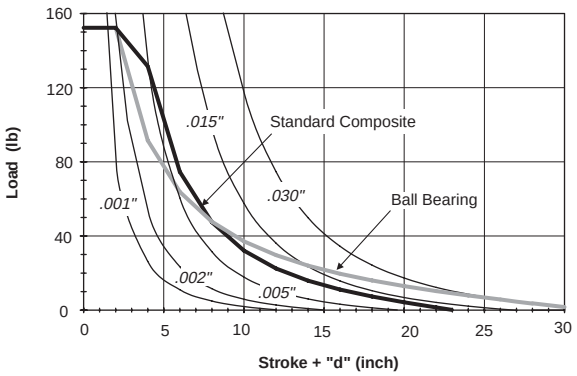

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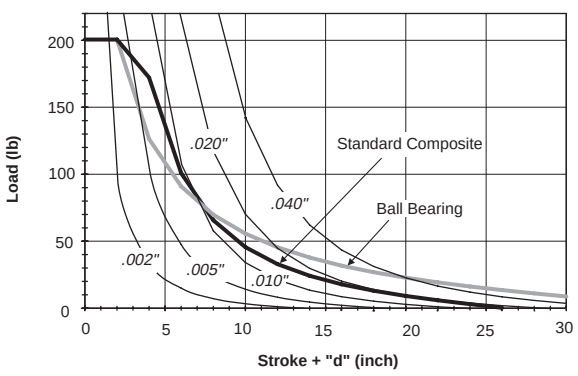

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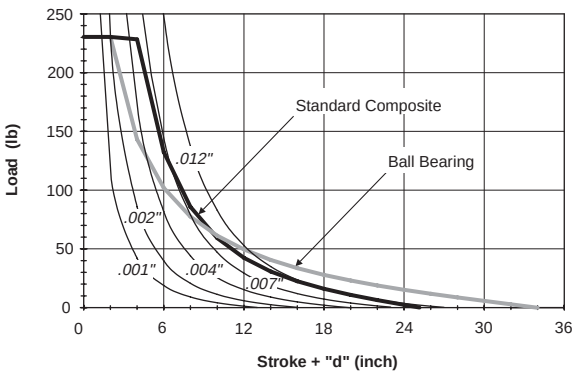

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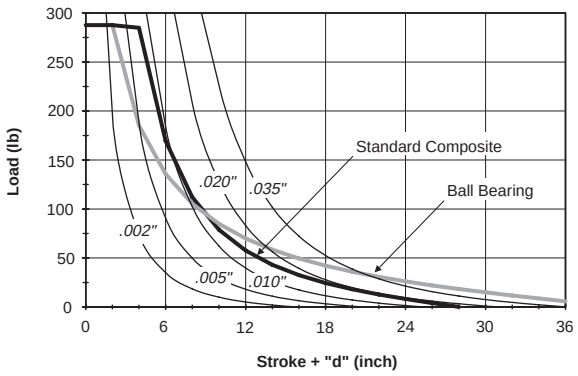

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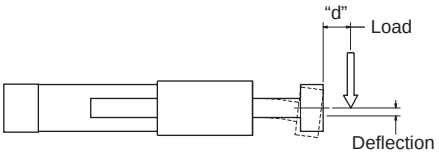
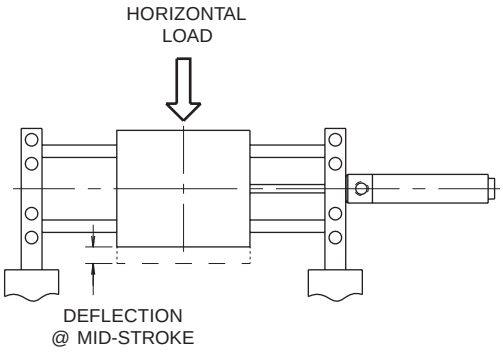


EXAMPLE:

An HBT15 with ball bearings and a "stroke+d" of 12" would have a load capacity of 20 lbs.



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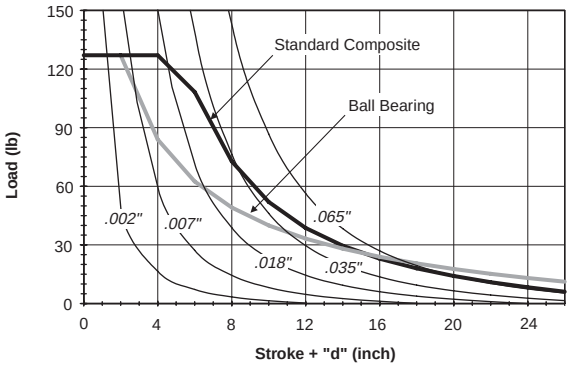

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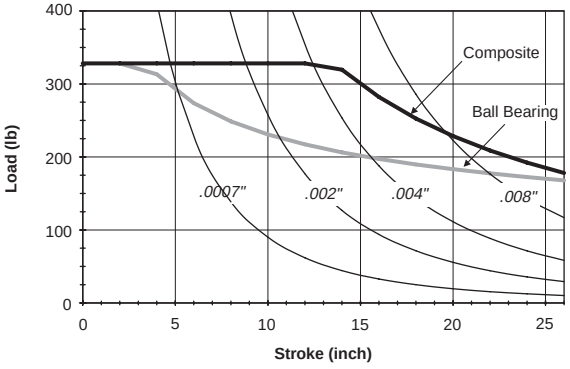

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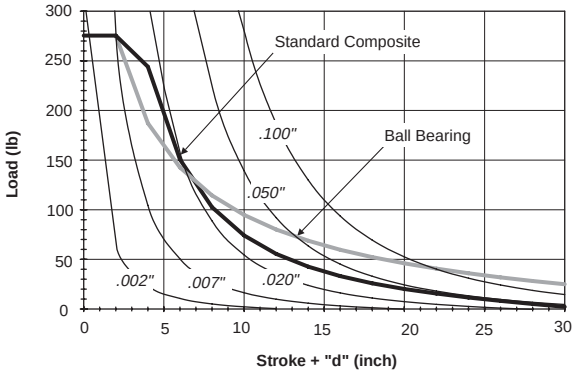

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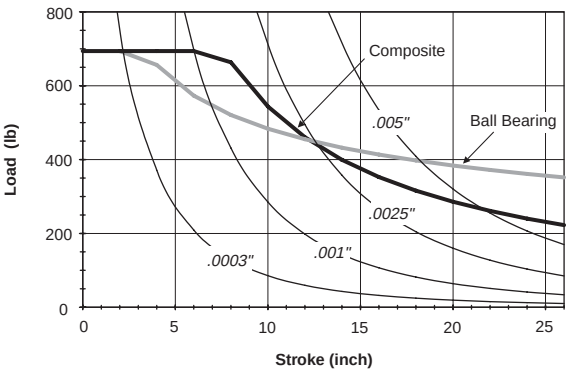

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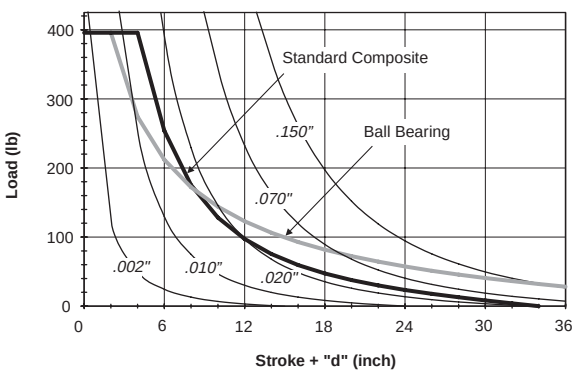

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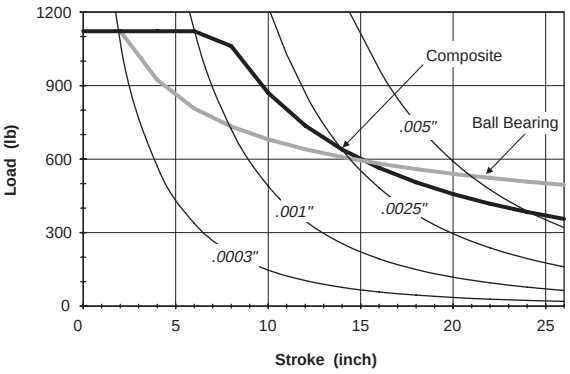

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Horizontal Load Capacity & Deflection with Oversized Shafting

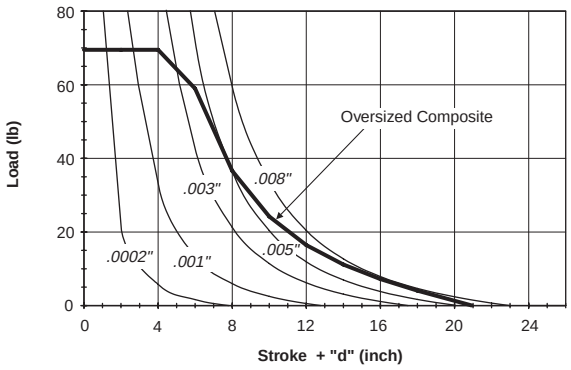
The plots on these two pages illustrate the side load vs. actuator stroke for the three HB slide sizes. Applied loads will cause a slight deflection of the support rods. Deflection distance is also shown. The graphs include the weight of the support rods and tooling plate and are based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic loads will reduce cycle life. For static loads, multiply the information in the graph by 1.5.

Note: Actuator life may vary depending on the severity of the following variables:

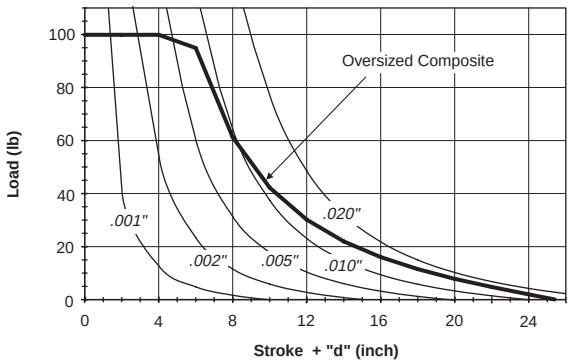
- Acceleration
- Velocity
- Vibration
- Orientation

F

HBC15



HBT15



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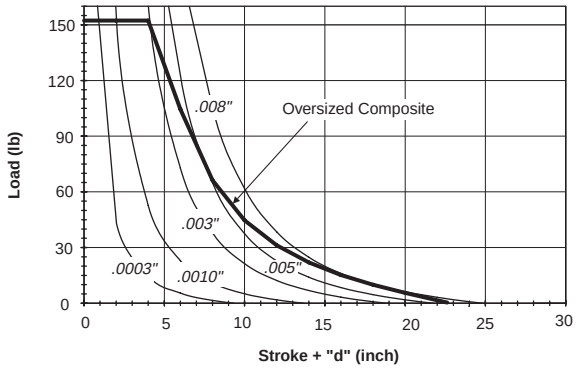

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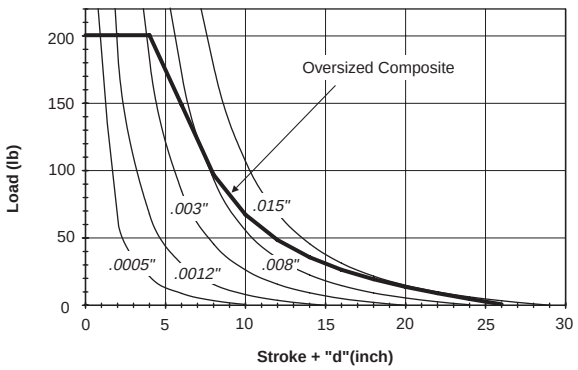

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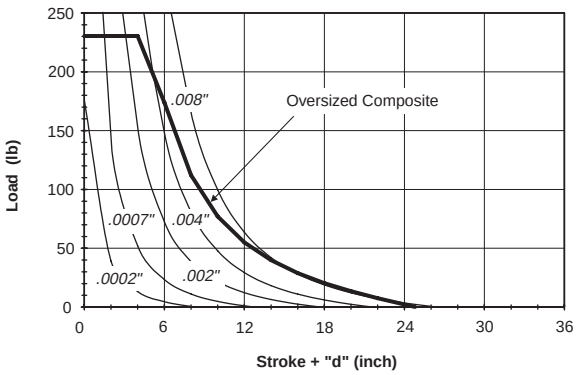

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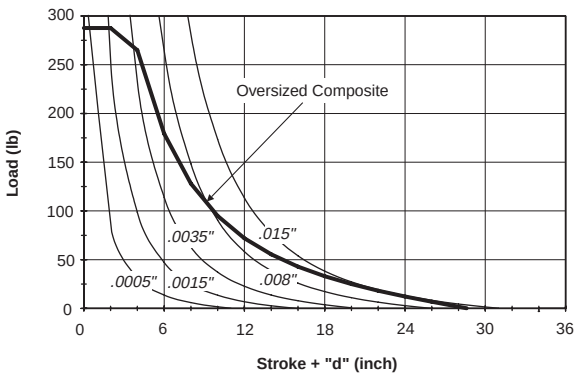

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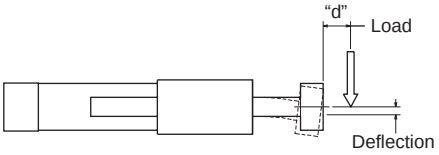
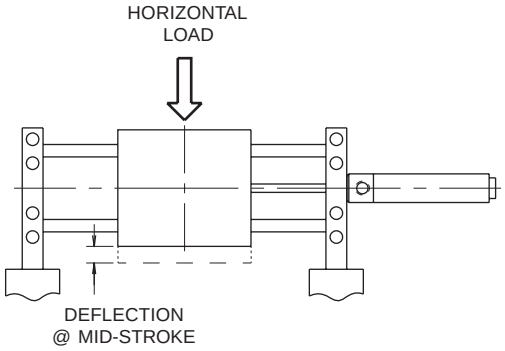
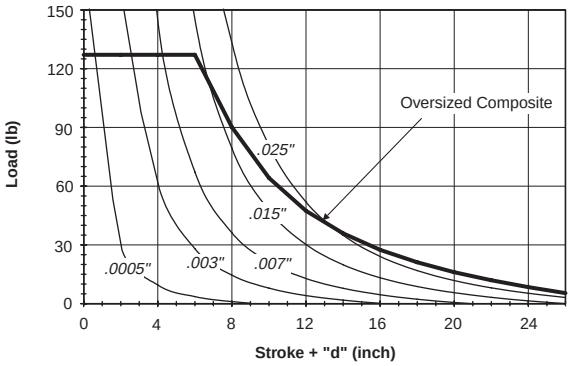


EXAMPLE:

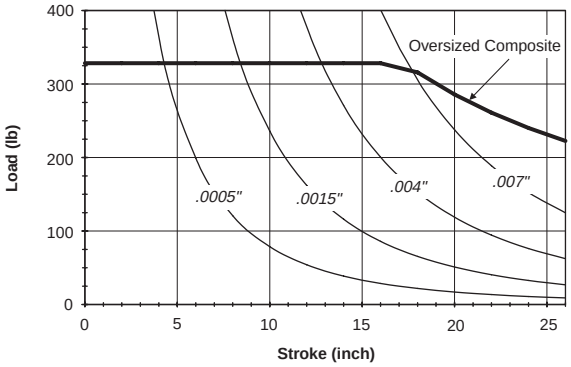
An HBT15 with oversized composite bushings and a "stroke+d" of 8" would have a load capacity of 60 lbs.



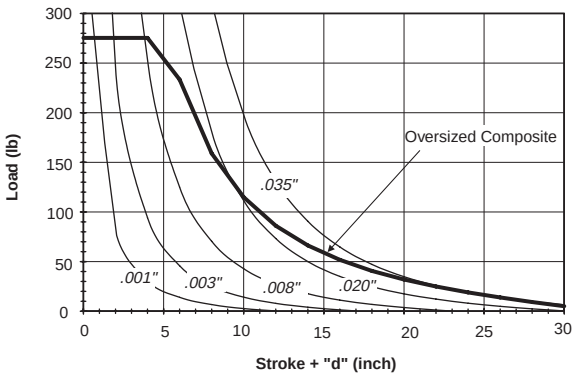
HBR15



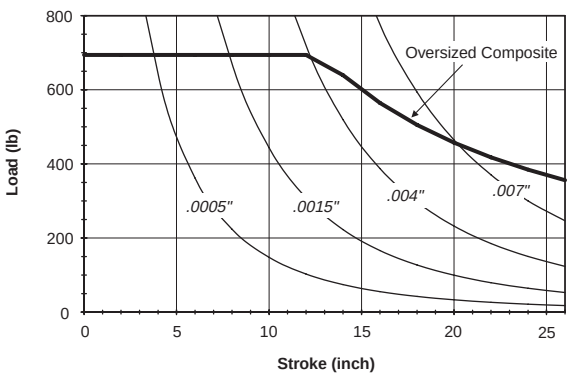
HBB15



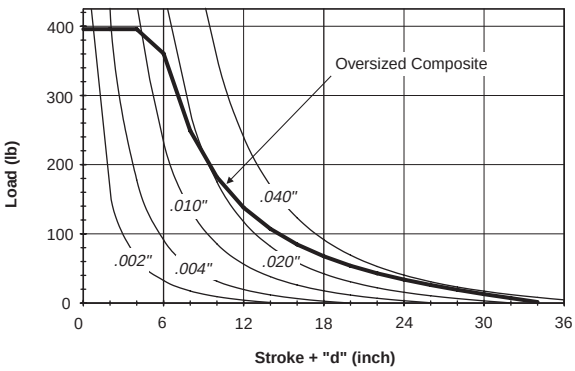
HBR20



HBB20



HBR25



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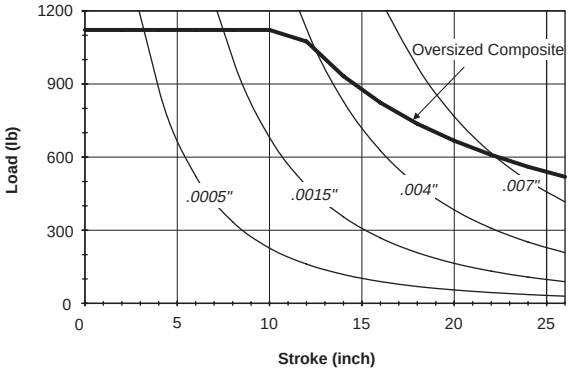

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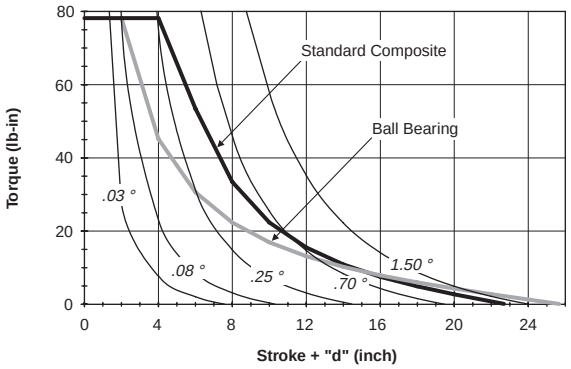
Symmetrical Torque Capacity with Standard Shafting

The plots on these two pages provide the torsional load vs. actuator stroke for various slide sizes. Torsional loads will cause a slight amount of angular deflection of the tooling plate. Angular deflection is also shown except for HBN, which should be used in non-rotating applications. The data presented is based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic torques will reduce cycle life. For static torque, multiply the information in the graph by 1.5. The vertical load for HBN does not include the weight of the tool plate and support rods.

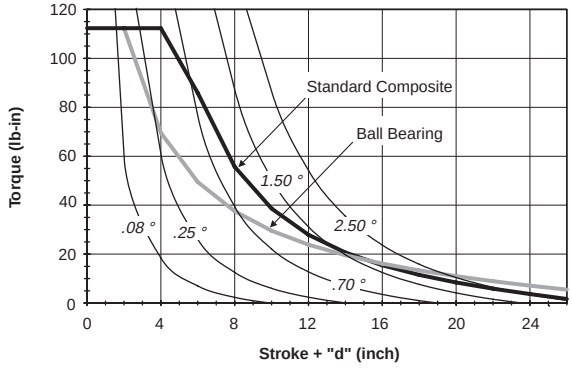
Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

HBC15



HBT15



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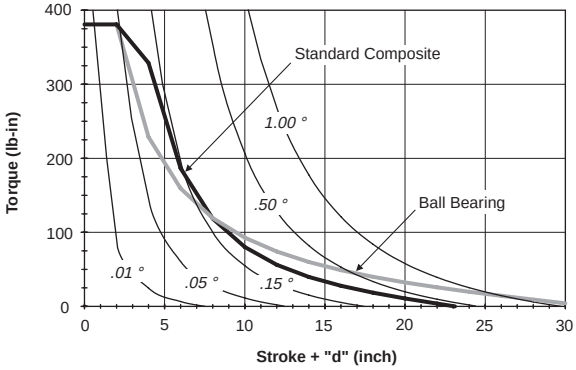

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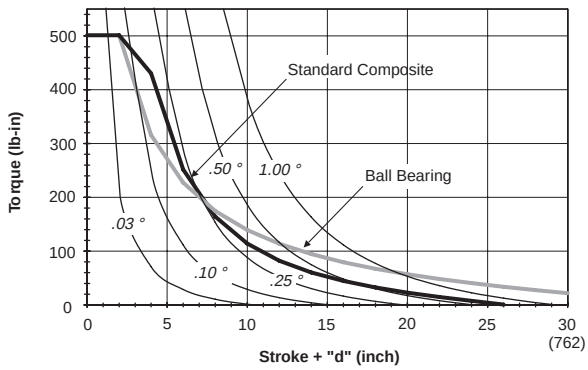

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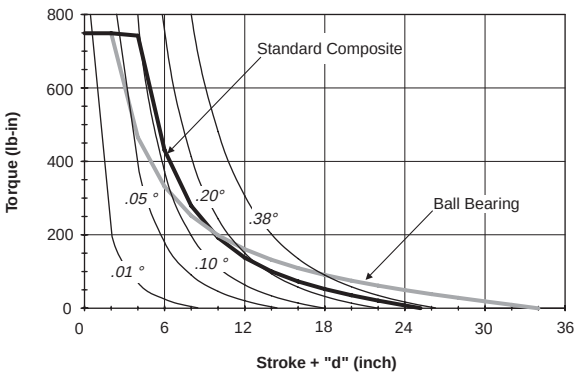

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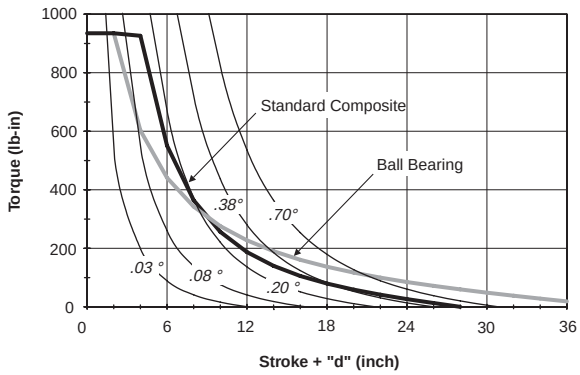

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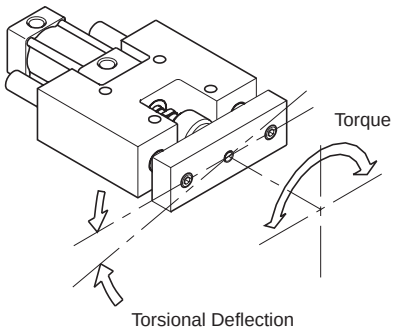
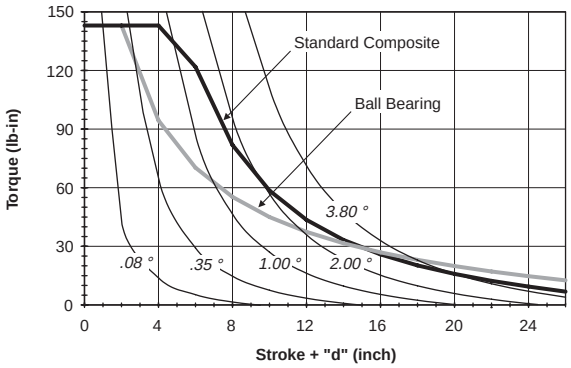


EXAMPLE:

An HBT25 with composite bushings and a “stroke+d” of 12" would have a torque capacity of 200 lb-in.

HBR15



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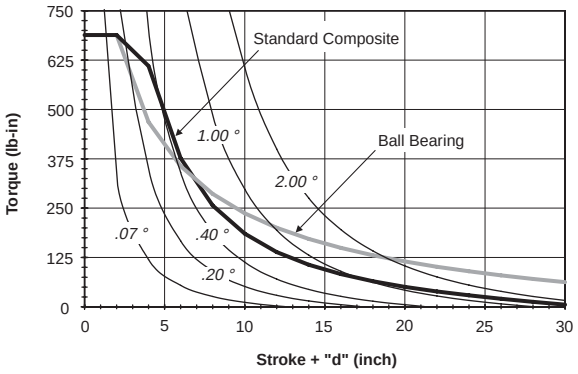

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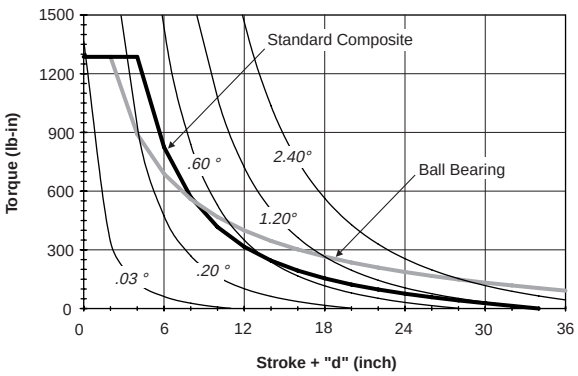

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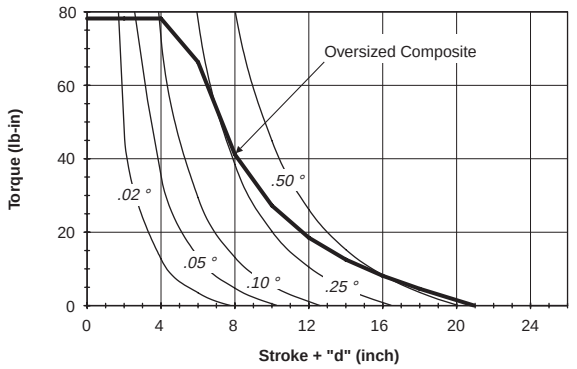
Symmetrical Torque Capacity with Oversized Shafting

The plots on these two pages provide the torsional load vs. actuator stroke for various slide sizes. Torsional loads will cause a slight amount of angular deflection of the tooling plate. Angular deflection is also shown. The data presented is based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic torques will reduce cycle life. For static torque, multiply the information in the graph by 1.5.

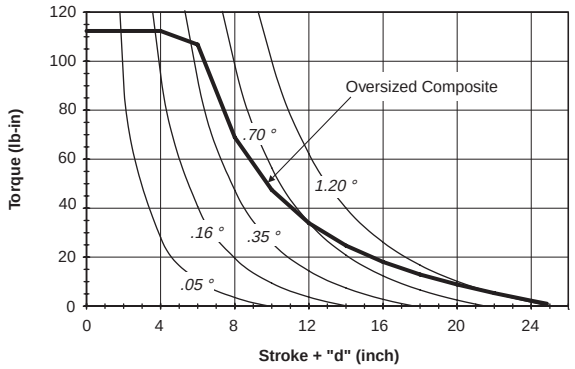
Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

HBC15



HBT15



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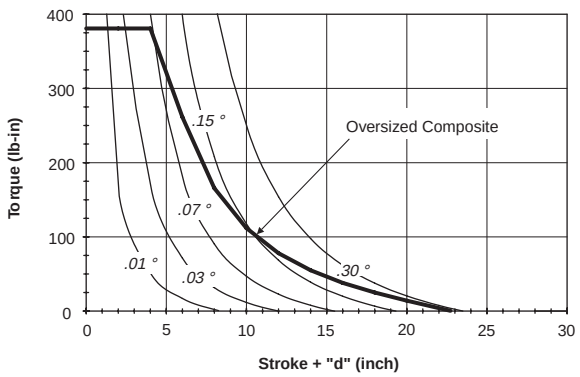

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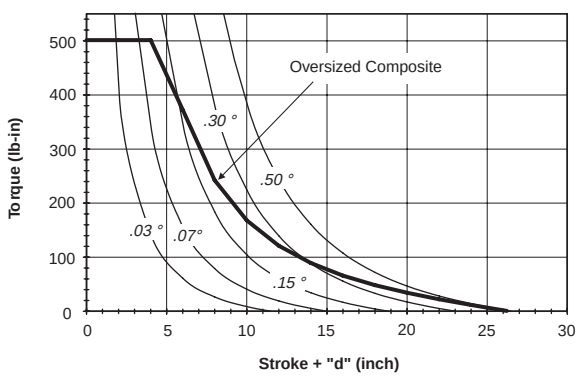

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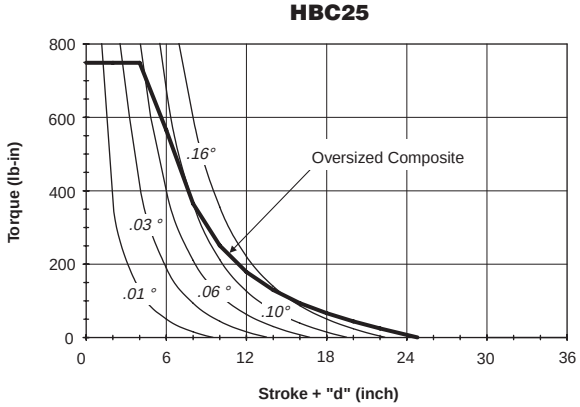

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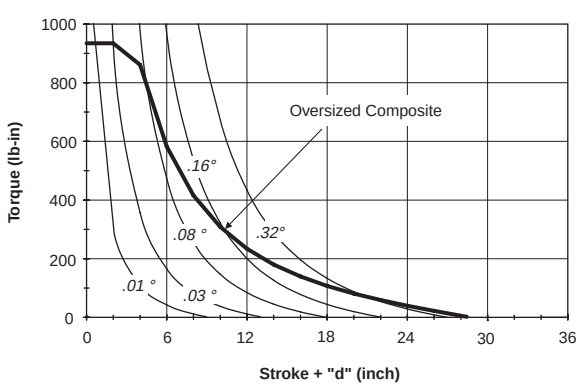

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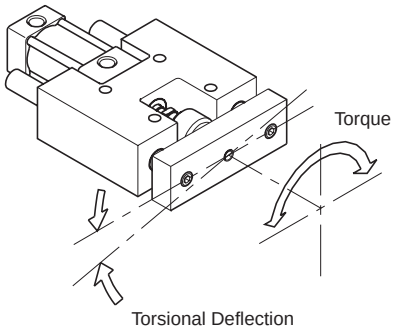
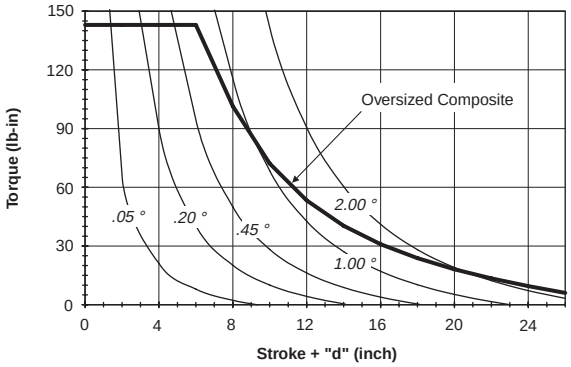


EXAMPLE:

An HBT25 with oversized composite bushings and a "stroke+d" of 6" would have a torque capacity of 600 lb-in.

HBR15



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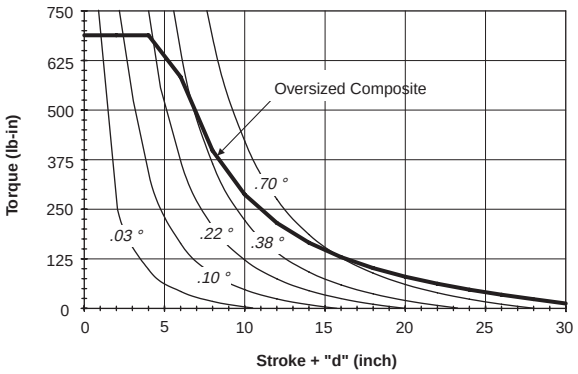

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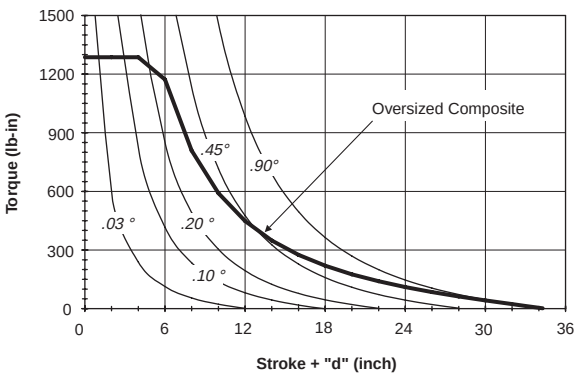

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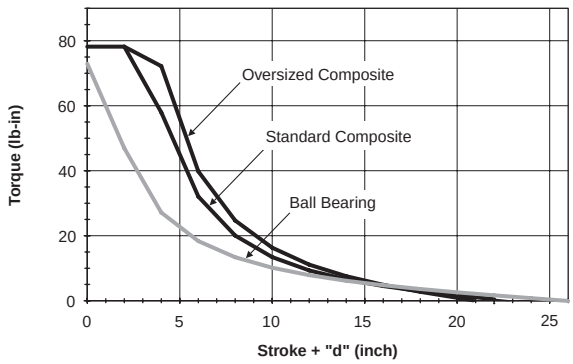
Asymmetrical Torque Capacity

Asymmetrical loading occurs when the load is applied to one side of the unit. HB Series units can resist torsional loads that are asymmetrical. The graphs on these two pages show torsional load capacity for both standard and oversized shafting under dynamic conditions For static applications, multiply the information in the graphs by 1.5. The vertical load for HBN does not include the weight of the tool plate and support rods.

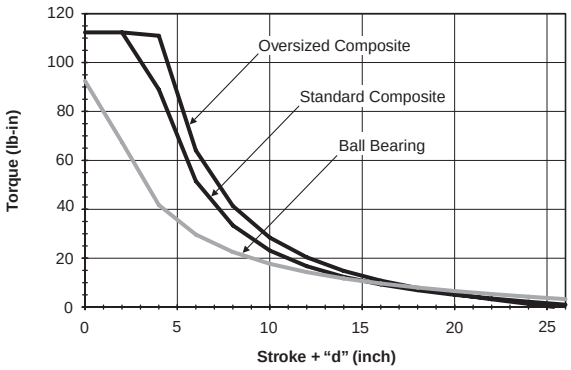
Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

HBC15



HBT15



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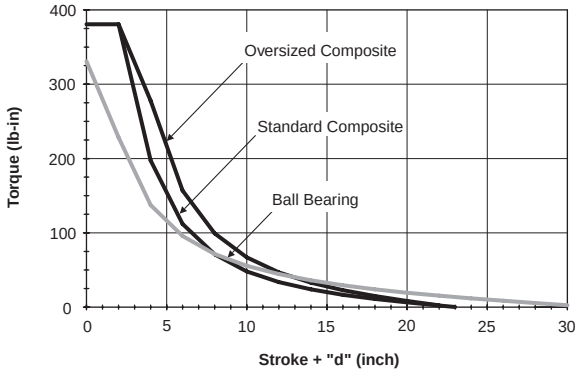

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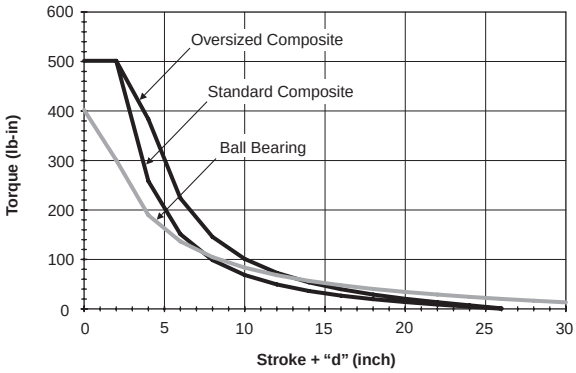

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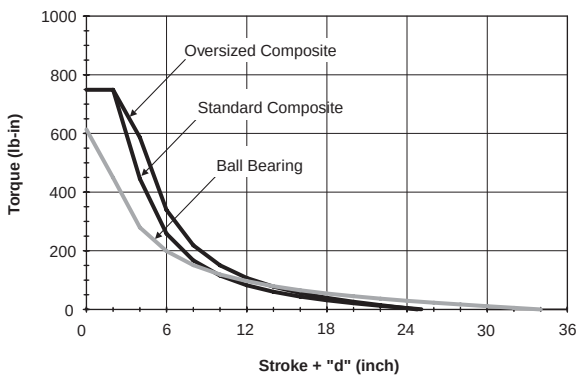

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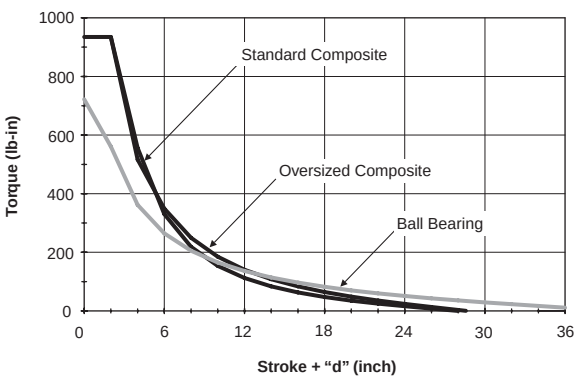

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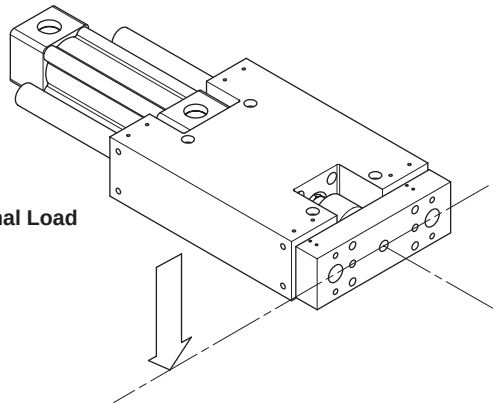
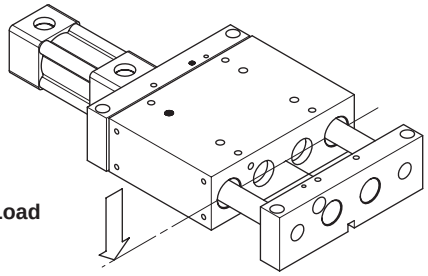


Torsional Load

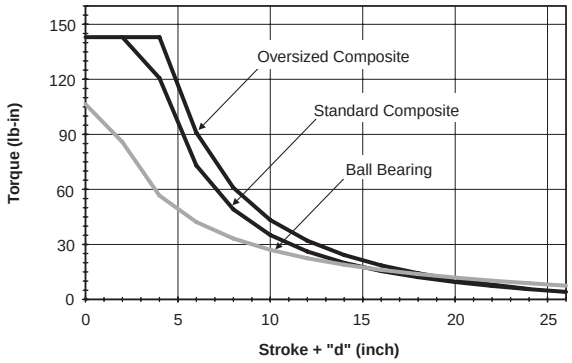


Torsional Load

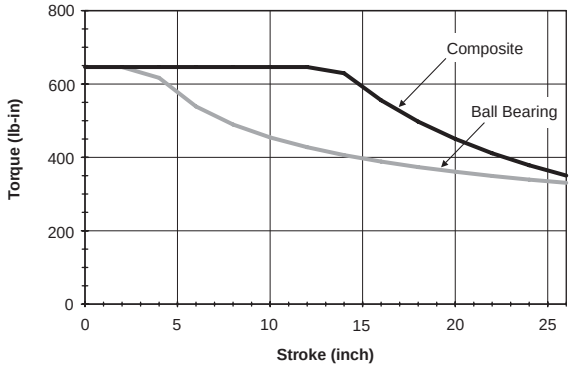
EXAMPLE:

An HBT-20 with standard composite bushings and a stroke + d of 10 inches would have an asymmetrical torque capacity of 80 lb-in.

HBR15



HBB15



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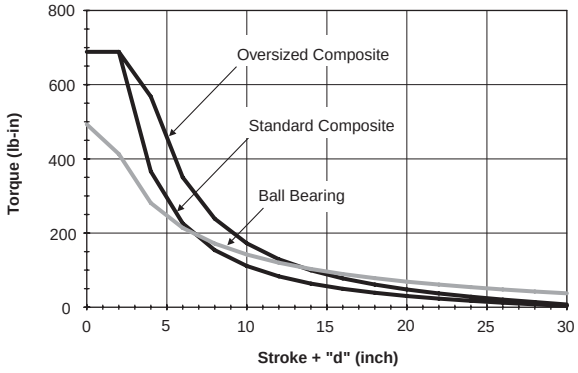

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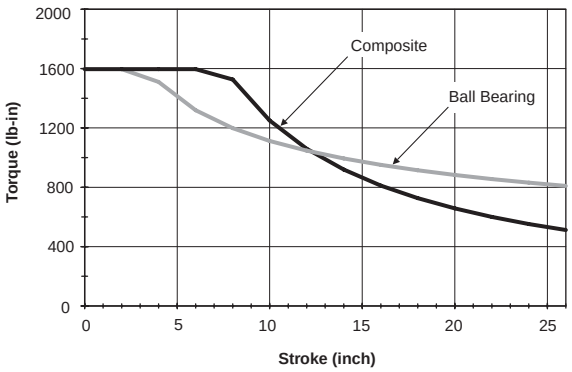

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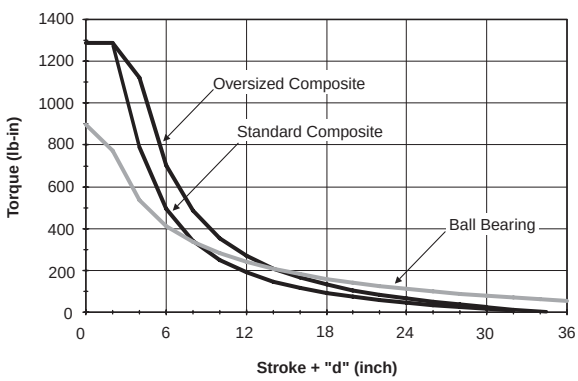

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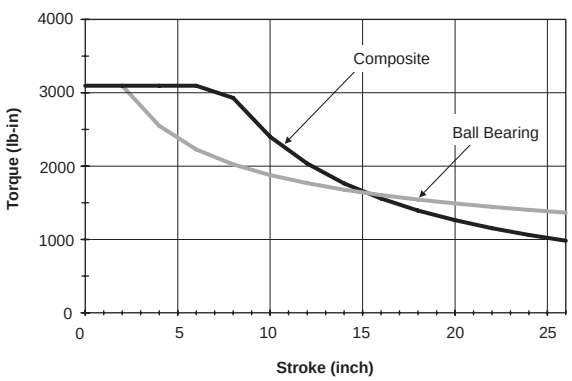

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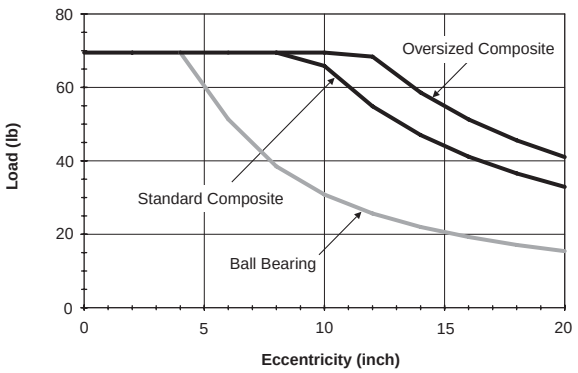
Vertical Eccentric Load Capacity

HB Series units mounted vertically will have the same eccentric load capacity regardless of orientation. The graphs provide maximum load capacity for an eccentric mounted load on a 4" stroke cylinder. The load is assumed to be mounted at the face of the tooling plate.

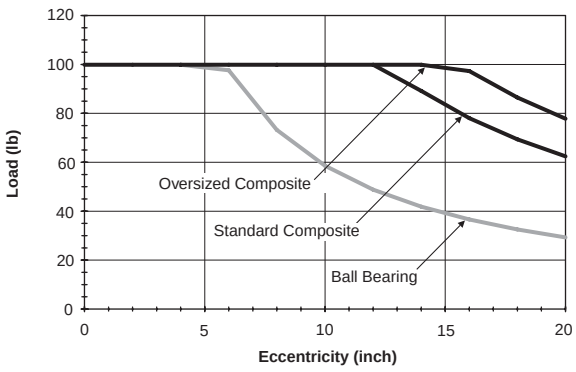
Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration

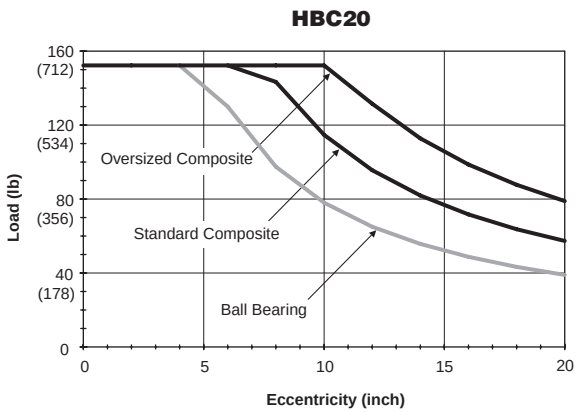
HBC15



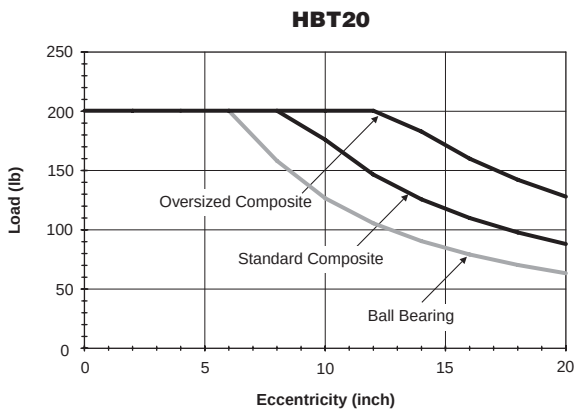
HBT15



HBC20



HBT20



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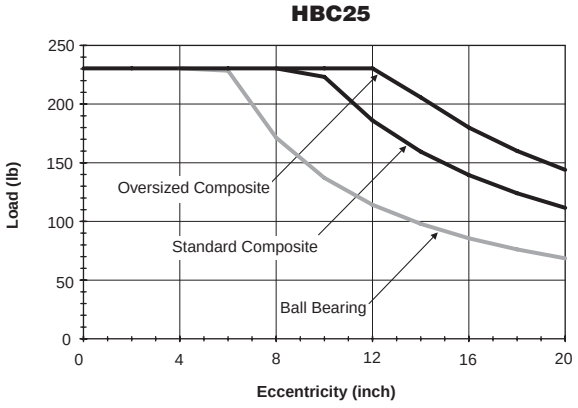
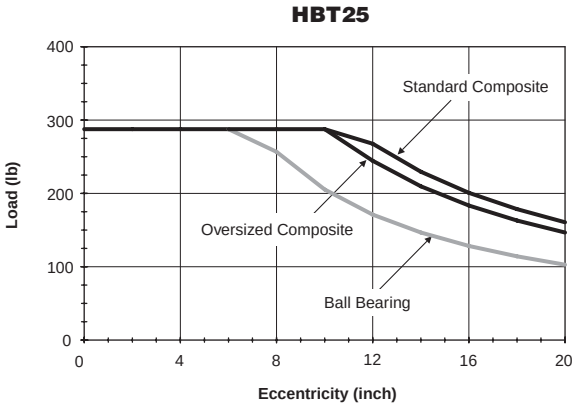


HBT25



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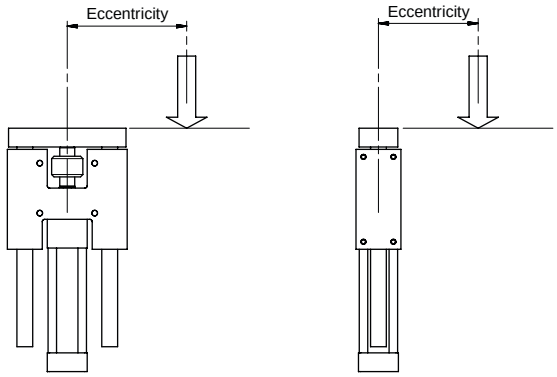
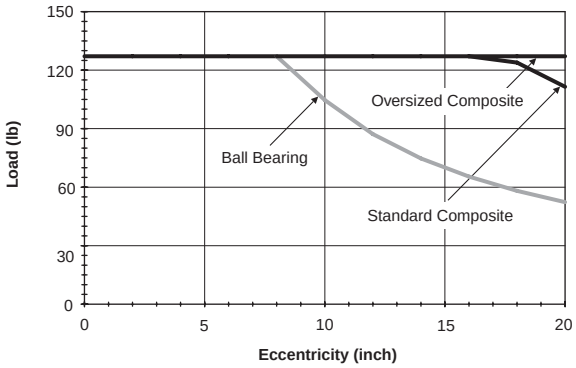


EXAMPLE:

An HBT15 with ball bearings carrying an eccentric load with an eccentricity distance of 15" would have a load capacity of 40 lbs.

HBR15



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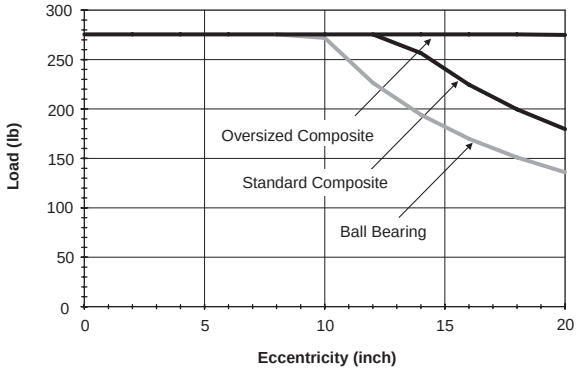
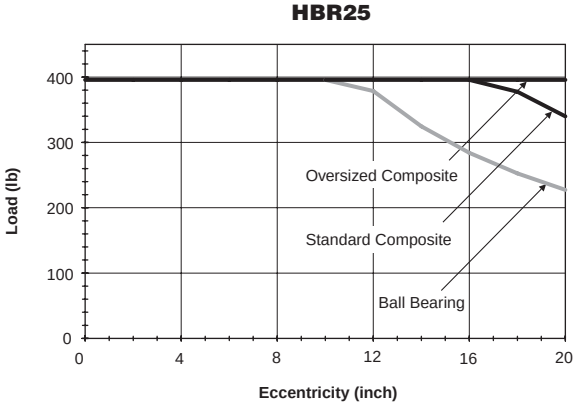


HBR25



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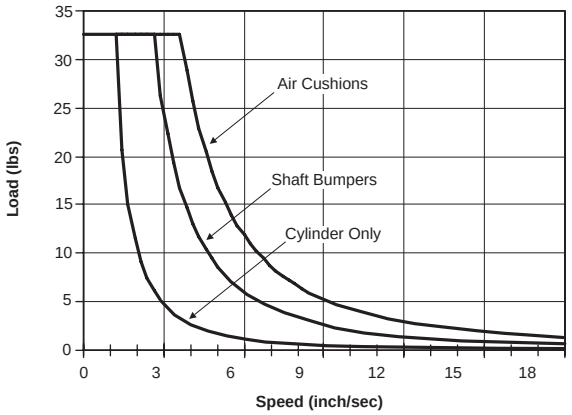
Kinetic Energy

These plots illustrate the stopping capacity of the HB Series with bumpers, cushions or cylinder only. This type of sizing is based on the weight of the load and the speed at which the load is moving. The bumper plots are based on a 0.020 deflection.

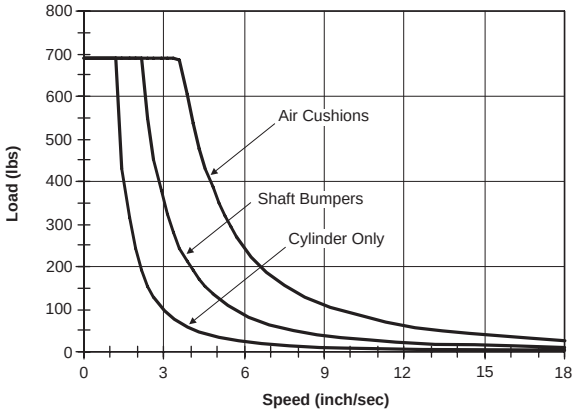
For values above the cushion line, shock absorbers must be specified. Follow the shock absorber sizing steps on the following page to ensure proper stopping capacity.

Note: These charts are to be used only to determine the stopping capacity of each guided cylinder.

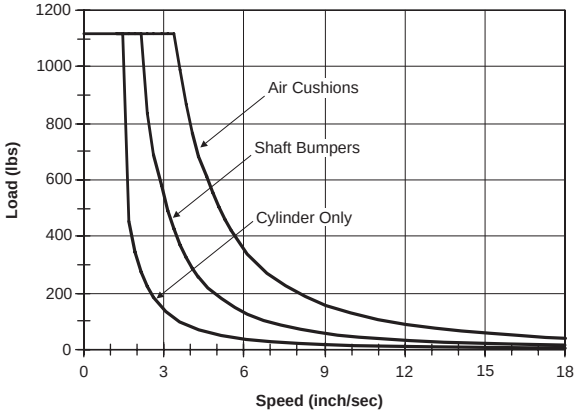
HB*15



HB*20



HB*25



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Kinetic Energy

Steps to sizing a guided cylinder with shocks:

1) Determine the "Moving Weight", W.

   Use Table 1 to determine the "Kinetic Energy Weight" of a given slide. This value should be added to the weight of the load the slide will be carrying.

   Moving Weight (lbs) =
   Kinetic Energy Weight (lbs) + Weight of Load (lbs)

2) Determine the velocity of the load, V (ft/second)

3) Determine the cylinder force output at the operating pressure, $F_{cylinder}$ (lbs)

4) Determine the Kinetic Energy of the load:

   $KE = 0.2 \times W \times V^2$ (lb-in)

5) Determine the Energy per Cycle, E_{cycle} (lb-in):

   $E_{cycle} = KE + F_{cylinder} \times$ Shock Stroke
   (unless stroke adjusters are used, 1 inch is standard)

   This value should be less than the value listed in table 2

6) Determine the Energy per Hour: E_{hour} (in-lbs)

   $E_{hour} = 2 \times E_{cycle} \times$ # of cycles in one hour
   (a cycle is defined as the extension and retraction of the slide)

   This value should be less than the value listed in table 2

7) Determine the Effective Weight of the load

$$W_{effective} = \frac{E_{cycle}}{0.2 \times V^2}$$

This value should be between the values listed in table 2

Example:

An HBT20-10D-B with standard support rods and shock absorbers will be carrying a load of 40 lbs at a velocity of 17 in/second (cycling 15 times per hour) while operating at 80psi. Is this unit properly sized?

1) Moving Weight = [8.35 + (10 × 0.65)] + 40 lbs = 54.85 lbs
2) V = 17 in/second = 1.4 ft/second
3) $F_{cylinder}$ = 251 lbs
4) $KE = 0.2 \times 54.85 \times 1.4^2 = 21.5$ lb-in
5) $E_{cycle} = 21.5 + 251 = 272.5$ lb-in
6) $E_{hour} = 2 \times 272.5 \times 15 = 8175$ lb-in

7) $$W_{effective} = \frac{272.5}{0.2 \times (1.4)^2} = 695 \text{ lbs}$$

The shock will dissipate the energy of the load.

Table 1

Model	Base Weight (lb)	Stroke Adder (lb/inch)	Base Weight, Oversized (lb)	Stroke Adder (lb/inch)
HBC15	3.66	0.36	4.36	0.52
HBC20	7.15	0.65	8.19	0.84
HBC25	12.73	1.04	14.19	1.27
HBT15	4.70	0.36	5.67	0.52
HBT20	8.35	0.65	9.67	0.84
HBT25	14.22	1.04	16.01	1.27
HBR15	5.52	0.36	6.96	0.52
HBR20	10.29	0.65	12.46	0.84
HBR25	17.63	1.04	20.66	1.27
HBB15*	7.93	0.09	7.93	0.09
HBB20*	13.94	0.22	13.94	0.22
HBB25*	25.03	0.42	25.03	0.42

*Support rods do not move with the carriage, so kinetic energy is the same for standard and oversized rods.

Table 2

Size	Total Energy per Cycle (lb-in)	Total Energy per Hour (lb-in)	Effective Weight (lb)	Velocity Range (in/sec)
15	600	600,000	20 - 3000	6 - 144
20	900	800,000	30 - 4500	6 - 144
25	1500	670,000	28 - 3800	6 - 120

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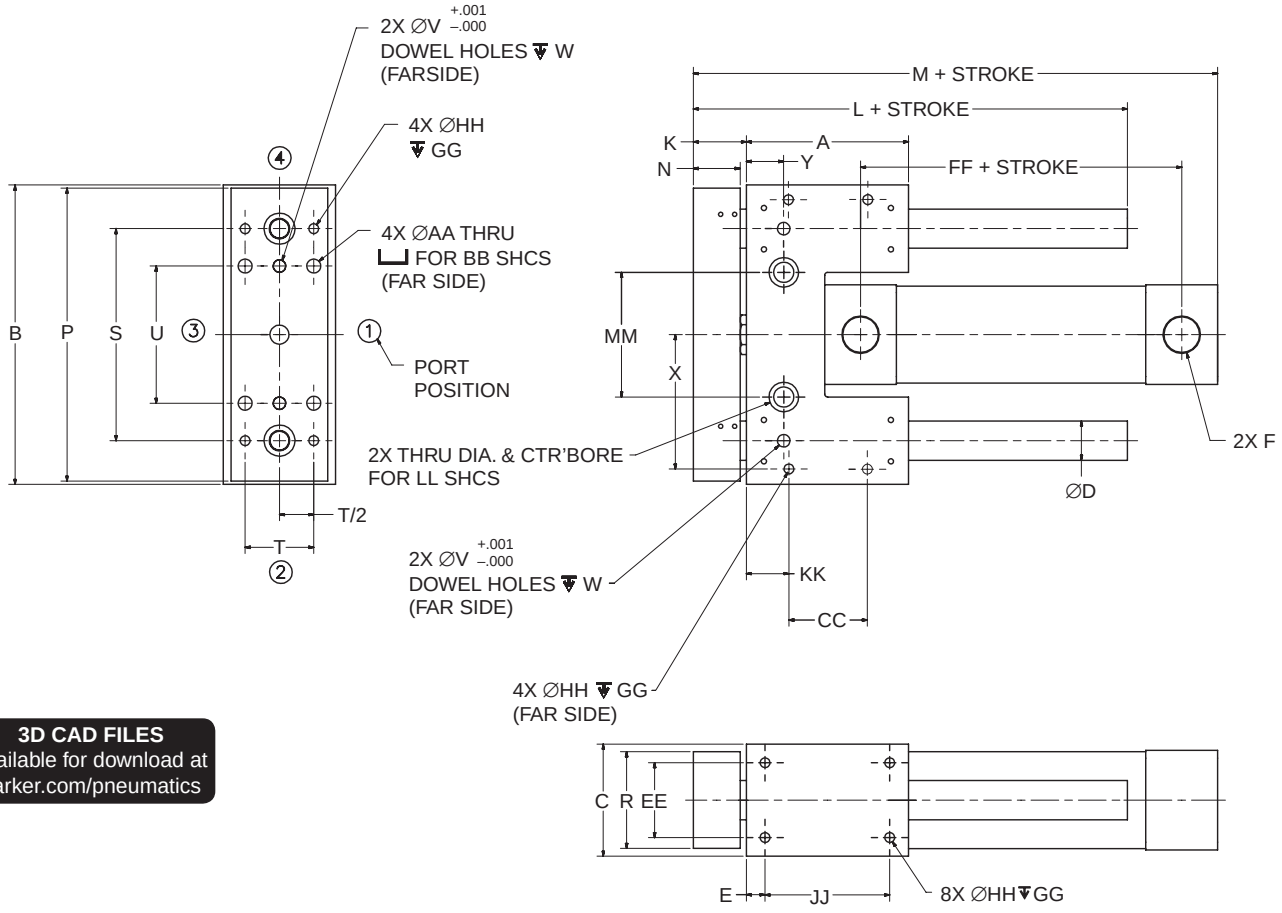
HBC Series



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Model	A	B	C	Ds*	Do**	E	F NPTF	F BSPP	K	L	M	N	P	R	S	T	U
15	3.25	6.00	2.25	20mm (0.79)	25mm (0.98)	0.375	1/4 [1]	1/4	1.06	5.19	6.26	0.94	5.88	1.94	4.250	1.375	2.750
20	4.00	7.25	2.75	25mm (0.98)	30mm (1.18)	0.500	3/8	1/4	1.31	6.39	7.00	1.19	7.13	2.44	5.000	1.750	3.250
25	5.00	9.00	3.25	30mm (1.18)	35mm (1.38)	0.500	3/8	3/8	1.56	7.82	8.38	1.44	8.88	2.88	6.500	2.000	3.750

Model	V	W	X	Y	AA	BB	CC	EE	FF	GG	HH	JJ	KK	LL	MM
15	0.251	0.27	2.750	0.750	0.28	1/4	1.750	1.500	2.31	0.50	1/4-20	2.50	0.75	3/8	2.500
20	0.313	0.33	3.250	0.750	0.34	5/16	2.250	1.750	2.31	0.63	5/16-18	3.00	0.88	3/8	3.000
25	0.376	0.39	4.000	1.532	0.41	3/8	3.000	2.250	2.38	0.75	3/8-16	4.00	1.00	1/2	4.000

* Standard shafting
** Oversized shafting

1 Model 15 with Cylinder Type 3A (3MA cylinder) has 3/8" NPTF ports.

All dimensions in inches unless otherwise noted.

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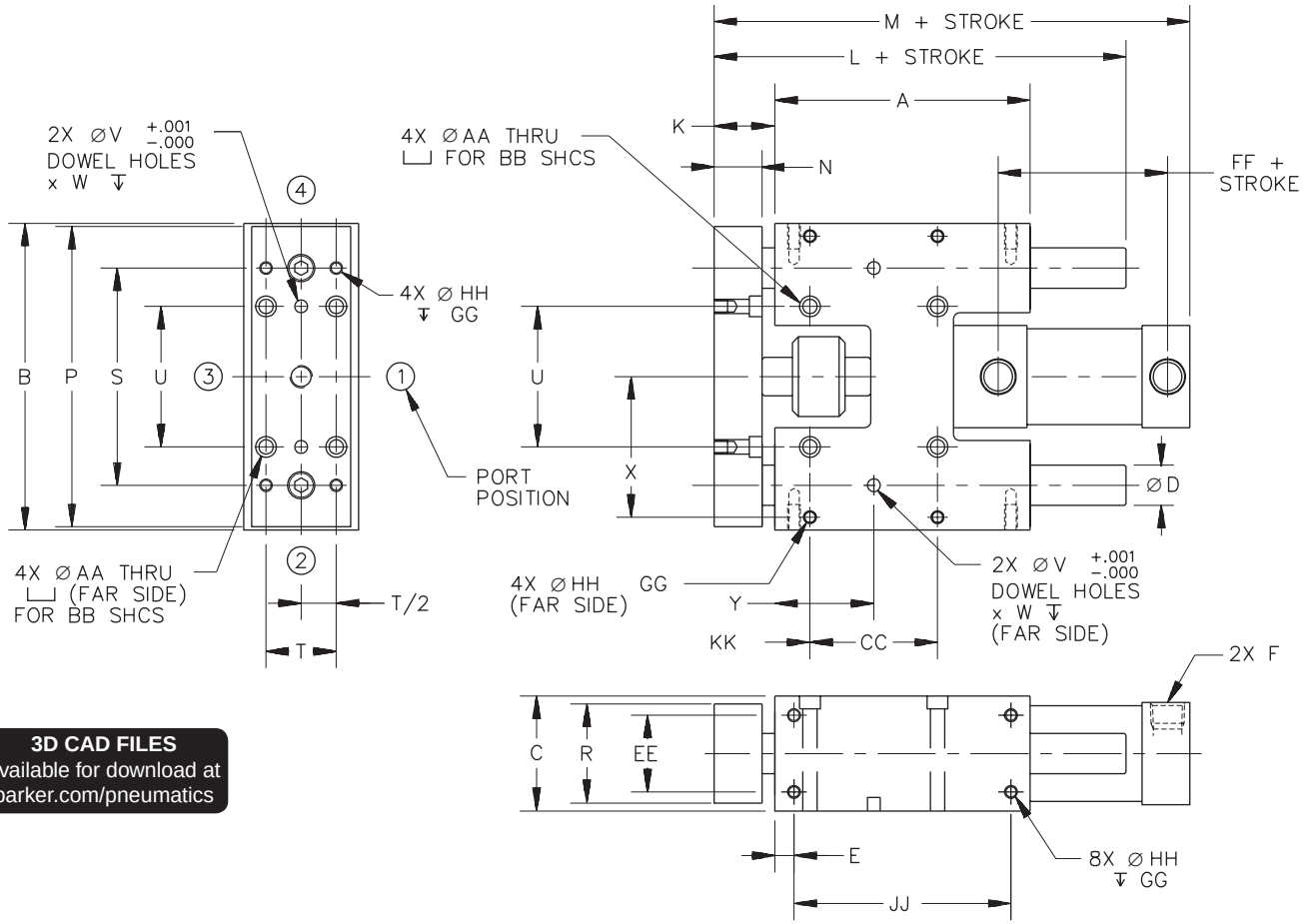
HBT Series



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Model	A	B	C	Ds*	Do**	E	F NPTF	F BSPP	K	L	M	N	P	R	S	T
15	5.0	6.00	2.25	20mm (0.79)	25mm (0.98)	0.375	1/4 [1]	1/4	1.06	6.94	8.19	0.94	5.88	1.94	4.250	1.375
20	5.5	7.25	2.75	25mm (0.98)	30mm (1.18)	0.500	3/8	1/4	1.31	7.88	8.94	1.19	7.13	2.44	5.000	1.750
25	6.5	9.00	3.25	30mm (1.18)	35mm (1.38)	0.500	3/8	3/8	1.56	9.31	10.31	1.44	8.88	2.88	6.500	2.000

Model	U	V	W	X	Y	AA	BB	CC	EE	FF	GG	HH	JJ	KK
15	2.750	0.251	0.27	2.750	1.938	0.28	1/4	2.500	1.500	2.31	0.50	1/4-20	4.25	0.69
20	3.250	0.313	0.33	3.250	2.250	0.34	5/16	2.750	1.750	2.31	0.63	5/16-18	4.50	0.88
25	3.750	0.376	0.39	4.000	2.750	0.41	3/8	3.500	2.250	2.38	0.75	3/8-16	5.50	1.00

* Standard shafting
** Oversized shafting

1 Model 15 with Cylinder Type 3A (3MA cylinder) has 3/8" NPTF ports.

All dimensions in inches unless otherwise noted.

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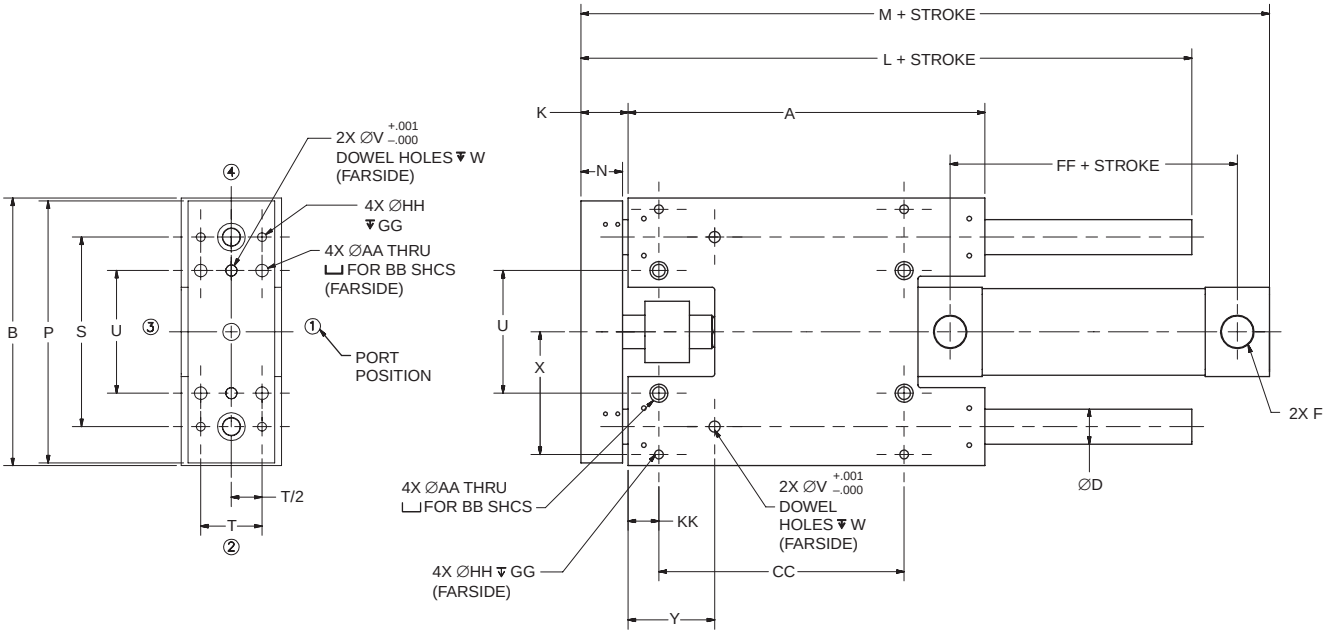
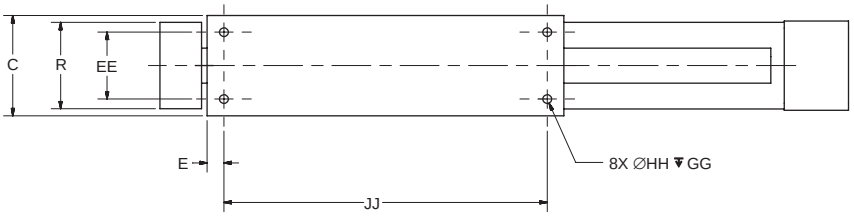
HBR Series





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Model	A	B	C	Ds*	Do**	E	F NPTF	F BSPP	K	L	M	N	P	R	S	T
15	8.00	6.00	2.25	20mm (0.79)	25mm (0.98)	0.375	1/4 [1]	1/4	1.06	9.94	11.19	0.94	5.88	1.94	4.250	1.375
20	10.00	7.25	2.75	25mm (0.98)	30mm (1.18)	0.500	3/8	1/4	1.31	12.39	13.44	1.19	7.13	2.44	5.000	1.750
25	12.00	9.00	3.25	30mm (1.18)	35mm (1.38)	0.500	3/8	3/8	1.56	14.82	15.82	1.44	8.88	2.88	6.500	2.000

Model	U	V	W	X	Y	AA	BB	CC	EE	FF	GG	HH	JJ	KK
15	2.750	0.251	0.27	2.750	1.938	0.28	1/4	5.500	1.500	2.31	0.50	1/4-20	7.25	0.69
20	3.250	0.313	0.33	3.250	2.250	0.34	5/16	7.250	1.750	2.31	0.63	5/16-18	9.00	0.88
25	3.750	0.376	0.39	4.000	2.760	0.41	3/8	9.000	2.250	2.38	0.75	3/8-16	11.00	1.00

* Standard shafting
** Oversized shafting

1 Model 15 with Cylinder Type 3A (3MA cylinder) has 3/8" NPTF ports.

All dimensions in inches unless otherwise noted.

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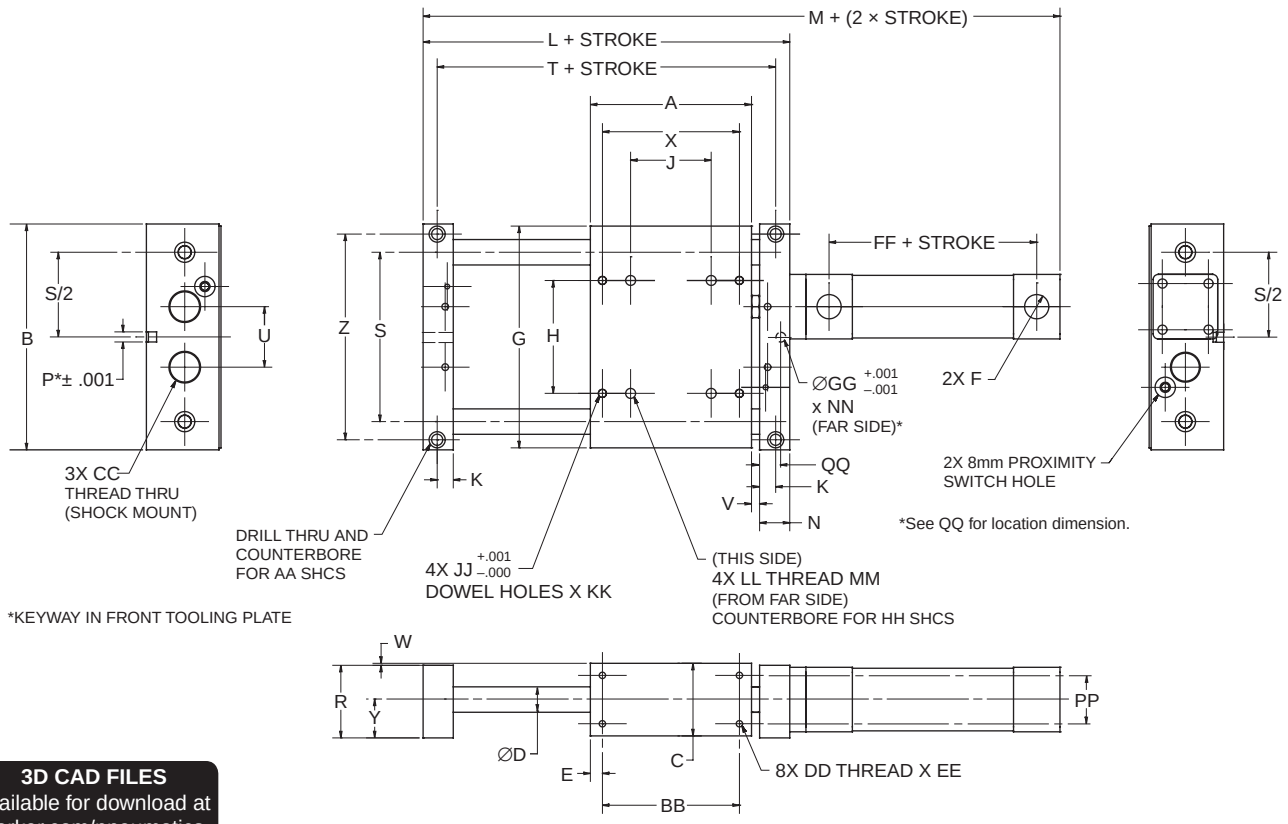
HBB Series



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Model	A	B	C	Ds*	Do**	E	F NPTF	F BSPP	G	H	J	K	L	M
15	5.00	7.00	2.25	20mm (0.79)	25mm (0.98)	0.375	1/4 [1]	1/4	6.875	3.50	2.50	0.50	7.00	11.13
20	5.50	8.75	2.75	25mm (0.98)	30mm (1.18)	0.500	3/8	1/4	8.625	4.50	2.50	0.50	8.00	12.13
25	6.50	11.00	3.25	30mm (1.18)	35mm (1.38)	0.500	3/8	3/8	10.875	6.00	3.00	0.50	9.50	13.75

Model	N	P	R	S	T	U	V	W	X	Y	Z	AA	BB
15	0.94	0.313	2.25	5.25	6.13	1.88	0.13	0.06	4.25	1.188	6.375	5/16-18	4.25
20	1.19	0.313	2.75	6.50	6.63	2.25	0.13	0.06	4.25	1.438	8.000	3/8-16	4.50
25	1.44	0.313	3.25	8.50	7.63	3.50	0.13	0.06	5.00	1.688	10.000	1/2-13	5.50

Model	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	QQ
15	25mm	1/4-20	0.50	2.31	0.313	5/16-18	0.251	0.27	3/8-16	0.75	0.25	1.50	0.500
20	25mm	5/16-18	0.63	2.31	0.313	5/16-18	0.251	0.27	3/8-16	0.75	0.25	1.75	0.594
25	1¼-12	3/8-16	0.75	2.38	0.313	5/16-18	0.313	0.33	3/8-16	0.75	0.25	2.75	0.719

* Standard shafting
** Oversized shafting

1 Model 15 with Cylinder Type 3A (3MA cylinder) has 3/8" NPTF ports.

All dimensions in inches unless otherwise noted.

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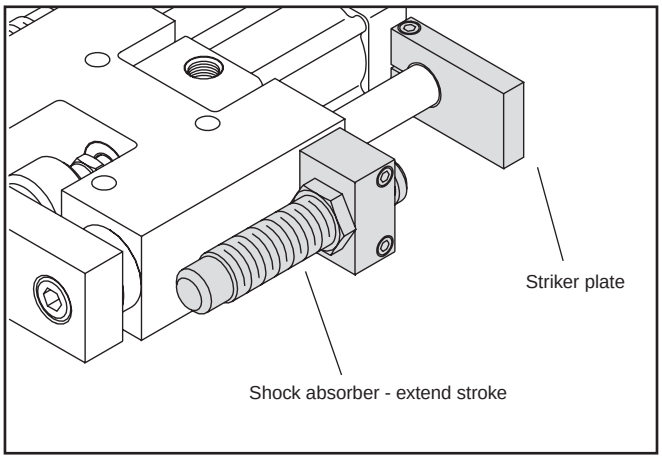
Shock Absorbers/Stroke Adjusters (A, A1, A2)

Adjustable shock absorbers are provided when this option is specified. These dissipate kinetic energy over a wide range of velocities and weights. Cylinder stroke is adjusted by moving the shock striker plate.

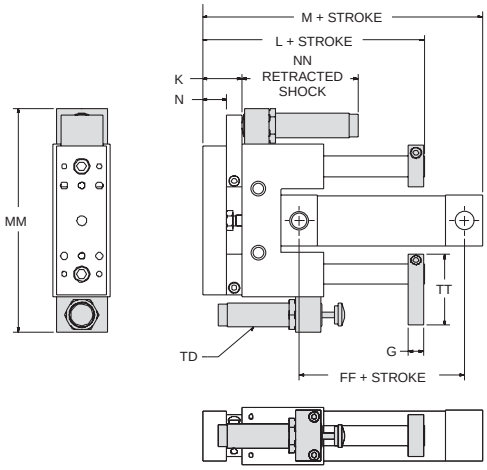
Shock Absorber Adjustment Procedure: Proper adjustment is important to maximize a shock absorber's performance. With a range of zero to ten, shocks are factory preset at five. Cycle the slide to impact the shock absorber. Rotate the shock's adjustment knob to achieve smooth deceleration. Adjusting towards zero increases resistance. If the initial impact is too hard, rotate the knob towards ten to lessen the resistance. If the final setting is less than one, a larger shock and/or slide should be considered. Tighten the adjusting knob set screw to maintain resistance



Shock Absorbers/Stroke Adjusters Extend and Retract (A)

F

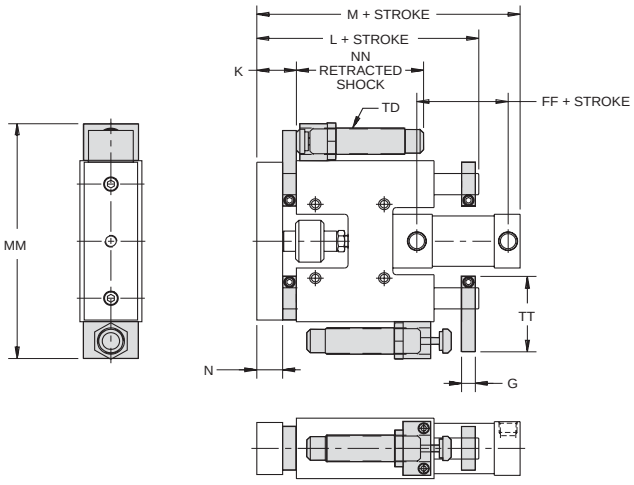
HBC



Model	G	K	L	M	N
HBC15	0.50	1.53	5.66	6.97	0.94
HBC20	0.63	1.88	6.95	7.82	1.19
HBC25	0.75	2.31	8.57	9.38	1.44

Model	FF	MM	NN	TD	TT
HBC15	2.56	8.75	4.62	M25 x 1.5	2.81
HBC20	2.56	10.00	5.86	M25 x 1.5	3.25
HBC25	2.63	12.50	4.45	1 1/4 - 12	4.13

HBT / HBR



Model	G	K	L	M	N
HBT15	0.50	1.53	7.31	8.81	0.94
HBT20	0.63	1.88	8.44	9.75	1.19
HBT25	0.75	2.31	10.06	11.31	1.44
Model	FF	MM	NN	TD	TT
HBT15	2.56	8.75	4.62	M25 x 1.5	2.81
HBT20	2.56	10.00	5.86	M25 x 1.5	3.25
HBT25	2.63	12.50	4.45	1 1/4 - 12	4.13

Model	G	K	L	M	N
HBR15	0.50	1.53	10.41	11.90	0.94
HBR20	0.63	1.88	12.95	14.26	1.19
HBR25	0.75	2.31	15.57	16.82	1.44
Model	FF	MM	NN	TD	TT
HBR15	2.56	8.75	4.62	M25 x 1.5	2.81
HBR20	2.56	10.00	5.86	M25 x 1.5	3.25
HBR25	2.63	12.50	4.45	1 1/4 - 12	4.13

All dimensions shown in inches.

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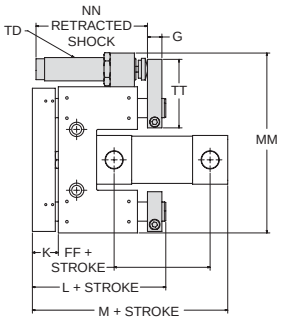
Shock Absorbers Extend Only (A1)

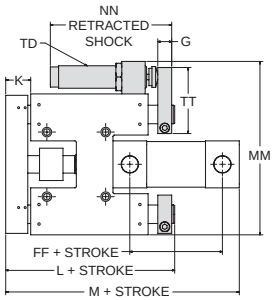
HBC



Model	G	K	L	M	N
HBC15	0.50	1.06	5.19	6.38	0.94
HBC20	0.63	1.31	6.39	7.13	1.19
HBC25	0.75	1.56	7.82	8.50	1.44

Model	FF	MM	NN	TD	TT
HBC15	2.44	7.38	4.62	M25 x 1.5	2.81
HBC20	2.44	8.63	5.86	M25 x 1.5	3.25
HBC25	2.50	10.75	4.45	1 1/4 - 12	4.13

HBT / HBR



Model	G	K	L	M	N
HBT15	0.50	1.06	6.94	8.32	0.94
HBT20	0.63	1.31	7.88	9.07	1.19
HBT25	0.75	1.56	9.31	10.44	1.44

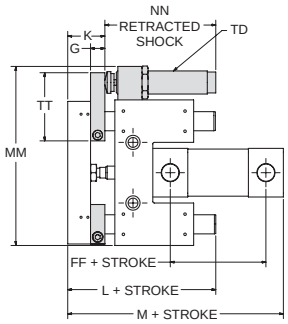
Model	FF	MM	NN	TD	TT
HBT15	2.44	7.38	4.62	M25 x 1.5	2.81
HBT20	2.44	8.63	5.86	M25 x 1.5	3.25
HBT25	2.50	10.75	4.45	1 1/4 - 12	4.13

Model	G	K	L	M	N
HBR15	0.50	1.06	9.94	11.31	0.94
HBR20	0.63	1.31	12.39	13.57	1.19
HBR25	0.75	1.56	14.82	15.94	1.44

Model	FF	MM	NN	TD	TT
HBR15	2.44	7.38	4.62	M25 x 1.5	2.81
HBR20	2.44	8.63	5.86	M25 x 1.5	3.25
HBR25	2.50	10.75	4.45	1 1/4 - 12	4.13

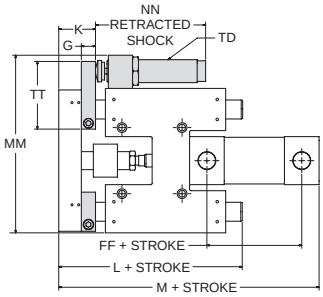
Shock Absorbers Retract Only (A2)

HBC



Model	K	L	M	FF	G	MM	NN	TD	TT
HBC15	1.53	5.66	6.85	2.44	0.50	7.38	4.62	M25 x 1.5	2.81
HBC20	1.88	6.95	7.69	2.44	0.63	8.63	5.86	M25 x 1.5	3.25
HBC25	2.32	8.57	9.26	2.50	0.75	10.75	4.45	1 1/4-12	4.13

HBT / HBR



Model	K	L	M	FF	G	MM	NN	TD	TT
HBT15	1.53	7.41	8.78	2.44	0.50	7.38	4.62	M25 x 1.5	2.81
HBT20	1.88	8.45	9.63	2.44	0.63	8.63	5.86	M25 x 1.5	3.25
HBT25	2.32	10.07	11.20	2.50	0.75	10.75	4.45	1 1/4-12	4.13

Model	K	L	M	FF	G	MM	NN	TD	TT
HBR15	1.53	10.40	11.78	2.44	0.50	7.38	4.62	M25 x 1.5	2.81
HBR20	1.88	12.95	14.13	2.44	0.63	8.63	5.86	M25 x 1.5	3.25
HBR25	2.32	15.57	16.70	2.50	0.75	10.75	4.45	1 1/4-12	4.13

All dimensions shown in inches.

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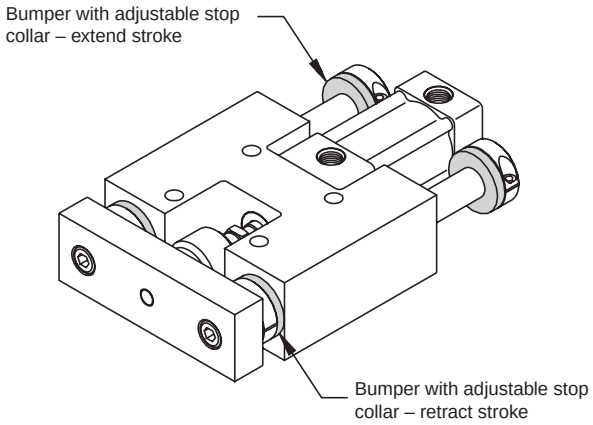
Bumpers/Adjustable Stop Collars (B, B1, B2, B3, B4)

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.

When bumpers are specified, an adjustable stop collar is supplied on the extend stroke as standard. An extend stop collar provides travel adjustment. A stop collar can also be specified for the retract stroke. This stop collar is optional and is only provided if requested.

Note: Stop collars must be adjusted evenly to avoid creating a moment between the guide rods.

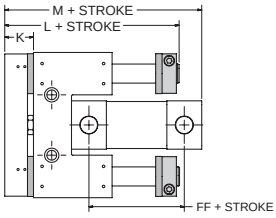


HBT shown with B4 option

Bumpers Both Ends (B)

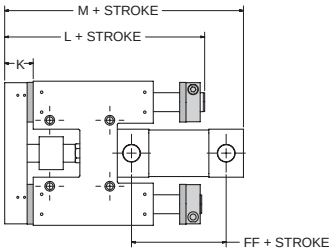
F

HBC



Model	K	L	M	FF
HBC15	1.19	5.32	6.62	2.56
HBC20	1.44	6.51	7.38	2.56
HBC25	1.69	7.94	8.75	2.63

HBT / HBR



Model	K	L	M	FF
HBT15	1.19	7.07	8.56	2.56
HBT20	1.44	8.01	9.32	2.56
HBT25	1.69	9.44	10.69	2.63

Model	K	L	M	FF
HBR15	1.19	10.07	11.56	2.56
HBR20	1.44	12.51	13.82	2.56
HBR25	1.69	14.94	16.19	2.63

All dimensions shown in inches.

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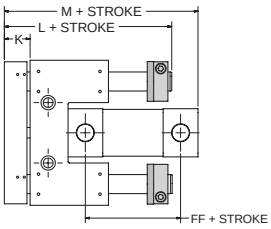
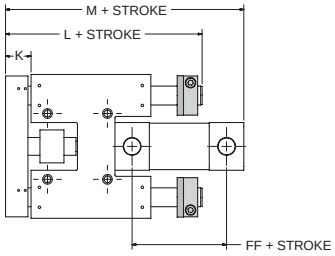
Bumpers and Adjustable Stop Collars, Extend Only (B1)

HBC



Model	K	L	M	FF
HBC15	1.06	5.19	6.37	2.44
HBC20	1.31	6.39	7.13	2.44
HBC25	1.56	7.82	8.50	2.50

HBT / HBR

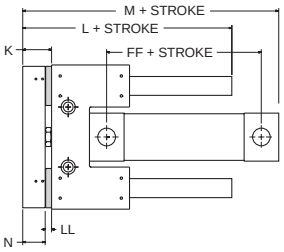


Model	K	L	M	FF
HBT15	1.06	6.94	8.31	2.44
HBT20	1.31	7.89	9.07	2.44
HBT25	1.56	9.32	10.44	2.50

Model	K	L	M	FF
HBR15	1.06	9.94	11.31	2.44
HBR20	1.31	12.39	13.57	2.44
HBR25	1.56	14.82	15.94	2.50

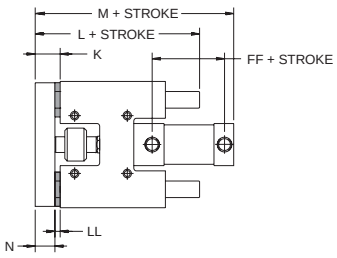
Bumpers on Retract Only (B2)

HBC



Model	K	L	M	N	FF	LL
HBC15	1.19	5.32	6.51	0.94	2.44	0.25
HBC20	1.44	6.51	7.26	1.19	2.44	0.25
HBC25	1.69	7.94	8.63	1.44	2.50	0.25

HBT / HBR



Model	K	L	M	N	FF	LL
HBT15	1.19	7.07	8.44	0.94	2.44	0.25
HBT20	1.44	8.01	9.19	1.19	2.44	0.25
HBT25	1.69	9.44	10.57	1.44	2.50	0.25

Model	K	L	M	N	FF	LL
HBR15	1.19	10.07	11.44	0.94	2.44	0.25
HBR20	1.44	12.51	13.70	1.19	2.44	0.25
HBR25	1.69	14.94	16.07	1.44	2.50	0.25

All dimensions shown in inches.

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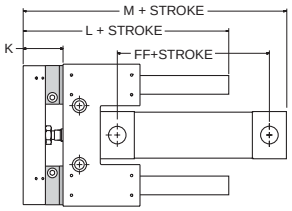
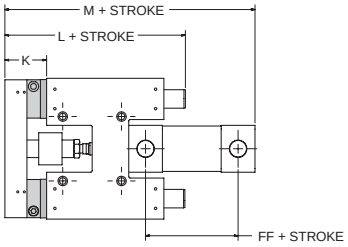
Bumpers and Adjustable Stop Collars, Retract Only (B3)

HBC



Model	K	L	M	FF
HBC15	1.78	5.91	7.10	2.44
HBC20	2.03	7.10	7.84	2.44
HBC25	2.28	8.53	9.22	2.50

HBT / HBR



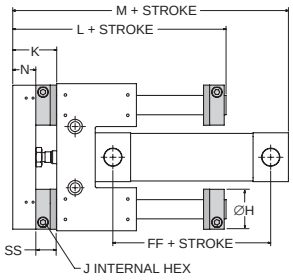
Model	K	L	M	FF
HBT15	1.78	7.66	9.03	2.44
HBT20	2.03	8.60	9.78	2.44
HBT25	2.28	10.03	11.16	2.50

Model	K	L	M	FF
HBR15	1.78	10.66	12.03	2.44
HBR20	2.03	13.10	14.28	2.44
HBR25	2.28	15.53	16.66	2.50

F

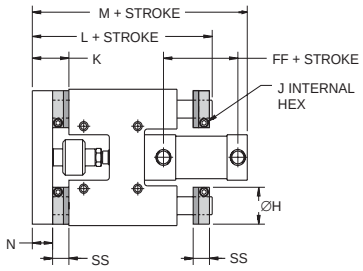
Bumpers and Adjustable Stop Collars, Both Ends (B4)

HBC



Model	H(s)*	H(o)**	J	K	L	M	N	FF	SS
HBC15	1.57	1.77	3/16	1.78	5.91	7.22	0.94	2.56	0.84
HBC20	1.77	2.12	3/16	2.03	7.10	7.97	1.19	2.56	0.84
HBC25	2.12	2.23	3/16	2.28	8.53	9.34	1.44	2.63	0.84

HBT / HBR



Model	H(s)*	H(o)**	J	K	L	M	N	FF	SS
HBT15	1.57	1.77	3/16	1.78	7.56	9.06	0.94	2.56	0.84
HBT20	1.77	2.12	3/16	2.03	8.69	10.00	1.19	2.56	0.84
HBT25	2.12	2.23	3/16	2.28	10.31	11.56	1.44	2.63	0.84

Model	H(s)*	H(o)**	J	K	L	M	N	FF	SS
HBR15	1.57	1.77	3/16	1.78	10.66	12.15	0.94	2.56	0.84
HBR20	1.77	2.12	3/16	2.03	13.10	14.41	1.19	2.56	0.84
HBR25	2.12	2.23	3/16	2.28	15.53	16.78	1.44	2.63	0.84

All dimensions shown in inches.

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Shock Absorbers

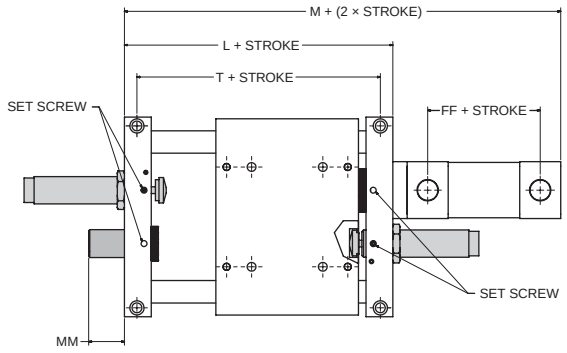
Adjustable shock absorbers are provided when this option is specified. These dissipate kinetic energy over a wide range of velocities and weights. Cylinder stroke is adjusted by moving the threaded stroke adjuster. It is important to adjust the threaded stroke adjuster to prevent the shock from "bottoming". **Maximum adjustment is 1/2".**

Shock Absorber Adjustment Procedure: Proper adjustment is important to maximize a shock absorber's performance. With a range of zero to ten, shocks are factory pre-set at five. Cycle the slide to impact the shock absorber. Rotate the shock's adjustment knob to achieve smooth deceleration. Adjusting towards zero increases resistance. If the initial impact is too hard, rotate the knob towards ten to lessen the resistance. If the final setting is less than one, a larger shock and/or slide should be considered. Tighten the adjusting knob set screw to maintain resistance.

Note: A standard HBB unit includes mounting holes in the end plates to allow field installation of the shock absorbers.

Shock Absorbers (A, A1, A2)

HBB



Model	L	T	M	FF	MM
HBB15	7.38	6.50	11.75	2.56	1.25
HBB20	8.38	7.00	12.75	2.56	1.00
HBB25	9.88	8.00	14.38	2.63	1.00

All dimensions shown in inches.

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Bumpers/Adjustable Stop Collars

(B, B1, B2, B3, B4, B5)

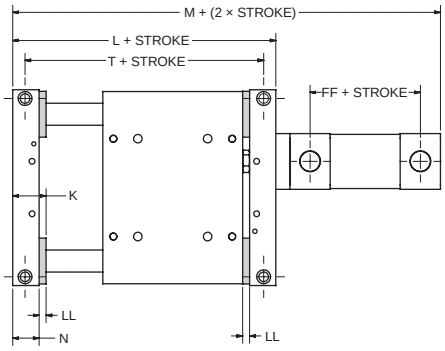
Bumpers absorb shock, reduce noise and permit faster cycle times thereby increasing production rates. They can be placed on the extend, retract or both positions.

A stop collar can be provided for travel adjustment. This stop collar is optional and is only provided if requested.

Note: Stop collars must be adjusted evenly to avoid creating a moment between the guide rods.

Bumpers Both Ends (B)

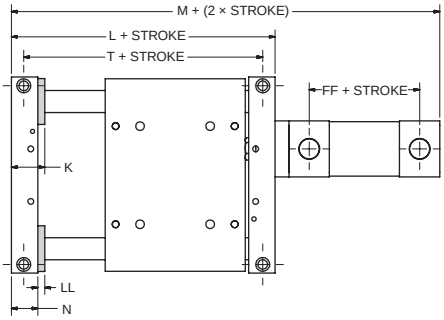
HBB



Model	L	T	M	K	N	FF	LL
HBB15	7.375	6.50	11.75	1.19	0.94	2.56	0.25
HBB20	8.375	7.00	12.75	1.44	1.19	2.56	0.25
HBB25	9.875	8.00	14.38	1.69	1.44	2.63	0.25

Bumpers, Extend Only (B1)

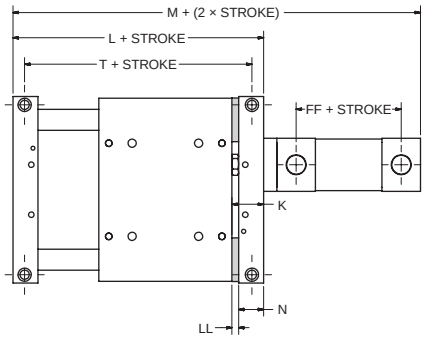
HBB



Model	L	T	M	K	N	FF	LL
HBB15	7.25	6.38	11.50	1.19	0.94	2.44	0.25
HBB20	8.25	6.88	12.50	1.44	1.19	2.44	0.25
HBB25	9.75	7.88	14.13	1.69	1.44	2.51	0.25

Bumpers on Retract Only (B2)

HBB



Model	L	T	M	K	N	FF	LL
HBB15	7.13	6.25	11.38	1.19	0.94	2.44	0.25
HBB20	8.13	6.75	12.38	1.44	1.19	2.44	0.25
HBB25	9.63	7.75	14.00	1.69	1.44	2.51	0.25

All dimensions shown in inches.

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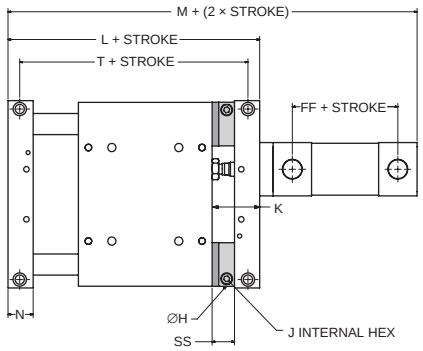
Bumpers and Adjustable Stop Collars, Retract Only (B3)

HBB

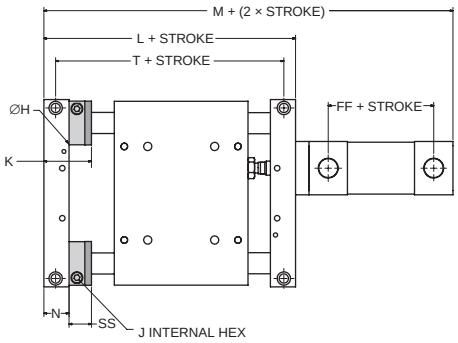


Model	L	T	M	K	N
HBB15	7.72	6.84	11.98	1.78	0.94
HBB20	8.72	7.34	12.98	2.03	1.19
HBB25	10.22	8.34	14.60	2.28	1.44

Model	H(s)*	H(o)**	J	FF	SS
HBB15	1.57	1.77	3/16	2.44	0.84
HBB20	1.77	2.12	3/16	2.44	0.84
HBB25	2.12	2.23	3/16	2.50	0.84

Bumpers and Adjustable Stop Collars, Extend Only (B4)

HBB

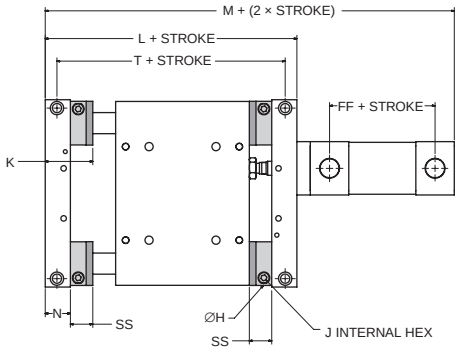


Model	L	T	M	K	N
HBB15	7.85	6.97	12.10	1.78	0.94
HBB20	8.85	7.47	13.10	2.03	1.19
HBB25	10.35	8.47	14.73	2.28	1.44

Model	H(s)*	H(o)**	J	FF	SS
HBB15	1.57	1.77	3/16	2.44	0.84
HBB20	1.77	2.12	3/16	2.44	0.84
HBB25	2.12	2.23	3/16	2.50	0.84

Bumpers and Adjustable Stop Collars, Both Ends (B5)

HBB



Model	L	T	M	K	N
HBB15	8.56	7.68	12.93	1.78	0.94
HBB20	9.56	8.18	13.93	2.03	1.19
HBB25	11.06	9.18	15.56	2.28	1.44

Model	H(s)*	H(o)**	J	FF	SS
HBB15	1.57	1.77	3/16	2.56	0.84
HBB20	1.77	2.12	3/16	2.56	0.84
HBB25	2.12	2.23	3/16	2.63	0.84

* Standard support rods
** Oversized support rods

All dimensions shown in inches.

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Threaded Stroke Adjusters (E, E1, E2, E3)

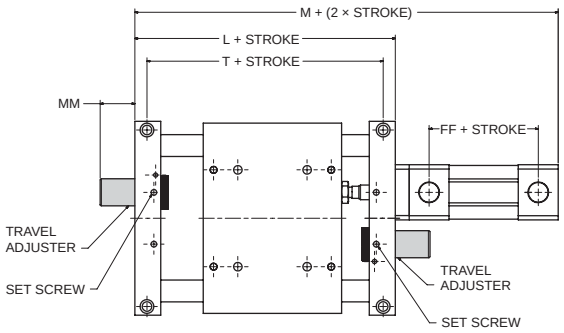
The threaded stroke adjust option allows for precise end of stroke positioning. The maximum stroke adjustment is one inch (1"). Threaded stroke adjusters are standard with shock absorbers.

Note:

Not available with Bumper Options B, B1, B2, B3, B4.

Threaded Stroke Adjusters, Both Ends (E)

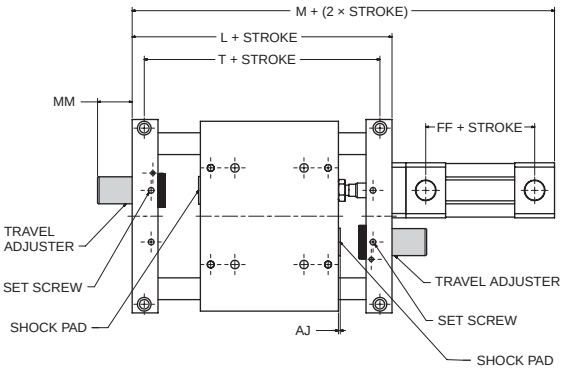
HBB



Model	L	T	M	FF	MM
HBB15	7.38	6.50	11.75	2.56	1.25
HBB20	8.38	7.00	12.75	2.56	1.00
HBB25	9.88	8.00	14.38	2.63	1.00

Stroke Adjusters and Shock Pads (E1, E2, E3)

HBB



Both Ends (E1)

Model	L	T	M	FF	MM	AJ
HBB15	7.63	6.75	12.00	2.56	1.25	0.13
HBB20	8.63	7.25	13.00	2.56	1.00	0.13
HBB25	10.13	8.25	14.63	2.63	1.00	0.13

Extend Only (E2)

Model	L	T	M	FF	MM	AJ
HBB15	7.38	6.50	11.75	2.56	1.25	0.13
HBB20	8.38	7.00	12.75	2.56	1.00	0.13
HBB25	9.88	8.00	14.38	2.63	1.00	0.13

Retract Only (E3)

Model	L	T	M	FF	MM	AJ
HBB15	7.25	6.38	11.63	2.56	1.25	0.13
HBB20	8.25	6.88	12.63	2.56	1.00	0.13
HBB25	9.75	7.88	14.25	2.63	1.00	0.13

All dimensions shown in inches.

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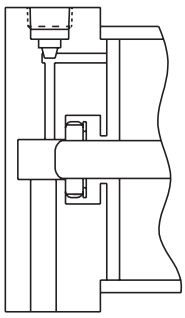
Cushions on Cylinder (C, C1, C2)

Optional cylinder cushions are available at either or both ends. The check seal cushions float radially to compensate for problems with misalignment. Flow paths molded on the circumference of the seal allow exceptionally rapid return stroke without the use of ball checks. A captive cushion screw provides safe cushion adjustment while the cylinder is pressurized. The brass adjustment screw provides maximum corrosion resistance.

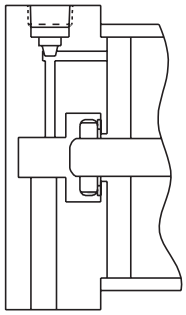
Cushion Location*: The cushion adjustment screws are located on the same face as the port unless specified otherwise. The port is machined off-center to allow space for the cushion screw.

Note: Cushions not available with Cylinder Type 3A (3MA cylinder).

* For steel cylinders, the cushion adjustment screw is located on the face opposite the port. Consult factory for other locations.



Spear entering cushion cavity

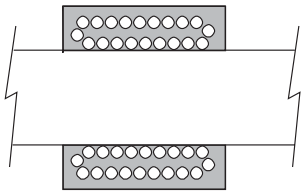


Spear exiting cushion cavity

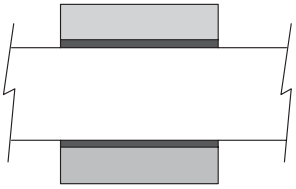
Bushings (D, T, T1, TC)

Selection should be based on the following criteria:

Application Requirement	Ball Bearing	Composite
Precision	Excellent	Good
Friction	Low	Higher
Friction Coefficient	Constant	Variable
Precision over Life of Bearing	Constant	Variable
Static Load Capacity	Good	Excellent
Dynamic Load Capacity	Good	Good with Lower Efficiency
Lubrication	Required	Not Required
Vibration Resistance	Fair	Excellent
Contamination Resistance	Fair	Excellent
Washdown Compatibility	Poor	Excellent



Recirculating Ball Bearing

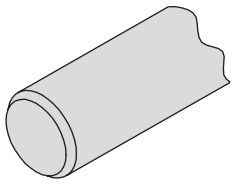


Composite Bushing

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

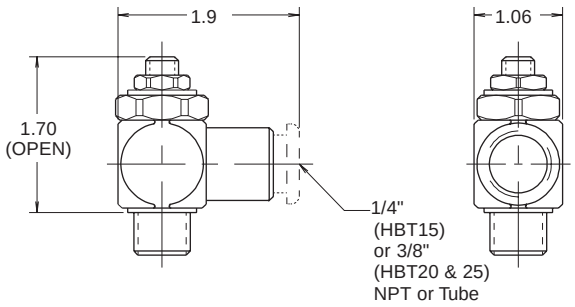
Stainless Steel Shafts (K)

Chrome plated, case-hardened carbon steel shafting is standard for slides. Stainless steel shafting can be specified for corrosive applications.



Flow Controls (F, G)

Right angle flow control valves allow precise adjustment of cylinder speed by metering exhaust air flow. Presto-Lok push-in or NPT ports provide 360° orientation capability.



All dimensions shown in inches.

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NFPA Steel Air Cylinder (S)*

Parker's 2A Series NFPA steel air cylinder is available for extremely rugged applications. Magnetic pistons are not available with this option. Consult factory for other switching or sensing options.

250 PSI NFPA Air Cylinder (3A, 4A)

Parker's 3MA and 4MA Series aluminum NFPA air cylinders are available for general purpose use.

400 PSI NFPA Hydraulic Cylinder (4L)

Parker's 4ML Series aluminum NFPA cylinder is available for 400 PSI hydraulic service. Cushions are not available.

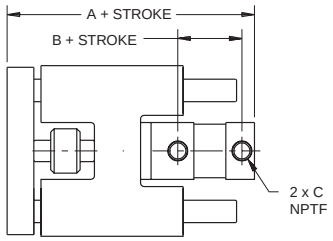
750 PSI NFPA Hydraulic Cylinder (S1)*

Parker's 3L Series NFPA steel cylinder is available for hydraulic service requiring higher force and precise control.

Magnetic pistons are not available with this option. Consult factory for other switching or sensing options.

**If cushions are specified with this option, the adjustment screw is located on the face opposite the port. Consult factory for other locations.*

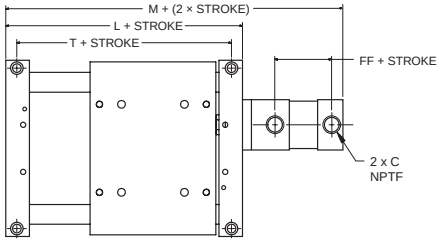
HBC
HBT
HBR



Model	A			B	C	Cylinder Bore (in)
	HBC	HBT	HBR			
15	C/F	8.56	11.56	2.25	3/8	1-1/2
20	C/F	9.31	13.81	2.25	3/8	2
25	C/F	10.69	16.2	2.38	3/8	2-1/2

C/F = Consult Factory

HBB

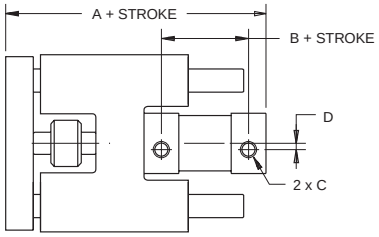


Model	L	T	M	C (NPTF)	FF	Cylinder Bore (in)
15	7.00	6.13	C/F	3/8	2.25	1-1/2
20	8.00	6.63	C/F	3/8	2.25	2
25	9.50	7.63	C/F	3/8	2.38	2-1/2

ISO Air Cylinder (D, E)

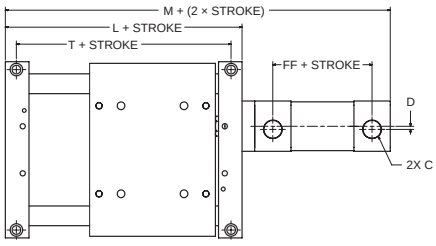
An ISO cylinder (Parker's P1D Series) is available for ISO or metric requirements. Magnetic pistons are standard.
If sensors are required, they must be ordered from the Electronic Sensors section of this catalog.

HBC
HBT
HBR



Model	A			B	C		Bore (mm)
	HBC	HBT	HBR		BSPP	NPTF	
15	6.77	8.69	11.70	2.95	1/4	3/8	40
20	7.55	9.48	13.99	2.83	1/4	3/8	50
25	9.39	11.32	16.83	3.50	3/8	3/8	63

HBB



Model	L	T	M	C		D	FF	Bore (mm)
				BSPP	NPTF			
15	7.0	6.1 3	11.63	1/4	1/4	0.22	2.95	40
20	8.0	6.63	12.67	1/4	3/8	0.34	2.83	50
25	9.5	7.63	14.76	3/8	3/8	0.24	3.50	63

All dimensions shown in inches.

Parker Hannifin Corporation
Pneumatic Division
Wadsworth, Ohio
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Rod Lock Cylinder (D1, D2, E1, E2)

The P1D Series Rod Lock Cylinder incorporates a powerful piston rod locking device, which clamps the piston rod and locks it in position. The locking device is a spring lock with an air pressure release and is integrated into the front (head) cover of the cylinder. This increases the cylinder length as shown below.

In the absence of air signal pressure, full holding force is applied to the piston rod. When air is present at 4 Bar (58 PSI), the locking device is released. A manual override rod lock version is also available.

Applications: Vertical guided cylinders
In the event of pressure loss
In the event of electrical control failure

Design Tip: The piston rod should not be moving when the locking device is activated. The locking device is not intended to repeatedly brake movement. See sample pneumatic circuit.

Note: Rod locking cylinders automatically include cushions, but include cushions ("C") in model code. If sensors are required, they must be ordered from the Electronic Sensors section of this catalog.

TECHNICAL DATA

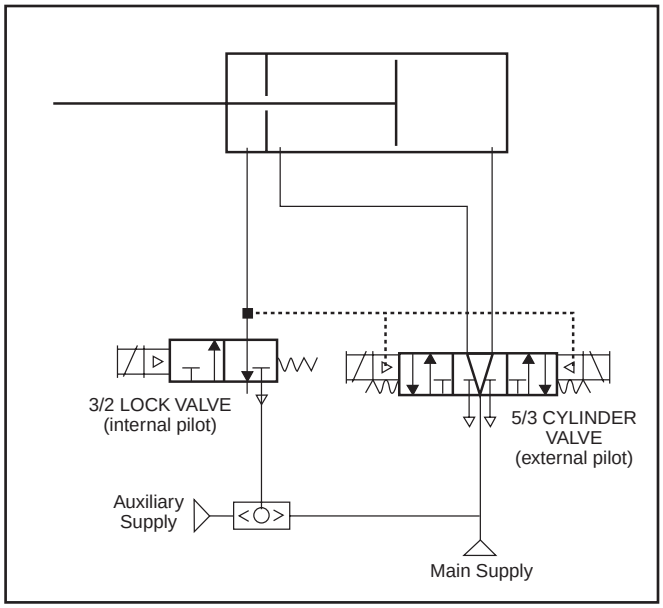
Maximum Pressure: 145 PSI (10 Bar)
Pressure Required to Unlock: 58 PSI (4 Bar) [1]

[1]Signal pressure to port on locking device. Operation at pressures lower than 4 Bar (58 PSI) may lead to inadvertent engagement of the rod lock device.

Model	Bore (mm)	Holding Force, lb (N)
15	40	193 (860)
20	50	303 (1345)
25	63	481 (2140)

ROD LOCK CIRCUIT

Lock valve must be maintained energized during cylinder motion, otherwise rod lock is engaged and cylinder valve shifts to mid position. For manual override of the rod lock, insert a shuttle valve and an auxiliary air supply to disable rod lock.

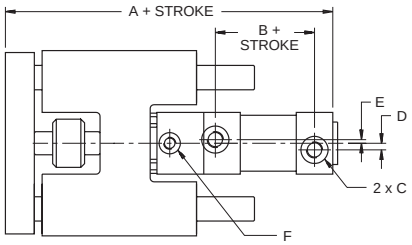


NOTES:

Cushion adjust (head only) located at position #4 for bore sizes 32-63mm. Head end port and cushion cannot be repositioned.

All P1D Rod Lock Versions are not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.

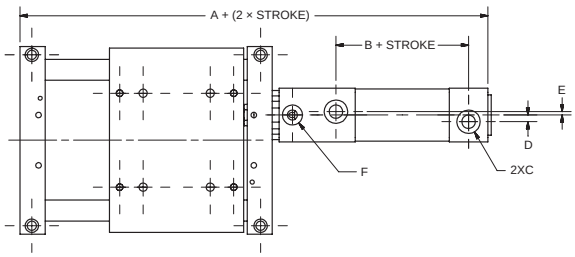
HBC
HBT
HBR



Model	A			B	C*	D	E	F*	Cylinder Bore (mm)
	HBC	HBT	HBR						
15	8.50	10.43	13.43	3.11	1/4	0.22	0.08	1/8	40
20	9.39	11.33	15.93	3.01	1/4	0.30	0.16	1/8	50
25	11.63	13.57	19.07	3.45	3/8	0.43	0.08	1/8	63

*BSPP or NPTF

HBB



HBB Model	A	B	C*	D	E	F*	Cylinder Bore (mm)
15	13.37	3.11	1/4	0.22	0.08	1/8	40
20	14.52	3.01	1/4	0.30	0.16	1/8	50
25	17.00	3.45	3/8	0.43	0.08	1/8	63

*BSPP or NPTF

All dimensions shown in inches.

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NFPA Rod Lock Cylinder (4J)

The 4MAJ Series Rod Lock Cylinder incorporates a powerful piston rod locking device, which clamps the piston rod and locks it in position. The locking device is a spring lock with an air pressure release and is attached to the front (head) cover of the cylinder. This increases the cylinder length as shown below.

In the absence of air signal pressure, full holding force is applied to the piston rod. When air is present at 60 PSIG or greater, the locking device is released. The manual override version is standard.

Applications: Vertical guided cylinders
In the event of pressure loss
In the event of electrical control failure

Design Tip: The piston rod should not be moving when the locking device is activated. The locking device is not intended to repeatedly brake movement. See sample pneumatic circuit.

Note: Rod locking cylinders automatically include cushions, but include cushions ("C") in model code. If sensors are required, they must be ordered from the Electronic Sensors section of this catalog.

TECHNICAL DATA

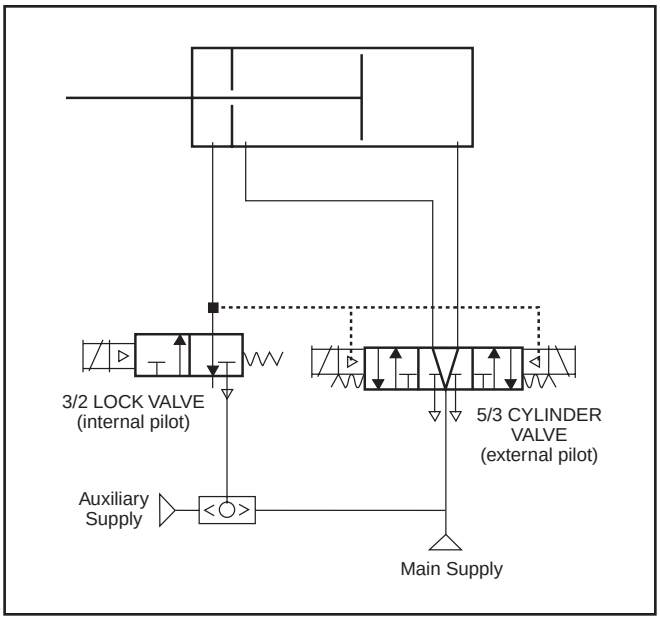
Maximum Pressure: 100 PSIG
Pressure Required to Unlock: 60 PSIG [1]

[1] Signal pressure to port on locking device. Operation at pressures lower than 60 PSIG may lead to inadvertent engagement of the rod lock device.

Model	Bore (inch)	Holding Force, lb
15	1½	180
20	2	314
25	2½	491

ROD LOCK CIRCUIT

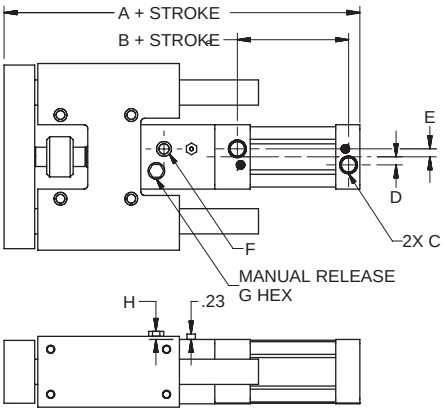
Lock valve must be maintained energized during cylinder motion, otherwise rod lock is engaged and cylinder valve shifts to mid position. For manual override of the rod lock, insert a shuttle valve and an auxiliary air supply to disable rod lock.



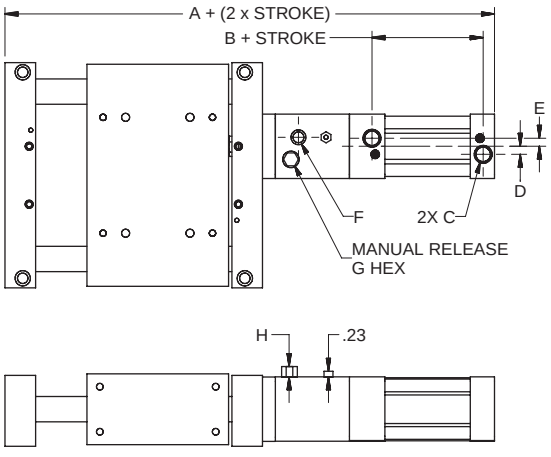
Note:

All 4MAJ rod lock cylinders are not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.

HBC
HBT
HBR



HBB



Model	A				B	C NPTF	D	E	F NPTF	G HEX	H	Cylinder Bore (inch)
	HBC	HBT	HBR	HBB								
15	8.89	10.82	13.82	14.26	2.31	3/8	0.31	0.31	1/8	5/16	0.19	1-1/2
20	9.88	11.82	16.32	15.51	2.31	3/8	0.31	0.31	1/8	1/2	0.27	2
25	11.26	13.19	18.70	17.13	2.38	3/8	0.31	0.31	1/8	1/2	0.27	2-1/2

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Special (X)

Other common modifications are available. Consult factory for specifications. Examples include:

- NC9 Series NFPA Pneumatic Cylinder
- 2AN Series NFPA Pneumatic Cylinder
- Cylinders with Continuous Position Feedback
- Bumpers on cylinder only

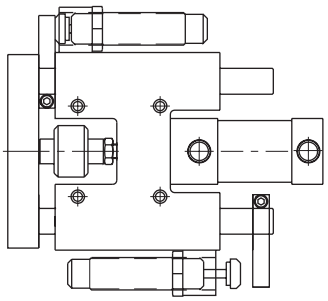
No Cylinder (Q, Q1)

The unit is supplied with cylinder mounting but no cylinder so that one may be field-added. Consult factory for required cylinder piston rod length.

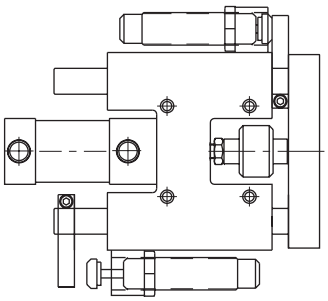
Left Hand Assembly (L1)

Units with shock absorbers can be assembled with shocks on the opposite sides.

Standard Orientation



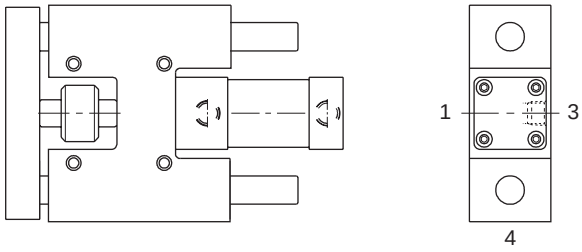
Left Hand Orientation



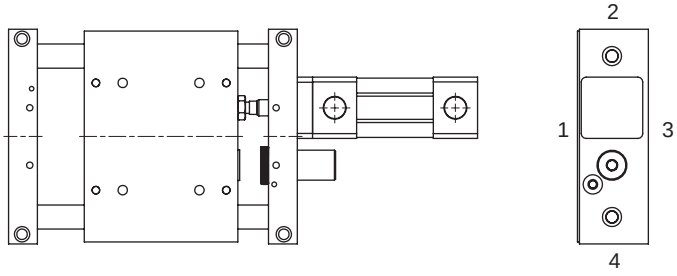
Port Location (L3)

Cylinder ports are located in position 3, opposite the standard position when L3 is specified. Port positions 2 and 4 are not possible.

HBC
HBT
HBR



HBB



Fluorocarbon Seals (V)

Standard abrasion-resistant nitrile seals should be used for general purpose applications with temperatures of 0 - 165°F. **Fluorocarbon** seals are recommended for high temperature applications up to 250°F.

Note: Fluorocarbon seals are not available for the 3MA Series cylinder.

Option	Temperature Range (°F)
Shock Absorbers	32 - 150
Bumpers	0 - 200
Piston Magnets	0 - 165
Sensors	14 - 140

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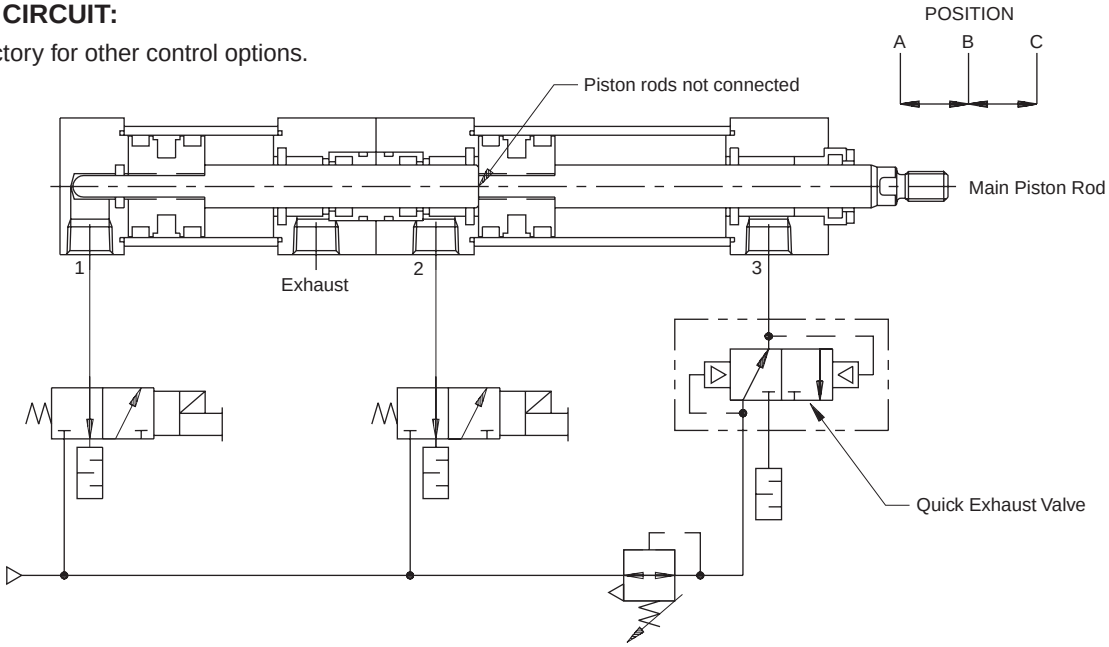
Three Position Cylinder

The three position unit utilizes a duplex air cylinder to provide the center position. This option can be specified with all other options. However, bumpers and body mounted inductive proximity sensors operate on the fully extended and retracted positions only. Cylinder mounted reed and solid state sensors can be used to detect the center position of the slide.

Note: The Three Position Cylinder is not available for the 3MA Series cylinder.

SAMPLE CIRCUIT:

Consult factory for other control options.



OPERATION:

Position A (fully retracted) is obtained by applying pressure to Port 3 with Ports 2 and 1 vented to atmosphere.

Position B (mid-position) is obtained by applying pressure to Port 1 while maintaining a lower pressure to Port 3. The pressure at Port 3 prevents the main piston rod from over-travelling. A quick exhaust valve can be used to maintain pressure while allowing full exhaust capability.

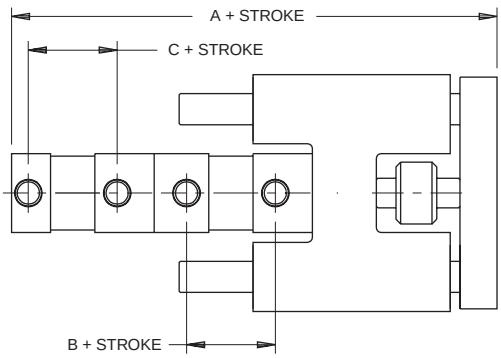
Position C (fully extended) is obtained by applying pressure to Port 2.

DIMENSIONAL DATA:

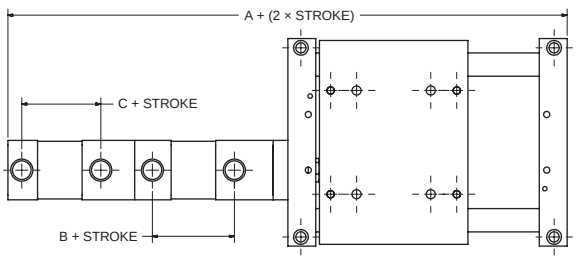
Three position units utilize a longer cylinder.
All other dimensions remain the same.

Model	A				B	C
	HBC	HBT	HBR	HBB		
15	10.38	12.31	15.31	15.25	2.38	2.31
20	11.12	13.06	17.56	16.25	2.38	2.31
25	12.57	14.50	20.01	17.94	2.38	2.38

HBC
HBT
HBR



HBB



All dimensions shown in inches.

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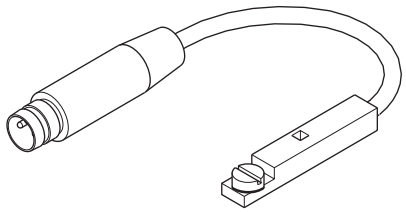
Solid State and Reed Sensors

Sensors must be ordered separately.

Magnetic piston is standard.

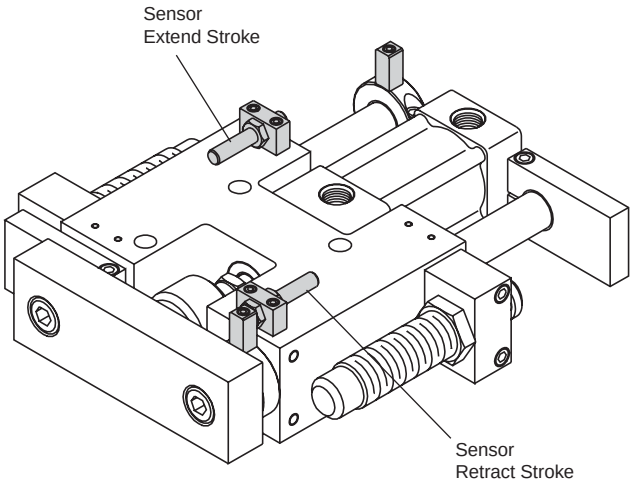
See Electronic Sensors section for part numbers and sensor specifications.



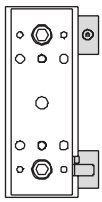
Inductive Proximity Sensors

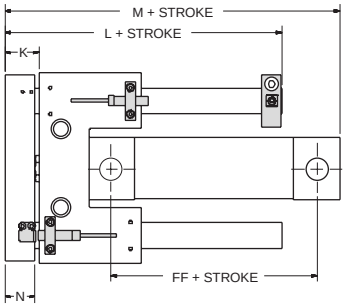
8mm barrel type proximity sensors may be ordered with the HB Series slides (options P, N, P1, N1). The slides can also be ordered “prox ready” (J, J1). A magnetic piston is standard.

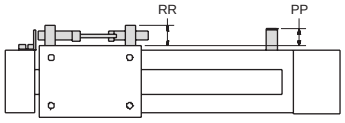
See Electronic Sensors section for sensor specifications.



HBC







Model	K	L	M	N
HBC15	1.06	5.19	6.26	0.94
HBC20	1.31	6.39	7.00	1.19
HBC25	1.56	7.82	8.38	1.44

Model	FF	PP	RR	
			8mm	12mm
HBC15	2.31	0.50	0.63	0.88
HBC20	2.31	0.50	0.63	0.88
HBC25	2.38	0.50	0.63	0.88

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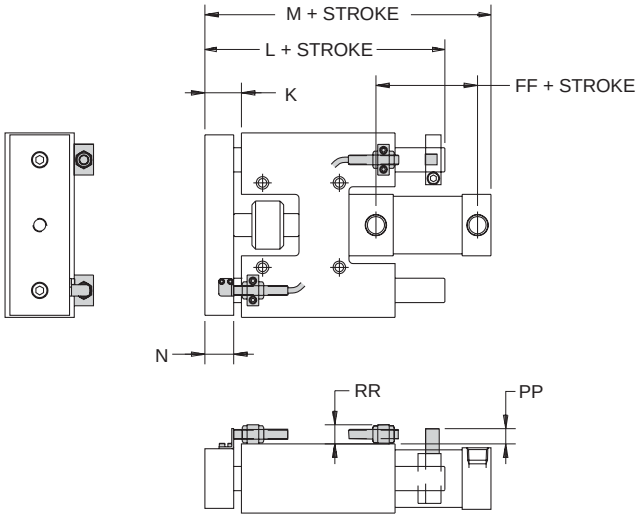
Proximity Sensor Dimensions

HBT
HBR



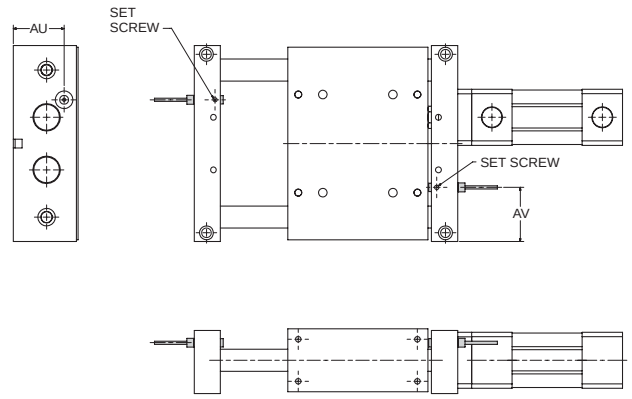
Model	K	L	M	N
HBT15	1.06	6.94	8.19	0.94
HBT20	1.31	7.88	8.94	1.19
HBT25	1.56	9.31	10.31	1.44

Model	FF	PP	RR	
			8mm	12mm
HBT15	2.31	0.50	0.63	0.88
HBT20	2.31	0.50	0.63	0.88
HBT25	2.38	0.50	0.63	0.88

Model	K	L	M	N
HBR15	1.06	9.94	11.19	0.94
HBR20	1.31	12.39	13.44	1.19
HBR25	1.56	14.82	15.82	1.44

Model	FF	PP	RR	
			8mm	12mm
HBR15	2.31	0.50	0.63	0.88
HBR20	2.31	0.50	0.63	0.88
HBR25	2.38	0.50	0.63	0.88

HBB



Model	AU	AV
HBB15	1.81	1.94
HBB20	2.19	2.63
HBB25	2.31	2.75

All dimensions shown in inches.

HB Series Service Kits

Cylinder Type	Info Location
3MA	pages B112-B114
4MA	pages B115-B118
4ML	pages B119-B122
4MAJ	page B123
2A	see Catalog 0106-6
P1D	page C33
3L	see Catalog 0106-6

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