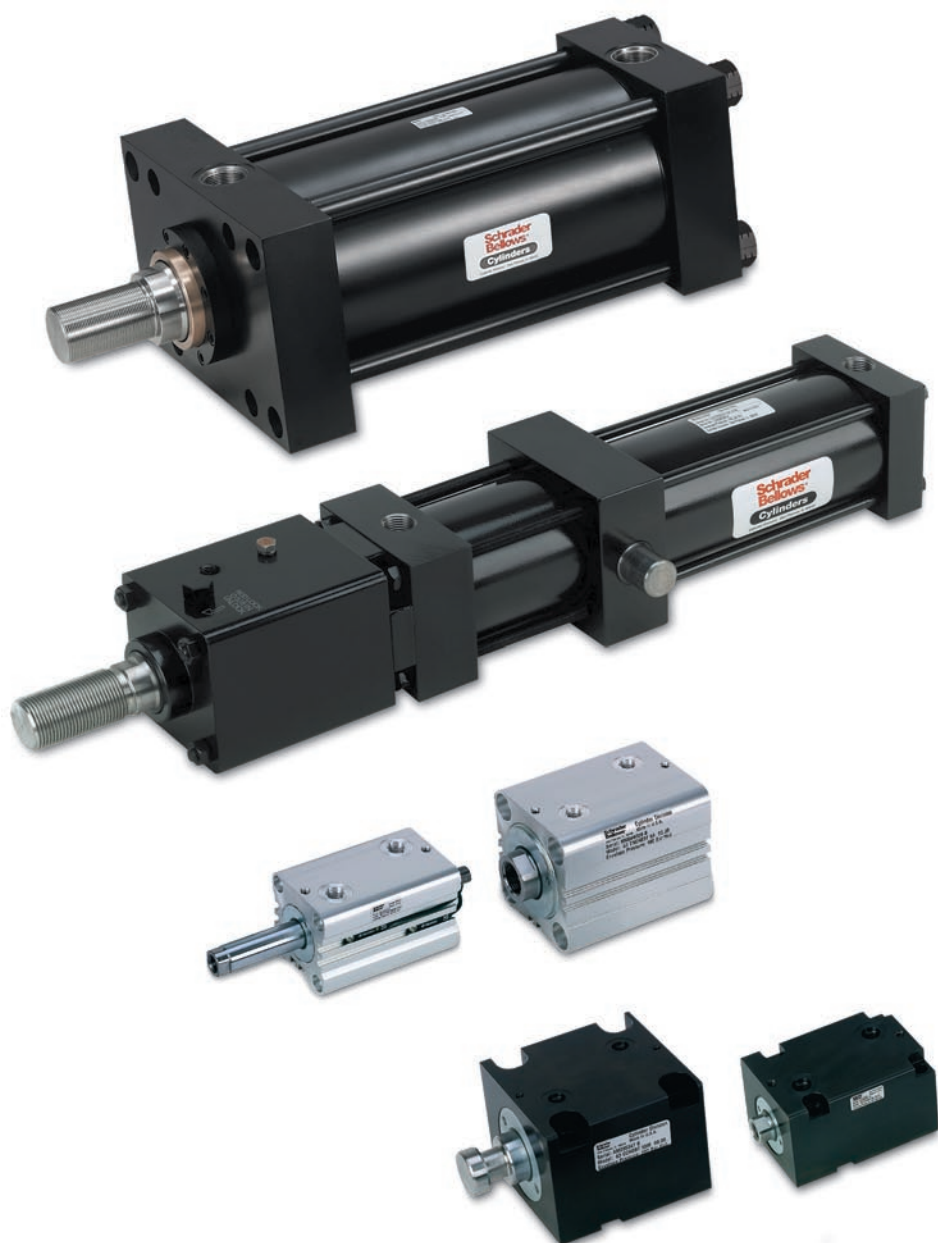




aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Industrial Cylinder Products

Pneumatic & Hydraulic Cylinders



**Schrader
Bellows®**

ENGINEERING YOUR SUCCESS.

Schrader Bellows®



In line with our policy of continuing product improvement, specifications and information contained in this catalog are subject to change.

Copyright ©2010, 2011 by Parker Hannifin Corporation.
All rights reserved.

PRINTED IN THE U.S.A.

WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from the Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by provisions stated on a separate page of the document entitled 'Offer of Sale'.

Table of Contents	Page	Section
<i>Manufacturing Locations</i>	<i>II</i>	<i>Introduction</i>
Section A: Pneumatic Cylinders		A
<i>Pneumatic Cylinder Index</i>	<i>1</i>	
PA-2 Series Heavy Duty Pneumatic Cylinders (Series Codes PA & PB)	3 - 47	
PN Series Non-Lube Cylinders (Series Codes PN & PP)	48 - 50	
NC9 Series Pneumatic Cylinders (Series Codes FA, FB, NA & NB)	51 - 88	
Rod Lock Pneumatic Cylinders	89 -108	
How To Order NC9 Series with Rod Lock (Series Codes FAJ, FBJ, NAJ & NBJ)	109	
How To Order PA-2 Series with Rod Lock (Series Codes PAJ, PBJ, PNJ & PPJ)	110	
Section B: Hydraulic Cylinders		B
<i>Hydraulic Cylinder Index</i>	<i>1</i>	
PL-2 Series Medium Duty Hydraulic Cylinders (Series Codes PL, PM, PE & PG)	3 - 48	
PH-2 Series Heavy Duty Hydraulic Cylinders (Series Codes PH, PJ, PF, PH, PX & PY)	49 - 78	
PH-3 Series Heavy Duty Hydraulic Cylinders (Series Codes PH, PJ, PF, PK, PX & PY)	79 - 122	
PHX Series Hydraulic and Electrohydraulic Actuators	123 - 126	
SHM Series Metric Hydraulic Cylinders	127 - 144	
Series CHE/CHD Compact Hydraulic Cylinders	145 - 194	
Section C: Application Engineering		C
<i>Application Engineering Index</i>	<i>1</i>	
Custom Modifications and Innovations	2 - 27	
Cylinder Parts Identification and Seal Kit Data	29 - 48	
Application Engineering Data	49 - 102	
Cylinder Safety Guide	106 - 107	
Offer of Sale	IBC	

Manufacturing Locations

Regional Plants

California

221 Helicopter Circle
Corona, CA 92880
Tel.: (951) 280-3800
Fax: (951) 280-3808
Fax: (800) 869-9886

Connecticut

80 Shaker Road
Enfield, CT 06082
Tel.: (860) 749-2215
Fax: (800) 323-0105

Georgia

1300 Six Flags Road
Lithia Springs, GA 30122
Tel.: (770) 819-3400
Fax: (800) 437-3498

Indiana

Goodland Plant
715 South Iroquois Street
Goodland, IN 47948
Tel.: (219) 297-3182
Fax: (800) 328-8120

Michigan

900 Plymouth Road
Plymouth, MI 48170
Tel.: (734) 455-1700
Fax: (734) 455-1007

Oregon

29289 Airport Road
Eugene, OR 97402-0079
Tel.: 541-689-9111
Fax: 541-688-6771
Fax: 800-624-7996

Section A – Pneumatic Cylinders

PA-2 SeriesPage 3

- Series codes PA, PB, PN & PP
- Heavy duty service with industrial tie rod construction
- Nominal pressure up to 250 PSI
- Standard bore sizes 1" - 14"
- 14 standard mounting styles

NC9 Series Ford Motor CompanyPage 51

- Series codes FA, FB, NA & NB
- Medium duty service with industrial tie rod construction
- Nominal pressure up to 250 PSI
- Standard bore sizes 1½" - 12"
- 10 Ford approved mounting styles
- Additional mounting styles available

NC9 & PA-2 Series with Rod Lock.....Page 89

- Series codes PAJ, PBJ, PNJ & PPJ
- Holding forces to resist up to 100 psi input from cap end
- Standard bore sizes 1½" - 8"
- Manual release is standard
- NEMA 4X rating protects internal components



PA-2 Series



Pneumatic Cylinders

PA-2 and NC9 Series Industrial Cylinders are designed to meet your application requirements – with quality and reliability built-in.

Bolt-on bronze rod gland cartridges in PA-2 and NC9 Series Cylinders are easily removed for service – without cylinder disassembly. The double-lip wiperseal cleans the rod surface and the rod seal provides positive non-leak sealing and minimum friction.

Floating Cushion Bearings are designed to provide smooth cushion action from start to stop without binding – an adjustable needle valve allows uniform range of cushion control. Cushions are optional and can be supplied at either or both ends.

Piston Rod Lock option for NC9 & PA-2 Series addresses the need to prevent unwanted actuator movement during machine service. Several industries eliminated the use of stored energy to restrain actuators, which makes our piston Rod Lock an important machine design component.

PA-2 and NC9 Series cylinders are available in a wide selection of bore sizes and mounting styles and are NFPA dimensionally interchangeable with other comparable cylinders.

J.I.T. Delivery

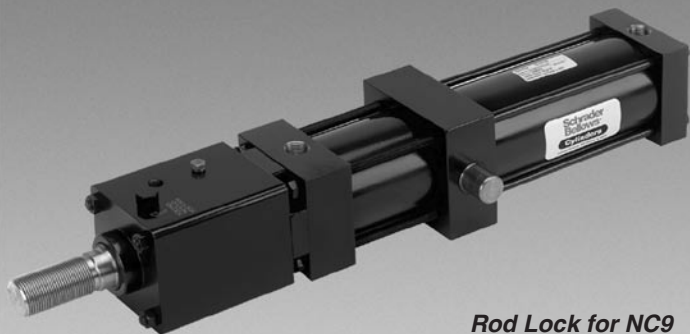
PA-2 and NC9 Series cylinders are available from your local Schrader Bellows distributor and are shipped from our strategically located regional manufacturing plants to save you freight costs and ensure J.I.T. delivery when you want it!

To order PA-2 or NC9 Series Cylinders or for sizing and application assistance contact your local Schrader Bellows distributor. To find a distributor in your area visit the Schrader Bellows web site at www.SchraderBellows.com.

NC9 Series



Rod Lock for NC9 and PA-2



Schrader Bellows®

®Registered Trademark, Schrader Bellows



Double Rod Models	39
“Style 6” Piston Rod End	44-45
How to Order	46-47
PN Series Non-Lube.....	48-50

Schrader Bellows PA-2 Series Heavy Duty Air Cylinder

When the job calls for reliable, heavy-duty performance, specify PA-2 Series. A 100,000 psi yield strength chrome-plated, case-hardened piston rod. A 125,000 psi yield strength rod-end stud with rolled threads. 100,000 psi yield strength tie rods. With construction like this, the Schrader Bellows PA-2 Series is rated for air service to 250 psi. This is one heavy-duty air cylinder that's really heavy duty.

They're truly premium quality cylinders, factory prelubricated standard with a non-lube option for millions of maintenance-free cycles. And to make sure every cylinder is premium quality, we subject each and every one – not just batch samples – to tough inspection and performance tests. See inside for the inside story on all the features that make PA-2 Series the high performance, long lasting choice for all your heavy-duty air applications.

Note: Rod diameters over 2½" will use a threaded nose gland.



Standard Specifications

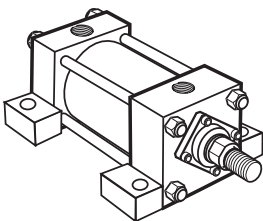
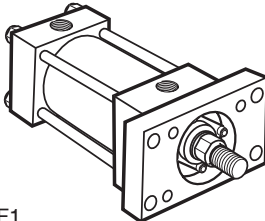
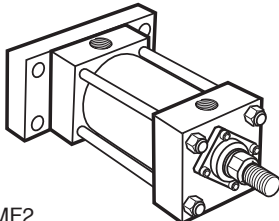
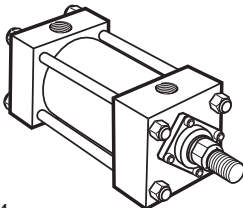
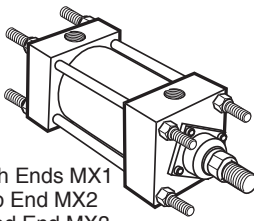
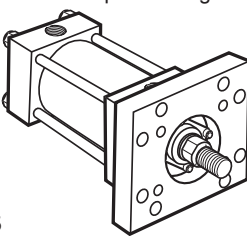
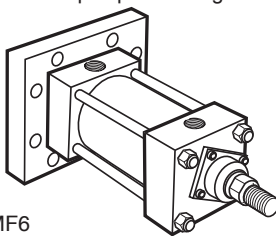
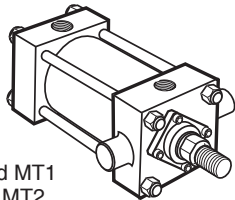
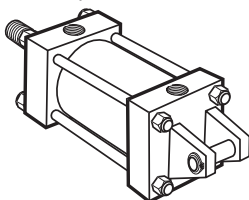
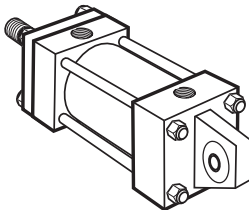
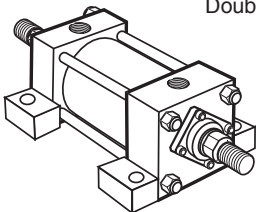
- Heavy Duty Service – ANSI/(NFPA) T3.6.7R2-1996 Specifications and Mounting Dimension Standards
- Standard Construction – Square Head – Tie Rod Design
- Nominal Pressure – Up to 250 PSI Air Service
- Standard Fluid – Filtered Air
- Standard Temperature – -10°F. to +165°F.*
- Bore Sizes – 1" through 14"
- Piston Rod Diameter – 1/2" through 5 1/2"

- Mounting Styles – 14 standard styles at various application ratings
- Strokes – Available in any practical stroke length
- Cushions – Optional at either end or both ends of stroke. "Float Check" at cap end.
- Rod Ends – Three Standard Choices – Specials to Order

* See Section C, "Operating Fluids and Temperature Range" for higher temperature service.

In line with our policy of continuing product improvement, specifications in this catalog are subject to change.

Mounting Styles and Ordering Notes

Available in all bore and rod combinations.		Available in all bore and rod combinations through 6" bore. 8"-14" bores supplied as Head Square (ME3) and Cap Square (ME4) mounts.																																																																																																						
Side Lug  MS2		Head Rectangular Flange  MF1		Cap Rectangular Flange  MF2																																																																																																				
Side Tap  MS4	Tie Rods Extended Both Ends  Both Ends MX1 Cap End MX2 Head End MX3		Head Square Flange  MF5		Cap Square Flange  MF6																																																																																																			
Trunnion Mounts  Head MT1 Cap MT2 Intermediate Fixed MT4		Cap Fixed Clevis  MP1 Pivot Pin Included		<table><tr><th>Bore</th><th>Rod Dia.</th><th>MX1 MS4 MF2 MT4</th><th>MX3 MPU3 MP1</th><th>MX2 MF6 MT1</th><th>MF1 MF5</th><th>ME3 ME4</th></tr><tr><td>1</td><td>1/2, 5/8</td><td></td><td>T</td><td></td><td>T</td><td>N/A</td></tr><tr><td>1 1/2</td><td>5/8 1</td><td></td><td>R T</td><td></td><td>T T</td><td>N/A N/A</td></tr><tr><td>2</td><td>5/8 1 1 3/8</td><td></td><td>R R T</td><td></td><td>R T T</td><td>N/A N/A N/A</td></tr><tr><td>2 1/2</td><td>5/8 1 1 3/8 1 3/4</td><td></td><td>R R T T</td><td></td><td>R R T T</td><td>N/A N/A N/A N/A</td></tr><tr><td>3 1/4</td><td>1 1 3/8 1 3/4, 2</td><td></td><td>R R R</td><td></td><td>R R T</td><td>N/A N/A N/A</td></tr><tr><td>4</td><td>1, 1 3/8 1 3/4, 2 2 1/2</td><td></td><td>R R R</td><td></td><td>R R T</td><td>N/A N/A N/A</td></tr><tr><td>5</td><td>1 - 2 2 1/2 3, 3 1/2</td><td></td><td>R R T</td><td></td><td>R T T</td><td>N/A N/A N/A</td></tr><tr><td>6</td><td>1 3/8 - 2 1/2 3 - 4</td><td></td><td>R T</td><td></td><td>R T</td><td>N/A N/A</td></tr><tr><td>7*</td><td>1 3/8, 1 3/4, 2</td><td></td><td>R</td><td></td><td>N/A</td><td>R</td></tr><tr><td>8*</td><td>1 3/8 - 4 1/2 5, 5 1/2</td><td></td><td>R R</td><td></td><td>N/A N/A</td><td>R R</td></tr><tr><td>10*</td><td>1 3/4 - 5 1/2</td><td></td><td>R</td><td></td><td>N/A</td><td>R</td></tr><tr><td>12*</td><td>2 - 5 1/2</td><td></td><td>R</td><td></td><td>N/A</td><td>R</td></tr><tr><td>14*</td><td>2 1/2 - 5 1/2</td><td></td><td>R</td><td></td><td>N/A</td><td>R</td></tr></table>			Bore	Rod Dia.	MX1 MS4 MF2 MT4	MX3 MPU3 MP1	MX2 MF6 MT1	MF1 MF5	ME3 ME4	1	1/2, 5/8		T		T	N/A	1 1/2	5/8 1		R T		T T	N/A N/A	2	5/8 1 1 3/8		R R T		R T T	N/A N/A N/A	2 1/2	5/8 1 1 3/8 1 3/4		R R T T		R R T T	N/A N/A N/A N/A	3 1/4	1 1 3/8 1 3/4, 2		R R R		R R T	N/A N/A N/A	4	1, 1 3/8 1 3/4, 2 2 1/2		R R R		R R T	N/A N/A N/A	5	1 - 2 2 1/2 3, 3 1/2		R R T		R T T	N/A N/A N/A	6	1 3/8 - 2 1/2 3 - 4		R T		R T	N/A N/A	7*	1 3/8, 1 3/4, 2		R		N/A	R	8*	1 3/8 - 4 1/2 5, 5 1/2		R R		N/A N/A	R R	10*	1 3/4 - 5 1/2		R		N/A	R	12*	2 - 5 1/2		R		N/A	R	14*	2 1/2 - 5 1/2		R		N/A	R
Bore	Rod Dia.	MX1 MS4 MF2 MT4	MX3 MPU3 MP1				MX2 MF6 MT1	MF1 MF5	ME3 ME4																																																																																															
1	1/2, 5/8		T		T	N/A																																																																																																		
1 1/2	5/8 1		R T		T T	N/A N/A																																																																																																		
2	5/8 1 1 3/8		R R T		R T T	N/A N/A N/A																																																																																																		
2 1/2	5/8 1 1 3/8 1 3/4		R R T T		R R T T	N/A N/A N/A N/A																																																																																																		
3 1/4	1 1 3/8 1 3/4, 2		R R R		R R T	N/A N/A N/A																																																																																																		
4	1, 1 3/8 1 3/4, 2 2 1/2		R R R		R R T	N/A N/A N/A																																																																																																		
5	1 - 2 2 1/2 3, 3 1/2		R R T		R T T	N/A N/A N/A																																																																																																		
6	1 3/8 - 2 1/2 3 - 4		R T		R T	N/A N/A																																																																																																		
7*	1 3/8, 1 3/4, 2		R		N/A	R																																																																																																		
8*	1 3/8 - 4 1/2 5, 5 1/2		R R		N/A N/A	R R																																																																																																		
10*	1 3/4 - 5 1/2		R		N/A	R																																																																																																		
12*	2 - 5 1/2		R		N/A	R																																																																																																		
14*	2 1/2 - 5 1/2		R		N/A	R																																																																																																		
Spherical Bearing  MPU3																																																																																																								
Double End Construction  Available in all bore and rod combinations in the following mounting styles: MDS2, MDS4, MDX1, MDX3, MDT1, MDT4, and MDF1 (1"-6"). MDF5 (1"-6") and MDE3 (8"-14").																																																																																																								

The inside story on why PA-2 Series is your best choice in heavy duty air cylinders.

Piston Rod – Medium carbon steel, induction case-hardened, hard chrome-plated and polished to 10 RMS finish. Piston rods are made from 90,000 to 100,000 psi minimum yield material in $\frac{5}{8}$ " through 4" diameters. The piston thread equals the catalog style #2 rod end thread for each rod diameter to assure proper piston-to-rod thread strength. Two wrench flats are provided for rod end attachment.

Rod Seal – The piston rod seal offers maximum sealing performance and efficiency with minimum friction. The highly resilient lips are pressure actuated and wear compensating, giving complete reliability through millions of cycles.

Steel Head – Bored and grooved to provide concentricity for mating parts.

Ports – NPTF ports are standard.

End Seals – Pressure-actuated cylinder body-to-head and cap "O" rings.

Secondary Seal – A Double-Service Wiperseal™ acts as a secondary pressure seal on the extend stroke and cleans the rod on the return stroke.

Bolt-On Rod Cartridge – assures true concentricity and allows removal without tie rod disassembly.

Piston Rod Stud – Furnished on 2" diameter rods and smaller when standard style #2 rod end threads are required. Piston rod studs are also available in 2 times the catalog "A" dimension length. Studs have rolled threads and are made from high strength steel. Anaerobic adhesive is used to permanently lock the stud to the piston rod.

Long Bearing Surface – is inboard of the seals, assuring positive lubrication from within the cylinder. An "O" ring is used as a seal between cartridge and head.

Alloy Steel Tie Rod Nuts

Align-A-Groove – A $\frac{3}{16}$ " wide surface machined at each end of the cylinder body. This makes precise mounting quick and easy.

Adjustable floating cushions

Cushions are optional, and can be supplied at head end, cap end, or both ends without change in envelope or mounting dimensions. Cushions are adjustable.

The PA-2 Series cylinder design incorporates the longest cushion sleeve and cushion spear that can be provided in the standard envelope without decreasing the rod bearing and piston bearing lengths.

adjacent to the needle valve except on certain bores of mounting style MS2 where it is mounted opposite the needle valve. The needle valve may be identified by the fact that it is slotted.

d. The check and needle valves are interchangeable in the head.

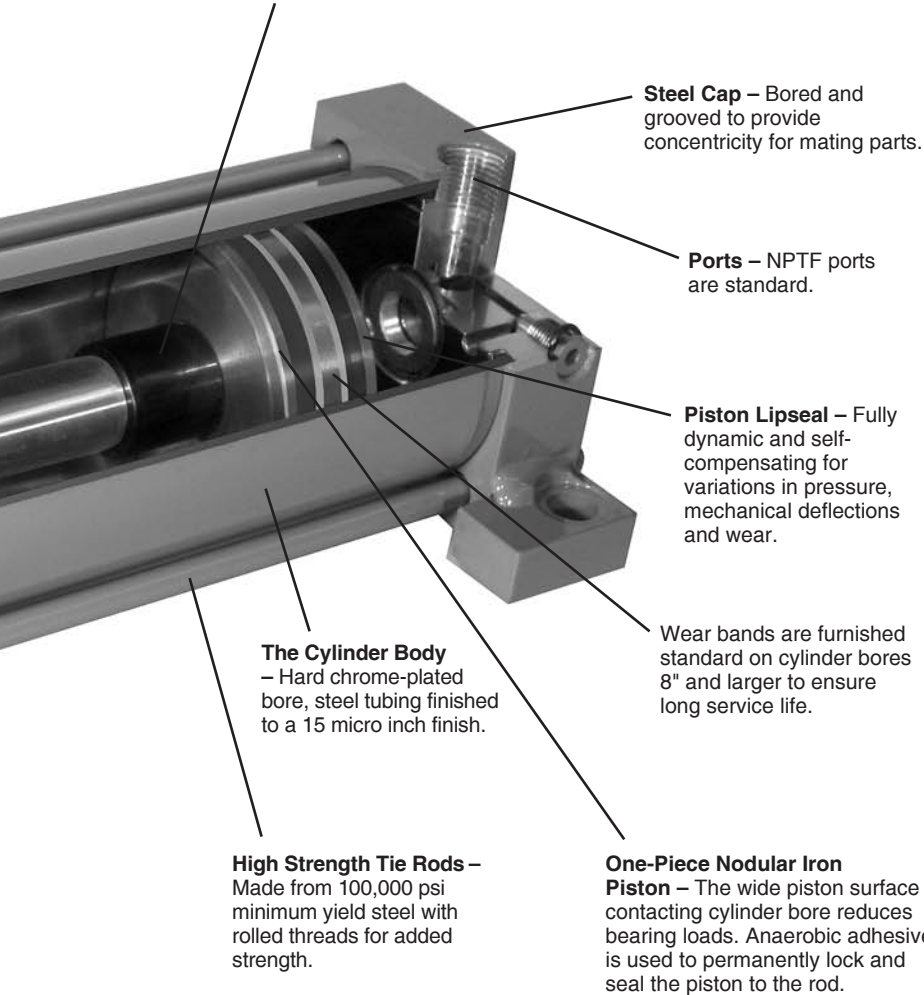
(1) When a cushion is specified at the head end:

- A self-centering sleeve is furnished on the piston rod assembly.
- A needle valve is provided that is flush with the side of the head when wide open. It may be identified by the fact that it is socket-keyed. Needle valves are located on side number 2, in all mounting styles except MT1, MT2 and MT4. These styles have needle valves located on side number 3.
- A springless check valve is provided that is also flush with the side of the head and is mounted

(2) When a cushion is specified at the cap end:

- A cushion spear is provided on the piston rod assembly.
- A "float check" self-centering bushing is provided which incorporates a large flow check valve for fast "out-stroke" action.
- A socket-keyed needle valve is provided that is flush with the side of the cap when wide open. It is located on side number 2 in all mounting styles except MT1, MT2 and MT4. These styles have needle valves located on side number 3.

Adjustable Floating Cushions – Cushions are optional and can be supplied at head end, cap end, or both ends without change in envelope or mounting dimensions.



Steel Cap – Bored and grooved to provide concentricity for mating parts.

Ports – NPTF ports are standard.

Piston Lipseal – Fully dynamic and self-compensating for variations in pressure, mechanical deflections and wear.

The Cylinder Body – Hard chrome-plated bore, steel tubing finished to a 15 micro inch finish.

Wear bands are furnished standard on cylinder bores 8" and larger to ensure long service life.

High Strength Tie Rods – Made from 100,000 psi minimum yield steel with rolled threads for added strength.

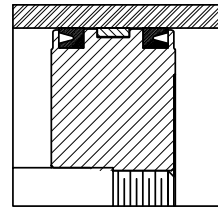
One-Piece Nodular Iron Piston – The wide piston surface contacting cylinder bore reduces bearing loads. Anaerobic adhesive is used to permanently lock and seal the piston to the rod.

Prelubricated Wearing Surfaces

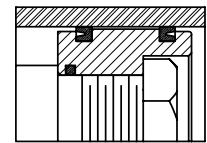
Schrader Bellows PA-2 Series Air Cylinders are factory prelubricated. Lube-A-Cyl applied to seals, piston, cylinder bore, piston rod and gland surfaces provides lubrication for normal operation.

Lube-A-Cyl has been field and laboratory tested, and is recommended by Schrader Bellows for air cylinders where lubricant should remain in the cylinder and not be expelled into the atmosphere.

Note: Threaded rod glands are supplied on cylinders with rod diameters over 2 1/2".



Piston with Wear Band
Standard 8"-14" Bore



Nut Retained Piston
Optional at extra charge

Cushion Length

Cylinder Bore (Inches)	Rod Diameter* (Inches)	Cushion Length (Inches)	
		Head*	Cap
1 1/2	5/8	7/8	13/16
	1	7/8	13/16
2	5/8	7/8	13/16
	1 3/8	7/8	13/16
2 1/2	5/8	7/8	13/16
	1 3/4	7/8	13/16
3 1/4	1	1 1/8	1
	2	13/16	1
4	1	1 1/8	1
	2 1/2	13/16	1
5	1	1 1/8	1
	3 1/2	13/16	1

Cylinder Bore (Inches)	Rod Diameter* (Inches)	Cushion Length (Inches)	
		Head*	Cap
6	1 3/8	1 3/8	1 1/4
	4	1 1/16	1 1/4
7	1 3/8	1 1/16	1 1/4
	2	1 1/16	1 1/4
8	1 3/8	1 1/16	1 1/4
	5 1/2	15/16	1 1/4
10	1 3/4	1 5/16	1 3/4
	5 1/2	1 3/16	1 3/4
12	2	1 5/16	1 3/4
	5 1/2	1 3/16	1 3/4
14	2 1/2	1 3/4	2
	5 1/2	1 11/16	2

*Head end cushions for rod diameters not listed have cushion lengths with the limits shown.

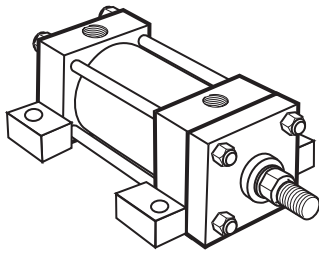
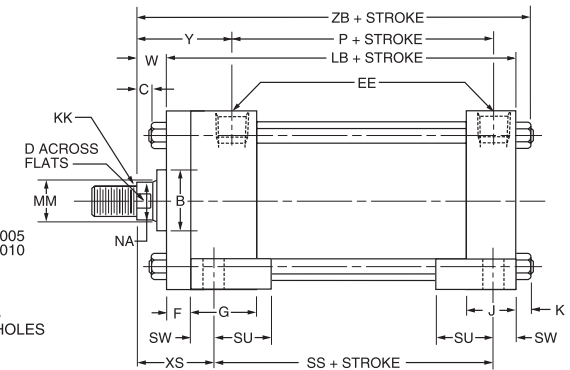
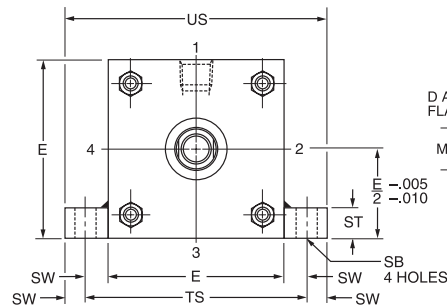
For cushion selection and sizing, see Section C of this catalog for additional information.

Side Lug Mount

Style MS2

1" - 1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods

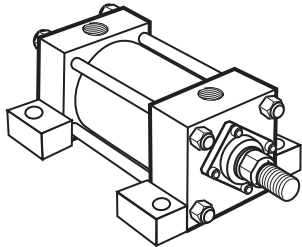
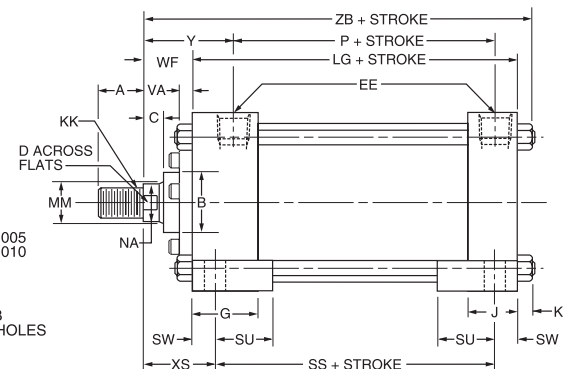
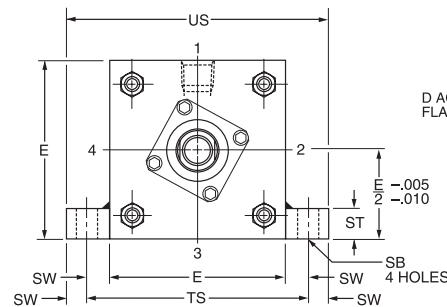
**Tie Rod
Retained Cartridge**

Before determining dimensions: See chart on page 5 for cylinder rod combinations that have removable cartridges.

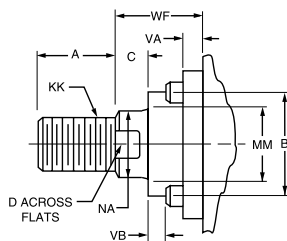
Side Lug Mount

Style MS2

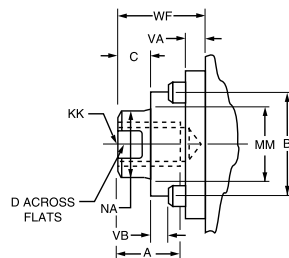
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

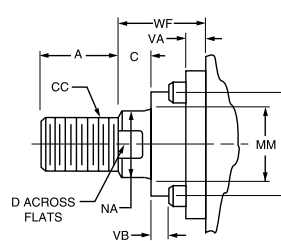
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special"
Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	G	J	K	SB•	ST	SU	SW	TS	US	Add Stroke			
													LB	LG	P	SS
1*	1 1/2	1/4	3/8	1 1/2	1	3/16	9/32	5/16	3/4	5/16	2 1/8	2 3/4	3 7/8	3 1/2	2 1/8	2 7/8
1 1/2	2	3/8†	3/8	1 1/2	1	1/4	7/16	1/2	15/16	3/8	2 3/4	3 1/2	4	3 5/8	2 1/4	2 7/8
2	2 1/2	3/8†	3/8	1 1/2	1	5/16	7/16	1/2	15/16	3/8	3 1/4	4	4	3 5/8	2 1/4	2 7/8
2 1/2	3	3/8†	3/8	1 1/2	1	5/16	7/16	1/2	15/16	3/8	3 3/4	4 1/2	4 1/8	3 3/4	2 3/8	3
3 1/4	3 3/4	1/2	—	1 3/4	1 1/4	3/8	9/16	3/4	1 1/4	1/2	4 3/4	5 3/4	4 7/8	4 1/4	2 5/8	3 1/4
4	4 1/2	1/2	—	1 3/4	1 1/4	3/8	9/16	3/4	1 1/4	1/2	5 1/2	6 1/2	4 7/8	4 1/4	2 5/8	3 1/4
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	13/16	1	1 9/16	11/16	6 7/8	8 1/4	5 1/8	4 1/2	2 7/8	3 1/8
6	6 1/2	3/4	3/4	2	1 1/2	7/16	13/16	1	1 9/16	11/16	7 7/8	9 1/4	5 3/4	5	3 1/8	3 5/8

* Cushions not available on 1" bore.

† On 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

■ 1" bore head is 1 3/4" x 1 1/2". See page 12, Section A.

• Upper surface spot-faced for socket head screws.

Table 2—Rod Dimensions and Envelope Dimensions Affected by Rod Size

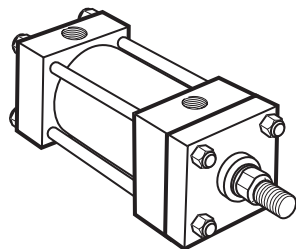
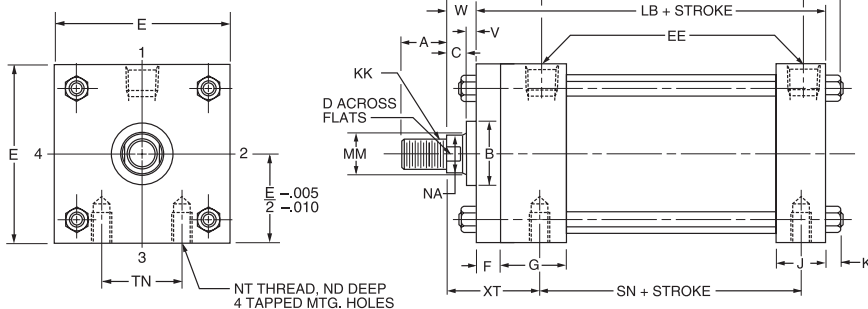
Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size												
		Style 4 CC	Style 2 & 3 KK	A	+.000 -.002 B	C	D	NA	V	VA	VB	W	WF	XS	Y	Add Stroke
																ZB
1*	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	7/16	1/4	—	—	5/8	—	15/16	115/16	411/16
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	—	—	5/8	—	15/16	115/16	411/16
1 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	13/8	115/16	47/8
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	1/2	—	—	1	—	13/4	25/16	51/4
2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	13/8	115/16	415/16
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	—	2	2 9/16	5 9/16
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	1 3/4	25/16	55/16
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	13/8	115/16	51/16
2 1/2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	3/4	—	—	1 1/2	—	2 1/4	213/16	515/16
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	1 3/4	25/16	57/16
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	—	2	2 9/16	511/16
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	1 7/8	27/16	6
3 1/4	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 15/16	—	1/4	9/16	—	2	2 1/2	3 1/16	65/8
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	2 1/8	211/16	61/4
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 3/8	215/16	61/2
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	1 7/8	27/16	6
4	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	11/16	—	2 1/4	2 3/4	35/16	67/8
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	2 1/8	211/16	61/4
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 3/8	215/16	61/2
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 15/16	—	1/4	9/16	—	2	2 1/2	3 1/16	65/8
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 1/16	27/16	65/16
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 3/8	5/8	—	—	1 5/8	—	2 15/16	35/16	73/16
5	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	25/16	211/16	6 9/16
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 9/16	215/16	6 13/16
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 15/16	—	1/4	9/16	—	2	2 11/16	3 1/16	6 15/16
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	11/16	—	2 1/4	2 15/16	3 5/16	7 3/16
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	5/8	—	—	1 5/8	—	2 15/16	3 5/16	7 3/16
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	7/16	—	1 5/8	25/16	213/16	7 1/16
6	4	3 3/4-12	3-12	4	4.749	1	3 3/8	3 7/8	1/2	—	—	1 1/2	—	2 15/16	37/16	7 11/16
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 9/16	3 1/16	7 5/16
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 15/16	—	1/4	9/16	—	2	2 11/16	3 3/16	7 7/16
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	11/16	—	2 1/4	2 15/16	37/16	7 11/16
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	1/2	—	—	1 1/2	—	2 15/16	37/16	7 11/16
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 3/8	1/2	—	—	1 1/2	—	2 15/16	37/16	7 11/16

Side Tap Mount**Style MS4**

1" - 1 1/2" - 2" - 2 1/2" - 5"

and 6" Bore

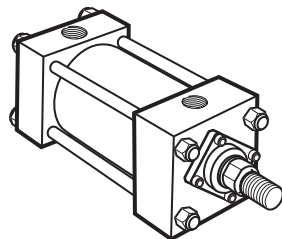
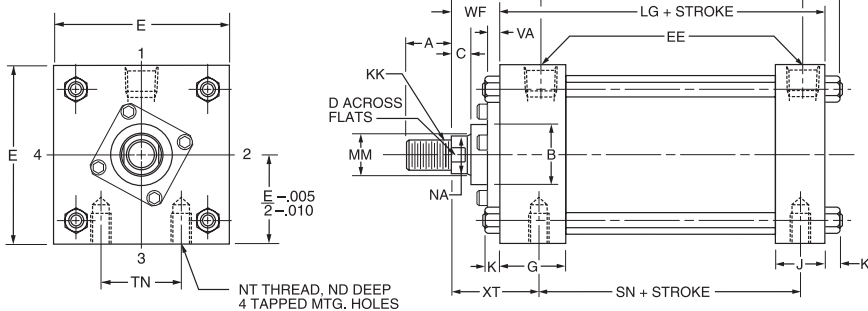
With Maximum Oversize Rods

**Tie Rod Retained Cartridge**

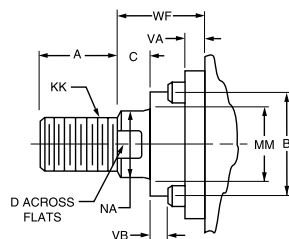
Before determining dimensions: See chart on page 5 for cylinder rod combinations that have removable cartridges.

Side Tap Mount**Style MS4**

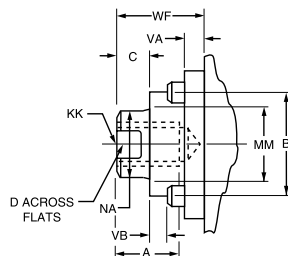
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

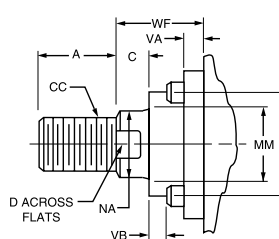
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	G	J	K	NT	TN	Add Stroke			
									LB	LG	P	SN
1*	■	1/4	3/8	1 1/2	1	3/16	10-24	9/16	3 7/8	—	2 1/8	2 1/8
1 1/2	2	3/8†	3/8	1 1/2	1	1/4	1/4-20	5/8	4	3 5/8	2 1/4	2 1/4
2	2 1/2	3/8†	3/8	1 1/2	1	5/16	5/16-18	7/8	4	3 5/8	2 1/4	2 1/4
2 1/2	3	3/8†	3/8	1 1/2	1	5/16	3/8-16	1 1/4	4 1/8	3 3/4	2 3/8	2 3/8
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	1/2-13	1 1/2	4 7/8	4 1/4	2 5/8	2 5/8
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	1/2-13	2 1/16	4 7/8	4 1/4	2 5/8	2 5/8
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	5/8-11	2 11/16	5 1/8	4 1/2	2 7/8	2 7/8
6	6 1/2	3/4	3/4	2	1 1/2	7/16	3/4-10	3 1/4	5 3/4	5	3 1/8	3 1/8

* Cushions not available on 1" bore.

† On 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

■ 1" bore head is 1 3/4" x 1 1/2". See page 12, Section A.

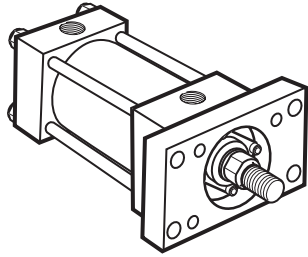
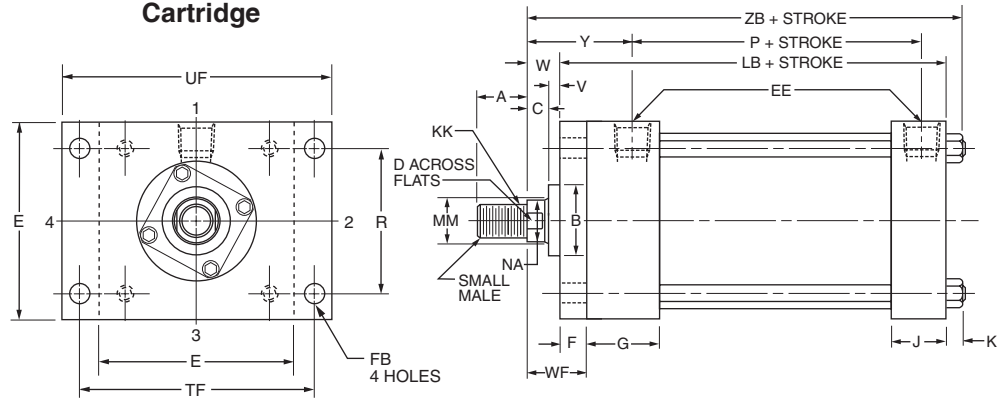
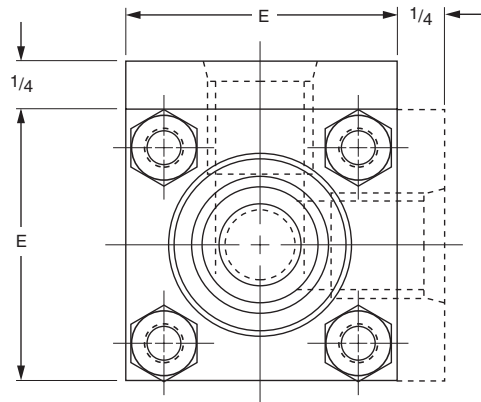
Table 2—Rod Dimensions and Envelope Dimensions Affected by Rod Size

Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size														Add Stroke
		Style 4 CC	Style 2 & 3 KK	A	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF	XT	Y	ND	ZB	
1*	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	7/16	1/4	—	—	5/8	—	1 ¹⁵ / ₁₆	1 ¹⁵ / ₁₆	1/4	4 ¹¹ / ₁₆	
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	—	—	5/8	—	1 ¹⁵ / ₁₆	1 ¹⁵ / ₁₆	1/4	4 ¹¹ / ₁₆	
1 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ / ₁₆	1 ¹⁵ / ₁₆	3/8	4 ⁷ / ₈	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ / ₁₆	1/2	—	—	1	—	2 ⁵ / ₁₆	2 ⁵ / ₁₆	3/8	5 1/4	
2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ / ₁₆	1 ¹³ / ₁₆	1 ¹¹ / ₃₂	4 ¹⁵ / ₁₆	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 ⁵ / ₁₆	5/8	—	—	1 1/4	—	2 ⁹ / ₁₆	2 ⁹ / ₁₆	1 ¹¹ / ₃₂	5 ⁹ / ₁₆	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ / ₁₆	—	1/4	3/8	—	1 3/8	2 ⁵ / ₁₆	2 ⁵ / ₁₆	1 ¹¹ / ₃₂	5 ⁵ / ₁₆	
2 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ / ₁₆	1 ¹⁵ / ₁₆	7/16	5 ¹ / ₁₆	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ / ₁₆	3/4	—	—	1 1/2	—	2 ¹³ / ₁₆	2 ¹³ / ₁₆	7/16	5 ¹⁵ / ₁₆	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ / ₁₆	—	1/4	3/8	—	1 3/8	2 ⁵ / ₁₆	2 ⁵ / ₁₆	7/16	5 ⁷ / ₁₆	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 ⁵ / ₁₆	5/8	—	—	1 1/4	—	2 ⁹ / ₁₆	2 ⁹ / ₁₆	7/16	5 ¹¹ / ₁₆	
3 1/4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ / ₁₆	—	1/4	3/8	—	1 3/8	2 ⁷ / ₁₆	2 ⁷ / ₁₆	1/2	6	
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	—	1/4	9/16	—	2	3 ¹ / ₁₆	3 ¹ / ₁₆	1/2	6 ⁵ / ₈	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 ⁵ / ₁₆	—	1/4	1/2	—	1 5/8	2 ¹¹ / ₁₆	2 ¹¹ / ₁₆	1/2	6 ¹ / ₄	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ / ₁₆	—	1/4	9/16	—	1 7/8	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	1/2	6 ¹ / ₂	
4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ / ₁₆	—	1/4	3/8	—	1 3/8	2 ⁷ / ₁₆	2 ⁷ / ₁₆	5/8	6	
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	—	1/4	1 ¹¹ / ₁₆	—	2 1/4	3 ⁵ / ₁₆	3 ⁵ / ₁₆	5/8	6 ⁷ / ₈	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 ⁵ / ₁₆	—	1/4	1/2	—	1 5/8	2 ¹¹ / ₁₆	2 ¹¹ / ₁₆	5/8	6 ¹ / ₄	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ / ₁₆	—	1/4	9/16	—	1 7/8	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	5/8	6 ¹ / ₂	
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	—	1/4	9/16	—	2	3 ¹ / ₁₆	3 ¹ / ₁₆	5/8	6 ⁵ / ₈	
5	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ / ₁₆	—	1/4	3/8	—	1 3/8	2 ⁷ / ₁₆	2 ⁷ / ₁₆	3/4	6 ⁵ / ₁₆	
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 ³ / ₈	5/8	—	—	1 5/8	—	3 ⁵ / ₁₆	3 ⁵ / ₁₆	3/4	7 ³ / ₁₆	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 ⁵ / ₁₆	—	1/4	1/2	—	1 5/8	2 ¹¹ / ₁₆	2 ¹¹ / ₁₆	3/4	6 ⁹ / ₁₆	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ / ₁₆	—	1/4	9/16	—	1 7/8	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	3/4	6 ¹³ / ₁₆	
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	—	1/4	9/16	—	2	3 ¹ / ₁₆	3 ¹ / ₁₆	3/4	6 ¹⁵ / ₁₆	
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	—	1/4	1 ¹¹ / ₁₆	—	2 1/4	3 ⁵ / ₁₆	3 ⁵ / ₁₆	3/4	7 ³ / ₁₆	
	3	2 ³ / ₄ -12	2 1/4-12	3 1/2	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5/8	—	—	1 5/8	—	3 ⁵ / ₁₆	3 ⁵ / ₁₆	3/4	7 ³ / ₁₆	
6	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 ⁵ / ₁₆	—	1/4	7/16	—	1 5/8	2 ¹³ / ₁₆	2 ¹³ / ₁₆	7/8	7 ¹ / ₁₆	
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	1/2	—	—	1 1/2	—	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7/8	7 ¹¹ / ₁₆	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ / ₁₆	—	1/4	9/16	—	1 7/8	3 ¹ / ₁₆	3 ¹ / ₁₆	7/8	7 ⁵ / ₁₆	
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	—	1/4	9/16	—	2	3 ³ / ₁₆	3 ³ / ₁₆	7/8	7 ⁷ / ₁₆	
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	—	1/4	1 ¹¹ / ₁₆	—	2 1/4	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7/8	7 ¹¹ / ₁₆	
	3	2 ³ / ₄ -12	2 1/4-12	3 1/2	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	1/2	—	—	1 1/2	—	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7/8	7 ¹¹ / ₁₆	
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 ³ / ₈	1/2	—	—	1 1/2	—	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7/8	7 ¹¹ / ₁₆	

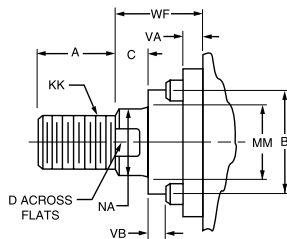
Head Rectangular Flange Mount

Style MF1

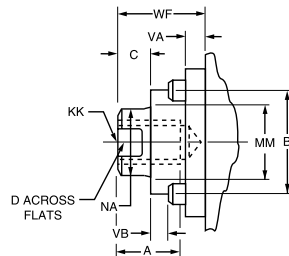
1" - 6" Bore

**Removable
Cartridge****1" Bore Cylinder Only****1" Bore Cylinder Only
Head End****Rod End Dimensions — see table 2****Thread Style 2**

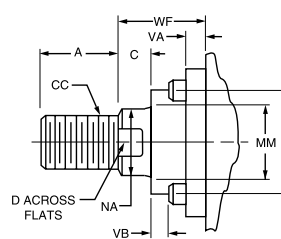
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special"
Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	FB	G	J	K	R	TF	UF	Add Stroke	
											LB	P
1*	■	1/4	3/8	1/4	1 1/2	1	3/16	1.08	2	2 1/2	3 7/8	2 1/8
1 1/2	2	3/8†	3/8	5/16	1 1/2	1	1/4	1.43	2 3/4	3 3/8	4	2 1/4
2	2 1/2	3/8†	3/8	3/8	1 1/2	1	5/16	1.84	3 3/8	4 1/8	4	2 1/4
2 1/2	3	3/8†	3/8	3/8	1 1/2	1	5/16	2.19	3 7/8	4 5/8	4 1/8	2 3/8
3 1/4	3 3/4	1/2	5/8	7/16	1 3/4	1 1/4	3/8	2.76	4 11/16	5 1/2	4 7/8	2 5/8
4	4 1/2	1/2	5/8	7/16	1 3/4	1 1/4	3/8	3.32	5 7/16	6 1/4	4 7/8	2 5/8
5	5 1/2	1/2	5/8	9/16	1 3/4	1 1/4	7/16	4.10	6 5/8	7 5/8	5 1/8	2 7/8
6	6 1/2	3/4	3/4	9/16	2	1 1/2	7/16	4.88	7 5/8	8 5/8	5 3/4	3 1/8

* Cushions not available on 1" bore.

† On 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

■ 1" bore head is 1 3/4" x 1 1/2". See page 12, Section A.

Table 2—Rod Dimensions and Envelope Dimensions Affected by Rod Size

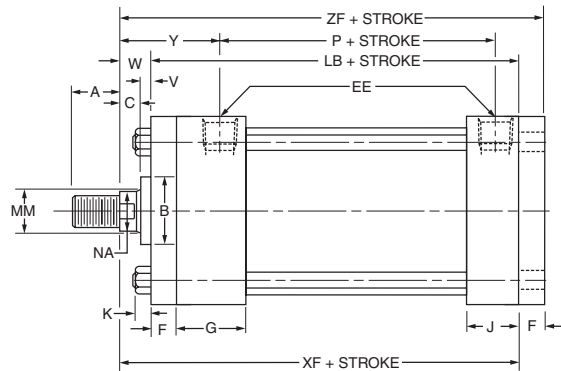
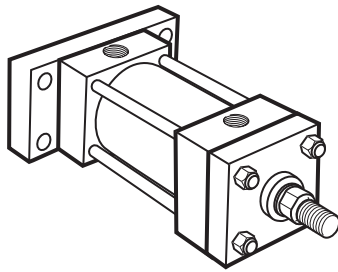
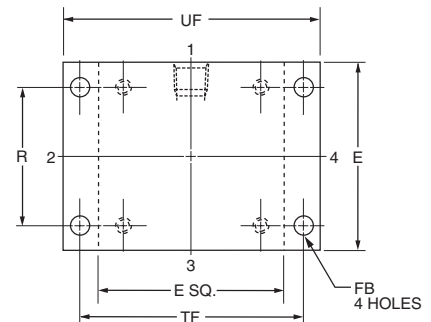
Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size										Add Stroke
		Style 4 CC	Style 2 & 3 KK	A	+0.000 -0.002 B	C	D	NA	V	W	WF	Y	ZB	
1*	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	7/16	1/4	5/8	1	1 ¹⁵ /16	4 ¹¹ /16	
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	5/8	1	1 ¹⁵ /16	4 ¹¹ /16	
1 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	5/8	1	1 ¹⁵ /16	4 ⁷ /8	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	1/2	1	1 ³ /8	2 ⁵ /16	5 ¹ /4	
2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	5/8	1	1 ¹⁵ /16	4 ¹⁵ /16	
	1 ³ /8	1 ¹ /4-12	1-14	1 ⁵ /8	1.999	5/8	1 ¹ /8	1 ⁵ /16	5/8	1 ¹ /4	1 ⁵ /8	2 ⁹ /16	5 ⁹ /16	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	1/2	1	1 ³ /8	2 ⁵ /16	5 ⁵ /16	
2 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	5/8	1	1 ¹⁵ /16	5 ¹ /16	
	1 ³ /4	1 ¹ /2-12	1 ¹ /4-12	2	2.374	3/4	1 ¹ /2	1 ¹¹ /16	3/4	1 ¹ /2	1 ⁷ /8	2 ¹³ /16	5 ¹⁵ /16	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	1/2	1	1 ³ /8	2 ⁵ /16	5 ⁷ /16	
	1 ³ /8	1 ¹ /4-12	1-14	1 ⁵ /8	1.999	5/8	1 ¹ /8	1 ⁵ /16	5/8	1 ¹ /4	1 ⁵ /8	2 ⁹ /16	5 ¹¹ /16	
3 1/4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	1/4	3/4	1 ³ /8	2 ⁷ /16	6	
	2	1 ³ /4-12	1 ¹ /2-12	2 ¹ /4	2.624	7/8	1 ¹¹ /16	1 ¹⁵ /16	1/2	1 ³ /8	2	3 ¹ /16	6 ⁵ /8	
	1 ³ /8	1 ¹ /4-12	1-14	1 ⁵ /8	1.999	5/8	1 ¹ /8	1 ⁵ /16	3/8	1	1 ⁵ /8	2 ¹¹ /16	6 ¹ /4	
	1 ³ /4	1 ¹ /2-12	1 ¹ /4-12	2	2.374	3/4	1 ¹ /2	1 ¹¹ /16	1/2	1 ¹ /4	1 ⁷ /8	2 ¹⁵ /16	6 ¹ /2	
4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	1/4	3/4	1 ³ /8	2 ⁷ /16	6	
	2 1/2	2 ¹ /4-12	1 ⁷ /8-12	3	3.124	1	2 ¹ /16	2 ³ /8	5/8	1 ⁵ /8	2 ¹ /4	3 ⁵ /16	6 ⁷ /8	
	1 ³ /8	1 ¹ /4-12	1-14	1 ⁵ /8	1.999	5/8	1 ¹ /8	1 ⁵ /16	3/8	1	1 ⁵ /8	2 ¹¹ /16	6 ¹ /4	
	1 ³ /4	1 ¹ /2-12	1 ¹ /4-12	2	2.374	3/4	1 ¹ /2	1 ¹¹ /16	1/2	1 ¹ /4	1 ⁷ /8	2 ¹⁵ /16	6 ¹ /2	
	2	1 ³ /4-12	1 ¹ /2-12	2 ¹ /4	2.624	7/8	1 ¹¹ /16	1 ¹⁵ /16	1/2	1 ³ /8	2	3 ¹ /16	6 ⁵ /8	
5	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	1/4	3/4	1 ³ /8	2 ⁷ /16	6 ⁵ /16	
	3 1/2	3 ¹ /4-12	2 ¹ /2-12	3 ¹ /2	4.249	1	3	3 ³ /8	5/8	1 ⁵ /8	2 ¹ /4	3 ⁵ /16	7 ³ /16	
	1 ³ /8	1 ¹ /4-12	1-14	1 ⁵ /8	1.999	5/8	1 ¹ /8	1 ⁵ /16	3/8	1	1 ⁵ /8	2 ¹¹ /16	6 ⁹ /16	
	1 ³ /4	1 ¹ /2-12	1 ¹ /4-12	2	2.374	3/4	1 ¹ /2	1 ¹¹ /16	1/2	1 ¹ /4	1 ⁷ /8	2 ¹⁵ /16	6 ¹³ /16	
	2	1 ³ /4-12	1 ¹ /2-12	2 ¹ /4	2.624	7/8	1 ¹¹ /16	1 ¹⁵ /16	1/2	1 ³ /8	2	3 ¹ /16	6 ¹⁵ /16	
	2 1/2	2 ¹ /4-12	1 ⁷ /8-12	3	3.124	1	2 ¹ /16	2 ³ /8	5/8	1 ⁵ /8	2 ¹ /4	3 ⁵ /16	7 ³ /16	
	3	2 ³ /4-12	2 ¹ /4-12	3 ¹ /2	3.749	1	2 ⁵ /8	2 ⁷ /8	5/8	1 ⁵ /8	2 ¹ /4	3 ⁵ /16	7 ³ /16	
6	1 ³ /8	1 ¹ /4-12	1-14	1 ⁵ /8	1.999	5/8	1 ¹ /8	1 ⁵ /16	1/4	7/8	1 ⁵ /8	2 ¹³ /16	7 ¹ /16	
	4	3 ³ /4-12	3-12	4	4.749	1	3 ³ /8	3 ⁷ /8	1/2	1 ¹ /2	2 ¹ /4	3 ⁷ /16	7 ¹¹ /16	
	1 ³ /4	1 ¹ /2-12	1 ¹ /4-12	2	2.374	3/4	1 ¹ /2	1 ¹¹ /16	3/8	1 ¹ /8	1 ⁷ /8	3 ¹ /16	7 ⁵ /16	
	2	1 ³ /4-12	1 ¹ /2-12	2 ¹ /4	2.624	7/8	1 ¹¹ /16	1 ¹⁵ /16	3/8	1 ¹ /4	2	3 ³ /16	7 ⁷ /16	
	2 1/2	2 ¹ /4-12	1 ⁷ /8-12	3	3.124	1	2 ¹ /16	2 ³ /8	1/2	1 ¹ /2	2 ¹ /4	3 ⁷ /16	7 ¹¹ /16	
	3	2 ³ /4-12	2 ¹ /4-12	3 ¹ /2	3.749	1	2 ⁵ /8	2 ⁷ /8	1/2	1 ¹ /2	2 ¹ /4	3 ⁷ /16	7 ¹¹ /16	
	3 1/2	3 ¹ /4-12	2 ¹ /2-12	3 ¹ /2	4.249	1	3	3 ³ /8	1/2	1 ¹ /2	2 ¹ /4	3 ⁷ /16	7 ¹¹ /16	

Cap Rectangular Flange Mount

Style MF2

1" - 1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods

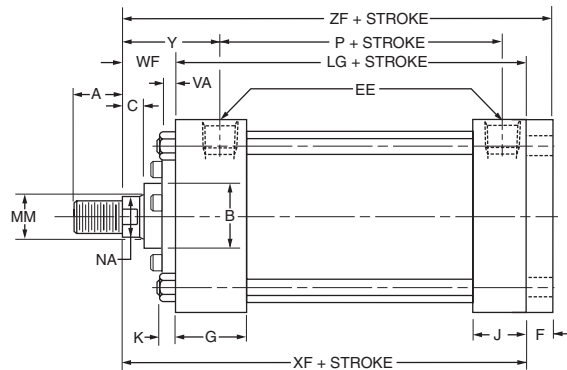
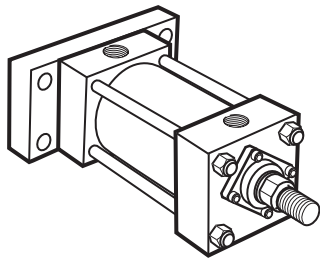
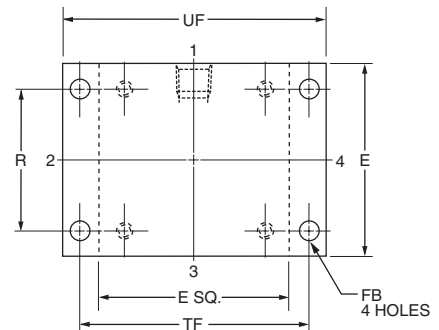
**Tie Rod Retained
Cartridge**

Before determining dimensions: See chart on page 5 for cylinder rod combinations that have removable cartridges.

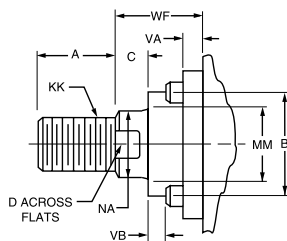
Cap Rectangular Flange Mount

Style MF2

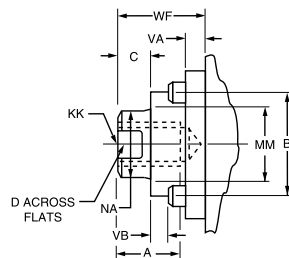
1 1/2" - 6" Bore

**Removable
Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

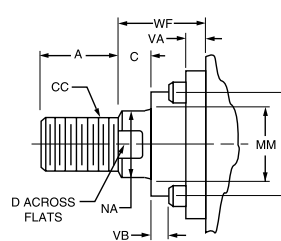
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**“Special”
Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	FB	G	J	K	R	TF	UF	Add Stroke		
											LB	LG	P
1*	■	1/4	3/8	1/4	1 1/2	1	3/16	1.08	2	2 1/2	3 7/8	—	2 1/8
1 1/2	2	3/8†	3/8	5/16	1 1/2	1	1/4	1.43	2 3/4	3 3/8	4	3 5/8	2 1/4
2	2 1/2	3/8†	3/8	3/8	1 1/2	1	5/16	1.84	3 3/8	4 1/8	4	3 5/8	2 1/4
2 1/2	3	3/8†	3/8	3/8	1 1/2	1	5/16	2.19	3 7/8	4 5/8	4 1/8	3 3/4	2 3/8
3 1/4	3 3/4	1/2	5/8	7/16	1 3/4	1 1/4	3/8	2.76	4 11/16	5 1/2	—	4 1/4	2 5/8
4	4 1/2	1/2	5/8	7/16	1 3/4	1 1/4	3/8	3.32	5 7/16	6 1/4	—	4 1/4	2 5/8
5	5 1/2	1/2	5/8	9/16	1 3/4	1 1/4	7/16	4.10	6 5/8	7 5/8	5 1/8	4 1/2	2 7/8
6	6 1/2	3/4	3/4	9/16	2	1 1/2	7/16	4.88	7 5/8	8 5/8	5 3/4	5	3 1/8

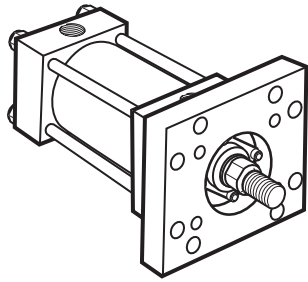
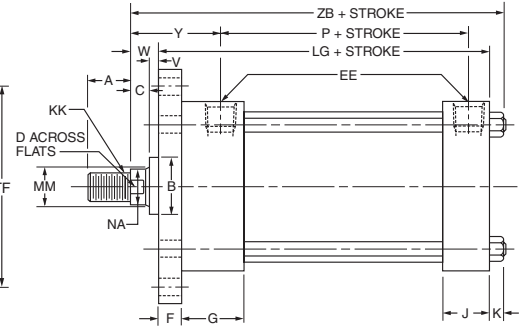
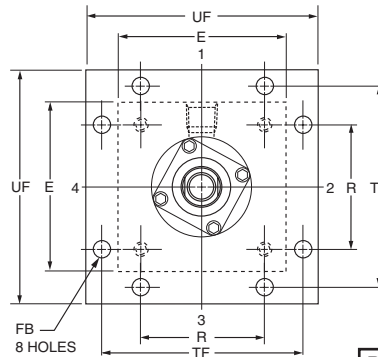
* Cushion not available on 1" bore.

† On 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

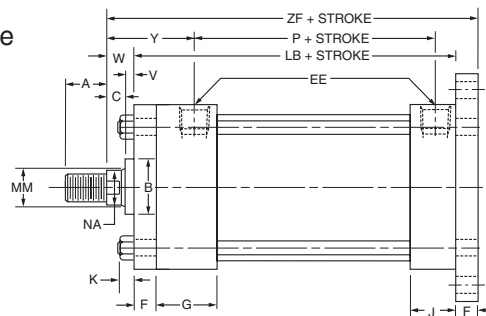
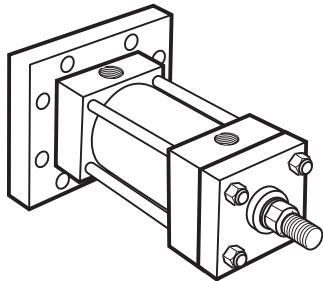
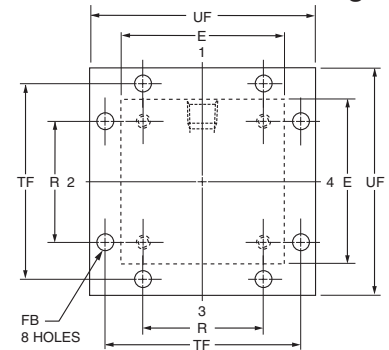
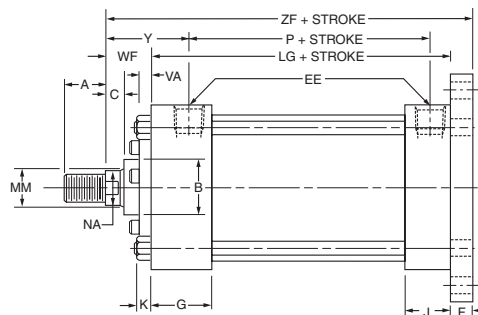
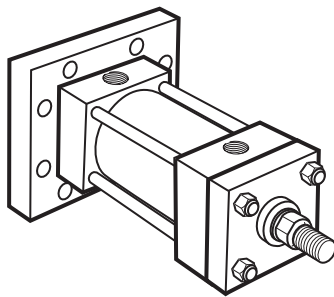
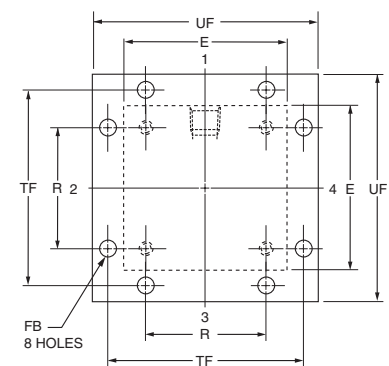
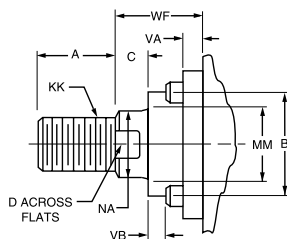
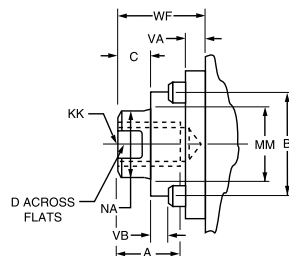
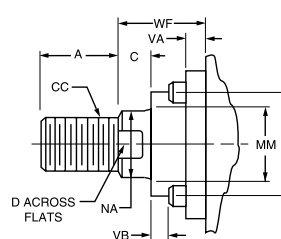
■ 1" bore head is 1 3/4" x 1 1/2". See page 12, Section A.

Table 2—Rod Dimensions and Envelope Dimensions Affected by Rod Size

Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size													Add Stroke	
		Style 4 CC	Style 2 & 3 KK	A	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF	Y	XF	ZF		
1	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	7/16	1/4	—	—	5/8	—	1 15/16	4 1/2	4 7/8		
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	—	—	5/8	—	1 15/16	4 1/2	4 7/8		
1 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 15/16	4 5/8	5		
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	1/2	—	—	1	—	2 5/16	5	5 3/8		
2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 15/16	4 5/8	5		
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	—	2 9/16	5 1/4	5 5/8		
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	—	1/4	3/8	—	1 3/8	2 5/16	5	5 3/8		
2 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 15/16	4 3/4	5 1/8		
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	3/4	—	—	1 1/2	—	2 13/16	5 5/8	6		
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	—	1/4	3/8	—	1 3/8	2 5/16	5 1/8	5 1/2		
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	—	2 9/16	5 3/8	5 3/4		
3 1/4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	—	1/4	3/8	—	1 3/8	2 7/16	5 5/8	6 1/4		
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	—	1/4	9/16	—	2	3 1/16	6 1/4	6 7/8		
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	2 11/16	5 7/8	6 1/2		
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 15/16	6 1/8	6 3/4		
4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	—	1/4	3/8	—	1 3/8	2 7/16	5 5/8	6 1/4		
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	1 1/16	—	2 1/4	3 5/16	6 1/2	7 1/8		
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	2 11/16	5 7/8	6 1/2		
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 15/16	6 1/8	6 3/4		
5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	—	1/4	9/16	—	2	3 1/16	6 1/4	6 7/8		
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	1 1/16	—	2 1/4	3 5/16	6 3/4	7 3/8		
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	5/8	—	—	1 5/8	—	3 5/16	6 3/4	7 3/8		
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	7/16	—	1 5/8	2 13/16	6 5/8	7 3/8		
	4	3 3/4-12	3-12	4	4.749	1	3 3/8	3 7/8	1/2	—	—	1 1/2	—	3 7/16	7 1/4	8		
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	3 1/16	6 7/8	7 5/8		
6	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	—	1/4	9/16	—	2	3 1/16	7	7 3/4		
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	1 1/16	—	2 1/4	3 7/16	7 1/4	8		
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	1/2	—	—	1 1/2	—	3 7/16	7 1/4	8		
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 3/8	1/2	—	—	1 1/2	—	3 7/16	7 1/4	8		

**Head Square Flange Mount
Style MF5
1" - 6" Bore****Removable Cartridge**

Before determining dimensions: See chart on page 5 for cylinder rod combinations that have removable cartridges.

**Cap Square Flange Mount
Style MF6
1" - 1 1/2" - 2" - 2 1/2" - 5" and 6" Bore
With Maximum Oversize Rods****Tie Rod Retained Cartridge****Cap Square Flange Mount
Style MF6
1 1/2" - 6" Bore****Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2
Small Male****Thread Style 3
Short Female****Thread Style 4
Intermediate Male****"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	FB	G	J	K	R	TF	UF	Add Stroke		
											LB	LG	P
1*	■	1/4	3/8	1/4	1 1/2	1	3/16	1.08	2	2 1/2	3 7/8	—	2 1/8
1 1/2	2	3/8†	3/8	5/16	1 1/2	1	1/4	1.43	2 3/4	3 3/8	4	3 5/8	2 1/4
2	2 1/2	3/8†	3/8	3/8	1 1/2	1	5/16	1.84	3 3/8	4 1/8	4	3 5/8	2 1/4
2 1/2	3	3/8†	3/8	3/8	1 1/2	1	5/16	2.19	3 7/8	4 5/8	4 1/8	3 3/4	2 3/8
3 1/4	3 3/4	1/2	5/8	7/16	1 3/4	1 1/4	3/8	2.76	4 11/16	5 1/2	4 7/8	4 1/4	2 5/8
4	4 1/2	1/2	5/8	7/16	1 3/4	1 1/4	3/8	3.32	5 7/16	6 1/4	4 7/8	4 1/4	2 5/8
5	5 1/2	1/2	5/8	9/16	1 3/4	1 1/4	7/16	4.10	6 5/8	7 5/8	5 1/8	4 1/2	2 7/8
6	6 1/2	3/4	3/4	9/16	2	1 1/2	7/16	4.88	7 5/8	8 5/8	5 3/4	5	3 1/8

* Cushion not available on 1" bore.

† On 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

■ 1" bore head is 1 3/4" x 1 1/2". See page 12, Section A.

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

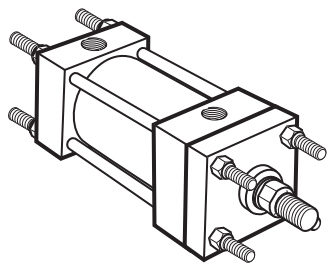
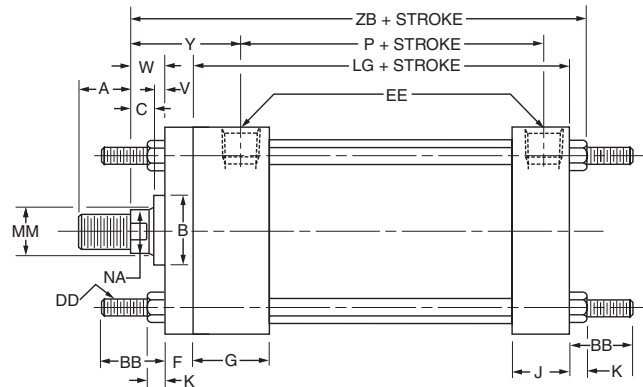
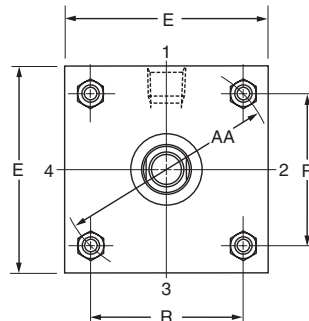
Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size											Add Stroke	
		Style 4 CC	Style 2 & 3 KK	A	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF	Y	ZB	ZF
1	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	7/16	1/4	—	—	5/8	—	1 15/16	4 11/16	4 7/8
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	—	—	5/8	—	1 15/16	4 11/16	4 7/8
1 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4**	1/4	3/16	1/4	1	1 15/16	4 7/8	5
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	1/2	—	—	1	—	2 5/16	5 1/4	5 3/8
2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4**	1/4	3/16	5/8	1	1 15/16	4 15/16	5
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	—	2 9/16	5 9/16	5 5/8
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	1 1/2**	1/4	3/8	1	1 3/8	2 5/16	5 5/16	5 3/8
2 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4**	1/4	3/16	5/8	1	1 15/16	5 1/16	5 1/8
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	3/4	—	—	1 1/2	—	2 13/16	5 15/16	6
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	1 1/2**	1/4	3/8	1	1 3/8	2 5/16	5 7/16	5 1/2
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	—	2 9/16	5 11/16	5 3/4
3 1/4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	1/4**	1/4	3/8	3/4	1 3/8	2 7/16	6	6 1/4
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	1/2**	1/4	9/16	1 3/8	2	3 1/16	6 5/8	6 7/8
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	3/8**	1/4	1/2	1	1 5/8	2 11/16	6 1/4	6 1/2
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	1/2**	1/4	9/16	1 1/4	1 7/8	2 15/16	6 1/2	6 3/4
4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	1/4**	1/4	3/8	3/4	1 3/8	2 7/16	6	6 1/4
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	5/8**	1/4	1 1/16	1 5/8	2 1/4	3 5/16	6 7/8	7 1/8
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	3/8**	1/4	1/2	1	1 5/8	2 11/16	6 1/4	6 1/2
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	1/2**	1/4	9/16	1 1/4	1 7/8	2 15/16	6 1/2	6 3/4
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	1/2**	1/4	9/16	1 3/8	2	3 1/16	6 5/8	6 7/8
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	1/4**	1/4	3/8	3/4	1 3/8	2 7/16	6 5/16	6 1/2
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 3/8	5/8	—	—	1 5/8	—	3 5/16	7 3/16	7 3/8
5	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	3/8**	1/4	1/2	1	1 5/8	2 11/16	6 9/16	6 3/4
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	1/2**	1/4	9/16	1 1/4	1 7/8	2 15/16	6 13/16	7
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	1/2**	1/4	9/16	1 3/8	2	3 1/16	6 15/16	7 1/8
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	5/8**	1/4	1 1/16	1 5/8	2 1/4	3 5/16	7 3/16	7 3/8
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	5/8	—	—	1 5/8	—	3 5/16	7 3/16	7 3/8
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	1/4	1/4	7/16	7/8	1 5/8	2 13/16	7 1/16	7 3/8
	4	3 3/4-12	3-12	4	4.749	1	3 3/8	3 7/8	3/8	—	—	1 1/2	—	3 7/16	7 11/16	8
6	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	3/8**	1/4	9/16	1 1/8	1 7/8	3 1/16	7 5/16	7 5/8
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	1/2**	1/4	9/16	1 1/4	2	3 3/16	7 7/16	7 3/4
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	1/2**	1/4	1 1/16	1 1/2	2 1/4	3 7/16	7 11/16	8
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	1/2	—	—	1 1/2	—	3 7/16	7 11/16	8
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 3/8	1/2	—	—	1 1/2	—	3 7/16	7 11/16	8

** For all MF5 mounts and MF6 mounts with maximum oversized rods.

Tie Rods Extended Mount**Style MX1**

1" - 1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods

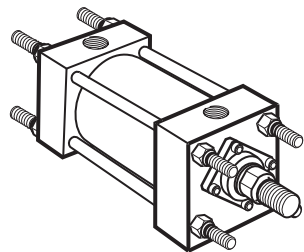
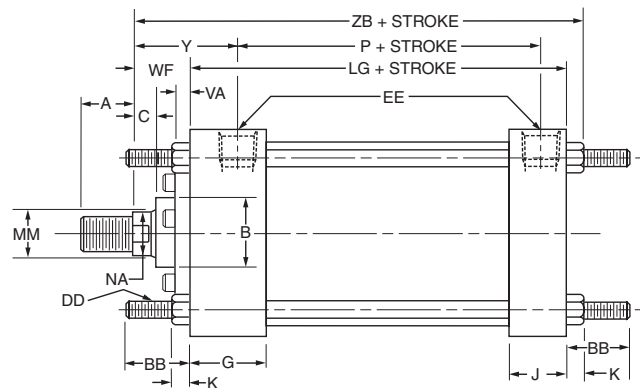
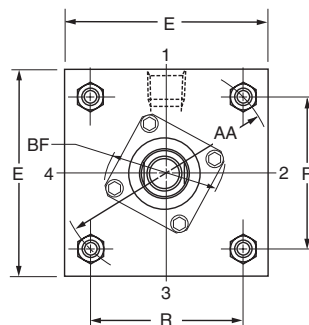
**Tie Rod Retained
Cartridge**

Tie Rods can be extended: Both Ends — Model MX1; Cap End — Model MX2; Head End — Model MX3.

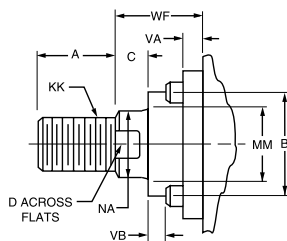
Before determining dimensions: See chart on page 5 for cylinder rod combinations that have removable cartridges.

Tie Rods Extended Mount**Style MX1**

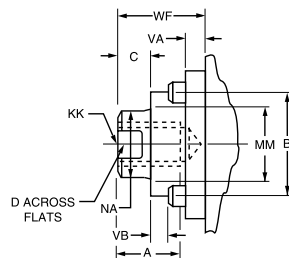
1 1/2" - 6" Bore

**Removable
Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

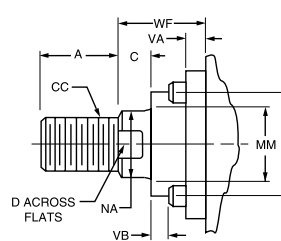
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special"
Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	AA	BB	DD	E	EE NPTF	F	G	J	K	R	Add Stroke	
											LG	P
1*	1.53	$\frac{3}{4}$	10-24	■	$\frac{1}{4}$	$\frac{3}{8}$	$1\frac{1}{2}$	1	$\frac{3}{16}$	1.08	$3\frac{1}{2}$	$2\frac{1}{8}$
$1\frac{1}{2}$	2.02	1	$\frac{1}{4}$ -28	2	$\frac{3}{8}$ †	$\frac{3}{8}$	$1\frac{1}{2}$	1	$\frac{1}{4}$	1.43	$3\frac{5}{8}$	$2\frac{1}{4}$
2	2.6	$1\frac{1}{8}$	$\frac{5}{16}$ -24	$2\frac{1}{2}$	$\frac{3}{8}$ †	$\frac{3}{8}$	$1\frac{1}{2}$	1	$\frac{5}{16}$	1.84	$3\frac{5}{8}$	$2\frac{1}{4}$
$2\frac{1}{2}$	3.1	$1\frac{1}{8}$	$\frac{5}{16}$ -24	3	$\frac{3}{8}$ †	$\frac{3}{8}$	$1\frac{1}{2}$	1	$\frac{5}{16}$	2.19	$3\frac{3}{4}$	$2\frac{3}{8}$
$3\frac{1}{4}$	3.9	$1\frac{3}{8}$	$\frac{3}{8}$ -24	$3\frac{3}{4}$	$\frac{1}{2}$	—	$1\frac{3}{4}$	$1\frac{1}{4}$	$\frac{3}{8}$	2.76	$4\frac{1}{4}$	$2\frac{5}{8}$
4	4.7	$1\frac{3}{8}$	$\frac{3}{8}$ -24	$4\frac{1}{2}$	$\frac{1}{2}$	—	$1\frac{3}{4}$	$1\frac{1}{4}$	$\frac{3}{8}$	3.32	$4\frac{1}{4}$	$2\frac{5}{8}$
5	5.8	$1\frac{13}{16}$	$\frac{1}{2}$ -20	$5\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$\frac{7}{16}$	4.10	$4\frac{1}{2}$	$2\frac{7}{8}$
6	6.9	$1\frac{13}{16}$	$\frac{1}{2}$ -20	$6\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	2	$1\frac{1}{2}$	$\frac{7}{16}$	4.88	5	$3\frac{1}{8}$

* Cushion not available on 1" bore.

† On $1\frac{1}{2}$ ", 2" and $2\frac{1}{2}$ " bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.■ 1" bore head is $1\frac{3}{4}$ " x $1\frac{1}{2}$ ". See page 12, Section A.

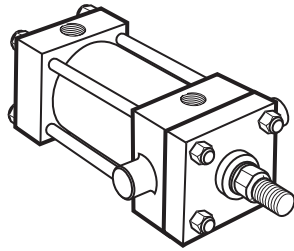
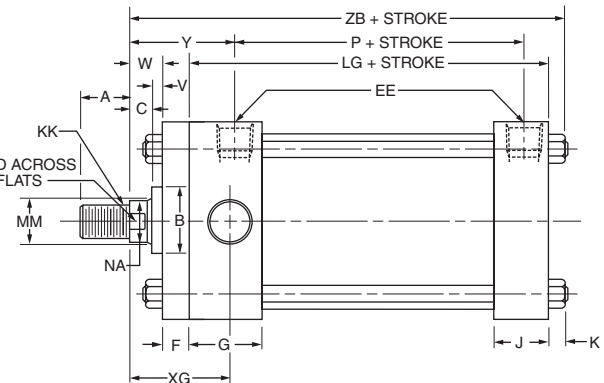
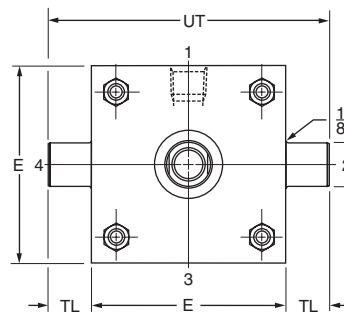
Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size													Add Stroke
		Style 4 CC	Style 2 & 3 KK	A	+.000 -.002 B	BF	C	D	NA	V	VA	VB	W	WF	Y		
																ZB	
1	1/2	7/16-20	5/16-24	5/8	.999	—	3/8	3/8	7/16	1/4	—	—	5/8	—	1 ¹⁵ /16	4 ¹¹ /16	
	5/8	1/2-20	7/16-20	3/4	1.124	—	3/8	1/2	9/16	1/4	—	—	5/8	—	1 ¹⁵ /16	4 ¹¹ /16	
1 1/2	5/8	1/2-20	7/16-20	3/4	1.124	1.968	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ /16	4 ⁷ /8	
	1	7/8-14	3/4-16	1 1/8	1.499	—	1/2	7/8	15/16	1/2	—	—	1	—	2 ⁵ /16	5 1/4	
2	5/8	1/2-20	7/16-20	3/4	1.124	1.968	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ /16	4 ¹⁵ /16	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	—	5/8	1 1/8	1 ⁵ /16	5/8	—	—	1 1/4	—	2 ⁹ /16	5 ⁹ /16	
	1	7/8-14	3/4-16	1 1/8	1.499	2.468	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 ⁵ /16	5 ⁵ /16	
	5/8	1/2-20	7/16-20	3/4	1.124	1.968	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ /16	5 1/16	
2 1/2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	—	3/4	1 1/2	1 ¹¹ /16	3/4	—	—	1 1/2	—	2 ¹³ /16	5 ¹⁵ /16	
	1	7/8-14	3/4-16	1 1/8	1.499	2.468	1/2	7/8	1 ⁵ /16	—	1/4	3/8	—	1 3/8	2 ⁵ /16	5 ⁷ /16	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	—	5/8	1 1/8	1 ⁵ /16	5/8	—	—	1 1/4	—	2 ⁹ /16	5 ¹¹ /16	
	1	7/8-14	3/4-16	1 1/8	1.499	2.468	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 ⁷ /16	6	
3 1/4	2	1 3/4-12	1 1/2-12	2 1/4	2.624	3.735	7/8	1 ¹¹ /16	1 ¹⁵ /16	—	1/4	9/16	—	2	3 1/16	6 ⁵ /8	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	2.968	5/8	1 1/8	1 ⁵ /16	—	1/4	1/2	—	1 5/8	2 ¹¹ /16	6 1/4	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3.735	3/4	1 1/2	1 ¹¹ /16	—	1/4	9/16	—	1 ⁷ /8	2 ¹⁵ /16	6 1/2	
	1	7/8-14	3/4-16	1 1/8	1.499	2.468	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 ⁷ /16	6	
4	2 1/2	2 1/4-12	1 ⁷ /8-12	3	3.124	4.312	1	2 ¹ /16	2 ³ /8	—	1/4	1 ¹¹ /16	—	2 1/4	3 ⁵ /16	6 ⁷ /8	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	2.968	5/8	1 1/8	1 ⁵ /16	—	1/4	1/2	—	1 5/8	2 ¹¹ /16	6 1/4	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3.735	3/4	1 1/2	1 ¹¹ /16	—	1/4	9/16	—	1 ⁷ /8	2 ¹⁵ /16	6 1/2	
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	3.735	7/8	1 ¹¹ /16	1 ¹⁵ /16	—	1/4	9/16	—	2	3 1/16	6 ⁵ /8	
5	1	7/8-14	3/4-16	1 1/8	1.499	2.468	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 ⁷ /16	6 ⁵ /16	
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	—	1	3	3 ³ /8	5/8	—	—	1 5/8	—	3 ⁵ /16	7 ³ /16	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	2.968	5/8	1 1/8	1 ⁵ /16	—	1/4	1/2	—	1 5/8	2 ¹¹ /16	6 ⁹ /16	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3.735	3/4	1 1/2	1 ¹¹ /16	—	1/4	9/16	—	1 ⁷ /8	2 ¹⁵ /16	6 ¹³ /16	
5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	3.735	7/8	1 ¹¹ /16	1 ¹⁵ /16	—	1/4	9/16	—	2	3 1/16	6 ¹⁵ /16	
	2 1/2	2 1/4-12	1 ⁷ /8-12	3	3.124	5.000	1	2 ¹ /16	2 ³ /8	—	1/4	1 ¹¹ /16	—	2 1/4	3 ⁵ /16	7 ³ /16	
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	—	1	2 ⁵ /8	2 ⁷ /8	5/8	—	—	1 5/8	—	3 ⁵ /16	7 ³ /16	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	2.968	5/8	1 1/8	1 ⁵ /16	—	1/4	7/16	—	1 5/8	2 ¹³ /16	7 1/16	
6	4	3 3/4-12	3-12	4	4.749	—	1	3 ³ /8	3 ⁷ /8	1/2	—	—	1 1/2	—	3 ⁷ /16	7 ¹¹ /16	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3.625	3/4	1 1/2	1 ¹¹ /16	—	1/4	9/16	—	1 ⁷ /8	3 1/16	7 ⁵ /16	
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	3.735	7/8	1 ¹¹ /16	1 ¹⁵ /16	—	1/4	9/16	—	2	3 ³ /16	7 ⁷ /16	
	2 1/2	2 1/4-12	1 ⁷ /8-12	3	3.124	4.312	1	2 ¹ /16	2 ³ /8	—	1/4	1 ¹¹ /16	—	2 1/4	3 ⁷ /16	7 ¹¹ /16	
6	3	2 3/4-12	2 1/4-12	3 1/2	3.749	—	1	2 ⁵ /8	2 ⁷ /8	1/2	—	—	1 1/2	—	3 ⁷ /16	7 ¹¹ /16	
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	—	1	3	3 ³ /8	1/2	—	—	1 1/2	—	3 ⁷ /16	7 ¹¹ /16	

Head Trunnion Mount**Style MT1**

1" - 1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

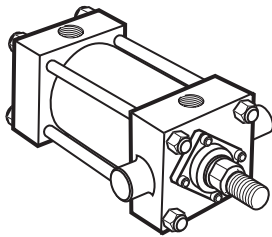
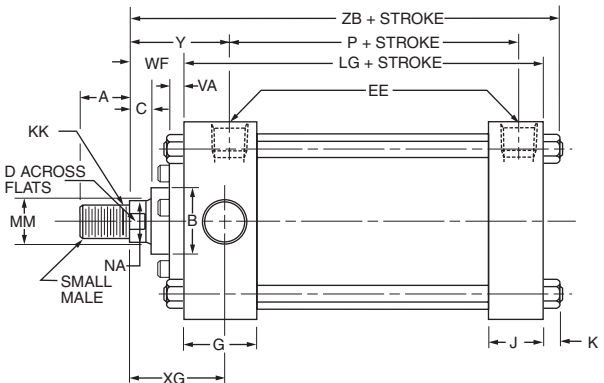
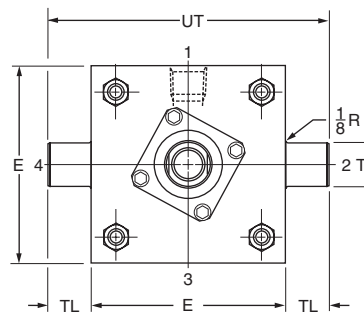
With Maximum Oversize Rods

**Tie Rod Retained Cartridge**

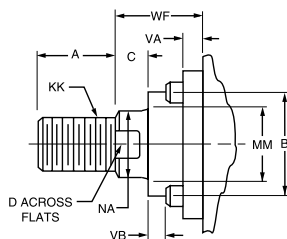
Before determining dimensions: See chart on page 5 for cylinder rod combinations that have removable cartridges.

Head Trunnion Mount**Style MT1**

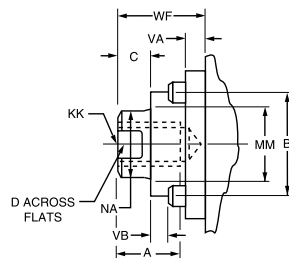
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

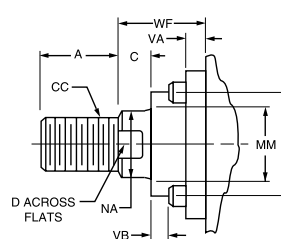
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	G	J	K	+.000 TD -.001	TL	UT	Add Stroke	
										LG	P
1*	■	1/4	3/8	1 1/2	1	3/16	.750	3/4	3	3 1/2	2 1/8
1 1/2	2	3/8†	3/8	1 1/2	1	1/4	1.000	1	4	3 5/8	2 1/4
2	2 1/2	3/8†	3/8	1 1/2	1	5/16	1.000	1	4 1/2	3 5/8	2 1/4
2 1/2	3	3/8†	3/8	1 1/2	1	5/16	1.000	1	5	3 3/4	2 3/8
3 1/4	3 3/4	1/2	—	1 3/4	1 1/4	3/8	1.000	1	5 3/4	4 1/4	2 5/8
4	4 1/2	1/2	—	1 3/4	1 1/4	3/8	1.000	1	6 1/2	4 1/4	2 5/8
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	1.000	1	7 1/2	4 1/2	2 7/8
6	6 1/2	3/4	3/4	2	1 1/2	7/16	1.375	1 3/8	9 1/4	5	3 1/8

* Cushion not available on 1" bore.

† On 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

■ 1" bore head is 1 3/4" x 1 1/2". See page 12, Section A.

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

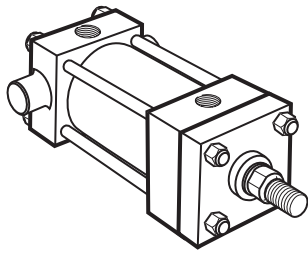
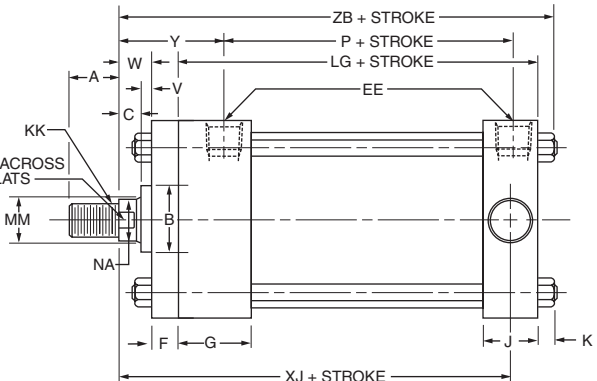
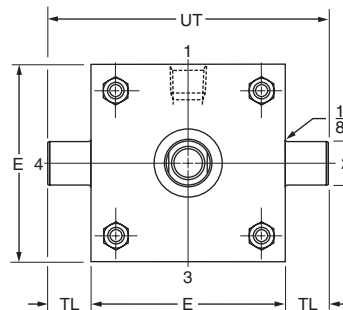
Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size													Add Stroke
		Style 4 CC	Style 2 & 3 KK	A	+.000 -.002 B	C	D	NA	V	VA	VB	W	WF	XG	Y	ZB	
1	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	7/16	1/4	—	—	5/8	—	1 3/4	1 15/16	4 11/16	
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	—	—	5/8	—	1 3/4	1 15/16	4 11/16	
1 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 3/4	1 15/16	4 7/8	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	1/2	—	—	1	—	2 1/8	2 5/16	5 1/4	
2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 3/4	1 15/16	4 15/16	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	—	2 3/8	2 9/16	5 9/16	
2 1/2	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	—	1/4	3/8	—	1 3/8	2 1/8	2 5/16	5 5/16	
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 3/4	1 15/16	5 1/16	
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	3/4	—	—	1 1/2	—	2 5/8	2 13/16	5 15/16	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	—	1/4	3/8	—	1 3/8	2 1/8	2 5/16	5 7/16	
3 1/4	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	—	2 3/8	2 9/16	5 11/16	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	—	1/4	3/8	—	1 3/8	2 1/4	2 7/16	6	
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	—	1/4	9/16	—	2	2 7/8	3 1/16	6 5/8	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	2 1/2	2 11/16	6 1/4	
4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 3/4	2 15/16	6 1/2	
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 5/16	—	1/4	3/8	—	1 3/8	2 1/4	2 7/16	6	
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	1 1/16	—	2 1/4	3 1/8	3 5/16	6 7/8	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	2 1/2	2 11/16	6 1/4	
5	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 3/4	2 15/16	6 1/2	
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	—	1/4	9/16	—	2	2 7/8	3 1/16	6 15/16	
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	1 1/16	—	2 1/4	3 1/8	3 5/16	7 3/16	
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	5/8	—	—	1 5/8	—	3 1/8	3 5/16	7 3/16	
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	7/16	—	1 5/8	2 5/8	2 13/16	7 1/16	
	4	3 3/4-12	3-12	4	4.749	1	3 3/8	3 7/8	1/2	—	—	1 1/2	—	3 1/4	3 7/16	7 11/16	
6	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 7/8	3 1/16	7 5/16	
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 5/16	—	1/4	9/16	—	2	3	3 3/16	7 7/16	
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	1 1/16	—	2 1/4	3 1/4	3 7/16	7 11/16	
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	1/2	—	—	1 1/2	—	3 1/4	3 7/16	7 11/16	
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 3/8	1/2	—	—	1 1/2	—	3 1/4	3 7/16	7 11/16	

Cap Trunnion Mount

Style MT2

1" - 1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods

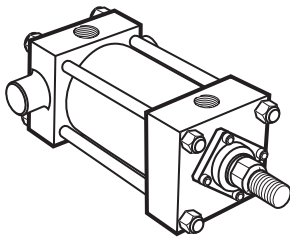
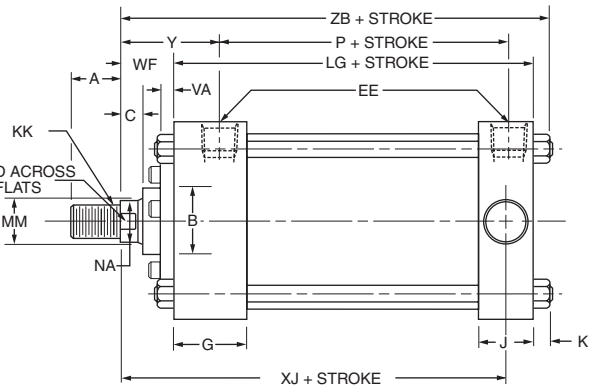
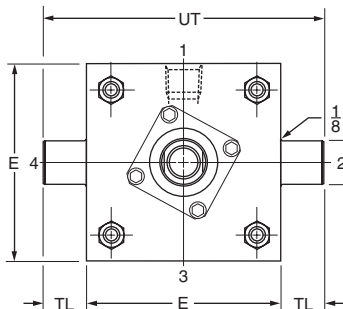
**Tie Rod Retained
Cartridge**

Before determining dimensions: See chart on page 5 for cylinder rod combinations that have removable cartridges.

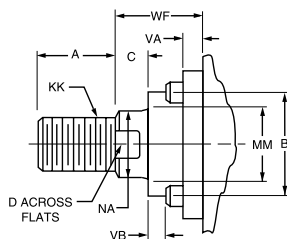
Cap Trunnion Mount

Style MT2

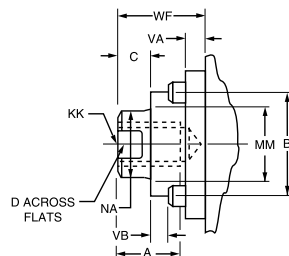
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

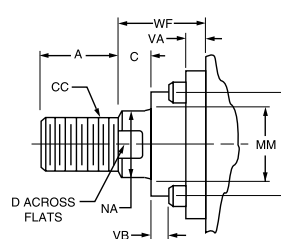
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special"
Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	G	J	K	+.000 TD -.001	TL	UT	Add Stroke	
										LG	P
1*	■	1/4	3/8	1 1/2	1	3/16	.750	3/4	3	3 1/2	2 1/8
1 1/2	2	3/8†	3/8	1 1/2	1	1/4	1.000	1	4	3 5/8	2 1/4
2	2 1/2	3/8†	3/8	1 1/2	1	5/16	1.000	1	4 1/2	3 5/8	2 1/4
2 1/2	3	3/8†	3/8	1 1/2	1	5/16	1.000	1	5	3 3/4	2 3/8
3 1/4	3 3/4	1/2	—	1 3/4	1 1/4	3/8	1.000	1	5 3/4	4 1/4	2 5/8
4	4 1/2	1/2	—	1 3/4	1 1/4	3/8	1.000	1	6 1/2	4 1/4	2 5/8
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	1.000	1	7 1/2	4 1/2	2 7/8
6	6 1/2	3/4	3/4	2	1 1/2	7/16	1.375	1 3/8	9 1/4	5	3 1/8

* Cushion not available on 1" bore.

† On 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

■ 1" bore head is 1 3/4" x 1 1/2". See page 12, Section A.

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

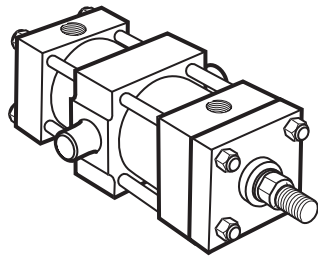
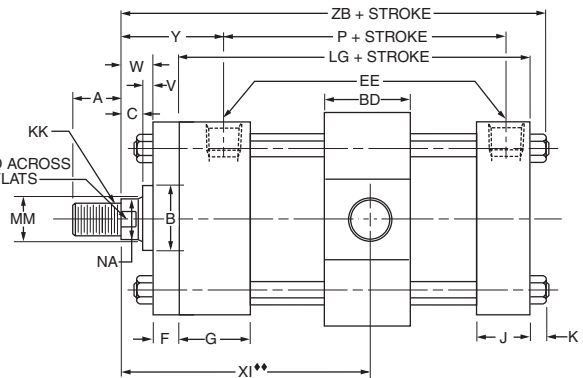
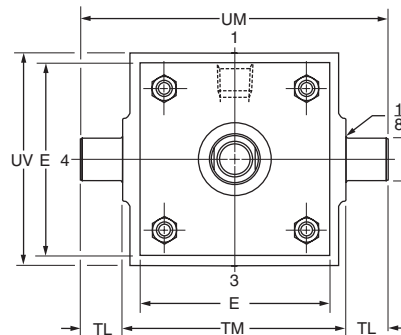
Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size												
		Style 4 CC	Style 2 & 3 KK	A	+.000 -.002 B	C	D	NA	V	VA	VB	W	WF	Y	Add Stroke	
															XJ	ZB
1	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	7/16	1/4	—	—	5/8	—	1 ¹⁵ /16	4	4 ¹¹ /16
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	—	—	5/8	—	1 ¹⁵ /16	4	4 ¹¹ /16
1 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ /16	4 ¹ /8	4 ⁷ /8
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	1/2	—	—	1	—	2 ⁵ /16	4 ¹ /2	5 ¹ /4
2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ /16	4 ¹ /8	4 ¹⁵ /16
	1 3/8	1 1/4-12	1-14	1 ⁵ /8	1.999	5/8	1 1/8	1 ⁵ /16	5/8	—	—	1 1/4	—	2 ⁹ /16	4 ³ /4	5 ⁹ /16
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	—	1/4	3/8	—	1 3/8	2 ⁵ /16	4 ¹ /2	5 ⁵ /16
2 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ /16	4 ¹ /4	5 ¹ /16
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ /16	3/4	—	—	1 1/2	—	2 ¹³ /16	5 ¹ /8	5 ¹⁵ /16
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	—	1/4	3/8	—	1 3/8	2 ⁵ /16	4 ⁵ /8	5 ⁷ /16
	1 3/8	1 1/4-12	1-14	1 ⁵ /8	1.999	5/8	1 1/8	1 ⁵ /16	5/8	—	—	1 1/4	1 ⁵ /8	2 ⁹ /16	4 ⁷ /8	5 ¹¹ /16
	3 1/4	2 1/4-12	2 1/8-12	3	3.124	1	2 1/16	2 ³ /8	—	1/4	1 ¹ /16	—	2 1/4	3 ⁵ /16	6 ¹ /8	7 ³ /16
3 1/4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	—	1/4	3/8	—	1 3/8	2 ⁷ /16	5	6
	2	1 ³ /4-12	1 1/2-12	2 1/4	2.624	7/8	1 ¹¹ /16	1 ¹⁵ /16	—	1/4	9/16	—	2	3 ¹ /16	5 ⁵ /8	6 ⁵ /8
	1 3/8	1 1/4-12	1-14	1 ⁵ /8	1.999	5/8	1 1/8	1 ⁵ /16	—	1/4	1/2	—	1 ⁵ /8	2 ¹¹ /16	5 ¹ /4	6 ¹ /4
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ /16	—	1/4	9/16	—	1 ⁷ /8	2 ¹⁵ /16	5 ¹ /2	6 ¹ /2
4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	—	1/4	3/8	—	1 3/8	2 ⁷ /16	5	6
	2 1/2	2 1/4-12	1 ⁷ /8-12	3	3.124	1	2 ¹ /16	2 ³ /8	—	1/4	1 ¹ /16	—	2 ¹ /4	3 ⁵ /16	5 ⁷ /8	6 ⁷ /8
	1 3/8	1 1/4-12	1-14	1 ⁵ /8	1.999	5/8	1 1/8	1 ⁵ /16	—	1/4	1/2	—	1 ⁵ /8	2 ¹¹ /16	5 ¹ /4	6 ¹ /4
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ /16	—	1/4	9/16	—	1 ⁷ /8	2 ¹⁵ /16	5 ¹ /2	6 ¹ /2
	2	1 ³ /4-12	1 1/2-12	2 1/4	2.624	7/8	1 ¹¹ /16	1 ¹⁵ /16	—	1/4	9/16	—	2	3 ¹ /16	5 ⁵ /8	6 ⁵ /8
5	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 ⁵ /16	—	1/4	3/8	—	1 3/8	2 ⁷ /16	5 ¹ /4	6 ⁵ /16
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 ³ /8	5/8	—	—	1 ⁵ /8	—	3 ⁵ /16	6 ¹ /8	7 ³ /16
	1 3/8	1 1/4-12	1-14	1 ⁵ /8	1.999	5/8	1 1/8	1 ⁵ /16	—	1/4	1/2	—	1 ⁵ /8	2 ¹¹ /16	5 ¹ /2	6 ³ /16
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ /16	—	1/4	9/16	—	1 ⁷ /8	2 ¹⁵ /16	5 ³ /4	6 ¹³ /16
	2	1 ³ /4-12	1 1/2-12	2 1/4	2.624	7/8	1 ¹¹ /16	1 ¹⁵ /16	—	1/4	9/16	—	2	3 ¹ /16	5 ⁷ /8	6 ¹⁵ /16
	2 1/2	2 1/4-12	1 ⁷ /8-12	3	3.124	1	2 ¹ /16	2 ³ /8	—	1/4	1 ¹ /16	—	2 ¹ /4	3 ⁵ /16	6 ¹ /8	7 ³ /16
	3	2 ³ /4-12	2 1/4-12	3 1/2	3.749	1	2 ⁵ /8	2 ⁷ /8	5/8	—	—	1 ⁵ /8	—	3 ⁵ /16	6 ¹ /8	7 ³ /16
6	1 3/8	1 1/4-12	1-14	1 ⁵ /8	1.999	5/8	1 1/8	1 ⁵ /16	—	1/4	7/16	—	1 ⁵ /8	2 ¹³ /16	5 ⁷ /8	7 ¹ /16
	4	3 ³ /4-12	3-12	4	4.749	1	3 ³ /8	3 ⁷ /8	1/2	—	—	1 1/2	—	3 ⁷ /16	6 ¹ /2	7 ¹¹ /16
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 ¹¹ /16	—	1/4	9/16	—	1 ⁷ /8	3 ¹ /16	6 ¹ /8	7 ⁵ /16
	2	1 ³ /4-12	1 1/2-12	2 1/4	2.624	7/8	1 ¹¹ /16	1 ¹⁵ /16	—	1/4	9/16	—	2	3 ³ /16	6 ¹ /4	7 ⁷ /16
	2 1/2	2 1/4-12	1 ⁷ /8-12	3	3.124	1	2 ¹ /16	2 ³ /8	—	1/4	1 ¹ /16	—	2 ¹ /4	3 ⁷ /16	6 ¹ /2	7 ¹¹ /16
	3	2 ³ /4-12	2 1/4-12	3 1/2	3.749	1	2 ⁵ /8	2 ⁷ /8	1/2	—	—	1 1/2	—	3 ⁷ /16	6 ¹ /2	7 ¹¹ /16
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 ³ /8	1/2	—	—	1 1/2	—	3 ⁷ /16	6 ¹ /2	7 ¹¹ /16

Intermediate Fixed Trunnion Mount

Style MT4

1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods

**Tie Rod Retained Cartridge**

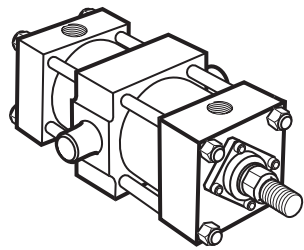
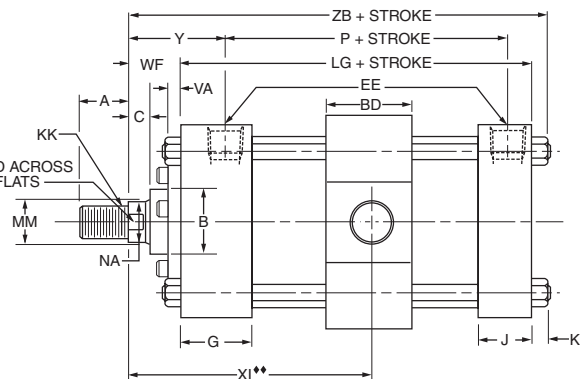
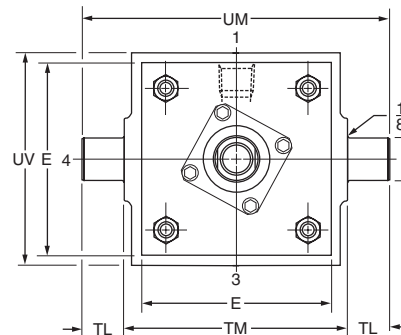
♦♦Dimension XI to be specified by customer.

Before determining dimensions: See chart on page 5 for cylinder rod combinations that have removable cartridges.

Intermediate Fixed Trunnion Mount

Style MT4

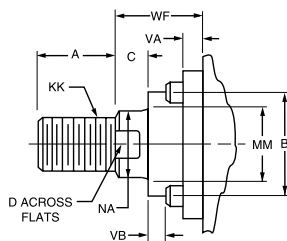
1 1/2" - 6" Bore

**Removable Cartridge**

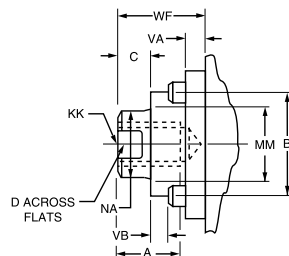
♦♦Dimension XI to be specified by customer.

Rod End Dimensions — see table 2**Thread Style 2**

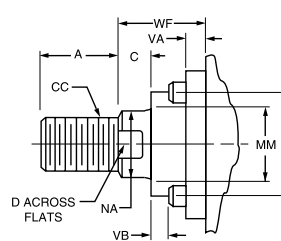
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	BD	E	EE NPTF	F	G	J	K	+0.000 TD -0.001	TL	TM	UM	UV	Minimum Stroke	Add Stroke	
														LG	P
1½	1¼	2	¾†	¾	1½	1	¼	1.000	1	2½	4½	2½	¼	3⅝	2¼
2	1½	2½	¾†	¾	1½	1	⅝	1.000	1	3	5	3	½	3⅝	2¼
2½	1½	3	¾†	¾	1½	1	⅝	1.000	1	3½	5½	3½	¾	3¾	2⅜
3¼	2	3¾	½	⅝	1¾	1¼	¾	1.000	1	4½	6½	4¼	⅞	4¼	2⅝
4	2	4½	½	—	1¾	1¼	¾	1.000	1	5¼	7¼	5	⅞	4¼	2⅝
5	2	5½	½	—	1¾	1¼	⅞	1.000	1	6¼	8¼	6	⅝	4½	2⅞
6	2½	6½	¾	¾	2	1½	⅞	1.375	1¾	7⅝	10⅝	7	1⅞	5	3⅞

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size													Min.♦♦ XI	Y	Add Stroke ZB
		Style 4 CC	Style 2 & 3 KK	A	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF						
1½	⅝	1/2-20	7/16-20	¾	1.124	¾	1/2	9/16	—	¼	¾	—	1	3¾	1⅝	47/8			
	1	7/8-14	¾-16	1⅞	1.499	1/2	7/8	1⅝	1/2	—	—	1	—	39/16	2⅝	5¼			
2	⅝	1/2-20	7/16-20	¾	1.124	¾	1/2	9/16	—	¼	¾	—	1	3⅝	1⅝	4⅝			
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅞	1⅝	⅝	—	—	1¼	—	3⅝	29/16	59/16			
	1	7/8-14	¾-16	1⅞	1.499	1/2	7/8	1⅝	—	¼	¾	—	1⅜	3⅞	2⅝	5⅝			
2½	⅝	1/2-20	7/16-20	¾	1.124	¾	1/2	9/16	—	¼	¾	—	1	3⅝	1⅝	5⅞			
	1¾	1½-12	1¼-12	2	2.374	¾	1½	1⅞	¾	—	—	1½	—	4¾	2⅜	5⅝			
	1	7/8-14	¾-16	1⅞	1.499	1/2	7/8	1⅝	—	¼	¾	—	1⅜	3⅞	2⅝	57/16			
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅞	1⅝	⅝	—	—	1¼	—	3⅝	29/16	5⅞			
3¼	1	7/8-14	¾-16	1⅞	1.499	1/2	7/8	1⅝	—	¼	¾	—	1⅜	4¾	27/16	6			
	2	1¾-12	1½-12	2¼	2.624	7/8	1⅞	1⅝	—	¼	9/16	—	2	4⅜	3⅞	6⅝			
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅞	1⅝	—	¼	1/2	—	1⅝	47/16	2⅞	6¼			
	1¾	1½-12	1¼-12	2	2.374	¾	1½	1⅞	—	¼	9/16	—	17/8	4⅞	2⅝	6½			
4	1	7/8-14	¾-16	1⅞	1.499	1/2	7/8	1⅝	—	¼	¾	—	1⅜	4¾	27/16	6			
	2½	2¼-12	17/8-12	3	3.124	1	2⅞	2¾	—	¼	1⅞	—	2¼	5⅞	3⅝	67/8			
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅞	1⅝	—	¼	1/2	—	1⅝	47/16	2⅞	6¼			
	1¾	1½-12	1¼-12	2	2.374	¾	1½	1⅞	—	¼	9/16	—	17/8	4⅞	2⅝	6½			
	2	1¾-12	1½-12	2¼	2.624	7/8	1⅞	1⅝	—	¼	9/16	—	2	4⅜	3⅞	6⅝			
5	1	7/8-14	¾-16	1⅞	1.499	1/2	7/8	1⅝	—	¼	¾	—	1⅜	4⅝	27/16	6⅝			
	3½	3¼-12	2½-12	3½	4.249	1	3	3¾	⅝	—	—	1⅝	—	5⅞	3⅝	73/16			
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅞	1⅝	—	¼	1/2	—	1⅝	47/16	2⅞	69/16			
	1¾	1½-12	1¼-12	2	2.374	¾	1½	1⅞	—	¼	9/16	—	17/8	4⅞	2⅝	6⅝			
	2	1¾-12	1½-12	2¼	2.624	7/8	1⅞	1⅝	—	¼	9/16	—	2	4⅜	3⅞	6⅝			
	2½	2¼-12	17/8-12	3	3.124	1	2⅞	2¾	—	¼	1⅞	—	2¼	5⅞	3⅝	73/16			
6	3	2¾-12	2¼-12	3½	3.749	1	2⅝	27/8	⅝	—	—	1⅝	—	5⅞	3⅝	73/16			
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅞	1⅝	—	¼	7/16	—	1⅝	4⅝	2⅜	7⅞			
	4	3¾-12	3-12	4	4.749	1	3¾	37/8	½	—	—	1½	—	59/16	37/16	7⅞			
	1¾	1½-12	1¼-12	2	2.374	¾	1½	1⅞	—	¼	9/16	—	17/8	5¾	3⅞	7⅝			
	2	1¾-12	1½-12	2¼	2.624	7/8	1⅞	1⅝	—	¼	9/16	—	2	5⅞	3⅝	77/16			
	2½	2¼-12	17/8-12	3	3.124	1	2⅞	2¾	—	¼	1⅞	—	2¼	59/16	37/16	7⅞			
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	27/8	½	—	—	1½	—	59/16	37/16	7⅞			
	3½	3¼-12	2½-12	3½	4.249	1	3	3¾	½	—	—	1½	—	59/16	37/16	7⅞			

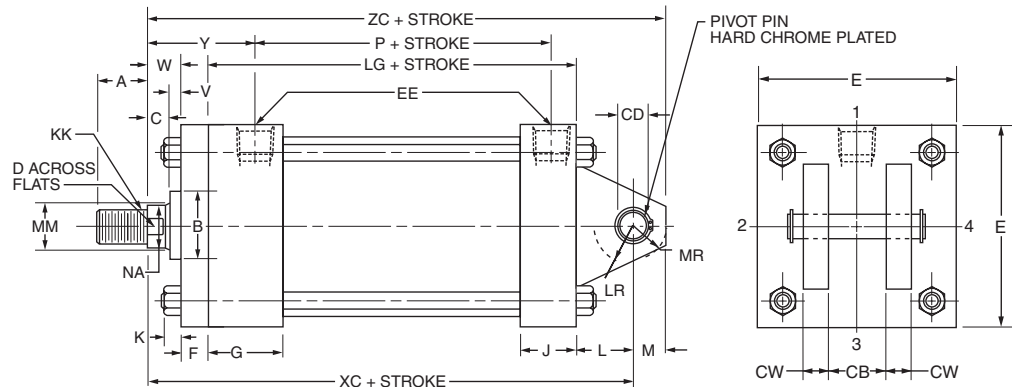
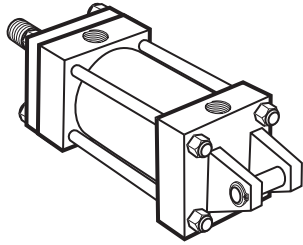
♦♦ Dimension XI to be specified by customer.

Cap Fixed Clevis Mount

Style MP1

1" - 1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods



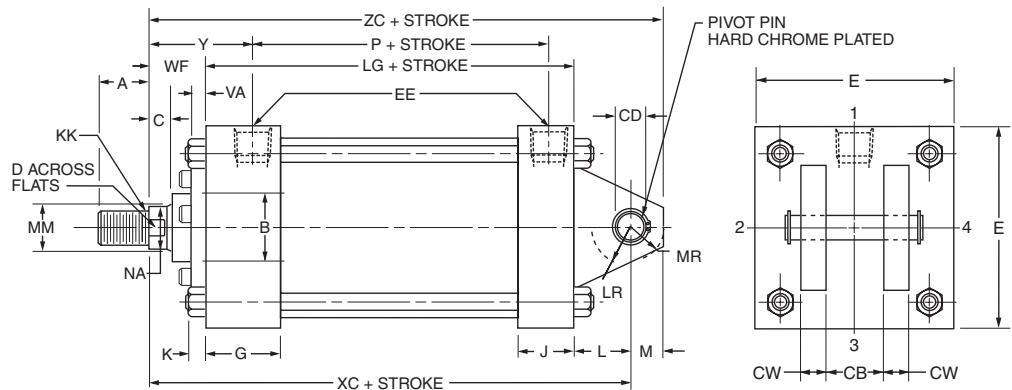
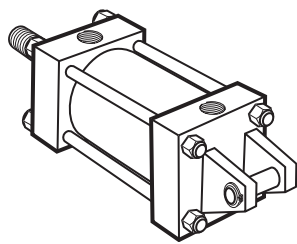
The 1", 4", 5" and 6" bore sizes have the tie rod nuts at both ends as shown. Tie rods thread into cap on all other bore sizes.

Before determining dimensions: See chart on page 5 for cylinder rod combinations that have removable cartridges.

Cap Fixed Clevis Mount

Style MP1

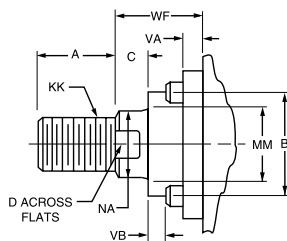
1 1/2" - 6" Bore



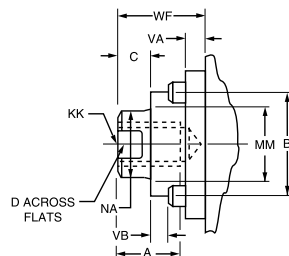
The 1", 4", 5" and 6" bore sizes have the tie rod nuts at both ends as shown. Tie rods thread into cap on all other bore sizes.

Removable Cartridge**Rod End Dimensions — see table 2****Thread Style 2**

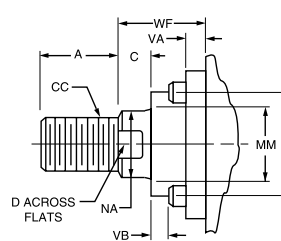
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	CB	+.000 CD• -.002	CW	E	EE NPTF	F	G	J	K	L	LR	M	MR	Add Stroke	
														LG	P
1*	**	.441**	**	■	1/4	3/8	1 1/2	1	3/16	1/2**	1/2**	7/16**	1/2**	3 1/2**	2 1/8
1 1/2	3/4	.501	1/2	2	3/8†	3/8	1 1/2	1	1/4	3/4	3/4	1/2	5/8	3 5/8	2 1/4
2	3/4	.501	1/2	2 1/2	3/8†	3/8	1 1/2	1	5/16	3/4	3/4	1/2	5/8	3 5/8	2 1/4
2 1/2	3/4	.501	1/2	3	3/8†	3/8	1 1/2	1	5/16	3/4	3/4	1/2	5/8	3 3/4	2 3/8
3 1/4	1 1/4	.751	5/8	3 3/4	1/2	—	1 3/4	1 1/4	3/8	1 1/4	1	3/4	15/16	4 1/4	2 5/8
4	1 1/4	.751	5/8	4 1/2	1/2	—	1 3/4	1 1/4	3/8	1 1/4	1	3/4	15/16	4 1/4	2 5/8
5	1 1/4	.751	5/8	5 1/2	1/2	—	1 3/4	1 1/4	3/8	1 1/4	1	3/4	15/16	4 1/2	2 7/8
6	1 1/2	1.001	3/4	6 1/2	3/4	3/4	2	1 1/2	7/16	1 1/2	1 1/4	1	1 3/16	5	3 1/8

† On 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

■ 1" bore head is 1 3/4" x 1 1/2". See page 12, Section A.

* Cushions not available on 1" bore.

** In 1" bore size model only, a single eye mounting, 7/16" thick, is used. Dimension CD (.441") is hole diameter — pin not supplied.

• Dimension CD is pin diameter except in 1" bore.

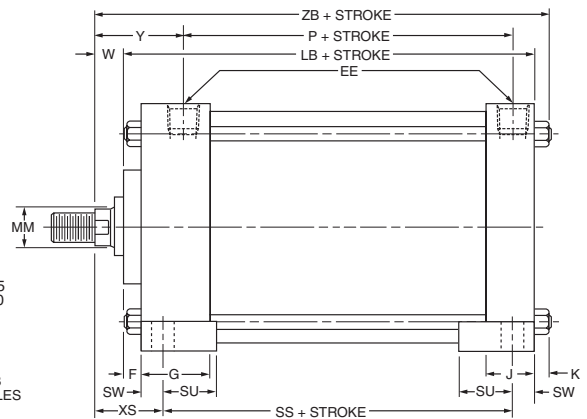
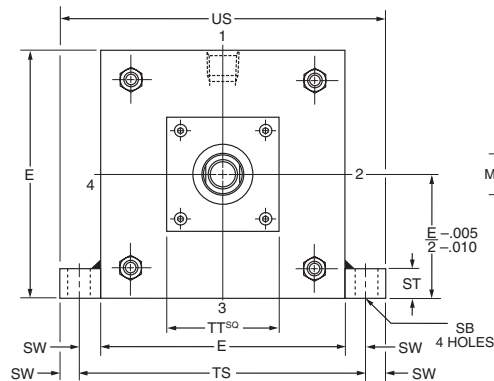
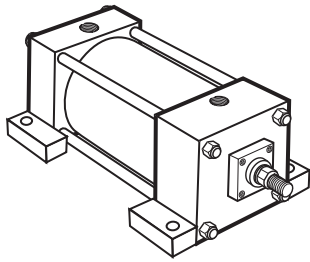
Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size												
		Style 4 CC	Style 2 & 3 KK	A	+.000 -.002 B	C	D	NA	V	VA	VB	W	WF	Y	Add Stroke	
															XC	ZC
1	1/2	7/16-20	5/16-20	5/8	.999	3/8	3/8	7/16	1/4	—	—	5/8	—	1 ¹⁵ /16	5	5 ⁷ /16
	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	1/4	—	—	5/8	—	1 ¹⁵ /16	5	5 ⁷ /16
1 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ /16	5 ³ /8	5 ⁷ /8
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	1/2	—	—	1	—	2 ⁵ /16	5 ³ /4	6 ¹ /4
2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ /16	5 ³ /8	5 ⁷ /8
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	—	2 ⁹ /16	6	6 ¹ /2
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 ⁵ /16	5 ³ /4	6 ¹ /4
2 1/2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	9/16	—	1/4	3/16	—	1	1 ¹⁵ /16	5 ¹ /2	6
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	3/4	—	—	1 1/2	—	2 ¹³ /16	6 ³ /8	6 ⁷ /8
	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 ⁵ /16	5 ⁷ /8	6 ³ /8
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	5/8	—	—	1 1/4	1 5/8	2 ⁹ /16	6 ¹ /8	6 ⁵ /8
3 1/4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 ⁷ /16	6 ⁷ /8	7 ⁵ /8
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 15/16	—	1/4	9/16	—	2	3 ¹ /16	7 ¹ /2	8 ¹ /4
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	2 ¹¹ /16	7 ¹ /8	7 ⁷ /8
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 ¹⁵ /16	7 ³ /8	8 ¹ /8
4	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 ⁷ /16	6 ⁷ /8	7 ⁵ /8
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	11/16	—	2 1/4	3 ⁵ /16	7 ³ /4	8 ¹ /2
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	2 ¹¹ /16	7 ¹ /8	7 ⁷ /8
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 ¹⁵ /16	7 ³ /8	8 ¹ /8
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 15/16	—	1/4	9/16	—	2	3 ¹ /16	7 ¹ /2	8 ¹ /4
5	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	15/16	—	1/4	3/8	—	1 3/8	2 ⁷ /16	7 ¹ /8	7 ⁷ /8
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 3/8	5/8	—	—	1 5/8	—	3 ⁵ /16	8	8 ³ /4
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	1/2	—	1 5/8	2 ¹¹ /16	7 ³ /8	8 ¹ /8
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	2 ¹⁵ /16	7 ⁵ /8	8 ³ /8
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 15/16	—	1/4	9/16	—	2	3 ¹ /16	7 ³ /4	8 ¹ /2
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	11/16	—	2 1/4	3 ⁵ /16	8	8 ³ /4
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	5/8	—	—	1 5/8	—	3 ⁵ /16	8	8 ³ /4
	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	1 5/16	—	1/4	7/16	—	1 5/8	2 ¹³ /16	8 ¹ /8	9 ¹ /8
6	4	3 3/4-12	3-12	4	4.749	1	3 3/8	3 7/8	1/2	—	—	1 1/2	—	3 ⁷ /16	8 ³ /4	9 ³ /4
	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	1 11/16	—	1/4	9/16	—	1 7/8	3 ¹ /16	8 ³ /8	9 ³ /8
	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	1 15/16	—	1/4	9/16	—	2	3 ³ /16	8 ¹ /2	9 ¹ /2
	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	2 3/8	—	1/4	11/16	—	2 1/4	3 ⁷ /16	8 ³ /4	9 ³ /4
	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	2 7/8	1/2	—	—	1 1/2	—	3 ⁷ /16	8 ³ /4	9 ³ /4
	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	3 3/8	1/2	—	—	1 1/2	—	3 ⁷ /16	8 ³ /4	9 ³ /4

Side Lug Mount

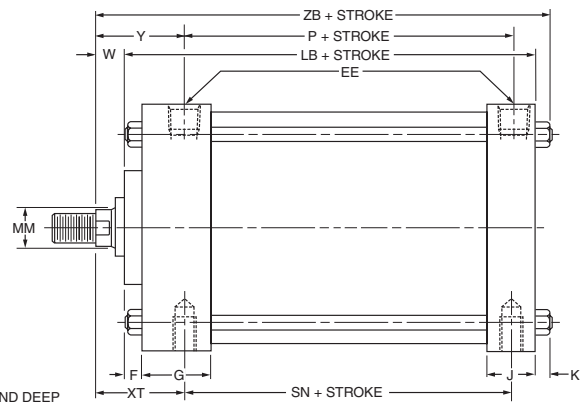
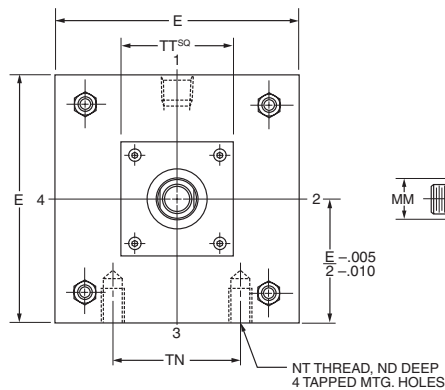
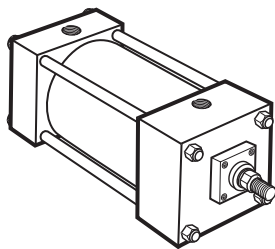
Style MS2

7" - 14" Bore

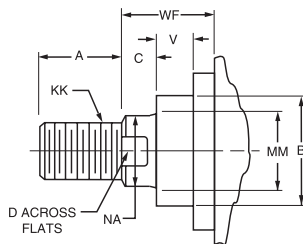
**Side Tap Mount**

Style MS4

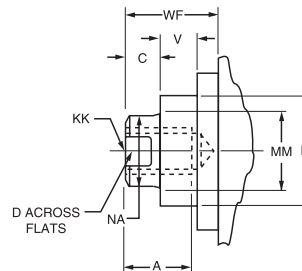
7" - 14" Bore

**Rod End Dimensions — see table 2****Thread Style 2**

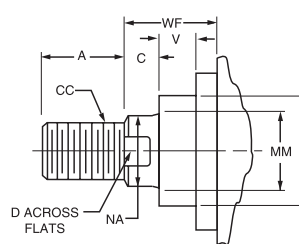
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**“Special”
Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	G	J	K	ND	NT	SB*	ST	SU	SW	TN	TS	US	Add Stroke			
																LB	P	SN	SS
7	7 ¹ / ₂	³ / ₄	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	1 ¹ / ₈	³ / ₄ -10	¹³ / ₁₆	1	1 ⁹ / ₁₆	¹¹ / ₁₆	3 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₄	5 ⁷ / ₈	3 ¹ / ₄	3 ¹ / ₄	3 ³ / ₄
8	8 ¹ / ₂	³ / ₄	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	1 ¹ / ₈	³ / ₄ -10	¹³ / ₁₆	1	1 ⁹ / ₁₆	¹¹ / ₁₆	4 ¹ / ₂	9 ⁷ / ₈	11 ¹ / ₄	5 ⁷ / ₈	3 ¹ / ₄	3 ¹ / ₄	3 ³ / ₄
10	10 ⁵ / ₈	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	1 ¹ / ₂	1-8	1 ¹ / ₁₆	1 ¹ / ₄	2	⁷ / ₈	5 ¹ / ₂	12 ³ / ₈	14 ¹ / ₈	7 ¹ / ₈	4 ¹ / ₈	4 ¹ / ₈	4 ⁵ / ₈
12	12 ³ / ₄	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	1 ¹ / ₂	1-8	1 ¹ / ₁₆	1 ¹ / ₄	2	⁷ / ₈	7 ¹ / ₄	14 ¹ / ₂	16 ¹ / ₄	7 ⁵ / ₈	4 ⁵ / ₈	4 ⁵ / ₈	5 ¹ / ₈
14	14 ³ / ₄	1 ¹ / ₄	³ / ₄	2 ³ / ₄	2 ¹ / ₄	³ / ₄	1 ⁷ / ₈	1 ¹ / ₄ -7	1 ⁵ / ₁₆	1 ¹ / ₂	2 ¹ / ₂	1 ¹ / ₈	8 ³ / ₈	17	19 ¹ / ₄	8 ⁷ / ₈	5 ¹ / ₂	5 ¹ / ₂	5 ⁷ / ₈

*Upper surface spotfaced for socket head cap screw.

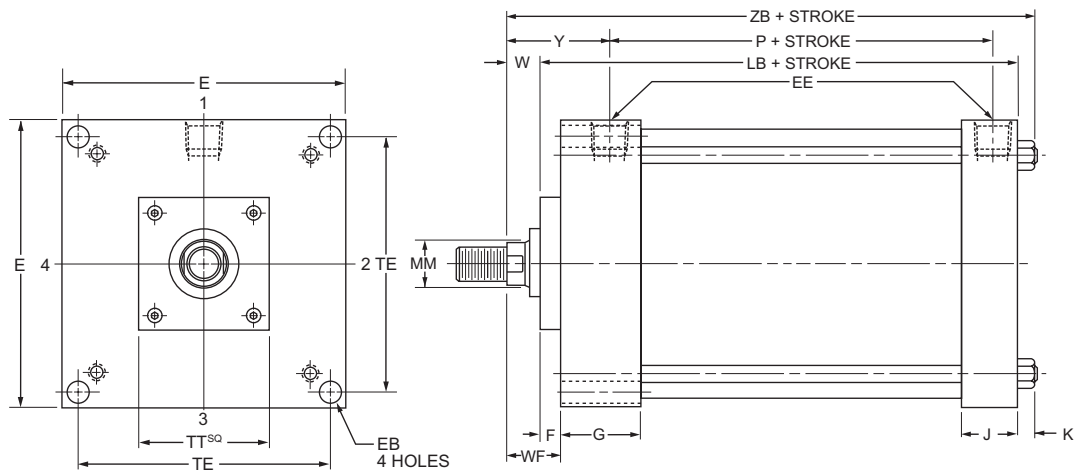
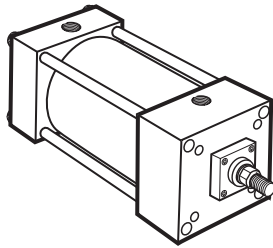
Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size												Add Stroke
		Style 4 CC	Style 2 & 3 KK	A	+0.000 -0.002 B	C	D	NA	TT	V	W	XS	XT	Y	ZB	
7	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	2 ⁵ / ₁₆	2 ¹³ / ₁₆	2 ¹³ / ₁₆	7 ⁵ / ₁₆	
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	2 ⁹ / ₁₆	3 ¹ / ₁₆	3 ¹ / ₁₆	7 ⁹ / ₁₆	
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2 ¹¹ / ₁₆	3 ³ / ₁₆	3 ³ / ₁₆	7 ¹¹ / ₁₆	
8	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	2 ⁵ / ₁₆	2 ¹³ / ₁₆	2 ¹³ / ₁₆	7 ⁵ / ₁₆	
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	2 ⁹ / ₁₆	3 ¹ / ₁₆	3 ¹ / ₁₆	7 ⁹ / ₁₆	
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2 ¹¹ / ₁₆	3 ³ / ₁₆	3 ³ / ₁₆	7 ¹¹ / ₁₆	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	
	10	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	2 ⁹ / ₁₆	3 ¹ / ₁₆	3 ¹ / ₁₆	8 ⁵ / ₁₆
2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2 ¹¹ / ₁₆	3 ³ / ₁₆	3 ³ / ₁₆	9 ¹ / ₁₆		
2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ⁵ / ₁₆		
3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ⁵ / ₁₆		
3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ⁵ / ₁₆		
4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ⁵ / ₁₆		
4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ⁵ / ₁₆		
5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ⁵ / ₁₆		
5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ⁵ / ₁₆		
12	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2 ¹¹ / ₁₆	3 ³ / ₁₆	3 ³ / ₁₆	9 ⁹ / ₁₆	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ¹³ / ₁₆	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ¹³ / ₁₆	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ¹³ / ₁₆	
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ¹³ / ₁₆	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ¹³ / ₁₆	
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ¹³ / ₁₆	
14	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂	9 ¹³ / ₁₆	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ¹ / ₈	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ¹ / ₈	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ¹ / ₈	
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ¹ / ₈	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ¹ / ₈	
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ¹ / ₈	
5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ¹ / ₈		

Head Square Mount

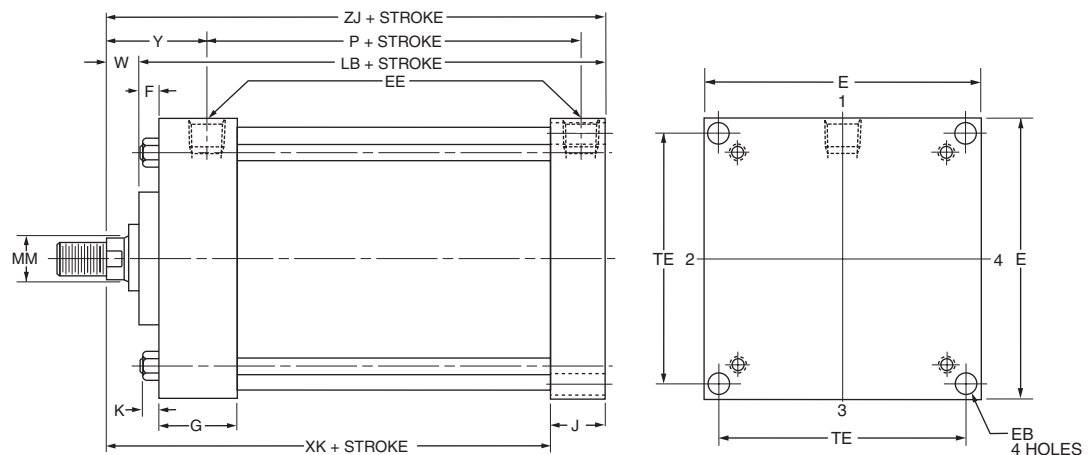
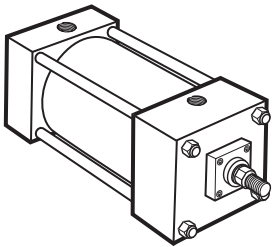
Style ME3

7" - 14" Bore

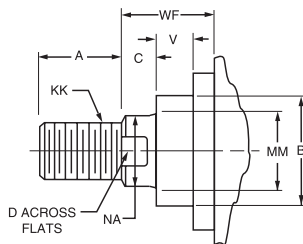
**Cap Square Mount**

Style ME4

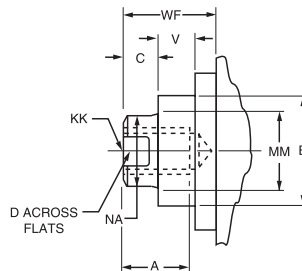
7" - 14" Bore

**Rod End Dimensions — see table 2****Thread Style 2**

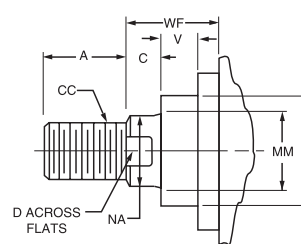
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK , A , W or WF . If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	E	EB	EE NPTF	F	G	J	K	TE	Add Stroke	
									LB	P
7	7 ¹ / ₂	⁹ / ₁₆	³ / ₄	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	6.75	5 ⁷ / ₈	3 ¹ / ₄
8	8 ¹ / ₂	¹¹ / ₁₆	³ / ₄	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	7.57	5 ⁷ / ₈	3 ¹ / ₄
10	10 ⁵ / ₈	¹³ / ₁₆	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	9.40	7 ¹ / ₈	4 ¹ / ₈
12	12 ³ / ₄	¹³ / ₁₆	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	11.10	7 ⁵ / ₈	4 ⁵ / ₈
14	14 ³ / ₄	¹⁵ / ₁₆	1 ¹ / ₄	³ / ₄	2 ³ / ₄	2 ¹ / ₄	³ / ₄	12.87	8 ⁷ / ₈	5 ¹ / ₂

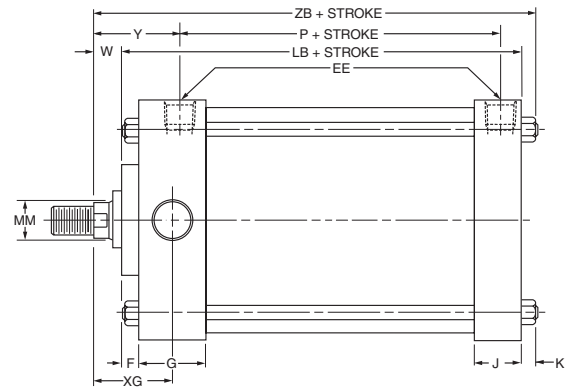
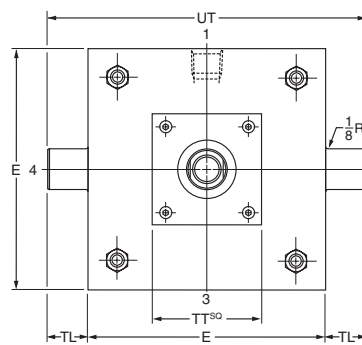
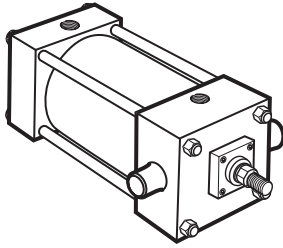
Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size													Add Stroke		
		Style 4 CC	Style 2 & 3 KK	A	+0.00 -0.002 B	C	D	NA	TT	V	W	WF	Y	XK	ZB	ZJ	XK	ZB	ZJ
7	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	1 ⁵ / ₈	2 ¹³ / ₁₆	5 ¹ / ₄	7 ⁵ / ₁₆	6 ³ / ₄			
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	1 ⁷ / ₈	3 ¹ / ₁₆	5 ¹ / ₂	7 ⁹ / ₁₆	7			
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	3 ³ / ₁₆	5 ⁷ / ₈	7 ¹¹ / ₁₆	7 ¹ / ₈			
8	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	1 ⁵ / ₈	2 ¹³ / ₁₆	5 ¹ / ₄	7 ⁵ / ₁₆	6 ³ / ₄			
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	1 ⁷ / ₈	3 ¹ / ₁₆	5 ¹ / ₂	7 ⁹ / ₁₆	7			
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	3 ³ / ₁₆	5 ⁷ / ₈	7 ¹¹ / ₁₆	7 ¹ / ₈			
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
10	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	1 ⁷ / ₈	3 ¹ / ₁₆	6 ¹ / ₄	8 ⁵ / ₁₆	8 ¹ / ₄			
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	3 ¹ / ₄	6 ³ / ₈	9 ¹ / ₁₆	8 ³ / ₈			
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
12	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	3 ¹ / ₄	6 ¹ / ₄	9 ¹ / ₁₆	8 ⁷ / ₈			
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
14	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈			
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈			
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈			
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈			
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈			
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈			
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈			

Head Trunnion Mount

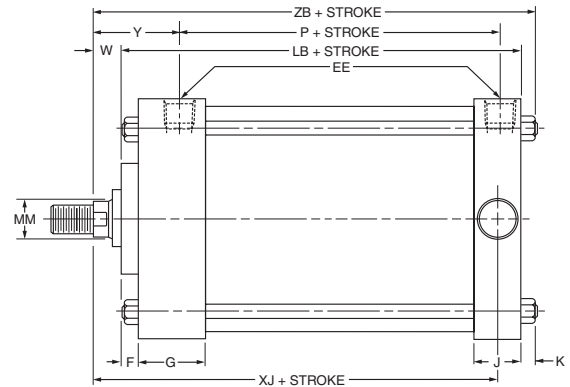
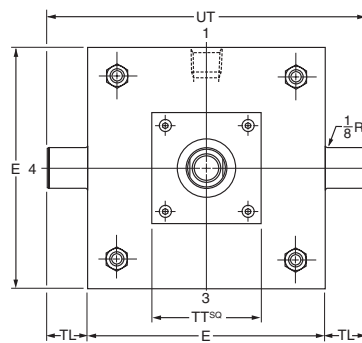
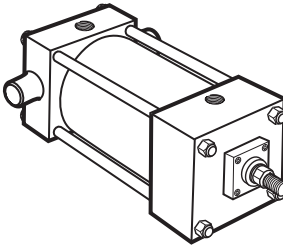
Style MT1

7" - 14" Bore

**Cap Trunnion Mount**

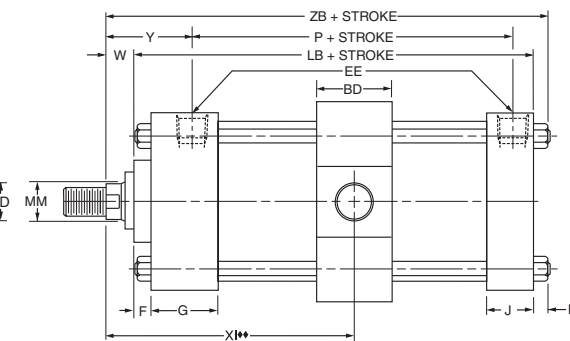
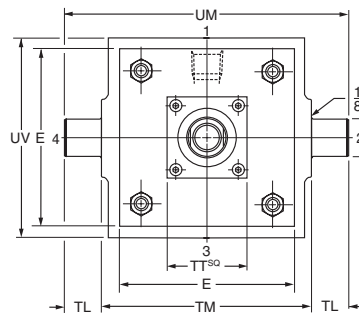
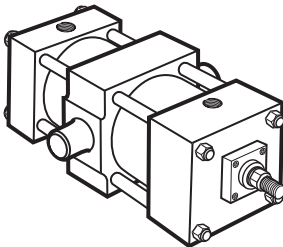
Style MT2

7" - 14" Bore

**Intermediate Fixed Trunnion Mount**

Model MT4

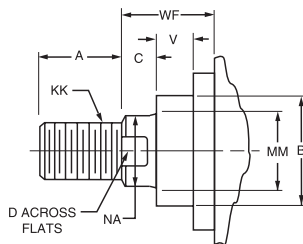
8" - 14" Bore



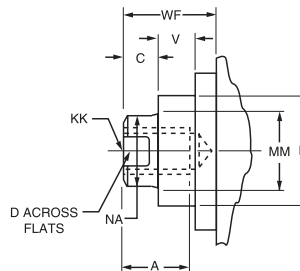
♦♦Dimension XI to be specified by customer.

Rod End Dimensions — see table 2**Thread Style 2**

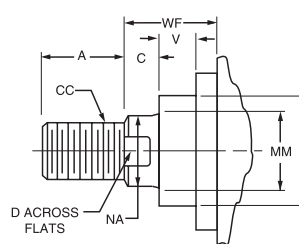
Small Male

**Thread Style 3**

Short Female

**Thread Style 4**

Intermediate Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Table 1—Envelope and Mounting Dimensions

Bore	BD	E	EE NPTF	F	G	J	K	+0.000 TD -0.001	TL	TM	UT	UM	UV	Add Stroke	
														LB	P
7	—	7 ¹ / ₂	³ / ₄	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	1.375	1 ³ / ₈	—	10 ¹ / ₄	—	—	5 ⁷ / ₈	3 ¹ / ₄
8	2 ¹ / ₂	8 ¹ / ₂	³ / ₄	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	1.375	1 ³ / ₈	9 ³ / ₄	11 ¹ / ₄	12 ¹ / ₂	9 ¹ / ₂	5 ⁷ / ₈	3 ¹ / ₄
10	3	10 ⁵ / ₈	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	1.750	1 ³ / ₄	12	14 ¹ / ₈	15 ¹ / ₂	11 ³ / ₄	7 ¹ / ₈	4 ¹ / ₈
12	3	12 ³ / ₄	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	1.750	1 ³ / ₄	14	16 ¹ / ₄	17 ¹ / ₂	13 ³ / ₄	7 ⁵ / ₈	4 ⁵ / ₈
14	3 ¹ / ₂	14 ³ / ₄	1 ¹ / ₄	³ / ₄	2 ³ / ₄	2 ¹ / ₄	³ / ₄	2.000	2	16 ¹ / ₄	18 ³ / ₄	20 ¹ / ₄	16	8 ⁷ / ₈	5 ¹ / ₂

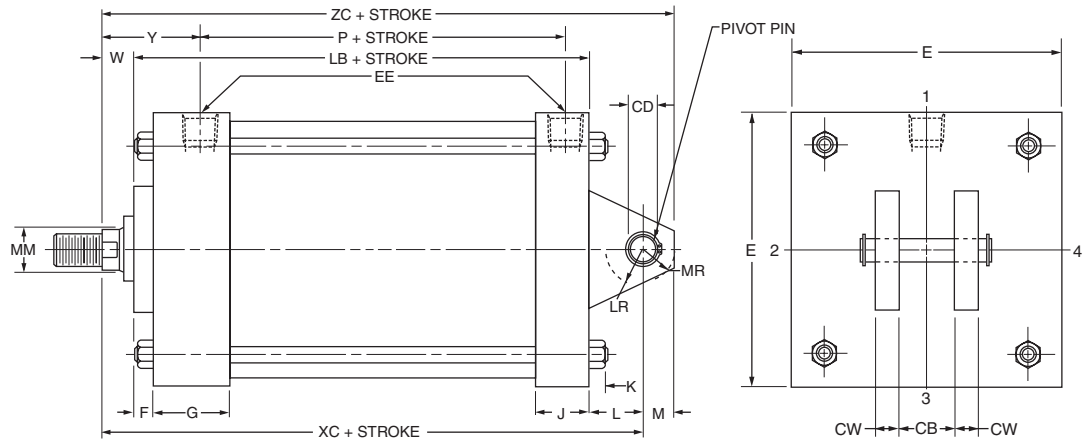
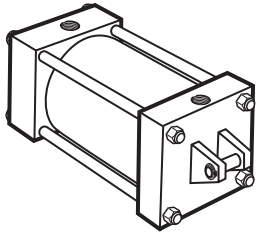
Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size													Add Stroke	
		Style 4 CC	Style 2 & 3 KK	A	+0.000 -0.002 B	C	D	NA	TT	V	W	XG	XI* (Min.)	Y				
																XJ	ZB	
7	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	2 ⁵ / ₈	—	2 ¹³ / ₁₆	6	7 ⁵ / ₁₆		
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	2 ⁷ / ₈	—	3 ¹ / ₁₆	6 ¹ / ₄	7 ⁹ / ₁₆		
8	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	3	—	3 ³ / ₁₆	6 ³ / ₈	7 ¹¹ / ₁₆		
	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	2 ⁵ / ₈	4 ¹⁵ / ₁₆	2 ¹³ / ₁₆	6	7 ⁵ / ₁₆		
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₄	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6 ⁵ / ₈	7 ¹⁵ / ₁₆		
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	2 ⁷ / ₈	5 ³ / ₁₆	3 ¹ / ₁₆	6 ¹ / ₄	7 ⁹ / ₁₆		
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	3	5 ⁵ / ₁₆	3 ³ / ₁₆	6 ³ / ₈	7 ¹¹ / ₁₆		
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	3 ¹ / ₄	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6 ⁵ / ₈	7 ¹⁵ / ₁₆		
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₄	5 ³ / ₁₆	3 ⁷ / ₁₆	6 ⁵ / ₈	7 ¹⁵ / ₁₆		
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₄	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6 ⁵ / ₈	7 ¹⁵ / ₁₆		
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₄	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6 ⁵ / ₈	7 ¹⁵ / ₁₆		
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₄	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6 ⁵ / ₈	7 ¹⁵ / ₁₆		
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₄	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6 ⁵ / ₈	7 ¹⁵ / ₁₆		
10	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	3	5 ¹¹ / ₁₆	3 ¹ / ₈	7 ¹ / ₄	8 ¹⁵ / ₁₆		
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	3 ¹ / ₈	5 ¹³ / ₁₆	3 ¹ / ₄	7 ³ / ₈	9 ¹ / ₁₆		
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	7 ⁵ / ₈	9 ⁵ / ₁₆		
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	7 ⁵ / ₈	9 ⁵ / ₁₆		
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	7 ⁵ / ₈	9 ⁵ / ₁₆		
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	7 ⁵ / ₈	9 ⁵ / ₁₆		
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	7 ⁵ / ₈	9 ⁵ / ₁₆		
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	7 ⁵ / ₈	9 ⁵ / ₁₆		
12	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	7 ⁵ / ₈	9 ⁵ / ₁₆		
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	3 ¹ / ₈	5 ¹³ / ₁₆	3 ¹ / ₄	7 ³ / ₈	9 ¹ / ₁₆		
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	8 ¹ / ₈	9 ¹³ / ₁₆		
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	8 ¹ / ₈	9 ¹³ / ₁₆		
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	8 ¹ / ₈	9 ¹³ / ₁₆		
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	8 ¹ / ₈	9 ¹³ / ₁₆		
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	8 ¹ / ₈	9 ¹³ / ₁₆		
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	8 ¹ / ₈	9 ¹³ / ₁₆		
14	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ³ / ₈	6 ¹ / ₁₆	3 ¹ / ₂	8 ¹ / ₈	9 ¹³ / ₁₆		
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	3 ⁵ / ₈	6 ¹³ / ₁₆	3 ¹³ / ₁₆	9 ¹ / ₄	11 ¹ / ₈		
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ⁵ / ₈	6 ¹³ / ₁₆	3 ¹³ / ₁₆	9 ¹ / ₄	11 ¹ / ₈		
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ⁵ / ₈	6 ¹³ / ₁₆	3 ¹³ / ₁₆	9 ¹ / ₄	11 ¹ / ₈		
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ⁵ / ₈	6 ¹³ / ₁₆	3 ¹³ / ₁₆	9 ¹ / ₄	11 ¹ / ₈		
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ⁵ / ₈	6 ¹³ / ₁₆	3 ¹³ / ₁₆	9 ¹ / ₄	11 ¹ / ₈		
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ⁵ / ₈	6 ¹³ / ₁₆	3 ¹³ / ₁₆	9 ¹ / ₄	11 ¹ / ₈		

Cap Fixed Clevis Mount

Style MP1

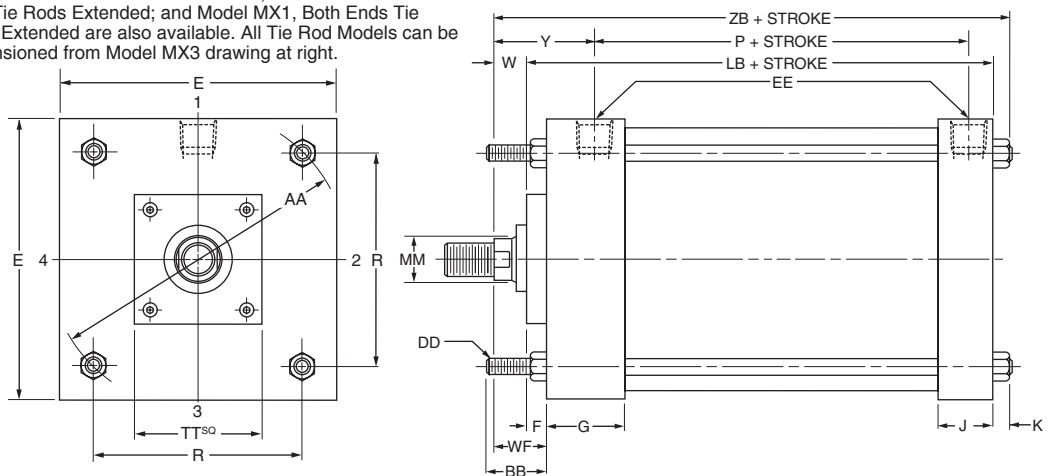
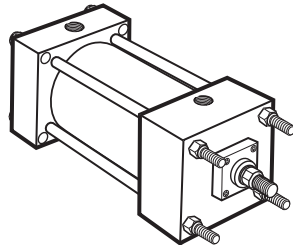
7" - 14" Bore

**Tie Rod Extended Mount**

Style MX3

7" - 14" Bore

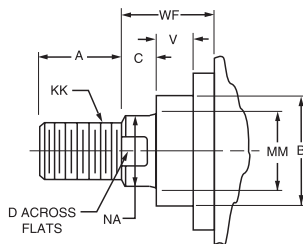
Model MX3 Head Tie Rods Extended, Illustrated. Model MX2 Cap Tie Rods Extended; and Model MX1, Both Ends Tie Rods Extended are also available. All Tie Rod Models can be dimensioned from Model MX3 drawing at right.



Models MX3 and MX1 not offered in 8" bore, rod diameters 4 1/2", 5" and 5 1/2".

Rod End Dimensions — see table 2**Thread Style 2**

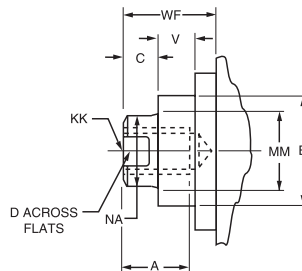
Small Male



A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered,

Thread Style 3

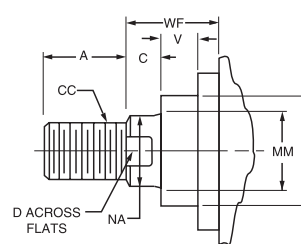
Short Female



style 2 rod ends are recommended through 2" piston rod diameters and style 4 rod ends are recommended on larger diameters. Use style 3 for applications where female rod end threads are required. If rod end is not specified, style 2 will be supplied.

Thread Style 4

Intermediate Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK , A , W or WF . If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	AA	BB	CB	+0.000 CD* -0.001	CW	DD	E	EE NPTF	F	G	J	K	L	LR	M	MR	R	Add Stroke	
																		LB	P
7	8.1	2 ⁵ / ₁₆	1 ¹ / ₂	1.000	³ / ₄	⁵ / ₈ -18	7 ¹ / ₂	³ / ₄	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	1 ¹ / ₂	1 ¹ / ₄	1	1 ³ / ₁₆	5.73	5 ⁷ / ₈	3 ¹ / ₄
8	9.1	2 ⁵ / ₁₆	1 ¹ / ₂	1.000	³ / ₄	⁵ / ₈ -18	8 ¹ / ₂	³ / ₄	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	1 ¹ / ₂	1 ¹ / ₄	1	1 ³ / ₁₆	6.44	5 ⁷ / ₈	3 ¹ / ₄
10	11.2	2 ¹¹ / ₁₆	2	1.375	1	³ / ₄ -16	10 ⁵ / ₈	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	2 ¹ / ₈	1 ⁷ / ₈	1 ³ / ₈	1 ⁵ / ₈	7.92	7 ¹ / ₈	4 ¹ / ₈
12	13.3	2 ¹¹ / ₁₆	2 ¹ / ₂	1.750	1 ¹ / ₄	³ / ₄ -16	12 ³ / ₄	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	2 ¹ / ₄	2 ¹ / ₈	1 ³ / ₄	2 ¹ / ₈	9.40	7 ⁵ / ₈	4 ⁵ / ₈
14	15.4	3 ³ / ₁₆	2 ¹ / ₂	2.000	1 ¹ / ₄	⁷ / ₈ -14	14 ³ / ₄	1 ¹ / ₄	³ / ₄	2 ³ / ₄	2 ¹ / ₄	³ / ₄	2 ¹ / ₂	2 ³ / ₈	2	2 ³ / ₈	10.90	8 ⁷ / ₈	5 ¹ / ₂

* CD is pin diameter.

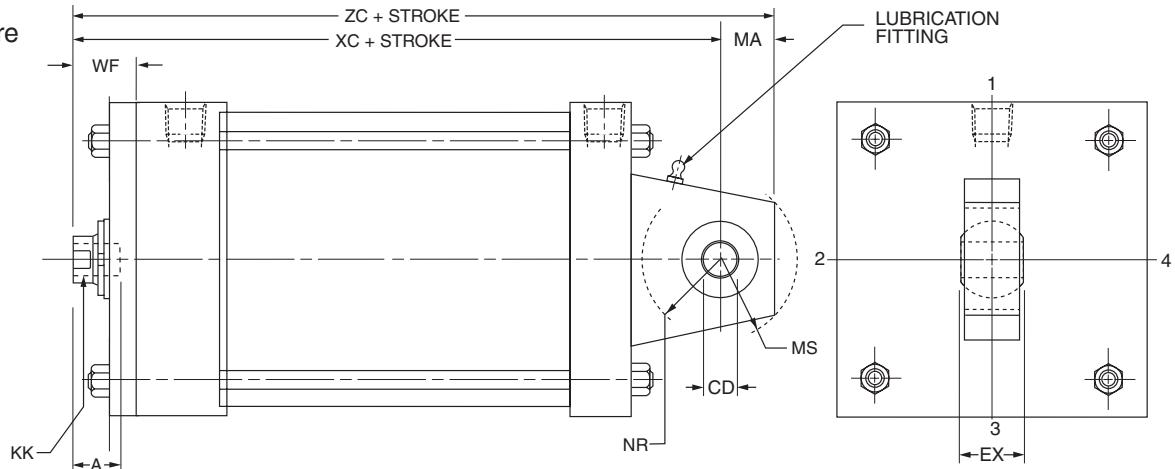
Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size													
		Style 4 CC	Style 2 & 3 KK	A	+0.000 -0.002 B	C	D	NA	TT	V	W	WF	XC	Y	Add Stroke		
															ZB	ZC	
7	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	1 ⁵ / ₈	8 ¹ / ₄	2 ¹³ / ₁₆	7 ⁵ / ₁₆	9 ¹ / ₄	
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	1 ⁷ / ₈	8 ¹ / ₂	3 ¹ / ₁₆	7 ⁹ / ₁₆	9 ¹ / ₂	
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	8 ⁵ / ₈	3 ³ / ₁₆	7 ¹¹ / ₁₆	9 ⁵ / ₈	
8	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	1 ⁵ / ₈	8 ¹ / ₄	2 ¹³ / ₁₆	7 ⁵ / ₁₆	9 ¹ / ₄	
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	8 ⁷ / ₈	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	9 ⁷ / ₈	
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	1 ⁷ / ₈	8 ¹ / ₂	3 ¹ / ₁₆	7 ⁹ / ₁₆	9 ¹ / ₂	
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	8 ⁵ / ₈	3 ³ / ₁₆	7 ¹¹ / ₁₆	9 ⁵ / ₈	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	8 ⁷ / ₈	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	9 ⁷ / ₈	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	8 ⁷ / ₈	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	9 ⁷ / ₈	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	8 ⁷ / ₈	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	9 ⁷ / ₈	
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	8 ⁷ / ₈	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	9 ⁷ / ₈	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	8 ⁷ / ₈	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	9 ⁷ / ₈	
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	8 ⁷ / ₈	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	9 ⁷ / ₈	
10	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	1 ⁷ / ₈	10 ³ / ₈	3 ¹ / ₈	8 ¹⁵ / ₁₆	11 ³ / ₄	
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	10 ¹ / ₂	3 ¹ / ₄	9 ¹ / ₁₆	11 ⁷ / ₈	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	10 ³ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	12 ¹ / ₈	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	10 ³ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	12 ¹ / ₈	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	10 ³ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	12 ¹ / ₈	
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	10 ³ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	12 ¹ / ₈	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	10 ³ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	12 ¹ / ₈	
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	10 ³ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	12 ¹ / ₈	
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	10 ³ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	12 ¹ / ₈	
12	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	11 ¹ / ₈	3 ¹ / ₄	9 ⁹ / ₁₆	12 ⁷ / ₈	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	11 ³ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆	13 ¹ / ₈	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	11 ³ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆	13 ¹ / ₈	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	11 ³ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆	13 ¹ / ₈	
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	11 ³ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆	13 ¹ / ₈	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	11 ³ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆	13 ¹ / ₈	
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	11 ³ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆	13 ¹ / ₈	
14	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	11 ³ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆	13 ¹ / ₈	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	12 ⁷ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈	14 ⁷ / ₈	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	12 ⁷ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈	14 ⁷ / ₈	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	12 ⁷ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈	14 ⁷ / ₈	
	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	12 ⁷ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈	14 ⁷ / ₈	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	12 ⁷ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈	14 ⁷ / ₈	

Spherical Bearing Mount

Style MPU3

1 ½" - 6" Bore



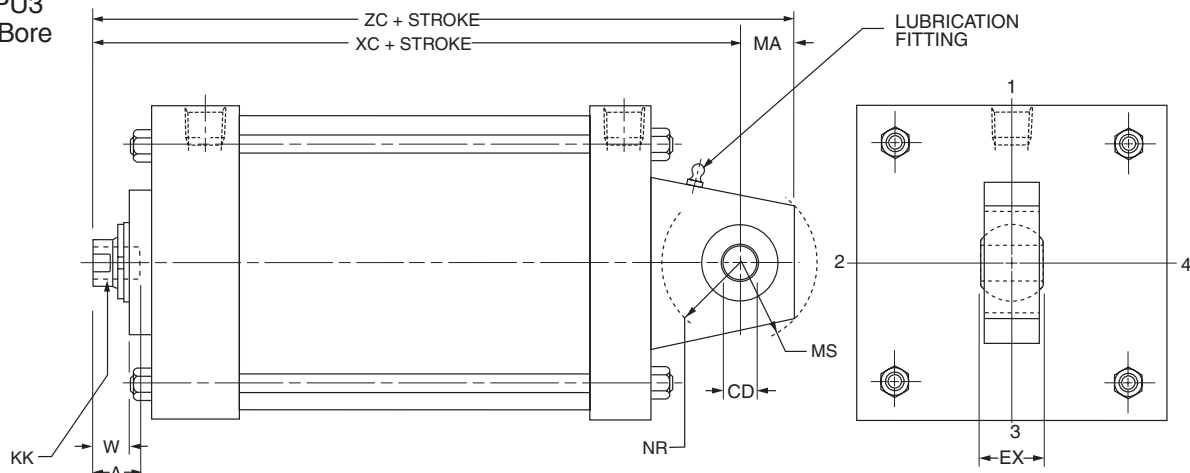
Bore	Rod Dia. MM	Thread		A	CD ²	EX	MA	MS	NR	WF	Add Stroke		Max. Oper. PSI ¹ PA-2
		Style 3 KK ³	Style 7 KK ³								XC	ZC	
1½	5/8	7/16-20	—	3/4	-.0005	7/16	3/4	15/16	5/8	1	5³/₈	6¹/₈	250
	1	**	7/16-20	3/4	.5000					1³/₈	5³/₄	6¹/₂	
2	5/8	7/16-20	—	3/4	-.0005	7/16	3/4	15/16	5/8	1	5³/₈	6¹/₈	250
	1³/₈	**	7/16-20	3/4	.5000					1⁵/₈	6	6³/₄	
	1	**	7/16-20	3/4	.5000					1³/₈	5³/₄	6¹/₂	
2½	5/8	7/16-20	—	3/4	-.0005	7/16	3/4	15/16	5/8	1	5¹/₂	6¹/₄	250
	1³/₄	**	7/16-20	3/4	.5000					1⁷/₈	6³/₈	7¹/₈	
	1	**	7/16-20	3/4	.5000					1³/₈	5¹/₈	6³/₈	
	1³/₈	**	7/16-20	3/4	.5000					1⁵/₈	6¹/₈	6⁷/₈	
3¼	1	¾-16	—	1¹/₈	-.0005	2¹/₃₂	1	1³/₈	1	1³/₈	6⁷/₈	7⁷/₈	250
	2	**	¾-16	1¹/₈	.7500					2	7¹/₂	8¹/₂	
	1³/₈	**	¾-16	1¹/₈	.7500					1⁵/₈	7¹/₈	8¹/₈	
	1³/₄	**	¾-16	1¹/₈	.7500					1⁷/₈	7³/₈	8³/₈	
4	1	¾-16	—	1¹/₈	-.0005	2¹/₃₂	1	1³/₈	1	1³/₈	6⁷/₈	7⁷/₈	250
	2½	**	¾-16	1¹/₈	.7500					2¹/₄	7³/₄	8³/₄	
	1³/₈	**	¾-16	1¹/₈	.7500					1⁵/₈	7¹/₈	8¹/₈	
	1³/₄	**	¾-16	1¹/₈	.7500					1⁷/₈	7³/₈	8³/₈	
	2	**	¾-16	1¹/₈	.7500					2	7¹/₂	8¹/₂	
5	1	¾-16	—	1¹/₈	-.0005	2¹/₃₂	1	1³/₈	1	1³/₈	7¹/₈	8¹/₈	250
	3½	**	¾-16	1¹/₈	.7500					2¹/₄	8	9	
	1³/₈	**	¾-16	1¹/₈	.7500					1⁵/₈	7³/₈	8³/₈	
	1³/₄	**	¾-16	1¹/₈	.7500					1⁷/₈	7⁵/₈	8⁵/₈	
	2	**	¾-16	1¹/₈	.7500					2	7³/₄	8³/₄	
	2½	**	¾-16	1¹/₈	.7500					2¹/₄	8	9	
6	3	**	¾-16	1¹/₈	.7500					2¹/₄	8	9	
	1³/₈	1-14	—	1⁵/₈	-.0005	7/8	1¼	1¹¹/₁₆	1¼	1⁵/₈	8¹/₈	9³/₈	250
	4	**	1-14	1⁵/₈	1.0000					2¹/₄	8³/₄	10	
	1³/₄	**	1-14	1⁵/₈	1.0000					1⁷/₈	8³/₈	9⁵/₈	
	2	**	1-14	1⁵/₈	1.0000					2	8¹/₂	9³/₄	
	2½	**	1-14	1⁵/₈	1.0000					2¹/₄	8³/₄	10	
	3	**	1-14	1⁵/₈	1.0000					2¹/₄	8³/₄	10	
	3½	**	1-14	1⁵/₈	1.0000					2¹/₄	8³/₄	10	

¹ Maximum operating pressure at 4:1 design factor is based on tensile strength of material. Pressure ratings are based on standard commercial bearing ratings.

² Dimension CD is hole diameter.

³ Threads listed are also for a spherical rod eye which match style 9 or style 7. The spherical rod eye pin diameter matches the cap pin and (if required) needs to be purchased separately; see PA-2 mounting accessories for detailed information.

Spherical Bearing Mount

Style MPU3
8" - 14" Bore

Bore	Rod Dia. MM	Thread		A	CD ²	EX	MA	MS	NR	Add Stroke			Max. Oper. PSI ¹ PA-2
		Style 3 KK ³	Style 7 KK ³							W	XC	ZC	
8	1 ³ / ₈	1-14	—	1 ⁵ / ₈	-0.0005 1.0000	7 ⁷ / ₈	1 ¹ / ₄	1 ¹¹ / ₁₆	1 ¹ / ₄	7 ⁷ / ₈	8 ¹ / ₄	9 ¹ / ₂	250
	5 ¹ / ₂	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	1 ³ / ₄	**	1-14	1 ⁵ / ₈						1 ¹ / ₈	8 ¹ / ₂	9 ³ / ₄	
	2	**	1-14	1 ⁵ / ₈						1 ¹ / ₄	8 ⁵ / ₈	9 ⁷ / ₈	
	2 ¹ / ₂	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	3	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	3 ¹ / ₂	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	4	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	4 ¹ / ₂	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	5	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
10	1 ³ / ₄	1 ¹ / ₄ -12	—	2	-0.0005 1.3750	1 ³ / ₁₆	1 ⁷ / ₈	2 ⁷ / ₁₆	1 ⁵ / ₈	1 ¹ / ₈	10 ³ / ₈	12 ¹ / ₄	250
	2	**	1 ¹ / ₄ -12	2						1 ¹ / ₄	10 ¹ / ₂	12 ³ / ₈	
	2 ¹ / ₂	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	3	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	3 ¹ / ₂	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	4	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	4 ¹ / ₂	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	5 ¹ / ₂	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
12	2	1 ¹ / ₂ -12	—	2 ¹ / ₄	-0.0005 1.7500	1 ¹⁷ / ₃₂	2 ¹ / ₂	2 ⁷ / ₈	2 ¹ / ₁₆	1 ¹ / ₄	11 ¹ / ₈	13 ⁵ / ₈	250
	2 ¹ / ₂	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	3	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	3 ¹ / ₂	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	4	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	4 ¹ / ₂	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	5 ¹ / ₂	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
14	2 ¹ / ₂	1 ⁷ / ₈ -12	—	3	-0.0005 2.0000	1 ³ / ₄	2 ¹ / ₂	3 ⁵ / ₁₆	2 ³ / ₈	1 ¹ / ₂	12 ⁷ / ₈	15 ³ / ₈	250
	3	**	1 ⁷ / ₈ -12	3						1 ¹ / ₂	12 ⁷ / ₈	15 ³ / ₈	
	3 ¹ / ₂	**	1 ⁷ / ₈ -12	3						1 ¹ / ₂	12 ⁷ / ₈	15 ³ / ₈	
	4	**	1 ⁷ / ₈ -12	3						1 ¹ / ₂	12 ⁷ / ₈	15 ³ / ₈	
	4 ¹ / ₂	**	1 ⁷ / ₈ -12	3						1 ¹ / ₂	12 ⁷ / ₈	15 ³ / ₈	
	5	**	1 ⁷ / ₈ -12	3						1 ¹ / ₂	12 ⁷ / ₈	15 ³ / ₈	
	5 ¹ / ₂	**	1 ⁷ / ₈ -12	3						1 ¹ / ₂	12 ⁷ / ₈	15 ³ / ₈	

¹ Maximum operating pressure at 4:1 design factor is based on tensile strength of material. Pressure ratings are based on standard commercial bearing ratings.

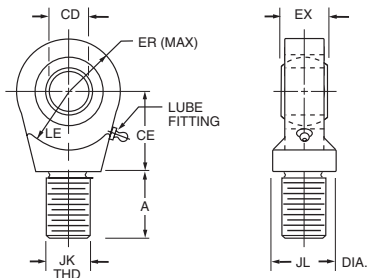
² Dimension CD is hole diameter.

³ Threads listed are also for a spherical rod eye which match style 9 or style 7. The spherical rod eye pin diameter matches the cap pin and (if required) needs to be purchased separately; see PA-2 mounting accessories for detailed information.

Cylinder Accessories**Spherical Bearing Mount – Style MPU3**

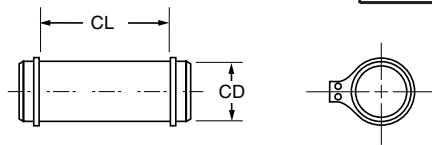
Schrader Bellows offers a complete range of Cylinder Accessories to assure you of the greatest versatility in present or future cylinder applications. Accessories offered for the respective cylinder include the Rod Eye,

Pivot Pin and Clevis Bracket. To select the proper part number for any desired accessory refer to the charts below.

Spherical Rod Eye

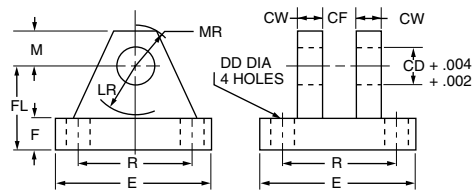
Order to fit Piston Rod Thread Size.

Bore Sizes	Series PA-2	1½, 2 & 2½	3¼, 4 & 5	6 & 8	10	12	14
Rod Eye	Part No.	1322900000	1322910000	1322920000	1322930000	1322940000	1322950000
CD		.5000-.0005	.7500-.0005	1.0000-.0005	1.3750-.0005	1.7500-.0005	2.0000-.0005
A		1½/16	1	1½	2	2½/8	2½/8
CE		7/8	1¼	1½	2½/8	2½/2	2¾/4
EX		7/16	2½/32	7/8	1¾/16	1¾/32	1¾/4
ER		1¾/16	1½/8	1¼	1½/16	2½/16	2½/2
LE		¾	1½/16	1¾/16	1¾/8	2½/8	2½/2
JK		7/16-20	¾-16	1-14	1¼-12	1½-12	1¾-12
JL		7/8	1½/16	1½	2	2¼	2¾/4
LOAD CAPACITY LBS.		2644	9441	16860	28562	43005	70193

Pivot Pin

Pivot Pins are furnished with
(2) Retainer Rings.

Bore Sizes	Series PA-2	1½, 2 & 2½	3¼, 4 & 5	6 & 8	10	12	14
Pivot Pin	Part No.	0839620000	0839630000	0839640000	0839650000	0839660000	0839670000
CD		.4997-.0004	.7497-.0005	.9997-.0005	1.3746-.0006	1.7496-.0006	1.9996-.0007
CL		1¾/16	2½/32	2½	3½/16	4¾/32	4½/16
LOAD CAPACITY LBS.		8600	19300	34300	65000	105200	137400

Clevis Bracket

Order to fit Cap or Rod Eye.

Bore Sizes	Series PA-2	1½, 2 & 2½	3¼, 4 & 5	6 & 8	10	12	14
Clevis Bracket	Part No.	0839470000	0839480000	0839490000	0839500000	0839510000	0839520000
CD		½	¾	1	1¾/8	1¾/4	2
CF		7/16	2½/32	7/8	1¾/16	1¾/32	1¾/4
CW		½	5/8	¾	1	1¼	1½
DD		1¾/32	17/32	17/32	2½/32	29/32	29/32
E		3	3¾/4	5½	6½	8½	10½/8
F		½	5/8	¾	7/8	1¼	1½
FL		1½	2	2½	3½	4½	5
LR		15/16	1¾/8	1½/16	2¾/16	2¾/8	3½/16
M		½	7/8	1	1¾/8	1¾/4	2
MR		5/8	1	1¾/16	1¾/8	2½/16	2¾/8
R		2.05	2.76	4.10	4.95	6.58	7.92
LOAD CAPACITY LBS.		5770	9450	14300	20322	37800	50375

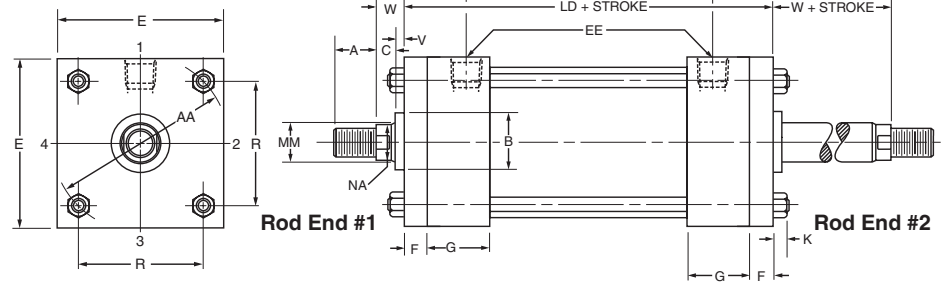
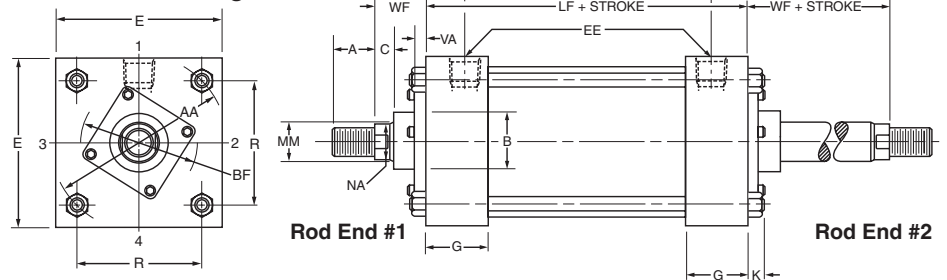
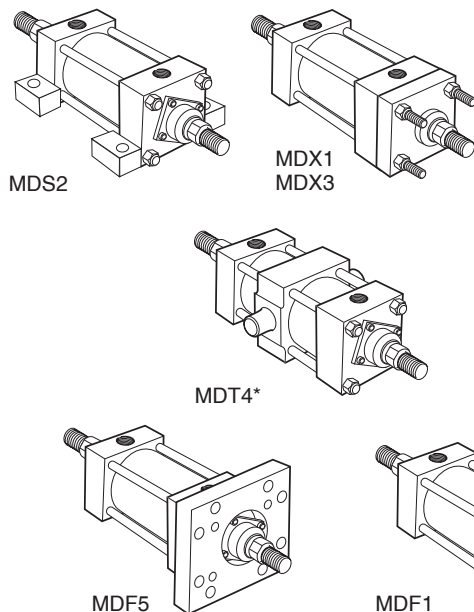
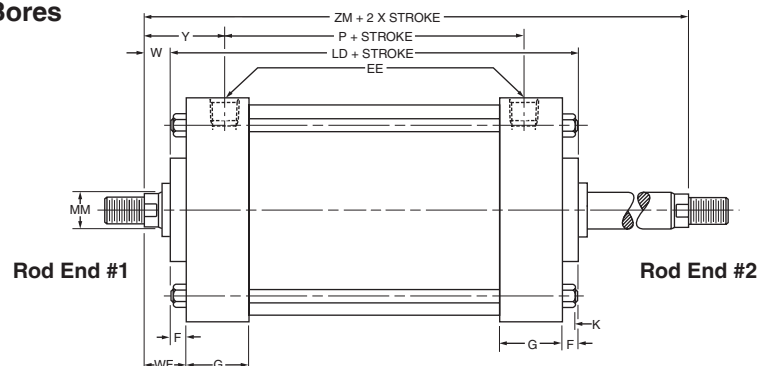
**Double Rod Models
1" to 14" Bore**

To determine dimensions for a double rod cylinder, first refer to the desired single rod mounting style cylinder shown on preceding pages of this catalog. After selecting necessary dimensions from that drawing, return to this page and supplement the single rod dimensions with those shown on the drawing and dimension table below. Note that double rod cylinders have a head (Dim. G) at both ends and that dimension LD or LF replaces LB or LG. The double rod dimensions differ from, or are in addition to those for single rod cylinders shown on preceding pages and provide the information needed to completely dimension a double rod cylinder. On a double rod cylinder where the two rod ends are different, be sure to clearly state which rod end is to be assembled at which end.

Port position 1 is standard. If other than standard, specify position 2, 3, or 4 when viewed from one end only.

If only one end of these Double Rod Cylinders is to be cushioned, be sure to specify clearly which end this will be.

Specify XI dimension from rod end #1.

**How to Use Double Rod Cylinder Dimension Drawings
1" to 6" Bores****Tie Rod Retained Cartridge****1" to 6" Bores****Removable Cartridge****7" to 14" Bores**

All dimensions are in inches and apply to standard rod sizes only. For alternate rod sizes, determine all envelope dimensions (within LD dim.) as described above and then use appropriate rod end dimensions for proper rod size from single rod cylinder.

Bore	Rod Dia. MM	Add Stroke			Add 2X Stroke
		LD	LF	SS	ZM
1	1/2	4 3/4	—	3 3/8	6
1 1/2	5/8	4 7/8	4 1/8	3 3/8	6 1/8
2	5/8	4 7/8	4 1/8	3 3/8	6 1/8
2 1/2	5/8	5	4 1/4	3 1/2	6 1/4
3 1/4	1	6	4 3/4	3 3/4	7 1/2
4	1	6	4 3/4	3 3/4	7 1/2
5	1	6 1/4	5	3 5/8	7 3/4
6	1 3/8	7	5 1/2	4 1/8	8 3/4
7	1 3/8	7 1/8	5 5/8	4 1/4	8 7/8
8	1 3/8	7 1/8	5 5/8	4 1/4	8 7/8
10	1 3/4	8 1/8	6 5/8	4 7/8	10 3/8
12	2	8 5/8	7 1/8	5 3/8	11 1/8
14	2 1/2	10 1/8	8 5/8	6 3/8	13 1/8
Replaces:		LB	LG	SS	—
On single rod mounting styles:		All Mtg. Styles		MS2	All Mtgs.

*Mounting style MDT4 not available in 1" and 7" bore sizes.

Cylinder Accessories

Schrader Bellows offers a complete range of cylinder accessories to assure you of the greatest versatility in present and future cylinder applications.

Rod End Accessories

Accessories offered for the rod end of the cylinder include Rod Clevis, Eye Bracket, Knuckle, Clevis Bracket, and Pivot Pin. To select the proper part number for any desired accessory, refer to the table below or on the opposite page and look in the row to the right of the rod thread in the first column. For economical accessory selection, it is recommended that rod end style 2 be specified on your cylinder order.

Accessory Load Capacity

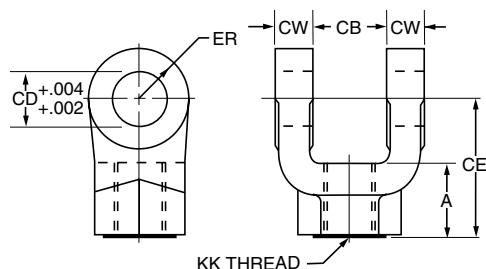
The various accessories have been load rated for your convenience. The load Capacity in lbs. Is the recommended maximum load for that accessory based on a 4:1 design factor in tension. (Pivot Pin is rated in shear.) Before specifying, compare the actual load or the tension (pull) force at maximum operating pressure of the cylinder with the load capacity of the accessory you plan to use. If load or pull force of cylinder exceeds load capacity of accessory, consult factory.

Thread Size	Rod Clevis		Mounting Plate or Eye Bracket		Pivot Pin	
	Part Number	Load Capacity (Lbs.)	Part Number	Load Capacity (Lbs.)	Part Number	Shear Capacity (Lbs.)
5/16-24	0512210000†	2600	0740770000	1700	—	—
7/16-20	0509400000	4250	0691950000	4100	0683680000	8600
1/2-20	0509410000	4900	0691950000	4100	0683680000	8600
3/4-16	0509420000	11200	0691960000	10500	0683690000	19300
3/4-16	1332840000	11200	0691960000	10500	0683690000	19300
7/8-14	0509430000	18800	*0853610000	20400	0683700000	34300
1-14	0509440000	19500	*0853610000	20400	0683700000	34300
1-14	1332850000	19500	*0853610000	20400	0683700000	34300
1 1/4-12	0509450000	33500	0691980000	21200	0683710000	65000
1 1/4-12	1332860000	33500	0691980000	21200	0683710000	65000
1 1/2-12	0509460000	45600	*0853620000	49480	0683720000	105200
1 3/4-12	0509470000	65600	*0853630000	70000	0683730000	137400
1 7/8-12	0509480000	65600	*0853630000	70000	0683730000	137400
2 1/4-12	0509490000	98200	*0853640000	94200	0683740000	214700
2 1/2-12	0509500000	98200	*0853650000	121900	0683750000	309200
2 3/4-12	0509510000	98200	*0853650000	121900	0683750000	309200
3 1/4-12	0509520000	156700	0735380000	57400	0735450000	420900
3 1/2-12	0509530000	193200	0735390000	75000	0735470000	565800
4-12	0509540000	221200	0735390000	75000	0735470000	565800

† Includes pivot pin.

* Cylinder accessory dimensions conform to NFPA recommended standard NFPA/T3.6.8 R1-1984, NFPA recommended standard fluid power systems – cylinder – dimensions for accessories for cataloged square head industrial cylinders.

Rod Clevis Dimensions

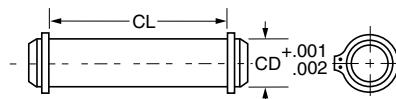


Part Number	A	CB	CD	CE	CW	ER	KK
0512210000†	13/16	11/32	5/16	2 1/4	13/64	19/64	5/16-24
0509400000	3/4	3/4	1/2	1 1/2	1/2	1/2	7/16-20
0509410000	3/4	3/4	1/2	1 1/2	1/2	1/2	1/2-20
0509420000	1 1/8	1 1/4	3/4	2 1/8	5/8	3/4	3/4-16
1332840000	1 1/8	1 1/4	3/4	2 3/8	5/8	3/4	3/4-16
0509430000	1 5/8	1 1/2	1	2 15/16	3/4	1	7/8-14
0509440000	1 5/8	1 1/2	1	2 15/16	3/4	1	1-14
1332850000	1 5/8	1 1/2	1	3 1/8	3/4	1	1-14
0509450000	1 7/8	2	1 3/8	3 3/4	1	1 3/8	1 1/4-12
1332860000	2	2	1 3/8	4 1/8	1	1 3/8	1 1/4-12
0509460000	2 1/4	2 1/2	1 3/4	4 1/2	1 1/4	1 3/4	1 1/2-12
0509470000	3	2 1/2	2	5 1/2	1 1/4	2	1 3/4-12
0509480000	3	2 1/2	2	5 1/2	1 1/4	2	1 7/8-12
0509490000	3 1/2	3	2 1/2	6 1/2	1 1/2	2 1/2	2 1/4-12
0509500000	3 1/2	3	3	6 3/4	1 1/2	2 3/4	2 1/2-12
0509510000	3 1/2	3	3	6 3/4	1 1/2	2 3/4	2 3/4-12
0509520000	3 1/2‡	4	3 1/2	7 3/4	2	3 1/2	3 1/4-12
0509530000	4‡	4 1/2	4	8 13/16	2 1/4	4	3 1/2-12
0509540000	4‡	4 1/2	4	8 13/16	2 1/4	4	4-12

†Includes Pivot Pin

‡Consult appropriate cylinder rod end dimensions for compatibility.

Pivot Pin Dimensions

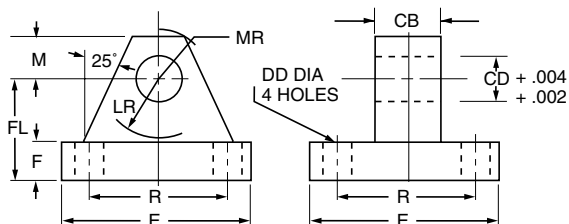


Part Number	CD	CL
0683680000	1/2	1 7/8
0683690000	3/4	2 5/8
0683700000	1	3 1/8
0683710000	1 3/8	4 1/8
0683720000	1 3/4	5 3/16
0683730000	2	5 3/16
0683740000	2 1/2	6 3/16
0683750000	3	6 1/4
0735450000	3 1/2	8 1/4
0735470000•	4	9

• This size supplied with cotter pins.

1. Pivot Pins are furnished with Clevis Mounted Cylinders as standard.
2. Pivot Pins are furnished with (2) Retainer Rings.
3. Pivot Pins must be ordered as a separate item if to be used with Knuckles, Rod Clevises, or Clevis Brackets.

Mounting Plate or Eye Bracket Dimensions



1. When used to mate with the Rod Clevis, select by thread size in table on opposite page.
2. When used to mount the Style MP1 Cylinders, select by bore size below.

Part Number	CB	CD	DD	E	F	FL	LR	M	MR	R	Bore
0740770000	5/16	5/16	17/64	2 1/4	3/8	1	5/8	3/8	1/2	1.75	1"
0691950000	3/4	1/2	13/32	2 1/2	3/8	1 1/8	3/4	1/2	9/16	1.63	1 1/2", 2", 2 1/2"
0691960000	1 1/4	3/4	17/32	3 1/2	5/8	1 7/8	1 1/4	3/4	7/8	2.55	3 1/4", 4", 5"
*0853610000	1 1/2	1	21/32	4 1/2	7/8	2 3/8	1 1/2	1	1 1/4	3.25	6", 7", 8"
0691980000	2	1 3/8	21/32	5	7/8	3	2 1/8	1 3/8	1 5/8	3.82	10"
*0853620000	2 1/2	1 3/4	29/32	6 1/2	1 1/8	3 3/8	2 1/4	1 3/4	2 1/8	4.95	12"
*0853630000	2 1/2	2	1 1/16	7 1/2	1 1/2	4	2 1/2	2	2 7/16	5.73	14"
*0853640000	3	2 1/2	1 3/16	8 1/2	1 3/4	4 3/4	3	2 1/2	3	6.58	—
*0853650000	3	3	1 5/16	9 1/2	2	5 1/4	3 1/4	2 3/4	3 1/4	7.50	—
0735380000	4	3 1/2	1 13/16	12 5/8	1 11/16	5 11/16	4	3 1/2	4 1/8	9.62	—
0735390000	4 1/2	4	2 1/16	14 7/8	1 15/16	6 7/16	4 1/2	4	5 1/4	11.45	—

* Cylinder accessory dimensions conform to NFPA recommended standard NFPA/T3.6.8 R1-1984, NFPA recommended standard fluid power systems - cylinder - dimensions for accessories for cataloged square head industrial cylinders.

Rod End Accessories

Accessories offered for the rod end of the cylinder include Rod Clevis, Eye Bracket, Knuckle, Clevis Bracket, and Pivot Pin. To select the proper part number for any desired accessory, refer to the table below or on the opposite page and look in the row to the right of the rod thread in the first column. For economical accessory selection, it is recommended that rod end style 2 be specified on your cylinder order.

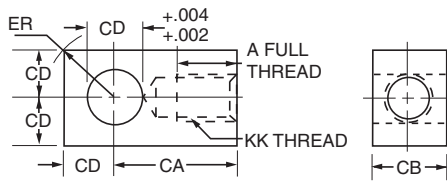
Accessory Load Capacity

The various accessories have been load rated for your convenience. The load Capacity in lbs. is the recommended maximum load for that accessory based on a 4:1 design factor in tension. (Pivot Pin is rated in shear.) Before specifying, compare the actual load or the tension (pull) force at the maximum operating pressure of the cylinder with the load capacity of the accessory you plan to use. If load or pull force of cylinder exceeds load capacity of accessory, consult factory.

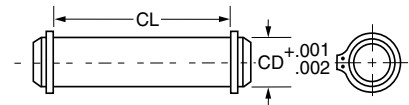
Thread Size	Knuckle		Clevis Bracket		Pivot Pin	
	Part Number	Load Capacity (Lbs.)	Part Number	Load Capacity (Lbs.)	Part Number	Shear Capacity (Lbs.)
5/16-24	0740750000	3300	0740760000	3600	0740780000	6600
7/16-20	0690890000	5000	0692050000	7300	0683680000	8600
1/2-20	0690900000	5700	0692050000	7300	0683680000	8600
3/4-16	0690910000	12100	0692060000	14000	0683690000	19300
7/8-14	0690920000	13000	0692070000	19200	0683700000	34300
1-14	0690930000	21700	0692070000	19200	0683700000	34300
1 1/4-12	0690940000	33500	0692080000	36900	0683710000	65000
1 1/2-12	0690950000	45000	0692090000	34000	0683720000	105200
1 3/4-12	0690960000	53500	0692100000	33000	0692150000	137400
1 7/8-12	0690970000	75000	0692100000	33000	0692150000	137400
2 1/4-12	0690980000	98700	0692110000	34900	0683740000	214700
2 1/2-12	0690990000	110000	0692120000	33800	0683750000	309200
2 3/4-12	0691000000	123300	0692130000	36900	0692160000	309200
3 1/4-12	0735360000	161300	0735420000	83500	0735450000	420900
3 1/2-12	0734370000	217300	0735420000	83500	0735450000	420900
4-12	0734380000	273800	0735430000	102600	0821810000	565800
4 1/2-12	0734390000	308500	0735440000	108400	0735470000•	565800

- This size supplied with cotter pins.

Knuckle Dimensions



Pivot Pin Dimensions



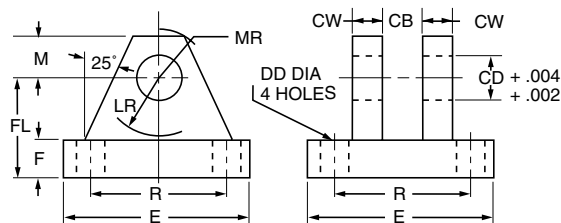
Part Number	A	CA	CB	CD	ER	KK
0740750000	3/4	1 1/2	7/16	7/16	19/32	5/16-24
0690890000	3/4	1 1/2	3/4	1/2	23/32	7/16-20
0690900000	3/4	1 1/2	3/4	1/2	23/32	1/2-20
0690910000	1 1/8	2 1/16	1 1/4	3/4	1 1/16	3/4-16
0690920000	1 1/8	2 3/8	1 1/2	1	1 7/16	7/8-14
0690930000	1 5/8	2 13/16	1 1/2	1	1 7/16	1-14
0690940000	2	3 7/16	2	1 3/8	1 31/32	1 1/4-12
0690950000	2 1/4	4	2 1/2	1 3/4	2 1/2	1 1/2-12
0690960000	2 1/4	4 3/8	2 1/2	2	2 27/32	1 3/4-12
0690970000	3	5	2 1/2	2	2 27/32	1 7/8-12
0690980000	3 1/2	5 13/16	3	2 1/2	3 9/16	2 1/4-12
0690990000	3 1/2	6 1/8	3	3	4 1/4	2 1/2-12
0691000000	3 5/8	6 1/2	3 1/2	3	4 1/4	2 3/4-12
0735360000	4 1/2	7 5/8	4	3 1/2	4 31/32	3 1/4-12
0734370000	5	7 5/8	4	3 1/2	4 31/32	3 1/2-12
0734380000	5 1/2	9 1/8	4 1/2	4	5 11/16	4-12
0734390000	5 1/2	9 1/8	5	4	5 11/16	4 1/2-12

Part Number	CD	CL
0740780000	7/16	1 5/16
0683680000	1/2	1 7/8
0683690000	3/4	2 5/8
0683700000	1	3 1/8
0683710000	1 3/8	4 1/8
0683720000	1 3/4	5 3/16
0692150000	2	5 11/16
0683740000	2 1/2	6 3/16
0683750000	3	6 1/4
0692160000	3	6 3/4
0735450000	3 1/2	8 1/4
0821810000	4	8 5/8
0735470000•	4	9

• This size supplied with cotter pins.

1. Pivot Pins are furnished with Clevis Mounted Cylinders as standard.
2. Pivot Pins are furnished with (2) Retainer Rings.
3. Pivot Pins must be ordered as a separate item if to be used with Knuckles, Rod Clevises, or Clevis Brackets.

Clevis Bracket Dimensions



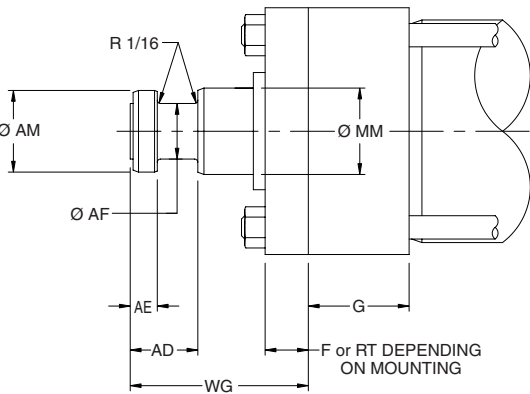
Part Number	CB	CD	CW	DD	E	F	FL	LR	M	MR	R
0740760000	15/32	7/16	3/8	17/64	2 1/4	3/8	1	5/8	3/8	1/2	1.75
0692050000	3/4	1/2	1/2	13/32	3 1/2	1/2	1 1/2	3/4	1/2	5/8	2.55
0692060000	1 1/4	3/4	5/8	17/32	5	5/8	1 7/8	1 3/16	3/4	29/32	3.82
0692070000	1 1/2	1	3/4	21/32	6 1/2	3/4	2 1/4	1 1/2	1	1 1/4	4.95
0692080000	2	1 3/8	1	21/32	7 1/2	7/8	3	2	1 3/8	1 21/32	5.73
0692090000	2 1/2	1 3/4	1 1/4	29/32	9 1/2	7/8	3 5/8	2 3/4	1 3/4	2 7/32	7.50
0692100000	2 1/2	2	1 1/2	1 1/16	12 3/4	1	4 1/4	3 3/16	2 1/4	2 25/32	9.40
0692110000	3	2 1/2	1 1/2	1 3/16	12 3/4	1	4 1/2	3 1/2	2 1/2	3 1/8	9.40
0692120000	3	3	1 1/2	1 5/16	12 3/4	1	6	4 1/4	3	3 19/32	9.40
0692130000	3 1/2	3	1 1/2	1 5/16	12 3/4	1	6	4 1/4	3	3 19/32	9.40
0735420000	4	3 1/2	2	1 13/16	15 1/2	1 11/16	6 11/16	5	3 1/2	4 1/8	12.00
0735430000	4 1/2	4	2	2 1/16	17 1/2	1 15/16	7 11/16	5 3/4	4	4 7/8	13.75
0735440000	5	4	2	2 1/16	17 1/2	1 15/16	7 11/16	5 3/4	4	4 7/8	13.75

Cylinder accessory dimensions conform to NFPA recommended standard NFPT/T3.6.8 R1-1984, NFPA recommended standard fluid power systems - cylinder - dimensions for accessories for cataloged square head industrial cylinders.

Schrader Bellows “Style 6”
Piston Rod End
Rod end flange coupling for Schrader Bellows
PA-2 and PN Series Pneumatic Cylinders

- Simplifies alignment
- Reduces assembly time
- Allows full rated pneumatic pressure in push and pull directions
- Available in 5/8" through 5-1/2" piston rod diameters

Style 6 Rod End



Dimensions Style 6 Rod End

MM Rod Dia.	AD	AE	AF	AM	WG
5/8	5/8	1/4	3/8	.57	1 3/4
1	1 5/16	3/8	1 1/16	.95	2 3/8
1 3/8	1 11/16	3/8	7/8	1.32	2 3/4
1 3/4	1 5/16	1/2	1 1/8	1.70	3 1/8
2	1 11/16	5/8	1 3/8	1.95	3 3/4
2 1/2	1 15/16	3/4	1 3/4	2.45	4 1/2
3	2 7/16	7/8	2 1/4	2.95	4 7/8
3 1/2	2 11/16	1	2 1/2	3.45	5 5/8
4	2 11/16	1	3	3.95	5 3/4
4 1/2	3 3/16	1 1/2	3 1/2	4.45	6 1/2
5	3 3/16	1 1/2	3 7/8	4.95	6 5/8
5 1/2	3 15/16	1 7/8	4 3/8	5.45	7 1/2

See Cylinder Catalog for F, G and RT per bore and series.

Consult Factory for availability of mounting accessories and Hardware.

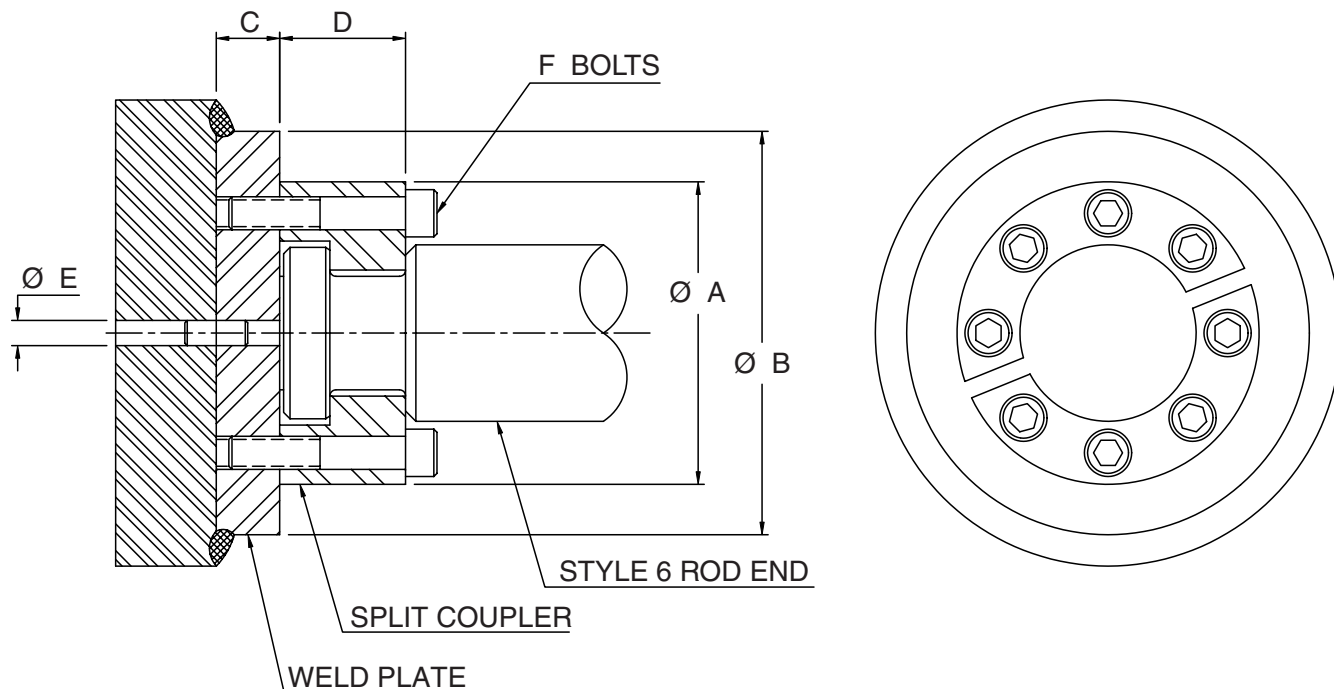
How To Order

Complete Model Number and place a “6” in the Piston Rod End designator position.

Example: PAD113561x12.00

Schrader Bellows “Style 6” Piston Rod End

Split Couplers and Weld Plates



⚠ WARNING: Piston rod separation from the machine member can result in severe personal injury or even death to nearby personnel. The cylinder user must make sure the weld holding the weld plate to the machine is of sufficient quality and size to hold the intended load. The cylinder user must also make sure the bolts holding split coupler to the weld plate are of sufficient strength to hold the intended load and installed in such a way that they will not become loose during the machine's operation.

Table 1 — Part Numbers and Dimensions

ROD DIA.	A	B	C	D	E	F	BOLT SIZE	BOLT CIRCLE	SPLIT COUPLER PART NO.	WELD PLATE PART NO.
$\frac{5}{8}$	1.50	2.00	.50	.56	.250	4	#10-24 x .94 LG	1.125	1472340062	1481740062
1	2.00	2.50	.50	.88	.250	6	.250-20 x 1.25 LG	1.500	1472340100	1481740100
$1\frac{3}{8}$	2.50	3.00	.63	1.00	.250	6	.312-18 x 1.50 LG	2.000	1472340138	1481740138
$1\frac{3}{4}$	3.00	4.00	.63	1.25	.250	8	.312-18 x 1.75 LG	2.375	1472340175	1481740175
2	3.50	4.00	.75	1.63	.375	12	.375-16 x 2.25 LG	2.687	1472340200	1481740200
$2\frac{1}{2}$	4.00	4.50	.75	1.88	.375	12	.375-16 x 2.50 LG	3.187	1472340250	1481740250
3	5.00	5.50	1.00	2.38	.375	12	.500-13 x 3.25 LG	4.000	1472340300	1481740300
$3\frac{1}{2}$	5.88	7.00	1.00	2.63	.375	12	.625-11 x 3.50 LG	4.687	1472340350	1481740350
4	6.38	7.00	1.00	2.63	.375	12	.625-11 x 3.50 LG	5.187	1472340400	1481740400
$4\frac{1}{2}$	6.88	8.00	1.00	3.13	.375	12	.625-11 x 4.00 LG	5.687	1472340450	1481740450
5	7.38	8.00	1.00	3.13	.375	12	.625-11 x 4.00 LG	6.187	1472340500	1481740500
$5\frac{1}{2}$	8.25	9.00	1.25	3.88	.375	12	.750-10 x 5.00 LG	6.875	1472340550	1481740550

Note: Bolts are not included with split coupler or weld plate.

How to Order PA-2 Series Cylinders

When ordering PA-2 Series cylinders, please review the following:

Note: Duplicate cylinders can be ordered by giving the SERIAL NUMBER from the nameplate of the original cylinder. Factory records supply a quick positive identification.

Piston Rods: Specify model number code based on bore size and rod diameter. Give thread style number for a standard thread or specify dimensions. See "Style 0 Rod End" below.

Cushions: If cushions are required specify according to the model number on the next page. If the cylinder is to have a double rod and only one cushion is required, be sure to specify clearly which end of the cylinder is to be cushioned.

Special Modifications: Additional information is required on orders for cylinders with special modifications. This is best handled with descriptive notes. For further information, consult factory.

Fluid Medium: PA-2 Series pneumatic cylinders are equipped with seals for use with lubricated air.

Class 1 Seals

Class 1 seals are the seals provided as standard in a cylinder assembly unless otherwise specified. For further information on fluid compatibility or operating limitations of all components, see section C.

For the PA-2 Series cylinders the following make-up Class 1 Seals:

Primary Piston Rod Seal – Nitrile with PTFE back-up washers

Piston Rod Wiper – Nitrile

Piston Seals – Nitrile with polymyte back-up washers

O-Rings – Nitrile

Style 0 Rod End

A style 0 rod end indicates a special rod end configuration. All special piston rod dimensions must have **all three:** KK; A; and W/WF specified with the rod fully retracted. A sketch or drawing should be submitted for rod ends requiring special machining such as snap ring grooves, keyways, tapers, multiple diameters, etc. It is good design practice to have this machining done on a diameter at least 0.065 inches smaller than the piston rod diameter. This allows the piston rod to have a chamfer preventing rod seal damage during assembly

or maintenance. Standard style 6 rod ends with a longer than standard WG dimension should call out a style 0 rod end and the note: **same as 6 except WG=_____**. A drawing should be submitted for special 6 rod ends that have specific tolerances or special radii. Special rod ends that have smaller than standard male threads, larger than standard female threads, or style 6 rod ends with smaller than standard AF or AE dimensions are to be reviewed by Engineering for proper strength at operating pressure.

Service Policy

On cylinders returned to the factory for repairs, it is standard policy for the Industrial Cylinder Division to make such part replacements as will put the cylinder in as good as new condition. Should the condition of the returned cylinder be such that expenses for repair would exceed the costs of a new one, you will be notified.

Address all correspondence and make shipments to, Service Department at your nearest regional plant listed in the pages of this catalog.

Certified Dimensions

Schrader Bellows guarantees that all cylinders ordered from this catalog will be built to dimensions shown. All dimensions are certified to be correct, and thus it is not necessary to request certified drawings.

How To Order By Model Number

PA-2 Pneumatic Cylinders can be specified by model number by using the tables shown at right.

1. Type

Select the Model Number Code which identifies single, double end or non-lube.

2. Bore & Rod Diameter

Select the Model Number Code which identifies the desired bore size and rod diameter combination.

3. Mounting & Cushioning

Select the Model Number Code which identifies the desired mounting style and cushioning option.

4. Rod End Style

Select the Model Number Code which identifies the desired rod end thread style.

5. Seal Type

Complete the Model Number by selecting the type of seals desired.

6. Stroke Length

It is necessary to specify the stroke length desired following the Model Number. For example: PAA101621 with 6" stroke.

Specifying the Desired Trunnion Location

For cylinders with intermediate trunnion mounting, the dimension specified should be the distance from the piston rod reference point to the center-line of the pin.

The Example Would Identify:

A single end pneumatic cylinder, 1-1/2" bore size, 5/8" piston rod diameter, side tapped mount, cushioned both ends, with a small male rod thread, Buna N Seals, a 6" stroke.

Optional Mounting Accessories

Specify separately the part number for desired optional mounting accessories.

Note: For special modifications other than piston rod ends use S in the tenth position of the model number and describe special features required.

Example: PAA101621S 6" Stroke

Cylinder to be Nickel Plated.

1	Model Number
Type	PA-2 Series Pneumatic
Single End	PA
Double End	PB
Non-Lube Single End	PN
Non-Lube Double End	PP

2	Bore Size	Rod Dia.	Model No. Code
1"	1/2"	5/8"	S50
		1"	S10
1 1/2"	5/8"	1"	A10
		1 1/8"	A11
2"	5/8"	1 1/8"	B10
		1 1/4"	B11
		1 3/8"	B12
2 1/2"	5/8"	1 3/8"	C10
		1 1/2"	C11
		1 3/4"	C12
		1 7/8"	C13
3 1/4"	1"	1 3/4"	D11
		1 7/8"	D12
		1 3/4"	D13
		2"	D14
4"	1"	1 3/8"	E11
		1 3/4"	E12
		1 3/4"	E13
		2"	E14
		2 1/2"	E15
5"	1"	1 3/8"	F11
		1 3/8"	F12
		1 3/4"	F13
		2"	F14
		2 1/2"	F15
		3"	F16
		3 1/2"	F17
6"	1 3/8"	1 3/4"	G12
		1 3/4"	G13
		2"	G14
		2 1/2"	G15
		3"	G16
		3 1/2"	G17
		4"	G18
	7"	1 3/8"	H12
		1 3/4"	H13
		2"	H14
	8"	1 3/8"	J12
		1 3/4"	J13
		2"	J14
		2 1/2"	J15
		3"	J16
		3 1/2"	J17
		4"	J18
		4 1/2"	J19
		5"	J41
		5 1/2"	J42
	10"	1 3/4"	K13
		2"	K14
		2 1/2"	K15
		3"	K16
		3 1/2"	K17
		4"	K18
		4 1/2"	K19
		5"	K41
		5 1/2"	K42
	12"	2"	L14
		2 1/2"	L15
		3"	L16
		3 1/2"	L17
		4"	L18
		4 1/2"	L19
		5"	L41
		5 1/2"	L42
	14"	2 1/2"	M15
		3"	M16
		3 1/2"	M17
		4"	M18
		4 1/2"	M19
		5"	M41
		5 1/2"	M42

3	Model Number Code				
	NFPA Style	Non- Cush.	Cush. Head	Cush. Cap	Cush. Both
Mounting Style					
Side Lug	MS2	05	06	07	08
Side Tap	MS4	13	14	15	16
Head Rectangular Flange (1-6)	MF1	21	22	23	24
Cap Rectangular Flange (1-6)	MF2	25	26	27	28
Head Square Flange (1-6)	MF5	29	30	31	32
Cap Square Flange (1-6)	MF6	33	34	35	36
Head Square (7-14)	ME3	37	38	39	40
Cap Square (7-14)	ME4	41	42	43	44
Tie Rods Extended Both Ends	MX1	53	54	55	56
Tie Rods Extended Cap End	MX2	57	58	59	60
Tie Rods Extended Head End	MX3	61	62	63	64
Head Trunnion	MT1	69	70	71	72
Cap Trunnion	MT2	73	74	75	76
Intermediate Fixed Trunnion	MT4	77	78	79	80
Cap Fixed Clevis	MP1	81	82	83	84
Spherical Bearing	MPU3	89	90	91	92
NO MOUNT	MX0	93	94	95	96

4	Rod End Style	Model Number Code
	Small Male	2
	Short Female	3
	Intermediate Male	4
	Flange Coupling	6
	Female Thread for Spherical Rod Eye	7
	Special Specify	0

5	Seal Type	Model Number Code
	Buna N Seals	1
	Fluorocarbon Seals	2

Model Number Example:

PA A10 16 2 1 W/6" Stroke

6 Specify Stroke Length 6.00"

Schrader Bellows Non-Lube Heavy-Duty Air Cylinders

PN Series



For millions of trouble free cycles

- Nominal pressure — 250 PSI — Air Service
- Standard Bore Sizes — 1" through 14"
- Piston Rod Diameters — 1/2" through 5 1/2"
- 14 Standard Mounting Styles
- NFPA Interchangeable
- Exceeds Automotive Specifications

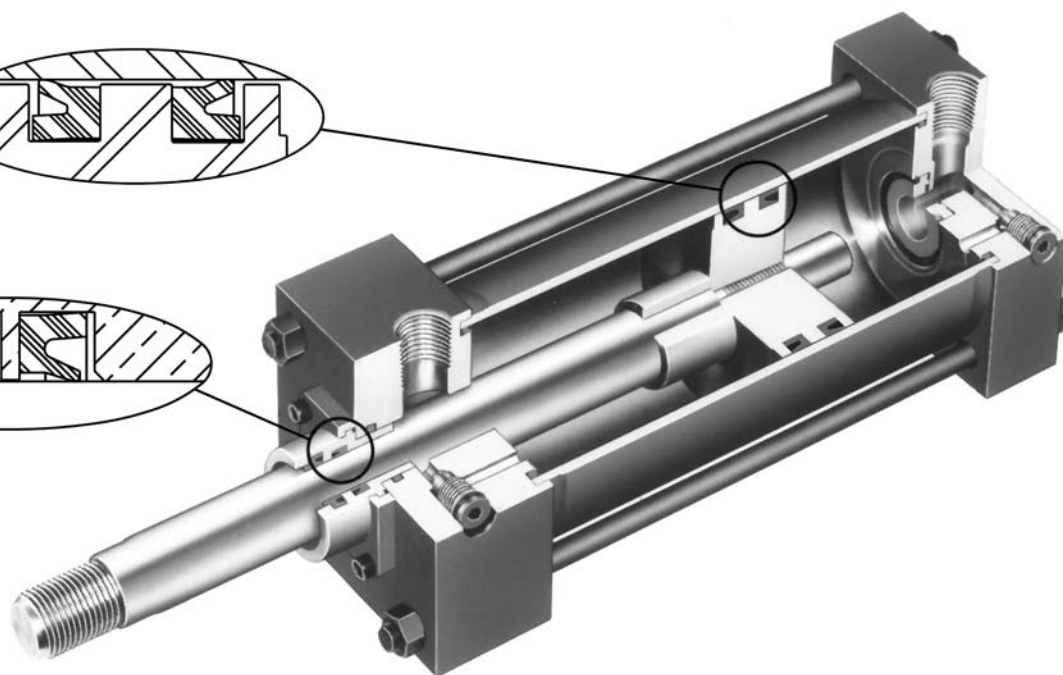
The PN Series Non-Lube Air Cylinder with Proven Performance

Millions of trouble free cycles with... ZERO LEAKAGE.

Piston Lipseals



Gland Lipseal



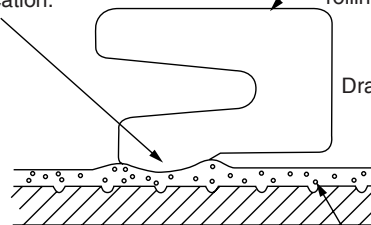
Increased Market Demand and continuous research and testing efforts inspired the development of the PN Series Non-Lubricated Air Cylinder. The PN Series piston rod and cylinder barrel surfaces act as highly efficient lubricant reservoirs, maintaining their own lubricant film. Other manufacturers pack grease into grooves and pockets and call them reservoirs. The fact of the matter is that as those grooves empty out over time; grease is being transported out of the cylinder and into the control system components and the atmosphere. The PN Series concept eliminates that problem by maintaining the lubricant film where it belongs: on the seals, bearing surfaces, piston rod and cylinder bore.

Benefits include...long seal and bearing life and since no oil is added through the use of lubricators – no oil is expelled into the atmosphere with the exhaust air as the cylinder strokes.

Anatomy of PN Series Sealing and Lubricant Retention Systems

Rounded sealing lip glides over lubricant film instead of scraping it off. Reduces friction, increases life and eliminates the need for added lubrication.

Increased heel thickness and outer lip extension improve stability, resist rolling.



Drawing not to scale

High integrity lubricant film with suspended PTFE particles

In the PN Series you get all the cost saving benefits and features of the popular heavy-duty PA-2 Series air cylinder including...

- Bolt-On Rod Gland Assembly for positive no leak sealing
- Piston rod, hard chrome-plated and case-hardened steel
- High strength rolled thread Piston Rod Stud

- Steel tube cylinder body with chrome-plated micro finish bore...

Plus the innovative “Non-Lube” feature which further increases your benefits of lower operating and maintenance costs.

Standard Specifications

- Heavy-Duty Service — ANSI/(NFPA) T3.6.7 R2-1996 Mounting Dimension Standards
- Standard Construction — Square Head — Tie Rod Design
- Standard Temperature — -10°F to +165°F
- Standard Fluid — Filtered Air
- Strokes — Available in any practical stroke length
- Cushions — Optional at either end or both ends of stroke. “Float Check” at cap end.

In line with our policy of continuing product improvement, specifications in this bulletin are subject to change.

Available Bore and Rod Sizes

Bore Sizes Available	1"	1 1/2"	2"	2 1/2"	3 1/4"	4"	5"	6"	8"	10"	12"	14"
----------------------	----	--------	----	--------	--------	----	----	----	----	-----	-----	-----

Rod Sizes Available	1/2"	5/8"	1"	1 3/8"	1 3/4"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5 1/2"
---------------------	------	------	----	--------	--------	----	--------	----	--------	----	--------	----	--------

How to Order PN Series Non-Lube Air Cylinders

Data Required on all PN Cylinder Orders

When ordering PN Series cylinders, be sure to specify each of the following requirements:

(**Note:** Duplicate cylinders can be ordered by giving the SERIAL NUMBER from the nameplate of the original cylinder. Factory records supply a quick, positive identification.)

a) Bore Size

b) Mounting Style

Specify your choice of mounting style — as shown in this catalog. If double rod is wanted, specify “with double rod.”

c) Series Designation (PN)

d) Length of Stroke

e) Piston Rod Diameter

Specify rod diameter in PN Series cylinders, standard rod diameters will be furnished if not otherwise specified, unless length of stroke makes the application questionable.

f) Piston Rod End Thread Style

Give thread style number or specify dimensions. Thread style number 2 will be supplied if not otherwise specified.

g) Cushions (if required)

Specify “Cushion-head end,” “Cushion-cap end” or “Cushion-both ends” as required. If cylinder is to have a double rod and only one cushion is required, be sure to specify clearly which end of the cylinder is to be cushioned.

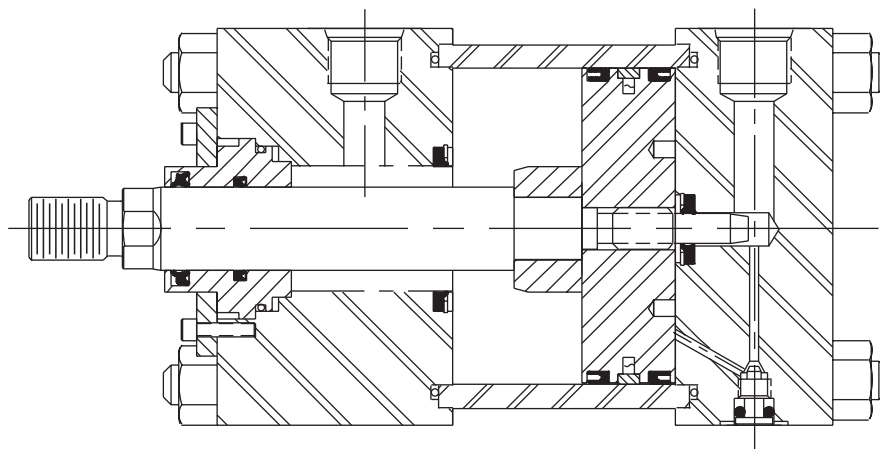


Contents

Specifications	52	Alignment Coupler	84
Ford Order Code	53	Accessories	85
Mounting Dimensions	54-79	Accessories / Cylinder Kits	86
Spherical Bearing Mount	80-81	Mounting Styles	87
Cylinder Accessories	82	Schrader Bellows Order Code	88
Double Rod Models	83		

Universal™ “NC9” Series Medium Duty Pre-Lubricated Pneumatic Cylinders

* These cylinders are specified for Automotive and Foundry Applications under the brand name “UNIVERSAL”.



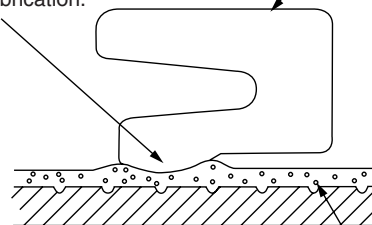
GENERAL SPECIFICATIONS NC9 Series Pneumatic Cylinders

INDUSTRY STANDARDS	Meets J.I.C. and ANSI/(NFPA) T 3.6.7R2-1996 standards.
PRESSURE RATING	250 PSI Air
TEMPERATURE RANGE	Buna-N Seal: -10°F to +165°F
BORE SIZES	1-1/2" through 12"
PISTON ROD DIAMETER	1" through 5-1/2"
MOUNTINGS	10 styles Ford approved
PISTON END THREAD	One standard style; Thread rolled on 1-1/2" through 8" bore size through 1" thread with rounded root radius for maximum strength.
CUSHIONS	Available at either end or both ends; all bore sizes
HEAD AND CAP ENDS	Machined from steel blocks
PISTON	Steel with non-metallic wear ring
PISTON RODS	100,000 PSI minimum yield strength steel. Induction hardened to Rc54. Ground, polished and hard chrome plated to a 10 micro-inch finish.
TUBE	Steel tubing is finished to 10-15 micro-inch finish and I.D. hard chrome plated.
TIE RODS	High tensile steel with rolled threads
TIE ROD NUTS	All steel, prevailing torque type
ROUNDED LIP U-CUP	Carboxylated Nitrile standard.

Anatomy of Series NC9 Sealing and Lubricant Retention Systems

Rounded sealing lip glides over lubricant film instead of scraping it off. Reduces friction, increases life and eliminates the need for added lubrication.

Increased heel thickness and outer lip extension improve stability, resist rolling.



Drawing not to scale
High integrity lubricant film with suspended PTFE particles

Ford NC9 Medium Duty Air Cylinder

Ordering Code

Ordering Example

NC9 MF1 1.5 X 6.0 1.0A CC2-HC2 CP1-HP1 S

Ford Series
NC9

Mounting Code	Description
MX1	Tie Rods Extended Both Ends
MX2	Tie Rods Extended Cap End
MX3	Tie Rods Extended Head End
MF1	Head Rect Flange 1 1/2"-6"
MF2	Cap Rect Flange 1 1/2"-6"
ME3	Head Square 8"-12"
ME4	Cap Square 8"-12"
MS2	Side Lug
MP1	Cap Fixed Clevis
MT4	Intermediate Fixed Trunnion

Cylinder Bore and Stroke

Piston Rod Diameter and Rod End Style	
Only one rod size is specified per bore (Other rod diameters available for replacement only. Modified rod ends must be described completely with KK, A, W or WF dimensions. If otherwise special, furnish dimensioned sketch.)	Ford spec (see pages 52 & 88)

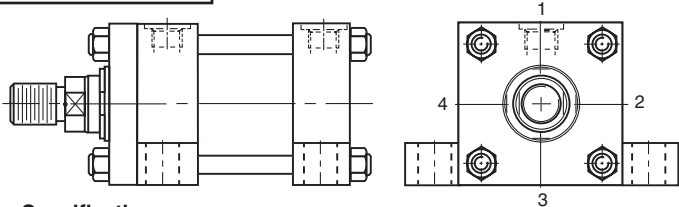
Cushion Location
"C" indicates Cap End Cushion "H" indicates Head End Cushion Cushion Adjust available @ positions 1, 2, 3, or 4

Port Type and Location
"C" indicates Cap End Port "H" indicates Head End Port "P" indicates NPTF pipe thread (standard) "T" indicates SAE straight thread Ports available @ positions 1, 2, or 3

S — Special Modifications
"S" in this position is used to describe all special features that are other than standard, or advise serial number if for replacement.

NOTE: Add the letter "D" for double rod end cylinder.
EXAMPLE: NC9-MDF2

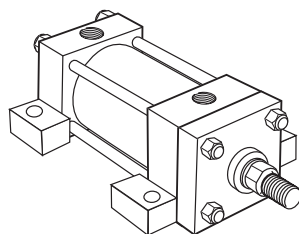
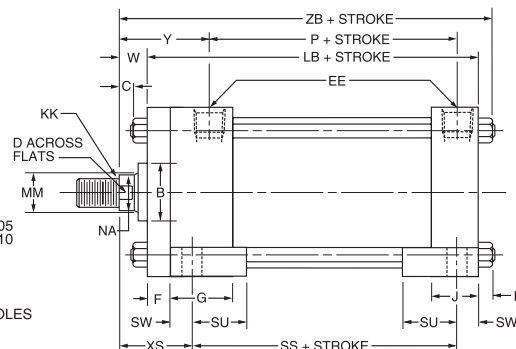
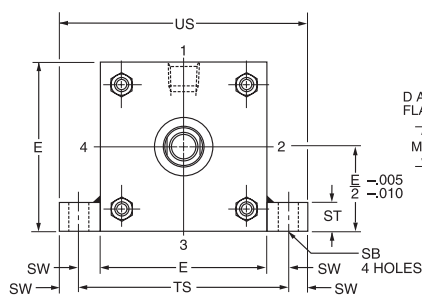
NOTE: Add the letter "K" if key extension is required.
EXAMPLE: NC9-MS2K



NC9 cylinders are built to Ford Motor Company Vehicle Operations Specifications.
Any deviation from this standard should be approved in writing by Ford Motor Company.

Side Lug Mount**Style MS2**

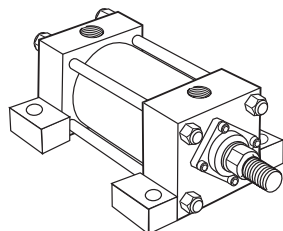
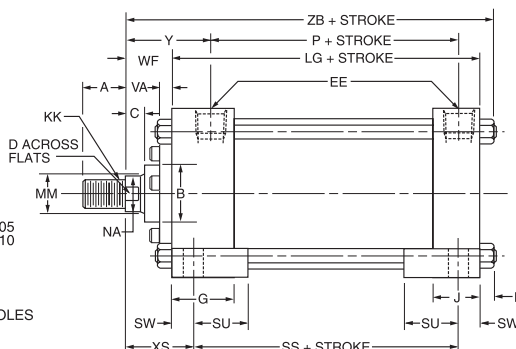
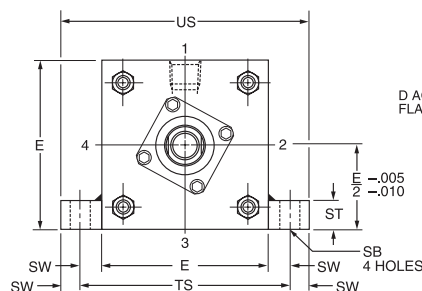
1 1/2" - 2" - 2 1/2" - 5" and 6" Bore
With Maximum Oversize Rods

**Tie Rod
Retained Cartridge**

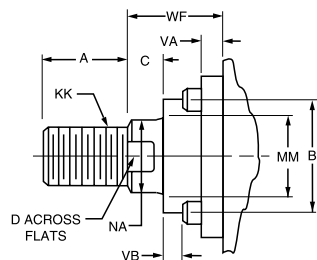
Before determining dimensions: See chart on page 87 for cylinder rod combinations that have removable cartridges.

Side Lug Mount**Style MS2**

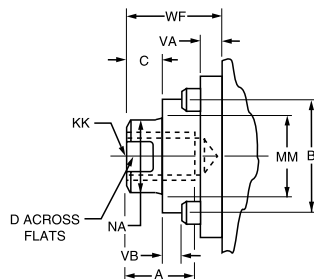
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

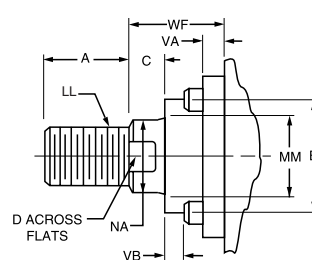
Small Male

**Thread Style 3**

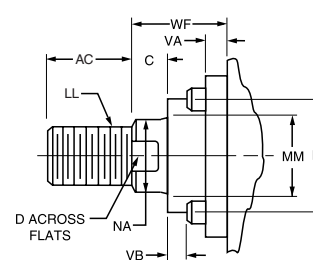
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE		F	G	J	K	SB•	ST	SU	SW	TS	US	Add Stroke			
		NPTF	SAE											LB	LG	P	SS
1½	2	¾†	#6**	¾	1½	1	¼	7/16	½	15/16	¾	2¾	3½	4	35/8	2¼	27/8
2	2½	¾†	#6	¾	1½	1	5/16	7/16	½	15/16	¾	3¼	4	4	35/8	2¼	27/8
2½	3	¾†	#6	¾	1½	1	5/16	7/16	½	15/16	¾	3¾	4½	4½	3¾	25/8	3
3¼	3¾	½	#10	—	1¾	1¼	¾	9/16	¾	1¼	½	4¾	5¾	47/8	4¼	25/8	3¼
4	4½	½	#10	—	1¾	1¼	¾	9/16	¾	1¼	½	5½	6½	47/8	4¼	25/8	3¼
5	5½	½	#10	5/8	1¾	1¼	7/16	13/16	1	19/16	11/16	67/8	8¼	5½	4½	27/8	3½
6	6½	¾	#12	¾	2	1½	7/16	13/16	1	19/16	11/16	77/8	9¼	5¾	5	3½	35/8

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods.
Minimum of three full threads available.

• Upper surface spot-faced for socket head screws.

** Port adapter fitting furnished at head end only.

Table 2—Rod Dimensions and Envelope Dimensions Affected by Rod Size

Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size														Add Stroke
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF	XS	Y	ZB	
1½	5/8	1/2-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	3/16	—	1	1⅜	1⅕1/16	47/8	
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	½	—	—	1	—	1¾	25/16	5¼	
2	5/8	1/2-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	3/16	—	1	1⅜	1⅕1/16	415/16	
	1⅜	1¼-12	1-14	1⅕8	2½2	1.999	5/8	1⅞	15/16	5/8	—	—	1¼	—	2	29/16	59/16	
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	1¾	25/16	55/16	
2½	5/8	1/2-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	3/16	—	1	1⅜	1⅕1/16	5⅕16	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅕1/16	¾	—	—	1½	—	2¼	2⅓1/16	515/16	
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	1¾	25/16	57/16	
	1⅜	1¼-12	1-14	1⅕8	2½2	1.999	5/8	1⅞	15/16	5/8	—	—	1¼	—	2	29/16	511/16	
3¼	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	17/8	27/16	6	
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1⅕1/16	1⅕1/16	—	¼	9/16	—	2	2½2	31/16	65/8	
	1⅜	1¼-12	1-14	1⅕8	2½2	1.999	5/8	1⅞	15/16	—	¼	½2	—	15/8	2⅞	2⅕1/16	6¼	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅕1/16	—	¼	9/16	—	17/8	2⅞	2⅕1/16	6½2	
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	17/8	27/16	6	
4	2½2	2¼-12	17/8-12	3	4½2	3.124	1	2½16	2⅓8	—	¼	11/16	—	2¼	2¾4	35/16	67/8	
	1⅜	1¼-12	1-14	1⅕8	2½2	1.999	5/8	1⅞	15/16	—	¼	½2	—	15/8	2⅞	2⅕1/16	6¼	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅕1/16	—	¼	9/16	—	17/8	2⅞	2⅕1/16	6½2	
	2	1¾-12	1½-12	2¼	3½2	2.624	7/8	1⅕1/16	1⅕1/16	—	¼	9/16	—	2	2½2	31/16	65⅔8	
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	21/16	27/16	65/16	
5	3½2	3¼-12	2½-12	3½2	—	4.249	1	3	3⅓8	5/8	—	—	15/8	—	2⅕1/16	35/16	73/16	
	1⅜	1¼-12	1-14	1⅕8	2½2	1.999	5/8	1⅞	15/16	—	¼	½2	—	15/8	25/16	2⅕1/16	69/16	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅕1/16	—	¼	9/16	—	17/8	29/16	2⅕1/16	613/16	
	2	1¾-12	1½-12	2¼	3½2	2.624	7/8	1⅕1/16	1⅕1/16	—	¼	9/16	—	2	2⅕1/16	31/16	615/16	
	2½2	2¼-12	17/8-12	3	4½2	3.124	1	2½16	2⅓8	—	¼	11/16	—	2¼	2⅕1/16	35/16	73/16	
	3	2¾4-12	2¼-12	3½2	—	3.749	1	25/8	27/8	5/8	—	—	15/8	—	2⅕1/16	35/16	73/16	
	1⅜	1¼-12	1-14	1⅕8	2½2	1.999	5/8	1⅞	15/16	—	¼	7/16	—	15/8	25/16	2⅕1/16	71/16	
6	4	3¾-12	3-12	4	—	4.749	1	3⅓8	37/8	½2	—	—	1½2	—	2⅕1/16	37/16	711/16	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅕1/16	—	¼	9/16	—	17/8	29/16	31/16	75/16	
	2	1¾-12	1½-12	2¼	3½2	2.624	7/8	1⅕1/16	1⅕1/16	—	¼	9/16	—	2	2⅕1/16	33/16	77/16	
	2½2	2¼-12	17/8-12	3	4½2	3.124	1	2½16	2⅓8	—	¼	11/16	—	2¼	2⅕1/16	37/16	711/16	
	3	2¾4-12	2¼-12	3½2	—	3.749	1	25/8	27/8	½2	—	—	1½2	—	2⅕1/16	37/16	711/16	
	3½2	3¼-12	2½-12	3½2	—	4.249	1	3	3⅓8	½2	—	—	1½2	—	2⅕1/16	37/16	711/16	

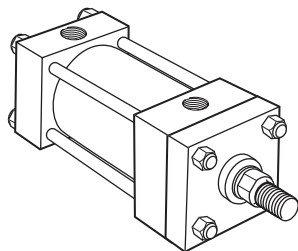
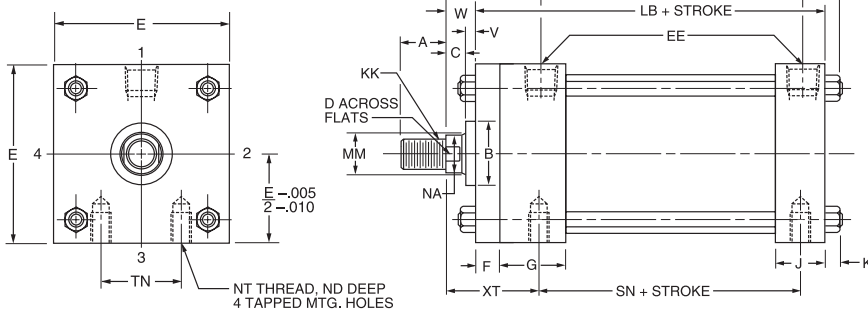
Side Tap Mount

Style MS4

1 1/2" - 2" - 2 1/2" - 5"

and 6" Bore

With Maximum Oversize Rods

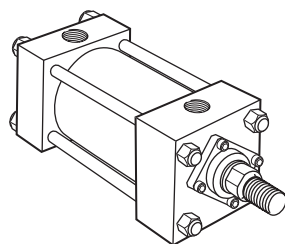
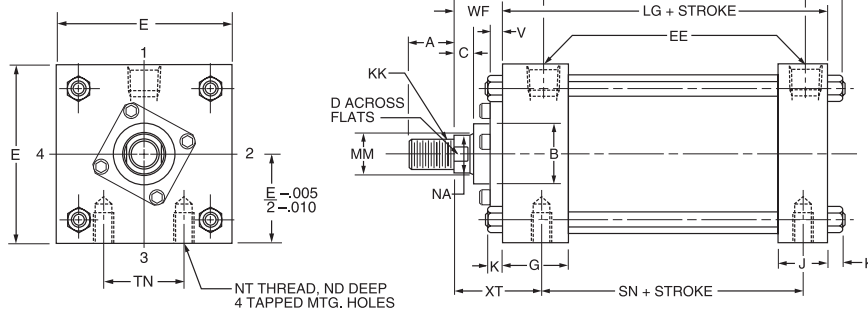
**Tie Rod Retained Cartridge**

Before determining dimensions: See chart on page 87 for cylinder rod combinations that have removable cartridges.

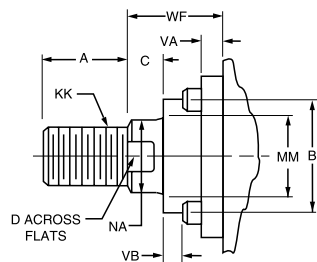
Side Tap Mount

Style MS4

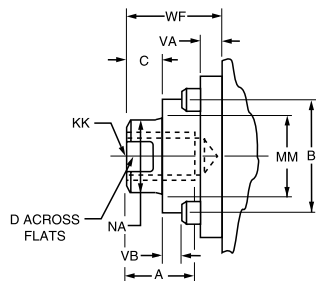
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

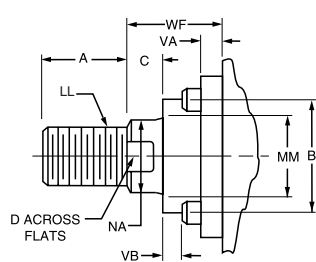
Small Male

**Thread Style 3**

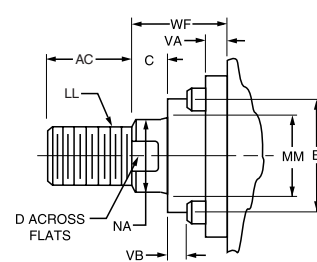
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**“Special” Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE		F	G	J	K	NT	TN	Add Stroke			
		NPTF	SAE							LB	LG	P	SN
1½	2	¾†	#6**	¾	1½	1	¼	¼-20	⅝	4	3⅝	2¼	2¼
2	2½	¾†	#6	¾	1½	1	⅝	⅝-18	⅞	4	3⅝	2¼	2¼
2½	3	¾†	#6	¾	1½	1	⅝	⅝-16	1¼	4⅞	3¾	2⅝	2⅝
3¼	3¾	½	#10	⅝	1¾	1¼	¾	½-13	1½	4⅞	4¼	2⅝	2⅝
4	4½	½	#10	⅝	1¾	1¼	¾	½-13	2⅞	4⅞	4¼	2⅝	2⅝
5	5½	½	#10	⅝	1¾	1¼	⅞	⅝-11	2⅞	5⅞	4½	2⅞	2⅞
6	6½	¾	#12	¾	2	1½	⅞	¾-10	3¼	5¾	5	3⅞	3⅞

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

** Port adapter fitting furnished at head end only.

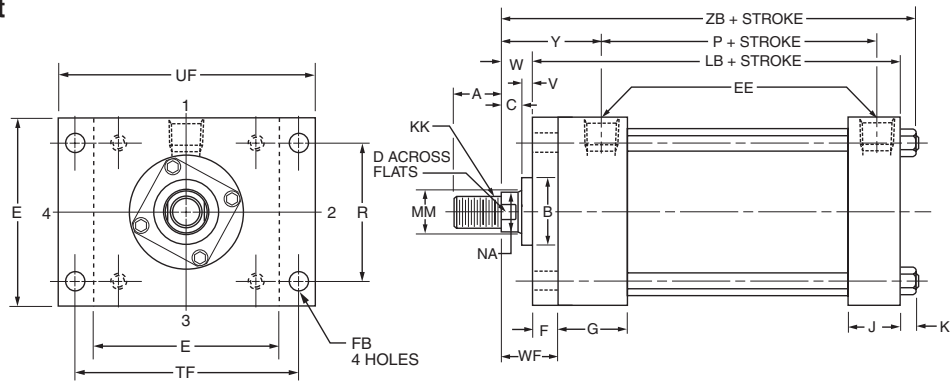
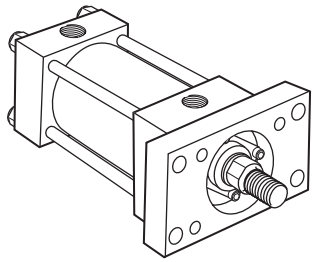
Table 2—Rod Dimensions and Envelope Dimensions Affected by Rod Size

Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size																Add Stroke
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF	XT	Y	ND	ZB		
1½	⅝	1/2-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	¾	—	1	1¹⁵/₁₆	1¹⁵/₁₆	¾	47/8		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	1⁵/₁₆	½	—	—	1	—	2⁵/₁₆	2⁵/₁₆	¾	5¼		
2	⅝	1/2-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	¾	—	1	1¹⁵/₁₆	1¹³/₁₆	1¹/₃₂	4¹⁵/₁₆		
	1⅜	1¼-12	1-14	1⁵/8	2½	1.999	⅝	1⅞	1⁵/₁₆	⅝	—	—	1¼	—	2⁹/₁₆	2⁹/₁₆	1¹/₃₂	5⁹/₁₆		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	1⁵/₁₆	—	¼	¾	—	1¾	2⁵/₁₆	2⁵/₁₆	1¹/₃₂	5⁵/₁₆		
2½	⅝	1/2-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	¾	—	1	1¹⁵/₁₆	1¹⁵/₁₆	7/16	5¹/16		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹/₁₆	¾	—	—	1½	—	2¹³/₁₆	2¹³/₁₆	7/16	5¹⁵/₁₆		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	1⁵/₁₆	—	¼	¾	—	1¾	2⁵/₁₆	2⁵/₁₆	7/16	57/16		
	1¾	1¼-12	1-14	1⁵/8	2½	1.999	⅝	1⅞	1⁵/₁₆	⅝	—	—	1¼	—	2⁹/₁₆	2⁹/₁₆	7/16	5¹¹/₁₆		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	1⁵/₁₆	—	¼	¾	—	1¾	2⁷/₁₆	2⁷/₁₆	½	6		
3¼	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1¹¹/₁₆	1¹⁵/₁₆	—	¼	9/16	—	2	3¹/₁₆	3¹/₁₆	½	6⁵/8		
	1⅜	1¼-12	1-14	1⁵/8	2½	1.999	⅝	1⅞	1⁵/₁₆	—	¼	½	—	1⁵/8	2¹¹/₁₆	2¹¹/₁₆	½	6¼		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹/₁₆	—	¼	9/16	—	17/8	2¹⁵/₁₆	2¹⁵/₁₆	½	6½		
4	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	1⁵/₁₆	—	¼	¾	—	1¾	2⁷/₁₆	2⁷/₁₆	⁵/8	6		
	2½	2¼-12	17/8-12	3	4½	3.124	1	2¹/₁₆	2¾	—	¼	1¹/₁₆	—	2¼	3⁵/₁₆	3⁵/₁₆	⁵/8	67/8		
	1⅜	1¼-12	1-14	1⁵/8	2½	1.999	⅝	1⅞	1⁵/₁₆	—	¼	½	—	1⁵/8	2¹¹/₁₆	2¹¹/₁₆	⁵/8	6¼		
	1¾	1¼-12	1¼-12	2	3	2.374	¾	1½	1¹¹/₁₆	—	¼	9/16	—	17/8	2¹⁵/₁₆	2¹⁵/₁₆	⁵/8	6½		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1¹¹/₁₆	1¹⁵/₁₆	—	¼	9/16	—	2	3¹/₁₆	3¹/₁₆	⁵/8	6⁵/8		
5	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	1⁵/₁₆	—	¼	¾	—	1¾	2⁷/₁₆	2⁷/₁₆	¾	6⁵/16		
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3¾	⅝	—	—	1⁵/8	—	3⁵/₁₆	3⁵/₁₆	¾	7³/16		
	1⅜	1¼-12	1-14	1⁵/8	2½	1.999	⅝	1⅞	1⁵/₁₆	—	¼	½	—	1⁵/8	2¹¹/₁₆	2¹¹/₁₆	¾	6⁹/16		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹/₁₆	—	¼	9/16	—	17/8	2¹⁵/₁₆	2¹⁵/₁₆	¾	6¹³/16		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1¹¹/₁₆	1¹⁵/₁₆	—	¼	9/16	—	2	3¹/₁₆	3¹/₁₆	¾	6¹⁵/16		
6	2½	2¼-12	17/8-12	3	4½	3.124	1	2¹/₁₆	2¾	—	¼	1¹/₁₆	—	2¼	3⁵/₁₆	3⁵/₁₆	¾	7³/16		
	3	2¾-12	2¼-12	3½	—	3.749	1	2⁵/8	27/8	⅝	—	—	1⁵/8	—	3⁵/₁₆	3⁵/₁₆	¾	7³/16		
	1⅜	1¼-12	1-14	1⁵/8	2½	1.999	⅝	1⅞	1⁵/₁₆	—	¼	7/16	—	1⁵/8	2¹³/₁₆	2¹³/₁₆	7/8	7¹/16		
	4	3¾-12	3-12	4	—	4.749	1	3¾	37/8	½	—	—	1½	—	37/16	37/16	7/8	7¹¹/16		
6	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹/₁₆	—	¼	9/16	—	17/8	3¹/₁₆	3¹/₁₆	7/8	7⁵/16		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1¹¹/₁₆	1¹⁵/₁₆	—	¼	9/16	—	2	3³/16	3³/16	7/8	77/16		
	2½	2¼-12	17/8-12	3	4½	3.124	1	2¹/₁₆	2¾	—	¼	1¹/₁₆	—	2¼	37/16	37/16	7/8	7¹¹/16		
	3	2¾-12	2¼-12	3½	—	3.749	1	2⁵/8	27/8	½	—	—	1½	—	37/16	37/16	7/8	7¹¹/16		
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3¾	½	—	—	1½	—	37/16	37/16	7/8	7¹¹/16		

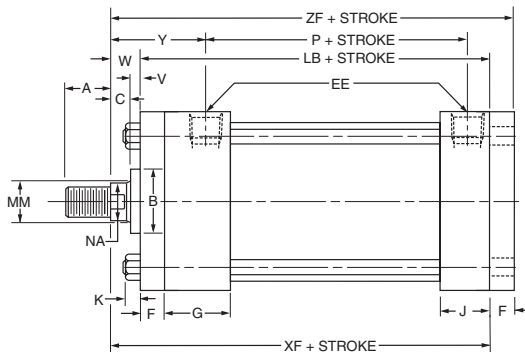
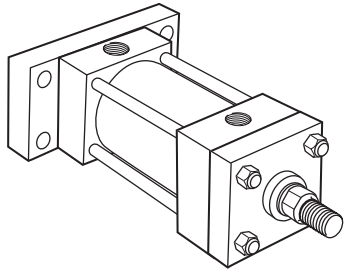
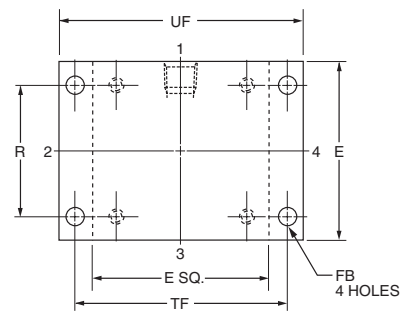
Head Rectangular Flange Mount

Style MF1

1 1/2" - 6" Bore

**Cap Rectangular Flange Mount**

Style MF2

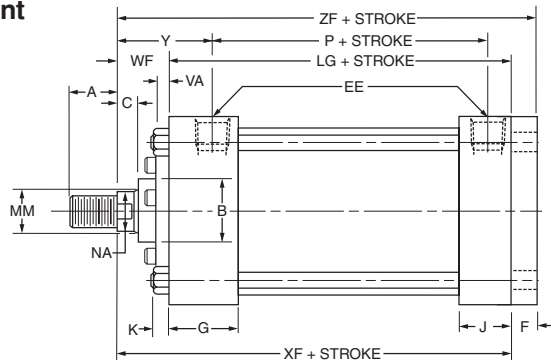
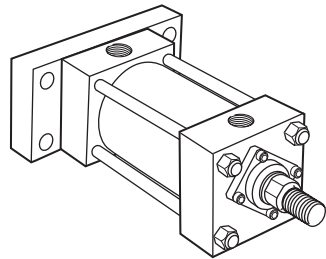
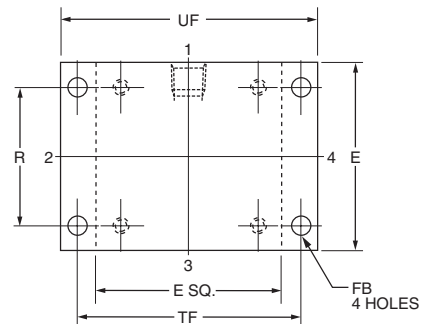
1 1/2" - 2" - 2 1/2" - 5" and 6" Bore
With Maximum Oversize Rods**Tie Rod Retained
Cartridge**

Before determining dimensions: See chart on page 87 for cylinder rod combinations that have removable cartridges.

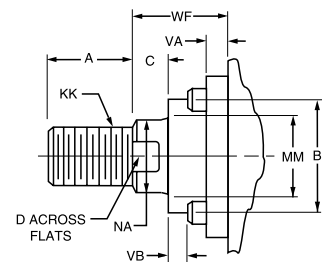
Cap Rectangular Flange Mount

Style MF2

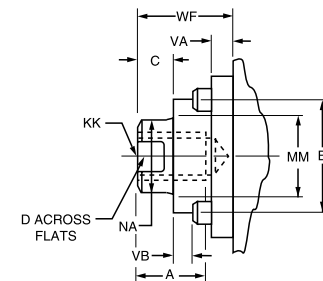
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

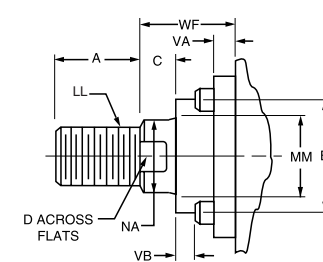
Small Male

**Thread Style 3**

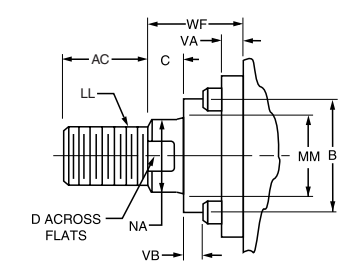
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE		F	FB	G	J	K	R	TF	UF	Add Stroke		
		NPTF	SAE									LB	LG	P
1½	2	¾†	#6**	¾	5/16	1½	1	¼	1.43	2¾	3¾	4	3⅝	2¼
2	2½	¾†	#6	¾	¾	1½	1	5/16	1.84	3¾	4½	4	3⅝	2¼
2½	3	¾†	#6	¾	¾	1½	1	5/16	2.19	3¾	4⅝	4½	3¾	2⅝
3¼	3¾	½	#10	5/8	7/16	1¾	1¼	¾	2.76	4½	5½	—	4¼	2⅝
4	4½	½	#10	5/8	7/16	1¾	1¼	¾	3.32	5½	6¼	—	4¼	2⅝
5	5½	½	#10	5/8	9/16	1¾	1¼	¾	4.10	6⅝	7⅝	5½	4½	2⅝
6	6½	¾	#12	¾	9/16	2	1½	7/16	4.88	7⅝	8⅝	5¾	5	3⅝

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

** Port adapter fitting furnished at head end only.

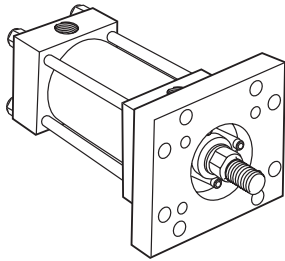
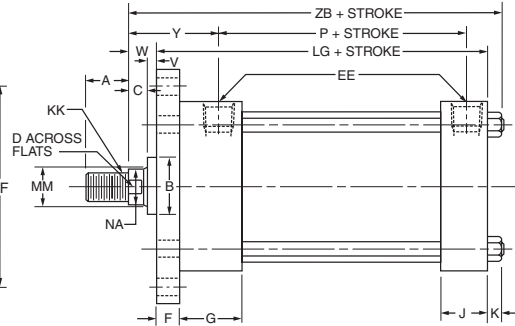
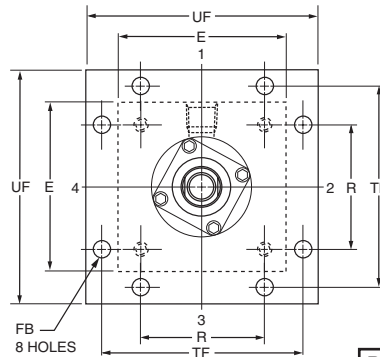
Table 2—Rod Dimensions and Envelope Dimensions Affected by Rod Size

Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size														
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+.000 -.002 B	C	D	NA	V	VA	VB	W	WF	Y	Add Stroke		
																XF	ZB	ZF
1½	5⁄8	1⁄2-20	7⁄16-20	¾	1⅞	1.124	¾	½	9⁄16	—	¼	¾	—	1	1¹⁵⁄₁₆	4⅝	4⅞	5
	1	7⁄8-14	¾-16	1⅞	1⅞	1.499	½	7⁄8	1⁵⁄₁₆	½	—	—	1	—	2⁵⁄₁₆	5	5¼	5⅜
2	5⁄8	1⁄2-20	7⁄16-20	¾	1⅞	1.124	¾	½	9⁄16	—	¼	¾	—	1	1¹⁵⁄₁₆	4⅝	4¹⁵⁄₁₆	5
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⁵⁄₁₆	⅝	—	—	1¼	—	2⁹⁄₁₆	5¼	5⁹⁄₁₆	5⅝
	1	7⁄8-14	¾-16	1⅞	1⅞	1.499	½	7⁄8	1⁵⁄₁₆	—	¼	¾	—	1⅜	2⁵⁄₁₆	5	5⁹⁄₁₆	5⅜
2½	5⁄8	1⁄2-20	7⁄16-20	¾	1⅞	1.124	¾	½	9⁄16	—	¼	¾	—	1	1¹⁵⁄₁₆	4¾	5¹⁄₁₆	5⅞
	1⅜	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹⁄₁₆	¾	—	—	1½	—	2¹³⁄₁₆	5⅝	5¹⁵⁄₁₆	6
	1	7⁄8-14	¾-16	1⅞	1⅞	1.499	½	7⁄8	1⁵⁄₁₆	—	¼	¾	—	1⅜	2⁵⁄₁₆	5⅞	5⁷⁄₁₆	5½
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⁵⁄₁₆	⅝	—	—	1¼	—	2⁹⁄₁₆	5⅜	5¹¹⁄₁₆	5¾
3¼	1	7⁄8-14	¾-16	1⅞	1⅞	1.499	½	7⁄8	1⁵⁄₁₆	—	¼	¾	—	1⅜	2⁹⁄₁₆	5⅝	5⅝	6¼
	2	1¾-12	1½-12	2¼	3½	2.624	7⁄8	1¹¹⁄₁₆	1¹⁵⁄₁₆	—	¼	9⁄16	—	2	3¹⁄₁₆	6¼	6	6⅞
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⁵⁄₁₆	—	¼	½	—	1⅝	2¹¹⁄₁₆	5⅞	6⅝	6½
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹⁄₁₆	—	¼	9⁄16	—	1⅞	2¹⁵⁄₁₆	6⅞	6¼	6¾
4	1	7⁄8-14	¾-16	1⅞	1⅞	1.499	½	7⁄8	1⁵⁄₁₆	—	¼	¾	—	1⅜	2⁹⁄₁₆	5⅝	6½	6¼
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2⅞	2⅜	—	¼	1¹⁄₁₆	—	2¼	3⁵⁄₁₆	6½	6	7⅞
	1⅝	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⁵⁄₁₆	—	¼	½	—	1⅝	2¹¹⁄₁₆	5⅞	6¼	6½
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹⁄₁₆	—	¼	9⁄16	—	1⅞	2¹⁵⁄₁₆	6⅞	6½	6¾
	2	1¾-12	1½-12	2¼	3½	2.624	7⁄8	1¹¹⁄₁₆	1¹⁵⁄₁₆	—	¼	9⁄16	—	2	3¹⁄₁₆	6¼	6⅝	6⅞
5	1	7⁄8-14	¾-16	1⅞	1⅞	1.499	½	7⁄8	1⁵⁄₁₆	—	¼	¾	—	1⅜	2⁹⁄₁₆	5⅞	6⅝	6½
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3⅜	⅝	—	—	1⅝	—	3⁵⁄₁₆	6¾	7³⁄₁₆	7⅜
	1⅝	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⁵⁄₁₆	—	¼	½	—	1⅝	2¹¹⁄₁₆	6⅞	6⁹⁄₁₆	6¾
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹⁄₁₆	—	¼	9⁄16	—	1⅞	2¹⁵⁄₁₆	6⅞	6¹³⁄₁₆	7
	2	1¾-12	1½-12	2¼	3½	2.624	7⁄8	1¹¹⁄₁₆	1¹⁵⁄₁₆	—	¼	9⁄16	—	2	3¹⁄₁₆	6½	6¹⁵⁄₁₆	7⅞
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2⅞	2⅜	—	¼	1¹⁄₁₆	—	2¼	3⁵⁄₁₆	6¾	7³⁄₁₆	7⅜
6	3	2¾-12	2¼-12	3½	—	3.749	1	2⅝	2⅞	⅝	—	—	1⅝	—	3⁵⁄₁₆	6¾	7³⁄₁₆	7⅜
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⁵⁄₁₆	—	¼	7⁄16	—	1⅝	2¹³⁄₁₆	6⅝	7¹⁄₁₆	7⅜
	4	3¾-12	3-12	4	—	4.749	1	3⅜	3⅞	½	—	—	1½	—	3⁷⁄₁₆	7¼	7¹¹⁄₁₆	8
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹⁄₁₆	—	¼	9⁄16	—	1⅞	3¹⁄₁₆	6⅞	7⁵⁄₁₆	7⅝
	2	1¾-12	1½-12	2¼	3½	2.624	7⁄8	1¹¹⁄₁₆	1¹⁵⁄₁₆	—	¼	9⁄16	—	2	3³⁄₁₆	7	7⁷⁄₁₆	7¾
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2⅞	2⅜	—	¼	1¹⁄₁₆	—	2¼	3⁷⁄₁₆	7¼	7¹¹⁄₁₆	8
	3	2¾-12	2¼-12	3½	—	3.749	1	2⅝	2⅞	½	—	—	1½	—	3⁷⁄₁₆	7¼	7¹¹⁄₁₆	8
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3⅜	½	—	—	1½	—	3⁷⁄₁₆	7¼	7¹¹⁄₁₆	8

Head Square Flange Mount

Style MF5

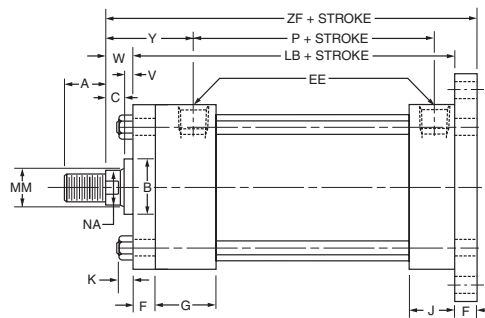
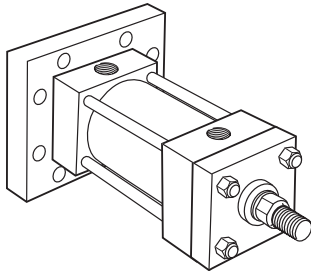
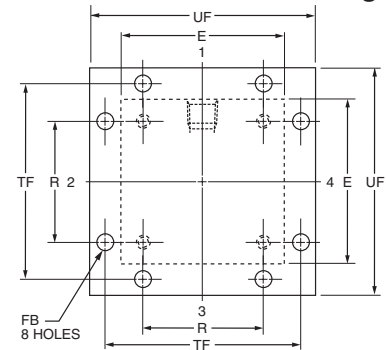
1 1/2" - 6" Bore

**Removable Cartridge**

Before determining dimensions: See chart on page 87 for cylinder rod combinations that have removable cartridges.

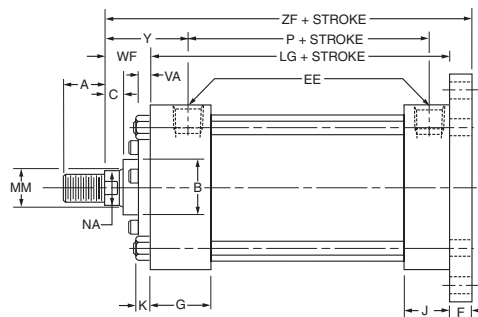
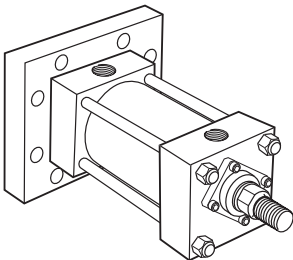
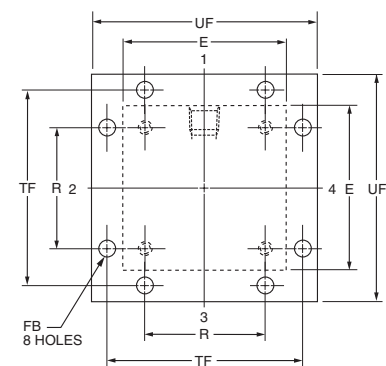
Cap Square Flange Mount

Style MF6

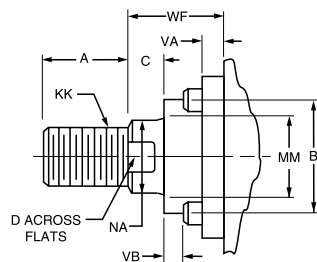
1 1/2" - 2" - 2 1/2" - 5" and 6" Bore
With Maximum Oversize Rods**Tie Rod Retained Cartridge****Cap Square Flange Mount**

Style MF6

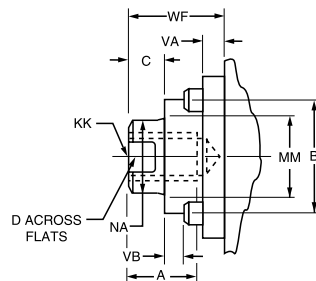
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

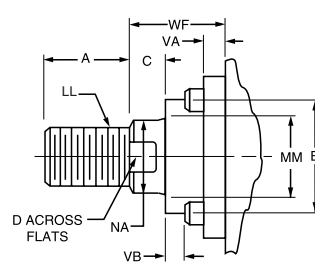
Small Male

**Thread Style 3**

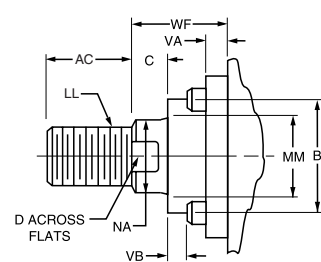
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE		F	FB	G	J	K	R	TF	UF	Add Stroke		
		NPTF	SAE									LB	LG	P
1½	2	¾†	#6**	¾	5/16	1½	1	¼	1.43	2¾	3/8	4	3½	2¼
2	2½	¾†	#6	¾	¾	1½	1	5/16	1.84	3¾	4/8	4	3½	2¼
2½	3	¾†	#6	¾	¾	1½	1	5/16	2.19	3¾	4½	4/8	3¾	2¾
3¼	3¾	1½	#10	5/8	7/16	1¾	1¼	¾	2.76	4½	5½	4¾	4¼	2¾
4	4½	1½	#10	5/8	7/16	1¾	1¼	¾	3.32	5½	6¼	4¾	4¼	2¾
5	5½	1½	#10	5/8	9/16	1¾	1¼	¾	4.10	6½	7½	5½	4½	2¾
6	6½	¾	#12	¾	9/16	2	1½	7/16	4.88	7½	8½	5¾	5	3½

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

** Port adapter fitting furnished at head end only.

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size														Add Stroke	
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF	Y	ZB	ZF		
1½	5/8	1½-20	7/16-20	¾	1½	1.124	¾	1/2	9/16	1/4**	1/4	3/16	1/4	1	1½/16	4¾	5		
	1	7/8-14	¾-16	1½	17/8	1.499	1/2	7/8	15/16	1/2	—	—	1	—	2½/16	5¼	5¾		
2	5/8	1½-20	7/16-20	¾	1½	1.124	¾	1/2	9/16	1/4**	1/4	3/16	5/8	1	1½/16	4½/16	5		
	1¾	1¼-12	1-14	1½	2½	1.999	5/8	1½	15/16	5/8	—	—	1¼	—	2¾/16	5¾/16	5¾		
	1	7/8-14	¾-16	1½	17/8	1.499	1/2	7/8	15/16	1/2**	1/4	3/8	1	1¾	2½/16	5½/16	5¾		
2½	5/8	1½-20	7/16-20	¾	1½	1.124	¾	1/2	9/16	1/4**	1/4	3/16	5/8	1	1½/16	5½/16	5½		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1½/16	¾	—	—	1½	—	2¾/16	5½/16	6		
	1	7/8-14	¾-16	1½	17/8	1.499	1/2	7/8	15/16	1/2**	1/4	3/8	1	1¾	2½/16	5¾/16	5½		
	1¾	1¼-12	1-14	1½	2½	1.999	5/8	1½	15/16	5/8	—	—	1¼	—	2¾/16	5½/16	5¾		
3¼	1	7/8-14	¾-16	1½	17/8	1.499	1/2	7/8	15/16	1/4**	1/4	3/8	¾	1¾	27/16	6	6¼		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1½/16	15/16	1/2**	1/4	9/16	1¾	2	3½/16	6¾	6¾		
	1¾	1¼-12	1-14	1½	2½	1.999	5/8	1½	15/16	3/8**	1/4	1/2	1	1½	2½/16	6¼	6½		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1½/16	1/2**	1/4	9/16	1¼	17/8	2½/16	6½	6¾		
4	1	7/8-14	¾-16	1½	17/8	1.499	1/2	7/8	15/16	1/4**	1/4	3/8	¾	1¾	27/16	6	6¼		
	2½	2¼-12	17/8-12	3	4½	3.124	1	2½/16	2¾	5/8**	1/4	1½/16	15/8	2¼	3½/16	6¾	7½		
	1¾	1¼-12	1-14	1½	2½	1.999	5/8	1½	15/16	3/8**	1/4	1/2	1	1½	2½/16	6¼	6½		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1½/16	1/2**	1/4	9/16	1¼	17/8	2½/16	6½	6¾		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1½/16	15/16	1/2**	1/4	9/16	1¾	2	3½/16	6¾	6¾		
5	1	7/8-14	¾-16	1½	17/8	1.499	1/2	7/8	15/16	1/4**	1/4	3/8	¾	1¾	27/16	6½/16	6½		
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3¾	5/8	—	—	15/8	—	3½/16	7¾/16	7¾		
	1¾	1¼-12	1-14	1½	2½	1.999	5/8	1½	15/16	3/8**	1/4	1/2	1	1½	2½/16	6¾/16	6¾		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1½/16	1/2**	1/4	9/16	1¼	17/8	2½/16	6¾/16	7		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1½/16	15/16	1/2**	1/4	9/16	1¾	2	3½/16	6½/16	7½		
	2½	2¼-12	17/8-12	3	4½	3.124	1	2½/16	2¾	5/8**	1/4	1½/16	15/8	2¼	3½/16	7¾/16	7¾		
6	3	2¾-12	2¼-12	3½	—	3.749	1	2½/8	27/8	5/8	—	—	15/8	—	3½/16	7¾/16	7¾		
	1¾	1¼-12	1-14	1½	2½	1.999	5/8	1½	15/16	1/4	1/4	7/16	7/8	15/8	2½/16	7½/16	7¾		
	4	3¾-12	3-12	4	—	4.749	1	3¾	37/8	¾	—	—	1½	—	37/16	7½/16	8		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1½/16	3/8**	1/4	9/16	1½	17/8	3½/16	7½/16	7¾		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1½/16	15/16	1/2**	1/4	9/16	1¼	2	3¾/16	77/16	7¾		
	2½	2¼-12	17/8-12	3	4½	3.124	1	2½/16	2¾	1/2**	1/4	1½/16	1½	2¼	37/16	7½/16	8		

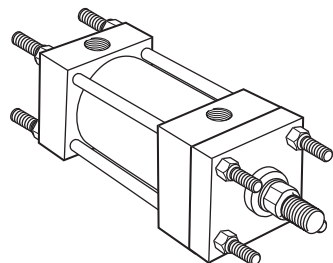
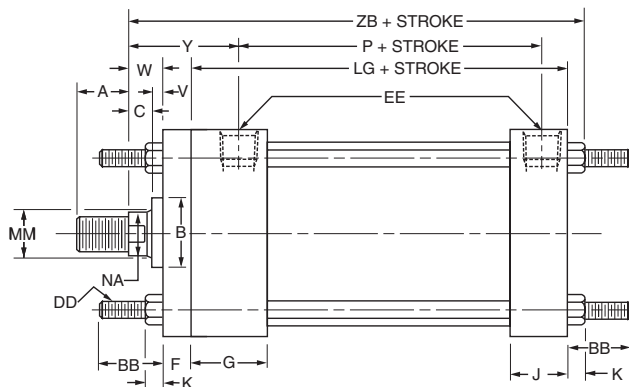
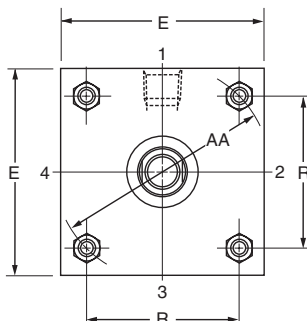
** For all MF5 mounts and MF6 mounts with maximum oversized rods.

Tie Rods Extended Mount

Style MX1

1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods

**Tie Rod Retained
Cartridge**

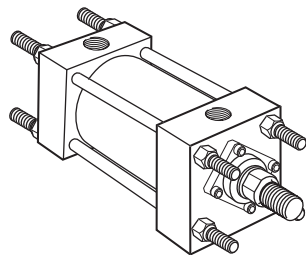
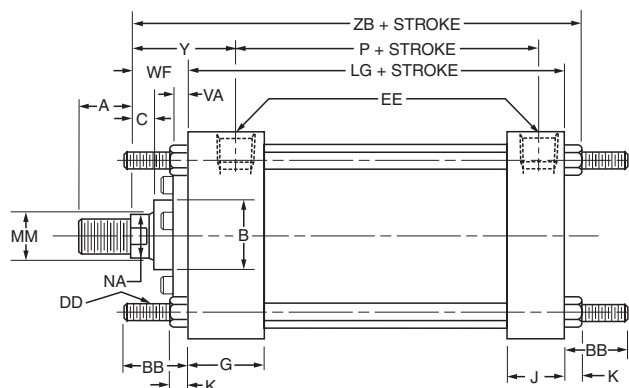
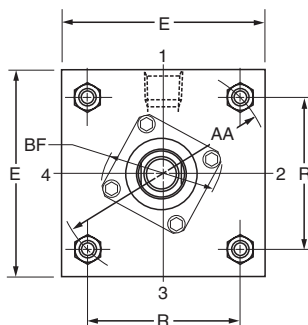
Tie Rods can be extended: Both Ends — Model MX1;
Cap End — Model MX2; Head End — Model MX3.

Before determining dimensions: See chart on page 87 for
cylinder rod combinations that have removable cartridges.

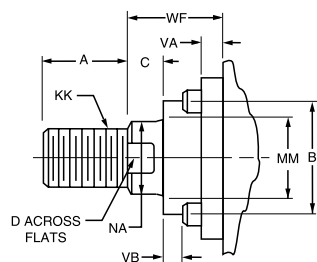
Tie Rods Extended Mount

Style MX1

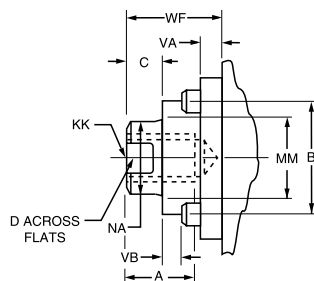
1 1/2" - 6" Bore

**Removable
Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

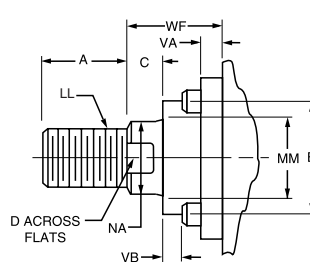
Small Male

**Thread Style 3**

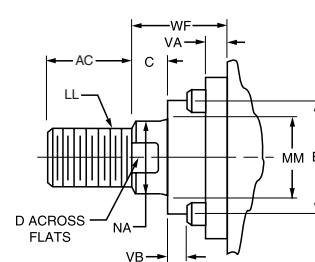
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**“Special” Thread Style 0**

Special thread, extension, rod eye, blank, etc., are
also available.

To order, specify “Style 0” and give desired dimensions
for KK, A, W or WF. If otherwise special, furnish
dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	AA	BB	DD	E	EE		F	G	J	K	R	Add Stroke	
					NPTF	SAE						LG	P
1½	2.02	1	1/4-28	2	3/8†	#6**	3/8	1½	1	1/4	1.43	3⁵/₈	2¼
2	2.6	1⅝	5/16-24	2½	3/8†	#6	3/8	1½	1	5/16	1.84	3⁵/₈	2¼
2½	3.1	1⅝	5/16-24	3	3/8†	#6	3/8	1½	1	5/16	2.19	3¾	2³/₈
3¼	3.9	1⅝	3/8-24	3¾	1/2	#10	—	1¾	1¼	3/8	2.76	4¼	2⁵/₈
4	4.7	1⅝	3/8-24	4½	1/2	#10	—	1¾	1¼	3/8	3.32	4¼	2⁵/₈
5	5.8	1¹³/₁₆	1/2-20	5½	1/2	#10	5/8	1¾	1¼	7/16	4.10	4½	2⁷/₈
6	6.9	1¹³/₁₆	1/2-20	6½	3/4	#12	3/4	2	1½	7/16	4.88	5	3⅝

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

** Port adapter fitting furnished at head end only.

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

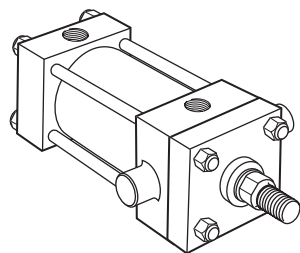
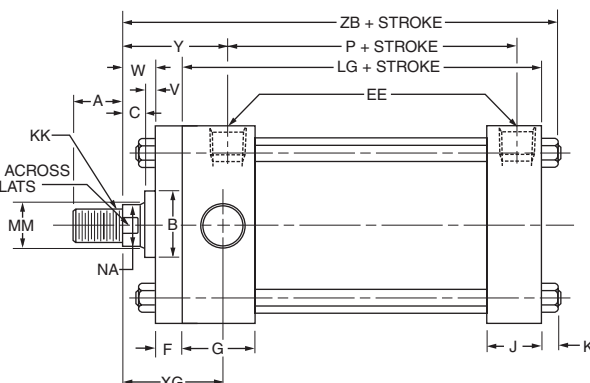
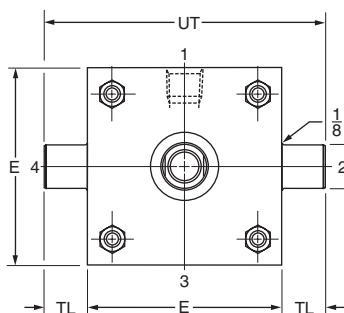
Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size															Add Stroke
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	BF	C	D	NA	V	VA	VB	W	WF	Y	ZB		
1½	5/8	1/2-20	7/16-20	¾	1⅝	1.124	1.968	¾	1/2	9/16	—	1/4	3/16	—	1	1⅕/16	4⅞		
	1	7/8-14	¾-16	1⅝	1⅞	1.499	—	1/2	7/8	1⅕/16	1/2	—	—	1	—	2⅕/16	5¼		
2	5/8	1/2-20	7/16-20	¾	1⅝	1.124	1.968	¾	1/2	9/16	—	1/4	3/16	—	1	1⅕/16	4⅕/16		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	—	5/8	1⅝	1⅕/16	5/8	—	—	1¼	—	2⅑/16	5⅑/16		
	1	7/8-14	¾-16	1⅝	1⅞	1.499	2.468	1/2	7/8	1⅕/16	—	1/4	3/8	—	1⅜	2⅕/16	5⅕/16		
2½	5/8	1/2-20	7/16-20	¾	1⅝	1.124	1.968	¾	1/2	9/16	—	1/4	3/16	—	1	1⅕/16	5⅓/16		
	1⅜	1½-12	1¼-12	2	3	2.374	—	¾	1½	1⅒/16	¾	—	—	1½	—	2⅓/16	5⅕/16		
	1	7/8-14	¾-16	1⅝	1⅞	1.499	2.468	1/2	7/8	1⅕/16	—	1/4	3/8	—	1⅜	2⅕/16	5⅗/16		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	—	5/8	1⅝	1⅕/16	5/8	—	—	1¼	—	2⅑/16	5⅒/16		
3¼	1	7/8-14	¾-16	1⅝	1⅞	1.499	2.468	1/2	7/8	1⅕/16	—	1/4	3/8	—	1⅜	2⅗/16	6		
	2	1¾-12	1½-12	2¼	3½	2.624	3.735	7/8	1⅒/16	1⅕/16	—	1/4	9/16	—	2	3⅓/16	6⅕/8		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	2.968	5/8	1⅝	1⅕/16	—	1/4	1/2	—	1⅝	2⅒/16	6¼		
	1¾	1½-12	1¼-12	2	3	2.374	3.735	¾	1½	1⅒/16	—	1/4	9/16	—	1⅞	2⅕/16	6½		
4	1	7/8-14	¾-16	1⅝	1⅞	1.499	2.468	1/2	7/8	1⅕/16	—	1/4	3/8	—	1⅜	2⅗/16	6		
	2½	2¼-12	1⅞-12	3	4½	3.124	4.312	1	2⅒/16	2⅜	—	1/4	1⅒/16	—	2¼	3⅕/16	6⅞		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	2.968	5/8	1⅝	1⅕/16	—	1/4	1/2	—	1⅝	2⅒/16	6¼		
	1¾	1½-12	1¼-12	2	3	2.374	3.735	¾	1½	1⅒/16	—	1/4	9/16	—	1⅞	2⅕/16	6½		
	2	1¾-12	1½-12	2¼	3½	2.624	3.735	7/8	1⅒/16	1⅕/16	—	1/4	9/16	—	2	3⅓/16	6⅕/8		
5	1	7/8-14	¾-16	1⅝	1⅞	1.499	2.468	1/2	7/8	1⅕/16	—	1/4	3/8	—	1⅜	2⅗/16	6⅕/16		
	3½	3¼-12	2½-12	3½	—	4.249	—	1	3	3⅜	5/8	—	—	1⅕/8	—	3⅕/16	7⅜/16		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	2.968	5/8	1⅝	1⅕/16	—	1/4	1/2	—	1⅝	2⅒/16	6⅑/16		
	1¾	1½-12	1¼-12	2	3	2.374	3.735	¾	1½	1⅒/16	—	1/4	9/16	—	1⅞	2⅕/16	6⅓/16		
	2	1¾-12	1½-12	2¼	3½	2.624	3.735	7/8	1⅒/16	1⅕/16	—	1/4	9/16	—	2	3⅓/16	6⅕/16		
	2½	2¼-12	1⅞-12	3	4½	3.124	5.000	1	2⅒/16	2⅜	—	1/4	1⅒/16	—	2¼	3⅕/16	7⅜/16		
6	3	2¾-12	2¼-12	3½	—	3.749	—	1	2⅕/8	2⅞/8	5/8	—	—	1⅕/8	—	3⅕/16	7⅜/16		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	2.968	5/8	1⅝	1⅕/16	—	1/4	7/16	—	1⅝	2⅓/16	7⅓/16		
	4	3¾-12	3-12	4	—	4.749	—	1	3⅜	3⅞/8	1/2	—	—	1½/2	—	3⅗/16	7⅒/16		
	1¾	1½-12	1¼-12	2	3	2.374	3.625	¾	1½	1⅒/16	—	1/4	9/16	—	1⅞	3⅓/16	7⅕/16		
	2	1¾-12	1½-12	2¼	3½	2.624	3.735	7/8	1⅒/16	1⅕/16	—	1/4	9/16	—	2	3⅓/16	7⅗/16		
	2½	2¼-12	1⅞-12	3	4½	3.124	4.312	1	2⅒/16	2⅜	—	1/4	1⅒/16	—	2¼	3⅗/16	7⅒/16		
	3	2¾-12	2¼-12	3½	—	3.749	—	1	2⅕/8	2⅞/8	1/2	—	—	1½/2	—	3⅗/16	7⅒/16		
	3½	3¼-12	2½-12	3½	—	4.249	—	1	3	3⅜	1/2	—	—	1½/2	—	3⅗/16	7⅒/16		

Head Trunnion Mount

Style MT1

1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods

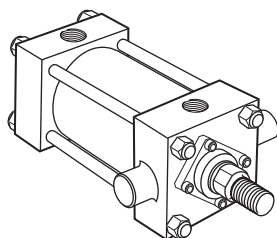
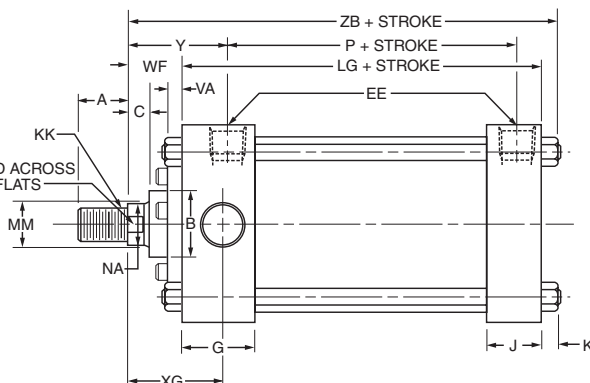
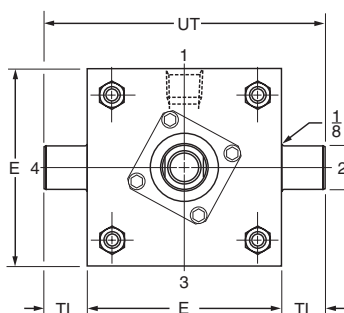
**Tie Rod Retained Cartridge**

Before determining dimensions: See chart on page 87 for cylinder rod combinations that have removable cartridges.

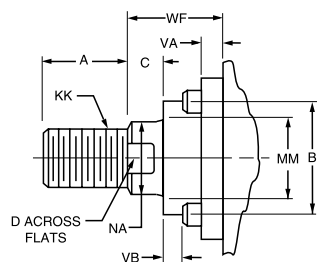
Head Trunnion Mount

Style MT1

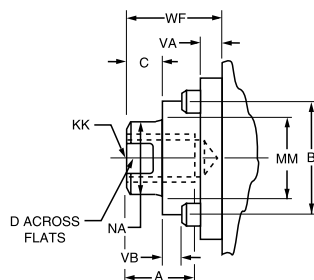
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

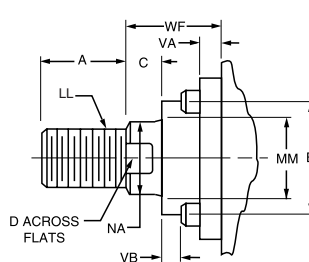
Small Male

**Thread Style 3**

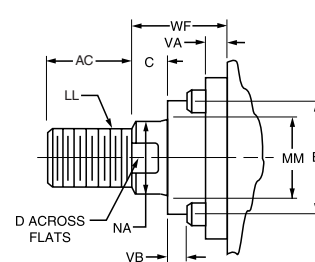
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**“Special” Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE		F	G	J	K	+0.000 TD -0.001	TL	UT	Add Stroke	
		NPTF	SAE								LG	P
1½	2	¾†	#6**	¾	1½	1	¼	1.000	1	4	3⅝	2¼
2	2½	¾†	#6	¾	1½	1	⅝	1.000	1	4½	3⅝	2¼
2½	3	¾†	#6	¾	1½	1	⅝	1.000	1	5	3¾	2⅝
3¼	3¾	½	#10	—	1¾	1¼	¾	1.000	1	5¾	4¼	2⅝
4	4½	½	#10	—	1¾	1¼	¾	1.000	1	6½	4¼	2⅝
5	5½	½	#10	⅝	1¾	1¼	⅞	1.000	1	7½	4½	2⅞
6	6½	¾	#12	¾	2	1½	⅞	1.375	1¾	9¼	5	3⅞

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

** Port adapter fitting furnished at head end only.

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

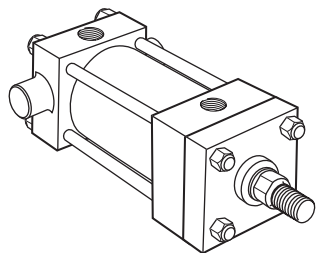
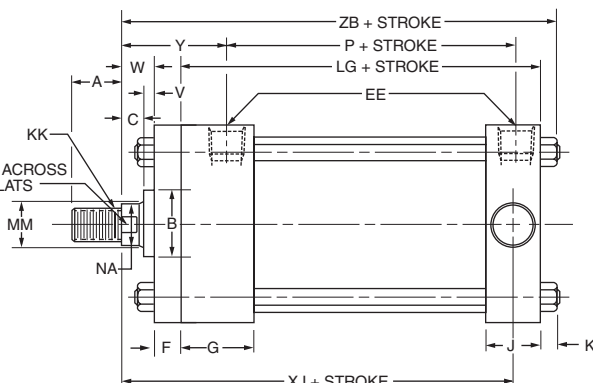
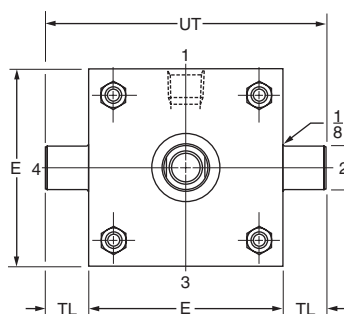
Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size															Add Stroke	
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF	XG	Y		ZB		
1½	⅝	½-20	⅞-20	¾	1⅞	1.124	¾	½	⅞	—	¼	⅜	—	1	1¾	1⅝		4⅞		
	1	⅞-14	¾-16	1⅞	1⅞	1.499	½	⅞	1⅝	½	—	—	1	—	2⅞	2⅝		5¼		
2	⅝	½-20	⅞-20	¾	1⅞	1.124	¾	½	⅞	—	¼	⅜	—	1	1¾	1⅝		4⅞		
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⅝	⅝	—	—	1¼	—	2⅞	2⅝		5⅞		
	1	⅞-14	¾-16	1⅞	1⅞	1.499	½	⅞	1⅝	—	¼	⅜	—	1⅞	2⅞	2⅝		5⅝		
	⅝	½-20	⅞-20	¾	1⅞	1.124	¾	½	⅞	—	¼	⅜	—	1	1¾	1⅝		5⅞		
2½	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞	¾	—	—	1½	—	2⅞	2⅝		5⅝		
	1	⅞-14	¾-16	1⅞	1⅞	1.499	½	⅞	1⅝	—	¼	⅜	—	1⅞	2⅞	2⅝		5⅝		
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⅝	⅝	—	—	1¼	—	2⅞	2⅝		5⅝		
	⅝	½-20	⅞-20	¾	1⅞	1.124	¾	½	⅞	—	¼	⅜	—	1	1¾	1⅝		5⅞		
3¼	1	⅞-14	¾-16	1⅞	1⅞	1.499	½	⅞	1⅝	—	¼	⅜	—	1⅞	2⅞	2⅝		6		
	2	1¼-12	1½-12	2¼	3½	2.624	⅞	1⅞	1⅝	—	¼	⅜	—	2	2⅞	3⅞		6⅝		
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⅝	—	¼	½	—	1⅞	2½	2⅝		6¼		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞	—	¼	⅜	—	1⅞	2¾	2⅝		6½		
4	1	⅞-14	¾-16	1⅞	1⅞	1.499	½	⅞	1⅝	—	¼	⅜	—	1⅞	2¼	2⅝		6		
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2⅞	2⅞	—	¼	1⅞	—	2¼	3⅞	3⅝		6⅞		
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⅝	—	¼	½	—	1⅞	2½	2⅝		6¼		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞	—	¼	⅜	—	1⅞	2¾	2⅝		6½		
5	2	1¾-12	1½-12	2¼	3½	2.624	⅞	1⅞	1⅝	—	¼	⅜	—	2	2⅞	3⅞		6⅝		
	1	⅞-14	¾-16	1⅞	1⅞	1.499	½	⅞	1⅝	—	¼	⅜	—	1⅞	2¼	2⅝		6⅝		
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3⅞	⅝	—	—	1⅝	—	3⅞	3⅝		7⅞		
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⅝	—	¼	½	—	1⅞	2½	2⅝		6⅞		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞	—	¼	⅜	—	1⅞	2¾	2⅝		6⅝		
	2	1¾-12	1½-12	2¼	3½	2.624	⅞	1⅞	1⅝	—	¼	⅜	—	2	2⅞	3⅞		6⅝		
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2⅞	2⅞	—	¼	1⅞	—	2¼	3⅞	3⅝		7⅞		
6	3	2¾-12	2¼-12	3½	—	3.749	1	2⅞	2⅞	⅝	—	—	1⅝	—	3⅞	3⅝		7⅞		
	1⅜	1¼-12	1-14	1⅞	2½	1.999	⅝	1⅞	1⅝	—	¼	⅞	—	1⅞	2⅞	2⅝		7⅞		
	4	3¾-12	3-12	4	—	4.749	1	3⅞	3⅞	½	—	—	1½	—	3¼	3⅞		7⅞		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞	—	¼	⅜	—	1⅞	2⅞	3⅞		7⅝		
	2	1¾-12	1½-12	2¼	3½	2.624	⅞	1⅞	1⅝	—	¼	⅜	—	2	3	3⅞		7⅞		
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2⅞	2⅞	—	¼	1⅞	—	2¼	3¼	3⅞		7⅞		
	3	2¾-12	2¼-12	3½	—	3.749	1	2⅞	2⅞	½	—	—	1½	—	3¼	3⅞		7⅞		

Cap Trunnion Mount

Style MT2

1 1/2" - 2" 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods

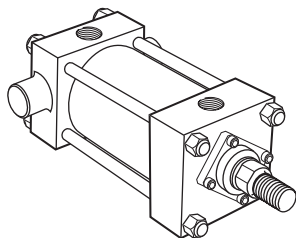
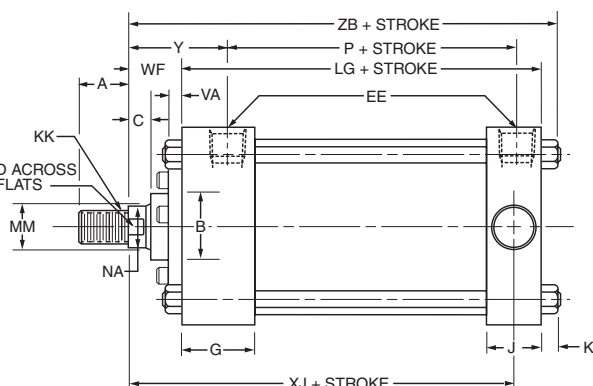
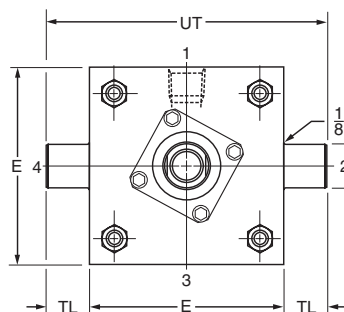
**Tie Rod Retained Cartridge**

Before determining dimensions: See chart on page 87 for cylinder rod combinations that have removable cartridges.

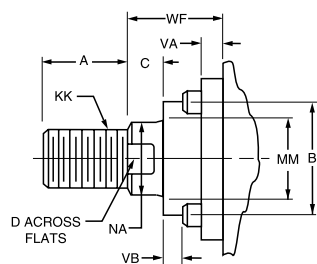
Cap Trunnion Mount

Style MT2

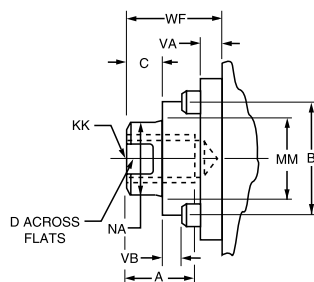
1 1/2" - 6" Bore

**Removable Cartridge****Rod End Dimensions — see table 2****Thread Style 2**

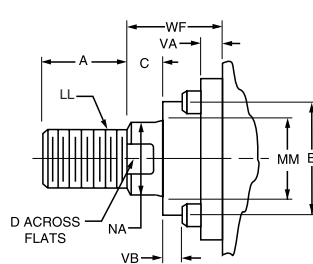
Small Male

**Thread Style 3**

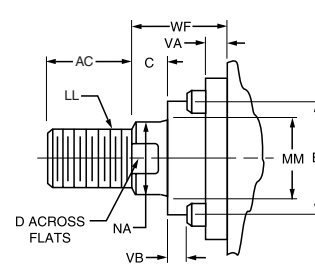
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE		F	G	J	K	+0.000 TD -0.001	TL	UT	Add Stroke	
		NPTF	SAE								LG	P
1½	2	⅜ [†]	#6**	⅜	1½	1	¼	1.000	1	4	3⅝	2¼
2	2½	⅜ [†]	#6	⅜	1½	1	⅝ ₁₆	1.000	1	4½	3⅝	2¼
2½	3	⅜ [†]	#6	⅜	1½	1	⅝ ₁₆	1.000	1	5	3¾	2⅝
3¼	3¾	½	#10	—	1¾	1¼	⅜	1.000	1	5¾	4¼	2⅝
4	4½	½	#10	—	1¾	1¼	⅜	1.000	1	6½	4¼	2⅝
5	5½	½	#10	⅝	1¾	1¼	⅞ ₁₆	1.000	1	7½	4½	2⅞
6	6½	¾	#12	¾	2	1½	⅞ ₁₆	1.375	1⅜	9¼	5	3⅞

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

** Port adapter fitting furnished at head end only.

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

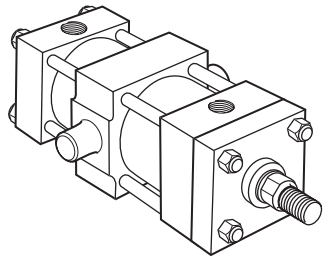
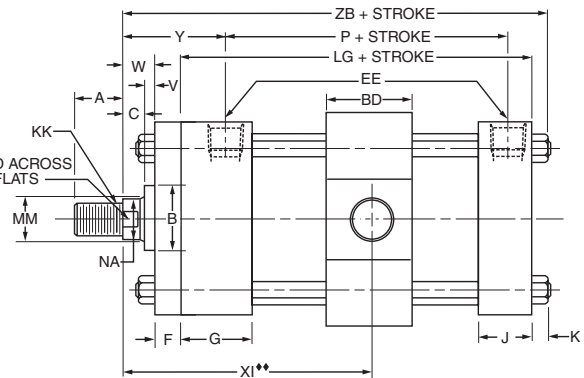
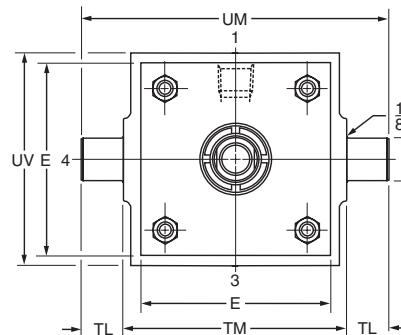
Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size															Add Stroke	
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF	Y					
																	XJ	ZB		
1½	⅝	1½-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	⅜16	—	1	115/16	4⅞	47/8			
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	½	—	—	1	—	25/16	4½	5¼			
2	⅝	1½-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	⅜16	—	1	115/16	4⅞	415/16			
	1⅜	1¼-12	1-14	15/8	2½	1.999	⅝	1⅞	15/16	5/8	—	—	1¼	—	29/16	4¾	59/16			
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	⅜8	—	13/8	25/16	4½	55/16			
2½	⅝	1½-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	⅜16	—	1	115/16	4¼	51/16			
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	111/16	¾	—	—	1½	—	213/16	5⅞	515/16			
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	⅜8	—	13/8	25/16	45/8	57/16			
	1⅜	1¼-12	1-14	15/8	2½	1.999	⅝	1⅞	15/16	5/8	—	—	1¼	15/8	29/16	47/8	511/16			
3¼	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	⅜8	—	13/8	27/16	5	6			
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	111/16	115/16	—	¼	9/16	—	2	31/16	55/8	65/8			
	1⅜	1¼-12	1-14	15/8	2½	1.999	⅝	1⅞	15/16	—	¼	½	—	15/8	211/16	5¼	6¼			
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	111/16	—	¼	9/16	—	17/8	215/16	5½	6½			
4	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	⅜8	—	13/8	27/16	5	6			
	2½	2¼-12	17/8-12	3	4½	3.124	1	21/16	23/8	—	¼	11/16	—	2¼	35/16	57/8	67/8			
	1⅜	1¼-12	1-14	15/8	2½	1.999	⅝	1⅞	15/16	—	¼	½	—	15/8	211/16	5¼	6¼			
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	111/16	—	¼	9/16	—	17/8	215/16	5½	6½			
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	111/16	115/16	—	¼	9/16	—	2	31/16	55/8	65/8			
5	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	⅜8	—	13/8	27/16	5¼	65/16			
	3½	3¼-12	2½-12	3½	—	4.249	1	3	33/8	5/8	—	—	15/8	—	35/16	6⅞	73/16			
	1⅜	1¼-12	1-14	15/8	2½	1.999	⅝	1⅞	15/16	—	¼	½	—	15/8	211/16	5½	69/16			
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	111/16	—	¼	9/16	—	17/8	215/16	5¾	613/16			
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	111/16	115/16	—	¼	9/16	—	2	31/16	57/8	615/16			
	2½	2¼-12	17/8-12	3	4½	3.124	1	21/16	23/8	—	¼	11/16	—	2¼	35/16	6⅞	73/16			
	3	2¾-12	2¼-12	3½	—	3.749	1	25/8	27/8	5/8	—	—	15/8	—	35/16	6⅞	73/16			
6	1⅜	1¼-12	1-14	15/8	2½	1.999	⅝	1⅞	15/16	—	¼	7/16	—	15/8	213/16	57/8	71/16			
	4	3¾-12	3-12	4	—	4.749	1	33/8	37/8	½	—	—	1½	—	37/16	6½	711/16			
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	111/16	—	¼	9/16	—	17/8	31/16	6⅞	75/16			
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	111/16	115/16	—	¼	9/16	—	2	33/16	6¼	77/16			
	2½	2¼-12	17/8-12	3	4½	3.124	1	21/16	23/8	—	¼	11/16	—	2¼	37/16	6½	711/16			
	3	2¾-12	2¼-12	3½	—	3.749	1	25/8	27/8	½	—	—	1½	—	37/16	6½	711/16			
	3½	3¼-12	2½-12	3½	—	4.249	1	3	33/8	½	—	—	1½	—	37/16	6½	711/16			

Intermediate Fixed Trunnion Mount

Style MT4

1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods

**Tie Rod Retained
Cartridge**

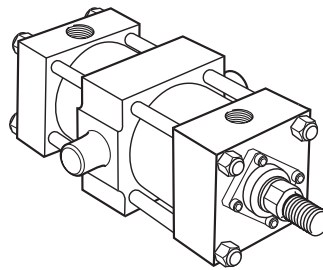
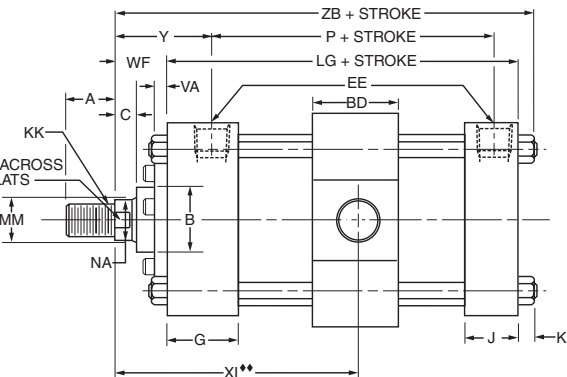
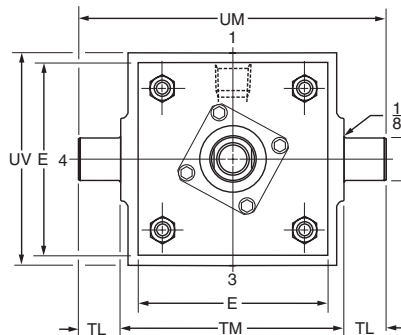
♦♦ Dimension XI to be specified by customer.

Before determining dimensions: See chart on page 87 for cylinder rod combinations that have removable cartridges.

Intermediate Fixed Trunnion Mount

Style MT4

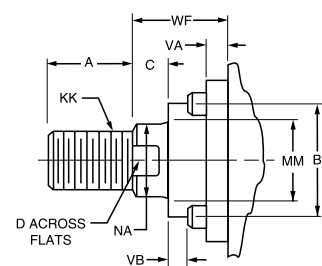
1 1/2" - 6" Bore

**Removable Cartridge**

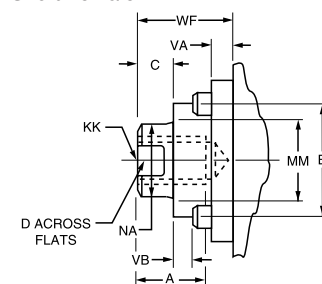
♦♦ Dimension XI to be specified by customer.

Rod End Dimensions — see table 2**Thread Style 2**

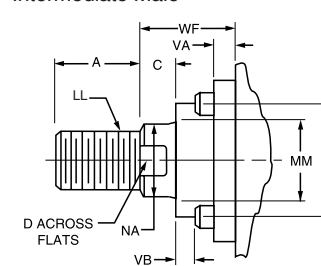
Small Male

**Thread Style 3**

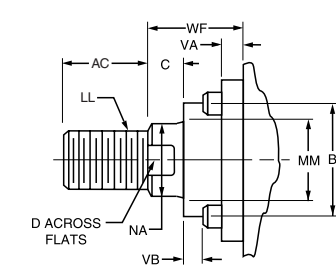
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	BD	E	EE		F	G	J	K	+0.000 TD -0.001	TL	TM	UM	UV	Minimum Stroke	Add Stroke	
			NPTF	SAE											LG	P
1½	1¼	2	¾ [†]	#6**	¾	1½	1	¼	1.000	1	2½	4½	2½	¼	3⅝	2¼
2	1½	2½	¾ [†]	#6	¾	1½	1	5/16	1.000	1	3	5	3	½	3⅝	2¼
2½	1½	3	¾ [†]	#6	¾	1½	1	5/16	1.000	1	3½	5½	3½	¾	3¾	2⅝
3¼	2	3¾	½	#10	⅝	1¾	1¼	¾	1.000	1	4½	6½	4¼	⅞	4¼	2⅝
4	2	4½	½	#10	—	1¾	1¼	¾	1.000	1	5¼	7¼	5	⅞	4¼	2⅝
5	2	5½	½	#10	—	1¾	1¼	7/16	1.000	1	6¼	8¼	6	⅝	4½	2⅞
6	2½	6½	¾	#12	¾	2	1½	7/16	1.375	1¾	7⅝	10¾	7	1⅞	5	3⅞

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

** Port adapter fitting furnished at head end only.

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size														Add Stroke ZB
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	V	VA	VB	W	WF	Min.♦♦ XI	Y		
1½	⅝	1/2-20	7/16-20	¾	1⅞	1.124	¾	1/2	9/16	—	¼	3/16	—	1	3³/16	1¹⁵/16	4⁷/8	
	1	7/8-14	¾-16	1⅞	1⅞	1.499	½	7/8	1⁵/16	½	—	—	1	—	3⁹/16	2⁵/16	5¼	
2	⅝	1/2-20	7/16-20	¾	1⅞	1.124	¾	1/2	9/16	—	¼	3/16	—	1	3⁵/16	1¹⁵/16	4¹⁵/16	
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	1⁵/16	⅝	—	—	1¼	—	3¹⁵/16	2⁹/16	5⁹/16	
	1	7/8-14	¾-16	1⅞	1⅞	1.499	½	7/8	1⁵/16	—	¼	3/8	—	1⅜	3¹¹/16	2⁵/16	5⁵/16	
2½	⅝	1/2-20	7/16-20	¾	1⅞	1.124	¾	1/2	9/16	—	¼	3/16	—	1	3⁵/16	1¹⁵/16	5¹/16	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹/16	¾	—	—	1½	—	4³/16	2¹³/16	5¹⁵/16	
	1	7/8-14	¾-16	1⅞	1⅞	1.499	½	7/8	1⁵/16	—	¼	3/8	—	1⅜	3¹¹/16	2⁵/16	5⁷/16	
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	1⁵/16	⅝	—	—	1¼	—	3¹⁵/16	2⁹/16	5¹¹/16	
3¼	1	7/8-14	¾-16	1⅞	1⅞	1.499	½	7/8	1⁵/16	—	¼	3/8	—	1⅜	4³/16	2⁷/16	6	
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1¹¹/16	1¹⁵/16	—	¼	9/16	—	2	4¹³/16	3¹/16	6⁵/8	
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	1⁵/16	—	¼	1/2	—	1⅝	4⁷/16	2¹¹/16	6¼	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹/16	—	¼	9/16	—	1⅞	4¹¹/16	2¹⁵/16	6½	
4	1	7/8-14	¾-16	1⅞	1⅞	1.499	½	7/8	1⁵/16	—	¼	3/8	—	1⅜	4³/16	2⁷/16	6	
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2¹/16	2³/8	—	¼	¹¹/16	—	2¼	5¹/16	3⁵/16	6⁷/8	
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	1⁵/16	—	¼	1/2	—	1⅝	4⁷/16	2¹¹/16	6¼	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹/16	—	¼	9/16	—	1⅞	4¹¹/16	2¹⁵/16	6½	
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1¹¹/16	1¹⁵/16	—	¼	9/16	—	2	4¹³/16	3¹/16	6⁵/8	
5	1	7/8-14	¾-16	1⅞	1⅞	1.499	½	7/8	1⁵/16	—	¼	3/8	—	1⅜	4⁵/16	2⁷/16	6⁵/16	
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3³/8	⅝	—	—	1⅝	—	5¹/16	3⁵/16	7³/16	
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	1⁵/16	—	¼	1/2	—	1⅝	4⁷/16	2¹¹/16	6⁹/16	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹/16	—	¼	9/16	—	1⅞	4¹¹/16	2¹⁵/16	6¹³/16	
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1¹¹/16	1¹⁵/16	—	¼	9/16	—	2	4¹³/16	3¹/16	6¹⁵/16	
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2¹/16	2³/8	—	¼	¹¹/16	—	2¼	5¹/16	3⁵/16	7³/16	
6	3	2¾-12	2¼-12	3½	—	3.749	1	2⁵/8	2⁷/8	⅝	—	—	1⅝	—	5¹/16	3⁵/16	7³/16	
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	1⁵/16	—	¼	7/16	—	1⅝	4¹⁵/16	2¹³/16	7¹/16	
	4	3¾-12	3-12	4	—	4.749	1	3³/8	3⁷/8	½	—	—	1½	—	5⁹/16	3⁷/16	7¹¹/16	
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1¹¹/16	—	¼	9/16	—	1⅞	5³/16	3¹/16	7⁵/16	
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1¹¹/16	1¹⁵/16	—	¼	9/16	—	2	5⁵/16	3³/16	7⁷/16	
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2¹/16	2³/8	—	¼	¹¹/16	—	2¼	5⁹/16	3⁷/16	7¹¹/16	
6	3	2¾-12	2¼-12	3½	—	3.749	1	2⁵/8	2⁷/8	½	—	—	1½	—	5⁹/16	3⁷/16	7¹¹/16	
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3³/8	½	—	—	1½	—	5⁹/16	3⁷/16	7¹¹/16	

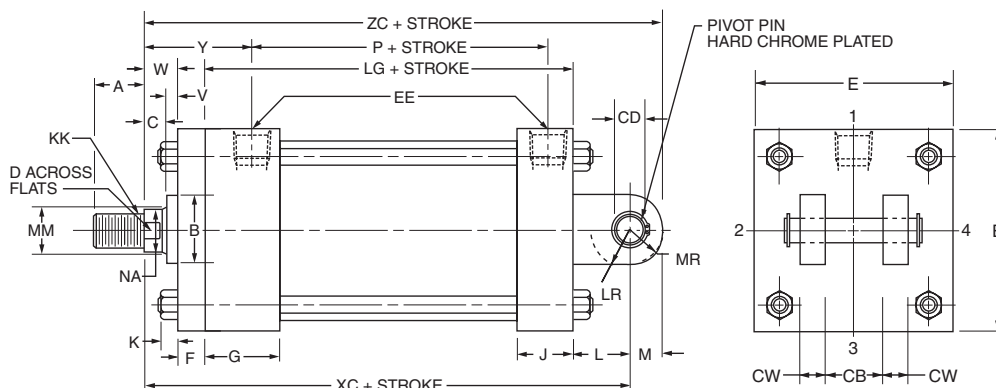
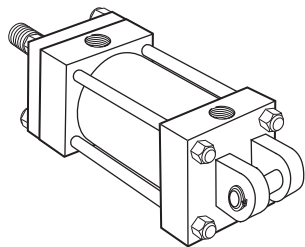
♦♦ Dimension XI to be specified by customer.

Cap Fixed Clevis Mount

Style MP1

1 1/2" - 2" - 2 1/2" - 5" and 6" Bore

With Maximum Oversize Rods



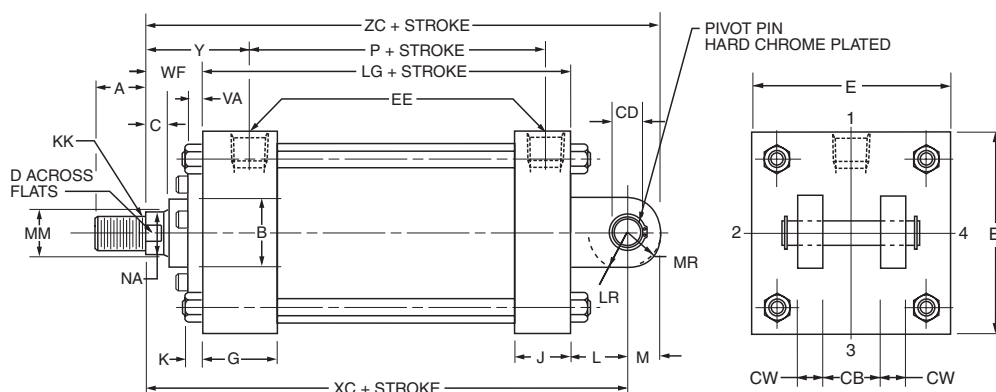
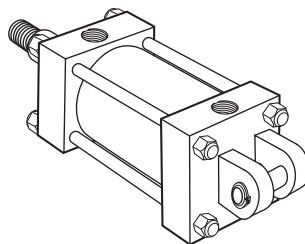
The 4", 5" and 6" bore sizes have the tie rod nuts at both ends as shown.
Tie rods thread into cap on all other bore sizes.

Before determining dimensions: See chart on page 87 for cylinder rod combinations that have removable cartridges.

Cap Fixed Clevis Mount

Style MP1

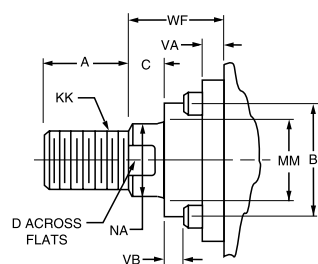
1 1/2" - 6" Bore

Removable Cartridge

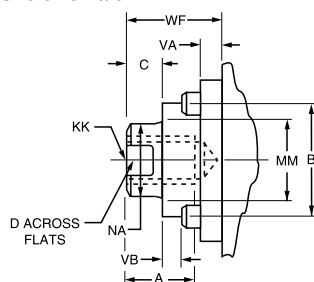
The 4", 5" and 6" bore sizes have the tie rod nuts at both ends as shown.
Tie rods thread into cap on all other bore sizes.

Rod End Dimensions — see table 2**Thread Style 2**

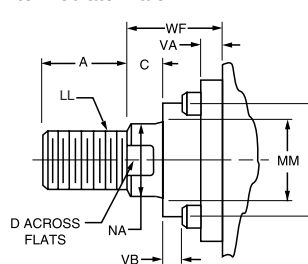
Small Male

**Thread Style 3**

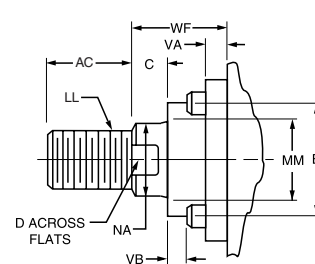
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**"Special" Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 0" and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	CB	+.000 CD -.002	CW	E	EE		F	G	J	K	L	LR	M	MR	Add Stroke	
					NPTF	SAE									LG	P
1½	¾	.501	½	2	¾†	#6**	¾	1½	1	¼	¾	¾	½	⅝	3⅝	2¼
2	¾	.501	½	2½	¾†	#6	¾	1½	1	⅝	¾	¾	½	⅝	3⅝	2¼
2½	¾	.501	½	3	¾†	#6	¾	1½	1	⅝	¾	¾	½	⅝	3¾	2⅝
3¼	1¼	.751	⅝	3¾	½	#10	—	1¾	1¼	⅜	1¼	1	¾	¾	4¼	2⅝
4	1¼	.751	⅝	4½	½	#10	—	1¾	1¼	⅜	1¼	1	¾	¾	4¼	2⅝
5	1¼	.751	⅝	5½	½	#10	⅝	1¾	1¼	⅞	1¼	1	¾	¾	4½	2⅞
6	1½	1.001	¾	6½	¾	#12	¾	2	1½	⅞	1½	1¼	1	1	5	3⅝

† On 1½", 2" and 2½" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with maximum oversize rods. Minimum of three full threads available.

** Port adapter fitting furnished at head end only.

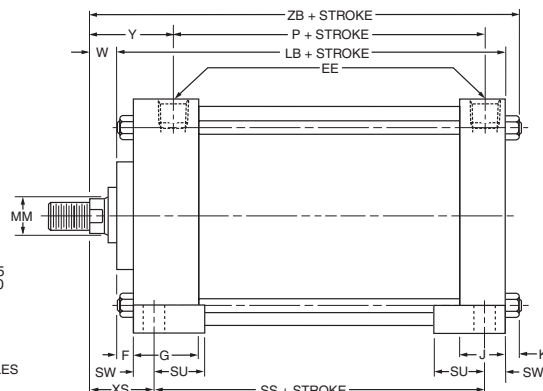
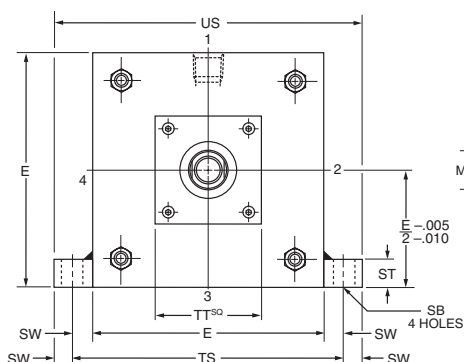
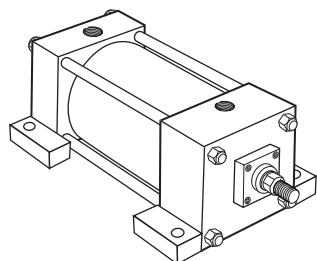
Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod Extensions and Envelope Dimensions Affected By Rod Size														Add Stroke	
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+.000 -.002 B	C	D	NA	V	VA	VB	W	WF	Y	XC	ZC		
1½	⅝	1½-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	3/16	—	1	1⅝/16	5⅜	5⅞		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	½	—	—	1	—	2⅝/16	5¾	6¼		
2	⅝	1½-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	3/16	—	1	1⅝/16	5⅜	5⅞		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	15/16	⅝	—	—	1¼	—	2⅞/16	6	6½		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	2⅝/16	5¾	6¼		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	2⅝/16	5¾	6¼		
2½	⅝	1½-20	7/16-20	¾	1⅞	1.124	¾	½	9/16	—	¼	3/16	—	1	1⅝/16	5½	6		
	1⅜	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞/16	¾	—	—	1½	—	2⅞/16	6⅜	6⅞		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	2⅝/16	5⅞	6⅜		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	15/16	⅝	—	—	1¼	1⅝/16	2⅞/16	6⅞	6⅝		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	2⅝/16	6⅞	7⅝		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1⅞/16	1⅝/16	—	¼	9/16	—	2	3⅞/16	7½	8¼		
3¼	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	15/16	—	¼	1/2	—	1⅞	2⅞/16	7⅞	7⅞		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞/16	—	¼	9/16	—	1⅞	2⅞/16	7⅞	8⅞		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	2⅝/16	6⅞	7⅝		
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2⅞/16	2⅜	—	¼	1⅞/16	—	2¼	3⅝/16	7¾	8½		
4	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	15/16	—	¼	1/2	—	1⅞	2⅞/16	7⅞	7⅞		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞/16	—	¼	9/16	—	1⅞	2⅞/16	7⅞	8⅞		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1⅞/16	1⅝/16	—	¼	9/16	—	2	3⅞/16	7½	8¼		
	1	7/8-14	¾-16	1⅞	17/8	1.499	½	7/8	15/16	—	¼	3/8	—	1⅜	2⅝/16	7⅞	7⅞		
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3⅜	⅝	—	—	1⅝	—	3⅝/16	8	8¾		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	15/16	—	¼	1/2	—	1⅞	2⅞/16	7⅞	8⅞		
5	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞/16	—	¼	9/16	—	1⅞	2⅞/16	7⅞	8⅞		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1⅞/16	1⅝/16	—	¼	9/16	—	2	3⅞/16	7¾	8½		
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2⅞/16	2⅜	—	¼	1⅞/16	—	2¼	3⅝/16	8	8¾		
	3	2¾-12	2¼-12	3½	—	3.749	1	2⅝	2⅞	⅝	—	—	1⅝	—	3⅝/16	8	8¾		
	1⅜	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	15/16	—	¼	7/16	—	1⅞	2⅞/16	8⅞	9⅞		
	4	3¾-12	3-12	4	—	4.749	1	3⅜	3⅞	½	—	—	1½	—	3⅞/16	8¾	9¾		
6	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1⅞/16	—	¼	9/16	—	1⅞	3⅞/16	8⅞	9⅞		
	2	1¾-12	1½-12	2¼	3½	2.624	7/8	1⅞/16	1⅝/16	—	¼	9/16	—	2	3⅞/16	8½	9½		
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2⅞/16	2⅜	—	¼	1⅞/16	—	2¼	3⅞/16	8¾	9¾		
	3	2¾-12	2¼-12	3½	—	3.749	1	2⅝	2⅞	½	—	—	1½	—	3⅞/16	8¾	9¾		
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3⅜	½	—	—	1½	—	3⅞/16	8¾	9¾		

Side Lug Mount

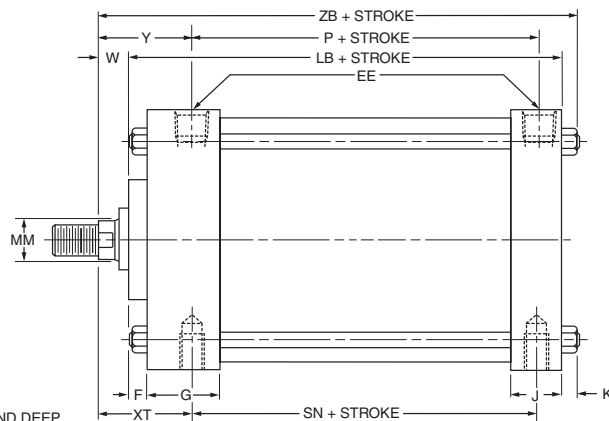
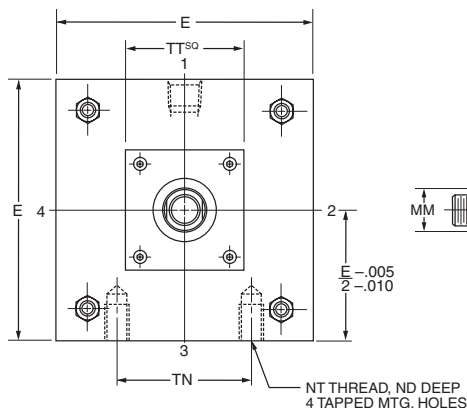
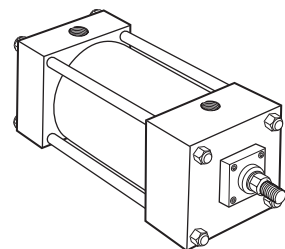
Style MS2

8" - 12" Bore

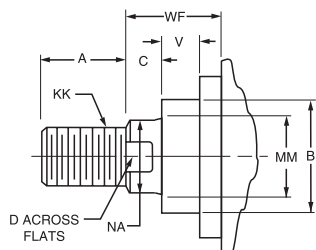
**Side Tap Mount**

Style MS4

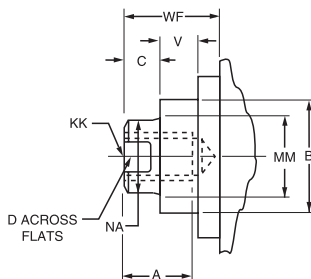
8" - 12" Bore

**Rod End Dimensions — see table 2****Thread Style 2**

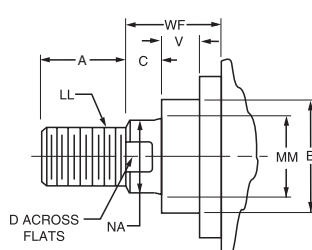
Small Male

**Thread Style 3**

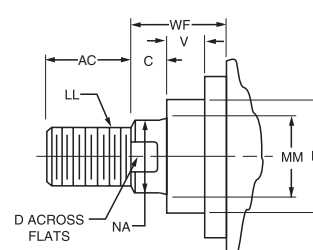
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**“Special” Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	E	EE		F	G	J	K	ND	NT	SB*	ST	SU	SW	TN	TS	US	Add Stroke			
		NPTF	SAE														LB	P	SN	SS
8	8 ¹ / ₂	³ / ₄	#12	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	1 ¹ / ₈	³ / ₄ -10	¹³ / ₁₆	1	1 ⁹ / ₁₆	1 ¹¹ / ₁₆	4 ¹ / ₂	9 ⁷ / ₈	11 ¹ / ₄	5 ⁷ / ₈	3 ¹ / ₄	3 ¹ / ₄	3 ³ / ₄
10	10 ⁵ / ₈	1	#16	³ / ₄	2 ¹ / ₄	2	1 ¹ / ₁₆	1 ¹ / ₂	1-8	1 ¹ / ₁₆	1 ¹ / ₄	2	⁷ / ₈	5 ¹ / ₂	12 ³ / ₈	14 ¹ / ₈	7 ¹ / ₈	4 ¹ / ₈	4 ¹ / ₈	4 ⁵ / ₈
12	12 ³ / ₄	1	#16	³ / ₄	2 ¹ / ₄	2	1 ¹ / ₁₆	1 ¹ / ₂	1-8	1 ¹ / ₁₆	1 ¹ / ₄	2	⁷ / ₈	7 ¹ / ₄	14 ¹ / ₂	16 ¹ / ₄	7 ⁵ / ₈	4 ⁵ / ₈	4 ⁵ / ₈	5 ¹ / ₈

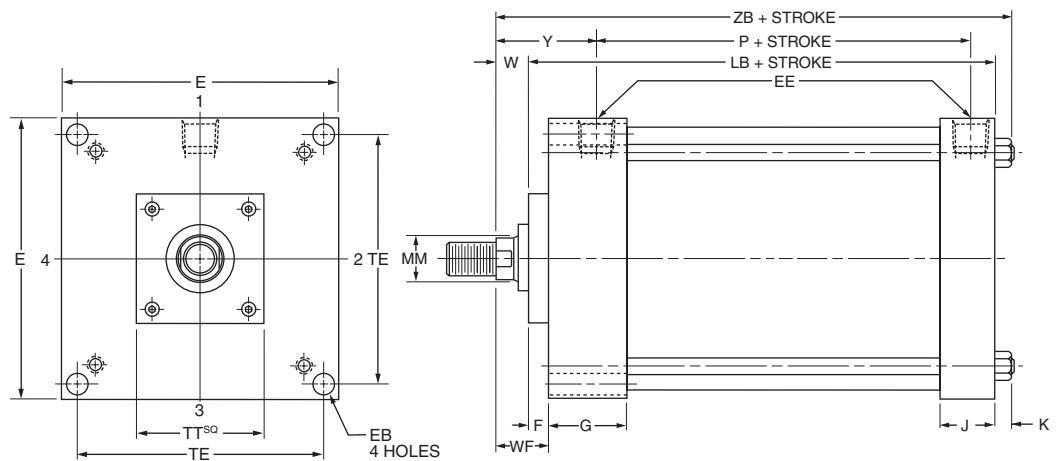
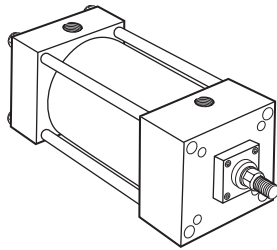
Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size														Add Stroke	
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	TT	V	W	XS	XT	Y			ZB	
8	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	2 ¹ / ₂	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	2 ⁵ / ₁₆	2 ¹³ / ₁₆	2 ¹³ / ₁₆			7 ⁵ / ₁₆	
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	—	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆			7 ¹⁵ / ₁₆	
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	3	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	2 ⁹ / ₁₆	3 ¹ / ₁₆	3 ¹ / ₁₆			7 ⁹ / ₁₆	
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2 ¹¹ / ₁₆	3 ³ / ₁₆	3 ³ / ₁₆			7 ¹¹ / ₁₆	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	4 ¹ / ₂	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆			7 ¹⁵ / ₁₆	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	—	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆			7 ¹⁵ / ₁₆	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	—	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆			7 ¹⁵ / ₁₆	
	4	3 ³ / ₄ -12	3-12	4	—	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆			7 ¹⁵ / ₁₆	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	—	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆			7 ¹⁵ / ₁₆	
10	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	—	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	3 ⁷ / ₁₆			7 ¹⁵ / ₁₆	
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	3	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	2 ⁹ / ₁₆	3 ¹ / ₁₆	3 ¹ / ₁₆			8 ¹⁵ / ₁₆	
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2 ¹¹ / ₁₆	3 ³ / ₁₆	3 ³ / ₁₆			9 ¹ / ₁₆	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	4 ¹ / ₂	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ⁵ / ₁₆	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	—	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ⁵ / ₁₆	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	—	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ⁵ / ₁₆	
	4	3 ³ / ₄ -12	3-12	4	—	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ⁵ / ₁₆	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	—	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ⁵ / ₁₆	
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	—	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ⁵ / ₁₆	
12	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	—	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ⁵ / ₁₆	
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2 ¹¹ / ₁₆	3 ³ / ₁₆	3 ³ / ₁₆			9 ⁹ / ₁₆	
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	4 ¹ / ₂	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ¹³ / ₁₆	
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	—	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ¹³ / ₁₆	
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	—	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ¹³ / ₁₆	
	4	3 ³ / ₄ -12	3-12	4	—	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ¹³ / ₁₆	
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	—	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ¹³ / ₁₆	
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	—	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	3 ¹ / ₂			9 ¹³ / ₁₆	

Head Square Mount

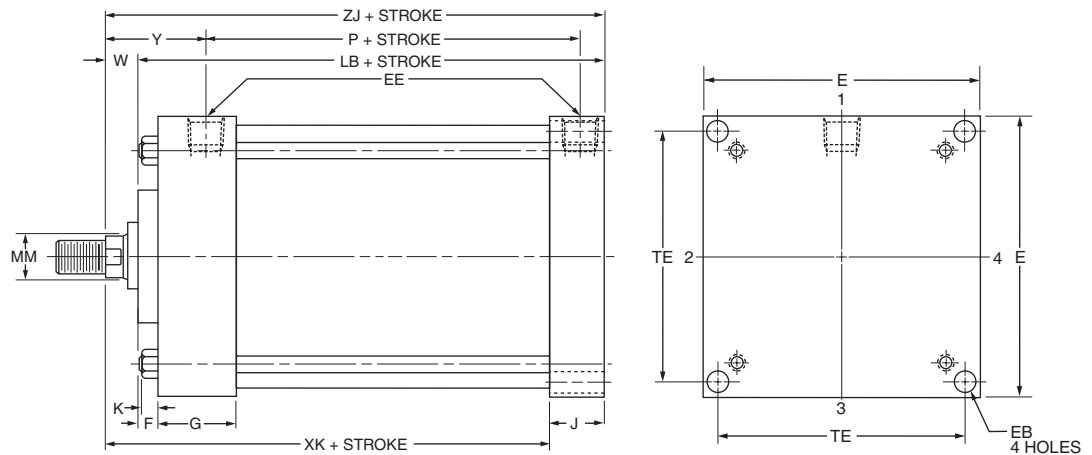
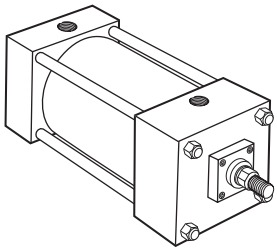
Style ME3

8" - 12" Bore

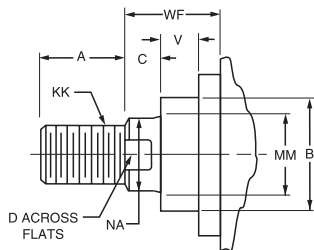
**Cap Square Mount**

Style ME4

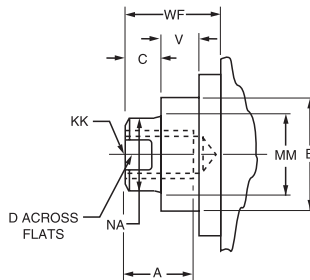
8" - 12" Bore

**Rod End Dimensions — see table 2****Thread Style 2**

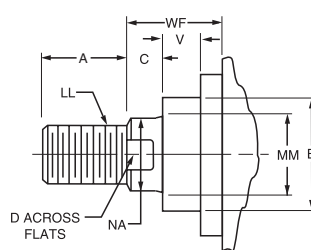
Small Male

**Thread Style 3**

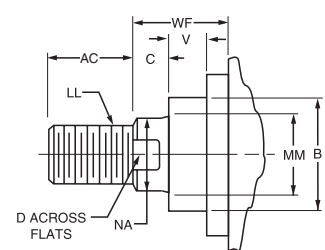
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**“Special” Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 0” and give desired dimensions for KK , A , W or WF . If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	E	EB	EE		F	G	J	K	TE	Add Stroke	
			NPTF	SAE						LB	P
8	8 ¹ / ₂	1 ¹ / ₁₆	3/4	#12	3/4	2	1 ¹ / ₂	9/16	7.57	5 ⁷ / ₈	3 ¹ / ₄
10	10 ⁵ / ₈	1 ³ / ₁₆	1	#16	3/4	2 ¹ / ₄	2	1 ¹ / ₁₆	9.40	7 ¹ / ₈	4 ¹ / ₈
12	12 ³ / ₄	1 ³ / ₁₆	1	#16	3/4	2 ¹ / ₄	2	1 ¹ / ₁₆	11.10	7 ⁵ / ₈	4 ⁵ / ₈

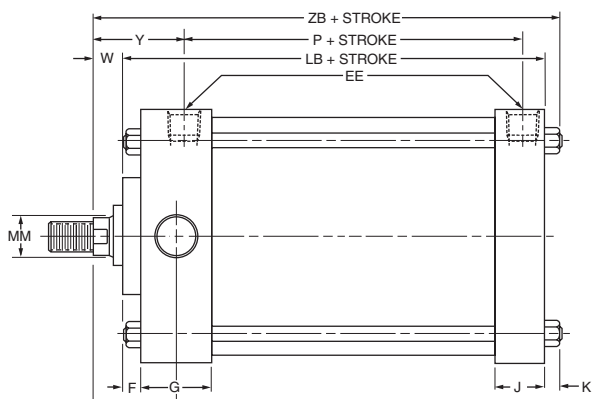
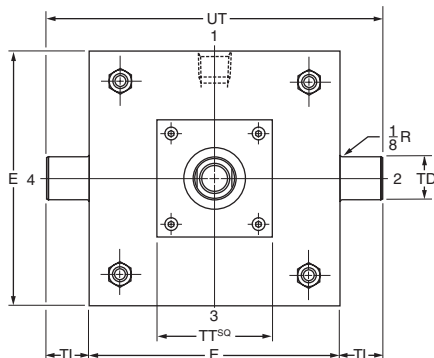
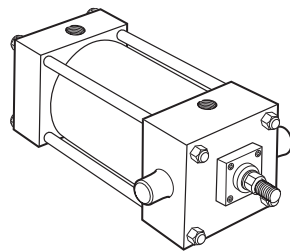
Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size														Add Stroke		
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	TT	V	W	WF	Y	XK	ZB	ZJ			
8	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	2 ¹ / ₂	1.999	5/8	1 ¹ / ₈	1 ⁵ / ₁₆	4	1/4	7/8	1 ⁵ / ₈	2 ¹³ / ₁₆	5 ¹ / ₄	7 ⁵ / ₁₆	6 ³ / ₄			
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	—	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	3	2.374	3/4	1 ¹ / ₂	1 ¹¹ / ₁₆	4	3/8	1 ¹ / ₈	1 ⁷ / ₈	3 ¹ / ₁₆	5 ¹ / ₂	7 ⁹ / ₁₆	7			
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂	2.624	7/8	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	3/8	1 ¹ / ₄	2	3 ³ / ₁₆	5 ⁵ / ₈	7 ¹¹ / ₁₆	7 ¹ / ₈			
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	4 ¹ / ₂	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	—	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	—	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	4	3 ³ / ₄ -12	3-12	4	—	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	—	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
10	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	—	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈			
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	3	2.374	3/4	1 ¹ / ₂	1 ¹¹ / ₁₆	4	3/8	1 ¹ / ₈	1 ⁷ / ₈	3 ¹ / ₁₆	6 ¹ / ₄	8 ¹⁵ / ₁₆	8 ¹ / ₄			
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂	2.624	7/8	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	3/8	1 ¹ / ₄	2	3 ¹ / ₄	6 ³ / ₈	9 ¹ / ₁₆	8 ³ / ₈			
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	4 ¹ / ₂	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	—	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	—	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	4	3 ³ / ₄ -12	3-12	4	—	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	—	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	—	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
12	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	—	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈			
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂	2.624	7/8	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	3/8	1 ¹ / ₄	2	3 ¹ / ₄	6 ⁷ / ₈	9 ⁹ / ₁₆	8 ⁷ / ₈			
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	4 ¹ / ₂	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	—	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	—	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	4	3 ³ / ₄ -12	3-12	4	—	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	—	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	—	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	—	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	1/2	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈			

Head Trunnion Mount

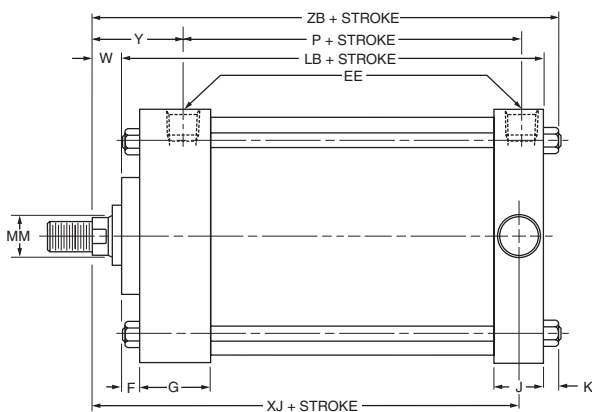
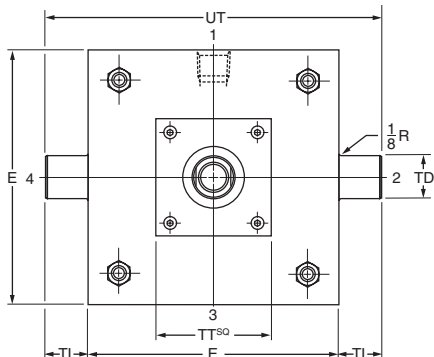
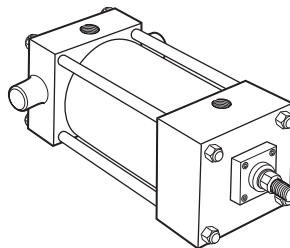
Style MT1

8" - 12" Bore

**Cap Trunnion Mount**

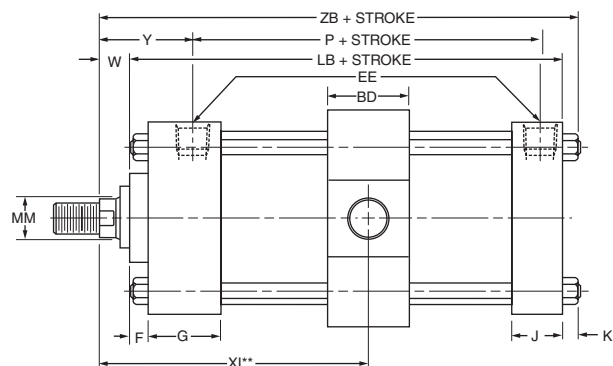
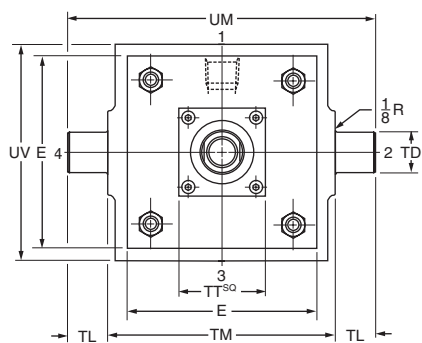
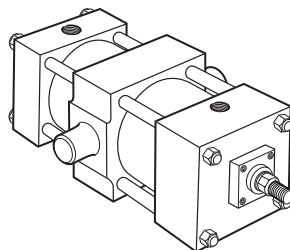
Style MT2

8" - 12" Bore

**Intermediate Fixed Trunnion Mount**

Model MT4

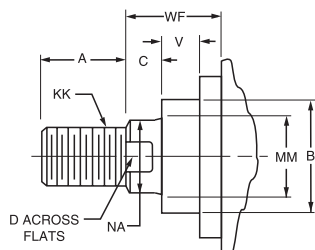
8" - 12" Bore



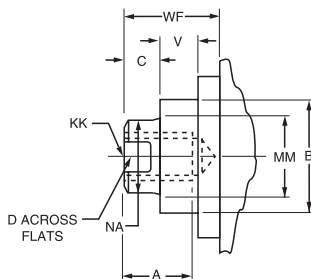
♦♦Dimension XI to be specified by customer.

Rod End Dimensions — see table 2**Thread Style 2**

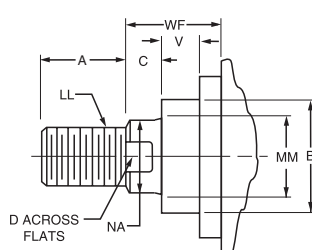
Small Male

**Thread Style 3**

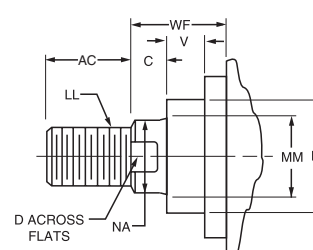
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**“Special” Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

Bore	BD	E	EE		F	G	J	K	+0.000 TD -0.001	TL	TM	UT	UM	UV	Add Stroke	
			NPTF	SAE											LB	P
8	2½	8½	¾	#12	¾	2	1½	9/16	1.375	1¾	9¾	11¼	12½	9½	5⅞	3¼
10	3	10⅝	1	#16	¾	2¼	2	11/16	1.750	1¾	12	14⅞	15½	11¾	7⅞	4⅞
12	3	12¾	1	#16	¾	2¼	2	11/16	1.750	1¾	14	16¼	17½	13¾	7⅞	4⅞

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

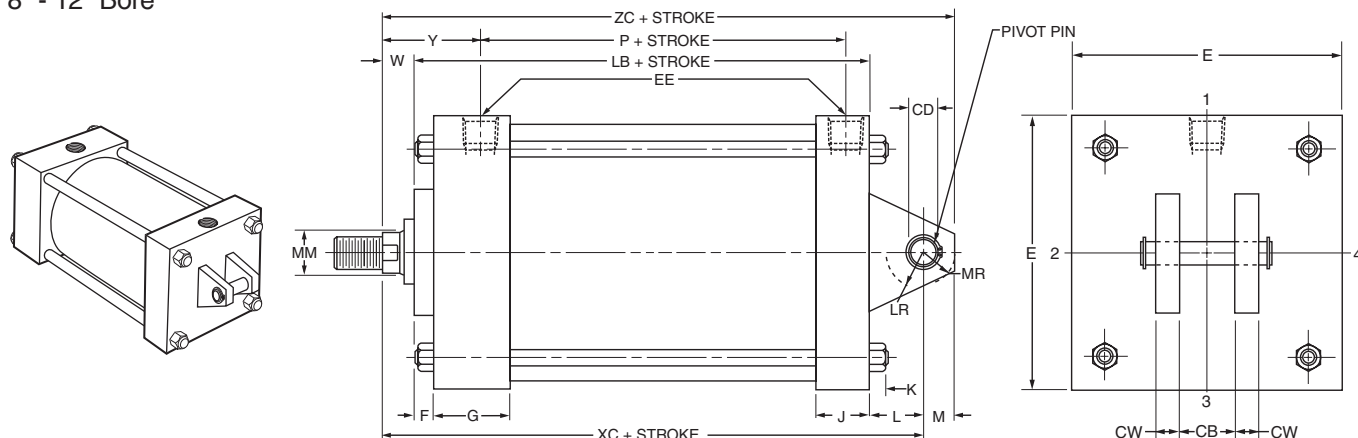
Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size														Add Stroke	
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	TT	V	W	XG	XI* (Min.)	Y	XJ	ZB		
8	1¾	1¼-12	1-14	1⅝	2½	1.999	⅝	1⅞	1⅝ ¹⁶	4	¼	⅞	2⅝	4 ¹⁵ / ₁₆	2 ¹³ / ₁₆	6	7 ⁵ / ₁₆		
	5½	5¼-12	4-12	5½	—	6.249	1	4⅝	5⅝	7	½	1½	3¼	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6⅝	7 ¹⁵ / ₁₆		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1 ¹¹ / ₁₆	4	⅜	1⅞	2⅞	5 ³ / ₁₆	3 ¹ / ₁₆	6¼	7 ⁹ / ₁₆		
	2	1¾-12	1½-12	2¼	3½	2.624	⅞	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	⅜	1¼	3	5 ⁵ / ₁₆	3 ³ / ₁₆	6⅝	7 ¹¹ / ₁₆		
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2 ¹ / ₁₆	2⅝	4	½	1½	3¼	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6⅝	7 ¹⁵ / ₁₆		
	3	2¾-12	2¼-12	3½	—	3.749	1	2⅝	2⅞	5½	½	1½	3¼	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6⅝	7 ¹⁵ / ₁₆		
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3⅝	5½	½	1½	3¼	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6⅝	7 ¹⁵ / ₁₆		
	4	3¾-12	3-12	4	—	4.749	1	3⅝	3⅞	5½	½	1½	3¼	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6⅝	7 ¹⁵ / ₁₆		
	4½	4¼-12	3¼-12	4½	—	5.249	1	3⅞	4⅝	7	½	1½	3¼	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6⅝	7 ¹⁵ / ₁₆		
10	5	4¾-12	3½-12	5	—	5.749	1	4¼	4⅞	7	½	1½	3¼	5 ⁹ / ₁₆	3 ⁷ / ₁₆	6⅝	7 ¹⁵ / ₁₆		
	1¾	1½-12	1¼-12	2	3	2.374	¾	1½	1 ¹¹ / ₁₆	4	⅜	1⅞	3	5 ¹¹ / ₁₆	3 ¹ / ₁₆	7¼	8 ¹⁵ / ₁₆		
	2	1¾-12	1½-12	2¼	3½	2.624	⅞	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	⅜	1¼	3⅞	5 ¹³ / ₁₆	3¼	7⅞	9 ¹ / ₁₆		
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2 ¹ / ₁₆	2⅝	4	½	1½	3⅞	6 ¹ / ₁₆	3½	7⅝	9 ⁵ / ₁₆		
	3	2¾-12	2¼-12	3½	—	3.749	1	2⅝	2⅞	5½	½	1½	3⅞	6 ¹ / ₁₆	3½	7⅝	9 ⁵ / ₁₆		
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3⅝	5½	½	1½	3⅞	6 ¹ / ₁₆	3½	7⅝	9 ⁵ / ₁₆		
	4	3¾-12	3-12	4	—	4.749	1	3⅝	3⅞	5½	½	1½	3⅞	6 ¹ / ₁₆	3½	7⅝	9 ⁵ / ₁₆		
	4½	4¼-12	3¼-12	4½	—	5.249	1	3⅞	4⅝	7	½	1½	3⅞	6 ¹ / ₁₆	3½	7⅝	9 ⁵ / ₁₆		
	5	4¾-12	3½-12	5	—	5.749	1	4¼	4⅞	7	½	1½	3⅞	6 ¹ / ₁₆	3½	7⅝	9 ⁵ / ₁₆		
12	5½	5¼-12	4-12	5½	—	6.249	1	4⅝	5⅝	7	½	1½	3⅞	6 ¹ / ₁₆	3½	7⅝	9 ⁵ / ₁₆		
	2	1¾-12	1½-12	2¼	3½	2.624	⅞	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	⅜	1¼	3⅞	5 ¹³ / ₁₆	3¼	7⅞	9 ⁹ / ₁₆		
	2½	2¼-12	1⅞-12	3	4½	3.124	1	2 ¹ / ₁₆	2⅝	4	½	1½	3⅞	6 ¹ / ₁₆	3½	8⅞	9 ¹³ / ₁₆		
	3	2¾-12	2¼-12	3½	—	3.749	1	2⅝	2⅞	5½	½	1½	3⅞	6 ¹ / ₁₆	3½	8⅞	9 ¹³ / ₁₆		
	3½	3¼-12	2½-12	3½	—	4.249	1	3	3⅝	5½	½	1½	3⅞	6 ¹ / ₁₆	3½	8⅞	9 ¹³ / ₁₆		
	4	3¾-12	3-12	4	—	4.749	1	3⅝	3⅞	5½	½	1½	3⅞	6 ¹ / ₁₆	3½	8⅞	9 ¹³ / ₁₆		
	4½	4¼-12	3¼-12	4½	—	5.249	1	3⅞	4⅝	7	½	1½	3⅞	6 ¹ / ₁₆	3½	8⅞	9 ¹³ / ₁₆		
	5	4¾-12	3½-12	5	—	5.749	1	4¼	4⅞	7	½	1½	3⅞	6 ¹ / ₁₆	3½	8⅞	9 ¹³ / ₁₆		

* Dimension XI to be specified by customer.

Cap Fixed Clevis Mount

Style MP1

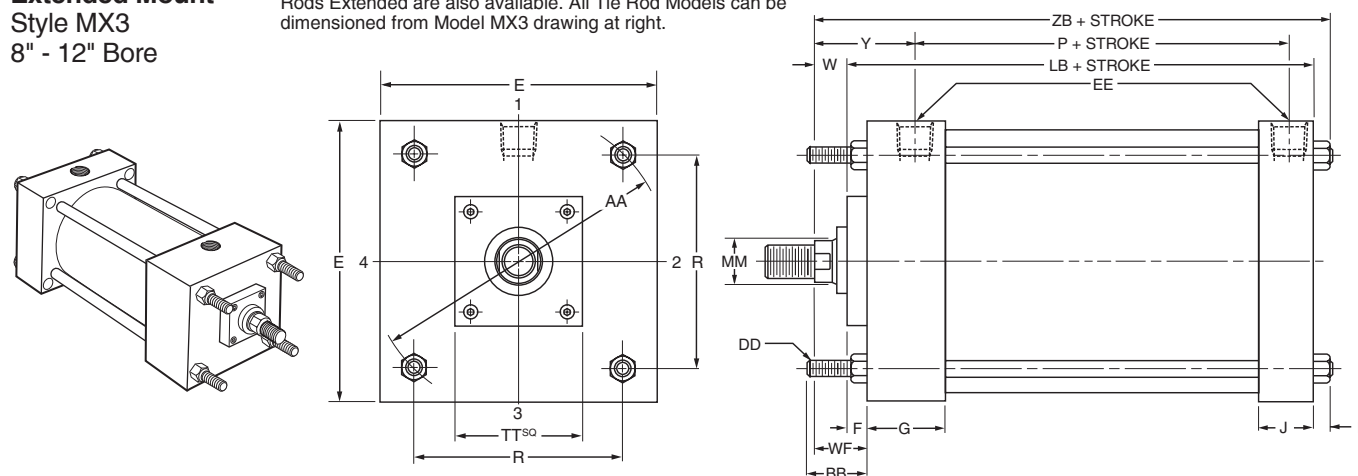
8" - 12" Bore

**Tie Rod
Extended Mount**

Style MX3

8" - 12" Bore

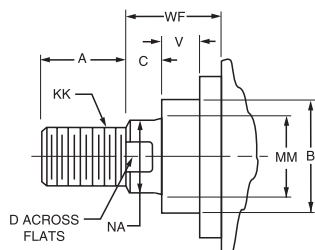
Model MX3 Head Tie Rods Extended, Illustrated. Model MX2 Cap Tie Rods Extended; and Model MX1, Both Ends Tie Rods Extended are also available. All Tie Rod Models can be dimensioned from Model MX3 drawing at right.



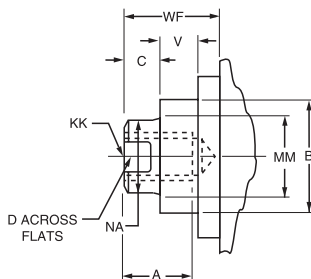
Models MX3 and MX1 not offered in 8" bore, rod diameters 4 1/2", 5" and 5 1/2".

Rod End Dimensions — see table 2**Thread Style 2**

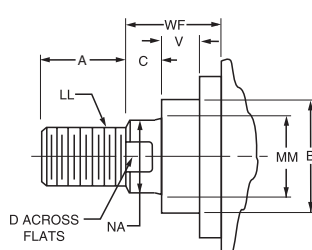
Small Male

**Thread Style 3**

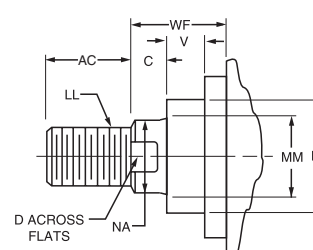
Short Female

**Thread Style 4**

Intermediate Male

**Thread Style 5**

Automotive Male

**“Special” Thread Style 0**

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, W or WF. If otherwise special, furnish dimensioned sketch.

Table 1—Envelope and Mounting Dimensions

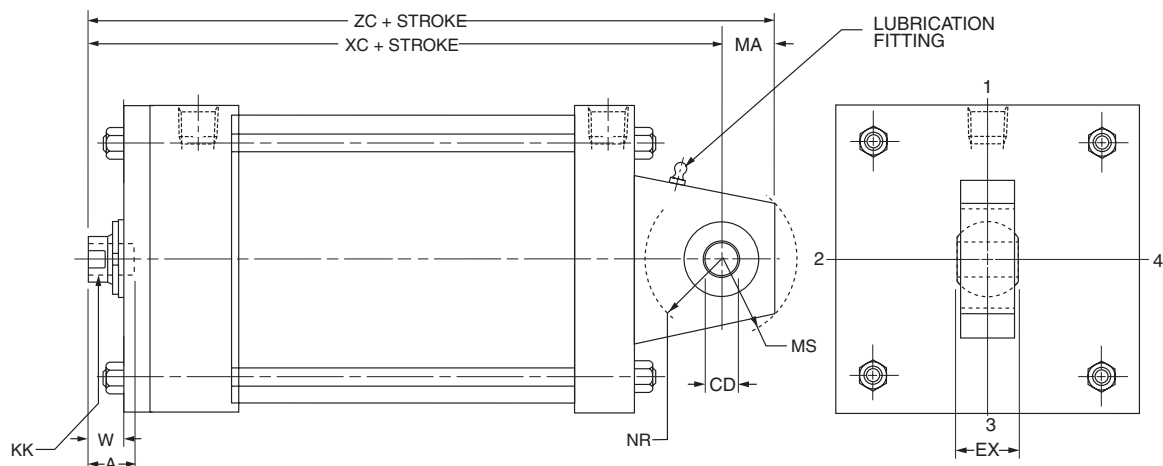
Bore	AA	BB	CB	+0.000 CD -0.001	CW	DD	E	EE		F	G	J	K	L	LR	M	MR	R	Add Stroke	
								NPTF	SAE										LB	P
8	9.1	2 ⁵ / ₁₆	1 ¹ / ₂	1.000	³ / ₄	⁵ / ₈ -18	8 ¹ / ₂	³ / ₄	#12	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	1 ¹ / ₂	1 ¹ / ₄	1	1 ³ / ₁₆	6.44	5 ⁷ / ₈	3 ¹ / ₄
10	11.2	2 ¹¹ / ₁₆	2	1.375	1	³ / ₄ -16	10 ⁵ / ₈	1	#16	³ / ₄	2 ¹ / ₄	2	1 ¹ / ₁₆	2 ¹ / ₈	1 ⁷ / ₈	1 ³ / ₈	1 ⁵ / ₈	7.92	7 ¹ / ₈	4 ¹ / ₈
12	13.3	2 ¹¹ / ₁₆	2 ¹ / ₂	1.750	1 ¹ / ₄	³ / ₄ -16	12 ³ / ₄	1	#16	³ / ₄	2 ¹ / ₄	2	1 ¹ / ₁₆	2 ¹ / ₄	2 ¹ / ₈	1 ³ / ₄	2 ¹ / ₈	9.40	7 ⁵ / ₈	4 ⁵ / ₈

Table 2—Rod End Dimensions and Envelope Dimensions Affected By Rod Size

Bore	Rod Dia. MM	Thread		Rod End Dimensions and Envelope Dimensions Affected By Rod Size														Add Stroke	
		Style 4 & 5 LL	Style 2 & 3 KK	A	AC	+0.000 -0.002 B	C	D	NA	TT	V	W	WF	Y	ZB	XC	ZC		
8	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	2 ¹ / ₂	1.999	⁵ / ₈	1 ¹ / ₈	1 ⁵ / ₁₆	4	¹ / ₄	⁷ / ₈	1 ⁵ / ₈	2 ¹³ / ₁₆	7 ⁵ / ₁₆	8 ¹ / ₄	9 ¹ / ₄		
	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	—	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	8 ⁷ / ₈	9 ⁷ / ₈		
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	3	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	1 ⁷ / ₈	3 ¹ / ₁₆	7 ⁹ / ₁₆	8 ¹ / ₂	9 ¹ / ₂		
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	3 ³ / ₁₆	7 ¹¹ / ₁₆	8 ⁵ / ₈	9 ⁵ / ₈		
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	4 ¹ / ₂	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	8 ⁷ / ₈	9 ⁷ / ₈		
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	—	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	8 ⁷ / ₈	9 ⁷ / ₈		
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	—	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	8 ⁷ / ₈	9 ⁷ / ₈		
	4	3 ³ / ₄ -12	3-12	4	—	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	8 ⁷ / ₈	9 ⁷ / ₈		
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	—	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	8 ⁷ / ₈	9 ⁷ / ₈		
10	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	—	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆	8 ⁷ / ₈	9 ⁷ / ₈		
	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	3	2.374	³ / ₄	1 ¹ / ₂	1 ¹¹ / ₁₆	4	³ / ₈	1 ¹ / ₈	1 ⁷ / ₈	3 ¹ / ₁₆	8 ⁵ / ₁₆	10 ³ / ₈	11 ³ / ₄		
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	3 ³ / ₁₆	9 ¹ / ₁₆	10 ¹ / ₂	11 ⁷ / ₈		
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	4 ¹ / ₂	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	10 ³ / ₄	12 ¹ / ₈		
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	—	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	10 ³ / ₄	12 ¹ / ₈		
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	—	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	10 ³ / ₄	12 ¹ / ₈		
	4	3 ³ / ₄ -12	3-12	4	—	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	10 ³ / ₄	12 ¹ / ₈		
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	—	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	10 ³ / ₄	12 ¹ / ₈		
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	—	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	10 ³ / ₄	12 ¹ / ₈		
12	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	—	6.249	1	4 ⁵ / ₈	5 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ⁵ / ₁₆	10 ³ / ₄	12 ¹ / ₈		
	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂	2.624	⁷ / ₈	1 ¹¹ / ₁₆	1 ¹⁵ / ₁₆	4	³ / ₈	1 ¹ / ₄	2	3 ³ / ₁₆	9 ⁹ / ₁₆	11 ¹ / ₈	12 ⁷ / ₈		
	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	4 ¹ / ₂	3.124	1	2 ¹ / ₁₆	2 ³ / ₈	4	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ¹³ / ₁₆	11 ³ / ₈	13 ¹ / ₈		
	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	—	3.749	1	2 ⁵ / ₈	2 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ¹³ / ₁₆	11 ³ / ₈	13 ¹ / ₈		
	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	—	4.249	1	3	3 ³ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ¹³ / ₁₆	11 ³ / ₈	13 ¹ / ₈		
	4	3 ³ / ₄ -12	3-12	4	—	4.749	1	3 ³ / ₈	3 ⁷ / ₈	5 ¹ / ₂	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ¹³ / ₁₆	11 ³ / ₈	13 ¹ / ₈		
	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	—	5.249	1	3 ⁷ / ₈	4 ³ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ¹³ / ₁₆	11 ³ / ₈	13 ¹ / ₈		
	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	—	5.749	1	4 ¹ / ₄	4 ⁷ / ₈	7	¹ / ₂	1 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	9 ¹³ / ₁₆	11 ³ / ₈	13 ¹ / ₈		

Spherical Bearing Mount – Style MPU3

1 1/2" to 6" Bore Sizes

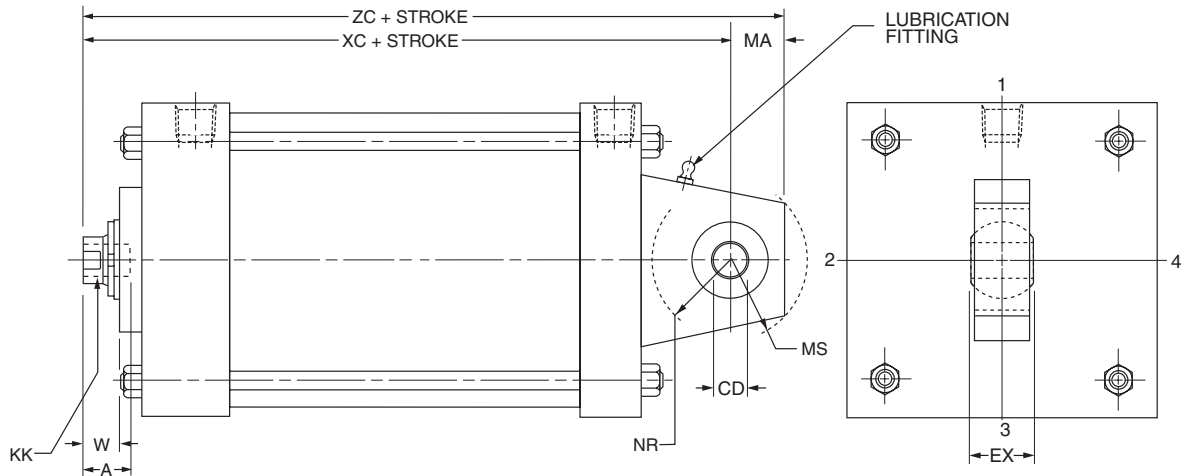


Bore	Rod Dia. MM	Thread		A	CD ²	EX	MA	MS	NR	W	Add Stroke		Max. Oper. PSI ¹ PA-2
		Style 3 KK ³	Style 7 KK ³								XC	ZC	
1½	5/8	7/16-20	—	3/4	-.0005	7/16	3/4	15/16	5/8	5/8	5¾	6½	250
	1	**	7/16-20	3/4	.5000					1	5¾	6½	
2	5/8	7/16-20	—	3/4	-.0005	7/16	3/4	15/16	5/8	5/8	5¾	6½	250
	1¾	**	7/16-20	3/4	-.0005	7/16	3/4	15/16	5/8	1¼	6	6¾	
	1	**	7/16-20	3/4	.5000					1	5¾	6½	
2½	5/8	7/16-20	—	3/4	-.0005	7/16	3/4	15/16	5/8	5/8	5½	6¼	250
	1¾	**	7/16-20	3/4	-.0005	7/16	3/4	15/16	5/8	1½	6¾	7½	
	1	**	7/16-20	3/4	.5000					1	5¾	6⅝	
	1¾	**	7/16-20	3/4						1¼	6⅞	6⅞	
3¼	1	¾-16	—	1½	-.0005	21/32	1	1¾	1	¾	6⅞	7⅞	250
	2	**	¾-16	1½	-.0005	21/32	1	1¾	1	1¾	7½	8½	
	1¾	**	¾-16	1½	.7500					1	7⅞	8⅞	
	1¾	**	¾-16	1½						1¼	7¾	8¾	
4	1	¾-16	—	1½	-.0005	21/32	1	1¾	1	¾	6⅞	7⅞	250
	2½	**	¾-16	1½	-.0005	21/32	1	1¾	1	1⅝	7¾	8¾	
	1¾	**	¾-16	1½	.7500					1	7⅞	8⅞	
	1¾	**	¾-16	1½						1¼	7¾	8¾	
	2	**	¾-16	1½						1¾	7½	8½	
5	1	¾-16	—	1½	-.0005	21/32	1	1¾	1	¾	7⅞	8⅞	250
	3½	**	¾-16	1½	-.0005	21/32	1	1¾	1	1⅝	8	9	
	1¾	**	¾-16	1½	.7500					1	7¾	8¾	
	1¾	**	¾-16	1½						1¼	7⅝	8⅝	
	2	**	¾-16	1½						1¾	7¾	8¾	
	2½	**	¾-16	1½						1⅝	8	9	
	3	**	¾-16	1½						1⅝	8	9	
6	1¾	1-14	—	1⅝	-.0005	7/8	1¼	1⅞	1¼	7/8	8⅞	9¾	250
	4	**	1-14	1⅝	-.0005	7/8	1¼	1⅞	1¼	1½	8¾	10	
	1¾	**	1-14	1⅝	1.0000					1⅞	8¾	9⅝	
	2	**	1-14	1⅝						1¼	8½	9¾	
	2½	**	1-14	1⅝						1½	8¾	10	
	3	**	1-14	1⅝						1½	8¾	10	
	3½	**	1-14	1⅝						1½	8¾	10	

¹ Maximum operating pressure at 4:1 design factor is based on tensile strength of material. Pressure ratings are based on standard commercial bearing ratings.

² Dimension CD is hole diameter.

³ Threads listed are also for a spherical rod eye which match style 9 or style 7. The spherical rod eye pin diameter matches the cap pin and (if required) needs to be purchased separately; see NC-9 mounting accessories for detailed information.

Spherical Bearing Mount – Style MPU3
8" to 12" Bore Sizes

Bore	Rod Dia. MM	Thread		A	CD ²	EX	MA	MS	NR	W	Add Stroke		Max. Oper. PSI
		Style 3 KK ³	Style 7 KK ³								XC	ZC	
8	1 ³ / ₈	1-14	—	1 ⁵ / ₈	-.0005 1.0000	7/ ₈	1 ¹ / ₄	1 ¹¹ / ₁₆	1 ¹ / ₄	7/ ₈	8 ¹ / ₄	9 ¹ / ₂	250
	5 ¹ / ₂	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	1 ³ / ₄	**	1-14	1 ⁵ / ₈						1 ¹ / ₈	8 ¹ / ₂	9 ³ / ₄	
	2	**	1-14	1 ⁵ / ₈						1 ¹ / ₄	8 ⁵ / ₈	9 ⁷ / ₈	
	2 ¹ / ₂	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	3	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	3 ¹ / ₂	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	4	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
	4 ¹ / ₂	**	1-14	1 ⁵ / ₈						1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	
10	5	**	1-14	1 ⁵ / ₈	-.0005 1.3750	1 ³ / ₁₆	1 ⁷ / ₈	2 ⁷ / ₁₆	1 ⁵ / ₈	1 ¹ / ₂	8 ⁷ / ₈	10 ¹ / ₈	250
	1 ³ / ₄	1 ¹ / ₄ -12	—	2						1 ¹ / ₈	10 ³ / ₈	12 ¹ / ₄	
	2	**	1 ¹ / ₄ -12	2						1 ¹ / ₄	10 ¹ / ₂	12 ³ / ₈	
	2 ¹ / ₂	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	3	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	3 ¹ / ₂	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	4	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	4 ¹ / ₂	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
	5 ¹ / ₂	**	1 ¹ / ₄ -12	2						1 ¹ / ₂	10 ³ / ₄	12 ⁵ / ₈	
12	2	1 ¹ / ₂ -12	—	2 ¹ / ₄	-.0005 1.7500	1 ¹⁷ / ₃₂	2 ¹ / ₂	2 ⁷ / ₈	2 ¹ / ₁₆	1 ¹ / ₄	11 ¹ / ₈	13 ⁵ / ₈	250
	2 ¹ / ₂	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	3	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	3 ¹ / ₂	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	4	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	4 ¹ / ₂	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	5	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	
	5 ¹ / ₂	**	1 ¹ / ₂ -12	2 ¹ / ₄						1 ¹ / ₂	11 ³ / ₈	13 ⁷ / ₈	

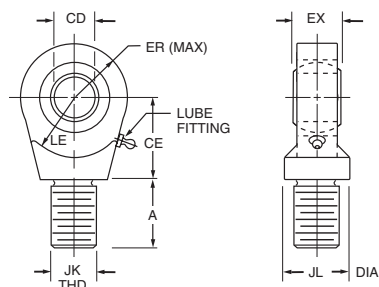
¹ Maximum operating pressure at 4:1 design factor is based on tensile strength of material. Pressure ratings are based on standard commercial bearing ratings.

² Dimension CD is hole diameter.

³ Threads listed are also for a spherical rod eye which match style 9 or style 7. The spherical rod eye pin diameter matches the cap pin and (if required) needs to be purchased separately; see NC-9 mounting accessories for detailed information.

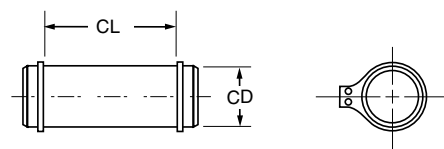
Schrader Bellows offers a complete range of Cylinder Accessories to assure you of the greatest versatility in present or future cylinder applications. Accessories offered for the respective cylinder include the Rod Eye, Pivot Pin

and Clevis Bracket. To select the proper part number for any desired accessory refer to the charts below.

Spherical Rod Eye

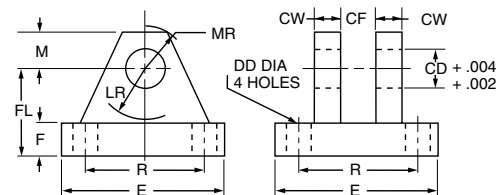
Bore Sizes	Series NC-9	1 1/2, 2 & 2 1/2	3 1/4, 4 & 5	6 & 8	10	12
Rod Eye	Part No.	1322900000	1322910000	1322920000	1322930000	1322940000
CD		.5000-.0005	.7500-.0005	1.0000-.0005	1.3750-.0005	1.7500-.0005
A		1 1/16	1	1 1/2	2	2 1/8
CE		7/8	1 1/4	1 7/8	2 1/8	2 1/2
EX		7/16	2 1/32	7/8	1 3/16	1 17/32
ER		13/16	1 1/8	1 1/4	1 11/16	2 1/16
LE		3/4	1 1/16	1 7/16	1 7/8	2 1/8
JK		7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12
JL		7/8	1 5/16	1 1/2	2	2 1/4
LOAD CAPACITY LBS.		2644	9441	16860	28562	43005

Order to fit Piston Rod Thread Size.

Pivot Pin

Bore Sizes	Series NC-9	1 1/2, 2 & 2 1/2	3 1/4, 4 & 5	6 & 8	10	12
Pivot Pin	Part No.	0839620000	0839630000	0839640000	0839650000	0839660000
CD		.4997-.0004	.7497-.0005	.9997-.0005	1.3746-.0006	1.7496-.0006
CL		1 9/16	2 1/32	2 1/2	3 5/16	4 7/32
LOAD CAPACITY LBS.		8600	19300	34300	65000	105200

Pivot Pins are furnished with (2) Retainer Rings.

Clevis Bracket

Bore Sizes	Series NC-9	1 1/2, 2 & 2 1/2	3 1/4, 4 & 5	6 & 8	10	12
Clevis Bracket	Part No.	0839470000	0839480000	0839490000	0839500000	0839510000
CD		1 1/2	3/4	1	1 3/8	1 3/4
CF		7/16	2 1/32	7/8	1 3/16	1 17/32
CW		1/2	5/8	3/4	1	1 1/4
DD		13/32	17/32	17/32	2 1/32	2 9/32
E		3	3 3/4	5 1/2	6 1/2	8 1/2
F		1 1/2	5/8	3/4	7/8	1 1/4
FL		1 1/2	2	2 1/2	3 1/2	4 1/2
LR		1 5/16	1 3/8	1 11/16	2 7/16	2 7/8
M		1 1/2	7/8	1	1 3/8	1 3/4
MR		5/8	1	1 3/16	1 5/8	2 1/16
R		2.05	2.76	4.10	4.95	6.58
LOAD CAPACITY LBS.		5770	9450	14300	20322	37800

Order to fit Cap or Rod Eye.

To determine dimensions for a double rod cylinder, first refer to the desired single rod mounting style cylinder shown on preceding pages of this catalog. After selecting necessary dimensions from that drawing, return to this page and supplement the single rod dimensions with those shown on the drawing and dimension table below. Note that double rod cylinders have a head (Dim. G) at both ends and that dimension LD or LF replaces LG or LB. The double rod dimensions differ from, or are in addition to those for single rod cylinders shown on preceding pages and provide the information needed to completely dimension a double rod cylinder. On a double rod cylinder where the two rod ends are different, be sure to clearly state which rod end is to be assembled at which end.

Port position 1 is standard. If other than standard, specify position 2, 3, or 4 when viewed from one end only.

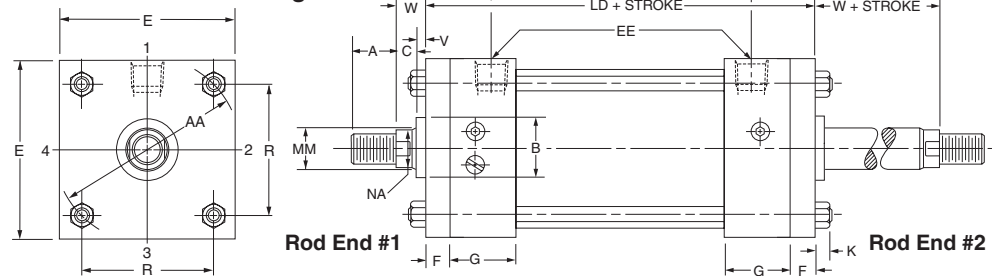
If only one end of these Double Rod Cylinders is to be cushioned, be sure to specify clearly which end this will be.

Specify XI dimension from rod end #1.

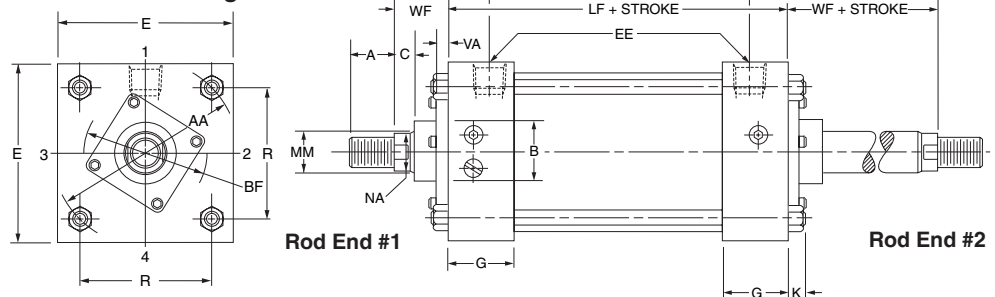
How to Use Double Rod Cylinder Dimension Drawings

1-1/2" to 6" Bores

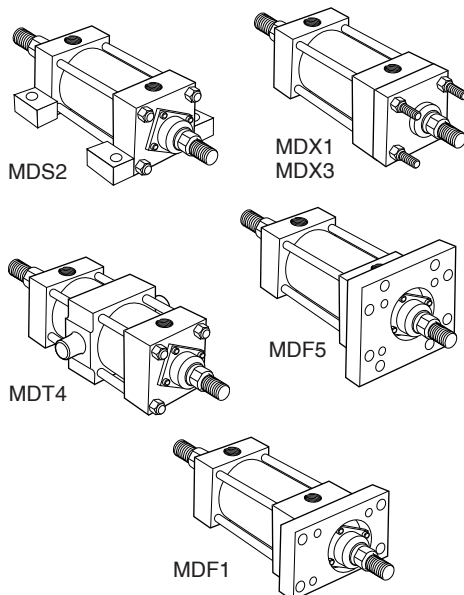
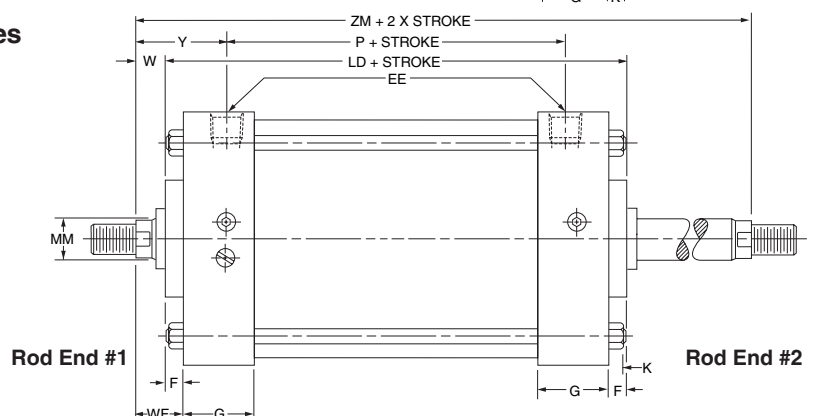
Tie Rod Retained Cartridge



1-1/2" to 6" Bores Removable Cartridge



8" to 12" Bores



All dimensions are in inches and apply to standard rod sizes only. For alternate rod sizes, determine all envelope dimensions (within LD dim.) as described above and then use appropriate rod end dimensions for proper rod size for single rod cylinder.

Bore	Rod Dia. MM	Add Stroke			Add 2X Stroke
		LD	LF	SS	ZM
1 1/2	5/8	4 7/8	4 1/8	3 3/8	6 1/8
2	5/8	4 7/8	4 1/8	3 3/8	6 1/8
2 1/2	5/8	5	4 1/4	3 1/2	6 1/4
3 1/4	1	6	4 3/4	3 3/4	7 1/2
4	1	6	4 3/4	3 3/4	7 1/2
5	1	6 1/4	5	3 5/8	7 3/4
6	1 3/8	7	5 1/2	4 1/8	8 3/4
8	1 3/8	7 1/8	5 5/8	4 1/4	8 7/8
10	1 3/4	8 1/8	6 5/8	4 7/8	10 3/8
12	2	8 5/8	7 1/8	5 3/8	11 1/8
Replaces:		LB	LG	SS	—
On single rod mounting styles:		All Mtg. Styles		MS2	All Mtgs.

Alignment Coupler

See Table 1 for Part Numbers and Dimensions

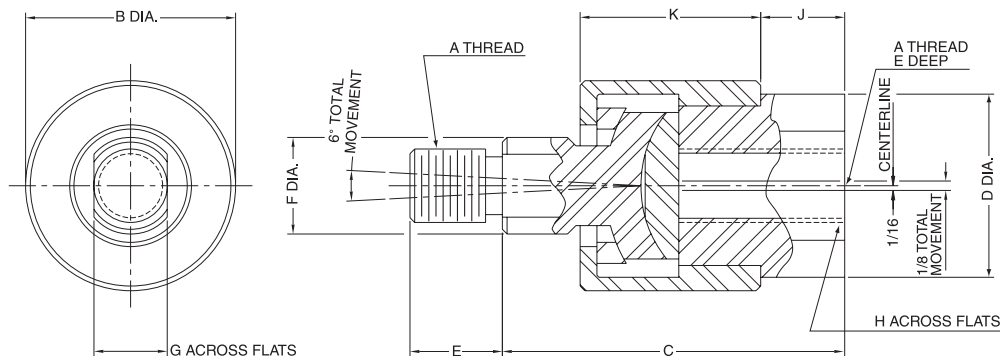


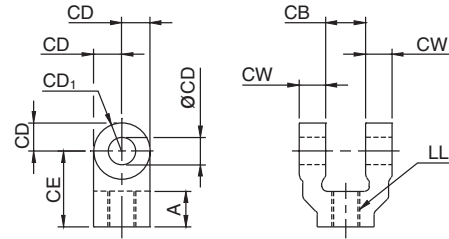
Table 1 — Part Numbers and Dimensions

Part No.	A	B	C	D	E	F	G	H	J	K	Max. Pull Load (lbs.)	Approx. Weight (lbs.)
1347570031	$\frac{5}{16}$ -24	1 $\frac{1}{8}$	1 $\frac{3}{4}$	$\frac{15}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{15}{16}$	1200	.35
1347570038	$\frac{3}{8}$ -24	1 $\frac{1}{8}$	1 $\frac{3}{4}$	$\frac{15}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{15}{16}$	2425	.35
1347570044	$\frac{7}{16}$ -20	1 $\frac{3}{8}$	2	1 $\frac{1}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{7}{8}$	$\frac{3}{8}$	1 $\frac{3}{32}$	3250	.55
1347570050	$\frac{1}{2}$ -20	1 $\frac{3}{8}$	2	1 $\frac{1}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{7}{8}$	$\frac{3}{8}$	1 $\frac{3}{32}$	4450	.55
1347570063	$\frac{5}{8}$ -18	1 $\frac{3}{8}$	2	1 $\frac{1}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{7}{8}$	$\frac{3}{8}$	1 $\frac{3}{32}$	6800	.55
1347570075	$\frac{3}{4}$ -16	2	2 $\frac{5}{16}$	1 $\frac{5}{8}$	1 $\frac{1}{8}$	$\frac{15}{16}$	$\frac{3}{4}$	1 $\frac{5}{16}$	$\frac{7}{16}$	1 $\frac{9}{32}$	9050	1.4
1347570088	$\frac{7}{8}$ -14	2	2 $\frac{5}{16}$	1 $\frac{5}{8}$	1 $\frac{1}{8}$	$\frac{15}{16}$	$\frac{3}{4}$	1 $\frac{5}{16}$	$\frac{7}{16}$	1 $\frac{9}{32}$	14450	1.4
1347570100	1-14	3	3	2 $\frac{3}{8}$	1 $\frac{5}{8}$	1 $\frac{7}{16}$	1 $\frac{1}{4}$	1 $\frac{7}{8}$	$\frac{3}{4}$	1 $\frac{25}{32}$	19425	4.8
1347570125	1 $\frac{1}{4}$ -12	3	3	2 $\frac{3}{8}$	1 $\frac{5}{8}$	1 $\frac{7}{16}$	1 $\frac{1}{4}$	1 $\frac{7}{8}$	$\frac{3}{4}$	1 $\frac{25}{32}$	30500	4.8
1337390125	1 $\frac{1}{4}$ -12	3 $\frac{1}{2}$	4	2	2	1 $\frac{1}{2}$	1 $\frac{1}{4}$	1 $\frac{11}{16}$	$\frac{3}{4}$	2 $\frac{1}{2}$	30500	6.9
1337390150	1 $\frac{1}{2}$ -12	4	4 $\frac{3}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	1 $\frac{3}{4}$	1 $\frac{1}{2}$	1 $\frac{15}{16}$	$\frac{7}{8}$	2 $\frac{3}{4}$	45750	9.8
1337390175	1 $\frac{3}{4}$ -12	4	4 $\frac{3}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	1 $\frac{3}{4}$	1 $\frac{1}{2}$	1 $\frac{15}{16}$	$\frac{7}{8}$	2 $\frac{3}{4}$	58350	9.8
1337390188	1 $\frac{7}{8}$ -12	5	5 $\frac{5}{8}$	3	3	2 $\frac{1}{4}$	1 $\frac{15}{16}$	2 $\frac{5}{8}$	1 $\frac{3}{8}$	3 $\frac{3}{8}$	67550	19.8

How to Order Linear Alignment Couplers — When ordering a cylinder with a threaded male rod end, specify the coupler of equal thread size by part number as listed in Table 1, i.e.; Piston Rod “KK” or “LL” dimension is $\frac{3}{4}$ " - 16", specify coupler part number 1347570075.

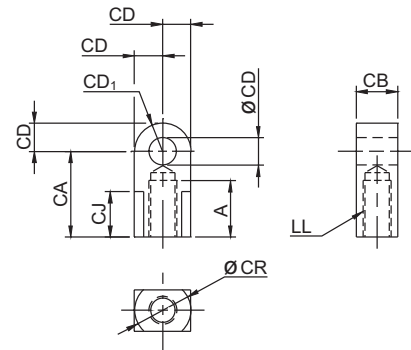
Rod Clevis — Order to Fit Thread Size of Piston Rod*

NC9 Part Number	Rod Dia.	Dimensions in Inches							Schrader Part Number
		Thread Size LL	A	CB	CD	CE	CW	CD1	
NC9-3402A	1	7/8-14	1 1/8	1 1/4	3/4	2 3/8	5/8	3/4	031970875
NC9-3404	1 3/8	1 1/4-12	2	2	1 3/8	4 1/8	1	1 1/4	031971250
NC9-3405	1 3/4	1 1/2-12	2 1/4	2 1/2	1 3/4	4 1/2	1 1/4	1 3/4	031971500
NC9-3405A	2	1 3/4-12	2 1/4	2 1/2	1 3/4	4 1/2	1 1/4	1 3/4	031971750
NC9-3406A	2 1/2	2 1/4-12	3	2 1/2	2	5 1/2	1 1/4	2	031977987



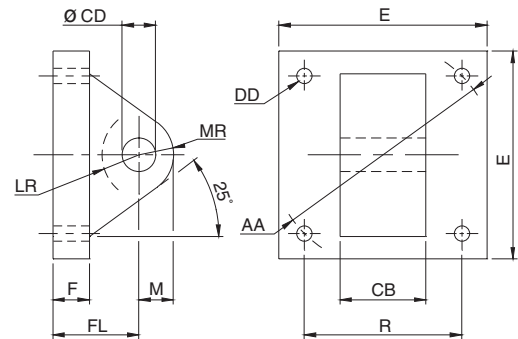
Rod Eye — Order to Fit Thread Size of Piston Rod*

NC9 Part Number	Rod Dia.	Dimensions in Inches								Schrader Part Number
		Thread Size LL	A	CA	CB	CD	CJ	CD1	CR	
NC9-3305A	1	7/8-14	1 1/8	2 1/16	1 1/4	3/4	3/4	3/4	1 1/2	031960875
NC9-3307	1 3/8	1 1/4-12	2	3 7/16	2	1 3/8	—	1 3/8	—	031961250
NC9-3308	1 3/4	1 1/2-12	2 1/4	4	2 1/2	1 3/4	—	1 3/4	—	031961500
NC9-3308A	2	1 3/4-12	2 1/4	4	2 1/2	1 3/4	—	1 3/4	—	031961750
NC9-3309A	2 1/2	2 1/4-12	3	5	2 1/2	2	—	2	—	031977999



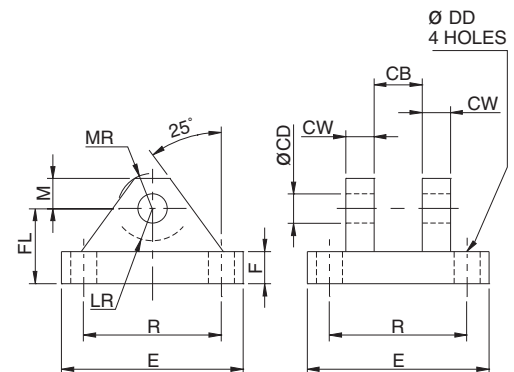
Eye Bracket — Order to Fit Pivot Pin Size (CD)*

NC9 Part Number	Dimensions in Inches										Schrader Bellows P/N
	CD	CB	AA	DD	E SQ.	F	FL	LR	R	MR	
NC9-3201	1/2	3/4	2.3	13/32	2 1/2	3/8	1 1/8	2 1/32	1.62	1/2	0691950000
NC9-3202	3/4	1 1/4	3.6	17/32	3 1/2	5/8	1 7/8	1 1/8	2.56	3/4	0691960000
NC9-3203	1	1 1/2	4.6	2 1/32	4 1/2	3/4	2 1/4	1 1/16	3.25	1	031951000
NC9-3210	1 3/8	2	5.4	2 1/32	5	7/8	3	1 5/8	3.82	1 3/8	0691980000
NC9-3212	1 3/4	2 1/2	7	15/16	6 1/2	7/8	3 3/8	1 7/8	4.95	1 3/4	0691990000
NC9-3213	2	2 1/2	8.1	1 1/16	7 1/2	1	3 1/2	2 1/8	5.73	2	031952000



Clevis Bracket for Rod Eye — Order to Fit Pivot Pin Size (CD)*

NC9 Part Number	Dimensions in Inches										Schrader Bellows P/N
	CB	CD	CW	DD	E	F	FL	LR	M	MR	
NC9-3204	3/4	1/2	1/2	13/32	3	3/8	1 1/8	9/16	1/2	1/2	031940500
NC9-3205	1 1/4	3/4	5/8	17/32	4 1/2	5/8	1 7/8	15/16	3/4	3/4	031940750
NC9-3206	1 1/2	1	3/4	2 1/32	5	3/4	2 1/4	1	1	1 3/16	031941000
NC9-3207	2	1 3/8	1	2 1/32	7 1/2	7/8	3	2	1 3/8	1 21/32	069208000
NC9-3208	2 1/2	1 3/4	1 1/4	29/32	9 1/2	7/8	3 3/8	2 3/4	1 3/4	2 7/32	069209000
NC9-3209	2 1/2	2	1 1/2	1 1/16	12 3/4	1	4 1/4	3 3/16	2 1/4	2 25/32	069210000



* Accessories listed on this page will attach current Ford specification rod thread and bore sizes. For sizes outside the current Ford specification see page 40 of Section A.

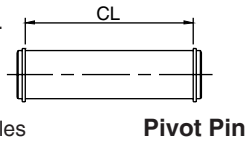
Pivot Pins and Jam Nuts

Sizes to fit current Ford specification cylinders

Pivot Pins with Retaining Rings

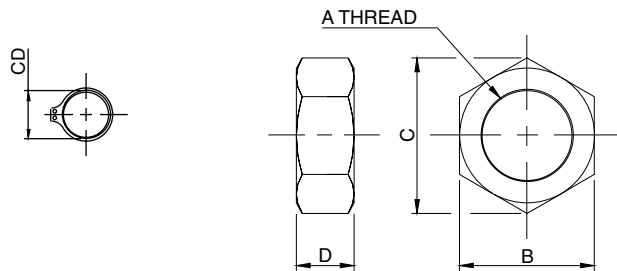
Ford Part Number	Dimensions in inches		Schrader Bellows P/N
	CD	CL	
NC9-3310	1/2	1 7/8	0683680000
NC9-3311	3/4	2 5/8	0683690000
NC9-3312	1	3 1/8	0683700000
NC9-3313	1 3/8	4 1/8	0683710000
NC9-3314	1 3/4	5 3/16	0683720000
NC9-3315	2	5 3/16	0683730000

1. Pivot Pins are furnished with Clevis Mounted Cylinders as standard.
2. Pivot Pins are furnished with (2) retaining rings.
3. Pivot Pins must be ordered as a separate item if to be used with Knuckles Rod Clevises or Clevis Brackets.



Jam Nut

Ford Part Number	Dimensions in inches				Schrader Bellows P/N
	Thd. A	B	C	D	
N/A	7/8-14	1 5/16	1 15/32	3 1/64	034451017
N/A	1 1/4-12	1 7/8	2 1/8	3 5/64	034451023
N/A	1 1/2-12	2 1/4	2 17/32	2 7/32	034451027
N/A	1 3/4-12	2 5/8	2 15/16	3 1/32	034451030
N/A	2 1/4-12	3 1/8	3 5/8	1 1/8	034451033



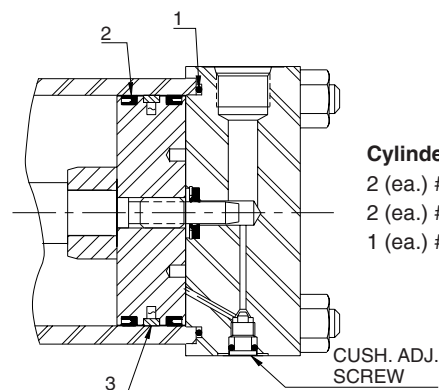
Cylinder Kits

For current Ford specification cylinders

Bore	Cylinder Seal Kit▲	Schrader Bellows Number▲▲
1 1/2	NC9-4201	190208003
2	NC9-4202	190408003
2 1/2	NC9-4203	190508003
3 1/4	NC9-4204	190708003
4	NC9-4205	190808003
5	NC9-4206	191008003
6	NC9-4207	191108003
8	NC9-4208	191308003
10	NC9-4209	191408003
12	NC9-4210	191508003

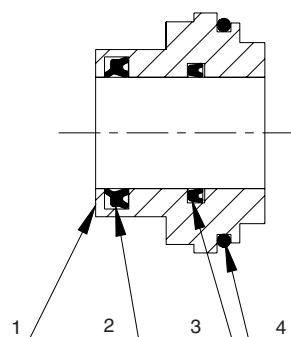
▲ Contain Items 1 through 3

▲▲ Contain Items 1 through 3 & Retaining Ring, Cushion Insert and Cushion Adj. Seal



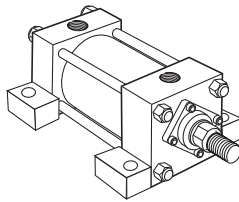
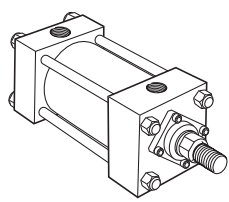
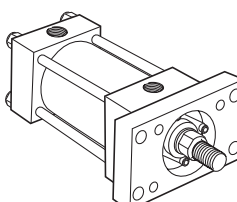
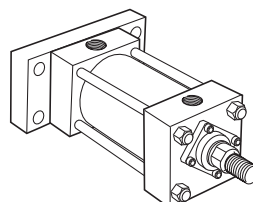
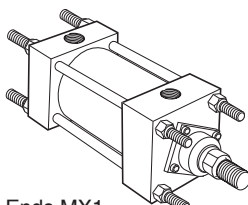
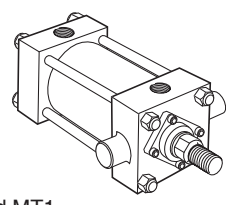
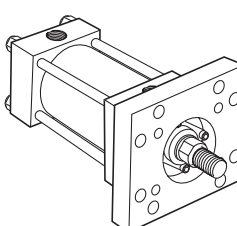
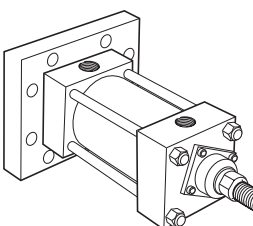
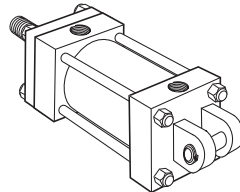
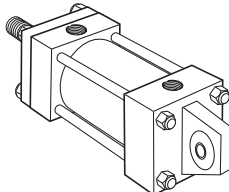
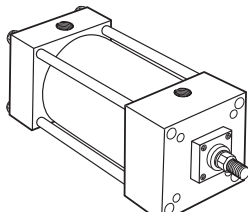
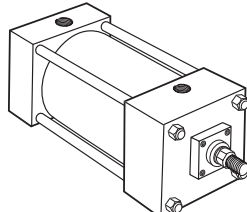
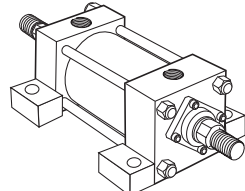
Cartridge Assembly

Bore	Rod	Cartridge Assembly	Schrader Bellows Number
1 1/2, 2	5/8	NC9-4001	190208014
2 1/2	5/8	NC9-4002	190518014
1 1/2, 2, 2 1/2	1	NC9-4003	190218014
3 1/4, 4, 5	1	NC9-4004	190718014
3 1/4, 4, 5	1 3/8	NC9-4005	190428014
2, 5, 6, 8	1 3/8	NC9-4006	191118014
2 1/2, 6, 8	1 3/4	—	190538014
3 1/4, 4, 5, 10	1 3/4	NC9-4007	191418014
3 1/4, 4, 5, 10	2	—	190738014
6, 8	2	NC9-4008	191518014
4, 8, 10, 12	2 1/2	NC9-4009	190848014



In line with our policy of continuing product improvement, specifications in this catalog are subject to change.

Mounting Styles and Ordering Notes

Available in all bore and rod combinations.		Available in all bore and rod combinations through 6" bore. 8"-12" bores supplied as Head Square (ME3) and Cap Square (ME4) mounts.																																																																																																																																																	
Side Lug  MS2	Side Tap  MS4	Head Rectangular Flange  MF1	Cap Rectangular Flange  MF2																																																																																																																																																
Tie Rods Extended  Both Ends MX1 Cap End MX2 Head End MX3	Trunnion Mounts  Head MT1 Cap MT2 Intermediate Fixed MT4	Head Square Flange  MF5	Cap Square Flange  MF6																																																																																																																																																
Cap Fixed Clevis  MP1	Spherical Bearing  MPU3	Rod Bearing Cartridges R = Removable Cartridge T = Tie Rod Retained Cartridge *MF5, MF6, MF1, MF2 not available in these bore sizes. ME3 and ME4 available in 8-12" bore only. <table><tr><th>Bore</th><th>Rod Dia.</th><th>MX1 MS4 MF6 MT2 MT4 MPU3</th><th>MX3 MS2 MF2 MT1 MP1</th><th>MF1 MF5</th><th>ME3 ME4</th></tr><tr><td rowspan="3">1 1/2</td><td>5/8</td><td>R</td><td></td><td>T</td><td></td></tr><tr><td>1</td><td>T</td><td></td><td>T</td><td>N/A</td></tr><tr><td>5/8</td><td>R</td><td></td><td>R</td><td>N/A</td></tr><tr><td rowspan="3">2</td><td>1</td><td>R</td><td></td><td>T</td><td>N/A</td></tr><tr><td>1 3/8</td><td>T</td><td></td><td>T</td><td>N/A</td></tr><tr><td>5/8</td><td>R</td><td></td><td>R</td><td>N/A</td></tr><tr><td rowspan="4">2 1/2</td><td>1</td><td>R</td><td></td><td>R</td><td>N/A</td></tr><tr><td>1 3/8</td><td>T</td><td></td><td>T</td><td>N/A</td></tr><tr><td>1 3/4</td><td>T</td><td></td><td>T</td><td>N/A</td></tr><tr><td>1</td><td>R</td><td></td><td>R</td><td>N/A</td></tr><tr><td rowspan="3">3 1/4</td><td>1 3/8</td><td>R</td><td></td><td>R</td><td>N/A</td></tr><tr><td>1 3/4, 2</td><td>R</td><td></td><td>T</td><td>N/A</td></tr><tr><td>1, 1 3/8</td><td>R</td><td></td><td>R</td><td>N/A</td></tr><tr><td rowspan="3">4</td><td>1 3/4, 2</td><td>R</td><td></td><td>R</td><td>N/A</td></tr><tr><td>2 1/2</td><td>R</td><td></td><td>T</td><td>N/A</td></tr><tr><td>1, 2</td><td>R</td><td></td><td>R</td><td>N/A</td></tr><tr><td rowspan="3">5</td><td>2 1/2, 3</td><td>R</td><td></td><td>T</td><td>N/A</td></tr><tr><td>3 1/2</td><td>T</td><td></td><td>T</td><td>N/A</td></tr><tr><td>1 3/8 - 2 1/2</td><td>R</td><td></td><td>R</td><td>N/A</td></tr><tr><td rowspan="2">6</td><td>3 - 4</td><td>T</td><td></td><td>T</td><td>N/A</td></tr><tr><td>1 3/8 - 4 1/2</td><td>R</td><td></td><td>N/A</td><td>R</td></tr><tr><td rowspan="2">8*</td><td>5, 5 1/2</td><td>R</td><td></td><td>N/A</td><td>R</td></tr><tr><td>1 3/4 - 5 1/2</td><td>R</td><td></td><td>N/A</td><td>R</td></tr><tr><td>10*</td><td></td><td>R</td><td></td><td>N/A</td><td>R</td></tr><tr><td>12*</td><td>2 - 5 1/2</td><td>R</td><td></td><td>N/A</td><td>R</td></tr></table>					Bore	Rod Dia.	MX1 MS4 MF6 MT2 MT4 MPU3	MX3 MS2 MF2 MT1 MP1	MF1 MF5	ME3 ME4	1 1/2	5/8	R		T		1	T		T	N/A	5/8	R		R	N/A	2	1	R		T	N/A	1 3/8	T		T	N/A	5/8	R		R	N/A	2 1/2	1	R		R	N/A	1 3/8	T		T	N/A	1 3/4	T		T	N/A	1	R		R	N/A	3 1/4	1 3/8	R		R	N/A	1 3/4, 2	R		T	N/A	1, 1 3/8	R		R	N/A	4	1 3/4, 2	R		R	N/A	2 1/2	R		T	N/A	1, 2	R		R	N/A	5	2 1/2, 3	R		T	N/A	3 1/2	T		T	N/A	1 3/8 - 2 1/2	R		R	N/A	6	3 - 4	T		T	N/A	1 3/8 - 4 1/2	R		N/A	R	8*	5, 5 1/2	R		N/A	R	1 3/4 - 5 1/2	R		N/A	R	10*		R		N/A	R	12*	2 - 5 1/2	R		N/A	R
Bore	Rod Dia.	MX1 MS4 MF6 MT2 MT4 MPU3	MX3 MS2 MF2 MT1 MP1	MF1 MF5	ME3 ME4																																																																																																																																														
1 1/2	5/8	R		T																																																																																																																																															
	1	T		T	N/A																																																																																																																																														
	5/8	R		R	N/A																																																																																																																																														
2	1	R		T	N/A																																																																																																																																														
	1 3/8	T		T	N/A																																																																																																																																														
	5/8	R		R	N/A																																																																																																																																														
2 1/2	1	R		R	N/A																																																																																																																																														
	1 3/8	T		T	N/A																																																																																																																																														
	1 3/4	T		T	N/A																																																																																																																																														
	1	R		R	N/A																																																																																																																																														
3 1/4	1 3/8	R		R	N/A																																																																																																																																														
	1 3/4, 2	R		T	N/A																																																																																																																																														
	1, 1 3/8	R		R	N/A																																																																																																																																														
4	1 3/4, 2	R		R	N/A																																																																																																																																														
	2 1/2	R		T	N/A																																																																																																																																														
	1, 2	R		R	N/A																																																																																																																																														
5	2 1/2, 3	R		T	N/A																																																																																																																																														
	3 1/2	T		T	N/A																																																																																																																																														
	1 3/8 - 2 1/2	R		R	N/A																																																																																																																																														
6	3 - 4	T		T	N/A																																																																																																																																														
	1 3/8 - 4 1/2	R		N/A	R																																																																																																																																														
8*	5, 5 1/2	R		N/A	R																																																																																																																																														
	1 3/4 - 5 1/2	R		N/A	R																																																																																																																																														
10*		R		N/A	R																																																																																																																																														
12*	2 - 5 1/2	R		N/A	R																																																																																																																																														
Head Square  ME3	Cap Square  ME4																																																																																																																																																		
Double End Construction  Available in all bore and rod combinations in the following mounting styles: MDS2, MDS4, MDX1, MDX3, MDT1, MDT4, and MDF1 (1"-6"). MDF5 (1"-6") and MDE3 (8"-12").																																																																																																																																																			

How To Order By Model Number

NC-9 Pneumatic Cylinders can be specified by model number by using the tables shown at right.

Selections in bold type indicate current Ford standard.

1. Type

Select the Model Number Code which identifies single, double end.

2. Bore & Rod Diameter

Select the Model Number Code which identifies the desired bore size and rod diameter combination.

3. Mounting & Cushioning

Select the Model Number Code which identifies the desired mounting style and cushioning option.

4. Rod End Style

Select the Model Number Code which identifies the desired rod end thread style.

5. Seal Type

Complete the Model Number by selecting the type of seals desired.

6. Stroke Length

It is necessary to specify the stroke length desired following the Model Number. For example: FAA110851 with 6" stroke.

Specifying the Desired Trunnion Location

For cylinders with intermediate trunnion mounting, the dimension specified should be the distance from the piston rod reference point to the center-line of the pin.

The Example Would Identify:

A single end pneumatic cylinder, 1-1/2" bore size, 1" piston rod diameter, side lug mount, cushioned both ends, with automotive male rod thread, Buna N Seals, and a 6" stroke.

Optional Mounting Accessories

Specify separately the part number for desired optional mounting accessories.

1	Model Number
Type	Pneumatic Steel Tube
Single End with NPT port	FA
Double End with NPT port	FB
Single End with SAE port	NA
Double End with SAE port	NB

2						
Bore Size	Rod Dia.	Model No. Code	Bore Size	Rod Dia.	Model No. Code	
1 1/2"	5/8"	A10	8"	1 3/8"	J12	
	1"	A11		1 3/4"	J13	
2"	5/8"	B10		2"	J14	
	1"	B11		2 1/2"	J15	
	1 3/8"	B12		3"	J16	
2 1/2"	5/8"	C10		3 1/2"	J17	
	1"	C11		4"	J18	
	1 3/8"	C12		4 1/2"	J19	
	1 3/4"	C13		5"	J41	
3 1/4"	1"	D11		10"	5 1/2"	J42
	1 3/8"	D12	1 3/4"		K13	
	1 3/4"	D13	2"		K14	
	2"	D14	2 1/2"		K15	
4"	1"	E11	3"		K16	
	1 3/8"	E12	3 1/2"		K17	
	1 3/4"	E13	4"		K18	
	2"	E14	4 1/2"		K19	
	2 1/2"	E15	5"		K41	
5"	1"	F11	5 1/2"		K42	
	1 3/8"	F12	12"	2	L14	
	1 3/4"	F13		2 1/2"	L15	
	2"	F14		3"	L16	
	2 1/2"	F15		3 1/2"	L17	
	3"	F16		4"	L18	
	3 1/2"	F17		4 1/2"	L19	
6"	1 3/8"	G12		5"	L41	
	1 3/4"	G13		5 1/2"	L42	
	2"	G14				
	2 1/2"	G15				
	3"	G16				
	3 1/2"	G17				
	4"	G18				

3	Model Number Code				
Mounting Style	NFPA Style	Non-Cush.	Cush. Head	Cush. Cap	Cush. Both
Side Lug	MS2	05	06	07	08
Side Tap	MS4	13	14	15	16
Head Rectangular Flange (1 1/2-6)	MF1	21	22	23	24
Cap Rectangular Flange (1 1/2-6)	MF2	25	26	27	28
Head Square Flange (1 1/2-6)	MF5	29	30	31	32
Cap Square Flange (1 1/2-6)	MF6	33	34	35	36
Head Square (8-14)	ME3	37	38	39	40
Cap Square (8-14)	ME4	41	42	43	44
Tie Rods Extended Both Ends	MX1	53	54	55	56
Tie Rods Extended Cap End	MX2	57	58	59	60
Tie Rods Extended Head End	MX3	61	62	63	64
Head Trunnion	MT1	69	70	71	72
Cap Trunnion	MT2	73	74	75	76
Intermediate Fixed Trunnion	MT4	77	78	79	80
Cap Fixed Clevis	MP1	81	82	83	84
Spherical Bearing	MPU3	89	90	91	92
NO MOUNT	MX0	93	94	95	96

4	Model Number Code
Rod End Style	
Small Male	2
Short Female	3
Intermediate Male	4
Automotive Male	5
Special Specify	0

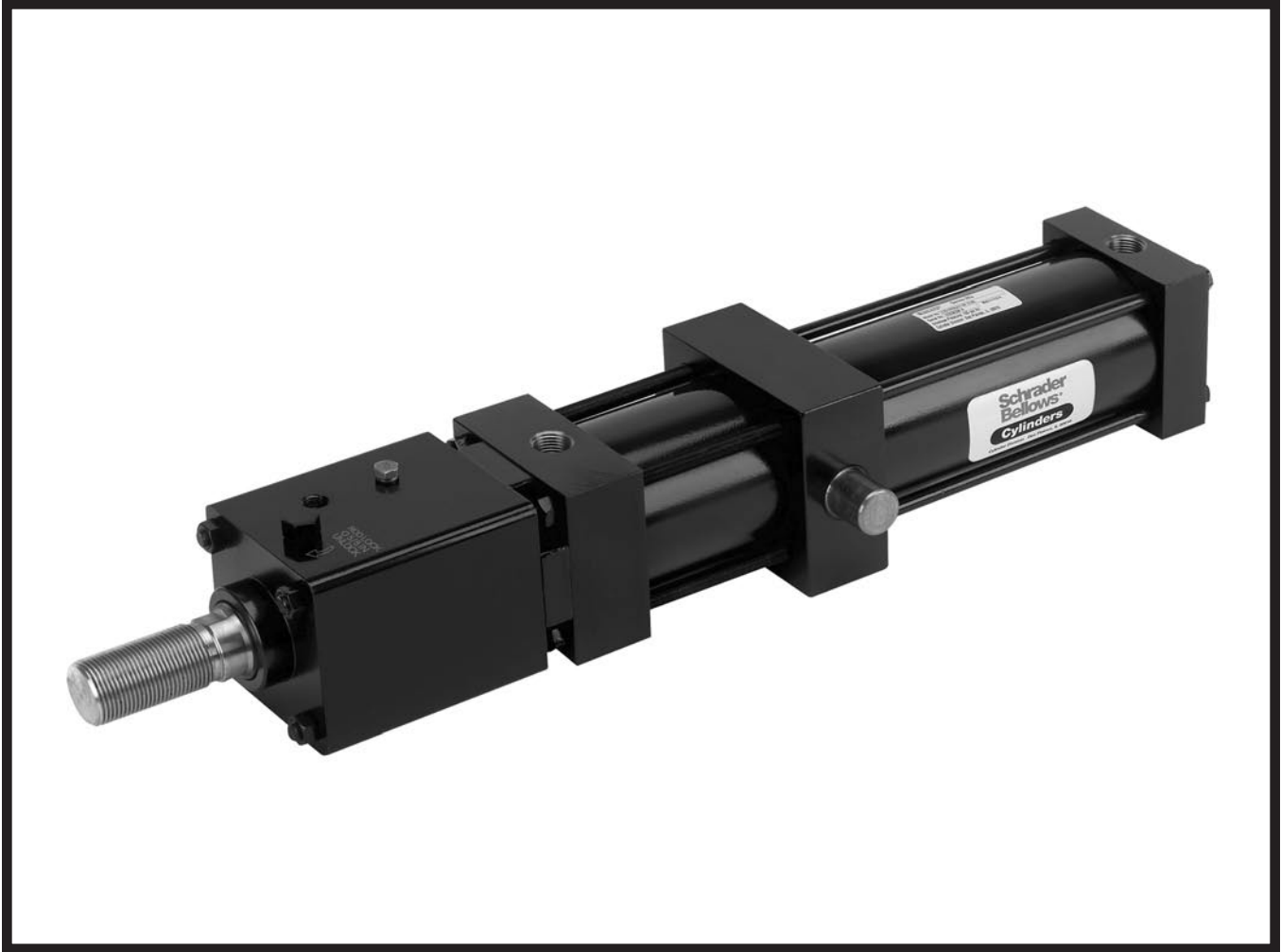
5	Model Number Code
Seal Type	
Buna N Seals	1
Fluorocarbon Seals	2

6	Model Number Code
Special Features	
S	

Model Number Example:

FA A11 08 5 1 S W/6"Stroke

7 Specify Stroke Length 6.00"

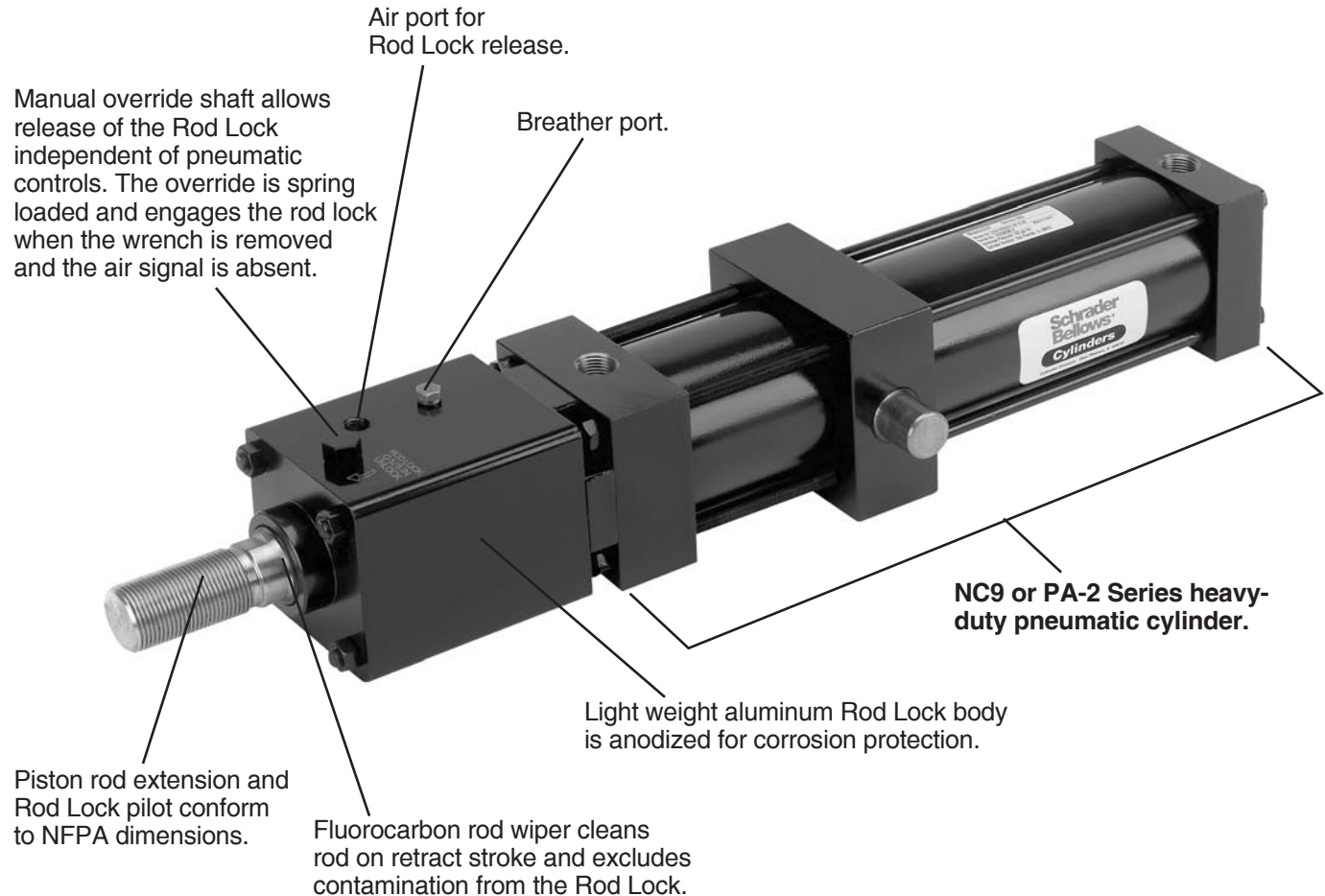


Contents

Features	90	"Style 6" Piston Rod End	44
Mounting Styles / Standard Specifications	91	Cylinder Accessories	
How to Select / Push & Pull Forces	92	NC9.....	82, 84-86
Rod Lock Connection / Specifications	93	PA-2.....	38, 40-43
Weight of Cylinder with Rod Lock.....	94	How to Order	108
Mounting Information.....	95-105	NC9.....	109
Double Rod End Models.....	106	PA-2.....	110

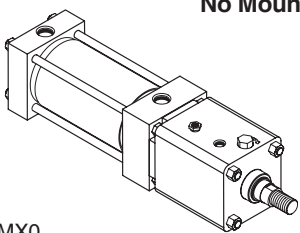
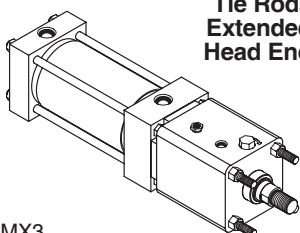
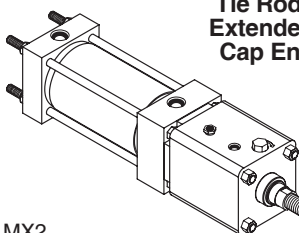
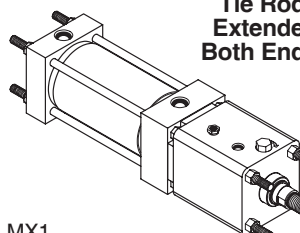
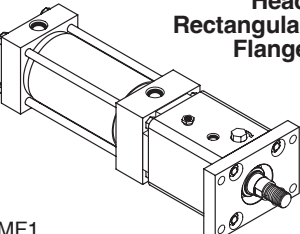
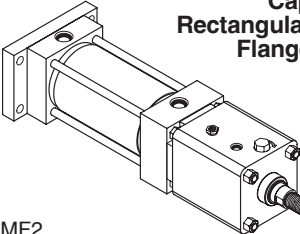
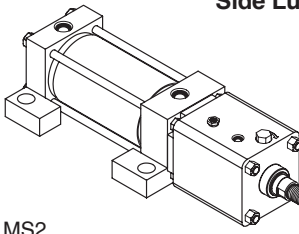
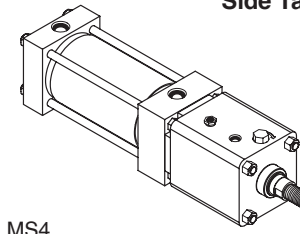
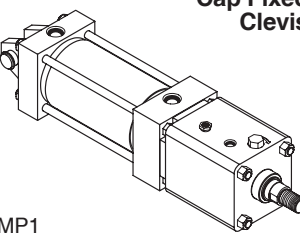
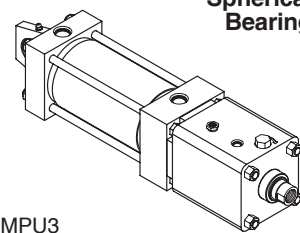
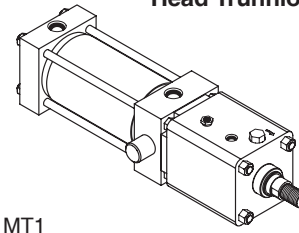
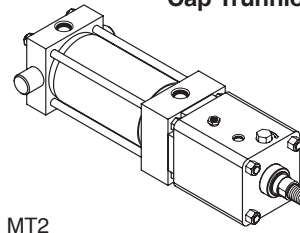
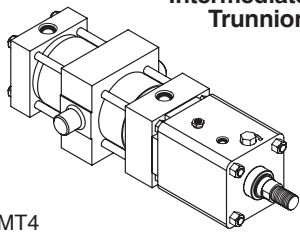
Benefits of using a piston Rod Lock include:

- Prevents rod movement upon release of stored energy
- Eliminates the need for pilot operated check valves for load holding
- Eliminates complicated piping between pilot operated check valves and the cylinder

**Rod Lock Features**

- **True Bolt-on Modularity** – the cylinder is built and tested as a stand alone unit. The Rod Lock is then assembled and tested at rated holding force.
- **Large Rod Lock Clamping Surface** – provides uniform force to the rod contact area. This allows holding forces to resist 100 psi input on the cylinder cap end for most bore and rod combinations.
- **Spring-engaged, air-released operation** – ensures positive holding in power-off situations with minimal air volume required for release.
- **Manual release is standard** – cam operated release disengages the Rod Lock with a simple turn of a hex bolt. The default-to-lock function springs back to the engaged position when released.
- **Rod Lock is sealed to withstand harsh environments** – NEMA 4X rating protects internal components from contamination

NC9, PA-2 Series with Rod Lock Mounting Styles

 No Mount MX0	 Tie Rods Extended Head End MX3	 Tie Rods Extended Cap End MX2	 Tie Rods Extended Both Ends MX1
 Head Rectangular Flange MF1	 Cap Rectangular Flange MF2	 Side Lug MS2	 Side Tap MS4
 Cap Fixed Clevis MP1	 Spherical Bearing MPU3	 Head Trunnion MT1	 Cap Trunnion MT2
 Intermediate Trunnion MT4			

Standard Specifications

- 13 Standard mounting styles
- Bore sizes – 1½" to 8"
- Strokes – up to 120"
- Piston Rod Diameters – 5⁄8" to 2½"
- Working pressure up to 100 psi
- Single and double rod construction available
- Temperature range – -10°F (-23°C) to +165°F (+74°C) (+74°C) (depending on seal class)

Seal Types	Typical Fluids	Temperature Range
1 – Standard Nitrile Seals	Dry 50μ filtered air	-10°F (-23°C) to +165°F (+74°C)
2 – Optional (At extra cost) Fluorocarbon Seals	Dry 50μ filtered air	-10°F (-23°C) to +165°F (+74°C)

Note: Type 2 seals do not increase temperature resistance of the cylinder and rock lock assembly.
Specify Type 2 seals for chemical compatibility.

How to Select a NC9 or PA-2 Series Cylinder

Step 1 – **Determine the correct cylinder bore size** necessary to achieve required push or pull force using the available operating pressure (up to 100 psi). Follow steps in Theoretical Push and Pull Forces below.

Step 2 – **Select the mounting style** that fits your installation needs. Determine the bore and rod sizes available for the required mounting style and complete the model selection.

Step 3 – **Choose a rod end style** and the desired rod end accessories.

Theoretical Push and Pull Forces

The cylinder output forces are derived from this formula:

$$F = P \times A$$

Where F = Force in pounds.

P = Pressure at the cylinder in pounds per square inch.

A = Effective area of cylinder piston in square inches.

To determine the bore size for the application, follow the steps below.

1. Select the Operating Pressure column closest to that desired.

2. In the same column, identify the force required to move the load (always rounding up). If the piston rod is in compression use the 'Push' row and if the piston rod is in tension use the 'Pull' row.

3. In the row to the left is the bore required. To select the correct rod diameter for the stroke required use the Piston Rod-Stroke Selection Chart on page C-67.

If the cylinder envelope dimensions are too large for the application, increase the operating pressure to the maximum pressure in the table below, if possible, and repeat steps 1 - 3.

Push and Pull Force in Pounds

Bore Ø	Rod Ø	Operating Direction	Piston Area (inches²)	Operating Pressure in psi		
				60	80	100
1 1/2	5/8	Push	1.767	106	141	177
		Pull	1.460	88	117	146
2	5/8	Push	3.142	189	251	314
		Pull	2.835	170	227	284
	1	Push	3.142	189	251	—
		Pull	2.357	141	189	—
2 1/2	5/8	Push	4.909	295	393	491
		Pull	4.602	276	368	460
	1	Push	4.909	295	393	491
		Pull	4.124	247	330	412
3 1/4	1	Push	8.296	498	664	830
		Pull	7.511	451	601	751
	1 3/8	Push	8.296	498	664	830
		Pull	6.811	409	545	681
	1 3/4	Push	8.296	498	664	830
		Pull	5.891	353	471	589
4	1	Push	12.566	754	1005	1257
		Pull	11.781	707	942	1178
	1 3/8	Push	12.566	754	1005	1257
		Pull	11.081	665	886	1108
	1 3/4	Push	12.566	754	1005	—
		Pull	10.161	610	813	—

Bore Ø	Rod Ø	Operating Direction	Piston Area (inches²)	Operating Pressure in psi		
				60	80	100
5	1	Push	19.635	1178	1571	1964
		Pull	18.850	1131	1508	1885
	1 3/8	Push	19.635	1178	1571	1964
		Pull	18.150	1089	1452	1815
	1 3/4	Push	19.635	1178	1571	—
		Pull	17.230	1034	1378	—
6	1 3/8	Push	28.274	1696	2262	2830
		Pull	26.789	1607	2143	2679
	1 3/4	Push	28.274	1696	2264	2827
		Pull	25.869	1552	2070	2587
	2	Push	28.274	1696	2262	—
		Pull	25.132	1508	2011	—
8	1 3/8	Push	50.265	3016	4021	5027
		Pull	48.780	2927	3902	4878
	1 3/4	Push	50.265	3016	4021	5027
		Pull	47.860	2872	3829	4786
	2 1/2	Push	50.265	3016	4021	—
		Pull	45.365	2722	3629	—

Cylinder Pressure Rating & Rod Lock Holding Force

Bore Ø	1 1/2	2	2 1/2	3 1/4	4	5	6	8
Rod Ø	5/8	5/8	1	5/8, 1	1, 1 3/8	1, 1 3/8	1 3/8, 1 3/4	1 3/8, 1 3/4
Cylinder Pressure Rating (psi)	100	100	80	100	100	80	100	80
Rod Lock Holding Force (lb.)	180	314	250	491	830	1256	1005	1963

Rod Lock Connection / Rod Lock Specifications

Connection

The Rod Lock release signal should be taken from the main air supply and must be **60 psi or higher**. Avoid using cylinder lines for the release signal because pressure levels may drop below the specified minimum. A separate quick-venting valve should be used for ON/OFF operation of the Rod Lock.

Caution: Release pressures that fall below 60 psi may result in engagement of the rod lock.

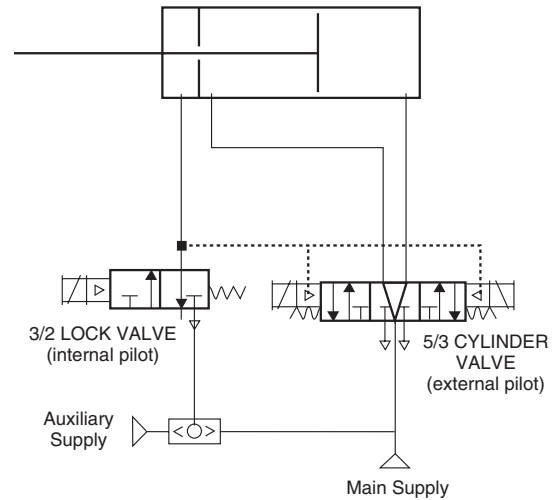
The Rod Lock is not intended to stop a moving load. The piston rod should not be moving when the Rod Lock release signal is removed.

NC9/PA-2 Series with Rod Lock is not intended for use in water service applications, environments with high humidity levels, or when fluids may splash on the cylinder or piston rod.

Other NC9/PA-2 Series and Rod Lock Features

- The Rod Lock can be operated in both directions, engaging with the same holding force
- The NC9/PA-2 Series with Rod Lock can be mounted in any orientation. E.g. vertical, horizontal, rod up or down.
- The piston rod must not be rotated when the Rod Lock is engaged. The Rod Lock cannot be used for torsional braking.
- Rated Rod Lock holding force applies only to static load conditions. If the rated load value is exceeded, slippage and other problems (including damage to Rod Lock and piston rod) may occur.
- An unrelated, redundant safety system is recommended to help ensure personal safety.

Sample Pneumatic Circuit



1. The Lock Valve must be energized during cylinder motion. When the Lock Valve is not energized, the Rod Lock is engaged and the Cylinder Valve must be in the mid-position.
2. The Cylinder Valve must be energized during extend or retract. It should also be energized at stroke end until a change of direction is required.
3. The 5/3 Cylinder Valve mid-position may be pressurized outlets if the combination of pressure load on the cylinder and the inertia effects of the attached load do not exceed the holding force rating of the rod lock device, including allowance for wear.
4. Do not use cylinder lines for logic functions because pressures can vary significantly.

Rod Lock Specifications

Bore Ø	Rod Ø	Air Chamber Volume (in ³)	Rated Holding Force (lbs)	Minimum Override Torque (ft-lbs applied to hex shaft)	Cylinder Pressure Rating (psi)
1.50	0.625	0.25	180	2	100
2.00	0.625	0.71	314	5	100
	1.000	0.68	250	5	80
2.50	0.625	1.26	491	7	100
	1.000	1.49	491	7	100
3.25	1.000	3.20	830	17	100
	1.375	2.11	830	17	100
4.00	1.000	6.73	1256	45	100
	1.375	4.78	1256	45	100
	1.750	3.36	1005	45	80
5.00	1.000	11.50	1963	72	100
	1.375	9.50	1963	72	100
	1.750	8.28	1570	72	80
6.00	1.375	14.08	2830	135	100
	1.750	12.75	2830	135	100
	2.000	12.30	2264	135	80
8.00	1.375	22.66	5026	160	100
	1.750	23.21	5026	160	100
	2.500	17.53	4020	160	80

Cylinder Weights

To determine the weight of an NC9 or PA-2 Series with Rod Lock cylinder, first select the basic zero stroke weight for the mounting required, and then calculate the weight of the cylinder stroke and add the results to the basic weight. For extra rod extension, use piston rod weights per inch in Table B.

Table A – NC9 or PA-2 Series Cylinder with Rod Lock Weights in Pounds

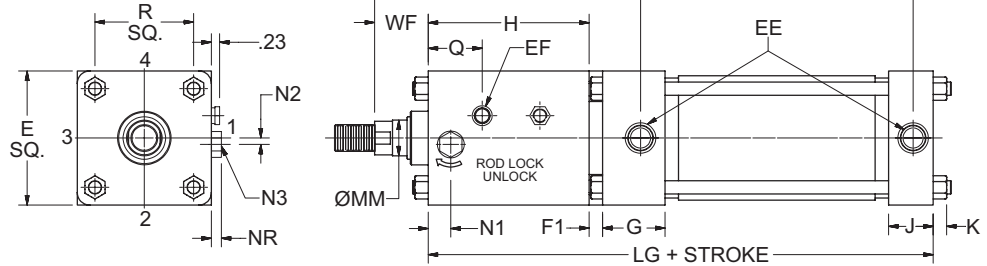
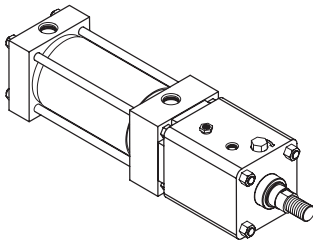
Bore Ø	Rod Ø	Single Rod Cylinders Basic Weight - Zero Stroke		Add Per Inch of Stroke	Double Rod Cylinders Basic Weight - Zero Stroke		Add Per Inch of Stroke
		MX0, MX1, MX2, MX3, MF1, MF2, MS4	MP1, MPU3, MS2, MT1, MT2, MT4		MDX0, MDX1, MDX3, MDF1, MDS4	MDS2, MDT1, MDT4	
1 1/2	5/8	6.0	6.6	0.30	6.5	7.1	0.60
2	5/8	10.0	10.4	0.50	11.7	12.1	1.00
	1	10.5	11.0	0.65	12.5	13.0	1.30
2 1/2	5/8	13.6	14.3	0.60	16.0	16.7	1.20
	1	14.1	14.6	0.75	16.6	17.1	1.50
3 1/4	1	24.6	25.6	0.80	30.1	31.1	1.60
	1 3/8	25.1	26.1	1.00	30.6	31.6	2.00
	1 3/4	25.9	26.9	1.25	32.2	33.2	2.50
	1	38.7	43.7	1.00	45.7	50.7	2.00
4	1 3/8	39.2	44.2	1.20	46.2	51.2	2.50
	1 3/4	40.0	45.0	1.50	47.8	52.8	3.00
	1	56.3	63.3	1.10	65.3	72.3	2.20
5	1 3/8	56.8	63.8	1.30	65.8	72.8	2.60
	1 3/4	57.6	64.6	1.55	67.4	74.4	3.10
	1 3/8	104.8	113.8	1.50	116.8	125.8	3.00
6	1 3/4	105.6	114.6	1.75	118.5	127.5	3.50
	2	106.3	115.3	2.00	120.0	129.0	4.00
8	1 3/8	158.4	163.4	2.00	172.4	177.4	4.00
	1 3/4	159.2	164.2	2.25	174.1	179.1	4.50
	2 1/2	161.7	166.7	3.00	179.1	184.1	6.00

Table B – Piston Rod Weights in Pounds

Rod Ø	Piston Rod Weight Per Inch
5/8"	0.09
1"	0.22
1 3/8"	0.42
1 3/4"	0.68
2"	0.89
2 1/2"	1.40

Style MX0 – Single Rod End

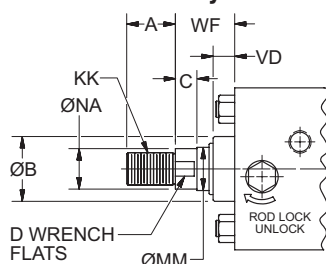
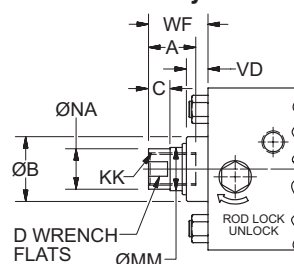
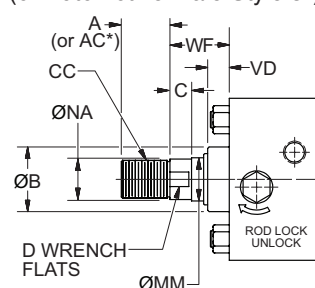
1½" to 8" Bore Size

**Style MX0 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	E	EE NPTF	EF NPTF	F1	G	J	K	N3 Hex	NR (Max.)	R	P Add Stroke
1.50	2.00	3/8	1/8	0.25	1.50	1.00	0.25	5/16	0.24	1.43	2.25
2.00	2.50	3/8	1/8	0.31	1.50	1.00	0.32	1/2	0.32	1.84	2.25
2.50	3.00	3/8	1/8	0.31	1.50	1.00	0.32	1/2	0.32	2.19	2.38
3.25	3.75	1/2	1/4	0.38	1.75	1.25	0.38	5/8	0.41	2.76	2.63
4.00	4.50	1/2	1/4	0.38	1.75	1.25	0.38	7/8	0.55	3.32	2.63
5.00	5.50	1/2	1/4	0.50	1.75	1.25	0.44	7/8	0.55	4.10	2.88
6.00	6.50	3/4	1/4	0.50	2.00	1.50	0.44	1 5/16	0.81	4.88	3.13
8.00	8.50	3/4	1/4	0.63	2.00	1.50	0.56	1 5/16	0.81	6.44	3.25

Style MX0 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions													LG Add Stroke
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +.000 -.002	C	D	H	N1	N2	NA	Q	VD	WF	Y	
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	2.63	0.22	0.14	0.56	0.72	0.38	1.00	4.81	6.50
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	2.88	0.34	0.13	0.56	0.90	0.38	1.00	5.13	6.81
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	3.88	0.34	0.15	0.94	1.07	0.50	1.38	6.50	7.81
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	2.88	0.35	0.15	0.56	0.76	0.50	1.00	5.13	6.94
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	4.00	0.35	0.15	0.94	1.12	0.50	1.38	6.63	8.06
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	4.50	0.63	0.18	0.94	1.51	0.50	1.38	7.31	9.13
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	4.88	0.81	0.25	1.31	1.65	0.63	1.63	7.94	9.50
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	4.88	0.63	0.24	0.94	1.73	0.50	1.38	7.69	9.50
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	5.13	0.77	0.28	1.31	1.68	0.75	1.63	8.19	9.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	5.50	1.03	0.26	1.69	2.09	0.88	1.88	8.81	10.13
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	5.38	0.72	0.22	0.94	2.00	0.50	1.38	8.31	10.38
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	5.75	0.72	0.22	1.31	2.33	0.75	1.63	8.94	10.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	6.38	1.10	0.22	1.69	2.30	0.88	1.88	9.81	11.38
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	6.38	1.17	0.18	1.31	2.71	0.76	1.63	9.69	11.88
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	6.88	1.50	0.18	1.69	3.07	0.88	1.88	10.44	12.38
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	7.00	1.49	0.18	1.94	3.18	1.25	2.00	10.69	12.50
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	6.63	1.31	0.18	1.31	2.89	0.76	1.63	10.06	12.38
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	7.13	1.57	0.18	1.69	3.15	0.88	1.88	10.81	12.88
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	7.50	1.22	0.30	2.38	3.15	1.38	2.25	11.56	13.25

Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

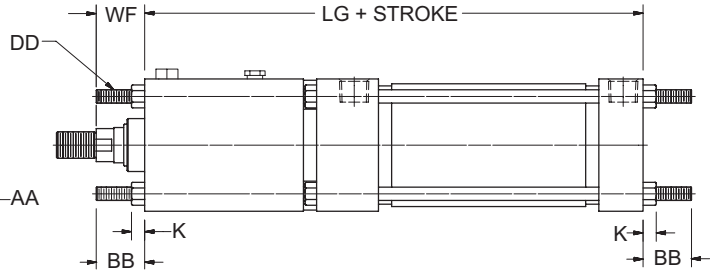
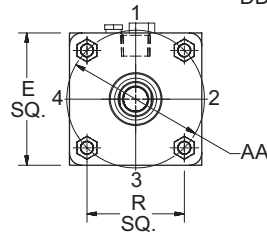
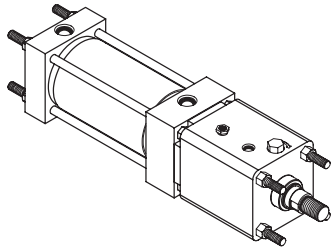
Special thread, extension, rod eye, blank, etc. are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, & WF. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

Style MX1 – Single Rod End*

1½" to 8" Bore Size

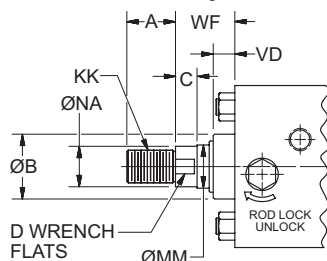
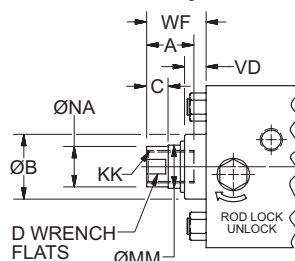
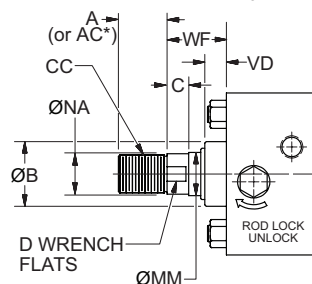
**Style MX1, MX2, MX3 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	AA	BB	DD	E	K	R
1.50	2.02	1.00	1/4-28	2.00	0.25	1.43
2.00	2.60	1.13	5/16-24	2.50	0.31	1.84
2.50	3.10	1.13	5/16-24	3.00	0.31	2.19
3.25	3.90	1.38	3/8-24	3.75	0.38	2.76
4.00	4.70	1.38	3/8-24	4.50	0.38	3.32
5.00	5.80	1.81	1/2-20	5.50	0.44	4.10
6.00	6.90	1.81	1/2-20	6.50	0.44	4.88
8.00	9.10	2.31	5/8-18	8.50	0.31	6.44

* Style MX3 – Tie Rods Extended Head End, and Style MX2 – Tie Rods Extended Cap End can be dimensioned from Style MX1 shown.

Style MX1, MX2, MX3 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions								LG Add Stroke
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +.000 -.002	C	D	NA	VD	WF	
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	6.50
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	6.81
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.81
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.50	1.00	6.94
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	8.06
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	9.13
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.63	1.63	9.50
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	9.50
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	9.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	10.13
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	10.38
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	10.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	11.38
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	11.88
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	12.38
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	1.94	1.25	2.00	12.50
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	12.38
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	1.69	0.88	1.88	12.88
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	2.38	1.38	2.25	13.25

Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

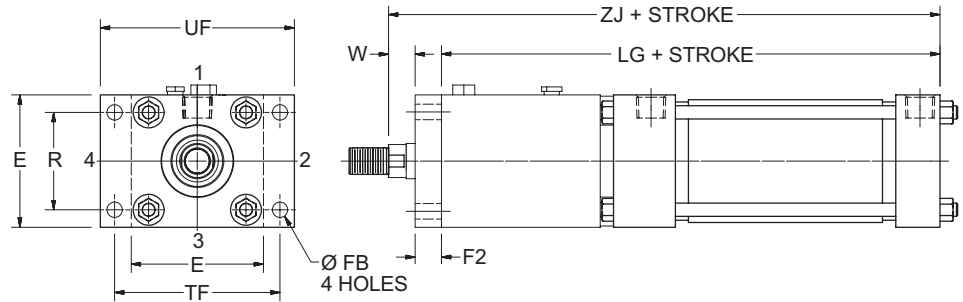
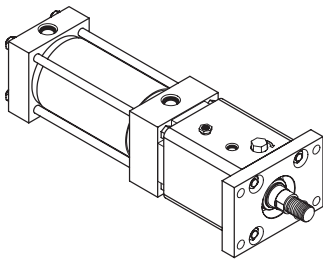
Special thread, extension, rod eye, blank, etc. are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, & WF. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

Style MF1 – Single Rod End

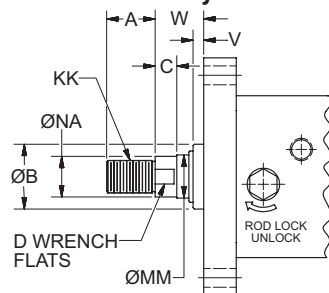
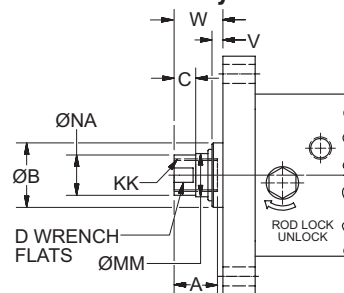
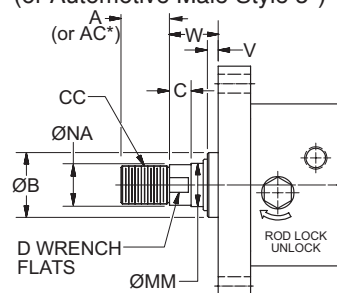
1½" to 8" Bore Size

**Style MF1 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	E	F2	FB (Bolt)	R	TF	UF
1.50	2.00	0.63	0.25	1.43	2.75	3.38
2.00	2.50	0.63	0.31	1.84	3.38	4.13
2.50	3.00	0.63	0.31	2.19	3.88	4.63
3.25	3.75	0.75	0.38	2.76	4.69	5.50
4.00	4.50	0.75	0.38	3.32	5.44	6.25
5.00	5.50	0.75	0.50	4.10	6.63	7.63
6.00	6.50	0.75	0.50	4.88	7.63	8.63
8.00	8.50	1.00	0.63	6.44	9.75	11.00

Style MF1 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions								Add Stroke	
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +0.000 -0.002	C	D	NA	V	W	LG	ZJ
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	—	0.63	6.50	7.75
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	—	0.63	6.81	8.06
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	—	1.00	7.81	9.44
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	—	0.63	6.94	8.19
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	—	1.00	8.06	9.69
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	—	0.75	9.13	10.63
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	—	1.00	9.50	11.25
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	—	0.75	9.50	11.00
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	—	1.00	9.75	11.50
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.13	1.25	10.13	12.13
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	—	0.75	10.38	11.88
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	—	1.00	10.75	12.50
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.13	1.25	11.38	13.38
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	—	0.88	11.88	13.50
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.13	1.13	12.38	14.25
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	1.94	0.50	1.25	12.50	14.50
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	—	0.88	12.38	14.25
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	1.69	—	1.13	12.88	15.00
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	2.38	0.38	1.50	13.25	15.75

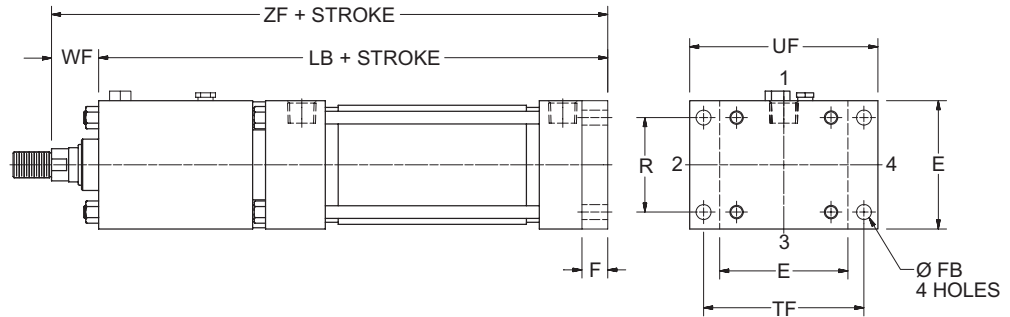
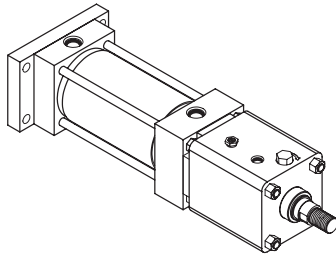
Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

Special thread, extension, rod eye, blank, etc. are also available. To order, specify “Style 0” and give desired dimensions for KK, A, & W. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

Style MF2 – Single Rod End**NC9 & PA-2 Series with Rod Lock****Style MF2 – Single Rod End**

1½" to 8" Bore Size

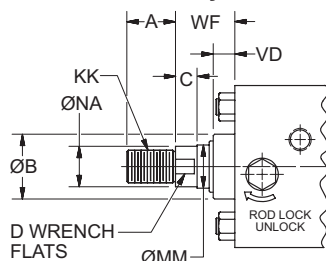
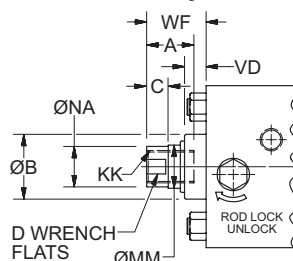
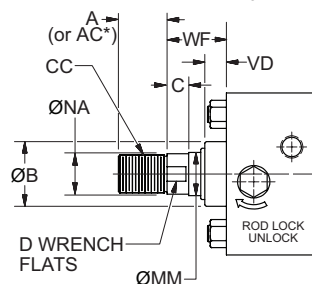
**Style MF2 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	E	F	FB (Bolt)	R	TF	UF
1.50	2.00	0.38	0.25	1.43	2.75	3.38
2.00	2.50	0.38	0.31	1.84	3.38	4.13
2.50	3.00	0.38	0.31	2.19	3.88	4.63
3.25	3.75	0.63	0.38	2.76	4.69	5.50
4.00	4.50	0.63	0.38	3.32	5.44	6.25
5.00	5.50	0.63	0.50	4.10	6.63	7.63
6.00	6.50	0.75	0.50	4.88	7.63	8.63
8.00	8.50	–	0.69*	7.57*	7.57*	8.50*

* Style ME4 Square Cap mount supplied in 8" bore.

Style MF2 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions								Add Stroke	
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +0.000 -0.002	C	D	NA	VD	WF	LB	ZF
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	6.88	7.88
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	7.19	8.19
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	8.19	9.56
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.50	1.00	7.31	8.31
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	8.44	9.81
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	9.75	11.13
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.63	1.63	10.13	11.75
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	10.13	11.50
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	10.38	12.00
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	10.75	12.63
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	11.00	12.38
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	11.38	13.00
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	12.00	13.88
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	12.63	14.25
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	13.13	15.00
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	1.94	1.25	2.00	13.25	15.25
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	12.38*	14.00*
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	1.69	0.88	1.88	12.88*	14.25*
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	2.38	1.38	2.25	13.25*	15.50*

Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

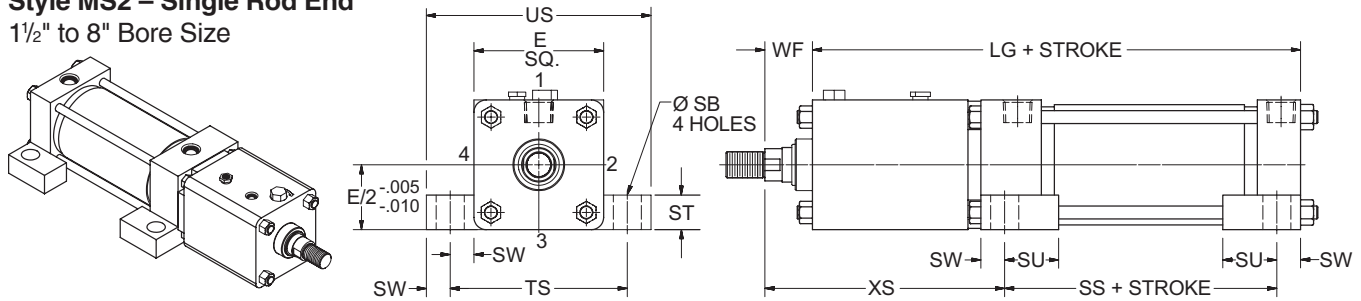
Special thread, extension, rod eye, blank, etc. are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, & WF. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

Style MS2 – Single Rod End**Pneumatic Cylinders****NC9 & PA-2 Series with Rod Lock****Style MS2 – Single Rod End**

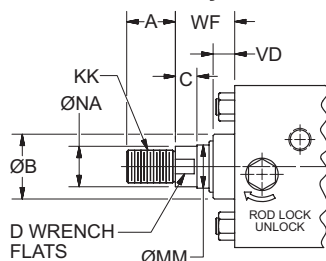
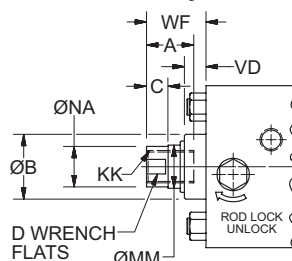
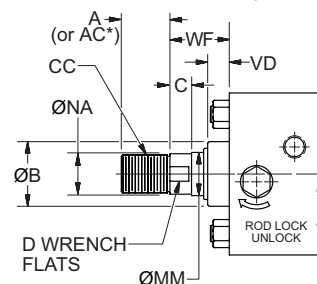
1½" to 8" Bore Size

**Style MS2 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	E	SB (Bolt)	ST	SU	SW	TS	US	SS Add Stroke
1.50	2.00	0.38	0.50	0.94	0.38	2.75	3.50	2.88
2.00	2.50	0.38	0.50	0.94	0.38	3.25	4.00	2.88
2.50	3.00	0.38	0.50	0.94	0.38	3.75	4.50	3.00
3.25	3.75	0.50	0.75	1.25	0.50	4.75	5.75	3.25
4.00	4.50	0.50	0.75	1.25	0.50	5.50	6.50	3.25
5.00	5.50	0.75	1.00	1.56	0.69	6.88	8.25	3.13
6.00	6.50	0.75	1.00	1.56	0.69	7.88	9.25	3.63
8.00	8.50	0.75	1.00	1.56	0.69	9.88	11.25	3.75

Style MS2 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions									LG Add Stroke
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +0.000 -0.002	C	D	NA	VD	WF	XS	
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	4.25	6.50
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	4.56	6.81
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	5.94	7.81
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.50	1.00	4.56	6.94
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	6.06	8.06
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	6.75	9.13
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.63	1.63	7.38	9.50
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.13	9.50
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	7.63	9.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	8.25	10.13
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.94	10.38
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	8.56	10.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	9.44	11.38
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	9.19	11.88
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	9.94	12.38
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	1.94	1.25	2.00	10.19	12.50
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	9.56	12.38
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	1.69	0.88	1.88	10.31	12.88
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	2.38	1.38	2.25	11.06	13.25

Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

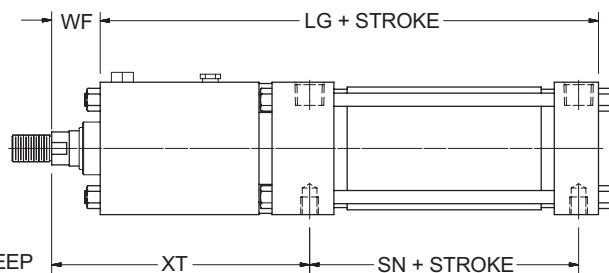
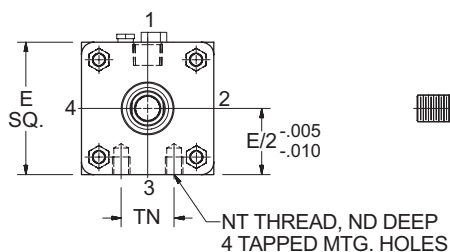
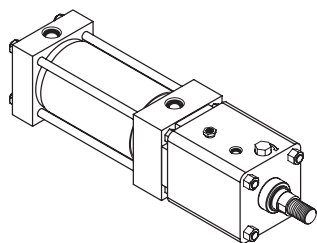
Special thread, extension, rod eye, blank, etc. are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, & WF. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

Style MS4 – Single Rod End**NC9 & PA-2 Series with Rod Lock****Style MS4 – Single Rod End**

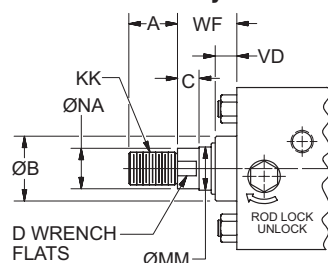
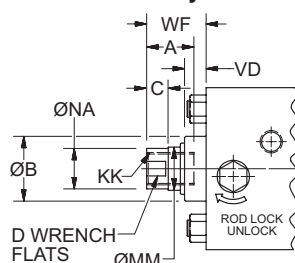
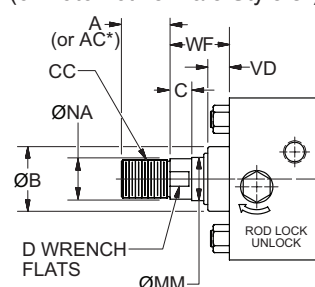
1½" to 8" Bore Size

**Style MS4 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	E	ND	NT	TN	SN Add Stroke
1.50	2.00	0.31	1/4-20	0.63	2.25
2.00	2.50	0.34	5/16-18	0.88	2.25
2.50	3.00	0.44	3/8-16	1.25	2.38
3.25	3.75	0.50	1/2-13	1.50	2.63
4.00	4.50	0.63	1/2-13	2.06	2.63
5.00	5.50	0.75	5/8-11	2.69	2.88
6.00	6.50	0.88	3/4-10	3.25	3.13
8.00	8.50	1.13	3/4-10	4.25	3.25

Style MS4 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions									LG Add Stroke
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +.000 -.002	C	D	NA	VD	WF	XT	
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	4.81	6.50
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	5.13	6.81
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	6.50	7.81
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.50	1.00	5.13	6.94
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	6.63	8.06
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.31	9.13
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.63	1.63	7.94	9.50
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.69	9.50
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	8.19	9.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	8.81	10.13
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	8.31	10.38
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	8.94	10.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	9.81	11.38
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	9.69	11.88
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	10.44	12.38
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	1.94	1.25	2.00	10.69	12.50
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	10.06	12.38
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	1.69	0.88	1.88	10.81	12.88
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	2.38	1.38	2.25	11.56	13.25

Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

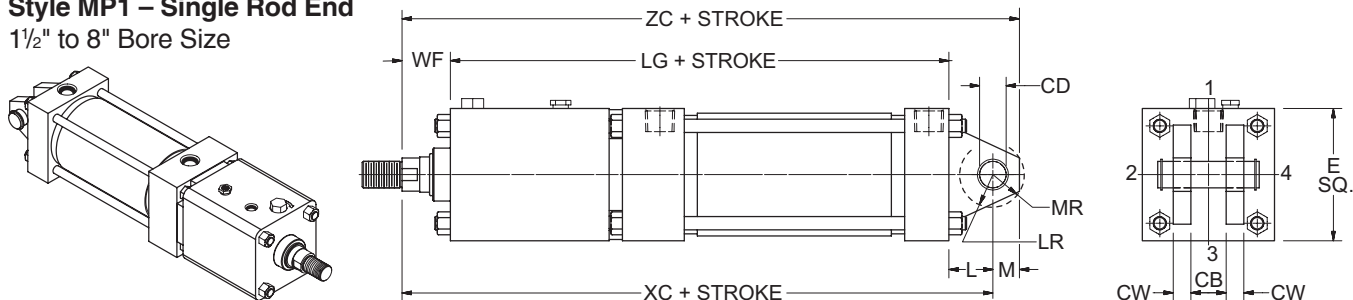
Special thread, extension, rod eye, blank, etc. are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, & WF. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

Style MP1 – Single Rod End

1½" to 8" Bore Size

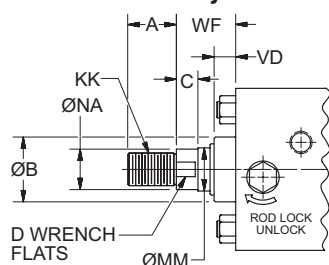
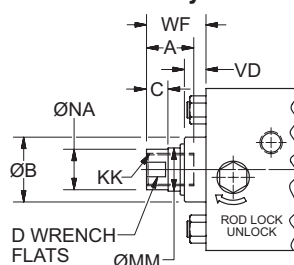
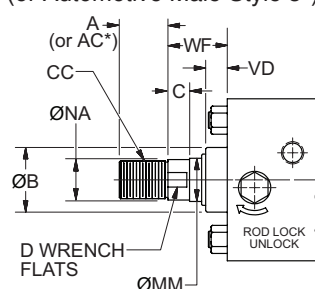
**Style MP1 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	CB	CD * +.000 -.002	CW	E	L	LR	M	MR
1.50	0.75	0.501	0.50	2.00	0.75	0.75	0.50	0.63
2.00	0.75	0.501	0.50	2.50	0.75	0.75	0.50	0.63
2.50	0.75	0.501	0.50	3.00	0.75	0.75	0.50	0.63
3.25	1.25	0.751	0.63	3.75	1.25	1.00	0.75	0.94
4.00	1.25	0.751	0.63	4.50	1.25	1.00	0.75	0.94
5.00	1.25	0.751	0.63	5.50	1.25	1.00	0.75	0.94
6.00	1.50	1.001	0.75	6.50	1.50	1.25	1.00	1.19
8.00	1.50	1.001	0.75	8.50	1.50	1.25	1.00	1.19

* Dimension CD is pin diameter.

Style MP1 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions								Add Stroke		
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +.000 -.002	C	D	NA	VD	WF	LG	XC	ZC
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	6.50	8.25	8.75
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	6.81	8.56	9.06
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.81	9.94	10.44
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.50	1.00	6.94	8.69	9.19
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	8.06	10.19	10.69
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	9.13	11.75	12.50
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.63	1.63	9.50	12.38	13.13
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	9.50	12.13	12.88
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	9.75	12.63	13.38
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	10.13	13.25	14.00
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	10.38	13.00	13.75
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	10.75	13.63	14.38
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	11.38	14.50	15.25
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	11.88	15.00	16.00
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	12.38	15.75	16.75
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	1.94	1.25	2.00	12.50	16.00	17.00
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	12.38	15.50	16.50
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	1.69	0.88	1.88	12.88	16.25	17.25
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	2.38	1.38	2.25	13.25	17.00	18.00

Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

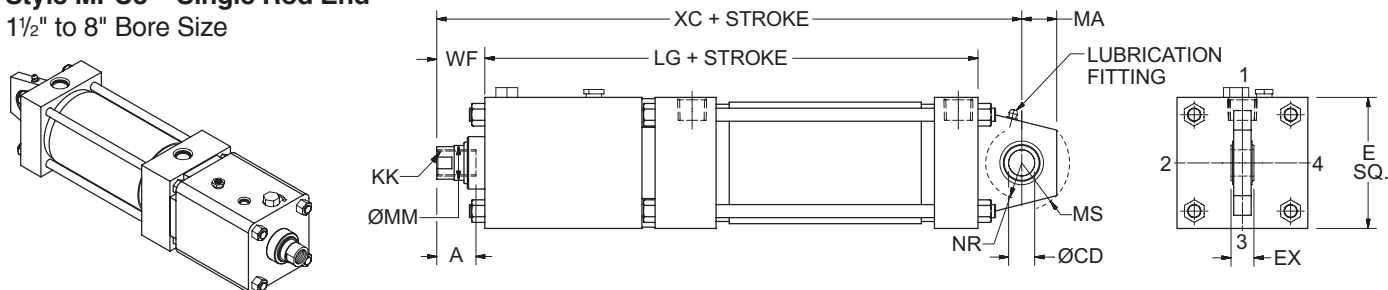
Special thread, extension, rod eye, blank, etc. are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, & WF. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

Style MPU3 – Single Rod End

1½" to 8" Bore Size

**Style MPU3 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	CD * +.0000 –.0005	E	EX	MA	MS	NR
1.50	0.5000	2.00	0.44	0.75	0.94	0.63
2.00	0.5000	2.50	0.44	0.75	0.94	0.63
2.50	0.5000	3.00	0.44	0.75	0.94	0.63
3.25	0.7500	3.75	0.66	1.00	1.38	1.00
4.00	0.7500	4.50	0.66	1.00	1.38	1.00
5.00	0.7500	5.50	0.66	1.00	1.38	1.00
6.00	1.0000	6.50	0.88	1.25	1.69	1.25
8.00	1.0000	8.50	0.88	1.25	1.69	1.25

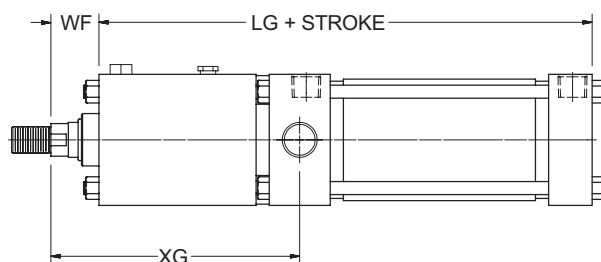
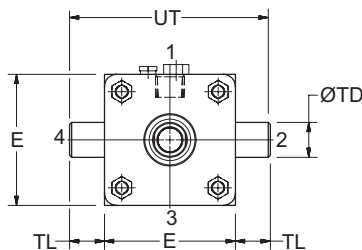
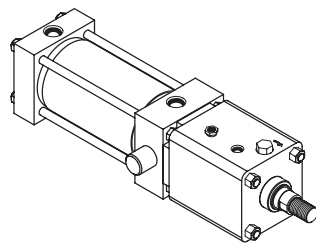
* Dimension CD is hole diameter.

Style MPU3 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		A	WF	Add Stroke	
		KK Style 3	KK Style 7			LG	XC
1.50	0.625	7/16-20	–	0.75	1.00	6.50	8.25
2.00	0.625	7/16-20	–	0.75	1.00	6.81	8.56
	1.000	–	7/16-20	1.13	1.38	7.81	9.94
2.50	0.625	7/16-20	–	0.75	1.00	6.94	8.69
	1.000	–	7/16-20	1.13	1.38	8.06	10.19
3.25	1.000	3/4-16	–	1.13	1.38	9.13	11.75
	1.375	–	3/4-16	1.63	1.63	9.50	12.38
4.00	1.000	3/4-16	–	1.13	1.38	9.50	12.13
	1.375	–	3/4-16	1.63	1.63	9.75	12.63
	1.750	–	3/4-16	2.00	1.88	10.13	13.25
5.00	1.000	3/4-16	–	1.13	1.38	10.38	13.00
	1.375	–	3/4-16	1.63	1.63	10.75	13.63
	1.750	–	3/4-16	2.00	1.88	11.38	14.50
6.00	1.375	1-14	–	1.63	1.63	11.88	15.00
	1.750	–	1-14	2.00	1.88	12.38	15.75
	2.000	–	1-14	2.25	2.00	12.50	16.00
8.00	1.375	1-14	–	1.63	1.63	12.38	15.50
	1.750	–	1-14	2.00	1.88	12.88	16.25
	2.500	–	1-14	3.00	2.25	13.25	17.00

Style MT1 – Single Rod End

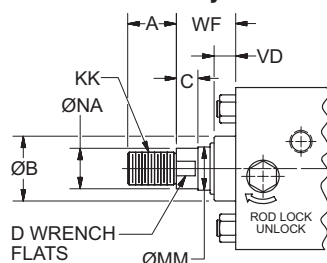
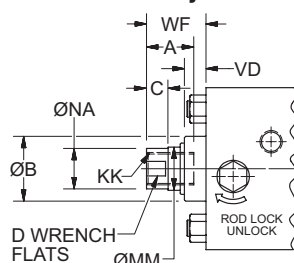
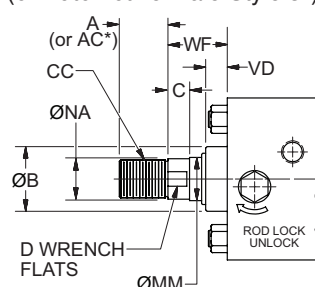
1½" to 8" Bore Size

**Style MT1 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	E	TD +.000 -.001	TL	UT
1.50	2.00	1.000	1.00	4.00
2.00	2.50	1.000	1.00	4.50
2.50	3.00	1.000	1.00	5.00
3.25	3.75	1.000	1.00	5.75
4.00	4.50	1.000	1.00	6.50
5.00	5.50	1.000	1.00	7.50
6.00	6.50	1.375	1.38	9.25
8.00	8.50	1.375	1.38	11.25

Style MT1 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions									LG Add Stroke
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +.000 -.002	C	D	NA	VD	WF	XG	
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	4.63	6.50
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	4.94	6.81
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	6.31	7.81
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.50	1.00	4.94	6.94
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	6.44	8.06
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.13	9.13
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.63	1.63	7.75	9.50
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.50	9.50
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	8.00	9.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	8.63	10.13
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	8.13	10.38
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	8.75	10.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	9.63	11.38
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	9.50	11.88
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	10.25	12.38
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	1.94	1.25	2.00	10.50	12.50
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	9.88	12.38
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	1.69	0.88	1.88	10.63	12.88
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	2.38	1.38	2.25	11.38	13.25

Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

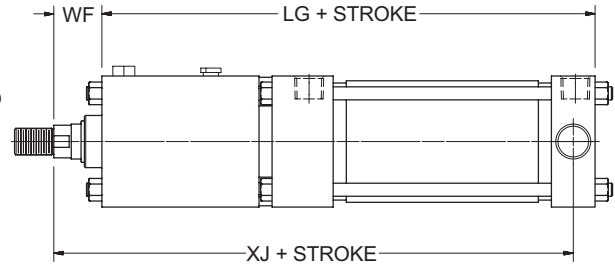
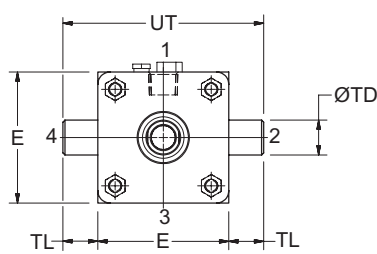
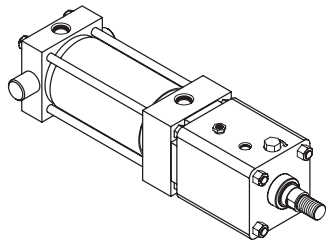
Special thread, extension, rod eye, blank, etc. are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, & WF. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

Style MT2 – Single Rod End

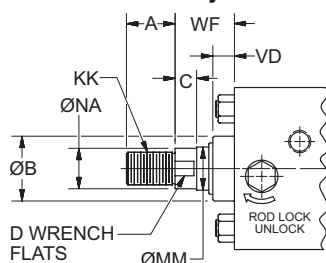
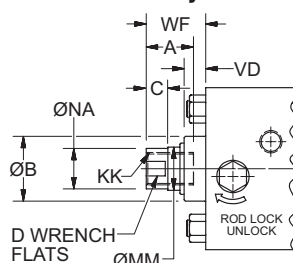
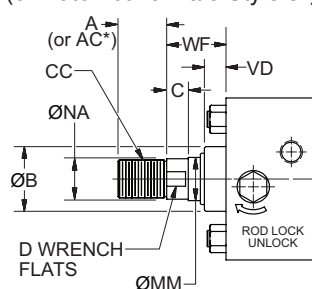
1½" to 8" Bore Size

**Style MT2 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	E	TD +.000 -.001	TL	UT
1.50	2.00	1.000	1.00	4.00
2.00	2.50	1.000	1.00	4.50
2.50	3.00	1.000	1.00	5.00
3.25	3.75	1.000	1.00	5.75
4.00	4.50	1.000	1.00	6.50
5.00	5.50	1.000	1.00	7.50
6.00	6.50	1.375	1.38	9.25
8.00	8.50	1.375	1.38	11.25

Style MT2 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions								Add Stroke	
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +.000 -.002	C	D	NA	VD	WF	LG	XJ
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	6.50	7.00
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	6.81	7.31
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.81	8.69
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.50	1.00	6.94	7.44
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	8.06	8.94
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	9.13	9.88
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.63	1.63	9.50	10.50
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	9.50	10.25
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	9.75	10.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	10.13	11.38
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	10.38	11.13
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	10.75	11.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	11.38	12.63
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	11.88	12.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	12.38	13.50
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	1.94	1.25	2.00	12.50	13.75
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	12.38	13.25
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	1.69	0.88	1.88	12.88	14.00
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	2.38	1.38	2.25	13.25	14.75

Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

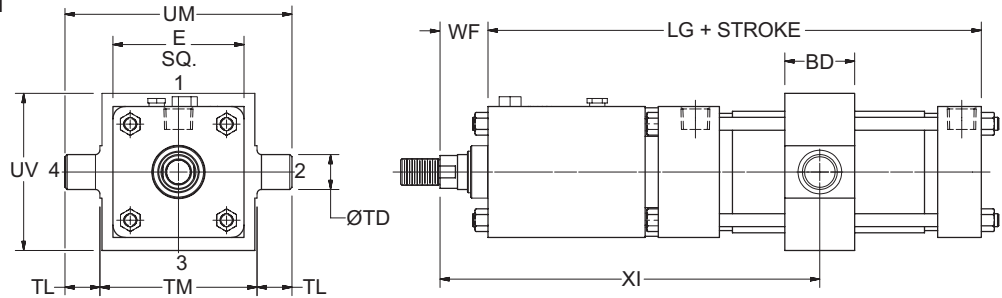
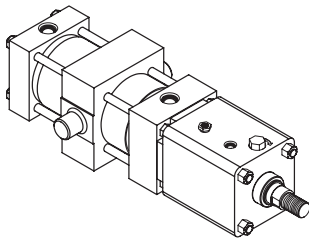
Special thread, extension, rod eye, blank, etc. are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, & WF. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

Style MT4 – Single Rod End

1½" to 8" Bore Size

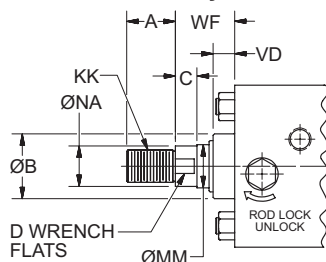
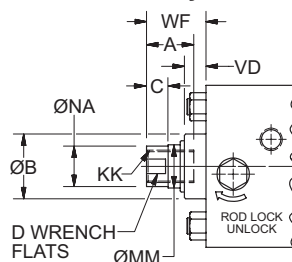
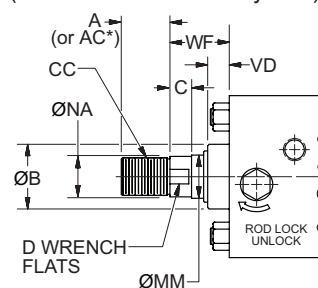
**Style MT4 Single Rod End – Envelope and Mounting Dimensions**

Bore Ø	E	TD +.000 -.001	TL	TM	UM	UV	Style DD Minimum Stroke
1.50	2.00	1.000	1.00	2.50	4.50	2.50	3.25
2.00	2.50	1.000	1.00	3.00	5.00	3.00	4.00
2.50	3.00	1.000	1.00	3.50	5.50	3.50	3.88
3.25	3.75	1.000	1.00	4.50	6.50	4.25	4.38
4.00	4.50	1.000	1.00	5.25	7.25	5.00	4.88
5.00	5.50	1.000	1.00	6.25	8.25	6.00	5.13
6.00	6.50	1.375	1.38	7.63	10.38	7.00	6.13
8.00	8.50	1.375	1.38	9.75	12.50	9.50	6.50

Style MT4 Single Rod End – Rod Dimensions

Bore Ø	MM Rod Ø	Thread		Rod Extensions and Pilot Dimensions								LG Add Stroke	XI† Minimum
		CC Style 4 & 5*	KK Style 2 & 3	A	AC*	B +.000 -.002	C	D	NA	VD	WF		
1.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	6.50	9.00
2.00	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.38	1.00	6.81	9.94
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	7.81	11.31
2.50	0.625	1/2-20	7/16-20	0.75	1.13	1.124	0.38	0.50	0.56	0.50	1.00	6.94	9.94
	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	8.06	11.44
3.25	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	9.13	12.50
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.63	1.63	9.50	13.13
4.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	9.50	13.38
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	9.75	13.88
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	10.13	14.50
5.00	1.000	7/8-14	3/4-16	1.13	1.88	1.499	0.50	0.88	0.94	0.50	1.38	10.38	14.50
	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	10.75	15.13
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	11.38	16.00
6.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	11.88	16.75
	1.750	1 1/2-12	1 1/4-12	2.00	3.00	2.374	0.75	1.50	1.69	0.88	1.88	12.38	17.50
	2.000	1 3/4-12	1 1/2-12	2.25	3.50	2.624	0.88	1.69	1.94	1.25	2.00	12.50	17.75
8.00	1.375	1 1/4-12	1-14	1.63	2.50	1.999	0.63	1.13	1.31	0.75	1.63	12.38	17.63
	1.750	1 1/2-12	1 1/4-12	2.00	3.50	2.374	0.75	1.50	1.69	0.88	1.88	12.88	18.38
	2.500	2 1/4-12	1 7/8-12	3.00	4.50	3.124	1.00	2.06	2.38	1.38	2.25	13.25	19.13

† Dimension XI to be specified by customer. If a shorter than minimum XI is required, the MT1 Mount on page 103 may be suitable.

Rod End Dimensions**Thread Style 2****Thread Style 3****Thread Style 4
(or Automotive Male Style 5*)****“Special”
Thread Style 0**

Special thread, extension, rod eye, blank, etc. are also available.

To order, specify “Style 0” and give desired dimensions for KK, A, & WF. If otherwise special furnish dimensional sketch.

*Thread length AC is supplied with Automotive Male rod end style 5.

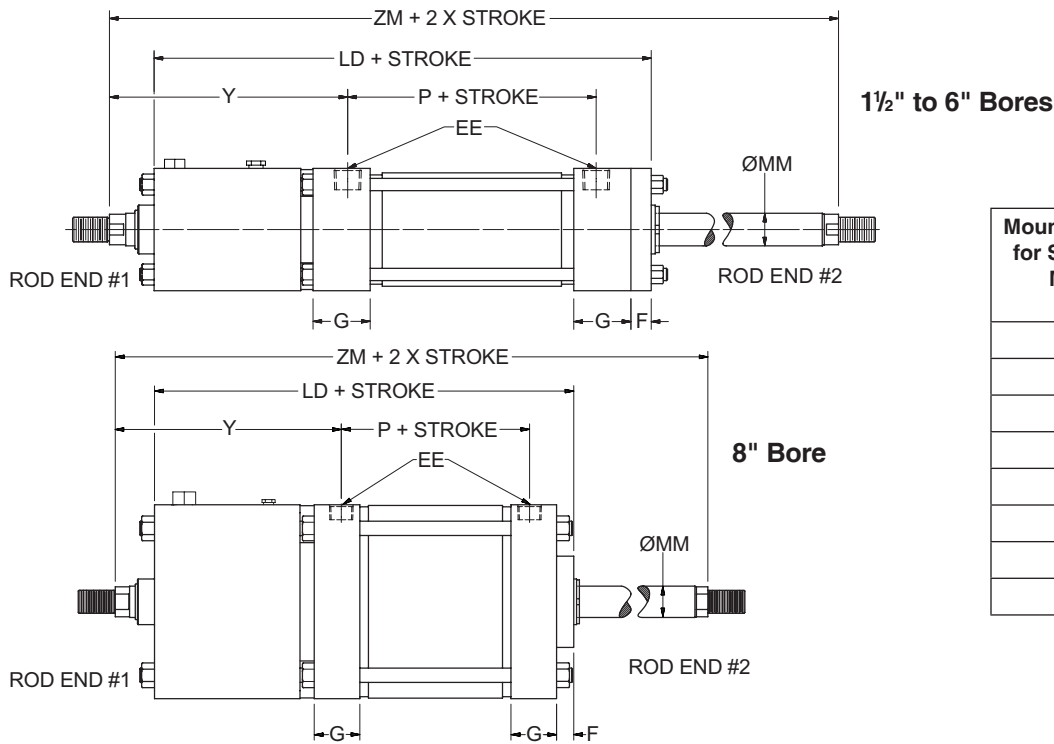
How to Use Double Rod Cylinder Dimension Drawings

To determine dimensions for a double rod cylinder, first refer to the desired single rod mounting style cylinder shown on preceding pages of this catalog. After selecting necessary dimensions from that drawing, return to this page and supplement the single rod dimensions with those shown in the drawings and dimension table below. Note that double rod cylinders have a head (Dim. G) at both ends and that dimension LD replaces LG.

The double rod dimensions differ from, or are in addition

to those for single rod cylinders shown on preceding pages and provide the information needed to completely dimension a double rod cylinder.

On a double rod cylinder, where the two rod ends are different, be sure to clearly state which rod end is to be assembled at which end. Port position #1 is standard. If other than standard, specify port position #2, 3 or 4 as viewed from one end only.



Mounting Styles for Single Rod Models	Corresponding Mounting Styles for Double Rod Models
MX0	MDX0
MX3	MDX3
MX1	MDX1
MF1	MDF1
MS2	MDS2
MS4	MDS4
MT1	MDT1
MT4	MDT4

Bore Ø	MM Rod Ø	EE NPTF	F	G	P	Y	Add Stroke		Add 2X Stroke
							LD	SSK	ZM
1.50	0.625	3/8	0.38	1.50	2.25	4.81	7.38	2.88	9.00
2.00	0.625	3/8	0.38	1.50	2.25	5.13	7.69	2.88	9.31
	1.000	3/8	0.38	1.50	2.25	6.50	8.69	2.88	11.06
2.50	0.625	3/8	0.38	1.50	2.38	5.13	7.81	3.00	9.44
	1.000	3/8	0.38	1.50	2.38	6.63	8.94	3.00	11.31
3.25	1.000	1/2	0.63	1.75	2.63	7.31	10.25	3.25	12.38
	1.375	1/2	0.63	1.75	2.63	7.94	10.63	3.25	13.25
4.00	1.000	1/2	0.63	1.75	2.63	7.69	10.63	3.25	12.75
	1.375	1/2	0.63	1.75	2.63	8.19	10.88	3.25	13.50
	1.750	1/2	0.63	1.75	2.63	8.81	11.25	3.25	14.38
5.00	1.000	1/2	0.63	1.75	2.88	8.31	11.50	3.13	13.63
	1.375	1/2	0.63	1.75	2.88	8.94	11.88	3.13	14.50
	1.750	1/2	0.63	1.75	2.88	9.81	12.50	3.13	15.63
6.00	1.375	3/4	0.75	2.00	3.13	9.69	13.13	3.63	15.63
	1.750	3/4	0.75	2.00	3.13	10.44	13.63	3.63	16.63
	2.000	3/4	0.75	2.00	3.13	10.69	13.75	3.63	17.00
8.00	1.375	3/4	0.75	2.00	3.25	10.06	13.63	3.75	16.13
	1.750	3/4	0.75	2.00	3.25	10.81	14.13	3.75	17.13
	2.500	3/4	0.75	2.00	3.25	11.56	14.50	3.75	18.25
Replaces Dimension								SS	
On Single Rod Mounting Style								MS2	

Rod Lock Removal

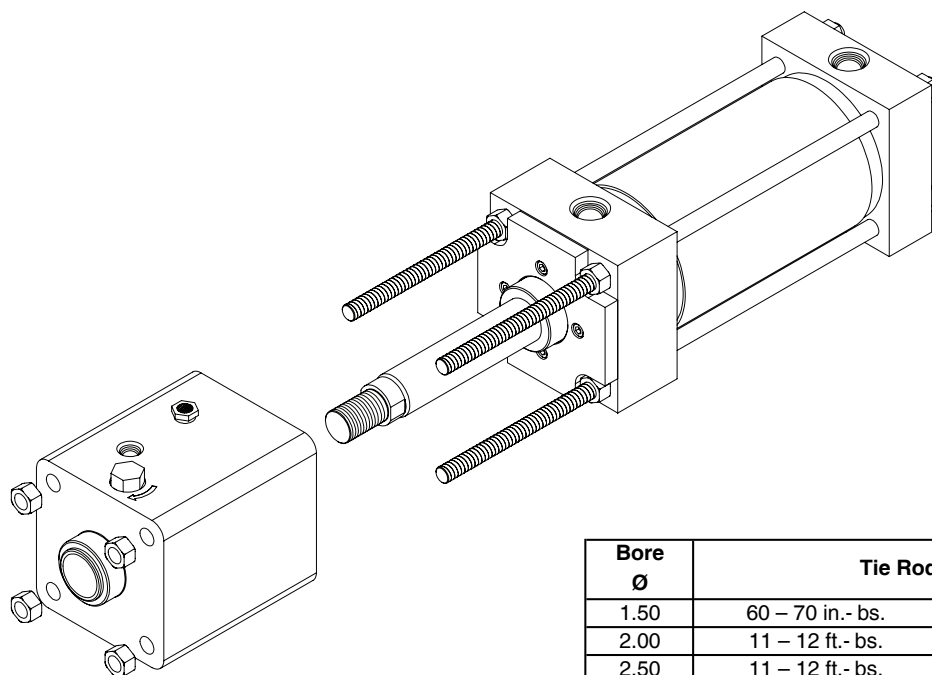
To service the base NC9 or PA-2 Series cylinder the Rod Lock must first be removed.

Note: The Rod Lock cannot be serviced nor is it considered a service item. The NC9 or PA-2 cylinder must be returned to the factory for Rod Lock service.

1. Using a corner-to-corner sequence, remove the four hex tie rod nuts at the face of the Rod Lock.
2. Apply a minimum of 60 psi to the Rod Lock release port, or apply the appropriate torque to the manual override shaft to disengage the Rod Lock from the piston rod.
3. Carefully slide the Rod Lock off the cylinder. The Rod Lock is piloted and sealed to the gland OD which may necessitate carefully prying the unit from the gland retainer.
4. The NC9 or PA-2 cylinder can now be serviced per normal practice. See page 86 for NC9 Service Kits or pages C-34 and C-35 for PA-2 Service Kits.

Rod Lock Installation

1. Ensure that the mating surfaces of the Rod Lock and cylinder are free of dirt and debris.
2. Apply a minimum of 60 psi to the Rod Lock release port, or apply the appropriate torque to the manual override shaft to disengage the Rod Lock from the piston rod.
3. Carefully slide the rod lock onto the piston rod toward the base cylinder. Because the Rod Lock is sealed to the gland some force may be required to bring it in contact with the gland retainer. Take care not to damage to Rod Lock-to-gland o-ring seal.
4. Torque the hex tie rod nuts that secure the Rod Lock to the values in the table below. Be sure to reuse nuts supplied with the cylinder. Torque the nuts gradually, starting at one corner and work in a diagonal pattern to ensure evenness of tightening. **DO NOT TORQUE ONE NUT COMPLETELY AND THEN THE OTHERS.**
5. Remove air pressure from the Rod Lock release port or torque from the manual override release shaft to engage the Rod Lock.



Bore Ø	Tie Rod Torque	
1.50	60 – 70 in.- bs.	69 – 81 cm-kg
2.00	11 – 12 ft.- bs.	15 – 16 N-m
2.50	11 – 12 ft.- bs.	15 – 16 N-m
3.25	25 – 26 ft.- bs.	34 – 35 N-m
4.00	25 – 26 ft.- bs.	34 – 35 N-m
5.00	60 – 64 ft.- bs.	81 – 87 N-m
6.00	60 – 64 ft.- bs.	81 – 87 N-m
8.00	110 – 114 ft.-lbs.	149 – 155 N-m

How to Order NC-9 or PA-2 Series Cylinders

When ordering NC-9 or PA-2 Series cylinders, please review the following:

Note: Duplicate cylinders can be ordered by giving the SERIAL NUMBER from the nameplate of the original cylinder. Factory records supply a quick positive identification.

Piston Rods: Specify model number code based on bore size and rod diameter. Give thread style number for a standard thread or specify dimensions. See "Style 0 Rod End" below.

Cushions: If cushions are required specify according to the model number on the next pages. If the cylinder is to have a double rod and only one cushion is required, be sure to specify clearly which end of the cylinder is to be cushioned.

Special Modifications: Additional information is required on orders for cylinders with special modifications. This is best handled with descriptive notes. For further information, consult factory.

Fluid Medium: NC-9 or PA-2 Series pneumatic cylinders are equipped with seals for use with lubricated air.

Type 1 Seals

Type 1 seals are the seals provided as standard in a cylinder assembly unless otherwise specified. For further information on fluid compatibility or operating limitations of all components, see section C.

For the NC9 or PA-2 Series cylinders the following make-up Type 1 Seals:

Primary Piston Rod Seal – Nitrile with PTFE back-up washers

Piston Rod Wiper – Nitrile

Piston Seals – Nitrile with polymyte back-up washers

O-Rings – Nitrile

Style 0 Rod End

A style 0 rod end indicates a special rod end configuration. All special piston rod dimensions must have **all three:** KK; A; and W/WF specified with the rod fully retracted. A sketch or drawing should be submitted for rod ends requiring special machining such as snap ring grooves, keyways, tapers, multiple diameters, etc. It is good design practice to have this machining done on a diameter at least 0.065 inches smaller than the piston rod diameter. This allows the piston rod to have a chamfer preventing rod seal damage during assembly or maintenance. Standard style 6 rod ends with a longer

than standard WG dimension should call out a style 0 rod end and the note: **same as 6 except WG=_____**. A drawing should be submitted for special 6 rod ends that have specific tolerances or special radii. Special rod ends that have smaller than standard male threads, larger than standard female threads, or style 6 rod ends with smaller than standard AF or AE dimensions are to be reviewed by Engineering for proper strength at operating pressure.

Service Policy

On cylinders returned to the factory for repairs, it is standard policy for the Industrial Cylinder Division to make such part replacements as will put the cylinder in as good as new condition. Should the condition of the returned cylinder be such that expenses for repair would exceed the costs of a new one, you will be notified.

Address all correspondence and make shipments to, Service Department at your nearest regional plant listed in the pages of this catalog.

Certified Dimensions

Schrader Bellows guarantees that all cylinders ordered from this catalog will be built to dimensions shown. All dimensions are certified to be correct, and thus it is not necessary to request certified drawings.

How To Order By Model Number

NC-9 Pneumatic Cylinders with Rod Lock can be specified by model number by using the tables shown at right. **Selections in bold type indicate current Ford standard.**

1. Type

Select the Model Number Code which identifies single, double end.

2. Bore & Rod Diameter

Select the Model Number Code which identifies the desired bore size and rod diameter combination.

3. Mounting & Cushioning

Select the Model Number Code which identifies the desired mounting style and cushioning option.

4. Rod End Style

Select the Model Number Code which identifies the desired rod end thread style.

5. Seal Type

Complete the Model Number by selecting the type of seals desired.

6. Stroke Length

It is necessary to specify the stroke length desired following the Model Number. For example: FAJA100851 with 6" stroke.

Specifying the Desired Trunnion Location

For cylinders with intermediate trunnion mounting, the dimension specified should be the distance from the piston rod reference point to the center-line of the pin.

The Example Would Identify:

A single end pneumatic cylinder with Rod Lock, 1-1/2" bore size, 5/8" piston rod diameter, side lug mount, cushioned both ends, with automotive male rod thread, Buna N Seals, and a 6" stroke.

Optional Mounting Accessories

Specify separately the part number for desired optional mounting accessories.

1	Model Number
Type	Pneumatic Steel Tube
Single End with Rod Lock and NPT port	FAJ
Double End with Rod Lock and NPT port	FBJ
Single End with Rod Lock and SAE port	NAJ
Double End with Rod Lock and SAE port	NBJ

2	Bore Size	Rod Dia.	Model No. Code
	1 1/2"	5/8"	A10
	2"	5/8"	B10
		1"	B11
	2 1/2"	5/8"	C10
		1"	C11
	3 1/4"	1"	D11
		1 3/8"	D12
	4"	1"	E11
		1 3/8"	E12
		1 3/4"	E13
	5"	1"	F11
		1 3/8"	F12
		1 3/4"	F13
	6"	1 3/8"	G12
		1 3/4"	G13
		2"	G14
	8"	1 3/8"	J12
		1 3/4"	J13
		2 1/2"	J15

3	Model Number Code				
Mounting Style	NFPA Style	Non-Cush.	Cush. Head	Cush. Cap	Cush. Both
Side Lug	MS2	05	06	07	08
Side Tap	MS4	13	14	15	16
Head Rectangular Flange (1 1/2-8)	MF1	21	22	23	24
Cap Rectangular Flange (1 1/2-6)	MF2	25	26	27	28
Cap Square (8)	ME4	41	42	43	44
Tie Rods Extended Both Ends	MX1	53	54	55	56
Tie Rods Extended Cap End	MX2	57	58	59	60
Tie Rods Extended Head End	MX3	61	62	63	64
Head Trunnion	MT1	69	70	71	72
Cap Trunnion	MT2	73	74	75	76
Intermediate Fixed Trunnion	MT4	77	78	79	80
Cap Fixed Clevis	MP1	81	82	83	84
Spherical Bearing	MPU3	89	90	91	92
NO MOUNT	MX0	93	94	95	96

4	Rod End Style	Model Number Code
	Small Male	2
	Short Female	3
	Intermediate Male	4
	Automotive Male	5
	Female Thread for Spherical Rod Eye	7
	Special Specify	0

5	Seal Type	Model Number Code
	Buna N Seals	1
	Fluorocarbon Seals	2

6	Special Features	S
---	------------------	---

7	Specify Stroke Length	6.00"
---	-----------------------	-------

Model Number Example:

FAJ A10 08 5 1 S W/6" Stroke

A

PA-2

NC9

Rod Lock

How To Order By Model Number

PA-2 Pneumatic Cylinders with Rod Lock can be specified by model number by using the tables shown at right.

1. Type

Select the Model Number Code which identifies single, double end or non-lube.

2. Bore & Rod Diameter

Select the Model Number Code which identifies the desired bore size and rod diameter combination.

3. Mounting & Cushioning

Select the Model Number Code which identifies the desired mounting style and cushioning option.

4. Rod End Style

Select the Model Number Code which identifies the desired rod end thread style.

5. Seal Type

Complete the Model Number by selecting the type of seals desired.

6. Stroke Length

It is necessary to specify the stroke length desired following the Model Number. For example: PAJA101621 with 6" stroke.

Specifying the Desired Trunnion Location

For cylinders with intermediate trunnion mounting, the dimension specified should be the distance from the piston rod reference point to the center-line of the pin.

The Example Would Identify:

A single end pneumatic cylinder with Rod Lock, 1-1/2" bore size, 5/8" piston rod diameter, side tapped mount, cushioned both ends, with a small male rod thread, Buna N Seals, a 6" stroke.

Optional Mounting Accessories

Specify separately the part number for desired optional mounting accessories.

Note: For special modifications other than piston rod ends use S in the tenth position of the model number and describe special features required.

Example: PAJA101621S 6" Stroke
Cylinder to be Nickel Plated.

1	Model Number
Type	PA-2 Series Pneumatic
Single End with Rod Lock	PAJ
Double End with Rod Lock	PBJ
Non-Lube Single End with Rod Lock	PNJ
Non-Lube Double End with Rod Lock	PPJ

2	Bore Size	Rod Dia.	Model No. Code
	1 1/2"	5/8"	A10
	2"	5/8"	B10
		1"	B11
	2 1/2"	5/8"	C10
		1"	C11
	3 1/4"	1"	D11
		1 3/8"	D12
	4"	1"	E11
		1 3/8"	E12
		1 3/4"	E13
	5"	1"	F11
		1 3/8"	F12
		1 3/4"	F13
	6"	1 3/8"	G12
		1 3/4"	G13
		2"	G14
	8"	1 3/8"	J12
		1 3/4"	J13
		2 1/2"	J15

3	Model Number Code				
Mounting Style	NFPA Style	Non-Cush.	Cush. Head	Cush. Cap	Cush. Both
Side Lug	MS2	05	06	07	08
Side Tap	MS4	13	14	15	16
Head Rectangular Flange (1 1/2-8)	MF1	21	22	23	24
Cap Rectangular Flange (1 1/2-6)	MF2	25	26	27	28
Cap Square (8)	ME4	41	42	43	44
Tie Rods Extended Both Ends	MX1	53	54	55	56
Tie Rods Extended Cap End	MX2	57	58	59	60
Tie Rods Extended Head End	MX3	61	62	63	64
Head Trunnion	MT1	69	70	71	72
Cap Trunnion	MT2	73	74	75	76
Intermediate Fixed Trunnion	MT4	77	78	79	80
Cap Fixed Clevis	MP1	81	82	83	84
Spherical Bearing	MPU3	89	90	91	92
NO MOUNT	MX0	93	94	95	96

4	Rod End Style	Model Number Code
	Small Male	2
	Short Female	3
	Intermediate Male	4
	Flange Coupling	6
	Female Thread for Spherical Rod Eye	7
	Special Specify	0

5	Seal Type*	Model Number Code
	Buna N Seals	1
	Fluorocarbon Seals	2

6	Specify Stroke Length	6.00"
---	-----------------------	-------

Model Number Example:

PAJ A10 16 2 1 W/6" Stroke

NOTES

A

PA-2

NC9

Rod Lock

NOTES