Schrader Bellows®

PH-2 Series

Heavy-Duty Industrial Tie Rod Hydraulic Cylinders

Contents

Schrader Bellows PH-2 Series Heavy-Duty Hydraulic Cylinder

When the application demands a heavy-duty cylinder with maximum performance, specify Schrader Bellows PH-2 Series. This cylinder has standard design features to maximize machine uptime. The standard bronze rod gland, case-hardened piston rod, high strength piston rod stud and tie rod material combine to make the PH-2 Series the cylinder for demanding applications up to 3000 psi.

Thorough inspection and performance testing of each cylinder before shipment assure PH-2 Series cylinder quality. See the following pages for the inside story on all the features that make PH-2 Series the high performance, long lasting choice for all your heavy-duty hydraulic applications.

Standard Specifications

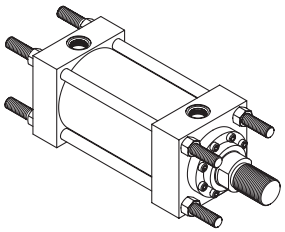
- Heavy Duty Service – ANSI/(NFPA) T3.6.7R2-1996 Mounting and Specification Dimensions
- Standard Construction – Square Head – Tie Rod Design
- Nominal Pressure – 3000 P.S.I.*
- Standard Fluid – Hydraulic Oil
- Standard Temperature – -10° F to +165° F
- Bore Sizes – 1 1/2" through 6"
- Piston Rod Diameter – 5/8" through 4"
- Mounting Styles – 16 standard styles at various application ratings
- Standard – Externally removable bolted bushing assembly
- 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

* If hydraulic operating pressure exceeds 3000 P.S.I., send application data for engineering evaluation and recommendation. See Section C, Application Engineering Data for actual design factors.

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

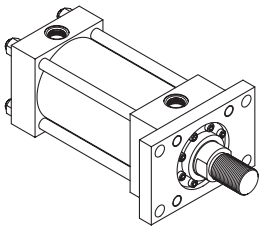
Mounting Styles

Tie Rods Extended



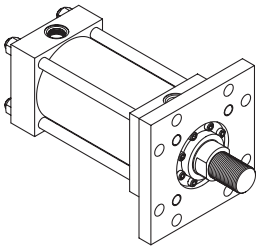
BOTH ENDS NFPA MX1
CAP END NFPA MX2
HEAD END NFPA MX3

Head Rectangular Flange



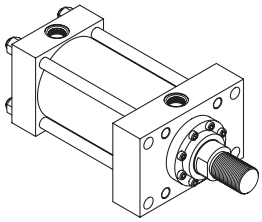
NFPA MF1

Head Square Flange



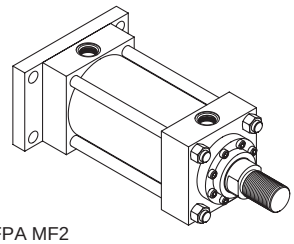
NFPA MF5

Head Rectangular



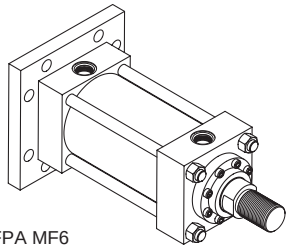
NFPA ME5

Cap Rectangular Flange



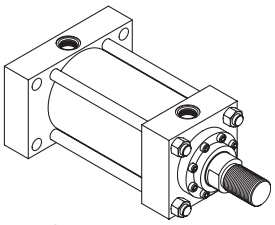
NFPA MF2

Cap Square Flange



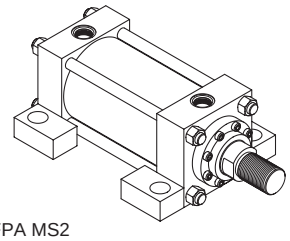
NFPA MF6

Cap Rectangular



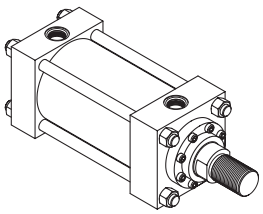
NFPA ME6

Side Lug



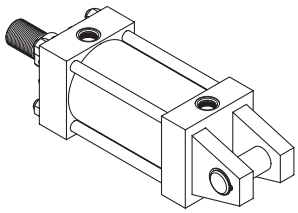
NFPA MS2

Side Tap



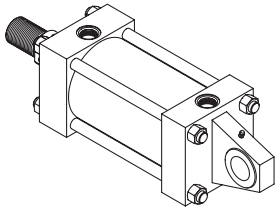
NFPA MS4

Cap Fixed Clevis



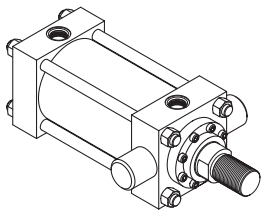
NFPA MP1

Spherical Bearing



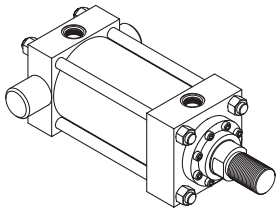
NFPA MPU3

Head Trunnion



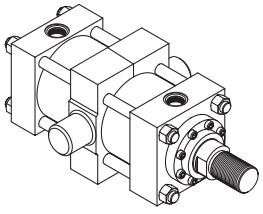
NFPA MT1

Cap Trunnion



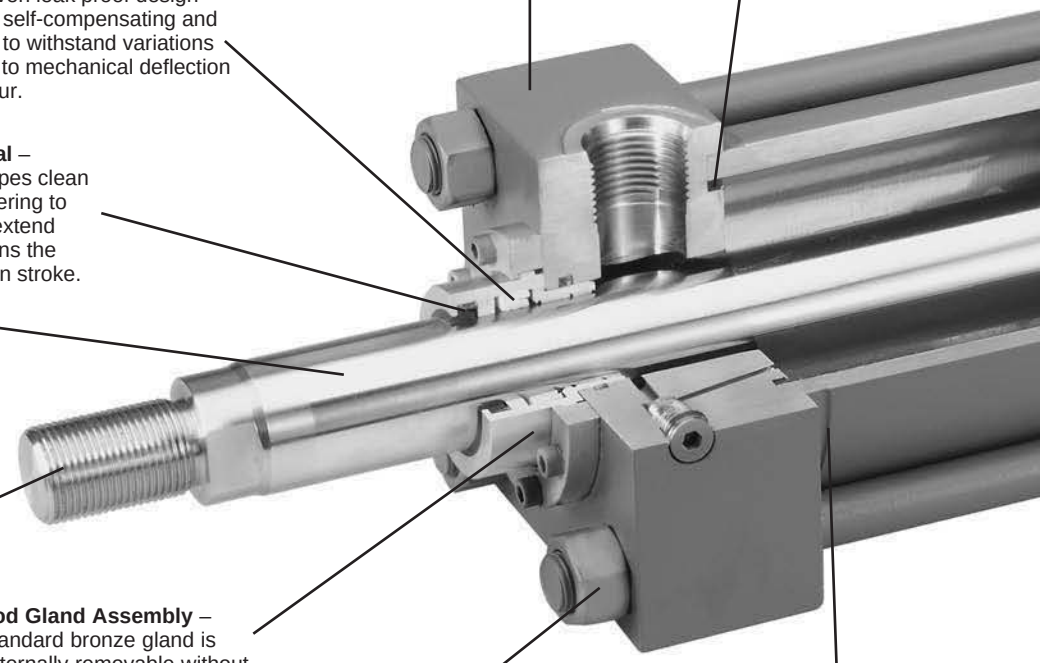
NFPA MT2

Intermediate Trunnion



NFPA MT4

Schrader Bellows . . .
PH-2 Series – your best choice in heavy duty hydraulic cylinders



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

End Seal – Pressure-actuated cylinder tube-to-head and cap "O" rings.

Primary Seal – New "Tri-Lip" Rod Seal is a proven leak proof design – completely self-compensating and self-relieving to withstand variations and conform to mechanical deflection that may occur.

Secondary Seal – Rod Wiper – wipes clean any oil film adhering to the rod on the extend stroke and cleans the rod on the return stroke.

Piston Rod – Medium carbon steel, induction case-hardened, hard chrome-plated and polished to 10 RMS finish.

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

Rod Gland Assembly – Standard bronze gland is externally removable without cylinder disassembly. (See gland retainer style chart for bore, rod and mount combinations that have this feature.) Long inboard bearing surface is ahead of the seals assuring lubrication by cylinder operating fluid.

Alloy Steel Tie Rod Nuts

Align-A-Groove – A $^{3}/_{16}$" wide surface machined at each end of the cylinder body. Makes precise mounting quick and easy.

Schrader Bellows stepped floating cushions combine the best features of known cushion technology.

Deceleration devices or built-in "cushions" are optional and can be supplied at head end, cap end, or both ends without change in envelope or mounting dimensions. Schrader Bellows cylinder cushions are a stepped design and combine the best features of known cushion technology.

Standard straight or tapered cushions have been used in industrial cylinders over a very broad range of applications, Schrader Bellows research has found that both designs have their limitations.

As a result, Schrader Bellows has taken a new approach in cushioning of industrial hydraulic cylinders and for specific load and velocity conditions have been able to obtain deceleration curves that come very close to the ideal. The success lies in a stepped sleeve or spear concept where the steps are calculated to approximate theoretical orifice areas curves.

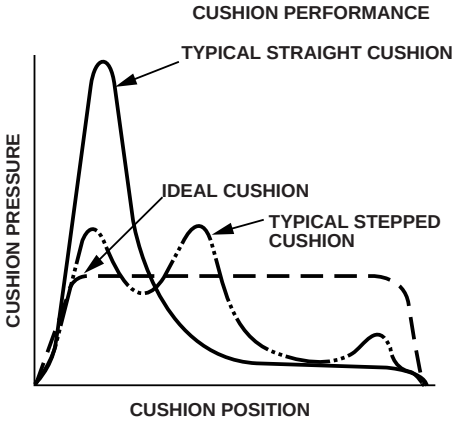
In the cushion performance chart, pressure traces show the results of typical orifice flow conditions. Tests of a three-step sleeve or spear show three pressure pulses coinciding with the steps. The deceleration curve shape comes very close to being theoretical, with the exception of the last $^{1}/_{2}$ inch of travel.

This is a constant shape in order to have some flexibility in application.

The stepped cushion design shows reduced pressure peaks for most load and speed conditions, with comparable reduction of objectionable stopping forces being transmitted to the load and the support structure.

All Schrader Bellows PH-2 cushions are adjustable.

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

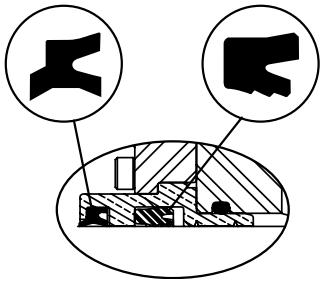


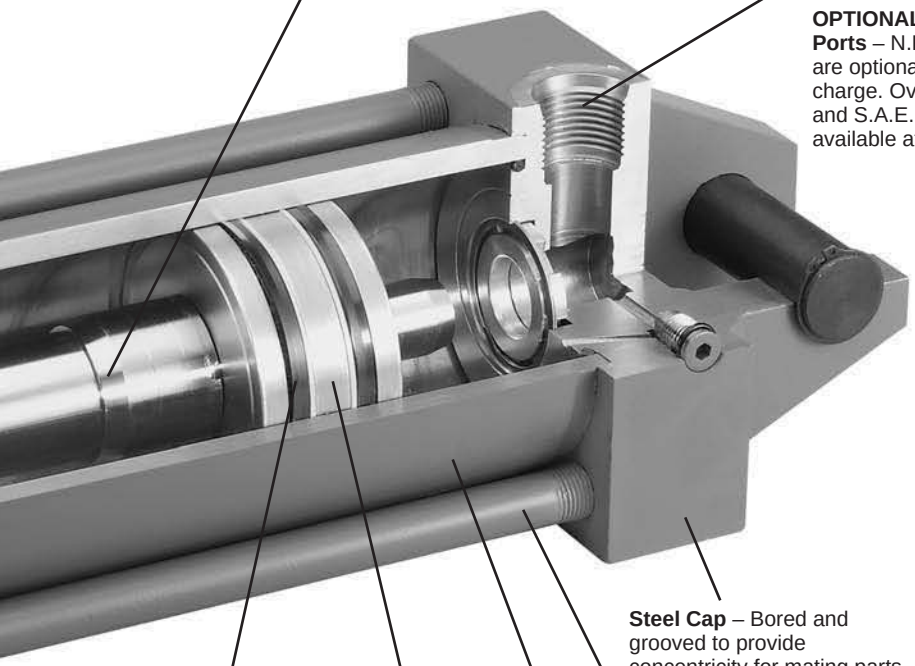
Adjustable Floating Stepped Cushions – For maximum performance – economical and flexible for even the most demanding applications – provides superior performance in reducing shock. Cushions are optional and can be supplied at head end, cap end, or both ends without change in envelope or mounting dimensions.

Ports – S.A. E. "O"-ring ports are standard

OPTIONAL PORTS

Ports – N.P.T.F. ports are optional at no extra charge. Oversize N.P.T.F. and S.A.E. ports are available at extra charge.





Gland Assembly with "Tri-Lip" Rod Seal
Gland Assembly externally removable without cylinder disassembly. (See gland retainer style chart for bore, rod and mount combinations that have this feature.) An O-ring is used as a seal between the gland and head. The "Tri-Lip" rod seal has multiple sealing edges to produce "dry rod" performance. It is molded from a special polyurethane material that is extremely resistant to abrasion and extrusion, resulting in exceptional service life. Wiperseal cleans rod of dirt, preventing it from entering the gland and also acts as a secondary rod seal.

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

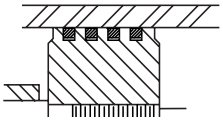
Lipseal™ Piston – Zero leakage under static conditions for hydraulic pressures up to 3000 PSI. Seals are self-compensating to conform to variations in pressure, mechanical deflection, and wear. Back-up washer prevents extrusion.

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

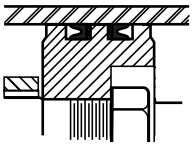
One-Piece Nodular Iron Piston – The wide piston surface contacting cylinder bore reduces bearing loads. Anaerobic adhesive is used to permanently lock and seal the piston to the rod.

The Cylinder Tube – Heavy-wall steel tubing, honed to a micro finish bore.

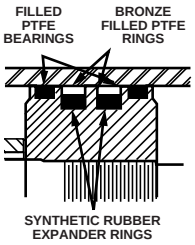
OPTIONAL PISTONS



Step cut iron piston rings are optional.



Piston with Retainer Nut – Optional at no extra charge.



Hi Load Piston – Optional at extra charge (1½ - 6" Bores). Includes wear rings and bronze-filled PTFE seals. Two wear rings serve as bearings which deform radially under side-loading, enabling the load to be spread over a larger area and reduce unit loading. Bronze-filled PTFE seals are designed for extrusion-free, leak-proof service and longer cylinder life than the lipseal type piston. Not available with retainer nut.

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

a. A self-centering stepped sleeve is furnished on the piston rod assembly.

b. A needle valve is provided that is flush with the side of the head even when wide open. It may be identified by the fact that it is socket-keyed. It is located on side number 2, in all mounting styles except MT1, MT2, MT4, ME5 and ME6. In these models it is located on side number 3.

c. On 6" bore and larger cylinders, a springless check valve is provided that is also flush with the side of the head and is mounted adjacent to the needle valve except on Style MS2, where it is mounted opposite the needle valve. It may be identified by the fact that it is slotted.

d. On 1½" - 5" bore cylinders a slotted sleeve design is used in place of the check valve.

e. 1½" - 2½" bore cylinders use cartridge style needle valve (see Figure A).

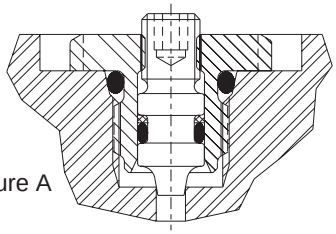


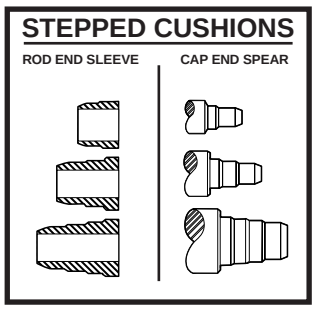
Figure A

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

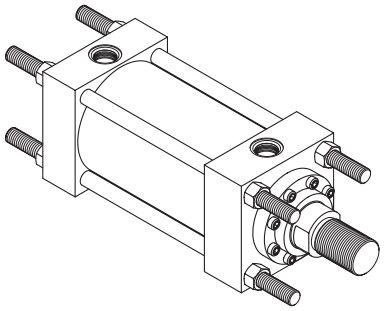
a. A stepped spear is provided on the piston rod.

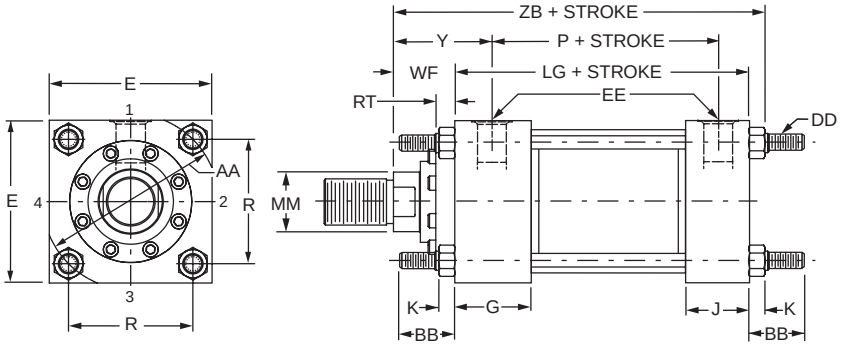
b. A "float check" self-centering bushing is provided which incorporates a large flow check valve for fast "out-stroke" action.

c. 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, MT4, ME5 and ME6. In these models it is located on side number 3.

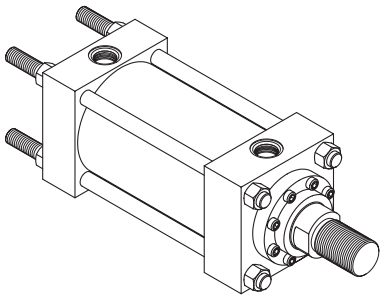


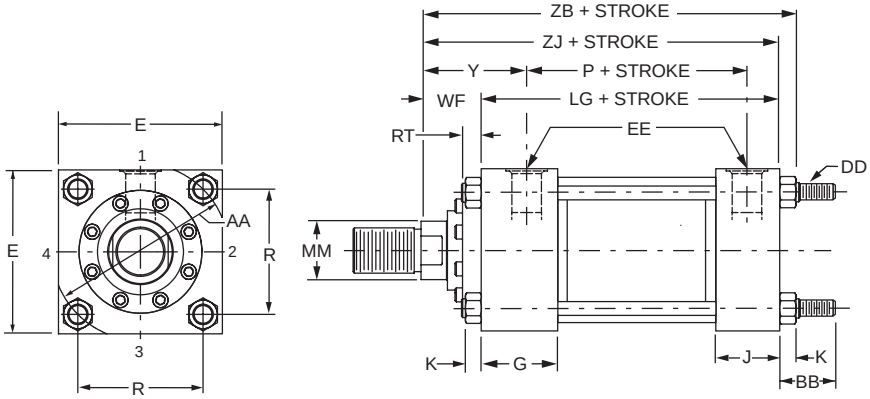
Tie Rods Extended Both Ends Mount
NFPA Style MX1



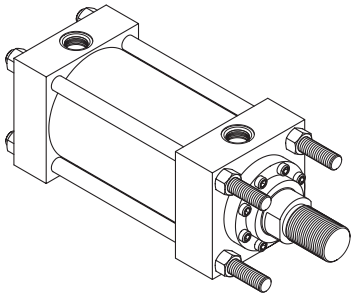


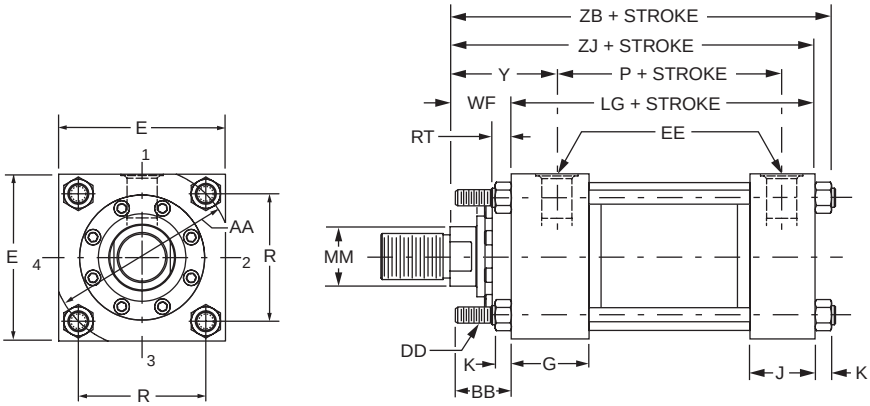
Tie Rods Extended Cap End Mount
NFPA Style MX2





Tie Rods Extended Head End Mount
NFPA Style MX3

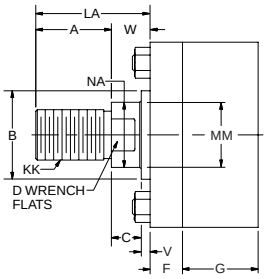




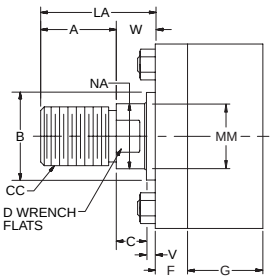
Rod End Dimensions for Full Face Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

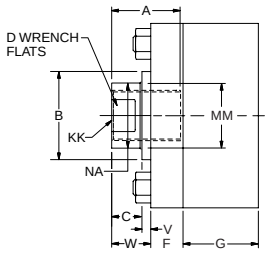
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

"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 and W. 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⊖	EE SAE*	F	G	J	K	R	Add Stroke LG	Add Stroke P
1½	2.3	1 3/8†	3/8-24	2½	½	10	3/8	1¾	1½	3/8	1.63	4⅝	2⅞
2	2.9	1 13/16†	½-20	3	½	10	⅝	1¾	1½	7/16	2.05	4⅝	2⅞
2½	3.6	1 13/16	½-20	3½	½	10	⅝	1¾	1½	7/16	2.55	4¾	3
3¼	4.6	2 5/16	⅝-18	4½	¾	12	¾	2	1¾	9/16	3.25	5½	3½
4	5.4	2 5/16	⅝-18	5	¾	12	⅞	2	1¾	9/16	3.82	5¾	3¾
5	7.0	3 3/16	⅞-14	6½	¾	12	⅞	2	1¾	13/16	4.95	6¼	4¼
6	8.1	3⅝	1-14	7½	1	16	1	2¼	2¼	⅞	5.73	7⅜	4⅞

* SAE straight thread ports are standard and are indicated by port number.
⊖ NPTF ports are available at no extra charge.

† 1 1/2" and 2" bore Styles MX1 and MX3 are only available with full face retainer construction (see gland retainer style chart). Head end 'BB' dimension for these bores is referenced from the front of full square retainer that is 'F' dimension thick.

Table 2—Rod Dimensions

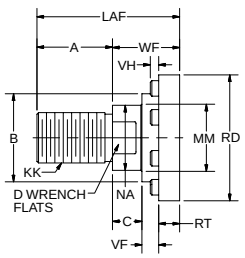
Bore	Rod Dia. MM	Thread Style 4 CC	Thread Style 2 & 3 KK	A	+.000 -.002 B	C	D	LA	LAF	NA	RD (Max.)	RT	V	VF	VH	W	WF	Y	Add Stroke ZB	Add Stroke ZJ
1½	⅝	½-20	7/16-20	¾	1.124	⅜	½	1⅜	1¾	9/16	1 15/16	⅜	¼	¼	⅜	⅝	1	2	6	5⅝
	1	⅞-14	¾-16	1⅛	1.499	½	⅞	2⅛	2½	15/16	2⅜	⅜	½	½	⅜	1	1⅜	2⅜	6⅜	6
2	1	⅞-14	¾-16	1⅛	1.499	½	⅞	1⅞	2½	15/16	2⅜	⅜	¼	½	⅜	¾	1⅜	2⅜	6 7/16	6
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	2⅝	3¼	1 5/16	2⅞	⅜	⅜	⅝	⅜	1	1⅝	2⅝	6 11/16	6¼
2½	1	⅞-14	¾-16	1⅛	1.499	½	⅞	–	2½	15/16	2⅜	⅜	¼	½	⅜	–	1⅜	2⅜	6 9/16	6⅛
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1 5/16	2⅞	⅜	⅜	⅝	⅜	–	1⅝	2⅝	6 13/16	6⅜
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	½	½	⅜	–	1⅞	2⅞	7 1/16	6⅝
3¼	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1 5/16	2⅞	⅜	¼	⅝	⅜	–	1⅝	2¾	7 11/16	7⅛
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	⅜	½	⅜	–	1⅞	3	7 15/16	7⅜
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	⅜	½	¼	–	2	3⅛	8 1/16	7½
4	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	¼	½	⅜	–	1⅞	3	8 3/16	7⅝
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2	3⅛	8 5/16	7¾
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	⅜	⅝	¼	–	2¼	3⅜	8 9/16	8
5	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2	3⅛	9 1/16	8¼
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	3⅜	4¼	⅝	⅜	⅝	¼	–	2¼	3⅜	9 5/16	8½
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	⅜	5/16	–	–	2¼	3⅜	9 5/16	8½
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	2⅜	5 15/16	15/16	⅜	5/16	–	–	2¼	3⅜	9 5/16	8½
6	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	¼	⅝	¼	–	2¼	3½	10½	9⅝
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	¼	5/16	–	–	2¼	3½	10½	9⅝
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	3⅜	5 15/16	15/16	¼	5/16	–	–	2¼	3½	10½	9⅝
	4	3¾-12	3-12	4	4.749	1	3⅜	–	6¼	3⅞	6 5/16	15/16	¼	5/16	–	–	2¼	3½	10½	9⅝

Table 3 — Envelope and Mounting Dimensions

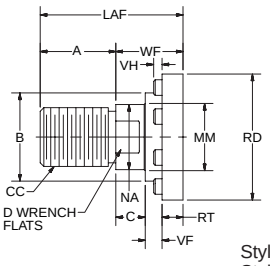
Rod End Dimensions for Bolted Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

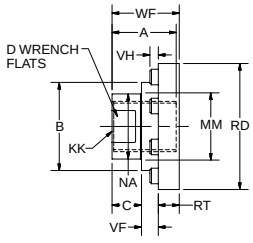
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

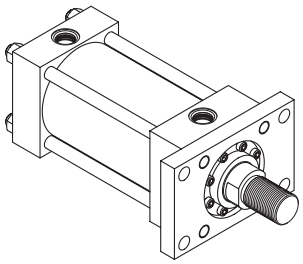
A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 2 rod ends are recommended through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

"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 and WF. If otherwise special, furnish dimensioned sketch.

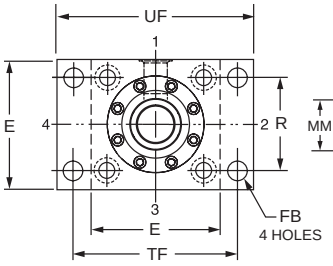
Head Rectangular Flange Mount NFPA Style MF1

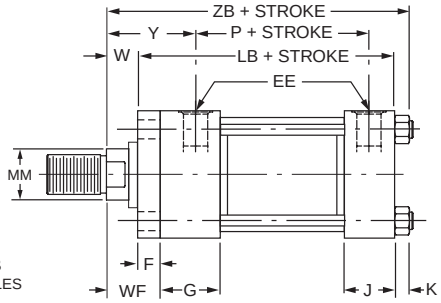


Maximum Pressure Rating - PSI
Push Application

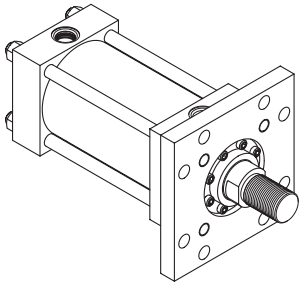
Bore	Rod Dia 5/8	1	1 3/8	1 3/4	2
1 1/2	1400	1000	–	–	–
2	–	2000	1200	–	–
2 1/2	–	700	700	1000	–
3 1/4	–	–	800	800	600
4	–	–	–	1000	1000
5	–	–	–	–	850

Bore	Rod Dia 2 1/2	3	3 1/2	4	5
4	700	–	–	–	–
5	850	450	800	–	–
6	650	650	400	400	–





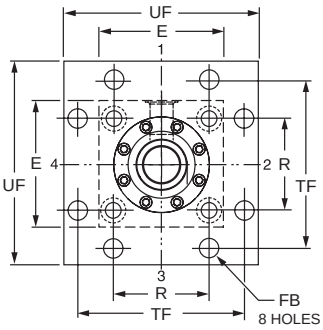
Head Square Flange Mount NFPA Style MF5

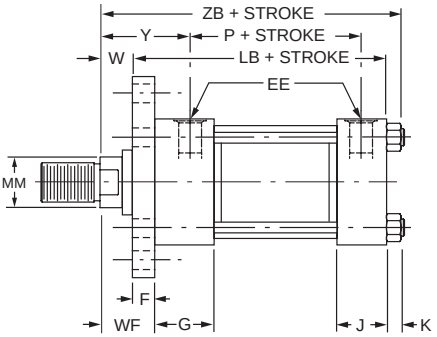


Maximum Pressure Rating - PSI
Push Application

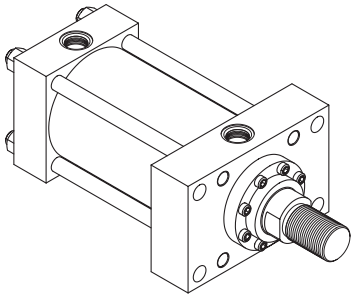
Bore	Rod Dia 5/8	1	1 3/8	1 3/4	2
1 1/2	3000	3000	–	–	–
2	–	3000	3000	–	–
2 1/2	–	3000	3000	3000	–
3 1/4	–	–	3000	3000	3000
4	–	–	–	3000	3000
5	–	–	–	–	2500

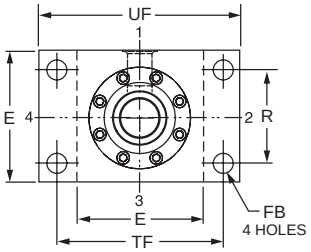
Bore	Rod Dia 2 1/2	3	3 1/2	4	5
4	3000	–	–	–	–
5	2500	1800	2300	–	–
6	2000	2000	1600	1600	–

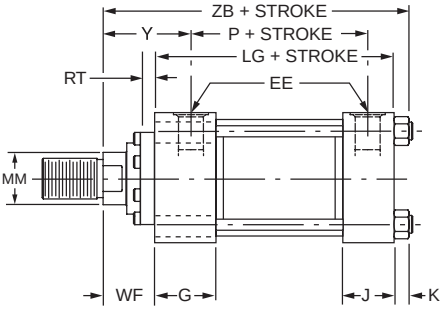




Head Rectangular Mount NFPA Style ME5



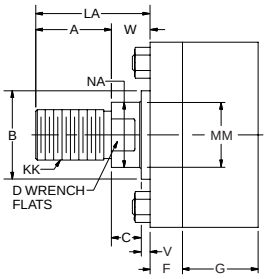




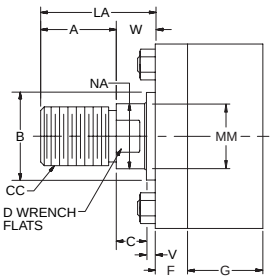
Rod End Dimensions for Full Face Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

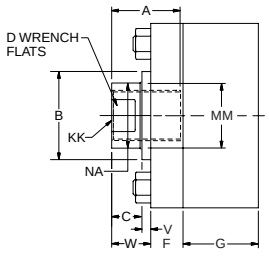
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

"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 and W. 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		F	FB	G	J	K	R	TF	UF	Add Stroke		
		NPTF⊖	SAE*									LB	LG	P
1½	2½	½	10	⅜	7/16	1¾	1½	⅜	1.63	3 7/16	4¼	5	4 5/8	2 7/8
2	3	½	10	⅝	9/16	1¾	1½	7/16	2.05	4⅛	5⅛	5¼	4 5/8	2 7/8
2½	3½	½	10	⅝	9/16	1¾	1½	7/16	2.55	4 5/8	5 5/8	5⅜	4¾	3
3¼	4½	¾	12	¾	11/16	2	1¾	9/16	3.25	5⅞	7⅛	6¼	5½	3½
4	5	¾	12	⅞	11/16	2	1¾	9/16	3.82	6⅜	7 5/8	6 5/8	5¾	3¾
5	6½	¾	12	⅞	15/16	2	1¾	13/16	4.95	8 3/16	9¾	7⅛	6¼	4¼
6	7½	1	16	1	1 1/16	2¼	2¼	⅞	5.73	9 7/16	11¼	8⅜	7⅜	4 7/8

* SAE straight thread ports are standard and are indicated by port number.

⊖ NPTF ports are available at no extra charge.

Table 2—Rod Dimensions

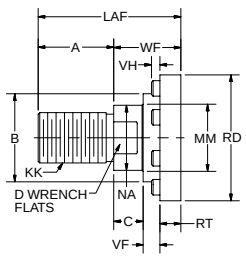
Bore	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions														Add Stroke
		Style 4 CC	Style 2 & 3 KK	A	+.000 -.002 B	C	D	LA	LAF	NA	RD (Max.)	RT	V	VF	VH	W	WF	Y	ZB
1½	⅝	½-20	7/16-20	¾	1.124	⅜	½	1⅜	1¾	9/16	1 15/16	⅜	¼	¼	3/16	⅝	1	2	6
	1	⅞-14	¾-16	1⅛	1.499	½	⅞	2⅛	2½	15/16	2⅜	⅜	½	½	3/16	1	1⅜	2⅜	6⅜
2	1	⅞-14	¾-16	1⅛	1.499	½	⅞	1⅞	2½	15/16	2⅜	⅜	¼	½	3/16	¾	1⅜	2⅜	6 7/16
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	2⅝	3¼	1 5/16	2⅞	⅜	⅜	⅝	3/16	1	1⅝	2⅝	6 11/16
2½	1	⅞-14	¾-16	1⅛	1.499	½	⅞	1⅞	2½	15/16	2⅜	⅜	¼	½	3/16	¾	1⅜	2⅜	6 9/16
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	2⅝	3¼	1 5/16	2⅞	⅜	⅜	⅝	3/16	1	1⅝	2⅝	6 13/16
	1¾	1½-12	1¼-12	2	2.374	¾	1½	3¼	3⅞	1 11/16	3 15/32	⅝	½	½	3/16	1¼	1⅞	2⅞	7 1/16
3¼	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	2½	3¼	1 5/16	2⅞	⅜	¼	⅝	3/16	⅞	1⅝	2¾	7 11/16
	1¾	1½-12	1¼-12	2	2.374	¾	1½	3⅛	3⅞	1 11/16	3 15/32	⅝	⅜	½	3/16	1⅛	1⅞	3	7 15/16
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	3½	4¼	1 15/16	3 23/32	⅝	⅜	½	1/4	1¼	2	3⅛	8 1/16
4	1¾	1½-12	1¼-12	2	2.374	¾	1½	3	3⅞	1 11/16	3 15/32	⅝	¼	½	3/16	1	1⅞	3	8 3/16
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	3⅜	4¼	1 15/16	3 23/32	⅝	¼	½	1/4	1⅛	2	3⅛	8 5/16
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	4⅜	5¼	2⅜	4¼	⅝	⅜	⅝	1/4	1⅜	2¼	3⅜	8 9/16
5	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	3⅜	4¼	1 15/16	3 23/32	⅝	¼	½	1/4	1⅛	2	3⅛	9 1/16
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	4⅜	5¼	2⅜	4¼	⅝	⅜	⅝	1/4	1⅜	2¼	3⅜	9 5/16
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	4⅞	5¾	2⅞	5 7/16	⅞	⅜	5/16	–	1⅜	2¼	3⅜	9 5/16
	3½	3¼-12	2½-12	3½	4.249	1	3	4⅞	5¾	3⅜	5 15/16	15/16	⅜	5/16	–	1⅜	2¼	3⅜	9 5/16
6	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	4¼	5¼	2⅜	4¼	⅝	¼	⅝	1/4	1¼	2¼	3½	10½
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	4¾	5¾	2⅞	5 7/16	⅞	¼	5/16	–	1¼	2¼	3½	10½
	3½	3¼-12	2½-12	3½	4.249	1	3	4¾	5¾	3⅜	5 15/16	15/16	¼	5/16	–	1¼	2¼	3½	10½
	4	3¾-12	3-12	4	4.749	1	3⅜	5¼	6¼	3⅞	6 5/16	15/16	¼	5/16	–	1¼	2¼	3½	10½

Table 3 — Envelope and Mounting Dimensions

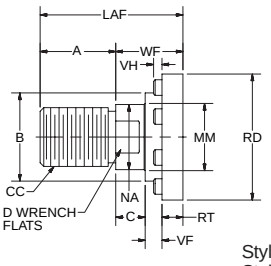
Rod End Dimensions for Bolted Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

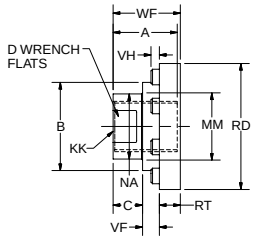
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

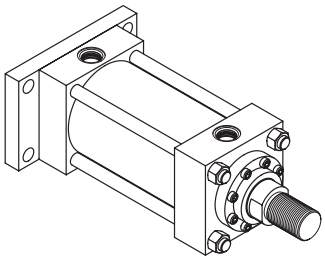
A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 2 rod ends are recommended through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

"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 and WF. If otherwise special, furnish dimensioned sketch.

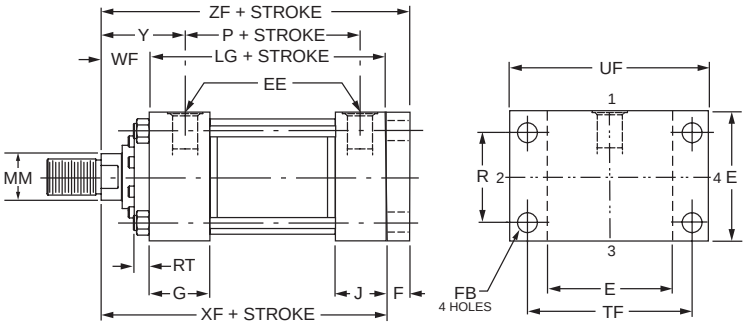
Cap Rectangular Flange Mount NFPA Style MF2



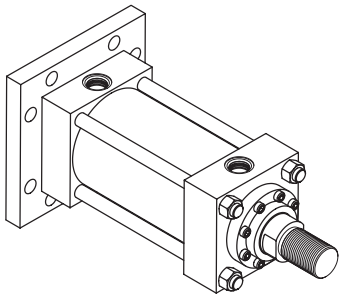
Maximum Pressure Rating - PSI
Pull Application

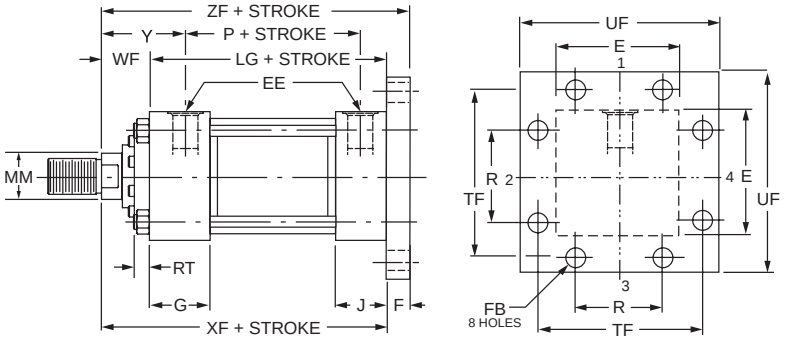
Bore	Rod Dia				
	5/8	1	1 3/8	1 3/4	2
1 1/2	2500	3000	–	–	–
2	–	3000	3000	–	–
2 1/2	–	3000	3000	3000	–
3 1/4	–	–	3000	3000	3000
4	–	–	–	3000	3000
5	–	–	–	–	2000

Bore	Rod Dia				
	2 1/2	3	3 1/2	4	5
4	3000	–	–	–	–
5	2000	2500	3000	–	–
6	1800	2000	2000	2500	–

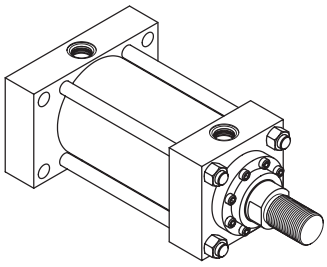


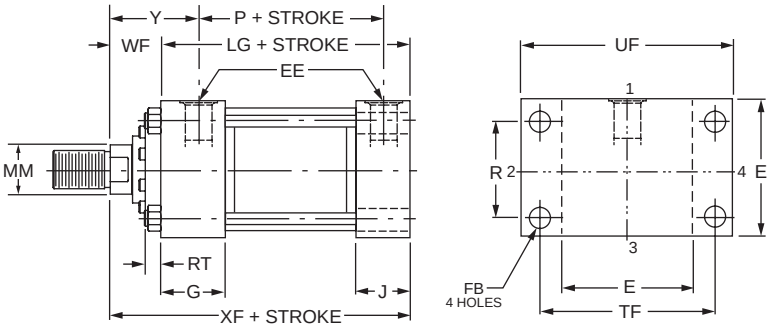
Cap Square Flange Mount NFPA Style MF6





Cap Rectangular Mount NFPA Style ME6

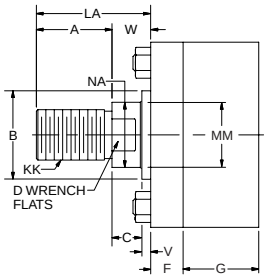




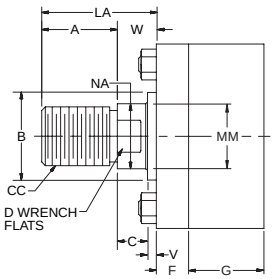
Rod End Dimensions for Full Face Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

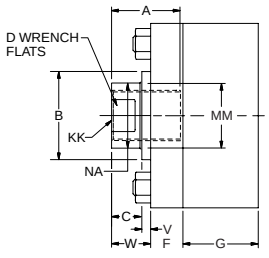
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

"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 and W. 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		F	FB	G	J	K	R	TF	UF	Add Stroke	
		NPTF⊖	SAE*									LG	P
1½	2½	½	10	⅜	7/16	1¾	1½	⅜	1.63	3 7/16	4¼	4⅝	2⅞
2	3	½	10	⅝	9/16	1¾	1½	7/16	2.05	4⅛	5⅛	4⅝	2⅞
2½	3½	½	10	⅝	9/16	1¾	1½	7/16	2.55	4⅝	5⅝	4¾	3
3¼	4½	¾	12	¾	11/16	2	1¾	9/16	3.25	5⅞	7⅛	5½	3½
4	5	¾	12	⅞	11/16	2	1¾	9/16	3.82	6⅜	7⅝	5¾	3¾
5	6½	¾	12	⅞	15/16	2	1¾	13/16	4.95	8 3/16	9¾	6¼	4¼
6	7½	1	16	1	1 1/16	2¼	2¼	⅞	5.73	9 7/16	11¼	7⅜	4⅞

* SAE straight thread ports are standard and are indicated by port number.
⊖ NPTF ports are available at no extra charge.

Table 2—Rod Dimensions

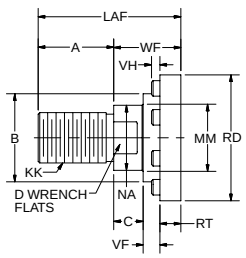
Bore	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions														Y	Add Stroke	
		Style 4 CC	Style 2 & 3 KK	A	+.000 -.002 B	C	D	LA	LAF	NA	RD (Max.)	RT	V	VF	VH	W	WF		XF	ZF
1½	⅝	½-20	7/16-20	¾	1.124	⅜	½	–	1¾	9/16	1 15/16	⅜	¼	¼	3/16	–	1	2	5⅝	6
	1	⅞-14	¾-16	1⅛	1.499	½	⅞	2⅛	2½	15/16	2⅜	⅜	½	½	3/16	1	1⅜	2⅜	6	6⅜
2	1	⅞-14	¾-16	1⅛	1.499	½	⅞	–	2½	15/16	2⅜	⅜	¼	½	3/16	–	1⅜	2⅜	6	6⅝
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	2⅝	3¼	1 5/16	2⅞	⅜	⅜	⅝	3/16	1	1⅝	2⅝	6¼	6⅞
2½	1	⅞-14	¾-16	1⅛	1.499	½	⅞	–	2½	15/16	2⅜	⅜	¼	½	3/16	–	1⅜	2⅜	6⅛	6¾
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1 5/16	2⅞	⅜	⅜	⅝	3/16	–	1⅝	2⅝	6⅜	7
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	½	½	3/16	–	1⅞	2⅞	6⅝	7¼
3¼	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1 5/16	2⅞	⅜	¼	⅝	3/16	–	1⅝	2¾	7⅛	7⅞
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	⅜	½	3/16	–	1⅞	3	7⅜	8⅛
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	⅜	½	¼	–	2	3⅛	7½	8¼
4	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	¼	½	3/16	–	1⅞	3	7⅝	8½
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2	3⅛	7¾	8⅝
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	⅜	⅝	¼	–	2¼	3⅜	8	8⅞
5	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2	3⅛	8¼	9⅛
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	⅜	⅝	¼	–	2¼	3⅜	8½	9⅜
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	⅜	5/16	–	–	2¼	3⅜	8½	9⅜
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	3⅜	5 15/16	15/16	⅜	5/16	–	–	2¼	3⅜	8½	9⅜
6	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	¼	⅝	¼	–	2¼	3½	9⅝	10⅝
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	¼	5/16	–	–	2¼	3½	9⅝	10⅝
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	3⅜	5 15/16	15/16	¼	5/16	–	–	2¼	3½	9⅝	10⅝
	4	3¾-12	3-12	4	4.749	1	3⅜	–	6¼	3⅞	6 5/16	15/16	¼	5/16	–	–	2¼	3½	9⅝	10⅝

Table 3 — Envelope and Mounting Dimensions

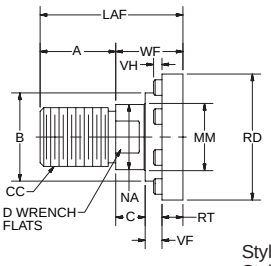
Rod End Dimensions for Bolted Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

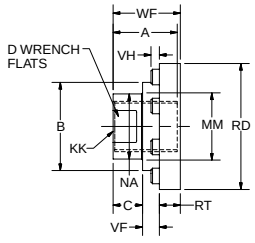
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

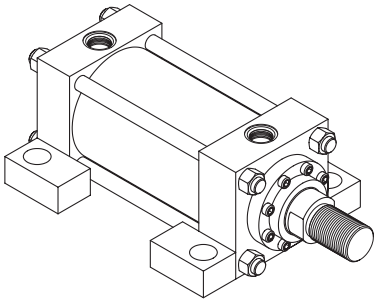
A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 2 rod ends are recommended through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

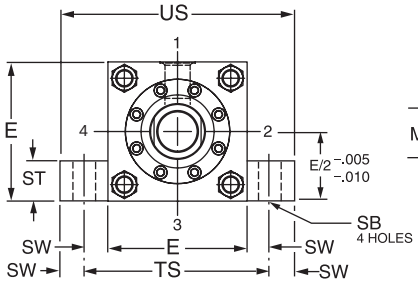
"Special" Thread Style 0

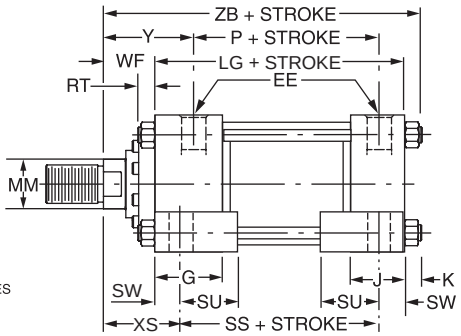
Special thread, extension, rod eye, blank, etc., are also available.

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

Side Lug Mount
NFPA Style MS2

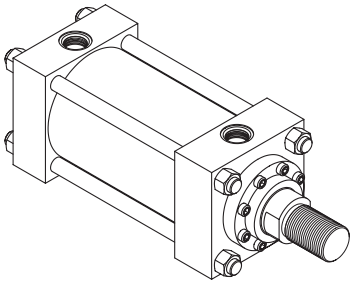


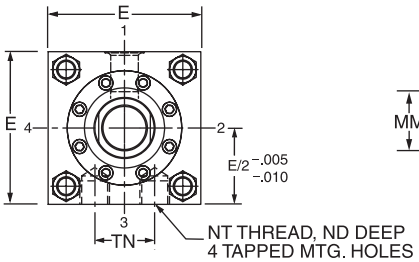


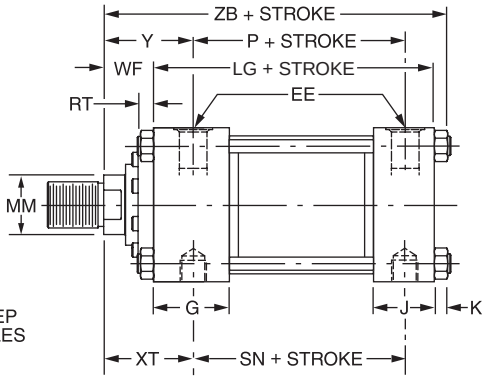


Style MS2 cylinders have mounting lugs welded to the head and cap, and are considered to be a fixed mount that does not absorb force on its centerline. The plane of the mounting surface is not through the centerline of the cylinder, and for this reason Style MS2 cylinders produce a turning moment as the cylinder applies force to the load. This turning moment tends to rotate the cylinder about its mounting bolts. If the cylinder is not well secured to the machine member on which it is mounted or the load is not well-guided, this turning moment results in side load applied to rod gland and piston bearings. **To avoid this problem, Style MS2 cylinders should be specified with a stroke length at least equal to the bore size.**

Side Tap Mount
NFPA Style MS4





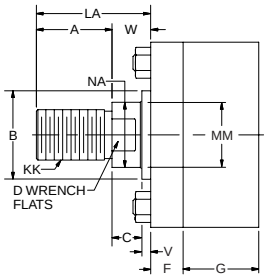


Style MS4 cylinders have side tapped holes for flush mounting, and are considered to be a fixed mount that does not absorb force on its centerline. The plane of the mounting surface is not through the centerline of the cylinder, and for this reason Style MS4 cylinders produce a turning moment as the cylinder applies force to the load. This turning moment tends to rotate the cylinder about its mounting bolts. If the cylinder is not well secured to the machine member on which it is mounted or the load is not well-guided, this turning moment results in side load applied to rod gland and piston bearings. **To avoid this problem, Style MS4 cylinders should be specified with a stroke length at least equal to the bore size.**

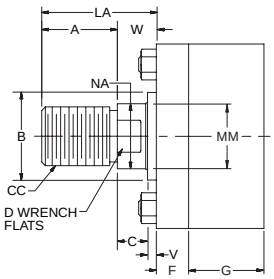
Rod End Dimensions for Full Face Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

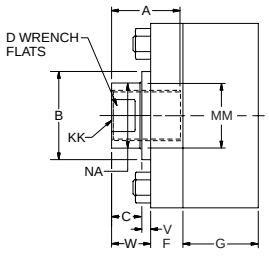
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

"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 and W. 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		F	G	J	K	L	NT	R	SB	ST	SU	SW	TN	TS	US	Add Stroke			
		NPTF⊖	SAE*															LG	P	SN	SS
1½	2½	½	10	⅜	1¾	1½	⅜	¾	⅜-16	1.63	7/16	½	15/16	⅜	¾	3¼	4	4⅝	2⅞	2⅞	3⅞
2	3	½	10	⅝	1¾	1½	7/16	1¼	½-13	2.05	9/16	¾	1¼	½	15/16	4	5	4⅝	2⅞	2⅞	3⅝
2½	3½	½	10	⅝	1¾	1½	7/16	1¼	⅝-11	2.55	13/16	1	1 9/16	11/16	1 5/16	4⅞	6¼	4¾	3	3	3⅜
3¼	4½	¾	12	¾	2	1¾	9/16	1½	¾-10	3.25	13/16	1	1 9/16	11/16	1½	5⅞	7¼	5½	3½	3½	4⅛
4	5	¾	12	⅞	2	1¾	9/16	2⅛	1-8	3.82	1 1/16	1¼	2	⅞	2 1/16	6¾	8½	5¾	3¾	3¾	4
5	6½	¾	12	⅞	2	1¾	13/16	2¼	1-8	4.95	1 1/16	1¼	2	⅞	2 15/16	8¼	10	6¼	4¼	4¼	4½
6	7½	1	16	1	2¼	2¼	⅞	2½	1¼-7	5.73	1 5/16	1½	2½	1⅛	3 5/16	9¾	12	7⅜	4⅞	5⅛	5⅛

* SAE straight thread ports are standard and are indicated by port number.

⊖ NPTF ports are available at no extra charge.

Table 2—Rod Dimensions

Bore	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions													
		Style 4 CC	Style 2 & 3 KK	A	+.000 -.002 B	C	D	LA	LAF	NA	RD (Max.)	RT	V	VF	VH	W	WF
1½	⅝	½-20	7/16-20	¾	1.124	⅜	½	–	1¾	9/16	1 15/16	⅜	¼	¼	3/16	–	1
	1	⅞-14	¾-16	1⅛	1.499	½	⅞	2⅛	2½	15/16	2⅜	⅜	½	½	3/16	1	1⅜
2	1	⅞-14	¾-16	1⅛	1.499	½	⅞	–	2½	15/16	2⅜	⅜	¼	½	3/16	–	1⅜
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	2⅝	3¼	1 5/16	2⅞	⅜	⅜	⅝	3/16	1	1⅝
2½	1	⅞-14	¾-16	1⅛	1.499	½	⅞	–	2½	15/16	2⅜	⅜	¼	½	3/16	–	1⅜
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1 5/16	2⅞	⅜	⅜	⅝	3/16	–	1⅝
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	½	½	3/16	–	1⅞
3¼	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1 5/16	2⅞	⅜	¼	⅝	3/16	–	1⅝
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	⅜	½	3/16	–	1⅞
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	⅜	½	¼	–	2
4	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	¼	½	3/16	–	1⅞
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	⅜	⅝	¼	–	2¼
5	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	3⅜	4¼	⅝	⅜	⅝	¼	–	2¼
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	⅜	5/16	–	–	2¼
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	2⅜	5 15/16	15/16	⅜	5/16	–	–	2¼
6	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	¼	⅝	¼	–	2¼
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	¼	5/16	–	–	2¼
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	3⅜	5 15/16	15/16	¼	5/16	–	–	2¼
	4	3¾-12	3-12	4	4.749	1	3⅜	–	6¼	3⅞	6 5/16	15/16	¼	5/16	–	–	2¼

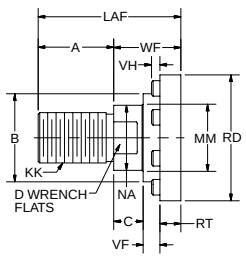
Table 3 — Envelope and Mounting Dimensions

Bore	ND	XS	XT	Y	Add Stroke ZB
1½	⅜	1⅜	2	2	6
	⅜	1¾	2⅜	2⅜	6⅜
2	7/16	1⅞	2⅜	2⅜	6 7/16
	7/16	2⅛	2⅝	2⅝	6 11/16
2½	½	2 1/16	2⅜	2⅜	6 9/16
	½	2 5/16	2⅝	2⅝	6 13/16
	½	2 9/16	2⅞	2⅞	7 1/16
3¼	11/16	2 5/16	2¾	2¾	7 11/16
	11/16	2 9/16	3	3	7 15/16
	11/16	2 11/16	3⅛	3⅛	8 1/16
4	11/16	2¾	3	3	8 3/16
	11/16	2⅞	3⅛	3⅛	8 5/16
	11/16	3⅛	3⅜	3⅜	8 9/16
5	1	2⅞	3⅛	3⅛	9 1/16
	1	3⅛	3⅜	3⅜	9 5/16
	1	3⅛	3⅜	3⅜	9 5/16
	1	3⅛	3⅜	3⅜	9 5/16
6	1¼	3⅜	3½	3½	10½
	1¼	3⅜	3½	3½	10½
	1¼	3⅜	3½	3½	10½
	1¼	3⅜	3½	3½	10½

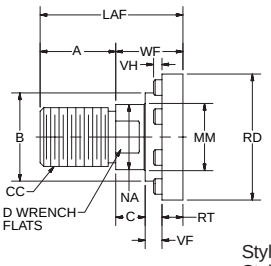
Rod End Dimensions for Bolted Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

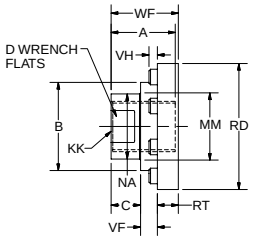
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

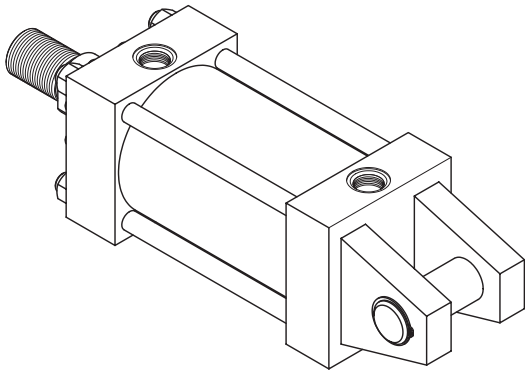
A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 2 rod ends are recommended through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

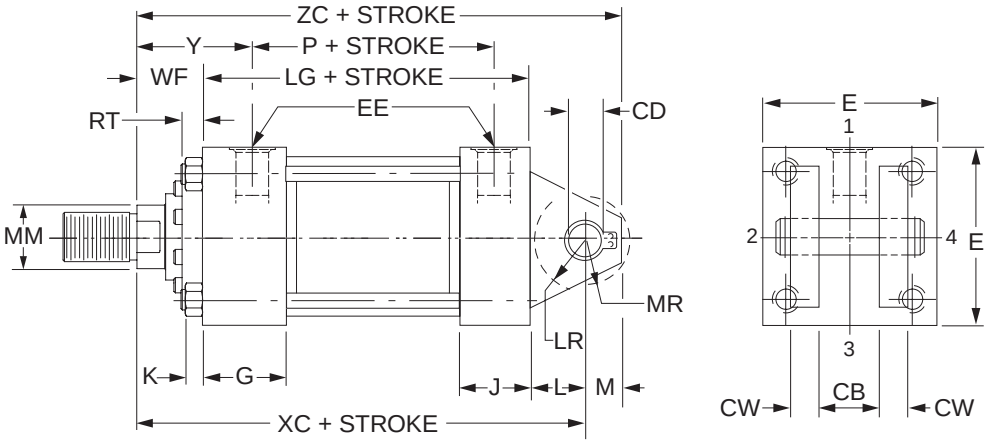
"Special" Thread Style 0

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

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

Cap Fixed Clevis Mount
NFPA Style MP1

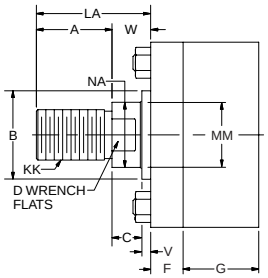




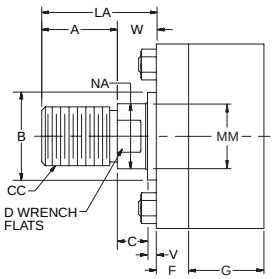
Rod End Dimensions for Full Face Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

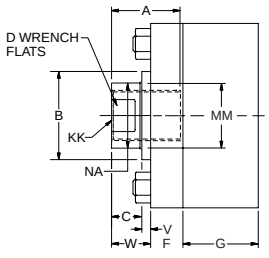
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

"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 and W. 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 -.002 CD†	CW	E	EE NPTF⊖	EE SAE*	F	G	J	K	L	LR	M	MR	Add Stroke LG	Add Stroke P
1½	¾	.501	½	2½	½	10	⅜	1¾	1½	⅜	¾	9/16	½	⅝	4⅝	2⅞
2	1¼	.751	⅝	3	½	10	⅝	1¾	1½	7/16	1¼	1	¾	15/16	4⅝	2⅞
2½	1¼	.751	⅝	3½	½	10	⅝	1¾	1½	7/16	1¼	15/16	¾	15/16	4¾	3
3¼	1½	1.001	¾	4½	¾	12	¾	2	1¾	9/16	1½	1¼	1	1 3/16	5½	3½
4	2	1.376	1	5	¾	12	⅞	2	1¾	9/16	2⅛	1¾	1⅜	1⅝	5¾	3¾
5	2½	1.751	1¼	6½	¾	12	⅞	2	1¾	13/16	2¼	2 1/16	1¾	2⅛	6¼	4¼
6	2½	2.001	1¼	7½	1	16	1	2¼	2¼	⅞	2½	2 5/16	2	2⅜	7⅜	4⅞

* SAE straight thread ports are standard and are indicated by port number.
⊖ NPTF ports are available at no extra charge.
† Dimension CD is pin diameter.

Table 2—Rod Dimensions

Bore	Rod Dia. MM	Thread Style 4 CC	Thread Style 2 & 3 KK	A	+.000 -.002 B	C	D	LA	LAF	NA	RD (Max.)	RT	V	VF	VH	W	WF
1½	⅝	½-20	7/16-20	¾	1.124	⅜	½	–	1¾	9/16	1 15/16	⅜	¼	¼	3/16	–	1
	1	⅞-14	¾-16	1⅛	1.499	½	⅞	2⅛	2½	15/16	2⅜	⅜	½	½	3/16	1	1⅜
2	1	⅞-14	¾-16	1⅛	1.499	½	⅞	–	2½	15/16	2⅜	⅜	¼	½	3/16	–	1⅜
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	2⅝	3¼	1⅝	2⅞	⅜	⅜	⅝	3/16	1	1⅝
2½	1	⅞-14	¾-16	1⅛	1.499	½	⅞	–	2½	15/16	2⅜	⅜	¼	½	3/16	–	1⅜
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1⅝	2⅞	⅜	⅜	⅝	3/16	–	1⅝
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	½	½	3/16	–	1⅞
3¼	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1⅝	2⅞	⅜	¼	⅝	3/16	–	1⅝
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	⅜	½	3/16	–	1⅞
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	⅜	½	¼	–	2
4	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	¼	½	3/16	–	1⅞
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	⅜	⅝	¼	–	2¼
5	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	3⅜	4¼	⅝	⅜	⅝	¼	–	2¼
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	⅜	5/16	–	–	2¼
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	2⅜	5 15/16	15/16	⅜	5/16	–	–	2¼
6	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	¼	⅝	¼	–	2¼
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	¼	5/16	–	–	2¼
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	3⅜	5 15/16	15/16	¼	5/16	–	–	2¼
	4	3¾-12	3-12	4	4.749	1	3⅜	–	6¼	3⅞	6 5/16	15/16	¼	5/16	–	–	2¼

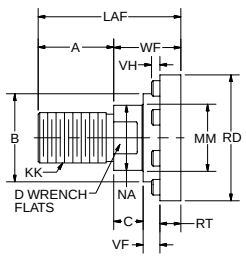
Table 3 — Envelope and Mounting Dimensions

Bore	Y	Add Stroke XC	Add Stroke ZC
1½	2	6⅜	6⅞
	2⅜	6¾	7¼
2	2⅜	7¼	8
	2⅝	7½	8¼
2½	2⅜	7⅜	8⅛
	2⅝	7⅝	8⅜
	2⅞	7⅞	8⅝
3¼	2¾	8⅝	9⅝
	3	8⅞	9⅞
	3⅛	9	10
4	3	9¾	11⅛
	3⅛	9⅞	11¼
	3⅜	10⅛	11½
5	3⅛	10½	12¼
	3⅜	10¾	12½
	3⅜	10¾	12½
	3⅜	10¾	12½
6	3½	12⅛	14⅛
	3½	12⅛	14⅛
	3½	12⅛	14⅛
	3½	12⅛	14⅛

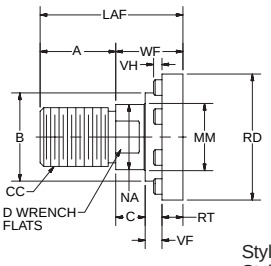
Rod End Dimensions for Bolted Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

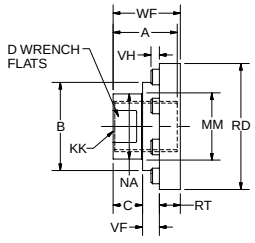
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

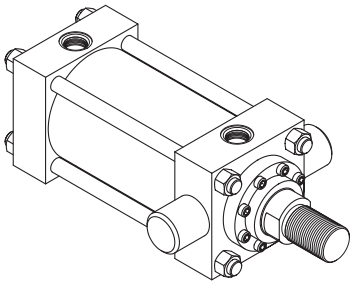
A high strength rod end stud is supplied on thread style 2 through 2" diameter rods. Larger sizes or special rod ends are cut threads. Style 2 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 2 rod ends are recommended through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

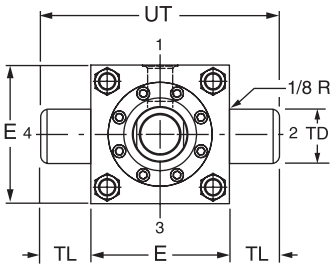
"Special" Thread Style 0

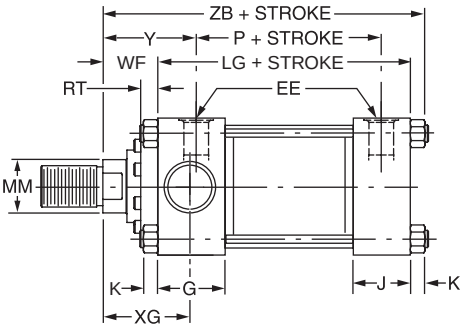
Special thread, extension, rod eye, blank, etc., are also available.

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

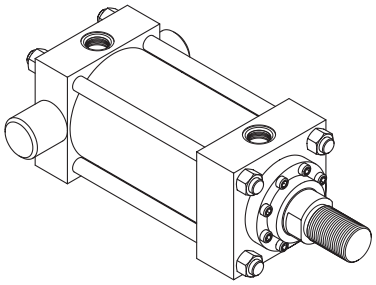
Head Trunnion Mount
NFPA Style MT1

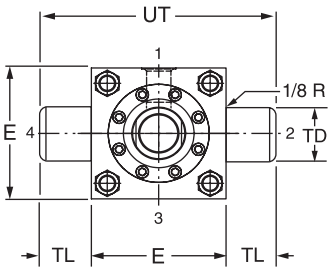


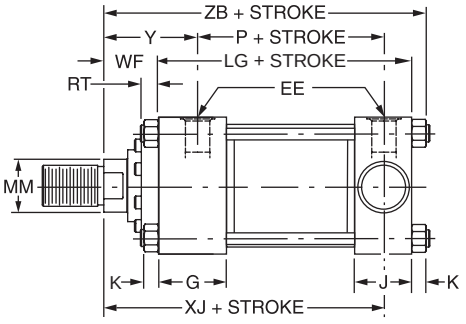




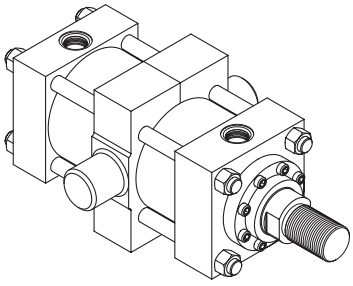
Cap Trunnion Mount
NFPA Style MT2

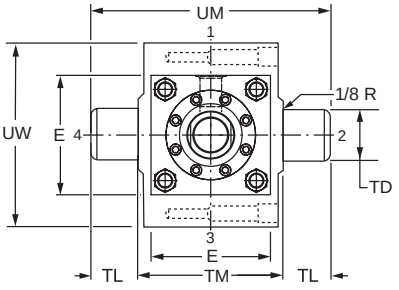


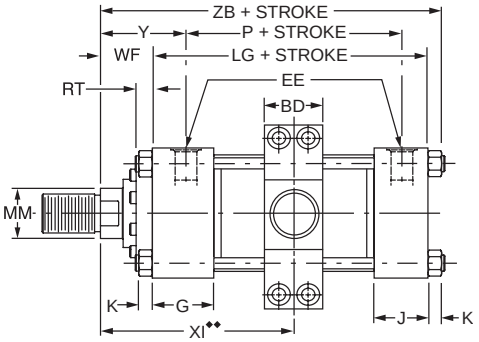




Intermediate Trunnion Mount
NFPA Style MT4





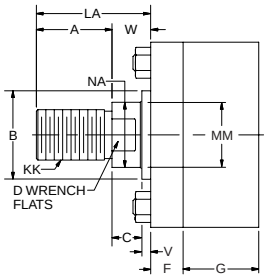


◆◆Dimension XI to be specified by customer.

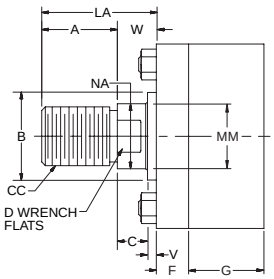
Rod End Dimensions for Full Face Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

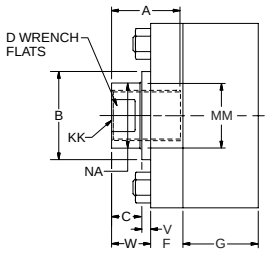
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

"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 and W. 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⊖	EE SAE*	F	G	J	K	+.000 -.001 TD	TL	TM	UM	UT	UW	Add Stroke LG	Add Stroke P	Style MT4 Minimum Stroke
1½	1¼	2½	½	10	⅜	1¾	1½	⅜	1.000	1	3	5	4½	3⅜	4⅝	2⅞	0
2	1½	3	½	10	⅝	1¾	1½	7/16	1.375	1⅜	3½	6¼	5¾	4⅛	4⅝	2⅞	¼
2½	1½	3½	½	10	⅝	1¾	1½	7/16	1.375	1⅜	4	6¾	6¼	4⅝	4¾	3	⅛
3¼	2	4½	¾	12	¾	2	1¾	9/16	1.750	1¾	5	8½	8	5 13/16	5½	3½	⅜
4	2	5	¾	12	⅞	2	1¾	9/16	1.750	1¾	5½	9	8½	6⅜	5¾	3¾	⅛
5	2	6½	¾	12	⅞	2	1¾	13/16	1.750	1¾	7	10½	10	7¾	6¼	4¼	0
6	3	7½	1	16	1	2¼	2¼	⅞	2.000	2	8½	12½	11½	10⅜	7⅜	4⅞	¼

* SAE straight thread ports are standard and are indicated by port number.
⊖ NPTF ports are available at no extra charge.

Table 2—Rod Dimensions

Bore	Rod Dia. MM	Thread Style 4 CC	Thread Style 2 & 3 KK	Rod Extensions and Pilot Dimensions A	+.000 -.002 B	C	D	LA	LAF	NA	RD (Max.)	RT	V	VF	VH	W	WF
1½	5/8	½-20	7/16-20	¾	1.124	⅜	½	–	1¾	9/16	1 15/16	⅜	¼	¼	3/16	–	1
	1	⅞-14	¾-16	1⅛	1.499	½	⅞	2⅛	2½	15/16	2⅜	⅜	½	½	3/16	1	1⅜
2	1	⅞-14	¾-16	1⅛	1.499	½	⅞	–	2½	15/16	2⅜	⅜	¼	½	3/16	–	1⅜
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	2⅝	3¼	1 5/16	2⅞	⅜	⅜	⅝	3/16	1	1⅝
2½	1	⅞-14	¾-16	1⅛	1.499	½	⅞	–	2½	15/16	2⅜	⅜	¼	½	3/16	–	1⅜
	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1 5/16	2⅞	⅜	⅜	⅝	3/16	–	1⅝
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	½	½	3/16	–	1⅞
3¼	1⅜	1¼-12	1-14	1⅝	1.999	⅝	1⅛	–	3¼	1 5/16	2⅞	⅜	¼	⅝	3/16	–	1⅝
	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	⅜	½	3/16	–	1⅞
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	⅜	½	¼	–	2
4	1¾	1½-12	1¼-12	2	2.374	¾	1½	–	3⅞	1 11/16	3 15/32	⅝	¼	½	3/16	–	1⅞
	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	⅜	⅝	¼	–	2¼
5	2	1¾-12	1½-12	2¼	2.624	⅞	1 11/16	–	4¼	1 15/16	3 23/32	⅝	¼	½	¼	–	2
	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	⅜	⅝	¼	–	2¼
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	⅜	5/16	–	–	2¼
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	3⅜	5 15/16	15/16	⅜	5/16	–	–	2¼
6	2½	2¼-12	1⅞-12	3	3.124	1	2 1/16	–	5¼	2⅜	4¼	⅝	¼	⅝	¼	–	2¼
	3	2¾-12	2¼-12	3½	3.749	1	2⅝	–	5¾	2⅞	5 7/16	⅞	¼	5/16	–	–	2¼
	3½	3¼-12	2½-12	3½	4.249	1	3	–	5¾	3⅜	5 15/16	15/16	¼	5/16	–	–	2¼
	4	3¾-12	3-12	4	4.749	1	3⅜	–	6¼	3⅞	6 5/16	15/16	¼	5/16	–	–	2¼

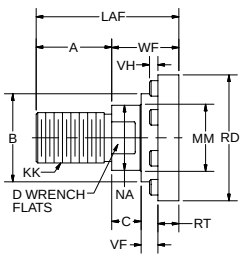
Table 3 — Envelope and Mounting Dimensions

Bore	XG	Min. XI ♦♦	Y	Add Stroke XJ	Add Stroke ZB
1½	1⅞	3 7/16	2	4⅞	6
	2¼	3 13/16	2⅜	5¼	6⅜
2	2¼	3 15/16	2⅜	5¼	6 7/16
	2½	4⅜6	2⅝	5½	6 11/16
2½	2¼	3 15/16	2⅜	5⅜	6 9/16
	2½	4⅜6	2⅝	5⅝	6 13/16
	2¾	4 7/16	2⅞	5⅞	7 1/16
3¼	2⅝	4 11/16	2¾	6¼	7 11/16
	2⅞	4 15/16	3	6½	7 15/16
	3	5 1/16	3⅛	5⅝	8 1/16
4	2⅞	4 15/16	3	6¾	8 3/16
	3	5 1/16	3⅛	6⅞	8 5/16
	3¼	5 5/16	3⅜	7⅛	8 9/16
5	3	5 1/16	3⅛	7⅜	9 1/16
	3¼	5 5/16	3⅜	7⅝	9 5/16
	3¼	5 5/16	3⅜	7⅝	9 5/16
	3¼	5 5/16	3⅜	7⅝	9 5/16
6	3⅜	6 1/16	3½	8⅜	10½
	3⅜	6 1/16	3½	8⅜	10½
	3⅜	6 1/16	3½	8⅜	10½
	3⅜	6 1/16	3½	8⅜	10½

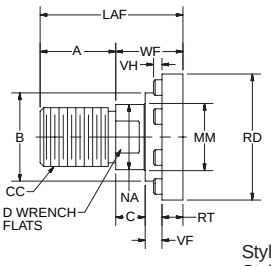
Rod End Dimensions for Bolted Retainers – See Table 2

See gland retainer style chart to determine which bore, rod and mount combinations have this feature.

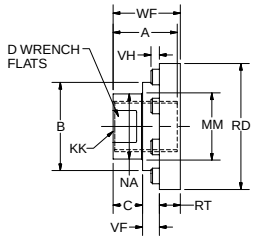
Thread Style 2
Small Male



Thread Style 4
Intermediate Male



Thread Style 3
Short Female



Style 3 stroke restrictions may apply. See Style 3 Minimum Stroke page for details.

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.

"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 and WF. If otherwise special, furnish dimensioned sketch.

Spherical Bearing Mounting – Style MPU3

Bore Ø	Maximum Operating psi[1]
1.50	1500
2.00	2200
2.50	1450
3.25	1500
4.00	1850
5.00	2000
6.00	1800

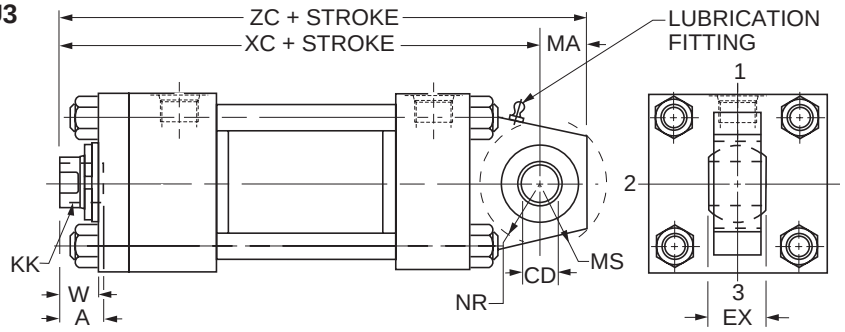


Table 1 — Dimensional and Mounting Data

Bore Ø	Rod No.	MM Rod Ø	Thread		A	CD[2] Ø	EX	MA	MS	NR	W	Add Stroke	
			Style 9 KK[3]	Style 7 KK[3]								XC	ZC
1.50	1 (Std.)	0.625	7/16-20	—	0.75	-.0005 .5000	0.44	0.75	0.94	0.63	0.63	6.38	7.13
	2	1.000	—	7/16-20	0.75						1.00	6.75	7.50
2.00	1 (Std.)	1.000	3/4-16	—	1.13	-.0005 .7500	0.66	1.00	1.38	1.00	0.75	7.25	8.25
	2	1.375	—	3/4-16	1.13						1.00	7.50	8.50
2.50	1 (Std.)	1.000	3/4-16	—	1.13	-.0005 .7500	0.66	1.00	1.38	1.00	0.75	7.38	8.38
	2	1.750	—	3/4-16	1.13						1.25	7.88	8.88
	3	1.375	—	3/4-16	1.13						1.00	7.63	8.63
3.25	1 (Std.)	1.375	1-14	—	1.63	-.0005 1.0000	0.88	1.25	1.69	1.25	0.88	8.63	9.88
	2	2.000	—	1-14	1.63						1.25	9.00	10.25
	3	1.750	—	1-14	1.63						1.13	8.88	10.13
4.00	1 (Std.)	1.750	1 1/4-12	—	2.00	-.0005 1.3750	1.19	1.88	2.44	1.63	1.00	9.75	11.63
	2	2.500	—	1 1/4-12	2.00						1.38	10.13	12.00
	3	2.000	—	1 1/4-12	2.00						1.13	9.88	11.75
5.00	1 (Std.)	2.000	1 1/2-12	—	2.25	-.0005 1.7500	1.53	2.50	2.88	2.06	1.13	10.50	13.00
	2	3.500	—	1 1/2-12	2.25						1.38	10.75	13.25
	3	2.500	—	1 1/2-12	2.25						1.38	10.75	13.25
	4	3.000	—	1 1/2-12	2.25						1.38	10.75	13.25
6.00	1 (Std.)	2.500	1 7/8-12	—	3.00	-.0005 2.0000	1.75	2.50	3.31	2.38	1.25	12.13	14.63
	2	4.000	—	1 7/8-12	3.00						1.25	12.13	14.63
	3	3.000	—	1 7/8-12	3.00						1.25	12.13	14.63
	4	3.500	—	1 7/8-12	3.00						1.25	12.13	14.63

Note: for additional dimensions see Series PH-2 NFPA MP1 mount.

[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.

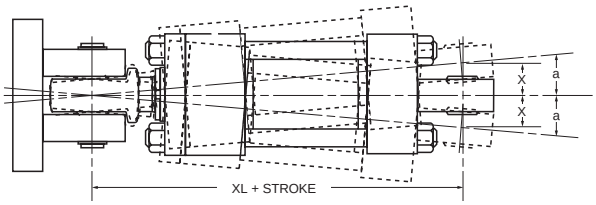
[2] Dimension "CD" is hole diameter.

[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 PH-2 mounting accessories for detailed information.

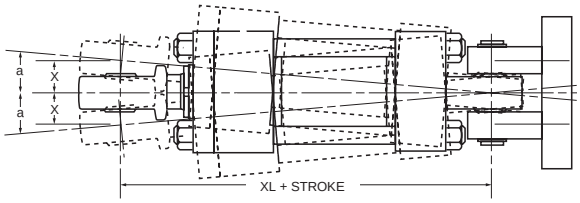
Mounting Information

Recommended maximum swivel angle on each side of the cylinder centerline.

Head End Mounting



Cap End Mounting



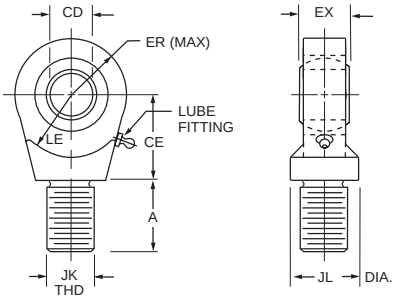
Bore	Head End Mounted		Cap End Mounted	
	Angle a	Tan. of a	Angle a	Tan. of a
1½	2°	.035	2°	.035
2	2½°	.044	4½°	.079
2½	2½°	.044	4½°	.079
3¼	3°	.052	3°	.052
4	2½°	.044	3°	.052
5	3°	.052	3°	.052
6	3°	.052	3°	.052

Note: Dimension X is the maximum off center mounting of the cylinder. To determine dimension X for various stroke lengths multiply the distance between pivot pin holes by tangent of angle a. For extended position use X = XL + 2X stroke.

Schrader Bellows
Des Plaines, IL USA

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.

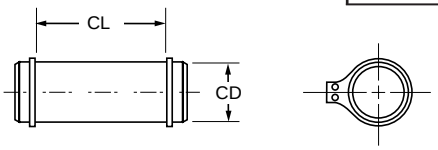
Spherical Rod Eye



Bore Sizes	PH-2 Series	1 1/2	2 & 2 1/2	3 1/4	4	5	6
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	11/16	1	1 1/2	2	2 1/8	2 7/8
	CE	7/8	1 1/4	1 7/8	2 1/8	2 1/2	2 3/4
	EX	7/16	21/32	7/8	1 3/16	1 17/32	1 3/4
	ER	7/8	1 1/4	1 3/8	1 13/16	2 3/16	2 5/8
	LE	3/4	1 1/16	1 7/16	1 7/8	2 1/8	2 1/2
	JK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
	JL	7/8	1 5/16	1 1/2	2	2 1/4	2 3/4
	LOAD CAPACITY LBS.	2644	9441	16860	28562	43005	70193

Order to fit Piston Rod Thread Size.

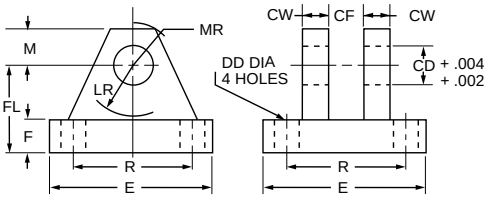
Pivot Pin



Bore Sizes	PH-2 Series	1 1/2	2 & 2 1/2	3 1/4	4	5	6
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	1 9/16	2 1/32	2 1/2	3 5/16	4 7/32	4 15/16
	SHEAR CAPACITY LBS.	8600	19300	34300	65000	105200	137400

Pivot Pins are furnished with (2) Retainer Rings.

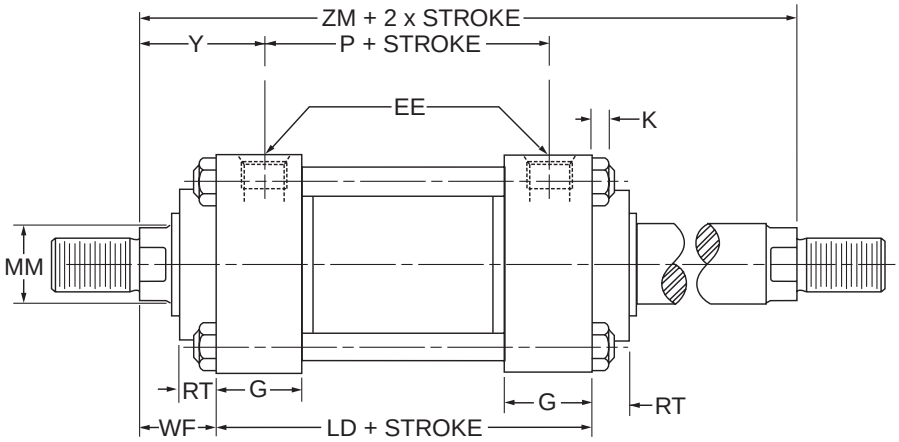
Clevis Bracket



Bore Sizes	PH-2 Series	1 1/2	2 & 2 1/2	3 1/4	4	5	6
Clevis Bracket	Part No.	0839470000	0839480000	0839490000	0839500000	0839510000	0839520000
	CD	1/2	3/4	1	1 3/8	1 3/4	2
	CF	7/16	21/32	7/8	1 3/16	1 17/32	1 3/4
	CW	1/2	5/8	3/4	1	1 1/4	1 1/2
	DD	13/32	17/32	17/32	21/32	29/32	29/32
	E	3	3 3/4	5 1/2	6 1/2	8 1/2	10 5/8
	F	1/2	5/8	3/4	7/8	1 1/4	1 1/2
	FL	1 1/2	2	2 1/2	3 1/2	4 1/2	5
	LR	15/16	1 3/8	1 11/16	2 7/16	2 7/8	3 5/16
	M	1/2	7/8	1	1 3/8	1 3/4	2
	MR	5/8	1	1 3/16	1 5/8	2 1/16	2 3/8
	R	2.05	2.76	4.10	4.95	6.58	7.92
	LOAD CAPACITY LBS.	5770	9450	14300	20322	37800	50375

Order to fit Cap or Rod Eye.

How to Use Double Rod Cylinder Dimension Drawings



Bore	Rod Dia. MM	Add Stroke			Add 2X Stroke
		LD	Style MDS4 SN	Style MDS2 SS	ZM
1 1/2	5/8	4 7/8	2 7/8	4 1/8	6 7/8
2	1	4 7/8	2 7/8	3 7/8	7 5/8
2 1/2	1	5	3	3 5/8	7 3/4
3 1/4	1 3/8	5 3/4	3 1/2	4 3/8	9
4	1 3/4	6	3 3/4	4 1/4	9 3/4
5	2	6 1/2	4 1/4	4 3/4	10 1/2
6	2 1/2	7 3/8	4 7/8	5 1/8	11 7/8

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, supplement the single rod dimensions with those shown on drawing and dimension table. 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 pos. 2, 3 or 4 when viewed from one end only.

All dimensions are in inches and apply to smallest 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.

Gland Retainer Styles

Bore	Rod Dia.	MX2, MF2, MF6, ME6, MS2, MS4, MT1, MT2, MT4, MP1, MPU3	MX1, MX3	MF1, MF5	ME5
1 1/2	5/8	B	R	R	B
	1	R	R	R	B
2	1	B	R	R	B
	1 3/8	R	R	R	B
2 1/2	1	B	B	B	B
	1 3/8	B	B	B	B
	1 3/4	B	B	R	B
3 1/4	1 3/8	B	B	B	B
	1 3/4	B	B	B	B
	2	B	B	B	B
4	1 3/4	B	B	B	B
	2	B	B	B	B
	2 1/2	B	B	B	B
5	2	B	B	B	B
	2 1/2	B	B	B	B
	3	B	B	B	B
	3 1/2	B	B	R	B
6	2 1/2	B	B	B	B
	3	B	B	B	B
	3 1/2	B	B	B	B
	4	B	B	B	B

The chart at left specifies the gland retainer construction – Bolted Retainer or Full Face Retainer – that will be supplied based on the bore, rod diameter and mounting combination selected in the cylinder model number.

Rod Gland Construction
B = Bolted Retainer
R = Full Face Retainer

Linear Alignment Couplers are available in 12 standard thread sizes...

Cost Saving Features and Benefits Include:

- Maximum reliability for trouble-free operation, long life and lower operating costs
- Increased cylinder life by reducing wear on piston and rod bearings
- Simplified cylinder installation and reduced assembly costs
- Increased rod bearing and rod seal life for lower maintenance costs

Alignment Coupler

See Table 1 for Part Numbers and Dimensions

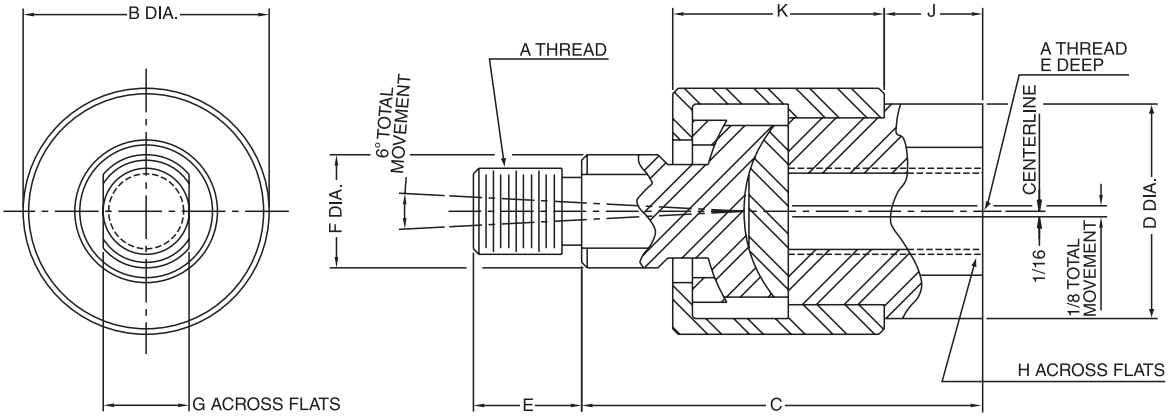


Table 1 — Part Numbers and Dimensions

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

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

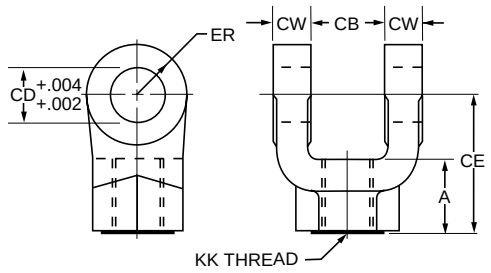
The various accessories have been load rated for your convenience. The load Capacity in lbs. Is the recommended maximum load for that accessory based on a 4:1 design factor in tension. (Pivot Pin is rated in shear.) Before specifying, compare the actual load or the tension (pull) force at maximum operating 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

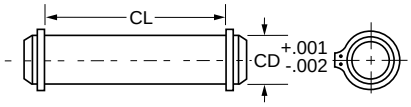
† Includes pivot pin.

* 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



Pivot Pin 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

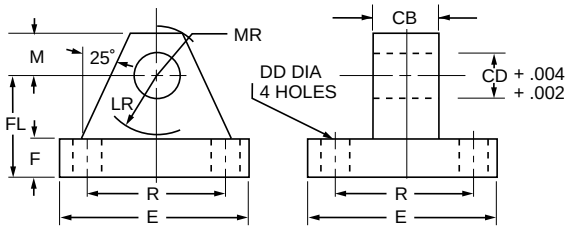
‡Consult appropriate cylinder rod end dimensions for compatibility.

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	–
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"
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	2", 2 1/2"
*0853610000	1 1/2	1	21/32	4 1/2	7/8	2 3/8	1 1/2	1	1 1/4	3.25	3 1/4"
0691980000	2	1 3/8	21/32	5	7/8	3	2 1/8	1 3/8	1 5/8	3.82	4"
*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	5"
*0853630000	2 1/2	2	1 1/16	7 1/2	1 1/2	4	2 1/2	2	2 7/16	5.73	6"
*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.

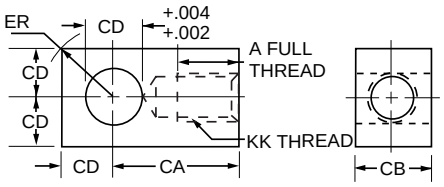
Accessory Load Capacity

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.

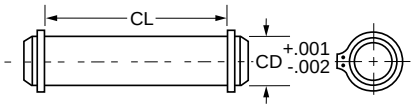
Thread Size	Knuckle		Clevis Bracket		Pivot Pin	
	Part Number	Load Capacity (Lbs.)	Part Number	Load Capacity (Lbs.)	Part Number	Shear Capacity (Lbs.)
5/16-24	0740750000	3300	0740760000	3600	0740780000	6600
7/16-20	0690890000	5000	0692050000	7300	0683680000	8600
1/2-20	0690900000	5700	0692050000	7300	0683680000	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



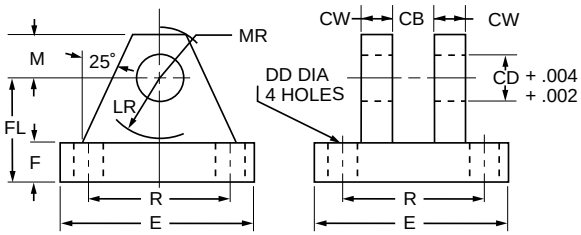
Part Number	A	CA	CB	CD	ER	KK
0740750000	3/4	1 1/2	7/16	7/16	19/32	5/16-24
0690890000	3/4	1 1/2	3/4	1/2	23/32	7/16-20
0690900000	3/4	1 1/2	3/4	1/2	23/32	1/2-20
0690910000	1 1/8	2 1/16	1 1/4	3/4	1 1/16	3/4-16
0690920000	1 1/8	2 3/8	1 1/2	1	1 7/16	7/8-14
0690930000	1 5/8	2 13/16	1 1/2	1	1 7/16	1-14
0690940000	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

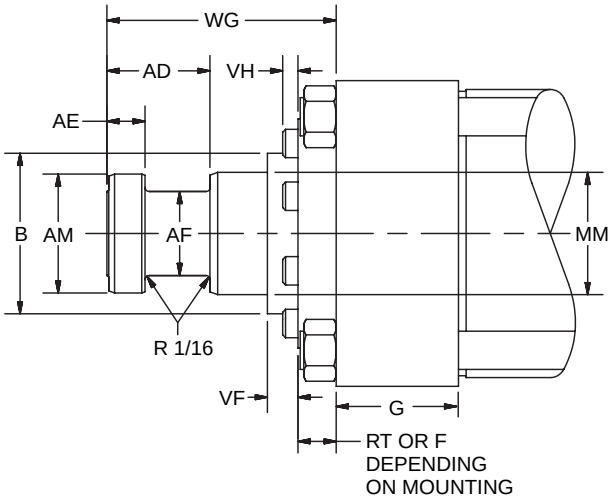
Cylinder accessory dimensions conform to NFPA recommended standard NFPT/T3.6.8 R1-1984, NFPA recommended standard fluid power systems - cylinder - dimensions for accessories for cataloged square head industrial cylinders.

Schrader Bellows "Style 6" Piston Rod End

Rod end flange coupling for Schrader Bellows PH-2 Series Hydraulic Cylinders

- Simplifies alignment
- Reduces assembly time
- Allows full rated hydraulic pressure in push and pull directions

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	15/16	3/8	11/16	.95	2 3/8
1 3/8	1 1/16	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

See Cylinder Catalog for B, F, G, RT, VF and VH per bore and rod diameter.

Consult Factory for availability of mounting accessories and Hardware.

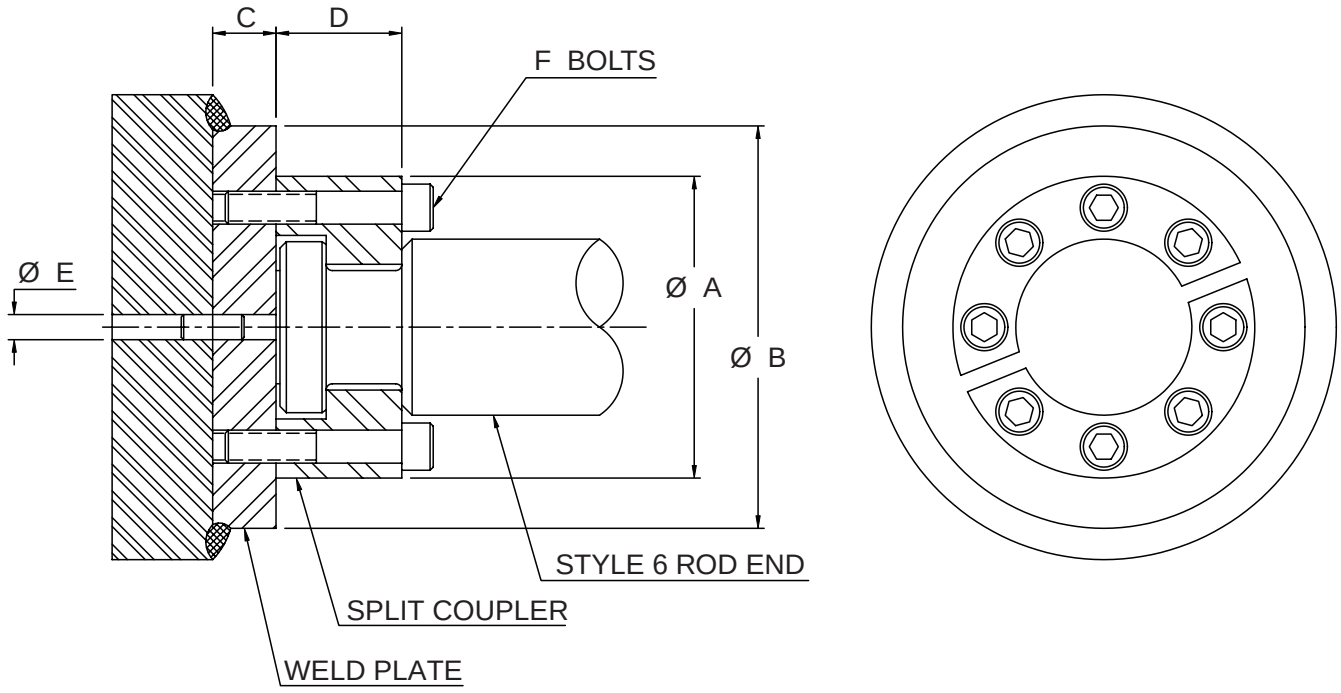
How To Order

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

Example: PHEA3216<u>6</u>5x12.0

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.
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 3/8	2.50	3.00	.63	1.00	.250	6	.312-18 x 1.50 LG	2.000	1472340138	1481740138
1 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 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 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

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

How to Order PH-2 Series Cylinders

When ordering PH-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.

Lipseal™ Piston (if desired): Schrader Bellows Lipseal™ pistons are offered as an option at no extra cost in the PH-2 Series cylinders. With this feature, zero leakage under static holding conditions is attained. Hi Load piston seals are available for an additional charge.

Fluid Medium: PH-2 Series hydraulic cylinders are equipped with seals for use with hydraulic oil. If other than hydraulic oil will be used, specify class of fluid (See Catalog section C.)

Water Service Modifications

When requested, Schrader Bellows can supply PH-2 Series cylinders with standard modifications that make the cylinders suitable for use with water as the fluid medium. The modifications include chrome-plated cylinder bore; electroless nickel-plated, non-wearing internal surfaces; Lipseal style piston, Buna N Seals and chrome-plated, precipitation hardened stainless steel piston rod.

Warranty – Schrader Bellows will warrant Series PH-2 cylinders modified for water or high water content fluid service to be free of defects in materials or workmanship, but cannot accept responsibility for premature failure due to excessive wear resulting from lack of lubricity, where failure is caused by corrosion, electrolysis or mineral deposits within the cylinder.

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 PH-2 series cylinders the following make-up Class 1 Seals:
Primary Piston Rod Seal – Enhanced Polyurethane
Piston Rod Wiper – Nitrile
Piston Seals – Nitrile lipseals with polymyte back-up washers
Option – Nitrile lipseals with polymyte back-up washers
Option – Hi-Load. Filled P.T.F.E. seals with a nitrile expander
O-Rings – Nitrile (nitrile back-up washer when used)

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.

Certified Dimensions

Schrader Bellows Industrial Cylinder Division 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

How To Order By Model Number

PH-2 Hydraulic 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 and port specification.

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. Piston rings standard, Lip Seals optional.

6. Stroke Length
It is necessary to specify the stroke length desired following the Model Number. For example: PHAA00823 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 hydraulic cylinder, 1-1/2" bore size, 5/8" piston rod diameter, side lug mount, cushioned both ends, with a small male rod thread, Piston Rings with Buna N Seals, a 6" stroke, and S.A.E. Ports.

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: PHAA00823S 6" Stroke
Ports to be position 2.

1 Type	Model Number: PH-2 Series Hydraulic
Single Rod End with SAE Straight Thread Ports	PH
Double Rod End with SAE Straight Thread Ports	PJ
Single Rod End with NPTF Ports	PF
Double Rod End with NPTF Ports	PK
Single End with SAE Flange Ports*	PX
Double End with SAE Flange Ports*	PY

*SAE Flange Ports not available in 1 1/2" & 2" bore sizes.

2 Bore Size	Rod Dia.	Model Number Code	Bore Size	Rod Dia.	Model Number Code
1 1/2"	5/8"	AA0	4"	1 3/4"	EA3
	1"	AA1		2"	EA4
2"	1"	BA1		2 1/2"	EA5
	1 3/8"	BA2	5"	2"	FA4
2 1/2"	1"	CA1		2 1/2"	FA5
	1 3/8"	CA2		3"	FA6
	1 3/4"	CA3		3 1/2"	FA7
3 1/4"	1 3/8"	DA2	6"	2 1/2"	GA5
	1 3/4"	DA3		3"	GA6
	2"	DA4		3 1/2"	GA7
				4"	GA8

3 Mounting Style	NFPA Style	Model Number Code: 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	MF1	21	22	23	24
Cap Rectangular Flange	MF2	25	26	27	28
Head Square Flange	MF5	29	30	31	32
Cap Square Flange	MF6	33	34	35	36
Head Rectangular	ME5	45	46	47	48
Cap Rectangular	ME6	49	50	51	52
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
Buna N Seals w/Piston Rings	3
Fluorocarbon Seals w/Piston Rings	4
Buna N with Hi-Load	5
Fluorocarbon with Hi-Load	6
High Water Content	7

6 Specify Stroke Length	6.00"

**Piston Rings are recommended for maximum seal life, but slight hydraulic bypass should be expected.

Model Number Example:

PH AA0 08 2 3 W/6" Stroke

NOTES