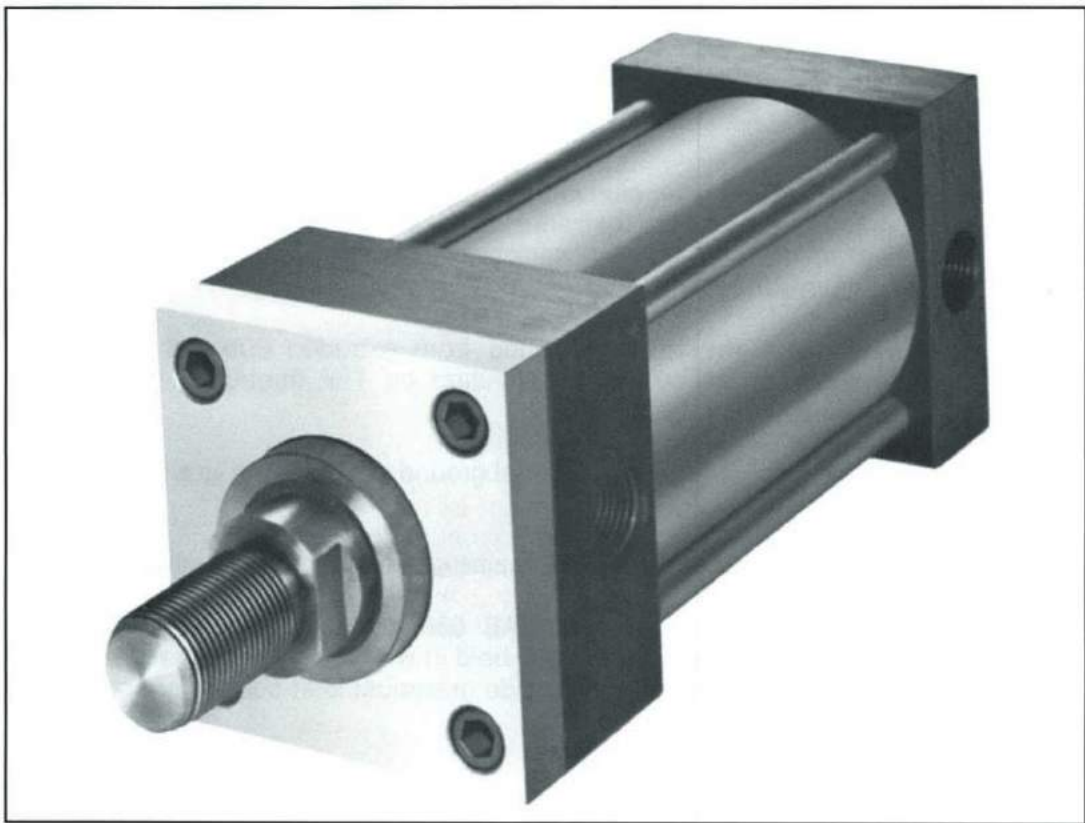
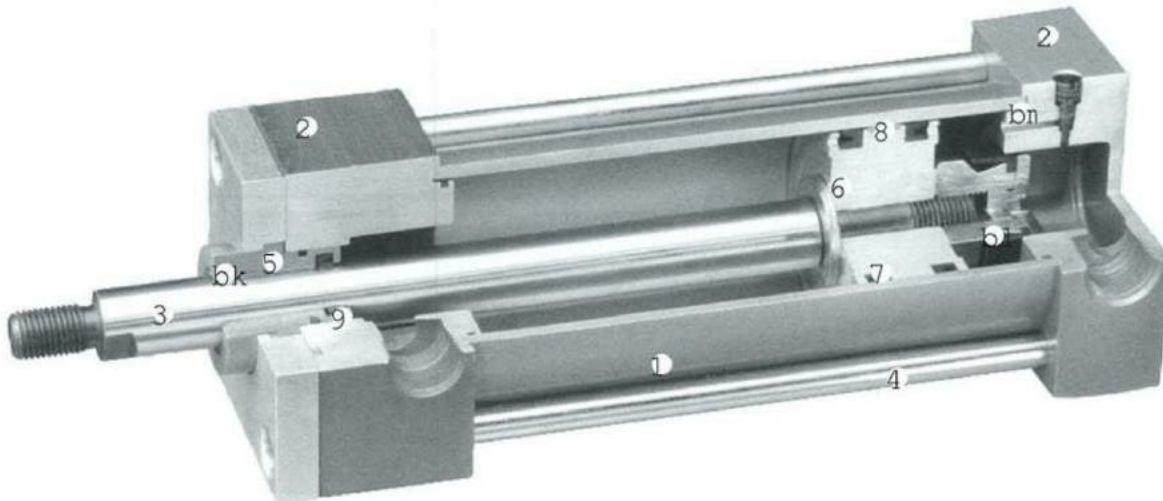


SERIES I



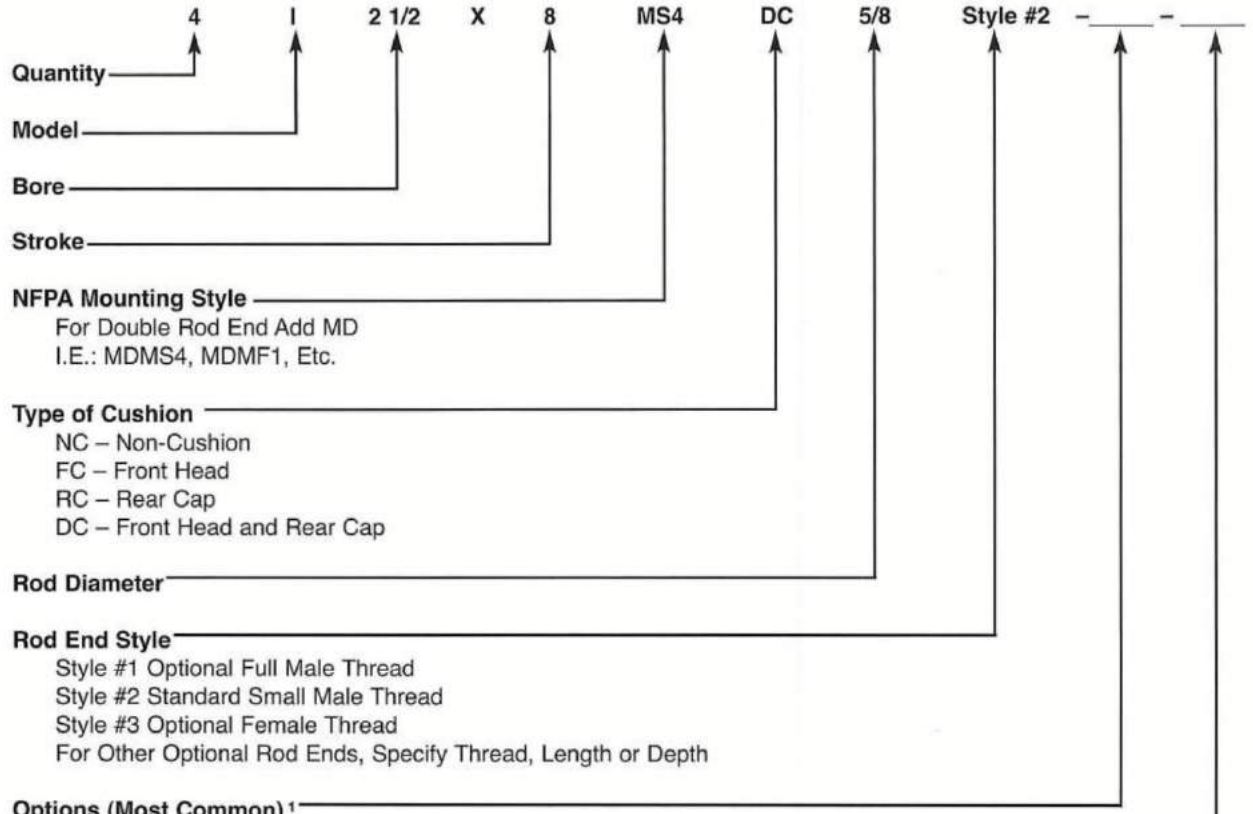
NFPA Interchangeable
1 1/2" - 8" Bores
250 PSI Pneumatic
250 PSI Non-Shock Hydraulic



SERIES I MATERIAL AND DESIGN SPECIFICATIONS

1. **Tube:** 6063-T832 grade aluminum alloy with hard coated I.D. This anodic coating provides extreme hardness, excellent wear, low coefficient of friction, and high corrosion resistance to ensure longer, trouble-free cycle life.
2. **Head and Cap:** Precision machined from extruded 6061-T6 grade aluminum alloy. Hard coated as standard on 1½" through 5" bores. (Optional on 6" and 8" bores.)
3. **Piston Rod:** Hard chrome plated steel ground and polished to a smooth finish.
4. **Tie Rods:** High strength 1215 grade zinc clear chromate plated steel.
5. **Rod Bushing:** Continuous cast SAE 660 grade bronze bushing is piloted into the head and is securely held in with an aluminum retaining plate (1½" through 5" bores) to provide maximum load bearing support.
6. **Piston:** High grade aluminum alloy.
7. **Piston Seals:** Block-Vee type, Buna N material is furnished as standard.
8. **Piston Bearing Strip:** A low friction, dimensionally stable nylon wear band constitutes an excellent bearing surface.
9. **Rod Seal:** Block-Vee type is self-adjusting to ensure proper seal.
10. **Rod Wiper:** Lip type urethane seal cleans piston rod and prevents foreign particles from entering cylinder.
11. **Cushion:** Self-adjusting urethane cup moves into the head/cap to insure a positive seal and allows air to meter across the cushion screw. This method provides a fast breakaway and more precise adjustment. (Optional)
12. **Tube Seal:** Buna N "O" ring in head and cap provides tight seal.

ORDERING INSTRUCTIONS FOR SERIES I CYLINDERS



NFPA Mounting Style
For Double Rod End Add MD
I.E.: MDMS4, MDMF1, Etc.

Type of Cushion
NC – Non-Cushion
FC – Front Head
RC – Rear Cap
DC – Front Head and Rear Cap

Rod Diameter

Rod End Style
Style #1 Optional Full Male Thread
Style #2 Standard Small Male Thread
Style #3 Optional Female Thread
For Other Optional Rod Ends, Specify Thread, Length or Depth

- Options (Most Common)**¹
- 416SS Rod
 - 303SS Rod, Tie Rods, & Nuts
 - M - Magno Piston (Required for Reed Switch Operation)
 - H - Poly Pak Rod Seal (Required for Hydraulic Application)
 - NL - Non-Lube (Teflon Bearing Strip Inside Rod Bushing)
 - PL - Pre-Lube (Moly Coat Spray)
 - HC - Hard Coat (1 1/2" - 5" Bore) Retainer Plate & Piston, (6" & 8" Bore) Head, Cap & Piston
 - CCR - Complete Corrosion Resistance (Hard Coat Option, Plus 303SS Rod, Tie Rods, & Nuts)
 - V - Viton Seals
 - MRW- Metallic Rod Wiper (Do not use with stainless steel rod.)
 - SR - Spring Return or SE - Spring Extend
 - P - Phenolic Rod Bushing
 - Rod Boot
 - Bumpers² (Specify Front Head, Rear Cap, or Both Ends)
 - E - Epoxy Paint
 - AS - Adjustable Stroke

Cylinder Accessories

Ports at Position #1 and MS4 (Side Tapped) at Position #3 are standard in all cylinders.
Cushion Screw at Position #4 is standard.

Note: If not specified, AAC will assume cylinder desired is MS4 mount, non-cushion, standard rod diameter and rod end style, hard chrome plated steel rod, Buna N seals, and ports at #1.

¹ Consult factory for other options not listed.
² Bumpers increase cylinder length. Consult factory.

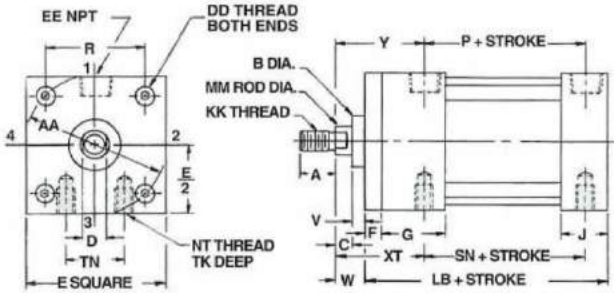
SERIES I CYLINDER DIMENSIONS

BORE	1½		2		2½		3¼		4		5		6		8	
ROD DIA.	5/8	5/8	1	5/8	1	5/8	1	1 3/8	1	1 3/8	1	1 3/8	1 3/8	1½	1 3/8	1½
A	¾	¾	1 1/8	¾	1 1/8	1 1/8	1 5/8	1 1/8	1 5/8	1 1/8	1 5/8	1 5/8	2	1 5/8	2	
AA	2.02	2.60	2.60	3.10	3.10	3.90	3.90	4.70	4.70	5.80	5.80	6.90	6.90	9.10	9.10	
AB	7/16	7/16	7/16	7/16	7/16	9/16	9/16	9/16	9/16	1 1/16	1 1/16	—	—	—	—	
AH	1 3/16	1 7/16	1 7/16	1 5/8	1 5/8	1 15/16	1 15/16	2 1/4	2 1/4	2 3/4	2 3/4	—	—	—	—	
AL	1	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 3/8	1 3/8	—	—	—	—	
AO	½	½	½	½	½	½	½	½	½	5/8	5/8	—	—	—	—	
AT	3/16	3/16	3/16	3/16	3/16	¼	¼	¼	¼	¼	¼	—	—	—	—	
B	1 1/8	1 1/8	1 1/2	1 1/8	1 1/2	1 1/2	2	1 1/2	2	1 1/2	2	2	2	2	2	
BB	1	1 1/8	1 1/8	1 1/8	1 1/8	1 3/8	1 3/8	1 3/8	1 3/8	1 13/16	1 13/16	1 13/16	1 13/16	2 5/16	2 5/16	
BD	1	1 3/16	1 3/16	1 3/16	1 3/16	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	—	—	
C	3/8	3/8	½	3/8	½	½	5/8	½	5/8	½	5/8	15/16	1 9/16	1 5/16	1 9/16	
CB	¾	¾	¾	¾	¾	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	
CD	½	½	½	½	½	¾	¾	¾	¾	¾	¾	1	1	1	1	
CW	½	½	½	½	½	5/8	5/8	5/8	5/8	5/8	5/8	¾	¾	¾	¾	
D	½	½	7/8	½	7/8	7/8	1 1/8	7/8	1 1/8	7/8	1 1/8	1 1/4	1 1/4	1 1/4	1 1/4	
DD	¼-28	5/16-24	5/16-24	5/16-24	5/16-24	3/8-24	3/8-24	3/8-24	3/8-24	½-20	½-20	½-20	½-20	5/8-18	5/8-18	
E	2	2 1/2	2 1/2	3	3	3 3/4	3 3/4	4 1/2	4 1/2	5 1/2	5 1/2	6 1/2	6 1/2	8 1/2	8 1/2	
EB	5/16	3/8	3/8	3/8	3/8	7/16	7/16	7/16	7/16	9/16	9/16	—	—	—	—	
EE	3/8	3/8	3/8	3/8	3/8	½	½	½	½	½	½	¾	¾	¾	¾	
EL	¾	1 5/16	1 5/16	1 1/16	1 1/16	7/8	7/8	1	1	1 1/16	1 1/16	—	—	—	—	
EO	1 1/32	5/16	5/16	5/16	5/16	3/8	3/8	3/8	3/8	½	½	—	—	—	—	
ET	9/16	1 1/16	1 1/16	¾	¾	1	1	1 1/8	1 1/8	1 3/8	1 3/8	—	—	—	—	
F	3/8	3/8	3/8	3/8	3/8	5/8	5/8	5/8	5/8	5/8	5/8	¾	¾	—	—	
FB	5/16	3/8	3/8	3/8	3/8	7/16	7/16	7/16	7/16	9/16	9/16	9/16	9/16	1 1/16	1 1/16	
G	1 3/8	1 3/8	1 3/8	1 3/8	1 3/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	2	2	2	2	
J	1	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	
K	5/32	3/16	3/16	3/16	3/16	7/32	7/32	7/32	7/32	5/16	5/16	5/16	5/16	3/8	3/8	
KK	7/16-20	7/16-20	¾-16	7/16-20	¾-16	¾-16	1-14	¾-16	1-14	¾-16	1-14	1-14	1 1/4-12	1-14	1 1/4-12	
KK-1	5/8-18	5/8-18	1-14	5/8-18	1-14	1-14	1 3/8-12	1-14	1 3/8-12	1-14	1 3/8-12	1 3/8-12	1 1/2-12	1 3/8-12	1 1/2-12	
L	¾	¾	¾	¾	¾	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 7/16	1 7/16	
LB	4	4	4	4 1/8	4 1/8	4 7/8	4 7/8	4 7/8	4 7/8	5 1/8	5 1/8	5 1/8	5 1/8	5 1/4	5 1/4	
LD	4 7/8	4 7/8	4 7/8	5	5	6	6	6	6	6 1/4	6 1/4	5 5/8	5 5/8	5 3/4	5 3/4	
LR	9/16	9/16	9/16	9/16	9/16	1	1	1	1	1	1	1 1/4	1 1/4	1 1/4	1 1/4	
M	½	½	½	½	½	¾	¾	¾	¾	¾	¾	1	1	1	1	
MM	5/8	5/8	1	5/8	1	1	1 3/8	1	1 3/8	1	1 3/8	1 3/8	1 1/2	1 3/8	1 1/2	
MR	½	½	½	½	½	7/8	7/8	1 5/16	1 5/16	1 5/16	1 5/16	1 5/16	1 5/16	1 5/16	1 5/16	
NT	¼-20	5/16-18	5/16-18	3/8-16	3/8-16	½-13	½-13	½-13	½-13	5/8-11	5/8-11	¾-10	¾-10	¾-10	¾-10	
P	2 1/4	2 1/4	2 1/4	2 3/8	2 3/8	2 5/8	2 5/8	2 5/8	2 5/8	2 7/8	2 7/8	3 1/8	3 1/8	3 1/4	3 1/4	
R	1.43	1.84	1.84	2.19	2.19	2.76	2.76	3.32	3.32	4.10	4.10	4.88	4.88	6.44	6.44	
S	1 1/4	1 3/4	1 3/4	2 1/4	2 1/4	2 3/4	2 3/4	3 1/2	3 1/2	4 1/4	4 1/4	—	—	—	—	
SA	6	6	6	6 1/8	6 1/8	7 3/8	7 3/8	7 3/8	7 3/8	7 7/8	7 7/8	—	—	—	—	

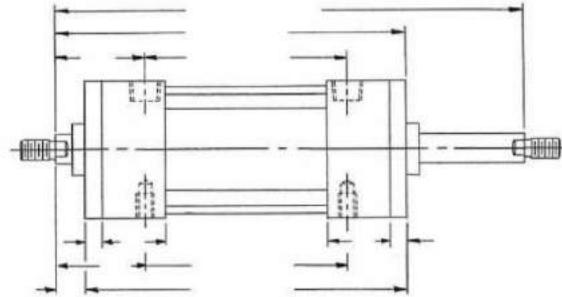
SERIES I CYLINDER DIMENSIONS

BORE	1½	2		2½		3¼		4		5		6		8	
ROD DIA.	5/8	5/8	1	5/8	1	1	1¾	1	1¾	1	1¾	1¾	1½	1¾	1½
SB	7/16	7/16	7/16	7/16	7/16	9/16	9/16	9/16	9/16	13/16	13/16	13/16	13/16	13/16	13/16
SE	5½	5¾	5¾	6¼	6¼	6⅝	6⅝	6⅞	6⅞	7¼	7¼	—	—	—	—
SN	2¼	2¼	2¼	2⅜	2⅜	2⅝	2⅝	2⅝	2⅝	2⅞	2⅞	3⅞	3⅞	3¼	3¼
SS	2⅞	2⅞	2⅞	3	3	3¼	3¼	3¼	3¼	3⅞	3⅞	3⅝	3⅝	3¼	3¼
ST	9/16	5/8	5/8	½	½	¾	¾	¾	¾	1	1	1	1	1	1
FSU	5/8	¾	¾	¾	¾	7/8	7/8	5/8	5/8	11/16	11/16	1¾	1¾	1¾	1¾
RSU	5/8	5/8	5/8	5/8	5/8	7/8	7/8	5/8	5/8	11/16	11/16	1¼	1¼	1¼	1¼
SW	¾	¾	¾	¾	¾	½	½	½	½	11/16	11/16	¾	¾	¾	¾
TD	1	1	1	1	1	1	1	1	1	1	1	1¾	1¾	1¾	1¾
TE	—	—	—	—	—	—	—	—	—	—	—	—	—	7.57	7.57
TF	2¾	3¾	3¾	3⅞	3⅞	411/16	411/16	57/16	57/16	6⅝	6⅝	7⅝	7⅝	—	—
TK	¾	9/16	9/16	9/16	9/16	¾	¾	1	1	1	1	¾	¾	1⅞	1⅞
TL	15/16	15/16	15/16	15/16	15/16	15/16	15/16	15/16	15/16	15/16	15/16	1¾	1¾	1¾	1¾
TM	2½	2⅞	2⅞	3¾	3¾	4½	4½	5½	5½	6½	6½	8½	8½	—	—
TN	5/8	7/8	7/8	1¼	1¼	1½	1½	2¼	2¼	211/16	211/16	3¼	3¼	4½	4½
TS	2¾	3¼	3¼	3¾	3¾	4¾	4¾	5½	5½	6⅞	6⅞	7⅞	7⅞	9⅞	9⅞
UF	3¾	4⅞	4⅞	4⅝	4⅝	5½	5½	6¼	6¼	7⅝	7⅝	8⅝	8⅝	—	—
UM	4¾	4¾	4¾	5¼	5¼	6¾	6¾	7¾	7¾	8¾	8¾	11¼	11¼	—	—
US	3½	4	4	4½	4½	5¾	5¾	6½	6½	8¼	8¼	9¼	9¼	11¼	11¼
UT	3⅞	4¾	4¾	4⅞	4⅞	5⅝	5⅝	6¾	6¾	7¾	7¾	9¼	9¼	11¼	11¼
UV	2½	2⅞	2⅞	3¾	3¾	4½	4½	5½	5½	6½	6½	8½	8½	—	—
UW	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/8	1/8	1/8	1/8
V	¼	¼	½	¼	½	¼	¾	¼	¾	¼	¾	¼	¼	¼	¼
W	5/8	5/8	1	5/8	1	¾	1	¾	1	¾	1	19/16	113/16	19/16	113/16
XA	5⅝	5⅝	6	5¾	6⅞	6⅞	7⅞	6⅞	7⅞	7¼	7½	—	—	—	—
XC	5¾	5¾	5¾	5½	5⅞	6⅞	7⅞	6⅞	7⅞	7⅞	7¾	83/16	87/16	8¼	8½
XD	5¾	5¾	6⅞	5⅞	6¼	7½	7¾	7½	7¾	7¾	8	815/16	93/16	91/16	95/16
XE	5¾	59/16	515/16	513/16	63/16	6½	6¾	6⅝	6⅞	615/16	73/16	—	—	—	—
XG	1¾	1¾	2⅞	1¾	2⅞	2¼	2½	2¼	2½	2¼	2½	2⅝	2⅞	2⅝	2⅞
XJ	4⅞	4⅞	4½	4¼	4⅝	5	5¼	5	5¼	5¼	5½	515/16	63/16	61/16	65/16
XS	1¾	1¾	1¾	1¾	1¾	1⅞	2⅞	1⅞	2⅞	21/16	25/16	25/16	29/16	25/16	29/16
XT	115/16	115/16	25/16	115/16	25/16	27/16	211/16	27/16	211/16	27/16	211/16	213/16	31/16	213/16	31/16
Y	115/16	115/16	25/16	115/16	25/16	27/16	211/16	27/16	211/16	27/16	211/16	213/16	31/16	213/16	31/16
ZA	6⅞	6⅞	6½	6¼	6⅝	7¾	7⅝	7¾	7⅝	7⅞	8⅞	—	—	—	—
ZB	425/32	413/16	53/16	415/16	55/16	527/32	63/32	527/32	63/32	63/16	67/16	7	7¼	73/16	77/16
ZE	523/32	57/8	6¼	6⅞	6½	6⅞	7⅞	7	7¼	77/16	711/16	—	—	—	—
ZF	5	5	5¾	5⅞	5½	6¼	6½	6¼	6½	6½	6¾	77/16	711/16	—	—
ZJ	4⅝	4⅝	5	4¾	5⅞	5⅝	5⅞	5⅝	5⅞	5⅞	6⅞	611/16	615/16	613/16	71/16
ZL	5½	5½	5⅞	5⅝	6	6¾	7	6¾	7	7	7¼	73/16	77/16	75/16	79/16
ZM	6⅞	6⅞	6⅞	6¼	7	7½	8	7½	8	7¾	8¼	8¾	9¼	87/8	93/8
ZZ	¾	½	½	½	½	5/8	5/8	5/8	5/8	5/8	5/8	—	—	—	—

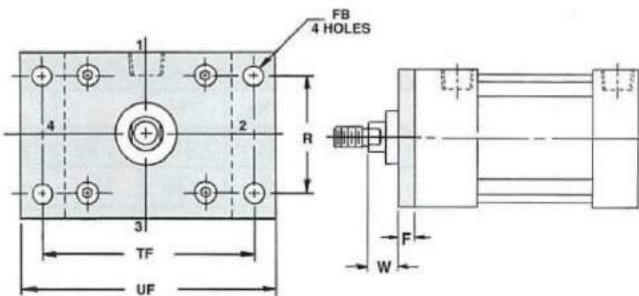
NFPA MOUNTING STYLES (1 1/2" - 5" BORE)



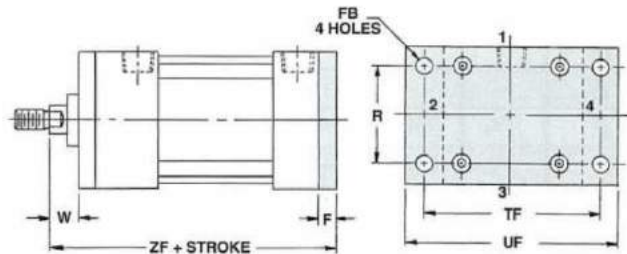
SIDE TAPPED (MS4)



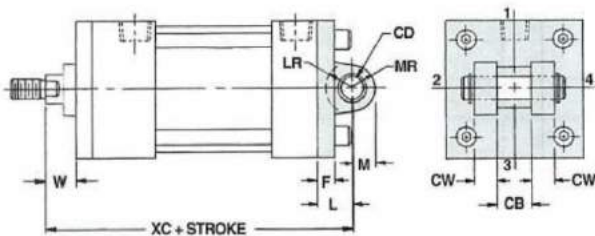
DOUBLE ROD END SIDE TAPPED (MDMS4)



HEAD RECTANGULAR FLANGE (MF1)

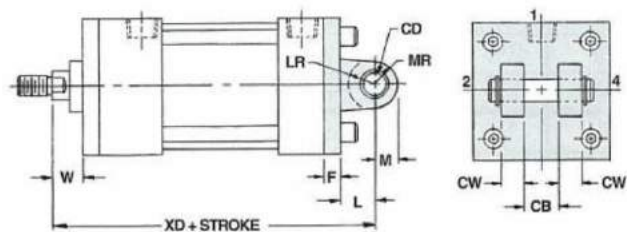


CAP RECTANGULAR FLANGE (MF2)



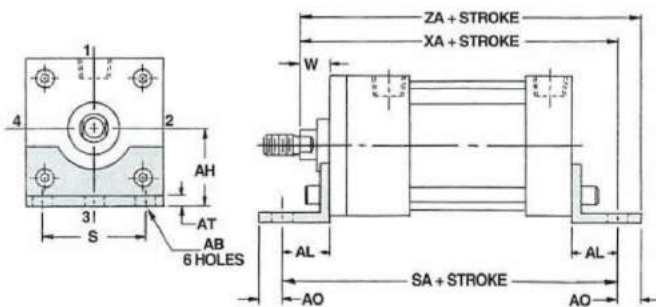
CAP CLEVIS DETACHABLE (MP1)

Furnished with pin & snaps
Cast iron MP1 available

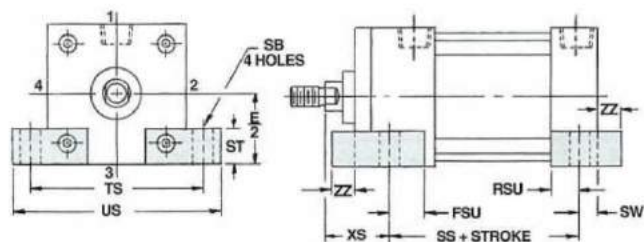


CAP CLEVIS DETACHABLE (MP2)

Furnished with pin & snaps
Cast iron MP2 available

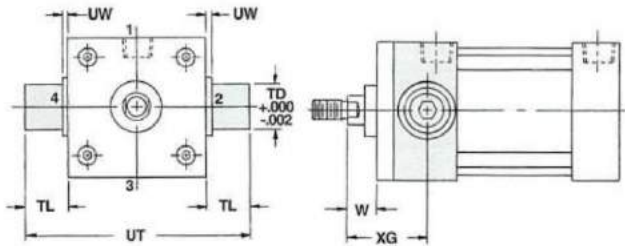


SIDE END ANGLES (MS1)

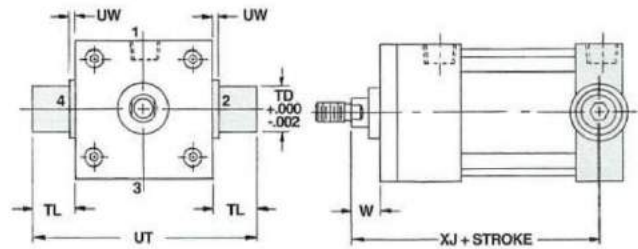


SIDE LUGS (MS2)

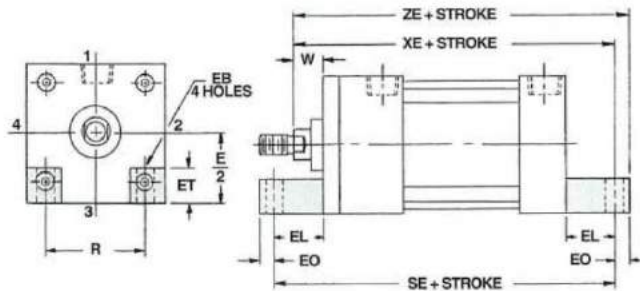
NFPA MOUNTING STYLES (1 1/2" - 5" BORE)



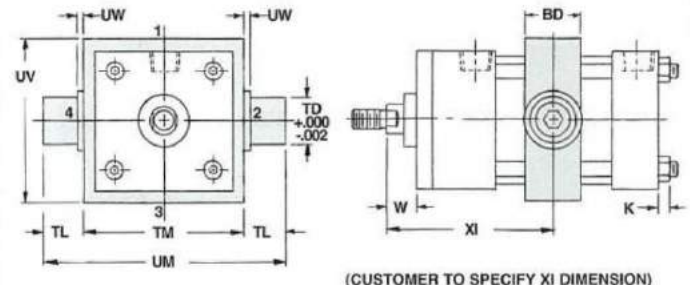
HEAD TRUNNION (MT1)



CAP TRUNNION (MT2)



SIDE END LUGS (MS7)



(CUSTOMER TO SPECIFY XI DIMENSION)

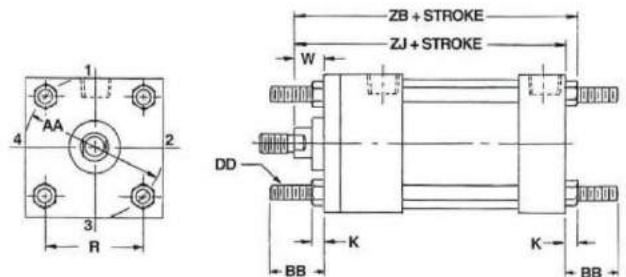
INTERMEDIATE TRUNNION (MT4)

BOTH ENDS TIE RODS EXTENDED (MX1)

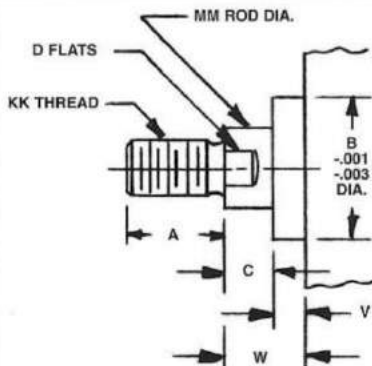
(ILLUSTRATED)

CAP TIE RODS EXTENDED (MX2)

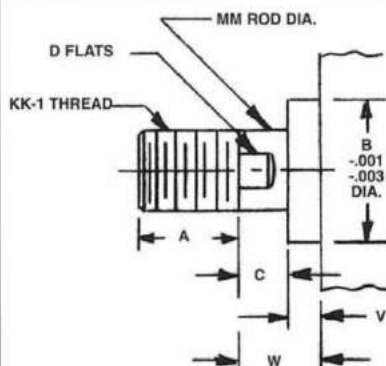
HEAD TIE RODS EXTENDED (MX3)



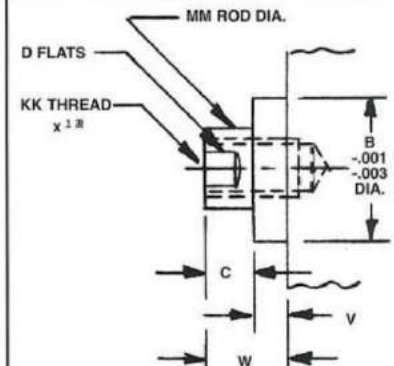
ROD END STYLES (For other optional rod ends, specify thread, length or depth)



Style #2 Standard Small Male Thread

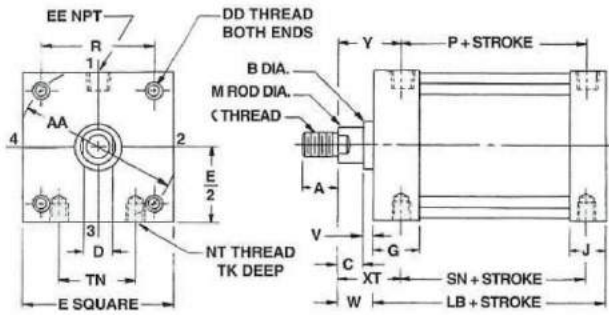


Style #1 Optional Full Male Thread

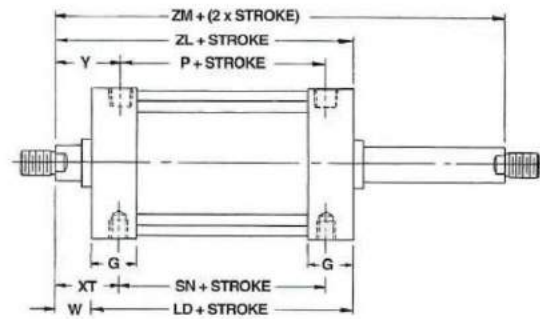


Style #3 Optional Female Thread

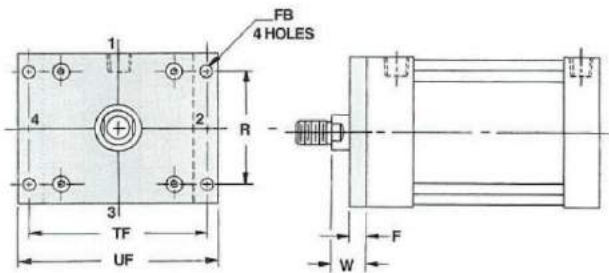
NFPA MOUNTING STYLES (6" - 8" BORE)



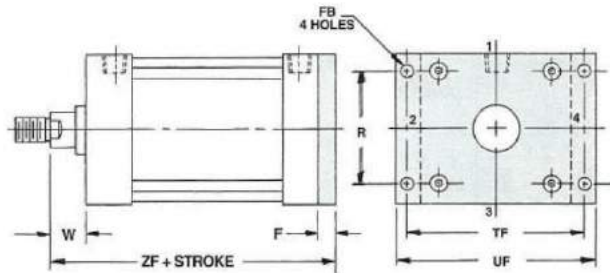
SIDE TAPPED (MS4)



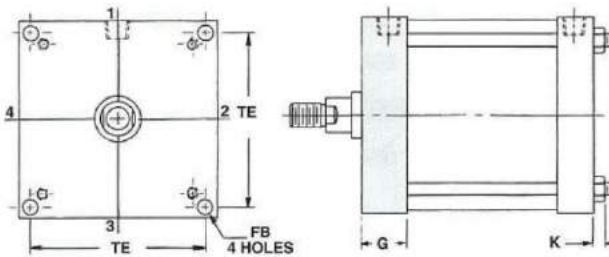
DOUBLE ROD END SIDE TAPPED (MDMS4)



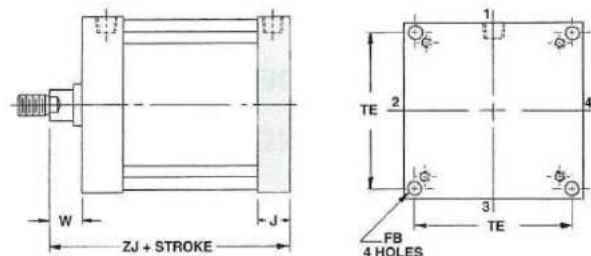
HEAD RECTANGULAR FLANGE (MF1)
6" bore only



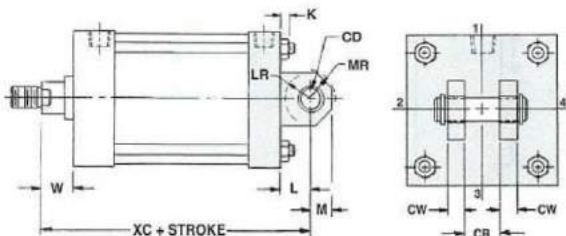
CAP RECTANGULAR FLANGE (MF2)
6" bore only



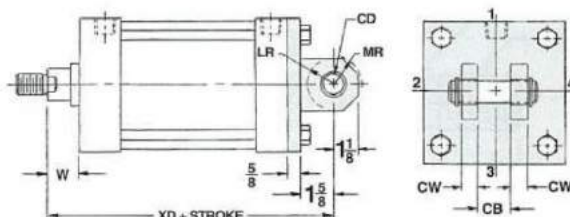
HEAD SQUARE FLANGE (ME3)
8" bore only



CAP SQUARE FLANGE (ME4)
8" bore only

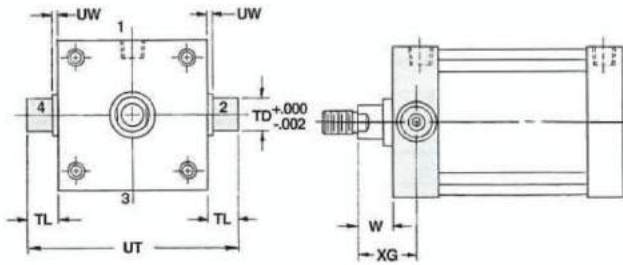


CAP CLEVIS WELDED (MP1)
Furnished with pin & snaps

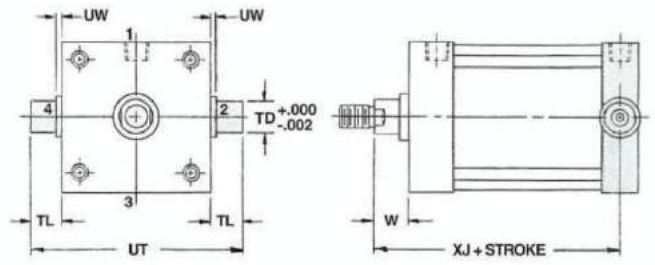


CAP CLEVIS DETACHABLE (MP2)
Furnished with pin & snaps
1 8" cap must be tapped to accept MP2
Base plate is 6-7/16" square

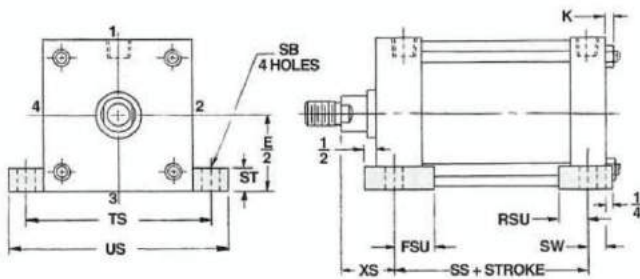
NFPA MOUNTING STYLES (6" - 8" BORE)



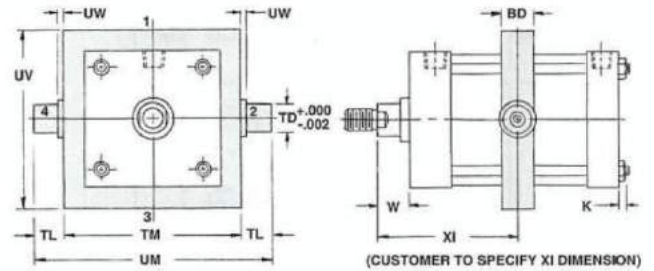
HEAD TRUNNION (MT1)



CAP TRUNNION (MT2)



SIDE LUGS WELDED (MS2)



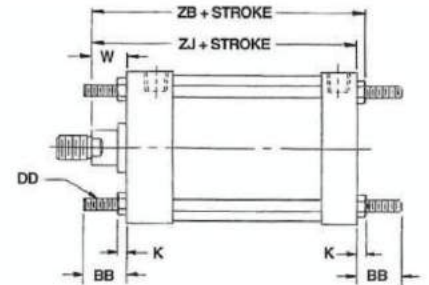
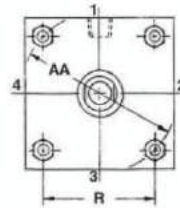
INTERMEDIATE TRUNNION (MT4)
6" bore only

BOTH ENDS TIE RODS EXTENDED (MX1)

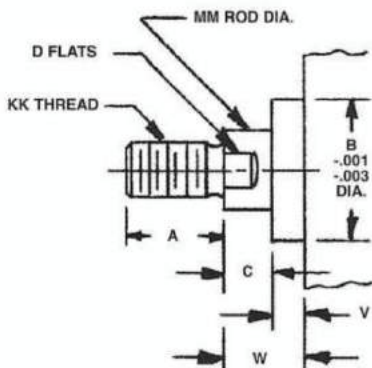
(ILLUSTRATED)

CAP TIE RODS EXTENDED (MX2)

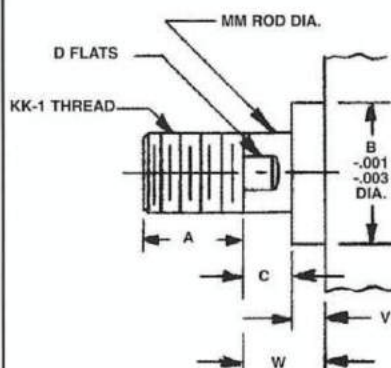
HEAD TIE RODS EXTENDED (MX3)



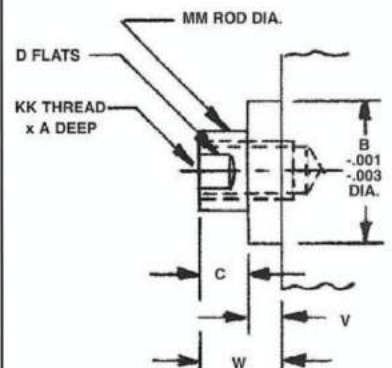
ROD END STYLES (For other optional rod ends, specify thread, length or depth)



Style #2 Standard Small Male Thread

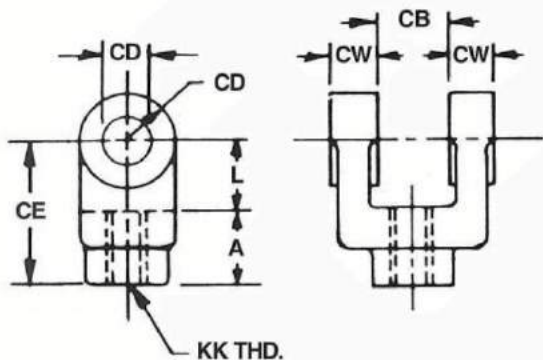


Style #1 Optional Full Male Thread



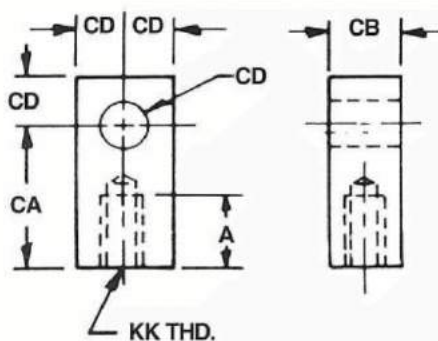
Style #3 Optional Female Thread

SERIES I ACCESSORIES



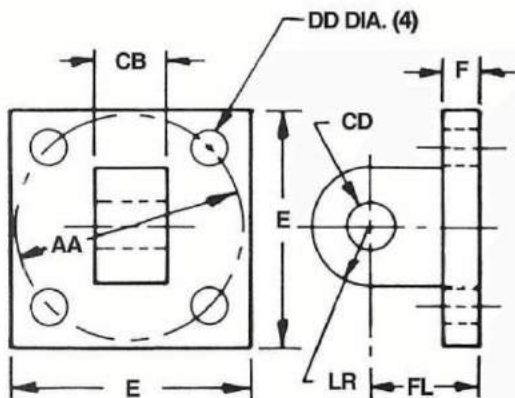
ROD CLEVIS

PART NUMBER	THD. KK	A	L	CB	CD	CE	CW
RC-437	7/16-20	3/4	3/4	3/4	1/2	1 1/2	1/2
RC-750	3/4-16	1 1/8	1 1/4	1 1/4	3/4	2 3/8	5/8
RC-100	1-14	1 5/8	1 1/2	1 1/2	1	3 1/8	3/4
*BRC-125	1 1/4-12	1 5/8	1	1	1	3	1/2



ROD EYE

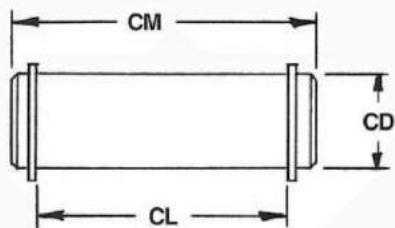
PART NUMBER	THD. KK	A	CA	CB	CD
RE-437	7/16-20	3/4	1 1/2	3/4	1/2
RE-750	3/4-16	1 1/8	2 1/16	1 1/4	3/4
RE-100	1-14	1 5/8	2 3/16	1 1/2	1
*BRE-125	1 1/4-12	1 5/8	3	2	1



EYE BRACKET

PART NUMBER	BORE SIZE	AA	E	F	CB	CD	DD	FL	LR
EM-500	1 1/2, 2 & 2 1/2	2.31	2 1/2	3/8	3/4	1/2	3/8	1 1/8	1/2
EM-750	3 1/4, 4 & 5	3.61	3 1/2	3/8	1 1/4	3/4	1/2	1 7/8	3/4
*BEM-100	6 & 8	6.89	6 1/2	3/8	1 1/2	1	1/2	2 1/4	1 1/4

Eye bracket interfaces with MP1 & MP2 clevis mount.
To use with rod clevis, check CB & CD dimensions.

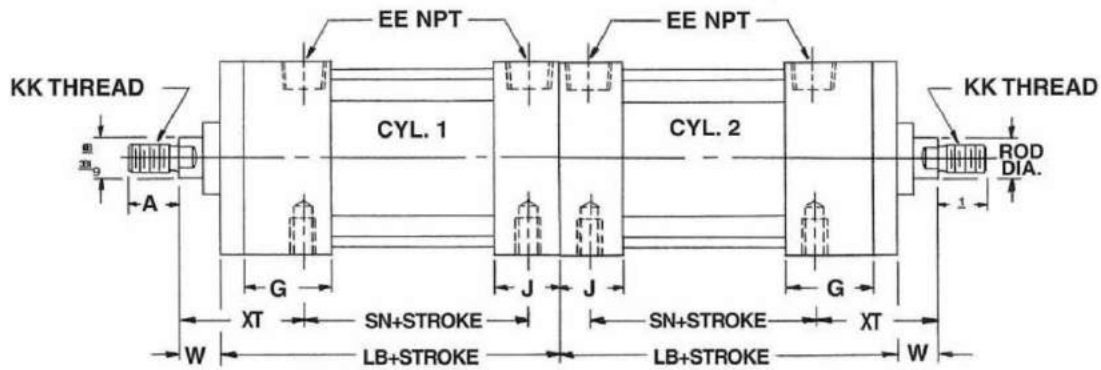


PIVOT PIN & SNAPS

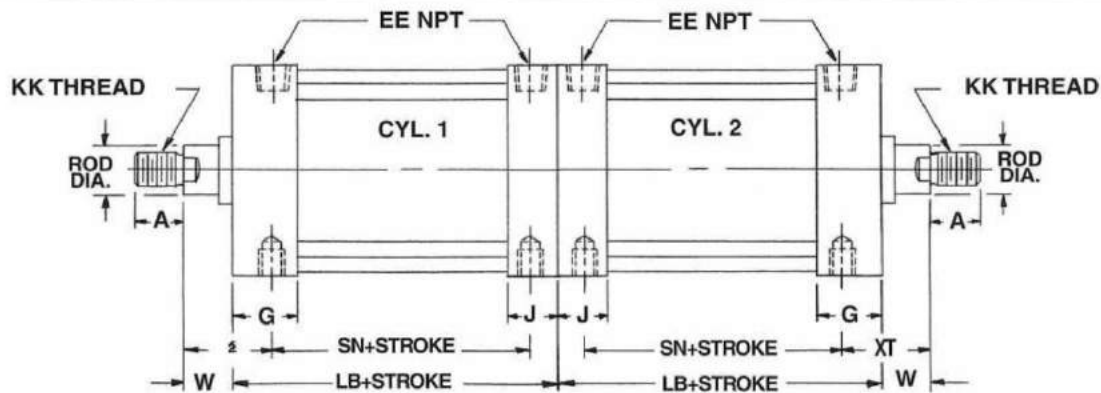
PART NUMBER	CD	CL	CM	W/ROD CLEVIS	W/ROD EYE
P-500	1/2	1 29/32	2	RC-437	RE-437
P-750	3/4	2 1 1/16	3 1/16	RC-750	RE-750
P-100	1	3 1/16	3 3/16	RC-100	RE-100
*BP-1100	1	2 1/16	2 5/16	BRC-125	—

* From Series B & J

MULTIPLE POSITION CYLINDERS



**SERIES I 1 1/2" - 5" BORE MULTIPLE POSITION
TANDEM BACK TO BACK**



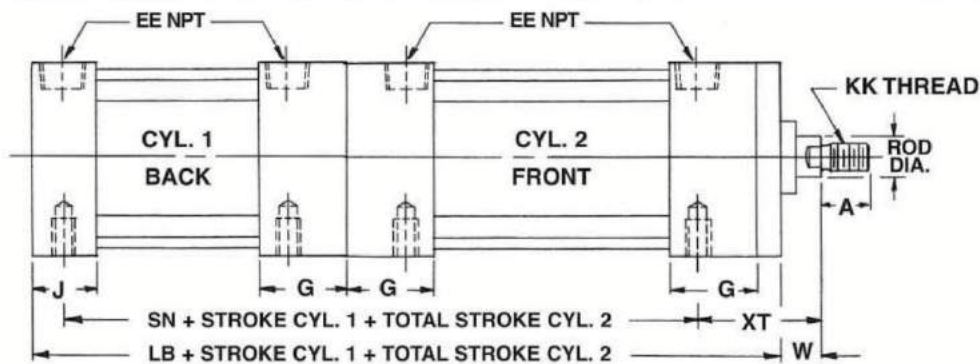
SERIES I 6" - 8" BORE MULTIPLE POSITION TANDEM BACK TO BACK

CONSULT FACTORY FOR ORDERING INSTRUCTIONS

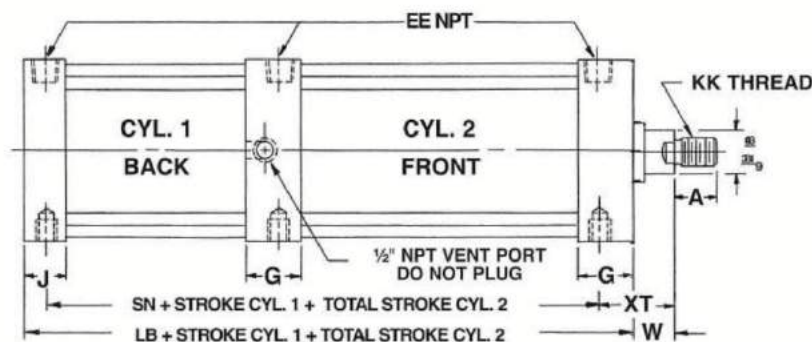
SERIES I CYLINDER DIMENSIONS

BORE	ROD DIA.	A	G	J	W	EE NPT	LB	KK	SN	XT
1 1/2	5/8	3/4	1 3/8	1	5/8	3/8	4	7/16 - 20	2 1/4	1 15/16
2	5/8	3/4	1 3/8	1	5/8	3/8	4	7/16 - 20	2 1/4	1 15/16
	1	1 1/8			1					2 5/16
2 1/2	5/8	3/4	1 3/8	1	5/8	3/8	4 1/8	7/16 - 20	2 3/8	1 15/16
	1	1 1/8			1					2 5/16
3 1/4	1	1 1/8	1 3/8	1 1/4	3/4	1/2	4 7/8	3/4 - 16	2 5/8	2 7/16
	1 3/8	1 5/8			1					1 - 14
4	1	1 1/8	1 3/8	1 1/4	3/4	1/2	4 7/8	3/4 - 16	2 5/8	2 7/16
	1 3/8	1 5/8			1					1 - 14
5	1	1 1/8	1 3/8	1 1/4	3/4	1/2	5 1/8	3/4 - 16	2 7/8	2 7/16
	1 3/8	1 5/8			1					1 - 14
6	1 3/8	1 5/8	2	1 1/2	1 1/16	3/4	5 1/8	1 - 14	3 3/8	2 1 3/16
	1 1/2	2			1 13/16					1 1/4 - 12
8	1 3/8	1 5/8	2	1 1/2	1 1/16	3/4	5 1/4	1 - 14	3 1/4	2 1 3/16
	1 1/2	2			1 13/16					1 1/4 - 12

MULTIPLE POSITION CYLINDERS



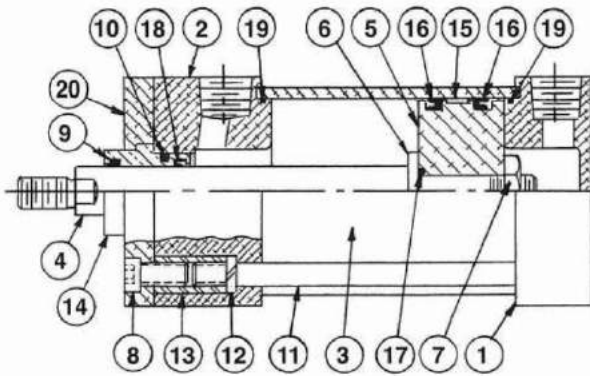
SERIES I 1 1/2" - 5" BORE MULTIPLE POSITION TANDEM FRONT TO BACK
CONSULT FACTORY FOR ONE CENTER HEAD DESIGN



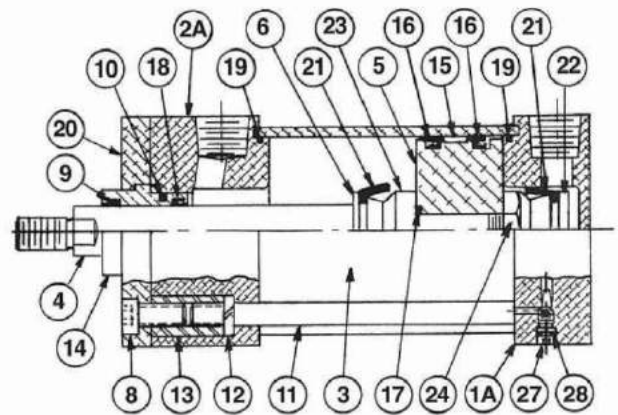
SERIES I 6" - 8" BORE MULTIPLE POSITION TANDEM FRONT TO BACK
CONSULT FACTORY FOR ORDERING INSTRUCTIONS

SERIES I CYLINDER DIMENSIONS

BORE	ROD DIA.	A	G	J	W	EE NPT	LB	KK	SN	XT
1 1/2	5/8	3/4	1 3/8	1	5/8	3/8	8	7/16 - 20	6 1/4	1 15/16
2	5/8	3/4	1 3/8	1	5/8	3/8	8	7/16 - 20	6 1/4	1 15/16
	1	1 1/8			1			3/4 - 16		2 5/16
2 1/2	5/8	3/4	1 3/8	1	5/8	3/8	8 1/4	7/16 - 20	6 1/2	1 15/16
	1	1 1/8			1			3/4 - 16		2 5/16
3 1/4	1	1 1/8	1 5/8	1 1/4	3/4	1/2	9 1/2	3/4 - 16	7 1/4	2 7/16
	1 3/8	1 5/8			1			1 - 14		2 11/16
4	1	1 1/8	1 5/8	1 1/4	3/4	1/2	9 1/2	3/4 - 16	7 1/4	2 7/16
	1 3/8	1 5/8			1			1 - 14		2 11/16
5	1	1 1/8	1 5/8	1 1/4	3/4	1/2	10	3/4 - 16	7 3/4	2 7/16
	1 3/8	1 5/8			1			1 - 14		2 11/16
6	1 3/8	1 5/8	2	1 1/2	1 9/16	3/4	9 3/4	1 - 14	7 3/4	2 13/16
	1 1/2	2			1 13/16			1 1/4 - 12		3 1/16
8	1 3/8	1 5/8	2	1 1/2	1 9/16	3/4	10	1 - 14	8	2 13/16
	1 1/2	2			1 13/16			1 1/4 - 12		3 1/16



SERIES I NON-CUSHION



SERIES I DOUBLE CUSHION

P/N	DESCRIPTION	QTY.
1	REAR CAP	1
1A	REAR CAP CUSHIONED (WITH P/N 27 & 28)	1
2	FRONT HEAD	1
2A	FRONT HEAD CUSHIONED (WITH P/N 27 & 28)	1
3	CYLINDER TUBE	1
4	PISTON ROD	1
5	PISTON	1
6	SUPPORT WASHER	1*
7	PISTON NUT	1
8	RETAINING PLATE BOLT	4
9	ROD WIPER	1
10	ROD BUSHING "O" RING	1
11	TIE ROD	4
12	TIE ROD LOCKWASHER	4
13	TIE ROD NUT	4
14	ROD BUSHING	1
15	PISTON BEARING STRIP	1
16	PISTON SEAL	2
17	PISTON ROD "O" RING	1
18	ROD SEAL (STANDARD)	1
18PP	ROD SEAL (HYDRAULIC)	1
19	TUBE SEAL "O" RING	2
20	RETAINING PLATE	1
21	CUSHION CUP	1†
22	REAR CUSHION RETAINING BOLT	1
23	FRONT CUSHION SPACER	1
24	REAR CUSHION SPACER NUT	1
27	CUSHION SCREW	1†
28	CUSHION SCREW "O" RING	1†

† Per cushion

* Not used on 1 1/2" - 5" bore with oversize rod.

REPAIR KITS

Repair kits containing all wearable replacement parts are available.

Please specify cylinder bore, rod diameter, single or double ended, type of cushion, air or hydraulic operated and any options which affect repair kit.

The 1 1/2" bore magno piston cylinder requires a special piston bearing strip. Please specify MAGNO when ordering this bore repair kit.

STANDARD REPAIR KIT CONTAINS:

P/N 9,10, 14, 15, 16, 17, 18 &19.

CUSHION REPAIR KIT CONTAINS:

Standard repair kit plus P/N 21 & 28.

NOTE: Cylinder design and cushion design for 1 6" & 8" bore are similar to Series J.

When ordering parts please specify cylinder bore, rod diameter, type of cushion and any options.

Selecting Cylinder Bore Size

When selecting a cylinder bore size for your application, first determine the maximum push or pull force required. Next, add at least 10% to the push/pull force or the working pressure to compensate for pressure drop in the

line and friction in the cylinder. This 10% figure is adequate for normal applications. Finally, knowing the working pressure available, select your cylinder bore size from the selection chart.

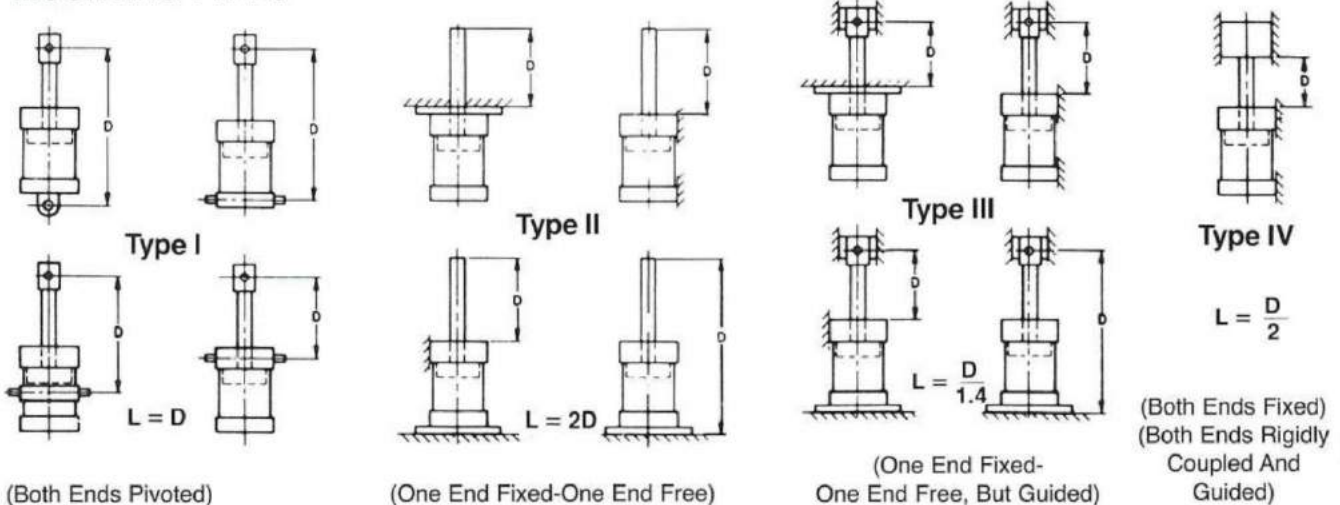
CYL. BORE DIA.	PISTON ROD DIA.	CYL. WORK ACTION	WORK AREA SQ. IN.	AIR PRESSURE P.S.I.						FLUID REQUIRED PER IN. OF STROKE		
				60	80	90	100	150	200	250	GALLON	CU. FT.
1½	¾	Push	1.767	106	141	159	177	265	353	442	.00765	.00102
		Pull	1.460	88	117	131	146	219	292	365	.00632	.00084
2	1	Push	3.141	188	251	282	314	471	628	785	.01360	.00182
		Pull	2.835	170	227	255	284	425	567	709	.01227	.00164
		Pull	2.357	141	189	212	236	354	471	589	.01020	.00136
2½	1	Push	4.908	294	392	441	490	736	981	1227	.02125	.00284
		Pull	4.602	276	368	414	460	690	920	1151	.01992	.00266
		Pull	4.124	247	330	371	412	619	825	1031	.01785	.00239
3¼	1 1/8	Push	8.296	498	664	747	830	1245	1660	2074	.03590	.00480
		Pull	7.511	451	601	676	751	1127	1502	1878	.03250	.00435
		Pull	6.811	409	545	613	681	1022	1362	1703	.02950	.00394
4	1 1/8	Push	12.566	754	1005	1130	1256	1884	2513	3141	.05440	.00727
		Pull	11.781	707	942	1060	1178	1767	2356	2945	.05100	.00682
		Pull	11.081	665	886	997	1108	1662	2216	2770	.04800	.00641
5	1 1/8	Push	19.635	1178	1570	1767	1963	2945	3927	4908	.08500	.01136
		Pull	18.850	1131	1508	1697	1885	2828	3770	4713	.08160	.01091
		Pull	18.150	1089	1452	1634	1815	2723	3630	4538	.07860	.01050
6	1 1/2	Push	28.274	1696	2262	2544	2827	4241	5654	7068	.12240	.01636
		Pull	26.789	1607	2144	2411	2679	4018	5358	6697	.11600	.01550
		Pull	26.507	1590	2120	2385	2650	3976	5301	6626	.1147	.00153
8	1 1/2	Push	50.265	3015	4021	4523	5026	7539	10053	12566	.21760	.02915
		Pull	48.780	2927	3902	4390	4878	7317	9756	12195	.21120	.02823
		Pull	48.498	2909	3879	4364	4849	7274	9699	12124	.2099	.00281

Selecting Cylinder Rod Diameter

Standard Rods - Standard rods can usually be selected when a cylinder is used for a pull or tension application. In some applications where long stroke cylinders are used for pull or tension, oversize rods may be required to eliminate rod sag.

Oversize Rods - Oversize rods are often required when a cylinder is used in a thrust or push application. In these applications, the designer must treat the piston rod as a column in compression and specify a rod large enough to prevent rod buckling.

MOUNTING TYPES



Rod Diameter Selection

To determine the correct rod for your application, follow the steps listed below:

- Determine the load or maximum thrust required.
- Classify your application as one of the mounting types illustrated.
- Determine stop tube length-see stop tube instructions.
- Determine the value of "L" for your application with the rod fully extended. (See dimensional chart below.)
- By referring to chart, select a thrust figure from the left-hand column, equal to or greater than the thrust of your application.
- Scan to the right of the thrust figure selected until an "L" value is equal to or greater than the "L" value determined above.
- Follow the "L" value column to the top of the chart to find the recommended rod diameter.
- In some cases, the recommended rod diameter may be larger than is available in the bore size selected. In this case, a larger bore size should be selected.

Thrust Load in Lbs.	VALUES OF "L" IN INCHES PISTON ROD DIAMETERS			
	5/8	1	1 1/8	1 1/2
100	75	191		
150	61	156		
200	53	135	255	
250	47	121	228	
300	43	110	208	250
350	40	102	193	232
400	38	96	180	217
450	35	90	170	205
500	34	86	161	194
600	31	79	147	177
700	28	72	137	164
800	27	68	128	154
900	25	64	120	145
1000	24	61	114	138
1200	22	55	104	125
1400	20	51	97	116

Thrust Load in Lbs.	VALUES OF "L" IN INCHES PISTON ROD DIAMETERS			
	5/8	1	1 1/8	1 1/2
1600	19	48	90	108
1800	18	45	85	102
2000	17	43	81	97
2200	16	41	77	92
2600	15	38	71	85
3000	14	35	66	79
3500	13	32	61	73
4000	12	30	57	68
5000	11	27	50	61
6000	10	25	47	56
7000	9	23	43	52
8000	8	22	41	49
9000		20	38	45
10000		19	36	43
12500		17	32	38

Stop Tubes

A stop tube is a spacer placed between the piston and the rod end head to reduce bearing loads. The reduction in bearing load is done by increasing the distance between bearing surfaces.

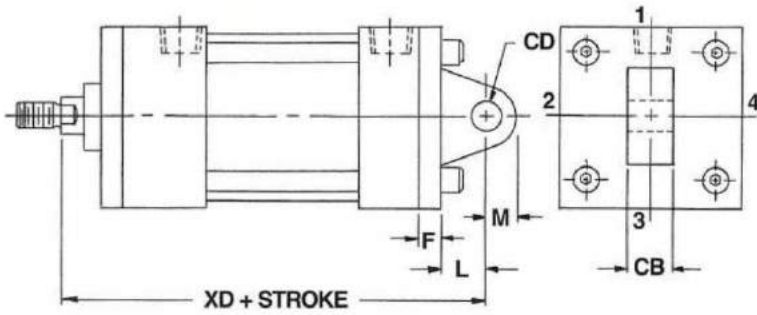
Stop tubes are recommended for mounting types I and II any time the "L" dimension of that application exceeds 40".

Stop tubes are normally not required with mounting types III and IV but the designer should use his own discretion to keep bearing loads to a minimum. Stop tubes should be specified at a rate of 1" for every 10", or fraction thereof, over an "L" dimension of 40".

Adjust "L" dimension by adding stop tube length when using "L" to determine rod diameter.

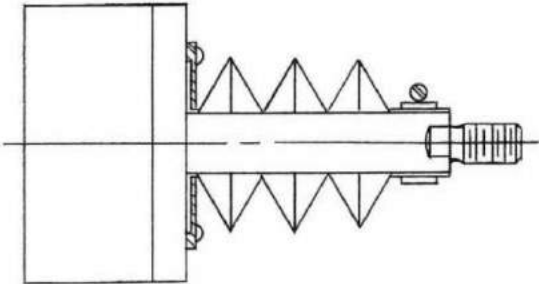
Note: Increasing rod diameter to reduce bearing load is not recommended. Stop tubes are more effective and generally more economical.

CYLINDER OPTIONS



**CAST IRON CAP EYE MOUNT
DETACHABLE (MP4)**

BORE	ROD DIA.	F	L	M	CB	CD	XD
1 1/2	5/8	3/8	3/4	5/8	3/4	1/2	5 3/4
2	5/8	3/8	3/4	5/8	3/4	1/2	5 3/4
	1						6 1/8
2 1/2	5/8	3/8	3/4	5/8	3/4	1/2	5 7/8
	1						6 1/4
3 1/4	1	5/8	1 1/4	7/8	1 1/4	3/4	7 1/2
	1 3/8						7 3/4
4	1	5/8	1 1/4	7/8	1 1/4	3/4	7 1/2
	1 3/8						7 3/4



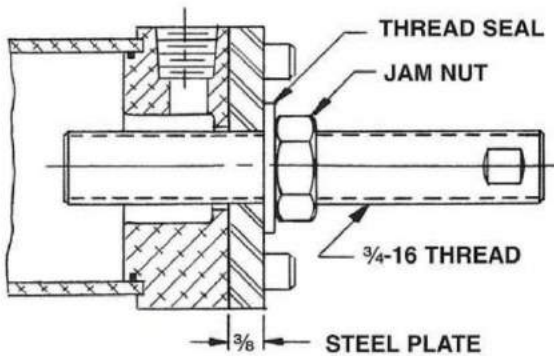
ROD BOOTS

Rod boots are used for added protection from environmental conditions. Material is Neoprene/Nylon .050-.060 gauge with an operating temperature of 0°F to 200°F.

NOTE: Rod extension increases 1" in length for every 3" of stroke. Maximum stroke is 24".

Not available on 1 1/2" bore, Model B120, or Series R cylinders.

Design changes for 1 3/8" & 1 1/2" rod diameter.



ADJUSTABLE STROKE

The adjustment is suitable for infrequent adjustments in the reduction of stroke length in the retracted position.

Length of adjustment must be specified when ordering.

Rear cap cushion is not available.

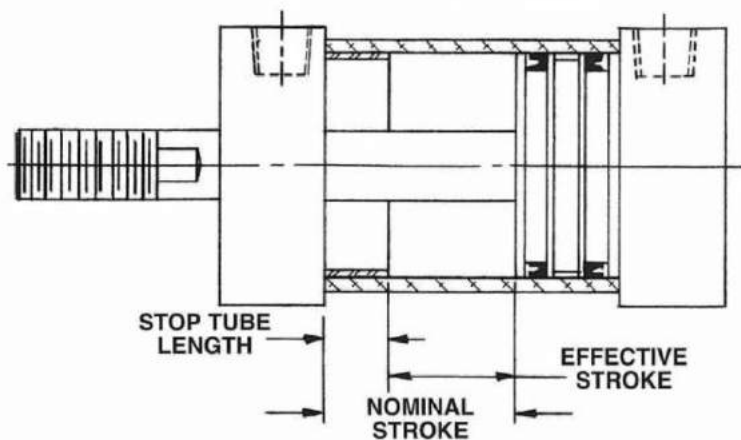
Steel plate may not be the same square size as rear cap on larger bore cylinders.

CYLINDER OPTIONS

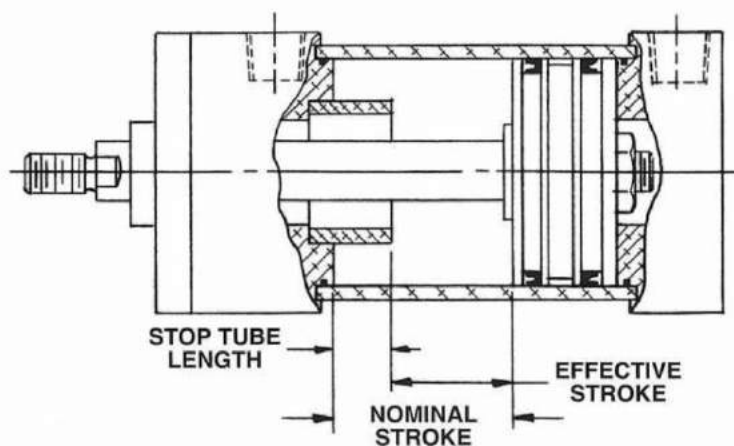
STOP TUBE

A stop tube increases the distance between the rod bushing and piston to reduce bearing loads when the piston rod is fully extended. See page 17 to determine stop tube length.

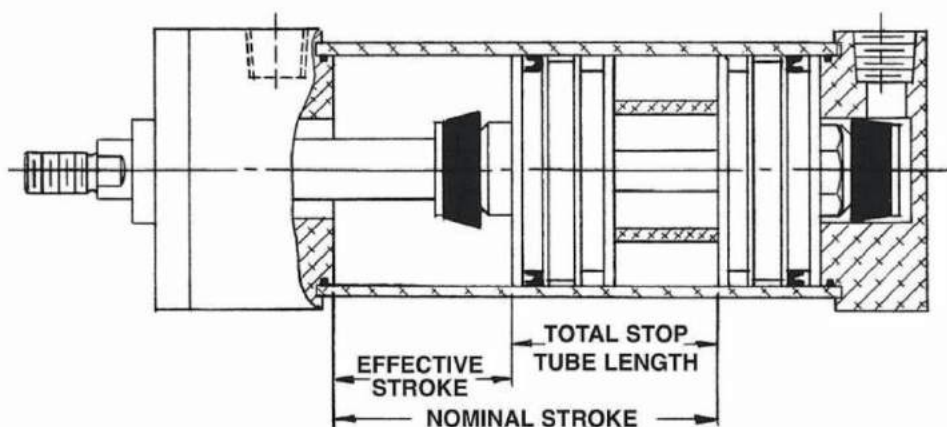
When ordering please specify nominal stroke, stop tube length and effective stroke.



SERIES B, J OR R
(SERIES B ILLUSTRATED)



SERIES I
(SERIES I 1 1/2" - 5" BORE ILLUSTRATED)
SERIES I 6" - 8" BORE MAY VARY



DUAL PISTON DESIGN

(SERIES I ILLUSTRATED)

All cylinders with cushion front head or both ends

CYLINDER OPTIONS

BUMPERS

A Buna N 90 durometer "O" ring is LOCTITED™ to the front head and/or rear cap surface to prevent metal to metal contact. Each bumper increases the cylinder length. Consult factory for bumper diameter. When ordering please specify bumper front head, rear cap or both ends.

SPRING RETURN OR EXTEND

This light duty spring cylinder is available with a 3" maximum stroke and a rod diameter of 1" or less. The cylinder length will be 1" longer than standard and have an approximate 10 pound pre-load with a spring rate of approximately 10 pounds per inch.

FAIL-SAFE SPRING RETURN

The cylinder provides fail-safe retraction, if air pressure is lost, with a heavy duty high force spring. It is available in certain models of the Series B and all Series J cylinders. Consult factory for specifications.

HOLLOW PISTON RODS

They are available on Series B cylinders only. Standard sizes are: 3/4" diameter piston rod with a 1/4" diameter thru hole and 1" diameter piston rod with a 7/16" diameter thru hole.

PHENOLIC ROD BUSHINGS

Phenolic material is a hard, dense laminated thermoset plastic produced by applying heat and pressure to layers of a fine weave cotton fabric reinforced with a phenolic binder. Phenolic is generally not attacked by common solvents such as alcohol or petroleum products and resists low concentrations of mineral acids (except nitric and chromic). However, in cases of chemical attack by acids such as nitric and chromic, the material retains its strength and may have a long and useful life. Phenolic offers excellent resistance to fruit acids. The material may be used continuously at 200°F.