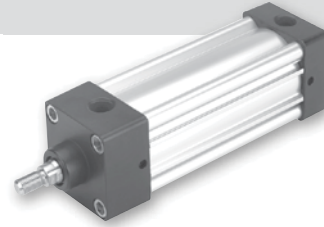


## 3MA Series

- NFPA interchangeable economy series
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4" and 5"
- Available in any practical stroke length
- 18 standard modular mounting styles available
- Extruded-profile aluminum body with integrated switch grooves
- Single rod end or double rod end options available
- Cushions – standard and adjustable at both ends, optional non-cushioned
- NPT porting standard
- RoHS compliant



### Operating information

Operating pressure:	250 PSIG (17 bar)
Temperature range:	-10°F to 165°F (-23°C to 74°C)
Filtration requirements:	40 micron, dry filtered air

### Ordering information

<b>2.00</b>	<b>C</b>	<b>J</b>	<b>3MA</b>	<b>U</b>	<b>1</b>	<b>4</b>	<b>A</b>	<b>C</b>	<b>6.000</b>
<b>Bore size</b> 1.50 2.00 2.50 3.25 4.00 5.00	<b>Double rod cylinder</b> <sup>5</sup> Specify "K" only if double rod cylinder is required.	<b>Mounting style</b> Specify mounting style code (see table on following page).	<b>Series</b> 3MA	<b>Ports</b> Standard (NPTF)	<b>Seals</b> <b>Blank</b> Standard (nitrile seals) <b>E</b> Fluorocarbon rod wiper and rod seal only <sup>2</sup>	<b>Piston rod number</b> Standard (rod code number 1) <sup>3</sup>	<b>Cushion cap end</b> <b>C</b> Standard (cushioned cap end) <b>Blank</b> Non-cushioned cap end	<b>Stroke length</b> Specify stroke length required in inches.	<b>Piston rod thread type</b> <b>A</b> Standard (UNF unified thread) <b>W</b> BSF British fine <b>M*</b> Metric
<b>Cushion head end</b> <b>C</b> Standard (cushioned head end) <b>Blank</b> Non-cushioned head end	<b>Cylinder construction</b> <b>Blank*</b> Standard (extruded body, standard round lobe orientation) <b>A*</b> Extruded body, round lobe orientation rotated 90 degrees from standard <b>N*</b> Extruded body, round lobe orientation rotated 180 degrees from standard <b>Z*</b> Extruded body, round lobe orientation rotated 270 degrees from standard <b>T</b> Aluminum round tube and carbon steel tie rods and nuts		<b>Special modification</b> Specify "S" only for special modification other than rod end, and then describe modification in item notes.		<b>Piston rod thread style</b> <b>4</b> Small male <b>8</b> Intermediate male <b>9</b> Short female <b>55</b> For use with split coupler <sup>4</sup> <b>3</b> Special (and specify all dimensions required)		<b>Rod material code</b> <b>Blank</b> Standard <b>Y</b> 17-4 PH stainless steel <b>J</b> 303 stainless steel <b>S</b> 316 stainless steel		
* Please reference catalog 0900P-E, table on page B10. Only applies to 1-1/2" to 4" bore size.									
<b>Piston type</b>									
<b>Blank</b>	Standard (lipseals and magnetic ring) <sup>5</sup>								
<b>1</b>	Lipseals, no magnetic ring <sup>5</sup>								
<b>2</b>	Lipseals, no magnetic ring (aluminum piston)								
<b>3</b>	Lipseals and magnetic ring (aluminum piston)								
<b>4</b>	Bumper seals, no magnetic ring								
<b>6</b>	Bumper seals and magnetic ring								
<b>B</b>	Lipseals, 1/4" thick bumpers both ends <sup>1</sup>								
<b>H</b>	Lipseals, 1/4" thick bumper head end <sup>1</sup>								
<b>C</b>	Lipseals, 1/4" thick bumper cap end <sup>1</sup>								
<b>D</b>	Lipseals and magnetic ring, 1/4" thick bumpers both ends <sup>1</sup>								
<b>F</b>	Lipseals and magnetic ring, 1/4" thick bumper head end <sup>1</sup>								
<b>R</b>	Lipseals and magnetic ring, 1/4" thick bumper cap end <sup>1</sup>								

<sup>1</sup> Addition of 1/4" bumper results in a 1/4" stroke loss per bumper, per end. For example, a 6" stroke cylinder with 1/4" bumpers at both ends (option B) has an effective stroke of 5-1/2".

<sup>2</sup> Used for external chemical compatibility applications, not high temperature.

<sup>3</sup> Review Piston Rod Selection Chart, please reference catalog 0900P-E, page A14 to determine proper piston rod diameter. (Note: 3MA has only one rod diameter per bore size, so proper piston rod diameter from chart result may lead to bore size change). For oversize rod within the same bore size, please see 4MA section.

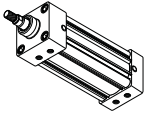
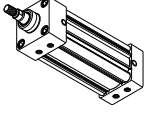
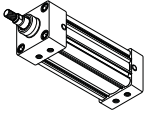
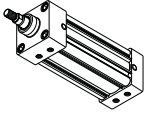
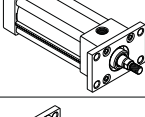
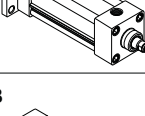
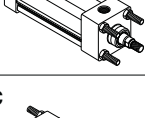
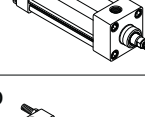
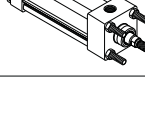
<sup>4</sup> For additional information regarding this style, please reference catalog 0900P-E, page B105. If non-standard Rod Material Code is required with this option, please place an "S" for special in Special Modification field and specify rod material in the item notes.

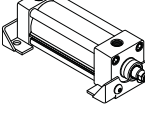
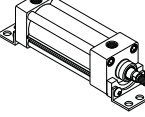
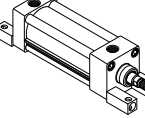
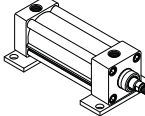
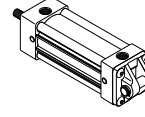
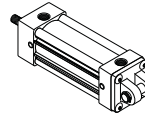
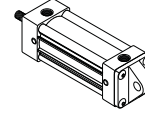
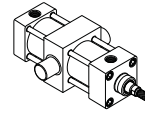
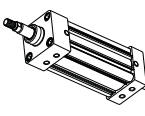
<sup>5</sup> Double rod cylinders not available with composite piston type.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



**3MA Mounting Styles for 1-1/2" to 5" Bore**

Mounting style	NFPA mounting	Description	Bore size
TEF 	MX5/MS4	Sleeve Nut with Side Tap (standard mount)	1-1/2 - 5
T 	MX0	No Mount (same construction as TEF)	1-1/2 - 5
TE 	MX5	Sleeve Nut (same construction as TEF)	1-1/2 - 5
F 	MS4	Side Tap (same construction as TEF)	1-1/2 - 5
J 	MF1	Head Rectangular Flange	1-1/2 - 5
H 	MF2	Cap Rectangular Flange	1-1/2 - 5
TB 	MX3	Tie Rods Extended Head End	1-1/2 - 5
TC 	MX2	Tie Rods Extended Cap End	1-1/2 - 5
TD 	MX1	Tie Rods Extended Both Ends	1-1/2 - 5

Mounting style	NFPA mounting	Description	Bore size
C 	MS2	Side Lug	1-1/2 - 5
CB 	MS1	Side End Angle	1-1/2 - 5
G 	MS7	Side End Lug	1-1/2 - 4
NB 	N/A	Base Bar	1-1/2 - 4
BB 	MP1	Cap Fixed Clevis	1-1/2 - 5
BC 	MP2	Cap Detachable Clevis	1-1/2 - 5
BE 	MP4	Cap Detachable Eye	1-1/2 - 4
DD 	MT4	Intermediate Trunnion	1-1/2 - 5
KTEF* 	MDX5/ MDS4	Double Rod End, TEF Mount	1-1/2 - 5

\* Double rod end cylinders can be ordered with head mountings, i.e. KJ.

**B**

Tie Rod Cylinders  
 Actuator Products

3MA  
 Series

4MA/4ML  
 Series

3MAJ/4MAJ  
 Series

4MNR  
 Series

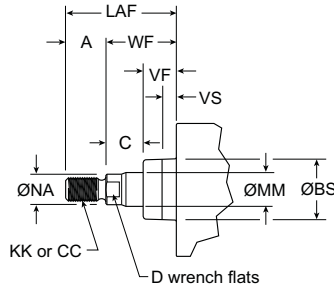
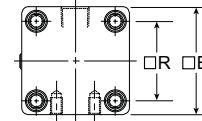
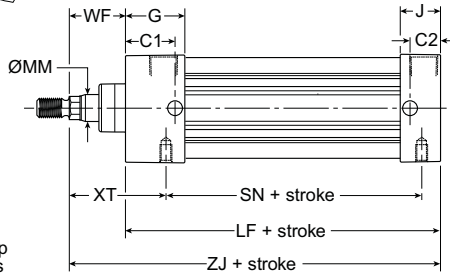
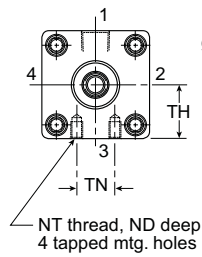
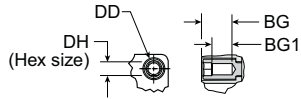
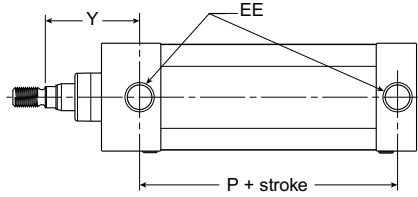
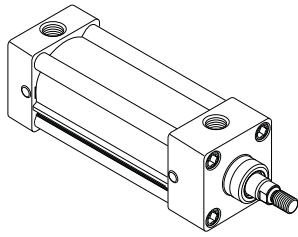
P1D  
 Series

**Sensors**

For sensors see page B339.



**3MA Single Rod Dimensioned Drawings (Styles TEF, T, TE and F)**



For dimensions of all standard rod end styles, please see next page.  
 BS = pilot diameter  
 VS = length of pilot diameter

**Styles TEF, T, TE and F**

Bore size	Rod no.	Rod dia. MM	Thread																EE (NPTF)	G
			Style 8 CC	Style 4 & 9 KK	A	AA	BG	BG1	BS	C	C1	C2	D	DD	DH	E				
1-1/2	1	5/8	1/2-20	7/16-20	0.750	2.020	0.562	0.374	1.124	0.385	1.000	0.500	1/2	1/4-28	1/4	2.000	3/8	1.438		
2	1	5/8	1/2-20	7/16-20	0.750	2.600	0.562	0.362	1.124	0.385	1.148	0.711	1/2	5/16-24	5/16	2.500	3/8	1.375		
2-1/2	1	5/8	1/2-20	7/16-20	0.750	3.100	0.562	0.362	1.124	0.385	1.117	0.711	1/2	5/16-24	5/16	3.000	3/8	1.344		
3-1/4	1	1	7/8-14	3/4-16	1.125	3.900	0.700	0.500	1.499	0.510	1.350	0.881	7/8	3/8-24	3/8	3.750	1/2	1.594		
4	1	1	7/8-14	3/4-16	1.125	4.700	0.700	0.500	1.499	0.510	1.350	0.881	7/8	3/8-24	3/8	4.500	1/2	1.594		
5	1	1	7/8-14	3/4-16	1.125	5.800	0.781	0.531	1.499	0.510	1.350	0.975	7/8	1/2-20	1/2	5.500	1/2	1.594		

Bore size	Rod no.	Rod dia. MM															Add stroke			
			J	LAF	NA	ND	NT	R	TH	TN	VF	VS	WF	XT	Y	LF	P	SN	ZJ	
1-1/2	1	5/8	0.938	1.750	0.563	0.375	1/4-20	1.430	0.993	0.625	0.615	-	1.000	1.938	1.875	3.625	2.313	2.250	4.625	
2	1	5/8	0.938	1.750	0.563	0.438	5/16-18	1.840	1.243	0.875	0.615	0.250	1.000	1.938	1.875	3.625	2.313	2.250	4.625	
2-1/2	1	5/8	0.938	1.750	0.563	0.625	3/8-16	2.190	1.493	1.250	0.615	0.250	1.000	1.938	1.938	3.750	2.375	2.375	4.750	
3-1/4	1	1	1.125	2.500	0.938	0.750	1/2-13	2.760	1.868	1.500	0.865	0.250	1.375	2.438	2.438	4.250	2.625	2.625	5.625	
4	1	1	1.125	2.500	0.938	0.750	1/2-13	3.320	2.243	2.063	0.865	0.250	1.375	2.438	2.438	4.250	2.625	2.625	5.625	
5	1	1	1.219	2.500	0.938	0.938	5/8-11	4.100	2.743	2.688	0.865	0.250	1.375	2.438	2.438	4.500	2.875	2.875	5.875	

**B**  
 Tie Rod Cylinders  
 Actuator Products

3MA Series

4MA/4ML Series

3MAJ/4MAJ Series

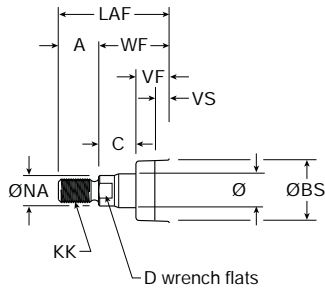
4MNR Series

P1D Series

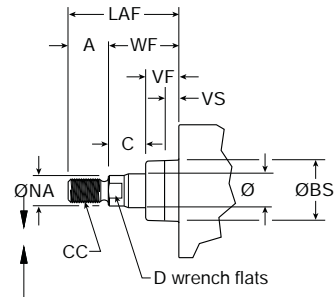


**3MA Rod End Dimensions**

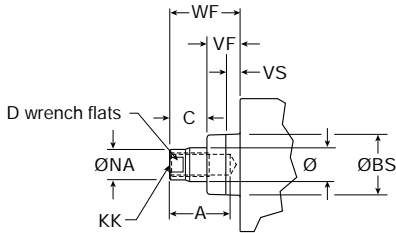
**Thread Style 4**  
 (NFPA Style SM)  
 Small Male



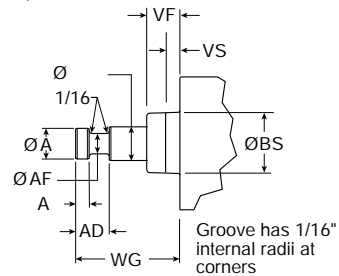
**Thread Style 8**  
 (NFPA Style IM)  
 Intermediate Male



**Thread Style 9**  
 (NFPA Style SF)  
 Short Female



**Thread Style 55**  
 For use with Split Coupler  
 (please reference catalog 0900P-E, page B105 for more information)



**Thread Style 3 - “Special Thread”**

Special threads, rod extensions, rod eyes, blanks, etc. are also available.  
 To order, specify “Style 3” and give desired dimensions for KK or CC, A and W or WF.  
 If otherwise special, please supply dimensioned sketch.

**Applies to all rod ends:**  
 BS = pilot diameter  
 VS = length of pilot diameter

**Rod End Dimensions**

Bore size	Rod no.	Rod dia. MM	Thread		+0.000 -0.004														
			Style 8 CC	Style 4 & 9 KK	A	AD	AE	AF	AM	BS	C	D	LAF	NA	VF	VS	WF	WG	
1-1/2	1	5/8	1/2-20	7/16-20	0.750	0.625	0.250	0.375	0.570	1.124	0.385	1/2	1.750	0.563	0.615	-	1.000	1.750	
2	1	5/8	1/2-20	7/16-20	0.750	0.625	0.250	0.375	0.570	1.124	0.385	1/2	1.750	0.563	0.615	0.250	1.000	1.750	
2-1/2	1	5/8	1/2-20	7/16-20	0.750	0.625	0.250	0.375	0.570	1.124	0.385	1/2	1.750	0.563	0.615	0.250	1.000	1.750	
3-1/4	1	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	2.500	0.938	0.865	0.250	1.375	2.375	
4	1	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	2.500	0.938	0.865	0.250	1.375	2.375	
5	1	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	2.500	0.938	0.865	0.250	1.375	2.375	

**B**

Tie Rod Cylinders  
Actuator Products

3MA Series

4MA/4ML Series

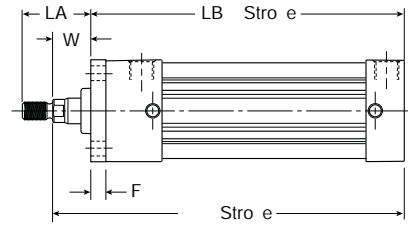
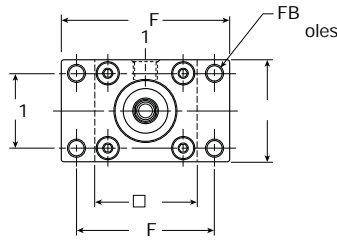
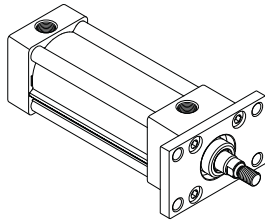
3MAJ/4MAJ Series

4MNR Series

P1D Series

**Head Rectangular Flange**

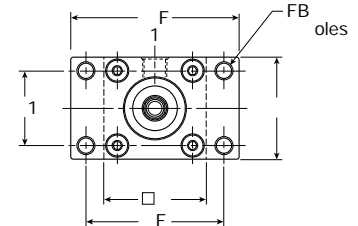
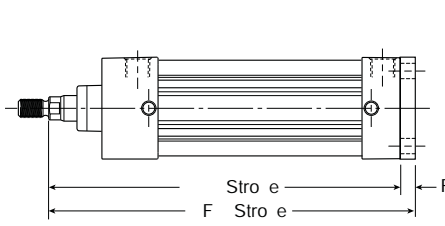
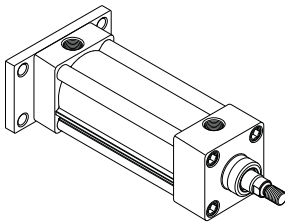
Style J  
 (NFPA MF1)



**Note:** Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.  
 For reference,  $WF = W + F$  and  $LA = W + A$ .

**Cap Rectangular Flange**

Style H  
 (NFPA MF2)



**Styles J and H**

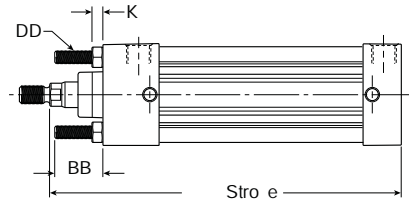
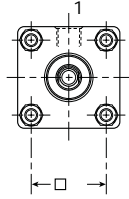
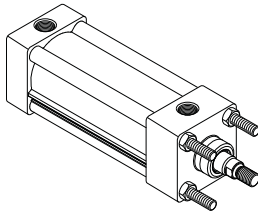
Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R1	TF	UF	W	Add stroke		
												LB	ZF	ZJ
1-1/2	1	5/8	0.750	2.000	0.375	0.313	1.375	1.430	2.750	3.375	0.625	4.000	5.000	4.625
2	1	5/8	0.750	2.500	0.375	0.375	1.375	1.840	3.375	4.125	0.625	4.000	5.000	4.625
2-1/2	1	5/8	0.750	3.000	0.375	0.375	1.375	2.190	3.875	4.625	0.625	4.125	5.125	4.750
3-1/4	1	1	1.125	3.750	0.625	0.438	1.875	2.760	4.688	5.500	0.750	4.875	6.250	5.625
4	1	1	1.125	4.500	0.625	0.438	1.875	3.320	5.438	6.250	0.750	4.875	6.250	5.625
5	1	1	1.125	5.500	0.625	0.563	1.875	4.100	6.625	7.625	0.750	5.125	6.500	5.875

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 3MA Series  
 4MA/4ML Series  
 3MAJ/4MAJ Series  
 4MNR Series  
 P1D Series



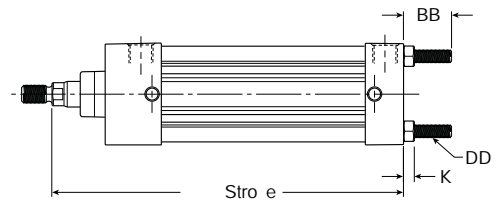
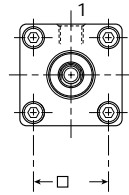
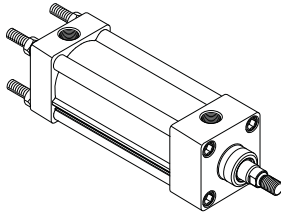
**Tie Rods Ext. Head End**

Style TB  
 (NFPA MX3)



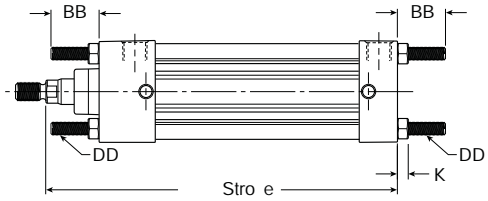
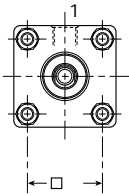
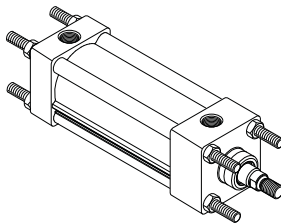
**Tie Rods Ext. Cap End**

Style TC  
 (NFPA MX2)



**Tie Rods Ext. Both Ends**

Style TD  
 (NFPA MX1)



**Styles TB, TC and TD**

Bore size	Rod no.	Rod dia. MM	BB	DD	E	K	R	Add stroke	
								ZJ	
1-1/2	1	5/8	1.000	1/4-28	2.000	0.250	1.430	4.625	
2	1	5/8	1.125	5/16-24	2.500	0.313	1.840	4.625	
2-1/2	1	5/8	1.125	5/16-24	3.000	0.313	2.190	4.750	
3-1/4	1	1	1.375	3/8-24	3.750	0.375	2.760	5.625	
4	1	1	1.375	3/8-24	4.500	0.375	3.320	5.625	
5	1	1	1.813	1/2-20	5.500	0.438	4.100	5.875	

**B**

Tie Rod Cylinders  
 Actuator Products

3MA Series

4MA/4ML Series

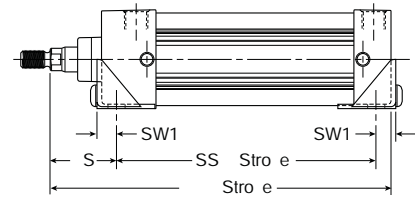
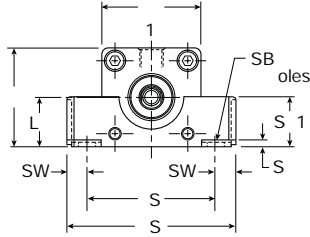
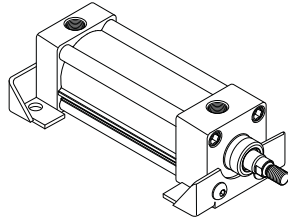
3MAJ/4MAJ Series

4MNR Series

P1D Series

**Side Lug**

Style C  
(NFPA MS2)

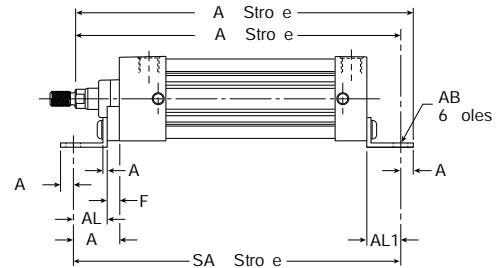
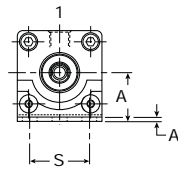
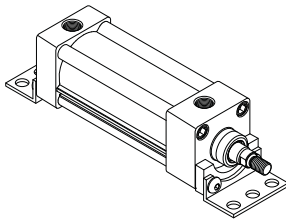


**Style C**

Bore size	Rod no.	Rod dia. MM	E	LH	SB	ST	ST1	ST2	SW	SW1	TS	US	XS	Add stroke	
														SS	ZJ
1-1/2	1	5/8	2.000	0.993	0.438	0.500	1.000	0.120	0.375	0.495	2.750	3.500	1.375	2.875	4.625
2	1	5/8	2.500	1.243	0.438	0.500	1.250	0.120	0.375	0.495	3.250	4.000	1.375	2.875	4.625
2-1/2	1	5/8	3.000	1.493	0.438	0.500	1.343	0.120	0.375	0.495	3.750	4.500	1.375	3.000	4.750
3-1/4	1	1	3.750	1.868	0.563	0.750	1.500	0.188	0.500	0.688	4.750	5.750	1.875	3.250	5.625
4	1	1	4.500	2.243	0.563	0.750	1.500	0.188	0.500	0.688	5.500	6.500	1.875	3.250	5.625
5	1	1	5.500	2.743	0.813	1.000	1.500	0.250	0.688	0.938	6.875	8.250	2.063	3.125	5.875

**Side End Angle\***

Style CB  
(NFPA MS1)



Note: Dimension "S" is for the holes in the mount (not the screw to screw dimension)

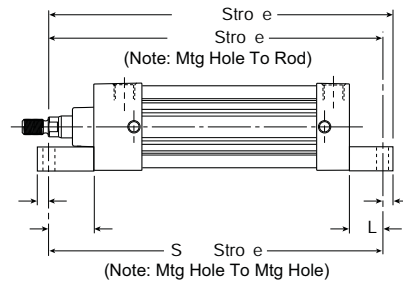
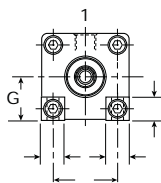
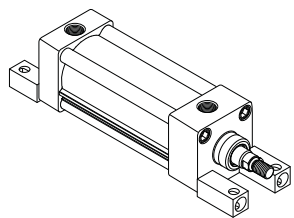
\*Maximum recommended pressure for this mount is 150 PSIG

**Style CB**

Bore size	Rod no.	Rod dia. MM	AB	AE	AH	AL	AL1	AO	AT	E	F	S	Add stroke		
													SA	XA	ZA
1-1/2	1	5/8	0.438	1.375	1.188	1.000	1.000	0.375	0.125	2.000	0.375	1.250	6.000	5.625	6.000
2	1	5/8	0.438	1.375	1.438	1.000	1.000	0.375	0.125	2.500	0.375	1.750	6.000	5.625	6.000
2-1/2	1	5/8	0.438	1.375	1.625	1.000	1.000	0.375	0.125	3.000	0.375	2.250	6.125	5.750	6.125
3-1/4	1	1	0.563	1.875	1.938	1.250	1.250	0.500	0.125	3.750	0.625	2.750	7.375	6.875	7.375
4	1	1	0.563	–	2.250	1.875	1.250	0.500	0.125	4.500	–	3.500	7.375	6.875	7.375
5	1	1	0.688	2.000	2.750	1.375	1.375	0.625	0.188	5.500	0.625	4.250	7.875	7.250	7.875

**Side End Lug**

Style G  
 (NFPA MS7)

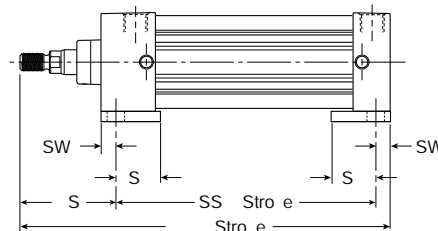
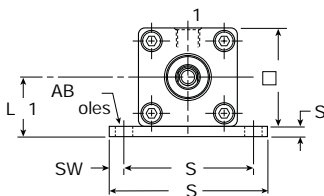
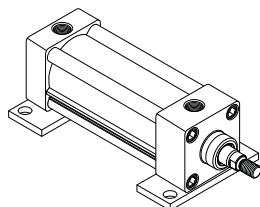


**Style G**

Bore Size	Rod no.	Rod Dia. MM	E	EB	EL	EM	EO	ET	GH	R	Add stroke		
											SE	XE	ZE
1-1/2	1	5/8	2.000	0.281	0.750	1.125	0.250	0.563	0.993	1.430	5.500	5.375	5.625
2	1	5/8	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	5.875	5.563	5.875
2-1/2	1	5/8	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	6.250	5.813	6.125
3-1/4	1	1	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	6.625	6.500	6.875
4	1	1	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	6.875	6.625	7.000

**Base Bar Mount**

Style NB



**Note:** Fasteners for NB base bar mount have been applied with removable threadlocking compound and torqued to bottom of endcaps.

**Style NB**

Bore size	Rod no.	Rod dia. MM	AB	E	LH1	ST3	SU	SW	TS	US	XS	Add stroke	
												SS	ZJ
1-1/2	1	5/8	0.438	2.000	1.243	0.250	1.125	0.375	2.750	3.500	1.375	2.875	4.625
2	1	5/8	0.438	2.500	1.493	0.250	1.125	0.375	3.250	4.000	1.375	2.875	4.625
2-1/2	1	5/8	0.438	3.000	1.868	0.375	1.125	0.375	3.750	4.500	1.375	3.000	4.750
3-1/4	1	1	0.563	3.750	2.368	0.500	1.250	0.500	4.750	5.750	1.875	3.250	5.625
4	1	1	0.563	4.500	2.743	0.500	1.250	0.500	5.500	6.500	1.875	3.250	5.625

**B**

Tie Rod Cylinders  
 Actuator Products

3MA Series

4MA/4ML Series

3MAJ/4MAJ Series

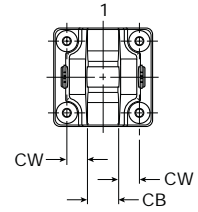
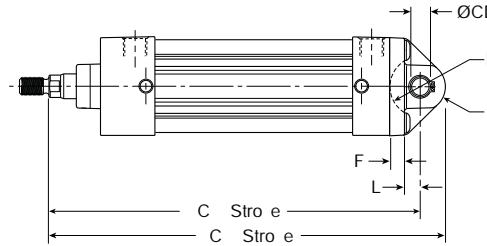
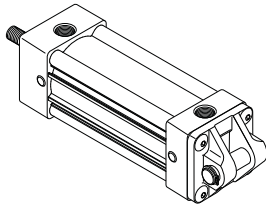
4MNR Series

P1D Series



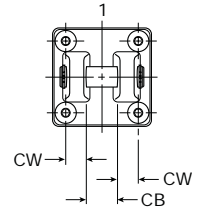
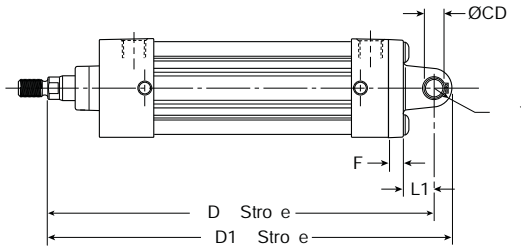
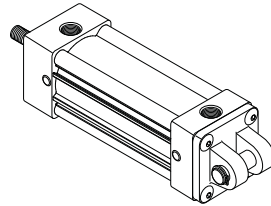
**Cap Fixed Clevis**

Style BB  
 (NFPA MP1)



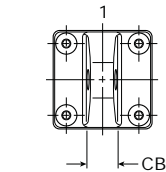
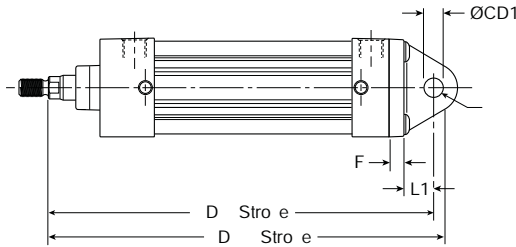
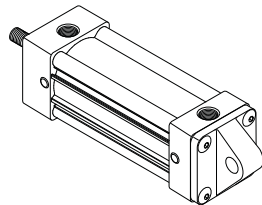
**Cap Detachable Clevis**

Style BC  
 (NFPA MP2)



**Cap Detachable Eye\***

Style BE  
 (NFPA MP4)



**Note:** 5 inch bore not available on BE mount, see 4MA series.

**Note:** For maximum swivel angle of BB mount with rear mounting plate, please reference Catalog 0900P-E, cylinder accessories on page B108.

**Styles BB, BC and BE**

Bore size	Rod no.	Rod dia. MM	CB	+0.002		+0.004		Add stroke											
				-0.002	-0.004	CW	E	F	L	LR	L1	MR	MR1	MR2	XC	XD	ZC	ZD1	ZD2
1-1/2	1	5/8	0.750	0.501	0.500	0.500	2.000	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.375	5.750	6.000	6.250	6.375
2	1	5/8	0.750	0.501	0.500	0.500	2.500	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.375	5.750	6.000	6.250	6.375
2-1/2	1	5/8	0.750	0.501	0.500	0.500	3.000	0.375	0.375	0.750	0.750	0.625	0.500	0.688	5.500	5.875	6.125	6.375	6.563
3-1/4	1	1	1.250	0.751	0.750	0.625	3.750	0.625	0.625	1.000	1.250	0.938	0.750	0.875	6.875	7.500	7.813	8.250	8.375
4	1	1	1.250	0.751	0.750	0.625	4.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	6.875	7.500	7.813	8.250	8.375
5*	1	1	1.250	0.751	0.750	0.625	5.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	7.125	7.750	8.063	8.500	8.625

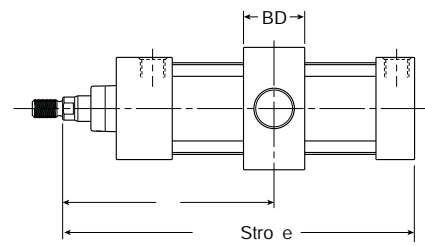
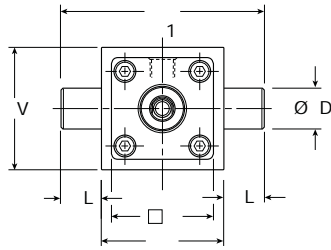
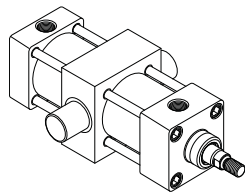
\* 5 inch bore not available on BE mount, see 4MA series

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 Series  
 4MA/4ML  
 Series  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series

**Intermediate Trunnion**

Style DD  
(NFPA MT4)

**Note:** Tie rod nuts for Style DD have a slot instead of internal hex.



**Style DD**

Bore size	Rod no.	Rod dia. MM	E	BD	+0.000 -0.001 TD	TL	TM	UM	UT	UV	XG	Min. XI	Add stroke	
													XJ	ZJ
1-1/2	1	5/8	2.000	1.250	1.000	1.000	2.500	4.500	4.000	2.500	1.750	3.036	4.125	4.625
2	1	5/8	2.500	1.500	1.000	1.000	3.000	5.000	4.500	3.000	1.750	3.125	4.125	4.625
2-1/2	1	5/8	3.000	1.500	1.000	1.000	3.500	5.500	5.000	3.500	1.750	3.094	4.250	4.750
3-1/4	1	1	3.750	2.000	1.000	1.000	4.500	6.500	5.750	4.250	2.250	3.969	5.000	5.625
4	1	1	4.500	2.000	1.000	1.000	5.250	7.250	6.500	5.000	2.250	3.969	5.000	5.625
5	1	1	5.500	2.000	1.000	1.000	6.250	8.250	7.500	6.000	2.250	3.969	5.250	5.875

**Mounting Kits and Accessories**

Refer to page B37 for 3MA mounting kits and cylinder accessories.

**1-1/2" - 5" Bore 3MA Piston Seal Kits & Complete Cylinder Kits**

Bore size	Rod no.	Rod dia. MM	PK - Piston Seal Kit, Standard Lipseals Includes piston & end seals	SK - Complete Cylinder Kit. Includes wiper, rod seal, rod bearing, cylinder seals, and needle valve inserts	Torque units endcap fastener or tie rod	
			Nitrile seal kit number	Nitrile seal kit number	USA inch-lbs	Metric N-m
1-1/2	1	5/8	PK1503MA01	SK15003MA1	32 - 36	3.6 - 4.1
2	1	5/8	PK2003MA01	SK20003MA1	72 - 82	8 - 9
2-1/2	1	5/8	PK2503MA01	SK25003MA1	72 - 82	8 - 9
3-1/4	1	1	PK3253MA01	SK32003MA1	216 - 228	24 - 25.3
4	1	1	PK4003MA01	SK40003MA1	216 - 228	24 - 25.3
5	1	1	PK5003MA01	SK50003MA1	360 - 372	41 - 42

**B**  
Tie Rod Cylinders  
Actuator Products

3MA Series

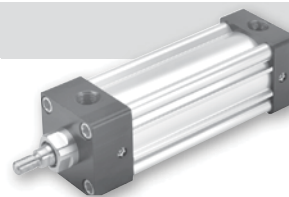
4MA/4ML Series

3MAJ/4MAJ Series

4MNR Series

P1D Series

## 4MA/4ML Series – 1-1/2" thru 5" Bore Size



- Industry leading aluminum NFPA interchangeable cylinder with flexible construction
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4" and 5"
- Removable bronze alloy gland/bearing for easy maintenance
- Available in any practical stroke length
- 20 standard mounting styles available
- Extruded-profile aluminum body with integrated switch grooves
- Single rod end or double rod ends
- Cushions – standard and adjustable at both ends, optional non-cushioned
- RoHS compliant

### Operating information

	4MA	4ML
Operating pressure:	250 PSIG (17 bar) maximum air service	400 PSIG (27 bar) maximum hydraulic service
Temperature range –		
Standard seals	-10°F to 165°F (-23°C to 74°C)	
Fluorocarbon seals	-10°F to 250°F (-23°C to 121°C)	
Low temperature seals	-50°F to 150°F (-46°C to 66°C)	
Filtration requirements:	40 micron, dry filtered air	Filtered hydraulic oil

### Ordering information

<b>2.00</b>	<b>J</b>	<b>4MA</b>	<b>U</b>	<b>1</b>	<b>4</b>	<b>A</b>	<b>6.000</b>
<b>Bore size</b> 1.50 <sup>1</sup> 2.00 2.50 3.25 4.00 5.00	<b>Double rod cylinder</b> <sup>12</sup> Specify "K" only if double rod cylinder is required.	<b>Series</b> 4MA Air service 4ML Hydraulic service <sup>2</sup>	<b>Ports</b> U NPTF R BSPP B BSPT T SAE	<b>Piston rod number</b> Specify rod code number for required diameter. <sup>8, 2</sup>	<b>Cushion cap end</b> Blank Non-cushioned cap end C Cushioned cap end (not available for 4ML)	<b>Cushion head end</b> Blank Non-cushioned head end C Cushioned head end (not available for 1.50" bore with 1" rod or 4ML)	<b>Stroke length</b> Specify stroke length required in inches. <sup>11</sup>
<b>Mounting style</b> Specify mounting style code (see table on following page).	<b>Special modification</b> Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MA with Linear Position Sensor Option) <sup>7</sup>	<b>Seals</b> Blank Standard (nitrile seals) V Fluorocarbon seals <sup>4</sup> E Fluorocarbon rod wiper and rod seal only <sup>5</sup> 4 Low temperature seals <sup>4</sup> M Metallic rod wiper, nitrile seals <sup>6</sup>	<b>Piston rod thread style</b> 4 Small male 8 Intermediate male 9 Short female 55 For use with split coupler <sup>9</sup> 3 Special (and specify all dimensions required)	<b>Piston rod thread type</b> A Standard (UNF unified thread) W BSF British fine M* Metric	<b>Rod material and gland code</b> Blank Standard rod and gland H Standard rod and HI LOAD gland Y 17-4 PH stainless steel rod and standard gland Z 17-4 PH stainless steel rod and HI LOAD gland J 303 stainless steel rod and standard gland <sup>10</sup> K 303 stainless steel rod and HI LOAD gland <sup>10</sup> S 316 stainless steel rod and standard gland <sup>10</sup> T 316 stainless steel rod and HI LOAD gland <sup>10</sup>		
<b>Cylinder construction</b> Blank* Standard (extruded body, standard round lobe orientation) A* Extruded body, round lobe orientation rotated 90 degrees from standard N* Extruded body, round lobe orientation rotated 180 degrees from standard Z* Extruded body, round lobe orientation rotated 270 degrees from standard T Aluminum round tube and carbon steel tie rods & nuts	<b>Special modification</b> Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MA with Linear Position Sensor Option) <sup>7</sup>	<b>Piston type</b> <sup>2</sup> Blank Standard (lipseals and magnetic ring) <sup>12</sup> 1 Lipseals, no magnetic ring <sup>12</sup> 2 Lipseals, no magnetic ring (aluminum piston) 3 Lipseals and magnetic ring (aluminum piston) (standard for 4ML) 4 Bumper seals, no magnetic ring 6 Bumper seals and magnetic ring B Lipseals, 1/4" thick bumpers both ends <sup>3</sup> H Lipseals, 1/4" thick bumper head end <sup>3</sup> C Lipseals, 1/4" thick bumper cap end <sup>3</sup> D Lipseals and magnetic ring, 1/4" thick bumpers both ends <sup>3</sup> F Lipseals and magnetic ring, 1/4" thick bumper head end <sup>3</sup> R Lipseals and magnetic ring, 1/4" thick bumper cap end <sup>3</sup>	<b>Seals</b> Blank Standard (nitrile seals) V Fluorocarbon seals <sup>4</sup> E Fluorocarbon rod wiper and rod seal only <sup>5</sup> 4 Low temperature seals <sup>4</sup> M Metallic rod wiper, nitrile seals <sup>6</sup>	<b>Piston rod thread type</b> A Standard (UNF unified thread) W BSF British fine M* Metric	<b>Rod material and gland code</b> Blank Standard rod and gland H Standard rod and HI LOAD gland Y 17-4 PH stainless steel rod and standard gland Z 17-4 PH stainless steel rod and HI LOAD gland J 303 stainless steel rod and standard gland <sup>10</sup> K 303 stainless steel rod and HI LOAD gland <sup>10</sup> S 316 stainless steel rod and standard gland <sup>10</sup> T 316 stainless steel rod and HI LOAD gland <sup>10</sup>		

\* Please reference catalog 0900P-E, table on page B10. Only applies to 1-1/2" to 4" bore size.

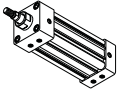
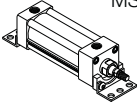
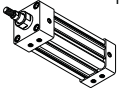
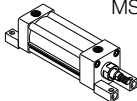
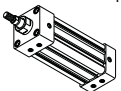
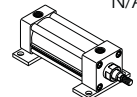
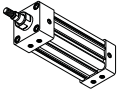
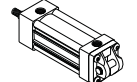
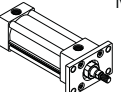
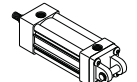
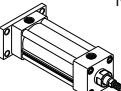
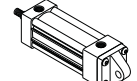
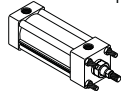
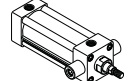
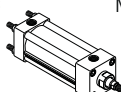
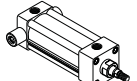
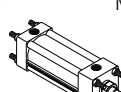
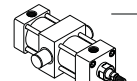
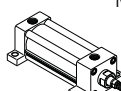
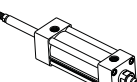
<sup>1</sup> Not available with Linear Position Sensor Option (LPSO).  
<sup>2</sup> Piston Types (blank), 1, 4 and 6 not available for 4ML. Piston Types (blank) and 1 not available for oversize rod numbers 2 and 3. Seals option V only available with Piston Types 2 and 4. Seals option 4 only available with Piston Types 2 and 3.  
<sup>3</sup> Addition of 1/4" bumper results in a 1/4" stroke loss per bumper, per end. For example, a 6" stroke cylinder with 1/4" bumpers at both ends (option B) has an effective stroke of 5-1/2".  
<sup>4</sup> Reed and solid-state sensors only available with standard seals or options E and M. See footnote 2.  
<sup>5</sup> Used for external chemical compatibility applications, not high temperature.  
<sup>6</sup> If fluorocarbon seals are required with this option, please place an "S" for special in the Special Modification field and specify the "fluorocarbon seals and metallic rod wiper" in the item notes.  
<sup>7</sup> For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:  
a. Sensor part number (please reference catalog 0900P-E, pages B100-B104)  
b. Sensor position  
c. Port position (if other than position 1)  
d. Length of stop tubing, gross stroke and net stroke (if required)  
Also, Piston Type option (blank), 3, 6, D, F or R is required.  
<sup>8</sup> Review Piston Rod Selection Chart, please reference catalog 0900P-E, page A14 to determine proper piston rod diameter.  
<sup>9</sup> For additional information regarding this style, please reference catalog 0900P-E, page B105. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in Special Modification field and specify Rod Material and Gland Code in the item notes.  
<sup>10</sup> Not available for 4ML.  
<sup>11</sup> If a stop tube is required, specify gross stroke (net stroke + stop tube) in the model number, then place an "S" for special in the Special Modification field and specify the stop tube length in the item notes. Not available with Piston Types (blank) and 1.  
<sup>12</sup> Double rod cylinders not available with composite piston type.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



**B**  
Tie Rod Cylinders  
Actuator Products  
3MA Series  
4MA/4ML Series  
3MAJ/4MAJ Series  
4MNR Series  
P1D Series

**4MA/4ML Mounting Styles for 1-1/2" to 5" Bore**

Mounting style	NFPA mounting	Description	Bore size	Mounting style	NFPA mounting	Description	Bore size
TEF 	MX5/MS4	Sleeve Nut with Side Tap (standard mount)	1-1/2 - 5*	CB 	MS1	Side End Angle	1-1/2 - 5
T 	MX0	No Mount (same construction as TEF)	1-1/2 - 5	G 	MS7	Side End Lug	1-1/2 - 4*
TE 	MX5	Sleeve Nut (same construction as TEF)	1-1/2 - 5	NB 	N/A	Base Bar	1-1/2 - 4*
F 	MS4	Side Tap (same construction as TEF)	1-1/2 - 5*	BB 	MP1	Cap Fixed Clevis	1-1/2 - 5
J 	MF1	Head Rectangular Flange	1-1/2 - 5	BC 	MP2	Cap Detachable Clevis	1-1/2 - 5
H 	MF2	Cap Rectangular Flange	1-1/2 - 5	BE 	MP4	Cap Detachable Eye	1-1/2 - 5
TB 	MX3	Tie Rods Extended Head End	1-1/2 - 5	D 	MT1	Head Trunnion	1-1/2 - 5*
TC 	MX2	Tie Rods Extended Cap End	1-1/2 - 5	DB 	MT2	Cap Trunnion	1-1/2 - 5
TD 	MX1	Tie Rods Extended Both Ends	1-1/2 - 5	DD 	MT4	Intermediate Trunnion	1-1/2 - 5
C 	MS2	Side Lug	1-1/2 - 5	KTEF † 	MDX5/MDS4	Double Rod End, TEF Mount	1-1/2 - 5

\* Not available for 1-1/2" bore with 1" rod.

† Double rod end cylinders can be ordered with head mountings, i.e. KJ.

<b>B</b> Tie Rod Cylinders Actuator Products	3MA Series
	4MA/4ML Series
	3MAJ/4MAJ Series
	4MNR Series
P1D Series	

**Sensors**

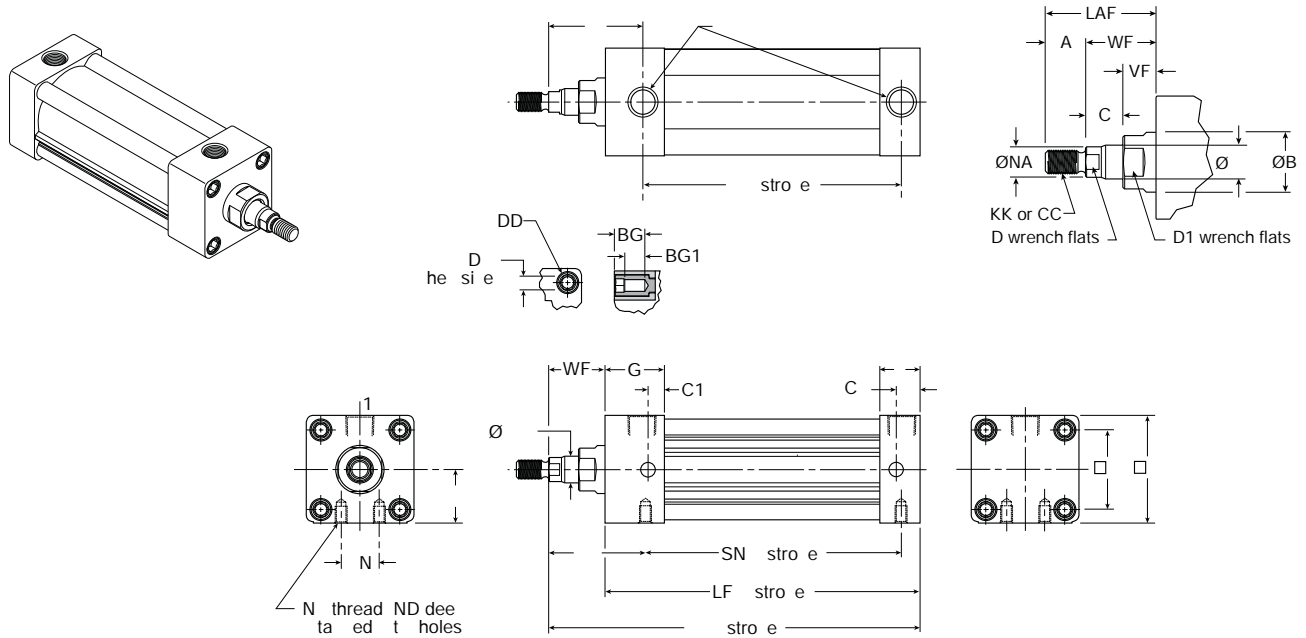
For sensors see page B339.



**Kits & Accessories**

See page B37.

Single Rod Dimensioned Drawings (Styles TEF, T, TE and F)



Styles TEF, T, TE and F

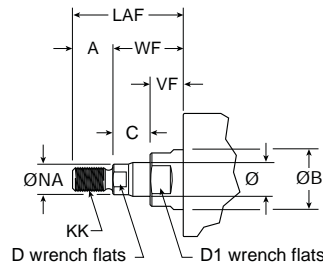
Bore size	Rod no.	Rod dia. MM	Thread		Style 8		Style 4 & 9		+0.000 -0.002														EE (NPTF)											
			Style 8 CC	Style 4 & 9 KK	A	AA	B	BG	BG1	C	C1	C2	D	D1	DD	DH	E	G																
1-1/2	1*	5/8	1/2-20	7/16-20	0.750	2.020	1.124	0.562	0.374	0.385	1.000	0.500	1/2	1	1/4-28	1/4	2.000	3/8	1.438															
	2	1	7/8-14	3/4-16	1.125	2.020	1.499	0.562	0.374	0.510	-	0.500	7/8	1-3/8	1/4-28	1/4	2.000	3/8	1.438															
2	1	5/8	1/2-20	7/16-20	0.750	2.600	1.124	0.562	0.362	0.385	1.000	0.562	1/2	1	5/16-24	5/16	2.500	3/8	1.375															
	3	1	7/8-14	3/4-16	1.125	2.600	1.499	0.562	0.362	0.510	1.000	0.562	7/8	1-3/8	5/16-24	5/16	2.500	3/8	1.375															
2-1/2	1	5/8	1/2-20	7/16-20	0.750	3.100	1.124	0.562	0.362	0.385	1.000	0.594	1/2	1	5/16-24	5/16	3.000	3/8	1.344															
	3	1	7/8-14	3/4-16	1.125	3.100	1.499	0.562	0.362	0.510	1.000	0.594	7/8	1-3/8	5/16-24	5/16	3.000	3/8	1.344															
3-1/4	1	1	7/8-14	3/4-16	1.125	3.900	1.499	0.700	0.500	0.510	1.188	0.719	7/8	1-3/8	3/8-24	3/8	3.750	1/2	1.594															
	3	1-3/8	1-1/4-12	1-14	1.625	3.900	1.999	0.700	0.500	0.635	1.188	0.719	1-1/8	1-7/8	3/8-24	3/8	3.750	1/2	1.594															
4	1	1	7/8-14	3/4-16	1.125	4.700	1.499	0.700	0.500	0.510	1.188	0.719	7/8	1-3/8	3/8-24	3/8	4.500	1/2	1.594															
	3	1-3/8	1-1/4-12	1-14	1.625	4.700	1.999	0.700	0.500	0.635	1.188	0.719	1-1/8	1-7/8	3/8-24	3/8	4.500	1/2	1.594															
5	1	1	7/8-14	3/4-16	1.125	5.800	1.499	0.781	0.531	0.510	1.188	0.813	7/8	1-3/8	1/2-20	1/2	5.500	1/2	1.594															
	3	1-3/8	1-1/4-12	1-14	1.625	5.800	1.999	0.781	0.531	0.635	1.188	0.813	1-1/8	1-7/8	1/2-20	1/2	5.500	1/2	1.594															
Bore size	Rod no.	Rod dia. MM	J		LAF		NA		ND		NT		R		TH		TN		VF		WF		XT		Y		LF		P		SN		ZJ	
			J	LAF	NA	ND	NT	R	TH	TN	VF	WF	XT	Y	LF	P	SN	ZJ																
1-1/2	1*	5/8	0.938	1.750	0.563	0.375	1/4-20	1.430	0.993	0.625	0.615	1.000	1.938	1.875	3.625	2.313	2.250	4.625																
	2	1	0.938	2.500	0.938	-	-	1.430	0.993	-	0.865	1.375	-	2.250	3.625	2.313	-	5.000																
2	1	5/8	0.937	1.750	0.563	0.438	5/16-18	1.840	1.243	0.875	0.615	1.000	1.938	1.875	3.625	2.313	2.250	4.625																
	3	1	0.937	2.500	0.938	0.375	5/16-18	1.840	1.243	0.875	0.865	1.375	2.313	2.250	3.625	2.313	2.250	5.000																
2-1/2	1	5/8	0.938	1.750	0.563	0.625	3/8-16	2.190	1.493	1.250	0.615	1.000	1.938	1.938	3.750	2.375	2.375	4.750																
	3	1	0.938	2.500	0.938	0.625	3/8-16	2.190	1.493	1.250	0.865	1.375	2.313	2.313	3.750	2.375	2.375	5.125																
3-1/4	1	1	1.125	2.500	0.938	0.750	1/2-13	2.760	1.868	1.500	0.865	1.375	2.438	2.438	4.250	2.625	2.625	5.625																
	3	1-3/8	1.125	3.250	1.313	0.750	1/2-13	2.760	1.868	1.500	0.990	1.625	2.688	2.688	4.250	2.625	2.625	5.875																
4	1	1	1.125	2.500	0.938	0.750	1/2-13	3.320	2.243	2.063	0.865	1.375	2.438	2.438	4.250	2.625	2.625	5.625																
	3	1-3/8	1.125	3.250	1.313	0.750	1/2-13	3.320	2.243	2.063	0.990	1.625	2.688	2.688	4.250	2.625	2.625	5.875																
5	1	1	1.219	2.500	0.938	0.938	5/8-11	4.100	2.743	2.688	0.865	1.375	2.438	2.438	4.500	2.875	2.875	5.875																
	3	1-3/8	1.219	3.250	1.313	0.938	5/8-11	4.100	2.743	2.688	0.990	1.625	2.688	2.688	4.500	2.875	2.875	6.125																

\* NOTE - 1-1/2" bore with 1" rod is TE mount, F mount not available.  
 1-1/2" bore with 1" rod cannot have a cushion at head end.

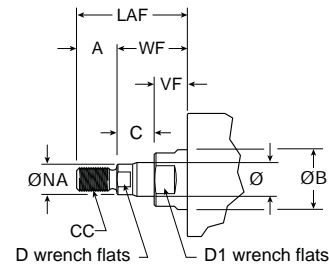


**4MA Rod End Dimensions**

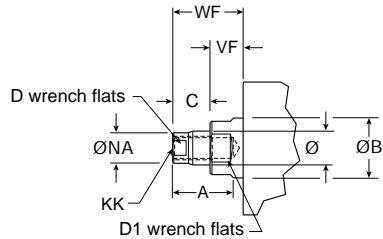
**Thread Style 4**  
 (NFPA Style SM)  
 Small Male



**Thread Style 8**  
 (NFPA Style IM)  
 Intermediate Male

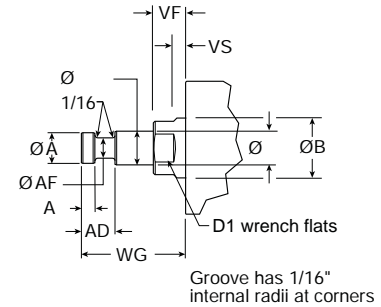


**Thread Style 9**  
 (NFPA Style SF)  
 Short Female



**Thread Style 55**

For use with Split Coupler  
 (please reference catalog 0900P-E, page B105 for more information)



**Thread Style 3 - "Special Thread"**

Special threads, rod extensions, rod eyes, blanks, etc. are also available.  
 To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF.  
 If otherwise special, please supply dimensioned sketch.

**Rod End Dimensions**

Bore size	Rod no.	Rod dia. MM	Thread		+0.000 -0.002													
			Style 8 CC	Style 4 & 9 KK	A	AD	AE	AF	AM	B	C	D	D1	LAF	NA	VF	WF	WG
1-1/2	1	5/8	1/2-20	7/16-20	0.750	0.625	0.250	0.375	0.570	1.124	0.385	1/2	1	1.750	0.563	0.615	1.000	1.750
	2	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
2	1	5/8	1/2-20	7/16-20	0.750	0.625	0.250	0.375	0.570	1.124	0.385	1/2	1	1.750	0.563	0.615	1.000	1.750
	3	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
2-1/2	1	5/8	1/2-20	7/16-20	0.750	0.625	0.250	0.375	0.570	1.124	0.385	1/2	1	1.750	0.563	0.615	1.000	1.750
	3	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
3-1/4	1	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
	3	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750
4	1	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
	3	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750
5	1	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
	3	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750

**B**

Tie Rod Cylinders  
 Actuator Products

3MA  
 Series

4MA/4ML  
 Series

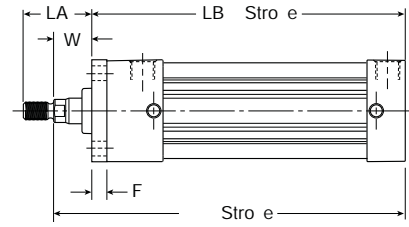
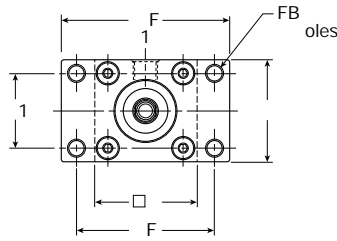
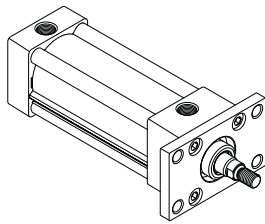
3MAJ/4MAJ  
 Series

4MNR  
 Series

P1D  
 Series

**Head Rectangular Flange**

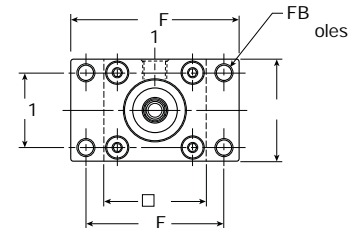
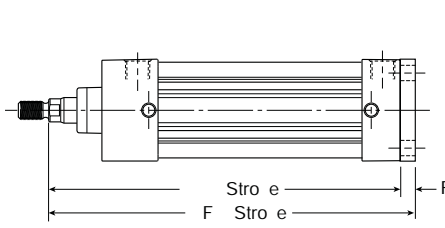
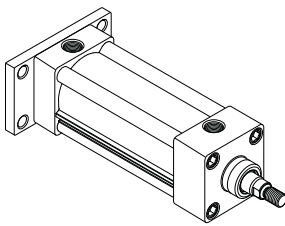
Style J  
 (NFPA MF1)



**Note:** Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.  
 For reference,  $WF = W + F$  and  $LA = W + A$ .

**Cap Rectangular Flange**

Style H  
 (NFPA MF2)



**Styles J and H**

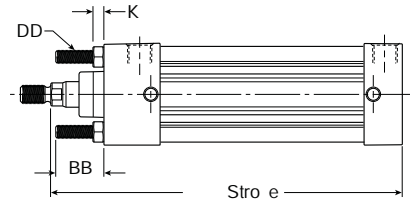
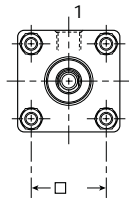
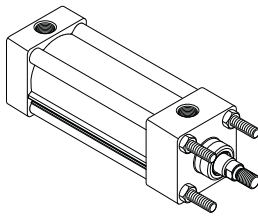
Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R1	TF	UF	W	Add stroke		
												LB	ZF	ZJ
1-1/2	1	5/8	0.750	2.000	0.375	0.313	1.375	1.430	2.750	3.375	0.625	4.000	5.000	4.625
	2	1	1.125	2.000	0.375	0.313	2.125	1.430	2.750	3.375	1.000	4.000	5.375	5.000
2	1	5/8	0.750	2.500	0.375	0.375	1.375	1.840	3.375	4.125	0.625	4.000	5.000	4.625
	3	1	1.125	2.500	0.375	0.375	2.125	1.840	3.375	4.125	1.000	4.000	5.375	5.000
2-1/2	1	5/8	0.750	3.000	0.375	0.375	1.375	2.190	3.875	4.625	0.625	4.125	5.125	4.750
	3	1	1.125	3.000	0.375	0.375	2.125	2.190	3.875	4.625	1.000	4.125	5.500	5.125
3-1/4	1	1	1.125	3.750	0.625	0.438	1.875	2.760	4.688	5.500	0.750	4.875	6.250	5.625
	3	1-3/8	1.625	3.750	0.625	0.438	2.625	2.760	4.688	5.500	1.000	4.875	6.500	5.875
4	1	1	1.125	4.500	0.625	0.438	1.875	3.320	5.438	6.250	0.750	4.875	6.250	5.625
	3	1-3/8	1.625	4.500	0.625	0.438	2.625	3.320	5.438	6.250	1.000	4.875	6.500	5.875
5	1	1	1.125	5.500	0.625	0.563	1.875	4.100	6.625	7.625	0.750	5.125	6.500	5.875
	3	1-3/8	1.625	5.500	0.625	0.563	2.625	4.100	6.625	7.625	1.000	5.125	6.750	6.125

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 Series  
 4MA/4ML  
 Series  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series



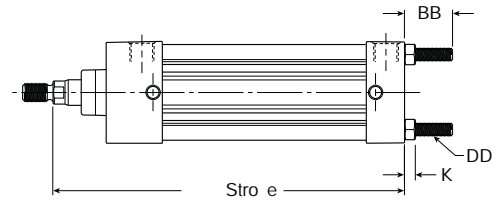
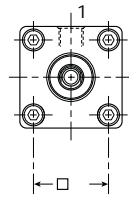
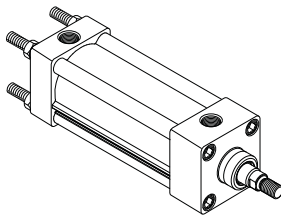
**Tie Rods Ext. Head End**

Style TB  
 (NFPA MX3)



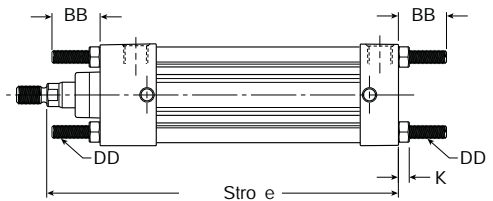
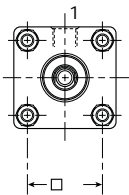
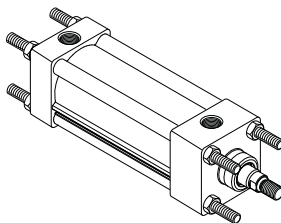
**Tie Rods Ext. Cap End**

Style TC  
 (NFPA MX2)



**Tie Rods Ext. Both Ends**

Style TD  
 (NFPA MX1)



**Styles TB, TC and TD**

Bore size	Rod no.	Rod dia. MM	BB	DD	E	K	R	Add stroke	
								ZJ	
1-1/2	1	5/8	1.000	1/4-28	2.000	0.250	1.430	4.625	
	2	1	1.000	1/4-28	2.000	0.250	1.430	5.000	
2	1	5/8	1.125	5/16-24	2.500	0.313	1.840	4.625	
	3	1	1.125	5/16-24	2.500	0.313	1.840	5.000	
2-1/2	1	5/8	1.125	5/16-24	3.000	0.313	2.190	4.750	
	3	1	1.125	5/16-24	3.000	0.313	2.190	5.125	
3-1/4	1	1	1.375	3/8-24	3.750	0.375	2.760	5.625	
	3	1-3/8	1.375	3/8-24	3.750	0.375	2.760	5.875	
4	1	1	1.375	3/8-24	4.500	0.375	3.320	5.625	
	3	1-3/8	1.375	3/8-24	4.500	0.375	3.320	5.875	
5	1	1	1.813	1/2-20	5.500	0.438	4.100	5.875	
	3	1-3/8	1.813	1/2-20	5.500	0.438	4.100	6.125	

**B**

Tie Rod Cylinders  
 Actuator Products

3MA  
 Series

4MA/4ML  
 Series

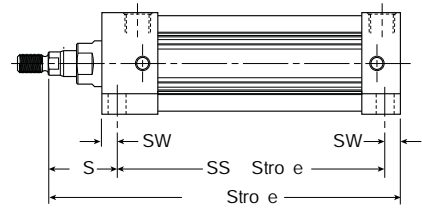
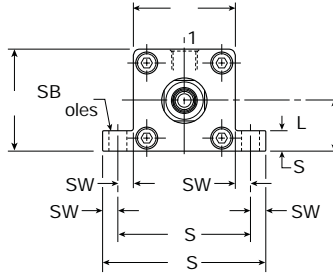
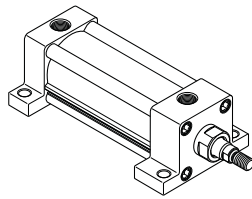
3MAJ/4MAJ  
 Series

4MNR  
 Series

P1D  
 Series



**Side Lug**  
 Style C for  
 (NFPA MS2)

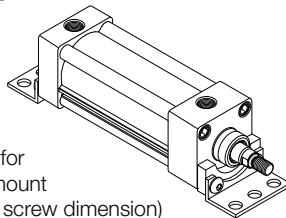


**Styles C**

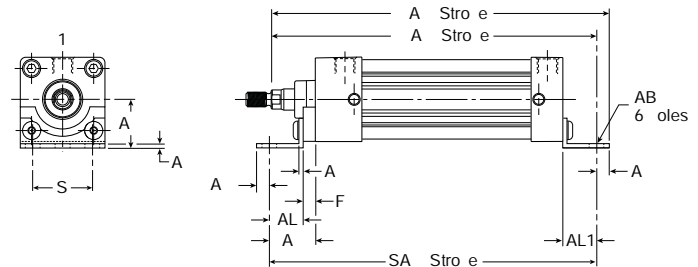
Bore size	Rod no.	Rod dia. MM	E	LH	SB	ST	ST1	ST2	SW	SW1	TS	US	XS	Add stroke	
														SS	ZJ
1-1/2	1	5/8	2.000	0.993	0.438	0.500	1.000	0.120	0.375	0.495	2.750	3.500	1.375	2.875	4.625
	2	1	2.000	0.993	0.438	0.500	1.000	0.120	0.375	0.495	2.750	3.500	1.750	2.875	5.000
2	1	5/8	2.500	1.243	0.438	0.500	1.250	0.120	0.375	0.495	3.250	4.000	1.375	2.875	4.625
	3	1	2.500	1.243	0.438	0.500	1.250	0.120	0.375	0.495	3.250	4.000	1.750	2.875	5.000
2-1/2	1	5/8	3.000	1.493	0.438	0.500	1.343	0.120	0.375	0.495	3.750	4.500	1.375	3.000	4.750
	3	1	3.000	1.493	0.438	0.500	1.343	0.120	0.375	0.495	3.750	4.500	1.750	3.000	5.125
3-1/4	1	1	3.750	1.868	0.563	0.750	1.500	0.188	0.500	0.688	4.750	5.750	1.875	3.250	5.625
	3	1-3/8	3.750	1.868	0.563	0.750	1.500	0.188	0.500	0.688	4.750	5.750	2.125	3.250	5.875
4	1	1	4.500	2.243	0.563	0.750	1.500	0.188	0.500	0.688	5.500	6.500	1.875	3.250	5.625
	3	1-3/8	4.500	2.243	0.563	0.750	1.500	0.188	0.500	0.688	5.500	6.500	2.125	3.250	5.875
5	1	1	5.500	2.743	0.813	1.000	1.500	0.250	0.688	0.938	6.875	8.250	2.063	3.125	5.875
	3	1-3/8	5.500	2.743	0.813	1.000	1.500	0.250	0.688	0.938	6.875	8.250	2.313	3.125	6.125

**Side End Angle\***

Style CB  
 (NFPA MS1)



**Note:**  
 Dimension "S" is for the holes in the mount (not the screw to screw dimension)



\*Maximum recommended pressure for this mount is 150 PSIG

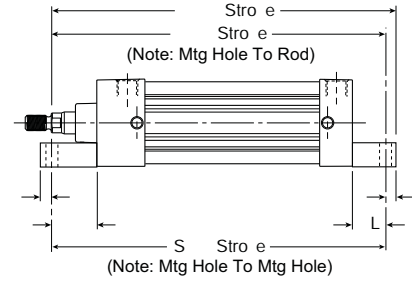
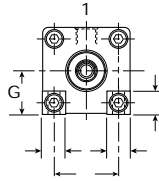
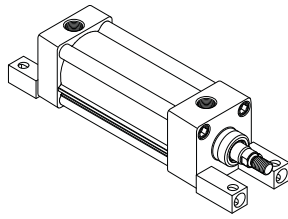
**Style CB**

Bore size	Rod no.	Rod dia. MM	AB	AE	AH	AL	AL1	AO	AT	E	F	S	Add stroke		
													SA	XA	ZA
1-1/2	1	5/8	0.438	1.375	1.188	1.000	1.000	0.375	0.125	2.000	0.375	1.250	6.000	5.625	6.000
	2	1	0.438	1.375	1.188	1.000	1.000	0.375	0.125	2.000	0.375	1.250	6.000	6.000	6.375
2	1	5/8	0.438	1.375	1.438	1.000	1.000	0.375	0.125	2.500	0.375	1.750	6.000	5.625	6.000
	3	1	0.438	1.375	1.438	1.000	1.000	0.375	0.125	2.500	0.375	1.750	6.000	6.000	6.375
2-1/2	1	5/8	0.438	1.375	1.625	1.000	1.000	0.375	0.125	3.000	0.375	2.250	6.125	5.750	6.125
	3	1	0.438	1.375	1.625	1.000	1.000	0.375	0.125	3.000	0.375	2.250	6.125	6.125	6.500
3-1/4	1	1	0.563	1.875	1.938	1.250	1.250	0.500	0.125	3.750	0.625	2.750	7.375	6.875	7.375
	3	1-3/8	0.563	1.875	1.938	1.250	1.250	0.500	0.125	3.750	0.625	2.750	7.375	7.125	7.625
4	1	1	0.563	-	2.250	1.875	1.250	0.500	0.125	4.500	-	3.500	7.375	6.875	7.375
	3	1-3/8	0.563	-	2.250	1.875	1.250	0.500	0.125	4.500	-	3.500	7.375	7.125	7.625
5	1	1	0.688	2.000	2.750	1.375	1.375	0.625	0.188	5.500	0.625	4.250	7.875	7.250	7.875
	3	1-3/8	0.688	2.000	2.750	1.375	1.375	0.625	0.188	5.500	0.625	4.250	7.875	7.500	8.125



**Side End Lug**

Style G  
 (NFPA MS7)



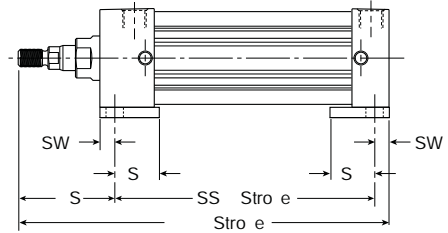
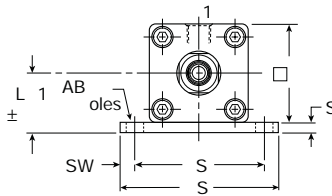
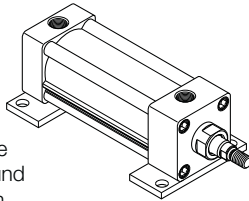
**Style G**

Bore size	Rod no.	Rod dia. MM	E	EB	EL	EM	EO	ET	GH	R	Add Stroke		
											SE	XE	ZE
1-1/2	1	5/8	2.000	0.281	0.750	1.125	0.250	0.563	0.993	1.430	5.500	5.375	5.625
	2	1	-	-	-	-	-	-	-	-	-	-	-
2	1	5/8	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	5.875	5.563	5.875
	3	1	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	5.875	5.938	6.250
2-1/2	1	5/8	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	6.250	5.813	6.125
	3	1	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	6.250	6.188	6.500
3-1/4	1	1	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	6.625	6.500	6.875
	3	1-3/8	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	6.625	6.750	7.125
4	1	1	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	6.875	6.625	7.000
	3	1-3/8	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	6.875	6.875	7.250

**Base Bar Mount**

Style NB for 4MA

**Note:** Fasteners for NB base bar mount have been applied with removable threadlocking compound and torqued to bottom of endcaps.



**Style NB**

Bore size	Rod no.	Rod dia. MM	AB	E	LH1	ST3	SU	SW	TS	US	XS	Add stroke	
												SS	ZJ
1-1/2	1	5/8	0.438	2.000	1.243	0.250	1.125	0.375	2.750	3.500	1.375	2.875	4.625
	2	1	-	-	-	-	-	-	-	-	-	-	-
2	1	5/8	0.438	2.500	1.493	0.250	1.125	0.375	3.250	4.000	1.375	2.875	4.625
	3	1	0.438	2.500	1.493	0.250	1.125	0.375	3.250	4.000	1.750	2.875	5.000
2-1/2	1	5/8	0.438	3.000	1.868	0.375	1.125	0.375	3.750	4.500	1.375	3.000	4.750
	3	1	0.438	3.000	1.868	0.375	1.125	0.375	3.750	4.500	1.750	3.000	5.125
3-1/4	1	1	0.563	3.750	2.368	0.500	1.250	0.500	4.750	5.750	1.875	3.250	5.625
	3	1-3/8	0.563	3.750	2.368	0.500	1.250	0.500	4.750	5.750	2.125	3.250	5.875
4	1	1	0.563	4.500	2.743	0.500	1.250	0.500	5.500	6.500	1.875	3.250	5.625
	3	1-3/8	0.563	4.500	2.743	0.500	1.250	0.500	5.500	6.500	2.125	3.250	5.875

**B**

Tie Rod Cylinders  
 Actuator Products

3MA Series

4MA/4ML Series

3MAJ/4MAJ Series

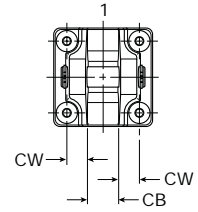
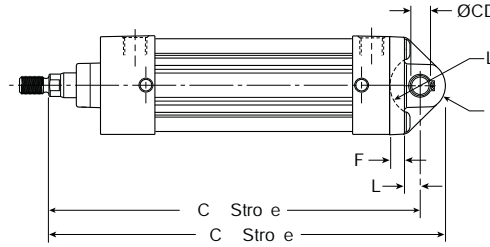
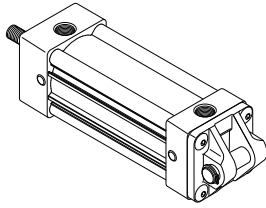
4MNR Series

P1D Series

**Cap Fixed Clevis**

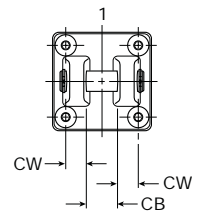
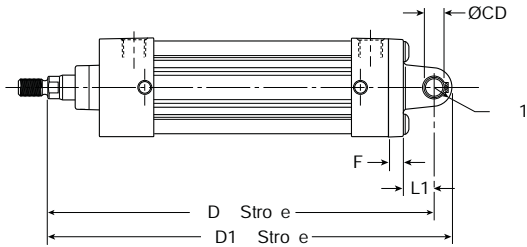
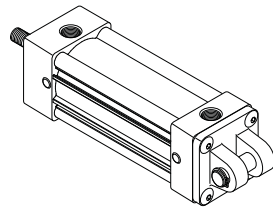
Style BB  
 (NFPA MP1)

**Note:** For maximum swivel angle of BB mount with rear mounting plate, see cylinder accessories



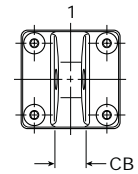
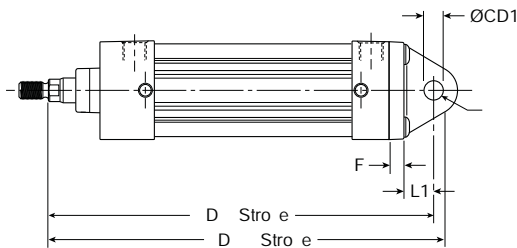
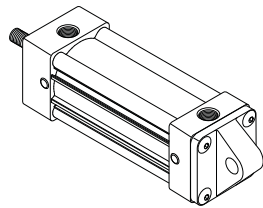
**Cap Detachable Clevis**

Style BC  
 (NFPA MP2)



**Cap Detachable Eye**

Style BE  
 (NFPA MP4)



**Styles BB, BC and BE**

Bore size	Rod no.	Rod dia. MM	CB	Rod dia. Tolerances		CW	E	F	L	LR	L1	MR	MR1	MR2	Add stroke				
				+0.000 -0.002	+0.002 +0.004										XC	XD	ZC	ZD1	ZD2
1-1/2	1	5/8	0.750	0.501	0.500	0.500	2.000	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.375	5.750	6.000	6.250	6.375
	2	1	0.750	0.501	0.500	0.500	2.000	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.750	6.125	6.375	6.625	6.750
2	1	5/8	0.750	0.501	0.500	0.500	2.500	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.375	5.750	6.000	6.250	6.375
	3	1	0.750	0.501	0.500	0.500	2.500	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.750	6.125	6.375	6.625	6.750
2-1/2	1	5/8	0.750	0.501	0.500	0.500	3.000	0.375	0.375	0.750	0.750	0.625	0.500	0.688	5.500	5.875	6.125	6.375	6.563
	3	1	0.750	0.501	0.500	0.500	3.000	0.375	0.375	0.750	0.750	0.625	0.500	0.688	5.875	6.250	6.500	6.750	6.313
3-1/4	1	1	1.250	0.751	0.750	0.625	3.750	0.625	0.625	1.000	1.250	0.938	0.750	0.875	6.875	7.500	7.813	8.250	8.375
	3	1-3/8	1.250	0.751	0.750	0.625	3.750	0.625	0.625	1.000	1.250	0.938	0.750	0.875	7.125	7.750	8.063	8.500	8.625
4	1	1	1.250	0.751	0.750	0.625	4.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	6.875	7.500	7.813	8.250	8.375
	3	1-3/8	1.250	0.751	0.750	0.625	4.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	7.125	7.750	8.063	8.500	8.625
5	1	1	1.250	0.751	0.750	0.625	5.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	7.125	7.750	8.063	8.500	8.625
	3	1-3/8	1.250	0.751	0.750	0.625	5.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	7.375	8.000	8.313	8.750	8.875

**B**  
 Tie Rod Cylinders  
 Actuator Products

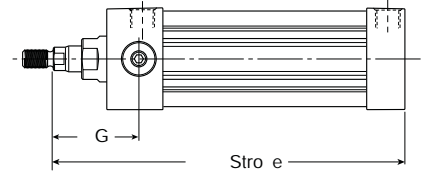
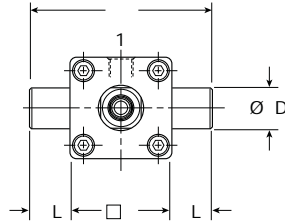
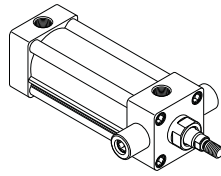
3MA Series  
 4MA/4ML Series  
 3MAJ/4MAJ Series  
 4MNR Series  
 P1D Series



**Head Trunnion\***

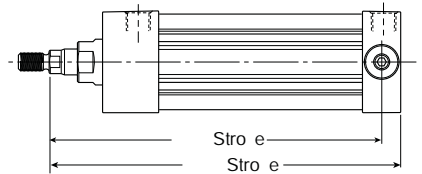
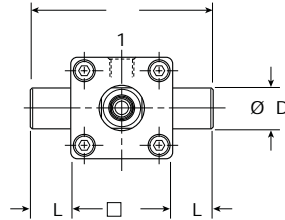
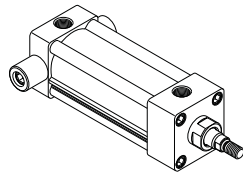
Style D  
 (NFPA MT1)

**Note:** not available for 1-1/2" bore with 1" rod.



**Cap Trunnion**

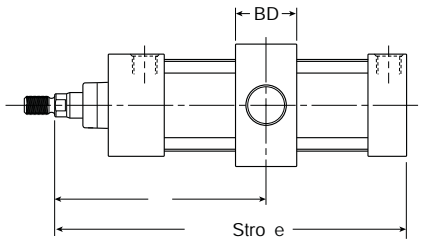
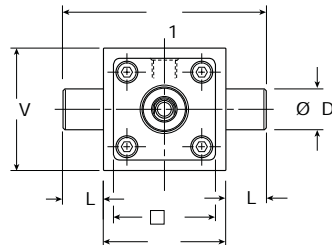
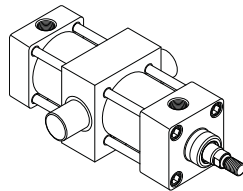
Style DB  
 (NFPA MT2)



**Intermediate Trunnion**

Style DD  
 (NFPA MT4)

**Note:** Tie rod nuts for Style DD have a slot instead of internal hex.



**Styles D, DB and DD**

Bore size	Rod no.	Rod dia. MM	E	BD	+0.000 -0.001 TD	TL	TM	UM	UT	UV	XG	Min. XI	Add stroke	
													XJ	ZJ
1-1/2	1 *	5/8	2.000	1.250	1.000	1.000	2.500	4.500	4.000	2.500	1.750	3.036	4.125	4.625
	2	1	2.000	1.250	1.000	1.000	2.500	4.500	4.000	2.500	-	3.437	4.250	5.000
2	1	5/8	2.500	1.500	1.000	1.000	3.000	5.000	4.500	3.000	1.750	3.125	4.125	4.625
	3	1	2.500	1.500	1.000	1.000	3.000	5.000	4.500	3.000	2.125	3.500	4.500	5.000
2-1/2	1	5/8	3.000	1.500	1.000	1.000	3.500	5.500	5.000	3.500	1.750	3.094	4.250	4.750
	3	1	3.000	1.500	1.000	1.000	3.500	5.500	5.000	3.500	2.125	3.469	4.625	5.125
3-1/4	1	1	3.750	2.000	1.000	1.000	4.500	6.500	5.750	4.250	2.250	3.969	5.000	5.625
	3	1-3/8	3.750	2.000	1.000	1.000	4.500	6.500	5.750	4.250	2.500	4.219	5.250	5.875
4	1	1	4.500	2.000	1.000	1.000	5.250	7.250	6.500	5.000	2.250	3.969	5.000	5.625
	3	1-3/8	4.500	2.000	1.000	1.000	5.250	7.250	6.500	5.000	2.500	4.219	5.250	5.875
5	1	1	5.500	2.000	1.000	1.000	6.250	8.250	7.500	6.000	2.250	3.969	5.250	5.875
	3	1-3/8	5.500	2.000	1.000	1.000	6.250	8.250	7.500	6.000	2.500	4.219	5.500	6.125

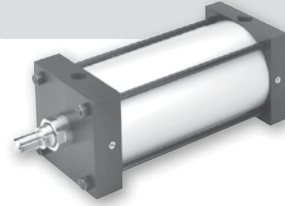
\* Head trunnion style D not available for 1-1/2" bore with 1" rod

**Kits & Accessories**

See page B37.



## 4MA/4ML Series – 6" thru 8" Bore Size



- Industry leading NFPA interchangeable cylinder with flexible construction
- Bore sizes – 6" and 8"
- Removable bronze alloy gland/bearing for easy maintenance
- Available in any practical stroke length
- Tube and tie rod construction for heavy duty use
- Single rod end or double rod ends
- Cushions – optional and adjustable at either end or both ends (N/A for 4ML hydraulic version)
- 20 standard mounting styles available
- RoHS compliant

### Operating information

	4MA	4ML
Operating pressure:	250 PSIG (17 bar) maximum air service	400 PSIG (27 bar) maximum hydraulic service
Temperature range –		
Standard seals	-10°F to 165°F (-23°C to 74°C)	
Fluorocarbon seals	-10°F to 250°F (-23°C to 121°C)	
Low temperature seals	-50°F to 150°F (-46°C to 66°C)	
Filtration requirements:	40 micron, dry filtered air    Filtered hydraulic oil	

### Ordering information

<b>6.00</b>	□	□	<b>J</b>	<b>4MA</b>	□	<b>U</b>	□	□	<b>1</b>	<b>4</b>	□	<b>A</b>	□	<b>12.000</b>
<b>Bore size</b> 6.00 8.00		<b>Double rod cylinder</b> Specify "K" only if double rod cylinder is required.		<b>Series</b> 4MA Air service 4ML Hydraulic service		<b>Ports</b> U NPTF R BSPP B BSPT T SAE			<b>Piston rod number</b> Specify rod code number for required diameter. 8, 2					<b>Stroke length</b> Specify stroke length required in inches. 8
			<b>Mounting style</b> Specify mounting style code (see table on following page).					<b>Special modification</b> Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MA with Linear Position Sensor Option) 7				<b>Cushion cap end</b> Blank Non-cushioned cap end C Cushioned cap end (not available for 4ML)		
		<b>Cushion head end</b> Blank Non-cushioned head end C Cushioned head end (not available for 4ML)										<b>Piston rod thread type</b> A Standard (UNF unified thread) W BSF British fine M* Metric		
			<b>Piston type</b> Blank Standard (lipseals and magnetic ring) 3 Lipseals and magnetic ring			<b>Seals</b> Blank Standard (nitrile seals) V Fluorocarbon seals 1 E Fluorocarbon rod wiper and rod seal only 2 4 Low temperature seals 1 M Metallic rod wiper, nitrile seals 3							<b>Rod material and gland code</b> Blank Standard rod and gland H Standard rod and HI LOAD gland Y 17-4 PH stainless steel rod and standard gland Z 17-4 PH stainless steel rod and HI LOAD gland J 303 stainless steel rod and standard gland 7 K 303 stainless steel rod and HI LOAD gland 7 S 316 stainless steel rod and standard gland 7 T 316 stainless steel rod and HI LOAD gland 7	
								<b>Piston rod thread style</b> 4 Small male 8 Intermediate male 9 Short female 55 For use with split coupler 6 3 Special (and specify all dimensions required)						




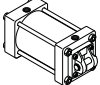

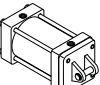

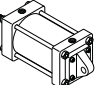

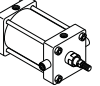

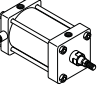

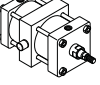

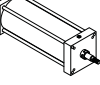

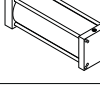


\* Please reference catalog 0900P-E, page B106.

**Sensors**  
For sensors see page B339.

1 Reed and solid-state sensors only available with standard seals or options E and M.  
 2 Used for external chemical compatibility applications, not high temperature.  
 3 If fluorocarbon seals are required with this option, please place an "S" for special in the Special Modification field and specify the "fluorocarbon seals and metallic rod wiper" in the item notes.  
 4 For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:  
 a. Sensor part number (please reference catalog 0900P-E, pages B100-B104)  
 b. Sensor position  
 c. Port position (if other than position 1)  
 d. Length of stop tubing, gross stroke and net stroke (if required)  
 Also, Piston Type 3 is required.  
 5 Review Piston Rod Selection Chart, please reference catalog 0900P-E, page A14 to determine proper piston rod diameter.  
 6 For additional information regarding this style, please reference catalog 0900P-E, page B105. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in Special Modification field and specify Rod Material and Gland Code in the item notes.  
 7 Not available for 4ML.  
 8 If a stop tube is required, specify gross stroke (net stroke + stop tube) in the model number, then place an "S" for special in the Special Modification field and specify the stop tube length in the item notes.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.

**4MA/4ML Mounting Styles for 6" to 8" Bore**

Mounting style	NFPA mounting	Description	Bore size	Mounting style	NFPA mounting	Description	Bore size
<b>T</b> 	MX0	No Mount	6 - 8	<b>CB</b> 	MS1	Side End Angle	6 - 8
<b>J</b> 	MF1	Head Rectangular Flange	6	<b>BB</b> 	MP1	Cap Fixed Clevis	6 - 8
<b>H</b> 	MF2	Cap Rectangular Flange	6	<b>BC</b> 	MP2	Cap Detachable Clevis	6 - 8
<b>TB</b> 	MX3	Tie Rods Extended Head End	6 - 8	<b>BE</b> 	MP4	Cap Detachable Eye	6
<b>TC</b> 	MX2	Tie Rods Extended Cap End	6 - 8	<b>D</b> 	MT1	Head Trunnion	6 - 8
<b>TD</b> 	MX1	Tie Rods Extended Both Ends	6 - 8	<b>DB</b> 	MT2	Cap Trunnion	6 - 8
<b>TE</b> 	MX5	Sleeve Nut	6 - 8	<b>DD</b> 	MT4	Intermediate Trunnion	6 - 8
<b>TEF</b> 	MX5/MS4	Sleeve Nut with Side Tap	6 - 8	<b>JB</b> 	ME3	Head Square	8
<b>C</b> 	MS2	Side Lug	6 - 8	<b>HB</b> 	ME4	Cap Square	8
<b>F</b> 	MS4	Side Tap	6 - 8	<b>KT †</b> 	MDX0	Double Rod End, No Mount	6 - 8

† Double rod end cylinders can be ordered with head mountings, i.e. KJ.

**B**

**Tie Rod Cylinders  
Actuator Products**

**3MA  
Series**

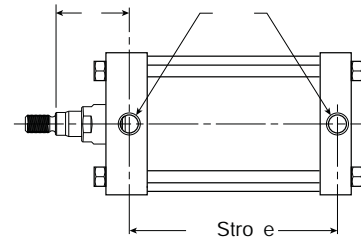
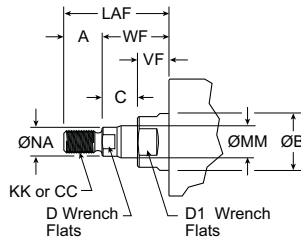
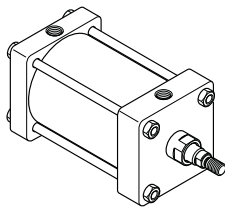
**4MA/4ML  
Series**

**3MAJ/4MAJ  
Series**

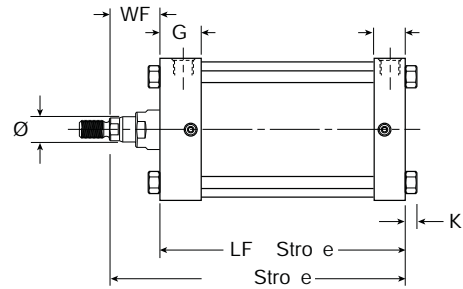
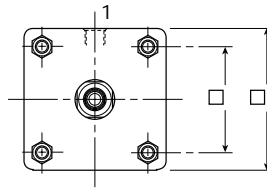
**4MNR  
Series**

**P1D  
Series**

**Single Rod Dimensioned Drawings – (Style T)**



For dimensions of all standard rod end styles, please see next page.



**Style T**

Bore size	Rod no.	Rod dia. MM	Thread		A	AA	+0.000 -0.002 B	C	D	D1	E	EE (NPTF)	G
			Style 8 CC	Style 4 & 9 KK									
6	1	1-3/8	1-1/4-12	1-14	1.625	6.900	1.999	0.635	1-1/8	1-7/8	6.500	3/4	1.910
	3	1-3/4	1-1/2-12	1-1/4-12	2.000	6.900	2.374	0.760	1-1/2	2-3/16	6.500	3/4	1.910
8	1	1-3/8	1-1/4-12	1-14	1.625	9.100	1.999	0.635	1-1/8	1-7/8	8.500	3/4	1.810
	3	1-3/4	1-1/2-12	1-1/4-12	2.000	9.100	2.374	0.760	1-1/2	2-3/16	8.500	3/4	1.810

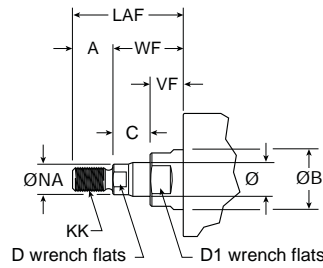
Bore size	Rod no.	Rod dia. MM	Add stroke										
			J	K	LAF	NA	R	VF	WF	Y	LF	P	ZJ
6	1	1-3/8	1.410	0.438	3.250	1.313	4.880	0.990	1.625	2.813	5.000	3.125	6.625
	3	1-3/4	1.410	0.438	3.875	1.688	4.880	1.115	1.875	3.063	5.000	3.125	6.875
8	1	1-3/8	1.440	0.563	3.250	1.313	6.440	0.990	1.625	2.750	5.125	3.250	6.750
	3	1-3/4	1.440	0.563	3.875	1.688	6.440	1.115	1.875	3.000	5.125	3.250	7.000

**B**  
 Tie Rod Cylinders  
 Actuator Products

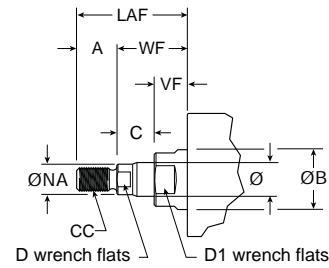
Series  
 3MA  
 4MA/4ML  
 3MAJ/4MAJ  
 4MNR  
 P1D

**4MA Rod End Dimensions**

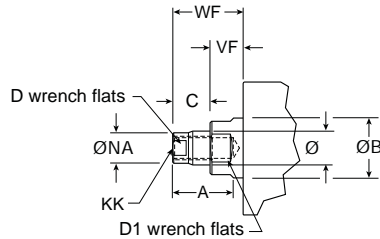
**Thread Style 4**  
 (NFPA Style SM)  
 Small Male



**Thread Style 8**  
 (NFPA Style IM)  
 Intermediate Male

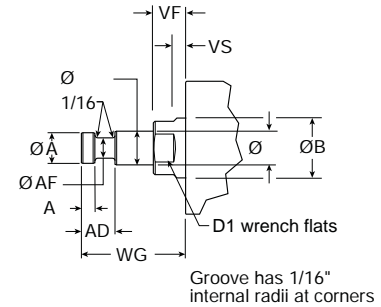


**Thread Style 9**  
 (NFPA Style SF)  
 Short Female



**Thread Style 55**

For use with Split Coupler  
 (please reference catalog 0900P-E, page B105 for more information)



**Thread Style 3 - "Special Thread"**

Special threads, rod extensions, rod eyes, blanks, etc. are also available.  
 To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF.  
 If otherwise special, please supply dimensioned sketch.

**Rod End Dimensions**

Bore size	Rod no.	Rod dia. MM	Thread		Tolerances: +.000 / -.002													
			Style 8 CC	Style 4 & 9 KK	A	AD	AE	AF	AM	B	C	D	D1	LAF	NA	VF	WF	WG
6	1	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750
	3	1-3/4	1-1/2-12	1-1/4-12	2.000	1.313	0.500	1.125	1.700	2.374	0.760	1-1/2	2-3/16	3.875	1.688	1.115	1.875	3.125
8	1	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750
	3	1-3/4	1-1/2-12	1-1/4-12	2.000	1.313	0.500	1.125	1.700	2.374	0.760	1-1/2	2-3/16	3.875	1.688	1.115	1.875	3.125

**B**

Tie Rod Cylinders  
 Actuator Products

3MA Series

4MA/4ML Series

3MAJ/4MAJ Series

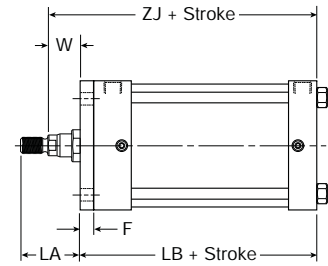
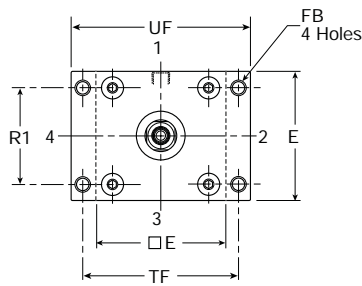
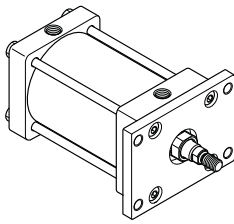
4MNR Series

P1D Series



**Head Rectangular Flange**

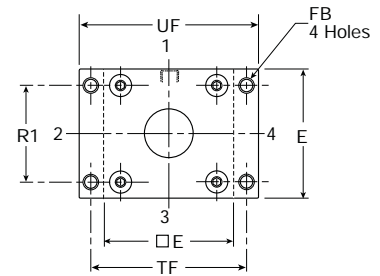
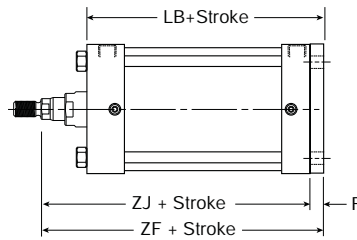
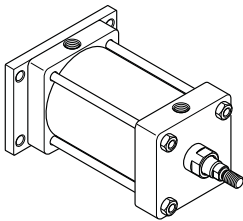
Style J  
 (NFFPA MF1)  
 (only 6" Bore)



**Note:** Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J. For reference,  $WF = W + F$  and  $LA = W + A$ .

**Cap Rectangular Flange**

Style H  
 (NFFPA MF2)  
 (only 6" Bore)



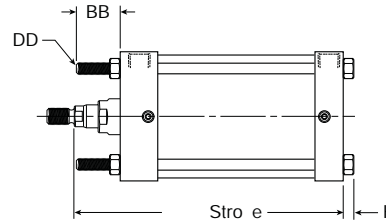
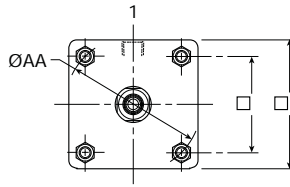
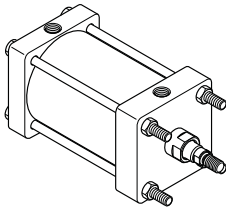
**Styles J and H**

Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R1	TF	UF	W	Add stroke		
												LB	ZF	ZJ
6	1	1-3/8	1.625	6.500	0.750	0.563	2.500	4.880	7.625	8.625	0.875	5.750	7.375	6.625
	3	1-3/4	2.000	6.500	0.750	0.563	3.125	4.880	7.625	8.625	1.125	5.750	7.625	6.875

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 Series  
 4MA/4ML  
 Series  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series

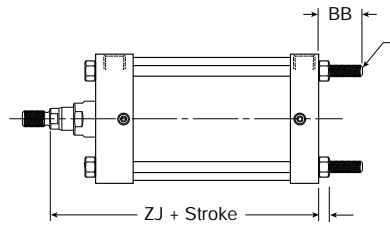
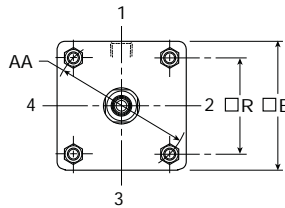
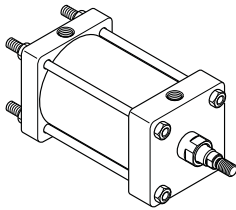
**Tie Rods Ext. Head End**

Style TB  
 (NFPA MX3)



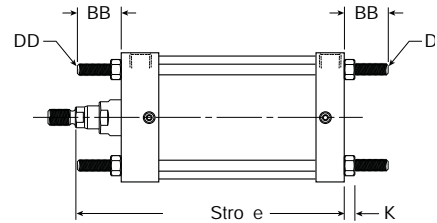
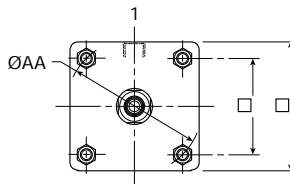
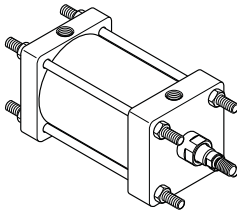
**Tie Rods Ext. Cap End**

Style TC  
 (NFPA MX2)



**Tie Rods Ext. Both Ends**

Style TD  
 (NFPA MX1)



**Styles TB, TC and TD**

Bore size	Rod no.	Rod dia. MM	AA	BB	DD	E	K	R	Add stroke	
									ZJ	
6	1	1-3/8	6.900	1.813	1/2-20	6.500	0.438	4.880	6.625	
	3	1-3/4	6.900	1.813	1/2-20	6.500	0.438	4.880	6.875	
8	1	1-3/8	9.100	2.313	5/8-18	8.500	0.563	6.440	6.750	
	3	1-3/4	9.100	2.313	5/8-18	8.500	0.563	6.440	7.000	

**B**

Tie Rod Cylinders  
 Actuator Products

3MA  
 Series

4MA/4ML  
 Series

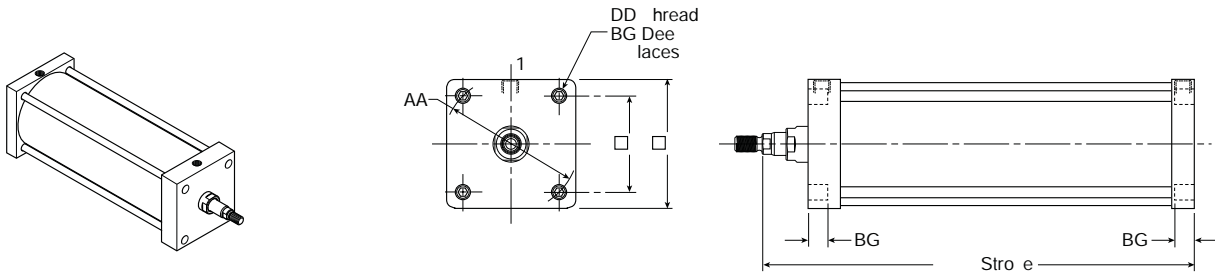
3MAJ/4MAJ  
 Series

4MNR  
 Series

P1D  
 Series

**Sleeve Nut**

Style TE  
 (NFPA MX5)



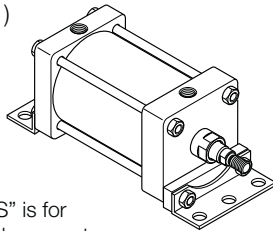
**Style TE**

Bore size	Rod no.	Rod dia. MM	AA	BG	DD	E	R	Add stroke	
								ZJ	
6	1	1-3/8	6.900	0.500	1/2-20	6.500	4.880	6.625	
	3	1-3/4	6.900	0.500	1/2-20	6.500	4.880	6.875	
8	1	1-3/8	9.100	0.620	5/8-18	8.500	6.440	6.750	
	3	1-3/4	9.100	0.620	5/8-18	8.500	6.440	7.000	

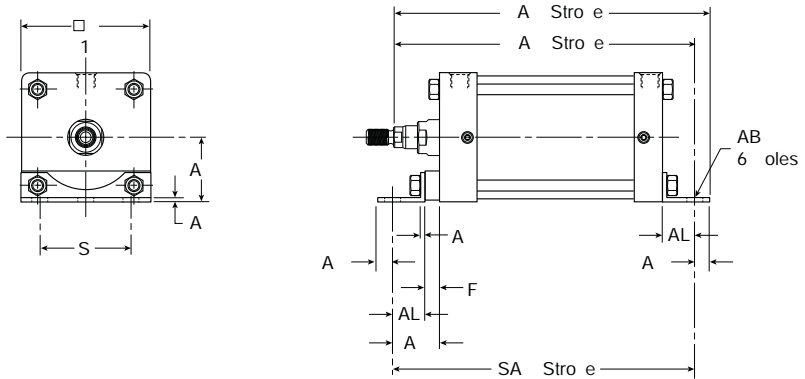
**B**  
 Tie Rod Cylinders  
 Actuator Products  
 3MA Series  
 4MA/4ML Series  
 3MAJ/4MAJ Series  
 4MNR Series  
 P1D Series

**Side End Angle\***

Style CB  
 (NFPA MS1)



**Note:**  
 Dimension "S" is for the holes in the mount (not the screw to screw dimension)



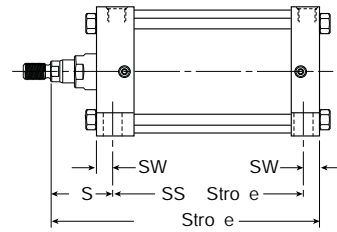
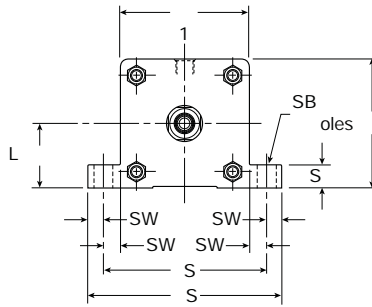
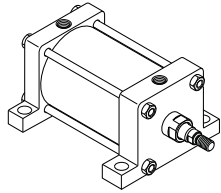
\*Maximum recommended pressure for this mount is 150 PSIG

**Style CB**

Bore size	Rod no.	Rod dia. MM	AB	AE	AH	AL	AO	AT	E	F	S	Add stroke		
												SA	XA	ZA
6	1	1-3/8	0.813	2.125	3.250	1.375	0.625	0.188	6.500	0.750	5.250	8.500	8.000	6.625
	3	1-3/4	0.813	2.125	3.250	1.375	0.625	0.188	6.500	0.750	5.250	8.500	8.250	6.875
8	1	1-3/8	0.813	1.813	4.250	1.813	0.688	0.250	8.500	-	7.125	8.750	8.563	9.250
	3	1-3/4	0.813	1.813	4.250	1.813	0.688	0.250	8.500	-	7.125	8.750	8.813	9.500

**Side Lug**

Style C  
 (NFPA MS2)

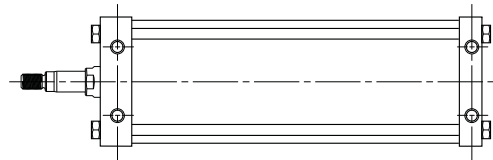
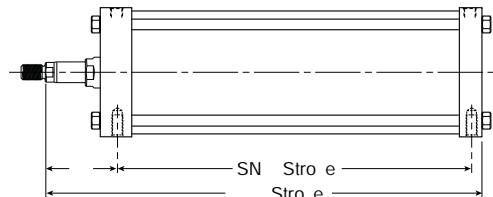
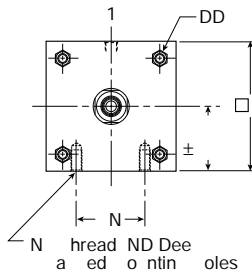
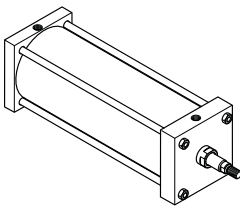


**Style C**

Bore size	Rod no.	Rod dia. MM	E	+/- .003 LH	SB	ST	SW	TS	US	XS	Add stroke	
											SS	ZJ
6	1	1-3/8	6.500	3.243	0.813	1.000	0.688	7.875	9.250	2.313	3.625	6.625
	3	1-3/4	6.500	3.243	0.813	1.000	0.688	7.875	9.250	2.563	3.625	6.875
8	1	1-3/8	8.500	4.243	0.813	1.000	0.688	9.875	11.250	2.313	3.750	6.750
	3	1-3/4	8.500	4.243	0.813	1.000	0.688	9.875	11.250	2.563	3.750	7.000

**Side Tap**

Style F  
 (NFPA MS4)



**Style F**

Bore size	Rod no.	Rod dia. MM	E	ND	NT	+/- .003 TH	TN	XT	Add stroke	
									SN	ZJ
6	1	1-3/8	6.500	1.125	3/4-10	3.243	3.250	2.813	3.125	6.625
	3	1-3/4	6.500	1.125	3/4-10	3.243	3.250	3.063	3.125	6.875
8	1	1-3/8	8.500	1.125	3/4-10	4.243	4.500	2.813	3.250	6.750
	3	1-3/4	8.500	1.125	3/4-10	4.243	4.500	3.063	3.250	7.000

**B**

Tie Rod Cylinders  
 Actuator Products

3MA  
 Series

4MA/4ML  
 Series

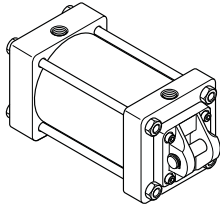
3MAJ/4MAJ  
 Series

4MNR  
 Series

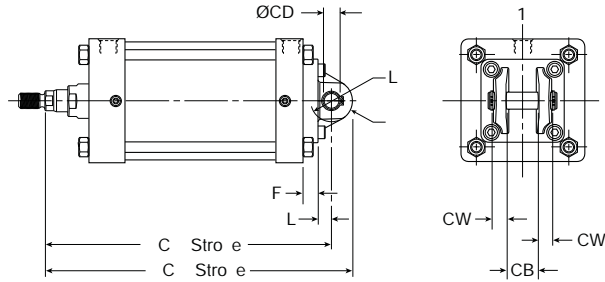
P1D  
 Series

**Cap Fixed Clevis**

Style BB  
 (NFPA MP1)

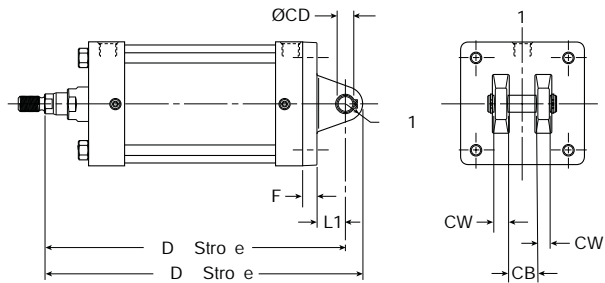
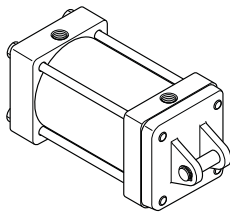


**Note:** For maximum swivel angle of BB mount with rear mounting plate, please reference catalog 0900P-E, cylinder accessories on page B108.



**Cap Detachable Clevis**

Style BC  
 (NFPA MP2)

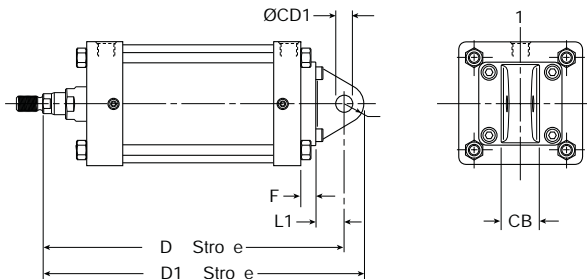
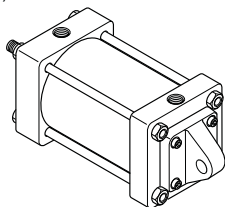


**Styles BB and BC**

Bore size	Rod no.	Rod dia. MM	CB	+0.000 -0.002 CD	CW	E	F	L	LR	L1	MR	MR1	Add stroke			
													XC	XD	ZC	ZD
6	1	1-3/8	1.500	1.001	0.750	6.500	0.750	0.750	1.250	1.500	1.125	1.000	8.125	8.875	9.250	9.875
	3	1-3/4	1.500	1.001	0.750	6.500	0.750	0.750	1.250	1.500	1.125	1.000	8.375	9.125	9.500	10.125
8	1	1-3/8	1.500	1.001	0.750	8.500	0.750	0.750	1.250	1.500	1.125	1.000	8.250	9.000	9.375	10.000
	3	1-3/4	1.500	1.001	0.750	8.500	0.750	0.750	1.250	1.500	1.125	1.000	8.500	9.250	9.625	10.250

**Cap Detachable Eye**

Style BE  
 (NFPA MP4)  
 (only 6" Bore)



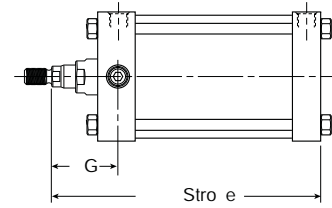
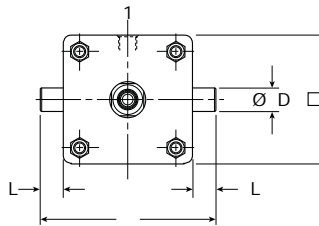
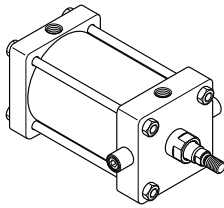
**Style BE**

Bore size	Rod no.	Rod dia. MM	CB	+0.002 +0.004 CD1	E	F	L1	MR2	Add stroke	
									XD	ZD1
6	1	1-3/8	1.500	1.000	6.500	0.750	1.500	1.125	8.875	10.000
	3	1-3/4	1.500	1.000	6.500	0.750	1.500	1.125	9.125	10.250

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 4MA/4ML  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series

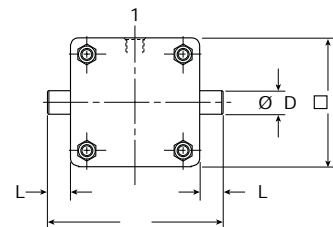
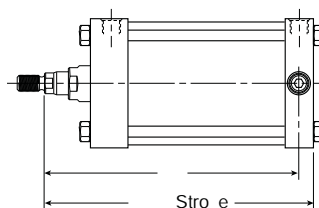
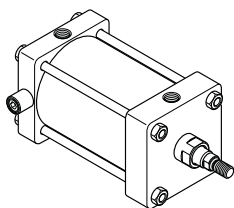
**Head Trunnion**

Style D  
 (NFPA MT1)



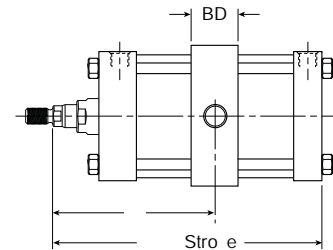
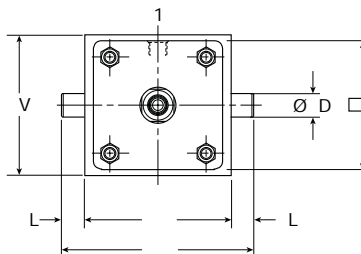
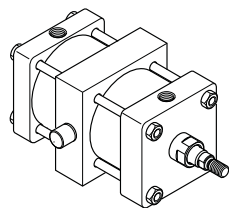
**Cap Trunnion**

Style DB  
 (NFPA MT2)



**Intermediate Trunnion**

Style DD  
 (NFPA MT4)



**Styles D, DB and DD**

Bore size	Rod no.	Rod dia. MM	E	BD	+0.000 -0.001 TD	TL	TM	UM	UT	UV	XG	Min. XI	Add stroke	
													XJ	ZJ
6	1	1-3/8	6.500	2.500	1.375	1.375	7.625	10.375	9.250	7.000	2.625	4.813	5.875	6.625
	3	1-3/4	6.500	2.500	1.375	1.375	7.625	10.375	9.250	7.000	2.875	5.063	6.125	6.875
8	1	1-3/8	8.500	2.500	1.375	1.375	9.750	12.500	11.250	9.500	2.625	4.750	6.000	6.750
	3	1-3/4	8.500	2.500	1.375	1.375	9.750	12.500	11.250	9.500	2.875	5.000	6.250	7.000

**B**

Tie Rod Cylinders  
 Actuator Products

3MA  
 Series

4MA/4ML  
 Series

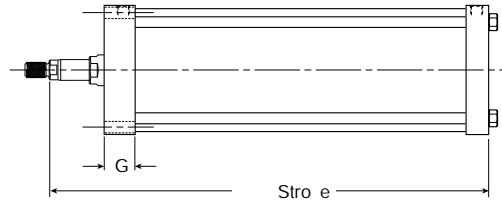
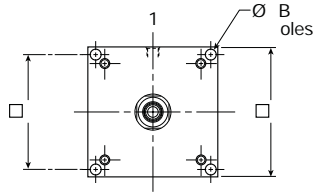
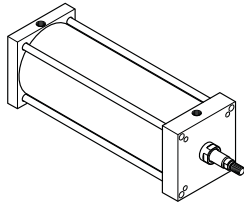
3MAJ/4MAJ  
 Series

4MNR  
 Series

P1D  
 Series

**Head Square**

Style JB  
 (NFPA ME3)

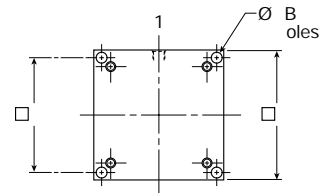
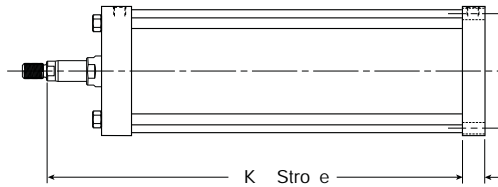
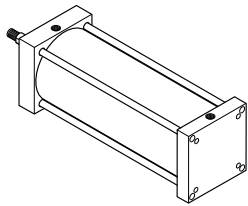


**B**

Tie Rod Cylinders  
 Actuator Products

**Cap Square**

Style HB  
 (NFPA ME4)



3MA  
 Series

4MA/4ML  
 Series

**Styles JB and HB**

Bore size	Rod no.	Rod dia. MM	E	EB	G	J	TE	Add stroke	
								XK	ZJ
8	1	1-3/8	8.500	0.688	1.810	1.440	7.570	5.313	6.750
	3	1-3/4	8.500	0.688	1.810	1.440	7.570	5.563	7.000

3MAJ/4MAJ  
 Series

4MNR  
 Series

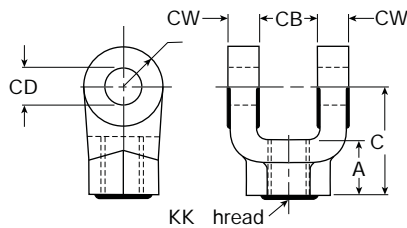
P1D  
 Series

**Mounting Kits and Accessories**

Bore size	J (MF1)	H (MF2)	BB (MP1)	BC (MP2)	BE (MP4)	CB (MS1)	C (MS2)	G (MS7)	Kit fastener torque units	
	Head rectangular flange	Cap rectangular flange	Cap fixed clevis	Cap detachable clevis	Cap detachable eye	Side end angles	Side lug (3MA only)	Side end lug	inch-lbs	N-m
	Kit number	Kit number	Kit number	Kit number	Kit number	Kit number	Kit number	Kit number		
1-1/2	L079700150	L079700150	L079710150	L079730150	L079720150	L079740150	L079830150	L079750150	32-36	3.6-4.1
2	L079700200	L079700200	L079710200	L079730200	L079720200	L079740200	L079830200	L079750200	72-82	8-9
2-1/2	L079700250	L079700250	L079710250	L079730250	L079720250	L079740250	L079830250	L079750250	72-82	8-9
3-1/4	L079700325	L079700325	L079710325	L079730325	L079720325	L079740325	L079830325	L079750325	216-228	24-25.3
4	L079700400	L079700400	L079710400	L079730400	L079720400	L079740400	L079830400	L079750400	216-228	24-25.3
5	L079700500	L079700500	L079710500	L079730500	N/A	L079740500	L079830500	N/A	360-372	41-42

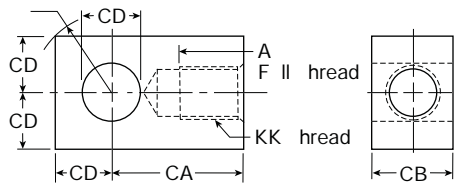
\*\* Spacer plate not used for 4" bore or double rod cylinders

**Female Rod Clevis**



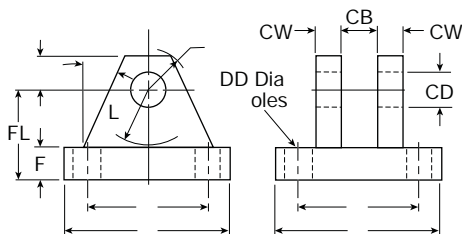
Symbol	1458030044	1458030050	1458030075	1458030088	1458030100	1458030125	1458030150
A	3/4	3/4	1-1/8	1-5/8	1-5/8	2	2-1/4
CB	3/4	3/4	1-1/4	1-1/2	1-1/2	2	2-1/2
CD	1/2	1/2	3/4	1	1	1-3/8	1-3/4
C E	1-1/2	1-1/2	2-1/8	2-15/16	2-15/16	3-3/4	4-1/2
CW	1/2	1/2	5/8	3/4	3/4	1	1-1/4
ER	1/2	1/2	3/4	1	1	1-3/8	1-3/4
KK	7/16-20	1/2-20	3/4-16	7/8-14	1-14	1-1/4-12	1-1/2-12
Load capacity (lbs)	4250	4900	11200	18800	19500	33500	45600

**Rod Eye Knuckle**



Symbol	1458040044	1458040050	1458040075	1458040088	1458040100	1458040125	1458040150
A	3/4	3/4	1-1/8	1-1/8	1-5/8	2	2-1/4
CA	1-1/2	1-1/2	2-1/16	2-3/8	2-13/16	3-7/16	4
CB	3/4	3/4	1-1/4	1-1/2	1-1/2	2	2-1/2
CD	1/2	1/2	3/4	1	1	1-3/8	1-3/4
ER	23/32	23/32	1-1/16	1-7/16	1-7/16	1-31/32	2-1/2
KK	7/16-20	1/2-20	3/4-16	7/8-14	1-14	1-1/4-12	1-1/2-12
Load capacity (lbs)	5000	5700	12100	13000	21700	33500	45000

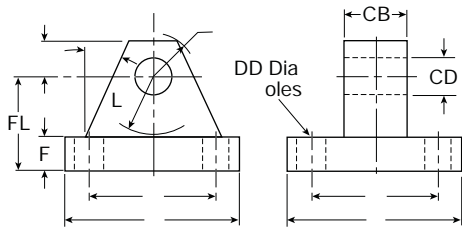
**Clevis Bracket**



Symbol	1458050044	1458050050	1458050075	1458050100	1458050138	1458050175
CB	15/32	3/4	1-1/4	1-1/2	2	2-1/2
CD	7/16	1/2	3/4	1	1-3/8	1-3/4
CW	3/8	1/2	5/8	3/4	1	1-1/4
DD	17/64	13/32	17/32	21/32	21/32	29/32
E	2-1/4	3-1/2	5	6-1/2	7-1/2	9-1/2
F	3/8	1/2	5/8	3/4	7/8	7/8
FL	1	1-1/2	1-7/8	2-1/4	3	3-5/8
LR	5/8	3/4	1-3/16	1-1/2	2	2-3/4
M	3/8	1/2	3/4	1	1-3/8	1-3/4
MR	1/2	5/8	29/32	1-1/4	1-21/32	2-7/32
R	1.75	2.55	3.82	4.95	5.73	7.50
Load capacity (lbs)	3600	7300	14000	19200	36900	34000



**Mounting Plate & Eye Bracket**



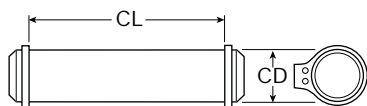
Symbol	1458060031	1458060050	1458060075	1458060100	1458060138	1458060175
CB	15/16	3/4	1-1/4	1-1/2	2	2-1/2
CD	15/16	1/2	3/4	1	1-3/8	1-3/4
DD	17/64	13/32	17/32	21/32	21/32	29/32
E	2-1/4	2-1/2	3-1/2	4-1/2	5	6-1/2
F	3/8	3/8	5/8	7/8	7/8	1-1/8
FL	1	1-1/8	17/8	2-3/8	3	3-3/8
LR	5/8	3/4	1-1/4	1-1/2	2-1/8	2-1/4
M	3/8	1/2	3/4	1	1-3/8	1-3/4
MR	1/2	9/16	7/8	1-1/4	1-5/8	2-1/8
R	1.75	1.63	2.55	3.25	3.82	4.95
<b>Load Capacity (lbs)</b>	1700	4100	10500	20400	21200	49480

**1-1/2" to 8" Bore Cylinder Accessories**

Rod end accessories can be selected by cylinder rod end thread size from Table A & B below. Mating parts for rod end accessories are listed just to the right of the knuckle or clevis selected. Mounting plates for style MP1 & MP4 cylinder mounts are selected by bore size from Table C.

Table A				Table B			Table C		
Rod end thread size	Mating parts			Mating parts			Mounting plates		
	Female rod clevis	Eye bracket	Pivot pin	Knuckle	Clevis bracket	Pivot pin	Bore size	For mtg. style MP1 cylinder	For mtg. style MP4 cylinder
7/16-20	1458030044	1458060050	0856640050	1458040044	1458050050	0856640050	1-1/2	1458060050	1458050050
1/2-20	1458030050	1458060050	0856640050	1458040050	1458050050	0856640050	2	1458060050	1458050050
3/4-16	1458030075	1458060075	0856640075	1458040075	1458050075	0856640075	2-1/2	1458060050	1458050050
7/8-14	1458030088	1458060100	0856640100	1458040088	1458050100	0856640100	3-1/4	1458060075	1458050075
1-14	1458030100	1458060100	0856640100	1458040100	1458050100	0856640100	4	1458060075	1458050075
1-1/4-12	1458030125	1458060138	0856640138	1458040125	1458050138	0856640138	5	1458060075	—
1-1/2-12	1458030150	1458060175	0856640175	1458040150	1458050175	0856640175	6	1458060100	—
							8	1458060100	—

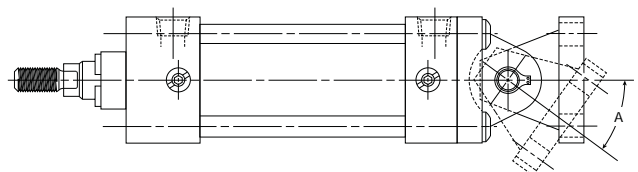
**Pivot Pin**



Symbol	0856640044	0856640050	0856640075	0856640100	0856640138	0856640175
CD	7/16	1/2	3/4	1	1-3/8	1-3/4
CL	1-5/16	1-7/8	2-5/8	3-1/8	4-1/8	5-3/16
<b>Shear cap. (lbs)</b>	6600	8600	19300	34300	65000	105200

**Note:** Pivot Pin must be ordered separately for single lug pivot mounting.

**Maximum pivot angle for rear clevis mounts (BB mounts) and accessories**



Bore	1-1/2	2	2-1/2	3-1/4	4	5	6	8
<b>Angle A</b>	52	43	29	50	49	45	42	42

**Service Kits**

Bore size	Rod dia.	Rod no.	RG - Rod gland cartridge kit. Includes gland and wiper, rod, and o-ring seals		Gland to head torque units		PK - Piston seal kit, standard lipseals. Includes piston and o-ring seals		SK - complete cylinder kit. Includes rod gland kit, piston seal kit, and cushion kits		Torque units endcap fastener or tie rod	
			Nitrile seal kit number	Fluorocarbon seals kit number	Ft-lbs	Nm	Nitrile seal kit number	Fluorocarbon seal kit number	Nitrile seal kit number	Fluorocarbon seal kit number	inch-lbs	Nm
1-1/2	5/8	1	RG04MA0061	RG04MA0065	40-45	54-61	PK1504MA01	PK1504MA05	SK15104MA1	SK15104MA5	32-36	3.6-4.1
	1	2	RG04MA0101	RG04MA0105	45-50	61-68			SK15304MA1	SK15304MA5		
2	5/8	1	RG04MA0061	RG04MA0065	40-45	54-61	PK2004MA01	PK2004MA05	SK20104MA1	SK20104MA5	72-82	8-9
	1	3	RG04MA0101	RG04MA0105	45-50	61-68			SK20304MA1	SK20304MA5		
2-1/2	5/8	1	RG04MA0061	RG04MA0065	40-45	54-61	PK2504MA01	PK2504MA05	SK25104MA1	SK25104MA5	72-82	8-9
	1	3	RG04MA0101	RG04MA0105	45-50	61-68			SK25304MA1	SK25304MA5		
3-1/4	1	1	RG04MA0101	RG04MA0105	45-50	61-68	PK3254MA01	PK3254MA05	SK32104MA1	SK32104MA5	216-228	24-25.3
	1-3/8	3	RG04MA0131	RG04MA0135	75-80	102-108			SK32304MA1	SK32304MA5		
4	1	1	RG04MA0101	RG04MA0105	45-50	61-68	PK4004MA01	PK4004MA05	SK40104MA1	SK40104MA5	216-228	24-25.3
	1-3/8	3	RG04MA0131	RG04MA0135	75-80	102-108			SK40304MA1	SK40304MA5		
5	1	1	RG04MA0101	RG04MA0105	45-50	61-68	PK5004MA01	PK5004MA05	SK50104MA1	SK50104MA5	360-372	41-42
	1-3/8	3	RG04MA0131	RG04MA0135	75-80	102-108			SK50304MA1	SK50304MA5		
6	1-3/8	1	RG04MA0131	RG04MA0135	75-80	102-108	PK6004MA01	PK6004MA05	SK60104MA1	SK60104MA5	420-432	48-49
	1-3/4	3	RG04MA0171	RG04MA0175	90-95	122-129			SK60304MA1	SK60304MA5		
8	1-3/8	1	RG04MA0131	RG04MA0135	75-80	102-108	PK8004MA01	PK8004MA05	SK80104MA1	SK80104MA5	960-972	109-115
	1-3/4	3	RG04MA0171	RG04MA0175	90-95	122-129			SK80304MA1	SK80304MA5		

**B**

**Tie Rod Cylinders  
Actuator Products**

**3MA  
Series**

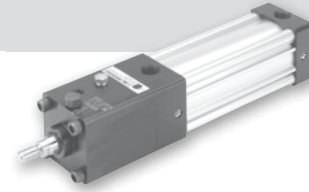
**4MA/4ML  
Series**

**3MAJ/4MAJ  
Series**

**4MNR  
Series**

**P1D  
Series**

## 3MAJ/4MAJ Series



- Industry leading NFPA interchangeable rod lock cylinder with flexible construction
- Rod lock holding force equivalent to cylinder output force at 100 PSIG
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6" and 8"
- 17 standard styles mounting styles available
- Available in any practical stroke length
- Rod diameters – 5/8", 1", 1-3/8" and 1-3/4"
- Single rod end or double rod ends
- Adjustable cushions are standard at both ends
- Manual override feature standard on all configurations

### Operating information

Operating pressure: 100 PSIG (7 bar) maximum air pressure, except 2" bore with 1" rod rated at 80 PSIG)  
 60 PSIG (4.1 bar) minimum air pressure to release rod lock

Temperature range –  
 Standard seals -10°F to 165°F (-23°C to 74°C)  
 Fluorocarbon seals -10°F to 250°F (-23°C to 121°C)

Filtration requirements: 40 micron, dry filtered air

### Ordering information

<b>2.00</b>	<b>C</b>	<b>J</b>	<b>4MAJ</b>	<b>U</b>	<b>1</b>	<b>4</b>	<b>A</b>	<b>C</b>	<b>6.000</b>
<b>Bore size</b> 1.50 <sup>1</sup> 2.00 2.50 3.25 4.00 5.00 6.00 <sup>2, 11</sup> 8.00 <sup>2, 11</sup>	<b>Double Rod Cylinder</b> <sup>12</sup> Specify "K" only if double rod cylinder is required.	<b>Mounting style</b> Specify mounting style code (see table on following page).	<b>Series</b> 4MAJ 4MA rod lock cylinder 3MAJ 3MA rod lock cylinder	<b>Ports</b> <sup>4</sup> U NPTF R BSPP B BSPT T SAE	<b>Piston rod number</b> Specify rod code number for required diameter. <sup>8</sup>	<b>Special modification</b> Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MAJ with Linear Position Sensor Option) <sup>7</sup>	<b>Cushion cap end</b> C Cushioned cap end "C" is required	<b>Piston rod thread type</b> A Standard (UNF unified thread) W BSF British fine M* Metric	<b>Stroke length</b> Specify stroke length required in inches. <sup>8</sup>
<b>Cushion head end</b> C Cushioned head end "C" is required	<b>Cylinder construction</b>		<b>Seals</b>		<b>Piston rod thread style</b>		<b>Rod material and gland code</b>		
	Blank* Standard (extruded body, standard round lobe orientation)		Blank Standard (nitrile seals)		4 Small male		Blank Standard rod and gland		
	A* Extruded body, round lobe orientation rotated 90 degrees from standard		V Fluorocarbon seals <sup>2, 5</sup>		8 Intermediate male		H Standard rod and HI LOAD gland		
	N* Extruded body, round lobe orientation rotated 180 degrees from standard		E Fluorocarbon rod wiper and rod seal only <sup>6</sup>		9 Short female		Y 17-4 PH stainless steel rod and standard gland		
	Z* Extruded body, round lobe orientation rotated 270 degrees from standard				55 For use with split coupler <sup>9</sup>		Z 17-4 PH stainless steel rod and HI LOAD gland		
	T Aluminum round tube and carbon steel tie rods & nuts				3 Special (and specify all dimensions required)				
* Please reference catalog 0900P-E, table on page B10. Only applies to 1-1/2" to 4" bore.									
<b>Piston type</b> <sup>11</sup>									
Blank Standard (lipseals and magnetic ring) <sup>12</sup>									
1 Lipseals, no magnetic ring <sup>12</sup>									
2 Lipseals, no magnetic ring (aluminum piston)									
3 Lipseals and magnetic ring (aluminum piston)									
4 Bumper seals, no magnetic ring									
6 Bumper seals and magnetic ring									
B Lipseals, 1/4" thick bumpers both ends <sup>3</sup>									
H Lipseals, 1/4" thick bumper head end <sup>3</sup>									
C Lipseals, 1/4" thick bumper cap end <sup>3</sup>									
D Lipseals and magnetic ring, 1/4" thick bumpers both ends <sup>3</sup>									
F Lipseals and magnetic ring, 1/4" thick bumper head end <sup>3</sup>									
R Lipseals and magnetic ring, 1/4" thick bumper cap end <sup>3</sup>									

<sup>1</sup> Not available with 1" rod diameter (rod number 2) for 1-1/2" bore. Not available with Linear Position Sensor Option (LPSO).

<sup>2</sup> Not available for 3MAJ, please specify 4MAJ.

<sup>3</sup> Addition of 1/4" bumper results in a 1/4" stroke loss per bumper, per end. For example, a 6" stroke cylinder with 1/4" bumpers at both ends (option B) has an effective stroke of 5-1/2".

<sup>4</sup> Port thread styles only for base cylinder. Rod lock port is always NPTF. If a different rod lock port thread style is required, place an "S" for special in the Special Modification field and indicate the desired rod lock port thread style in the item notes. NPTF cylinder ports are must be ordered for 3MAJ.

<sup>5</sup> Fluorocarbon seals for 4MAJ are only for external chemical compatibility applications, not high temperature.

<sup>6</sup> Used for external chemical compatibility applications, not high temperature.

<sup>7</sup> For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:  
 a. Sensor part number (please reference catalog 0900P-E, pages B100-B104)  
 b. Sensor position  
 c. Port position (if other than position 1)  
 d. Length of stop tubing, gross stroke and net stroke (if required)  
 LPSO not available for 3MAJ, please specify 4MAJ. Cylinder dimensions will

<sup>8</sup> Review Piston Rod Selection Chart, please reference catalog 0900P-E, on page A14 to determine proper piston rod diameter.

<sup>9</sup> For additional information regarding this style, please reference catalog 0900P-E, page B105. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in Special Modification field and specify Rod Material and Gland Code in the item notes.

<sup>10</sup> If a stop tube is required, specify gross stroke (net stroke + stop tube) in the model number, then place an "S" for special in the Special Modification field and specify the stop tube length in the item notes. Not available with Piston Types (blank) and 1 for 1-1/2" - 5" bore cylinders. Stop tube not available for 3MAJ, please specify 4MAJ.

<sup>11</sup> 6"-8" bore 4MAJ can accept only Piston Types (blank) and 3. The (blank) piston for 6"-8" bores is aluminum, lipseals, no magnetic ring. Composite pistons not available with oversize rod number 3.

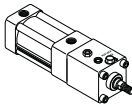
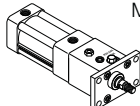
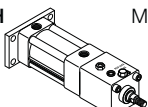
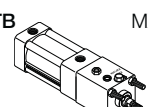
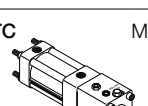
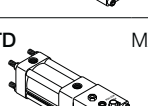
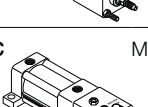
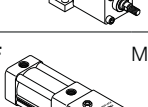
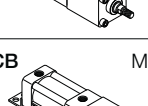
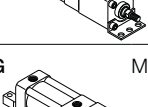
<sup>12</sup> Double rod cylinders not available with composite piston type.

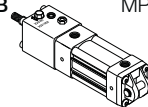
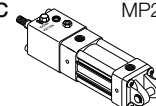
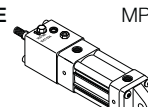
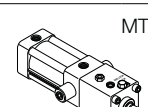
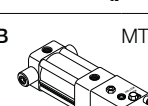
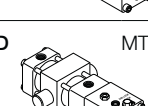
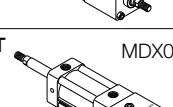
For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



**B**  
 Tie Rod Cylinders  
 Actuator Products  
 3MA Series  
 4MA/4ML Series  
 3MAJ/4MAJ Series  
 4MNR Series  
 P1D Series

**3MAJ\*/4MAJ Mounting Styles for 6" to 8" Bore**

Mounting style	NFPA mounting	Description	Bore size
T 	MX0	No Mount	1-1/2 - 8
J 	MF1	Head Rectangular Flange	1-1/2 - 6
H 	MF2	Cap Rectangular Flange	1-1/2 - 6
TB 	MX3	Tie Rods Extended Head End	1-1/2 - 8
TC 	MX2	Tie Rods Extended Cap End	1-1/2 - 8
TD 	MX1	Tie Rods Extended Both Ends	1-1/2 - 8
C 	MS2	Side Lug	1-1/2 - 8
F 	MS4	Side Tap	1-1/2 - 8
CB 	MS1	Side End Angle	1-1/2 - 8
G 	MS7	Side End Lug	1-1/2 - 4

Mounting style	NFPA mounting	Description	Bore size
BB 	MP1	Cap Fixed Clevis	1-1/2 - 8
BC 	MP2	Cap Detachable Clevis	1-1/2 - 8
BE 	MP4	Cap Detachable Eye	1-1/2 - 6
D 	MT1	Head Trunnion	1-1/2 - 8
DB 	MT2	Cap Trunnion	1-1/2 - 8
DD 	MT4	Intermediate Trunnion	1-1/2 - 8
KT 	MDX0	Double Rod End, No Mount	1-1/2 - 8

\* 3MAJ utilizes base 3MA cylinder and is available in 1-1/2" to 5" bore sizes. Mounting style codes C, D and DB not available for 3MAJ

**B**

**Tie Rod Cylinders  
Actuator Products**

**3MA  
Series**

**4MA/4ML  
Series**

**3MAJ/4MAJ  
Series**

**4MNR  
Series**

**P1D  
Series**

**Sensors**

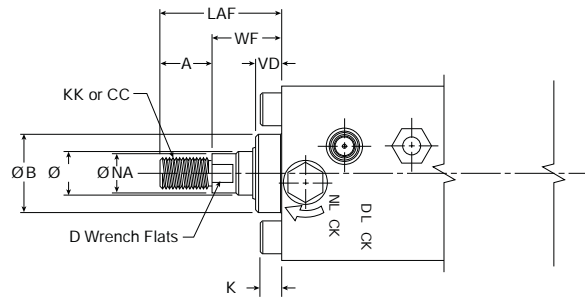
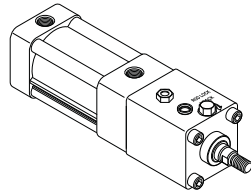
For sensors see page B339.



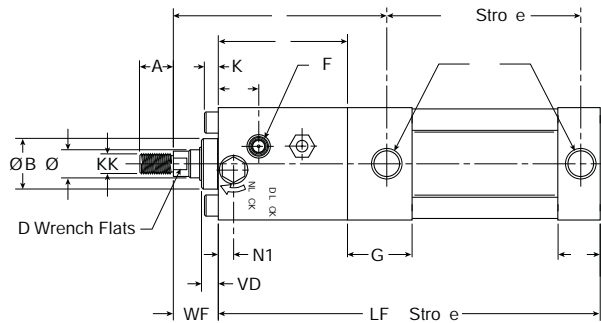
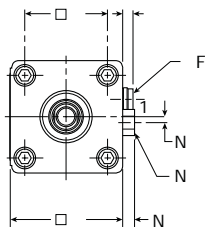
**3MAJ/4MAJ Series Single Rod Dimensions**

**No Mount Basic**

Style T  
 (NFPA MX0)



For dimensions of all standard rod end styles, see next page.



**Style T**

Bore size	Rod no.	Rod dia. MM	Thread		A	AA	+0.000 -0.002 B	D	E	EE (NPTF)	EF (NPTF)	G	H	J
			Style 8 CC	Style 4 & 9 KK										
1-1/2	1	5/8	1/2-20	7/16-20	0.750	2.020	1.124	1/2	2.000	3/8	1/8	1.438	2.625	0.938
	2	5/8	1/2-20	7/16-20	0.750	2.600	1.124	1/2	2.500	3/8	1/8	1.375	2.875	0.937
2	3	1	7/8-14	3/4-16	1.125	2.600	1.499	7/8	2.500	3/8	1/8	1.375	3.875	0.937
	1	5/8	1/2-20	7/16-20	0.750	3.100	1.124	1/2	3.000	3/8	1/8	1.344	2.875	0.938
2-1/2	3	1	7/8-14	3/4-16	1.125	3.100	1.499	7/8	3.000	3/8	1/8	1.344	4.000	0.938
	1	1	7/8-14	3/4-16	1.125	3.900	1.499	7/8	3.750	1/2	1/4	1.594	4.500	1.125
3-1/4	3	1-3/8	1-1/4-12	1-14	1.625	3.900	1.999	1-1/8	3.750	1/2	1/4	1.594	4.875	1.125
	1	1	7/8-14	3/4-16	1.125	4.700	1.499	7/8	4.500	1/2	1/4	1.594	4.875	1.125
4	3	1-3/8	1-1/4-12	1-14	1.625	4.700	1.999	1-1/8	4.500	1/2	1/4	1.594	5.125	1.125
	1	1	7/8-14	3/4-16	1.125	5.800	1.499	7/8	5.500	1/2	1/4	1.594	5.375	1.219
5	3	1-3/8	1-1/4-12	1-14	1.625	5.800	1.999	1-1/8	5.500	1/2	1/4	1.594	5.750	1.219

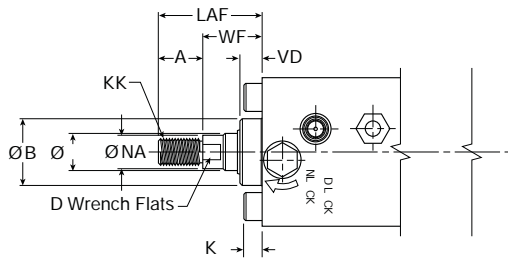
Bore size	Rod no.	Rod dia. MM	K2	LAF	N1	N2	Hex N3	NA	NR	Q	R	VD	WF	Y	Add stroke	
															LF	P
1-1/2	1	5/8	0.250	1.750	0.220	0.140	5/16	0.563	0.190	0.715	1.430	0.375	1.000	4.500	6.250	2.313
	1	5/8	0.313	1.750	0.340	0.130	1/2	0.563	0.265	0.895	1.840	0.375	1.000	4.750	6.500	2.313
2	3	1	0.313	2.500	0.338	0.146	1/2	0.938	0.275	1.065	1.840	0.500	1.375	6.125	7.500	2.313
	1	5/8	0.313	1.750	0.346	0.150	1/2	0.563	0.265	0.755	2.190	0.500	1.000	4.813	6.625	2.375
2-1/2	3	1	0.313	2.500	0.346	0.148	1/2	0.938	0.265	1.120	2.190	0.500	1.375	6.313	7.750	2.375
	1	1	0.375	2.500	0.631	0.180	5/8	0.938	0.340	1.510	2.760	0.500	1.375	6.938	8.750	2.625
3-1/4	3	1-3/8	0.375	3.250	0.813	0.247	5/8	1.313	0.350	1.645	2.760	0.625	1.625	7.563	9.125	2.625
	1	1	0.375	2.500	0.625	0.240	7/8	0.938	0.500	1.725	3.320	0.500	1.375	7.313	9.125	2.625
4	3	1-3/8	0.375	3.250	0.771	0.276	7/8	1.313	0.490	1.679	3.320	0.750	1.625	7.813	9.375	2.625
	1	1	0.500	2.500	0.720	0.220	7/8	0.938	0.500	1.995	4.100	0.500	1.375	7.813	9.875	2.875
5	3	1-3/8	0.500	3.250	0.720	0.220	7/8	1.313	0.490	2.330	4.100	0.750	1.625	8.438	10.250	2.875



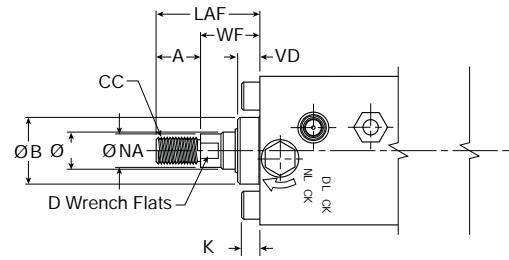
**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 4MA/4ML  
 3MAJ/4MAJ  
 4MNR  
 P1D

**Rod End Dimensions**

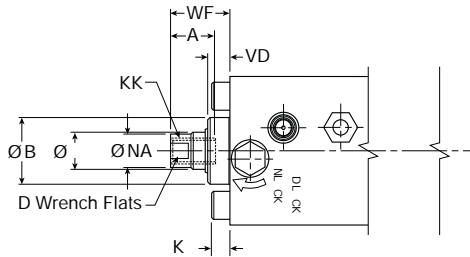
**Thread Style 4**  
 (NFPA Style SM)  
 Small Male



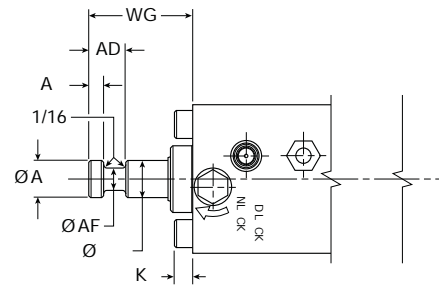
**Thread Style 8**  
 (NFPA Style IM)  
 Intermediate Male



**Thread Style 9**  
 (NFPA Style SF)  
 Short Female



**Thread Style 55**  
 For use with Split Coupler  
 (please reference catalog 0900P-E, page B105 for more information)



**Thread Style 3 - “Special Thread”**

Special threads, rod extensions, rod eyes, blanks, etc. are also available. To order, specify “Style 3” and give desired dimensions for KK or CC, A and W or WF. If otherwise special, please supply dimensioned sketch.

**Rod End Dimensions**

Bore size	Rod no.	Rod dia. MM	Thread		+0.000 -0.002												
			Style 8 CC	Style 4 & 9 KK	A	AD	AE	AF	AM	B	D	K2	LAF	NA	VD	WF	WG
1-1/2	1	5/8	1/2-20	7/16-20	0.750	0.625	0.250	0.375	0.570	1.124	1/2	0.250	1.750	0.563	0.375	1.000	1.750
	2	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.313	2.500	0.938	0.500	1.375	2.375
	3	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.313	2.500	0.938	0.500	1.375	2.375
2-1/2	1	5/8	1/2-20	7/16-20	0.750	0.625	0.250	0.375	0.570	1.124	1/2	0.313	1.750	0.563	0.500	1.000	1.750
	3	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.313	2.500	0.938	0.500	1.375	2.375
3-1/4	1	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.375	2.500	0.938	0.500	1.375	2.375
	3	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.375	3.250	1.313	0.625	1.625	2.750
4	1	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.375	2.500	0.938	0.500	1.375	2.375
	3	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.375	3.250	1.313	0.750	1.625	2.750
5	1	1	7/8-14	3/4-16	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.500	2.500	0.938	0.500	1.375	2.375
	3	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.500	3.250	1.313	0.750	1.625	2.750

**B**

Tie Rod Cylinders  
 Actuator Products

3MA Series

4MA/4ML Series

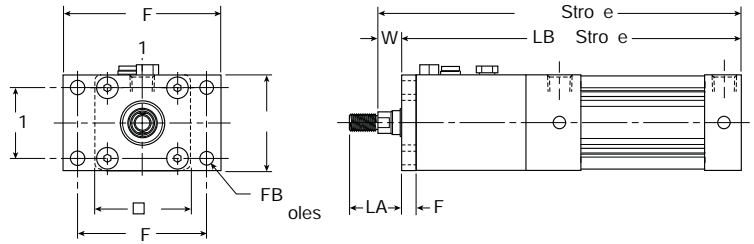
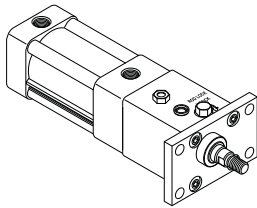
3MAJ/4MAJ Series

4MNR Series

P1D Series

**Head Rectangular Flange**

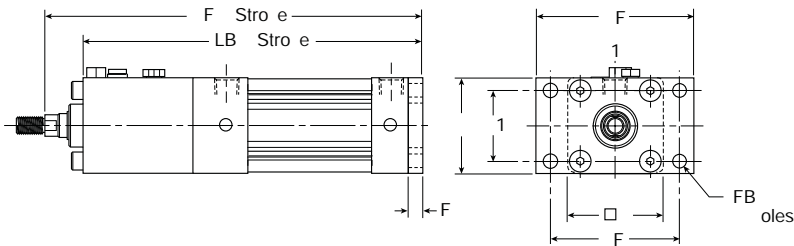
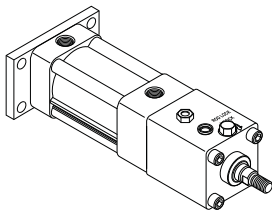
Style J  
 (NFPA MF1)



**Note:** Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J. For reference,  $WF = W + F$  and  $LA = W + A$ .

**Cap Rectangular Flange**

Style H  
 (NFPA MF2)



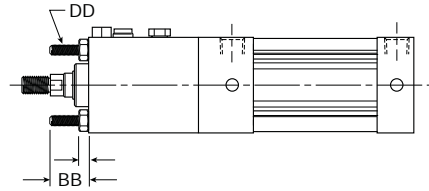
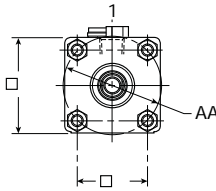
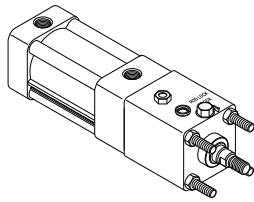
**Styles J and H**

Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R1	TF	UF	W	Add stroke		
												LB	ZF	ZJ
1-1/2	1	5/8	0.750	2.000	0.375	0.313	1.375	1.430	2.750	3.375	0.625	6.625	7.625	7.250
	1	5/8	0.750	2.500	0.375	0.375	1.375	1.840	3.375	4.125	0.625	6.875	7.875	7.500
	3	1	1.125	2.500	0.375	0.375	2.125	1.840	3.375	4.125	1.000	7.875	9.250	8.875
2-1/2	1	5/8	0.750	3.000	0.375	0.375	1.375	2.190	3.875	4.625	0.625	7.000	8.000	7.625
	3	1	1.125	3.000	0.375	0.375	2.125	2.190	3.875	4.625	1.000	8.125	9.500	9.125
3-1/4	1	1	1.125	3.750	0.625	0.438	1.875	2.760	4.688	5.500	0.750	9.375	10.750	10.125
	3	1-3/8	1.625	3.750	0.625	0.438	2.625	2.760	4.688	5.500	1.000	9.750	11.375	10.750
4	1	1	1.125	4.500	0.625	0.438	1.875	3.320	5.438	6.250	0.750	9.750	11.125	10.500
	3	1-3/8	1.625	4.500	0.625	0.438	2.625	3.320	5.438	6.250	1.000	10.000	11.625	11.000
5	1	1	1.125	5.500	0.625	0.563	1.875	4.100	6.625	7.625	0.750	10.500	11.875	11.250
	3	1-3/8	1.625	5.500	0.625	0.563	2.625	4.100	6.625	7.625	1.000	10.875	12.500	11.875

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 Series  
 4MA/4ML  
 Series  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series

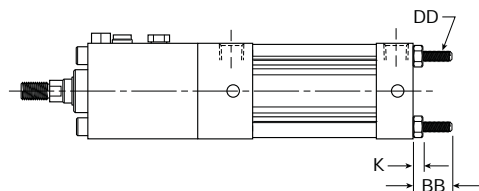
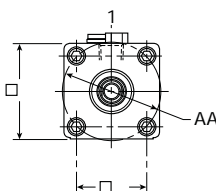
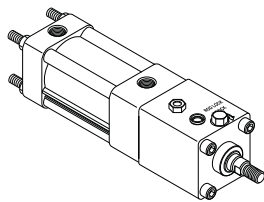
**Tie Rods Extended Head End Mount**

Style TB  
 (NFFA MX3)



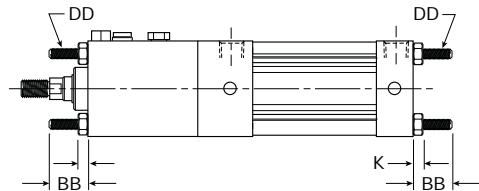
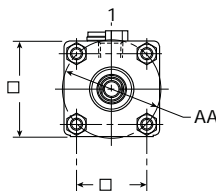
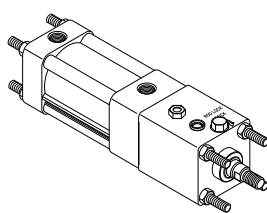
**Tie Rods Extended Cap End Mount**

Style TC  
 (NFFA MX2)



**Tie Rods Extended Both Ends Mount**

Style TD  
 (NFFA MX1)



**Styles TB, TC and TD**

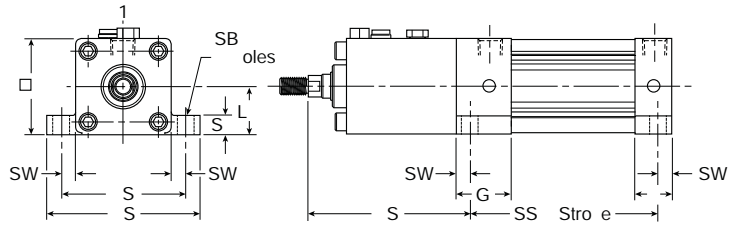
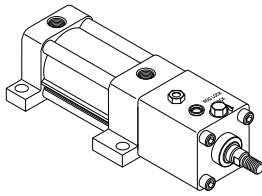
Bore size	Rod no.	Rod dia. MM	AA	BB	DD	E	K	R
1-1/2	1	5/8	2.020	1.000	1/4-28	2.000	0.250	1.430
2	1	5/8	2.600	1.125	5/16-24	2.500	0.313	1.840
	3	1	2.600	1.125	5/16-24	2.500	0.313	1.840
2-1/2	1	5/8	3.100	1.125	5/16-24	3.000	0.313	2.190
	3	1	3.100	1.125	5/16-24	3.000	0.313	2.190
3-1/4	1	1	3.900	1.375	3/8-24	3.750	0.375	2.760
	3	1-3/8	3.900	1.375	3/8-24	3.750	0.375	2.760
4	1	1	4.700	1.375	3/8-24	4.500	0.375	3.320
	3	1-3/8	4.700	1.375	3/8-24	4.500	0.375	3.320
5	1	1	5.800	1.813	1/2-20	5.500	0.438	4.100
	3	1-3/8	5.800	1.813	1/2-20	5.500	0.438	4.100

<b>B</b>	<b>Tie Rod Cylinders</b>	<b>Actuator Products</b>
	<b>3MA</b>	<b>Series</b>
	<b>4MA/4ML</b>	<b>Series</b>
	<b>3MAJ/4MAJ</b>	<b>Series</b>
	<b>4MNR</b>	<b>Series</b>
	<b>P1D</b>	<b>Series</b>



**Side Lug Mount**

Style C (only 4MAJ)  
 (NFPA MS2)

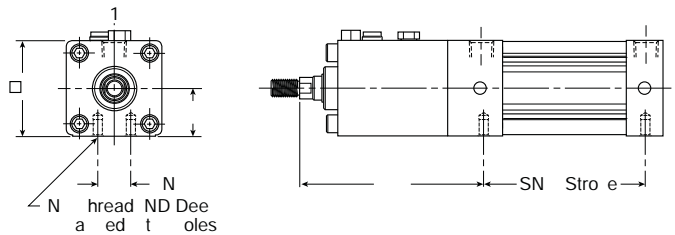
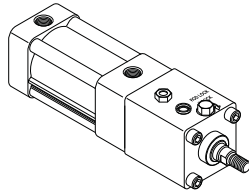


**Style C**

Bore size	Rod no.	Rod dia. MM	E	G	J	+/- .003 LH	SB	ST	SW	TS	US	XS	Add stroke SS
1-1/2	1	5/8	2.000	1.438	0.938	0.993	0.438	0.500	0.375	2.750	3.500	4.000	2.875
	2	5/8	2.500	1.375	0.937	1.243	0.438	0.500	0.375	3.250	4.000	4.250	2.875
2	3	1	2.500	1.375	0.937	1.243	0.438	0.500	0.375	3.250	4.000	5.625	2.875
	1	5/8	3.000	1.344	0.938	1.493	0.438	0.500	0.375	3.750	4.500	4.250	3.000
2-1/2	3	1	3.000	1.344	0.938	1.493	0.438	0.500	0.375	3.750	4.500	5.750	3.000
	1	1	3.750	1.594	1.125	1.868	0.563	0.750	0.500	4.750	5.750	6.375	3.250
3-1/4	3	1-3/8	3.750	1.594	1.125	1.868	0.563	0.750	0.500	4.750	5.750	7.000	3.250
	1	1	4.500	1.594	1.125	2.243	0.563	0.750	0.500	5.500	6.500	6.750	3.250
4	3	1-3/8	4.500	1.594	1.125	2.243	0.563	0.750	0.500	5.500	6.500	7.250	3.250
	1	1	5.500	1.594	1.219	2.743	0.813	1.000	0.688	6.875	8.250	7.438	3.125
5	3	1-3/8	5.500	1.594	1.219	2.743	0.813	1.000	0.688	6.875	8.250	8.063	3.125

**Side Tap Mount**

Style F  
 (NFPA MS4)

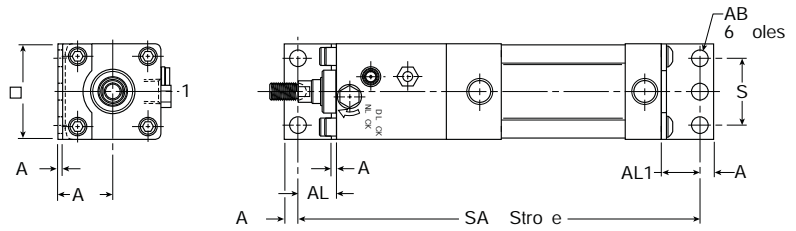
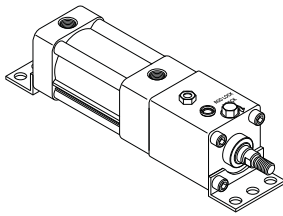


**Style F**

Bore size	Rod no.	Rod dia. MM	E	ND	NT	+/- .003 TH	TN	XT	Add stroke SN
1-1/2	1	5/8	2.000	0.375	1/4-20	0.993	0.625	4.563	2.250
	2	5/8	2.500	0.438	5/16-18	1.243	0.875	4.813	2.250
2	3	1	2.500	0.375	5/16-18	1.243	0.875	6.188	2.250
	1	5/8	3.000	0.625	3/8-16	1.493	1.250	4.813	2.375
2-1/2	3	1	3.000	0.625	3/8-16	1.493	1.250	6.313	2.375
	1	1	3.750	0.750	1/2-13	1.868	1.500	6.938	2.625
3-1/4	3	1-3/8	3.750	0.750	1/2-13	1.868	1.500	7.563	2.625
	1	1	4.500	0.750	1/2-13	2.243	2.063	7.313	2.625
4	3	1-3/8	4.500	0.750	1/2-13	2.243	2.063	7.813	2.625
	1	1	5.500	0.938	5/8-11	2.743	2.688	7.813	2.875
5	3	1-3/8	5.500	0.938	5/8-11	2.743	2.688	8.438	2.875

**Side End Angle Mount**

Style CB  
 (NFPA MS1)

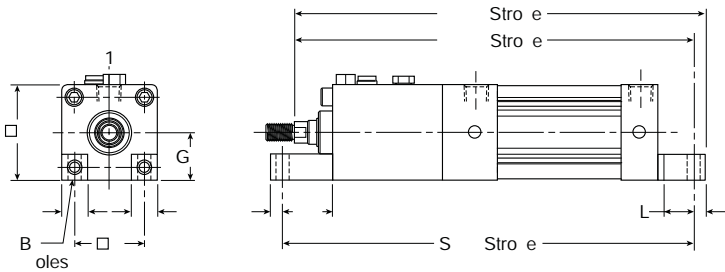
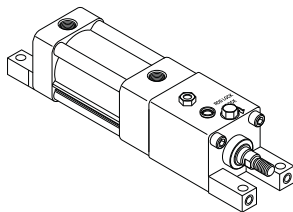


**Style CB**

Bore size	Rod no.	Rod dia. MM	AB	AH	AL	AL1	AO	AT	E	S	Add stroke	
											SA	SA
1-1/2	1	5/8	0.438	1.188	1.000	1.000	0.375	0.125	2.000	1.250	8.250	
	3	1	0.438	1.438	1.000	1.000	0.375	0.125	2.500	1.750	8.500	
2	1	5/8	0.438	1.438	1.000	1.000	0.375	0.125	2.500	1.750	9.500	
	3	1	0.438	1.438	1.000	1.000	0.375	0.125	2.500	1.750	9.500	
2-1/2	1	5/8	0.438	1.625	1.000	1.000	0.375	0.125	3.000	2.250	8.625	
	3	1	0.438	1.625	1.000	1.000	0.375	0.125	3.000	2.250	9.750	
3-1/4	1	1	0.563	1.938	1.250	1.250	0.500	0.125	3.750	2.750	11.250	
	3	1-3/8	0.563	1.938	1.250	1.250	0.500	0.125	3.750	2.750	11.625	
4	1	1	0.563	2.250	1.875	1.250	0.500	0.125	4.500	3.500	12.250	
	3	1-3/8	0.563	2.250	1.875	1.250	0.500	0.125	4.500	3.500	12.500	
5	1	1	0.688	2.750	1.375	1.375	0.625	0.188	5.500	4.250	12.625	
	3	1-3/8	0.688	2.750	1.375	1.375	0.625	0.188	5.500	4.250	13.000	

**Side End Lug Mount**

Style G  
 (NFPA MS7)



**Style G**

Bore size	Rod no.	Rod dia. MM	E	EB	EL	EM	EO	ET	+/- .003 GH	R	Add stroke		
											SE	XE	ZE
1-1/2	1	5/8	2.000	0.281	0.750	1.125	0.250	0.563	0.993	1.430	8.125	8.000	8.250
	3	1	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	8.750	8.438	8.750
2	1	5/8	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	9.750	9.813	10.125
	3	1	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	9.750	9.813	10.125
2-1/2	1	5/8	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	9.125	8.688	9.000
	3	1	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	10.250	10.188	10.500
3-1/4	1	1	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	11.125	11.000	11.375
	3	1-3/8	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	11.500	11.625	12.000
4	1	1	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	11.750	11.500	11.875
	3	1-3/8	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	12.000	12.000	12.375

**B**

Tie Rod Cylinders  
 Actuator Products

3MA Series

4MA/4ML Series

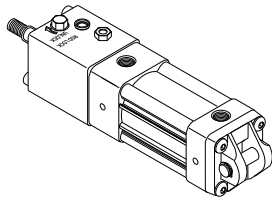
3MAJ/4MAJ Series

4MNR Series

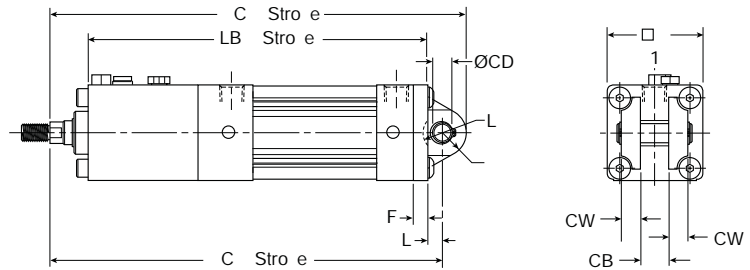
P1D Series

**Cap Fixed Clevis Mount**

Style BB  
 (NFPA MP1)

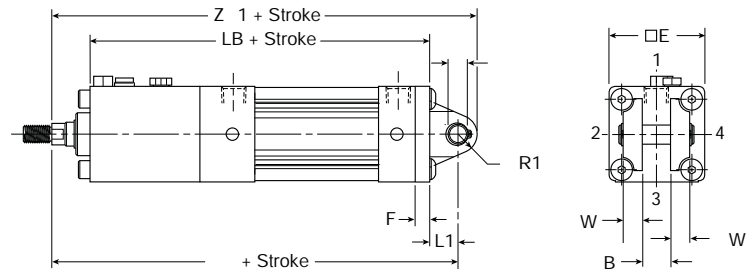
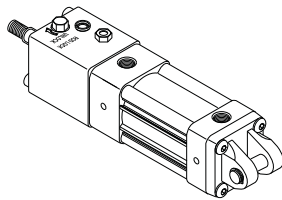


**NOTE:** For maximum swivel angle of BB mount with rear mounting plate, please reference catalog 0900P-E, cylinder accessories on page B108.



**Cap Detachable Clevis Mount**

Style BC  
 (NFPA MP2)



**Styles BB and BC**

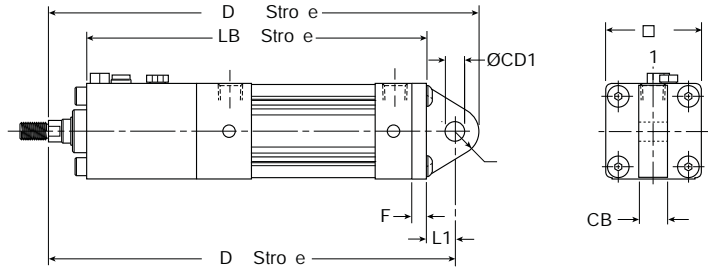
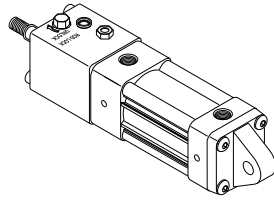
Bore size	Rod no.	Rod dia. MM	CB	+0.002 -0.002 CD	CW	E	F	L	L1	LR	MR	MR1	Add stroke				
													LB	XC	XD	ZC	ZD1
1-1/2	1	5/8	0.750	0.501	0.500	2.000	0.375	0.375	0.750	0.750	0.625	0.500	6.625	8.000	8.375	8.625	8.875
	2	1	0.750	0.501	0.500	2.500	0.375	0.375	0.750	0.750	0.625	0.500	6.875	8.250	8.625	8.875	9.125
2	3	1	0.750	0.501	0.500	2.500	0.375	0.375	0.750	0.750	0.625	0.500	7.875	9.625	10.000	10.250	10.500
	1	5/8	0.750	0.501	0.500	3.000	0.375	0.375	0.750	0.750	0.625	0.500	7.000	8.375	8.750	9.000	9.250
2-1/2	3	1	0.750	0.501	0.500	3.000	0.375	0.375	0.750	0.750	0.625	0.500	8.125	9.875	10.250	10.500	10.750
	1	1	1.250	0.751	0.625	3.750	0.625	0.625	1.250	1.000	0.938	0.750	9.375	11.375	12.000	12.313	12.750
3-1/4	3	1-3/8	1.250	0.751	0.625	3.750	0.625	0.625	1.250	1.000	0.938	0.750	9.750	12.000	12.625	12.938	13.375
	1	1	1.250	0.751	0.625	4.500	0.625	0.625	1.250	1.000	0.938	0.750	9.750	11.750	12.375	12.688	13.125
4	3	1-3/8	1.250	0.751	0.625	4.500	0.625	0.625	1.250	1.000	0.938	0.750	10.000	12.250	12.875	13.188	13.625
	1	1	1.250	0.751	0.625	5.500	0.625	0.625	1.250	1.000	0.938	0.750	10.500	12.500	13.125	13.438	13.875
5	3	1-3/8	1.250	0.751	0.625	5.500	0.625	0.625	1.250	1.000	0.938	0.750	10.875	13.125	13.750	14.063	14.500

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 Series  
 4MA/4ML  
 Series  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series

**Cap Detachable Eye Mount\***

Style BE  
 (NFPA MP4)

\* Not available for  
 5" bore 3MAJ,  
 please specify 4MAJ.



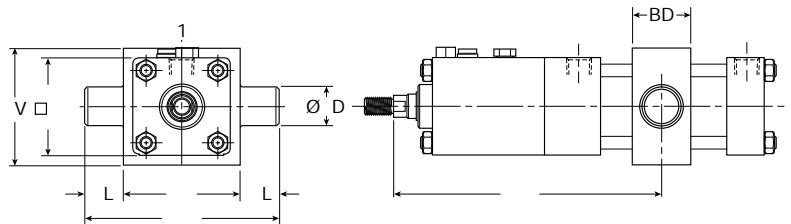
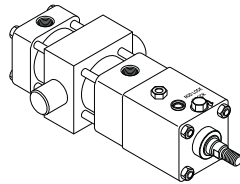
**Style BE**

Bore size	Rod no.	Rod dia. MM	CB	+0.002 +0.004 CD1	E	F	L1	MR2	Add Stroke		
									LB	XD	ZD2
1-1/2	1	5/8	0.750	0.500	2.000	0.375	0.750	0.625	6.625	8.375	9.000
	3	1	0.750	0.500	2.500	0.375	0.750	0.625	6.875	8.625	9.250
2	1	5/8	0.750	0.500	2.500	0.375	0.750	0.625	7.875	10.000	10.625
	3	1	0.750	0.500	3.000	0.375	0.750	0.688	7.000	8.750	9.438
2-1/2	1	5/8	0.750	0.500	3.000	0.375	0.750	0.688	8.125	10.250	10.938
	3	1	0.750	0.500	3.750	0.625	1.250	0.875	9.375	12.000	12.875
3-1/4	1	1	1.250	0.750	3.750	0.625	1.250	0.875	9.750	12.625	13.500
	3	1-3/8	1.250	0.750	4.500	0.625	1.250	0.875	10.000	12.875	13.750
4	1	1	1.250	0.750	5.500	0.625	1.250	0.875	10.500	13.125	14.000
	3	1-3/8	1.250	0.750	5.500	0.625	1.250	0.875	10.875	13.750	14.625
5*	1	1	1.250	0.750							
	3	1-3/8	1.250	0.750							

**Intermediate Trunnion Mount**

Style DD  
 (NFPA MT4)

**Note:** Tie rod nuts for Style DD have a slot instead of external hex.



**Note:** Style DD requires minimum stroke per table.

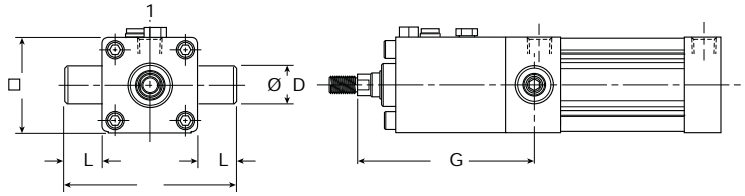
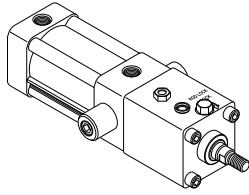
**Style DD**

Bore size	Rod no.	Rod dia. MM	E	BD	+0.000 -0.001 TD	TL	TM	UM	UV	Min. XI	Min. stroke
2	1	5/8	2.500	1.500	1.000	1.000	3.000	5.000	3.000	6.00	4.000
	3	1	2.500	1.500	1.000	1.000	3.000	5.000	3.000	7.38	4.000
2-1/2	1	5/8	3.000	1.500	1.000	1.000	3.500	5.500	3.500	5.97	3.875
	3	1	3.000	1.500	1.000	1.000	3.500	5.500	3.500	7.47	3.875
3-1/4	1	1	3.750	2.000	1.000	1.000	4.500	6.500	4.250	13.72	4.375
	3	1-3/8	3.750	2.000	1.000	1.000	4.500	6.500	4.250	14.34	4.375
4	1	1	4.500	2.000	1.000	1.000	5.250	7.250	5.000	14.09	4.875
	3	1-3/8	4.500	2.000	1.000	1.000	5.250	7.250	5.000	14.59	4.875
5	1	1	5.500	2.000	1.000	1.000	6.250	8.250	6.000	16.34	5.125
	3	1-3/8	5.500	2.000	1.000	1.000	6.250	8.250	6.000	16.97	5.125



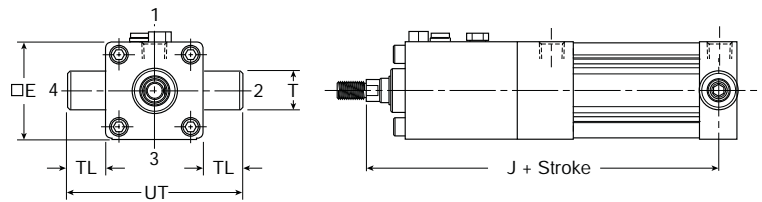
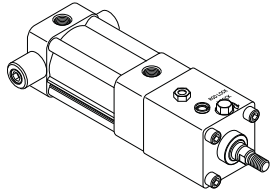
**Head Trunnion Mount**

Style D (only 4MAJ)  
 (NFPA MT1)



**Cap Trunnion Mount**

Style DB (only 4MAJ)  
 (NFPA MT2)



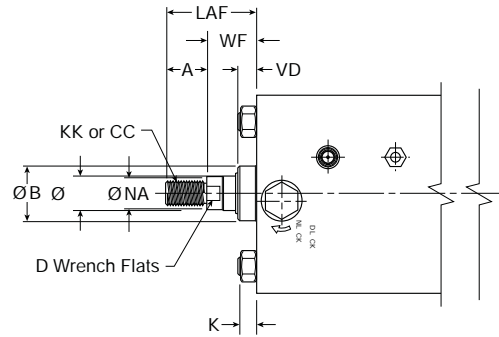
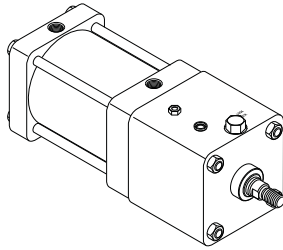
**Styles D and DB**

Bore size	Rod no.	Rod dia. MM	E	+0.000 -0.001 TD	TL	UT	XG	XJ
1-1/2	1	5/8	2.000	1.000	1.000	4.000	4.375	6.750
	3	1	2.500	1.000	1.000	4.500	4.625	7.000
2	1	5/8	2.500	1.000	1.000	4.500	6.000	8.375
	3	1	2.500	1.000	1.000	4.500	6.000	8.375
2-1/2	1	5/8	3.000	1.000	1.000	5.000	4.625	7.125
	3	1	3.000	1.000	1.000	5.000	6.125	8.625
3-1/4	1	1	3.750	1.000	1.000	5.750	6.750	9.500
	3	1-3/8	3.750	1.000	1.000	5.750	7.375	10.125
4	1	1	4.500	1.000	1.000	6.500	7.125	9.875
	3	1-3/8	4.500	1.000	1.000	6.500	7.625	10.375
5	1	1	5.500	1.000	1.000	7.500	7.625	10.625
	3	1-3/8	5.500	1.000	1.000	7.500	8.250	11.250

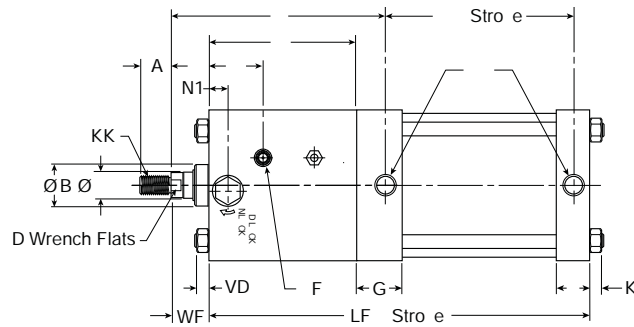
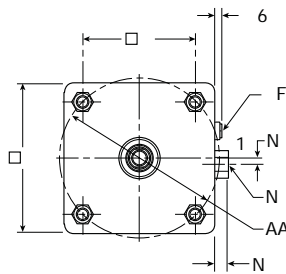
**B**  
Tie Rod Cylinders  
Actuator Products

Series 3MA  
Series 4MA/4ML  
Series 3MAJ/4MAJ  
Series 4MNR  
Series P1D

**No Mount**  
 Style T  
 (NFPA MX0)



For dimensions of all standard rod end styles, see next page.



**Style T**

Bore size	Rod no.	Rod dia. MM	Thread		A	AA	B	D	E	EE (NPTF)	EF (NPTF)	G	H	J
			Style 8 CC	Style 4 & 9 KK										
6	1	1-3/8	1-1/4 - 12	1-14	1.625	6.900	1.999	1-1/8	6.500	3/4	1/4	1.910	6.375	1.410
	3	1-3/4	1-1/2 - 12	1-1/4 - 12	2.000	6.900	2.374	1-1/2	6.500	3/4	1/4	1.910	6.875	1.410
8	1	1-3/8	1-1/4 - 12	1-14	1.625	9.100	1.999	1-1/8	8.500	3/4	1/4	1.810	6.625	1.440
	3	1-3/4	1-1/2 - 12	1-1/4 - 12	2.000	9.100	2.374	1-1/2	8.500	3/4	1/4	1.810	7.125	1.440

Bore size	Rod no.	Rod dia. MM	K	LAF	N1	N2	Hex N3	NA	NR	Q	R	VD	WF	Y	Add stroke	
															LF	P
6	1	1-3/8	0.438	3.250	1.165	0.177	1-5/16	1.313	0.750	2.705	4.880	0.755	1.625	9.188	11.375	3.125
	3	1-3/4	0.438	3.875	1.495	0.177	1-5/16	1.688	0.740	3.055	4.880	0.875	1.875	9.938	11.875	3.125
8	1	1-3/8	0.563	3.250	1.305	0.177	1-5/16	1.313	0.740	2.885	6.440	0.755	1.625	9.375	11.750	3.250
	3	1-3/4	0.563	3.875	1.570	0.177	1-5/16	1.688	0.740	3.145	6.440	0.875	1.875	10.125	12.250	3.250

**B**

Tie Rod Cylinders  
Actuator Products

3MA Series

4MA/4ML Series

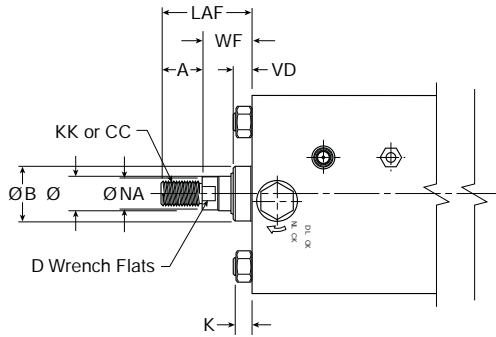
3MAJ/4MAJ Series

4MNR Series

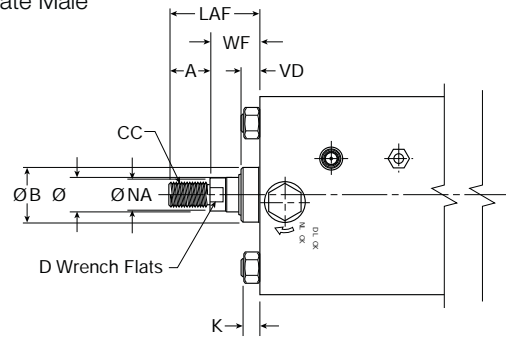
P1D Series

**Rod End Dimensions – 6" to 8" Bore Sizes**

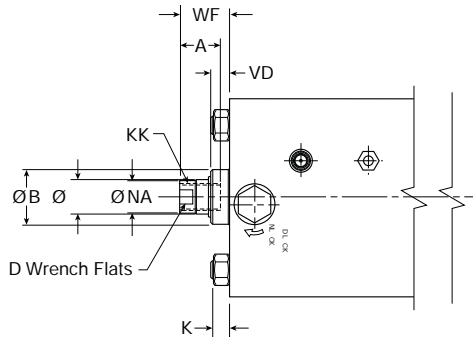
**Thread Style 4**  
 (NFPA Style SM)  
 Small Male



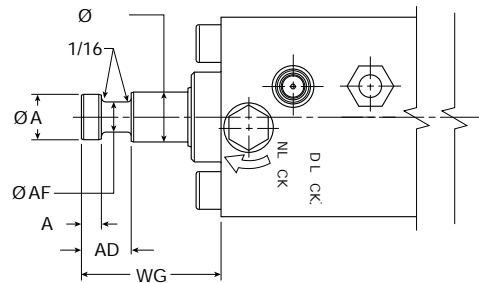
**Thread Style 8**  
 (NFPA Style IM)  
 Intermediate Male



**Thread Style 9**  
 (NFPA Style SF)  
 Short Female



**Thread Style 55**  
 For use with Split Coupler  
 (please reference catalog 0900P-E, page B105 for more information)



**Thread Style 3 - "Special Thread"**

Special threads, rod extensions, rod eyes, blanks, etc. are also available.  
 To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF.  
 If otherwise special, please supply dimensioned sketch.

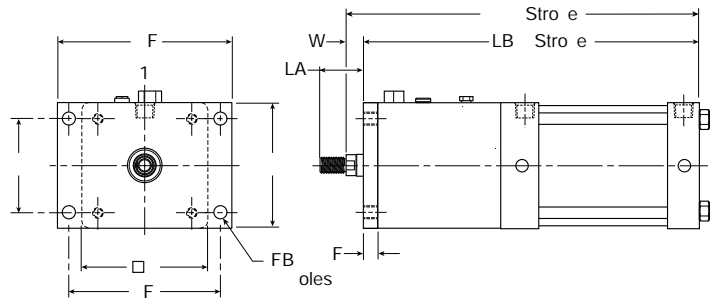
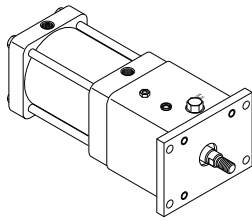
**Rod End Dimensions**

Bore size	Rod no.	Rod dia. MM	Thread														
			Style 8 CC	Style 4 & 9 KK	A	AD	AE	AF	AM	<sup>+0.000</sup> <sub>-0.002</sub> B	D	K	LAF	NA	VD	WF	WG
6	1	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.438	3.250	1.313	0.755	1.625	2.750
	3	1-3/4	1-1/2-12	1-1/4-12	2.000	1.313	0.500	1.125	1.700	2.374	1-1/2	0.438	3.875	1.688	0.875	1.875	3.125
8	1	1-3/8	1-1/4-12	1-14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.563	3.250	1.313	0.755	1.625	2.750
	3	1-3/4	1-1/2-12	1-1/4-12	2.000	1.313	0.500	1.125	1.700	2.374	1-1/2	0.563	3.875	1.688	0.875	1.875	3.125

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 Series  
 4MA/4ML  
 Series  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series

**Head Rectangular Flange Mount**

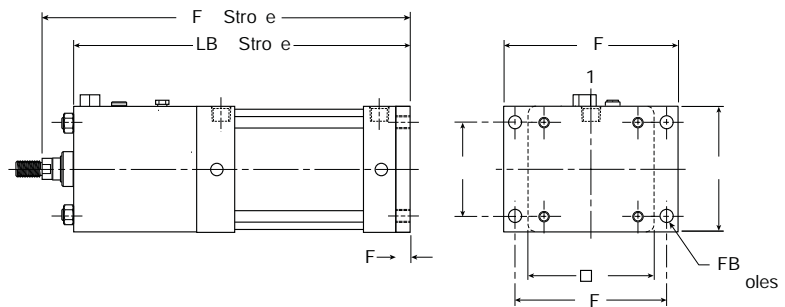
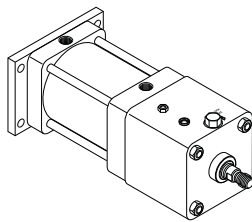
Style J  
 (NFPA MF1)  
 (only 6" Bore)



**Note:** Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.  
 For reference,  $WF = W + F$  and  $LA = W + A$ .

**Cap Rectangular Flange Mount**

Style H  
 (NFPA MF2)  
 (only 6" Bore)



**Styles J and H**

Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R	TF	UF	W	Add stroke		
												LB	ZF	ZJ
6	1	1-3/8	1.625	6.500	0.750	0.563	2.500	4.880	7.625	8.625	0.875	12.125	13.750	13.000
	3	1-3/4	2.000	6.500	0.750	0.563	3.125	4.880	7.625	8.625	1.125	12.625	14.500	13.750

**B**

Tie Rod Cylinders  
 Actuator Products

3MA Series

4MA/4ML Series

3MAJ/4MAJ Series

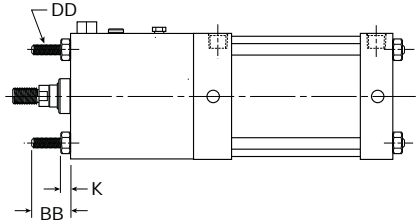
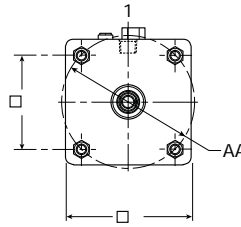
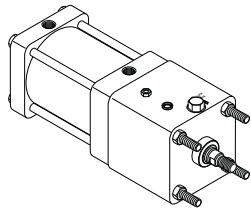
4MNR Series

P1D Series



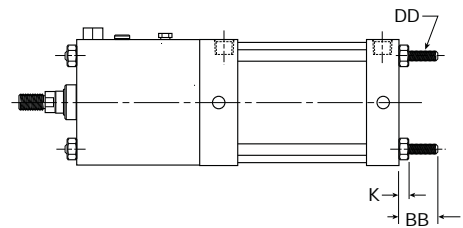
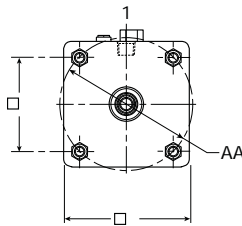
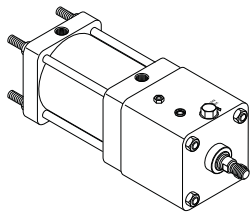
**Tie Rods Extended Head End Mount**

Style TB  
 (NFPA MX3)



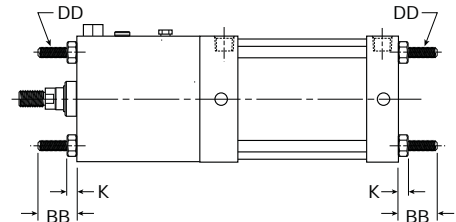
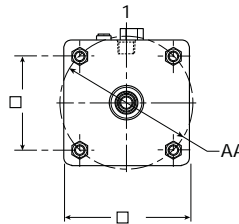
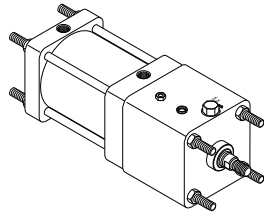
**Tie Rods Extended Cap End Mount**

Style TC  
 (NFPA MX2)



**Tie Rods Extended Both Ends Mount**

Style TD  
 (NFPA MX1)



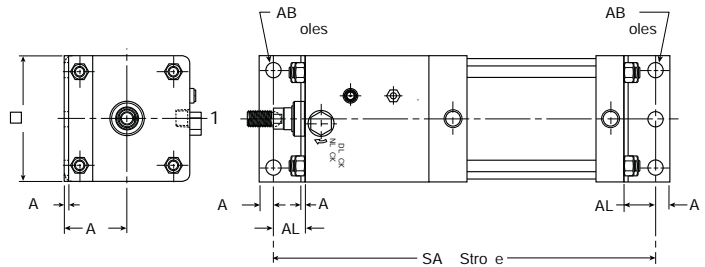
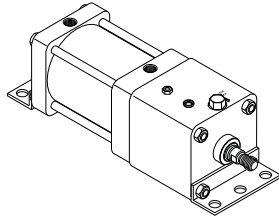
**Styles TB, TC and TD**

Bore size	Rod no.	Rod dia. MM	AA	BB	DD	E	K	R
6	1	1-3/8	6.900	1.813	1/2-20	6.500	0.438	4.880
	3	1-3/4	6.900	1.813	1/2-20	6.500	0.438	4.880
8	1	1-3/8	9.100	2.313	5/8-18	8.500	0.563	6.440
	3	1-3/4	9.100	2.313	5/8-18	8.500	0.563	6.440

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 Series  
 4MA/4ML  
 Series  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series

**Side End Angle Mount**

Style CB  
 (NFPA MS1)

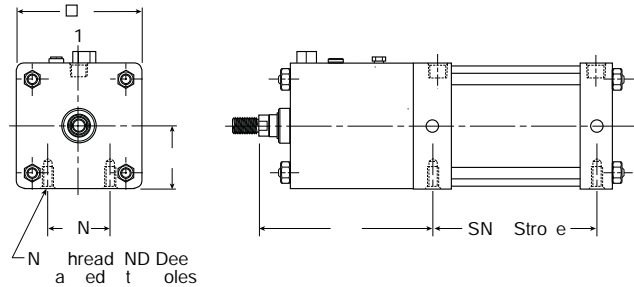
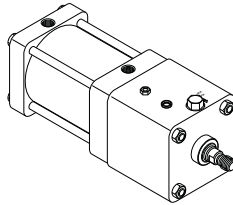


**Style CB**

Bore size	Rod no.	Rod dia. MM	AB	AH	AL	AO	AT	E	S	Add stroke SA
6	1	1-3/8	0.813	3.250	1.375	0.625	0.188	6.500	5.250	14.125
	3	1-3/4	0.813	3.250	1.375	0.625	0.188	6.500	5.250	14.625
8	1	1-3/8	0.813	4.250	1.813	0.688	0.250	8.500	7.125	15.375
	3	1-3/4	0.813	4.250	1.813	0.688	0.250	8.500	7.125	15.875

**Side Tap Mount**

Style F  
 (NFPA MS4)

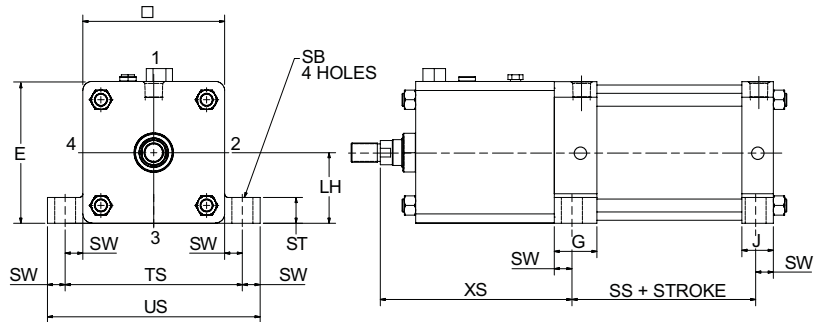
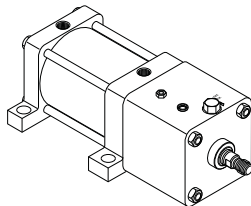


**Style F**

Bore size	Rod no.	Rod dia. MM	E	ND	NT	+/- .003 TH	TN	XT	Add stroke SN
6	1	1-3/8	6.500	1.125	3/4-10	3.243	3.250	9.188	3.125
	3	1-3/4	6.500	1.125	3/4-10	3.243	3.250	9.938	3.125
8	1	1-3/8	8.500	1.125	3/4-10	4.243	4.500	9.438	3.250
	3	1-3/4	8.500	1.125	3/4-10	4.243	4.500	10.188	3.250

**Side Lug Mount**

Style C  
 (NFPA MS2)



**Style C**

Bore size	Rod no.	Rod dia. MM	E	G	J	+/- .003 LH	SB	ST	SW	TS	US	XS	Add stroke SS
6	1	1-3/8	6.500	1.910	1.410	3.243	0.813	1.000	0.688	7.875	9.250	8.688	3.625
	3	1-3/4	6.500	1.910	1.410	3.243	0.813	1.000	0.688	7.875	9.250	9.438	3.625
8	1	1-3/8	8.500	1.810	1.440	4.243	0.813	1.000	0.688	9.875	11.250	8.938	3.750
	3	1-3/4	8.500	1.810	1.440	4.243	0.813	1.000	0.688	9.875	11.250	9.688	3.750

**B**

Tie Rod Cylinders  
 Actuator Products

3MA Series

4MA/4ML Series

3MAJ/4MAJ Series

4MNR Series

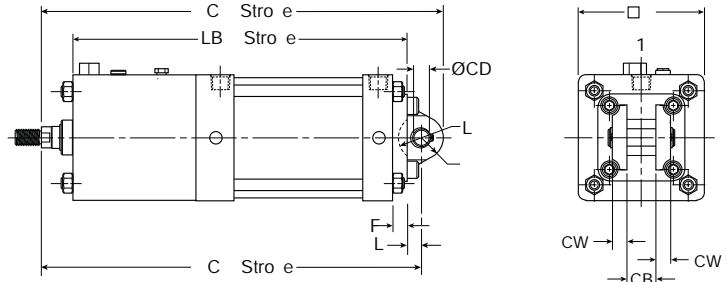
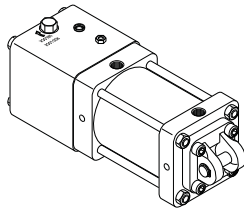
P1D Series



**Cap Fixed Clevis**

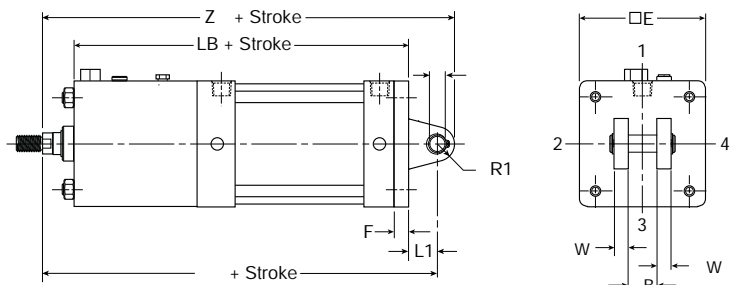
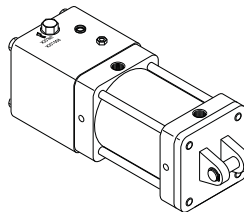
Style BB  
 (NFPA MP1)

**NOTE:** For maximum swivel angle of BB mount with rear mounting plate, please reference catalog 0900P-E, cylinder accessories on page B108.



**Cap Detachable Clevis**

Style BC  
 (NFPA MP2)

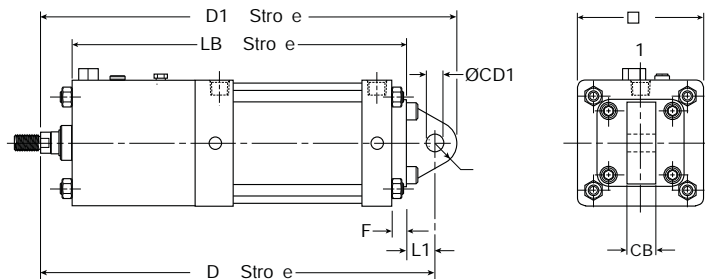
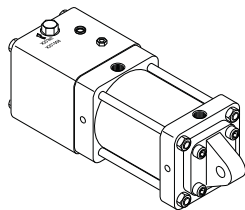


**Styles BB and BC**

Bore size	Rod no.	Rod dia. MM	CB	Rod dia. tolerance		CW	E	F	L	L1	LR	MR	MR1	Add stroke				
				+0.002	-0.002									LB	XC	XD	ZC	ZD
6	1	1-3/8	1.500	1.001	0.750	6.500	0.750	0.750	0.750	1.500	1.250	1.125	1.000	12.125	14.500	15.250	15.625	16.250
	3	1-3/4	1.500	1.001	0.750	6.500	0.750	0.750	0.750	1.500	1.250	1.125	1.000	12.625	15.250	16.000	16.375	17.000
8	1	1-3/8	1.500	1.001	0.750	8.500	0.750	0.750	0.750	1.500	1.250	1.125	1.000	12.500	14.875	15.625	16.000	16.625
	3	1-3/4	1.500	1.001	0.750	8.500	0.750	0.750	0.750	1.500	1.250	1.125	1.000	13.000	15.625	16.375	16.750	17.375

**Cap Detachable Eye Mount**

Style BE  
 (NFPA MP4)  
 (only 6" Bore)



**Style BE**

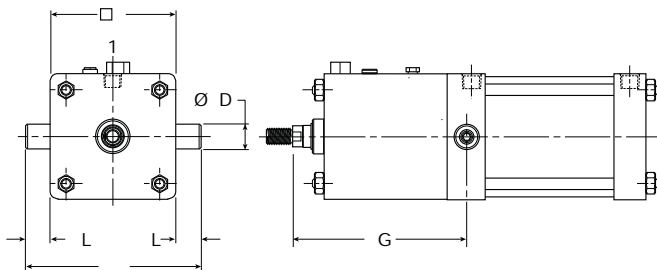
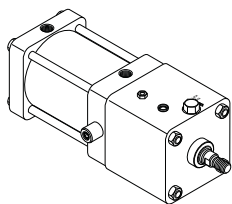
Bore size	Rod no.	Rod dia. MM	CB	Rod dia. tolerance		E	F	L1	MR2	Add stroke		
				+0.002	+0.004					LB	XD	ZD1
6	1	1-3/8	1.500	1.000	1.000	6.500	0.750	1.500	1.125	12.125	15.250	16.375
	3	1-3/4	1.500	1.000	1.000	6.500	0.750	1.500	1.125	12.625	16.000	17.125

**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 Series  
 4MA/4ML  
 Series  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series



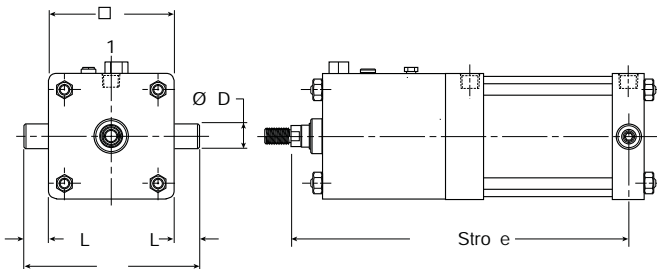
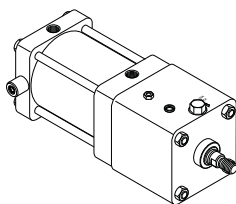
**Head Trunnion Mount**

Style D  
 (NFPA MT1)



**Cap Trunnion Mount**

Style DB  
 (NFPA MT2)

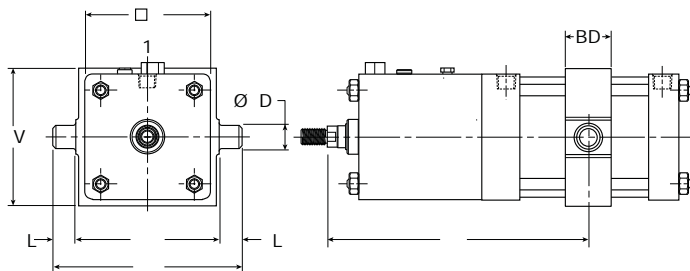
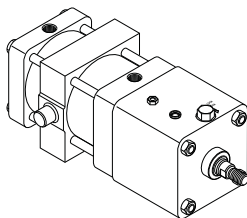


**Styles D and DB**

Bore size	Rod no.	Rod dia. MM	E	+0.000 -0.001 TD	TL	UT	XG	XJ
6	1	1-3/8	6.500	1.375	1.375	9.250	9.000	12.250
	3	1-3/4	6.500	1.375	1.375	9.250	9.750	13.000
8	1	1-3/8	8.500	1.375	1.375	11.250	9.250	12.625
	3	1-3/4	8.500	1.375	1.375	11.250	10.000	13.375

**Intermediate Trunnion Mount**

Style DD  
 (NFPA MT4)



**Note:** Style DD requires minimum stroke per table.

**Style DD**

Bore size	Rod no.	Rod dia. MM	E	BD	+0.000 -0.001 TD	TL	TM	UM	UV	Min. XI	Min. stroke
6	1	1-3/8	6.500	2.500	1.375	1.375	7.625	10.375	7.000	20.16	6.125
	3	1-3/4	6.500	2.500	1.375	1.375	7.625	10.375	7.000	20.19	6.125
8	1	1-3/8	8.500	2.500	1.375	1.375	9.750	12.500	9.500	26.31	6.500
	3	1-3/4	8.500	2.500	1.375	1.375	9.750	12.500	9.500	27.06	6.500

**Kits & Accessories**

See page B37.



**B**

Tie Rod Cylinders  
Actuator Products

3MA Series

4MA/4ML Series

3MAJ/4MAJ Series

4MNR Series

P1D Series