

- 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
For technical information see CD		

**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>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>Cushion cap end</b> Blank Non-cushioned cap end C Cushioned cap end (not available for 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>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>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>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>		
<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>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>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>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.

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



**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**

Tie Rod Cylinders  
 Actuator Products

3MA  
 Series

4MA/4ML  
 Series

3MAJ/4MAJ  
 Series

4MNR  
 Series

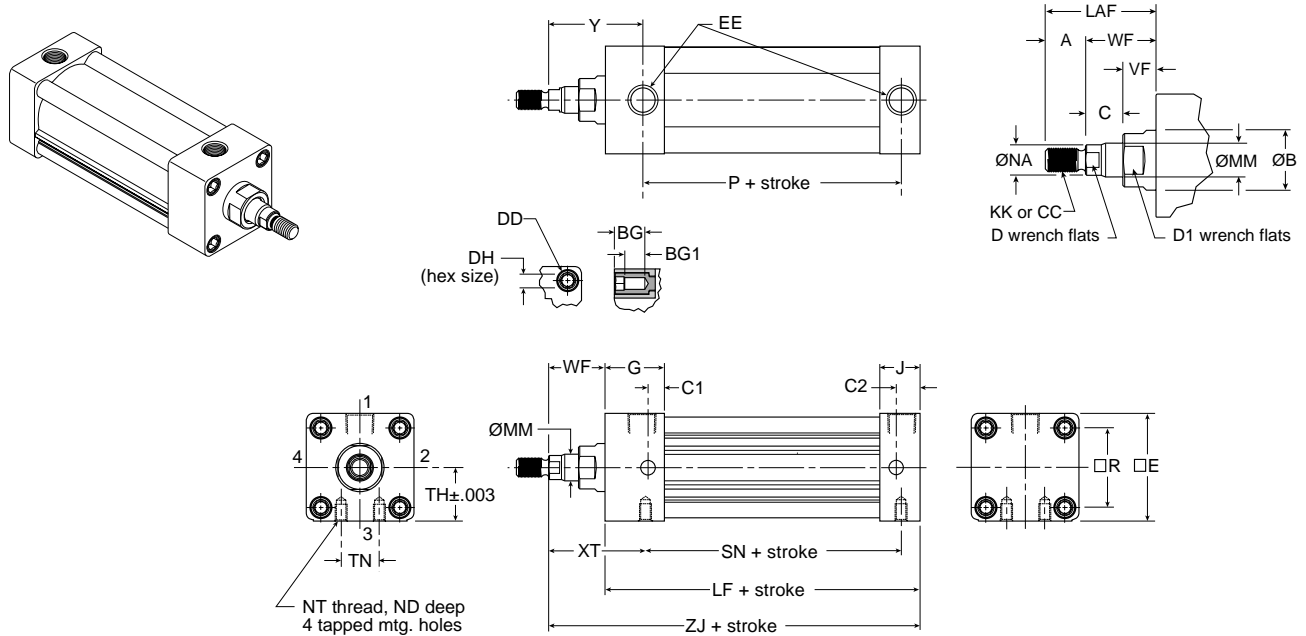
P1D  
 Series

**Sensors**

For sensors see page B294.



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



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	B	BG	BG1	C	C1	C2	D	D1	DD	DH	E			
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														Add stroke				
			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		

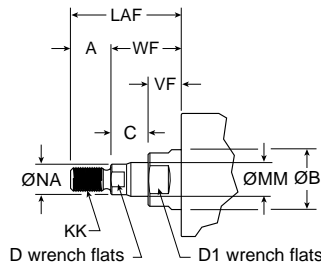
\* NOTE - 1-1/2" bore with 1" rod is TE mount, F mount not available.  
 1-1/2" bore with 1" rod cannot have a cushion at head end.



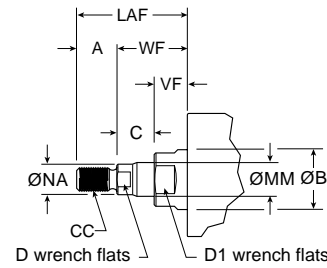
**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 4MA/4ML  
 3MAJ/4MAJ  
 4MNR  
 P1D

**4MA Rod End Dimensions**

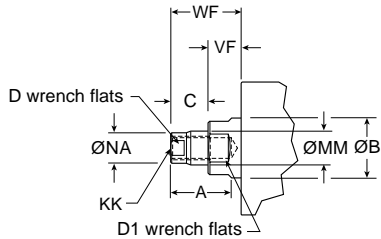
**Thread Style 4**  
 (NFPA Style SM)  
 Small Male



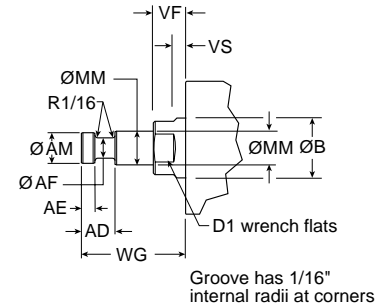
**Thread Style 8**  
 (NFPA Style IM)  
 Intermediate Male



**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		+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

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3MA Series

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4MA/4ML Series

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3MAJ/4MAJ Series

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4MNR Series

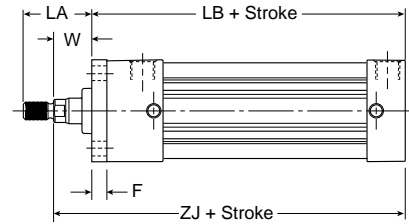
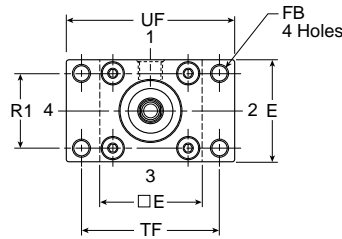
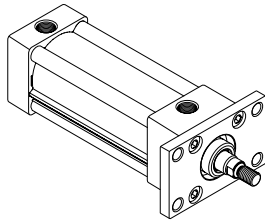
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P1D Series



**Head Rectangular Flange**

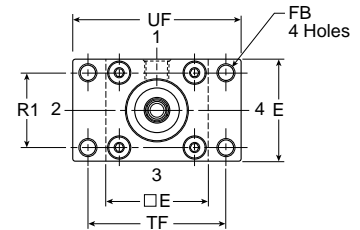
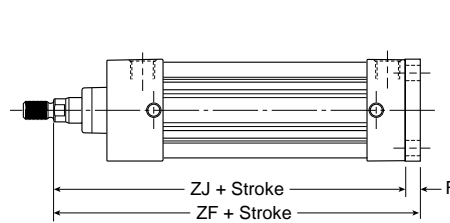
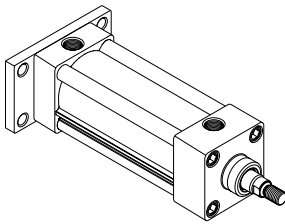
Style J  
 (NFPA MF1)



**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**

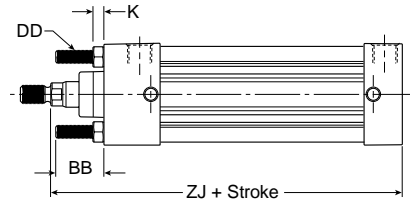
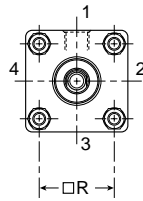
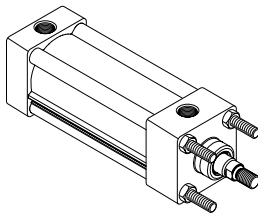
Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R1	TF	UF	W	Add stroke		
												LB	ZF	ZJ
1-1/2	1	5/8	0.750	2.000	0.375	0.313	1.375	1.430	2.750	3.375	0.625	4.000	5.000	4.625
	2	1	1.125	2.000	0.375	0.313	2.125	1.430	2.750	3.375	1.000	4.000	5.375	5.000
2	1	5/8	0.750	2.500	0.375	0.375	1.375	1.840	3.375	4.125	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



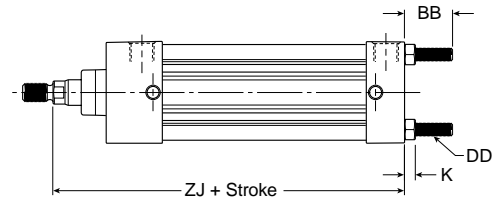
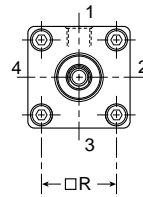
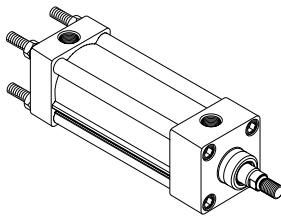
**Tie Rods Ext. Head End**

Style TB  
 (NFPA MX3)



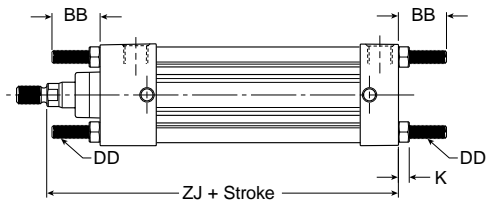
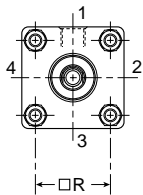
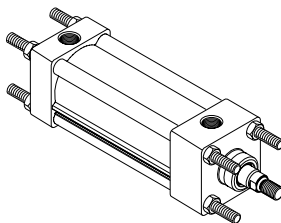
**Tie Rods Ext. Cap End**

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

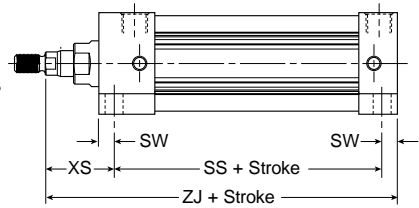
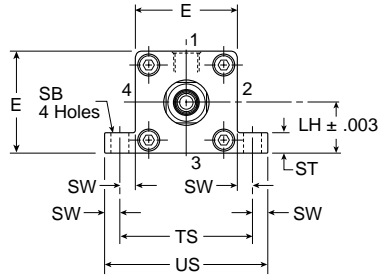
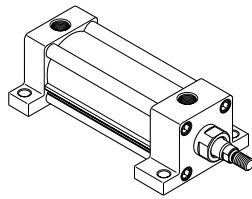
3MAJ/4MAJ  
 Series

4MNR  
 Series

P1D  
 Series



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

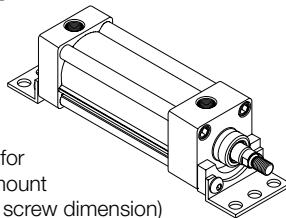


**Styles C**

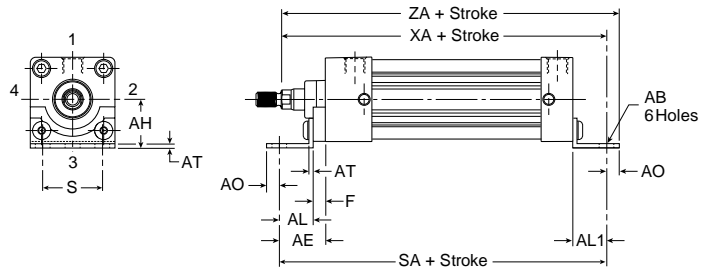
Bore size	Rod no.	Rod dia. MM	E	LH	SB	ST	ST1	ST2	SW	SW1	TS	US	XS	Add stroke	
														SS	ZJ
1-1/2	1	5/8	2.000	0.993	0.438	0.500	1.000	0.120	0.375	0.495	2.750	3.500	1.375	2.875	4.625
	2	1	2.000	0.993	0.438	0.500	1.000	0.120	0.375	0.495	2.750	3.500	1.750	2.875	5.000
2	1	5/8	2.500	1.243	0.438	0.500	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**

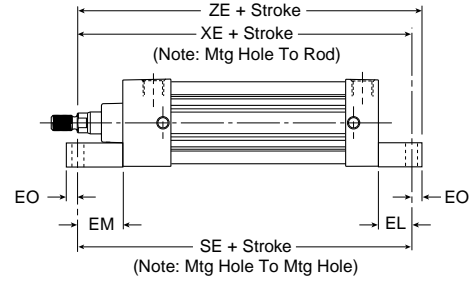
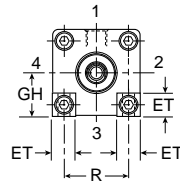
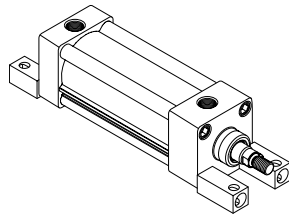
Bore size	Rod no.	Rod dia. MM	AB	AE	AH	AL	AL1	AO	AT	E	F	S	Add stroke		
													SA	XA	ZA
1-1/2	1	5/8	0.438	1.375	1.188	1.000	1.000	0.375	0.125	2.000	0.375	1.250	6.000	5.625	6.000
	2	1	0.438	1.375	1.188	1.000	1.000	0.375	0.125	2.000	0.375	1.250	6.000	6.000	6.375
2	1	5/8	0.438	1.375	1.438	1.000	1.000	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)



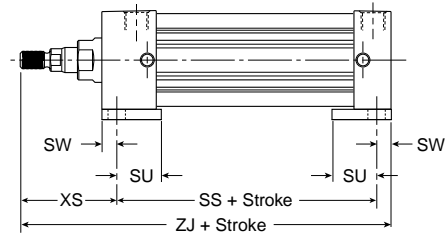
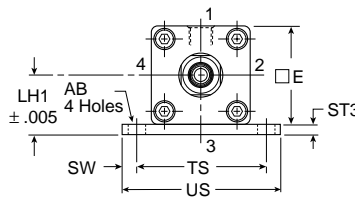
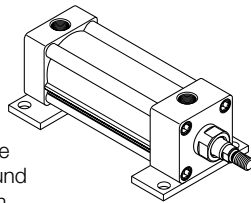
**Style G**

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

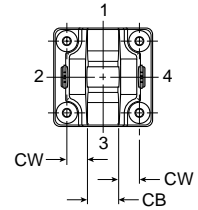
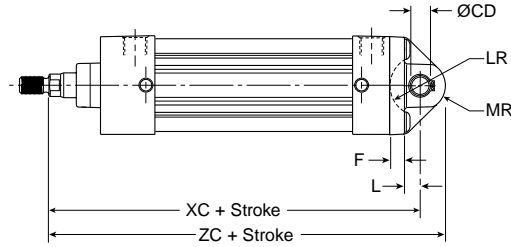
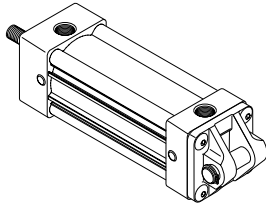




**Cap Fixed Clevis**

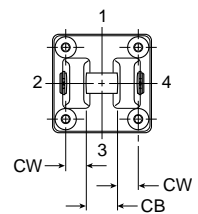
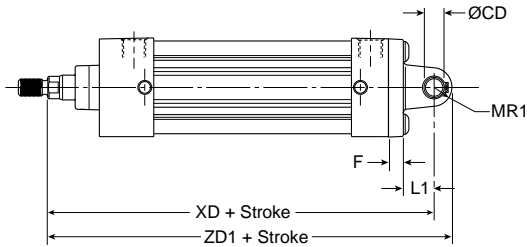
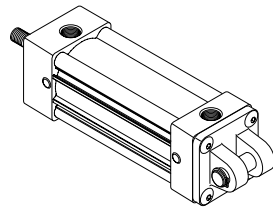
Style BB  
 (NFPA MP1)

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



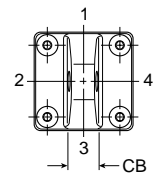
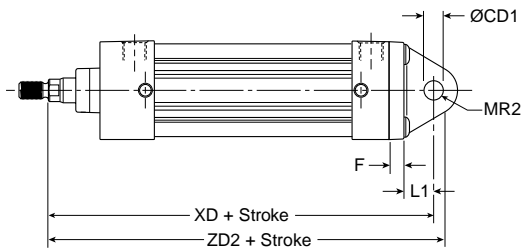
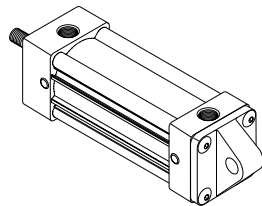
**Cap Detachable Clevis**

Style BC  
 (NFPA MP2)



**Cap Detachable Eye**

Style BE  
 (NFPA MP4)



**Styles BB, BC and BE**

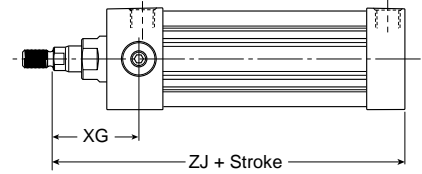
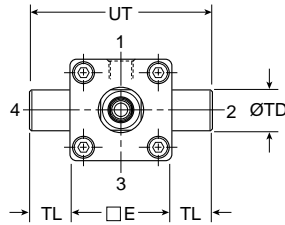
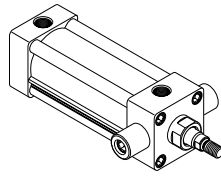
Bore size	Rod no.	Rod dia. MM	CB	Rod dia. tolerance		CW	E	F	L	LR	L1	MR	MR1	MR2	Add stroke				
				+0.000 -0.002	+0.002 +0.004										XC	XD	ZC	ZD1	ZD2
1-1/2	1	5/8	0.750	0.501	0.500	0.500	2.000	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.375	5.750	6.000	6.250	6.375
	2	1	0.750	0.501	0.500	0.500	2.000	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



**Head Trunnion\***

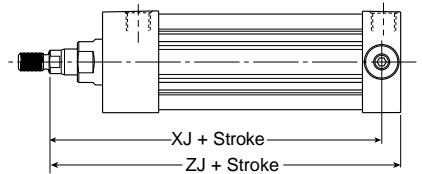
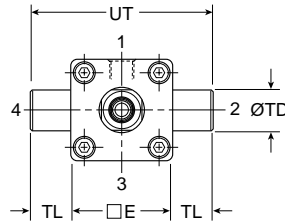
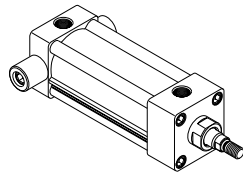
Style D  
(NFPA MT1)

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



**Cap Trunnion**

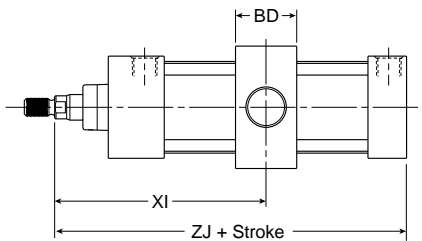
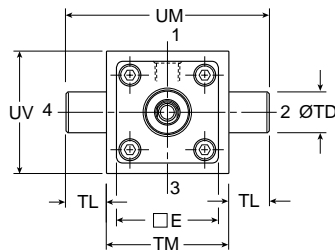
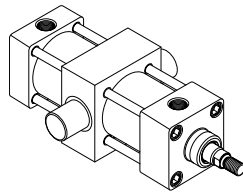
Style DB  
(NFPA MT2)



**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

**B**

Tie Rod Cylinders  
Actuator Products

3MA Series

4MA/4ML Series

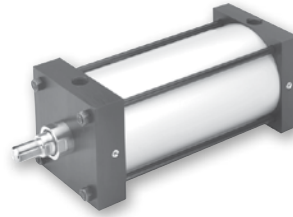
3MAJ/4MAJ Series

4MNR Series

P1D Series



- 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
For technical information see CD		

### 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>Cushion cap end</b> Blank Non-cushioned cap end C Cushioned cap end (not available for 4ML)		<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>Piston rod thread type</b> A Standard (UNF unified thread) W BSF British fine M * Metric		
		<b>Cushion head end</b> Blank Non-cushioned head end C Cushioned head end (not available for 4ML)				<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>Piston type</b> Blank Standard (lipseals and magnetic ring) 3 Lipseals and magnetic ring											
								<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)						
													<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	


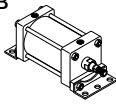

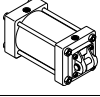
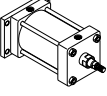
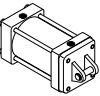
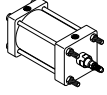
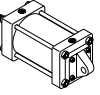
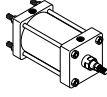
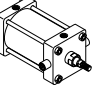
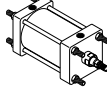
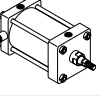
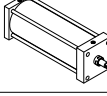
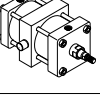
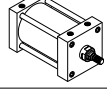
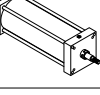
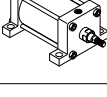
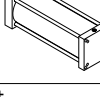
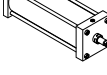
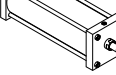
**Sensors**  
For sensors see page B294.

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.

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



**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

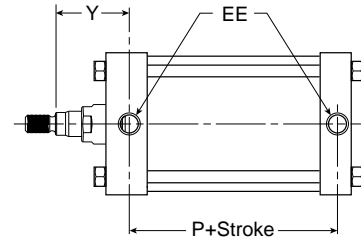
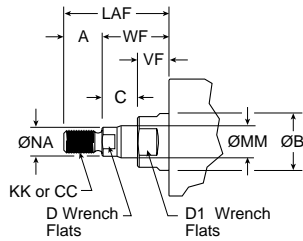
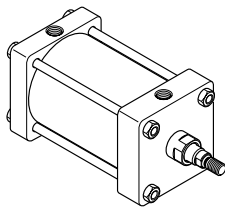
4MA/4ML  
 Series

3MAJ/4MAJ  
 Series

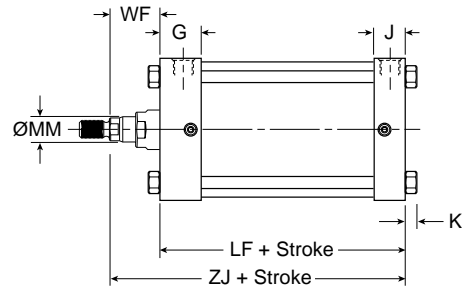
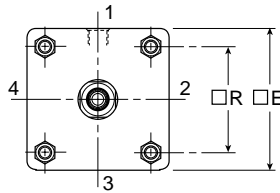
4MNR  
 Series

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	R	VF	WF	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

3MA Series

4MA/4ML Series

3MAJ/4MAJ Series

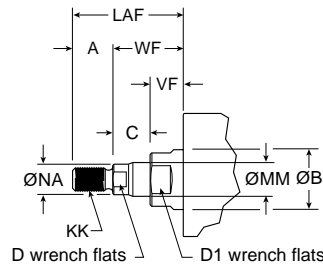
4MNR Series

P1D Series

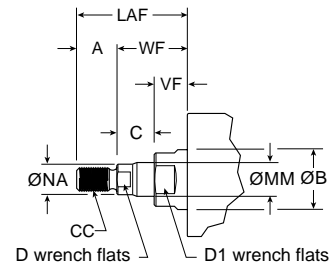


**4MA Rod End Dimensions**

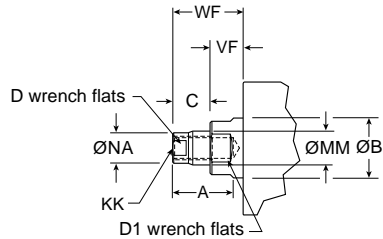
**Thread Style 4**  
 (NFPA Style SM)  
 Small Male



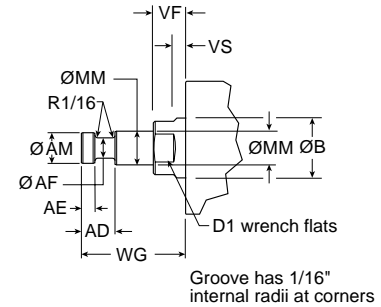
**Thread Style 8**  
 (NFPA Style IM)  
 Intermediate Male



**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.

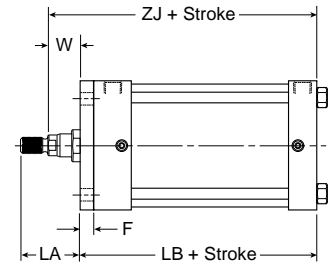
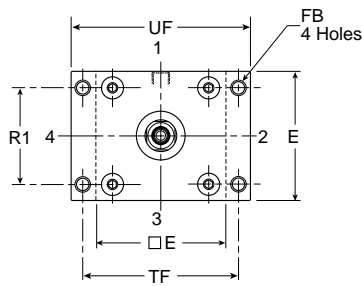
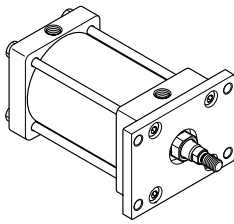
**Rod End Dimensions**

Bore size	Rod no.	Rod dia. MM	Thread		Tolerances													
			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	+0.000	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	-0.002	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	+0.000	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	-0.002	0.760	1-1/2	2-3/16	3.875	1.688	1.115	1.875	3.125



**Head Rectangular Flange**

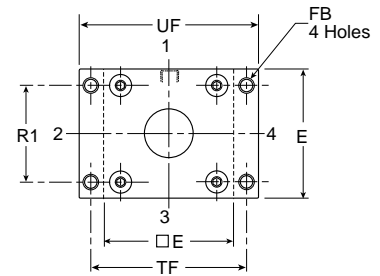
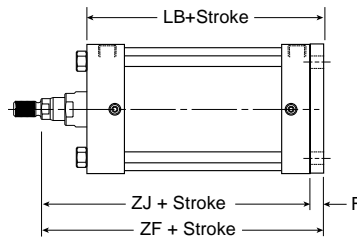
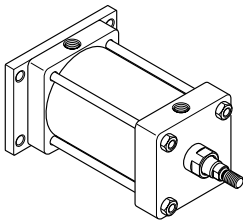
Style J  
 (NFFPA MF1)  
 (only 6" Bore)



**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

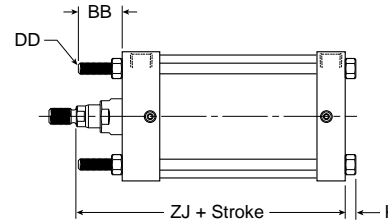
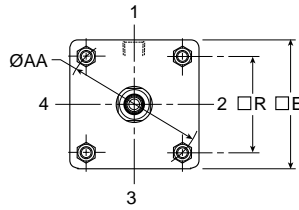
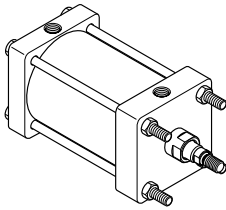
**B**  
 Tie Rod Cylinders  
 Actuator Products  
 Series  
 3MA  
 Series  
 4MA/4ML  
 Series  
 3MAJ/4MAJ  
 Series  
 4MNR  
 Series  
 P1D  
 Series





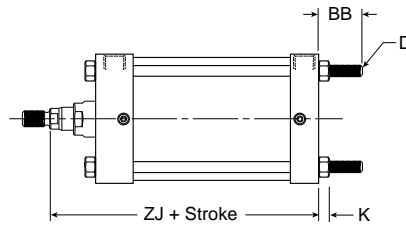
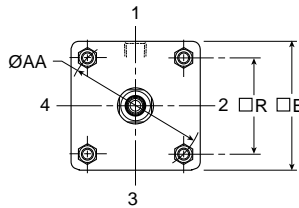
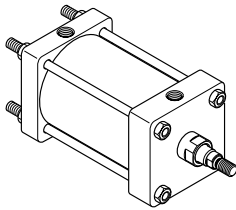
**Tie Rods Ext. Head End**

Style TB  
 (NFPA MX3)



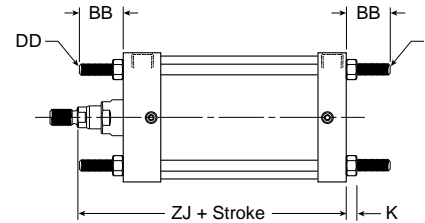
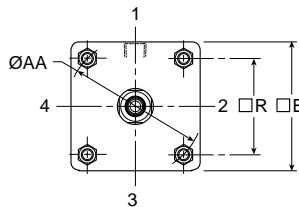
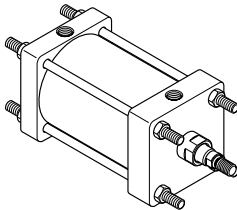
**Tie Rods Ext. Cap End**

Style TC  
 (NFPA MX2)



**Tie Rods Ext. Both Ends**

Style TD  
 (NFPA MX1)



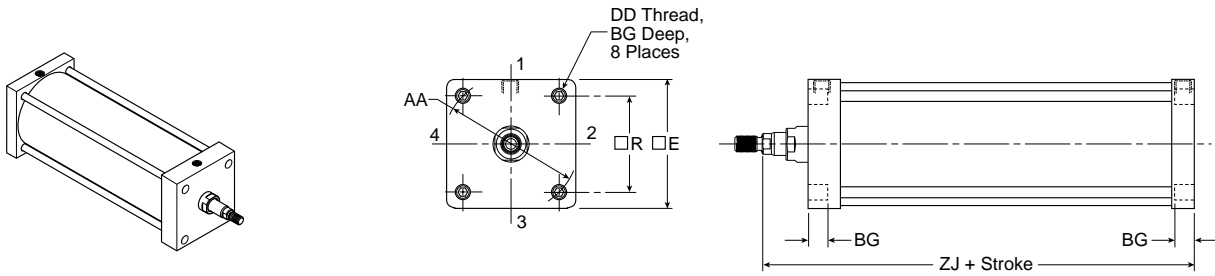
**Styles TB, TC and TD**

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

**Sleeve Nut**

Style TE  
 (NFPA MX5)



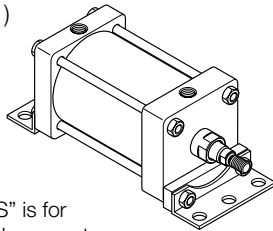
**Style TE**

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	

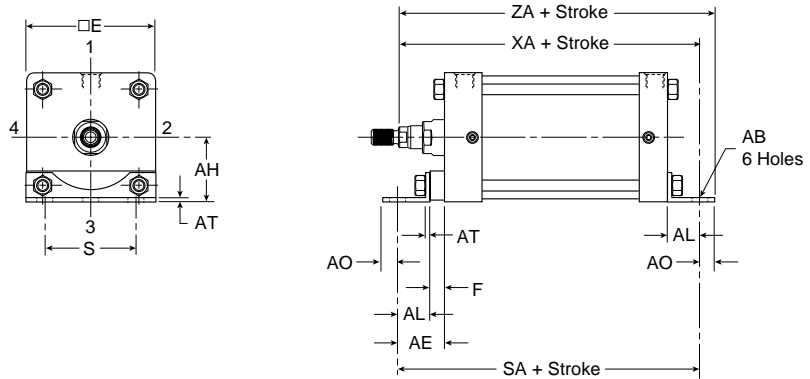
**B**  
 Tie Rod Cylinders  
 Actuator Products  
 3MA Series  
 4MA/4ML Series  
 3MAJ/4MAJ Series  
 4MNR Series  
 P1D Series

**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

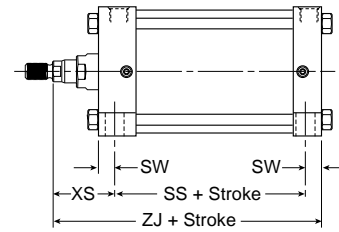
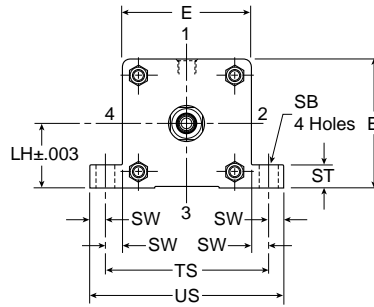
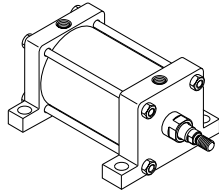
**Style CB**

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)

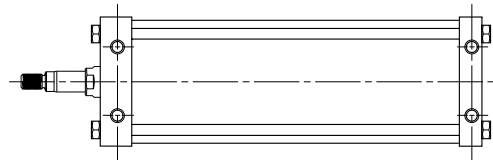
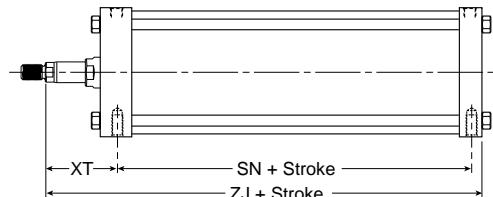
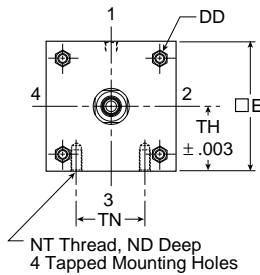
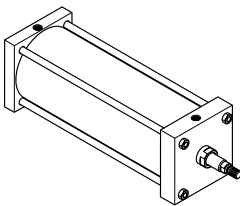


**Style C**

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

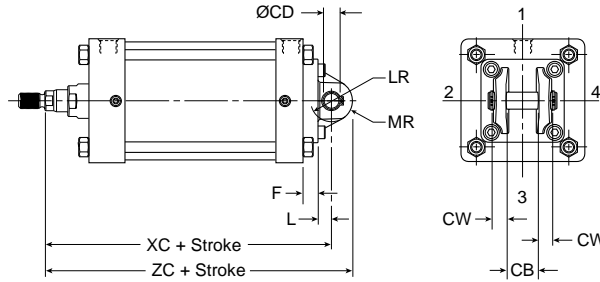
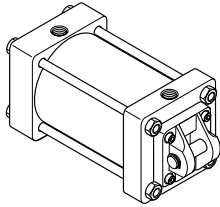
P1D  
 Series



**Cap Fixed Clevis**

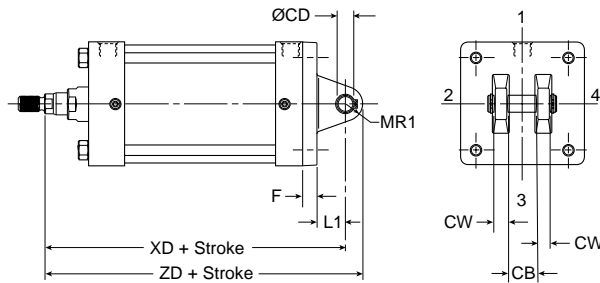
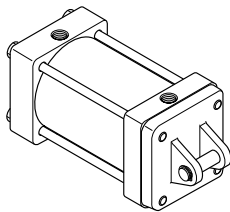
Style BB  
 (NFPA MP1)

**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)

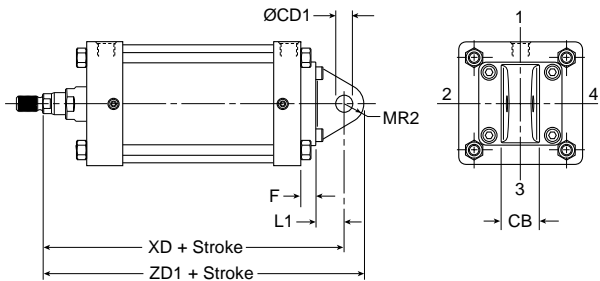
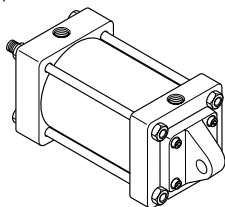


**Styles BB and BC**

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)

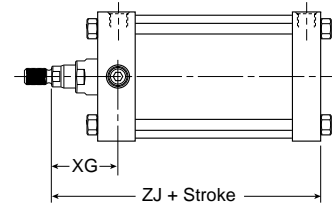
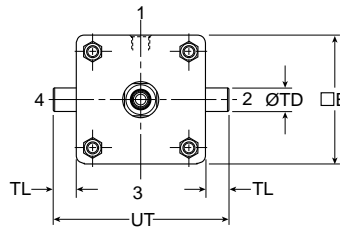
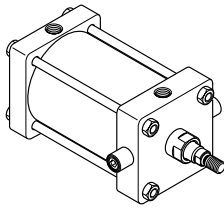


**Style BE**

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

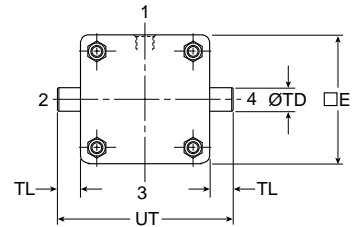
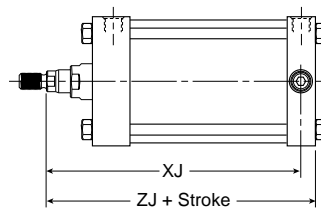
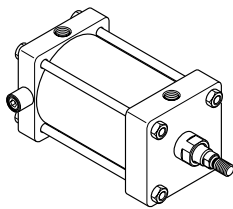
**Head Trunnion**

Style D  
 (NFPA MT1)



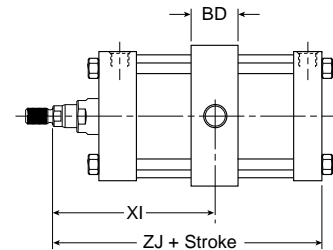
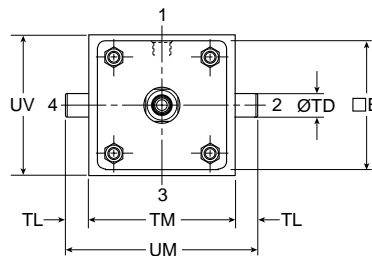
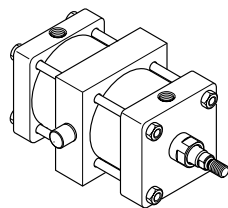
**Cap Trunnion**

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

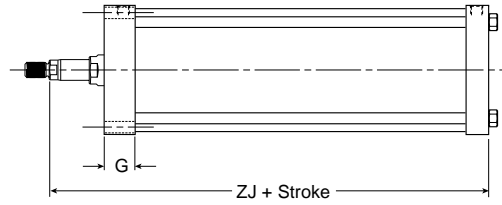
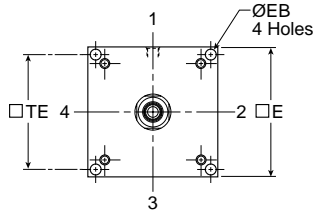
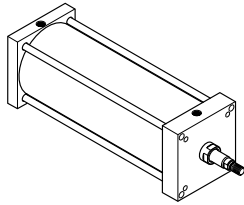
4MNR  
 Series

P1D  
 Series



**Head Square**

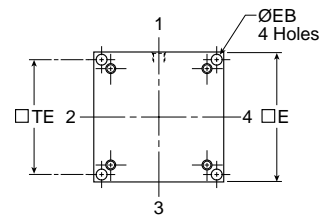
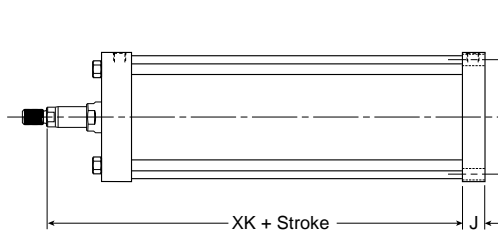
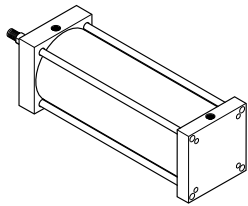
Style JB  
 (NFPA ME3)



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

**Cap Square**

Style HB  
 (NFPA ME4)



**Styles JB and HB**

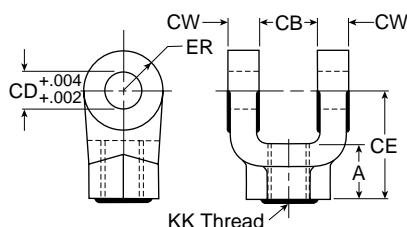
Bore size	Rod no.	Rod dia. MM	E	EB	G	J	TE	Add stroke	
								XK	ZJ
8	1	1-3/8	8.500	0.688	1.810	1.440	7.570	5.313	6.750
	3	1-3/4	8.500	0.688	1.810	1.440	7.570	5.563	7.000

**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

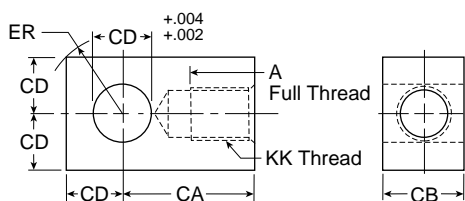
\*\* Spacer plate not used for 4" bore or double rod cylinders

**Female Rod Clevis**



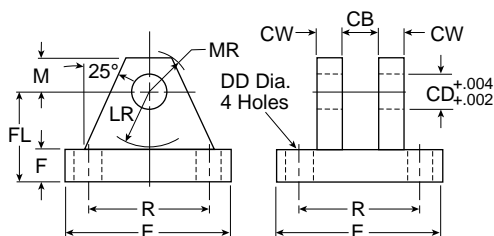
Symbol	1458030044	1458030050	1458030075	1458030088	1458030100	1458030125	1458030150
A	3/4	3/4	1-1/8	1-5/8	1-5/8	2	2-1/4
CB	3/4	3/4	1-1/4	1-1/2	1-1/2	2	2-1/2
CD	1/2	1/2	3/4	1	1	1-3/8	1-3/4
C E	1-1/2	1-1/2	2-1/8	2-15/16	2-15/16	3-3/4	4-1/2
CW	1/2	1/2	5/8	3/4	3/4	1	1-1/4
ER	1/2	1/2	3/4	1	1	1-3/8	1-3/4
KK	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



**B**

Tie Rod Cylinders  
Actuator Products

3MA Series

4MA/4ML Series

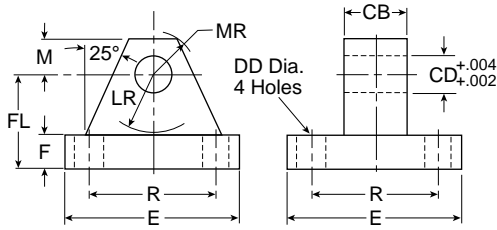
3MAJ/4MAJ Series

4MNR Series

P1D Series



**Mounting Plate & Eye Bracket**



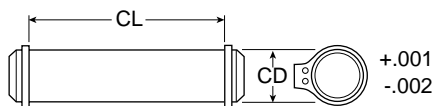
Symbol	1458060031	1458060050	1458060075	1458060100	1458060138	1458060175
CB	15/16	3/4	1-1/4	1-1/2	2	2-1/2
CD	15/16	1/2	3/4	1	1-3/8	1-3/4
DD	17/64	13/32	17/32	21/32	21/32	29/32
E	2-1/4	2-1/2	3-1/2	4-1/2	5	6-1/2
F	3/8	3/8	5/8	7/8	7/8	1-1/8
FL	1	1-1/8	17/8	2-3/8	3	3-3/8
LR	5/8	3/4	1-1/4	1-1/2	2-1/8	2-1/4
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.

Rod end thread size	Table A Mating parts			Table B Mating parts			Table C 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	—

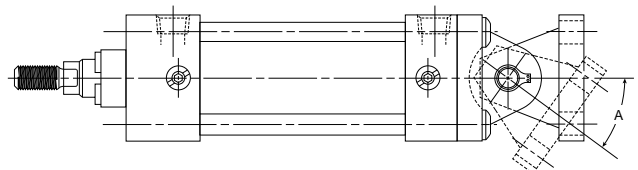
**Pivot Pin**



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**

