3MA/4MA Series

Non-Lube NFPA Air Cylinders

Contents

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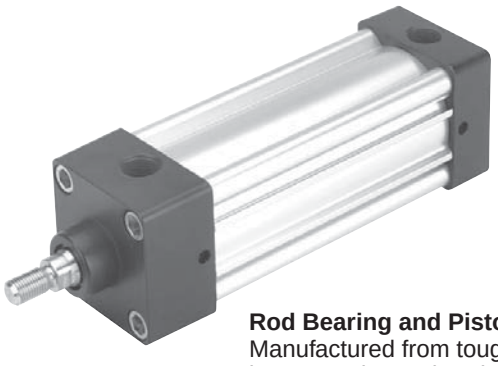

Rod Bearing and Piston
Manufactured from tough, impact-resistant, bearing-grade materials, the composite rod bearing and piston provide excellent wear resistance. Other advantages include noise reduction without the need for bumpers and lower friction than other materials. Aluminum piston with wear band is available for bumper piston seals and other options.

Piston Seals
Carboxylated nitrile rounded-lip piston seals combine low friction with leak-free service and long service life. Optional bumper piston seals provide additional noise reduction and smooth end-of-stroke deceleration.

Piston Assembly
High strength steel fastener (composite piston) or piston rod thread (aluminum piston) connects the piston to the rod and is secured in place with anaerobic adhesive.

Ports
NPTF ports are standard.

Endcap Fasteners
Zinc plated steel endcap fasteners for tough environments. Stainless steel is available as an option.

Rod Seal
Carboxylated nitrile rounded-lip rod seal combines low friction with leak-free service and long service life.

Magnetic Piston Ring
Included as a standard feature for use with a variety of sensors.

Adjustable Cushions
Included as a standard feature.

Cylinder Body
Extruded aluminum profile cylinder body offers integrated sensor grooves to minimize sensor installation time, maximize sensor protection and eliminate the need for brackets. Grooves readily accept both Global and Mini-Global Sensors. Single corner lobe of extrusion will accept legacy 2MA sensor brackets. Anodized and bright-dipped for corrosion resistance, maximum seal life and lower friction.

Rod Wiper
Outboard urethane rod wiper protects the cylinder by removing external debris and adherents from the piston rod during the entire stroke.

Heads and Caps
High-pressure die cast aluminum heads and caps are designed with the most flexible mounting platform. TEF mount is standard. Anodized for corrosion resistance.

Piston Rod
Standard case-hardened (50-64 Rc), hard chrome plated and polished carbon steel piston rod for reliable performance, long rod seal life and low friction. Grades of stainless steel are available as options.

For a complete list of 3MA options, please see pages B6 and B16.

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B

How to Order 3MA Series Cylinders for 1-1/2" to 5" Bore

3MA cylinders can be specified by model number by using the table below.

2.00	C		J		3MA		U			1	4		A	C	6.000

Bore Size
1.50
2.00
2.50
3.25
4.00
5.00

Cushion Head End

C	Standard (cushioned head end)
Blank	Non-cushioned head end

Double Rod Cylinder [5]
Specify "K" only if double rod cylinder is required.

Mounting Style
Specify mounting style code (see table on following page).

Series
3MA

Ports
Standard (NPTF)

Seals

Blank	Standard (nitrile seals)
E	Fluorocarbon rod wiper and rod seal only [2]

Special Modification
Specify "S" only for special modification other than rod end, and then describe modification in item notes.

Piston Rod Number
Standard (rod code number 1) [3]

Stroke Length
Specify stroke length required in inches.

Cushion Cap End

C	Standard (cushioned cap end)
Blank	Non-cushioned cap end

Piston Rod Thread Type

A	Standard (UNF Unified Thread)
W	BSF British Fine
M	Metric (see page B106)

Rod Material Code

Blank	Standard
Y	17-4 PH stainless steel
J	303 stainless steel
S	316 stainless steel

Cylinder Construction

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 and nuts

* See Table on page B10. Only applies to 1-1/2" to 4" Bore.

Piston Type

Blank	Standard (lipseals and magnetic ring) [5]
1	Lipseals, no magnetic ring [5]
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 [1]
H	Lipseals, 1/4" thick bumper head end [1]
C	Lipseals, 1/4" thick bumper cap end [1]
D	Lipseals and magnetic ring, 1/4" thick bumpers both ends [1]
F	Lipseals and magnetic ring, 1/4" thick bumper head end [1]
R	Lipseals and magnetic ring, 1/4" thick bumper cap end [1]

Piston Rod Thread Style

4	Small male
8	Intermediate male
9	Short female
55	For use with Split Coupler [4]
3	Special (and specify all dimensions required)

How to order 3MA Series cylinders with sensors:

Sensors must be ordered separately and are not mounted to the cylinder prior to shipment.

1. Cylinder model number must have a Piston Type with a magnetic ring ((blank), 3, 6, D, F or R).
2. Please refer to pages M1-M9 for sensor part numbers and specifications. Global, Mini-Global, NAMUR and Weld Immune Sensors will fit the 3MA Series.
3. Style DD mounts and tie rod versions with Global Sensors will require tie rod bracket P8S-TMA0X. Please refer to page M9 for more information.

[1] 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".

[2] Used for external chemical compatibility applications, not high temperature.

[3] Review Piston Rod Selection Chart on 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.

[4] For additional information regarding this style, refer to 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.

[5] Double rod cylinders not available with composite piston type.

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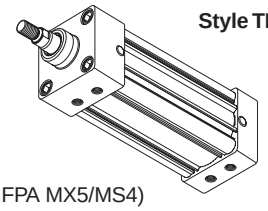
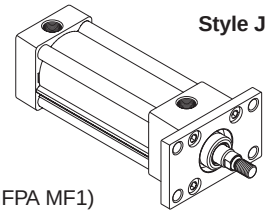
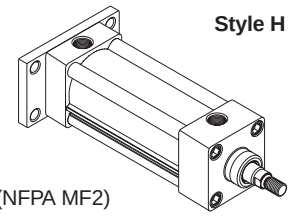
3MA Series Mounting Styles for 1-1/2" to 5" Bore

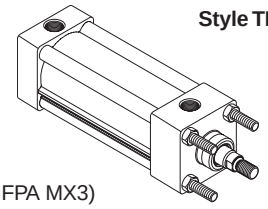
Mounting Code	NFPA Mounting	Description	Available Bore Sizes 3MA
TEF	MX5/MS4	Sleeve Nut with Side Tap (standard mount)	1-1/2 - 5
T	MX0	No Mount (same construction as TEF)	1-1/2 - 5
TE	MX5	Sleeve Nut (same construction as TEF)	1-1/2 - 5
F	MS4	Side Tap (same construction as TEF)	1-1/2 - 5
J	MF1	Head Rectangular 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
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

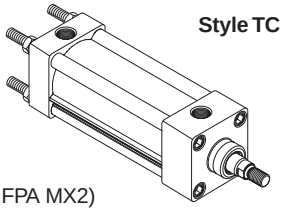
*Double rod end cylinders can be ordered with head mountings, i.e. KJ (see page B19).

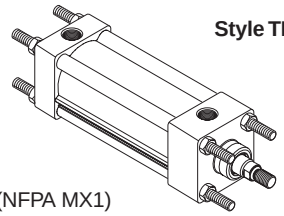
Standard Mount
Style TEF

(NFPA MX5/MS4)

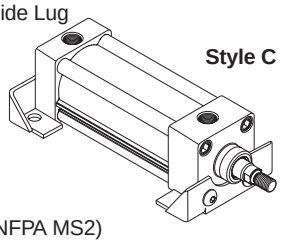
Head Rectangular Flange
Style J

(NFPA MF1)

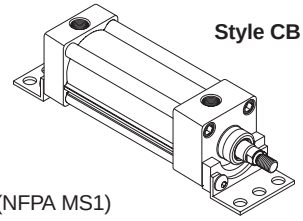
Cap Rectangular Flange
Style H

(NFPA MF2)

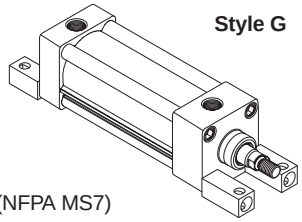
Tie Rods Ext. Head End
Style TB

(NFPA MX3)

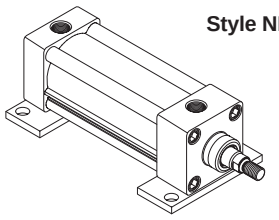
Tie Rods Ext. Cap End
Style TC

(NFPA MX2)

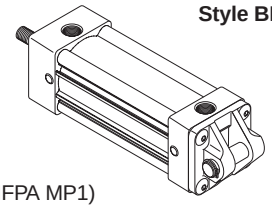
Tie Rods Ext. Both Ends
Style TD

(NFPA MX1)

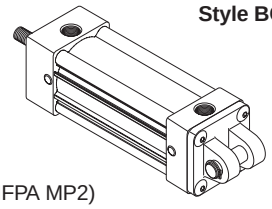
Side Lug
Style C

(NFPA MS2)

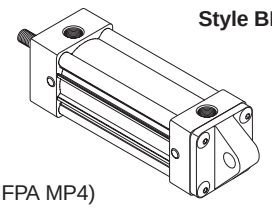
Side End Angle
Style CB

(NFPA MS1)

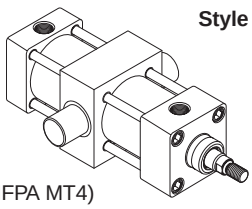
Side End Lug
Style G

(NFPA MS7)

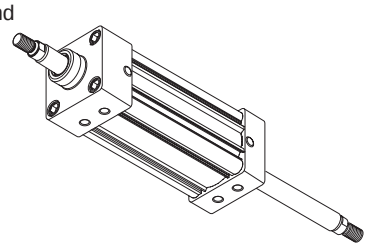
Base Bar Mount
Style NB


Cap Fixed Clevis
Style BB

(NFPA MP1)

Cap Detachable Clevis
Style BC

(NFPA MP2)

Cap Detachable Eye
Style BE

(NFPA MP4)

Intermediate Trunnion
Style DD

(NFPA MT4)

Double Rod End
Style KTEF

(NFPA MDX0)

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B

General Specifications

- NFPA interchangeable
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4" and 5"
- Strokes – available in any practical stroke length
- Rod diameters – 5/8" and 1"
- Rod end styles – 4 standard, specials available
- Single rod end or double rod ends
- Cushions – standard and adjustable at both ends, optional non-cushioned
- Operating pressure – 250 PSIG (17 Bar) maximum air service
- Media – dry, filtered air
- Temperature range – -10°F to +165°F (-23°C to +74°C)
- Mounting styles – 18 standard styles
- One porting style – NPTF
- RoHS compliant

For material options, including seals and piston rods, please see Material Specifications on next page.

Cylinder Weights – 3MA Cylinders

Bore (inch)	Rod (inch)	No Mount Single Rod 3MA	
		Base Wt. (lbs.)	Per Inch (lbs.)
1-1/2	5/8	1.57	0.20
2	5/8	2.13	0.21
2-1/2	5/8	2.87	0.23
3-1/4	1	5.73	0.42
4	1	7.51	0.49
5	1	10.99	0.61

Mounting Weight Adders

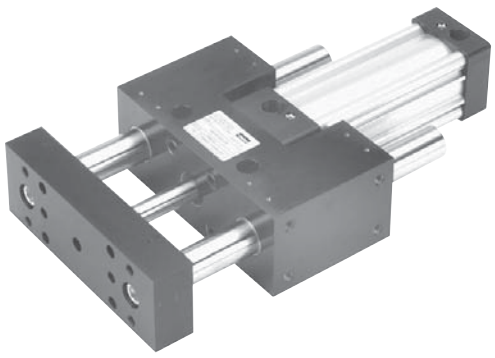
Bore (inch)	Weight (lbs) by Mounting Style						
	J, H	BB	CB, G	DD	BE	C	BC
1-1/2	0.51	0.15	0.36	1.70	0.23	0.15	0.20
2	0.76	0.26	065	2.38	0.32	0.15	0.29
2-1/2	1.13	0.38	1.05	3.00	0.42	0.15	0.41
3-1/4	2.76	0.98	1.38	5.35	1.26	0.35	1.06
4	4.05	1.35	2.20	6.75	1.62	0.35	1.49
5	6.46	1.20	4.29	8.77	N/A	0.57	2.41

Standard Cushion Position

Mounting Code	Position
All 3MA mounts	2

Standard Port Sizes

Bore	NPTF
1-1/2	3/8
2	3/8
2-1/2	3/8
3-1/4	1/2
4	1/2
5	1/2



For a guided version of the 3MA Series, please see the HB Series in Section F.

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Material Specifications – Standard Temperatures and Applications

Head and cap	Black anodized aluminum alloy
Head and cap screws	Zinc plated steel alloy
Cylinder body	Clear anodized aluminum alloy
Piston rod	Case-hardened, chrome plated carbon steel
Rod seal	Carboxylated nitrile (Nitroxile)
Rod wiper	Molythane
Rod bearing	Composite
Needle valve inserts	Composite
Piston	Composite (standard) Aluminum alloy (optional)
Piston seals	Carboxylated nitrile (Nitroxile)
Piston bearing	Composite (for standard piston) MolyGard™ (for aluminum piston)
Magnetic ring	Plastic-bound magnetic material
Piston fastener	Zinc plated steel alloy (for composite piston) Piston rod for aluminum piston
O-rings	Nitrile
End seals	Nitrile
Cushion seals	Urethane
Cushion needle valves	Composite
Tie-rods/studs	Blackened carbon steel (some mounts)
Tie-rod nuts	Steel alloy, SAE J995 Grade 8 (some mounts)

Other Standard Options – Material and Part Changes

Cylinder seal options	Fluorocarbon rod wiper and rod seal for external chemical compatibility Other seal options available, please consult factory
Bumper piston seal options	Carboxylated nitrile (Nitroxile) for standard temperatures
Piston rod material options	Case-hardened, chrome plated carbon steel (standard) 17-4 PH stainless steel, chrome plated 303 stainless steel, chrome plated 316 stainless steel, chrome plated (for stainless steel without chrome plating, please consult factory)
1/4" thick bumpers option	Urethane

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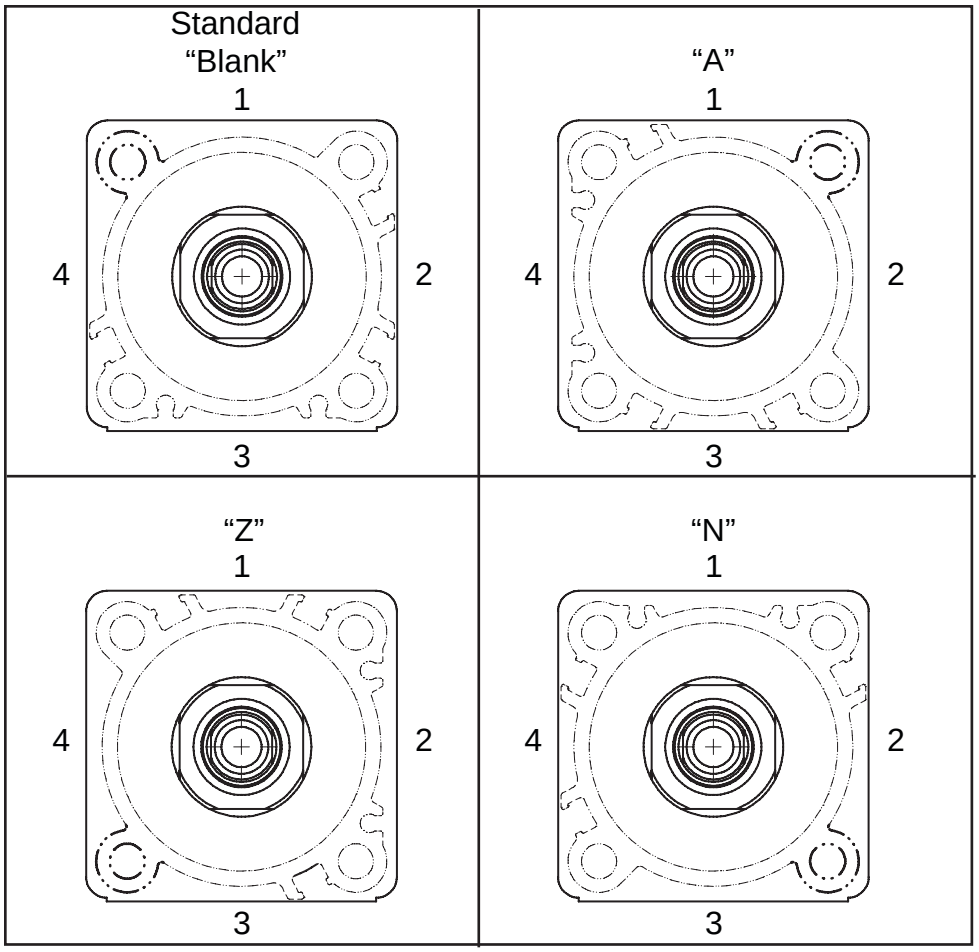
B

3MA/4MA Extruded Cylinder Body Orientation Options*



* Only applies to 1-1/2" to 4" Bore

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Piston
Manufactured from tough, impact-resistant, bearing-grade materials, the composite piston provides excellent wear resistance. Other advantages include noise reduction without the need for bumpers and lower friction than other materials. Aluminum piston with wear band (shown) is available for bumper piston seals, hydraulic service and other options.

Piston Assembly
High strength steel fastener or piston rod thread connects the piston to the rod and is secured in place with anaerobic adhesive.

Ports
NPTF ports are standard. Other port styles available.

Piston Seals
Carboxylated nitrile rounded-lip piston seals combine low friction with leak-free service and long service life. Optional bumper piston seals provide additional noise reduction and smooth end-of-stroke deceleration.

Endcap Fasteners
Zinc plated steel endcap fasteners for tough environments. Stainless steel is available as an option.

Rod Seal
Carboxylated nitrile rounded-lip rod seal combines low friction with leak-free service and long service life.

Rod Wiper
Outboard urethane rod wiper protects the cylinder by removing external debris and adherents from the piston rod during the entire stroke.

Magnetic Piston Ring
Included as a standard feature for use with a variety of sensors.

Cylinder Body
Extruded aluminum profile cylinder body offers integrated sensor grooves to minimize sensor installation time, maximize sensor protection and eliminate the need for brackets. Grooves readily accept both Global and Mini-Global Sensors. Single corner lobe of extrusion will accept legacy 2MA sensor brackets. Anodized and bright-dipped for corrosion resistance, maximum seal life and lower friction.

Adjustable Cushions Available

Heads and Caps
High-strength aluminum heads and caps are designed with the most flexible mounting platform. TEF mount is standard. Using our proprietary extrusion, we can offer customization of the endcaps for unique designs, including extra ports, duplex, tandem and many special mountings. Anodized for corrosion resistance.

Piston Rod
Standard case-hardened (50-64 Rc), hard chrome plated and polished carbon steel piston rod for reliable performance, long rod seal life and low friction. Grades of stainless steel are available as options.

Rod Gland/Bearing
Threaded bronze rod gland is externally removable, without cylinder disassembly, for easy maintenance. Machined flats permit the use of common tools for removal and installation. Options include HI LOAD design for side load conditions and metallic wiper design for extremely tough rod contaminant/adherent applications.

For a complete list of 4MA options, please see pages B12 and B16.

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B

How to Order 4MA Series Cylinders for 1-1/2" to 5" Bore

4MA cylinders can be specified by model number by using the table below.

2.00			J		4MA		U			1	4		A		6.000

Bore Size

1.50 [1]
2.00
2.50
3.25
4.00
5.00

Double Rod Cylinder [12]

Specify "K" only if double rod cylinder is required.

Mounting Style

Specify mounting style code (see table on following page).

Series

4MA	Air service
4ML	Hydraulic service [2]

Ports

U	NPTF
R	BSPP
B	BSPT
T	SAE

Seals

Blank	Standard (nitrile seals)
V	Fluorocarbon seals [4]
E	Fluorocarbon rod wiper and rod seal only [5]
4	Low temperature seals [4]
M	Metallic rod wiper, nitrile seals [6]

Piston Rod Number

Specify rod code number for required diameter. [8, 2]

Stroke Length

Specify stroke length required in inches. [11]

Cushion Cap End

Blank	Non-cushioned cap end
C	Cushioned cap end (not available for 4ML)

Cushion Head End

Blank	Non-cushioned head end
C	Cushioned head end (n/a for 1.50" bore with 1" rod or 4ML)

Piston Rod Thread Type

A	Standard (UNF Unified Thread)
W	BSF British Fine
M	Metric (see page B106)

Cylinder Construction

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 and nuts

* See Table on page B10. Only applies to 1-1/2" to 4" Bore.

Specia Modification

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]

Piston Rod Thread Style

4	Small male
8	Intermediate male
9	Short female
55	For use with Split Coupler [9]
3	Special (and specify all dimensions required)

Rod Material and Gland Code

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 [10]
K	303 stainless steel rod and HI LOAD gland [10]
S	316 stainless steel rod and standard gland [10]
T	316 stainless steel rod and HI LOAD gland [10]

Piston Type [2]

Blank	Standard (lipseals and magnetic ring) [12]
1	Lipseals, no magnetic ring [12]
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 [3]
H	Lipseals, 1/4" thick bumper head end [3]
C	Lipseals, 1/4" thick bumper cap end [3]
D	Lipseals and magnetic ring, 1/4" thick bumpers both ends [3]
F	Lipseals and magnetic ring, 1/4" thick bumper head end [3]
R	Lipseals and magnetic ring, 1/4" thick bumper cap end [3]

[1] Not available with Linear Position Sensor Option (LPSO).

[2] 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.

[3] 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".

[4] Reed and solid-state sensors only available with standard seals or options E and M. See footnote 2.

[5] Used for external chemical compatibility applications, not high temperature.

[6] 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.

[7] For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:
   a. Sensor part number (see 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.

[8] Review Piston Rod Selection Chart on page A14 to determine proper piston rod diameter.

[9] For additional information regarding this style, refer to 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.

[10] Not available for 4ML.

[11] 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.

[12] Double rod cylinders not available with composite piston type.

How to order 4MA/4ML Series cylinders with sensors:

Sensors must be ordered separately and are not mounted to the cylinder prior to shipment.

1. Cylinder model number must have a Piston Type with a magnetic ring ((blank), 3, 6, D, F or R).
2. Please refer to pages M1-M9 for sensor part numbers and specifications. Global, Mini-Global, NAMUR and Weld Immune Sensors will fit the 4MA/4ML Series.
3. Style DD mounts and tie rod versions with Global Sensors will require tie rod bracket P8S-TMA0X. Please refer to page M9 for more information.

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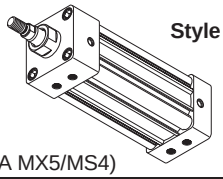
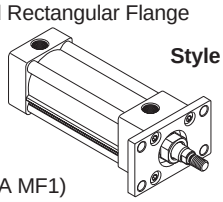
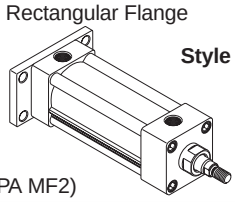
4MA Series Mounting Styles for 1-1/2" to 5" Bore

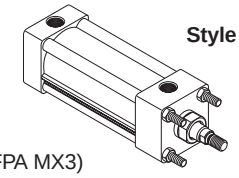
Mounting Code	NFPA Mounting Style	Description	Available Bore Sizes		
			4MA/4ML	4MA/4ML-LPSO w/o Stop Tube	4MA/4ML-LPSO w/Stop Tube
TEF	MX5/MS4	Sleeve Nut with Side Tap (standard mount)	1-1/2 - 5*	2 - 5	2 - 5
T	MX0	No Mount (same construction as TEF)	1-1/2 - 5	2 - 5	2 - 5
TE	MX5	Sleeve Nut (same construction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

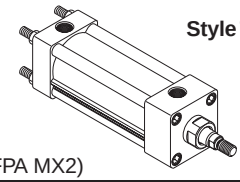
* Mounts TEF, F, G, NB and D not available for 1-1/2" bore with 1" rod.
** May interfere with mounting. Please provide clearance for Linear Position Sensor overhang (see page B101).

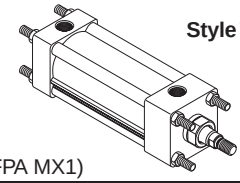
Standard Mount
Style TEF

(NFPA MX5/MS4)

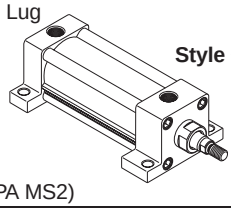
Head Rectangular Flange
Style J

(NFPA MF1)

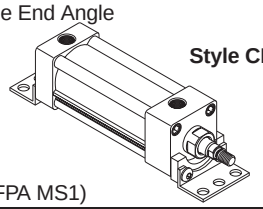
Cap Rectangular Flange
Style H

(NFPA MF2)

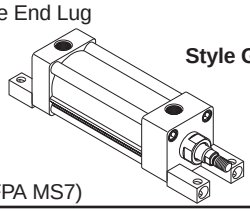
Tie Rods Ext. Head End
Style TB

(NFPA MX3)

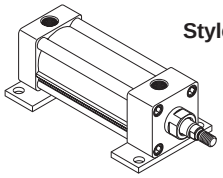
Tie Rods Ext. Cap End
Style TC

(NFPA MX2)

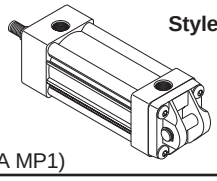
Tie Rods Ext. Both Ends
Style TD

(NFPA MX1)

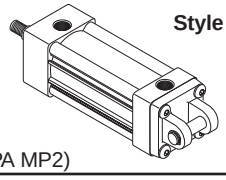
Side Lug
Style C

(NFPA MS2)

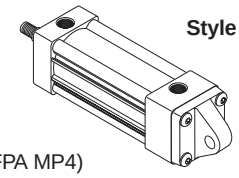
Side End Angle
Style CB

(NFPA MS1)

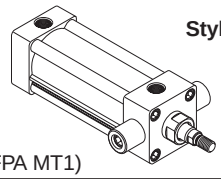
Side End Lug
Style G

(NFPA MS7)

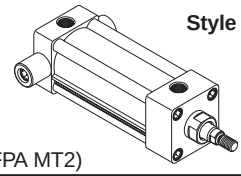
Base Bar Mount
Style NB


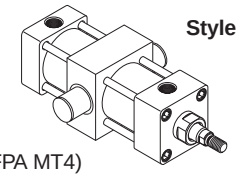
Cap Fixed Clevis
Style BB

(NFPA MP1)

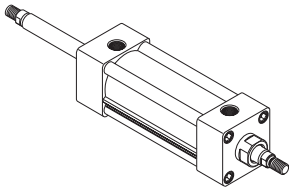
Cap Detachable Clevis
Style BC

(NFPA MP2)

Cap Detachable Eye
Style BE

(NFPA MP4)

Head Trunnion
Style D

(NFPA MT1)

Cap Trunnion
Style DB

(NFPA MT2)

Intermediate Trunnion
Style DD

(NFPA MT4)

Double Rod End
Style KTEF

(NFPA MDX0)

***Double rod end cylinders can be ordered with head mountings, i.e. KJ (see page B21).

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B

General Specifications

- NFPA interchangeable
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4" and 5"
- Strokes – available in any practical stroke length
- Rod diameters – 5/8", 1" and 1-3/8"
- Rod end styles – 4 standard, specials available
- Single rod end or double rod ends
- Cushions – optional and adjustable at either end or both ends (n/a for 4ML Hydraulic Version)
- Operating pressure – 4MA = 250 PSIG (17 Bar) maximum air service
  4ML = 400 PSIG (27 Bar) maximum hydraulic service
- Media 4MA = dry, filtered air
  4ML = filtered hydraulic oil
- Temperature range –
  -10°F to +165°F (-23°C to +74°C) with standard seals
  -10°F to +250°F (-23°C to +121°C) with fluorocarbon seals option
  -50°F to +150°F (-46°C to +66°C) with low temperature seals option
- Mounting styles – 20 standard styles
- RoHS compliant

For material options, including seals, piston rods and glands, please see Material Specifications on next page.

Cylinder Weights – 4MA/4ML Cylinders

Bore (inch)	Rod (inch)	No Mount Single Rod 4MA/4ML		No Mount Double Rod	
		Base Wt. (lbs.)	Per Inch (lbs.)	Base Wt. (lbs.)	Per Inch (lbs.)
1-1/2	0.625	1.73	0.20	2.16	0.28
2	0.625	2.40	0.21	3.05	0.30
	1.00	2.99	0.35	4.34	0.58
2-1/2	0.625	3.25	0.23	3.96	0.31
	1.00	4.06	0.37	5.74	0.60
3-1/4	1.00	6.45	0.42	7.65	0.64
	1.375	7.93	0.62	11.46	1.05
4	1.00	8.80	0.49	10.32	0.71
	1.375	10.29	0.69	14.37	1.12
5	1.00	13.20	0.61	15.84	0.84
	1.375	14.72	0.81	18.89	1.24

Mounting Weight Adders

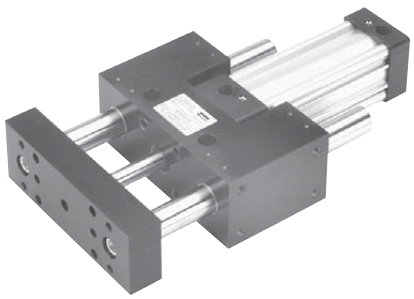
Bore (inch)	Weight (lbs) by Mounting Style							
	J, H	D, DB	BB	CB, G	DD	BE	C	BC
1-1/2	0.51	0.50	0.15	0.36	1.70	0.23	0.15	0.20
2	0.76	0.50	0.26	065	2.38	0.32	0.15	0.29
2-1/2	1.13	0.50	0.38	1.05	3.00	0.42	0.15	0.41
3-1/4	2.76	0.50	0.98	1.38	5.35	1.26	0.35	1.06
4	4.05	0.50	1.35	2.20	6.75	1.62	0.35	1.49
5	6.46	0.50	1.20	4.29	8.77	1.26	0.57	2.41

Standard Cushion Position

Mounting Code	Position
All except D, DB, DD	2
D, DB, DD	3

Standard Port Sizes

Bore	NPTF	BSPT	BSPP	SAE
1-1/2	3/8	Rc3/8	G3/8	6
2	3/8	Rc3/8	G3/8	6
2-1/2	3/8	Rc3/8	G3/8	6
3-1/4	1/2	Rc1/2	G1/2	10
4	1/2	Rc1/2	G1/2	10
5	1/2	Rc1/2	G1/2	10



For a guided version of the 4MA or 4ML Series, please see the HB Series in Section F.

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Material Specifications – Standard Temperatures and Applications

Head and cap	Black anodized aluminum alloy
Head and cap screws	Zinc plated steel alloy
Cylinder body	Clear anodized aluminum alloy
Piston rod	Case-hardened, chrome plated carbon steel
Rod seal	Carboxylated nitrile (Nitroxile)
Rod wiper	Molythane
Rod bearing (gland)	Bronze alloy
Piston	Composite (standard) Aluminum alloy (optional)
Piston seals	Carboxylated nitrile (Nitroxile)
Piston bearing	Composite (for standard piston) MolyGard™ (for aluminum piston)
Magnetic ring	Plastic-bound magnetic material
Piston fastener	Zinc plated steel alloy (for composite piston) Piston rod for aluminum piston
O-rings	Nitrile
End seals	Nitrile
Cushion seals	Urethane
Cushion needle valves	Stainless steel
Tie-rods/studs	Blackened carbon steel (some mounts)
Tie-rod nuts	Steel alloy, SAE J995 Grade 8 (some mounts)

4MA Options – Material and Part Changes

High temperatures (-10°F to +250°F)	All seals and wiper are fluorocarbon Aluminum piston only (without magnetic ring)
Low temperatures (-50°F to +150°F)	Rod seal, piston seals, o-rings and end seals are low temperature-rated nitrile Aluminum piston only

4ML Hydraulic Version – Material and Part Changes

Hydraulic service (general)	Aluminum piston only (all temperatures) Cushions and bumper piston seals not available
Hydraulic service (std temp)	Polyurethane TS-2000 rod seal and nitrile piston seals (for hydraulic use)
Hydraulic service (high temp)	Fluorocarbon TS-2000 rod seal; wiper and all seals are fluorocarbon (for hydraulic use)

Other Standard Options – Material and Part Changes

Cylinder seal options	Fluorocarbon for high temperatures or chemical compatibility Other seal options available, please consult factory
Bumper piston seal options (4MA only, n/a for 4ML)	Carboxylated nitrile (Nitroxile) for standard temperatures Fluorocarbon for high temperatures or chemical compatibility
1/4" thick bumpers option	Urethane
Piston rod material options	Case-hardened, chrome plated carbon steel (standard) 17-4 PH stainless steel, chrome plated 303 stainless steel, chrome plated (n/a for 4ML) 316 stainless steel, chrome plated (n/a for 4ML) (for stainless steel without chrome plating, please consult factory)
HI LOAD gland option	Composite bearing pressed into bronze alloy gland
Metallic rod scraper option	Dual high strength bronze wipers with PTFE (5/8" rod only) or fluorocarbon energizer

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B

How to Select a 3MA or 4MA Cylinder

Parker cylinders are available based on air or hydraulic operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

Step 1 - **Determine the correct cylinder bore size** necessary to achieve required force using the available operating pressure.

Step 2 - **Determine the series cylinder to use**, based on operating pressure.

Step 3 - **Turn to the appropriate cylinder selection section.** Select the mounting style that fits your installation needs. Determine the bore and rod sizes available for the model you select. Then complete model selection.

- Choose a rod end style and the desired rod end accessories.
- Size the cylinder to meet your application requirements.

Step 4 - **Consider the following conditions** which may require further modifications to the cylinder you have selected.

Application Condition	Check the Following
Quick Starts or Stops	Confirm that determined thrust is sufficient to accelerate or decelerate cylinder and load within prescribed distance. Optional cushions should be used to reduce shock during deceleration, check that peak pressures will be within tolerable limits.
Long Push Stroke	Check whether stop tube (4MA with aluminum piston only) is required to prevent excessive bearing loads and wear.
High-column Loading Long Push Stroke	Determine if standard size piston rod is strong enough to accommodate intended load. See Application Engineering section for recommendations.
Long Horizontal Stroke	Determine if standard size piston rod is strong enough to accommodate intended load.
High Operating Temperatures	For temperatures between 165°F and 250°F use 4MA or 4ML cylinder with high temperature seals.

General Options and Modifications

3MA
- Non-Cushioned (adjustable cushions standard)
- Non-Magnetic piston (magnetic ring standard)
- Piston Bumper Seals
- Piston Bumpers (1/4" thick)
- Port Relocation (cushions will follow)
- Double Rod End
- Rod End Modifications
- Rod Materials (grades of stainless steel)
- Fluorocarbon Rod Wiper and Rod Seal only
- Mixed Mountings
- Round Tube and Tie Rod Construction
- Stainless Steel Fasteners/Tie Rods
- Hydro-Check unit for smooth hydraulic control
- Air Cylinder/Valve Combination (ACVB)
- Adjustable Point Sensors (order separately)
- Rod lock version (see 3MAJ)

4MA
- Adjustable Cushions
- Non-Magnetic Piston (magnetic ring standard)
- Piston Bumper Seals
- Piston Bumpers (1/4" thick)
- Port and Adjustable Cushion Relocation
- Port Thread Styles
- Multiple Ports

4MA (continued)
- Special Heads, Caps, Pistons and Mounts
- Double Rod End
- Oversize Rod Diameters
- Rod End Modifications
- Rod Materials (grades of stainless steel)
- Fluorocarbon Rod Wiper and Rod Seal only
- Fluorocarbon Seals (all cylinder seals)
- Metallic Rod Wiper
- HI LOAD Gland Assembly
- Stop Tube
- Mixed Mountings
- Round Tube and Tie Rod Construction
- Stainless Steel Fasteners/Tie Rods
- Shock Absorber on Cap End
- NuCushion Bumpers
- LECTROFLUOR® Coating
- Hydro-Check unit for smooth hydraulic control
- Air Cylinder/Valve Combination (ACVB)
- Adjustable Point Sensors (order separately)
- Continuous Linear Position Sensing (LPSO)
- High Temperature Service (to +250°F)
- Low Temperature Service (to -50°F)
- Hydraulic Service (4ML) (400 PSIG)
- Rod lock version (see 4MAJ)

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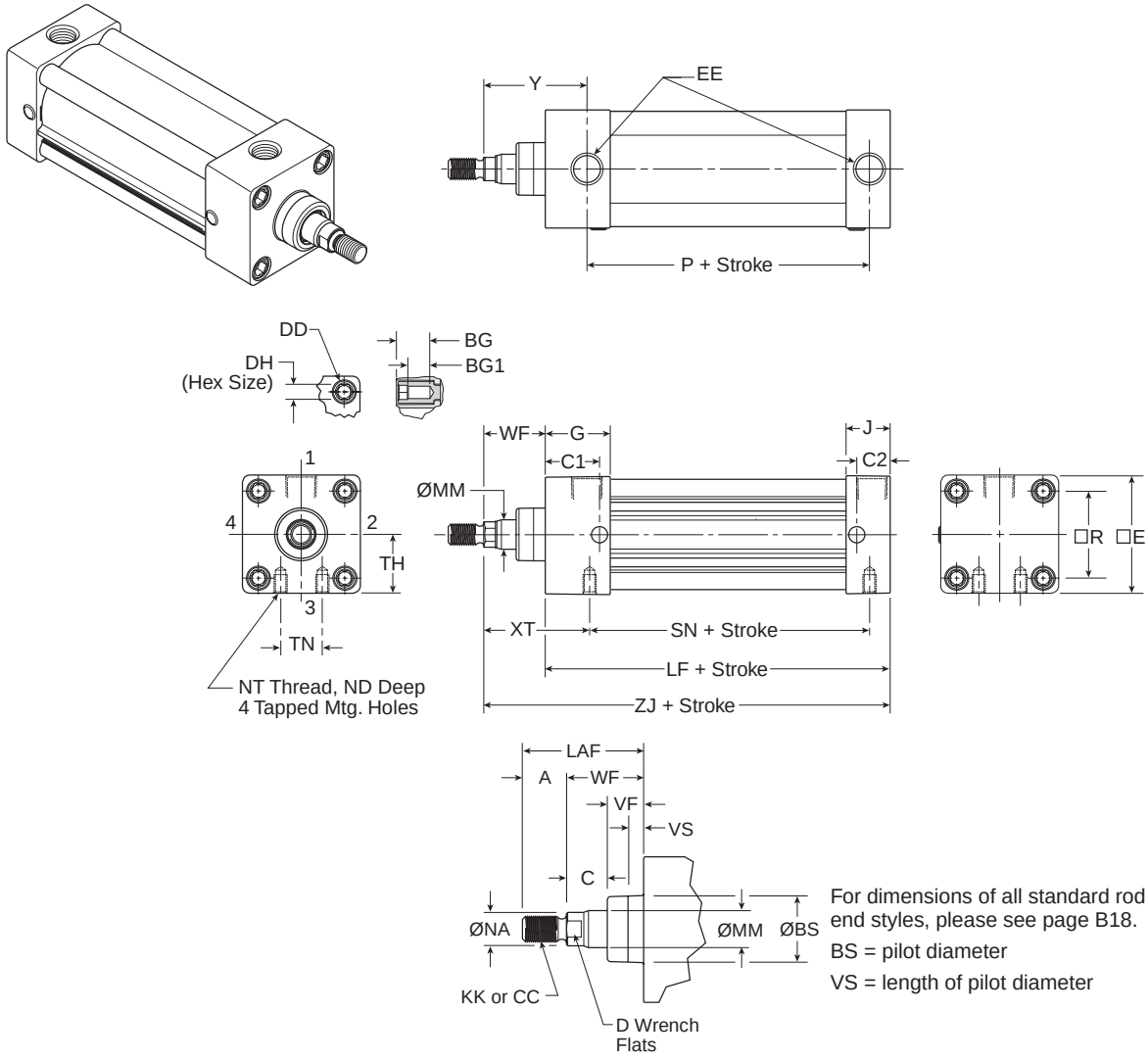
3MA Single Rod Dimensioned Drawings for 1-1/2" to 5" Bore Size (Styles TEF, T, TE and F)



For dimensions of all standard rod end styles, please see page B18.

BS = pilot diameter

VS = length of pilot diameter

3MA Cylinder Dimensions – Styles TEF, T, TE and F

Bore Size	Rod No.	Rod Dia. MM	Thread		A	AA	BG	BG1	+.000 -.004 BS	C	C1	C2	D	DD	DH	E	EE (NPTF)	G
			Style 8 CC	Style 4 & 9 KK														
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	J	LAF	NA	ND	NT	R	+.005 -.005 TH	TN	VF	VS	WF	XT	Y	Add Stroke			
																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

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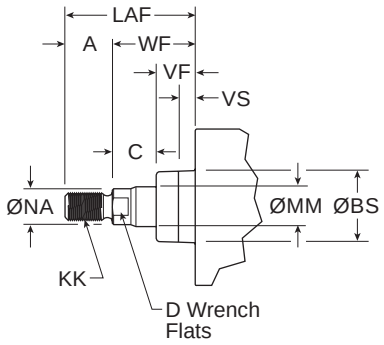
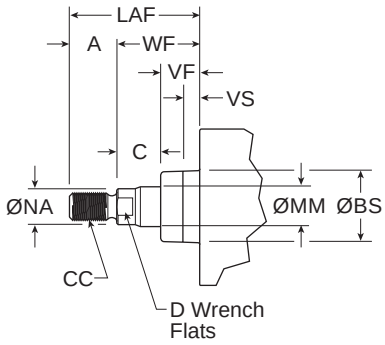
B

3MA Rod End Dimensions – 1-1/2" to 5" Bore Size

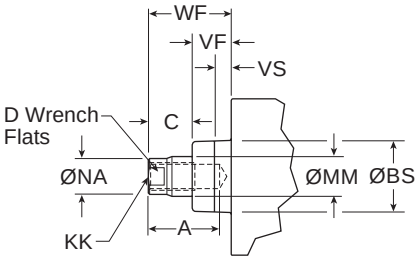
Thread Style 4
(NFPA Style SM)
Small Male



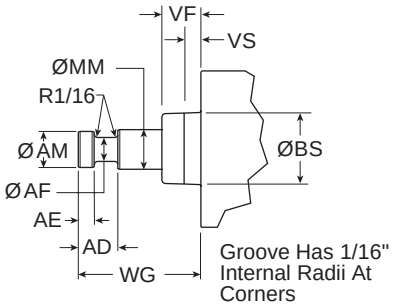
Thread Style 8
(NFPA Style IM)
Intermediate Male



Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55
For use with Split Coupler
(see page B105 for more information)



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

Rod End Dimensions

Bore Size	Rod No.	Rod Dia. MM	Thread		A	AD	AE	AF	AM	+.000 -.004 BS	C	D	LAF	NA	VF	VS	WF	WG
			Style 8 CC	Style 4 & 9 KK														
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

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.

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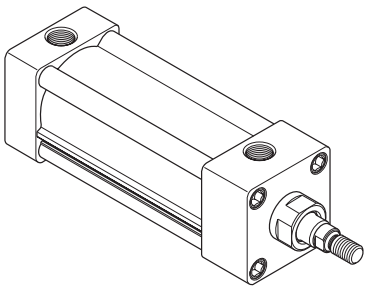
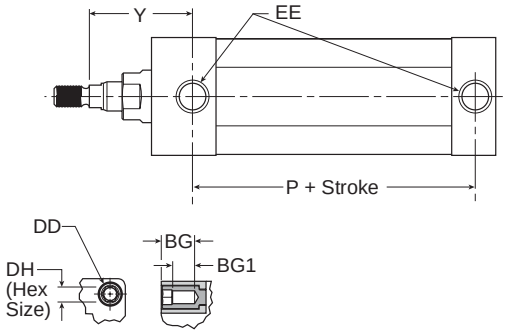
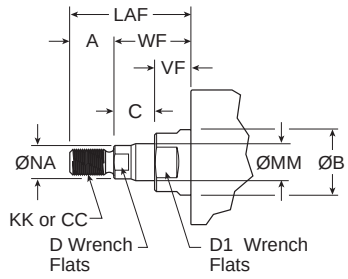
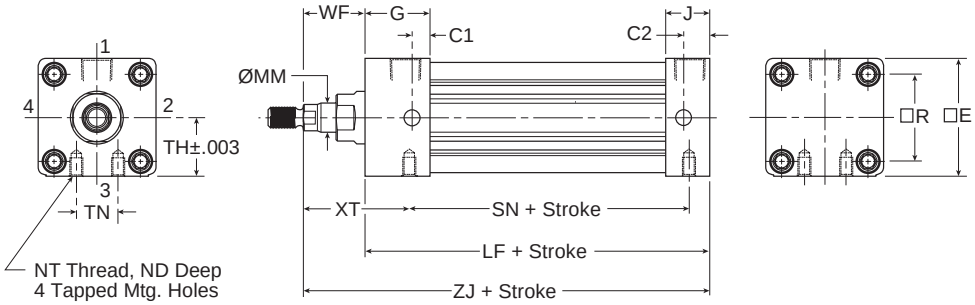
4MA Single Rod Dimensioned Drawings for 1-1/2" to 5" Bore Size (Styles TEF, T, TE and F)







For dimensions of all standard rod end styles, please see page B20.



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 Cylinder Dimensions – Styles TEF, T, TE and F

Bore Size	Rod No.	Rod Dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	A	AA	+.000 -.002 B	BG	BG1	C	C1	C2	D	D1	DD	DH	E	EE (NPTF)	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	+.003 -.003 TH	TN	VF	WF	XT	Y	Add Stroke LF	Add Stroke P	Add Stroke SN	Add Stroke 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

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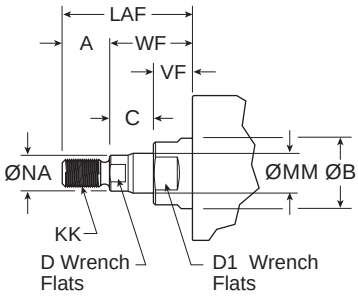
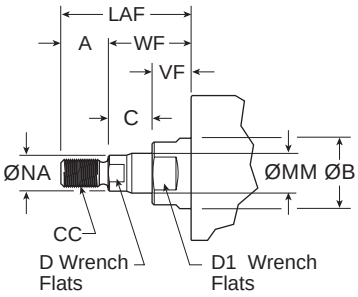
B

4MA Rod End Dimensions – 1-1/2" to 5" Bore Size

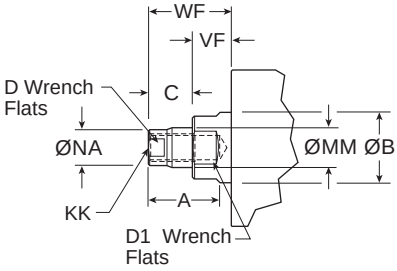
Thread Style 4
(NFPA Style SM)
Small Male



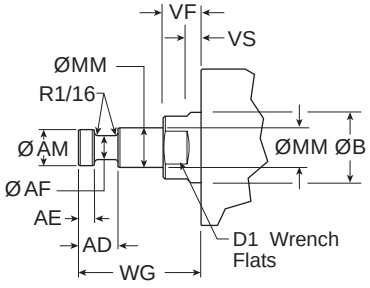
Thread Style 8
(NFPA Style IM)
Intermediate Male



Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55
For use with Split Coupler
(see page B105 for more information)



Groove Has 1/16" Internal Radii At Corners

Rod End Dimensions

Bore Size	Rod No.	Rod Dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	A	AD	AE	AF	AM	+.000 -.002 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

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.

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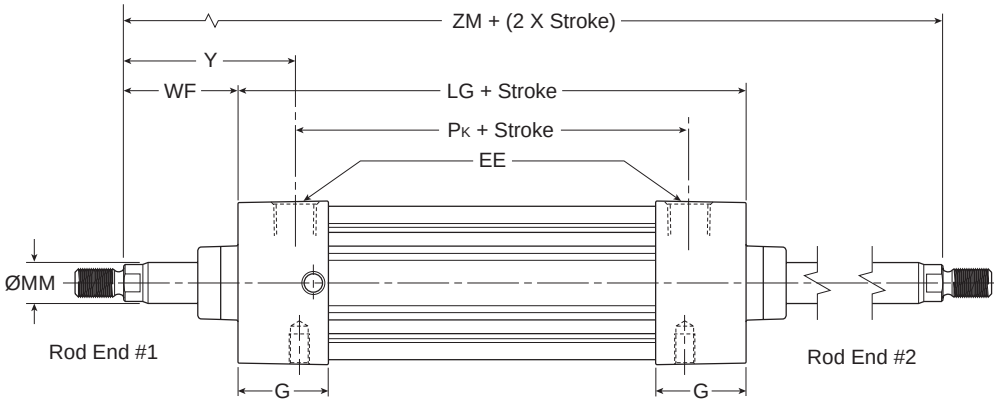
To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below. Note that double rod end cylinders have a head dimension G at both ends, and that LG replaces LF, PK replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

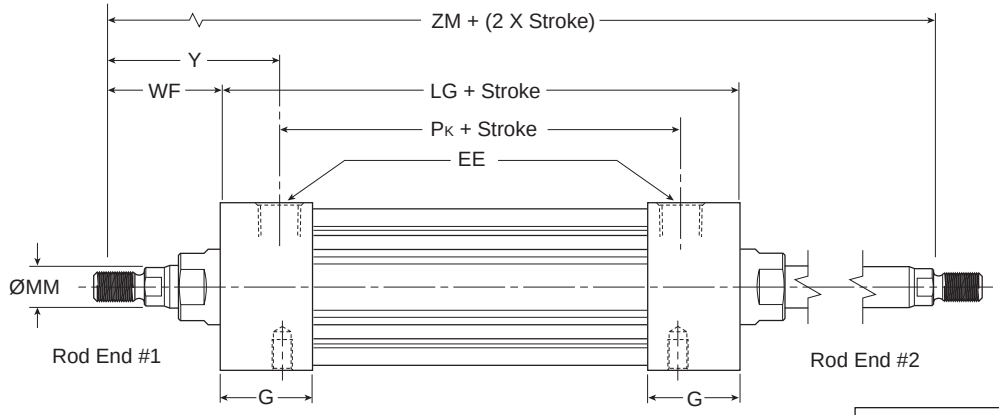
When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

3MA K-type for 1-1/2" to 5" Bore



Mounting Styles for Single Rod Models	Corresponding Mounting Styles for Double Rod Models
C	KC
CB	KCB
D	KD
DD	KDD
F	KF
G	KG
J	KJ
NB	KNB
T	KT
TB	KTB
TD	KTD
TE	KTE
TEF	KTEF

4MA K-type for 1-1/2" to 5" Bore



Double rod cylinders not available with composite piston type.

Cylinder Dimensions – K-type

Bore Size	Rod No.	Rod Dia. MM	EE (NPTF)	G	WF	Y	Add Stroke								Add 2X Stroke
							LG	PK	SAK	XAK	SSK	SNK	SEK	XEK	ZM
1-1/2	1	5/8	3/8	1.438	1.000	1.875	4.125	2.375	6.125	6.125	3.375	2.250	6.375	6.250	6.125
	2	1	3/8	1.438	1.375	2.250	4.125	2.375	6.500	6.500	3.375	–	–	–	5.760
2	1	5/8	3/8	1.375	1.000	1.875	4.125	2.375	6.125	6.125	3.375	2.250	6.750	6.438	6.125
	3	1	3/8	1.375	1.375	2.250	4.125	2.375	6.125	6.500	3.375	2.250	6.750	6.813	6.875
2-1/2	1	5/8	3/8	1.344	1.000	1.938	4.250	2.375	6.250	6.250	3.500	2.375	7.125	6.688	6.250
	3	1	3/8	1.344	1.375	2.313	4.250	2.375	6.250	6.625	3.500	2.375	7.125	7.063	7.000
3-1/4	1	1	1/2	1.594	1.375	2.438	4.750	2.625	7.250	7.375	3.750	2.625	7.750	7.625	7.500
	3	1-3/8	1/2	1.594	1.625	2.688	4.750	2.625	7.250	7.625	3.750	2.625	7.750	7.875	8.000
4	1	1	1/2	1.594	1.375	2.438	4.750	2.625	7.250	7.375	3.750	2.625	8.000	7.750	7.500
	3	1-3/8	1/2	1.594	1.625	2.688	4.750	2.625	7.250	7.625	3.750	2.625	8.000	8.000	8.000
5	1	1	1/2	1.594	1.375	2.438	4.938	2.813	7.688	7.688	3.563	2.813	–	–	7.688
	3	1-3/8	1/2	1.594	1.625	2.688	4.938	2.813	7.688	7.938	3.563	2.813	–	–	8.188
Replaces Dimension							LF	P	SA	XA	SS	SN	SE	XE	–
On Single Rod Mounting Styles							All Styles		CB		C	TEF, F	G		All

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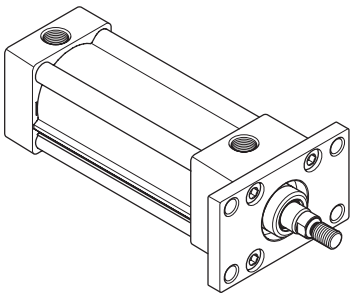
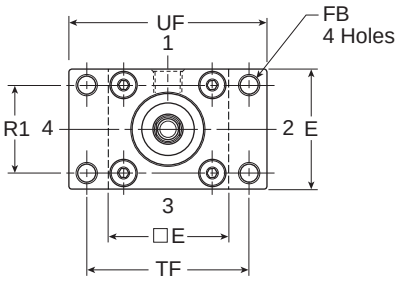
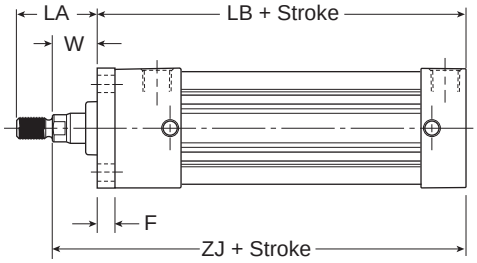
B

Head Rectangular Flange
Style J
(NFPA MF1)

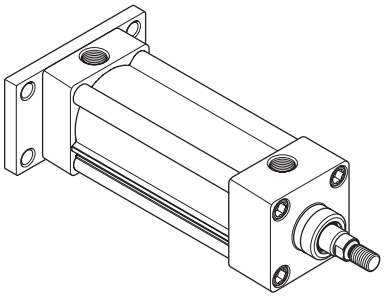


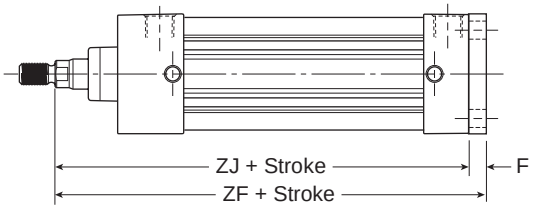


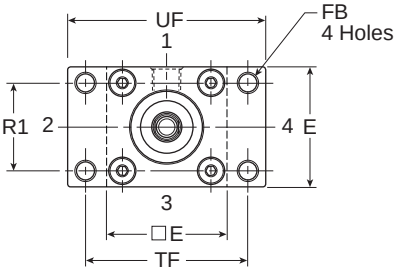


Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.
For reference, WF = W + F and LA = W + A.

Cap Rectangular Flange
Style H
(NFPA MF2)







Cylinder Dimensions – 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

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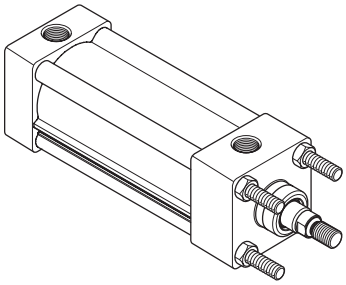
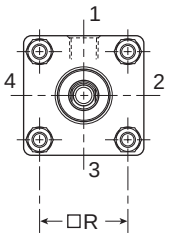
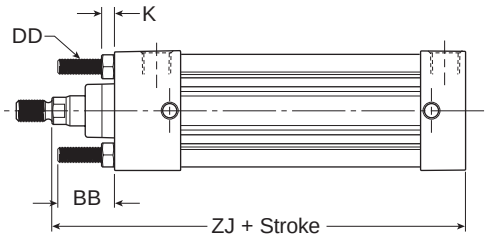
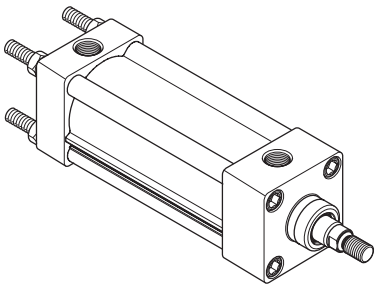
Tie Rods Ext. Head End
Style TB
(NFPA MX3)

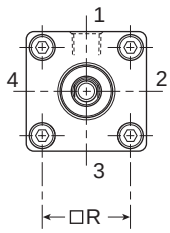


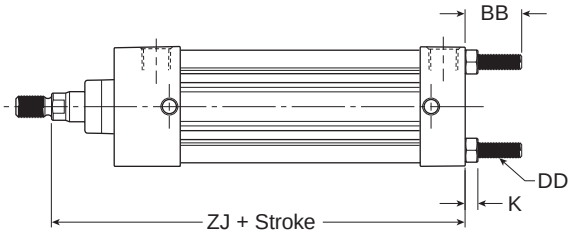




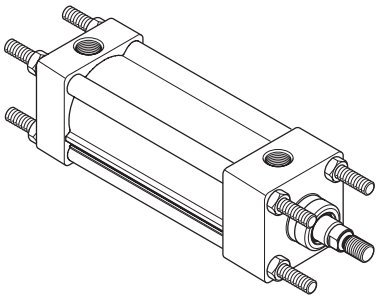
Tie Rods Ext. Cap End
Style TC
(NFPA MX2)

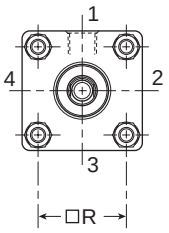


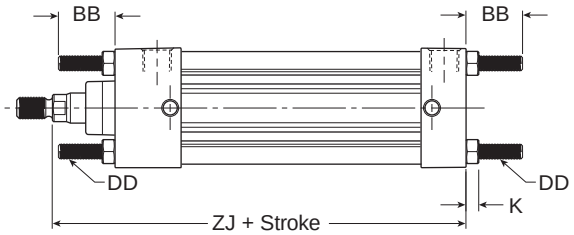




Tie Rods Ext. Both Ends
Style TD
(NFPA MX1)







Cylinder Dimensions – 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

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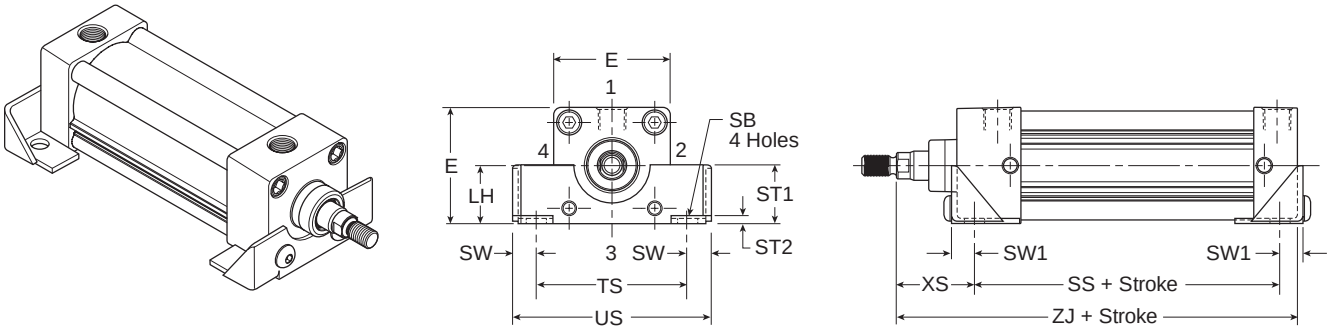
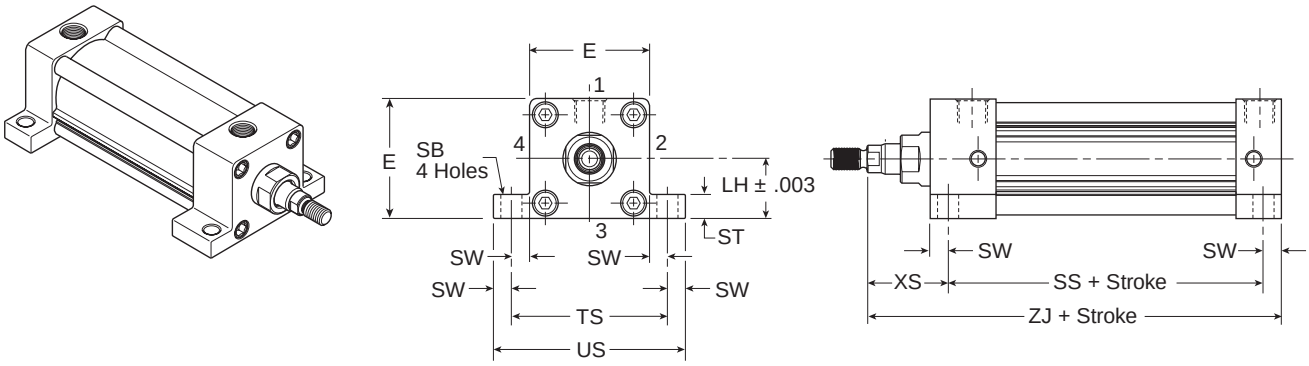
B

Side Lug
Style C for 3MA
(NFPA MS2)



Side Lug
Style C for 4MA/4ML
(NFPA MS2)



Cylinder Dimensions – 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	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

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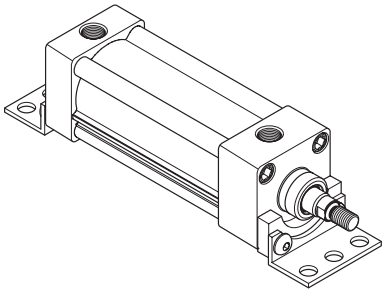
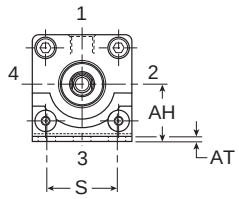
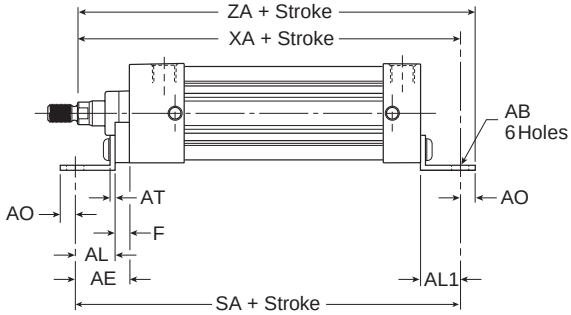
Side End Angle*

Style CB
(NFPA MS1)







Note: Dim "S" Is For The Holes In The Mount (Not The Screw To Screw Dim)

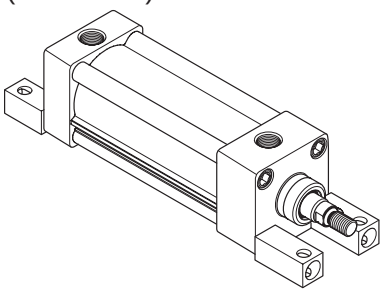
*Maximum recommended pressure for this mount is 150 PSIG

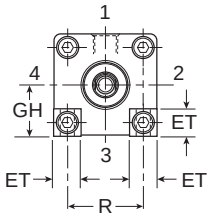
Cylinder Dimensions – Style CB

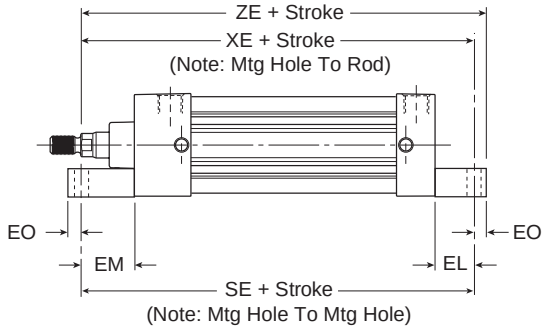
Bore Size	Rod No.	Rod Dia. MM	AB	AE	AH	AL	AL1	AO	AT	E	F	S	Add Stroke SA	Add Stroke XA	Add Stroke ZA
1-1/2	1	5/8	0.438	1.375	1.188	1.000	1.000	0.375	0.125	2.000	0.375	1.250	6.000	5.625	6.000
	2	1	0.438	1.375	1.188	1.000	1.000	0.375	0.125	2.000	0.375	1.250	6.000	6.000	6.375
2	1	5/8	0.438	1.375	1.438	1.000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







Cylinder Dimensions – Style G

Bore Size	Rod No.	Rod Dia. MM	E	EB	EL	EM	EO	ET	GH	R	Add Stroke SE	Add Stroke XE	Add Stroke 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

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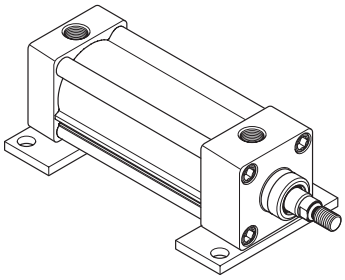
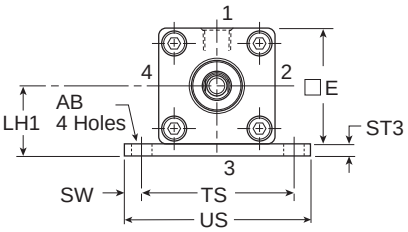
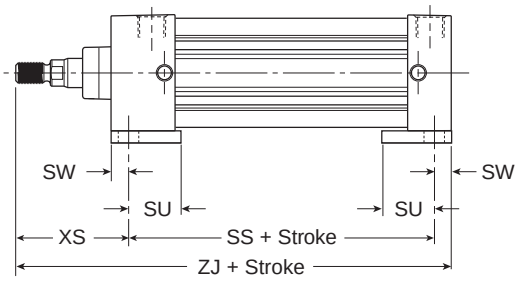
B

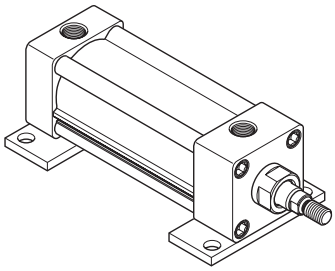
Base Bar Mount
Style NB for 3MA

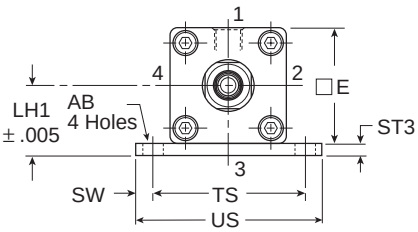


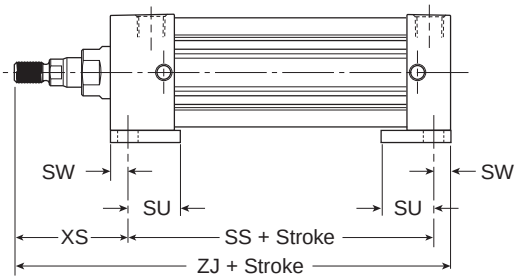




Base Bar Mount
Style NB for 4MA







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

Cylinder Dimensions – 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

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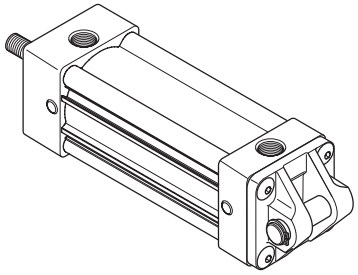
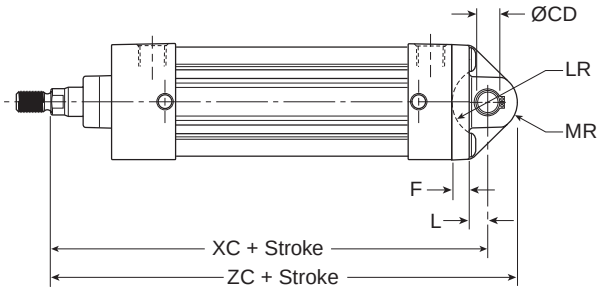
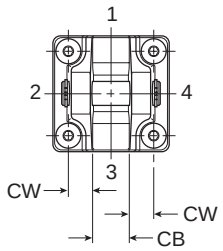
Cap Fixed Clevis
Style BB
(NFPA MP1)

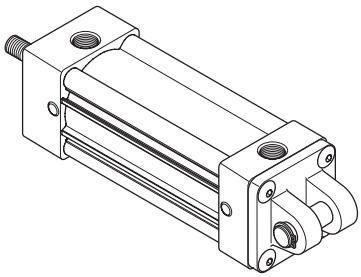
Note: For maximum swivel angle of BB mount with rear mounting plate, see Cylinder Accessories on page B108.

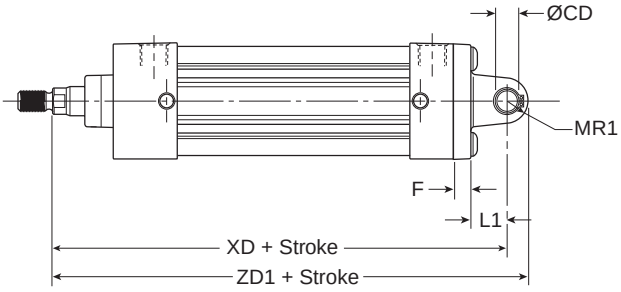


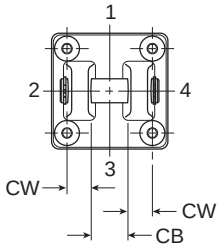




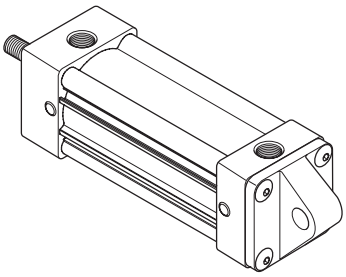
Cap Detachable Clevis
Style BC
(NFPA MP2)

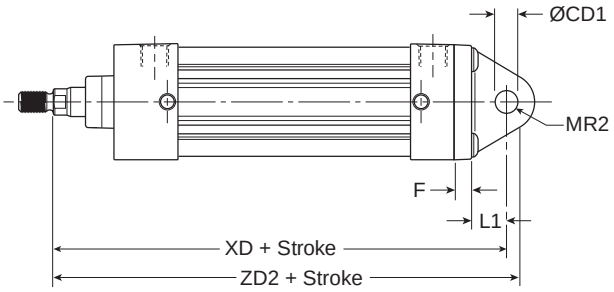


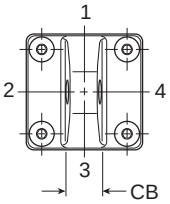




Cap Detachable Eye*
Style BE
(NFPA MP4)







*Not available for 5" bore 3MA, please specify 4MA

Cylinder Dimensions – Styles BB, BC and BE

Bore Size	Rod No.	Rod Dia. MM	CB	+.000 -.002 CD	+.002 +.004 CD1	CW	E	F	L	LR	L1	MR	MR1	MR2	Add Stroke 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

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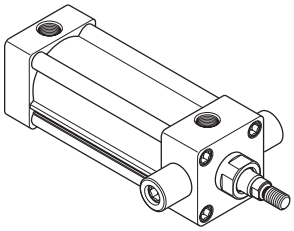
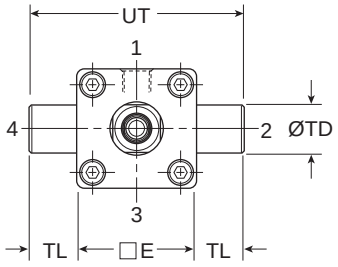
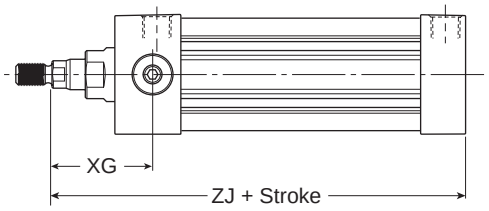
B

Head Trunnion*

Style D (only for 4MA/4ML)
(NFPA MT1)



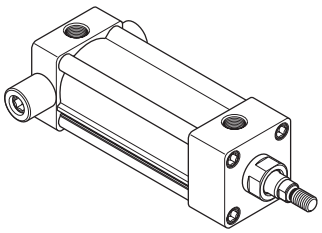


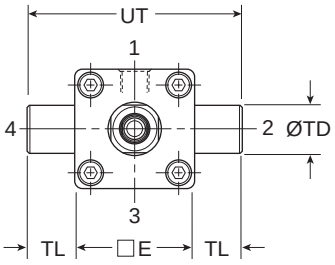


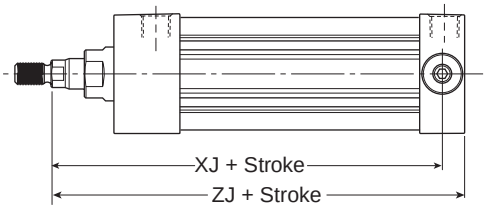
*Not available for 1-1/2" bore with 1" rod

Cap Trunnion

Style DB (only for 4MA/4ML)
(NFPA MT2)

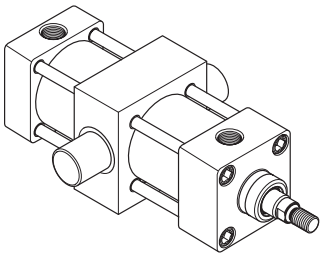


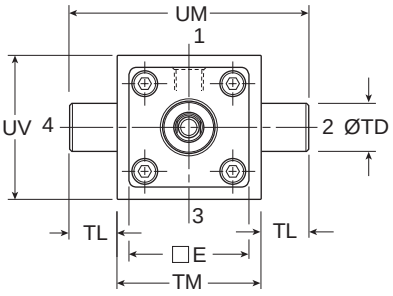


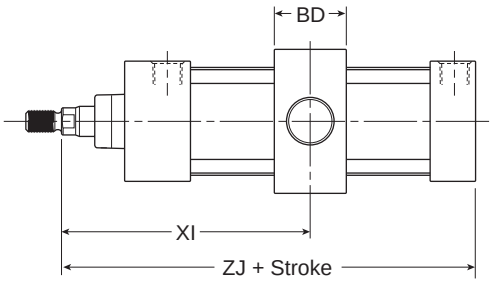


Intermediate Trunnion

Style DD
(NFPA MT4)







Cylinder Dimensions – Styles D, DB and DD

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

Bore Size	Rod No.	Rod Dia. MM	E	BD	+.000 –.001 TD	TL	TM	UM	UT	UV	XG	Min. XI	Add Stroke XJ	Add Stroke 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

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Piston Seals (hidden)
Carboxylated nitrile rounded-lip piston seals combine low friction with leak-free service and long service life.

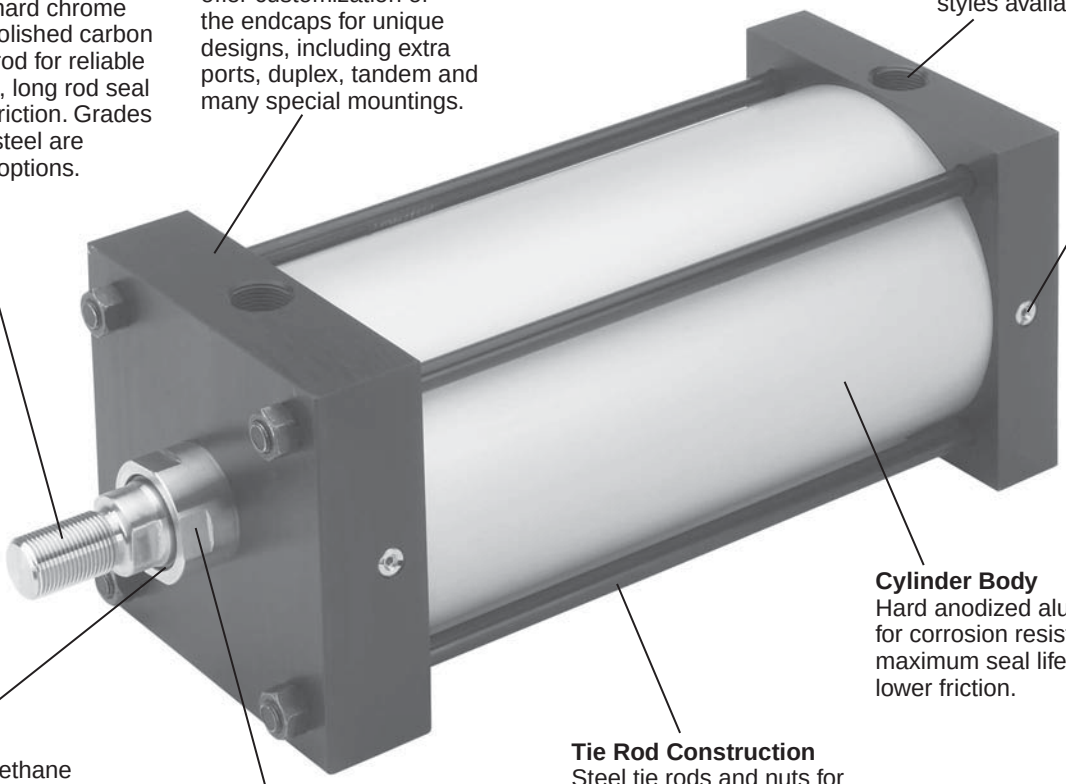
Piston Assembly (hidden)
Aluminum piston with wear band increases service life and eliminates metal-to-metal contact. Optional magnetic piston ring for use with a variety of sensors. Anaerobic adhesive is used to permanently lock and seal the piston to the rod.

Heads and Caps
High-strength aluminum heads and caps are anodized for corrosion resistance. We can offer customization of the endcaps for unique designs, including extra ports, duplex, tandem and many special mountings.

Piston Rod
Standard case-hardened (50-64 Rc), hard chrome plated and polished carbon steel piston rod for reliable performance, long rod seal life and low friction. Grades of stainless steel are available as options.

Ports
NPTF ports are standard. Other port styles available.

Adjustable Cushions Available



Cylinder Body
Hard anodized aluminum for corrosion resistance, maximum seal life and lower friction.

Rod Wiper
Outboard urethane rod wiper protects the cylinder by removing external debris and adherents from the piston rod during the entire stroke.

Rod Gland/Bearing
Threaded bronze rod gland is externally removable, without cylinder disassembly, for easy maintenance. Machined flats permit the use of common tools for removal and installation. Options include HI LOAD design for side load conditions and metallic wiper design for extremely tough rod contaminant/adherent applications.

Rod Seal (hidden)
Carboxylated nitrile rounded-lip rod seal combines low friction with leak-free service and long service life.

Tie Rod Construction
Steel tie rods and nuts for heavy-duty use. Stainless steel is available as an option.

For a complete list of 4MA options, please see pages B30 and B34.

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B

How to Order 4MA Series Cylinders for 6" and 8" Bore

4MA cylinders can be specified by model number by using the table below.

6.00			J	4MA		U			1	4		A		12.000

Bore Size
6.00
8.00

Double Rod Cylinder
Specify "K" only if double rod cylinder is required.

Mounting Style
Specify mounting style code (see table on following page).

Series
4MA Air service
4ML Hydraulic service

Ports
U NPTF
R BSPP
B BSPT
T SAE

Piston Rod Number
Specify rod code number for required diameter.[5]

Stroke Length
Specify stroke length required in inches.[8]

Cushion Head End
Blank Non-cushioned head end
C Cushioned head end (not available for 4ML)

Seals
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]

Cushion Cap End
Blank Non-cushioned cap end
C Cushioned cap end (not available for 4ML)

Piston Rod Thread Type
A Standard (UNF Unified Thread)
W BSF British Fine
M Metric (see page B106)

Piston Type
Blank Standard (lipseals, no magnetic ring)
3 Lipseals and magnetic ring

Special Modification
Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MA with Linear Position Sensor Option)[4]

Piston Rod Thread Style
4 Small male
8 Intermediate male
9 Short female
55 For use with Split Coupler[6]
3 Special (and specify all dimensions required)

Rod Material and Gland Code
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]

[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 (see 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 on page A14 to determine proper piston rod diameter.

[6] For additional information regarding this style, refer to 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.

How to order 6"-8" Bore 4MA/4ML Series cylinders with sensors:

Sensors must be ordered separately and are not mounted to the cylinder prior to shipment.

1. Cylinder model number must have Piston Type 3.
2. Please refer to pages M1-M9 for sensor part numbers and specifications. Global, NAMUR and Weld Immune Sensors will fit the 6"-8" Bore 4MA/4ML Series.
3. Tie rod bracket P8S-TMA0X will be required for Global Sensors. Please refer to page M9 for more information.

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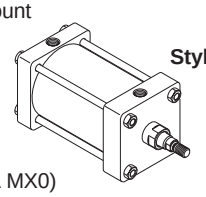
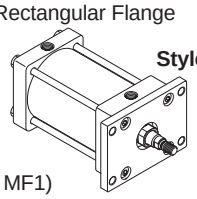
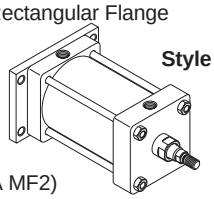
4MA Series Mounting Styles – 6" and 8" Bore

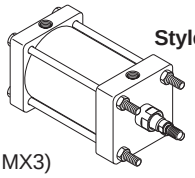
Mounting Code	NFPA Mounting Style	Description	Available Bore Sizes		
			4MA/4ML	4MA/4ML-LPSO w/o Stop Tube	4MA/4ML-LPSO w/Stop Tube
T	MX0	No Mount	6 - 8	6 - 8	6 - 8
J	MF1	Head Rectangular Flange	6	6*	6
H	MF2	Cap Rectangular Flange	6	6*	6*
TB	MX3	Tie Rods Extended Head End	6 - 8	-	6 - 8
TC	MX2	Tie Rods Extended Cap End	6 - 8	-	-
TD	MX1	Tie Rods Extended Both Ends	6 - 8	-	-
TE	MX5	Sleeve Nut	6 - 8	6 - 8	6 - 8
TEF	MX5/MS4	Sleeve Nut with Side Tap	6 - 8	6 - 8	6 - 8
C	MS2	Side Lug	6 - 8	6 - 8	6 - 8
F	MS4	Side Tap	6 - 8	6 - 8	6 - 8
CB	MS1	Side End Angle	6 - 8	6 - 8	6 - 8
BB	MP1	Cap Fixed Clevis	6 - 8	6 - 8*	6 - 8*
BC	MP2	Cap Detachable Clevis	6 - 8	6 - 8*	6 - 8*
BE	MP4	Cap Detachable Eye	6	6*	6*
D	MT1	Head Trunnion	6 - 8	6 - 8	6 - 8
DB	MT2	Cap Trunnion	6 - 8	6 - 8*	6 - 8*
DD	MT4	Intermediate Trunnion	6 - 8	-	-
JB	ME3	Head Square	8	-	8
HB	ME4	Cap Square	8	-	-
KT**	MDX0	Double Rod End, No Mount	6 - 8	6 - 8	6 - 8

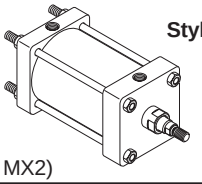
* May interfere with mounting. Please provide clearance for Linear Position Sensor overhang (see page B101).
** Double rod end cylinders can be ordered with head mountings, i.e. KJ (see page B37).

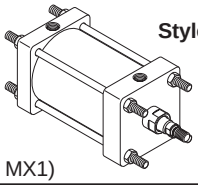
No Mount
Style T

(NFPA MX0)

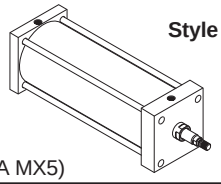
Head Rectangular Flange
Style J

(NFPA MF1)

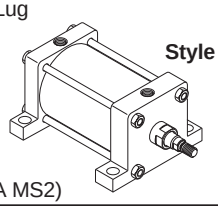
Cap Rectangular Flange
Style H

(NFPA MF2)

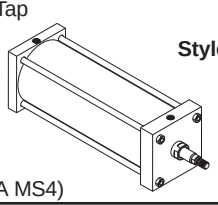
Tie Rods Ext. Head End
Style TB

(NFPA MX3)

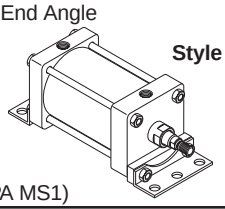
Tie Rods Ext. Cap End
Style TC

(NFPA MX2)

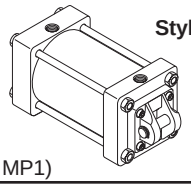
Tie Rods Ext. Both Ends
Style TD

(NFPA MX1)

Sleeve Nut
Style TE

(NFPA MX5)

Side Lug
Style C

(NFPA MS2)

Side Tap
Style F

(NFPA MS4)

Side End Angle
Style CB

(NFPA MS1)

Cap Fixed Clevis
Style BB

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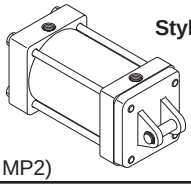
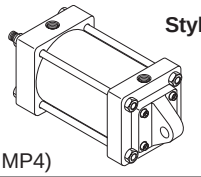
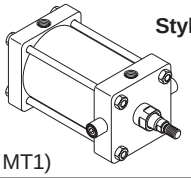
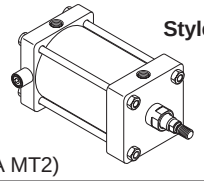
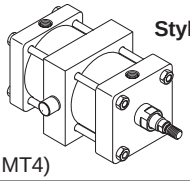
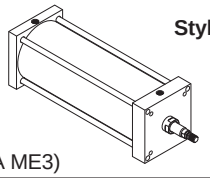
Cap Detachable Clevis
Style BC

(NFPA MP2)

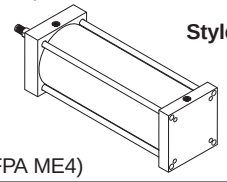
Cap Detachable Eye
Style BE

(NFPA MP4)

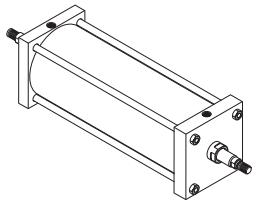
Head Trunnion
Style D

(NFPA MT1)

Cap Trunnion
Style DB

(NFPA MT2)

Intermediate Trunnion
Style DD

(NFPA MT4)

Head Square
Style JB

(NFPA ME3)

Cap Square
Style HB

(NFPA ME4)

Double Rod End
Style KT

(NFPA MDX0)

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B

General Specifications

- NFPA interchangeable
- Bore sizes – 6" and 8"
- Strokes – available in any practical stroke length
- Rod diameters – 1-3/8" and 1-3/4"
- Rod end styles – 4 standard, specials available
- Single rod end or double rod ends
- Cushions – optional and adjustable at either end or both ends
  (n/a for 4ML Hydraulic Version)
- Operating pressure –
  4MA = 250 PSIG (17 Bar) maximum air service
  4ML = 400 PSIG (27 Bar) maximum hydraulic service
- Media – 4MA = dry, filtered air
  4ML = filtered hydraulic oil
- Temperature range –
  -10°F to +165°F (-23°C to +74°C) with standard seals
  -10°F to +250°F (-23°C to +121°C) with fluorocarbon seals option
  -50°F to +150°F (-46°C to +66°C) with low temperature seals option
- Mounting styles – 20 standard styles
- RoHS compliant

For material options, including seals, piston rods and glands, please see Material Specifications on next page.

Cylinder Weights – 4MA/4ML Cylinders

Bore (inch)	Rod (inch)	No Mount Single Rod 4MA/4ML		No Mount Double Rod	
		Base Wt. (lbs.)	Per Inch (lbs.)	Base Wt. (lbs.)	Per Inch (lbs.)
6	1.375	20.50	0.87	25.65	1.30
	1.75	22.61	1.13	30.41	1.82
8	1.375	35.50	1.25	41.15	1.68
	1.75	37.63	1.51	45.90	2.20

Mounting Weight Adders

Bore (inch)	Weight (lbs) by Mounting Style							
	J, H	D, DB	BB	CB	DD	BE	C	BC
6	10.74	1.22	2.91	5.88	15.52	2.91	0.69	11.38
8	N/A	1.22	2.91	7.84	25.01	N/A	0.67	17.31

Standard Cushion Position

Mounting Code	Position
All except D, DB, DD	2
D, DB, DD	3

Standard Port Sizes

Bore	NPTF	BSPT	BSPP	SAE
6	3/4	Rc3/4	G3/4	12
8	3/4	Rc3/4	G3/4	12

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Material Specifications – Standard Temperatures and Applications

Head and cap	Black anodized aluminum alloy
Cylinder body	Clear hard-coat anodized aluminum alloy
Piston rod	Case-hardened, chrome plated carbon steel
Rod seal	Carboxylated nitrile (Nitroxile)
Rod wiper	Molythane
Rod bearing (gland)	Bronze alloy
Piston	Aluminum alloy
Piston seals	Carboxylated nitrile (Nitroxile)
Piston bearing	MolyGard™
Magnetic ring	Plastic-bound magnetic material
Piston fastener	Piston rod for aluminum piston
O-rings	Nitrile
End seals	Nitrile
Cushion seals	Urethane
Cushion needle valves	Brass cushion needle valves
Tie-rods	Blackened carbon steel
Tie-rod nuts	Steel alloy, SAE J995 Grade 8

4MA Options – Material and Part Changes

High temperatures (-10°F to +250°F)	All seals and wiper are fluorocarbon Aluminum piston only (without magnetic ring)	Low temperatures (-50°F to +150°F)	Rod seal, piston seals, o-rings and end seals are low temperature-rated nitrile

4ML Hydraulic Version – Material and Part Changes

Hydraulic service (general)	Cushions not available	Hydraulic service (high temp)	Fluorocarbon TS-2000 rod seal; wiper and all seals are fluorocarbon (for hydraulic use)
Hydraulic service (std temp)	Polyurethane TS-2000 rod seal and nitrile piston seals (for hydraulic use)		

Other Standard Options – Material and Part Changes

Cylinder seal options	Fluorocarbon for high temperatures or chemical compatibility Other seal options available, please consult factory	HI LOAD gland option Metallic rod scraper option	Composite bearing pressed into bronze alloy gland Dual high strength bronze wipers with fluorocarbon energizer
Piston rod material options	Case-hardened, chrome plated carbon steel (standard) 17-4 PH stainless steel, chrome plated 303 stainless steel, chrome plated (n/a for 4ML) 316 stainless steel, chrome plated (n/a for 4ML) (for stainless steel without chrome plating, please consult factory)		

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B

How to Select a 6" - 8" Bore 4MA Cylinder

Parker cylinders are available based on air or hydraulic operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

Step 1 - **Determine the correct cylinder bore size** necessary to achieve required force using the available operating pressure.

Step 2 - **Determine the series cylinder to use**, based on operating pressure.

Step 3 - **Turn to the appropriate cylinder selection section.** Select the mounting style that fits your installation needs. Determine the bore and rod sizes available for the model you select. Then complete model selection.

- Choose a rod end style and the desired rod end accessories.
- Size the cylinder to meet your application requirements.

Step 4 - **Consider the following conditions** which may require further modifications to the cylinder you have selected.

Application Condition	Check the Following
Quick Starts or Stops	Confirm that determined thrust is sufficient to accelerate or decelerate cylinder and load within prescribed distance. Optional cushions should be used to reduce shock during deceleration, check that peak pressures will be within tolerable limits.
Long Push Stroke	Check whether stop tube is required to prevent excessive bearing loads and wear.
High-column Loading Long Push Stroke	Determine if standard size piston rod is strong enough to accommodate intended load. See Application Engineering section for recommendations.
Long Horizontal Stroke	Determine if standard size piston rod is strong enough to accommodate intended load.
High Operating Temperatures	For temperatures between 165°F and 250°F use 4MA cylinder with high temperature seals.

General Options and Modifications:

- Adjustable Cushions
- Magnetic Piston
- Port and Adjustable Cushion Relocation
- Port Thread Styles
- Multiple Ports
- Special Heads, Caps, Pistons and Mounts
- Double Rod End
- Oversize Rod Diameters
- Rod End Modifications
- Rod Materials (grades of stainless steel)
- Stainless Steel Tie Rods and Nuts
- Fluorocarbon Rod Wiper and Rod Seal only
- Fluorocarbon Seals (all cylinder seals)
- Metallic Rod Wiper
- HI LOAD Gland Assembly
- Stop Tube
- Mixed Mountings
- Shock Absorber on Cap End
- Air Cylinder/Valve Combination (ACVB)
- Adjustable Point Sensors (order separately)
- Continuous Linear Position Sensing (LPSO)
- High Temperature Service (to +250°F)
- Low Temperature Service (to -50°F)
- Hydraulic Service (4ML) (400 PSIG)
- Rod lock version (see 4MAJ)

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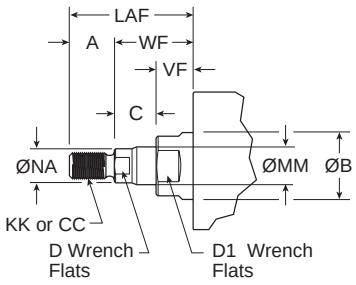
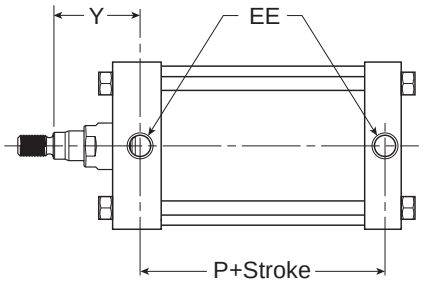
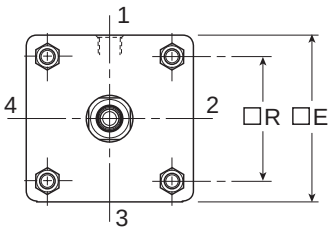
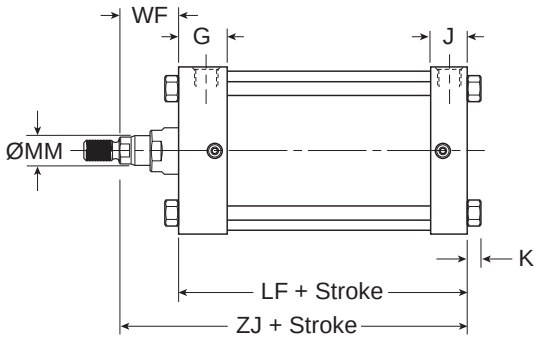
4MA Series Single Rod Dimensions – 6" and 8" Bore





For dimensions of all standard rod end styles, please see page B36.





Cylinder Dimensions – Style T

Bore Size	Rod No.	Rod Dia. MM	Thread		A	AA	+.000 -.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	J	K	LAF	NA	R	VF	WF	Y	Add Stroke		
											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

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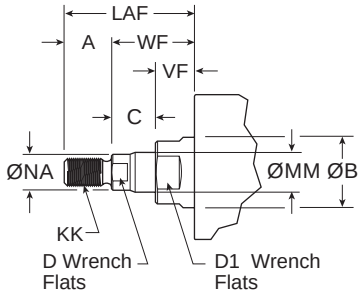
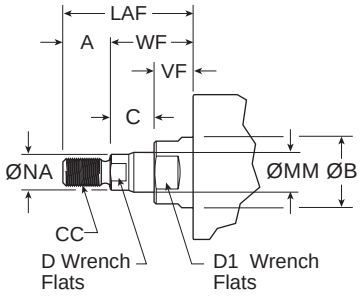
B

4MA Rod End Dimensions – 6" and 8" Bore Sizes

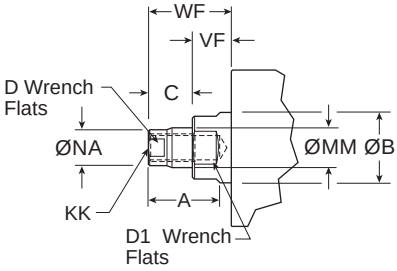
Thread Style 4
(NFPA Style SM)
Small Male



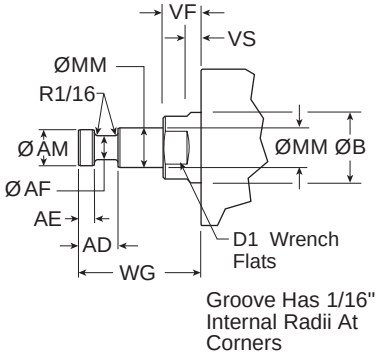
Thread Style 8
(NFPA Style IM)
Intermediate Male



Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55
For use with Split Coupler
(see page B105 for more information)



Rod End Dimensions

Bore Size	Rod No.	Rod Dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	A	AD	AE	AF	AM	+.000 -.002 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

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.

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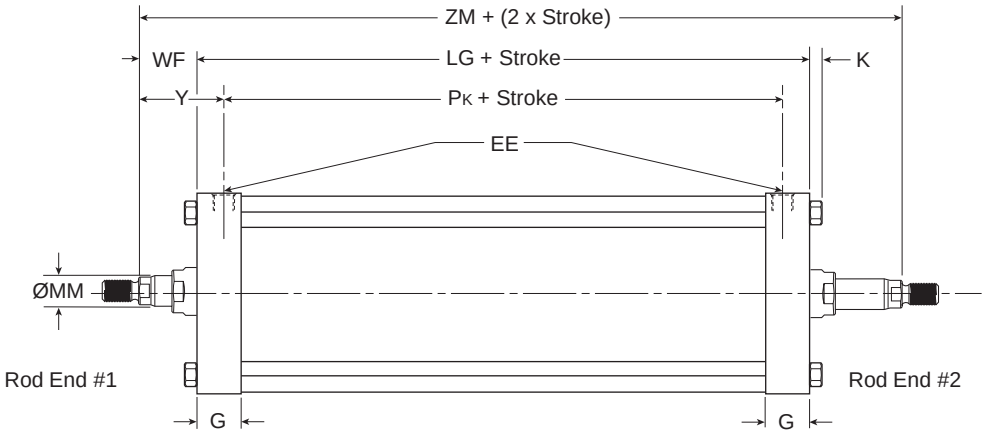
To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below.
Note that double rod end cylinders have a head dimension G at both ends, and that LG replaces LF, P_K replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

4MA Series K-type Drawing – 6" and 8" Bore



Mounting Styles for Single Rod Models	Corresponding Mounting Styles for Double Rod Models
C	KC
CB	KCB
D	KD
DD	KDD
F	KF
J	KJ
T	KT
TB	KTB
TD	KTD
TE	KTE
TEF	KTEF

Cylinder Dimensions – Style KT

Bore Size	Rod No.	Rod Dia. MM	EE (NPTF)	G	K	WF	Y	Add Stroke						Add 2X Stroke
								LG	P_K	SA_K	XA_K	SS_K	SN_K	ZM
6	1	1-3/8	3/4	1.910	0.438	1.625	2.813	5.500	3.125	8.250	8.500	4.125	3.125	8.750
	3	1-3/4	3/4	1.910	0.438	1.875	3.063	5.500	3.125	8.250	8.750	4.125	3.125	9.250
8	1	1-3/8	3/4	1.810	0.563	1.625	2.750	5.500	3.250	9.125	8.938	4.125	3.125	8.750
	3	1-3/4	3/4	1.810	0.563	1.875	3.000	5.500	3.250	9.125	9.188	4.125	3.125	9.250
Replaces Dimension								LF	P	SA	XA	SS	SN	–
On Single Rod Mounting Styles								All Styles		CB		C	F, TEF	All

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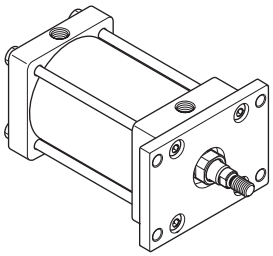
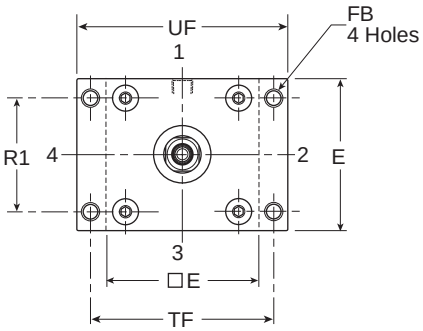
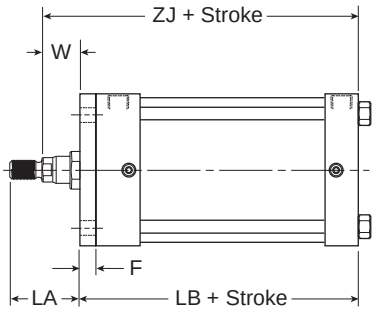
B

Head Rectangular Flange
Style J
(NFPA MF1)
(only 6" Bore)

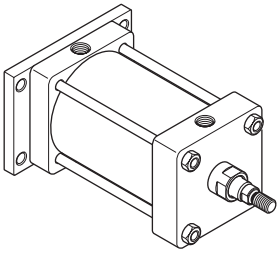


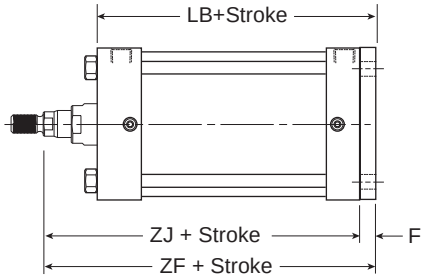


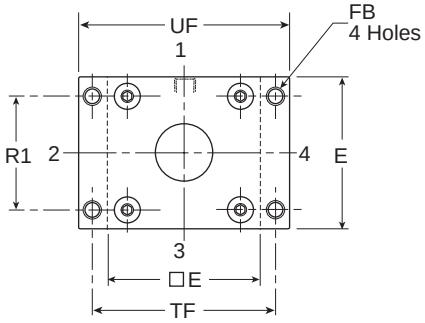


Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.
For reference, WF = W + F and LA = W + A.

Cap Rectangular Flange
Style H
(NFPA MF2)
(only 6" Bore)







Cylinder Dimensions – 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

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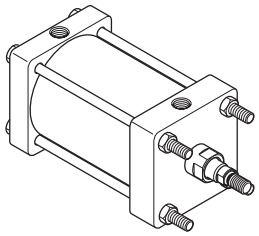
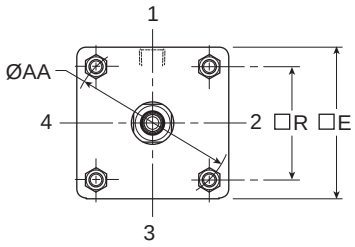
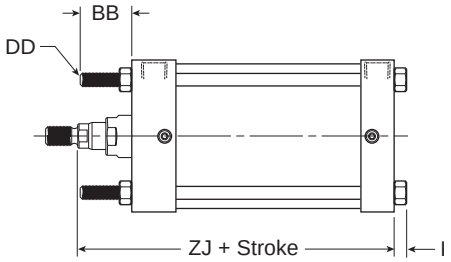
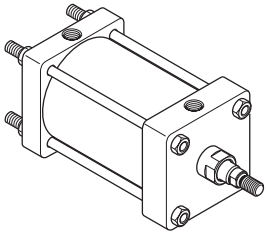
Tie Rods Ext. Head End
Style TB
(NFPA MX3)

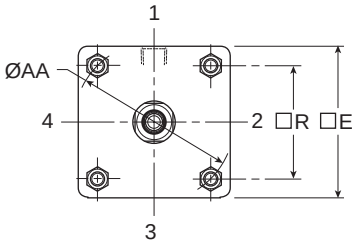


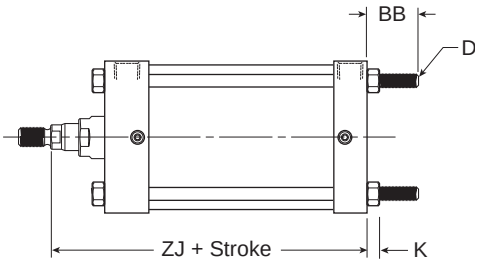




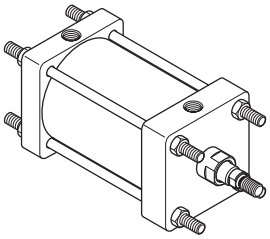
Tie Rods Ext. Cap End
Style TC
(NFPA MX2)

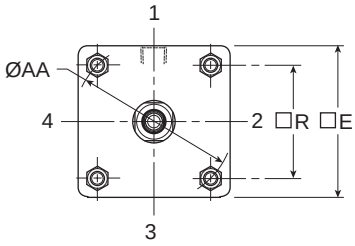


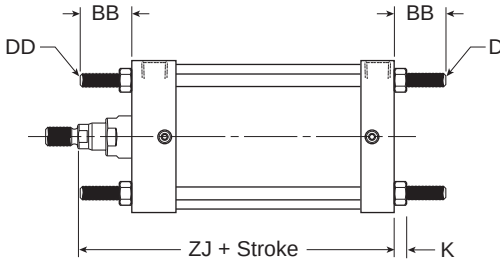




Tie Rods Ext. Both Ends
Style TD
(NFPA MX1)







Cylinder Dimensions – 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

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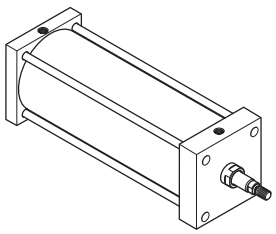
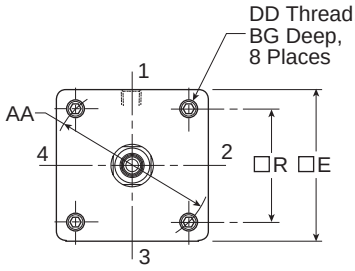
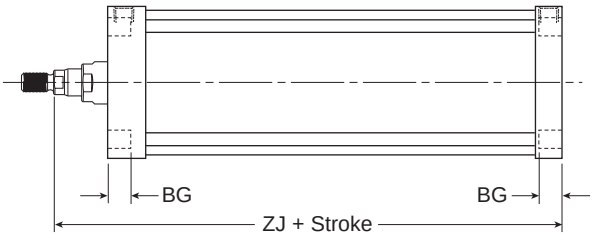
B

Sleeve Nut
Style TE
(NFPA MX5)







Cylinder Dimensions – 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

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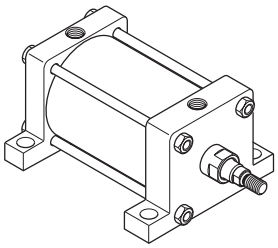
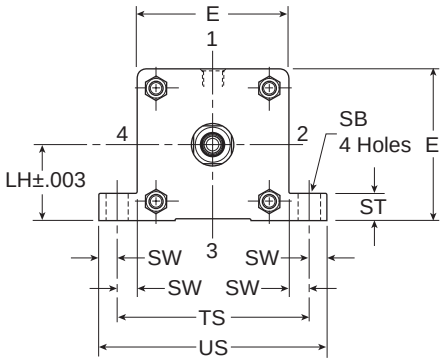
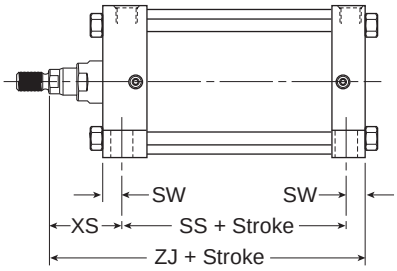
Side Lug
Style C
(NFPA MS2)



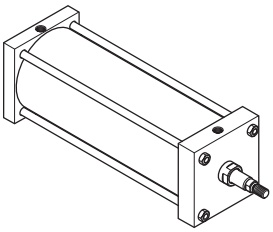


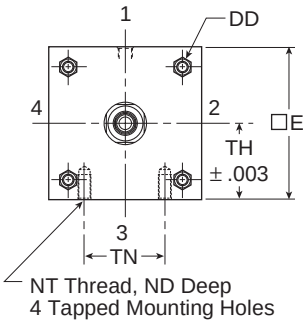


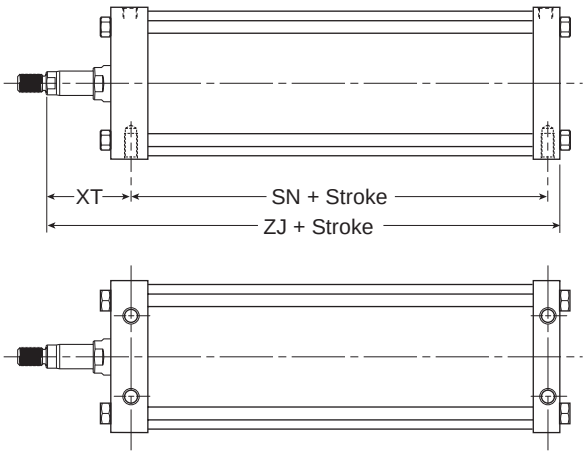
Cylinder Dimensions – Style C

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)







Cylinder Dimensions – 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

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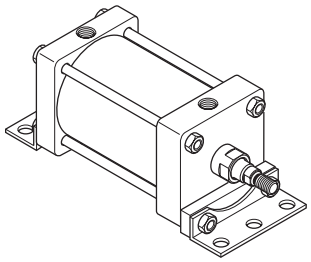
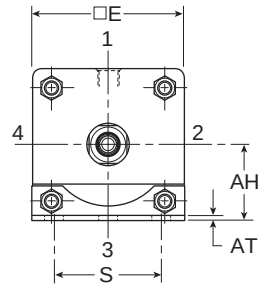
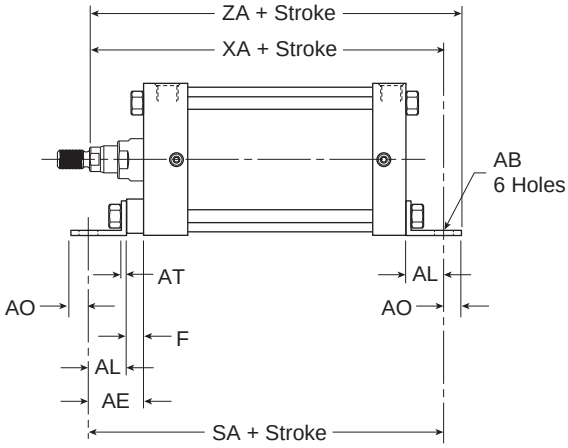
B

Side End Angle*
Style CB
(NFPA MS1)





Note:
Dim. "S" Is For The Holes In The Mount
(Not The Tie Rod To Tie Rod Dim.)



*Maximum recommended pressure for this mount is 150 PSIG

Cylinder Dimensions – 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	8.625
	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	8.875
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

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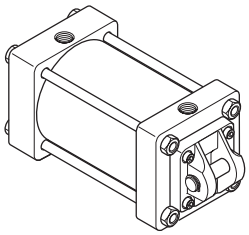
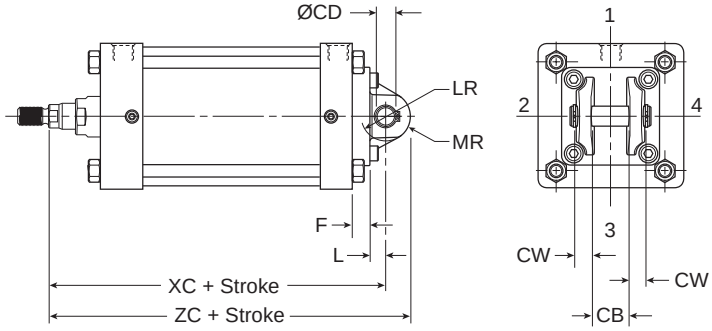
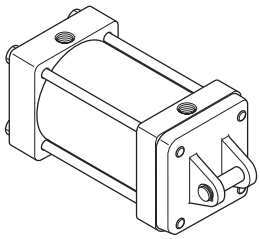
Cap Fixed Clevis
Style BB
(NFPA MP1)

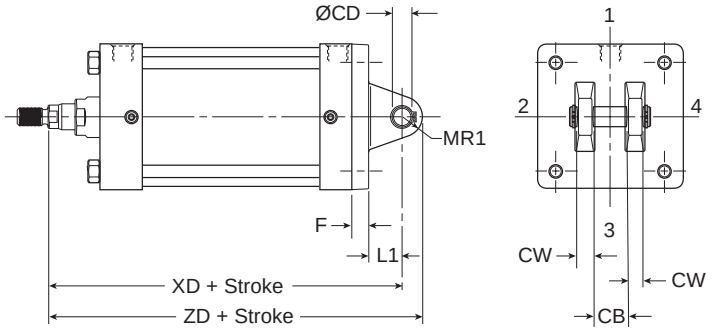
Note: For maximum swivel angle of BB mount with rear mounting plate, see Cylinder Accessories on page B108.





Cap Detachable Clevis
Style BC
(NFPA MP2)

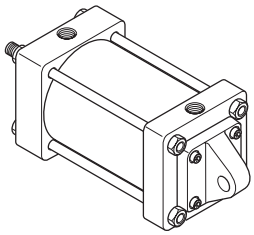


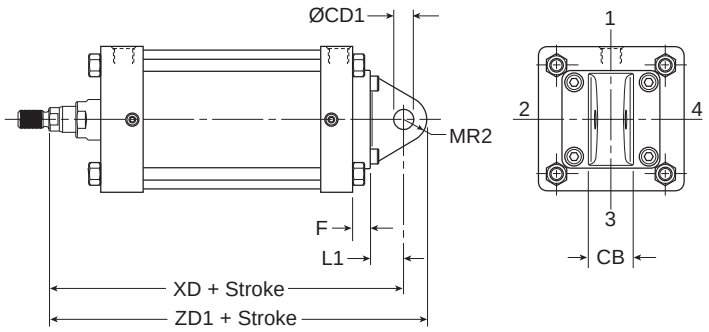


Cylinder Dimensions – Styles BB and BC

Bore Size	Rod No.	Rod Dia. MM	CB	+.000 -.002 CD	CW	E	F	L	LR	L1	MR	MR1	Add Stroke XC	Add Stroke XD	Add Stroke ZC	Add Stroke 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)





Cylinder Dimensions – Style BE

Bore Size	Rod No.	Rod Dia. MM	CB	+.002 +.004 CD1	E	F	L1	MR2	Add Stroke XD	Add Stroke 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

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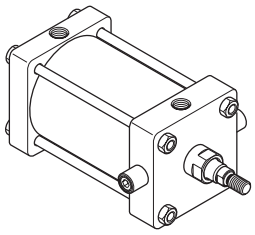
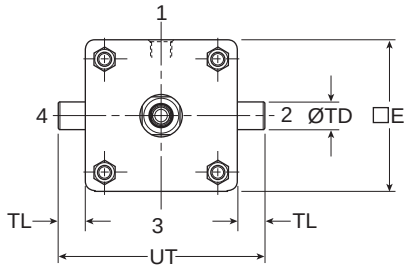
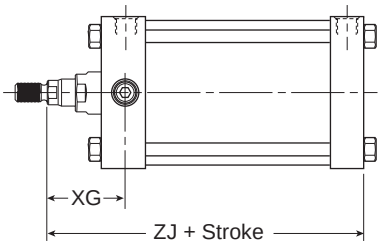
B

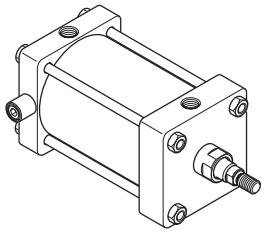
Head Trunnion
Style D
(NFPA MT1)

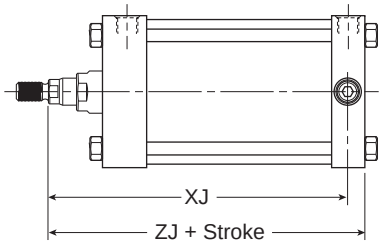


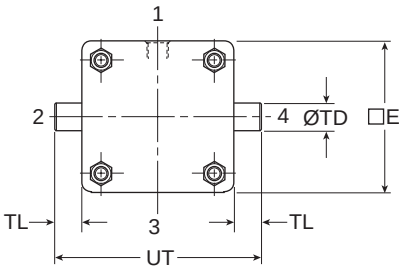




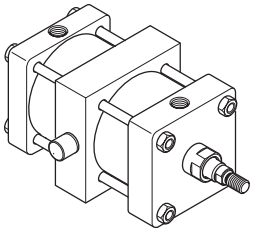
Cap Trunnion
Style DB
(NFPA MT2)

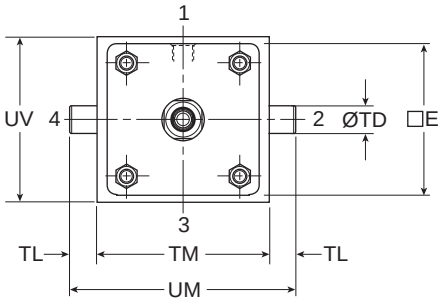


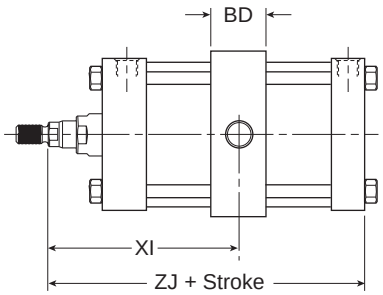




Intermediate Trunnion
Style DD
(NFPA MT4)







Cylinder Dimensions – Style D, DB and DD

Bore Size	Rod No.	Rod Dia. MM	E	BD	+.000 -.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

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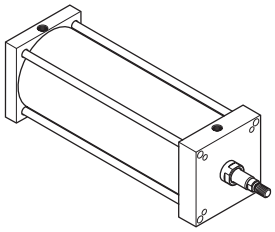
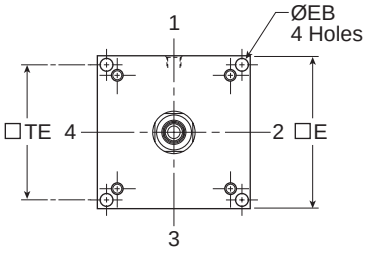
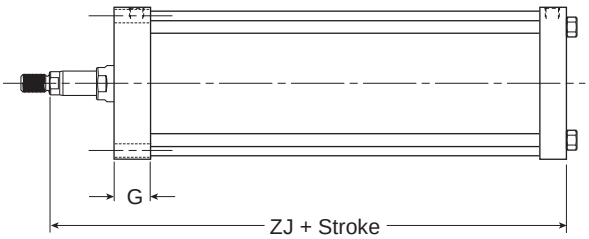
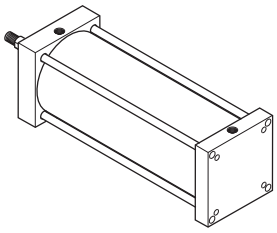
Head Square
Style JB
(NFPA ME3)
(only 8" Bore)

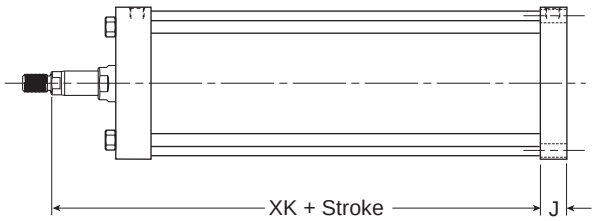


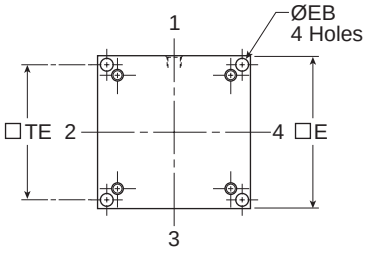




Cap Square
Style HB
(NFPA ME4)
(only 8" Bore)







Cylinder Dimensions – Styles JB and HB

Bore Size	Rod No.	Rod Dia. MM	E	EB	G	J	TE	Add Stroke XK	Add Stroke 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

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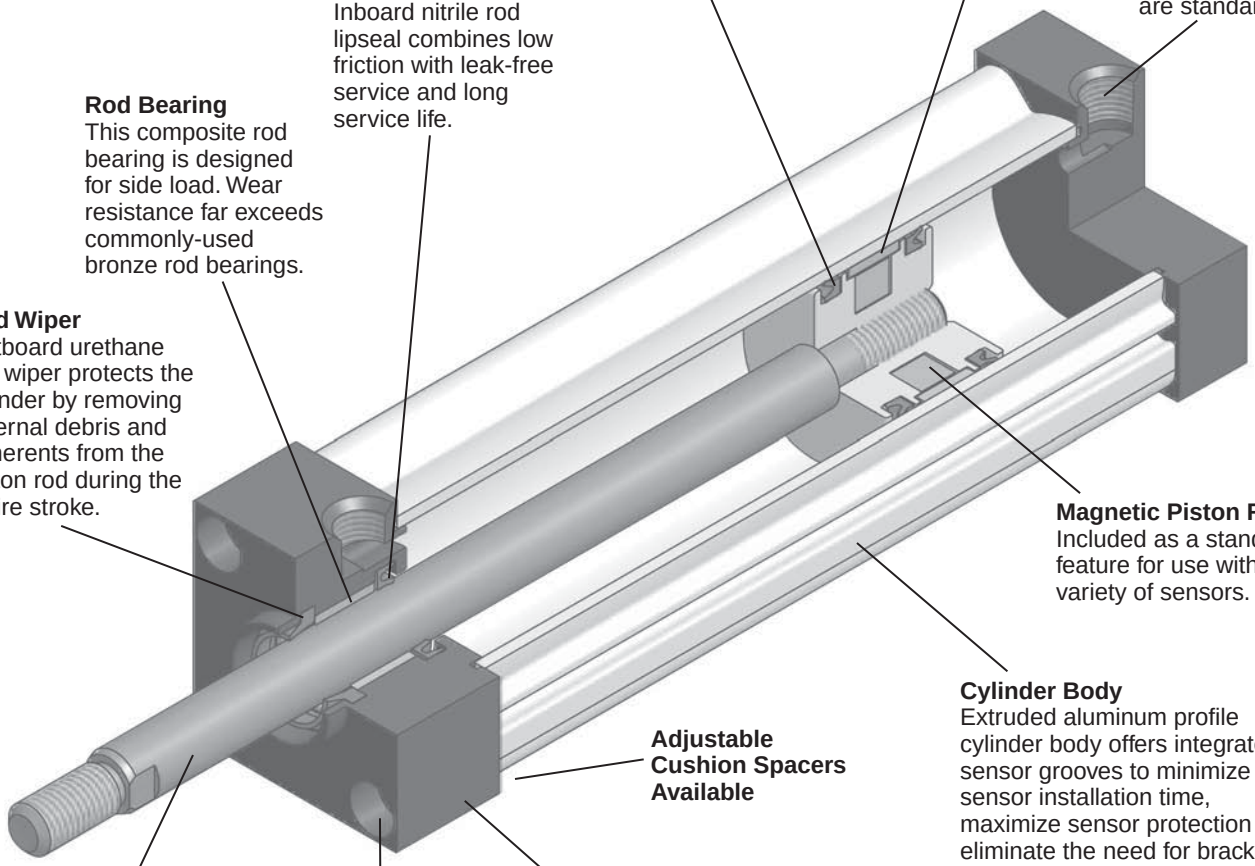

Piston Assembly
Aluminum piston with wear band increases service life and eliminates metal-to-metal contact. Anaerobic adhesive is used to permanently lock and seal the piston to the rod.

Piston Seals
Nitrile piston lipseals combine low friction with leak-free service and long service life. Optional bumper piston seals provide additional noise reduction and smooth end-of-stroke deceleration.

Ports
1/8" NPTF ports are standard.

Rod Seal
Inboard nitrile rod lipseal combines low friction with leak-free service and long service life.

Rod Bearing
This composite rod bearing is designed for side load. Wear resistance far exceeds commonly-used bronze rod bearings.

Rod Wiper
Outboard urethane rod wiper protects the cylinder by removing external debris and adherents from the piston rod during the entire stroke.

Magnetic Piston Ring
Included as a standard feature for use with a variety of sensors.

Cylinder Body
Extruded aluminum profile cylinder body offers integrated sensor grooves to minimize sensor installation time, maximize sensor protection and eliminate the need for brackets. Grooves readily accept Mini-Global Sensors. Anodized and bright-dipped for corrosion resistance, maximum seal life and lower friction. A few mounts require anodized aluminum tube and steel tie rod construction (tie rod brackets for sensors available).

Adjustable Cushion Spacers Available

Heads and Caps
Steel alloy heads and caps are black zinc-plated for corrosion resistance

Piston Rod
Hard chrome plated and polished carbon steel piston rod for reliable performance, long rod seal life and low friction. Grades of stainless steel are available as options.

Endcap Fasteners
Zinc-plated steel endcap fasteners (and tie rods for some mounts) for heavy-duty use. Stainless steel is available as an option.

For a complete list of 3MA options, please see pages B48 and B52.

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B

How to Order 3MA Series Cylinders for 1-1/8" Bore

3MA cylinders can be specified by model number by using the table below.

1.12			J	3MA		U			1	6		A		4.000

Bore Size
1.12 1-1/8"

Double Rod Cylinder
Specify "K" only if double rod cylinder is required.

Mounting Style
Specify mounting style code (see table on following page).

Series
3MA Air service
3ML Hydraulic service

Ports
U 1/8" NPTF (standard)
T SAE #4 (adapter)[5]

Seals
Blank Standard (nitrile seals)
V Fluorocarbon seals[2]
E Fluorocarbon rod wiper and rod seal only[3]

Piston Rod Number
1 3/8" rod
3 1/2" rod
Specify rod code number for required diameter.

Stroke Length
Specify stroke length required in inches.[4]

Cushion Cap End
Blank Non-cushioned cap end
C Cushioned cap end (not available for 3ML)

Cushion Head End
Blank Non-cushioned head end
C Cushioned head end (not available for 3ML)

Piston Rod Thread Type
A Standard (UNF Unified Thread)
W BSF British Fine
M Metric (see page B106)

Piston Type
Blank Standard (lipseals and magnetic ring)
2 Lipseals, no magnetic ring
4 Bumper seals, no magnetic ring[1]
6 Bumper seals and magnetic ring[1]

Special Modification
Specify "S" only for special modification other than rod end, and then describe modification in item notes.

Rod Material Code
Blank Standard
Y 17-4 PH stainless steel
J 303 stainless steel[1]
S 316 stainless steel[1]

Piston Rod Thread Style
6 Full male
4 Small male
9 Short female
3 Special (and specify all dimensions required)

[1] Not available for 3ML

[2] Reed and solid-state sensors only available with standard seals or seal option E.

[3] Used for external chemical compatibility applications, not high temperature.

[4] 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.

[5] Not available with US mount. Adapter height is approximately 0.83" when installed. Adapter body extends 0.15" from cap face. Use of mountings at cap end may be affected by this port type.

How to order 1-1/8" Bore 3MA/3ML Series cylinders with sensors:

Sensors must be ordered separately and are not mounted to the cylinder prior to shipment.

1. Cylinder model number must have Piston Type (blank) or 6.
2. Please refer to pages M1-M9 for sensor part numbers and specifications. Mini-Global, NAMUR and Weld Immune Sensors will fit the 1-1/8" Bore 3MA/3ML Series (Global Sensors not available).
3. Tie rod bracket P8S-TMA0Z will be required for Mini-Global Sensors with Mounting Styles US, F, MR, TB, TC, TD or other tie rod versions.
   Please refer to page M9 for more information.

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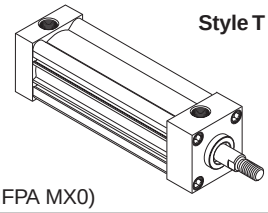
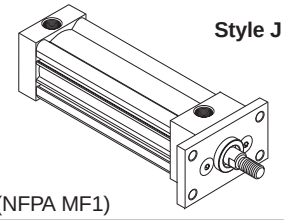
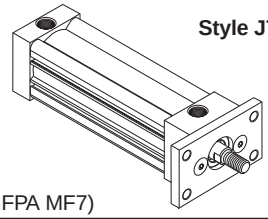
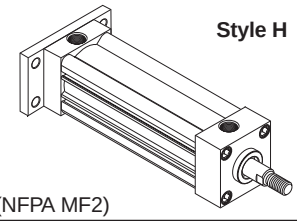
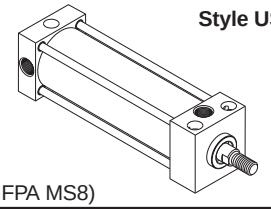
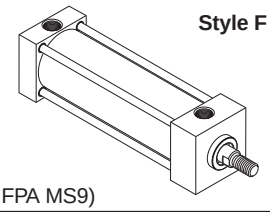
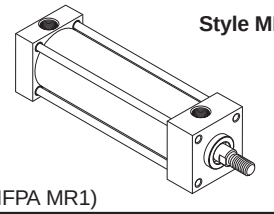
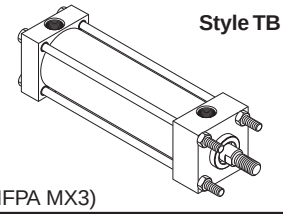
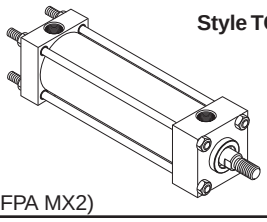
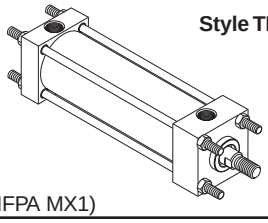
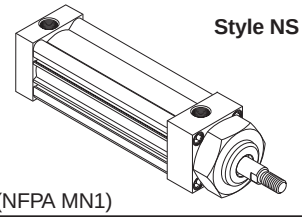
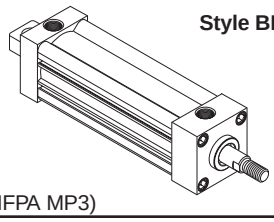
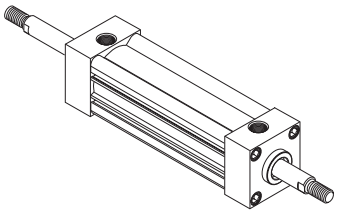
3MA Series Mounting Styles for 1-1/8" Bore

No Mount Basic **Style T**  (NFPA MX0)	Head Rectangular Flange **Style J**  (NFPA MF1)	Head Rect. Flange (no pilot) **Style J7**  (NFPA MF7)	Cap Rectangular Flange **Style H**  (NFPA MF2)
Side Thru Hole **Style US**  (NFPA MS8)	Side Tap **Style F**  (NFPA MS9)	Head Tap **Style MR**  (NFPA MR1)	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)	Threaded Nose **Style NS**  (NFPA MN1)	Cap Pivot Eye **Style BE**  (NFPA MP3)
Double Rod End **Style KT**  (NFPA MDX0)	Double rod end cylinders can be ordered with head mountings, i.e. KJ (see page B53).		

Note: Styles US, F, MR, TB, TC and TD are tie rod construction only, profile body not available. If Mini-Global sensors are required, please order one tie rod bracket (P8S-TMA0Z) for each sensor.

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B

General Specifications

- NFPA interchangeable – NFPA/T3.6.11 R1-1998 (R2004)
- Strokes – available in any practical stroke length
- Rod diameters – 3/8" and 1/2"
- Rod end styles – 3 standard, specials available
- Single rod end or double rod ends
- Cushions – optional and adjustable at either end or both ends (n/a for 3ML Hydraulic Version)
- Operating pressure –
  3MA = 250 PSIG (17 Bar) max. air service
  3ML = 1,100 PSIG (76 Bar) max. hydraulic service
- Media – 3MA = dry, filtered air
  3ML = filtered hydraulic oil
- Temperature range –
  -10°F to +165°F (-23°C to +74°C) with standard seals
  -10°F to +250°F (-23°C to +121°C) with fluorocarbon seals option
  -50°F to +150°F (-46°C to +66°C) with low temperature seals (consult factory)
- Mounting styles – 13 standard styles

For material options, including seals and piston rods, please see Material Specifications on next page.

Cylinder Weights – 1-1/8" Bore

3MA/3ML Cylinders

Bore (inch)	Rod (inch)	No Mount Single Rod 3MA	
		Base Wt. (lbs.)	Per Inch (lbs.)
1-1/8	3/8	1.26	0.10
	1/2		0.13

Standard Cushion Position

Mounting Code	Position
All mounts	2

Standard Port Size

Bore	NPTF
1-1/8	1/8

Recommended Maximum Extend Stroke Length

Rod (inch)	Pressure (PSIG)			
	100	200	500	1100
3/8	26"	18"	12"	9"
1/2	46"	32"	21"	15"

Please consult Actuator Division for longer stroke lengths.

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Material Specifications – Standard Temperatures and Applications

Head and cap	Black zinc plated steel alloy
Head and cap screws	Zinc plated steel alloy
Cylinder body	Clear anodized aluminum alloy
Piston rod	Chrome plated carbon steel
Rod seal	Nitrile
Rod wiper	Molythane
Rod bearing	Composite
Piston	Aluminum alloy
Piston seals	Nitrile
Piston bearing	MolyGard™
Magnetic ring	Plastic-bound magnetic material
Piston fastener	Piston rod for aluminum piston
O-rings	Nitrile
End seals	Nitrile
Cushion spacer	Black zinc plated steel alloy
Cushion seals	Urethane
Cushion needle valves	Stainless steel
Tie-rods (some mounts)	Blackened carbon steel
Tie-rod nuts (some mounts)	Black oxided steel alloy
Cylinder accessories	Black zinc plated steel alloy

3MA Options – Material and Part Changes

High temperatures (-10°F to +250°F)	All seals and wiper are fluorocarbon Aluminum piston only (without magnetic ring)
Low temperatures (-50°F to +150°F)	Rod seal, piston seals, o-rings and end seals are low temperature-rated nitrile (consult factory)

3ML Hydraulic Version – Material and Part Changes

Hydraulic service (general)	Cushions and bumper piston seals not available
Hydraulic service (std temp)	Nitrile rod seal and piston seals (for hydraulic use)
Hydraulic service (high temp)	All seals and wiper are fluorocarbon (for hydraulic use)

Other Standard Options – Material and Part Changes

Cylinder seal options	Fluorocarbon for high temperatures or chemical compatibility Other seal options available, please consult factory
Bumper piston seal options (3MA only, n/a for 3ML)	Carboxylated nitrile (Nitroxile) for standard temperatures Fluorocarbon for high temperatures and chemical compatibility
Piston rod material options	Chrome plated carbon steel (standard) 17-4 PH stainless steel 303 stainless steel (n/a for 3ML) 316 stainless steel (n/a for 3ML) (for stainless steel with chrome plating, please consult factory) Case-hardened, chrome plated carbon steel

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B

How to Select a 1-1/8" Bore 3MA Cylinder

Parker cylinders are available based on air or hydraulic operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

Step 1 - **Verify that the 1-1/8" bore size is** appropriate to achieve required force using the available operating pressure.

Step 2 - **Determine the series cylinder to use**, based on operating pressure.

Step 3 - **Turn to the appropriate cylinder selection section.** Select the mounting style that fits your installation needs.

- Choose a rod end style and the desired rod end accessories.
- Size the cylinder to meet your application requirements.

Step 4 - **Consider the following conditions** which may require further modifications to the cylinder you have selected.

Application Condition	Check the Following
Quick Starts or Stops	Confirm that determined thrust is sufficient to accelerate or decelerate cylinder and load within prescribed distance. Optional cushions should be used to reduce shock during deceleration, check that peak pressures will be within tolerable limits.
Long Push Stroke	Check whether stop tube is required to prevent excessive bearing loads and wear.
High-column Loading Long Push Stroke	Determine if standard size piston rod is strong enough to accommodate intended load. See Application Engineering section for recommendations.
Long Horizontal Stroke	Determine if standard size piston rod is strong enough to accommodate intended load.
High Operating Temperatures	For temperatures between 165°F and 250°F use 3MA or 3ML cylinder with high temperature seals.

General Options and Modifications:

- Adjustable Cushions (Cushion Spacers)
- Non-Magnetic Piston (magnetic ring standard)
- Piston Bumper Seals
- Port and Adjustable Cushion Relocation
- Port Thread Styles
- Multiple Ports
- Special Heads, Caps, Pistons and Mounts
- Double Rod End
- Oversize Rod Diameters
- Rod End Modifications
- Rod Materials (grades of stainless steel)
- Fluorocarbon Rod Wiper and Rod Seal only
- Fluorocarbon Seals (all cylinder seals)
- Stop Tube
- Mixed Mountings
- Round Tube and Tie Rod Construction
- Stainless Steel Fasteners/Tie Rods
- Shock Absorber on Cap End
- LECTROFLUOR® Coating
- Adjustable Point Sensors (order separately)
- High Temperature Service (to +250°F)
- Hydraulic Service (3ML) (1,100 PSIG)

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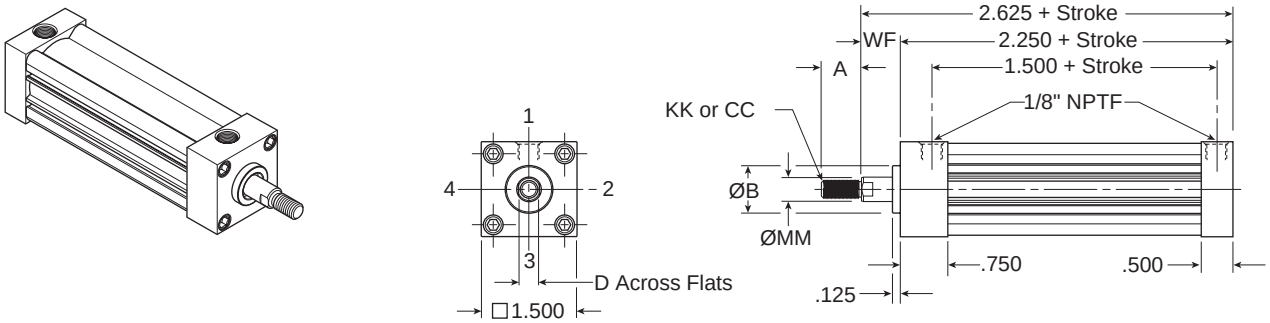
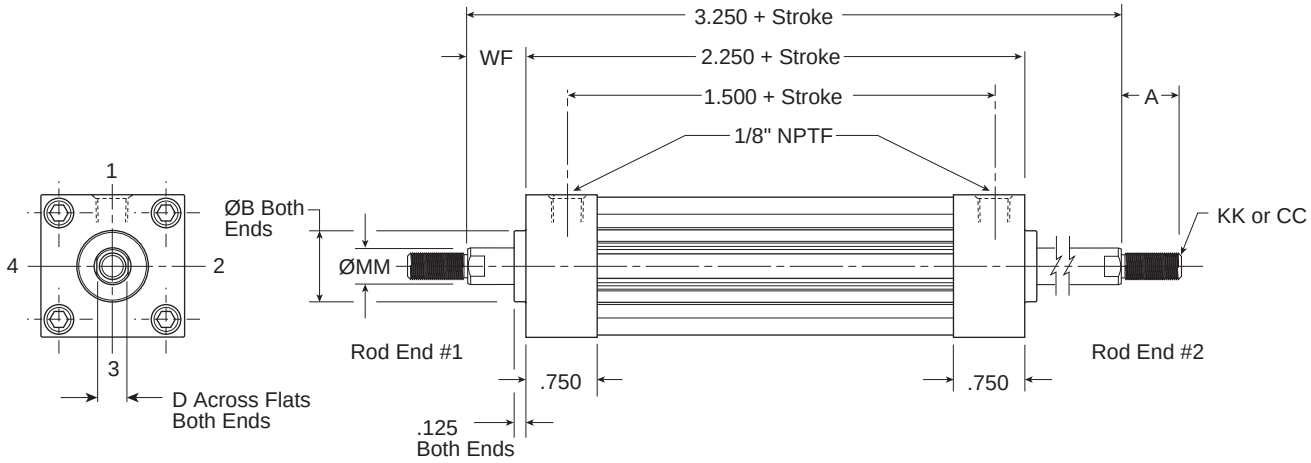
Single Rod, Double Rod and Cushioned Cylinder Dimensions

Single Rod – T Mount Dimensions

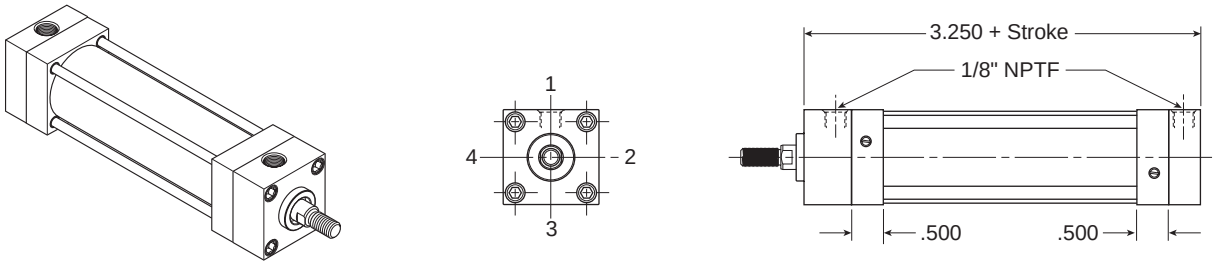


Double Rod – KT Mount Dimensions



Single rod end mounts T, J, J7, TB, TD and NS can become double rod end mounts KT, KJ, KJ7, KTB, KTD and KNS. Please use the appropriate dimensions from head face of the single rod end mount drawings with KT drawing above for double rod end cylinder dimensions.

Cushioned Cylinder Dimensions



Rod End Dimensions

Bore Size	Rod No.	Rod Dia. MM	Thread Style 6 CC	Thread Style 4 KK	Thread Style 9 KK	A	-0.001 -0.003 B	D	LAF	WF
1-1/8	1	3/8	3/8-24	5/16-24	1/4-28	0.625	0.750	5/16	1.000	0.375
	3	1/2	1/2-20	7/16-20	3/8-24	0.750	0.750	7/16	1.125	0.375

Note: Adjustable cushions will add 0.50" to each end. Cushions at both ends will add a total of 1.00" to the base cylinder length. Single rod configuration shown above. Available with single rod and double rod cylinders.

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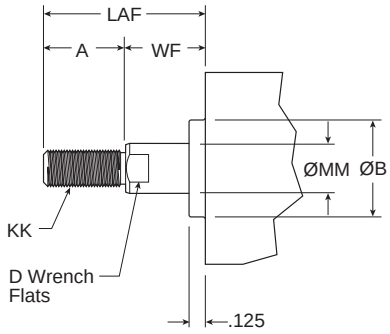
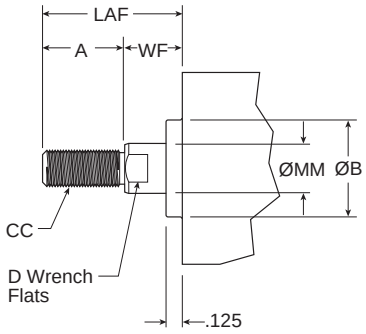
B

3MA Series Rod End Dimensions – 1-1/8" Bore

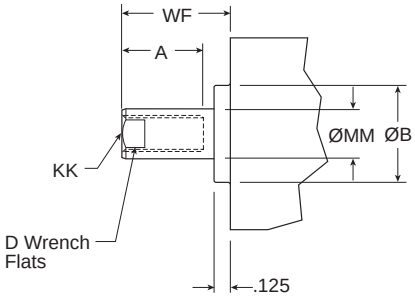
Thread Style 4
Small Male



Thread Style 6
Full Male



Thread Style 9
Short Female



Rod End Dimensions

Bore Size	Rod No.	Rod Dia. MM	Thread Style 6 CC	Thread Style 4 KK	Thread Style 9 KK	A	-0.001 -0.003 B	D	LAF	WF
1-1/8	1	3/8	3/8-24	5/16-24	1/4-28	0.625	0.750	5/16	1.000	0.375
	3	1/2	1/2-20	7/16-20	3/8-24	0.750	0.750	7/16	1.125	0.375

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.

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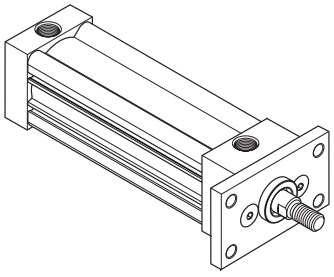
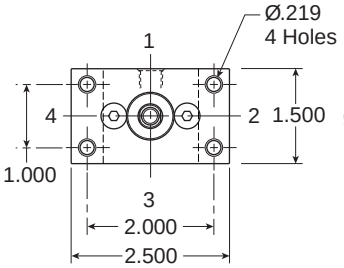
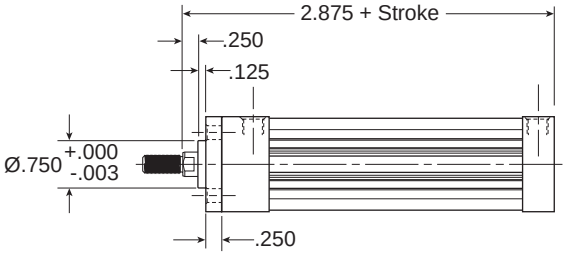
Head Rectangular Flange
Style J
(NFPA MF1)

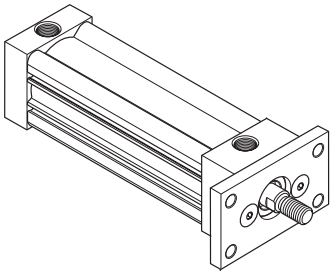


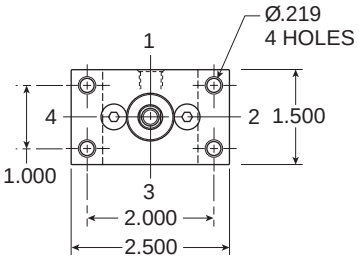


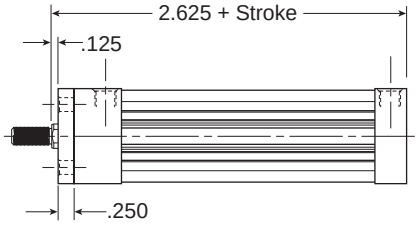


W dimension = .375

Head Rectangular Flange (no pilot)
Style J7
(NFPA MF7)

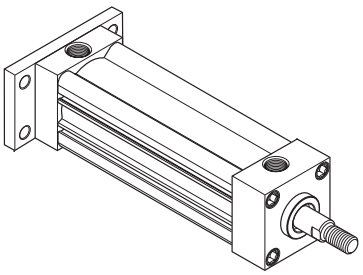


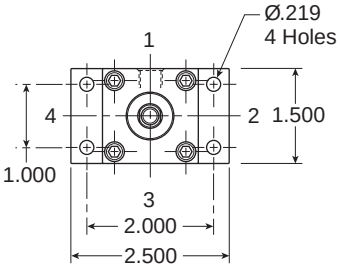


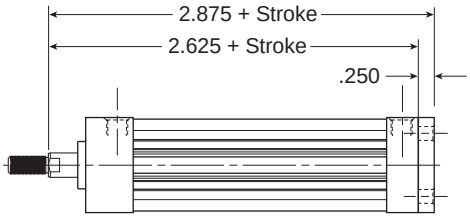


W dimension = .125

Cap Rectangular Flange
Style H
(NFPA MF2)







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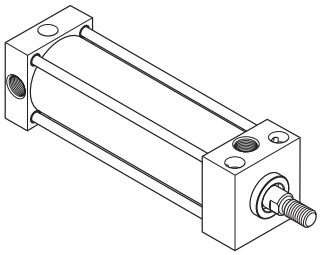
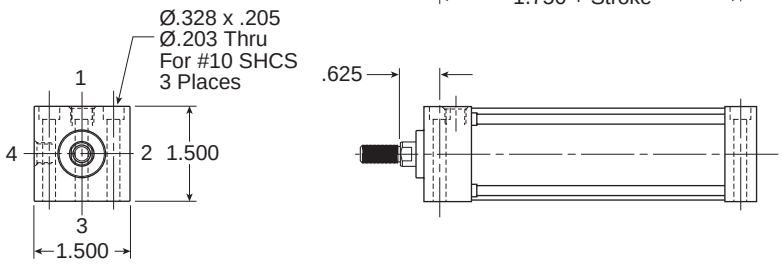
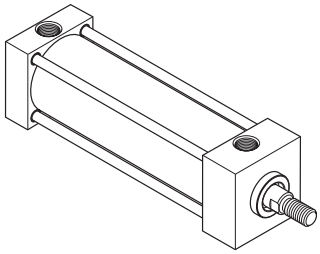
B

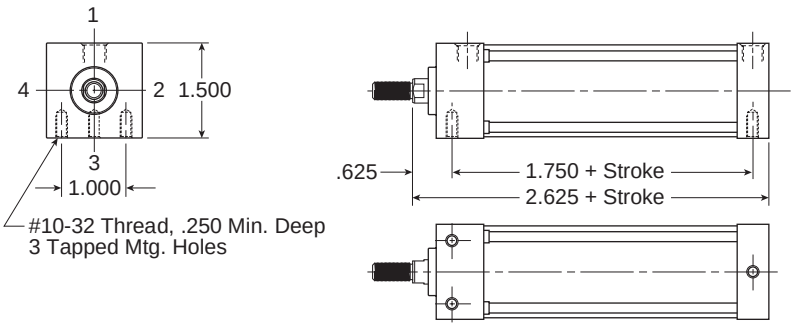
Side Thru Hole
Style US
(NFPA MS8)



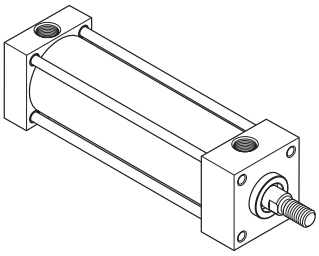


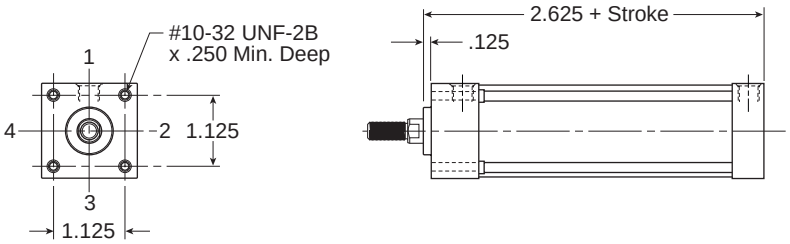
Side Tap
Style F
(NFPA MS9)





Head Tap
Style MR
(NFPA MR1)





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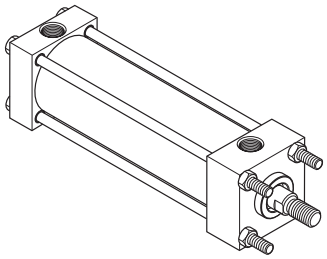
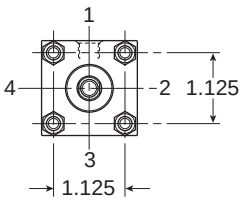
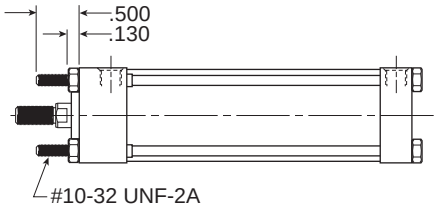
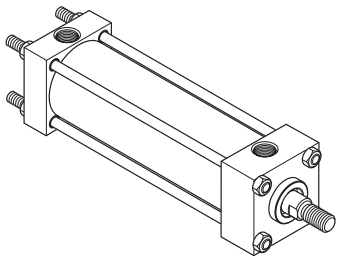
Tie Rods Ext. Head End
Style TB
(NFPA MX3)

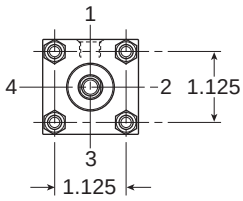


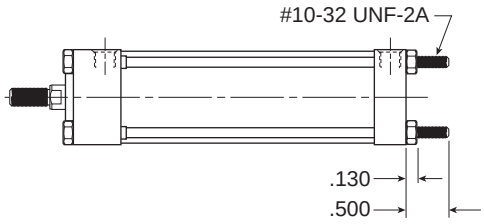




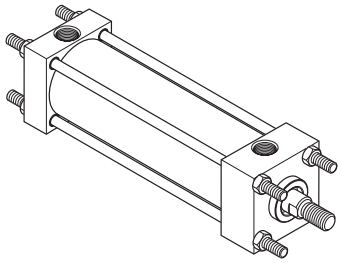
Tie Rods Ext. Cap End
Style TC
(NFPA MX2)

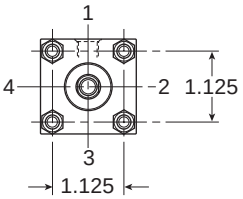


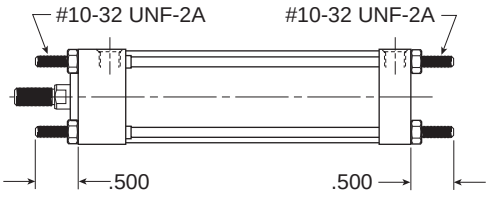




Tie Rods Ext. Both Ends
Style TD
(NFPA MX1)







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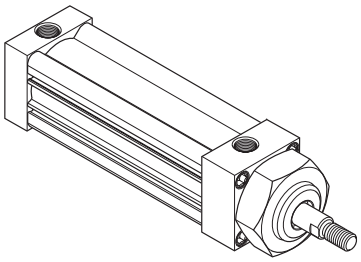
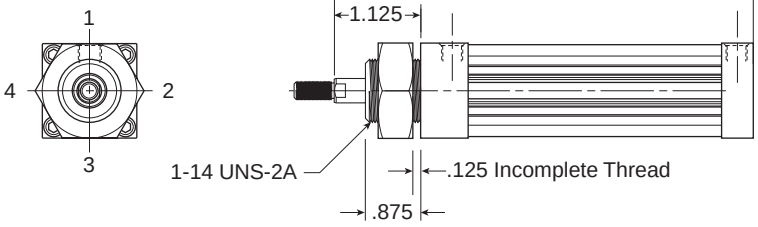
B

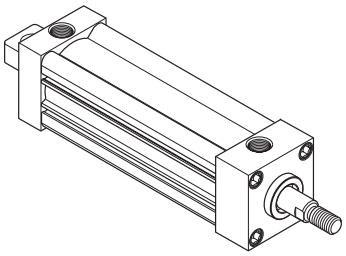
Threaded Nose
Style NS
(NFPA MN1)

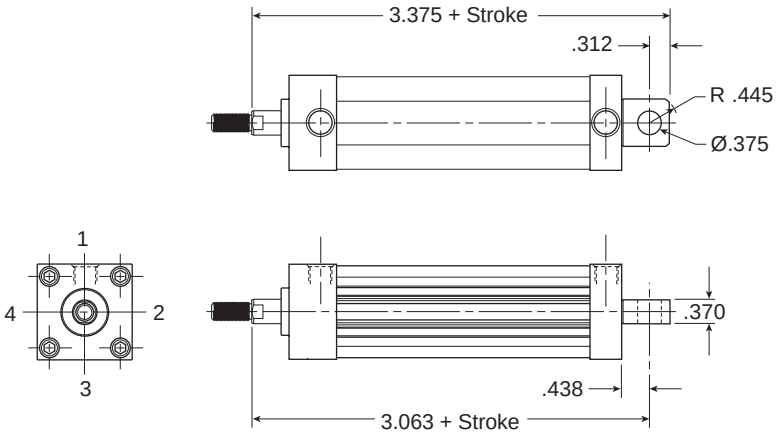




WF dimension = 1.125

Cap Pivot Eye
Style BE
(NFPA MP3)





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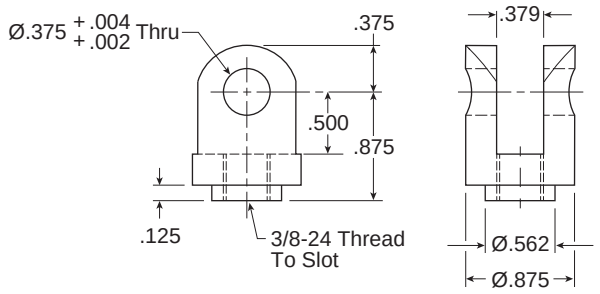
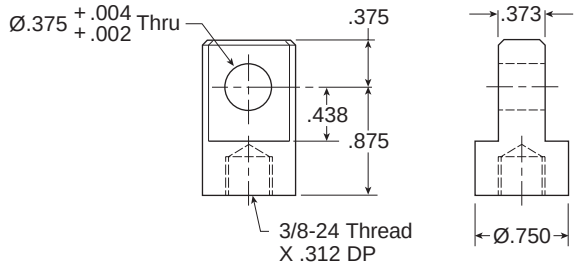
Cylinder Accessories

Note: Pivot Pin Assembly must be ordered separately

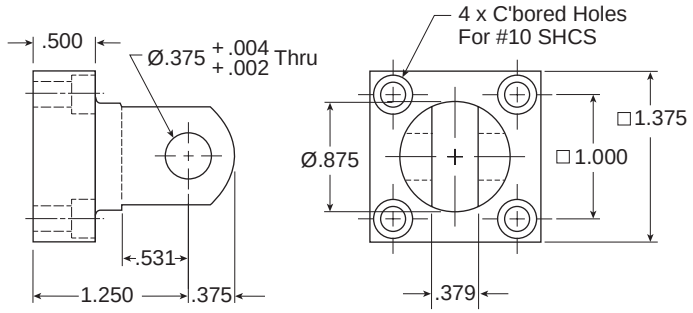
Rod Clevis P/N 1458030038



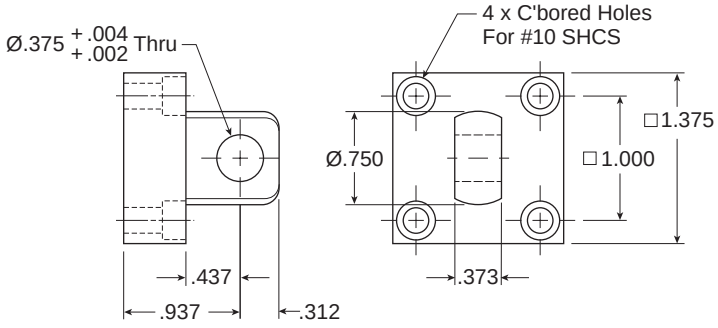
Rod Eye P/N 1458040038



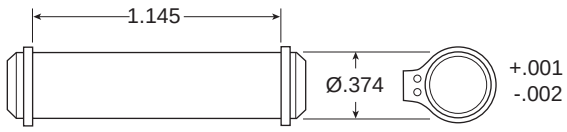
Clevis Bracket P/N 1458050038



Eye Bracket P/N 1458060038



Pivot Pin Assembly P/N 0856640038



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