

cylinders

A Series

Aluminum NFPA Interchangeable Cylinder Line



numatics®

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The **A Series** is an aluminum NFPA Interchangeable cylinder line that is designed and built to excel in the most demanding applications. The A Series encompasses many value-added features such as an extra long graphite filled cast iron rod bushing and a standard oversized wear band that is located on the rear of the piston. Additionally, the A Series includes the well-proven "T Seal" piston seal configuration made from carboxilated nitrile with self-lubricating Teflon® compound. These are just a sample of the features that make the A Series the *Superior* NFPA Interchangeable air cylinder line.

Tube

The **tube** is hard coat anodized. The hard coating is an electro-chemical process, which produces a very dense surface of aluminum oxide. This surface has extreme hardness (60 Rc), excellent wear and corrosion resistance, and a low coefficient of friction. The 10", 12" and 14" bores use a honed, chrome plated tube.

End Caps

The **end caps** are accurately machined from (6061-T6) solid aluminum bar stock. They are anodized for corrosion resistance. Additionally, a recess on the piston-mating surface (at both ends) enables the air to work on a larger piston area for effortless breakaway.

Rod Bushing

The A Series includes a graphite filled, cast iron **rod bushing** that is extra long in length. Graphite filled offers the best bearing surface when using a hard chrome plated steel piston rod. Cast iron provides maximum resistance against wear. The added length adds superior alignment and support of the piston rod as well as provides maximum load bearing support. The 10", 12" and 14" bores are equipped with a bronze bushing.

Rod Seal

The carboxilated nitrile with Teflon® compound **rod seal** is self-lubricating and durable. The rounded lip design ensures proper sealing and long life.

Rod Wiper

The standard **rod wiper** construction is a highly durable polyurethane.

Piston Rod

High strength steel (100,000 psi minimum yield) **piston rod** has a ground, polished, and chrome plated surface. This surface provides maximum life for both the rod bushing and the seals.

Bushing Retainer

The **bushing retainer** allows cartridge removal (cylinder repair) without complete disassembly.

Tie Rods

The **tie rods** are 100,000 psi minimum yield steel for maximum holding power. The threads are roll formed for superior strength and engagement.

Piston Seal

The **piston seal** is a carboxilated nitrile with Teflon® compound making it self-lubricating. The "T" seal with back-up ring construction prevents rolling and seals at all pressures.

Wear Band

The **wear band** is a stable, lubricating strip located on the piston. We separated the load bearing points by locating the wear band at the rear of the piston. This maximizes column strength at full extension.

Piston

The solid aluminum alloy **piston** is strong and durable.



Cushion Seal

The floating **cushion seal** design enables rapid stroke reversal by providing instantaneous full flow to the piston. Each cushion has a flush, retained adjustment needle.

Tube End Seal

The **tube end seals** are compression type and reusable.

Ports

Our enhanced **port** design enables the cylinder to work more efficiently. Through the use of precise machining depths and tool shape, we are able to smooth the flow path into and out of the cylinder.

Teflon® is a registered trademark of DuPont™.

Standard Specifications:

- Meets NFPA specifications
- Bore sizes from 1-1/2" through 6" (8" through 14" are Large Bore A Series)
- Piston rod diameters from 5/8" to 1-3/4" (1-3/8" through 2-1/2" for Large Bore A Series)
- Nominal pressure rating is 250 psi air
- Standard temperature -10°F to 165°F (-23°C to 74°C)
- NPTF ports
- Flexible port and cushion location
- Multitude of mounting options



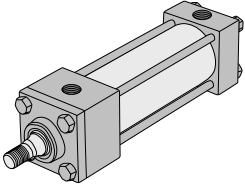
A Series NFPA Interchangeable

NUMATICS®

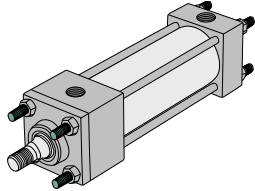
Standard A Series Mounts

Centerline Mounts

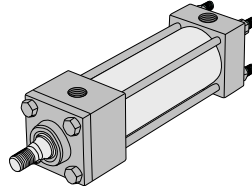
X0 Mount
Basic No Mount



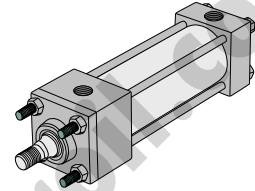
X1 Mount
Extended Tie Rods – Both Ends



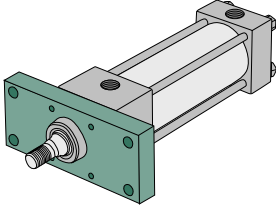
X2 Mount
Extended Tie Rods – Cap End



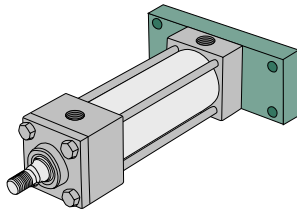
X3 Mount
Extended Tie Rods – Head End



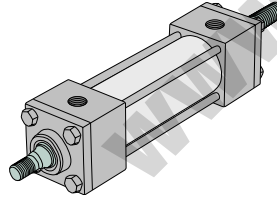
F1 Mount
Head Rectangular Flange



F2 Mount
Cap Rectangular Flange

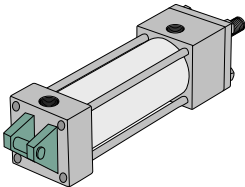


DA Mount
Double Rod End

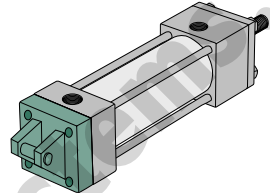


Pivot Mounts

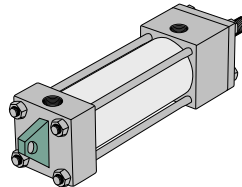
P1 Mount
Fixed Clevis



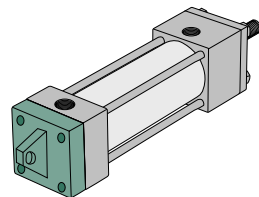
P2 Mount
Detachable Clevis



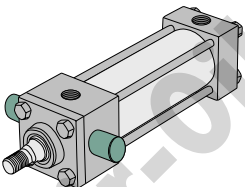
P3 Mount
Fixed Eye



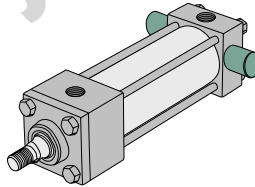
P4 Mount
Detachable Eye



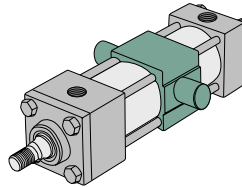
T1 Mount
Head Trunnion



T2 Mount
Cap Trunnion

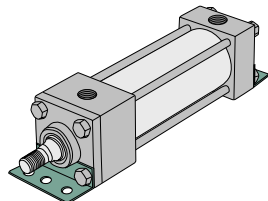


T4 Mount
Intermediate Trunnion

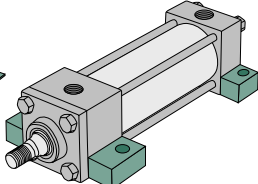


Foot Mounts

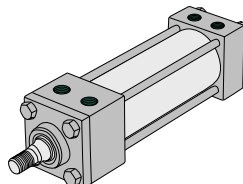
S1 Mount
Angle Mount



S2 Mount
Side Lugs



S4 Mount
Bottom Tapped





How to Order

Leave blank unless using MU or BK option.

P1 A L - 04 A 1 D - C AA 0 04 0

Mount

- F1 = Front Flange
- F2 = Rear Flange
- P1 = Fixed Clevis
- P2 = Detachable Clevis
- P3 = Fixed Eye
- P4 = Detachable Eye
- S1 = Angle Mount
- S2 = Side Lug Mount
- S4 = Bottom Tap
- SN = Sleeve Nut
- T1 = Head Trunnion (Fixed Steel Ears)
- T6 = Head Trunnion (Removeable Aluminum Ears)
- T2 = Cap Trunnion (Fixed Steel Ears)
- T7 = Cap Trunnion (Removeable Aluminum Ears)
- T4* = Mid Trunnion
- X0 = Basic No Mount
- X1 = Extended Tie Rods Both Ends
- X2 = Extended Tie Rod Cap
- X3 = Extended Tie Rod Head
- *Specify "X1" length.

Type

- A = A Series NFPA Interchangeable

Bore

- K = 1-1/2" R = 4"
- L = 2" T = 5"
- M = 2-1/2" U = 6"
- P = 3-1/4"

Full Inches of Stroke

- 00 = 0" Stroke
- 01 = 1" Stroke
- 02 = 2" Stroke
- 03 = 3" Stroke
- 99 = 99" Stroke
- Note: Consult factory for strokes greater than 99".

Fractional Inches of Stroke

- A = 0" I = 1/2"
- B = 1/16" J = 9/16"
- C = 1/8" K = 5/8"
- D = 3/16" L = 11/16"
- E = 1/4" M = 3/4"
- F = 5/16" N = 13/16"
- G = 3/8" O = 7/8"
- H = 7/16" P = 15/16"

Rod Code

- 1 = Style #1 Standard Rod Diameter
- 2 = Style #2 Standard Rod Diameter
- 3 = Style #3 Standard Rod Diameter
- 4 = Special Standard Rod Diameter (must specify threads)
- 5 = Special Oversize Rod Diameter (must specify threads)
- 6 = Style #1 Oversize Rod Diameter
- 7 = Style #2 Oversize Rod Diameter
- 8 = Style #3 Oversize Rod Diameter
- U = Male Coupling Rod End Standard Rod Diameter
- V = Male Coupling Rod End Oversized Rod Diameter

Fractional Inches of Stroke

- A = 0" I = 1/2"
- B = 1/16" J = 9/16"
- C = 1/8" K = 5/8"
- D = 3/16" L = 11/16"
- E = 1/4" M = 3/4"
- F = 5/16" N = 13/16"
- G = 3/8" O = 7/8"
- H = 7/16" P = 15/16"

Full Inches of Stroke

- 00 = 0" Stroke
- 01 = 1" Stroke
- 02 = 2" Stroke
- 03 = 3" Stroke

Magnet

- 0 = No Magnet
- 2 = Reed Magnet

Options

- AA = No Options
- BA** = Bumpers Both Ends
- BC** = Bumper Cap Only
- BH** = Bumper Head
- BK = Back to Back Cylinder
- CT = Composite Tube
- DA = Double Rod End
- EB = Silencer Bumpers
- GA = High Temperature Rod Boot
- KA* = Stroke Adjuster
- LB = Low Breakaway Seals
- LP = Profile Tubing (1.5"-3.25" Bores)
- MA = Metallic Rod Scraper
- MU = Multiposition Cylinder
- NA = Nickel Plated Cylinder, Stainless Steel Rod and Tie Rods
- PA = Polypak Rod Seal
- RB = Rod Boot
- RA* = Save Air Stroke Adjuster
- SA = Stainless Steel Piston Rod
- SS = Stainless Piston Rod and Tie Rod
- ST = Stainless Tie Rods
- TD = Tandem Cylinder
- VA = Viton Seals
- 1A* = Rod Extension
- 2A* = Thread Extension
- 12* = Rod and Thread Extension
- 3A = Studded Rod End
- 4A* = Stop Tube
- 4D* = Double Piston Stop Tube
- * Specify length.
- **Bumpers add .062" to OAL (per bumper).
- Consult factory for information regarding combination options.

Cushions

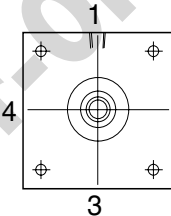
| Position | 1 | 2 | 3 | 4 | Fixed |
|--------------|---|---|---|---|-------|
| No Cushion | A | A | A | A | A |
| Head and Cap | B | C | D | E | Y |
| Head Only | F | G | H | J | W |
| Cap Only | K | L | M | N | V |

Ports

| Position | 1/8" | 1/4" | 3/8" | 1/2" | 3/4" |
|----------|------|------|------|------|------|
| 1 | B | C | D | E | F |
| 2 | H | I | J | K | L |
| 3 | N | O | P | Q | R |
| 4 | T | U | V | W | X |

Z = Special Ports (must specify ports size(s) and location(s)).
Consult factory for additional details.

Cylinder Orientation



Ports are normally located in position 1.
Cushions are normally located in position 2.

Rod End Styles, Diameters and Threads

| Diameter | Style #1 Standard Male | Style #2 Optional Male | Style #3 Optional Female |
|----------|---------------------------|---------------------------|-----------------------------|
| 0.625 | 7/16-20 | 1/2-20 | 7/16-20 |
| 1.000 | 3/4-16 | 7/8-14 | 3/4-16 |
| 1.375 | 1-14 | 1 1/4-12 | 1-14 |
| 1.750 | 1 1/4-12 | 1 1/2-12 | 1 1/4-12 |
| 1.375 | 1-14 | 1 1/4-12 | 1-14 |

Rod Diameters by Bore Size

| Bore | Standard Dia. | Oversized Dia. |
|--------|---------------|----------------|
| 1-1/2" | 0.625 | 1.000 |
| 2" | 0.625 | 1.000 |
| 2-1/2" | 0.625 | 1.000 |
| 3-1/4" | 1.000 | 1.375 |
| 4" | 1.000 | 1.375 |
| 5" | 1.000 | 1.375 |
| 6" | 1.375 | 1.750 |

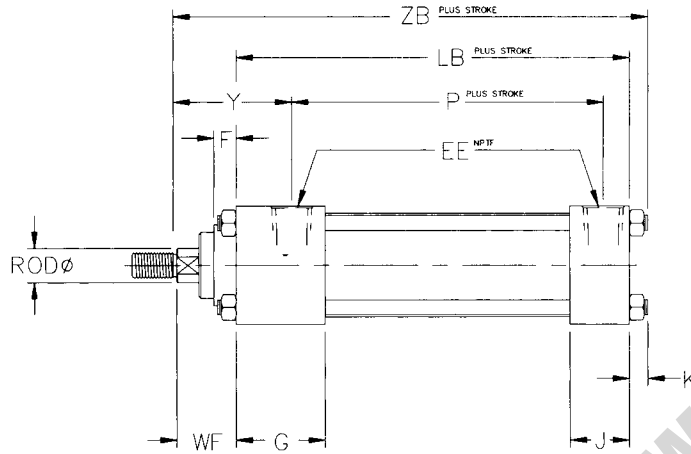
The above information is for information purposes only and not all combinations are available.



A Series NFPA Interchangeable

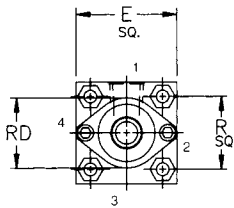
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Basic No Mount Cylinder

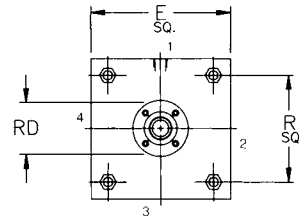


Mount Code X0

NFPA MX0



1-1/2" Through 2-1/2"



3-1/4" Through 6"

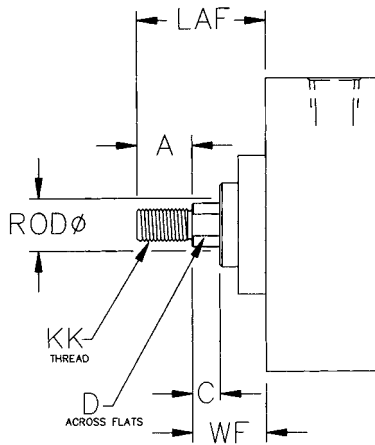
Dimensions

| BORE | ROD | E | EE | F | G | J | K | LB | P | R | RD | WF | Y | ZB |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|
| 1-1/2" | 0.625 | 2.000 | 0.375 | 0.375 | 1.500 | 1.000 | 0.250 | 3.625 | 2.250 | 1.430 | 1.375 | 1.000 | 1.938 | 4.875 |
| | 1.000 | 2.000 | 0.375 | 0.375 | 1.500 | 1.000 | 0.250 | 3.625 | 2.103 | 1.430 | 1.397* | 1.375 | 2.460 | 5.250 |
| 2" | 0.625 | 2.500 | 0.375 | 0.375 | 1.500 | 1.000 | 0.313 | 3.625 | 2.250 | 1.840 | 1.375 | 1.000 | 1.938 | 4.938 |
| | 1.000 | 2.500 | 0.375 | 0.375 | 1.500 | 1.000 | 0.313 | 3.625 | 2.250 | 1.840 | 2.500* | 1.375 | 2.313 | 5.313 |
| 2-1/2" | 0.625 | 3.000 | 0.375 | 0.375 | 1.500 | 1.000 | 0.313 | 3.750 | 2.375 | 2.190 | 1.375 | 1.000 | 1.938 | 5.062 |
| | 1.000 | 3.000 | 0.375 | 0.375 | 1.500 | 1.000 | 0.313 | 3.750 | 2.375 | 2.190 | 3.000* | 1.375 | 2.313 | 5.438 |
| 3-1/4" | 1.000 | 3.750 | 0.500 | 0.625 | 1.750 | 1.250 | 0.375 | 4.250 | 2.625 | 2.760 | 2.706 | 1.375 | 2.438 | 6.000 |
| | 1.375 | 3.750 | 0.500 | 0.625 | 1.750 | 1.250 | 0.375 | 4.250 | 2.625 | 2.760 | 3.125 | 1.625 | 2.688 | 6.250 |
| 4" | 1.000 | 4.500 | 0.500 | 0.625 | 1.750 | 1.250 | 0.375 | 4.250 | 2.625 | 3.320 | 2.706 | 1.375 | 2.438 | 6.000 |
| | 1.375 | 4.500 | 0.500 | 0.625 | 1.750 | 1.250 | 0.375 | 4.250 | 2.625 | 3.320 | 3.125 | 1.625 | 2.688 | 6.250 |
| 5" | 1.000 | 5.500 | 0.500 | 0.625 | 1.750 | 1.250 | 0.500 | 4.500 | 2.875 | 4.100 | 2.706 | 1.375 | 2.438 | 6.375 |
| | 1.375 | 5.500 | 0.500 | 0.625 | 1.750 | 1.250 | 0.500 | 4.500 | 2.875 | 4.100 | 3.125 | 1.625 | 2.688 | 6.625 |
| 6" | 1.375 | 6.500 | 0.750 | 0.625 | 2.000 | 1.500 | 0.500 | 5.000 | 3.125 | 4.880 | 3.125 | 1.625 | 2.813 | 7.125 |
| | 1.750 | 6.500 | 0.750 | 0.750 | 2.000 | 1.500 | 0.500 | 5.000 | 3.125 | 4.880 | 3.788 | 1.875 | 3.063 | 7.375 |

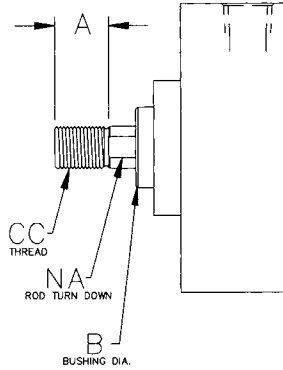
* Uses a full-face bushing retainer.



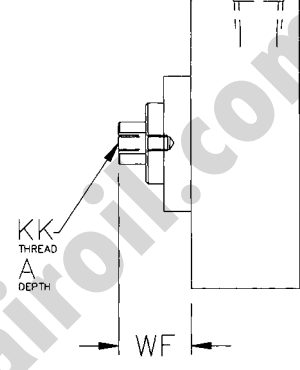
Standard and Optional Rod Ends



Style #1 (Standard Male)



Style #2 (Optional Male)

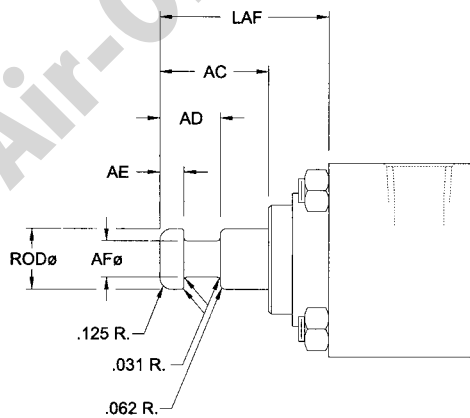


Style #3 (Optional Female)

Dimensions

| BORE | ROD | KK(1) | CC(2) | KK(3) | A | B | C | D | NA | LAF | WF |
|--------|-------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 7/16-20 | 1/2-20 | 7/16-20 | 0.750 | 1.125 | 0.375 | 0.500 | 0.585 | 1.750 | 1.000 |
| | 1.000 | 3/4-16 | 7/8-14 | 3/4-16 | 1.125 | 1.500 | 0.500 | 0.813 | 0.960 | 2.500 | 1.375 |
| 2" | 0.625 | 7/16-20 | 1/2-20 | 7/16-20 | 0.750 | 1.125 | 0.375 | 0.500 | 0.585 | 1.750 | 1.000 |
| | 1.000 | 3/4-16 | 7/8-14 | 3/4-16 | 1.125 | 1.500 | 0.500 | 0.813 | 0.960 | 2.500 | 1.375 |
| 2-1/2" | 0.625 | 7/16-20 | 1/2-20 | 7/16-20 | 0.750 | 1.125 | 0.375 | 0.500 | 0.585 | 1.750 | 1.000 |
| | 1.000 | 3/4-16 | 7/8-14 | 3/4-16 | 1.125 | 1.500 | 0.500 | 0.813 | 0.960 | 2.500 | 1.375 |
| 3-1/4" | 1.000 | 3/4-16 | 7/8-14 | 3/4-16 | 1.125 | 1.500 | 0.500 | 0.813 | 0.960 | 2.500 | 1.375 |
| | 1.375 | 1-14 | 1 1/4-12 | 1-14 | 1.625 | 2.000 | 0.625 | 1.125 | 1.313 | 3.250 | 1.625 |
| 4" | 1.000 | 3/4-16 | 7/8-14 | 3/4-16 | 1.125 | 1.500 | 0.500 | 0.813 | 0.960 | 2.500 | 1.375 |
| | 1.375 | 1/4 | 1 1/4-12 | 1-14 | 1.625 | 2.000 | 0.625 | 1.125 | 1.313 | 3.250 | 1.625 |
| 5" | 1.000 | 3/4-16 | 7/8-14 | 3/4-16 | 1.125 | 1.500 | 0.500 | 0.813 | 0.960 | 2.500 | 1.375 |
| | 1.375 | 1-14 | 1 1/4-12 | 1-14 | 1.625 | 2.000 | 0.625 | 1.125 | 1.313 | 3.250 | 1.625 |
| 6" | 1.375 | 1-14 | 1 1/4-12 | 1-14 | 1.625 | 2.000 | 0.625 | 1.125 | 1.313 | 3.250 | 1.625 |
| | 1.750 | 1 1/4-12 | 1 1/2-12 | 1 1/4-12 | 2.000 | 2.375 | 0.750 | 1.500 | 1.688 | 3.875 | 1.875 |

Male Coupling Rod End



U = Male Coupling Rod End Standard Rod Diameter
V = Male Coupling Rod End Oversized Rod Diameter

Dimensions

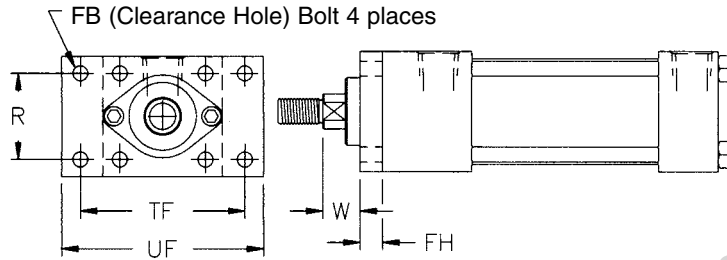
| BORE | ROD | AC | AD | AE | AF | LAF |
|--------------------|--------|-------|-------|-------|-------|-------|
| 1-1/2", 2", 2-1/2" | 5/8" | 1.125 | 0.625 | 0.250 | 0.375 | 1.750 |
| | 1" | 1.625 | 0.938 | 0.375 | 0.688 | 2.500 |
| 3-1/4", 4", 5" | 1" | 1.500 | 0.938 | 0.375 | 0.688 | 2.375 |
| | 1 3/8" | 1.750 | 1.062 | 0.375 | 0.875 | 2.750 |
| 6" | 1 3/8" | 1.750 | 1.062 | 0.375 | 0.875 | 2.750 |
| | 1 3/4" | 2.000 | 1.313 | 0.500 | 1.125 | 3.125 |



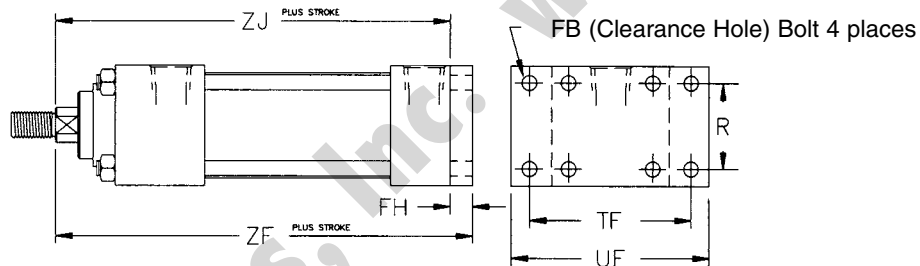
A Series
NFPA Interchangeable

NUMATICS®

Flange Mounts



Mount Code F1 NFPA MF1



Mount Code F2 NFPA MF2

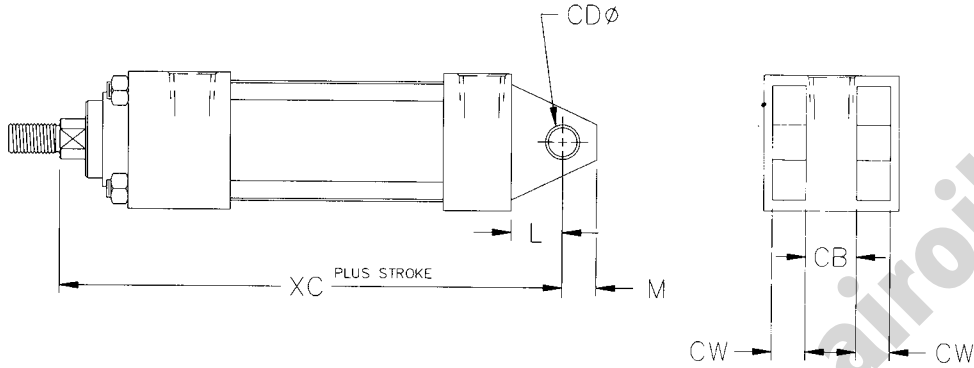
NOTE: This drawing represents 1-1/2" through 2-1/2" bore rod bushing retainer configuration.

Dimensions

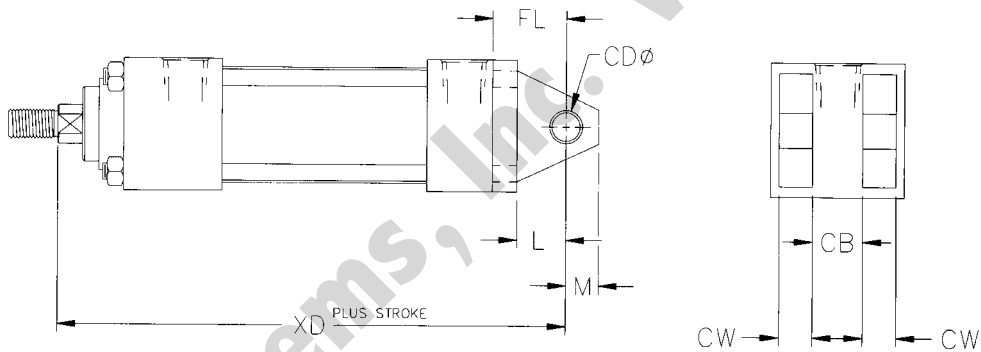
| BORE | ROD | FB | FH | R | TF | UF | W | ZJ | ZF |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 0.313 | 0.375 | 1.430 | 2.750 | 3.375 | 0.625 | 4.625 | 5.000 |
| | 1.000 | 0.313 | 0.375 | 1.430 | 2.750 | 3.375 | 1.000 | 5.000 | 5.375 |
| 2" | 0.625 | 0.375 | 0.375 | 1.840 | 3.375 | 4.125 | 0.625 | 4.625 | 5.000 |
| | 1.000 | 0.375 | 0.375 | 1.840 | 3.375 | 4.125 | 1.000 | 5.000 | 5.375 |
| 2-1/2" | 0.625 | 0.375 | 0.375 | 2.190 | 3.875 | 4.625 | 0.625 | 4.750 | 5.125 |
| | 1.000 | 0.375 | 0.375 | 2.190 | 3.875 | 4.625 | 1.000 | 5.125 | 5.500 |
| 3-1/4" | 1.000 | 0.438 | 0.625 | 2.760 | 4.688 | 5.500 | 0.750 | 5.625 | 6.250 |
| | 1.375 | 0.438 | 0.625 | 2.760 | 4.688 | 5.500 | 1.000 | 5.875 | 6.500 |
| 4" | 1.000 | 0.438 | 0.625 | 3.320 | 5.438 | 6.250 | 0.750 | 5.625 | 6.250 |
| | 1.375 | 0.438 | 0.625 | 3.320 | 5.438 | 6.250 | 1.000 | 5.875 | 6.500 |
| 5" | 1.000 | 0.563 | 0.625 | 4.100 | 6.625 | 7.625 | 0.750 | 5.875 | 6.500 |
| | 1.375 | 0.563 | 0.625 | 4.100 | 6.625 | 7.625 | 1.000 | 6.125 | 6.750 |
| 6" | 1.375 | 0.563 | 0.750 | 4.880 | 7.625 | 8.625 | 0.875 | 6.625 | 7.375 |
| | 1.750 | 0.563 | 0.750 | 4.880 | 7.625 | 8.625 | 1.125 | 6.875 | 7.625 |



Clevis Mounts



Mount Code P1 NFPA MP1



Mount Code P2 NFPA MP2

Dimensions

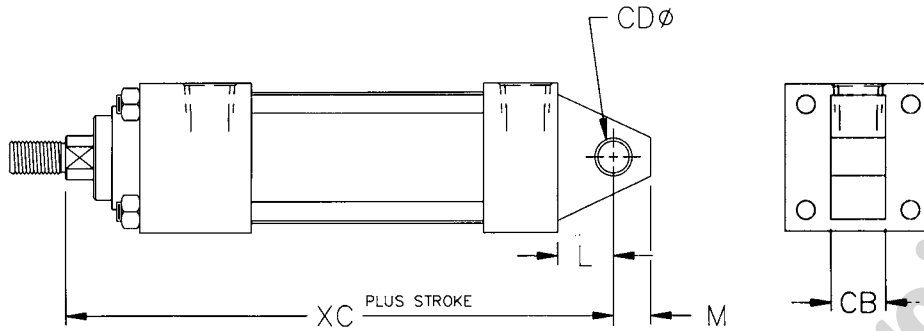
| BORE | ROD | CB | CD | CW | FL | L | M | XC | XD |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 0.750 | 0.500 | 0.500 | 1.125 | 0.750 | 0.500 | 5.375 | 5.750 |
| | 1.000 | 0.750 | 0.500 | 0.500 | 1.125 | 0.750 | 0.500 | 5.750 | 6.125 |
| 2" | 0.625 | 0.750 | 0.500 | 0.500 | 1.125 | 0.750 | 0.500 | 5.375 | 5.750 |
| | 1.000 | 0.750 | 0.500 | 0.500 | 1.125 | 0.750 | 0.500 | 5.750 | 6.125 |
| 2-1/2" | 0.625 | 0.750 | 0.500 | 0.500 | 1.125 | 0.750 | 0.500 | 5.500 | 5.875 |
| | 1.000 | 0.750 | 0.500 | 0.500 | 1.125 | 0.750 | 0.500 | 5.875 | 6.250 |
| 3-1/4" | 1.000 | 1.250 | 0.750 | 0.625 | 1.875 | 1.250 | 0.750 | 6.875 | 7.500 |
| | 1.375 | 1.250 | 0.750 | 0.625 | 1.875 | 1.250 | 0.750 | 7.125 | 7.750 |
| 4" | 1.000 | 1.250 | 0.750 | 0.625 | 1.875 | 1.250 | 0.750 | 6.875 | 7.500 |
| | 1.375 | 1.250 | 0.750 | 0.625 | 1.875 | 1.250 | 0.750 | 7.125 | 7.750 |
| 5" | 1.000 | 1.250 | 0.750 | 0.625 | 1.875 | 1.250 | 0.750 | 7.125 | 7.750 |
| | 1.375 | 1.250 | 0.750 | 0.625 | 1.875 | 1.250 | 0.750 | 7.375 | 8.000 |
| 6" | 1.375 | 1.500 | 1.000 | 0.750 | 2.250 | 1.500 | 1.000 | 8.125 | 8.875 |
| | 1.750 | 1.500 | 1.000 | 0.750 | 2.250 | 1.500 | 1.000 | 8.375 | 9.125 |



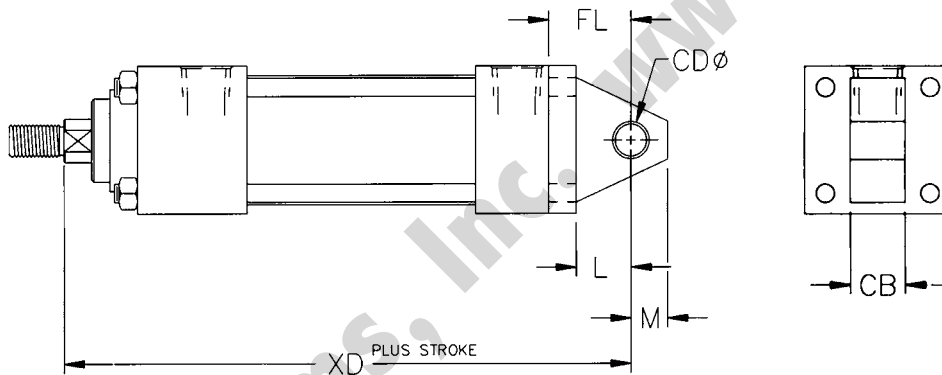
A Series NFPA Interchangeable

NUMATICS®

Eye Mounts



Mount Code P3 NFPA MP3



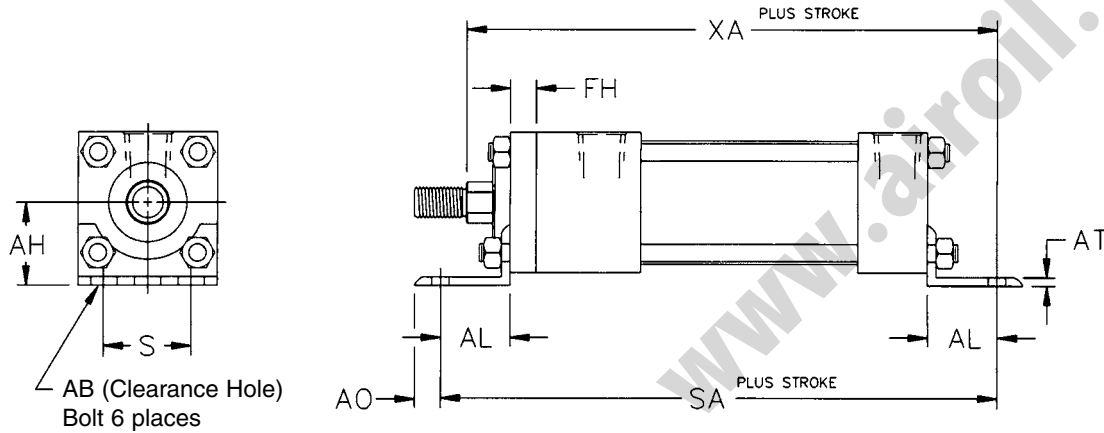
Mount Code P4 NFPA MP4

Dimensions

| BORE | ROD | CB | CD | FL | L | M | XC | XD |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 0.750 | 0.500 | 1.125 | 0.750 | 0.500 | 5.375 | 5.750 |
| | 1.000 | 0.750 | 0.500 | 1.125 | 0.750 | 0.500 | 5.750 | 6.125 |
| 2" | 0.625 | 0.750 | 0.500 | 1.125 | 0.750 | 0.500 | 5.375 | 5.750 |
| | 1.000 | 0.750 | 0.500 | 1.125 | 0.750 | 0.500 | 5.750 | 6.125 |
| 2-1/2" | 0.625 | 0.750 | 0.500 | 1.125 | 0.750 | 0.500 | 5.500 | 5.875 |
| | 1.000 | 0.750 | 0.500 | 1.125 | 0.750 | 0.500 | 5.875 | 6.250 |
| 3-1/4" | 1.000 | 1.250 | 0.750 | 1.875 | 1.250 | 0.750 | 6.875 | 7.500 |
| | 1.375 | 1.250 | 0.750 | 1.875 | 1.250 | 0.750 | 7.125 | 7.750 |
| 4" | 1.000 | 1.250 | 0.750 | 1.875 | 1.250 | 0.750 | 6.875 | 7.500 |
| | 1.375 | 1.250 | 0.750 | 1.875 | 1.250 | 0.750 | 7.125 | 7.750 |
| 5" | 1.000 | 1.250 | 0.750 | 1.875 | 1.250 | 0.750 | 7.125 | 7.750 |
| | 1.375 | 1.250 | 0.750 | 1.875 | 1.250 | 0.750 | 7.375 | 8.000 |
| 6" | 1.375 | 1.500 | 1.000 | 2.250 | 1.500 | 1.000 | 8.125 | 8.875 |
| | 1.750 | 1.500 | 1.000 | 2.250 | 1.500 | 1.000 | 8.375 | 9.125 |



Angle Mount



Mount Code S1 NFPA MS1

Dimensions

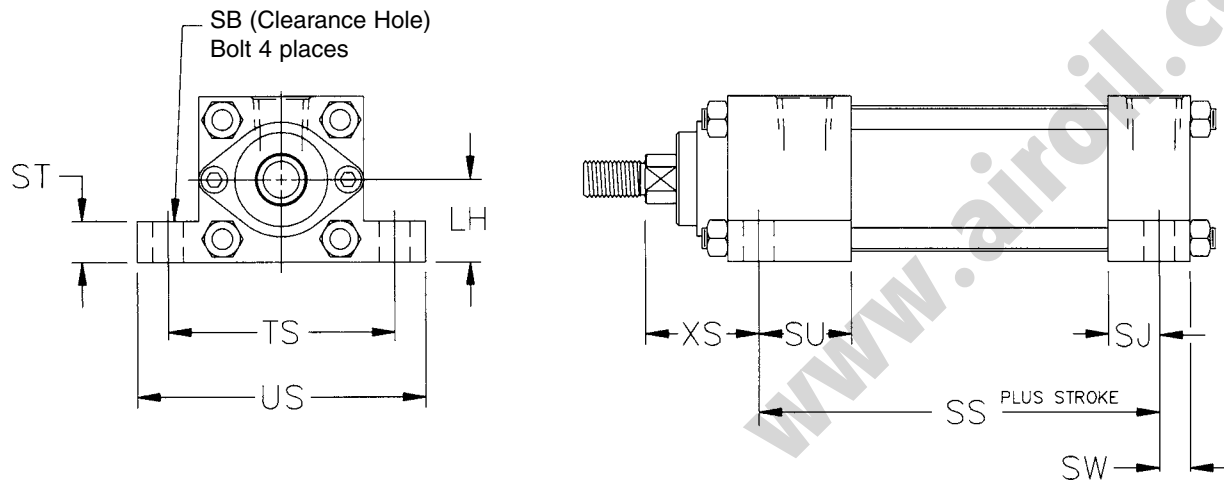
| BORE | ROD | AB | AH | AL | AO | AT | FH | S | SA | XA |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 0.375 | 1.188 | 1.000 | 0.375 | 0.125 | 0.375 | 1.250 | 6.000 | 5.625 |
| | 1.000 | 0.375 | 1.188 | 1.000 | 0.375 | 0.125 | 0.375 | 1.250 | 6.000 | 6.000 |
| 2" | 0.625 | 0.375 | 1.438 | 1.000 | 0.375 | 0.125 | 0.375 | 1.750 | 6.000 | 5.625 |
| | 1.000 | 0.375 | 1.438 | 1.000 | 0.375 | 0.125 | 0.375 | 1.750 | 6.000 | 6.000 |
| 2-1/2" | 0.625 | 0.375 | 1.625 | 1.000 | 0.375 | 0.125 | 0.375 | 2.250 | 6.125 | 5.750 |
| | 1.000 | 0.375 | 1.625 | 1.000 | 0.375 | 0.125 | 0.375 | 2.250 | 6.125 | 6.125 |
| 3-1/4" | 1.000 | 0.500 | 1.938 | 1.250 | 0.500 | 0.125 | 0.625 | 2.750 | 7.375 | 6.875 |
| | 1.375 | 0.500 | 1.938 | 1.250 | 0.500 | 0.125 | 0.625 | 2.750 | 7.375 | 7.125 |
| 4" | 1.000 | 0.500 | 2.250 | 1.250 | 0.500 | 0.125 | 0.625 | 3.500 | 7.375 | 6.875 |
| | 1.375 | 0.500 | 2.250 | 1.250 | 0.500 | 0.125 | 0.625 | 3.500 | 7.375 | 7.125 |
| 5" | 1.000 | 0.625 | 2.750 | 1.375 | 0.625 | 0.188 | 0.625 | 4.250 | 7.875 | 7.250 |
| | 1.375 | 0.625 | 2.750 | 1.375 | 0.625 | 0.188 | 0.625 | 4.250 | 7.875 | 7.500 |
| 6" | 1.375 | 0.750 | 3.250 | 1.375 | 0.625 | 0.188 | 0.750 | 5.250 | 8.500 | 8.000 |
| | 1.750 | 0.750 | 3.250 | 1.375 | 0.625 | 0.188 | 0.750 | 5.250 | 8.500 | 8.250 |



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Side Lug Mount



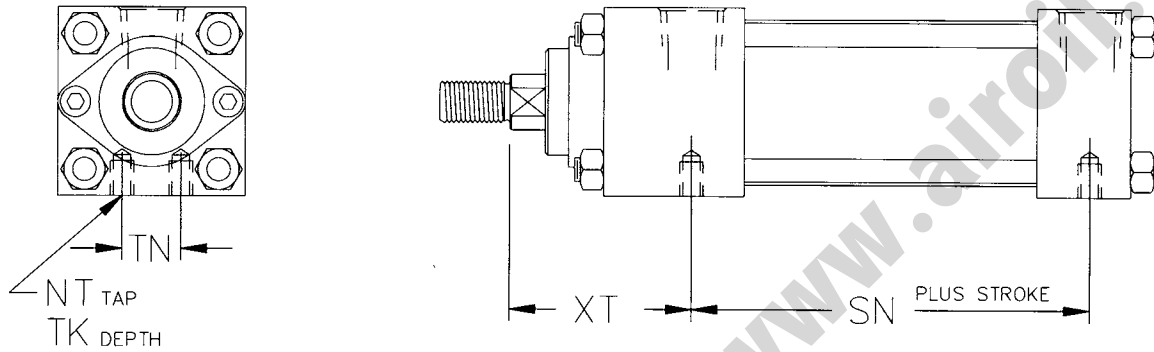
Mount Code S2 NFPA MS2

Dimensions

| BORE | ROD | LH | SB | SJ | SS | ST | SU | SW | TS | US | XS |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 1.000 | 0.375 | 0.625 | 2.875 | 0.500 | 1.125 | 0.375 | 2.750 | 3.500 | 1.375 |
| | 1.000 | 1.000 | 0.375 | 0.625 | 2.875 | 0.500 | 1.125 | 0.375 | 2.750 | 3.500 | 1.750 |
| 2" | 0.625 | 1.250 | 0.375 | 0.625 | 2.875 | 0.500 | 1.125 | 0.375 | 3.250 | 4.000 | 1.375 |
| | 1.000 | 1.250 | 0.375 | 0.625 | 2.875 | 0.500 | 1.125 | 0.375 | 3.250 | 4.000 | 1.750 |
| 2-1/2" | 0.625 | 1.500 | 0.375 | 0.625 | 3.000 | 0.500 | 1.125 | 0.375 | 3.750 | 4.500 | 1.375 |
| | 1.000 | 1.500 | 0.375 | 0.625 | 3.000 | 0.500 | 1.125 | 0.375 | 3.750 | 4.500 | 1.750 |
| 3-1/4" | 1.000 | 1.875 | 0.500 | 0.750 | 3.250 | 0.750 | 1.250 | 0.500 | 4.750 | 5.750 | 1.875 |
| | 1.375 | 1.875 | 0.500 | 0.750 | 3.250 | 0.750 | 1.250 | 0.500 | 4.750 | 5.750 | 2.125 |
| 4" | 1.000 | 2.250 | 0.500 | 0.750 | 3.250 | 0.750 | 1.250 | 0.500 | 5.500 | 6.500 | 1.875 |
| | 1.375 | 2.250 | 0.500 | 0.750 | 3.250 | 0.750 | 1.250 | 0.500 | 5.500 | 6.500 | 2.125 |
| 5" | 1.000 | 2.750 | 0.750 | 0.563 | 3.125 | 1.000 | 1.063 | 0.688 | 6.875 | 8.250 | 2.063 |
| | 1.375 | 2.750 | 0.750 | 0.563 | 3.125 | 1.000 | 1.063 | 0.688 | 6.875 | 8.250 | 2.313 |
| 6" | 1.375 | 3.250 | 0.750 | 0.813 | 3.625 | 1.000 | 1.313 | 0.688 | 7.875 | 9.250 | 2.313 |
| | 1.750 | 3.250 | 0.750 | 0.813 | 3.625 | 1.000 | 1.313 | 0.688 | 7.875 | 9.250 | 2.563 |



Bottom Tap Mount



Mount Code S4 NFPA MS4

Dimensions

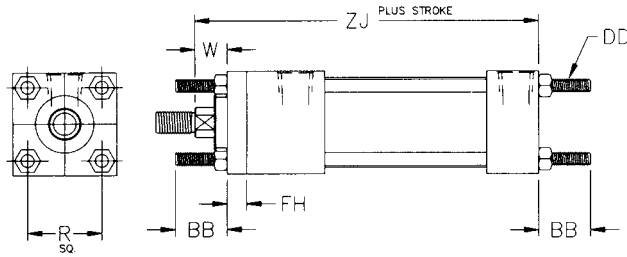
| BORE | ROD | NT | TK | TN | SN | XT |
|--------|-------|---------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 1/4-20 | 0.375 | 0.625 | 2.250 | 1.938 |
| | 1.000 | 1/4-20 | 0.313 | 0.625 | 2.250 | 2.313 |
| 2" | 0.625 | 5/16-18 | 0.500 | 0.875 | 2.250 | 1.938 |
| | 1.000 | 5/16-18 | 0.500 | 0.875 | 2.250 | 2.313 |
| 2-1/2" | 0.625 | 3/8-16 | 0.625 | 1.250 | 2.375 | 1.938 |
| | 1.000 | 3/8-16 | 0.625 | 1.250 | 2.375 | 2.313 |
| 3-1/4" | 1.000 | 1/2-13 | 0.750 | 1.500 | 2.625 | 2.438 |
| | 1.375 | 1/2-13 | 0.750 | 1.500 | 2.625 | 2.688 |
| 4" | 1.000 | 1/2-13 | 0.750 | 2.063 | 2.625 | 2.438 |
| | 1.375 | 1/2-13 | 0.750 | 2.063 | 2.625 | 2.688 |
| 5" | 1.000 | 5/8-11 | 1.000 | 2.688 | 2.875 | 2.438 |
| | 1.375 | 5/8-11 | 1.000 | 2.688 | 2.875 | 2.688 |
| 6" | 1.375 | 3/4-10 | 1.125 | 3.250 | 3.125 | 2.813 |
| | 1.750 | 3/4-10 | 1.125 | 3.250 | 3.125 | 3.063 |



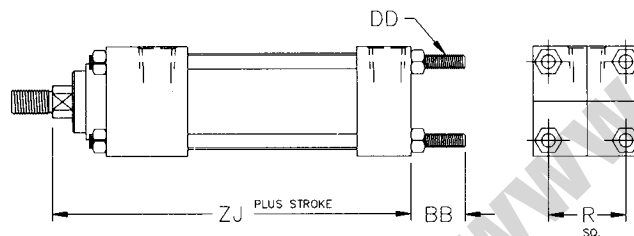
A Series NFPA Interchangeable

NUMATICS®

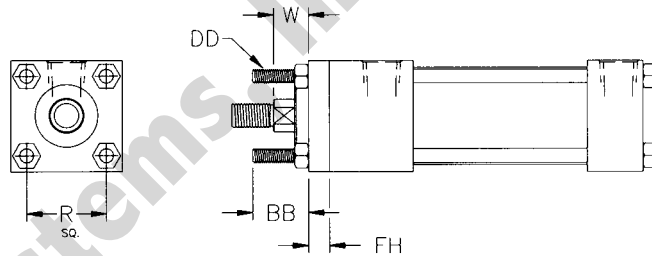
Extended Tie Rod Mounts



Mount Code X1 NFPA MX1



Mount Code X2 NFPA MX2



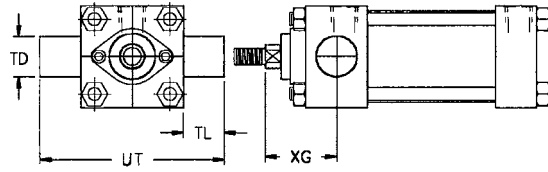
Mount Code X3 NFPA MX3

Dimensions

| BORE | ROD | BB | DD | FH | R | W | ZJ |
|--------|-------|-------|---------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 1.000 | 1/4-28 | 0.375 | 1.430 | 0.625 | 4.625 |
| | 1.000 | 1.000 | 1/4-28 | 0.375 | 1.430 | 1.000 | 5.000 |
| 2" | 0.625 | 1.125 | 5/16-24 | 0.375 | 1.840 | 0.625 | 4.625 |
| | 1.000 | 1.125 | 5/16-24 | 0.375 | 1.840 | 1.000 | 5.000 |
| 2-1/2" | 0.625 | 1.125 | 5/16-24 | 0.375 | 2.190 | 0.625 | 4.750 |
| | 1.000 | 1.125 | 5/16-24 | 0.375 | 2.190 | 1.000 | 5.125 |
| 3-1/4" | 1.000 | 1.375 | 3/8-24 | 0.625 | 2.760 | 0.750 | 5.625 |
| | 1.375 | 1.375 | 3/8-24 | 0.625 | 2.760 | 1.000 | 5.875 |
| 4" | 1.000 | 1.375 | 3/8-24 | 0.625 | 3.320 | 0.750 | 5.625 |
| | 1.375 | 1.375 | 3/8-24 | 0.625 | 3.320 | 1.000 | 5.875 |
| 5" | 1.000 | 1.813 | 1/2-20 | 0.625 | 4.100 | 0.750 | 5.875 |
| | 1.375 | 1.813 | 1/2-20 | 0.625 | 4.100 | 1.000 | 6.125 |
| 6" | 1.375 | 1.813 | 1/2-20 | 0.750 | 4.880 | 0.875 | 6.625 |
| | 1.750 | 1.813 | 1/2-20 | 0.750 | 4.880 | 1.125 | 6.875 |

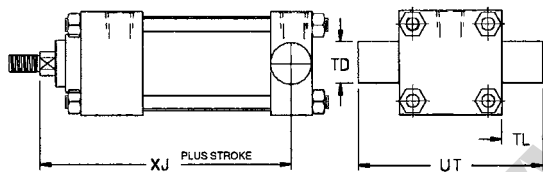


Trunnion Mounts



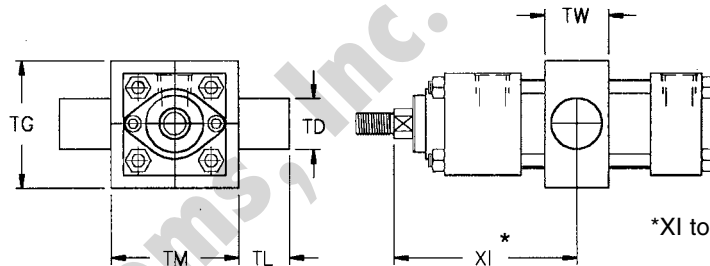
Mount Code T1 (Fixed Steel Trunnion Ears)
Mount Code T6 (Removable Aluminum Trunnion Ears)

NFPA MT1



Mount Code T2 (Fixed Steel Trunnion Ears)
Mount Code T7 (Removable Aluminum Trunnion Ears)

NFPA MT2



*XI to be specified by customer

Mount Code T4

NFPA MT4

Dimensions

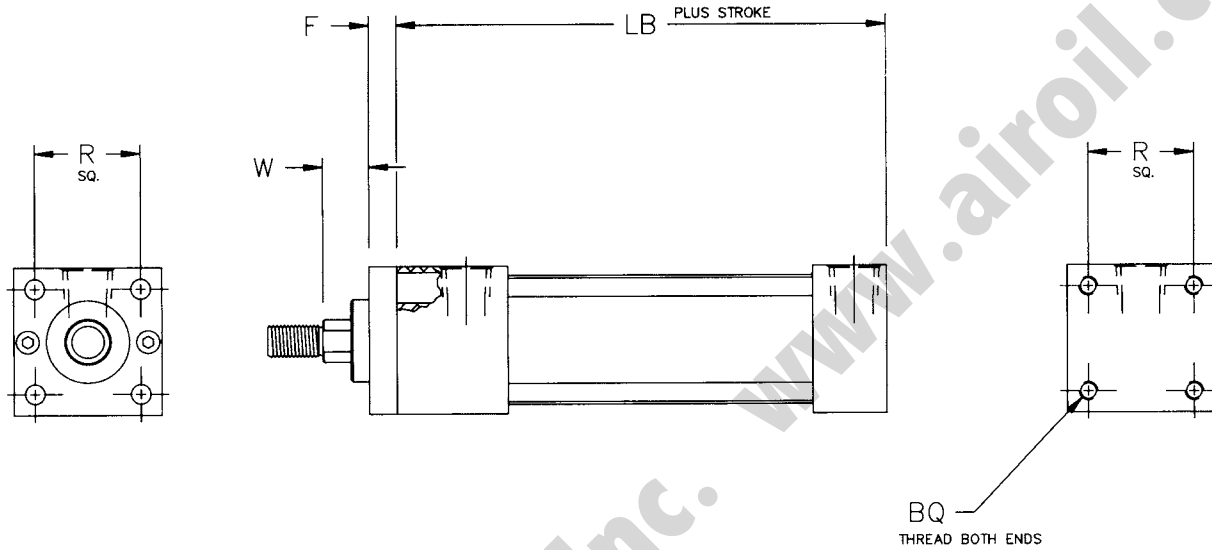
| BORE | ROD | TD | TG | TL | TM | TW | UT | XG | XI (Min.) | XJ |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|-------|
| 1-1/2" | 0.625 | 1.000 | 2.500 | 1.000 | 2.500 | 1.250 | 4.000 | 1.750 | 3.125 | 4.125 |
| | 1.000 | 1.000 | 2.500 | 1.000 | 2.500 | 1.250 | 4.000 | 2.125 | 3.500 | 4.500 |
| 2" | 0.625 | 1.000 | 3.000 | 1.000 | 3.000 | 1.500 | 4.500 | 1.750 | 3.250 | 4.125 |
| | 1.000 | 1.000 | 3.000 | 1.000 | 3.000 | 1.500 | 4.500 | 2.125 | 3.625 | 4.500 |
| 2-1/2" | 0.625 | 1.000 | 3.500 | 1.000 | 3.500 | 1.500 | 5.000 | 1.750 | 3.250 | 4.250 |
| | 1.000 | 1.000 | 3.500 | 1.000 | 3.500 | 1.500 | 5.000 | 2.125 | 3.625 | 4.625 |
| 3-1/4" | 1.000 | 1.000 | 4.250 | 1.000 | 4.500 | 2.000 | 5.750 | 2.250 | 4.125 | 5.000 |
| | 1.375 | 1.000 | 4.250 | 1.000 | 4.500 | 2.000 | 5.750 | 2.500 | 4.375 | 5.250 |
| 4" | 1.000 | 1.000 | 5.000 | 1.000 | 5.250 | 2.000 | 6.500 | 2.250 | 4.125 | 5.000 |
| | 1.375 | 1.000 | 5.000 | 1.000 | 5.250 | 2.000 | 6.500 | 2.500 | 4.375 | 5.250 |
| 5" | 1.000 | 1.000 | 6.000 | 1.000 | 6.250 | 2.000 | 7.500 | 2.250 | 4.125 | 5.250 |
| | 1.375 | 1.000 | 6.000 | 1.000 | 6.250 | 2.000 | 7.500 | 2.500 | 4.375 | 5.500 |
| 6" | 1.375 | 1.375 | 7.000 | 1.375 | 7.625 | 2.500 | 9.250 | 2.625 | 4.875 | 5.875 |
| | 1.750 | 1.375 | 7.000 | 1.375 | 7.625 | 2.500 | 9.250 | 2.875 | 5.125 | 6.125 |



A Series
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NUMATICS®

Sleeve Nut Mount



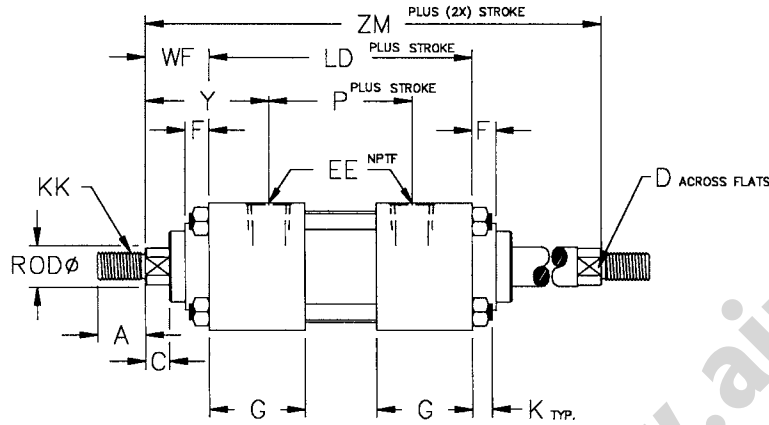
Mount Code SN

Dimensions

| BORE | ROD | BQ | F | LB | R | W |
|--------|-------|---------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 1/4-28 | 0.375 | 3.625 | 1.430 | 0.625 |
| | 1.000 | 1/4-28 | 0.375 | 3.625 | 1.430 | 1.000 |
| 2" | 0.625 | 5/16-24 | 0.375 | 3.625 | 1.840 | 0.625 |
| | 1.000 | 5/16-24 | 0.375 | 3.625 | 1.840 | 1.000 |
| 2-1/2" | 0.625 | 5/16-24 | 0.375 | 3.750 | 2.190 | 0.750 |
| | 1.000 | 5/16-24 | 0.375 | 3.750 | 2.190 | 1.000 |
| 3-1/4" | 1.000 | 3/8-24 | 0.625 | 4.250 | 2.760 | 0.750 |
| | 1.375 | 3/8-24 | 0.625 | 4.250 | 2.760 | 1.000 |
| 4" | 1.000 | 3/8-24 | 0.625 | 4.250 | 3.320 | 0.750 |
| | 1.375 | 3/8-24 | 0.625 | 4.250 | 3.320 | 1.000 |
| 5" | 1.000 | 1/2-20 | 0.625 | 4.500 | 4.100 | 0.750 |
| | 1.375 | 1/2-20 | 0.625 | 4.500 | 4.100 | 1.000 |
| 6" | 1.375 | 1/2-20 | 0.625 | 5.000 | 4.880 | 0.875 |
| | 1.750 | 1/2-20 | 0.750 | 5.000 | 4.880 | 1.125 |

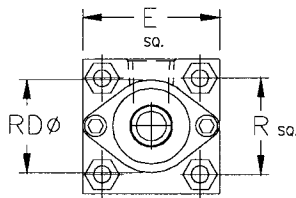


Double Rod End

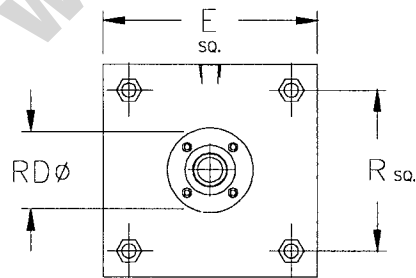


Order as "DA" Option

NFPA MDXO



1 1/2" Through 2 1/2"



3 1/4" Through 6"

Dimensions

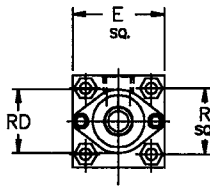
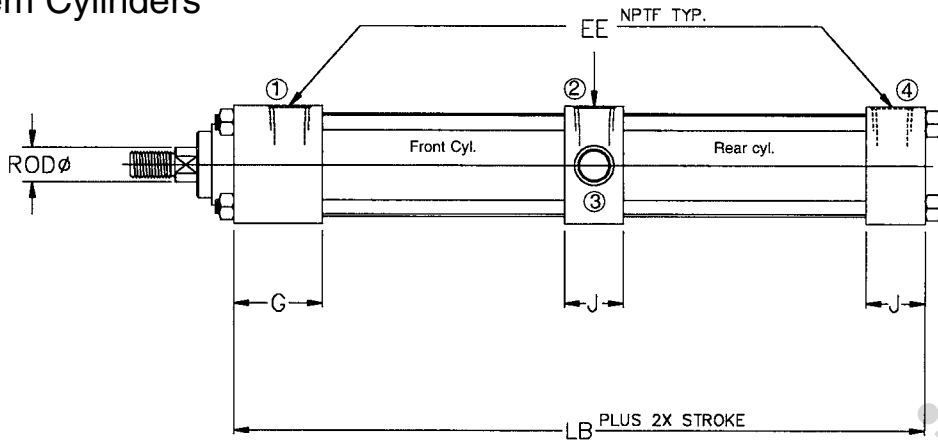
| BORE | ROD | A | C | D | E | EE | F | G | K | KK | LD | P | R | SN | SS | RD | WF | Y | ZM |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 0.750 | 0.375 | 0.500 | 2.000 | 0.375 | 0.375 | 1.500 | 0.250 | 7/16-20 | 4.125 | 2.250 | 1.430 | 2.250 | 3.375 | 1.375 | 1.000 | 1.938 | 6.125 |
| | 1.000 | 1.125 | 0.500 | 0.813 | 2.000 | 0.250 | 0.375 | 1.500 | 0.250 | 3/4-16 | 4.125 | 1.955 | 1.430 | 2.250 | 3.375 | 2.000 | 1.375 | 2.460 | 6.875 |
| 2" | 0.625 | 0.750 | 0.375 | 0.500 | 2.500 | 0.375 | 0.375 | 1.500 | 0.313 | 7/16-20 | 4.125 | 2.250 | 1.840 | 2.250 | 3.375 | 1.375 | 1.000 | 1.938 | 6.125 |
| | 1.000 | 1.125 | 0.500 | 0.813 | 2.500 | 0.375 | 0.375 | 1.500 | 0.313 | 3/4-16 | 4.125 | 2.250 | 1.840 | 2.250 | 3.375 | 2.500 | 1.375 | 2.313 | 6.875 |
| 2-1/2" | 0.625 | 0.750 | 0.375 | 0.500 | 3.000 | 0.375 | 0.375 | 1.500 | 0.313 | 7/16-20 | 4.250 | 2.375 | 2.190 | 2.375 | 3.500 | 1.375 | 1.000 | 1.938 | 6.250 |
| | 1.000 | 1.125 | 0.500 | 0.813 | 3.000 | 0.375 | 0.375 | 1.500 | 0.313 | 3/4-16 | 4.250 | 2.375 | 2.190 | 2.375 | 3.500 | 3.000 | 1.375 | 2.313 | 7.000 |
| 3-1/4" | 1.000 | 1.125 | 0.500 | 0.813 | 3.750 | 0.500 | 0.625 | 1.750 | 0.375 | 3/4-16 | 4.750 | 2.625 | 2.760 | 2.625 | 3.750 | 2.706 | 1.375 | 2.438 | 7.500 |
| | 1.375 | 1.625 | 0.625 | 1.125 | 3.750 | 0.500 | 0.625 | 1.750 | 0.375 | 1-14 | 4.750 | 2.625 | 2.760 | 2.625 | 3.750 | 3.125 | 1.625 | 2.688 | 8.000 |
| 4" | 1.000 | 1.125 | 0.500 | 0.813 | 4.500 | 0.500 | 0.625 | 1.750 | 0.375 | 3/4-16 | 4.750 | 2.625 | 3.320 | 2.625 | 3.750 | 2.706 | 1.375 | 2.438 | 7.500 |
| | 1.375 | 1.625 | 0.625 | 1.125 | 4.500 | 0.500 | 0.625 | 1.750 | 0.375 | 1-14 | 4.750 | 2.625 | 3.320 | 2.625 | 3.750 | 3.125 | 1.625 | 2.688 | 8.000 |
| 5" | 1.000 | 1.125 | 0.500 | 0.813 | 5.500 | 0.500 | 0.625 | 1.750 | 0.500 | 3/4-16 | 5.000 | 2.875 | 4.100 | 2.875 | 3.625 | 2.706 | 1.375 | 2.438 | 7.750 |
| | 1.375 | 1.625 | 0.625 | 1.125 | 5.500 | 0.500 | 0.625 | 1.750 | 0.500 | 1-14 | 5.000 | 2.875 | 4.100 | 2.875 | 3.625 | 3.125 | 1.625 | 2.688 | 8.250 |
| 6" | 1.375 | 1.625 | 0.625 | 1.125 | 6.500 | 0.750 | 0.625 | 2.000 | 0.500 | 1-14 | 5.500 | 3.125 | 4.880 | 3.125 | 4.125 | 3.125 | 1.625 | 2.813 | 8.750 |
| | 1.750 | 2.000 | 0.750 | 1.500 | 6.500 | 0.750 | 0.750 | 2.000 | 0.500 | 1 1/4-12 | 5.500 | 3.125 | 4.880 | 3.125 | 4.125 | 3.788 | 1.875 | 3.063 | 9.250 |



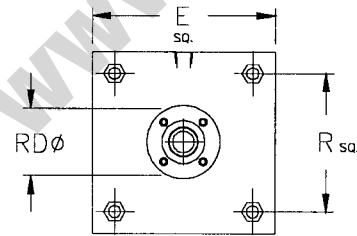
A Series NFPA Interchangeable

NUMATICS®

Tandem Cylinders



1-1/2" Through 2-1/2"



3-1/4" Through 6"

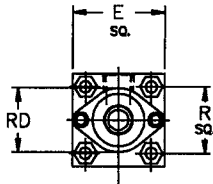
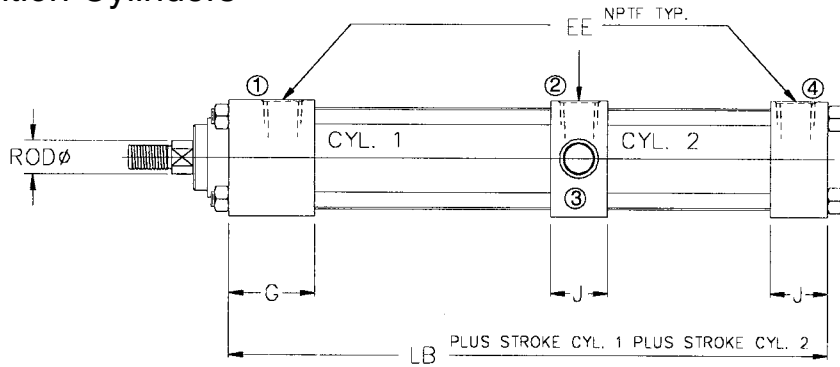
This configuration provides approximately twice the force of an equivalent basic double acting cylinder. Two pistons are attached to a common piston rod. Ports 2 and 4 are pressurized to roughly double the extend force. Ports 1 and 3 are pressurized to double the retract force.

Dimensions

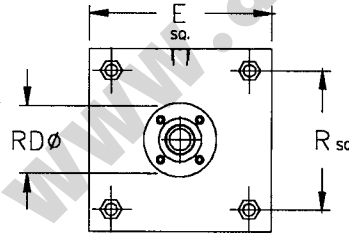
| BORE | ROD | E | EE | G | J | LB | R | RD |
|--------|-------|-------|-----|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 2.000 | 3/8 | 1.500 | 1.000 | 5.750 | 1.430 | 1.375 |
| | 1.000 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 2" | 0.625 | 2.500 | 3/8 | 1.500 | 1.000 | 5.750 | 1.840 | 1.375 |
| | 1.000 | 2.500 | 3/8 | 1.500 | 1.000 | 5.750 | 1.840 | 2.000 |
| 2-1/2" | 0.625 | 3.000 | 3/8 | 1.500 | 1.000 | 6.000 | 2.190 | 1.375 |
| | 1.000 | 3.000 | 3/8 | 1.500 | 1.000 | 6.000 | 2.190 | 3.000 |
| 3-1/4" | 1.000 | 3.750 | 1/2 | 1.750 | 1.250 | 6.750 | 2.760 | 2.706 |
| | 1.375 | 3.750 | 1/2 | 1.750 | 1.250 | 6.750 | 2.760 | 3.125 |
| 4" | 1.000 | 4.500 | 1/2 | 1.750 | 1.250 | 6.750 | 3.320 | 2.706 |
| | 1.375 | 4.500 | 1/2 | 1.750 | 1.250 | 6.750 | 3.320 | 3.125 |
| 5" | 1.000 | 5.500 | 1/2 | 1.750 | 1.250 | 7.250 | 4.100 | 2.706 |
| | 1.375 | 5.500 | 1/2 | 1.750 | 1.250 | 7.250 | 4.100 | 3.125 |
| 6" | 1.375 | 6.500 | 3/4 | 2.000 | 1.500 | 8.000 | 4.880 | 3.125 |
| | 1.750 | 6.500 | 3/4 | 2.000 | 1.500 | 8.000 | 4.880 | 3.788 |



Multi-Position Cylinders



1-1/2" Through 2 1/2"



3-1/4" Through 6"

Multi-position cylinders look similar to tandem cylinders. However, in this cylinder the rear and front piston rods are separate. The stroke from full retract to the intermediate extend point is set by the stroke of cylinder #2. The total stroke from full retract to full extend is set by the stroke cylinder #1. Full extend or retract is achieved by pressurizing ports 2 or 1 respectively with ports 3 and 4 vented. An intermediate position is achieved by pressurizing port 4 with the other ports vented or by pressurizing both ports 1 and 4. With 1 and 4 pressurized, the rod is more positively held in the intermediate position.

Dimensions

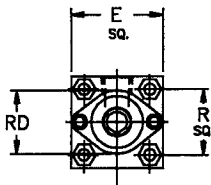
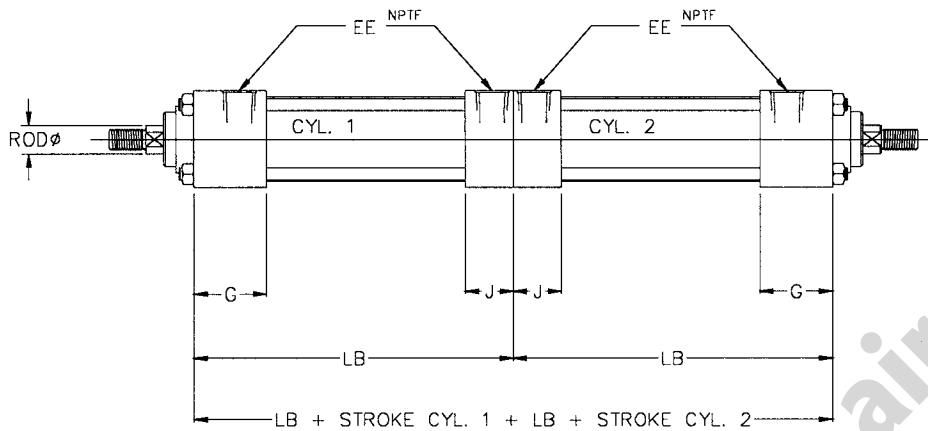
| BORE | ROD | E | EE | G | J | LB | R | RD |
|--------|-------|-------|-----|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 2.000 | 3/8 | 1.50 | 1.00 | 5.750 | 1.430 | 1.375 |
| | 1.000 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 2" | 0.625 | 2.500 | 3/8 | 1.500 | 1.000 | 5.750 | 1.840 | 1.375 |
| | 1.000 | 2.500 | 3/8 | 1.500 | 1.000 | 5.750 | 1.840 | 2.000 |
| 2-1/2" | 0.625 | 3.000 | 3/8 | 1.500 | 1.000 | 6.000 | 2.190 | 1.375 |
| | 1.000 | 3.000 | 3/8 | 1.500 | 1.000 | 6.000 | 2.190 | 3.000 |
| 3-1/4" | 1.000 | 3.750 | 1/2 | 1.750 | 1.250 | 6.750 | 2.760 | 2.706 |
| | 1.375 | 3.750 | 1/2 | 1.750 | 1.250 | 6.750 | 2.760 | 3.125 |
| 4" | 1.000 | 4.500 | 1/2 | 1.750 | 1.250 | 6.750 | 3.320 | 2.706 |
| | 1.375 | 4.500 | 1/2 | 1.750 | 1.250 | 6.750 | 3.320 | 3.125 |
| 5" | 1.000 | 5.500 | 1/2 | 1.750 | 1.250 | 7.250 | 4.100 | 2.706 |
| | 1.375 | 5.500 | 1/2 | 1.750 | 1.250 | 7.250 | 4.100 | 3.125 |
| 6" | 1.375 | 6.500 | 3/4 | 2.000 | 1.500 | 8.000 | 4.880 | 3.125 |
| | 1.750 | 6.500 | 3/4 | 2.000 | 1.500 | 8.000 | 4.880 | 3.788 |



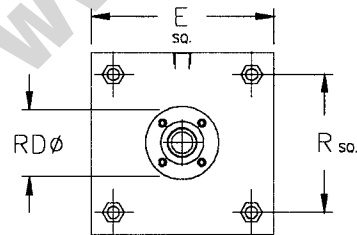
A Series NFPA Interchangeable

NUMATICS®

Back to Back Cylinders



1-1/2" Through 2 1/2"



3-1/4" Through 6"

This configuration is two cylinders mounted back to back. Each cylinder can be operated independently. The cylinders can have the same stroke or different strokes. This configuration enables you to have four combinations of rods extended or retracted.

Dimensions

| BORE | ROD | E | EE | G | J | LB | R | RD |
|--------|-------|-------|-----|-------|-------|-------|-------|-------|
| 1-1/2" | 0.625 | 2.000 | 3/8 | 1.500 | 1.000 | 3.625 | 1.430 | 1.375 |
| | 1.000 | 2.000 | 1/4 | 1.500 | 1.000 | 3.625 | 1.430 | 2.000 |
| 2" | 0.625 | 2.500 | 3/8 | 1.500 | 1.000 | 3.625 | 1.840 | 1.375 |
| | 1.000 | 2.500 | 3/8 | 1.500 | 1.000 | 3.625 | 1.840 | 2.000 |
| 2-1/2" | 0.625 | 3.000 | 3/8 | 1.500 | 1.000 | 3.750 | 2.190 | 1.375 |
| | 1.000 | 3.000 | 3/8 | 1.500 | 1.000 | 3.750 | 2.190 | 3.000 |
| 3-1/4" | 1.000 | 3.750 | 1/2 | 1.750 | 1.250 | 4.250 | 2.760 | 2.706 |
| | 1.375 | 3.750 | 1/2 | 1.750 | 1.250 | 4.250 | 2.760 | 3.125 |
| 4" | 1.000 | 4.500 | 1/2 | 1.750 | 1.250 | 4.250 | 3.320 | 2.706 |
| | 1.375 | 4.500 | 1/2 | 1.750 | 1.250 | 4.250 | 3.320 | 3.125 |
| 5" | 1.000 | 5.500 | 1/2 | 1.750 | 1.250 | 4.500 | 4.100 | 2.706 |
| | 1.375 | 5.500 | 1/2 | 1.750 | 1.250 | 4.500 | 4.100 | 3.125 |
| 6" | 1.375 | 6.500 | 3/4 | 2.000 | 1.500 | 5.000 | 4.880 | 3.125 |
| | 1.750 | 6.500 | 3/4 | 2.000 | 1.500 | 5.000 | 4.880 | 3.788 |



Air-Oil Tanks

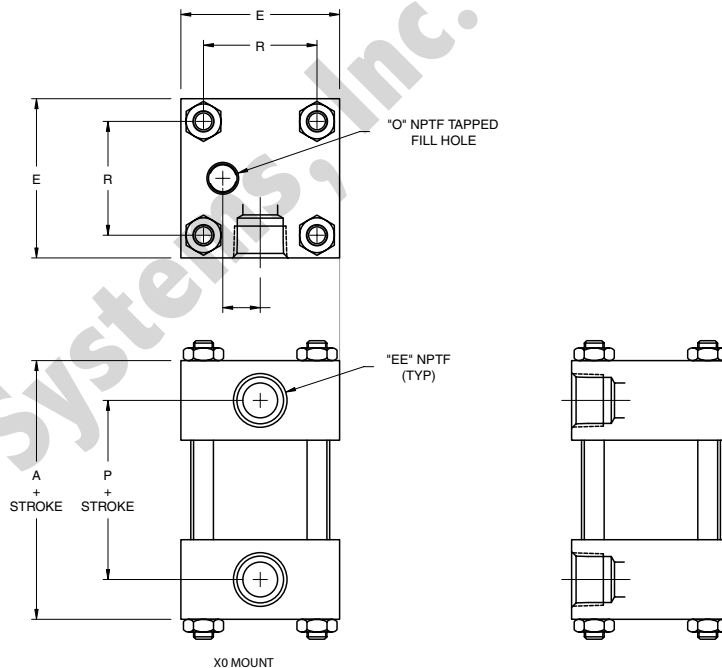
The Numatics Air-Oil Tank offers a way to convert available (shop) air pressure into hydraulic pressure. Compressed air is applied directly to the oil that is in the air-oil tank. In turn, it is converted into hydraulic pressure. Note that the pressure is converted at a 1 to 1 ratio. For example, 90 psi air produces 90 psi hydraulic pressure.

All Numatics Air-Oil Tanks have a sight level gauge, which shows the oil level. They also contain two fluid flow baffles. The top baffle disperses the incoming air over the surface of the oil in an effort to inhibit agitation. The bottom baffle ensures a smooth flow pattern. This will minimize oil turbulence and eliminate swirling. Swirling could cause the oil to be blown from the tank into atmosphere.

Air-Oil Tanks are used to assist in making the piston rod travel smooth and effortless. In turn, preventing unwanted chatter. Air-Oil Tanks are commonly used in slow speed applications. Fluid velocity in or out of the tank through standard ports should be less than 6 feet per second. Again, this will prevent the oil from being blown from the tank into atmosphere. Since each tank is designed for a specific port size, note that increasing the port size in an effort to decrease the fluid velocity is not recommended. Subsequently, a tank with a larger port should be selected.

| BORE | STROKE (IN) | STROKE (IN) | STROKE (IN) | STROKE (IN) | STROKE (IN) | STROKE (IN) |
|--------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| | 4 | 8 | 12 | 16 | 20 | 24 |
| | VOLUME (IN ³) | VOLUME (IN ³) | VOLUME (IN ³) | VOLUME (IN ³) | VOLUME (IN ³) | VOLUME (IN ³) |
| 2" | 12.6 | 25.1 | 37.7 | 50.3 | 62.8 | 75.4 |
| 2-1/2" | 19.6 | 39.3 | 58.9 | 78.5 | 98.2 | 117.8 |
| 3-1/4" | 33.2 | 66.4 | 99.5 | 132.7 | 165.9 | 199.1 |
| 4" | 50.3 | 100.5 | 150.8 | 201.1 | 251.3 | 301.6 |
| 5" | 78.5 | 157.1 | 235.6 | 314.2 | 392.7 | 471.2 |
| 6" | 113.1 | 226.2 | 339.3 | 452.4 | 565.5 | 678.6 |
| 8" | 201.1 | 402.1 | 603.2 | 804.2 | 1005.3 | 1206.4 |

X0 Mount



Dimensions

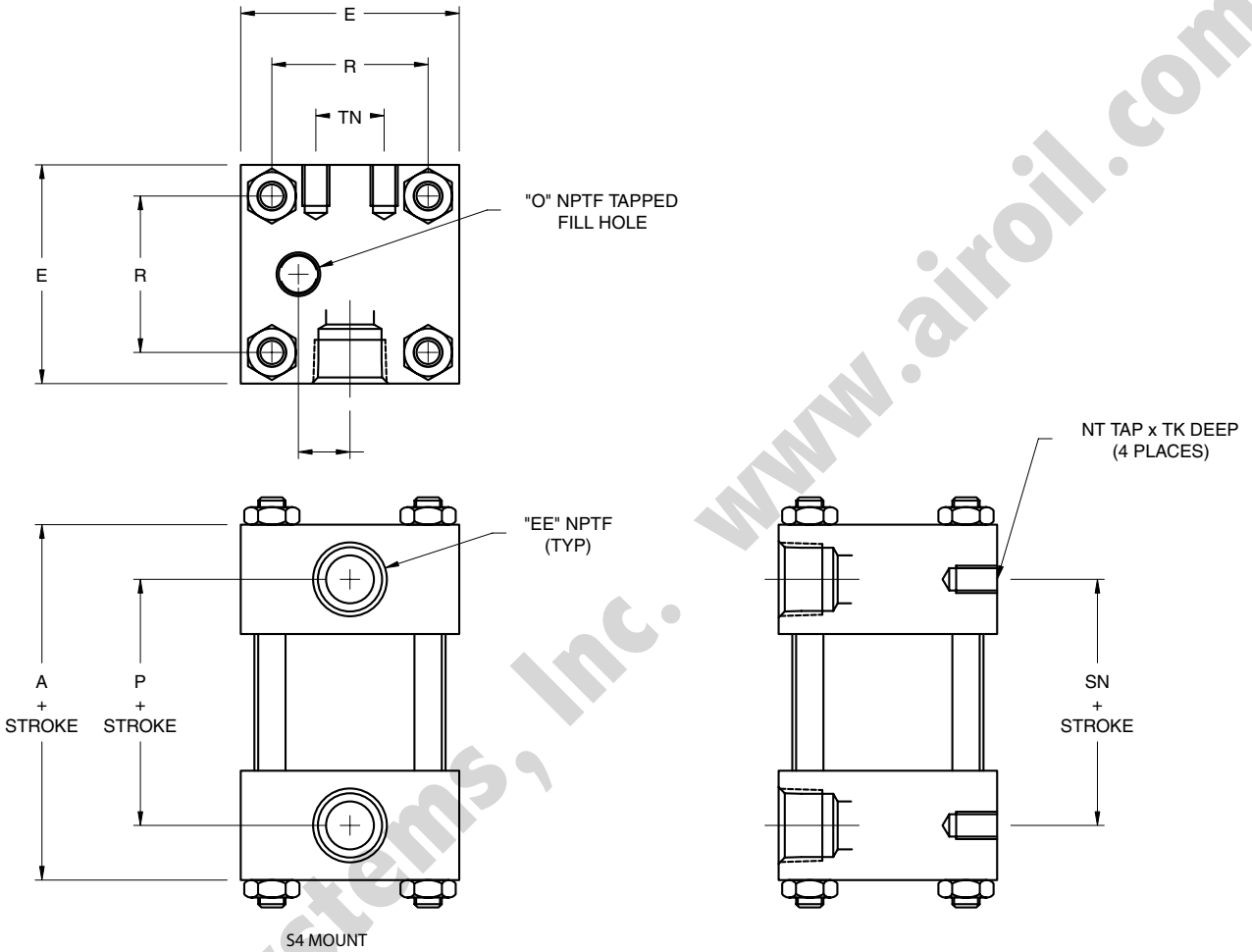
| BORE | A | E | EE | M | O | P | R |
|--------|------|------|-----|------|-----|------|------|
| 2" | 2.00 | 2.50 | 3/8 | 0.56 | 1/4 | 1.12 | 1.84 |
| 2-1/2" | 2.00 | 3.00 | 3/8 | 0.69 | 1/4 | 1.12 | 2.19 |
| 3-1/4" | 2.50 | 3.75 | 1/2 | 0.88 | 3/8 | 1.38 | 2.76 |
| 4" | 2.50 | 4.50 | 1/2 | 0.88 | 3/8 | 1.38 | 3.32 |
| 5" | 2.50 | 5.50 | 1/2 | 1.31 | 3/8 | 1.38 | 4.10 |
| 6" | 3.00 | 6.50 | 1/2 | 1.31 | 3/8 | 1.63 | 4.88 |
| 8" | 3.00 | 8.50 | 3/4 | 2.25 | 1/2 | 1.63 | 6.44 |



A Series Air-Oil Tanks

NUMATICS®

S4 Mount

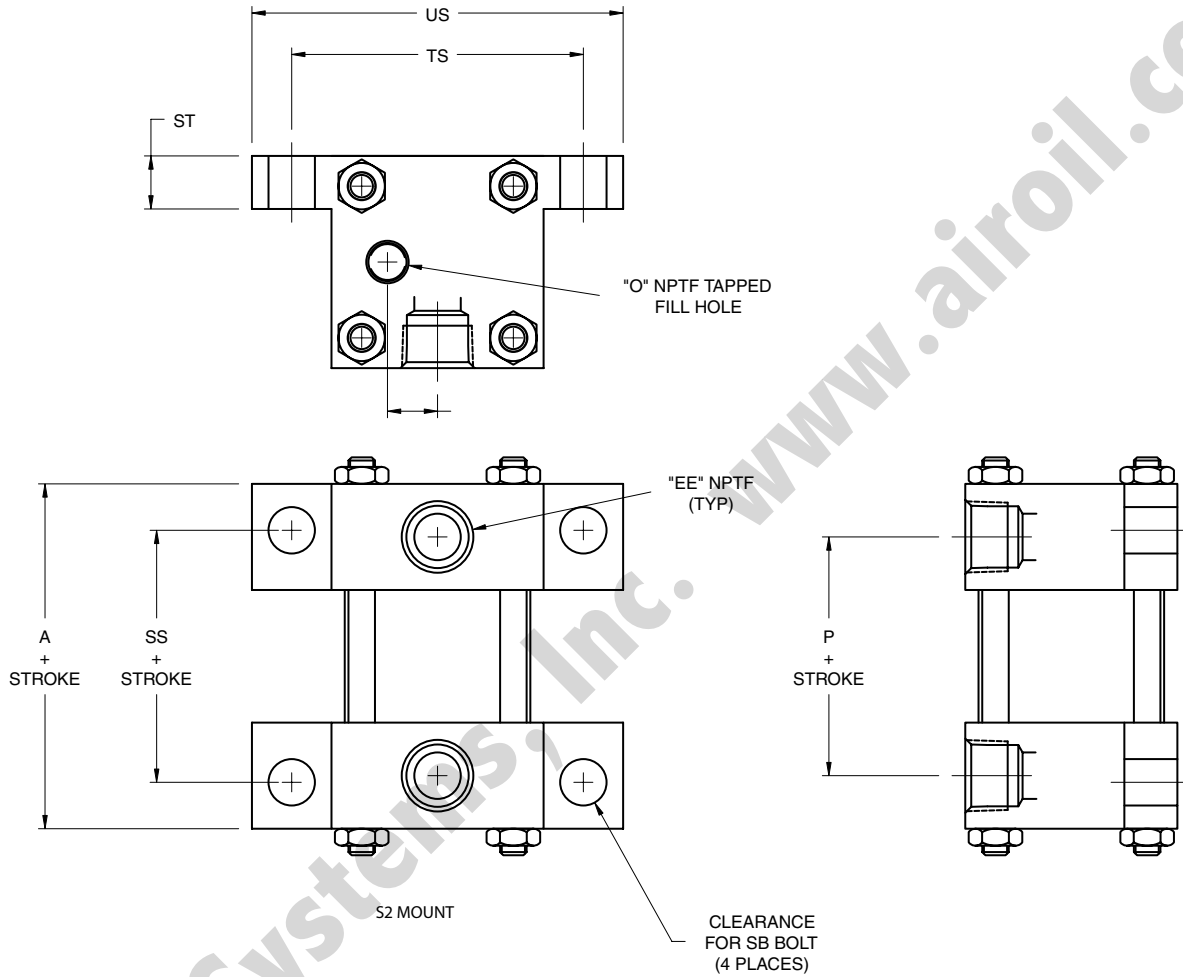


Dimensions

| BORE | A | E | EE | M | O | P | R | NT | SN | TK | TN |
|--------|------|------|-----|------|-----|------|------|----------------|------|------|------|
| 2" | 2.00 | 2.50 | 3/8 | 0.56 | 1/4 | 1.12 | 1.84 | 5/16-18 UNC-2B | 1.13 | 0.28 | 0.88 |
| 2-1/2" | 2.00 | 3.00 | 3/8 | 0.69 | 1/4 | 1.12 | 2.19 | 3/8-16 UNC-2B | 1.13 | 0.28 | 1.25 |
| 3-1/4" | 2.50 | 3.75 | 1/2 | 0.88 | 3/8 | 1.38 | 2.76 | 1/2-13 UNC-2B | 1.37 | 0.25 | 1.50 |
| 4" | 2.50 | 4.50 | 1/2 | 0.88 | 3/8 | 1.38 | 3.32 | 1/2-13 UNC-2B | 1.37 | 0.50 | 2.06 |
| 5" | 2.50 | 5.50 | 1/2 | 1.31 | 3/8 | 1.38 | 4.10 | 5/8-11 UNC-2B | 1.37 | 1.00 | 2.69 |
| 6" | 3.00 | 6.50 | 1/2 | 1.31 | 3/8 | 1.63 | 4.88 | 3/4-10 UNC-2B | 1.63 | 0.94 | 3.25 |
| 8" | 3.00 | 8.50 | 3/4 | 2.25 | 1/2 | 1.63 | 6.44 | 3/4-10 UNC-2B | 1.63 | 0.94 | 4.50 |



S2 Mount



Dimensions

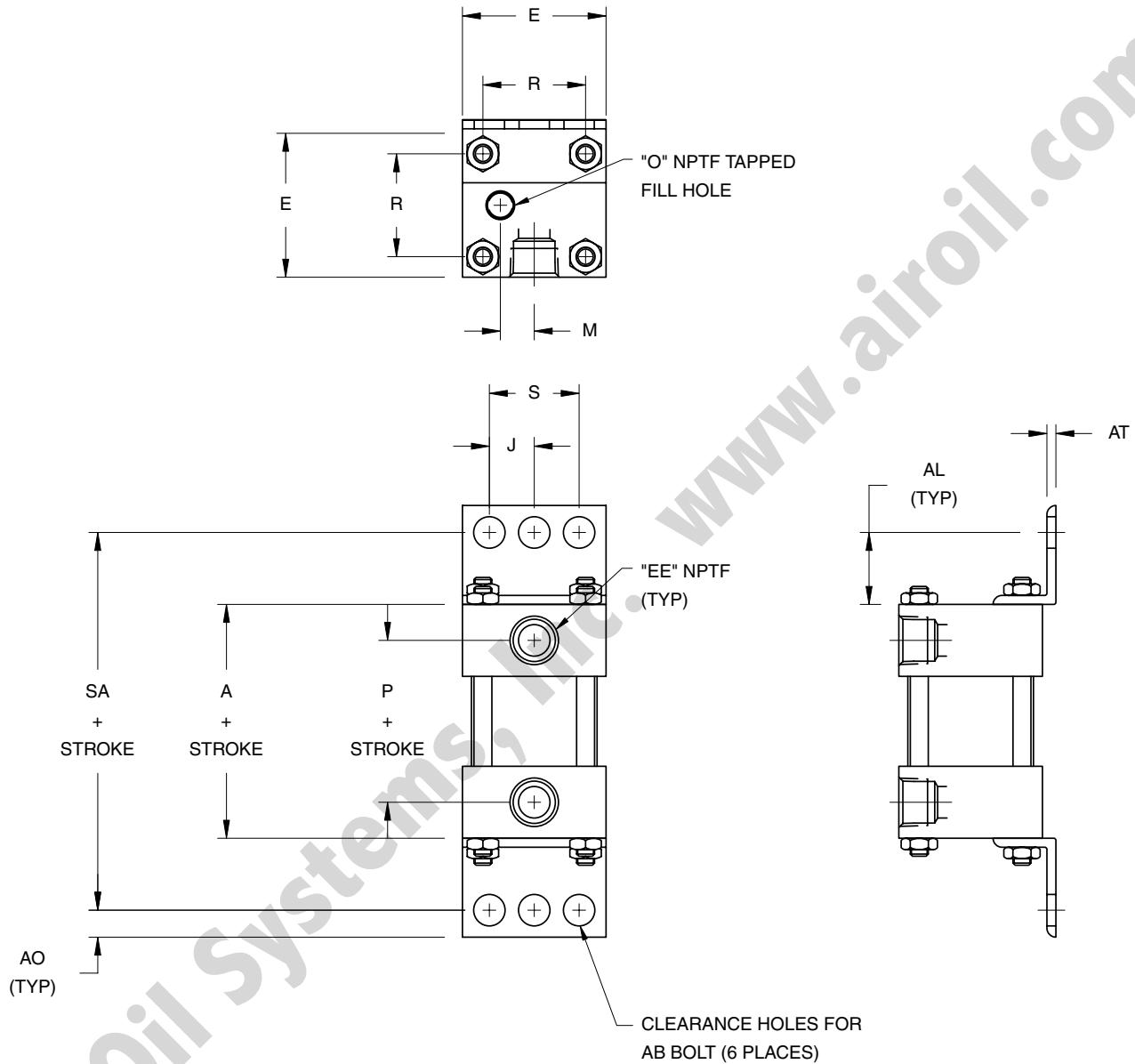
| BORE | A | EE | M | O | P | SB | SS | ST | TS | US |
|--------|------|-----|------|-----|------|-----|------|------|------|-------|
| 2" | 2.00 | 3/8 | 0.56 | 1/4 | 1.12 | 3/8 | 1.13 | 0.50 | 3.25 | 4.00 |
| 2-1/2" | 2.00 | 3/8 | 0.69 | 1/4 | 1.12 | 3/8 | 1.13 | 0.50 | 3.75 | 4.50 |
| 3-1/4" | 2.50 | 1/2 | 0.88 | 3/8 | 1.38 | 1/2 | 1.44 | 0.75 | 4.75 | 5.75 |
| 4" | 2.50 | 1/2 | 0.88 | 3/8 | 1.38 | 1/2 | 1.44 | 0.75 | 5.50 | 6.50 |
| 5" | 2.50 | 1/2 | 1.31 | 3/8 | 1.38 | 3/4 | 1.44 | 1.00 | 6.88 | 8.25 |
| 6" | 3.00 | 1/2 | 1.31 | 3/8 | 1.63 | 3/4 | 1.69 | 1.00 | 7.88 | 9.25 |
| 8" | 3.00 | 3/4 | 2.25 | 1/2 | 1.63 | 3/4 | 1.69 | 1.00 | 9.88 | 11.25 |



A Series Air-Oil Tanks

NUMATICS®

S1 Mount



Dimensions

| BORE | A | AO | AL | AT | J | E | EE | M | O | P | R | S | SA | AB |
|--------|------|------|------|------|------|------|-----|------|-----|------|------|------|------|-----|
| 2" | 2.00 | 0.38 | 1.00 | 0.13 | 0.88 | 2.50 | 3/8 | 0.56 | 1/4 | 1.12 | 1.84 | 1.75 | 4.00 | 3/8 |
| 2-1/2" | 2.00 | 0.38 | 1.00 | 0.13 | 1.13 | 3.00 | 3/8 | 0.69 | 1/4 | 1.12 | 2.19 | 2.25 | 4.00 | 3/8 |
| 3-1/4" | 2.50 | 0.50 | 1.25 | 0.13 | 1.38 | 3.75 | 1/2 | 0.88 | 3/8 | 1.38 | 2.76 | 2.75 | 5.00 | 1/2 |
| 4" | 2.50 | 0.50 | 1.25 | 0.13 | 1.75 | 4.50 | 1/2 | 0.88 | 3/8 | 1.38 | 3.32 | 3.50 | 5.00 | 1/2 |
| 5" | 2.50 | 0.63 | 1.38 | 0.19 | 2.13 | 5.50 | 1/2 | 1.31 | 3/8 | 1.38 | 4.10 | 4.25 | 5.25 | 5/8 |
| 6" | 3.00 | 0.63 | 1.38 | 0.19 | 2.63 | 6.50 | 1/2 | 1.31 | 3/8 | 1.63 | 4.88 | 5.25 | 5.75 | 3/4 |
| 8" | 3.00 | 0.69 | 1.81 | 0.25 | 3.56 | 8.50 | 3/4 | 2.25 | 1/2 | 1.63 | 6.44 | 7.13 | 6.63 | 3/4 |



Stop Tube Data

Step 1 - Determine which mount below corresponds to your application.

Step 2 - Determine the value of "L" from Table 1 below. Then find "L" dimension in Table 2 and read across to determine the required stop tube length.

Step 3 - Add the stop tube length to the original "L" value from Step 2. This is the corrected "L". If the corrected "L" still falls within the same range as the original "L" then this is the required stop tube length. Otherwise, use this number in Table 2 to determine the second stop tube length.

Step 4 - Add the second stop length to the original "L". If this value falls within the same range then the second stop tube length is the required length. Otherwise, repeat Step 4.

NOTE: Specify the effective stroke and the stop tube length when ordering.

Example:

Step 1: 10" bore cylinder, 1 3/4 diameter rod, P1 mount, 82 inch stroke
From catalog, XC = 10.375

From table 1, "L" = XC = (2 x Stroke)

Step 2: From Table 1, "L" = 10.375 + 164 = 174.375 inches
From Table 2, when "L" = 174.375, stop tube length = 14 inches

Step 3: Corrected "L" = 14 + 174.375 = 188.375 inches
From Table 2, when "L" = 188.375, stop tube length = 15 inches

Step 4: New corrected "L" = 15 + 174.375 = 189.375 inches
From Table 2, when "L" = 189.375, stop tube length = 15 inches

The stop tube length from Step 3 and 4 are the same, therefore, 15 inches is the required stop tube length.

Table 1

| MOUNT CODE | "L" (INCHES) |
|------------|-------------------|
| E3* | 4 x (W + Stroke) |
| E4* | 4 x (WF + Stroke) |
| P1 & U3 | XC + (2 x Stroke) |
| S1* | 4 x (WF + Stroke) |
| S2* | 4 x (WF + Stroke) |
| S4* | 4 x (WF + Stroke) |
| X3* | 4 x (WF + Stroke) |
| X2* | 4 x (WF + Stroke) |
| X1* | 4 x (WF + Stroke) |
| T1 | XG + Stroke |
| T2 | XJ + (2 x Stroke) |
| T3 | XI + Stroke |

* "L" given is for an unsupported rod end. If rod end is supported with a guide less than 1" in width, divide "L" by 4. If rod end is supported with a guide greater than 1" in width, divide "L" by 8.

For P1 mount, "L" assumes that the rod extends and the cylinder pivots with the rod. Multiply "L" by four so the rod extends and the cylinder does not pivot with the rod.

Table 2

| "L" (INCHES) | STOP TUBE LENGTH (INCHES) |
|--------------|---------------------------|
| 0-40 | 0 |
| 41-50 | 1 |
| 51-60 | 2 |
| 61-70 | 3 |
| 71-80 | 4 |
| 81-90 | 5 |
| 91-100 | 6 |
| 101-110 | 7 |
| 111-120 | 8 |
| 121-130 | 9 |
| 131-140 | 10 |
| 141-150 | 11 |
| 151-160 | 12 |
| 161-170 | 13 |
| 171-180 | 14 |
| 181-190 | 15 |
| 191-200 | 16 |
| 201-210 | 17 |
| 211-220 | 18 |
| 221-230 | 19 |
| 231-240 | 20 |
| 241-250 | 21 |
| 251-260 | 22 |
| 261-270 | 23 |
| 271-280 | 24 |
| 281-290 | 25 |
| 291-300 | 26 |
| 301-310 | 27 |



A Series NFPA Interchangeable

NUMATICS®

Force Tables

The **extend force** is determined from Table 1 based on the operating pressure and cylinder bore size. Then determine the Retract Force by subtracting the "Retract Force Deduction" from the Extend Force. The "Retract Force Deduction" is found in Table 2 below corresponding to the piston rod diameter and operating pressure. These forces are theoretical based on areas with no friction allowance.

Table 1 Force Chart Extend

| BORE | PISTON AREA | PRESSURE | | | | | | | | | | | CUBIC FEET DISPLACEMENT PER INCH OF EXTENDED STROKE |
|------|-------------|----------|------|------|------|------|------|------|------|------|------|-------|---|
| | | 40 | 50 | 60 | 80 | 90 | 100 | 125 | 150 | 175 | 200 | 400 | |
| 1.50 | 1.77 | 71 | 88 | 106 | 141 | 159 | 177 | 221 | 265 | 309 | 353 | 707 | .00102 |
| 2.00 | 3.14 | 126 | 157 | 188 | 251 | 283 | 314 | 393 | 471 | 550 | 628 | 1257 | .00182 |
| 2.50 | 4.91 | 196 | 245 | 295 | 393 | 442 | 491 | 614 | 736 | 859 | 982 | 1963 | .00284 |
| 3.25 | 8.30 | 332 | 415 | 498 | 664 | 747 | 830 | 1037 | 1244 | 1452 | 1659 | 3318 | .00480 |
| 4.00 | 12.57 | 503 | 628 | 754 | 1005 | 1131 | 1257 | 1571 | 1885 | 2199 | 2513 | 5027 | .00727 |
| 5.00 | 19.63 | 785 | 982 | 1178 | 1571 | 1767 | 1963 | 2454 | 2945 | 3436 | 3927 | 7854 | .01136 |
| 6.00 | 28.27 | 1131 | 1414 | 1696 | 2262 | 2545 | 2827 | 3534 | 4241 | 4948 | 5655 | 11310 | .01636 |

Table 2 Retract Force Deduction

| ROD | ROD AREA | PRESSURE | | | | | | | | | | | CUBIC FEET DISPLACEMENT PER INCH OF STROKE |
|-------|----------|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | | 40 | 50 | 60 | 80 | 90 | 100 | 125 | 150 | 175 | 200 | 400 | |
| .625 | .307 | 12 | 15 | 18 | 25 | 28 | 31 | 38 | 46 | 54 | 61 | 123 | .00018 |
| 1.000 | .785 | 31 | 39 | 47 | 63 | 71 | 79 | 98 | 118 | 137 | 157 | 314 | .00045 |
| 1.375 | 1.485 | 59 | 74 | 89 | 119 | 134 | 148 | 186 | 223 | 260 | 297 | 594 | .00086 |
| 1.750 | 2.405 | 96 | 120 | 144 | 192 | 216 | 241 | 301 | 361 | 421 | 481 | 962 | .00139 |

Stop tube Selection

Stop tubes are required for long stroke applications. The stop tube length is calculated based on the mount style, stroke and other mounting dimensions. Use the chart on *page 25* to determine the stop tube length for all A Series cylinders 1 1/2" bore through 6" bore.

Common Cylinder Options

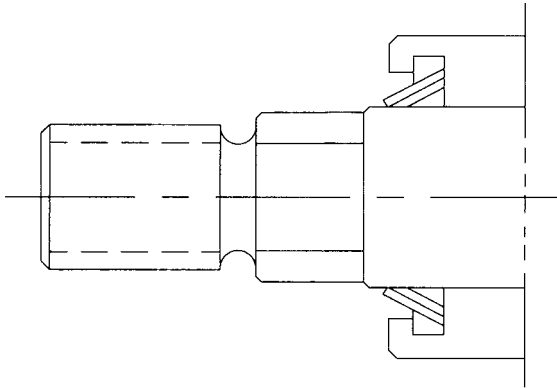
For spring extend/retract cylinders consult factory with bore, stroke and spring force requirements. Viton seals for ambient temperatures to 385 degrees Fahrenheit are also available. Bumpers are available upon request.

Approximate Cylinder Weights (lbs)

| BORE | 1-1/2" | | 2" | | 2-1/2" | | 3-1/4" | | 4" | | 5" | | 6" | |
|------------------------|--------|------|------|------|--------|------|--------|--------|-------|--------|-------|--------|--------|--------|
| | 5/8" | 1" | 5/8" | 1" | 5/8" | 1" | 1" | 1-3/8" | 1" | 1-3/8" | 1" | 1-3/8" | 1-3/8" | 1-3/4" |
| Piston Rod Diameter | 5/8" | 1" | 5/8" | 1" | 5/8" | 1" | 1" | 1-3/8" | 1" | 1-3/8" | 1" | 1-3/8" | 1-3/8" | 1-3/4" |
| X0, S4 | 2.10 | 2.80 | 2.70 | 3.40 | 3.60 | 4.30 | 7.10 | 8.40 | 9.30 | 10.80 | 13.00 | 14.00 | 22.00 | 22.50 |
| F1, F2, S2 | 2.70 | 3.50 | 3.70 | 4.40 | 5.00 | 5.70 | 10.30 | 12.00 | 14.00 | 15.40 | 20.00 | 21.00 | 32.00 | 34.00 |
| P2, P4 | 3.20 | 4.00 | 4.10 | 5.00 | 5.50 | 6.40 | 11.50 | 13.10 | 15.50 | 16.40 | 20.10 | 21.80 | 35.00 | 36.00 |
| T1, T2 | 2.60 | 3.30 | 3.10 | 3.90 | 4.00 | 4.80 | 7.50 | 8.90 | 9.90 | 11.30 | 13.70 | 15.00 | 23.00 | 25.00 |
| P1, P3, X1, X2, X3, S1 | 2.30 | 3.00 | 2.80 | 3.50 | 3.70 | 4.50 | 7.50 | 9.00 | 9.90 | 11.30 | 13.30 | 15.00 | 23.00 | 25.00 |
| Per Inch Of Stroke | 0.24 | 0.40 | 0.30 | 0.40 | 0.30 | 0.44 | 0.50 | 0.70 | 0.60 | 0.80 | 0.60 | 0.80 | 0.90 | 1.14 |



Metallic Rod Scraper



A rod scraper may be necessary when the cylinder must endure paint overspray, weld splatter or flyash.

Order as "MA" Option

Electroless Nickel Protection

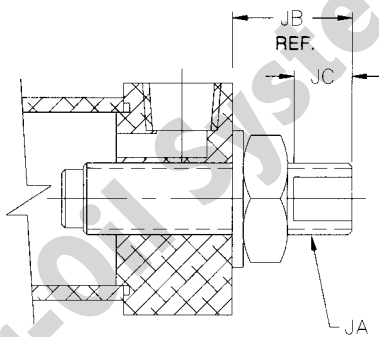
Electroless Nickel Plated NFA Air Cylinder for Use in Corrosive Environments

1. Tie rods and tie rod nuts are 300 series stainless steel.
2. Piston rod is 303 stainless steel turned, ground, polished and hard chrome plated.
3. Tube, head, cap, bushing retainer and all mounts are protected from corrosion with .0005 thick electroless nickel plating.
4. The rod bushing is a cutting edge PolyLube™ composite bushing.
5. Reed, Hall and Prox switches are NEMA 4 approved for corrosive and wash down environments.
6. Mounting accessories are available with electroless nickel plating.

For detailed information regarding the properties of PolyLube™, call 1-800-918-9261.

Order as "NA" Option

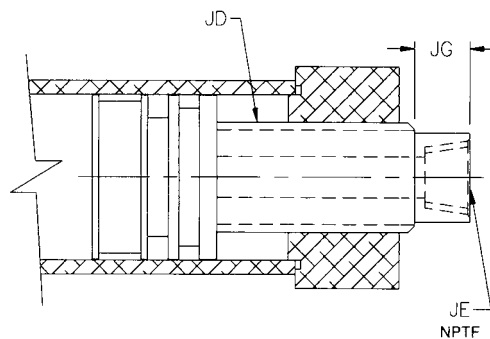
Adjustable Stroke Cylinder



Order as "KA" Option

| BORE | JA | JB | JC |
|--------|--------|------|-------|
| 1-1/2" | 5/8-11 | 1.50 | 1.125 |
| 2" | 5/8-11 | 1.50 | 1.125 |
| 2-1/2" | 5/8-11 | 1.50 | 1.125 |
| 3-1/4" | 1-14 | 1.25 | 0.703 |
| 4" | 1-14 | 1.25 | 0.703 |
| 5" | 1-14 | 1.25 | 0.703 |
| 6" | 1-14 | 1.00 | 0.453 |

Save Air Stroke Adjuster



Order as "RA" Option

| BORE | JD | JE | JG |
|--------|----------------|-----|------|
| 1-1/2" | 1-8 UNC-2A | 3/8 | 0.50 |
| 2" | 1-8 UNC-2A | 3/8 | 0.50 |
| 2-1/2" | 1 3/4-5 UNC-2A | 1/2 | 0.50 |
| 3-1/4" | 1 3/4-5 UNC-2A | 3/4 | 0.75 |
| 4" | 1 3/4-5 UNC-2A | 3/4 | 0.75 |
| 5" | 1 3/4-5 UNC-2A | 3/4 | 0.75 |
| 6" | 2-4 1/2 UNC-2A | 1 | 0.75 |



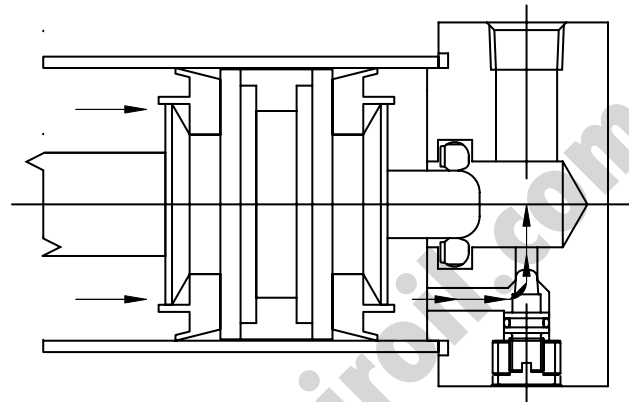
A Series NFPA Interchangeable

NUMATICS®

Silencer Bumper Seal

Our “Silencer” design reduces the noise caused by the final impact of the piston against the cap. It also allows usage of standard pneumatic cushions in order to further reduce the amount of end of stroke noise and impact while still giving the deceleration benefits. When the cushion spear enters into the cushion seal, the cushioning effect takes place by trapping air and then metering it out at a rate set via the adjustable cushion needle.

Note: Silencer Bumper does not add length to the cylinder, but a minimum force of 60PSI must be applied to collapse the seals to reach the full extend and retract positions.



Technical Data

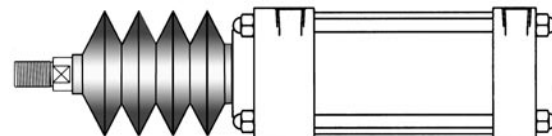
A Series Bore Sizes: 1 1/2", 2", 2 1/2", 4" and 5"
 Temperature: -20°F to 200°F
 Pressure Rating: 150 psi air

Static Stroke Length Reduction Based on PSI

| BORE | 0 PSI | 20 PSI | 40 PSI | 60 PSI | 80 PSI | 100 PSI |
|--------|-------|--------|--------|--------|--------|---------|
| 1-1/2" | 0.106 | 0.056 | 0.028 | 0.018 | 0.000 | 0.000 |
| 2" | 0.090 | 0.070 | 0.046 | 0.037 | 0.018 | 0.000 |
| 2 1/2" | 0.201 | 0.166 | 0.122 | 0.071 | 0.008 | 0.000 |
| 3 1/4" | 0.160 | 0.102 | 0.082 | 0.048 | 0.038 | 0.000 |
| 4" | 0.150 | 0.085 | 0.065 | 0.031 | 0.005 | 0.000 |
| 5" | 0.219 | 0.158 | 0.099 | 0.530 | 0.015 | 0.000 |

Rod Boot

Our cylinder has a hardened bearing surface on the piston rod to protect it from external damage. Furthermore, the cylinder is also equipped with a highly efficient rod wiper. A rod wiper removes external contaminants such as dirt and dust. Exposed piston rods that are subjected to contaminants that contain hardening properties, i.e., paint, must be protected to ensure long life. In these applications, you should consider using a collapsing cover to protect the piston rod. The collapsing cover is commonly referred to as a Rod Boot.



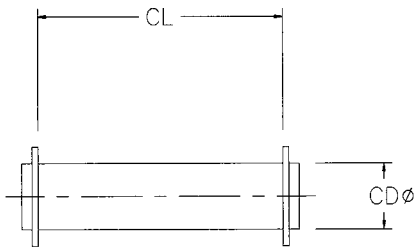
NOTE: High temperature rod boot available (option GA). Consult factory for detailed rod boot information.



Accessories

Accessories Guide

| ROD THREAD | ROD CLEVIS | EYE BRACKET | PIVOT PIN | ROD EYE | CLEVIS BRACKET | BORE |
|------------|------------|-------------|-----------|----------|----------------|-----------------|
| 7/16-20 | A500-301 | A500-101 | A500-401 | A500-201 | A500-001 | 1 1/2, 2, 2 1/2 |
| 1/2-20 | A500-302 | A500-101 | A500-401 | A500-202 | A500-001 | 1 1/2, 2, 2 1/2 |
| 3/4-16 | A500-303 | A500-102 | A500-402 | A500-203 | A500-002 | 3 1/4, 4, 5 |
| 7/8-14 | A500-304 | A500-102 | A500-403 | — | — | — |
| 1-14 | A500-305 | A500-103 | A500-403 | A500-204 | A500-003 | 6 |
| 1 1/4-12 | A500-306 | A500-104 | A500-404 | A500-205 | — | — |
| 1 1/2-12 | A500-307 | A500-105 | A500-405 | A500-206 | — | — |

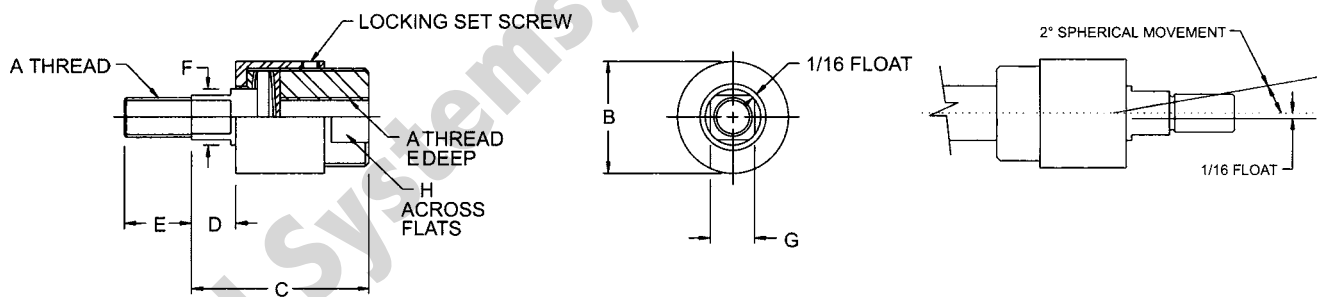


Pivot Pin

| PART NO. | CD | CL |
|----------|-------|-------|
| A500-401 | 0.500 | 1.875 |
| A500-402 | 0.750 | 2.625 |
| A500-403 | 1.000 | 3.125 |
| A500-404 | 1.375 | 4.125 |
| A500-405 | 1.750 | 5.125 |

Included with mount codes P1, P2, P3 and P4

Rod Couplers



Standard Couplers

| PART NUMBER | | A | B | C | D | E | F | G | H | MAXIMUM PULL LOAD |
|-------------|----------|----------|-------|---------|-------|-------|-------|--------|-------|-------------------|
| STANDARD | NICKEL | | | | | | | | | |
| A500-603 | B500-603 | 7/16-20 | 1 1/4 | 2 | 1/2 | 3/4 | 5/8 | 1/2 | 1 | 2,535 |
| A500-604 | B500-604 | 1/2-20 | 1 1/4 | 2 | 1/2 | 3/4 | 5/8 | 1/2 | 1 | 3,500 |
| A500-605 | B500-605 | 5/8-18 | 1 1/4 | 2 | 1/2 | 3/4 | 5/8 | 1/2 | 1 | 4,750 |
| A500-606 | B500-606 | 3/4-16 | 1 3/4 | 2 5/16 | 1/2 | 1 1/8 | 31/32 | 13/16 | 1 1/2 | 8,750 |
| A500-607 | B500-607 | 7/8-14 | 1 3/4 | 2 5/16 | 1/2 | 1 1/8 | 31/32 | 13/16 | 1 1/2 | 9,750 |
| A500-608 | B500-608 | 1-14 | 2 1/2 | 2 15/16 | 1/2 | 1 5/8 | 1 3/8 | 1 5/32 | 2 1/4 | 16,125 |
| A500-609 | B500-609 | 1 1/4-12 | 2 1/2 | 2 15/16 | 1/2 | 1 5/8 | 1 3/8 | 1 5/32 | 2 1/4 | 19,600 |
| N35-1001 | N35-1004 | 1 1/2-12 | 3 1/4 | 4 3/8 | 13/16 | 2 1/4 | 1 3/4 | 1 1/2 | 3 | 34,000 |

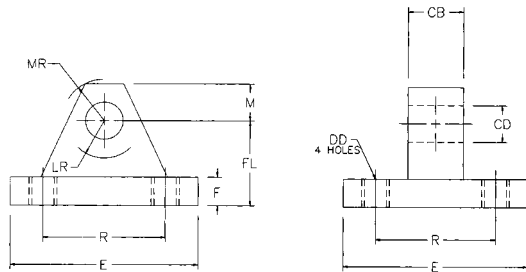


A Series NFPA Interchangeable

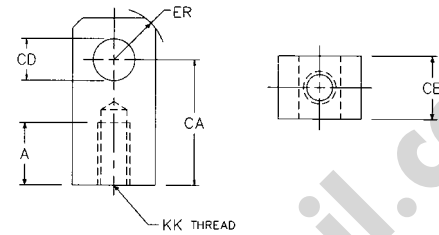
NUMATICS®

Accessories

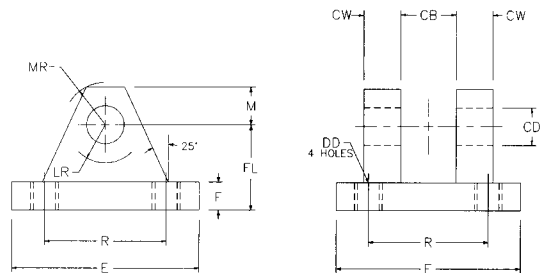
Eye Bracket *



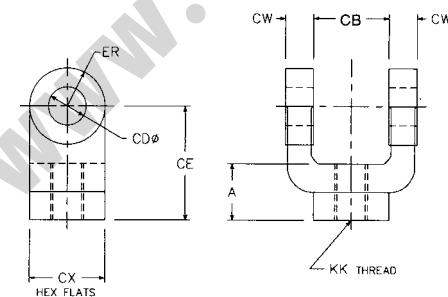
Rod Eye *



Clevis Bracket *



Rod Clevis *



*Order pivot pin separately

Dimensions

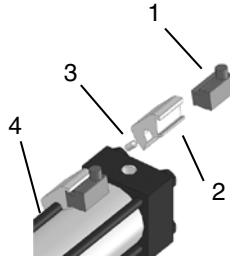
| PART NO. | A | CA | CB | CD | CE | CW | CX | DD | E | ER | F | FL | KK | LR | M | MR | R |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|----------|-------|-------|-------|-------|
| Clevis Bracket | | | | | | | | | | | | | | | | | |
| A500-001 | - | - | 0.750 | 0.500 | - | 0.500 | - | 3/8-24 | 2.500 | - | 0.375 | 1.125 | - | 0.500 | 0.500 | 0.563 | 1.625 |
| A500-002 | - | - | 1.250 | 0.750 | - | 0.625 | - | 1/2-20 | 3.500 | - | 0.625 | 1.875 | - | 1.063 | 0.750 | 1.063 | 2.563 |
| A500-003 | - | - | 1.500 | 1.000 | - | 0.750 | - | 5/8-18 | 4.500 | - | 0.750 | 2.250 | - | 1.250 | 1.000 | 1.125 | 3.250 |
| Eye Bracket | | | | | | | | | | | | | | | | | |
| A500-101 | - | - | 0.750 | 0.500 | - | - | - | 0.406 | 2.500 | - | 0.375 | 1.125 | - | 0.750 | 0.500 | 0.563 | 1.630 |
| A500-102 | - | - | 1.250 | 0.750 | - | - | - | 0.531 | 3.500 | - | 0.625 | 1.875 | - | 1.250 | 0.750 | 0.875 | 2.560 |
| A500-103 | - | - | 1.500 | 1.000 | - | - | - | 0.656 | 4.500 | - | 0.750 | 2.250 | - | 1.500 | 1.000 | 1.250 | 3.250 |
| A500-104 | - | - | 2.000 | 1.375 | - | - | - | 0.656 | 5.000 | - | 0.875 | 3.000 | - | 2.125 | 1.375 | 1.625 | 3.810 |
| A500-105 | - | - | 2.500 | 1.750 | - | - | - | 0.906 | 6.500 | - | 0.875 | 3.125 | - | 2.250 | 1.750 | 2.125 | 4.950 |
| Rod Clevis | | | | | | | | | | | | | | | | | |
| A500-301 | 0.750 | - | 0.750 | 0.500 | 1.500 | 0.500 | 1.000 | - | - | 0.500 | - | - | 7/16-20 | - | - | - | - |
| A500-302 | 0.750 | - | 0.750 | 0.500 | 1.500 | 0.500 | 1.000 | - | - | 0.500 | - | - | 1/2-20 | - | - | - | - |
| A500-303 | 1.125 | - | 1.250 | 0.750 | 2.375 | 0.625 | 1.250 | - | - | 0.750 | - | - | 3/4-16 | - | - | - | - |
| A500-304 | 1.625 | - | 1.500 | 1.000 | 3.125 | 0.750 | 1.500 | - | - | 1.000 | - | - | 7/8-14 | - | - | - | - |
| A500-305 | 1.625 | - | 1.500 | 1.000 | 3.125 | 0.750 | 1.500 | - | - | 1.000 | - | - | 1-14 | - | - | - | - |
| A500-306 | 2.000 | - | 2.000 | 1.375 | 4.125 | 1.000 | 2.000 | - | - | 1.375 | - | - | 1 1/4-12 | - | - | - | - |
| A500-307 | 2.250 | - | 2.500 | 1.750 | 4.500 | 1.250 | 2.375 | - | - | 1.750 | - | - | 1 1/2-12 | - | - | - | - |
| Rod Eye | | | | | | | | | | | | | | | | | |
| A500-201 | 0.750 | 1.500 | 0.750 | 0.500 | - | - | - | - | - | 0.625 | - | - | 7/16-20 | - | - | - | - |
| A500-202 | 0.750 | 1.500 | 0.750 | 0.500 | - | - | - | - | - | 0.625 | - | - | 1/2-20 | - | - | - | - |
| A500-203 | 1.125 | 2.063 | 1.250 | 0.750 | - | - | - | - | - | 0.875 | - | - | 3/4-16 | - | - | - | - |
| A500-204 | 1.625 | 2.813 | 1.500 | 1.000 | - | - | - | - | - | 1.188 | - | - | 1-14 | - | - | - | - |
| A500-205 | 2.000 | 3.438 | 2.000 | 1.375 | - | - | - | - | - | 1.563 | - | - | 1 1/4-12 | - | - | - | - |
| A500-206 | 2.250 | 4.000 | 2.500 | 1.750 | - | - | - | - | - | 2.000 | - | - | 1 1/2-12 | - | - | - | - |



A Series World application Detail

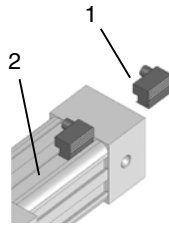
Round Tube and Tie Rod Detail

1. World Switch
2. Tie Rod Bracket
3. Adjustment Screw
4. Cylinder Tie Rod



Profile Tube Detail

1. World Switch
2. Dove Tail extrusion



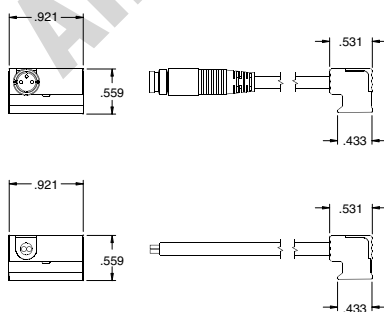
A series World Switch Bracket

| Cylinders | Bore | Part Number |
|------------------|---------------|-------------|
| A series Tie Rod | 1 1/2" | SB6-K01 |
| A series Tie Rod | 2"-2 1/2" | SB6-L01 |
| A series Tie Rod | 3 1/4"-4" | SB6-P01 |
| A series Tie Rod | 5"-6" | SB6-T01 |
| A series Tie Rod | 8" | SB6-W01 |
| A series Profile | 1 1/2"-3 1/4" | Direct Fit |

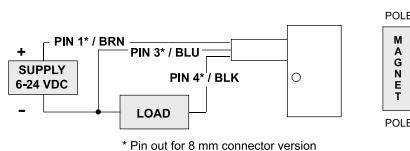
A series World Switch Hall Effect Part Numbers

| P/N | Switch Style | Switch Type | Function | Switching Voltage | Switching Current | Switching Power | Voltage Drop |
|---------|----------------------|--|------------------------------|-------------------|-------------------|-----------------|--------------|
| SH6-031 | 3m Wire Version | Hall Effect for Reed Magnet & Light Sourcing | Normally Open Sourcing (PNP) | 6 -24 VDC | 0.3 Amps Max. | 7.2 Watts Max. | 0.5 Volts |
| SH6-021 | 8m Connector Pigtail | Hall Effect for Reed Magnet & Light Sourcing | Normally Open Sourcing (PNP) | 6 -24 VDC | 0.3 Amps Max. | 7.2 Watts Max. | 0.5 Volts |
| SH6-032 | 3m Wire Version | Hall Effect for Reed Magnet & Light Sourcing | Normally Open Sourcing (NPN) | 6 -24 VDC | 0.3 Amps Max. | 7.2 Watts Max. | 0.5 Volts |
| SH6-022 | 8m Connector Pigtail | Hall Effect for Reed Magnet & Light Sourcing | Normally Open Sourcing (NPN) | 6 -24 VDC | 0.3 Amps Max. | 7.2 Watts Max. | 0.5 Volts |

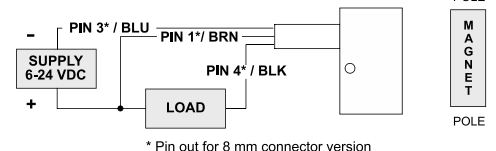
Hall Effect Switch



PNP Sourcing



NPN Sinking





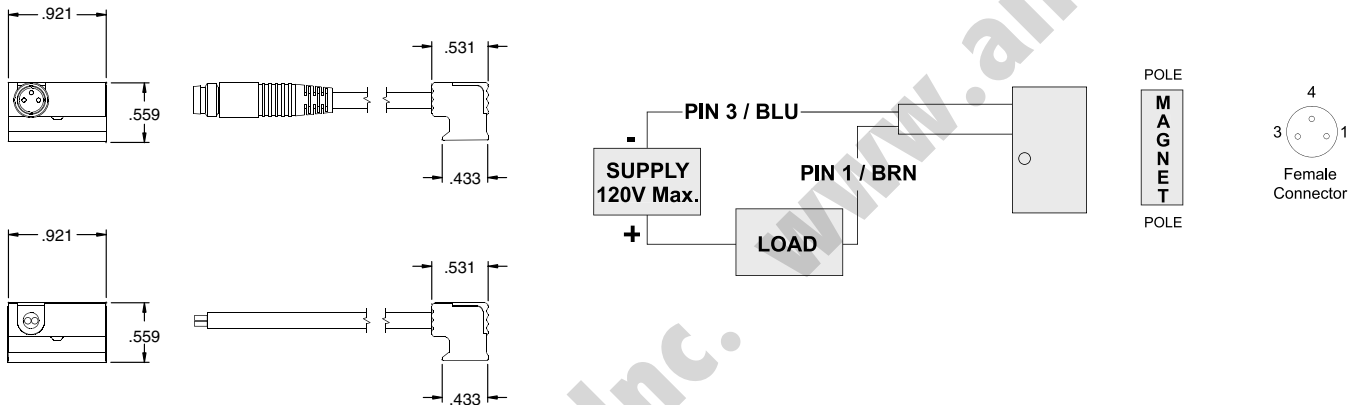
A Series NFPA Interchangeable

NUMATICS®

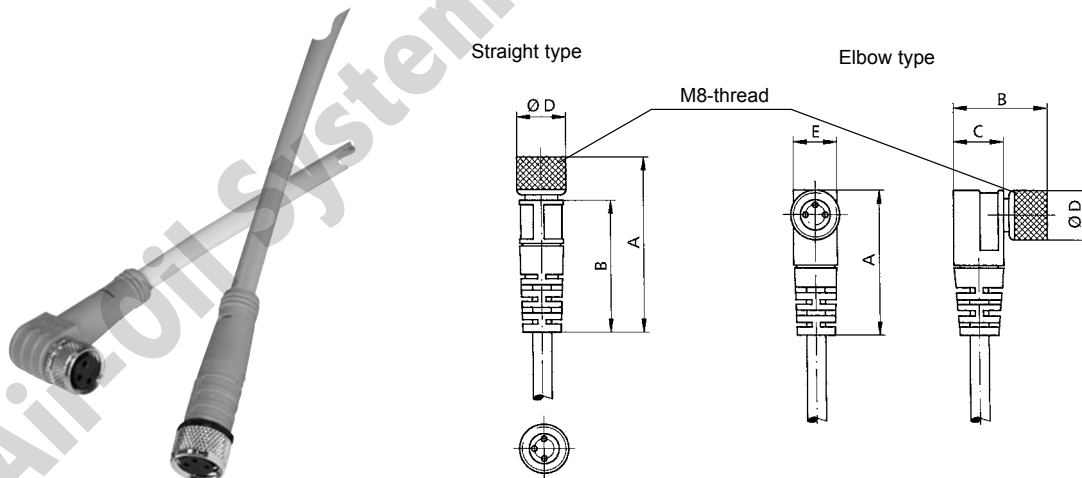
A Series World Switch Reed Switch Part Numbers

| P/N | Switch Style | Switch Type | Function | Switching Voltage | Switching Current | Switching Power | Voltage Drop |
|---------|-----------------|------------------------|--------------------|-------------------|------------------------------------|-----------------|--------------|
| SR6-002 | 3m Wire Version | Reed Switch, LED | SPST Normally Open | 5 - 120V AC/DC | 0.025 Amps Max. 0.001 Amps Min. | 3 Watts Max. | 3.5 Volts |
| SR6-004 | 3m Wire Version | Reed Switch, LED & MOV | SPST Normally Open | 5 - 120V AC/DC | 0.5 Amps Max. 0.005 Amps Min. | 10 Watts Max. | 3.0 Volts |
| SR6-021 | 8mm Pigtail | Reed Switch | SPST Normally Open | 0 - 120V AC/DC | 0.5 Amps Max. | 10 Watts Max. | 0 Volts |
| SR6-022 | 8mm Pigtail | Reed Switch, LED | SPST Normally Open | 5 - 120V AC/DC | 0.025 Amps Max. 0.001 Amps Min. | 3 Watts Max. | 3.5 Volts |
| SR6-024 | 8mm Pigtail | Reed Switch, LED & MOV | SPST Normally Open | 5 - 120V AC/DC | 0.5 Amps Max. 0.005 Amps Min. | 10 Watts Max. | 3.0 Volts |

Reed Switch - Normally Open Type SR6



Cords M8-thread for Switches and Sensors with Connector



Dimensions (mm)

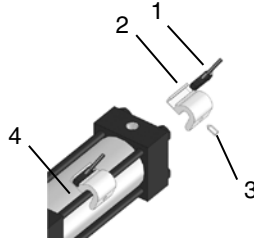
| Type | | A | B | C | D | E | Weight (approx. kg) | Order Code |
|------------------------|---------------------------|------|------|-----|-----|-----|---------------------|------------|
| Straight with 5m-cable | (3x0.25 mm ²) | 32.3 | 24.4 | — | 9.0 | — | 0.143 | SC6-001 |
| Elbow with 5m-cable | (3x0.25 mm ²) | 26.3 | 17.1 | 9.2 | 9.0 | 8.0 | 0.145 | SC6-002 |



A Series Global Application Detail

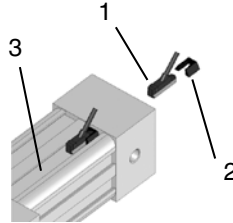
Round Tube and Tie Rod Detail

1. Global Switch
2. Tie Rod Bracket
3. Adjustment Screw
4. Cylinder Tie Rod



Profile Tube Detail

1. Global Switch
2. Included Dovetail adapter
3. Dove Tail extrusion

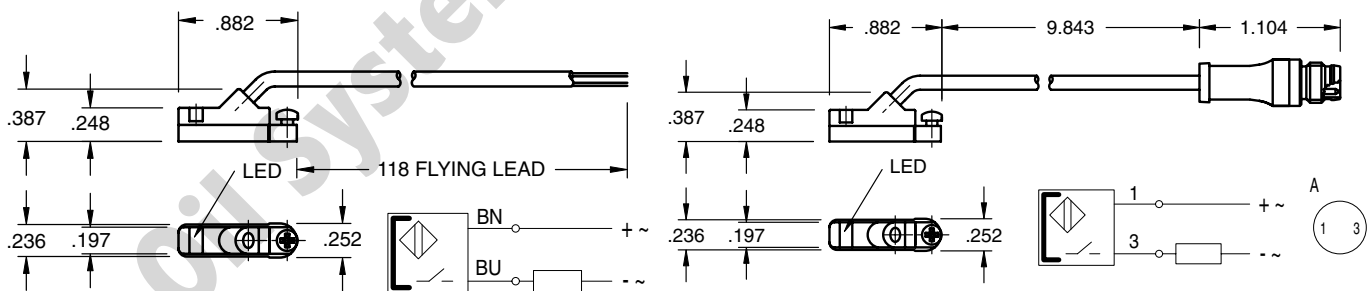


A Series Global Switch Bracket

| Cylinders | Bore | Part Number |
|------------------|---------------|-------------------------------------|
| A series Tie Rod | 1 1/2"-2 1/2" | N199-1017 |
| A series Tie Rod | 3 1/4"-4" | N199-1018 |
| A series Tie Rod | 5"-8" | N199-1019 |
| A series Profile | 1 1/2"-3 1/4" | Direct Fit w/included adapter |

A Series Global Switches

Reed Switch (AC/DC NO), flying lead - RSS02, 8mm connector - RSQ02



Sensing Data

Ambient temperature range T_a
 Frequency of operating cycles f at U_e
 Turn on time t
 turn off time t
 LED function indication

(°F/°C) -4 to 176 (-20 to 80)
 (kHz) 0.5
 (ms) ≤ 0.25
 (ms) 0.03
 yes

Mechanical Data

Housing material Polyamide
 Material of sensing face Polyamide
 Connection PVC cable
 Degree of Protection IP 67
 Rated shock: half-sinus, 50g, 11 ms
 Rated vibration environment: 10g, 10...2000 Hz. 90 min

Electrical Data

Rated operational voltage U_e (V) 3...130 AC/DC
 Supply voltage U_B (V) 3...130 AC/DC
 Voltage drop U_d at I_e Stat./dyn. (V) 3.5
 Rated insulation volatage U_i (V) 2750 DC (EN 60335-1)
 Rated supply frequency (Hz) AC/DC
 Rated operational current I_e (mA) 50 (10W max.)
 No-load supply current I_o at U_e d./und. (mA) 0
 Observe polarity for correct LED function

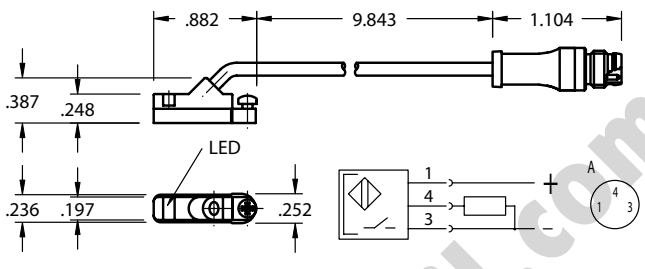
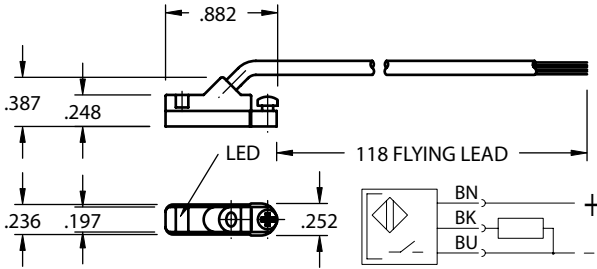




A Series NFPA Interchangeable

NUMATICS®

Electronic Switch (PNP NO), flying lead - HPNPS31, 8mm connector - HPNPQ31



Sensing Data

| | | |
|--|---------|-------------------------------|
| Ambient temperature range d | (°F/°C) | -13 to +158 (-25 to +70) |
| Temperature drift | (% of) | $\leq 0.3\%/^{\circ}\text{C}$ |
| Frequency of operating cycles f at U_e | (kHz) | 10 |
| Turn on time t | (ms) | .05 |
| turn off time t | (ms) | .05 |
| Utilization categories | | DC13 |
| Function-/supply voltage indication | | YES |

Mechanical Data

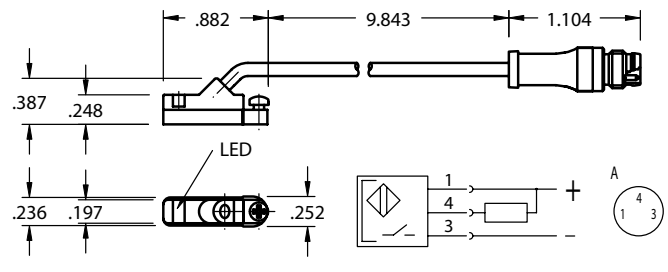
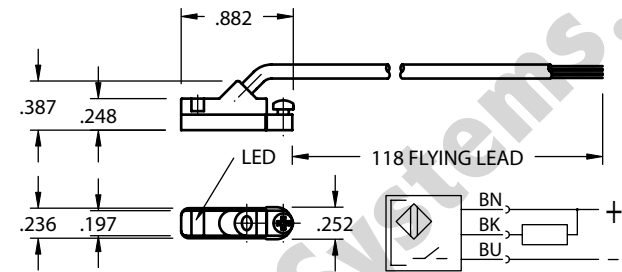
| | |
|---|-----------|
| Housing material | Polyamide |
| Material of sensing face | Polyamide |
| Connection | PVC cable |
| Degree of Protection | IP 67 |
| Rated shock: half-sinus, 30 g, 11 ms | |
| Rated vibration environment: 55 Hz, 1mm amplitude, 3 x 30 | |

Electrical Data

| | | |
|---|---------------|------------|
| Rated operational voltage U_e | (V) | 24 DC |
| Supply voltage U_B | (V) | 10...30 DC |
| incl. ripple | (% of U_e) | 15 |
| Voltage drop U_d at I_e Stat./dyn. | (V) | 1/- |
| Rated insulation volatage U_i | (V) | 75 AC |
| Rated supply frequency | (Hz) | DC |
| Rated operational current I_e | (mA) | 200 |
| No-load supply current I_o at U_e d./und. | (mA) | 25/13 |
| Protected against polarity reversal | | YES |



Electronic Switch (NPN NO), flying lead - HNPNS32, 8mm connector - HNPNQ32



Sensing Data

| | | |
|--|---------------|-------------------------------|
| Ambient temperature range d | (°F/°C) | -13 to +158 (-25 to +70) |
| Temperature drift | (% of S_T) | $\leq 0.3\%/^{\circ}\text{C}$ |
| Frequency of operating cycles f at U_e | (kHz) | 10 |
| Turn on time t | (ms) | .05 |
| turn off time t | (ms) | .05 |
| Utilization categories | | DC13 |
| Function-/supply voltage indication | | YES |

Mechanical Data

| | |
|---|-----------|
| Housing material | Polyamide |
| Material of sensing face | Polyamide |
| Connection | PVC cable |
| Degree of Protection | IP 67 |
| Rated shock: half-sinus, 30 g, 11 ms | |
| Rated vibration environment: 55 Hz, 1mm amplitude, 3 x 30 | |

Electrical Data

| | | |
|---|---------------|------------|
| Rated operational voltage U_e | (V) | 24 DC |
| Supply voltage U_B | (V) | 10...30 DC |
| incl. ripple | (% of U_e) | 15 |
| Voltage drop U_d at I_e Stat./dyn. | (V) | 1/- |
| Rated insulation volatage U_i | (V) | 75 AC |
| Rated supply frequency | (Hz) | DC |
| Rated operational current I_e | (mA) | 200 |
| No-load supply current I_o at U_e d./und. | (mA) | 25/13 |
| Protected against polarity reversal | | YES |

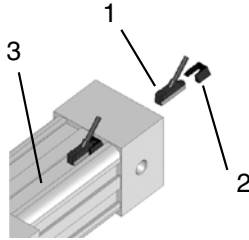




A Series 9000 application Detail

Profile Tube Detail

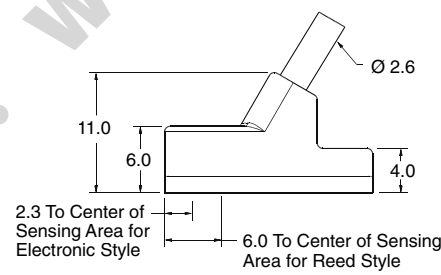
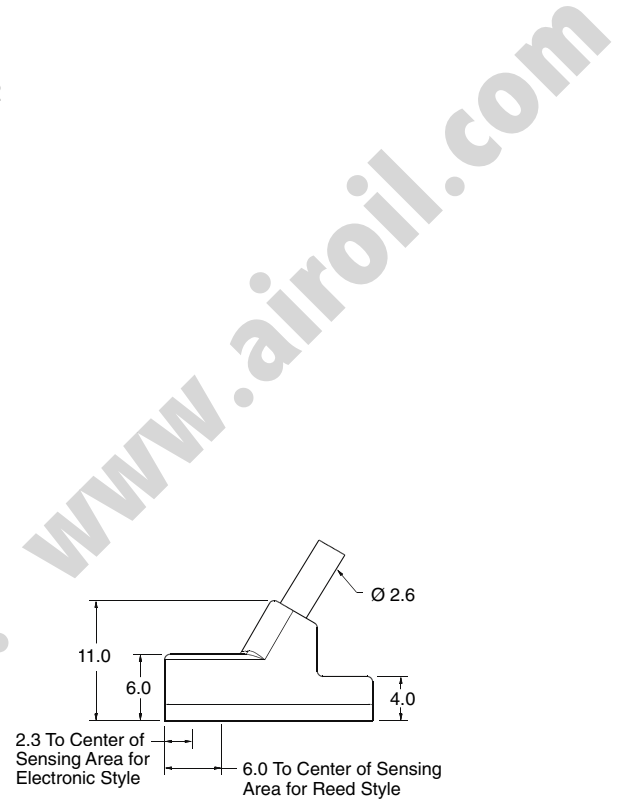
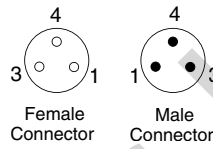
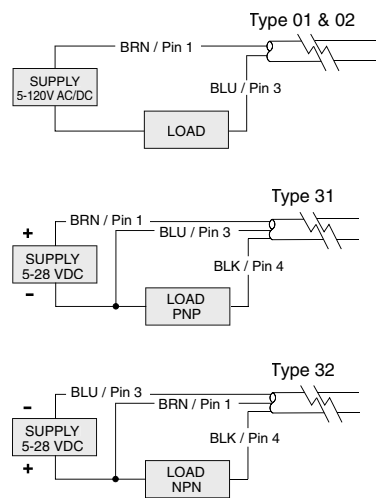
1. 9000 Switch
2. Included Dovetail adapter
3. Dove Tail extrusion



A Series 9000 series Switch

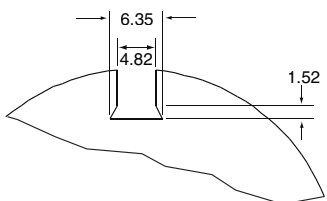
| Cylinders | Bore | Part Number |
|------------------|-----------------------|----------------------------------|
| A series Profile | 1 1/2"-3 1/4" Bore | Direct Fit w/included adapter |

Series 9000 Type 02, 31 & 32 Wiring Diagrams



| Type Code | Description | Function | Switching Voltage | Switching Current | Switching Power | Switching Speed | Voltage Drop |
|-------------|---|-----------------------|--------------------------|-----------------------------------|-----------------|----------------------------------|------------------|
| 940-100-002 | Reed Switch for PLC's, LED (current limiting) | SPST Normally Open | 5-120V AC/DC 50/60 Hz | 0.03 Amps max. 0.001 Amps min. | 4 Watts max. | 0.4 ms operate 0.1 ms release | 3.5 Volts @ 5 mA |
| 940-100-031 | Electronic for Reed Magnet, LED & Sourcing | PNP Normally Open | 5-28 VDC | 0.2 Amps max. | 4.8 Watts max. | 4 µs operate 4 µs release | 1.0 Volts max |
| 940-100-032 | Electronic for Reed Magnet, LED & Sourcing | NPN Normally Open | 5-28 VDC | 0.2 Amps max. | 4.8 Watts max. | 4 µs operate 4 µs release | 1.0 Volts max |

Groove Dimension

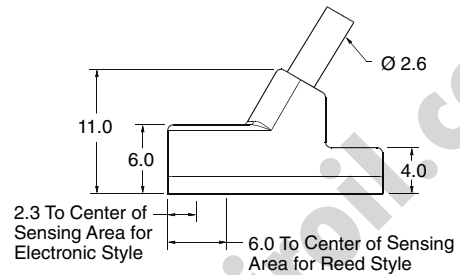
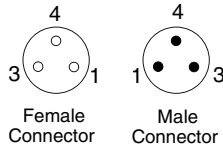
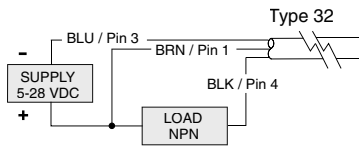
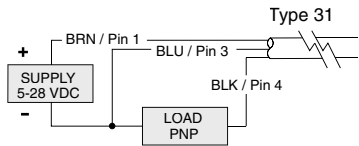
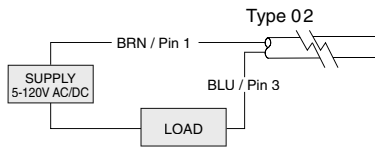




A Series NFPA Interchangeable

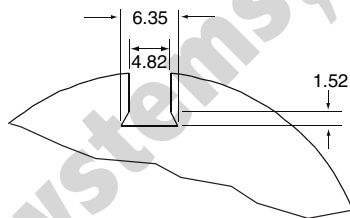
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Series 9000 Type 02, 31 & 32 Wiring Diagrams



| Type Code | Description | Function | Switching Voltage | Switching Current | Switching Power | Switching Speed | Voltage Drop |
|-------------|---|--------------------|--------------------------|-----------------------------------|-----------------|----------------------------------|------------------|
| 940-100-002 | Reed Switch for PLC's, LED (current limiting) | SPST Normally Open | 5-120V AC/DC 50/60 Hz | 0.03 Amps max. 0.001 Amps min. | 4 Watts max. | 0.4 ms operate 0.1 ms release | 3.5 Volts @ 5 mA |
| 940-100-031 | Electronic for Reed Magnet, LED & Sourcing | PNP Normally Open | 5-28 VDC | 0.2 Amps max. | 4.8 Watts max. | 4 µs operate 4 µs release | 1.0 Volts max |
| 940-100-032 | Electronic for Reed Magnet, LED & Sourcing | NPN Normally Open | 5-28 VDC | 0.2 Amps max. | 4.8 Watts max. | 4 µs operate 4 µs release | 1.0 Volts max |

Groove Dimension





How to Order - A Series Piston Rod Assembly

A92- K 1 N 0 - 01 A-AA

Type _____
A92 = A Series Piston Rod Assembly

Bore _____
K = 1-1/2" U = 6"
L = 2" W = 8"
M = 2-1/2" X = 10"
P = 3-1/4" Y = 12"
R = 4" B = 14"
T = 5"

Rod Code _____
1 = Style # 1 Standard Rod Diameter
2 = Style # 2 Standard Rod Diameter
3 = Style # 3 Standard Rod Diameter
4 = Special Standard Rod Diameter
(must specify threads)
5 = Special Oversize Rod Diameter
(must specify threads)
6 = Style # 1 Oversize Rod Diameter
7 = Style # 2 Oversize Rod Diameter
8 = Style # 3 Oversize Rod Diameter
A = Style # 1 Second Oversize Rod Diameter
B = Style # 2 Second Oversize Rod Diameter
C = Style # 3 Second Oversize Rod Diameter
U = Male Coupling Rod End Oversize Rod Diameter
V = Male Coupling Rod End Oversize Rod Diameter

Cushion _____
N = No Cushion
B = Both Ends Cushioned
H = Head End Cushioned
C = Cap End Cushioned

Magnet _____
0 = No Magnet
2 = Reed Magnet (Is Included with Piston Rod Assembly)

Options (Does Not Include Seals)
AA = No Option
BH = Bumpered Head End
CR = Cylinder Ready "Stroke to Go"
DA = Double Rod
EB = Bumper Seals
FA = No Wrench Flats, No Turn Down
FB = Four Wrench Flats
GA = High Temperature Rod Boot
JN = Jam Nut
KA = Stroke Adjust
LB = Low Breakaway
NA = Nickel Plated
NN = Nylock Nut
NS = Cylinder Ready "No Stroke to Go"
PP = PolyPak Piston
RA = Save Air Stroke Adjuster
RB = Rod Boot
SA = Stainless Rod
TI** = "T" Seal Piston
VA = Viton Seals
1A* = Rod Extension
1B* = Rear Rod Extension
2A* = Thread Extension
2B* = Rear Thread Extension
3A = Rod Stud
3B = Rear Rod Stud
4A* = Stop Tube
4D* = Double Piston Stop Tube

* = must specify length
** For 10", 12", and 14" bores.
Consult factory for additional options.

Fractional Inches of Stroke
A = 0" E = 1/4" I = 1/2" M = 3/4"
B = 1/16" F = 5/16" J = 9/16" N = 13/16"
C = 1/8" G = 3/8" K = 5/8" O = 7/8"
D = 3/16" H = 7/16" L = 11/16" P = 15/16"

Full Inches of Stroke
00 = 0" Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke
05 = 5" Stroke
99 = 99" Stroke

Note: Options listed are ones that apply to a piston rod assembly only.
Model number is set up to use option code supplied with original cylinder or with any above.
Note: Bumpers are not included with Piston Rod Assembly.



A Series NFPA Interchangeable

NUMATICS®

How to Order - A Series Repair Kit

A98 - K 1 N - AA

Type

A98 = A Series Repair Kit

Bore

| | |
|------------|---------|
| K = 1-1/2" | U = 6" |
| L = 2" | W = 8" |
| M = 2-1/2" | X = 10" |
| P = 3-1/4" | Y = 12" |
| R = 4" | B = 14" |
| T = 5" | |

Rod Size

0 = Standard Rod
1 = Oversize Rod
2 = Second Oversize Rod

Options

AA = No Option
BK = Back to Back
BZ = Bronze Bushing
CR = Cylindicator Ready "Stroke to Go"
CZ = Composite Bushing
DA = Double Rod
EB = Silencer Bumpers
GA = High Temperature Rod Boot
LB = Low Breakaway
LT = Low Temp Seals
MA = Metallic Rod Scraper
MB = Rear Metallic Rod Scraper
NA = Nickel Plated
NS = Cylindicator Ready "No Stroke to Go"
PA = Polypak Rod Seal
PB = Rear Polypak Rod Seal
PP = Polypak Piston Seals
RA = Save Air Stroke Adjust
TI** = "T" Seal Piston
VA = Viton Seals
4D = Double Piston Stop Tube
** For 10", 12", and 14" bores.

Cushion

N = No Cushion
B = Both Ends Cushioned
H = Head End Cushioned
C = Cap End Cushioned

Note: Options listed are ones that apply to a repair kit only.

Model number is set up to use option code supplied with original cylinder or with any above.

How to Order - A Series Seal Kit

A97 - K 1 N - AA

Type

A97 = A Series Seal Kit

Bore

| | |
|------------|---------|
| K = 1-1/2" | U = 6" |
| L = 2" | W = 8" |
| M = 2-1/2" | X = 10" |
| P = 3-1/4" | Y = 12" |
| R = 4" | B = 14" |
| T = 5" | |

Rod Size

0 = Standard Rod
1 = Oversize Rod
2 = Second Oversize Rod

Options

AA = No Option
BK = Back to Back
CR = Cylindicator Ready "Stroke to Go"
DA = Double Rod
EB = Silencer Bumpers
LB = Low Breakaway
LT = Low Temp Seals
MA = Metallic Rod Scraper
MB = Rear Metallic Rod Scraper
NS = Cylindicator Ready "No Stroke to Go"
PA = Polypak Rod Seal
PB = Rear Polypak Rod Seal
PP = Polypak Piston Seals
RA = Save Air Stroke Adjust
TI** = "T" Seal Piston
VA = Viton Seals
4D = Double Piston Stop Tube
** For 10", 12", and 14" bores.

Cushion

N = No Cushion
B = Both Ends Cushioned
H = Head End Cushioned
C = Cap End Cushioned

Note: Options listed are ones that apply to a seal kit only.

Model number is set up to use option code supplied with original cylinder or with any above.



Piston Rod Assembly Kit Installation Instructions

1. Loosen 4 Tie Rod Nuts (Part #20) to remove Piston/Rod Assembly (Part #18 & #19).
2. Carefully remove seals. (Part #12, #14, & #15). Any damage to the seals may result in leakage.
3. Lubricate piston seal(s) and wearband (Part #12) with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
4. Install Piston Seal (Part #15). Make sure the piston seal is not twisted inside groove. Next install back-up rings if piston seal is a T-seal.
5. Install lubricated wearband onto piston. Sink piston/rod assembly into sinker tube.
6. Apply lube inside the cylinder tube (Part #17).
7. Sink piston/rod assembly into cylinder tube.
8. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
9. Examine all seals before reassembling cylinder for any contamination. Contamination may cause leakage.
10. Lightly grease Rod Seal (Part #3) of Loaded Bushing before installing. This will ease the installation of the rod bushing over the rod.
11. Reassemble cylinder. Loosely torque Tie Rod Nuts (Part #20) to allow head and cap to rotate slightly.
12. Before final torque, place cylinder on level surface. This will ensure that the cylinder head and cap are square. Torque Tie Rod Nuts (Part #20) in a crisscross pattern. Use torque tolerances chart for Tie Rod Nuts and Retainer Screws.
13. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 11-13.

See Seal Installation Guide on page 41 for additional (visual) instructions.

Repair Kit and Seal Kit Removal/Installation Instructions

1. Loosen 2 or 4 Retainer Screws (Part #11) to remove Loaded Bushing (Part # 9)
2. Loosen 4 Tie Rod Nuts (Part #20) to remove Piston/Rod Assembly (Part #18 & #19)
3. Carefully remove old seals. (Part [#1, #2, #3 Seal kit only], #5, #6, #7, #12, #14, & #15) Any damage to the seal grooves may result in leakage.
4. Lubricate new seals with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
5. Install Piston Seal (Part #15). Make sure the piston seal is not twisted inside groove. Next install back-up rings (Part #14) if piston seal is a T-seal.
6. Install lubricated Wearband (Part #12) onto piston. Sink piston/rod assembly into sinker tube.
7. Apply lube inside the cylinder tube.
8. Sink piston/rod assembly into cylinder tube.
9. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
10. Place Tube End Seals (Part #6) into head and cap seal grooves. Examine seals after installing for any contamination. Contamination may cause leakage.
11. Install Rod Wiper (Part #1), Bushing O-ring (Part #2), and Rod Seal (Part #3) into bushing (Seal Kit only). Lightly grease Rod Seal and Bushing O-ring after installation. This will ease the installation of the rod bushing over the rod and into the head.
12. Reassemble cylinder except for loaded rod bushing (Part #9). First, loosely torque Tie Rod Nuts to allow head and cap to rotate slightly. Carefully place bushing over the rod until getting interference. With a twisting motion, slide the bushing down onto the rod and into the bushing pocket on the head.
13. Place Bushing Retainer (Part #10). Lightly tighten Retainer Screws (Part #11).
14. Before final torque, place cylinder on level surface to square head and cap. Torque Tie Rod Nuts in a crisscross pattern. Use the following charts for torque tolerances for Tie Rod Nuts and Retainer Screws.
15. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 12-14.

See Seal Installation Guide on page 41 for additional (visual) instructions.



A Series NFPA Interchangeable

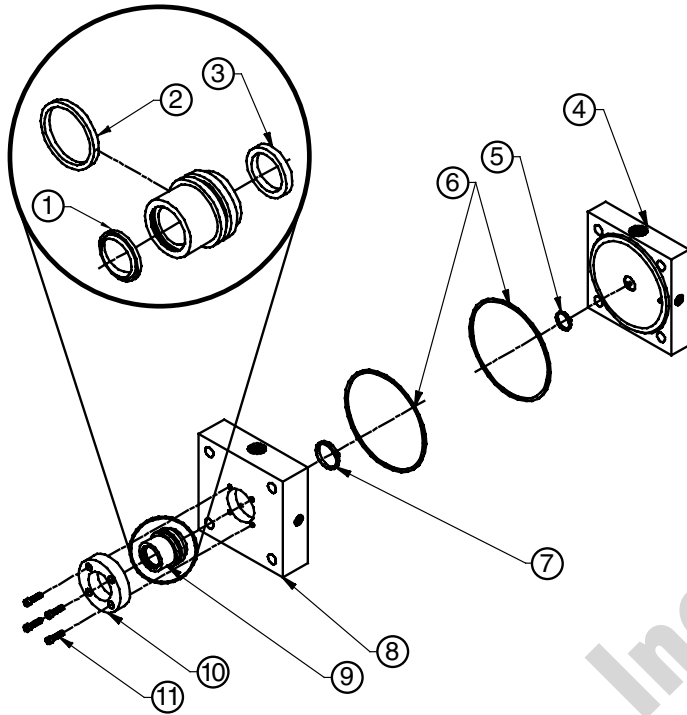
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Diagrams

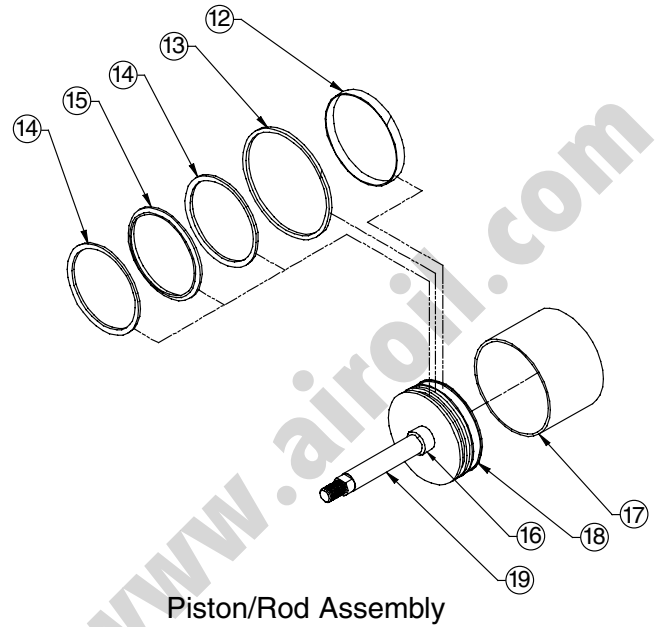
Pneumatic Service Temperatures:

Nitrile Seals: -10°F (-23°C) to 165°F (74°C)

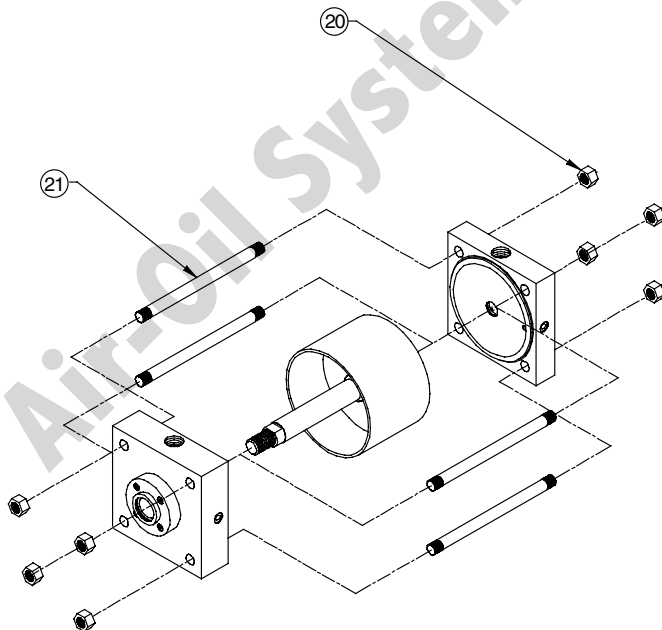
Viton® Seals: 0°F (-17°C) to 400°F (204°C)



Head, Cap, and Bushing Assembly



Piston/Rod Assembly



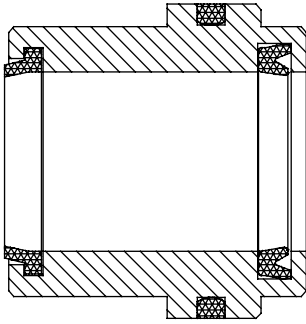
Cylinder Assembly and Tie Rod Torque

A Series

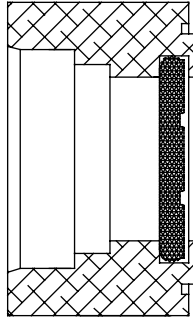
| Part # | Description | Parts included in: | | |
|--------|-------------------------|--------------------|------------|---------------------|
| | | Seal Kit | Repair Kit | Piston/Rod Assembly |
| 1 | Rod Wiper | X | | |
| 2 | Bushing O-ring | X | | |
| 3 | Rod Seal | X | | |
| 4 | Cap | | | |
| 5 | Cap Cushion Seal | X | X | |
| 6 | Tube End Seals | X | X | |
| 7 | Head Cushion Seal | X | X | |
| 8 | Head | | | |
| 9 | Loaded Bushing Assembly | | X | |
| 10 | Bushing Retainer | | | |
| 11 | Retainer Screws | | | |
| 12 | Wearband | X | X | |
| 13 | Magnet | | | X |
| 14 | Back-up Rings | X | X | |
| 15 | Piston Seal | X | X | |
| 16 | Cushion Spear | | | X |
| 17 | Tube | | | |
| 18 | Piston | | | X |
| 19 | Rod | | | X |
| 20 | Hex Nuts | | | |
| 21 | Tie Rods | | | |



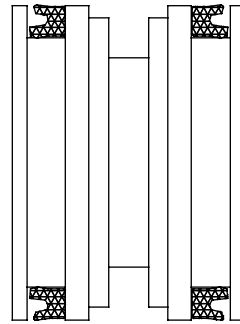
Seal Installation Guide



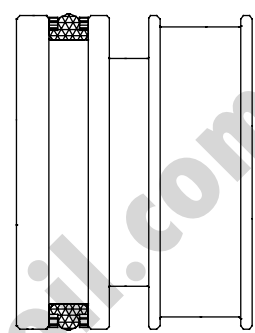
Loaded Bushing



Cushioned Head or Cap



Low Breakaway Piston



T-Seal Piston

Torque Tolerances (LBS-FT) Tie Rod Nut Part #20

| Bore | Min. | Max. |
|--------|------|------|
| 1-1/2" | 8 | 10 |
| 2" | 15 | 20 |
| 2-1/2" | 15 | 20 |
| 3-1/4" | 23 | 30 |
| 4" | 23 | 30 |
| 5" | 50 | 60 |
| 6" | 50 | 60 |
| 8" | 80 | 90 |
| 10" | 200 | 220 |
| 12" | 200 | 220 |
| 14" | 300 | 330 |

Retainer Screws Torque Tolerances (lbs-ft) Part #11

| Size | Min. | Max. |
|---------|------|------|
| #10-32 | 1 | 1.5 |
| 1/4-28 | 5 | 7 |
| 5/16-24 | 10 | 12 |

Note: Sinker Tubes are not included in kits. They can be ordered using the part numbers from the provided chart.

Sinker Tube Part Numbers

| Bore | Part # |
|--------|---------|
| 1-1/2" | A06-K91 |
| 2" | A06-L91 |
| 2-1/2" | A06-P91 |
| 3-1/4" | A06-M91 |
| 4" | A06-R91 |
| 5" | A06-T91 |
| 6" | A06-U91 |
| 8" | A06-W91 |
| 10" | A06-X91 |
| 12" | A06-Y91 |
| 14" | A06-B91 |

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