

NFPA Aluminum & Steel Cylinders

NFPA Aluminum & Steel Cylinders

1-1/2 to 12 inch bore size

Impact dampening seals

Adjustable captive cushion needle

Ecology cylinders meet OSHA noise standards

Constructed of the finest materials

Technical data

Medium:

Filtered compressed air to 250 PSI

Petroleum based hydraulic fluid to 400 PSI*

Operating temperature:

Series A & J -20°F to 200°F with Viton Seals -20°F to 400°F

Operating Pressure:

250 PSIG Air, 400 PSIG Hydraulic*

Bore Sizes: 1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6", 7", 8", 10", 12"

Lubrication:

None required

Norgren Air Cylinders are rated for "no lube added" service. All internal components are lubricated at time of assembly with a Teflon® based grease.

Materials:

Head and End Caps: black anodized 6061-T6 aluminum

Head and End Caps: precision machined steel*

Tube: 6063-T832 aluminum, clear anodized O.D., hard coat anodized I.D.

Rod: hard chrome plated steel

Piston: machined high-strength aluminum alloy

Rod: hard chrome plated steel

Rod Bearing: oil impregnated sintered iron*

Seals: nitrile rod seal, urethane rod wiper, nitrile piston seals, nitrile tube end seals

Tie Rods: high-tensile strength steel

* J and EJ series only



1 Ultra Cushion® Seals: Advanced design features a unique, one-piece, compound seal of nitrile* captured within a precision machined groove. Linear and radial "float" of the cushion seals eliminates misalignment. Ultra Cushions provide exceptionally fast "out of cushion" stroke reversal. (Head and Cap Cushions are optional.)

*Nitrile seals on the 5/8" & 1" rod diameter. For rod sizes 1-3/8" and larger, urethane seals are standard.

2 O-Ring Tube Seal: Buna is standard. (Viton is optional.)

3 Adjustable Captive Cushion Needle: A one-piece, precision threaded brass cushion adjustment screw with a threaded steel capture ring. It provides safe and precise cushion adjustment.

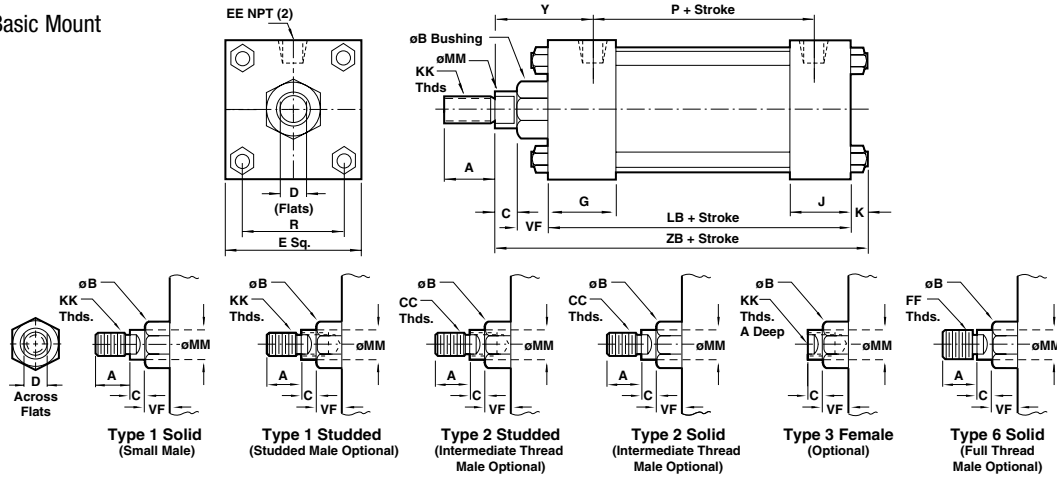


4 Wiper Seal: Lip-type urethane wiper seal keeps contaminants from getting into cylinder by aggressively wiping foreign materials from the piston rod, enhancing the rod seal life.

5 Wear Ring: Reinforced Teflon® compounded with polyphenylene sulfide provides supreme wear and excellent bearing support.

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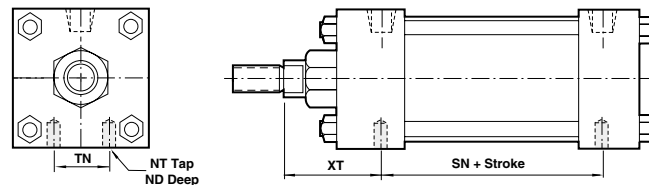
NFPA (MX0) 05 Basic Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|--------------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|
| ø Rod Std. | 5/8" | 5/8" | 5/8" | 1" | 1" | 1" | 1-3/8" | 1-3/8" | 1-3/8" | 1-3/4" | 2" |
| MM O.S. | 1" | 1" | 1" | 1-3/8" | 1-3/8" | 1-3/8" | 1-3/4" | 1-3/4" | 1-3/4" | 2" | 2-1/2" |
| A Std. | .750 | .750 | .750 | 1.125 | 1.125 | 1.125 | 1.625 | 1.625 | 1.625 | 2.000 | 2.250 |
| A O.S. | 1.125 | 1.125 | 1.125 | 1.625 | 1.625 | 1.625 | 2.000 | 2.000 | 2.000 | 2.250 | 3.000 |
| B +.000 Std. | 1.124 | 1.124 | 1.124 | 1.499 | 1.499 | 1.499 | 1.999 | 1.999 | 1.999 | 2.374 | 2.624 |
| B -.002 O.S. | 1.499 | 1.499 | 1.499 | 1.999 | 1.999 | 1.999 | 2.374 | 2.374 | 2.374 | 2.624 | 3.124 |
| C Std. | .375 | .375 | .375 | .500 | .500 | .500 | .625 | .625 | .625 | .750 | .875 |
| C O.S. | .500 | .500 | .500 | .625 | .625 | .625 | .750 | .750 | .750 | .875 | 1.000 |
| CC Std. | 1/2 - 20 | 1/2 - 20 | 1/2 - 20 | 7/8 - 14 | 7/8 - 14 | 7/8 - 14 | 1-1/4 - 12 | 1-1/4 - 12 | 1-1/4 - 12 | 1-1/2 - 12 | 1-3/4 - 12 |
| CC O.S. | 7/8 - 14 | 7/8 - 14 | 7/8 - 14 | 1-1/4 - 12 | 1-1/4 - 12 | 1-1/4 - 12 | 1-1/2 - 12 | 1-1/2 - 12 | 1-1/2 - 12 | 1-3/4 - 12 | 2-1/4 - 12 |
| D Std. | .500 | .500 | .500 | .813 | .813 | .813 | 1.125 | 1.125 | 1.125 | 1.500 | 1.688 |
| D O.S. | .813 | .813 | .813 | 1.125 | 1.125 | 1.125 | 1.500 | 1.500 | 1.500 | 1.688 | 2.063 |
| E | 2.000 | 2.500 | 3.000 | 3.750 | 4.500 | 5.500 | 6.500 | 7.500 | 8.500 | 10.625 | 12.750 |
| EE | .375 | .375 | .375 | .500 | .500 | .500 | .750 | .750 | .750 | 1.000 | 1.000 |
| FF Std. | 5/8-18 | 5/8-18 | 5/8-18 | 1 - 14 | 1 - 14 | 1 - 14 | 1-3/8-12 | 1-3/8-12 | 1-3/8-12 | 1-3/4-12 | 2-12 |
| FF O.S. | 1 - 14 | 1 - 14 | 1 - 14 | 1-3/8-12 | 1-3/8-12 | 1-3/8-12 | 1-3/4-12 | 1-3/4-12 | 1-3/4-12 | 2-12 | 2-1/2-12 |
| G | 1.500 | 1.500 | 1.500 | 1.750 | 1.750 | 1.750 | 2.000 | 2.000 | 2.000 | 2.250 | 2.250 |
| J | 1.000 | 1.000 | 1.000 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 | 2.000 | 2.000 |
| K | .250 | .313 | .313 | .375 | .375 | .438 | .438 | .563 | .563 | .688 | .688 |
| KK Std. | 7/16 - 20 | 7/16 - 20 | 7/16 - 20 | 3/4 - 16 | 3/4 - 16 | 3/4 - 16 | 1 - 14 | 1 - 14 | 1 - 14 | 1-1/4 - 12 | 1-1/2 - 12 |
| KK O.S. | 3/4 - 16 | 3/4 - 16 | 3/4 - 16 | 1 - 14 | 1 - 14 | 1 - 14 | 1-1/4 - 12 | 1-1/4 - 12 | 1-1/4 - 12 | 1-1/2 - 12 | 1-7/8 - 12 |
| LB | 3.625 | 3.625 | 3.750 | 4.250 | 4.250 | 4.500 | 5.000 | 5.125 | 5.125 | 6.375 | 6.875 |
| P | 2.340 | 2.340 | 2.470 | 2.690 | 2.690 | 2.940 | 3.125 | 3.250 | 3.250 | 4.125 | 4.625 |
| R | 1.428 | 1.838 | 2.192 | 2.758 | 3.323 | 4.101 | 4.87 | 5.730 | 6.442 | 7.969 | 9.4069 |
| VF Std. | .625 | .625 | .625 | .875 | .875 | 1.000 | 1.000 | 1.000 | 1.000 | 1.125 | 1.125 |
| VF O.S. | .875 | .875 | .875 | 1.000 | 1.000 | 1.000 | 1.125 | 1.125 | 1.125 | 1.125 | 1.250 |
| Y Std. | 1.840 | 1.840 | 1.840 | 2.380 | 2.380 | 2.380 | 2.813 | 2.813 | 2.813 | 3.125 | 3.250 |
| Y O.S. | 2.220 | 2.220 | 2.220 | 2.630 | 2.630 | 2.630 | 3.063 | 3.063 | 3.063 | 3.250 | 3.500 |
| ZB Std. | 4.875 | 4.938 | 5.063 | 6.000 | 6.000 | 6.313 | 7.063 | 7.313 | 7.313 | 8.938 | 9.563 |
| ZB O.S. | 5.250 | 5.313 | 5.438 | 6.250 | 6.250 | 6.563 | 7.313 | 7.563 | 7.563 | 9.063 | 9.813 |

All dimensions ± .015 unless otherwise noted.

NFPA (MS4) 01 Side Tapped Mount

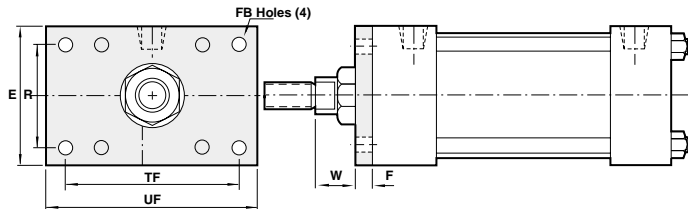


| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|---------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-------|-------|
| ND | .375 | .375 | .500 | .750 | .750 | .938 | 1.125 | 1.125 | 1.125 | 1.500 | 1.500 |
| NT | 1/4 - 20 | 5/16 - 18 | 3/8 - 16 | 1/2 - 13 | 1/2 - 13 | 5/8 - 11 | 3/4 - 10 | 3/4 - 10 | 3/4 - 10 | 1 - 8 | 1 - 8 |
| SN | 2.250 | 2.250 | 2.375 | 2.625 | 2.625 | 2.875 | 3.125 | 3.250 | 3.250 | 4.125 | 4.625 |
| TN | .625 | .875 | 1.250 | 1.500 | 2.063 | 2.688 | 3.250 | 3.500 | 4.500 | 5.500 | 7.250 |
| XT Std. | 1.938 | 1.938 | 1.938 | 2.438 | 2.438 | 2.438 | 2.813 | 2.813 | 2.813 | 3.125 | 3.250 |
| XT O.S. | 2.313 | 2.313 | 2.313 | 2.688 | 2.688 | 2.688 | 3.063 | 3.063 | 3.063 | 3.250 | 3.500 |

All dimensions ± .015 unless otherwise noted.

NFPA Aluminum & Steel Cylinders

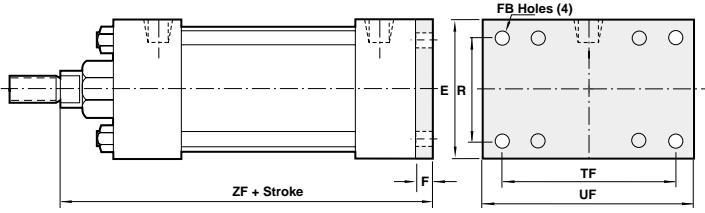
NFPA (MF1) 03 Head Rectangular Flange Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" |
|------|-----------|-------|--------|--------|-------|-------|-------|
| E | 2.000 | 2.500 | 3.000 | 3.750 | 4.500 | 5.500 | 6.500 |
| F | .375 | .375 | .375 | .625 | .625 | .625 | .750 |
| FB | .313 | .375 | .375 | .438 | .438 | .563 | .563 |
| R | 1.428 | 1.838 | 2.192 | 2.758 | 3.323 | 4.101 | 4.879 |
| TF | 2.750 | 3.375 | 3.875 | 4.688 | 5.438 | 6.625 | 7.625 |
| UF | 3.375 | 4.125 | 4.625 | 5.500 | 6.250 | 7.625 | 8.625 |
| W | Std. .625 | .625 | .625 | .750 | .750 | .750 | .875 |
| O.S. | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.125 |

All dimensions ± .015 unless otherwise noted.

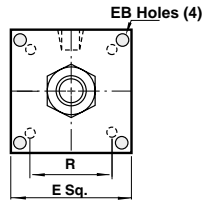
NFPA (MF2) 04 Cap Rectangular Flange Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" |
|------|------------|-------|--------|--------|-------|-------|-------|
| E | 2.000 | 2.500 | 3.000 | 3.750 | 4.500 | 5.500 | 6.500 |
| F | .375 | .375 | .375 | .625 | .625 | .625 | .750 |
| R | 1.428 | 1.838 | 2.192 | 2.758 | 3.323 | 4.101 | 4.879 |
| TF | 2.750 | 3.375 | 3.875 | 4.687 | 5.438 | 6.625 | 7.625 |
| UF | 3.375 | 4.125 | 4.625 | 5.500 | 6.250 | 7.625 | 8.625 |
| ZF | Std. 5.000 | 5.000 | 5.125 | 6.250 | 6.250 | 6.500 | 7.375 |
| O.S. | 5.375 | 5.375 | 5.500 | 6.500 | 6.500 | 6.750 | 7.625 |

All dimensions ± .015 unless otherwise noted.

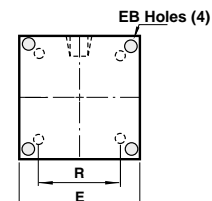
NFPA (ME3) 03 Head Square Mount



| Bore | 7" | 8" | 10" | 12" |
|------|-------|-------|--------|--------|
| E | 7.500 | 8.500 | 10.625 | 12.750 |
| EB | .563 | .688 | .813 | .813 |
| R | 5.730 | 6.442 | 7.969 | 9.406 |

All dimensions ± .015 unless otherwise noted.

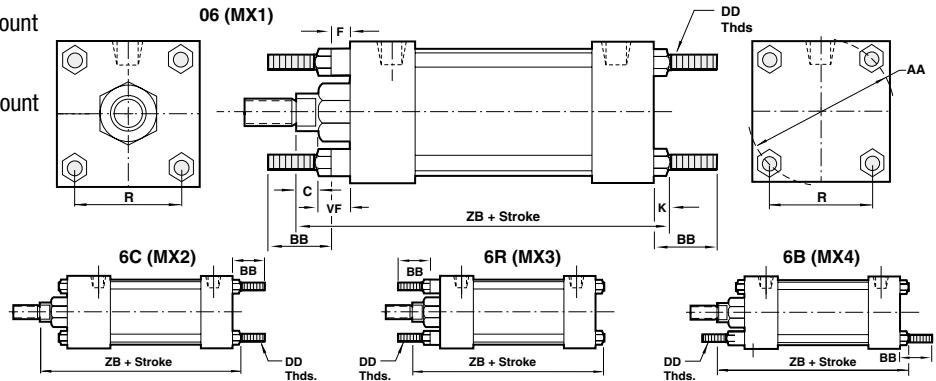
NFPA (ME4) 04 Cap Square Mount



| Bore | 7" | 8" | 10" | 12" |
|------|-------|-------|--------|--------|
| E | 7.500 | 8.500 | 10.625 | 12.750 |
| EB | .563 | .688 | .813 | .813 |
| R | 5.730 | 6.442 | 7.969 | 9.406 |

All dimensions ± .015 unless otherwise noted.

- NFPA (MX1) 06 (4) Extended Tie Rods Both Ends Mount
- NFPA (MX2) 6C Cap Tie Rods Extended Mount
- NFPA (MX3) 6R Head Tie Rods Extended Mount
- NFPA (MX4) 6B (2) Extended Tie Rods Both Ends Mount

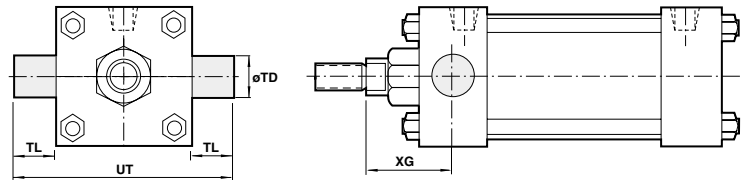


| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|------|------------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|
| AA | 2.020 | 2.600 | 3.100 | 3.900 | 4.700 | 5.800 | 6.900 | 8.100 | 9.100 | 11.313 | 13.313 |
| BB | 1.000 | 1.125 | 1.125 | 1.375 | 1.375 | 1.813 | 1.813 | 2.313 | 2.313 | 2.688 | 2.688 |
| C | Std. .375 | .375 | .375 | .500 | .500 | .500 | .625 | .625 | .625 | .750 | .875 |
| O.S. | .500 | .500 | .500 | .625 | .625 | .625 | .750 | .625 | .750 | .875 | 1.000 |
| DD | 1/4 - 28 | 5/16 - 24 | 5/16 - 24 | 3/8 - 24 | 3/8 - 24 | 1/2 - 20 | 1/2 - 20 | 5/8 - 18 | 5/8 - 18 | 3/4 - 16 | 3/4 - 16 |
| F | .375 | .375 | .375 | .625 | .625 | .625 | .750 | .750 | .750 | — | — |
| K | .250 | .313 | .313 | .375 | .375 | .438 | .438 | .563 | .563 | .688 | .688 |
| R | 1.428 | 1.838 | 2.192 | 2.758 | 3.323 | 4.101 | 4.879 | 5.730 | 6.442 | 7.969 | 9.406 |
| VF | Std. .625 | .625 | .625 | .875 | .875 | .875 | 1.000 | 1.000 | 1.000 | 1.125 | 1.125 |
| O.S. | .875 | .875 | .875 | 1.000 | 1.000 | 1.000 | 1.125 | 1.125 | 1.125 | 1.125 | 1.250 |
| ZB | Std. 4.875 | 4.938 | 5.063 | 6.000 | 6.000 | 6.313 | 7.063 | 7.313 | 7.313 | 8.938 | 9.563 |
| O.S. | 5.250 | 5.313 | 5.438 | 6.250 | 6.250 | 6.563 | 7.313 | 7.563 | 7.563 | 9.063 | 9.813 |

All dimensions ± .015 unless otherwise noted.

NFPA Aluminum & Steel Cylinders

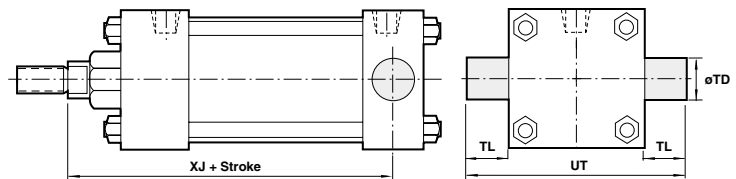
NFPA (MT1) 07 Head Trunnion Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|----------------------|------------|-------|--------|--------|-------|-------|-------|--------|--------|--------|--------|
| TD $+0.000$ -0.001 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.375 | 1.375 | 1.375 | 1.750 | 1.750 |
| TL | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.375 | 1.375 | 1.375 | 1.750 | 1.750 |
| UT | 4.000 | 4.500 | 5.000 | 5.750 | 6.500 | 7.500 | 9.250 | 10.250 | 11.250 | 14.125 | 16.250 |
| XG | Std. 1.750 | 1.750 | 1.750 | 2.250 | 2.250 | 2.250 | 2.625 | 2.625 | 2.625 | 3.000 | 3.125 |
| | O.S. 2.125 | 2.125 | 2.125 | 2.500 | 2.500 | 2.500 | 2.875 | 2.875 | 2.875 | 3.125 | 3.375 |

All dimensions $\pm .015$ unless otherwise noted.

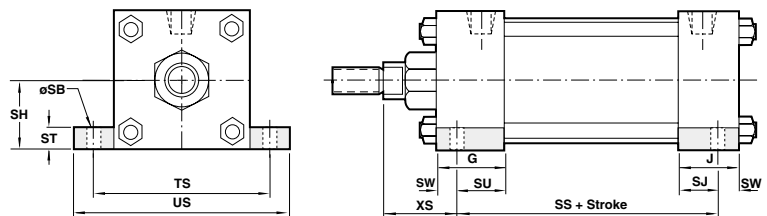
NFPA (MT2) 8R & 08 Cap Trunnion Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|----------------------|------------|-------|--------|--------|-------|-------|-------|--------|--------|--------|--------|
| TD $+0.000$ -0.001 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.375 | 1.375 | 1.375 | 1.750 | 1.750 |
| TL | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.375 | 1.375 | 1.375 | 1.750 | 1.750 |
| UT | 4.000 | 4.500 | 5.000 | 5.750 | 6.500 | 7.500 | 9.250 | 10.250 | 11.250 | 14.125 | 16.250 |
| XJ | Std. 4.125 | 4.125 | 4.250 | 5.000 | 5.000 | 5.250 | 5.875 | 6.000 | 6.000 | 7.250 | 7.875 |
| | O.S. 4.500 | 4.500 | 4.625 | 5.250 | 5.250 | 5.500 | 6.125 | 6.250 | 6.250 | 7.375 | 8.125 |

All dimensions $\pm .015$ unless otherwise noted.

NFPA (MS2) 09 Side Lug Mount

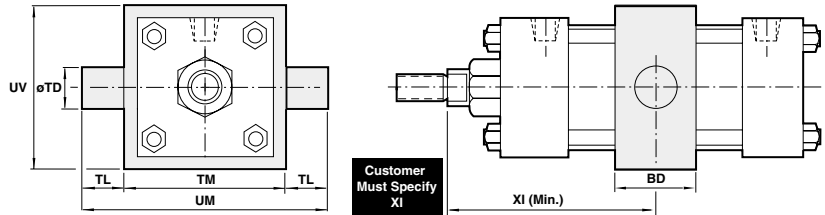


| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|------|------------|-------|--------|--------|-------|-------|-------|--------|--------|--------|--------|
| G | 1.500 | 1.500 | 1.500 | 1.750 | 1.750 | 1.750 | 2.000 | 2.000 | 2.000 | 2.250 | 2.250 |
| J | 1.000 | 1.000 | 1.000 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 | 2.000 | 2.000 |
| SB | .438 | .438 | .438 | .563 | .563 | .813 | .813 | .813 | .813 | 1.063 | 1.063 |
| SH | 1.000 | 1.250 | 1.500 | 1.875 | 2.250 | 2.750 | 3.250 | 3.750 | 4.250 | 5.313 | 6.375 |
| SJ | .625 | .625 | .625 | .750 | .750 | .813 | .813 | .813 | .813 | 2.000 | 2.000 |
| SS | 2.875 | 2.875 | 3.000 | 3.250 | 3.250 | 3.125 | 3.625 | 3.750 | 3.750 | 4.625 | 5.125 |
| ST | .500 | .500 | .500 | .750 | .750 | 1.000 | 1.000 | 1.000 | 1.000 | 1.250 | 1.250 |
| SU | 1.125 | 1.125 | 1.125 | 1.250 | 1.250 | 1.063 | 1.313 | 1.563 | 1.563 | 2.000 | 2.000 |
| SW | .375 | .375 | .375 | .500 | .500 | .688 | .688 | .688 | .688 | .875 | .875 |
| TS | 2.750 | 3.250 | 3.750 | 4.750 | 5.500 | 6.875 | 7.875 | 8.875 | 9.875 | 12.375 | 14.500 |
| US | 3.500 | 4.000 | 4.500 | 5.750 | 6.500 | 8.250 | 9.250 | 10.250 | 11.250 | 14.125 | 16.250 |
| XS | Std. 1.375 | 1.375 | 1.375 | 1.875 | 1.875 | 2.062 | 2.313 | 2.313 | 2.313 | 2.750 | 2.875 |
| | O.S. 1.750 | 1.750 | 1.750 | 2.125 | 2.125 | 2.313 | 2.562 | 2.563 | 2.563 | 2.875 | 3.125 |

All dimensions $\pm .015$ unless otherwise noted.

NFPA Aluminum & Steel Cylinders

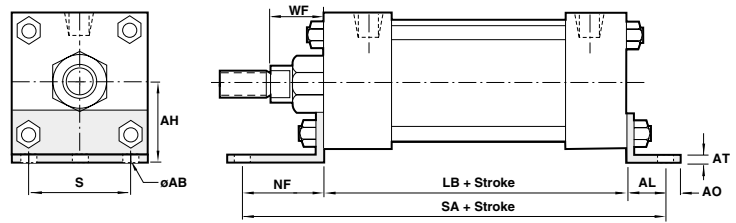
NFPA (MT4) 10 Center Trunnion Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|----------------------|--------|-------|--------|--------|-------|-------|--------|--------|--------|--------|--------|
| BD | 1.250 | 1.500 | 1.500 | 2.000 | 2.000 | 2.000 | 2.500 | 2.500 | 2.500 | 3.000 | 3.000 |
| TD $+0.000$ -0.001 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.375 | 1.375 | 1.375 | 1.750 | 1.750 |
| TL | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.375 | 1.375 | 1.375 | 1.750 | 1.750 |
| TM | 2.500 | 3.000 | 3.500 | 4.500 | 5.250 | 6.250 | 7.625 | 8.750 | 9.750 | 12.000 | 14.000 |
| UM | 4.500 | 5.000 | 5.500 | 6.500 | 7.250 | 8.250 | 10.375 | 11.500 | 12.500 | 15.500 | 17.500 |
| UV | 2.500 | 3.000 | 3.500 | 4.250 | 5.000 | 6.000 | 7.000 | 8.500 | 9.500 | 11.750 | 13.750 |
| XI min. | Std. | 3.125 | 3.250 | 3.250 | 4.125 | 4.125 | 4.625 | 4.875 | 4.875 | 5.625 | 5.750 |
| | O.S. | 3.500 | 3.625 | 3.625 | 4.375 | 4.375 | 4.875 | 5.125 | 5.125 | 5.750 | 6.000 |

All dimensions \pm .015 unless otherwise noted.

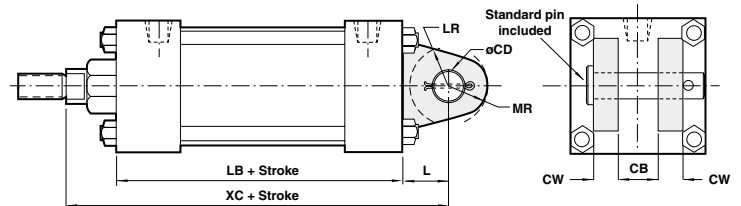
NFPA (MS1) 11 Side End Angle Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|------|--------|-------|--------|--------|-------|-------|-------|-------|-------|--------|--------|
| AB | .438 | .438 | .438 | .563 | .563 | .688 | .813 | .813 | .813 | 1.063 | 1.063 |
| AH | 1.188 | 1.438 | 1.625 | 1.938 | 2.250 | 2.750 | 3.250 | 3.750 | 4.250 | 5.313 | 6.375 |
| AL | 1.000 | 1.000 | 1.000 | 1.250 | 1.250 | 1.375 | 1.375 | 1.813 | 1.813 | 2.125 | 2.125 |
| AO | .375 | .375 | .375 | .500 | .500 | .625 | .625 | .688 | .688 | .875 | .875 |
| AT | .125 | .125 | .125 | .125 | .125 | .187 | .187 | .250 | .250 | .250 | .250 |
| LB | 3.625 | 3.625 | 3.750 | 4.250 | 4.250 | 4.500 | 5.000 | 5.125 | 5.125 | 6.375 | 6.875 |
| NF | 1.375 | 1.375 | 1.375 | 1.875 | 1.875 | 2.000 | 2.125 | 1.813 | 1.813 | 1.813 | 1.813 |
| S | 1.250 | 1.750 | 2.250 | 2.750 | 3.500 | 4.250 | 5.250 | 6.125 | 7.125 | 8.875 | 11.000 |
| SA | 6.000 | 6.000 | 6.125 | 7.375 | 7.375 | 7.875 | 8.500 | 8.750 | 8.750 | 10.625 | 11.125 |
| WF | STD. | 1.000 | 1.000 | 1.375 | 1.375 | 1.375 | 1.625 | 1.625 | 1.625 | 1.875 | 2.000 |
| | O.S. | 1.375 | 1.375 | 1.375 | 1.625 | 1.625 | 1.875 | 1.875 | 1.875 | 2.000 | 2.250 |

All dimensions \pm .015 unless otherwise noted.

NFPA (MP1) 12 Cap Fixed Clevis Mount



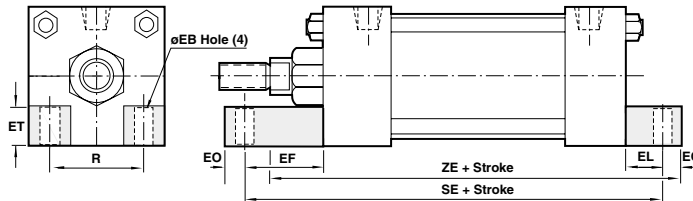
| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|------|--------|-------|--------|--------|-------|-------|-------|-------|-------|--------|--------|
| CB | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 | 2.000 | 2.500 |
| CD | .500 | .500 | .500 | .750 | .750 | .750 | 1.000 | 1.000 | 1.000 | 1.375 | 1.750 |
| CW | .500 | .500 | .500 | .625 | .625 | .625 | .750 | .750 | .750 | 1.000 | 1.250 |
| L | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 | 2.125 | 2.250 |
| LB | 3.625 | 3.625 | 3.750 | 4.250 | 4.250 | 4.500 | 5.000 | 5.125 | 5.125 | 6.375 | 6.875 |
| LR | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 | 1.875 | 2.125 |
| MR | .625 | .625 | .625 | .938 | .938 | .938 | 1.188 | 1.188 | 1.188 | 1.625 | 2.125 |
| XC | Std. | 5.375 | 5.375 | 5.500 | 6.875 | 6.875 | 7.125 | 8.125 | 8.250 | 10.375 | 11.125 |
| | O.S. | 5.750 | 5.750 | 5.875 | 7.125 | 7.125 | 7.375 | 8.375 | 8.500 | 10.500 | 11.375 |

All dimensions \pm .015 unless otherwise noted.

NFPA Aluminum & Steel Cylinders

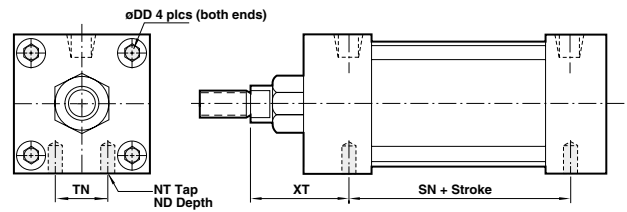
All dimensions ± .015 unless otherwise noted.

NFPA (MS7) 15 End Lug Mount



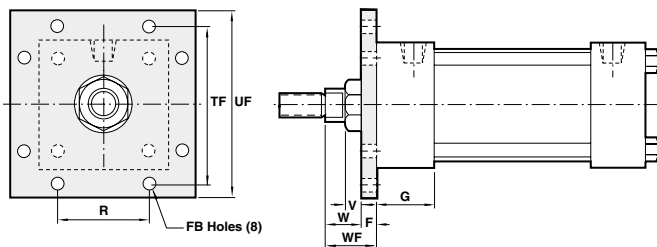
| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" |
|------|------------|-------|--------|--------|-------|-------|-------|-------|-------|
| EB | .313 | .375 | .375 | .438 | .438 | .563 | .563 | .688 | .688 |
| EF | 1.125 | 1.313 | 1.438 | 1.500 | 1.625 | 1.688 | 1.750 | 1.750 | 1.750 |
| EL | .750 | .938 | 1.063 | .875 | 1.000 | 1.063 | 1.000 | 1.125 | 1.125 |
| EO | .250 | .313 | .313 | .375 | .375 | .500 | .500 | .625 | .625 |
| ET | .500 | .750 | .750 | 1.000 | 1.250 | 1.500 | 1.500 | 1.750 | 2.063 |
| R | 1.428 | 1.838 | 2.192 | 2.758 | 3.323 | 4.101 | 4.879 | 5.730 | 6.442 |
| SE | 5.500 | 5.875 | 6.250 | 6.625 | 6.875 | 7.250 | 7.750 | 7.375 | 7.375 |
| ZE | Std. 5.625 | 5.875 | 6.125 | 6.875 | 7.000 | 7.438 | 8.125 | 8.500 | 8.500 |
| O.S. | 6.000 | 6.250 | 6.500 | 7.125 | 7.250 | 7.688 | 8.375 | 8.750 | 8.750 |

16 Sleeve Nut Construction Side Tapped (Universal Mount)



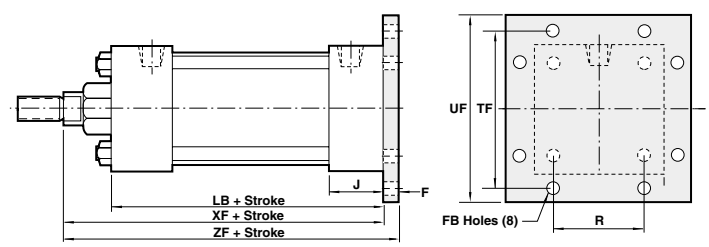
| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" |
|------|------------|-----------|----------|----------|----------|----------|----------|
| DD | 1/4-28 | 5/16-24 | 5/16-24 | 3/8-24 | 3/8-24 | 1/2-20 | 1/2-20 |
| NT | 1/4 - 20 | 5/16 - 18 | 3/8 - 16 | 1/2 - 13 | 1/2 - 13 | 5/8 - 11 | 3/4 - 10 |
| ND | .375 | .375 | .500 | .750 | .750 | .938 | 1.125 |
| SN | 2.250 | 2.250 | 2.375 | 2.625 | 2.625 | 2.875 | 3.125 |
| TN | .625 | .875 | 1.250 | 1.500 | 2.063 | 2.688 | 3.250 |
| XT | Std. 1.938 | 1.938 | 1.938 | 2.438 | 2.438 | 2.438 | 2.813 |
| O.S. | 2.313 | 2.313 | 2.313 | 2.688 | 2.688 | 2.688 | 3.063 |

NFPA (MF5) 20 Head Square Flange Mount



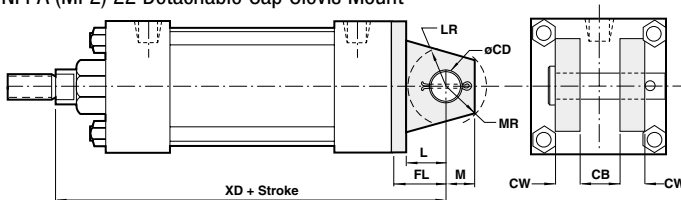
| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" |
|------|------------|-------|--------|--------|-------|-------|-------|
| F | .375 | .375 | .375 | .625 | .625 | .625 | .750 |
| FB | .313 | .375 | .375 | .438 | .438 | .563 | .563 |
| G | 1.500 | 1.500 | 1.500 | 1.750 | 1.750 | 1.750 | 2.000 |
| R | 1.428 | 1.838 | 2.192 | 2.758 | 3.323 | 4.101 | 4.879 |
| TF | 2.750 | 3.375 | 3.875 | 4.688 | 5.438 | 6.625 | 7.625 |
| UF | 3.375 | 4.125 | 4.625 | 5.500 | 6.250 | 7.625 | 8.625 |
| V | Std. .250 | .250 | .250 | .250 | .250 | .250 | .250 |
| O.S. | .500 | .500 | .500 | .375 | .375 | .375 | .375 |
| W | Std. .625 | .625 | .625 | .750 | .750 | .750 | .875 |
| O.S. | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.125 |
| WF | Std. 1.000 | 1.000 | 1.000 | 1.375 | 1.375 | 1.375 | 1.625 |
| O.S. | 1.375 | 1.375 | 1.375 | 1.625 | 1.625 | 1.625 | 1.875 |

NFPA (MF6) 21 Cap Square Flange Mount



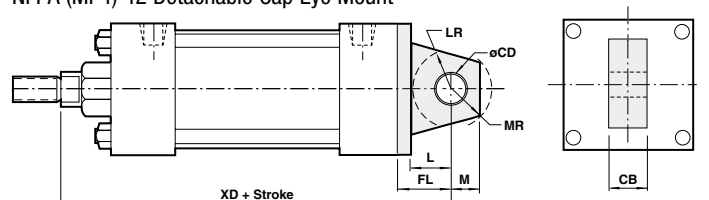
| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" |
|------|------------|-------|--------|--------|-------|-------|-------|
| F | .375 | .375 | .375 | .625 | .625 | .625 | .750 |
| FB | .313 | .375 | .375 | .438 | .438 | .563 | .563 |
| J | 1.000 | 1.000 | 1.000 | 1.250 | 1.250 | 1.250 | 1.500 |
| LB | 3.625 | 3.625 | 3.750 | 4.250 | 4.250 | 4.500 | 5.000 |
| R | 1.428 | 1.838 | 2.192 | 2.758 | 3.323 | 4.101 | 4.879 |
| TF | 2.750 | 3.375 | 3.875 | 4.688 | 5.438 | 6.625 | 7.625 |
| UF | 3.375 | 4.125 | 4.625 | 5.500 | 6.250 | 7.625 | 8.625 |
| XF | Std. 4.625 | 4.625 | 4.750 | 5.625 | 5.625 | 5.875 | 6.625 |
| O.S. | 5.000 | 5.000 | 5.125 | 5.875 | 5.875 | 6.125 | 6.875 |
| ZF | Std. 5.000 | 5.000 | 5.125 | 6.250 | 6.250 | 6.500 | 7.375 |
| O.S. | 5.375 | 5.375 | 5.500 | 6.500 | 6.500 | 6.750 | 7.625 |

NFPA (MP2) 22 Detachable Cap Clevis Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" |
|------|------------|-------|--------|--------|-------|-------|-------|-------|-------|
| CB | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 |
| CD | .500 | .500 | .500 | .750 | .750 | .750 | 1.000 | 1.000 | 1.000 |
| CW | .500 | .500 | .500 | .625 | .625 | .625 | .750 | .750 | .750 |
| FL | 1.125 | 1.125 | 1.125 | 1.875 | 1.875 | 1.875 | 2.250 | 2.250 | 2.250 |
| L | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 |
| LR | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 |
| M | .500 | .500 | .500 | .750 | .750 | .750 | 1.000 | 1.000 | 1.000 |
| MR | .625 | .625 | .625 | .938 | .938 | .938 | 1.188 | 1.188 | 1.188 |
| XD | Std. 5.750 | 5.750 | 5.875 | 7.500 | 7.500 | 7.750 | 8.875 | 9.000 | 9.000 |
| O.S. | 6.125 | 6.125 | 6.250 | 7.750 | 7.750 | 8.000 | 9.125 | 9.250 | 9.250 |

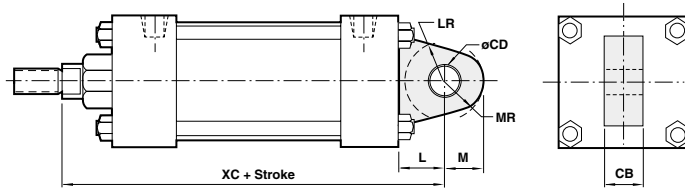
NFPA (MP4) 42 Detachable Cap Eye Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" |
|------|------------|-------|--------|--------|-------|-------|-------|-------|-------|
| CB | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 |
| CD | .500 | .500 | .500 | .750 | .750 | .750 | 1.000 | 1.000 | 1.000 |
| FL | 1.125 | 1.125 | 1.125 | 1.875 | 1.875 | 1.875 | 2.250 | 2.250 | 2.250 |
| L | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 |
| LR | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 |
| M | .500 | .500 | .500 | .750 | .750 | .750 | 1.000 | 1.000 | 1.000 |
| MR | .625 | .625 | .625 | .938 | .938 | .938 | 1.188 | 1.188 | 1.188 |
| XD | Std. 5.750 | 5.750 | 5.875 | 7.500 | 7.500 | 7.750 | 8.875 | 9.000 | 9.000 |
| O.S. | 6.125 | 6.125 | 6.250 | 7.750 | 7.750 | 8.000 | 9.125 | 9.250 | 9.250 |

NFPA Aluminum & Steel Cylinders

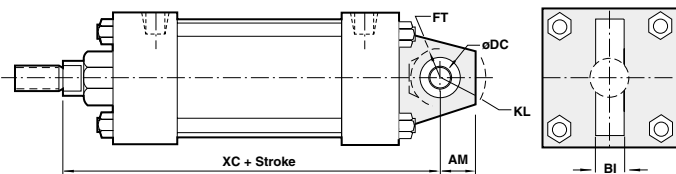
NFPA (MP3) 32 Cap Fixed Eye



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|---------|--------|-------|--------|--------|-------|-------|-------|-------|-------|--------|--------|
| CB | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 | 2.000 | 2.500 |
| CD | .500 | .500 | .500 | .750 | .750 | .750 | 1.000 | 1.000 | 1.000 | 1.375 | 1.750 |
| L | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 | 2.125 | 2.250 |
| LR | .750 | .750 | .750 | 1.250 | 1.250 | 1.250 | 1.500 | 1.500 | 1.500 | 1.875 | 2.125 |
| M | .500 | .500 | .500 | .750 | .750 | .750 | 1.000 | 1.000 | 1.000 | 1.375 | 1.750 |
| MR | .625 | .625 | .625 | .938 | .938 | .938 | 1.188 | 1.188 | 1.188 | 1.625 | 2.125 |
| XC Std. | 5.375 | 5.375 | 5.500 | 6.875 | 6.875 | 7.125 | 8.125 | 8.250 | 8.250 | 10.375 | 11.125 |
| O.S. | 5.750 | 5.750 | 5.875 | 7.125 | 7.125 | 7.375 | 8.375 | 8.500 | 8.500 | 10.500 | 11.375 |

All dimensions ± .015 unless otherwise noted.

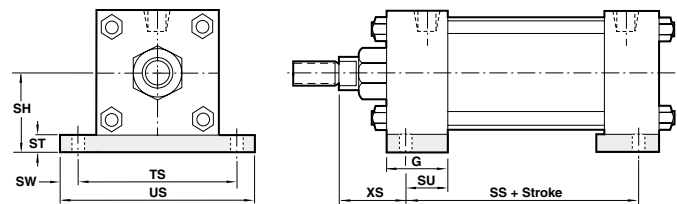
52 (Not NFPA) Spherical Bearing Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" |
|---------|--------|-------|--------|--------|-------|-------|-------|-------|-------|
| AM | .750 | .750 | .750 | 1.000 | 1.000 | 1.000 | 1.250 | 1.250 | 1.250 |
| BI | .438 | .438 | .438 | .656 | .656 | .656 | .875 | .875 | .875 |
| DC | .500 | .500 | .500 | .750 | .750 | .750 | 1.000 | 1.000 | 1.000 |
| FT | .625 | .625 | .625 | 1.000 | 1.000 | 1.000 | 1.250 | 1.250 | 1.250 |
| KL | .969 | .969 | .969 | 1.406 | 1.406 | 1.406 | 1.719 | 1.719 | 1.719 |
| XC Std. | 5.375 | 5.375 | 5.500 | 6.875 | 6.875 | 7.125 | 8.125 | 8.250 | 8.250 |
| O.S. | 5.750 | 5.750 | 5.875 | 7.125 | 7.125 | 7.375 | 8.375 | 8.500 | 8.500 |

All dimensions ± .015 unless otherwise noted.

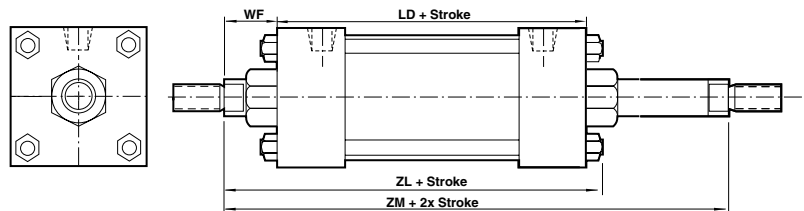
60 Base (Not NFPA) Bar Mount



| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" |
|---------|--------|-------|--------|--------|-------|-------|-------|
| G | 1.500 | 1.500 | 1.500 | 1.750 | 1.750 | 1.750 | 2.000 |
| SH | 1.250 | 1.500 | 1.875 | 2.375 | 2.750 | 3.500 | 4.000 |
| SS | 2.875 | 2.875 | 3.000 | 3.250 | 3.250 | 3.125 | 3.625 |
| ST | .250 | .250 | .375 | .500 | .500 | .750 | .750 |
| SU | 1.125 | 1.125 | 1.125 | 1.250 | 1.250 | 1.063 | 1.313 |
| SW | .375 | .375 | .375 | .500 | .500 | .688 | .688 |
| TS | 2.750 | 3.250 | 3.750 | 4.750 | 5.500 | 6.875 | 7.875 |
| US | 3.500 | 4.000 | 4.500 | 5.750 | 6.500 | 8.250 | 9.250 |
| XS Std. | 1.375 | 1.375 | 1.375 | 1.875 | 1.875 | 2.063 | 2.313 |
| O.S. | 1.750 | 1.750 | 1.750 | 2.125 | 2.125 | 2.313 | 2.563 |

All dimensions ± .015 unless otherwise noted.

NFPA (MX0) 05 Basic with Double Rod End Cylinder



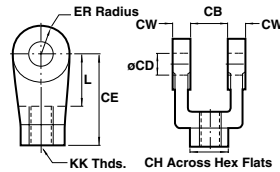
| Bore | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 7" | 8" | 10" | 12" |
|---------|--------|-------|--------|--------|-------|-------|-------|-------|-------|--------|--------|
| LD | 4.125 | 4.125 | 4.250 | 4.750 | 4.750 | 5.000 | 5.500 | 5.625 | 5.625 | 6.625 | 7.125 |
| WF Std. | 1.000 | 1.000 | 1.000 | 1.375 | 1.375 | 1.375 | 1.625 | 1.625 | 1.625 | 1.875 | 2.000 |
| O.S. | 1.375 | 1.375 | 1.375 | 1.625 | 1.625 | 1.625 | 1.875 | 1.875 | 1.875 | 2.000 | 2.250 |
| ZL Std. | 5.375 | 5.438 | 5.563 | 6.500 | 6.500 | 6.813 | 7.563 | 7.813 | 7.813 | 10.375 | 11.125 |
| O.S. | 5.750 | 5.813 | 5.938 | 6.750 | 6.750 | 7.063 | 7.813 | 8.125 | 8.125 | 10.625 | 11.625 |
| ZM Std. | 6.125 | 6.125 | 6.250 | 7.500 | 7.500 | 7.500 | 8.750 | 8.875 | 8.875 | 9.250 | 9.675 |
| O.S. | 6.875 | 6.875 | 7.000 | 8.000 | 8.000 | 8.000 | 9.250 | 9.375 | 9.375 | 9.375 | 10.375 |

All dimensions ± .015 unless otherwise noted.

All dimensions ± .015 unless otherwise noted.

NFPA Aluminum & Steel Cylinders

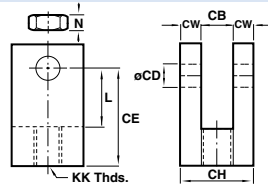
NFPA Rod Clevis



Note: Rod Clevis Assembly 49102A and 49103A are supplied with NFPA Pin. All others are with Standard Pin

| Rod Clevis | Rod Clevis Assy. | KK | CB | CD | CE | CH | CW | ER | L |
|------------|------------------|------------|-------|-------|-------|-------|-------|-------|-------|
| 49028 | 49028A | 7/16 - 20 | .750 | .500 | 1.500 | 1.000 | .500 | .500 | .750 |
| 49029 | 49029A | 1/2 - 20 | .750 | .500 | 1.500 | 1.000 | .500 | .500 | .750 |
| 49097 | 49097A | 5/8 - 18 | .750 | .500 | 1.500 | 1.000 | .500 | .500 | .750 |
| 49030 | 49030A | 3/4 - 16 | 1.250 | .750 | 2.375 | 1.250 | .625 | .750 | 1.250 |
| 49098 | 49098A | 7/8 - 14 | 1.250 | .750 | 2.375 | 1.250 | .625 | .750 | 1.250 |
| 49032 | 49032A | 1 - 14 | 1.500 | 1.000 | 3.125 | 1.500 | .750 | 1.000 | 1.500 |
| 49033 | 49033A | 1 1/4 - 12 | 2.000 | 1.375 | 4.125 | 2.000 | 1.000 | 1.375 | 2.125 |
| 49099 | 49099A | 1 3/8 - 12 | 2.000 | 1.375 | 4.125 | 2.000 | 1.000 | 1.000 | 2.125 |
| 49034 | 49034A | 1 1/2 - 12 | 2.500 | 1.750 | 4.500 | 2.375 | 1.250 | 1.750 | 2.250 |
| 49100 | 49100A | 1 3/4 - 12 | 2.500 | 1.750 | 4.500 | 2.375 | 1.250 | 1.750 | 2.250 |
| 49036 | 49036A | 1 7/8 - 12 | 2.500 | 2.000 | 5.500 | 2.937 | 1.250 | 2.000 | 2.500 |
| 49101 | 49101A | 2 - 12 | 2.500 | 2.000 | 5.500 | 2.937 | 1.250 | 2.000 | 2.500 |
| 49102 | 49102A | 2 1/4 - 12 | 3.000 | 2.500 | 6.500 | 3.500 | 1.500 | 2.750 | 3.000 |
| 49103 | 49103A | 2 1/2 - 12 | 3.000 | 3.000 | 6.750 | 3.875 | 1.500 | 2.750 | 3.250 |

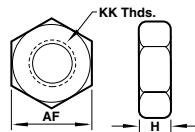
Small Rod Clevis & Jam Nut



Note: Rod Clevis Assembly is supplied with Jam Nut and Standard Pin.

| Rod Clevis | Rod Clevis Assy. | KK | CB | CD | CE | CH | CW | L | N |
|------------|------------------|----------|------|------|-------|-------|------|-------|------|
| 49218 | 49218A | 1/2 - 20 | .500 | .500 | 1.375 | 1.000 | .250 | .750 | .375 |
| 49219 | 49219A | 3/4 - 16 | .750 | .750 | 1.750 | 1.500 | .375 | 1.000 | .500 |

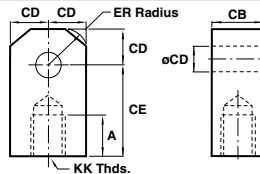
Rod Jam Nut



| | 52025 | 52026 | 52027 | 52010 | 52029 | 52030 | 52085 |
|----|-----------|----------|----------|----------|----------|--------|------------|
| KK | 7/16 - 20 | 1/2 - 20 | 5/8 - 18 | 3/4 - 16 | 7/8 - 14 | 1 - 14 | 1 1/4 - 12 |
| AF | .688 | .750 | .938 | 1.125 | 1.313 | 1.500 | 1.875 |
| H | .250 | .313 | .375 | .422 | .484 | .547 | .719 |

| | 52092 | 52068 | 52082 | 52070 | 52093 | 52083 | 52075 |
|----|-----------|------------|------------|------------|--------|------------|------------|
| KK | 13/8 - 12 | 1 1/2 - 12 | 1 3/4 - 12 | 1 7/8 - 12 | 2 - 12 | 2 1/4 - 12 | 2 1/2 - 12 |
| AF | 2.063 | 2.250 | 2.625 | 2.938 | 3.125 | 3.500 | 3.875 |
| H | .781 | .844 | .969 | 1.031 | 1.094 | 1.203 | 1.453 |

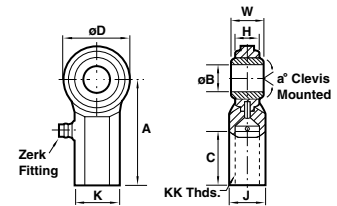
NFPA Rod Eye



Note: Rod Eye Assembly 49062A and 49096A are supplied with NFPA Pin. All others are supplied with Standard Pin

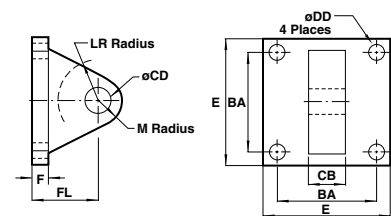
| Rod Eye | Rod Eye Assy. | KK | A | CB | CD | CE | ER |
|---------|---------------|------------|-------|-------|-------|-------|-------|
| 49015 | 49015A | 7/16 - 20 | .750 | .750 | .500 | 1.500 | .563 |
| 49014 | 49014A | 1/2 - 20 | .750 | .750 | .500 | 1.500 | .563 |
| 49091 | 49091A | 5/8 - 18 | .750 | 1.250 | .750 | 2.063 | .500 |
| 49013 | 49013A | 3/4 - 16 | 1.125 | 1.250 | .750 | 2.063 | .938 |
| 49092 | 49092A | 7/8 - 14 | 1.125 | 1.250 | .750 | 2.063 | .750 |
| 49011 | 49011A | 1 - 14 | 1.625 | 1.500 | 1.000 | 2.813 | 1.125 |
| 49010 | 49010A | 1 1/4 - 12 | 2.000 | 2.000 | 1.375 | 3.438 | 1.563 |
| 49093 | 49093A | 1 3/8 - 12 | 1.625 | 2.000 | 1.375 | 3.438 | 1.375 |
| 49009 | 49009A | 1 1/2 - 12 | 2.250 | 2.500 | 1.750 | 4.000 | 2.500 |
| 49094 | 49094A | 1 3/4 - 12 | 2.250 | 2.500 | 1.750 | 4.000 | 2.500 |
| 49007 | 49007A | 1 7/8 - 12 | 3.000 | 2.500 | 2.000 | 5.000 | 2.875 |
| 49095 | 49095A | 2 - 12 | 2.250 | 2.500 | 2.000 | 5.000 | 2.875 |
| 49062 | 49062A | 2 1/4 - 12 | 3.000 | 3.000 | 2.500 | 5.813 | 3.250 |
| 49096 | 49096A | 2 1/2 - 12 | 3.000 | 3.000 | 3.000 | 6.125 | 3.250 |

Spherical Rod Eye



| Spherical Rod Eye | 49220 | 49221 | 49222 |
|-------------------------|--------------------|--------------|----------|
| Spherical Rod Eye Assy. | 49220A | 49221A | 49222A |
| Bore | 1-1/2, 2 & 2-1/2 | 3-1/4, 4 & 5 | 6 & 8 |
| KK | UNF-2B | 1/2 - 20 | 3/4 - 16 |
| a° | Misalignment Angle | 12 | 14 |
| A | | 2.125 | 2.875 |
| B | + .0025 / -.0005 | .500 | .750 |
| C | + .062 / -.031 | 1.063 | 1.563 |
| D | ± .010 | 1.313 | 1.750 |
| H | Reference | .453 | .593 |
| J | ± .010 | .750 | 1.000 |
| K | ± .010 | .875 | 1.125 |
| W | + .000 / -.005 | .625 | .875 |

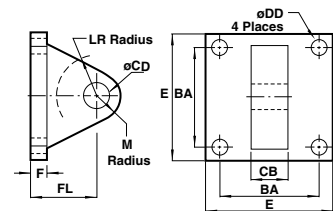
NFPA Eye Bracket



Note: NFPA Eye Bracket Assembly is supplied with Standard Pin.

| NFPA Eye Bracket | 49021 | 49020 | 49019 | 49016 | 49017 | 49018 |
|----------------------|--------|--------|--------|--------|--------|--------|
| Eye Bracket Assembly | 49021A | 49020A | 49019A | 49016A | 49017A | 49018A |
| BA | 1.625 | 2.563 | 3.250 | 3.813 | 4.937 | 5.750 |
| CB | .750 | 1.250 | 1.500 | 2.000 | 2.500 | 2.500 |
| CD | .500 | .750 | 1.000 | 1.375 | 1.750 | 2.000 |
| DD | .406 | .531 | .656 | .656 | .906 | 1.026 |
| E | 2.500 | 3.500 | 4.500 | 5.000 | 6.500 | 7.500 |
| F | .375 | .625 | .750 | .875 | .875 | 1.000 |
| FL | 1.125 | 1.875 | 2.250 | 3.000 | 3.125 | 3.500 |
| LR | .750 | 1.250 | 1.500 | 2.125 | 2.250 | 2.500 |
| M | .500 | .750 | 1.000 | 1.375 | 1.750 | 2.000 |

Norgren Eye Bracket

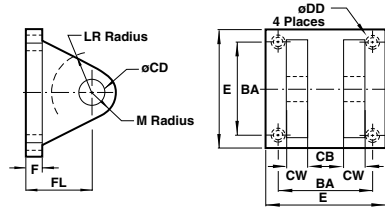


Note: Norgren Eye Bracket Assembly is supplied with Standard Pin.

| Eye Bracket | 49240 | 49241 | 49242 | 49243 | 49244 | 49019 | 49016 | 49017 | 49018 |
|----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Eye Bracket Assembly | 49240A | 49241A | 49242A | 49243A | 49244A | 49019A | 49016A | 49017A | 49018A |
| BA | 1.438 | 1.844 | 2.188 | 2.938 | 3.563 | 3.250 | 3.813 | 4.950 | 5.730 |
| CB | .750 | .750 | .750 | 1.250 | 1.250 | 1.500 | 2.000 | 2.500 | 2.500 |
| CD | .500 | .500 | .500 | .750 | .750 | 1.000 | 1.375 | 1.750 | 2.000 |
| DD | .281 | .344 | .344 | .469 | .469 | .656 | .656 | .906 | 1.062 |
| E | 2.000 | 2.500 | 3.000 | 3.750 | 4.500 | 4.500 | 5.000 | 6.500 | 7.500 |
| F | .375 | .375 | .375 | .500 | .500 | .750 | .875 | .875 | 1.000 |
| FL | 1.125 | 1.125 | 1.125 | 1.750 | 1.750 | 2.250 | 3.000 | 3.125 | 3.500 |
| LR | .563 | .563 | .563 | 1.000 | 1.000 | 1.500 | 2.125 | 2.250 | 2.500 |
| M | .625 | .625 | .625 | .875 | .875 | 1.000 | 1.375 | 1.750 | 2.000 |

NFPA Aluminum & Steel Cylinders

NFPA Clevis Bracket

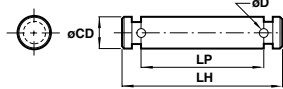


Note: NFPA Clevis Bracket Assembly is supplied with Standard Pin.

| NFPA Clevis Bracket | 49250 | 49251 | 49252 |
|-------------------------|----------|----------|----------|
| Clevis Bracket Assembly | 49250A | 49251A | 49252A |
| BA | 1.625 | 2.563 | 3.250 |
| CB | .750 | 1.250 | 1.500 |
| CD | .500 | .750 | 1.000 |
| CW | .500 | .625 | .750 |
| DD | 3/8 - 24 | 1/2 - 20 | 5/8 - 18 |
| E | 2.500 | 3.500 | 4.500 |
| F | .375 | .625 | .750 |
| FL | 1.125 | 1.875 | 2.250 |
| LR | .750 | 1.250 | 1.500 |
| M | .500 | .813 | 1.000 |

All dimensions ± .015 unless otherwise noted.

NFPA Pin

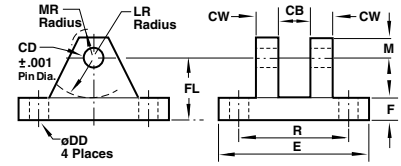


Note: ø.500, .750, 1.000 are Retainer type design ø1.375 and larger are Cotter Pin design.

| NFPA Pin | 49006-R | 49005-R | 49004-R | 49003 | 49002 | 49001 | 49000 | 49126 | 49127 |
|----------|---------|---------|---------|-------|-------|-------|-------|-------|-------|
| CD | .500 | .750 | 1.000 | 1.375 | 1.750 | 2.000 | 2.000 | 2.500 | 3.000 |
| LH | 2.219 | 3.125 | 3.750 | 4.750 | 5.812 | 5.812 | 6.312 | 6.875 | 6.875 |
| LP | 1.875 | 2.750 | 3.250 | 4.250 | 5.250 | 5.281 | 5.770 | 6.312 | 6.344 |
| D | - | - | - | .173 | .173 | .204 | .204 | .219 | .250 |

All dimensions ± .015 unless otherwise noted.

Norgren Clevis Bracket

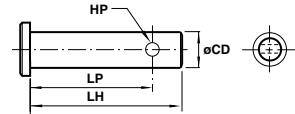


Note: Norgren Clevis Bracket Assembly is supplied with Standard Pin.

| Norgren Clevis Bracket | 49022 | 49023 | 49024 | 49027 | 49025 | 49026 |
|-------------------------|--------|--------|--------|--------|--------|--------|
| Clevis Bracket Assembly | 49022A | 49023A | 49024A | 49027A | 49025A | 49026A |
| CB | .750 | 1.250 | 1.500 | 2.000 | 2.500 | 2.500 |
| CD | .500 | .750 | 1.000 | 1.375 | 1.750 | 2.000 |
| CW | .500 | .625 | .750 | 1.000 | 1.250 | 1.500 |
| DD | .406 | .531 | .656 | .656 | .906 | 1.026 |
| E | 3.500 | 5.000 | 6.500 | 8.000 | 10.000 | 12.000 |
| F | .500 | .625 | .750 | .875 | .875 | 1.000 |
| FL | 1.500 | 1.875 | 2.250 | 3.000 | 3.625 | 4.520 |
| LR | .750 | 1.188 | 1.500 | 2.000 | 2.750 | 3.188 |
| M | .500 | .750 | 1.000 | 1.375 | 1.750 | 2.250 |
| MR | .625 | .906 | 1.250 | 1.656 | 2.219 | 2.781 |
| R | 2.547 | 3.828 | 4.953 | 5.734 | 7.500 | 9.938 |

All dimensions ± .015 unless otherwise noted.

Standard Pin



| Std. Pin | 49207* | 49208* | 49206 | 49205 | 49204 | 49203 | 49202 | 49201 |
|----------|--------|--------|-------|-------|-------|-------|-------|-------|
| CD | .500 | .750 | .500 | .750 | 1.000 | 1.375 | 1.750 | 2.000 |
| HP | .156 | .156 | .156 | .156 | .203 | .250 | .250 | .250 |
| LH | 1.421 | 2.000 | 2.250 | 3.000 | 3.500 | 5.000 | 6.000 | 6.000 |
| LP | 1.266 | 1.843 | 2.093 | 2.843 | 3.297 | 4.500 | 5.500 | 5.500 |

All dimensions ± .015 unless otherwise noted.

Switches

Note: 1-1/2" to 2-1/2" bore steel cylinders are supplied with an aluminum tube as standard. If a 3-1/4" to 12" bore steel cylinder requires switches the aluminum tube and magnetic piston options must be selected.

| Switch Model | CS8-2-04 Reed | CS8-2-31 Hall | CS8-2-32 Hall | CS7-04 Reed | CS7-24 Reed | CS7-31 Hall | CS7-32 Hall |
|-----------------------------|-----------------------------|------------------------------------|-----------------------------------|-----------------------------|--|------------------------------------|-----------------------------------|
| Bore Sizes | 1-1/8" - 2-1/2" | 1-1/8" - 2-1/2" | 1-1/8" - 2-1/2" | 2" - 4" | 2" - 4" | 2" - 4" | 2" - 4" |
| Switch Type | Reed Switch *MOV & Light | Hall Effect/Light, Sourcing PNP | Hall Effect/Light, Sinking NPN | Reed Switch *MOV & Light | Reed Switch *MOV & Light, 3 Wire | Hall Effect/Light, Sourcing PNP | Hall Effect/Light, Sinking NPN |
| Function | SPST NO | Normally Open | Normally Open | Normally Open | Normally Open | Normally Open | Normally Open |
| Switching Voltage | 5-120 VDC/VAC | 6-24 VDC | 6-24 VDC | 5-240 VDC/VAC | 24-240 VAC | 6-24 VDC | 6-24 VDC |
| Switching Current | 50/60 Hz | .5 Amp Max | .5 Amp Max | 50/60 Hz | 50/60 Hz | 1 Amp Max | 1 Amp Max |
| Switching Power | .5 Amp Max | .5 Amp Max | .5 Amp Max | 1 Amp Max | 4 Amp Max 50 Amp Inrush | 1 Amp Max | 1 Amp Max |
| Max Voltage Drop | 10 VA | 12 Watts Max | 12 Watts Max | 30 Watts Max | 100 Watts Max | 24 Watts Max | 24 Watts Max |
| Magnetic Sensitivity | 3.5 Volts | .5 Volts | .5 Volts | 3 Volts | N/A | .5 Volts | .5 Volts |
| Enclosure Class | 85 Gauss | 85 Gauss | 85 Gauss | 85 Gauss Parallel | 85 Gauss Parallel | 85 Gauss Parallel | 85 Gauss Parallel |
| Temperature Range | NEMA 6/CSA | NEMA 6/CSA | NEMA 6/CSA | NEMA 6/CSA | NEMA 6/CSA | NEMA 6/CSA | NEMA 6/CSA |
| Temperature Range | -22°F to +176°F | -22°F to +176°F | -22°F to +176°F | -22°F to +176°F | -22°F to +176°F | -22°F to +176°F | -22°F to +176°F |

* Metal Oxide Varistor Surge Suppression. NOTE: All CS8 series switches are supplied with 9' leads.

NFPA Aluminum & Steel Cylinders

Norgren Ecology Cylinder Options offer these advantages:

Energy Absorption Capacity of the Impact Dampening Seals

*Usable Pounds Stoppable at the Following Piston Speeds

This chart features the energy absorption capacity of the impact dampening piston seals with a Non-Adjustable cushions.

| In/Sec | Cylinder Bore | | | | | | | | | | |
|--------|---------------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
| | 1-1/2 | 2 | 2-1/2 | 3-1/4 | 4 | 5 | 6 | 7 | 8 | 10** | 12** |
| 6 | 155.6 | 275.5 | 499.8 | 969.3 | 1505.4 | 2603.2 | 4159.8 | 5794.2 | 8067.6 | 12,242 | 20,139 |
| 12 | 38.4 | 68.1 | 123.4 | 239.7 | 372.6 | 644.8 | 1030.2 | 1435.8 | 2000.4 | 3026 | 4971 |
| 18 | 16.7 | 29.7 | 53.7 | 104.6 | 162.8 | 282.1 | 450.6 | 628.7 | 876.8 | 1319.3 | 2162.1 |
| 24 | 9.2 | 16.3 | 29.4 | 57.3 | 89.4 | 155.2 | 247.8 | 346.2 | 483.6 | 722 | 1179 |
| 30 | 5.6 | 10.0 | 18.1 | 35.4 | 55.4 | 96.4 | 153.9 | 215.4 | 301.6 | 445.5 | 724 |
| 36 | 3.7 | 6.7 | 11.9 | 23.5 | 37.0 | 64.5 | 102.9 | 144.4 | 202.7 | 295.3 | 476.8 |
| 42 | 2.6 | 4.6 | 8.2 | 16.3 | 25.8 | 45.3 | 72.2 | 101.6 | 143.1 | 204.8 | 327.7 |
| 48 | 1.8 | 3.2 | 5.8 | 11.7 | 18.6 | 32.8 | 52.2 | 73.8 | 104.4 | 146 | 231 |
| 54 | 1.3 | 2.4 | 4.2 | 8.5 | 13.6 | 24.2 | 38.5 | 54.7 | 77.9 | 105.7 | 164.7 |
| 60 | 1.0 | 1.8 | 3.0 | 6.2 | 10.1 | 18.1 | 28.7 | 41.1 | 58.9 | 76.9 | 117.2 |

*The weight of the cylinder piston has been deducted from the figures shown above.

Note: The use of Viton® Seals limits the absorption of the impact dampening seals by 50%.

** Series J & EJ only

Operates Quietly to Meet OSHA Specifications.

Series EA cylinders provide substantial reductions in impact noise, which reduces overall machine noise and helps meet government regulations.

Summary of Sound Levels in Decibels

| PSI Air Sound Pressure Level+ | | Cylinder Model | | | |
|-------------------------------|--------|----------------|---------|---------|----------|
| | | A133B3 | EA155B3 | A1133A3 | EA1155A3 |
| | | J133B3 | EJ155B3 | J1133A3 | EJ1155A3 |
| | | 5" x 6" | 5" x 6" | 2" x 6" | 2" x 6" |
| 95 | End++ | 108 | 73 | 110 | 74 |
| PSI+ | Side++ | 112 | 84 | 110 | 81 |
| 50 | End++ | 108 | 73 | 113 | 74 |
| PSI+ | Side++ | 113 | 85 | 110 | 81 |

+Peak sound pressure is given in decibels (dB) re:2 x 105 N/m².

++End position of mike was 3' on centerline from end of cylinder; side position of mike was 3' perpendicular to centerline abeam of end of cylinder.

Note: At 5 feet, cylinder sound levels would be less by 9 dB from side figure and 13 dB from end figure. The total noise emitted will depend on the structure to which the cylinder is attached. If it is mounted on a thin flat plate of considerable area, the noise will be increased by a sounding board effect.

Energy absorption capacity of the impact dampening piston seals with an adjustable cushion.

| In/Sec | Cylinder Bore | | | | | | | | | | |
|--------|---------------|-----|-------|-------|-------|-------|-------|--------|-------|--------|--------|
| | 1-1/2 | 2 | 2-1/2 | 3-1/4 | 4 | 5 | 6 | 7 | 8 | 10* | 12* |
| 6 | 279 | 495 | 899 | 1,744 | 2,709 | 4,685 | 7,486 | 10,429 | 4,520 | 22,035 | 36,250 |
| 12 | 68 | 122 | 221 | 430 | 699 | 1,159 | 1,854 | 2,583 | 3,800 | 5,446 | 8,947 |
| 18 | 30 | 53 | 95 | 187 | 291 | 507 | 810 | 1,130 | 1,576 | 2,374 | 3,891 |
| 24 | 16 | 29 | 52 | 102 | 160 | 279 | 444 | 622 | 869 | 1,299 | 1,414 |
| 30 | 10 | 18 | 32 | 63 | 99 | 172 | 275 | 387 | 541 | 801 | 1,303 |
| 36 | 6.7 | 12 | 21.6 | 42 | 66 | 116 | 183 | 259 | 363 | 531 | 856 |
| 42 | 4.7 | 8.3 | 14.7 | 29 | 46 | 81 | 129 | 181 | 257 | 367 | 588 |
| 48 | 3.4 | 5.7 | 10.4 | 21 | 33 | 59 | 93 | 131 | 187 | 262 | 415 |
| 54 | 2.3 | 4.3 | 7.6 | 15.3 | 24 | 43 | 68 | 97 | 138 | 189 | 295 |
| 60 | 1.8 | 3.2 | 5.4 | 11 | 18 | 33 | 52 | 74 | 106 | 138 | 211 |

* Series J & EJ only

Effect of Impact Dampening Seals on Total Stroke of Cylinders

| PSI | Cylinder Bore | | | | | | | | | | |
|-----|---------------|-----|-------|-------|-----|-----|-----|-----|-----|-----|-----|
| | 1-1/2 | 2 | 2-1/2 | 3-1/4 | 4 | 5 | 6 | 7 | 8 | 10* | 12* |
| 0 | .14 | .15 | .17 | .19 | .22 | .25 | .28 | .32 | .32 | .36 | .40 |
| 20 | .10 | .10 | .12 | .14 | .16 | .18 | .20 | .22 | .22 | .24 | .26 |
| 40 | .07 | .07 | .08 | .09 | .10 | .12 | .13 | .14 | .14 | .15 | .16 |
| 60 | .04 | .04 | .05 | .05 | .06 | .07 | .07 | .08 | .08 | .09 | .10 |
| 80 | .02 | .02 | .02 | .02 | .03 | .03 | .03 | .04 | .04 | .04 | .04 |
| 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

* Series J & EJ only

Note: These figures are for new cylinders. The impact dampening seals will take some compression set during operation of the cylinder and the stroke loss will decrease. Also, the pressure at zero stroke loss will decrease to about 80 psi. At pressures above those of zero stroke loss, a slight clicking sound may be produced during impact. To determine the stroke loss for either the head or cap end, divide the value shown by 2.

NFPA Aluminum & Steel Cylinders

Decel-Air™ Cushion

Explanation of Decel-Air Cushion:

Norgren's Decel Cushioned cylinder was designed for applications where high velocity, low mass, material transfer or machine function is required, and where the kinetic energy to be absorbed during cushioning exceeds the parameters of our standard Series EA or EJ air cylinders equipped with non-adjustable or adjustable cushions. Decel cushions employ longer-than-standard air cushions to assist our Impact Dampening Piston Seal.

Decel Cushioned Cylinder

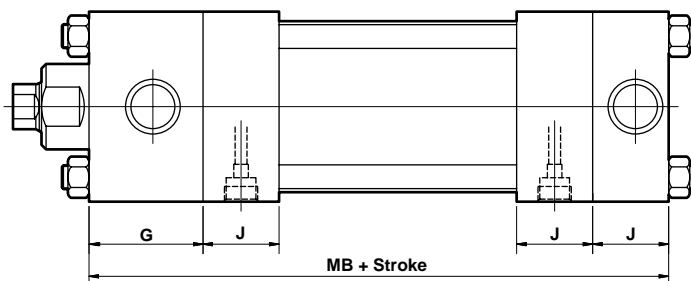
Fully Cushioned Load Stopping Capacity in Pounds*

| In/ Sec | Cylinder Bore | | | | | | | | | | |
|------------|---------------|------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| | 1-1/2 | 2 | 2-1/2 | 3-1/4 | 4 | 5 | 6 | 7 | 8 | 10 | 12 |
| 6 | 558 | 990 | 1.798 | 3.488 | 5.418 | 9.370 | 14.972 | 20.040 | 20.858 | 44.070 | 72.500 |
| 12 | 136 | 244 | 442 | 860 | 1.338 | 2.318 | 3.708 | 5.166 | 7.600 | 10.892 | 17.894 |
| 18 | 60 | 106 | 190 | 374 | 582 | 1.014 | 1.620 | 2.260 | 3.152 | 4.748 | 7.782 |
| 24 | 32 | 58 | 104 | 204 | 320 | 558 | 888 | 1.244 | 1.738 | 2.598 | 2.828 |
| 30 | 20 | 36 | 64 | 126 | 198 | 344 | 550 | 774 | 1.082 | 1.602 | 2.606 |
| 36 | 13.4 | 24 | 43 | 84 | 132 | 232 | 366 | 518 | 726 | 1.062 | 1.712 |
| 42 | 9.4 | 16.6 | 29 | 58 | 92 | 162 | 258 | 362 | 514 | 734 | 1.176 |
| 48 | 6.8 | 11.4 | 20.8 | 42 | 66 | 118 | 186 | 262 | 374 | 524 | 830 |
| 54 | 4.6 | 8.6 | 10.8 | 30 | 48 | 86 | 136 | 194 | 276 | 378 | 590 |

| Piston Rod Dia. Weights* | |
|--------------------------|----------------------------------|
| 5/8" | - .30 lb. + 0.09 lb./in. stroke |
| 1" | - .90 lb. + 0.22 lb./in. stroke |
| 1-3/8" | - 2.2 lb. + 0.42 lb./in. stroke |
| 1-3/4" | - 4.0 lb. + 0.68 lb./in. stroke |
| 2" | - 5.5 lb. + 0.90 lb./in. stroke |
| 2-1/2" | - 10.1 lb. + 1.40 lb./in. stroke |

*Double Weight for double rod end cylinders

*Include piston rod weight in total load to be stopped.



Basic Envelope Dimensions

| Cyl. Bore | G | J | Add Stroke MB |
|-----------|-------|-------|---------------|
| 1-1/2 | 1-1/2 | 1 | 5-5/8 |
| 2 | 1-1/2 | 1 | 5-5/8 |
| 2-1/2 | 1-1/2 | 1 | 5-3/4 |
| 3-1/4 | 1-3/4 | 1-1/4 | 6-3/4 |
| 4 | 1-3/4 | 1-1/4 | 6-3/4 |
| 5 | 1-3/4 | 1-1/4 | 7 |
| 6 | 2 | 1-1/2 | 8 |
| 7 | 2 | 1-1/2 | 8-1/8 |
| 8 | 2 | 1-1/2 | 8-1/8 |

Cylinder Order Information

EJ 01 - 7 7 - A 1 - HR-L(14)-MS-P(1/4)-V - 2" x 6"

| Series | |
|-----------------------------------|-----|
| Series A Cylinder | A |
| Series A Double Rod End Cylinder | DA |
| Series EA Cylinder | EA |
| Series EA Double Rod End Cylinder | EDA |
| Series J Cylinder | J |
| Series J Double Rod End Cylinder | DJ |
| Series EJ Cylinder | EJ |
| Series EJ Double Rod End Cylinder | EDJ |

| Mounting Options | |
|--|----|
| Side Tapped (MS4) | 01 |
| Head Rectangular Flange (MF1) | 03 |
| Head Square (ME3) - 7" & 8" Bores | 03 |
| Cap Rectangular Flange (MF2) | 04 |
| Cap Square (ME4) - 7" & 8" Bores | 04 |
| Basic Cylinder No Mounting (MX0) | 05 |
| Both Ends (4) Tie Rods Ext. (MX1) | 06 |
| Both Ends (2) Tie Rods Ext. (MX4) | 6B |
| Cap Tie Rods Ext. (MX2) | 6C |
| Head Tie Rods Ext. (MX3) | 6R |
| Removable Head Trunnion (MT1) - A & EA | 7R |
| Head Trunnion (MT1) - J & EJ | 07 |
| Removable Cap Trunnion (MT2) - A & EA | 8R |
| Cap Trunnion (MT2) - J & EJ | 08 |
| Side Lugs (MS2) | 09 |
| Center Trunnion (MT4) | 10 |
| Side End Angles (MS1) | 11 |
| Cap Fixed Clevis (MP1) | 12 |
| Side End Lugs (MS7) | 15 |
| Sleeve Nut Construction (Universal) | 16 |
| Head Square Flange (MF5) | 20 |
| Cap Square Flange (MF6) | 21 |
| Detachable Cap Clevis (MP2) | 22 |
| Cap Fixed Eye (MP3) | 32 |
| Detachable Cap Eye (MP4) | 42 |
| Spherical Bearing | 52 |
| Base Bar (Not NFPA A & EA Only) | 60 |

| Cushion in Head | |
|---------------------------------|----|
| None | 3 |
| Non-Adjustable Cushion | †5 |
| Adjustable Cushion (Position 2) | 7 |
| Decel Cushion | 9 |

† Standard with EA & EJ

| Cushion in Cap | |
|---------------------------------|----|
| None | 3 |
| Non-Adjustable Cushion | †5 |
| Adjustable Cushion (Position 2) | 7 |
| Decel Cushion | 9 |

† Standard with EA & EJ

Bore and Stroke (write out)

| Additional Options – order alphabetically – More on page ?? | |
|---|--------|
| Case Hardened (45 Rc) | HR |
| Port Location position 1 standard: L(Head Cap) | |
| (specify position 1 thru 4 for head and/or cap) | L(_) |
| Metal Rod Scraper | MS |
| Cushion Adjust Screw Location position 2 standard: | |
| N(Head Cap) (specify position 1 thru 4 for head and/or cap) | N(_) |
| Non-Standard Port Sizes: [specify port size for P(_H) | |
| head only, P(_C) cap only, or P(_ both head & cap] | *P(_) |
| Magnetic Piston – includes aluminum tube option - J & EJ | PS |
| Rod Stud | RS |
| Type 1 (5/8" – 1-3/4" øRod) | |
| Type 2 (5/8" & 1" øRod) | |
| Rod Extensions (specify length of additional rod extension) | RX |
| Single Acting Spring Extend (Cap End)–See page ACT-1-95 | SC |
| Single Acting Spring Retract (Rod End)–See page ACT-1-95 | SR |
| 303 Stainless Steel (Hard Chrome Plated) | SS |
| Stop Tube (Cap End) (specify stop tube length) | ST(_C) |
| Stop Tube (Rod End) (specify stop tube length) | ST(_R) |
| Special Rod Threads (specify rod thread) | T |
| Thread Extensions (specify length of thread extension) | TX |
| Viton® Seals | V |

* 1-1/2", 2", 2-1/2" bore cylinders have 3/8" NPT Standard, 1/2" NPT oversize.
3-1/4", 4", 5" bore cylinders have 1/2" NPT Standard, 3/4" NPT oversize.

| Piston Rod Threads Type | |
|----------------------------------|---|
| Small Male (Solid) | 1 |
| Intermediate Thread Male (Solid) | 2 |
| Female | 3 |
| Full Thread Male (Solid) | 6 |
| Plain Rod End | 7 |

| Piston Rod Diameters | |
|---------------------------------|----------|
| Standard on 1-1/2", 2", 2-1/2" | 5/8" A |
| Standard on 3-1/4", 4", 5" | 1" B |
| Oversized on 1-1/2", 2", 2-1/2" | 1" B |
| Standard on 6", 7", 8" | 1-3/8" C |
| Oversized on 3-1/4", 4", 5" | 1-3/8" C |
| Standard on 10" | 1-3/4" D |
| Oversized on 6", 7", 8" | 1-3/4" D |
| Standard on 12" | 2" E |
| Oversized on 10" | 2" E |
| Oversized on 10", 12" | 2-1/2" F |

Port and Cushion Adjustment Positions
(As viewed from rod end: Port standard position 1, Cushion Adjustment standard position 2.)

NOTE: A Port and a Cushion Adjustment cannot be in the same position.

