

# Diaphragm Air Cylinders



Small bore  
Cylinders

Standard  
Cylinders

Super  
Cylinders



Air Cylinders

# Diaphragm Air Cylinders

## Features

- Low start up pressure
- Low breakaway force
- Extremely sensitive response
- Very smooth, "non-jarring" action
- Wide temperature range
- Very low friction
- No edge seals to replace
- No blow-by leakage
- Numerous varieties
- Low total cost

## Description

Diaphragm Air Cylinders are actuators made from elastomers, engineered metals and fabrics. They require no lubrication, are virtually frictionless, and economical. They can be used to provide lifting, clamping, pushing, coining, turning, and other linear force or actuation motions in many applications.

The development of the long stroke rolling diaphragm for dynamic sealing proved to be the solution for many applications requiring low friction, no lubrication, low leakage, wide temperature variations, and low total cost. The popularity of the rolling diaphragm as a sealing means led to many requests for a standard line of "off the shelf" diaphragm cylinders; single and double acting, short and long stroke with a wide selection of effective areas. To meet these requests, the long stroke rolling diaphragm cylinder was developed and Bellofram has supplied many thousands of them since their 1965 introduction.

## Applications

Diaphragm Air Cylinder applications are almost unlimited. They are replacing conventionally sealed cylinders and actuators where low cost and reliability are requirements. They can be used with vacuum and gaseous pressure systems. They are currently solving many unique problems, being used as:

- Expansion Chambers
- Accumulators
- Pumps
- Reservoirs
- Shock Mounts
- Impact Absorbers
- Weld Drivers
- Tensioners
- Dancer Rolls
- Valve Actuation
- Louver Controls

## Standard Cylinders

Standard Bellofram Air Cylinders are available in eight sizes. Each size is available in both a spring-return and a double-acting variety, with one or two stroke variations (Series E or F).

Sizes 4 and 6 have impact-extruded aluminum shells. Larger sizes have steel shells. Rods are ground, polished and hard-chrome plated steel. Bearings are sintered bronze, molybdenum disulphite impregnated. Other components are high strength materials with suitable corrosion resistant treatment.

- Bellofram engineers will help you define your specific needs.
- All Standard cylinders can be ordered with either no spring, or no bearing, as standard options.
- Standard cylinders can be ordered with one of six different mounting options.
- Specifications for Standard cylinders are shown in the table on the next page.

## Super Cylinders

Bellofram Super Cylinders are standard spring-return cylinders equipped with linear ball bearings and hardened steel rods. This refinement allows an absolute minimum of friction for applications where maximum sensitivity is needed.

Super Cylinders are available only in spring-return varieties and in Series F stroke variations.

All mounting options offered on standard cylinders are also available on super cylinders.



### Standard and Super Cylinder Specifications

|                           |   |
|---------------------------|---|
| Plant Air                 | Up to 145 PSIG (10 BAR)   |
| Temperatures              | -40° to 225° F (-40° to 107° C)   |
| Materials of Construction | <p><b>Body:</b> Sizes 4 and 6 are impact-extruded aluminum shell. Larger sizes are made from a steel shell.</p> <p><b>Diaphragm:</b> Neoprene® elastomer reinforced with Flex-Weave Dacron® fabric.</p> <p><b>Rods:</b> Ground, polished and hard-chrome plated steel.</p> <p><b>Bearings:</b> Sintered bronze, molybdenum disulphite impregnated.</p> <p>Other components are high strength materials with suitable corrosion resistant treatment.</p> |
| Testing                   | All cylinders are leak-tested prior to shipment. However, the cylinder is not a bubble tight assembly   |

### Standard and Super Cylinder Operating Data

| Size<br>(Effective Area)<br>(Sq. Inches) | Equivalent<br>Bore Diam.<br>(Inches) | Spring Return                    |                                  |   |          |  |          | Double Acting                    |                                  |
|--|--------------------------------------|----------------------------------|----------------------------------|---|----------|--|----------|----------------------------------|----------------------------------|
|  |                                      | Stroke<br>+.03/- .12<br>(Inches) | Stroke<br>+.03/- .12<br>(Inches) | Approx. Spring Force -<br>Zero Stroke<br>(lbs.) |          | Approx. Increase Force<br>Per Inches of Stroke<br>(lbs.) |          | Stroke<br>+.03/- .12<br>(Inches) | Stroke<br>+.03/- .12<br>(Inches) |
|  |                                      |                                  |                                  | Series E  | Series F | Series E   | Series F |                                  |                                  |
| 4  | 2.3                                  |                                  | 1.80                             |   | 6        |  | 3        |                                  | 1.3                              |
| 6  | 2.8                                  |                                  | 2.40                             |   | 9        |  | 4        |                                  | 1.9                              |
| 9  | 3.4                                  | 2.20                             | 3.00                             | 17  | 12       | 4  | 4        |                                  | 2.5                              |
| 12                                       | 3.9                                  | 2.30                             | 3.60                             | 18  | 18       | 6  | 6        | 1.8                              | 3.1                              |
| 16                                       | 4.5                                  | 2.62                             | 4.20                             | 24  | 24       | 8  | 8        | 2.1                              | 3.7                              |
| 24                                       | 5.5                                  | 2.60                             | 5.24                             | 36  | 36       | 11   | 11       | 2.0                              | 4.6                              |
| 30                                       | 6.3                                  | 3.07                             | 6.00                             | 45  | 54       | 13   | 14       | 2.4                              | 5.4                              |
| 36                                       | 6.8                                  | 3.55                             | 6.00                             | 54  | 54       | 16   | 14       | 2.9                              | 5.4                              |

## Small Bore Cylinders

Bellofram's 0.38 and 1.7 sq. inch effective area diaphragm cylinders combine the performance of the diaphragm cylinder with small size. Two different stroke options are available in each size, with either flush or extended rods on 0.38 sq. inch cylinders. Only spring return varieties are available.

### Specifications

0.38 sq. inch Cylinders have aluminum alloy shells and end caps, and carbon steel rods. 1.7 sq. inch Cylinders have die-cast aluminum shells and end caps, and chrome-plated carbon steel rods. All varieties have oil-impregnated bronze bearings, polyester fabric reinforced Nitrile diaphragms, and music wire springs. Optional foot mounts are available for the 1.7 sq. inch Cylinders.



Marsh Bellofram offers very smooth, "Non-Jarring" action in a Low Cost Cylinder

External stroke limiters should be provided by the customer to limit the stroke in both directions on both single-acting and double-acting cylinders.

Installation and operation procedures furnished with each cylinder should be followed for maximum service life.



### Small Bore Cylinder Operating Data

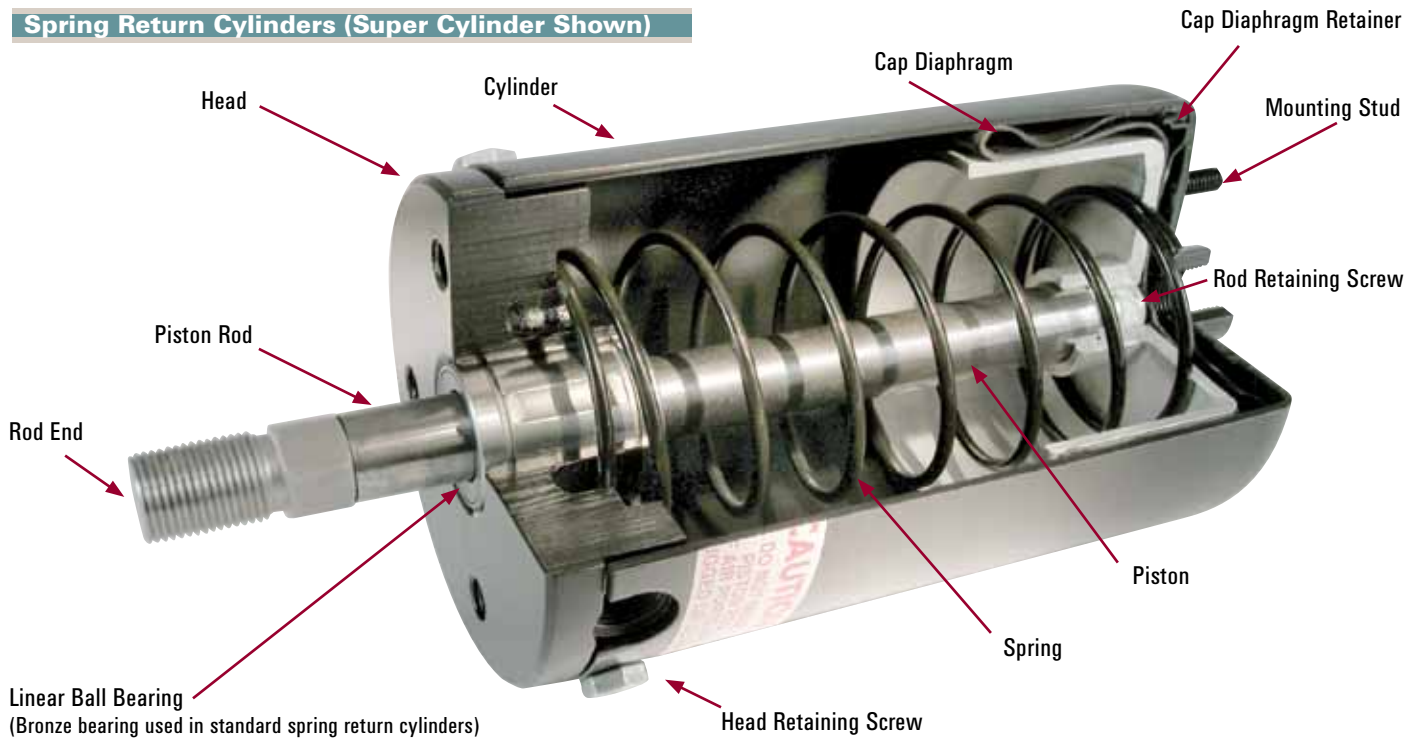
| Part Number | Size (Effective Area) Sq. In. | Stroke In. | Load @ 0 Stroke Lbs. | Spring Load @ Max. Stroke Lbs. | Equiv. Bore Dia. In. | Maximum Operating Press. PSI | Rod Type |
|-------------|-------------------------------|------------|----------------------|--------------------------------|----------------------|------------------------------|----------|
| 908-013-000 | 0.384                         | 0.70       | 2                    | 7                              | 0.7                  | 125                          | Flush    |
| 908-034-000 | 0.384                         | 0.70       | 2                    | 7                              | 0.7                  | 125                          | 3/4"     |
| 908-014-000 | 0.384                         | 0.32       | 5                    | 7                              | 0.7                  | 125                          | Flush    |
| 908-035-000 | 0.384                         | 0.32       | 5                    | 7                              | 0.7                  | 125                          | 3/4"     |
| 980-008-000 | 1.7                           | 1.0        | 4                    | 8                              | 1.5                  | 125                          | —        |
| 980-077-000 | 1.7                           | 1.75       | 4                    | 11                             | 1.5                  | 125                          | —        |

### Cylinder Replacement Parts

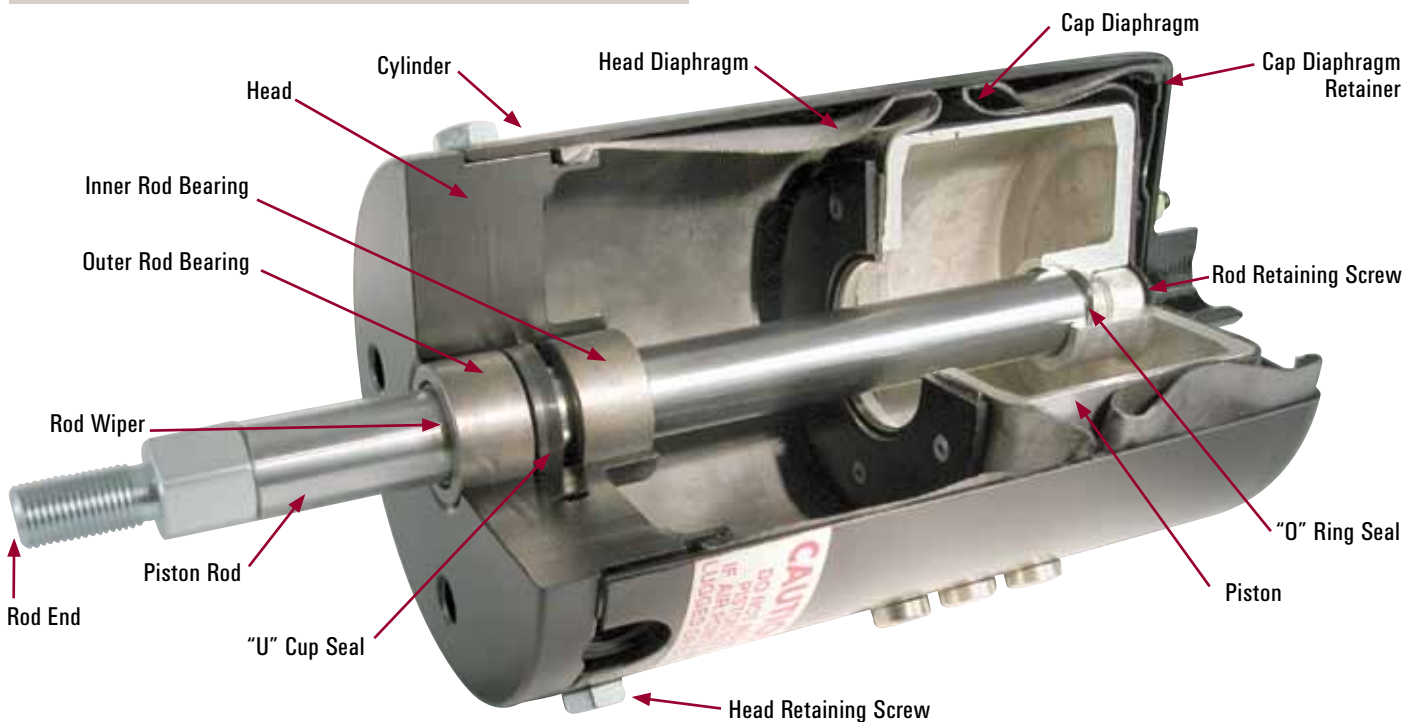
When ordering replacement parts, provide nomenclature of part from photographs in addition to the following information from the nameplate on the cylinder: Type, Size, Series, and Rod type.

Complete kits are available for replacement of diaphragm or bearings.

### Spring Return Cylinders (Super Cylinder Shown)



### Double Acting Cylinders



## Standard Cylinders Ordering Information

| ↑        | ↑         | ↑        | ↑          | ↑          | ↑ | Type  |
|----------|-----------|----------|------------|------------|---|---|
| <b>S</b> |           |          |            |            |   | Spring Return   |
| <b>D</b> |           |          |            |            |   | Double Acting   |
|          |           |          |            |            |   | <b>Size</b>   |
|          | <b>04</b> |          |            |            |   | 4 Square Inches   |
|          | <b>06</b> |          |            |            |   | 6 Square Inches   |
|          | <b>09</b> |          |            |            |   | 9 Square Inches   |
|          | <b>12</b> |          |            |            |   | 12 Square Inches  |
|          | <b>16</b> |          |            |            |   | 16 Square Inches  |
|          | <b>24</b> |          |            |            |   | 24 Square Inches  |
|          | <b>30</b> |          |            |            |   | 30 Square Inches  |
|          | <b>36</b> |          |            |            |   | 36 Square Inches  |
|          |           |          |            |            |   | <b>Series</b>   |
|          |           | <b>E</b> |            |            |   | Determines Stroke   |
|          |           | <b>F</b> |            |            |   | Make a selection from Operating Data Table on pg. 47        |
|          |           |          |            |            |   | <b>Rod</b>  |
|          |           |          | <b>BP</b>  |            |   | Bellofram Product Standard                                  |
|          |           |          | <b>SM</b>  |            |   | National Fluid Power Assoc. Standard                        |
|          |           |          |            |            |   | Make a selection from dimensional data tables on pgs. 51-54 |
|          |           |          |            |            |   | <b>Mounting</b>   |
|          |           |          | <b>N</b>   |            |   | Nose Mount  |
|          |           |          | <b>UM</b>  |            |   | Universal Mount   |
|          |           |          | <b>FM</b>  |            |   | Foot Mount  |
|          |           |          | <b>CFM</b> |            |   | Cap Flange Mount  |
|          |           |          | <b>HFM</b> |            |   | Head Flange Mount   |
|          |           |          | <b>CBM</b> |            |   | Clevis Bracket Mount  |
|          |           |          | <b>CBS</b> |            |   | Clevis Bracket Stud   |
|          |           |          |            |            |   | <b>Standard Options</b>                                     |
|          |           |          |            | <b>NS</b>  |   | No Spring   |
|          |           |          |            | <b>NB</b>  |   | No Bearing  |
|          |           |          |            | <b>NBS</b> |   | No Bearing or Spring  |
|          |           |          |            |            |   | No Standard Option Requested                                |

Example: D-12-F-BP-CBM is a Double Acting, 12 sq. in., 3.1" Stroke, BP Rod End Cylinder with Clevis Bracket Mount.

## Super Cylinders Ordering Information

| ↑         | ↑         | ↑        | ↑          | ↑         | ↑ | Type   |
|-----------|-----------|----------|------------|-----------|---|--|
| <b>SS</b> |           |          |            |           |   | Super Cylinders  |
|           |           |          |            |           |   | <b>Size</b>  |
|           | <b>04</b> |          |            |           |   | 4 Square Inches  |
|           | <b>06</b> |          |            |           |   | 6 Square Inches  |
|           | <b>09</b> |          |            |           |   | 9 Square Inches  |
|           | <b>12</b> |          |            |           |   | 12 Square Inches   |
|           | <b>16</b> |          |            |           |   | 16 Square Inches   |
|           | <b>24</b> |          |            |           |   | 24 Square Inches   |
|           | <b>30</b> |          |            |           |   | 30 Square Inches   |
|           | <b>36</b> |          |            |           |   | 36 Square Inches   |
|           |           |          |            |           |   | <b>Series</b>  |
|           |           | <b>F</b> |            |           |   | Determines Stroke  |
|           |           |          |            |           |   | Make a selection from Operating Data Table on pg. 47       |
|           |           |          |            |           |   | <b>Rod</b>   |
|           |           |          | <b>BP</b>  |           |   | Bellofram Product Standard                                 |
|           |           |          | <b>SM</b>  |           |   | National Fluid Power Assoc. Standard                       |
|           |           |          |            |           |   | Make a selection from dimensional data table on pgs. 51-54 |
|           |           |          |            |           |   | <b>Mounting</b>  |
|           |           |          | <b>UM</b>  |           |   | Universal Mount  |
|           |           |          | <b>FM</b>  |           |   | Foot Mount   |
|           |           |          | <b>CFM</b> |           |   | Cap Flange Mount   |
|           |           |          | <b>HFM</b> |           |   | Head Flange Mount  |
|           |           |          | <b>CBM</b> |           |   | Clevis Bracket Mount                                       |
|           |           |          | <b>CBS</b> |           |   | Clevis Bracket Stud  |
|           |           |          |            |           |   | <b>Standard Options</b>                                    |
|           |           |          |            | <b>NS</b> |   | No Spring  |
|           |           |          |            |           |   | No Standard Option Requested                               |

Example: SS-12-F-SM-HFM is a Single Acting Super Cylinder, 12 sq. in., 3.6" stroke, SM Rod End Cylinder with a Head Flange Mount.

## Repair Kits

Repair Kits are available to permit user in-plant maintenance without delay and expense of returning parts to the factory. Each kit includes installation instructions. Nameplate data of the cylinder must accompany order to insure receipt of correct parts.

The following is included in the repair kits:

### Spring Return Diaphragm Kit

1. Diaphragm, Cap
2. Adhesive, Cap
3. Nuts, Cap Retainer
4. Instructions

### Spring Return Bearing Kit

1. Inner Bearing
2. Outer Bearing
3. Rod Wiper
4. Instructions

### Double Acting Diaphragm Kit

1. Diaphragm, Cap
2. Diaphragm, Head
3. Adhesive, Cap
4. Adhesive, Head
5. Rivets, Blind (or Screws)
6. Nuts, Cap Retainer
7. Seal "O" Ring
8. Instructions

### Double Acting Bearing Kit

1. Inner Bearing
2. Outer Bearing
3. Rod Wiper
4. U-Cup Seal
5. Instructions

## Breather Vents

Breather vents are available for use on Bellofram Spring Return Air Cylinders.

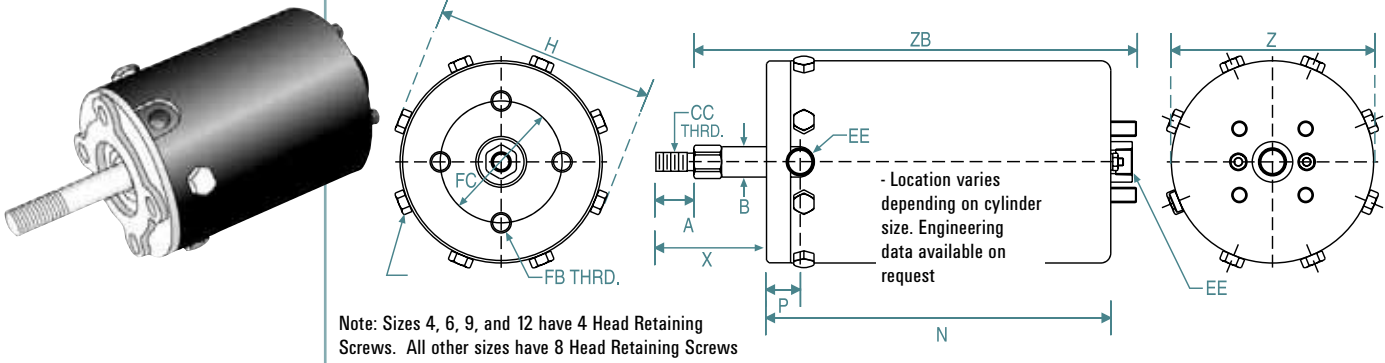
The Breather, which contains a 40 micron bronze filter, is simply threaded into the air relief port of the cylinder head. It prevents foreign matter from being drawn into the cylinder on the return stroke of the piston, and also acts as a snubber. The snubbing reduces the piston speed and impact at the end of the stroke in both directions.

### Breather Vents Ordering Data

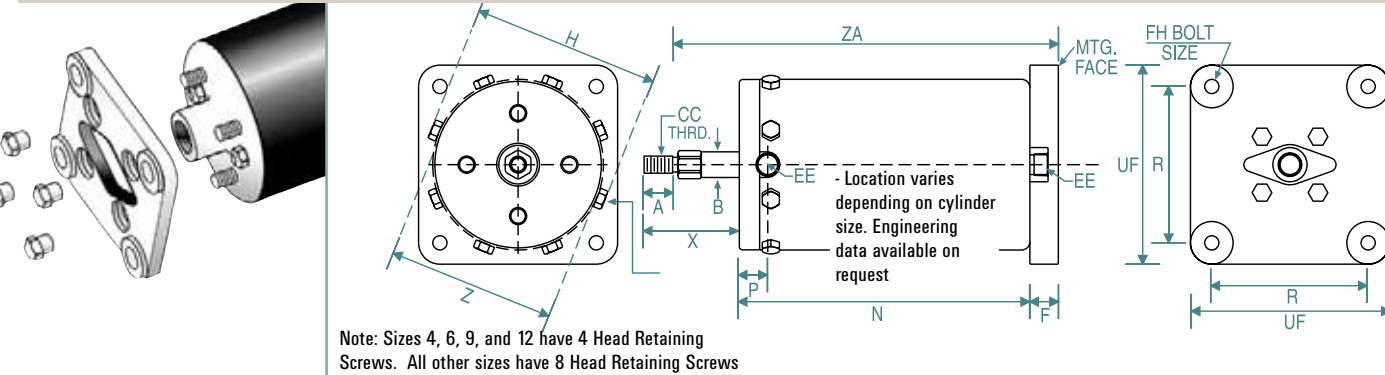
Breather Vent for 1/4" Pipe Tap  
(Fits cylinder sizes 4, 6, 9)  
Part No. 661-000-001

Breather Vent for 3/8" Pipe Tap  
(Fits cylinder sizes 12, 16, 24, 30, 36)  
Part No. 661-000-002

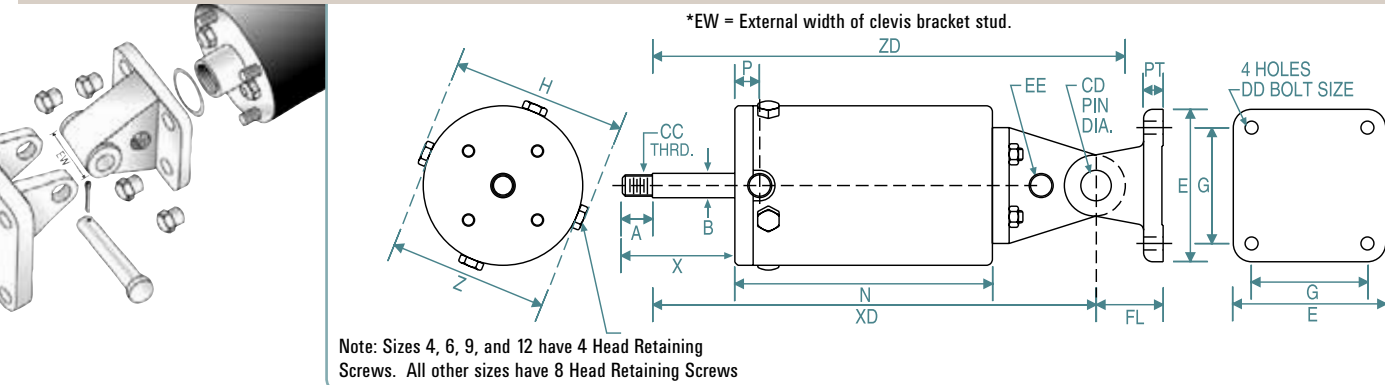
### Universal Mount



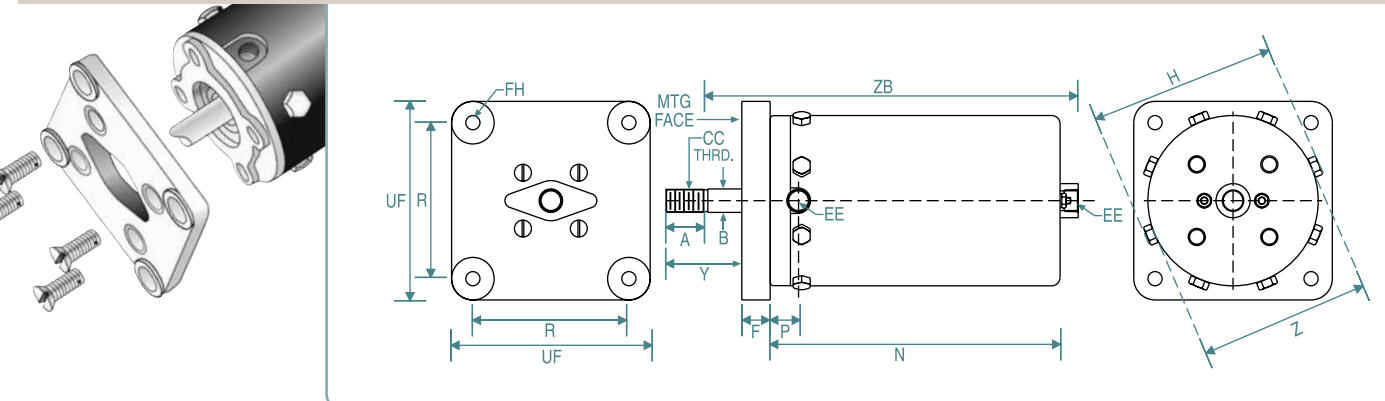
### Cap Flange Mount



### Clevis Bracket Mount (or Stud)



### Head Flange Mount



**Standard Cylinders - Universal, Cap Flange, Clevis Bracket, Head Flange Mounts — Dimensions - Inches**

| Size | Series | Z    | H    | N    | EE      | FC   | FB       | B   | P    | F    | R    | UF   | FH   | CD   | DD  | E    | FL   | EW   | PT  | G    |
|------|--------|------|------|------|---------|------|----------|-----|------|------|------|------|------|------|-----|------|------|------|-----|------|
| 4    | F      | 2.71 | 3.02 | 4.34 | 1/4 NPT | 2.00 | 1/4 - 20 | 1/2 | .50  | .781 | 2.81 | 3.62 | 1/4  | .625 | 1/4 | 3.12 | 1.38 | .93  | 3/8 | 2.38 |
| 6    | F      | 3.27 | 3.58 | 5.28 | 1/4 NPT | 2.00 | 1/4 - 20 | 1/2 | .51  | .781 | 2.81 | 3.62 | 1/4  | .625 | 1/4 | 3.12 | 1.38 | .93  | 1/2 | 2.38 |
| 9    | E      | 3.84 | 4.25 | 5.31 | 1/4 NPT | 3.00 | 7/16-14  | 3/4 | .75  | .690 | 4.38 | 5.50 | 7/16 | .750 | 1/4 | 3.75 | 1.69 | .99  | 1/2 | 3.0  |
|      | 6.34   |      |      |      |         |      |          |     |      |      |      |      |      |      |     |      |      |      |     |      |
| 12   | E      | 4.38 | 4.79 | 5.31 | 3/8 NPT | 3.00 | 7/16-14  | 3/4 | .75  | .690 | 4.38 | 5.50 | 7/16 | .750 | 1/2 | 4.00 | 1.75 | 1.24 | 1/2 | 3.0  |
|      | 7.28   |      |      |      |         |      |          |     |      |      |      |      |      |      |     |      |      |      |     |      |
| 16   | E      | 4.99 | 5.40 | 6.03 | 3/8 NPT | 3.00 | 1/2-13   | 3/4 | .87  | .690 | 4.38 | 5.50 | 1/2  | .750 | 1/2 | 4.00 | 1.75 | 1.24 | 1/2 | 3.0  |
|      | 8.38   |      |      |      |         |      |          |     |      |      |      |      |      |      |     |      |      |      |     |      |
| 24   | E      | 6.16 | 6.57 | 6.28 | 3/8 NPT | 4.75 | 5/8-11   | 3/4 | 1.00 | .656 | 6.00 | 7.50 | 1/2  | 1.00 | 1/2 | 5.12 | 2.00 | 1.49 | 5/8 | 4.0  |
|      | 10.22  |      |      |      |         |      |          |     |      |      |      |      |      |      |     |      |      |      |     |      |
| 30   | E      | 6.88 | 7.29 | 7.00 | 3/8 NPT | 4.75 | 5/8-11   | 1   | 1.00 | .656 | 6.00 | 7.50 | 1/2  | 1.00 | 1/2 | 5.12 | 2.00 | 1.49 | 5/8 | 4.0  |
|      | 11.44  |      |      |      |         |      |          |     |      |      |      |      |      |      |     |      |      |      |     |      |
| 36   | E      | 7.38 | 7.79 | 7.69 | 3/8 NPT | 4.75 | 5/8-11   | 1   | 1.00 | .656 | 6.00 | 7.50 | 1/2  | 1.00 | 1/2 | 5.12 | 2.00 | 1.49 | 5/8 | 4.0  |
|      | 11.47  |      |      |      |         |      |          |     |      |      |      |      |      |      |     |      |      |      |     |      |

| Size | Series | BP Rod End* |      |      |       |       |       |       |        | SM Rod End† |       |       |       |       |         |
|------|--------|-------------|------|------|-------|-------|-------|-------|--------|-------------|-------|-------|-------|-------|---------|
|      |        | X           | Y    | A    | ZA    | ZD    | XD    | ZB    | CC     | A           | ZA    | ZD    | XD    | ZB    | CC      |
| 4    | F      | 2.73        | 1.95 | .75  | 7.10  | 9.07  | 8.45  | 6.72  | 3/8-24 | 1.00        | 6.85  | 8.82  | 8.19  | 6.47  | 7/16-20 |
| 6    | F      | 2.69        | 1.91 | .75  | 8.00  | 9.97  | 9.35  | 7.63  | 3/8-24 | 1.00        | 7.75  | 9.72  | 9.09  | 7.38  | 7/16-20 |
| 9    | E      | 2.92        | 2.23 | 1.00 | 7.92  | 10.73 | 9.98  | 7.63  | 1/2-20 | 1.12        | 7.80  | 10.61 | 9.86  | 7.56  | 3/4-16  |
|      | F      | 2.69        | 2.00 |      | 8.72  | 11.55 | 10.80 | 8.44  |        |             | 8.60  | 11.42 | 10.67 | 8.32  |         |
| 12   | E      | 2.92        | 2.23 | 1.00 | 7.92  | 10.98 | 10.23 | 7.78  | 1/2-20 | 1.12        | 7.80  | 10.86 | 10.11 | 7.66  | 3/4-16  |
|      | F      | 2.95        | 2.26 |      | 9.91  | 12.98 | 12.23 | 9.78  |        |             | 9.80  | 12.86 | 12.11 | 9.66  |         |
| 16   | E      | 3.06        | 2.37 | 1.00 | 8.18  | 11.84 | 11.09 | 8.64  | 1/2-20 | 1.12        | 8.66  | 11.72 | 10.97 | 8.52  | 3/4-16  |
|      | F      | 2.78        | 2.09 |      | 10.85 | 13.91 | 13.16 | 10.71 |        |             | 10.73 | 13.78 | 13.03 | 10.59 |         |
| 24   | E      | 2.86        | 2.17 | 1.00 | 8.53  | 11.78 | 10.78 | 8.73  | 1/2-20 | 1.12        | 8.71  | 12.16 | 11.16 | 8.59  | 3/4-16  |
|      | F      | 2.44        | 1.78 |      | 12.35 | 16.22 | 15.22 | 12.08 |        |             | 12.23 | 15.68 | 14.68 | 12.03 |         |
| 30   | E      | 2.83        | 2.14 | 1.25 | 9.27  | 12.70 | 11.70 | 9.26  | 5/8-18 | 1.50        | 8.02  | 12.89 | 11.89 | 9.30  | 1-14    |
|      | F      | 3.05        | 2.36 | 1.50 | 13.68 | 17.11 | 16.11 | 13.53 | 1-12   |             | 13.68 | 17.11 | 16.11 | 13.53 |         |
| 36   | E      | 2.83        | 2.14 | 1.25 | 9.96  | 13.31 | 12.31 | 9.82  | 5/8-18 | 1.50        | 9.71  | 13.60 | 12.60 | 10.00 | 1-14    |
|      | F      | 3.05        | 2.36 | 1.50 | 13.71 | 17.13 | 16.13 | 13.54 | 1-12   |             | 13.71 | 17.13 | 16.13 | 13.54 |         |



\*BP Rod End - Bellofram Products Co. Standard  
 †SM Rod End - National Fluid Power Assoc. Standards

Air Cylinders

**Standard Cylinders - Universal, Cap Flange, Clevis Bracket, Head Flange Mounts — Dimensions - Millimeters**

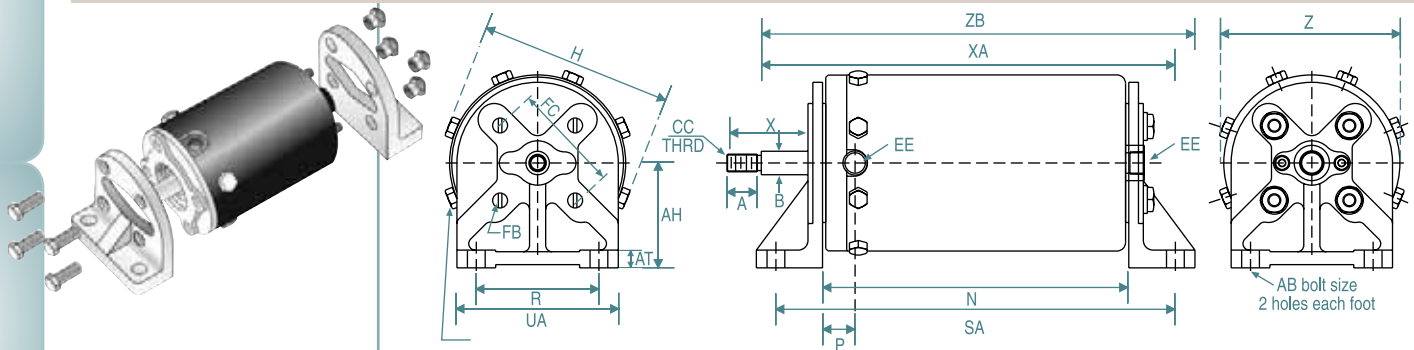
| Size | Series | Z      | H      | N      | FC     | B     | P     | F     | R      | UF     | FH    | CD    | DD    | E      | FL    | EW    | PT    | G      |
|------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|-------|-------|-------|--------|-------|-------|-------|--------|
| 4    | F      | 68.83  | 76.71  | 110.24 | 50.80  | 12.70 | 12.70 | 19.84 | 71.37  | 91.95  | 6.35  | 15.88 | 6.25  | 79.25  | 35.05 | 23.62 | 9.53  | 60.45  |
| 6    | F      | 83.06  | 90.93  | 134.11 | 50.80  | 12.70 | 12.95 | 19.84 | 71.37  | 91.95  | 6.35  | 15.88 | 6.25  | 79.25  | 35.05 | 23.62 | 12.70 | 60.45  |
| 9    | E      | 97.52  | 107.95 | 134.87 | 76.20  | 19.05 | 19.05 | 17.53 | 111.25 | 139.70 | 11.11 | 19.50 | 6.25  | 95.25  | 42.93 | 25.15 | 12.70 | 76.20  |
|      | 161.04 |        |        |        |        |       |       |       |        |        |       |       |       |        |       |       |       |        |
| 12   | E      | 11.25  | 121.67 | 134.87 | 76.20  | 19.05 | 19.05 | 17.53 | 111.25 | 139.70 | 11.11 | 19.50 | 12.70 | 101.60 | 44.45 | 31.50 | 12.70 | 76.20  |
|      | 184.91 |        |        |        |        |       |       |       |        |        |       |       |       |        |       |       |       |        |
| 16   | E      | 126.75 | 137.16 | 153.16 | 76.20  | 19.50 | 22.10 | 17.53 | 111.25 | 139.70 | 12.70 | 19.50 | 12.70 | 101.60 | 44.45 | 31.50 | 12.70 | 76.20  |
|      | 212.85 |        |        |        |        |       |       |       |        |        |       |       |       |        |       |       |       |        |
| 24   | E      | 156.46 | 166.88 | 159.51 | 120.65 | 19.50 | 25.40 | 16.66 | 152.40 | 190.50 | 12.70 | 25.40 | 12.70 | 130.05 | 50.80 | 37.85 | 15.88 | 101.60 |
|      | 259.59 |        |        |        |        |       |       |       |        |        |       |       |       |        |       |       |       |        |
| 30   | E      | 174.75 | 185.17 | 177.80 | 120.65 | 25.40 | 25.40 | 16.66 | 152.40 | 190.50 | 12.70 | 25.40 | 12.70 | 130.05 | 50.80 | 37.85 | 15.88 | 101.60 |
|      | 290.58 |        |        |        |        |       |       |       |        |        |       |       |       |        |       |       |       |        |
| 36   | E      | 187.45 | 197.87 | 195.33 | 120.65 | 25.40 | 25.40 | 16.66 | 152.40 | 190.50 | 12.70 | 25.40 | 12.70 | 130.05 | 50.80 | 37.85 | 15.88 | 101.60 |
|      | 291.34 |        |        |        |        |       |       |       |        |        |       |       |       |        |       |       |       |        |

| Size | Series | BP Rod End* |       |       |        |        |        |        |       | SM Rod End† |        |        |        |  |
|------|--------|-------------|-------|-------|--------|--------|--------|--------|-------|-------------|--------|--------|--------|--|
|      |        | X           | Y     | A     | ZA     | ZD     | XD     | ZB     | A     | ZA          | ZD     | XD     | ZB     |  |
| 4    | F      | 69.34       | 49.53 | 19.05 | 180.34 | 230.38 | 244.63 | 170.69 | 25.40 | 173.99      | 224.03 | 208.03 | 164.34 |  |
| 6    | F      | 68.33       | 48.51 | 19.05 | 203.20 | 253.24 | 237.49 | 193.80 | 25.40 | 196.85      | 246.89 | 230.89 | 187.45 |  |
| 9    | E      | 74.17       | 56.64 | 25.40 | 201.17 | 272.54 | 253.49 | 193.80 | 28.45 | 198.12      | 269.49 | 250.44 | 192.02 |  |
|      | F      | 68.33       | 50.80 |       | 221.49 | 293.37 | 274.32 | 214.38 |       | 218.44      | 290.07 | 271.02 | 211.33 |  |
| 12   | E      | 74.17       | 56.64 | 25.40 | 201.17 | 278.89 | 259.84 | 197.61 | 28.45 | 198.12      | 275.84 | 256.79 | 194.56 |  |
|      | F      | 74.93       | 57.40 |       | 251.97 | 329.69 | 310.64 | 257.41 |       | 248.92      | 326.64 | 307.59 | 245.36 |  |
| 16   | E      | 77.72       | 60.20 | 25.40 | 207.77 | 300.74 | 281.69 | 219.46 | 28.45 | 219.93      | 279.69 | 278.64 | 216.41 |  |
|      | F      | 70.61       | 53.09 |       | 275.59 | 353.31 | 334.26 | 272.03 |       | 272.54      | 350.01 | 330.96 | 268.99 |  |
| 24   | E      | 72.64       | 55.12 | 25.40 | 216.66 | 299.21 | 273.81 | 221.74 | 28.45 | 221.23      | 308.86 | 283.46 | 218.19 |  |
|      | F      | 61.98       | 45.21 |       | 313.69 | 411.99 | 286.59 | 306.83 |       | 310.64      | 398.27 | 372.87 | 305.56 |  |
| 30   | E      | 71.88       | 54.36 | 31.75 | 235.46 | 322.58 | 297.18 | 235.20 | 38.10 | 203.71      | 327.41 | 302.00 | 236.22 |  |
|      | F      | 77.47       | 59.94 | 38.10 | 347.47 | 434.59 | 409.19 | 343.66 |       | 347.47      | 434.59 | 409.19 | 343.66 |  |
| 36   | E      | 71.88       | 54.36 | 31.75 | 252.98 | 338.07 | 312.67 | 249.43 | 38.10 | 246.63      | 345.44 | 320.04 | 254.00 |  |
|      | F      | 77.47       | 59.94 | 38.10 | 248.23 | 435.10 | 409.70 | 343.92 |       | 248.23      | 435.10 | 409.70 | 343.92 |  |



\*BP Rod End - Bellofram Products Co. Standard  
 †SM Rod End - National Fluid Power Assoc. Standards

## Foot Mount



Note: Sizes 4, 6, 9, and 12 have 4 Head Retaining Screws. All other sizes have 8 Head Retaining Screws

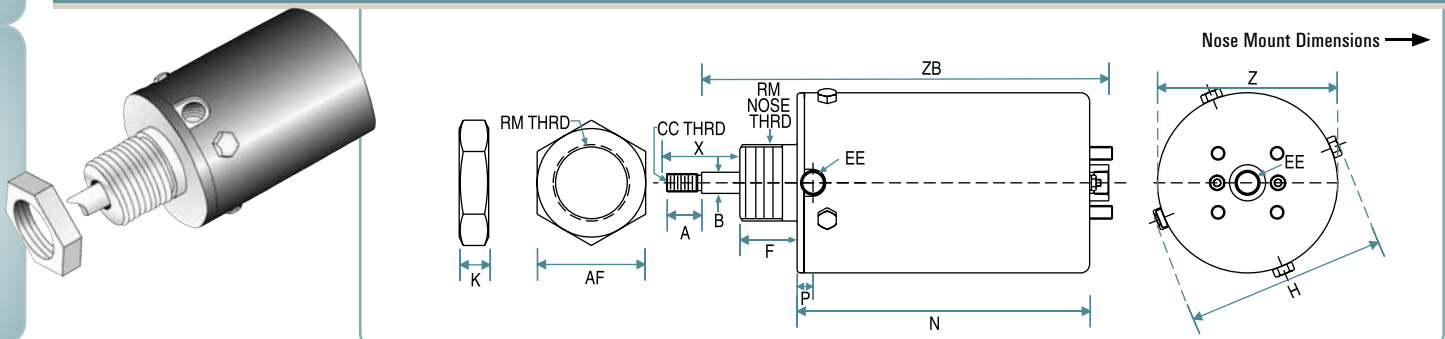
## Standard Cylinders with Foot Mount Dimensions - Inches

| Size | Series | Z    | H    | N     | EE      | FC   | FB       | B   | P    | AT  | AH   | UA   | R    | SA    | AB  | X    | BP Rod End* |       |       |        | SM Rod End† |       |       |         |
|------|--------|------|------|-------|---------|------|----------|-----|------|-----|------|------|------|-------|-----|------|-------------|-------|-------|--------|-------------|-------|-------|---------|
|      |        |      |      |       |         |      |          |     |      |     |      |      |      |       |     |      | A           | XA    | ZB    | CC     | A           | XA    | ZB    | CC      |
| 4    | F      | 2.71 | 3.02 | 4.34  | 1/4 NPT | 2.00 | 1/4 - 20 | 1/2 | .50  | .38 | 1.88 | 2.62 | 2.00 | 6.59  | 1/4 | 2.41 | .75         | 7.44  | 7.82  | 3/8-24 | 1.00        | 7.19  | 7.57  | 7/16-20 |
| 6    | F      | 3.27 | 3.58 | 5.28  | 1/4 NPT | 2.00 | 1/4 - 20 | 1/2 | .51  | .38 | 1.88 | 2.62 | 2.00 | 7.53  | 1/4 | 2.38 | .75         | 8.35  | 8.72  | 3/8-24 | 1.00        | 8.10  | 8.47  | 7/16-20 |
| 9    | E      | 3.84 | 4.25 | 5.31  | 1/4 NPT | 3.00 | 7/16-14  | 3/4 | .75  | .56 | 2.75 | 4.00 | 3.00 | 8.56  | 1/2 | 2.24 | 1.00        | 8.86  | 9.55  | 1/2-20 | 1.12        | 8.74  | 9.43  | 3/4-16  |
|      | F      |      |      | 9.59  |         |      |          |     |      |     |      |      |      | 10.29 |     |      |             | 9.55  | 10.16 |        |             |       |       |         |
| 12   | E      | 4.38 | 4.79 | 5.31  | 3/8 NPT | 3.00 | 7/16-14  | 3/4 | .75  | .56 | 2.75 | 4.00 | 3.00 | 8.56  | 1/2 | 2.30 | 1.00        | 8.86  | 9.56  | 1/2-20 | 1.12        | 8.73  | 9.44  | 3/4-16  |
|      | F      |      |      | 10.53 |         |      |          |     |      |     |      |      |      | 11.56 |     |      |             | 10.73 | 11.36 |        |             |       |       |         |
| 16   | E      | 4.99 | 5.40 | 6.03  | 3/8 NPT | 3.00 | 1/2-13   | 3/4 | .87  | .56 | 2.75 | 4.00 | 3.00 | 9.28  | 1/2 | 2.31 | 1.00        | 9.72  | 10.42 | 1/2-20 | 1.12        | 9.59  | 10.22 | 3/4-16  |
|      | F      |      |      | 11.62 |         |      |          |     |      |     |      |      |      | 12.41 |     |      |             | 11.66 | 12.28 |        |             |       |       |         |
| 24   | E      | 6.16 | 6.57 | 6.28  | 3/8 NPT | 4.75 | 5/8-11   | 3/4 | 1.00 | .68 | 4.00 | 6.25 | 4.75 | 10.16 | 5/8 | 2.23 | 1.00        | 10.09 | 10.86 | 1/2-20 | 1.12        | 9.94  | 10.63 | 3/4-16  |
|      | F      |      |      | 14.09 |         |      |          |     |      |     |      |      |      | 14.29 |     |      |             | 13.10 | 13.79 |        |             |       |       |         |
| 30   | E      | 6.88 | 7.29 | 7.00  | 3/8 NPT | 4.75 | 5/8-11   | 1   | 1.00 | .68 | 4.00 | 6.25 | 4.75 | 10.88 | 5/8 | 2.20 | 1.25        | 10.52 | 11.20 | 5/8-18 | 1.50        | 10.26 | 10.95 | 1-14    |
|      | F      |      |      | 15.31 |         |      |          |     |      |     |      |      |      | 15.61 |     |      |             | 14.92 | 15.69 |        |             |       |       |         |
| 36   | E      | 7.38 | 7.79 | 7.69  | 3/8 NPT | 4.75 | 5/8-11   | 1   | 1.00 | .68 | 4.00 | 6.25 | 4.75 | 11.56 | 5/8 | 2.20 | 1.25        | 11.22 | 11.91 | 5/8-18 | 1.50        | 10.97 | 11.66 | 1-14    |
|      | F      |      |      | 15.34 |         |      |          |     |      |     |      |      |      | 15.62 |     |      |             | 14.94 | 15.62 |        |             |       |       |         |

## Standard Cylinders with Foot Mount Dimensions - Millimeters

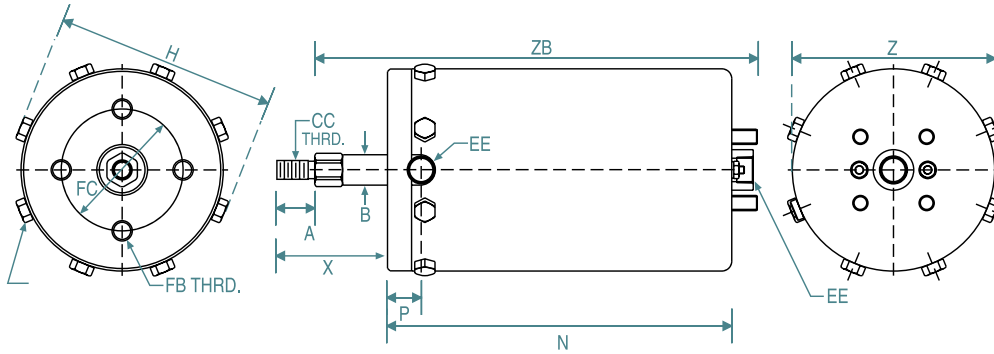
| Size | Series | Z      | H      | N      | FC     | B     | P     | AT    | AH     | UA     | R      | SA     | AB    | X     | BP Rod End* |        |        |       | SM Rod End† |        |        |
|------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|--------|--------|-------|-------|-------------|--------|--------|-------|-------------|--------|--------|
|      |        |        |        |        |        |       |       |       |        |        |        |        |       |       | A           | XA     | ZB     | CC    | A           | XA     | ZB     |
| 4    | F      | 68.83  | 76.71  | 110.24 | 50.80  | 12.70 | 12.70 | 9.65  | 47.75  | 66.65  | 50.80  | 167.39 | 6.35  | 61.21 | 19.05       | 188.98 | 198.63 | 25.40 | 182.63      | 192.28 |        |
| 6    | F      | 83.06  | 90.93  | 134.11 | 50.80  | 12.70 | 12.95 | 9.65  | 47.75  | 66.55  | 50.80  | 191.26 | 6.35  | 60.45 | 19.05       | 212.09 | 221.49 | 25.40 | 205.74      | 215.14 |        |
| 9    | E      | 97.54  | 107.95 | 134.87 | 76.20  | 19.05 | 19.05 | 14.22 | 69.85  | 101.60 | 76.20  | 273.41 | 12.70 | 56.90 | 25.40       | 225.04 | 242.57 | 28.45 | 222.00      | 239.52 |        |
|      | F      |        |        | 161.04 |        |       |       |       |        |        |        |        |       |       |             |        |        |       |             |        | 243.59 |
| 12   | E      | 111.25 | 121.67 | 134.87 | 76.20  | 19.05 | 19.05 | 14.22 | 69.85  | 101.60 | 76.20  | 273.41 | 12.70 | 58.42 | 25.40       | 225.04 | 242.82 | 28.45 | 221.74      | 239.78 |        |
|      | F      |        |        | 184.91 |        |       |       |       |        |        |        |        |       |       |             |        |        |       |             |        | 267.46 |
| 16   | E      | 126.75 | 137.16 | 153.16 | 76.20  | 19.05 | 22.10 | 14.22 | 69.85  | 101.60 | 76.20  | 235.71 | 12.70 | 58.67 | 25.40       | 246.89 | 264.67 | 28.45 | 243.59      | 259.59 |        |
|      | F      |        |        | 212.85 |        |       |       |       |        |        |        |        |       |       |             |        |        |       |             |        | 295.15 |
| 24   | E      | 156.46 | 166.88 | 159.51 | 120.65 | 19.05 | 25.40 | 17.27 | 101.60 | 158.75 | 120.65 | 258.06 | 15.88 | 56.64 | 25.40       | 256.29 | 275.84 | 28.45 | 252.48      | 270.00 |        |
|      | F      |        |        | 259.59 |        |       |       |       |        |        |        |        |       |       |             |        |        |       |             |        | 357.89 |
| 30   | E      | 174.75 | 185.17 | 177.80 | 120.65 | 25.40 | 25.40 | 17.27 | 101.60 | 158.75 | 120.65 | 276.35 | 15.88 | 55.88 | 31.75       | 267.21 | 284.48 | 38.10 | 260.60      | 278.13 |        |
|      | F      |        |        | 290.58 |        |       |       |       |        |        |        |        |       |       |             |        |        |       |             |        | 388.87 |
| 36   | E      | 187.45 | 197.8  | 195.33 | 120.65 | 25.40 | 25.40 | 17.27 | 101.60 | 158.75 | 120.65 | 293.62 | 15.88 | 55.88 | 31.75       | 284.99 | 302.51 | 38.10 | 278.64      | 296.16 |        |
|      | F      |        |        | 291.34 |        |       |       |       |        |        |        |        |       |       |             |        |        |       |             |        | 389.64 |

## Universal Mount





## Super Cylinder



### Standard Cylinders with Foot Mount Dimensions - Inches

| Size | Series | Z    | H    | N     | EE      | FC   | FB       | B   | P    | X    | BP Rod End* |       |        | SM Rod End† |       |         |
|------|--------|------|------|-------|---------|------|----------|-----|------|------|-------------|-------|--------|-------------|-------|---------|
|      |        |      |      |       |         |      |          |     |      |      | A           | ZB    | CC     | A           | ZB    | CC      |
| 4    | F      | 2.71 | 3.02 | 4.34  | 1/4 NPT | 2.00 | 1/4 - 20 | 1/2 | .50  | 3.10 | .75         | 7.09  | 3/8-24 | 1.00        | 6.85  | 7/16-20 |
| 6    | F      | 3.27 | 3.58 | 5.28  | 1/4 NPT | 2.00 | 1/4 - 20 | 1/2 | .51  | 2.16 | .75         | 7.09  | 3/8-24 | 1.00        | 6.85  | 7/16-20 |
| 9    | F      | 3.84 | 4.25 | 6.34  | 1/4 NPT | 3.00 | 7/16-14  | 3/4 | .75  | 3.50 | 1.00        | 9.25  | 1/2-20 | 1.12        | 9.13  | 3/4-16  |
| 12   | F      | 4.38 | 4.79 | 7.28  | 3/8 NPT | 3.00 | 7/16-14  | 3/4 | .75  | 2.57 | 1.00        | 9.38  | 1/2-20 | 1.12        | 9.26  | 3/4-16  |
| 16   | F      | 4.99 | 5.40 | 8.38  | 3/8 NPT | 3.00 | 1/2-13   | 3/4 | .87  | 3.78 | 1.00        | 11.69 | 1/2-20 | 1.12        | 11.57 | 3/4-16  |
| 24   | F      | 6.16 | 6.57 | 10.22 | 3/8 NPT | 4.75 | 5/8-11   | 3/4 | 1.00 | 2.00 | 1.00        | 11.75 | 1/2-20 | 1.12        | 11.75 | 3/4-16  |
| 30   | F      | 6.88 | 7.29 | 11.44 | 3/8 NPT | 4.75 | 5/8-11   | 1   | 1.00 | 3.05 | 1.50        | 13.52 | 1-12   | 1.50        | 13.52 | 1-14    |
| 36   | F      | 7.38 | 7.79 | 11.47 | 3/8 NPT | 4.75 | 5/8-11   | 1   | 1.00 | 3.05 | 1.50        | 13.55 | 1-12   | 1.50        | 13.55 | 1-14    |

### Standard Cylinders with Foot Mount Dimensions - Millimeters

| Size | Series | Z      | H      | N      | FC     | B     | P     | X     | BP Rod End* |        | SM Rod End† |        |
|------|--------|--------|--------|--------|--------|-------|-------|-------|-------------|--------|-------------|--------|
|      |        |        |        |        |        |       |       |       | A           | ZB     | A           | ZB     |
| 4    | F      | 68.83  | 76.71  | 110.24 | 50.80  | 12.70 | 12.70 | 78.74 | 19.05       | 180.09 | 25.40       | 173.99 |
| 6    | F      | 83.06  | 90.93  | 134.11 | 50.80  | 12.70 | 12.95 | 54.86 | 19.05       | 180.09 | 25.40       | 173.99 |
| 9    | F      | 97.54  | 107.95 | 161.04 | 76.20  | 19.05 | 19.05 | 88.90 | 25.40       | 234.95 | 28.45       | 231.90 |
| 12   | F      | 111.25 | 121.67 | 184.91 | 76.20  | 19.05 | 19.05 | 65.28 | 25.40       | 238.25 | 28.45       | 235.20 |
| 16   | F      | 126.75 | 137.16 | 212.85 | 76.20  | 19.05 | 22.10 | 96.01 | 25.40       | 296.93 | 28.45       | 293.88 |
| 24   | F      | 156.46 | 166.88 | 259.59 | 120.65 | 19.05 | 25.40 | 50.80 | 25.40       | 298.45 | 28.45       | 298.45 |
| 30   | F      | 174.75 | 185.17 | 290.58 | 120.65 | 25.40 | 25.40 | 77.47 | 38.10       | 343.41 | 38.10       | 343.41 |
| 36   | F      | 187.45 | 197.80 | 195.33 | 120.65 | 25.40 | 25.40 | 77.47 | 38.10       | 344.17 | 38.10       | 344.17 |

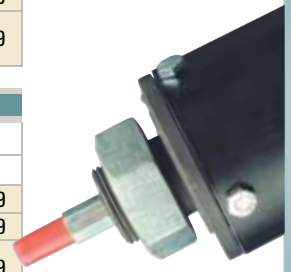
**Super Cylinders are equipped with linear ball bearings and hardened steel rods.**

### Nose Mount Dimensions - Inches

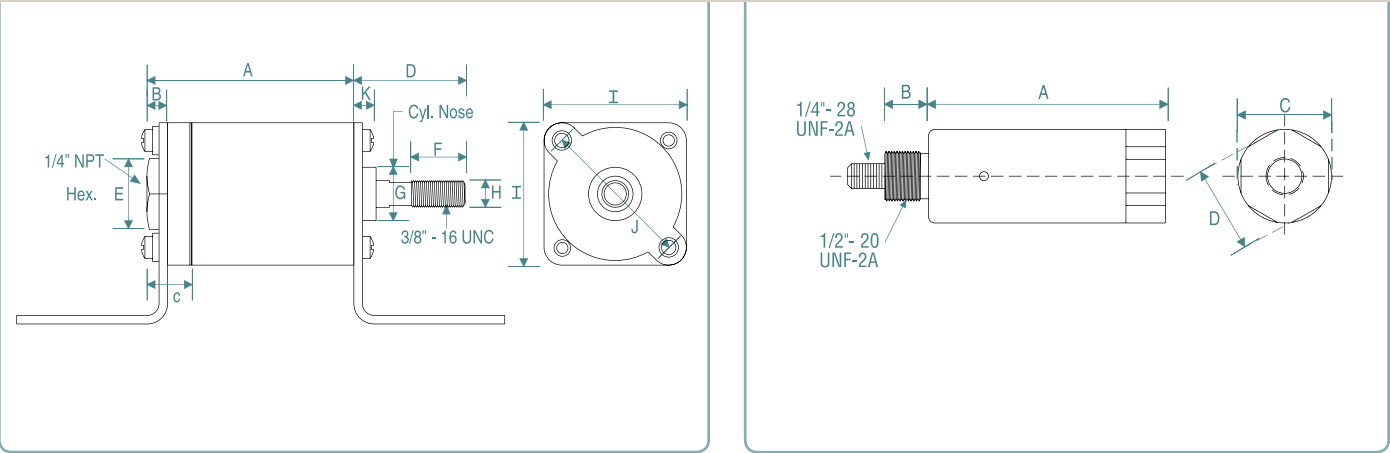
| Size | Series | Z    | H    | N    | EE      | F    | RM         | B   | X    | BP Rod End* |      |          | SM Rod End† |      |           | AF   | K   | P   |
|------|--------|------|------|------|---------|------|------------|-----|------|-------------|------|----------|-------------|------|-----------|------|-----|-----|
|      |        |      |      |      |         |      |            |     |      | A           | ZB   | CC       | A           | ZB   | CC        |      |     |     |
| 4    | F      | 2.71 | 3.02 | 4.34 | 1/4 NPT | 1.25 | 1-3/8 - 12 | 1/2 | 1.48 | .75         | 6.72 | 3/8 - 24 | 1.00        | 6.47 | 7/16 - 20 | 2.06 | .78 | .59 |
| 6    | F      | 3.27 | 3.58 | 5.28 | 1/4 NPT | 1.25 | 1-3/8 - 12 | 1/2 | 1.44 | .75         | 7.63 | 3/8 - 24 | 1.00        | 7.06 | 7/16 - 20 | 2.06 | .78 | .59 |
| 9    | E      | 3.84 | 4.15 | 5.16 | 1/4 NPT | 1.25 | 1-5/8 - 12 | 3/4 | 1.83 | 1.00        | 7.65 | 1/2 - 20 | 1.12        | 7.53 | 3/4-16    | 2.44 | .91 | .59 |
|      | F      |      |      | 6.19 |         |      |            |     | 1.61 |             | 8.45 |          |             | 8.33 |           |      |     |     |

### Nose Mount Dimensions - Millimeters

| Size | Series | Z     | H      | N      | F     | B     | X     | BP Rod End* |        | SM Rod End† |        | AF    | K     | P     |
|------|--------|-------|--------|--------|-------|-------|-------|-------------|--------|-------------|--------|-------|-------|-------|
|      |        |       |        |        |       |       |       | A           | ZB     | A           | ZB     |       |       |       |
| 4    | F      | 68.83 | 76.71  | 110.24 | 31.75 | 12.70 | 37.59 | 19.05       | 170.69 | 25.40       | 164.34 | 52.32 | 19.81 | 14.99 |
| 6    | F      | 83.06 | 91.93  | 134.11 | 31.75 | 12.70 | 36.58 | 19.05       | 193.80 | 25.40       | 179.32 | 52.32 | 19.81 | 14.99 |
| 9    | E      | 97.54 | 105.41 | 131.06 | 31.75 | 19.05 | 46.48 | 25.40       | 194.31 | 28.45       | 191.26 | 61.98 | 23.11 | 14.99 |
|      | F      |       |        | 157.23 |       |       | 40.89 |             | 214.63 |             | 211.58 |       |       |       |



### Small Bore Cylinder



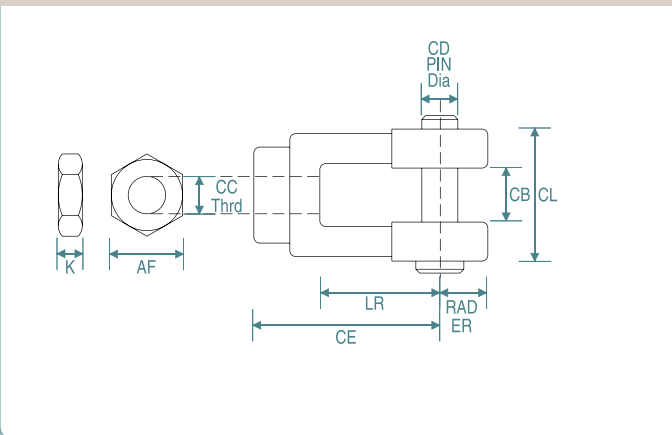
#### Small Bore Cylinder Dimensions - Inches

| Part Number | A       | B     | C   | D     | E     | F   | G   | H   | I | J     | K    | Part Number | A    | B     | C     | D   |
|-------------|---------|-------|-----|-------|-------|-----|-----|-----|---|-------|------|-------------|------|-------|-------|-----|
| 980-008-000 | 2-29/32 | 13/64 | 5/8 | 19/16 | 13/16 | 3/4 | 3/4 | 3/8 | 2 | 2-1/8 | 5/16 | 908-013-000 | 2.81 | 0.438 | 15/16 | 7/8 |
| 980-077-000 | 3-21/32 | 13/64 | 5/8 | 19/16 | 13/16 | 3/4 | 3/4 | 3/8 | 2 | 2-1/8 | 5/16 | 908-034-000 |      |       |       |     |
|             |         |       |     |       |       |     |     |     |   |       |      | 908-014-000 | 1.95 | 0.244 | 15/16 | 7/8 |
|             |         |       |     |       |       |     |     |     |   |       |      | 908-035-000 |      |       |       |     |

#### Small Bore Cylinder Dimensions - Millimeters

| Part Number | A    | B   | C    | D    | E    | F    | G    | H   | I    | J    | K   | Part Number | A    | B    | C    | D    |
|-------------|------|-----|------|------|------|------|------|-----|------|------|-----|-------------|------|------|------|------|
| 980-008-000 | 73.8 | 5.2 | 15.9 | 39.6 | 20.6 | 19.1 | 19.1 | 9.5 | 50.8 | 54.0 | 7.9 | 908-013-000 | 71.4 | 11.1 | 23.8 | 22.2 |
| 980-077-000 | 92.9 | 5.2 | 15.9 | 39.6 | 20.6 | 19.1 | 19.1 | 9.5 | 50.8 | 54.0 | 7.9 | 908-034-000 |      |      |      |      |
|             |      |     |      |      |      |      |      |     |      |      |     | 908-014-000 | 49.5 | 6.2  | 23.8 | 22.2 |
|             |      |     |      |      |      |      |      |     |      |      |     | 908-035-000 |      |      |      |      |

### Rod Clevis and Jam Nut



### Rod Clevis and Jam Nut Ordering Information

| ↑         | ↑         | ↑         | ↑ |   |
|-----------|-----------|-----------|---|---|
|           |           |           |   | Size  |
| <b>04</b> |           |           |   | Area in Square Inches: 04, 06, 09, 16, 24, 30, or 36                    |
|           |           |           |   | Series  |
| <b>E</b>  |           |           |   | Determines Stroke: Make a selection from Operating Data Table on pg. 47 |
| <b>F</b>  |           |           |   | Rod   |
|           | <b>BP</b> |           |   | Bellofram Product Standard  |
|           | <b>SM</b> |           |   | National Fluid Power Assoc. Standard                                    |
|           |           |           |   | Make a selection from dimensional data table on pgs. 51-54              |
|           |           |           |   | Rod Clevis  |
|           |           | <b>RC</b> |   | Rod Clevis  |

Example: 36-F-BP-RC is a Rod Clevis for a size 36 sq. in. cylinder with a 1-12 rod thread.

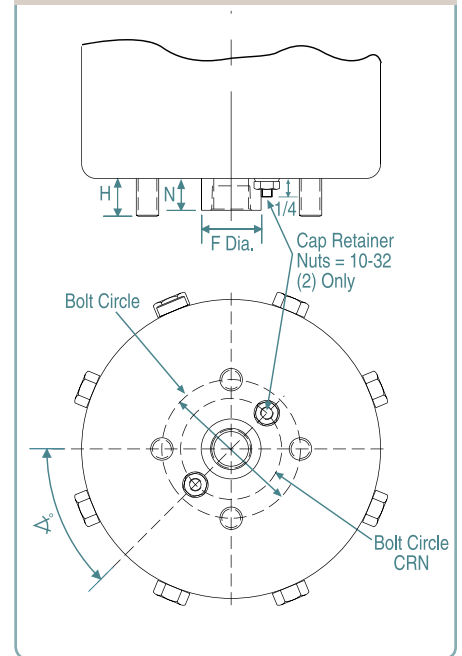
### Rod Clevis and Jam Nut Dimensions - Inches

| Size      | Rod End | Rod End CC Thrd. | Series | CB   | CD Pin Dia. | CE    | CL   | Rad. ER | LR   | AF      | K     |
|-----------|---------|------------------|--------|------|-------------|-------|------|---------|------|---------|-------|
| 4         | BP      | 3/8-24           | F      | .56  | 3/8         | 1-7/8 | 1.38 | .53     | 1.25 | 9/16    | 7/32  |
|           | SM      | 7/16-20          |        |      | 7/16        |       |      |         |      | 11/16   | 1/4   |
| 6         | BP      | 3/8-24           | F      | .56  | 3/8         | 1-7/8 | 1.38 | .53     | 1.25 | 9/16    | 7/32  |
|           | SM      | 7/16-20          |        |      | 7/16        |       |      |         |      | 11/16   | 1/4   |
| 9         | BP      | 1/2-20           | E or F | .56  | 1/2         | 1-7/8 | 1.38 | .53     | 1.25 | 3/4     | 5/16  |
|           | SM      | 3/4-16           |        | .88  | 3/4         | 2-3/8 | 2.12 | .75     |      | 1-1/8   | 27/64 |
| 12        | BP      | 1/2-20           | E or F | .56  | 1/2         | 1-7/8 | 1.38 | .53     | 1.25 | 3/4     | 5/16  |
|           | SM      | 3/4-16           |        | .88  | 3/4         | 2-3/8 | 2.12 | .75     |      | 1-1/8   | 27/64 |
| 16        | BP      | 1/2-20           | E or F | .56  | 1/2         | 1-7/8 | 1.38 | .53     | 1.25 | 3/4     | 5/16  |
|           | SM      | 3/4-16           |        | .88  | 3/4         | 2-3/8 | 2.12 | .75     |      | 1-1/8   | 27/64 |
| 24        | BP      | 1/2-20           | E or F | .56  | 1/2         | 1-7/8 | 1.38 | .53     | 1.25 | 3/4     | 5/16  |
|           | SM      | 3/4-16           |        | .88  | 3/4         | 2-3/8 | 2.12 | .75     |      | 1-1/8   | 27/64 |
| 30 and 36 | BP      | 5/8-18           | E      | .56  | 9/16        | 1-7/8 | 1.38 | .53     | 1.25 | 1-15/16 | 3/8   |
|           | BP      | 1-12             | F      | 1.50 | 1           | 3-1/2 | 3.50 | 1.00    | 1.50 | 1-1/2   | 35/64 |
|           | SM      | 3/4-16           |        |      |             |       |      |         |      |         |       |
|           | SM      | 1-14             | E or F | 1.50 | 1           | 3-1/2 | 3.50 | 1.00    | 1.50 | 1-1/2   | 35/64 |

BP Rod End – Bellofram Products Co. Standard, SM Rod End – National Fluid Power Assoc. Standards



### Cylinder Cap End Mounting Studs



### Rod Clevis and Jam Nut Dimensions - Millimeters

| Size      | Rod End | Series | CB    | CD Pin Dia. | CE    | CL    | Rad. ER | LR    | AF    | K     |
|-----------|---------|--------|-------|-------------|-------|-------|---------|-------|-------|-------|
| 4         | BP      | F      | 14.22 | 9.53        | 47.63 | 35.05 | 13.46   | 31.75 | 14.29 | 5.56  |
|           | SM      |        |       | 11.11       |       |       |         |       | 17.46 | 6.36  |
| 6         | BP      | F      | 14.22 | 9.53        | 47.63 | 35.05 | 13.56   | 31.75 | 14.29 | 5.56  |
|           | SM      |        |       | 11.11       |       |       |         |       | 17.46 | 6.35  |
| 9         | BP      | E or F | 14.22 | 12.70       | 47.63 | 35.05 | 13.56   | 31.75 | 19.05 | 7.94  |
|           | SM      |        | 22.35 | 19.05       | 60.33 | 53.85 | 19.05   |       | 18.58 | 10.72 |
| 12        | BP      | E or F | 14.22 | 12.70       | 47.63 | 35.05 | 13.56   | 31.75 | 19.05 | 7.94  |
|           | SM      |        | 22.35 | 19.05       | 60.33 | 53.85 | 19.05   |       | 28.58 | 10.72 |
| 16        | BP      | E or F | 14.22 | 12.70       | 47.63 | 35.05 | 13.56   | 31.75 | 19.05 | 7.94  |
|           | SM      |        | 22.35 | 19.05       | 60.33 | 53.85 | 19.05   |       | 28.59 | 10.72 |
| 24        | BP      | E or F | 14.22 | 12.70       | 47.63 | 35.05 | 13.56   | 31.75 | 19.05 | 7.94  |
|           | SM      |        | 22.35 | 19.05       | 60.33 | 53.85 | 19.05   |       | 28.59 | 13.89 |
| 30 and 36 | BP      | E      | 14.22 | 14.29       | 47.63 | 35.05 | 13.46   | 31.75 | 33.34 | 9.53  |
|           | BP      | F      | 38.1  | 25.4        | 88.90 | 88.90 | 25.4    | 38.1  | 38.1  | 13.89 |
|           | SM      |        |       |             |       |       |         |       |       |       |
|           | SM      | E or F | 38.1  | 25.4        | 88.90 | 88.90 | 25.4    | 38.1  | 38.1  | 13.89 |

### Cylinder Cap End Mounting Studs Dimensions - Inches

| Size | Number of Studs | Size of Stud | H (Approx.) | Bolt Circle | F (Boss) | N     | Bolt Circle CRN | <° |
|------|-----------------|--------------|-------------|-------------|----------|-------|-----------------|----|
| 4    | 2               | 1/4-20       | 5/8         | 1-5/16      | 11/16    | 13/32 | 1-3/8           | 90 |
| 6    | 2               | 1/4-20       | 5/8         | 1-1/2       | 11/16    | 13/32 | 1-3/8           | 90 |
| 9    | 4               | 1/4-20       | 5/8         | 2           | 11/16    | 13/32 | 1-3/8           | 45 |
| 12   | 4               | 1/4-20       | 5/8         | 2-5/16      | 1        | 17/32 | 1-11/16         | 45 |
| 16   | 4               | 3/8-16       | 5/8         | 2-5/16      | 1        | 17/32 | 1-11/16         | 45 |
| 24   | 4               | 3/8-16       | 9/16        | 3-1/8       | 1        | 17/32 | 1-11/16         | 45 |
| 30   | 4               | 1/2-13       | 11/16       | 4           | 1        | 17/32 | 1-11/16         | 45 |
| 36   | 4               | 1/2-13       | 11/16       | 4           | 1        | 17/32 | 1-11/16         | 45 |

**All Diaphragm Cylinders feature Bellofram Rolling Diaphragms for low friction and increased sensitivity!**

## Diaphragm Cylinders Part Numbers

### Type S (Spring Return)

| Series         |    | E           |             |             |             | F           |             |             |             |
|----------------|----|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Rod            |    | BP          |             | SM          |             | BP          |             | SM          |             |
| Mount          |    | UM          | N           | ZB          | N           | UM          | N           | UM          | N           |
| Size (sq. in.) | 4  |             |             |             |             | 900-002-000 | 900-006-000 | 900-004-000 | 900-008-000 |
|                | 6  |             |             |             |             | 900-010-000 | 900-014-000 | 900-012-000 | 900-016-000 |
|                | 9  | 900-018-000 | 900-022-000 | 900-020-000 | 900-024-000 | 900-026-000 | 900-030-000 | 900-028-000 | 900-032-000 |
|                | 12 | 900-034-000 |             | 900-036-000 |             | 900-038-000 |             | 900-040-000 |             |
|                | 16 | 900-042-000 |             | 900-044-000 |             | 900-046-000 |             | 900-048-000 |             |
|                | 24 | 900-050-000 |             | 900-052-000 |             | 900-054-000 |             | 900-056-000 |             |
|                | 30 | 900-058-000 |             | 900-060-000 |             | 900-062-000 |             | 900-064-000 |             |
|                | 36 | 900-066-000 |             | 900-068-000 |             | 900-070-000 |             | 900-072-000 |             |

All cylinders are supplied with cap mounting studs. Consult factory for cylinders required without cap mounting studs. Select part numbers from non-shaded areas only.

### Type D Cylinders (Double Acting)

| Series         |    | E           |             | F           |             |             |             |
|----------------|----|-------------|-------------|-------------|-------------|-------------|-------------|
| Rod            |    | BP          | SM          | BP          |             | SM          |             |
| Mount          |    | UM          | UM          | UM          | N           | UM          | N           |
| Size (sq. in.) | 4  |             |             | 902-002-000 | 902-006-000 | 902-004-000 | 902-008-000 |
|                | 6  |             |             | 902-010-000 | 902-014-000 | 902-012-000 | 902-016-000 |
|                | 9  |             |             | 902-018-000 | 902-022-000 | 902-020-000 | 902-024-000 |
|                | 12 | 902-026-000 | 902-028-000 | 902-030-000 |             | 902-032-000 |             |
|                | 16 | 902-034-000 | 902-036-000 | 902-038-000 |             | 902-040-000 |             |
|                | 24 | 902-042-000 | 902-044-000 | 902-046-000 |             | 902-048-000 |             |
|                | 30 | 902-050-000 | 902-052-000 | 902-054-000 |             | 902-056-000 |             |
|                | 36 | 902-058-000 | 902-060-000 | 902-062-000 |             | 902-064-000 |             |

All cylinders are supplied with cap mounting studs. Consult factory for cylinders required without cap mounting studs. Select part numbers from non-shaded areas only.

### Type SS (Super Cylinders)

| Series         |    | F           |             |
|----------------|----|-------------|-------------|
| Rod            |    | BP          | SM          |
| Mount          |    | UM          | UM          |
| Size (sq. in.) | 4  | 903-074-000 | 903-001-000 |
|                | 6  | 903-076-000 | 903-011-000 |
|                | 9  | 903-078-000 | 903-021-000 |
|                | 12 | 903-080-000 | 903-031-000 |
|                | 16 | 903-082-000 | 903-041-000 |
|                | 24 | 903-084-000 | 903-051-000 |
|                | 30 | 903-086-000 | 903-061-000 |
|                | 36 | 903-088-000 | 903-071-000 |

### Repair Kits

| Spring Return Cylinders |             |              |             | Double Acting Cylinders |             |              |             | Super Cylinders |             |
|-------------------------|-------------|--------------|-------------|-------------------------|-------------|--------------|-------------|-----------------|-------------|
| Diaphragm Kits          |             | Bearing Kits |             | Diaphragm Kits          |             | Bearing Kits |             | Bearing Kits    |             |
| Kit No.                 | Part No.    | Kit No.      | Part No.    | Kit No.                 | Part No.    | Kit No.      | Part No.    | Kit No.         | Part No.    |
| S4FN                    | 970-041-000 | SB46S        | 970-058-000 | D4S                     | 970-014-000 | DB46S        | 970-064-000 | SSB46S          | 970-134-000 |
| S6FN                    | 970-042-000 | SB924S       | 970-060-000 | D6S                     | 970-018-000 | DB924S       | 970-066-000 | SSB924S         | 970-133-000 |
| S9EN                    | 970-043-000 | SB36FB       | 970-062-000 | D9S                     | 970-020-000 | DB36FB       | 970-068-000 | SSB36FB         | 970-135-000 |
| S9FN                    | 970-044-000 |              |             | D12ES                   | 970-022-000 |              |             |                 |             |
| S12E                    | 970-045-000 |              |             | D12FS                   | 970-024-000 |              |             |                 |             |
| S12F                    | 970-046-000 |              |             | D16ES                   | 970-026-000 |              |             |                 |             |
| S16E                    | 970-047-000 |              |             | D16FS                   | 970-028-000 |              |             |                 |             |
| S16F                    | 970-048-000 |              |             | D24ES                   | 970-030-000 |              |             |                 |             |
| S24E                    | 970-049-000 |              |             | D24FS                   | 970-032-000 |              |             |                 |             |
| S24F                    | 970-050-000 |              |             | D30ES                   | 970-034-000 |              |             |                 |             |
| S30E                    | 970-051-000 |              |             | D30FS                   | 970-036-000 |              |             |                 |             |
| S30F                    | 970-052-000 |              |             | D36ES                   | 970-038-000 |              |             |                 |             |
| S36E                    | 970-053-000 |              |             | D36FS                   | 970-040-000 |              |             |                 |             |
| S36F                    | 970-054-000 |              |             |                         |             |              |             |                 |             |

### Mounting Kits

| Size | FM          | CFM         | HFM         | CBM         | CBS         |
|------|-------------|-------------|-------------|-------------|-------------|
| 4    | 904-001-000 | 904-012-000 | 904-008-000 | 904-026-000 | 904-019-000 |
| 6    | 904-002-000 | 904-013-000 | 904-008-000 | 904-027-000 | 904-020-000 |
| 9    | 904-003-000 | 904-014-000 | 904-009-000 | 904-028-000 | 904-021-000 |
| 12   | 904-004-000 | 904-015-000 | 904-009-000 | 904-029-000 | 904-022-000 |
| 16   | 904-005-000 | 904-016-000 | 904-010-000 | 904-030-000 | 904-023-000 |
| 24   | 904-006-000 | 904-017-000 | 904-010-000 | 904-031-000 | 904-024-000 |
| 30   | 904-007-000 | 904-018-000 | 904-011-000 | 904-032-000 | 904-025-000 |
| 36   | 904-007-000 | 904-018-000 | 904-011-000 | 904-032-000 | 904-025-000 |

### Rod Clevis Mounts

| Rod            |                      | BP          | SM          |
|----------------|----------------------|-------------|-------------|
| Size (sq. in.) | 4                    | 904-033-000 | 904-037-000 |
|                | 6                    | 904-033-000 | 904-037-000 |
|                | 9                    | 904-034-000 | 904-038-000 |
|                | 12                   | 904-034-000 | 904-038-000 |
|                | 16                   | 904-034-000 | 904-038-000 |
|                | 24                   | 904-034-000 | 904-038-000 |
|                | 30 and 36 (E stroke) |             | 904-039-000 |
|                | 30 and 36 (F stroke) | 904-036-000 | 904-039-000 |