

# ARO

## *Pneumatic Cylinders*

*Composite, round line repairable and disposable,  
and NFPA square interchangeable*



[airpumping.co.uk](http://airpumping.co.uk)

*of 1979*

Unit 16, Upminster Trading Park, Watley St, Upminster, Essex, RM14 3PL, ENGLAND

**IR** Ingersoll Rand  
Industrial Technologies



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# Pneumatic Cylinders

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## Descriptions

### Series 01 Micro-Air™ Cylinders (1/2" thru 1-1/8" bore)

Micro-Air Cylinders, small bore, repairable, double-acting cylinders, are designed for light duty applications. Available in 1/2, 3/4, and 1-1/8 inch bore sizes. Operate on air pressure to 200 PSI, generating thrusts from 4.9 to 199 pounds. They are available in stroke lengths up to 6 inches and in several mounting styles. For more information, see pages 9 through 11.



### Series S Silverair™ Cylinders (1/2" thru 2-1/2" bore)

Silverair Cylinders, small and medium bore, disposable, single- and double-acting cylinders are designed for light duty applications. Available in bore sizes from 1/2 inch to 2-1/2 inches. Operate on air pressures to 200 PSI, generating thrusts up to 982 pounds. For more information, see pages 12 through 24.



### Premair™ Composite Cylinders (7/16" thru 2" bore)

Featuring a patented composite body construction, the new Premair cylinder is ideal in assembly environments where corrosive (including wet or wash down) conditions exist. Premair's composite construction is also dent-resistant, lighter weight, quieter and provides superior service life when compared to metal cylinders. Available in 7 bore sizes and 3 types (double-acting, spring extend, spring retract); Premair offers a broad spectrum of trouble-free linear motion. For more information, see pages 25 through 33.



### Series 23, 24 & 28 Economair® Cylinders (1-1/8" thru 4" bore)

Economair Cylinders, round line repairable cylinders, are designed for medium to heavy-duty use in a wide range of applications. Available in 1-1/8 to 4-inch bore sizes. Operate on air pressure to 200 PSI, generating thrusts from 25 to 2,513 pounds. Available as double-acting, with optional cushions, magnetic pistons or double rod ends. O-ring seals are standard. U-cup or low friction seals are optional. A variety of mounts are available to meet a wide range of application requirements.

For more information, see pages 34 through 39.



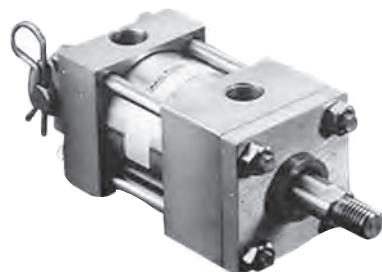
# Pneumatic Cylinders

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## Descriptions

### **Series AN & SN Provenair® Cylinders** (1-1/2" thru 10" bore)

Provenair Cylinders are NFPA interchangeable square head cylinders designed for rugged use. Available in 1-1/2 to 10-inch bore sizes. They operate on air pressure up to 250 PSI, generating thrusts up to 3,141 pounds. They are available as double-acting, with optional cushions, magnetic pistons and/or with double rod ends. A broad selection of NFPA standard mounts makes them dimensionally interchangeable with other NFPA cylinders. For more information, see pages 41 through 55.



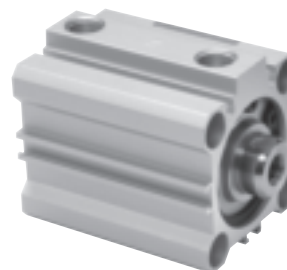
### **Premair™ Series Round Compact Cylinders** (1/2" thru 4" bore)

Premair Round Compact Cylinders are available in 8 bore sizes, from 1/2" thru 4". They are designed for light to medium duty applications and are interchangeable with the leading manufacturer of round compact cylinders. These cylinders are available in single or double acting, and with a variety of mounting, seal and magnetic options. For more information, see pages 59 through 67.



### **Premair™ Series Square Metric Compact Cylinders** (12mm thru 160mm bore)

Premair Square Metric Compact Cylinders are available in 13 bore sizes, from 12mm thru 160mm. All cylinders come with NPT Ports and inch threads on rod end, and magnetic piston as standard. Mounting through holes are tapped and accept a variety of mounting kits. These cylinders interchange with the leading manufacturers of Square Compact Cylinders. For more information, see pages 68 through 74.



# Pneumatic Cylinders

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## Accessories

### Mounts

Micro-Air™

Silverair™

Premair™

Economair®

Provenair® (1-1/2 thru 10-inch bore)

Provenair® Stainless Steel (1-1/2 thru 8-inch bore)



Mounts

### Rod End Accessories

Micro-Air™

Silverair™

Premair™

Economair®

Provenair® (1-1/2 thru 10-inch bore)



Rod End Accessories



Alignment Couplers

### Alignment Couplers

### Switches, Cylinder Mounted

### Flow Control Valves

### Volume Chambers

### Repair Kits



Electrical Switches



Right Angle Flow Controls

# Pneumatic Cylinders

## Developing Specifications

### Calculating the Proper Bore Size

A cylinder's bore size determines the force it will produce at a given supply pressure. The weight of the load or the clamping force required will largely determine the force requirements of the cylinder, and hence, the bore size required. But before determining the appropriate bore size you must compensate for air pressure drop, packing friction and load variations using the following computation:

#### A) Compensating for Pressure Drop – Decrease the line pressure value by 15 p.s.i. This compensates for pressure drop in the system.

Operating pressure (psig) = Line pressure (psig) less 15 (psig pressure drop)

**Example:** If the line pressure is 95 (psig), subtract 15 (psig) to obtain 80 (psig) operating pressure (for sizing purposes).

#### B) Compensating for Packing Friction – Before you begin selecting a cylinder you already know the weight of the load you must move or the clamping force you must apply. **Multiply this force or load value by 1.25.** This compensates for packing friction and load variations. (If speed is of concern for your application, multiply the force value by 2.0.)

Force required (in pounds) = 1.25 x load (or required clamping force)

**Example:** If cylinder must move 100 pound load, multiplying 100 pounds by 1.25 = 125 pounds force required.

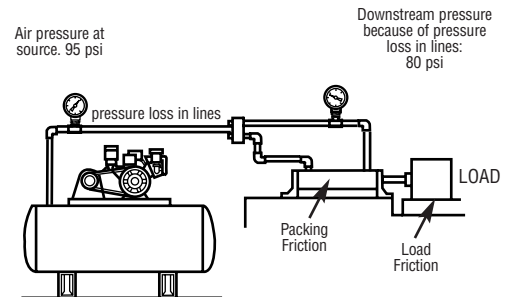
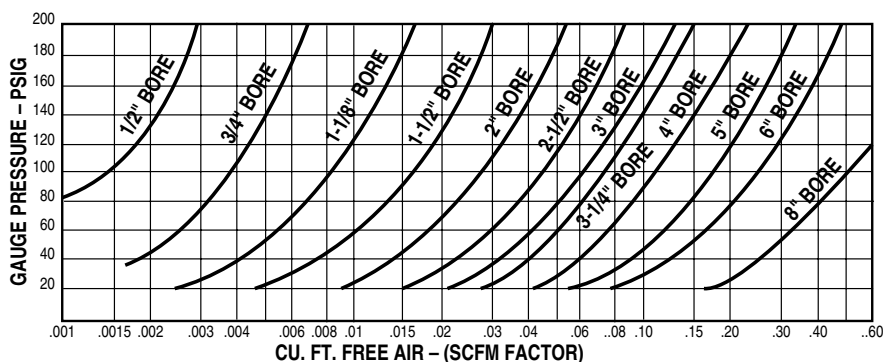
Now, at the top of the chart on the next page, find the column with the operating pressure calculated in “A” above (in this example, 80 psig). Go down that column until you find the force requirement calculated in “B”, above (or the next higher value). Note that the force values in bold type represent the extend force while those in standard type represent retract force (retract force is lower because the rod reduces the effective piston area). Choose the appropriate value, then go to the **Cylinder Bore** column to find the bore requirements for your application.

Now that you know the cylinder bore size that will produce the force required for your application, go to page 7 to determine rod size requirements.

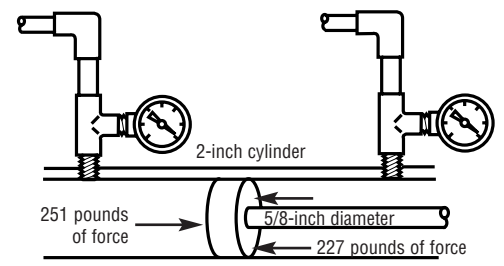
Air consumption for each cylinder bore size can be found in the chart below.

### Cylinder Air Consumption

To calculate the air consumption of a cylinder, multiply the total inches of stroke (extend plus retract) by the cycles per minute times the SCFM factor from the chart below. To find the SCFM factor, find your gauge pressure in the left hand column. Next, find your cylinder bore size in the chart. Where the two intersect, read down to the SCFM factor at the bottom of the chart.



This illustration shows a pressure loss of 15 PSI through the airlines and points out friction factors, both of which must be compensated for.



Given equal pressure on both sides of a piston, the surface area on the extend side will provide greater force.

# Pneumatic Cylinders

## Bore Selection Sizes

$$\text{EFFECTIVE PISTON AREA} \times \text{OPERATING PRESSURE} = \text{FORCE}$$

| CYLINDER BORE (INCHES) | ROD DIAMETER (INCHES) | EFFECTIVE PISTON AREA (SQ. IN.) | OPERATING PRESSURE (PSI) |      |      |      |      |      |      |      |      |       |       |
|------------------------|-----------------------|---------------------------------|--------------------------|------|------|------|------|------|------|------|------|-------|-------|
|                        |                       |                                 | 20                       | 40   | 60   | 70   | 80   | 90   | 100  | 110  | 125  | 150   | 200   |
| SELECTING BORE SIZE    |                       |                                 | FORCE OR LOAD VALUE      |      |      |      |      |      |      |      |      |       |       |
| 7/16                   |                       | .15                             | 3                        | 6    | 9    | 10   | 12   | 13   | 15   | 16   | 18   | 22    | 30    |
|                        | 3/16                  | .123                            | 2.5                      | 4.9  | 7.4  | 8.6  | 9.8  | 11   | 12.3 | 13.5 | 15.4 | 18.5  | 24.6  |
| 1/2                    |                       | .196                            | 4                        | 8    | 12   | 14   | 16   | 18   | 20   | 22   | 25   | 29    | 39    |
|                        | 3/16                  | .169                            | 3                        | 7    | 10   | 12   | 14   | 15   | 17   | 19   | 21   | 25    | 34    |
|                        | 1/4                   | .147                            | 3                        | 6    | 9    | 10   | 12   | 13   | 15   | 16   | 18   | 22    | 29    |
| 9/16                   |                       | .25                             | 5                        | 10   | 15   | 17   | 20   | 22   | 25   | 27   | 31   | 37    | 50    |
|                        | 3/16                  | .23                             | 4.5                      | 8.9  | 13.4 | 15.6 | 17.8 | 20   | 22   | 29.5 | 27.9 | 33.5  | 44.6  |
| 3/4                    |                       | .442                            | 9                        | 18   | 27   | 31   | 35   | 40   | 44   | 49   | 55   | 66    | 88    |
|                        | 1/4                   | .393                            | 8                        | 16   | 24   | 28   | 31   | 35   | 39   | 43   | 49   | 59    | 79    |
| 7/8                    |                       | .604                            | 12                       | 24   | 36   | 42   | 48   | 54   | 60   | 66   | 75   | 90    | 120   |
|                        | 1/4                   | .553                            | 11                       | 22   | 33   | 38   | 44   | 49   | 55   | 60   | 69   | 82    | 110   |
| 1-1/16                 |                       | .890                            | 18                       | 36   | 53   | 62   | 71   | 80   | 89   | 98   | 111  | 134   | 178   |
|                        | 5/16                  | .810                            | 16                       | 32   | 49   | 57   | 65   | 73   | 81   | 89   | 101  | 122   | 162   |
| 1-1/8                  |                       | .994                            | 20                       | 40   | 60   | 70   | 80   | 89   | 99   | 109  | 124  | 149   | 199   |
|                        | 5/16                  | .917                            | 18                       | 37   | 55   | 64   | 73   | 83   | 92   | 101  | 115  | 138   | 183   |
|                        | 3/8                   | .884                            | 18                       | 35   | 53   | 62   | 71   | 80   | 88   | 97   | 110  | 133   | 177   |
| 1-1/4                  |                       | 1.227                           | 25                       | 49   | 74   | 88   | 98   | 110  | 123  | 135  | 153  | 184   | 245   |
|                        | 7/16                  | 1.077                           | 22                       | 43   | 65   | 75   | 86   | 97   | 108  | 118  | 135  | 162   | 215   |
| 1-1/2                  |                       | 1.767                           | 35                       | 71   | 106  | 124  | 141  | 159  | 177  | 194  | 221  | 265   | 353   |
|                        | 7/16                  | 1.617                           | 32                       | 65   | 97   | 113  | 129  | 146  | 162  | 178  | 202  | 243   | 323   |
|                        | 1/2                   | 1.571                           | 31                       | 63   | 94   | 110  | 126  | 141  | 157  | 173  | 196  | 236   | 314   |
|                        | 5/8                   | 1.460                           | 29                       | 58   | 88   | 102  | 117  | 131  | 146  | 161  | 183  | 219   | 292   |
|                        | 1                     | 1.325                           | 27                       | 53   | 80   | 93   | 106  | 119  | 133  | 146  | 166  | 199   | 265   |
| 1-3/4                  |                       | 2.405                           | 48                       | 96   | 144  | 168  | 192  | 216  | 240  | 265  | 301  | 361   | 481   |
|                        | 1/2                   | 2.209                           | 44                       | 88   | 133  | 155  | 177  | 199  | 221  | 243  | 276  | 331   | 442   |
| 2                      |                       | 3.142                           | 63                       | 126  | 189  | 220  | 251  | 283  | 314  | 346  | 393  | 471   | 628   |
|                        | 5/8                   | 2.835                           | 57                       | 113  | 170  | 198  | 227  | 255  | 284  | 312  | 354  | 425   | 567   |
|                        | 1                     | 2.700                           | 54                       | 108  | 162  | 189  | 216  | 243  | 270  | 297  | 338  | 405   | 540   |
| 2-1/2                  |                       | 4.910                           | 98                       | 196  | 295  | 344  | 393  | 442  | 491  | 540  | 614  | 737   | 982   |
|                        | 5/8                   | 4.602                           | 92                       | 184  | 276  | 322  | 368  | 414  | 460  | 506  | 575  | 690   | 920   |
|                        | 3/4                   | 4.470                           | 89                       | 179  | 268  | 313  | 358  | 402  | 447  | 492  | 559  | 671   | 894   |
|                        | 1                     | 4.123                           | 82                       | 165  | 247  | 289  | 330  | 371  | 412  | 454  | 515  | 618   | 825   |
| 3                      |                       | 7.069                           | 141                      | 283  | 424  | 495  | 566  | 636  | 707  | 778  | 884  | 1060  | 1414  |
|                        | 3/4                   | 6.6268                          | 133                      | 265  | 398  | 464  | 530  | 596  | 663  | 729  | 828  | 994   | 1325  |
| 3-1/4                  |                       | 8.296                           | 166                      | 332  | 498  | 581  | 664  | 747  | 830  | 913  | 1037 | 1244  | 1659  |
|                        | 1                     | 7.510                           | 150                      | 300  | 451  | 526  | 601  | 676  | 751  | 826  | 939  | 1127  | 1502  |
|                        | 1-3/8                 | 6.810                           | 136                      | 272  | 409  | 477  | 545  | 613  | 681  | 749  | 851  | 1021  | 1362  |
| 4                      |                       | 12.566                          | 251                      | 503  | 754  | 880  | 1005 | 1131 | 1257 | 1382 | 1571 | 1885  | 2513  |
|                        | 1                     | 11.781                          | 236                      | 471  | 707  | 825  | 942  | 1060 | 1178 | 1296 | 1473 | 1767  | 2356  |
|                        | 1-3/8                 | 11.081                          | 222                      | 443  | 665  | 776  | 886  | 997  | 1108 | 1219 | 1385 | 1662  | 2216  |
| 5                      |                       | 19.635                          | 393                      | 785  | 1178 | 1374 | 1571 | 1767 | 1964 | 2160 | 2454 | 2945  | 3927  |
|                        | 1                     | 18.850                          | 377                      | 754  | 1131 | 1320 | 1508 | 1697 | 1885 | 2074 | 2356 | 2828  | 3770  |
|                        | 1-3/8                 | 18.150                          | 363                      | 726  | 1089 | 1271 | 1452 | 1634 | 1815 | 1996 | 2269 | 2723  | 3630  |
| 6                      |                       | 28.274                          | 565                      | 1131 | 1696 | 1979 | 2262 | 2545 | 2827 | 3110 | 3534 | 4241  | 5655  |
|                        | 1-3/8                 | 16.789                          | 536                      | 1072 | 1607 | 1875 | 2143 | 2411 | 2679 | 2947 | 3349 | 4018  | 5358  |
|                        | 1-3/4                 | 25.870                          | 517                      | 1035 | 1552 | 1811 | 2070 | 2328 | 2587 | 2846 | 3234 | 3881  | 5174  |
| 8                      |                       | 50.260                          | 1005                     | 2010 | 3016 | 3518 | 4021 | 4523 | 5026 | 5529 | 6283 | 7539  | 10052 |
|                        | 1-3/8                 | 48.770                          | 975                      | 1951 | 2926 | 3414 | 3902 | 4489 | 4877 | 5365 | 6096 | 7316  | 9754  |
|                        | 1-3/4                 | 47.820                          | 956                      | 1913 | 2869 | 3347 | 3826 | 4304 | 4782 | 5260 | 5978 | 7173  | 9564  |
| 10                     |                       | 78.54                           | 1571                     | 3142 | 4712 | 5497 | 6283 | 7068 | 7854 | 8639 | 9818 | 11781 | 15708 |
|                        | 1-3/4                 | 76.14                           | 1523                     | 3046 | 4568 | 5330 | 6091 | 6853 | 7614 | 8375 | 9518 | 11421 | 15228 |

**VALUES IN BOLD TYPE REPRESENT EXTEND FORCE.** Other values represent retract force (piston area, less area of piston rod).  
Check series order information for available rod diameters in each series.

# Pneumatic Cylinders

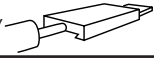
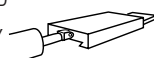
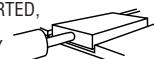
## Rod Diameter

A) use the stroke factor table to find the proper multiplier based on the mounting configuration and rod end connection used.

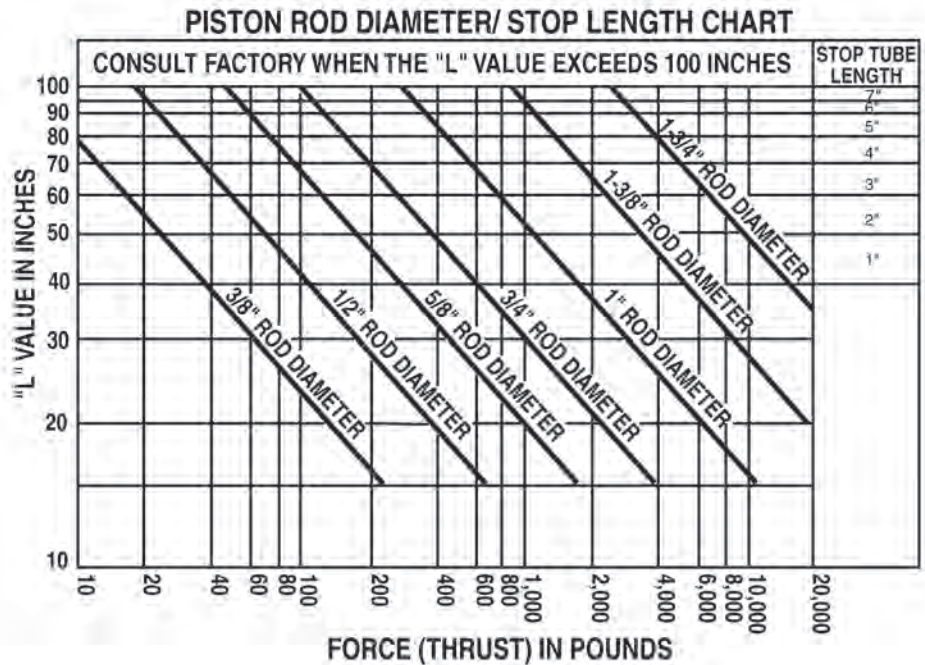
B) Multiply your required working stroke length by the factor you found from the stroke factor table in Step A. Note: if you require a rod or thread extension in your application (Longer than standard) add the extra length(s) to your required working stroke length and then multiply by the stroke factor found in Step A, the result of this arithmetic is the "L" Value.

C) Use the piston rod diameter/ stop length chart to complete your cylinder specification. Find the approximate "L" value (determined in Steps A & B) on the left side of the chart. At the bottom of the chart, find the force (thrust) required for your cylinder. Reference the bore selection sizes table on the previous page to determine bore size, rod diameter or force at various PSI. Find the intersection of the "L" value (Horizontal) line with the force in pounds (Vertical) line. The intersection should be on, or to-the-left of the diagonal (rod diameter) line. The diagonal (rod diameter) line indicates the correct piston rod diameter for your application. Note: If your "L" value-force lines intersect above, or to-the-right of a diagonal line, find a cylinder with the next larger piston rod diameter to avoid premature cylinder wear or failure.

## STROKE FACTOR

| ROD END CONNECTION                                                                                              | CYLINDER RIGIDLY MOUNTED            |                                    | CYLINDER PIVOT MOUNTED |                         |                                      |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------|------------------------|-------------------------|--------------------------------------|
|                                                                                                                 | L-MOUNTS, SIDE-TAPPED SIDE END LUGS | FRONT OR REAR FLANGE MOUNTING NUTS | FRONT-MOUNTED TRUNNION | CENTER-MOUNTED TRUNNION | CLEVIS EYE, OR REAR-MOUNTED TRUNNION |
| FIXED AND RIGIDLY GUIDED       | 0.50                                | 0.50                               | N/A                    | N/A                     | N/A                                  |
| PIVOTED AND RIGIDLY GUIDED     | 0.71                                | 0.71                               | 1.00                   | 1.50                    | 2.00                                 |
| SUPPORTED, NOT RIGIDLY GUIDED  | 1.00                                | 1.00                               | N/A                    | N/A                     | N/A                                  |

**Note:** Remember, long, slim piston rods may buckle when subjected to a heavy push load.



**Note:** When a stop tube is needed, a minimum 2" length is required on all Economair cylinders with Lip packings, and in 4", 5", 6" and 8" Provenair cylinders.

## Stop Tube Requirements

*Available in Economair & Provenair Only*

Occasionally, an application will require a stop tube. Stop tube length is determined by "L" value. If your "L" value (from Step B) is 40 or greater, find the correct stop tube length for your cylinder on the right side of the piston rod diameter/stop length chart. The recommended stop-tube length is shown above the "L" value line.

**Note:** If "L" value is 39, no stop tube is required. If "L" value is 40-49, a 1" stop tube is recommended. If "L" value is 50-59, a 2" stop tube is recommended, etc.

# Pneumatic Cylinders

## Options

Additional options required will help determine which cylinder series will be selected:

**Stainless steel piston rods are beneficial in corrosive environments.** Stainless steel rods are standard on Micro-Air and Silverair Series. Stainless Steel rods are options on Economair and Provenair Series.

**Cylinder cushions** are designed to reduce the shock experienced at the end of the stroke by reducing piston speed the last fraction of an inch of stroke. Cylinder cushions are available in Economair and Provenair Series, only.

**Packing shape and material** affect cylinder performance:

- **O-Ring packings** are good, general purpose packings, but they require more breakaway force than other packing shapes.
- **O-Ring – Low Friction** packings provide the effective sealing characteristics of Buna N with the low friction characteristics of Teflon®. This design is effective where the cylinder must operate at low pressures.
- **U-Cup packings** offer low breakaway friction and better sealing characteristics at low pressure than O-Ring packings. U-cups are wear compensating seals; they offer longer wear life than O-rings.
- **U-Cup – Self Lube (“Slippery Seals”) packings** are ideal in applications where air line lubrication cannot be used. This packing design helps reduce cylinder “chatter” in low pressure applications and it offers the same sealing characteristics as Buna N.

## Packing Characteristics

|                                    | Material                       | Sealing Characteristics | Friction Characteristics | Temperature Tolerance | Availability         |
|------------------------------------|--------------------------------|-------------------------|--------------------------|-----------------------|----------------------|
| O-RING                             | Teflon over Buna N O-Ring Seal | Good                    | Medium                   | 0° to 180° F          | Economair            |
| O-RING                             | Buna N                         | Good                    | High                     | 0° to 180° F          | Micro-Air, Economair |
| O-RING                             | Viton®                         | Good                    | High                     | Up to 300° F          | Micro-Air, Economair |
| U-CUP-SELF-LUBE (“Slippery Seals”) | Nitrile                        | Very Good               | Low                      | 0° to 180° F          | Economair, Provenair |
| U-CUP                              | Buna N                         | Very Good               | Medium                   | 0° to 180° F          | Economair, Provenair |
| U-CUP                              | Viton                          | Very Good               | Medium                   | Up to 300° F          | Economair, Provenair |

**Note:** When applying rod cylinders, there must be no side load or bending stress at any point along the rod. Applications which induce side load and/or bending stress will damage packings, bushings, piston barrels, piston rods and cushion bosses. When metal parts are damaged, seal and packing replacement is an inadequate repair. The elastomers will quickly become damaged. Inspect and replace all worn or damaged parts when rebuilding cylinders.

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Pneumatic Cylinders

# Micro-Air

## Features

### Series 01

Micro-Air Cylinders are ideal for small part positioning, clamping and ejecting. Also they're the perfect choice for applications where small bore, medium duty, repairable cylinders are preferred. Prelubed, they're suitable for operations without externally applied lubrication.

- Micro-Air Cylinders are repairable. Service kits are available to extend the useable life of the cylinder.
- Micro-Air Cylinders operate on air pressure to 200 p.s.i. (14 bar). A tough little cylinder that can handle the pressures!
- Superior performance over a wide temperature range – 0° to 180° F (-18° to 82° C), even to 300° F (149° C) when Viton seals are used (consult factory).
- Micro-Air Cylinders have superior wear characteristics, thanks to the hard coated aluminum tubing I.D. In addition to an internal hardness of 60 Rockwell C, the barrel has an internal finish of 16 microinches or better.
- Micro-Air Cylinders are equipped with Series 303 stainless steel piston rods for corrosion resistance. Also, the ground and polished finish on the rods minimizes friction, providing longer packing life.
- Micro-Air Cylinders provide greater durability than disposable cylinders.
- Double end-mount cylinders can also be used as a pivot mount. Pivot pin included with each cylinder.

## Performance Specs

**Bore Sizes:** 1/2", 3/4", and 1-1/8"  
**Maximum Output Force:** 199 pounds (1-1/8" bore)  
**Standard Operating Temperature range:** 0° to 180° F (-18° to 82° C)  
**Viton Seals Models:** For high heat applications. Consult factory.  
Range of mounting styles and attachable mounts/ accessories to meet nearly any application requirement.



## Ordering

01

XX

-

XXXX

-

0

XX

BORE SIZE

51

1/2 in

76

3/4 in.

18

1-1/8 in.

CYLINDER TYPE AND MOUNTING STYLE

1009

Double Acting, Double End Mount and Pivot Mount, BUNA-N Seals

5029

Double Acting, Nose Mount, Rear Port, BUNA-N Seals

1309

Double Acting, Double End Mount and Pivot Mount, Viton Seals

5329

Double Acting, Nose Mount, Rear Port, Viton Seals

STROKE LENGTH

WHOLE INCHES

FRACTIONS

0

= 0 in

0

= None

1

= 1 in

1

= 1/8 in

2

= 2 in

2

= 1/4 in

3

= 3 in

3

= 3/8 in

4

= 4 in

4

= 1/2 in

5

= 5 in

5

= 5/8 in

6

= 6 in

6

= 3/4 in

7

= 7/8 in

NOTE: Highlighted selections denote most popular models.

(1/2" Increments, 1/2" through 6")

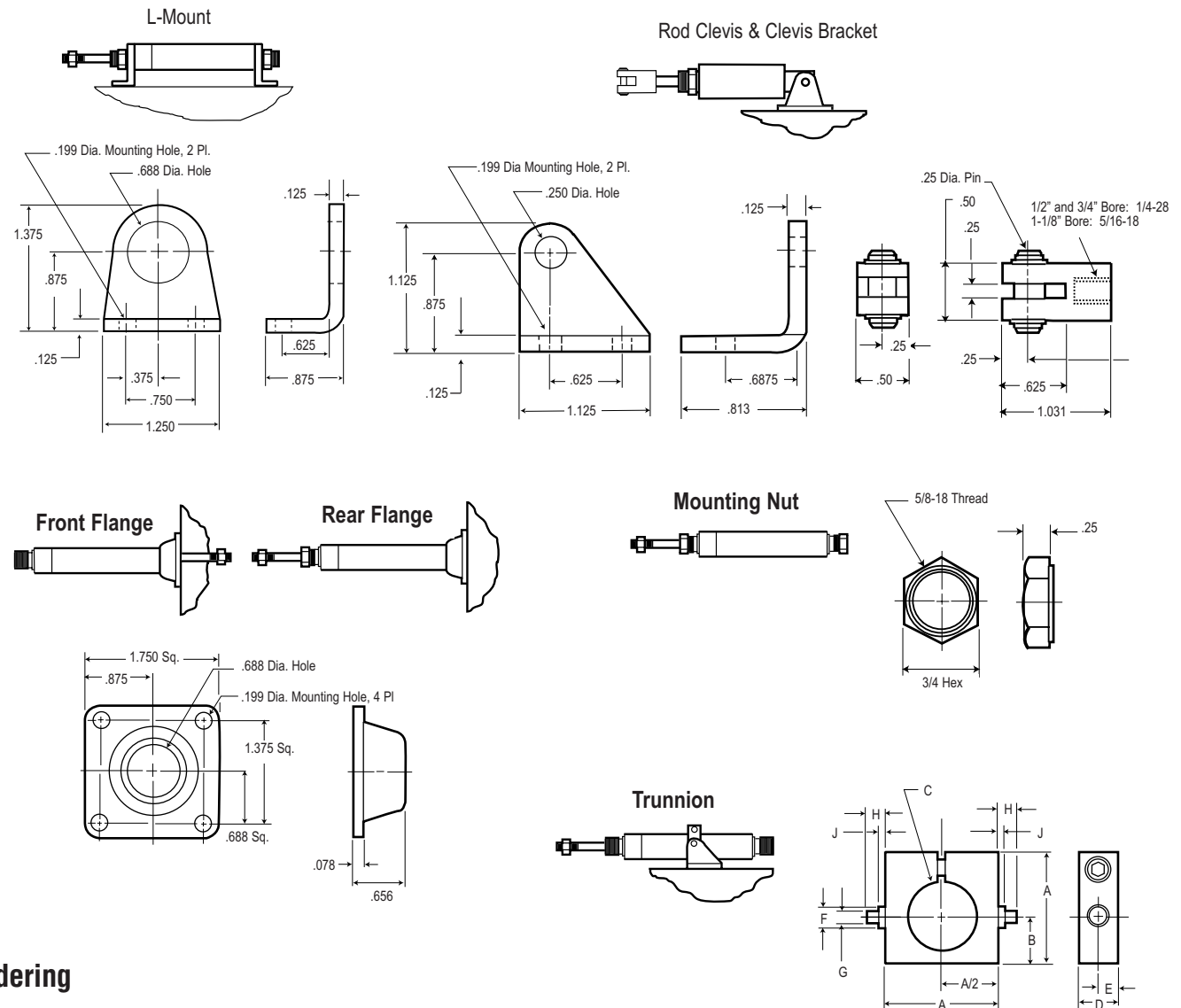
Maximum stroke length - 6-7/8-inches.  
Consult factory for the other stroke requirements.

# Pneumatic Cylinders

## Micro-Air

### Dimensional Data

#### Series 01



### Ordering

#### Mounting Kit

|                      | Cylinder Bore (Inches) |         |         |
|----------------------|------------------------|---------|---------|
|                      | 1/2                    | 3/4     | 1-1/8   |
| L-MOUNTS (2 Qty) *   | 20515                  | 20515   | 20515   |
| FLANGE MOUNT *       | 20516                  | 20516   | 20516   |
| MOUNTING NUT (2 Qty) | 20514-1                | 20514-1 | 20514-1 |
| CLEVIS BRACKET       | 20519                  | 20519   | 20519   |
| TRUNNION             | -                      | 20523   | 20524   |
| TRUNNION BRACKETS    | -                      | 20561   | -       |
| ROD CLEVIS           | 20517                  | 20517   | 20518-1 |

\* NOTE: Mounting nuts included.

| Reference                  | Cylinder Bore (Inches) |      |       |
|----------------------------|------------------------|------|-------|
|                            | 1/2                    | 3/4  | 1-1/8 |
| <b>Trunnion Dimensions</b> |                        |      |       |
| A                          | 1.50                   | 1.50 | 2.25  |
| B                          | .625                   | .625 | .875  |
| C Dia.                     | .703                   | .953 | 1.391 |
| D                          | .500                   | .500 | .750  |
| E                          | .250                   | .250 | .375  |
| F Dia.                     | -                      | -    | .563  |
| G Dia. ± .002              | .250                   | .250 | .437  |
| H ± .010                   | .250                   | .250 | .438  |
| J                          | -                      | -    | .0625 |

\* 20561 Trunnion Bracket Kit (right and left brackets) is used for 20523 Trunnion. Reference Clevis bracket dimensions.

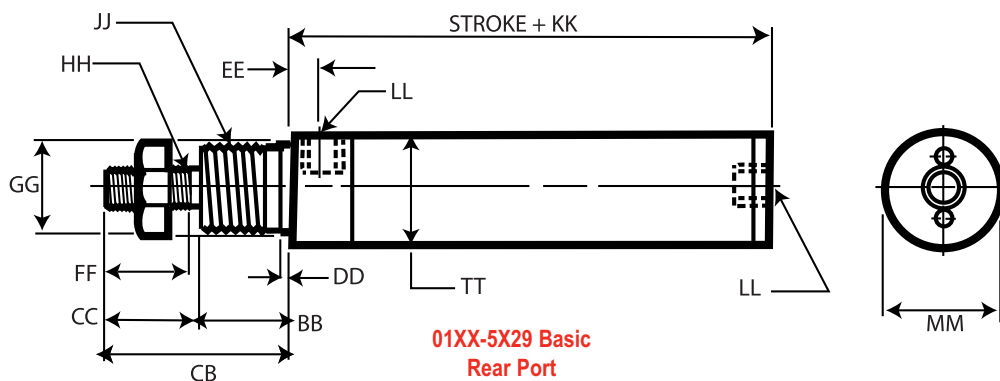
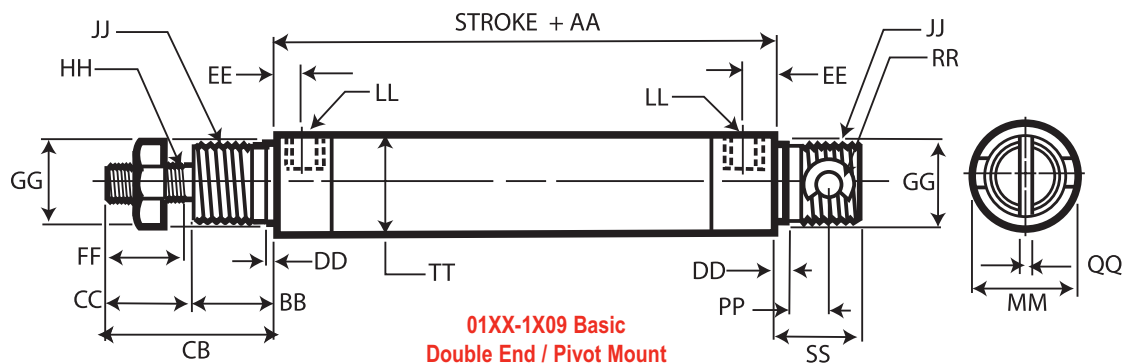
## Dimensional Data

### Series 01

| Reference           | CYLINDER BORE (INCHES) |               |                |
|---------------------|------------------------|---------------|----------------|
|                     | 1/2                    | 3/4           | 1-1/8          |
| Rod Diameter        | 1/4                    | 1/4           | 5/16           |
| AA                  | 2.438                  | 2.438         | 2.688          |
| BB                  | .625                   | .625          | .625           |
| CC                  | .750                   | .750          | .750           |
| CB                  | 1.375                  | 1.375         | 1.375          |
| DD                  | .047                   | .047          | .047           |
| EE                  | .281                   | .281          | .281           |
| FF*                 | .719                   | .719          | .719           |
| GG (± .002)         | .682                   | .682          | .682           |
| HH                  | 1/4-28<br>UNF          | 1/4-28<br>UNF | 5/16-18<br>UNC |
| JJ (UNF-2A)         | 5/8-18                 | 5/8-18        | 5/8-18         |
| KK                  | 2                      | 2             | 2              |
| LL (NPTF)           | 1/8-27                 | 1/8-27        | 1/8-27         |
| MM                  | .787                   | .912          | 1.350**        |
| PP                  | .375                   | .375          | .375           |
| QQ (SLOT)<br>± .002 | .130                   | .130          | .130           |
| RR (PIN)            | .250                   | .250          | .250           |
| SS                  | .625                   | .625          | .625           |
| TT DIA.             | .700                   | .950          | 1.375          |

\* Note: FF shows total thread, including run out.

\*\* On rear head only of 5029 dimension is 1.291.



**Features**

**Series S**

Silverair round cylinders are designed for application in OEM and MRO applications where a disposable, light duty cylinder is preferred. Prelubed, they're suitable for operations without externally applied lubrication. Constructed of stainless steel and aluminum, they stand up to the attack of corrosive environments.

- Silverair cylinders feature stainless steel (Series 304) barrels. Drawn and polished internal diameters have superior lube-holding characteristics for a low friction surface that gives smooth performance and outstanding cycle life.
- Piston rods are centerless ground and polished Series 303 stainless steel, providing smooth rod movement.
- Lightweight aluminum heads feature full flow ports for maximum air flow and smooth response.
- Piston rod threads are roll formed to provide superior strength and durability.
- U-cup design on piston seals provides continuous cylinder barrel contact, minimizes blow-by and offers longer seal life than O-ring piston seals.
- The oil-permeated bronze rod bushing is precision ball sized for reduced friction and increased cylinder life.
- Return springs on single-acting cylinders are made from a high tensile alloy for exceptional performance and long service life.
- Silverair cylinders are prelubricated, so they're ideal in applications where external lubrication can't be supplied.



**Performance Specifications**

|                              |                                                    |
|------------------------------|----------------------------------------------------|
| Bore Sizes:                  | 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 2" and 2-1/2" |
| Air Pressure:                | to 200 p.s.i. (14 bar)                             |
| Operating Temperature Range: | -40° to 160° F (18° to 82° C)                      |
| Maximum Output Force:        | 982 pounds (2-1/2-inch bore cylinder)              |
| Viton Seals Models:          | For high heat applications. Consult factory.       |

Range of mounting styles and attachable mounts/accessories covers wide range of application requirements.

Magnetic pistons available for use with Hall Effect or Reed Switches.

**Ordering**

See following page.

## Ordering

Include dashes. Dashes are significant.

**S X XX - X X X X - XXX**

### SERIES

**S** Stainless Steel

### CYLINDER TYPE

**S** Single Acting, Spring Return (Not available on 25 bore size)

**D** Double Acting

**R** Single Acting, Spring Extend (Not available on 25 bore size)

**H** Single Acting, Hex Rod (Non-rotating rod)  
(Spring return only) Not available on 14, 17, 20 or 25 bore sizes)

### BORE SIZE

**05** 1/2 in

**07** 3/4 in.

**11** 1-1/16 in.

**14** 1-1/4 in. (Not available on type SH)

**15** 1-1/2 in.

**17** 1-3/4 in. (Not available on type SH)

**20** 2 in. (Not available on type SH)

**25** 2-1/2 in. (Not available on type SS, SR or SH)

### MOUNTING STYLE

**B** Block Mount (Available on 05, 07, 11 and 15 bore size only)  
(Not available on type SH)

**D** Double Rod End (Double Acting Only)

**N** Nose Mount

**P** Universal Mount (Pivot or Double End)

*Silverair attachable mounts must be ordered separately.  
See page 14.*

### Note A: Bumpers

- Not available with magnetic piston option.
- Standard on double rod ends.
- Do not affect external dimensions.

**Note B:** Wearstrip is standard on double-acting nose mount, universal mount and block front mount of 5" or more of stroke. Also on single acting, spring extend cylinders with 3" or more of stroke. Not available on 1/2" bore cylinders. Not available on single acting, hex rod (non-rotating rod)

**Note:** Highlighted selections denote most popular models.

### STROKE LENGTH

#### WHOLE INCHES

**00** = 0 in

**01** = 1 in

**02** = 2 in

**03** = 3 in

**04** = 4 in

**05** = 5 in

**06** = 6 in

**10** = 10 in

etc.

#### FRACTIONS

**0** = None

**1** = 1/8 in

**2** = 1/4 in

**3** = 3/8 in

**4** = 1/2 in

**5** = 5/8 in

**6** = 3/4 in

**7** = 7/8 in

For recommended maximum stroke lengths, per type, see pages 16 through 21.

(1/2" Increments, 1/2" through 6")

### WEARSTRIP (Note B)

**4** None (standard)

**W** Wearstrip

### PACKING

**B** Buna N

**V** Viton

### MAGNET/ BUMPERS (Note A)

**4** No Bumpers, no magnet

**B** Bumpers

**M** Magnetic Piston (Not available in 1/2" bore or for single-acting cylinders).

For switch information, see page 23.

## Ordering

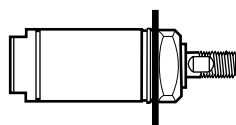
### Series S (Mounting Kits)

|                                                                                 |                                                                                                                                            | CYLINDER BORE (INCHES) |           |           |           |           |           |
|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------|-----------|-----------|-----------|-----------|
| 1/2                                                                             | 3/4                                                                                                                                        | 1-1/16                 | 1-1/4     | 1-1/2     | 1-3/4     | 2         | 2-1/2     |
| <b>L-MOUNT (Single Acting)</b>                                                  |                                                                                                                                            |                        |           |           |           |           |           |
| Order Mounting Nut below.                                                       |                                                                                                                                            |                        |           |           |           |           |           |
| 118108-5                                                                        | 118108-7                                                                                                                                   | 118108-11              | 118108-14 | 118108-14 | 118108-17 | 118108-20 | 118108-25 |
| <b>L-MOUNT (Double Acting)</b>                                                  |                                                                                                                                            |                        |           |           |           |           |           |
| Order Mounting Nut below.                                                       |                                                                                                                                            |                        |           |           |           |           |           |
| 118108-50                                                                       | 118108-11                                                                                                                                  | 118108-11              | 118108-14 | 118108-14 | 118108-17 | 118108-20 | 118108-25 |
| <b>MOUNTING NUT (Single Acting*)</b>                                            |                                                                                                                                            |                        |           |           |           |           |           |
| 118109-5                                                                        | 118109-7                                                                                                                                   | 118109-11              | 118109-14 | 118109-14 | 118109-17 | 118109-20 | 118109-25 |
| <b>MOUNTING NUT (Double Acting)</b>                                             |                                                                                                                                            |                        |           |           |           |           |           |
| 118109-50                                                                       | 118109-11                                                                                                                                  | 118109-11              | 118109-14 | 118109-14 | 118109-17 | 118109-20 | 118109-25 |
| <b>PIVOT BRACKET (Pivot Pin Included)</b>                                       |                                                                                                                                            |                        |           |           |           |           |           |
| 117523-5                                                                        | 117523-7                                                                                                                                   | 117523-7               | 117523-14 | 117523-15 | 117523-15 | 117523-20 | 117523-20 |
| <b>ROD CLEVIS (Pivot Pin Included)</b>                                          |                                                                                                                                            |                        |           |           |           |           |           |
| 117555-5                                                                        | 117555-7                                                                                                                                   | 117555-11              | 117555-14 | 117555-14 | 117555-17 | 117555-17 | 117555-17 |
| <b>PIVOT PINS (Standard Equipment)</b>                                          |                                                                                                                                            |                        |           |           |           |           |           |
| <b>Pin</b>                                                                      |                                                                                                                                            |                        |           |           |           |           |           |
| 118119-5                                                                        | 118119-7                                                                                                                                   | 118119-7               | 118119-14 | -         | -         | 118119-20 | -         |
| <b>Retainer</b>                                                                 |                                                                                                                                            |                        |           |           |           |           |           |
| 118592-5                                                                        | 118592-5                                                                                                                                   | 118592-5               | 118592-5  | 118592-15 | 118592-15 | 118592-15 | -         |
| <b>Optional Press Fit Pin</b>                                                   |                                                                                                                                            |                        |           |           |           |           |           |
| 118121-5                                                                        | 118121-7                                                                                                                                   | 118121-7               | 118121-14 | 118121-15 | 118121-15 | -         | -         |
| <b>FOR DOUBLE END MOUNTING OF SINGLE-ACTING CYLINDERS, ORDER THE FOLLOWING:</b> |                                                                                                                                            |                        |           |           |           |           |           |
| 1/2-inch bore                                                                   | One 118108-5 L-Mount and one 118109-5 Nut for rear mounting thread. One 118108-50 L-Mount and one 118109-50 Nut for front mounting thread. |                        |           |           |           |           |           |
| 3/4-inch bore                                                                   | Two 118108-7 L-Mounts, one 118109-7 Nut for rear mounting thread and one 118109-11 Nut for front mounting thread.                          |                        |           |           |           |           |           |

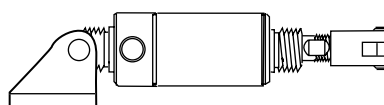
**NOTE:** Silverair accessories are bright zinc plated steel.



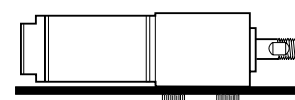
**L-Mount**



**Mounting Nut**



**Pivot Bracket and Rod Clevis**



**Block Front Mount**

## Dimensional Data

### Series S (Mounting Kit)

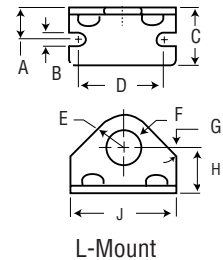
| Dim Ref | CYLINDER BORE (INCHES) |                   |                   |                   |                  |                 |                 |                 |             |                 |
|---------|------------------------|-------------------|-------------------|-------------------|------------------|-----------------|-----------------|-----------------|-------------|-----------------|
|         | 1/2 Single Acting      | 1/2 Double Acting | 3/4 Single Acting | 3/4 Double Acting | 1-1/16 All Types | 1-1/4 All Types | 1-1/2 All Types | 1-3/4 All Types | 2 All Types | 2-1/2 All Types |

#### L-Mount Bracket

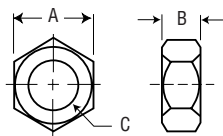
|   |      |      |      |      |      |      |      |        |      |      |
|---|------|------|------|------|------|------|------|--------|------|------|
| A | .31  | .31  | .44  | .56  | .56  | .75  | .75  | .94    | 1.00 | 1.00 |
| B | .19  | .19  | .19  | .27  | .27  | .28  | .28  | .34.34 | .34  | .34  |
| C | .62  | .62  | .75  | 1.00 | 1.00 | 1.50 | 1.50 | 1.50   | 1.62 | 1.62 |
| D | 1.00 | 1.00 | 1.25 | 1.50 | 1.50 | 1.89 | 1.89 | 2.25   | 2.25 | 2.88 |
| E | .37  | .37  | .40  | .56  | .56  | .75  | .75  | .88    | 1.00 | 1.25 |
| F | .38  | .44  | .50  | .63  | .63  | .76  | .76  | 1.04   | 1.38 | 1.50 |
| G | 56°  | 56°  | 45°  | 45°  | 45°  | 49°  | 49°  | 52°    | 60°  | 63°  |
| H | .57  | .57  | .69  | .81  | .81  | 1.00 | 1.00 | 1.25   | 1.50 | 1.75 |
| J | 1.38 | 1.38 | 1.63 | 1.88 | 1.88 | 2.50 | 2.50 | 3.00   | 3.00 | 3.75 |

#### Mounting Nut

|   |        |         |        |        |        |        |        |      |          |          |
|---|--------|---------|--------|--------|--------|--------|--------|------|----------|----------|
| A | .56    | .68     | .75    | .93    | .93    | 1.12   | 1.12   | 1.50 | 1.85     | 2.06     |
| B | .22    | .25     | .31    | .37    | .37    | .42    | .42    | .56  | .50      | .50      |
| C | 3/8-24 | 7/16-20 | 1/2-20 | 5/8-18 | 5/8-18 | 3/4-16 | 3/4-16 | 1-14 | 1-1/4-12 | 1-3/8-12 |



L-Mount

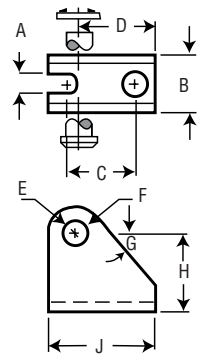


Mounting Nut

| Dim Ref | CYLINDER BORE (INCHES) |               |                  |                 |                 |                 |             |                 |
|---------|------------------------|---------------|------------------|-----------------|-----------------|-----------------|-------------|-----------------|
|         | 1/2 All Types          | 3/4 All Types | 1-1/16 All Types | 1-1/4 All Types | 1-1/2 All Types | 1-3/4 All Types | 2 All Types | 2-1/2 All Types |

#### Pivot Bracket

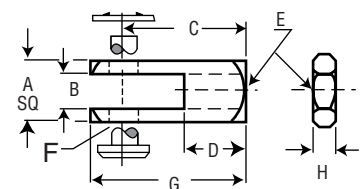
|   |     |      |      |      |      |      |      |      |
|---|-----|------|------|------|------|------|------|------|
| A | .20 | .26  | .26  | .32  | .39  | .39  | .45  | .45  |
| B | .52 | .65  | .65  | .77  | .96  | .96  | 1.20 | 1.20 |
| C | .43 | .75  | .75  | .75  | 1.00 | 1.00 | 1.00 | 1.00 |
| D | .54 | .87  | .87  | .94  | 1.25 | 1.25 | 1.43 | 1.43 |
| E | .22 | .31  | .31  | .31  | .38  | .38  | .38  | .38  |
| F | .16 | .26  | .26  | .26  | .38  | .38  | .38  | .38  |
| G | 50° | 53°  | 53°  | 53°  | 52°  | 52°  | 48°  | 48°  |
| H | .64 | .87  | .87  | 1.06 | 1.37 | 1.37 | 1.68 | 1.68 |
| J | .75 | 1.19 | 1.19 | 1.25 | 1.63 | 1.63 | 1.81 | 1.81 |



Pivot Bracket

#### Rod Clevis

|   |       |        |         |         |         |        |        |        |
|---|-------|--------|---------|---------|---------|--------|--------|--------|
| A | .38   | .50    | .50     | .75     | .75     | .75    | .75    | .75    |
| B | .19   | .25    | .25     | .38     | .38     | .38    | .38    | .38    |
| C | .75   | .94    | .94     | 1.30    | 1.30    | 1.30   | 1.30   | 1.30   |
| D | .38   | .50    | .50     | .75     | .75     | .75    | .75    | .75    |
| E | 10-32 | 1/4-28 | 5/16-24 | 7/16-20 | 7/16-20 | 1/2-20 | 1/2-20 | 1/2-20 |
| F | .19   | .25    | .25     | .38     | .38     | .38    | .38    | .38    |
| G | .94   | 1.20   | 1.20    | 1.70    | 1.70    | 1.70   | 1.70   | 1.70   |
| H | .12   | .16    | .16     | .25     | .25     | .31    | .31    | .31    |



Rod Clevis

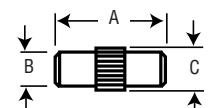
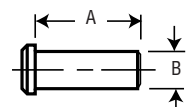
#### Pivot Pin

As supplied with Pivot Bracket:

|   |     |     |     |     |      |      |      |      |
|---|-----|-----|-----|-----|------|------|------|------|
| A | .69 | .81 | .81 | .94 | 1.13 | 1.13 | 1.44 | 1.44 |
| B | .15 | .25 | .25 | .25 | .37  | .37  | .37  | .37  |

For press fit into pivot hole:

|   |     |     |     |     |      |      |   |   |
|---|-----|-----|-----|-----|------|------|---|---|
| A | .50 | .75 | .75 | .87 | 1.12 | 1.12 | — | — |
| B | .15 | .24 | .24 | .24 | .37  | .37  | — | — |
| C | .17 | .26 | .26 | .26 | .39  | .39  | — | — |



Pivot Pins

## Performance Specifications

### Series S (Spring Return, Nose Mount)

| Model SSXX-N4B4-XXX - (Max. Stroke - 4 inches) |                                                                  |
|------------------------------------------------|------------------------------------------------------------------|
| <b>Bore sizes:</b>                             | 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2"                   |
| <b>Hex Mounting Nut:</b>                       | Standard (except on 2-inch models).                              |
| <b>Options:</b>                                | Wearstrip (except on 1/2-inch bore), bumper, Viton               |
| <b>Accessories:</b>                            | L-mount, rod clevis                                              |
| <b>Notes:</b>                                  | No rod bushing on 1/2-inch models - front head is hard anodized. |

| Model SHXX-N4B4-XXX - (Max. Stroke - 4 inches) |                                               |
|------------------------------------------------|-----------------------------------------------|
| Nonrotating                                    |                                               |
| <b>Bore sizes:</b>                             | 1/2", 3/4", 1-1/16", 1-1/2"                   |
| <b>Hex Mounting Nut:</b>                       | Standard                                      |
| <b>Options:</b>                                | Wearstrip (except on 1/2-inch bore),          |
| <b>Accessories:</b>                            | L-mount, rod clevis                           |
| <b>Notes:</b>                                  | No rod bushing - front head is hard anodized. |

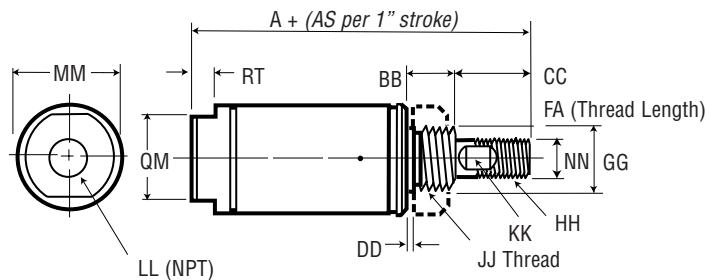
### Series S (Spring Return, Universal Mount)

| Model SSXX-P4B4-XXX - (Max. Stroke - 4 inches) |                                                                                    |
|------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Bore sizes:</b>                             | 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2"                                     |
| <b>Options:</b>                                | Wearstrip (except on 1/2-inch bore), bumper, Viton                                 |
| <b>Accessories:</b>                            | Pivot bracket, rod clevis, L-mount, mounting nut. Order mounting nuts as required. |
| <b>Notes:</b>                                  | No rod bushing on 1/2-inch models - front head is hard anodized.                   |

| Model SHXX-P4B4-XXX - (Max. Stroke - 4 inches) |                                                                                    |
|------------------------------------------------|------------------------------------------------------------------------------------|
| Nonrotating                                    |                                                                                    |
| <b>Bore sizes:</b>                             | 1/2", 3/4", 1-1/16", 1-1/2"                                                        |
| <b>Options:</b>                                | Wearstrip (except on 1/2-inch bore), bumper, Viton                                 |
| <b>Accessories:</b>                            | Pivot bracket, rod clevis, L-mount, mounting nut. Order mounting nuts as required. |
| <b>Notes:</b>                                  | No rod bushing - front head is hard anodized.                                      |

## Dimensional Data

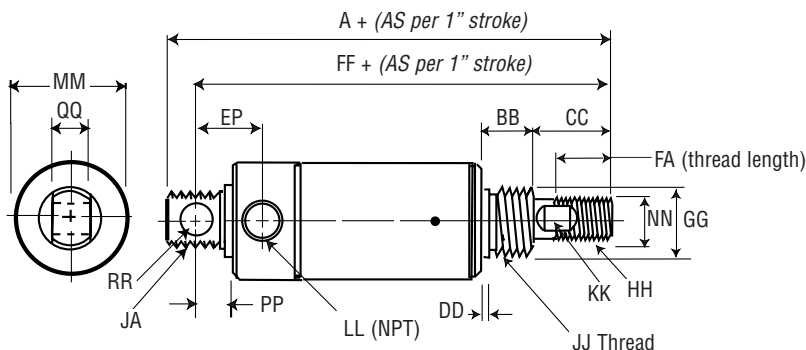
### Series S (Spring Return, Nose Mount)



### Spring Forces

| Bore Size | Spring Force (lbs.) |          |
|-----------|---------------------|----------|
|           | Normal              | Actuated |
| 1/2"      | 1                   | 2        |
| 3/4"      | 1.5                 | 5        |
| 1-1/16"   | 4                   | 8        |
| 1-1/4"    | 7                   | 14       |
| 1-1/2"    | 6                   | 12       |
| 1-3/4"    | 12                  | 24       |
| 2"        | 15                  | 30       |

### Series S (Spring Return, Universal Mount)



## Dimensional Data

### Series S

| Dim<br>Code   | Cylinder<br>Description | CYLINDER BORE (INCHES) |        |         |         |         |        |          |
|---------------|-------------------------|------------------------|--------|---------|---------|---------|--------|----------|
|               |                         | 1/2                    | 3/4    | 1-1/16  | 1-1/4   | 1-1/2   | 1-3/4  | 2        |
| Single Acting |                         |                        |        |         |         |         |        |          |
| A             | SSXX-N4B4-XXX           | 1.81                   | 2.00   | 2.56    | 3.41    | 3.19    | 3.85   | 4.17     |
| A             | SHXX-N4B4-XXX           | 2.06                   | 2.25   | 2.68    | —       | 3.44    | —      | —        |
| A             | SSXX-P4B4-XXX           | 2.50                   | 3.06   | 3.44    | 4.50    | 4.25    | 5.41   | 5.54     |
| A             | SHXX-P4B4-XXX           | 2.75                   | 3.31   | 3.56    | —       | 4.50    | —      | —        |
| AS            | SSXX-N4B4-XXX           | 1.88                   | 1.69   | 1.56    | 1.81    | 1.69    | 2.00   | 2.00     |
| AS            | SHXX-N4B4-XXX           | 1.88                   | 1.69   | 1.56    | —       | 1.69    | —      | —        |
| AS            | SSXX-P4B4-XXX           | 1.88                   | 1.69   | 1.56    | 1.81    | 1.69    | 2.00   | 2.00     |
| AS            | SHXX-P4B4-XXX           | 1.88                   | 1.69   | 1.56    | —       | 1.69    | —      | —        |
| BB            | SSXX-N4B4-XXX           | .31                    | .44    | .50     | .62     | .62     | .75    | .81      |
| BB            | SHXX-N4B4-XXX           | .31                    | .44    | .50     | —       | .62     | —      | —        |
| BB            | SSXX-P4B4-XXX           | .31                    | .44    | .50     | .62     | .62     | .75    | .81      |
| BB            | SHXX-P4B4-XXX           | .31                    | .44    | .50     | —       | .62     | .75    | .81      |
| CC            | SSXX-XXXX-XXX           | .50                    | .50    | .62     | 1.00    | 1.00    | 1.19   | —        |
| CC            | SHXX-XXXX-XXX           | .75                    | .75    | .75     | —       | 1.25    | —      | —        |
| DD            | All Types               | .04                    | .07    | .07     | .07     | .07     | .09    | .12      |
| EP            | All Types               | .42                    | .66    | .62     | .91     | .81     | .98    | 1.00     |
| FA            | All Types               | .50                    | .50    | .50     | .50     | .75     | .88    | .88      |
| FF            | SSXX-X4B4-XXX           | 2.25                   | 2.77   | 3.16    | 4.14    | 3.88    | 4.91   | 5.11     |
| GG            | All Types               | .375                   | .500   | .625    | .750    | .750    | 1.03   | 1.375    |
| HH            | All Types               | 10-32                  | 1/4-28 | 5/16-24 | 7/16-20 | 7/16-20 | 1/2-20 | 1/2-20   |
| JA            | SSXX-N4B4-XXX           | 7/16-20                | 5/8-18 | 5/8-18  | 3/4-16  | 3/4-16  | 1-14   | 1-1/4-12 |
| JA            | SHXX-N4B4-XXX           | 3/8-24                 | 5/8-18 | 5/8-18  | —       | 3/4-16  | —      | —        |
| JJ            | All Types               | 3/8-24                 | 1/2-20 | 5/8-18  | 3/4-16  | 3/4-16  | 1-14   | 1-1/4-12 |
| KK            | Wrench Flat             | None                   | None   | .25     | .38     | .38     | .44    | .50      |
| LL            | All Types               | 10-32                  | 1/8    | 1/8     | 1/8     | 1/8     | 1/4    | 1/4      |
| MM            | All Types               | .56                    | .81    | 1.12    | 1.31    | 1.55    | 1.81   | 2.07     |
| NN            | Standard Rod            | .187                   | .250   | .312    | .437    | .437    | .500   | .625     |
| NN            | Hex Flats               | .187                   | .250   | .375    | —       | .437    | —      | —        |
| PP            | All Types               | .25                    | .34    | .34     | .41     | .50     | .50    | .57      |
| QM            | All Types               | .37                    | .62    | .87     | .87     | .82     | 1.25   | 1.25     |
| QQ            | All Types               | .31                    | .38    | .38     | .50     | .62     | .62    | .75      |
| RR            | All Types               | .16                    | .25    | .25     | .25     | .38     | .38    | .38      |
| RT            | All Types               | .12                    | .16    | .25     | .18     | .25     | .25    | .31      |

## Performance Specifications

### Series S (Spring Extend, Nose Mount)

| Model SRXX-N4B4-XXX - (Max. Stroke - 4 inches) |                                                                                                                |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Bore sizes:</b>                             | 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2"                                                                 |
| <b>Hex Mounting Nut:</b>                       | Standard                                                                                                       |
| <b>Options:</b>                                | Bumper, Viton                                                                                                  |
| <b>Accessories:</b>                            | Rod clevis, L-mount                                                                                            |
| <b>Wearstrip:</b>                              | Not available on 1/2-inch bore.<br>Standard with 3 inches of stroke, or more<br>(optional on shorter strokes). |
| <b>Notes:</b>                                  | No rod bushing on 1/2-inch models - front head is hard anodized.                                               |

### Series S (Block Front Mount - Spring Extend or Spring Return)

| Model SSXX-B4B4-XXX - (Max. Stroke - 4 inches) (Spring Return) |                                                                                         |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Bore sizes:</b>                                             | 1/2", 3/4", 1-1/16"                                                                     |
| <b>Options:</b>                                                | Wearstrip (except on 1/2-inch bore),<br>bumper, Viton                                   |
| <b>Accessories:</b>                                            | Rod clevis                                                                              |
| <b>Notes:</b>                                                  | No rod bushing on 1/2-inch models - front head is hard anodized. Head is hard anodized. |

### Series S (Spring Extend, Universal Mount)

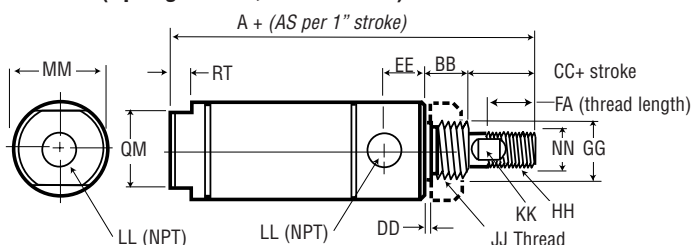
| Model SRXX-P4B4-XXX - (Max. Stroke - 4 inches) |                                                                                                                |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Bore sizes:</b>                             | 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2"                                                                 |
| <b>Options:</b>                                | Bumper, Viton                                                                                                  |
| <b>Accessories:</b>                            | Pivot bracket, rod clevis, L-mount, mounting nut.                                                              |
| <b>Wearstrip:</b>                              | Not available on 1/2-inch bore.<br>Standard with 3 inches of stroke, or more<br>(optional on shorter strokes). |
| <b>Notes:</b>                                  | No rod bushing on 1/2-inch models - front head is hard anodized.                                               |

### Model SRXX-B4B4-XXX (Spring Extend, Illustrated) (Max. Stroke - 4 inches)

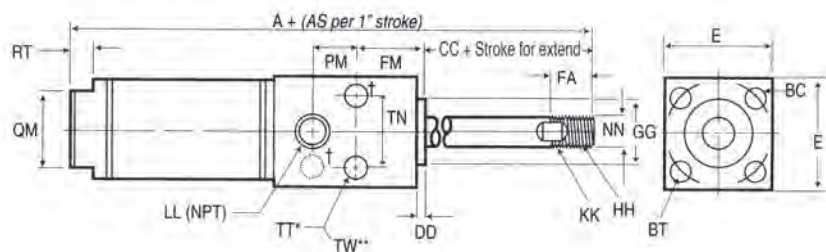
|                     |                                                                                                                |
|---------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Bore sizes:</b>  | 1/2", 3/4", 1-1/16"                                                                                            |
| <b>Options:</b>     | Bumper, Viton                                                                                                  |
| <b>Accessories:</b> | Rod clevis                                                                                                     |
| <b>Wearstrip:</b>   | Not available on 1/2-inch bore.<br>Standard with 3 inches of stroke, or more<br>(optional on shorter strokes). |
| <b>Notes:</b>       | No rod bushing on 1/2-inch models - front head is hard anodized.                                               |

## Dimensional Data

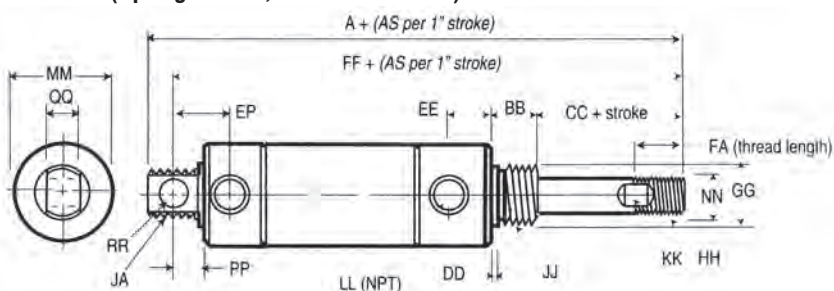
### Series S (Spring Extend, Nose Mount)



### Series S (Block Front Mount - Spring Extend or Spring Return)



### Series S (Spring Extend, Universal Mount)



### Spring Forces

| Bore Size | Spring Force (lbs.) |          |
|-----------|---------------------|----------|
|           | Normal              | Actuated |
| 1/2"      | 1                   | 2        |
| 3/4"      | 1.5                 | 5        |
| 1-1/16"   | 4                   | 8        |
| 1-1/4"    | 7                   | 14       |
| 1-1/2"    | 6                   | 12       |
| 1-3/4"    | 12                  | 24       |
| 2"        | 15                  | 30       |

\* TT - Two thru holes drilled and counterbored on port side for cap screw size listed.

\*\* TW - Above thru holes tapped on opposite side for additional mounting option.

† Mounting hole locations for 1/2-inch models.

## Dimensional Data

### Series S

| Dim Code      | Cylinder Description | CYLINDER BORE (INCHES) |          |          |         |         |        |          |
|---------------|----------------------|------------------------|----------|----------|---------|---------|--------|----------|
|               |                      | 1/2                    | 3/4      | 1-1/16   | 1-1/4   | 1-1/2   | 1-3/4  | 2        |
| Single Acting |                      |                        |          |          |         |         |        |          |
| A             | SRXX-N4B4-XXX        | 2.42                   | 2.78     | 3.28     | 4.25    | 4.00    | 5.03   | 5.11     |
| A             | SRXX-P4B4-XXX        | 3.12                   | 3.84     | 4.15     | 5.33    | 5.06    | 6.59   | 6.48     |
| A             | SSXX-B4B4-XXX        | 2.42                   | 3.34     | 4.28     | —       | 5.00    | —      | —        |
| A             | SRXX-B4B4-XXX        | 2.42                   | 3.34     | 4.28     | —       | 5.18    | —      | —        |
| AS            | SRXX-N4B4-XXX        | 1.44                   | 2.69     | 2.56     | 2.81    | 2.69    | 3.00   | 3.00     |
| AS            | SRXX-P4B4-XXX        | 1.44                   | 2.69     | 2.56     | 2.81    | 2.69    | 3.00   | 3.00     |
| AS            | SSXX-B4B4-XXX        | 1.88                   | 1.69     | 1.56     | —       | 1.69    | —      | —        |
| AS            | SRXX-B4B4-XXX        | 2.88                   | 2.69     | 2.56     | —       | 2.69    | —      | —        |
| BB            | All Types            | .41                    | .50      | .50      | .62     | .62     | .75    | .81      |
| BC            | Bolt Circle Dia.     | .75                    | 1.00     | 1.25     | —       | 1.75    | —      | —        |
| BT            | Threaded Hole        | 8-32(2)                | 10-32(2) | 10-32(2) | —       | 1/4-20  | —      | —        |
| CC            | SRXX-N4B4-XXX        | .50                    | .50      | .62      | 1.00    | 1.00    | 1.19   | 1.25     |
| CC            | SRXX-P4B4-XXX        | .50                    | .50      | .62      | 1.00    | 1.00    | 1.19   | 1.25     |
| CC            | SRXX-B4B4-XXX        | .50                    | 1.06     | 1.12     | —       | 1.50    | —      | —        |
| CC            | SSXX-B4B4-XXX        | .50                    | 1.06     | 1.12     | —       | 1.50    | —      | —        |
| DD            | Block Front Mount    | .06                    | .09      | .09      | —       | .12     | —      | —        |
| DD            | All Others           | .04                    | .07      | .07      | .07     | .07     | .09    | .12      |
| E             | Block Front Mount    | .75                    | 1.00     | 1.25     | —       | 1.75    | —      | —        |
| EE            | All Types            | .37                    | .48      | .52      | .69     | .62     | .72    | .69      |
| EP            | SRXX-P4B4-XXX        | .42                    | .66      | .62      | .91     | .81     | .98    | 1.00     |
| FA            | Block Front          | .50                    | .75      | .75      | —       | 1.25    | —      | —        |
| FA            | All Others           | .50                    | .50      | .50      | .50     | .75     | .88    | .88      |
| FF            | SRXX-P4B4-XXX        | 5.76                   | 3.55     | 3.87     | 4.97    | 4.69    | 6.09   | 6.05     |
| FM            | Block Front Mount    | .31                    | .48      | .72      | —       | 1.00    | —      | —        |
| GG            | Block Front Mount    | .437                   | .625     | .750     | —       | 1.00    | —      | —        |
| GG            | SRXX-XXXX-XXX        | .437                   | .625     | .625     | .750    | .750    | 1.03   | 1.375    |
| HH            | All Types            | 10-32                  | 1/4-28   | 5/16-24  | 7/16-20 | 7/16-20 | 1/2-20 | 1/2-20   |
| JA            | SRXX-P4B4-XXX        | 7/16-20                | 5/8-18   | 5/8-18   | 3/4-16  | 3/4-16  | 1-14   | 1-1/4-12 |
| JJ            | All Types            | 7/16-20                | 5/8-18   | 5/8-18   | 3/4-16  | 3/4-16  | 1-14   | 1-1/4-12 |
| KK            | Wrench Flat          | None                   | None     | .25      | .38     | .38     | .44    | .50      |
| LL            | Block Front Mount    | 10-32                  | 1/8      | 1/8      | 1/8     | 1/4     | —      | —        |
| LL            | All Others           | 10-32                  | 1/8      | 1/8      | 1/8     | 1/8     | 1/4    | 1/4      |
| MM            | All Types            | .62                    | .88      | 1.12     | 1.31    | 1.55    | 1.81   | 2.07     |
| NN            | All Types            | .187                   | .250     | .312     | .437    | .437    | .500   | .625     |
| PM            | Block Front Mount    | .44                    | .51      | .54      | —       | .66     | —      | —        |
| PP            | SRXX-P4B4-XXX        | .25                    | .34      | .34      | .41     | .50     | .50    | .57      |
| QM            | All Types            | .37                    | .62      | .87      | .87     | .82     | 1.25   | 1.25     |
| QQ            | SRXX-P4B4-XXX        | .31                    | .38      | .38      | .50     | .62     | .62    | .75      |
| RR            | SRXX-P4B4-XXX        | .16                    | .25      | .25      | .25     | .38     | .38    | .38      |
| RT            | All Types            | .12                    | .16      | .25      | .18     | .25     | .25    | .31      |
| TN            | Block Front Mount    | .44                    | .62      | .81      | —       | 1.12    | —      | —        |
| TT            | Block Front Mount    | 8-32                   | 10-32    | 10-32    | —       | 1/4-20  | —      | —        |
| TW            | Block Front Mount    | —                      | 1/4-20   | 1/4-20   | —       | 5/16-18 | —      | —        |

## Performance Specifications

### Series S (Nose Mount)

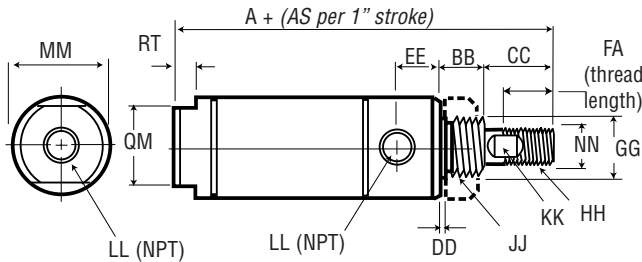
| Model SDXX-N4B4-XXX - (Max. Stroke - 12 inches) |                                                                                                             |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Bore sizes:</b>                              | 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2", 2-1/2"                                                      |
| <b>Hex Mounting Nut:</b>                        | Standard (Except on 2 and 2-1/2-inch models).                                                               |
| <b>Options:</b>                                 | Bumper, Viton, Internal Magnet                                                                              |
| <b>Accessories:</b>                             | Rod clevis, L-mount                                                                                         |
| <b>Wearstrip:</b>                               | Not available on 1/2-inch bore.<br>Standard with 5 inches of stroke, or more (optional on shorter strokes). |
| <b>Notes:</b>                                   | No rod bushing on 1/2-inch models - front head is hard anodized.                                            |

### Series S (Universal Mount)

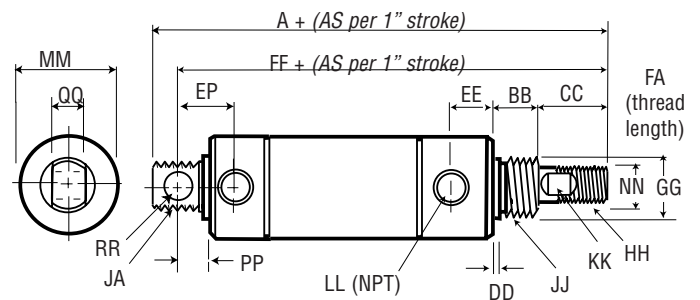
| Model SDXX-P4B4-XXX - (Max. Stroke - 12 inches) |                                                                                                             |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Bore sizes:</b>                              | 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2", 2-1/2"                                                      |
| <b>Options:</b>                                 | Bumper, Viton, Internal Magnet                                                                              |
| <b>Accessories:</b>                             | Pivot bracket, rod clevis, L-mount, mounting nut.                                                           |
| <b>Wearstrip:</b>                               | Not available on 1/2-inch bore.<br>Standard with 5 inches of stroke, or more (optional on shorter strokes). |
| <b>Notes:</b>                                   | No rod bushing on 1/2-inch models - front head is hard anodized.                                            |

## Dimensional Data

### Series S (Nose Mount)



### Series S (Universal Mount)



| Dim Code      | Cylinder Description | CYLINDER BORE (INCHES) |        |         |         |         |        |          |          |
|---------------|----------------------|------------------------|--------|---------|---------|---------|--------|----------|----------|
|               |                      | 1/2                    | 3/4    | 1-1/16  | 1-1/4   | 1-1/2   | 1-3/4  | 2        | 2-1/2    |
| Double Acting |                      |                        |        |         |         |         |        |          |          |
| A             | SDXX-N4B4-XXX        | 2.62                   | 3.47   | 3.75    | 4.75    | 4.44    | 5.57   | 5.56     | 5.56     |
| A             | SDXX-P4B4-XXX        | 3.31                   | 4.54   | 4.62    | 5.83    | 5.50    | 7.13   | 6.93     | 6.93     |
| AS            | All Types            | 1.00                   | 1.00   | 1.00    | 1.00    | 1.00    | 1.00   | 1.00     | 1.00     |
| BB            | All Types            | .41                    | .50    | .50     | .62     | .62     | .75    | .81      | .81      |
| CC            | All Types            | .50                    | .50    | .62     | 1.00    | 1.00    | 1.19   | 1.25     | 1.25     |
| DD            | All Types            | .04                    | .07    | .07     | .07     | .07     | .09    | .12      | .12      |
| EE            | All Types            | .37                    | .48    | .52     | .69     | .62     | .72    | .69      | .69      |
| EP            | SDXX-P4B4-XXX        | .42                    | .66    | .62     | .91     | .81     | .98    | 1.0      | 1.0      |
| FA            | All Types            | .50                    | .50    | .50     | .75     | .75     | .88    | .88      | .88      |
| FF            | SDXX-P4B4-XXX        | 6.12                   | 4.25   | 4.34    | 5.47    | 5.12    | 6.63   | 6.50     | 6.50     |
| GG            | All Types            | .437                   | .625   | .625    | .750    | .750    | 1.030  | 1.50     | 1.50     |
| HH            | All Types            | 10-32                  | 1/4-28 | 5/16-24 | 7/16-20 | 7/16-20 | 1/2-20 | 1/2-20   | 1/2-20   |
| JJ            | All Types            | 7/16-20                | 5/8-18 | 5/8-18  | 3/4-16  | 3/4-16  | 1-14   | 1-1/4-12 | 1-3/8-12 |
| KK            | All Types            | None                   | None   | .25     | .38     | .38     | .44    | .50      | .50      |
| LL            | All Types            | 10-32                  | 1/8    | 1/8     | 1/8     | 1/8     | 1/4    | 1/4      | 1/4      |
| MM            | All Types            | .62                    | .88    | 1.12    | 1.31    | 1.55    | 1.81   | 2.07     | 2.62     |
| NN            | All Types            | .187                   | .250   | .312    | .437    | .437    | .500   | .625     | .625     |
| PP            | SDXX-P4B4-XXX        | .25                    | .34    | .34     | .41     | .50     | .50    | .57      | .57      |
| QM            | SDXX-N4B4-XXX        | .37                    | .62    | .87     | .87     | .87     | 1.25   | 1.25     | 1.75     |
| QQ            | SDXX-P4B4-XXX        | .31                    | .38    | .38     | .50     | .62     | .62    | .75      | .75      |
| RR            | SDXX-P4B4-XXX        | .16                    | .25    | .25     | .25     | .38     | .38    | .38      | .38      |
| RT            | SDXX-N4B4-XXX        | .12                    | .16    | .25     | .18     | .25     | .25    | .31      | .31      |

## Performance Specifications

### Series S (Double Rod End, Double End Mount)

#### Model SDXX-D4B4-XXX - (Max. Stroke - 12 inches)

|                          |                                                              |
|--------------------------|--------------------------------------------------------------|
| <b>Bore sizes:</b>       | 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2" 1-3/4", 2", 2-1/2"       |
| <b>Hex Mounting Nut:</b> | Standard (Except on 2 and 2-1/2-inch models) and bumpers.    |
| <b>Options:</b>          | Viton, wearstrip.                                            |
| <b>Accessories:</b>      | L-mount, rod clevis, mounting nut (2, 2-1/2-inch models)     |
| <b>Notes:</b>            | No rod bushing on 1/2-inch models - heads are hard anodized. |

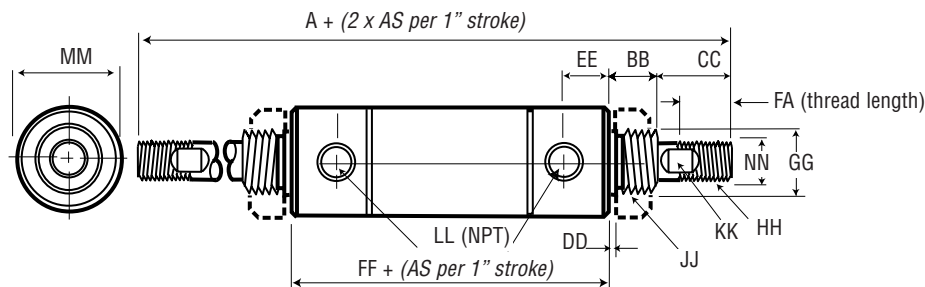
### Series S (Block Front Mount)

#### Model SDXX-B4B4-XXX - (Max. Stroke - 12 inches)

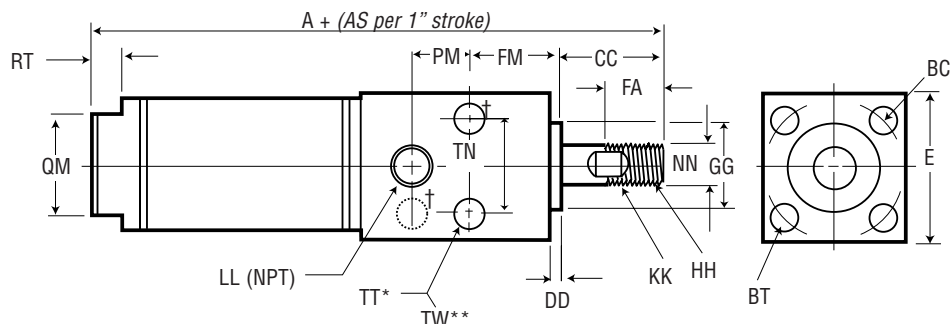
|                     |                                                                                                                                                                                                        |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bore sizes:</b>  | 1/2", 3/4", 1-1/16"                                                                                                                                                                                    |
| <b>Options:</b>     | Wearstrip, Bumpers, Viton, Internal Magnet                                                                                                                                                             |
| <b>Accessories:</b> | Rod clevis                                                                                                                                                                                             |
| <b>Wearstrip:</b>   | Not available on 1/2-inch bore.<br>Standard with 5 inches of stroke, or more (optional on shorter strokes).                                                                                            |
| <b>Notes:</b>       | No rod bushing on 1/2-inch models - front head is hard anodized.<br>Wearstrip not available on 1/2-inch bore.<br>Wearstrip is standard with 5 inches of stroke, or more (optional on shorter strokes). |

## Dimensional Data

### Series S (Double Rod End, Double End Mount)



### Series S (Block Front Mount)



\* TT - Two thru holes drilled and counterbored on port side for cap screw size listed.

\*\* TW - Above thru holes tapped on opposite side for additional mounting option.

† Mounting hole locations for 1/2-inch models.

## Dimensional Data

### Series S

| Dim Code      | Cylinder Description | CYLINDER BORE (INCHES) |        |         |         |         |        |          |          |
|---------------|----------------------|------------------------|--------|---------|---------|---------|--------|----------|----------|
|               |                      | 1/2                    | 3/4    | 1-1/16  | 1-1/4   | 1-1/2   | 1-3/4  | 2        | 2-1/2    |
| Double Acting |                      |                        |        |         |         |         |        |          |          |
| A             | SDXX-D4B4-XXX        | 3.88                   | 5.03   | 5.32    | 6.83    | 6.63    | 8.57   | 8.31     | 8.31     |
| A             | Block Front Mount    | 2.62                   | 4.03   | 4.75    | —       | 5.44    | —      | —        | —        |
| AS            | Block Front Mount    | 1.00                   | 1.00   | 1.00    | —       | 1.00    | —      | —        | —        |
| AS            | SDXX-D4B4-XXX        | .50                    | 1.00   | 1.00    | 1.00    | 1.00    | 1.00   | 1.00     | 1.00     |
| BB            | SDXX-D4B4-XXX        | .41                    | .50    | .50     | .62     | .62     | .75    | .81      | .81      |
| BC            | Bolt Circle Dia.     | .75                    | 1.00   | 1.25    | —       | 1.75    | —      | —        | —        |
| BT            | Threaded Hole        | 8-32                   | 10-32  | 10-32   | —       | 1/4-20  | —      | —        | —        |
| CC            | Block Front Mount    | .50                    | 1.06   | 1.12    | —       | 1.50    | —      | —        | —        |
| CC            | SDXX-D4B4-XXX        | .50                    | .50    | .62     | 1.00    | 1.00    | 1.19   | 1.25     | 1.25     |
| DD            | Block Front Mount    | .06                    | .09    | .09     | —       | .12     | —      | —        | —        |
| DD            | SDXX-D4B4-XXX        | .04                    | .07    | .07     | .07     | .07     | .09    | .12      | .12      |
| E             | Block Front Mount    | .75                    | 1.00   | 1.25    | —       | 1.75    | —      | —        | —        |
| EE            | SDXX-D4B4-XXX        | .37                    | .48    | .52     | .69     | .62     | .72    | .69      | .69      |
| FA            | Block Front Mount    | .50                    | .75    | .75     | —       | 1.25    | —      | —        | —        |
| FA            | SDXX-D4B4-XXX        | .50                    | .50    | .50     | .75     | .75     | .88    | .88      | .88      |
| FF            | SDXX-D4B4-XXX        | 2.07                   | 3.03   | 3.07    | 3.58    | 3.39    | 4.69   | 4.19     | 4.19     |
| FM            | Block Front Mount    | .31                    | .48    | .72     | —       | 1.00    | —      | —        | —        |
| GG            | Block Front Mount    | .437                   | .625   | .750    | —       | 1.00    | —      | —        | —        |
| GG            | SDXX-D4B4-XXX        | .437                   | .625   | .625    | .750    | .750    | 1.030  | 1.50     | 1.50     |
| HH            | All Types            | 10-32                  | 1/4-28 | 5/16-24 | 7/16-20 | 7/16-20 | 1/2-20 | 1/2-20   | 1/2-20   |
| JJ            | SDXX-D4B4-XXX        | 7/16-20                | 5/8-18 | 5/8-18  | 3/4-16  | 3/4-16  | 1-14   | 1-1/4-12 | 1-3/8-12 |
| KK            | All Types            | None                   | None   | .25     | .38     | .38     | .44    | .50      | .50      |
| LL            | All Types            | 10-32                  | 1/8    | 1/8     | 1/8     | 1/8     | 1/4    | 1/4      | 1/4      |
| MM            | SDXX-D4B4-XXX        | .62                    | .88    | 1.12    | 1.31    | 1.55    | 1.81   | 2.07     | 2.62     |
| NN            | All Types            | .187                   | .250   | .312    | .437    | .437    | .500   | .625     | .625     |
| PM            | Block Front Mount    | .44                    | .51    | .54     | —       | .66     | —      | —        | —        |
| QM            | Block Front Mount    | .37                    | .62    | .87     | —       | .87     | —      | —        | —        |
| RT            | Block Front Mount    | .12                    | .16    | .25     | —       | .25     | —      | —        | —        |
| TN            | Block Front Mount    | .44                    | .62    | .81     | —       | 1.12    | —      | —        | —        |
| TT            | Block Front Mount    | 8-32                   | 10-32  | 10-32   | —       | 1/4-20  | —      | —        | —        |
| TW            | Block Front Mount    | —                      | 1/4-20 | 1/4-20  | —       | 5/16-18 | —      | —        | —        |

## Features

### Series S (Hall Effect Switches)

Hall Effect Sensors are typically used in conjunction with computers, programmable controllers or other solid state devices to sense and process cylinder rod proximity. The solid state circuitry in this sinking switch (NPN) provides clean, fast output without “bounce.” The 300 mW power capability restricts its use to low power loads. One switch kit fits all Silverair cylinders for reduced and simplified inventory. 3/8 inch effective area per switch. For two switches, a minimum of 1-inch stroke is recommended.

### Series S (Reed Switches)

Epoxy encapsulated reed switches are ideal for harsh environments. One switch kit fits all Silverair cylinders for reduced and simplified inventory. 50 watt reed is common in all sensors. Model 117045-300 lights up during reed engagement in low voltage applications. Model 117045-500 lights up over wide voltage range. Model 117045-100 is a basic sensor with no LED.

## Performance Specifications

### Series S (Hall Effect Switches)

|                             |                              |
|-----------------------------|------------------------------|
| <b>Input Voltage:</b>       | 5 to 24 VDC                  |
| <b>Input Current:</b>       | 25 mA maximum                |
| <b>Output Voltage Drop:</b> | 0.4 VDC maximum              |
| <b>Output Current:</b>      | 330 mA maximum               |
| <b>Power Dissipation:</b>   | 300 mW maximum               |
| <b>Temperature Range:</b>   | -20° to 185°F (-29° to 85°C) |

### Series S (Reed Switches)

|                                    |                              |
|------------------------------------|------------------------------|
| <b>Contacts:</b>                   | Normally open                |
| <b>Contact Rating:</b>             | 50 W maximum                 |
| <b>Switching Current:</b>          | 1 A maximum                  |
| <b>Initial Contact Resistance:</b> | 1 Ohm                        |
| <b>Minimum Break Down Voltage:</b> | 225 VDC, 275 VAC             |
| <b>Temperature Range:</b>          | -40° to 200°F (-40° to 93°C) |

## Ordering

### Series S (Hall Effect Switches)

| Model No.         | Description                                                    |
|-------------------|----------------------------------------------------------------|
| <b>118123-100</b> | w/LED, 5-24 VDC, 24 inch leads (includes 118124 Mounting Kit)  |
| <b>118123-200</b> | w/LED, 5-24 VDC, 144 inch leads (includes 118124 Mounting Kit) |

### Series S (Reed Switches)

One 118124 Mounting Kit is included with each Reed Switch

| Model No.         | Description                                     |
|-------------------|-------------------------------------------------|
| <b>117045-100</b> | No LED, 120 VAC or 200 VDC max., 24 inch leads  |
| <b>117045-200</b> | No LED, 120 VAC or 200 VDC max., 144 inch leads |
| <b>117045-300</b> | w/LED, 5-24 VAC/DC max., 24 inch leads          |
| <b>117045-400</b> | w/LED, 5-24 VAC/DC max., 144 inch leads         |
| <b>117045-500</b> | w/LED, 120 VAC or 200 VDC max., 24 inch leads   |
| <b>117045-600</b> | w/LED, 120 VAC or 200 VDC max., 144 inch leads  |



### Technical Information:

1. Do not exceed specification, permanent damage to the sensor may occur.
2. For reed switch type sensors, polarity must be observed for the proper functioning of LED. Connect the brown wire in series with load positive (+) and the blue wire to negative (-) or power source space. If the polarity is reversed, reed switch remains functional but LED will remain in “OFF” state.
3. For solid-state type sensors, polarity must also be observed. Connect brown wire to the positive (+) and the blue to the negative (-) of DC power source. The black wire must connect to the load ONLY. If the black wire is accidentally connected to the power source, permanent damage to the sensor may occur.
4. An external protection circuit may be required if the reed switch is used with inductive load, such as relay or solenoid. For DC inductive load, attach an external diode parallel to the load and use R -C circuit parallel with AC inductive load.
5. Keep sensors away from stray magnetic field to prevent malfunctions.
6. When using reed switch with capacitive load or if the lead wire length exceeds 10-meter, and inductor must be installed in series with the sensor to prevent damage (Sticking effect).

Pneumatic Cylinders

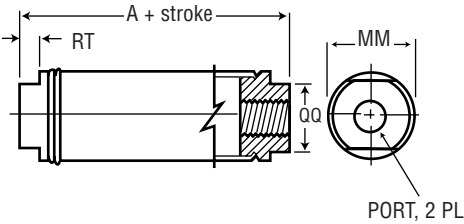
# Silverair™ Volume Chambers

## Features

### Series S (Stainless Steel Volume Chambers)

Volume chambers are used wherever there is the need to accumulate or store a volume of air or vacuum, such as a time delay in a circuit.

- Stainless steel body and aluminum endcaps offer excellent corrosion resistance in adverse environments.
- Available in lengths up to 24 inches, at 1/8-inch increments, providing a capability to meet very specific pneumatic accumulator applications.



## Performance Specifications

|                      |                                       |
|----------------------|---------------------------------------|
| Operating Pressures: | 0 - 200 PSIG (14 bar)                 |
| Temperatures Ranges: | -40° to 160°F, ambient (-40° to 71°C) |
| Operation:           | Compressed air or with vacuum         |

| Volume (ci)                 | Cylinder Bore (Inches) |        |       |      |
|-----------------------------|------------------------|--------|-------|------|
|                             | 3/4                    | 1-1/16 | 1-1/2 | 2    |
| Add per 1.0 inch of length  | .44                    | .89    | 1.77  | 3.14 |
| Basic Volume (add to total) | .41                    | .92    | 1.80  | 4.44 |

## Ordering

| Reference | Cylinder Bore (Inches) |        |       |      |
|-----------|------------------------|--------|-------|------|
|           | 3/4                    | 1-1/16 | 1-1/2 | 2    |
| A         | 1.91                   | 2.18   | 2.26  | 2.81 |
| MM        | .81                    | 1.11   | 1.55  | 2.07 |
| QQ        | .62                    | .88    | .88   | 1.25 |
| RT        | .16                    | .25    | .25   | .32  |
| PORT      | .125                   | .125   | .125  | .25  |

11811 X - X X X

### BORE SIZE

- 5 3/4 inch
- 6 1-1/16 inch
- 7 1-1/2 inch
- 8 2 inch

### CHAMBER LENGTH

(1" Increments, 1" through 4")

#### WHOLE INCHES FRACTIONS

- |            |            |
|------------|------------|
| 00 = 0 in  | 0 = None   |
| 01 = 1 in  | 1 = 1/8 in |
| 02 = 2 in  | 2 = 1/4 in |
| 03 = 3 in  | 3 = 3/8 in |
| 04 = 4 in  | 4 = 1/2 in |
| 05 = 5 in  | 5 = 5/8 in |
| 06 = 6 in  | 6 = 3/4 in |
| 10 = 10 in | 7 = 7/8 in |
| etc.       |            |

- Under 1" stroke, use 00 and fraction designation.

Example: 1/2" stroke = 004

**Note:** Highlighted selections denotes most popular models.

# Pneumatic Cylinders

## Premair™ Composite

### Features

- Corrosion-Resistant Composite Construction
- Superior Wear; Longer Service Life than Metal Cylinders
- Lighter Weight than Metal Cylinders
- Quiet Operation: No “Pinging”
- User-adjustable Port Location
- Factory Lubricated
- Dent-Resistant
- All-Stainless Accessories
- Five Year Warranty

### Technical Data

|                                                                                                                                                             |                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Temperature Range:</b>                                                                                                                                   | -20° to 200°F (-25° to 95°C)                                                                                                                                                                                                                   |
| <b>Pressure Range:</b>                                                                                                                                      | 200 PSI (4 PSI Breakaway)                                                                                                                                                                                                                      |
| <b>Chemical Compatibility:</b>                                                                                                                              | Delrin® compositions have excellent resistance to a wide variety of solvents, esters, oils, greases, gasoline and other petroleum hydrocarbons. They resist weak acids and bases, but are not recommended for uses outside of pH range 4 to 9. |
| DuPont Delrin® Product and Properties Guide, page 9 H-41651-1.<br>For detailed information about Dupont Delrin®, contact DuPont Polymers at (302) 999-4592. |                                                                                                                                                                                                                                                |
| <b>Comparative Data:</b>                                                                                                                                    | 30% lighter vs. Metal<br>2 x Wear life of Metal                                                                                                                                                                                                |

### Patented Prema-Lok™ Sealed End-Cap Retention/Rotation System

Premair is making cylinder installation and positioning easier than ever!

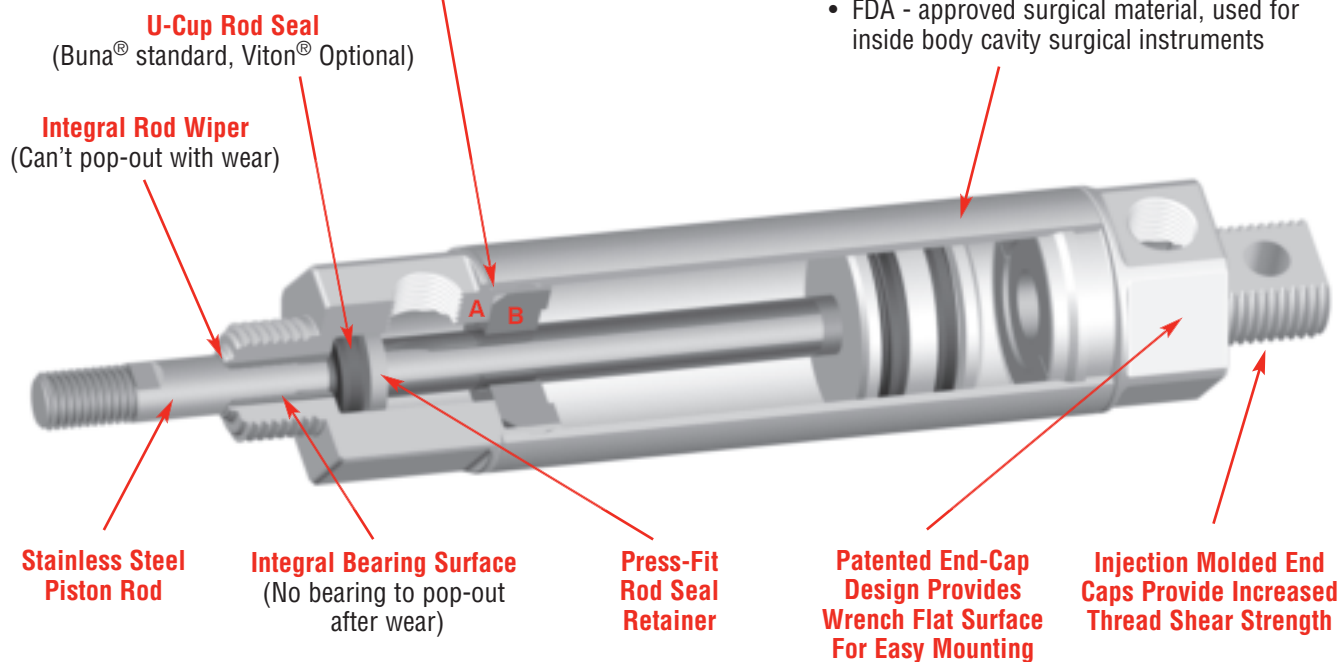
Premair's patented\* port-positioning design permits quick, accurate adjustment without the time loss and headaches of special ordering, not to mention added inventory. All you do is order one model, set it and forget it.

- (A) Press-fit end caps are permanently retained and provide seal
- (B) Secondary “wedge” insures permanent retention and leak-proof seal
- Press-fit end cap design also permits end cap rotation

### Composite Body

Patented, Continuous Cross-Wound Thermo-Set Epoxy Provides:

- Corrosion resistance
- Dent/wear resistance
- Lighter weight than metal
- FDA - approved surgical material, used for inside body cavity surgical instruments

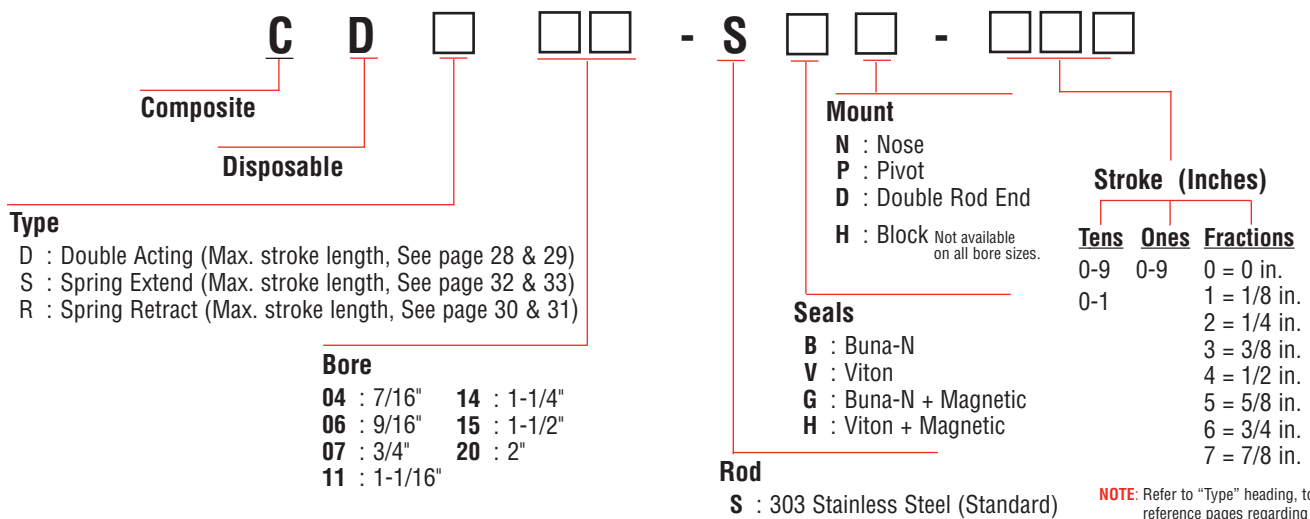


\* Multiple patents applied for. Additional patents pending.

# Pneumatic Cylinders

## Premair™ Composite

### Ordering / Most Popular Models



### Most Popular (Standard) Models

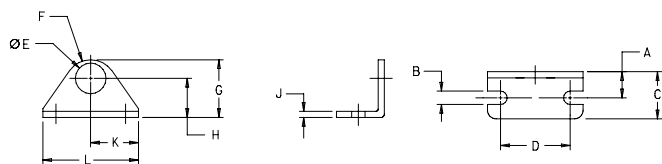
|                 |                 |                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| CDD04-SBH-004-K | CDD07-SBH-024-K | CDD11-SBH-024-K | CDD14-SBN-024-K | CDD15-SBP-040-K | CDR07-SBP-004-K |
| CDD04-SBH-010-K | CDD07-SBH-030-K | CDD11-SBH-030-K | CDD14-SBN-030-K | CDD15-SBP-060-K | CDR07-SBP-010-K |
| CDD04-SBH-014-K | CDD07-SBH-040-K | CDD11-SBH-040-K | CDD14-SBN-040-K | CDD15-SBP-080-K | CDR07-SBP-014-K |
| CDD04-SBH-020-K | CDD07-SBH-050-K | CDD11-SBH-050-K | CDD14-SBN-050-K | CDD20-SBN-010-K | CDR07-SBP-020-K |
| CDD04-SBH-024-K | CDD07-SBH-060-K | CDD11-SBH-060-K | CDD14-SBN-060-K | CDD20-SBN-014-K | CDR11-SBN-004-K |
| CDD04-SBH-030-K | CDD07-SBN-004-K | CDD11-SBN-004-K | CDD14-SBN-070-K | CDD20-SBN-020-K | CDR11-SBN-010-K |
| CDD04-SBH-040-K | CDD07-SBN-010-K | CDD11-SBN-010-K | CDD14-SBN-080-K | CDD20-SBN-024-K | CDR11-SBN-014-K |
| CDD04-SBN-004-K | CDD07-SBN-014-K | CDD11-SBN-014-K | CDD14-SBN-090-K | CDD20-SBN-030-K | CDR11-SBN-020-K |
| CDD04-SBN-010-K | CDD07-SBN-020-K | CDD11-SBN-020-K | CDD14-SBN-100-K | CDD20-SBN-040-K | CDR14-SBN-004-K |
| CDD04-SBN-014-K | CDD07-SBN-024-K | CDD11-SBN-024-K | CDD14-SBN-110-K | CDD20-SBN-060-K | CDR14-SBN-010-K |
| CDD04-SBN-020-K | CDD07-SBN-030-K | CDD11-SBN-030-K | CDD14-SBN-120-K | CDD20-SBN-080-K | CDR14-SBN-014-K |
| CDD04-SBN-024-K | CDD07-SBN-040-K | CDD11-SBN-040-K | CDD14-SBP-004-K | CDD20-SBP-010-K | CDR14-SBN-020-K |
| CDD04-SBN-030-K | CDD07-SBN-050-K | CDD11-SBN-050-K | CDD14-SBP-010-K | CDD20-SBP-014-K | CDR14-SBN-024-K |
| CDD04-SBN-040-K | CDD07-SBN-060-K | CDD11-SBN-060-K | CDD14-SBP-014-K | CDD20-SBP-020-K | CDR14-SBN-030-K |
| CDD04-SBP-004-K | CDD07-SBN-070-K | CDD11-SBN-070-K | CDD14-SBP-020-K | CDD20-SBP-024-K | CDR14-SBP-004-K |
| CDD04-SBP-010-K | CDD07-SBN-080-K | CDD11-SBN-080-K | CDD14-SBP-024-K | CDD20-SBP-030-K | CDR14-SBP-010-K |
| CDD04-SBP-014-K | CDD07-SBN-090-K | CDD11-SBN-090-K | CDD14-SBP-030-K | CDD20-SBP-040-K | CDR14-SBP-014-K |
| CDD04-SBP-020-K | CDD07-SBN-100-K | CDD11-SBN-100-K | CDD14-SBP-040-K | CDD20-SBP-060-K | CDR14-SBP-020-K |
| CDD04-SBP-024-K | CDD07-SBN-110-K | CDD11-SBN-110-K | CDD14-SBP-050-K | CDD20-SBP-080-K | CDS06-SBN-004-K |
| CDD04-SBP-030-K | CDD07-SBN-120-K | CDD11-SBN-120-K | CDD14-SBP-060-K | CDR04-SBN-004-K | CDS06-SBN-010-K |
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| CDD06-SBN-014-K | CDD07-SBP-020-K | CDD11-SBP-020-K | CDD14-SBP-100-K | CDR04-SBP-004-K | CDS07-SBN-004-K |
| CDD06-SBN-020-K | CDD07-SBP-024-K | CDD11-SBP-024-K | CDD14-SBP-110-K | CDR04-SBP-010-K | CDS07-SBN-010-K |
| CDD06-SBN-024-K | CDD07-SBP-030-K | CDD11-SBP-030-K | CDD14-SBP-120-K | CDR04-SBP-014-K | CDS07-SBN-014-K |
| CDD06-SBN-030-K | CDD07-SBP-040-K | CDD11-SBP-040-K | CDD15-SBN-004-K | CDR04-SBP-020-K | CDS07-SBP-004-K |
| CDD06-SBN-040-K | CDD07-SBP-050-K | CDD11-SBP-050-K | CDD15-SBN-010-K | CDR06-SBN-004-K | CDS07-SBP-010-K |
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| CDD06-SBP-014-K | CDD07-SBP-080-K | CDD11-SBP-080-K | CDD15-SBN-030-K | CDR06-SBN-020-K | CDS11-SBN-010-K |
| CDD06-SBP-020-K | CDD07-SBP-090-K | CDD11-SBP-090-K | CDD15-SBN-040-K | CDR06-SBP-004-K | CDS11-SBN-014-K |
| CDD06-SBP-024-K | CDD07-SBP-100-K | CDD11-SBP-100-K | CDD15-SBN-060-K | CDR06-SBP-010-K | CDS11-SBN-020-K |
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| CDD07-SBH-010-K | CDD11-SBH-010-K | CDD14-SBN-010-K | CDD15-SBP-014-K | CDR07-SBN-010-K | CDS11-SBP-020-K |
| CDD07-SBH-014-K | CDD11-SBH-014-K | CDD14-SBN-014-K | CDD15-SBP-020-K | CDR07-SBN-014-K |                 |
| CDD07-SBH-020-K | CDD11-SBH-020-K | CDD14-SBN-020-K | CDD15-SBP-030-K | CDR07-SBN-020-K |                 |

# Pneumatic Cylinders

## Premair™ Composite

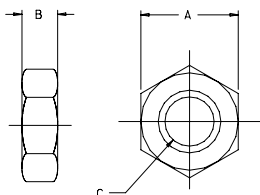
### Accessories (All Stainless Steel)

#### L-Mount Kit (One Bracket, One Nut)



| Bore     | 7/16"(.04) | 9/16"(.06) | 3/4"(.07)  | 1-1/16"(.11) | 1-1/4"(.14) | 1-1/2"(.15) | 2"(.20)    |
|----------|------------|------------|------------|--------------|-------------|-------------|------------|
| A        | 0.38       | 0.38       | 0.56       | 0.56         | 0.75        | 0.75        | 1          |
| B        | 0.19       | 0.19       | 0.27       | 0.27         | 0.28        | 0.28        | 0.34       |
| C        | 0.69       | 0.69       | 1          | 1            | 1.5         | 1.5         | 1.62       |
| D        | 1          | 1          | 1.5        | 1.5          | 1.88        | 1.88        | 2.25       |
| E (Dia.) | 0.44       | 0.44       | 0.63       | 0.63         | 0.75        | 1           | 1.38       |
| F (Rad.) | 0.38       | 0.38       | 0.56       | 0.56         | 0.75        | .75         | 1          |
| G        | 0.83       | 0.83       | 1.38       | 1.38         | 1.75        | 1.75        | 2.5        |
| H        | 0.56       | 0.56       | 0.81       | 0.81         | 1           | 1           | 1.5        |
| J        | 0.09       | 0.09       | 0.13       | 0.13         | 0.13        | 0.13        | 0.25       |
| K        | 0.69       | 0.69       | 0.94       | 0.94         | 1.25        | 1.25        | 1.56       |
| L        | 1.38       | 1.38       | 1.88       | 1.88         | 2.5         | 2.5         | 3.12       |
| Model    | 114020-056 | 114020-056 | 114020-106 | 114020-106   | 114020-125  | 114020-150  | 114020-200 |

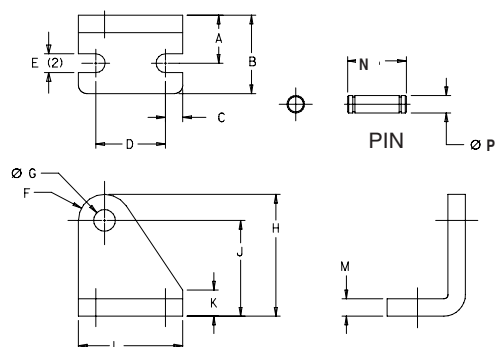
#### Mounting Nut (Nuts Sold Individually)



| Bore  | 7/16"(.04) | 9/16"(.06) | 3/4"(.07)  | 1-1/16"(.11) | 1-1/4"(.14) | 1-1/2"(.15) | 2"(.20)    |
|-------|------------|------------|------------|--------------|-------------|-------------|------------|
| A     | 0.69       | 0.69       | 0.94       | 0.94         | 1.13        | 1.5         | 1.88       |
| B     | 0.25       | 0.25       | 0.38       | 0.38         | 0.42        | 0.55        | 0.50       |
| C     | 7/16-20    | 7/16-20    | 5/8-18     | 5/8-18       | 3/4-16      | 1-12        | 1 1/4-12   |
| Model | 114021-056 | 114021-056 | 114021-106 | 114021-106   | 114021-125  | 114021-150  | 114021-200 |

#### Pivot Bracket Kit (Two Piece)

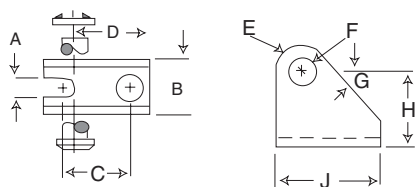
(Left Bracket, Right Bracket, Pivot Pin, 2 E-Clips)



| Bore     | 7/16"(.04) | 9/16"(.06) | 3/4"(.07)  | 1-1/16"(.11) | 1-1/4"(.14) | 1-1/2"(.15) | 2"(.20)    |
|----------|------------|------------|------------|--------------|-------------|-------------|------------|
| A        | 0.28       | 0.28       | 0.44       | 0.44         | 0.44        | 0.62        | 0.69       |
| B        | 0.5        | 0.5        | 0.81       | 0.81         | 0.81        | 1           | 1.13       |
| C        | 0.13       | 0.13       | 0.19       | 0.19         | 0.19        | 0.25        | 0.25       |
| D        | 0.5        | 0.5        | 0.75       | 0.75         | 0.75        | 1           | 1          |
| E        | 0.19       | 0.19       | 0.27       | 0.27         | 0.27        | 0.27        | 0.27       |
| F (Rad.) | 0.2        | 0.2        | 0.31       | 0.31         | 0.31        | 0.38        | 0.38       |
| G (Dia.) | 0.16       | 0.16       | 0.25       | 0.25         | 0.25        | 0.38        | 0.38       |
| H        | 0.77       | 0.77       | 1.19       | 1.19         | 1.19        | 1.75        | 1.75       |
| J        | 0.56       | 0.56       | 0.88       | 0.88         | 0.88        | 1.38        | 1.38       |
| K        | 0.13       | 0.13       | 0.25       | 0.25         | 0.25        | 0.25        | 0.38       |
| L        | 0.75       | 0.75       | 1.13       | 1.13         | 1.13        | 1.50        | 1.50       |
| M        | 0.06       | 0.06       | 0.13       | 0.13         | 0.13        | 0.13        | 0.25       |
| N        | 0.602      | 0.602      | 0.829      | 0.829        | 0.954       | 1.10        | 1.48       |
| P        | 0.156      | 0.156      | 0.250      | 0.250        | 0.250       | .375        | .375       |
| Model    | 114022-043 | 114022-043 | 114022-075 | 114022-075   | 114022-125  | 114022-150  | 114022-200 |

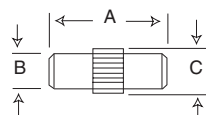
#### U-Pivot Bracket Kit (Single Piece)

(Bracket, Pivot Pin, 2 E-Clips)



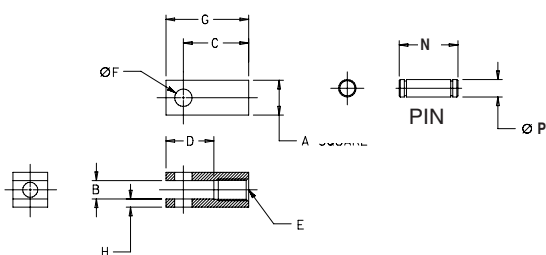
| Bore     | 7/16"(.04) | 9/16"(.06) | 3/4"(.07)  | 1-1/16"(.11) | 1-1/4"(.14) | 1-1/2"(.15) | 2"(.20)    |
|----------|------------|------------|------------|--------------|-------------|-------------|------------|
| A        | .20        | .20        | 0.26       | 0.26         | 0.32        | .39         | .45        |
| B        | .52        | .52        | 0.65       | 0.65         | 0.77        | .96         | 1.20       |
| C        | .43        | .43        | 0.75       | 0.75         | 0.75        | 1.00        | 1.00       |
| D        | .54        | .54        | 0.87       | 0.87         | 0.94        | 1.25        | 1.43       |
| E (Rad.) | .22        | .22        | 0.31       | 0.31         | 0.31        | .38         | .38        |
| (Dia.)   | .16        | .16        | 0.26       | 0.26         | 0.26        | .38         | .38        |
| G        | 50°        | 50°        | 53°        | 53°          | 53°         | 52°         | 48°        |
| H        | .64        | .64        | 0.87       | 0.87         | 1.06        | 1.37        | 1.68       |
| J        | .75        | .75        | 1.19       | 1.19         | 1.25        | 1.63        | 1.81       |
| Model    | 114570-043 | 114570-043 | 114570-075 | 114570-075   | 114570-125  | 114570-150  | 114570-200 |

#### Optional Press Fit Pin



| Bore  | 7/16"(.04) | 9/16"(.06) | 3/4"(.07)  | 1-1/16"(.11) | 1-1/4"(.14) | 1-1/2"(.15) | 2"(.20) |
|-------|------------|------------|------------|--------------|-------------|-------------|---------|
| A     | .50        | .50        | 0.75       | 0.75         | 0.87        | 1.13        | N/A     |
| B     | .15        | .15        | 0.24       | 0.24         | 0.24        | .37         | N/A     |
| C     | .17        | .17        | 0.26       | 0.26         | 0.26        | .39         | N/A     |
| Model | 114634-056 | 114634-056 | 114634-106 | 114634-106   | 114634-125  | 114634-150  | N/A     |

#### Rod Clevis Kit (Rod Clevis, Clevis Pin, Jam Nut and 2 E-Clips)

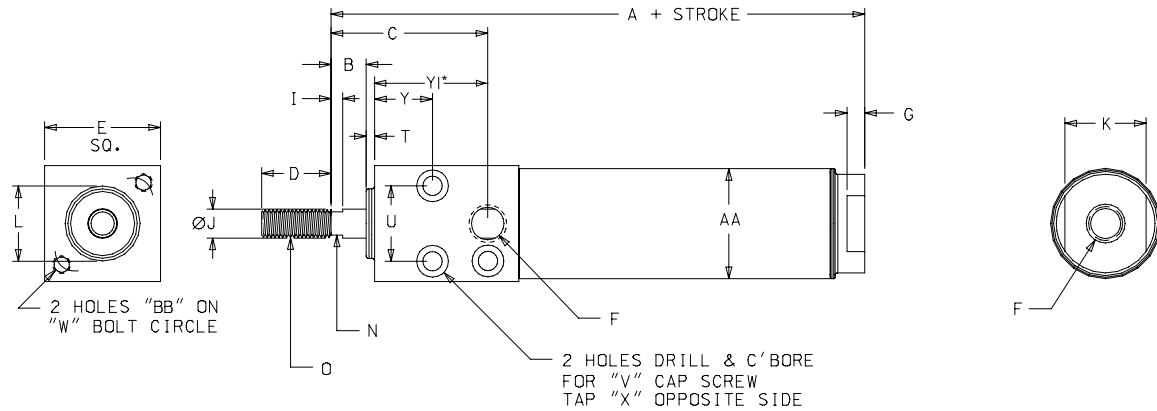


| Bore     | 7/16"(.04) | 9/16"(.06) | 3/4"(.07)  | 1-1/16"(.11) | 1-1/4"(.14) | 1-1/2"(.15) | 2"(.20)    |
|----------|------------|------------|------------|--------------|-------------|-------------|------------|
| A        | 0.38       | 0.38       | 0.5        | 0.5          | 0.75        | 0.75        | 0.75       |
| B        | 0.19       | 0.19       | 0.25       | 0.25         | 0.38        | 0.38        | 0.38       |
| C        | 0.75       | 0.75       | 0.94       | 0.94         | 1.31        | 1.31        | 1.31       |
| D        | 0.56       | 0.56       | 0.69       | 0.69         | 0.94        | 0.94        | 0.94       |
| E        | #10-32     | #10-32     | 1/4-28     | 5/16-24      | 7/16-20     | 7/16-20     | 1/2-20     |
| F (Dia.) | 0.19       | 0.19       | 0.25       | 0.25         | 0.38        | 0.38        | 0.38       |
| G        | 0.94       | 0.94       | 1.19       | 1.19         | 1.69        | 1.69        | 1.69       |
| H        | 0.09       | 0.09       | 0.13       | 0.13         | 0.19        | 0.19        | 0.19       |
| N        | 0.55       | 0.56       | 0.700      | 0.700        | 1.03        | 1.03        | 1.03       |
| P (Dia.) | 0.187      | 0.19       | 0.25       | 0.25         | 0.375       | 0.38        | 0.38       |
| Model    | 114023-043 | 114023-043 | 114023-075 | 114023-106   | 114023-125  | 114023-125  | 114023-200 |

# Pneumatic Cylinders

## Premair™ Composite

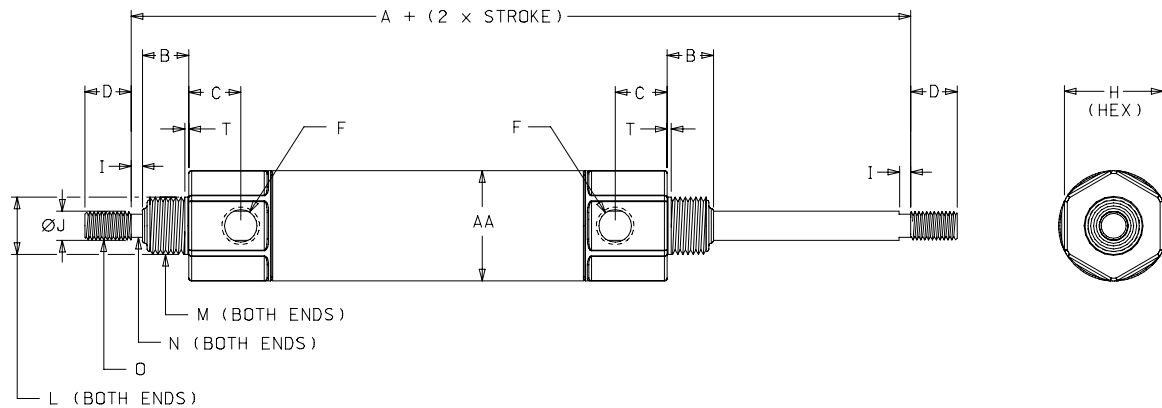
### Dimensional Data



#### DOUBLE ACTING / BLOCK MOUNT ( Maximum Stroke 12")

| Bore | 7/16"(04) | 9/16"(06) | 3/4"(07) | 1-1/16"(11) | 1-1/4"(12) | 1-1/2"(15) | 2"(20) | Bore | 7/16"(04) | 9/16"(06) | 3/4"(07)      | 1-1/16"(11)   | 1-1/4"(14) | 1-1/2"(15)     | 2"(20) |
|------|-----------|-----------|----------|-------------|------------|------------|--------|------|-----------|-----------|---------------|---------------|------------|----------------|--------|
| A    | 2.13      | -         | 3.22     | 3.75        | -          | 4.19       | -      | N    | -         | -         | 0.22          | 0.25          | -          | 0.38           | -      |
| B    | -         | -         | 0.25     | 0.38        | -          | 0.38       | -      | O    | 10-32     | -         | 1/4-28        | 5/16-24       | -          | 7/16-20 UNF-2A | -      |
| C    | 0.72      | -         | 1.34     | 1.63        | -          | 1.91       | -      | T    | 0.06      | -         | 0.09          | 0.09          | -          | 0.09           | -      |
| D    | 0.5       | -         | 0.75     | 0.75        | -          | 1.25       | -      | U    | 0.44      | -         | 0.63          | 0.81          | -          | 1.69           | -      |
| E    | 0.75      | -         | 1        | 1.25        | -          | 1.75       | -      | V    | -         | -         | #10-32        | #10-32        | -          | 1/4"           | -      |
| F    | 10-32     | -         | 1/8 NPT  | 1/8 NPT     | -          | 1/4 NPT    | -      | W    | 0.75      | -         | 1.00          | 1.25          | -          | 1.750          | -      |
| G    | 0.19      | -         | 0.19     | 0.19        | -          | 0.25       | -      | X    | #8-32     | -         | 1/4-20 UNC-28 | 1/4-20 UNC-28 | -          | 5/16-18 UNC-2B | -      |
| I    | -         | -         | 0.25     | 0.25        | -          | 0.25       | -      | Y    | 0.25      | -         | 0.38          | 0.63          | -          | 0.88           | -      |
| J    | 0.19      | -         | 0.25     | 0.31        | -          | 0.44       | -      | Y1*  | 0.69      | -         | -             | -             | -          | -              | -      |
| K    | 0.38      | -         | 0.63     | 0.88        | -          | 1.50       | -      | AA   | 0.56      | -         | 0.88          | 1.19          | -          | 1.69           | -      |
| L    | 0.44      | -         | 0.63     | 0.75        | -          | 1          | -      | BB   | #8-32     | -         | #10-32        | #10-32        | -          | 1/4-20 UNC-2B  | -      |

\* - 7/16" Bore Only



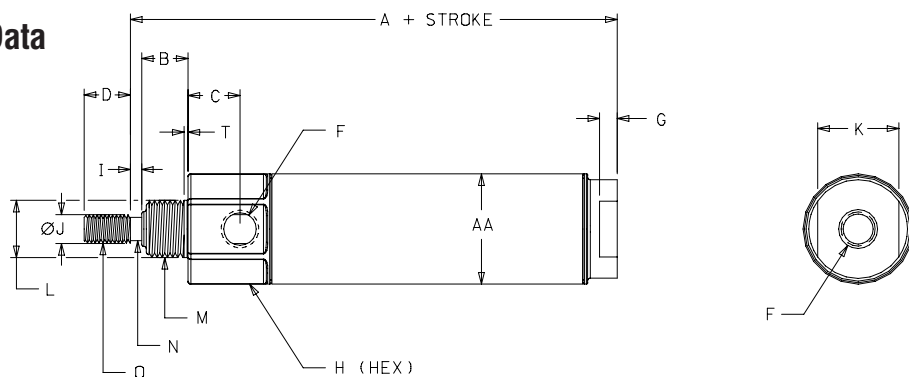
#### DOUBLE ACTING / DOUBLE ROD END ( Maximum Stroke 12", 6" for 7/16" and 9/16" Bore)

| Bore | 7/16"(04) | 9/16"(06) | 3/4"(07) | 1-1/16"(11) | 1-1/4"(12) | 1-1/2"(15) | 2"(20)  | Bore | 7/16"(04) | 9/16"(06) | 3/4"(07)  | 1-1/16"(11) | 1-1/4"(14) | 1-1/2"(15)     | 2"(20)          |
|------|-----------|-----------|----------|-------------|------------|------------|---------|------|-----------|-----------|-----------|-------------|------------|----------------|-----------------|
| A    | 2.81      | 2.94      | 4        | 4.38        | 5.56       | 5.12       | 6.56    | J    | 0.19      | 0.19      | 0.25      | 0.31        | 0.44       | 0.44           | 0.62            |
| B    | 0.38      | 0.38      | 0.5      | 0.5         | 0.63       | 0.63       | 0.81    | L    | .433/.437 | .433/.437 | .621/.624 | .621/.624   | .746/.749  | .746/.749      | 1.372/1.375     |
| C    | 0.34      | 0.34      | 0.47     | 0.56        | 0.75       | 0.33       | 0.74    | M    | 7/16-20   | 7/16-20   | 5/8-18    | 5/8-18      | 3/4-16     | 1-12 UNF-2A    | 1 1/4-12 UNF-2A |
| D    | 0.5       | 0.5       | 0.5      | 0.5         | 0.75       | 0.75       | 0.88    | N    | -         | -         | -         | 0.25        | 0.38       | 0.38           | 0.50            |
| F    | #10-32    | #10-32    | 1/8 NPT  | 1/8 NPT     | 1/8 NPT    | 1/8 NPT    | 1/4 NPT | O    | #10-32    | #10-32    | 1/4-28    | 5/16-24     | 7/16-20    | 7/16-20 UNF-2A | 1/2-20 UNF-2A   |
| H    | 0.56      | 0.69      | 0.88     | 1.06        | 1.25       | -          | -       | T    | 0.05      | 0.06      | 0.09      | 0.09        | 0.09       | 0.09           | 0.13            |
| I    | -         | -         | -        | 0.13        | 0.25       | 0.25       | 0.31    | AA   | 0.56      | 0.69      | 0.88      | 1.19        | 1.38       | 1.69           | 2.23            |

# Pneumatic Cylinders

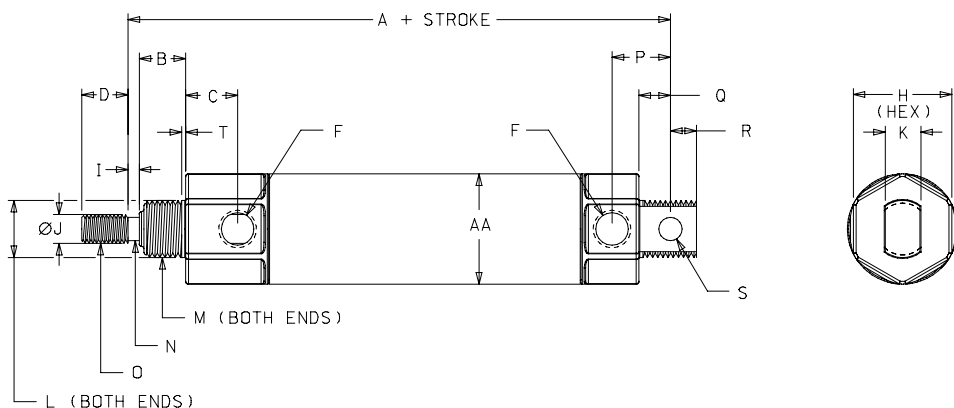
## Premair™ Composite

### Dimensional Data



### DOUBLE ACTING / NOSE MOUNT ( Maximum Stroke 12")

| Bore | 7/16"(04) | 9/16"(06) | 3/4"(07) | 1-1/16"(11) | 1-1/4"(12) | 1-1/2"(15) | 2"(20)  | Bore | 7/16"(04) | 9/16"(06) | 3/4"(07)  | 1-1/16"(11) | 1-1/4"(14) | 1-1/2"(15)     | 2"(20)          |
|------|-----------|-----------|----------|-------------|------------|------------|---------|------|-----------|-----------|-----------|-------------|------------|----------------|-----------------|
| A    | 2.13      | 2.28      | 2.97     | 3.13        | 4          | 3.69       | 4.69    | J    | 0.19      | 0.19      | 0.25      | 0.31        | 0.44       | 0.44           | 0.62            |
| B    | 0.38      | 0.38      | 0.5      | 0.5         | 0.62       | 0.63       | 0.81    | K    | 0.38      | 0.50      | 0.62      | 0.88        | 0.88       | 0.62           | 1.25            |
| C    | 0.34      | 0.34      | 0.47     | 0.56        | 0.75       | 0.74       | 0.74    | L    | .433/.437 | .433/.437 | .621/.624 | .621/.624   | .746/.749  | .746/.769      | 1.372/1.375     |
| D    | 0.5       | 0.5       | 0.5      | 0.5         | 0.75       | 0.75       | 0.88    | M    | 7/16-20   | 7/16-20   | 5/8-18    | 5/8-18      | 3/4-16     | 1-12 UNF-2A    | 1 1/4-12 UNF-2A |
| F    | #10-32    | #10-32    | 1/8 NPT  | 1/8 NPT     | 1/8 NPT    | 1/8 NPT    | 1/4 NPT | N    | -         | -         | -         | 0.25        | 0.38       | 0.38           | 0.50            |
| G    | 0.19      | 0.19      | 0.19     | 0.19        | 0.19       | 0.25       | 0.31    | O    | #10-32    | #10-32    | 1/4-28    | 5/16-24     | 7/16-20    | 7/16-20 UNF-2A | 1/2-20 UNF-2A   |
| H    | 0.56      | 0.69      | 0.88     | 1.06        | 1.25       | -          | -       | T    | 0.05      | 0.06      | 0.09      | 0.09        | 0.09       | 0.09           | 0.13            |
| I    | -         | -         | -        | 0.13        | 0.25       | 0.25       | 0.31    | AA   | 0.56      | 0.69      | 0.88      | 1.19        | 1.38       | 1.69           | 2.23            |



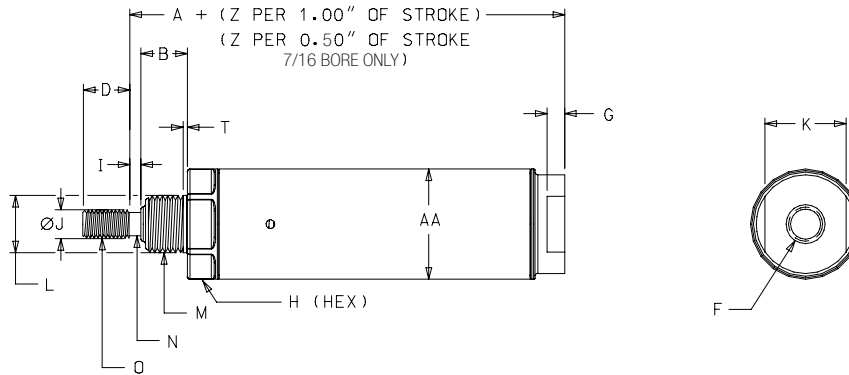
### DOUBLE ACTING / PIVOT MOUNT (Maximum Stroke 32", 12" for 7/16" and 9/16" Bore)

| Bore | 7/16"(04) | 9/16"(06) | 3/4"(07)  | 1-1/16"(11) | 1-1/4"(12) | 1-1/2"(15) | 2"(20)      | Bore | 7/16"(04) | 9/16"(06) | 3/4"(07) | 1-1/16"(11) | 1-1/4"(14) | 1-1/2"(15)     | 2"(20)          |
|------|-----------|-----------|-----------|-------------|------------|------------|-------------|------|-----------|-----------|----------|-------------|------------|----------------|-----------------|
| A    | 2.56      | 2.56      | 3.75      | 3.84        | 4.72       | 4.38       | 5.62        | M    | 7/16-20   | 7/16-20   | 5/8-18   | 5/8-18      | 3/4-16     | 1-12 UNF-2A    | 1 1/4-12 UNF-2A |
| B    | 0.38      | 0.38      | 0.5       | 0.5         | 0.63       | 0.63       | 0.81        | N    | -         | -         | -        | 0.25        | 0.38       | 0.38           | 0.50            |
| C    | 0.34      | 0.34      | 0.47      | 0.56        | 0.62       | 0.74       | 0.74        | O    | #10-32    | #10-32    | 1/4-28   | 5/16-24     | 7/16-20    | 7/16-20 UNF-2A | 1/2-20 UNF-2A   |
| D    | 0.5       | 0.5       | 0.5       | 0.5         | 0.75       | 0.75       | 0.88        | P    | 0.44      | 0.44      | 0.69     | 0.63        | 0.78       | 0.81           | 1.03            |
| F    | #10-32    | #10-32    | 1/8 NPT   | 1/8 NPT     | 1/8 NPT    | 1/8 NPT    | 1/4 NPT     | Q    | 0.25      | 0.25      | 0.34     | 0.34        | 0.41       | 0.41           | 0.56            |
| H    | 0.56      | 0.69      | 0.88      | 1.06        | 1.25       | -          | -           | R    | 0.25      | 0.25      | 0.28     | 0.28        | 0.41       | 0.38           | 0.44            |
| I    | -         | -         | -         | 0.13        | 0.25       | 0.25       | 0.31        | S    | 0.156     | 0.156     | 0.25     | 0.25        | 0.25       | 0.375          | 0.375           |
| J    | 0.19      | 0.19      | 0.25      | 0.31        | 0.44       | 0.44       | 0.62        | T    | 0.05      | 0.06      | 0.09     | 0.09        | 0.09       | 0.09           | 0.13            |
| K    | 0.31      | 0.31      | 0.38      | 0.38        | 0.5        | 0.62       | 0.75        | AA   | 0.56      | 0.69      | 0.88     | 1.19        | 1.38       | 1.69           | 2.23            |
| L    | .433/.437 | .433/.437 | .621/.624 | .621/.624   | .746/.749  | .746/.749  | 1.372/1.375 |      |           |           |          |             |            |                |                 |

# Pneumatic Cylinders

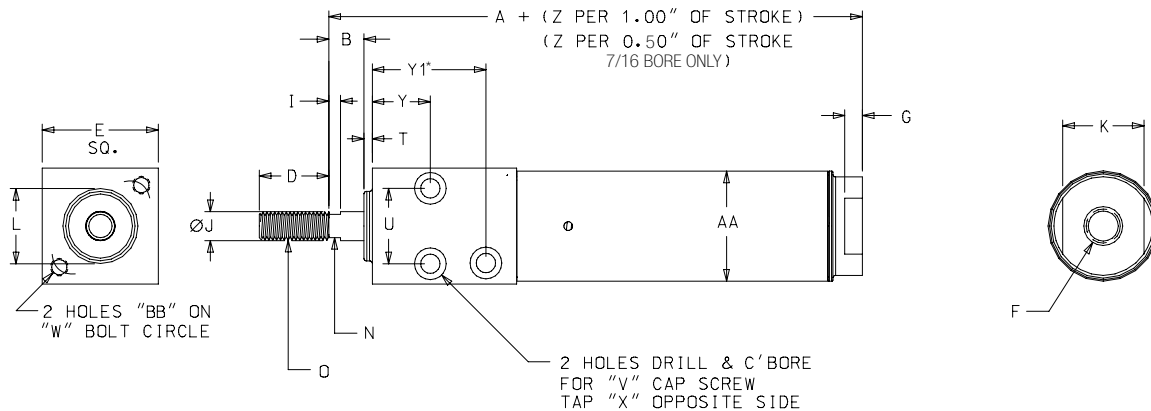
## Premair™ Composite

### Dimensional Data



#### SINGLE ACTING / SPRING RETRACT / NOSE MOUNT (Maximum Stroke 6")

| Bore | 7/16"(.04) | 9/16"(.06) | 3/4"(.07) | 1-1/16"(.11) | 1-1/4"(.12) | 1-1/2"(.15) | 2"(.20) | Bore | 7/16"(.04) | 9/16"(.06) | 3/4"(.07) | 1-1/16"(.11) | 1-1/4"(.14) | 1-1/2"(.15)    | 2"(.20)         |
|------|------------|------------|-----------|--------------|-------------|-------------|---------|------|------------|------------|-----------|--------------|-------------|----------------|-----------------|
| A    | 1.31       | 1.53       | 1.5       | 2.06         | 2.66        | 2.44        | 3.29    | K    | 0.38       | 0.5        | 0.62      | 0.88         | 0.88        | 0.62           | 0.75            |
| B    | 0.31       | 0.38       | 0.5       | 0.5          | 0.63        | 0.63        | 0.81    | L    | .433/.437  | .433/.437  | .621/.624 | .621/.624    | .746/.749   | .746/.749      | 1.372/1.375     |
| C    | 0.34       | 0.38       | 0.47      | 0.56         | 0.75        | 0.74        | 0.74    | M    | 7/16-20    | 7/16-20    | 5/8-18    | 5/8-18       | 3/4-16      | 1-12 UNF-2A    | 1 1/4-12 UNF-2A |
| D    | 0.5        | 0.5        | 0.5       | 0.5          | 0.75        | 0.75        | 0.88    | N    | -          | -          | -         | 0.25         | 0.38        | 0.38           | 0.50            |
| F    | #10-32     | #10-32     | 1/8 NPT   | 1/8 NPT      | 1/8 NPT     | 1/8 NPT     | 1/4 NPT | O    | #10-32     | #10-32     | 1/4-28    | 5/16-24      | 7/16-20     | 7/16-20 UNF-2A | 1/2-20 UNF-2A   |
| G    | 0.19       | 0.19       | 0.19      | 0.19         | 0.19        | 0.25        | 0.31    | T    | 0.05       | 0.06       | 0.09      | 0.09         | 0.093       | 0.09           | 0.13            |
| H    | 0.56       | 0.69       | 0.88      | 1.06         | 1.25        | -           | -       | Z    | 0.94       | 1.63       | 1.69      | 1.56         | 1.81        | 1.69           | 2.00            |
| I    | -          | -          | -         | 0.13         | 0.25        | 0.25        | 0.31    | AA   | 0.56       | 0.69       | 0.88      | 1.19         | 1.38        | 1.69           | 2.23            |
| J    | 0.19       | 0.19       | 0.25      | 0.31         | 0.44        | 0.44        | 0.62    |      |            |            |           |              |             |                |                 |



#### SINGLE ACTING / SPRING RETRACT / BLOCK MOUNT (Maximum Stroke 6")

| Bore | 7/16"(.04) | 3/4"(.07) | 1-1/16"(.11) | 1-1/2"(.15)    | 2"(.20) | Bore | 7/16"(.04) | 3/4"(.07)     | 1-1/16"(.11)  | 1-1/2"(.15)    | 2"(.20) |
|------|------------|-----------|--------------|----------------|---------|------|------------|---------------|---------------|----------------|---------|
| A    | 1.94       | 2.56      | 3.13         | 3.87           | -       | Q    | -          | -             | -             | -              | -       |
| B    | -          | 0.25      | 0.38         | -              | -       | R    | -          | -             | -             | -              | -       |
| D    | 0.5        | 0.75      | 0.75         | 1.25           | -       | S    | -          | -             | -             | -              | -       |
| E    | 0.75       | 1         | 1.25         | 1.75           | -       | T    | 0.06       | 0.09          | 0.09          | 0.09           | -       |
| F    | #10-32     | 1/8 NPT   | 1/8 NPT      | 1/8 NPT        | -       | U    | 0.44       | 0.63          | 0.81          | 1.69           | -       |
| G    | 0.19       | 0.19      | 0.19         | 0.25           | -       | V    | -          | #10-32        | #10-32        | 1/4"           | -       |
| I    | -          | 0.25      | 0.25         | 0.25           | -       | W    | 0.75       | 1.00          | 1.25          | 1.750          | -       |
| J    | 0.19       | 0.25      | 0.31         | 0.44           | -       | X    | #8-32      | 1/4-20 UNC-2B | 1/4-20 UNC-2B | 5/16-18 UNC-2B | -       |
| K    | 0.38       | 0.63      | 0.88         | 0.62           | -       | Y    | 0.25       | 0.38          | 0.63          | 0.88           | -       |
| L    | 0.44       | 0.63      | 0.75         | 1              | -       | Y1   | 0.69       | -             | -             | -              | -       |
| M    | -          | -         | -            | -              | -       | Z    | .94 **     | 1.69          | 1.81          | 1.69           | -       |
| N    | -          | 0.22      | 0.25         | 0.38           | -       | AA   | 0.56       | 0.88          | 1.19          | 1.69           | -       |
| O    | #10-32     | 1/4-28    | 5/16-24      | 7/16-20 UNF-2A | -       | BB   | #8-32      | #10-32        | #10-32        | -              | -       |
| P    | -          | -         | -            | -              | -       |      |            |               |               |                |         |

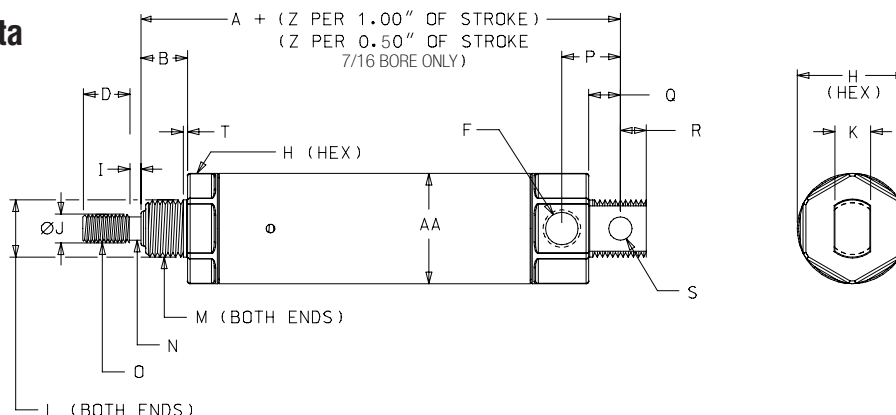
\* - 7/16" Bore Only

\*\* - Per .500" Stroke (7/16" Bore Only)

# Pneumatic Cylinders

## Premair™ Composite

### Dimensional Data



### SINGLE ACTING / SPRING RETRACT / PIVOT MOUNT (Maximum Stroke 6")

| Bore | 7/16"(04) | 9/16"(06) | 3/4"(07)  | 1-1/16"(11) | 1-1/4"(14) | 1-1/2"(15)  | 2"(20)          | Bore | 7/16"(04) | 9/16"(06) | 3/4"(07) | 1-1/16"(11) | 1-1/4"(14) | 1-1/2"(15)     | 2"(20)        |
|------|-----------|-----------|-----------|-------------|------------|-------------|-----------------|------|-----------|-----------|----------|-------------|------------|----------------|---------------|
| A    | 1.75      | 1.81      | 2.28      | 2.66        | 3.38       | 3.12        | 4.23            | N    | -         | -         | -        | 0.25        | 0.38       | 0.38           | 0.50          |
| B    | 0.31      | 0.38      | 0.5       | 0.5         | 0.63       | 0.63        | 0.81            | O    | #10-32    | #10-32    | 1/4-28   | 5/16-24     | 7/16-20    | 7/16-20 UNF-2A | 1/2-20 UNF-2A |
| D    | 0.5       | 0.5       | 0.5       | 0.5         | 0.75       | 0.75        | 0.88            | P    | 0.44      | 0.44      | 0.69     | 0.63        | 0.78       | 0.81           | 1.03          |
| F    | #10-32    | #10-32    | 1/8 NPT   | 1/8 NPT     | 1/8 NPT    | 1/8 NPT     | 1/4 NPT         | Q    | 0.25      | 0.25      | 0.34     | 0.34        | 0.41       | 0.41           | 0.56          |
| H    | 0.56      | 0.69      | 0.88      | 1.06        | 1.25       | -           | -               | R    | 0.25      | 0.19      | 0.28     | 0.28        | 0.41       | 0.38           | 0.44          |
| I    | -         | -         | -         | 0.13        | 0.25       | 0.25        | 0.31            | S    | 0.156     | 0.156     | 0.25     | 0.25        | 0.25       | 0.375          | 0.375         |
| J    | 0.19      | 0.19      | 0.25      | 0.31        | 0.44       | 0.44        | 0.62            | T    | 0.05      | 0.06      | 0.09     | 0.09        | 0.09       | 0.09           | 0.13          |
| K    | 0.31      | 0.31      | 0.38      | 0.38        | 0.5        | 0.62        | 0.75            | Z    | 0.94**    | 1.63      | 1.69     | 1.56        | 1.81       | 1.69           | 2             |
| L    | .433/.437 | .433/.437 | .621/.624 | .621/.624   | .746/.749  | .746/.749   | 1.372/1.375     | AA   | 0.56      | 0.69      | 0.88     | 1.19        | 1.38       | 1.69           | 2.23          |
| M    | 7/16-20   | 7/16-20   | 5/8-18    | 5/8-18      | 3/4-16     | 1-12 UNF-2A | 1 1/4-12 UNF-2A |      |           |           |          |             |            |                |               |

\*\* - Per .500" Stroke (7/16" Bore Only)

### Switches (Specifications/Ordering)

| Model Number       | 114406-1          | 114406-2 | 114406-3 | 114407-1                            | 114407-2 | 114407-3 | 114416-1          | 114416-2 | 114416-3 |
|--------------------|-------------------|----------|----------|-------------------------------------|----------|----------|-------------------|----------|----------|
| Lead Length/Type   | 1m bare           | 3m bare  | Plug     | 1m bare                             | 3m bare  | Plug     | 1m bare           | 3m bare  | Plug     |
| Lead Color         | Gray              |          |          | Black                               |          |          | Grey              |          |          |
| Switch Type        | REED              |          |          | PNP(SOURCING)                       |          |          | NPN (SINKING)     |          |          |
| Input Voltage      | 100 Vdc, 120VAC   |          |          | 4.5V~30 Vdc                         |          |          | 4.5V~30 Vdc       |          |          |
| Operating Current  | 5~40mA, Max. 50mA |          |          | Max. 50m @30 VDC                    |          |          | Max. 50m @ 30 VDC |          |          |
| Detecting Distance | 2.0 mm            |          |          | 3.0 mm                              |          |          | 3.0 mm            |          |          |
| Sensing Area       | 12mm              |          |          | 5mm                                 |          |          | 5mm               |          |          |
| Location from Tip  |                   |          |          |                                     |          |          |                   |          |          |
| Detecting Width    | -                 |          |          | 2.0 mm                              |          |          | 2.0 mm            |          |          |
| Response Time      | 1 mSec. Min.      |          |          | 1 mSec. Min.                        |          |          | 1 mSec. Min.      |          |          |
| LED                | 5mA Min.          |          |          | Min. 1mA @ 5Vdc (Max. 9mA @ 24 Vdc) |          |          |                   |          |          |
| LED Color          | Red               |          |          | Red                                 |          |          | Red               |          |          |
| Protection         |                   |          |          | Reverse Battery                     |          |          |                   |          |          |
| Shock Vibration    |                   |          |          | MIL-STD-810E                        |          |          |                   |          |          |
| Environmental      |                   |          |          | IP67 and VL94V0                     |          |          |                   |          |          |

NOTE: Plug is 8mm 3 pin PICO Connector

### Switch Bracket kit

Kit includes clamp, cradle and stainless steel screw. Switches are designed to nest in cradle, cradle is affixed to cylinder using posilock snap. Switches can be fine adjusted in cradle.

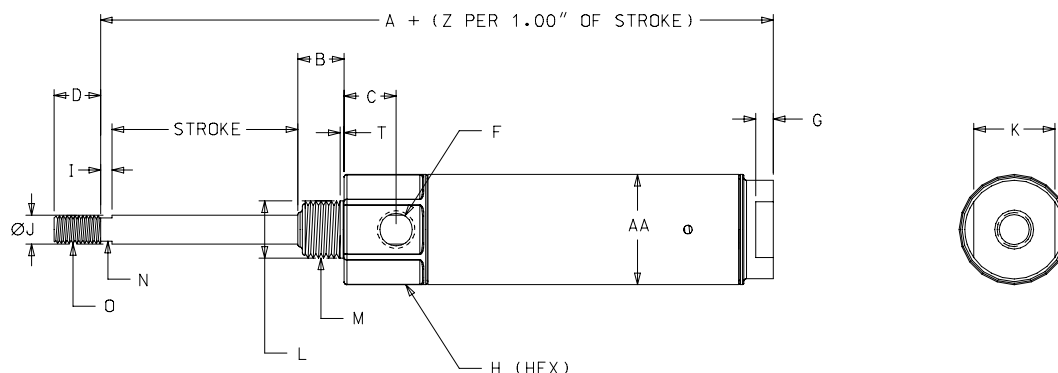
| Bore Size | 7/16"      | 9/16"      | 3/4"       | 1-1/16"    | 1-1/4"     | 1-1/2"     | 2"         |
|-----------|------------|------------|------------|------------|------------|------------|------------|
| Model No. | 114701-043 | 114701-056 | 114701-075 | 114701-106 | 114701-125 | 114701-150 | 114701-200 |



# Pneumatic Cylinders

## Premair™ Composite

### Dimensional Data



### SINGLE ACTING / SPRING EXTEND / NOSE MOUNT (Maximum Stroke 6")

| Bore | 7/16" (04) | 9/16" (06) | 3/4" (07) | 1-1/16" (11) | 1-1/4" (14) | 1-1/2" (15) | 2" (20) | Bore | 7/16" (04) | 9/16" (06) | 3/4" (07) | 1-1/16" (11) | 1-1/4" (14) | 1-1/2" (15)    | 2" (20)         |
|------|------------|------------|-----------|--------------|-------------|-------------|---------|------|------------|------------|-----------|--------------|-------------|----------------|-----------------|
| A    | 1.78       | 2          | 2.31      | 2.38         | 3.31        | 3.25        | 4.23    | K    | 0.38       | 0.5        | 0.38      | 0.38         | 0.5         | 0.62           | 0.75            |
| B    | 0.38       | 0.38       | 0.5       | 0.5          | 0.63        | 0.63        | 0.81    | L    | .433/.437  | .433/.437  | .621/.624 | .621/.624    | .746/.749   | .746/.749      | 1.372/1.375     |
| C    | 0.34       | 0.34       | 0.47      | 0.56         | 0.62        | 0.74        | 0.74    | M    | 7/16-20    | 7/16-20    | 5/8-18    | 5/8-18       | 3/4-16      | 1-12 UNF-2A    | 1 1/4-12 UNF-2A |
| D    | 0.5        | 0.5        | 0.5       | 0.5          | 0.75        | 0.75        | 0.88    | N    | -          | -          | -         | 0.25         | 0.38        | 0.38           | 0.50            |
| F    | #10-32     | #10-32     | 1/8 NPT   | 1/8 NPT      | 1/8 NPT     | 1/8 NPT     | 1/4 NPT | O    | #10-32     | #10-32     | 1/4-28    | 5/16-24      | 7/16-20     | 7/16-20 UNF-2A | 1 1/2-20 UNF-2A |
| G    | 0.19       | 0.19       | 0.19      | 0.19         | 0.19        | 0.25        | 0.31    | T    | 0.05       | 0.06       | 0.09      | 0.09         | 0.09        | 0.09           | 0.13            |
| H    | 0.63       | 0.75       | 0.94      | 1.19         | 1.38        | -           | -       | Z    | 1.44       | 1.63       | 2.69      | 2.81         | 2.81        | 2.69           | 3.00            |
| I    | -          | -          | -         | 0.13         | 0.25        | 0.25        | 0.31    | AA   | 0.56       | 0.69       | 0.88      | 1.19         | 1.38        | 1.69           | 2.23            |
| J    | 0.19       | 0.19       | 0.25      | 0.31         | 0.44        | 0.44        | 0.62    |      |            |            |           |              |             |                |                 |

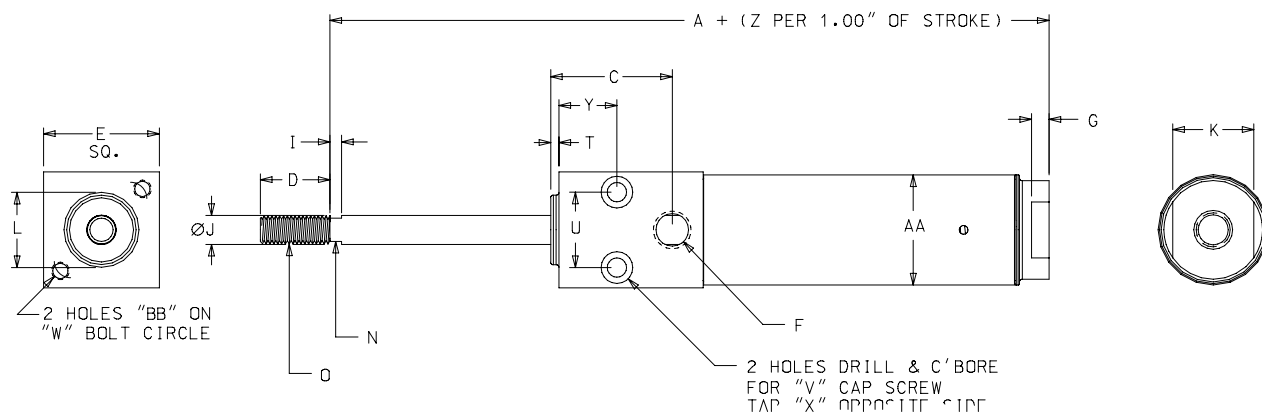
### Spring Forces

| Bore Size | Relaxed (lbs.) | Compressed (lbs.) |
|-----------|----------------|-------------------|
| 5/16"     | .5             | 1                 |
| 7/16"     | 1              | 2                 |
| 9/16"     | 2              | 4                 |
| 3/4"      | 3              | 6                 |
| 7/8"      | 3              | 6                 |
| 1-1/16"   | 3              | 6                 |
| 1-1/4"    | 7.5            | 15                |
| 1-1/2"    | 7              | 14                |
| 1-3/4"    | 11             | 24                |
| 2"        | 15             | 30                |

# Pneumatic Cylinders

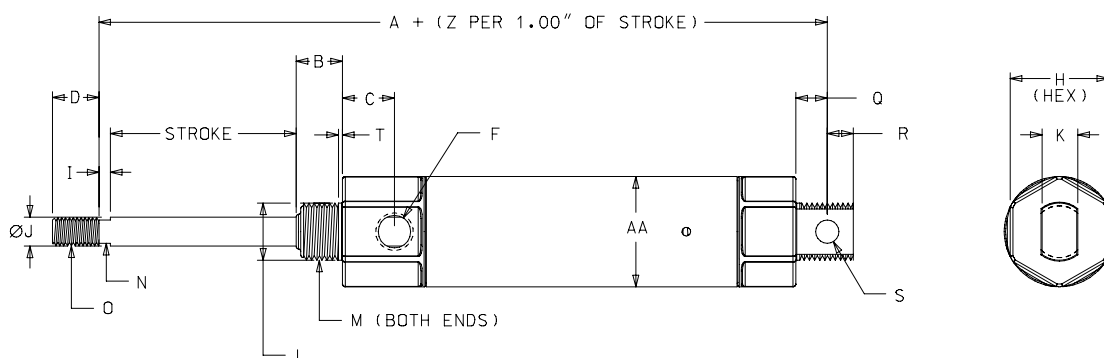
## Premair™ Composite

### Dimensional Data



#### SINGLE ACTING / SPRING EXTEND / BLOCK MOUNT (Maximum Stroke 6")

| Bore | 3/4" (07) | 1-1/16" (11) | 1-1/2" (15) | Bore | 3/4" (07)     | 1-1/16" (11)  | 1-1/2" (15)    |
|------|-----------|--------------|-------------|------|---------------|---------------|----------------|
| A    | 2.56      | 3.13         | 3.87        | O    | 1/4-28        | 5/16-24       | 7/16-20 UNF-2A |
| C    | 0.88      | 1.16         | 1.91        | T    | 0.09          | 0.09          | 0.09           |
| D    | 0.75      | 0.75         | 1.25        | U    | 0.63          | 0.81          | 1.69           |
| E    | 1         | 1.25         | 1.75        | V    | #10-32        | #10-32        | 1/4"           |
| F    | 1/8 NPT   | 1/8 NPT      | 1/4 NPT     | W    | 1             | 1.25          | 1.750          |
| G    | 0.19      | 0.19         | 0.25        | X    | 1/4-20 UNC-2B | 1/4-20 UNC-2B | 5/16-18 UNC-2B |
| I    | 0.13      | 0.13         | 0.25        | Y    | 0.38          | 0.63          | 0.88           |
| J    | 0.25      | 0.31         | 0.44        | Z    | 2.69          | 2.81          | 2.69           |
| K    | 0.63      | 0.88         | 0.62        | AA   | 0.94          | 1.19          | 1.69           |
| L    | 0.625     | 0.75         | 1           | BB   | #10-32        | #10-32        |                |
| N    | 0.22      | 0.25         | 0.38        |      |               |               |                |



#### SINGLE ACTING / SPRING EXTEND / PIVOT MOUNT (Maximum Stroke 6")

| Bore | 7/16" (04) | 9/16" (06) | 3/4" (07) | 1-1/16" (11) | 1-1/4" (14) | 1-1/2" (15) | 2" (20)     | Bore | 7/16" (04) | 9/16" (06) | 3/4" (07) | 1-1/16" (11) | 1-1/4" (14) | 1-1/2" (15)    | 2" (20)         |
|------|------------|------------|-----------|--------------|-------------|-------------|-------------|------|------------|------------|-----------|--------------|-------------|----------------|-----------------|
| A    | 2.22       | 2.31       | 2.44      | 2.66         | 3.78        | 3.94        | 5.17        | M    | 7/16-20    | 7/16-20    | 5/8-18    | 5/8-18       | 3/4-16      | 1-12 UNF-2A    | 1 1/4-12 UNF-2A |
| B    | 0.38       | 0.38       | 0.5       | 0.5          | 0.63        | 0.63        | 0.81        | N    | -          | -          | -         | 0.25         | 0.38        | 0.38           | 0.50            |
| C    | 0.34       | 0.34       | 0.47      | 0.56         | 0.62        | 0.74        | 0.74        | O    | #10-32     | #10-32     | 1/4-28    | 5/16-24      | 7/16-20     | 7/16-20 UNF-2A | 1/2-20 UNF-2A   |
| D    | 0.5        | 0.5        | 0.5       | 0.5          | 0.75        | 0.75        | 0.88        | Q    | 0.25       | 0.25       | 0.34      | 0.34         | 0.41        | 0.41           | 0.56            |
| F    | #10-32     | #10-32     | 1/8 NPT   | 1/8 NPT      | 1/8 NPT     | 1/8 NPT     | 1/4 NPT     | R    | 0.25       | 0.25       | 0.28      | 0.28         | 0.41        | 0.38           | 0.44            |
| H    | 0.56       | 0.69       | 0.88      | 1.06         | 1.25        | -           | -           | S    | 0.16       | 0.16       | 0.25      | 0.25         | 0.25        | 0.375          | 0.375           |
| I    | -          | -          | -         | 0.13         | 0.25        | 0.25        | 0.31        | T    | 0.05       | 0.06       | 0.09      | 0.09         | 0.09        | 0.09           | 0.13            |
| J    | 0.19       | 0.19       | 0.25      | 0.31         | 0.44        | 0.44        | 0.62        | Z    | 1.44       | 2.63       | 2.69      | 2.81         | 2.81        | 2.69           | 3.00            |
| K    | 0.31       | 0.31       | 0.38      | 0.38         | 0.5         | 0.62        | 0.75        | AA   | 0.56       | 0.69       | 0.88      | 1.19         | 1.38        | 1.69           | 2.23            |
| L    | .433/.437  | .433/.437  | .621/.624 | .621/.624    | .746/.749   | .746/.749   | 1.372/1.375 |      |            |            |           |              |             |                |                 |

**Features**

**Series 23, 24, & 28**

Economair round cylinders are medium to heavy-duty units that can be installed anywhere that a repairable cylinder is desired. Prelubed, they're suitable for operation without externally applied lubrication. Unique endcap retention design provides a concentric assembly, resulting in a service life superior to tie rod cylinder construction.

- Cylinder heads are high tensile strength aluminum alloy, retained by a feed ring wire, a simple design that eliminates excess cylinder weight and bulk.
- The barrel I.D. is hard-coated aluminum with a Rockwell C60 hardness. A finish of 16 microinches or better insures low friction and smooth operation.
- Piston rod is ground and polished, hard-chrome plated steel for minimum friction and maximum packing life. Optional 303 stainless steel is excellent for corrosion resistance and washdown applications (303 stainless steel is standard on 1-1/8-inch bore cylinders).
- Adjustable cushions provide excellent control of cylinder deceleration. Full range adjustability (except fixed cushions on 1-1/8-inch bore).
- High grade, self-lubricating bronze rod bearing reduces friction and promotes smooth operation.
- Piston seal selection insures job-matched performance - Buna N O-ring, Low Friction U-cup and self-lubricating packings available.
- Wear compensating rod wiper protects internal seals and parts from dirt, grit and debris.
- NPTF dry seal pipe threads on ports.
- Optional self-lubricating U-cup seals reduce drag and promote extra cylinder life.
- Cylinder is repairable so instead of buying complete new units, repair kits can be used.



**Performance Specifications**

|                                     |                                                                                                                                                 |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bore Sizes:</b>                  | 1-1/8", 1-1/2", 2", 2-1/2", 3" and 4"                                                                                                           |
| <b>Maximum Output Force:</b>        | 2,513 pounds (4-inch bore).                                                                                                                     |
| <b>Air Pressure:</b>                | To 200 p.s.i. (14 bar).<br>May be operated hydraulically (200 p.s.i., nonshock).                                                                |
| <b>Operating Temperature Range:</b> | 0° to 180° F (-18° to 82° C).                                                                                                                   |
| <b>Seals:</b>                       | Viton seals available for high heat applications. Consult factory.                                                                              |
| <b>Notes:</b>                       | Wide range of mounting styles and attachable mounting hardware/ accessories allows cylinders to be applied in nearly any pneumatic application. |



**U-cup and Magnetic Piston Options**

# Pneumatic Cylinders

## Economair®

### Ordering

Series 23, 24, & 28

Include dashes ( - ). The dashes are significant.

**2X XX - X X X9 - XXX**

(1" Increments, 1" through 10" plus 1 1/2", 2 1/2" and 3 1/2")

#### SERIES NO.

- 23** Noncushioned
- 24** Cushioned, Both Ends
- 28** Magnetic Piston, Cushioned Both Ends

**NOTE:** 1-1/8 inch bore not available

#### BORE SIZE

- 18** 1-1/8 in
- 15** 1-1/2 in
- 20** 2 in
- 25** 2-1/2 in
- 30** 3 in
- 40** 4 in

#### CYLINDER TYPE

- 1** Double Acting, Rear Tang
- 5** Double Acting, No Rear Tang
- 2** Double Acting, Double Rod

**NOTE:** Not Available in Series 28

**Economair mounts must be ordered separately, see below.**

#### STROKE LENGTH

| WHOLE INCHES     | FRACTIONS         |
|------------------|-------------------|
| <b>00</b> = 0 in | <b>0</b> = 0 in   |
| <b>01</b> = 1 in | <b>1</b> = 1/8 in |
| <b>02</b> = 2 in | <b>2</b> = 1/4 in |
| <b>03</b> = 3 in | <b>3</b> = 3/8 in |
| <b>04</b> = 4 in | <b>4</b> = 1/2 in |
| <b>05</b> = 5 in | <b>5</b> = 5/8 in |
| <b>06</b> = 6 in | <b>6</b> = 3/4 in |
| ◇ ◇              | <b>7</b> = 7/8 in |
| to to            |                   |
| <b>99</b> 99 in  |                   |

#### OPTIONS

- 09** Standard Rod
- 89** 303 Stainless Steel Rod — Standard on 1-1/8" bore cylinder.

#### PACKING

- 0** O-Ring, Nitrile
- 2** O-Ring, Low Friction
- 3** O-Ring, Viton
- 4** Lip, Nitrile (pneumatic)
- 5** Lip, Self-Lubricating (low friction)
- 6** Lip, Viton

Not available in Series 28

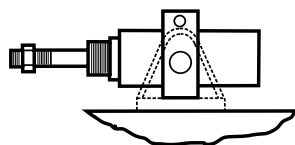
These packings add one inch to cylinder length.

Viton not available in Series 28

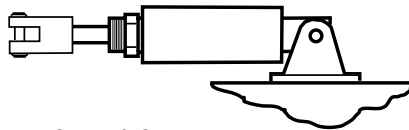
**Note:** Highlighted selections denote most popular models.

### Mounts

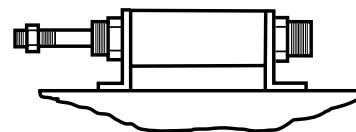
|                              | Cylinder Bore (Inches) |        |        |        |        |        |
|------------------------------|------------------------|--------|--------|--------|--------|--------|
|                              | 1-1/8                  | 1-1/2  | 2      | 2-1/2  | 3      | 4      |
| <b>L-Mount (2 qty.)</b>      | 20533                  | 20534  | 20534  | 20535  | 20535  | 20536  |
| <b>Flange Mount</b>          | 20537                  | 20538  | 20538  | 20539  | 20539  | 20540  |
| <b>Clevis Bracket</b>        | 20546                  | 20547  | 20547  | 20548  | 20548  | 20549  |
| <b>Mounting Nut (2 qty.)</b> | 20529                  | 20530  | 20530  | 20531  | 20531  | 20532  |
| <b>Trunnion</b>              | 20524                  | 20556  | 20557  | 20558  | 20559  | 20560  |
| <b>Aluminum Rod Clevis</b>   | —                      | 20542  | 20543  | 20544  | 20544  | 20545  |
| <b>Steel Rod Clevis</b>      | 20541                  | 115906 | 115907 | 115908 | 115908 | 115909 |



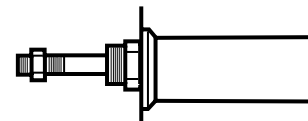
Trunnion



Rod Clevis & Clevis Bracket



L-Mount



Flange Mount



Mounting Nut

**Note:** Order cylinder, rod clevis and clevis bracket separately.  
Every Economair Cylinder includes rod nut.  
Trunnion Mount does not include pillow block.

# Pneumatic Cylinders

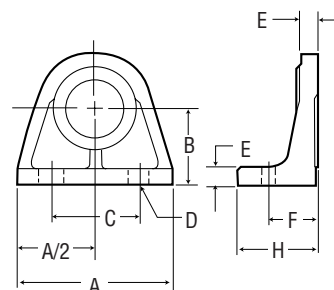
## Economair® - Dimensional Data

### Dimensional Data

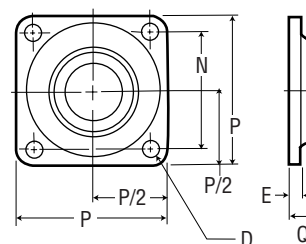
Series 23, 24, & 28

| Reference | Cylinder Bore (Inches) |        |        |        |        |       |
|-----------|------------------------|--------|--------|--------|--------|-------|
|           | 1-1/8                  | 1-1/2  | 2      | 2-1/2  | 3      | 4     |
| Rod dia.  | 0.38                   | 0.50   | 0.63   | 0.75   | 0.75   | 1.00  |
| A         | 1.625                  | 3.00   | 3.00   | 4.00   | 4.00   | 5.00  |
| B         | 1.281                  | 1.50   | 1.50   | 2.00   | 2.00   | 2.625 |
| C         | 1.00                   | 1.688  | 1.688  | 2.25   | 2.25   | 3.00  |
| D-dia.*   | .250                   | .250   | .250   | .375   | .375   | .438  |
| E         | .250                   | .313   | .313   | .375   | .375   | .438  |
| F         | .625                   | .906   | .906   | 1.219  | 1.219  | 1.469 |
| G         | .375                   | .500   | .500   | .625   | .625   | .750  |
| H         | 1.00                   | 1.531  | 1.531  | 2.094  | 2.094  | 2.531 |
| J         | .750                   | 1.00   | 1.00   | 1.25   | 1.25   | 1.188 |
| K         | .375                   | .469   | .469   | .781   | .781   | .781  |
| L-HEX     | 1.0625                 | 1.438  | 1.438  | 2.0625 | 2.0625 | 2.50  |
| M-dia.    | 1.25                   | 1.75   | 1.75   | 2.438  | 2.438  | 2.938 |
| N         | 2.00                   | 2.50   | 2.50   | 3.375  | 3.375  | 4.00  |
| P         | 2.50                   | 3.25   | 3.25   | 4.50   | 4.50   | 5.188 |
| Q         | .688                   | .594   | .594   | .719   | .719   | .844  |
| R         | 1.219                  | 1.750  | 1.750  | 2.375  | 2.375  | 3.00  |
| S         | .313                   | .313   | .313   | .375   | .375   | .438  |
| T         | 2.250                  | 3.00   | 3.00   | 4.00   | 4.00   | 5.00  |
| U         | 1.75                   | 2.25   | 2.25   | 3.00   | 3.00   | 3.75  |
| V         | 1.75                   | 2.25   | 2.25   | 2.688  | 2.688  | 3.375 |
| W         | 1.406                  | 1.75   | 1.75   | 2.0625 | 2.0625 | 2.625 |
| X         | .750                   | 1.00   | 1.00   | 1.25   | 1.25   | 1.50  |
| Y-dia.*   | .250                   | .3125  | .3125  | .438   | .4375  | .625  |
| Z         | .656                   | .688   | .688   | .875   | .875   | 1.063 |
| ZZ        | .3125                  | .375   | .375   | .500   | .500   | .625  |
| TA        | 3.125                  | 4.125  | 4.125  | 5.375  | 5.625  | 7.125 |
| TB        | 2.25                   | 3.00   | 3.00   | 3.75   | 4.25   | 5.50  |
| TC-dia.   | .438                   | .500   | .500   | .750   | .750   | .750  |
| TD        | 2.00                   | 2.625  | 3.125  | 4.00   | 4.50   | 5.75  |
| TE        | .875                   | 1.125  | 1.375  | 1.875  | 2.125  | 2.688 |
| TF        | .750                   | 1.250  | 1.250  | 1.50   | 1.50   | 1.50  |
| TG-dia.*  | .250                   | .3125  | .3125  | .4375  | .4375  | .500  |
| TH-Thd.   | 3/8-16                 | 1/2-13 | 5/8-11 | 3/4-10 | 3/4-10 | 1-8   |
| TK        | —                      | 2.0625 | 2.0625 | 2.50   | 2.50   | 3.25  |
| TL        | —                      | .875   | .875   | 1.00   | 1.00   | 1.325 |
| TM        | —                      | 1.0625 | 1.0625 | 1.438  | 1.438  | 1.938 |
| TN        | —                      | 1.813  | 1.00   | 1.813  | 1.813  | 1.50  |

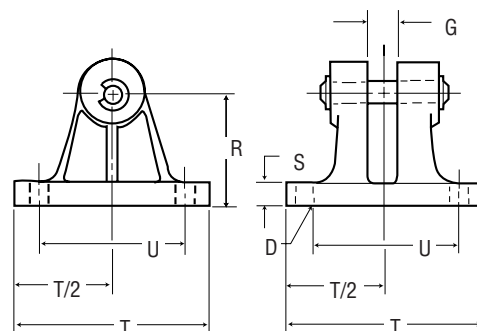
\*Bolt or pin diameter



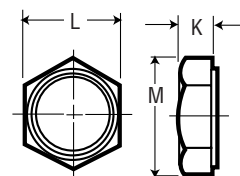
L-Type



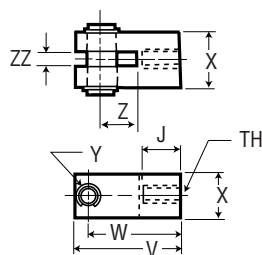
Flange



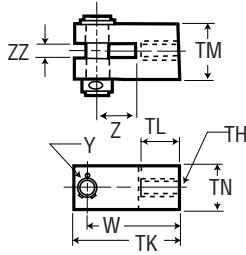
Clevis Bracket



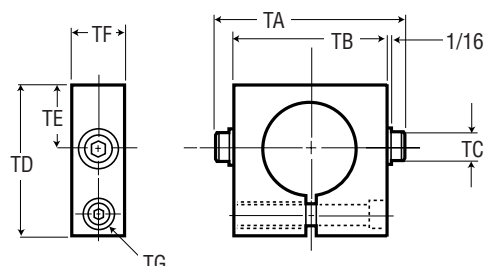
Mounting Nut



Steel Rod Clevis



Aluminum Rod Clevis



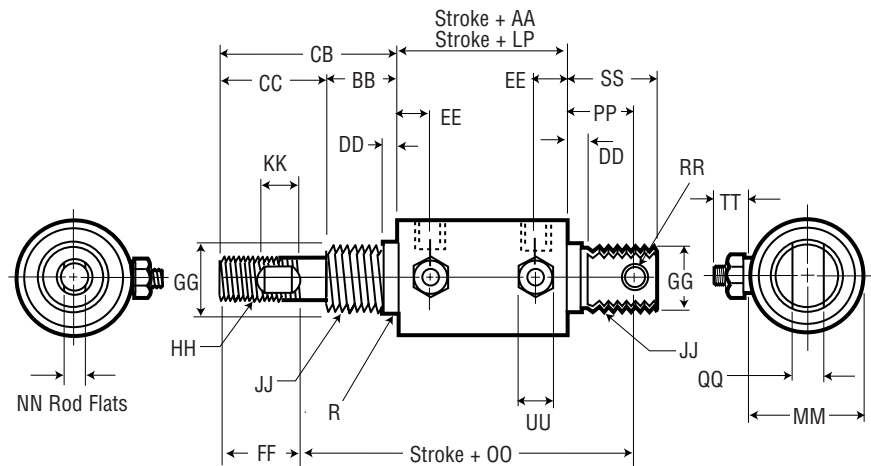
Trunnion

# Pneumatic Cylinders

## Economair® - Dimensional Data

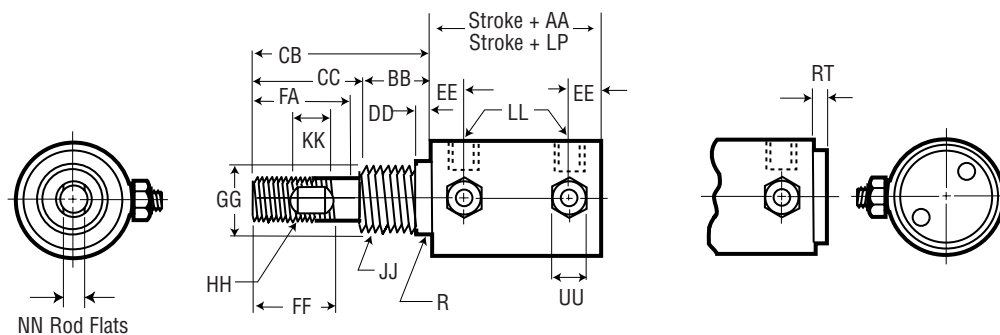
### Dimensional Data

#### Series 23, 24, & 28 (Double Acting with Tang)



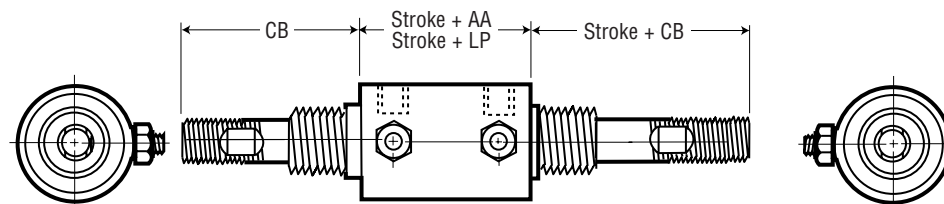
AA = Double acting with O-ring or low friction packing.  
LP = Double acting with U cup packing.

#### (Double Acting, No Tang)



AA = Double acting with O-ring or low friction packing.  
LP = Double acting with U cup packing.

#### (Double Acting, Double Ended)



# Pneumatic Cylinders

## Economair® - Dimensional Data

### Dimensional Data

#### Series 23, 24, & 28

| Dimensional Reference | Cylinder Bore (Inches) |           |           |          |          |          |
|-----------------------|------------------------|-----------|-----------|----------|----------|----------|
|                       | 1-1/8                  | 1-1/2     | 2         | 2-1/2    | 3        | 4        |
| Rod Diameter          | .38                    | .50       | .63       | .75      | .75      | 1.00     |
| Stroke Factor AA*     | 2.031                  | 2.625     | 2.625     | 2.875    | 2.875    | 4.00     |
| Stroke Factor LP**    | 3.031                  | 3.625     | 3.625     | 3.875    | 3.875    | 5.00     |
| BB                    | .750                   | 1.00      | 1.00      | 1.250    | 1.250    | 1.250    |
| CB                    | 1.750                  | 2.438     | 2.438     | 2.938    | 2.938    | 3.500    |
| CC                    | 1.00                   | 1.438     | 1.438     | 1.688    | 1.688    | 2.250    |
| DD                    | .125                   | .219      | .219      | .344     | .344     | .406     |
| EE                    | .422                   | .516      | .516      | .563     | .563     | .813     |
| FA                    | .781                   | 1.156     | 1.156     | 1.375    | 1.375    | 1.750    |
| FF▲                   | .875                   | 1.250     | 1.250     | 1.50     | 1.50     | 1.875    |
| (± .002) GG           | .748                   | 1.057     | 1.057     | 1.432    | 1.432    | 1.777    |
| (UNC-2A) HH           | 3/8-16                 | 1/2-13    | 5/8-11    | 3/4-10   | 3/4-10   | 1-8      |
| JJ                    | 3/4-16                 | 1-1/16-18 | 1-1/16-18 | 1-3/8-12 | 1-3/8-12 | 1-3/4-12 |
|                       | UNF-2A                 | UNEF-2A   | UNEF-2A   | UNF-2A   | UNF-2A   | UN-2A    |
| KK                    | .313                   | .500      | .500      | .500     | .500     | .500     |
| (NPTF) LL             | 1/8-27                 | 1/4-18    | 1/4-18    | 3/8-18   | 3/8-18   | 1/2-14   |
| MM                    | 1.375                  | 1.750     | 2.250     | 2.750    | 3.250    | 4.250    |
| NN                    | .313                   | .406      | .500      | .625     | .625     | .875     |
| OO                    | 3.594                  | 4.688     | 4.688     | 5.688    | 5.688    | 7.063    |
| PP                    | .688                   | .875      | .875      | 1.375    | 1.375    | 1.438    |
| QQ                    | .375                   | .500      | .500      | .625     | .625     | .750     |
| (RAD.) R              | .016                   | .016      | .016      | .094     | .094     | .094     |
| RR                    | .250                   | .313      | .313      | .438     | .438     | .500     |
| RT                    | —                      | .172      | —         | .438     | .438     | .438     |
| SS                    | .969                   | 1.25      | 1.25      | 2.00     | 2.00     | 2.188    |
| TT                    | —                      | .438      | .438      | .438     | .438     | .438     |
| UU                    | —                      | .500      | .500      | .500     | .625     | .625     |

\* Double acting with O-ring or low friction packing

\*\* Double acting with U-cup packing

▲ FF shows total thread, including run out.

## Switches (Specifications / Ordering)

### Switch

| Model Number       | 119581-1                | 119581-2 | 119581-3 | 119582-1         | 119582-2 | 119582-3 | 119583-1         | 119583-2 | 119583-3 |
|--------------------|-------------------------|----------|----------|------------------|----------|----------|------------------|----------|----------|
| Lead Length/Type   | 1m bare                 | 3m bare  | Plug     | 1m bare          | 3m bare  | Plug     | 1m bare          | 3m bare  | Plug     |
| Lead Color         | Black                   |          |          | Grey             |          |          | Black            |          |          |
| Switch Type        | REED                    |          |          | PNP(SOURCING)    |          |          | NPN (SINKING)    |          |          |
| Input Voltage      | 100 VDC, 125 VAC Max.   |          |          | 10 - 30 VDC      |          |          | 5 - 30 VDC       |          |          |
|                    | —                       |          |          | —                |          |          | 5 - 100mA @ 5V   |          |          |
| Operating Current  | 300mA (150mA Inductive) |          |          | 7 - 100mA @ 12V  |          |          | 10 - 200mA @ 12V |          |          |
|                    | —                       |          |          | 14 - 200mA @ 24V |          |          | 20 - 200mA @ 24V |          |          |
| Detecting Distance | 2.5 mm                  |          |          | 1.5 mm           |          |          | 1.5 mm           |          |          |
| Detecting Width    | —                       |          |          | 3.0 mm           |          |          | 3.0 mm           |          |          |
| Response Time      | 1 mSec. Min.            |          |          | —                |          |          | —                |          |          |
| LED Function       | 18mA Min.               |          |          | 1mA Min.         |          |          | 1mA Min.         |          |          |

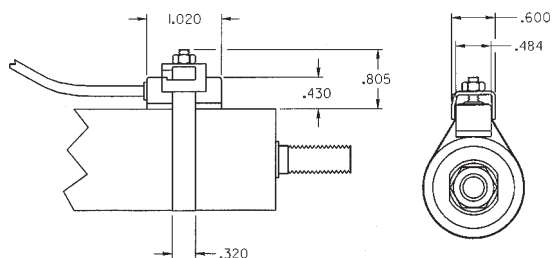


### Switch Mounting Brackets

| Bore   | Model Number |
|--------|--------------|
| 1-1/8" | 119897-18    |
| 1-1/2" | 119897-15    |
| 2"     | 119897-20    |
| 2-1/2" | 119897-25    |
| 3"     | 119897-30    |
| 4"     | 119897-40    |

**Note:** Order bracket and switch separately.

### (Switch Bracket)



### Technical Information:

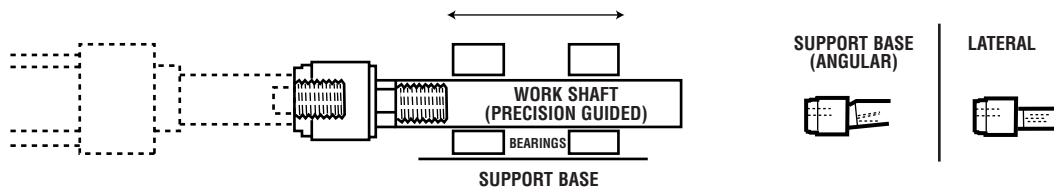
1. Do not exceed specification, permanent damage to the sensor may occur.
2. For reed switch type sensors, polarity must be observed for the proper functioning of LED. Connect the brown wire in series with load positive (+) and the blue wire to negative (-) or power source space. If the polarity is reversed, reed switch remains functional but LED will remain in "OFF" state.
3. For solid-state type sensors, polarity must also be observed. Connect brown wire to the positive (+) and the blue to the negative (-) of DC power source. The black wire must connect to the load ONLY. If the black wire is accidentally connected to the power source, permanent damage to the sensor may occur.
4. An external protection circuit may be required if the reed switch is used with inductive load, such as relay or solenoid. For DC inductive load, attach an external diode parallel to the load and use R-C circuit parallel with AC inductive load.
5. Keep sensors away from stray magnetic field to prevent malfunctions.
6. When using reed switch with capacitive load or if the lead wire length exceeds 10-meter, and inductor must be installed in series with the sensor to prevent damage (Sticking effect).

# Pneumatic Cylinders

## Rod Alignment Cylinders

### Features

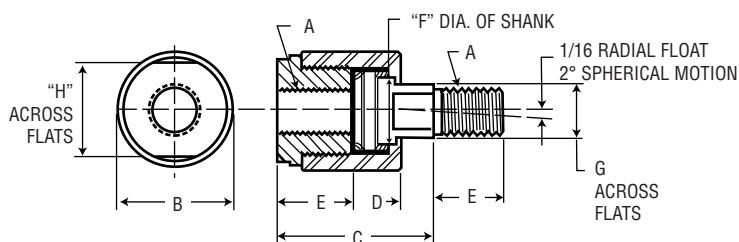
- Slide applications no longer require costly precision cylinder machining for mounting fixed or rigid guide.
- Friction due to misalignment is eliminated, increasing cylinder efficiency.
- An angular error of 2° and 1/16 inch lateral misalignment on push and pull stroke is compensated.
- Cylinder and component wear is reduced, providing increased reliability.
- Field alignment problems are rectified.
- All components are heat treated for improved corrosion resistance, wear resistance, and fatigue properties.



### Ordering

| Coupler Number | Dimensions |      |       |      |       |       |      |      | Max. Pull At Yields (Pounds) |
|----------------|------------|------|-------|------|-------|-------|------|------|------------------------------|
|                | A          | B    | C     | D    | E     | F     | G    | H    |                              |
| 118683         | 3/8-16     | .875 | 1.25  | .25  | .625  | .313  | .313 | .75  | 5,000                        |
| 118684         | 7/16-20    | 1.25 | 2.00  | .50  | .75   | .625  | .50  | 1.00 | 10,000                       |
| 118685         | 1/2-20     | 1.25 | 2.00  | .50  | .75   | .625  | .50  | 1.00 | 14,000                       |
| 118686         | 1/2-13     | 1.25 | 2.00  | .50  | .75   | .625  | .50  | 1.00 | 14,000                       |
| 118687         | 5/8-18     | 1.25 | 2.00  | .50  | .75   | .625  | .50  | 1.00 | 19,000                       |
| 118688         | 3/4-16     | 1.75 | 2.31  | .50  | 1.125 | .97   | .813 | 1.50 | 34,000                       |
| 118689         | 3/4-10     | 1.75 | 2.31  | .50  | 1.125 | .97   | .813 | 1.50 | 34,000                       |
| 118690         | 7/8-14     | 1.75 | 2.31  | .50  | 1.125 | .97   | .813 | 1.50 | 39,000                       |
| 118691         | 1-14       | 2.50 | 2.94  | .50  | 1.625 | 1.375 | 1.16 | 2.25 | 64,000                       |
| 118692         | 1-8        | 2.50 | 2.94  | .50  | 1.625 | 1.375 | 1.16 | 2.25 | 64,000                       |
| 118693         | 1-1/4-12   | 2.50 | 2.94  | .50  | 1.625 | 1.375 | 1.16 | 2.25 | 78,000                       |
| 118694         | 1-3/8-12   | 2.50 | 2.94  | .50  | 1.625 | 1.375 | 1.16 | 2.25 | 78,000                       |
| 118695         | 1-1/2-12   | 3.25 | 4.375 | .812 | 2.25  | 1.375 | 1.50 | 3.00 | 134,000                      |

### Dimensional Data



## Provenair®...

### The Most Flexible Cylinder for New or Retrofit Designs

Your best creations are only as good as their parts. Ensure performance to your customer's expectations by including ARO Provenair Cylinders in your original specifications. They are precision built using the latest extrusion technologies and feature a profiled barrel that is not only good looking, but eliminates cumbersome and dirt-catching tie rods. At the same time, the profiled barrel provides superior strength compared to traditional tie rod constructed cylinders. Provenair end caps, mounts, and rod end accessories - even our position sensor brackets, are protected against corrosion. To maximize cycle life, every Provenair has a factory-installed Teflon® wearband on the piston. A "Floating" rod bushing provides smooth strokes and maximized wear; reduced galling compared to bronze bushings.

Maintenance and repair of ARO Provenair Cylinders is very simple and fast. The rod bushing is retained by a stainless steel spiro retaining ring and is easily removed with a small screwdriver. The retaining ring slides off the rod along with the bushing and its captive seals. There are no small screws to lose on the floor or under your machine, and no seals to fall inside the cylinder. Replacement of the reciprocating assembly and its seals is equally simple and, unlike tie rod cylinders, you needn't worry about equalizing torque on the Provenair tie bolts!

Provenair is flexible, you can change it to fit most of your application requirements. Factory installed mounts save you time, but you may easily change your Provenair Cylinder mount



with an ARO mounting kit. If you require an oversized rod diameter, Provenair converts easily - right on your machine! Simply specify the piston rod diameter, thread style, and material (chrome steel or stainless steel) when ordering the replacement reciprocating assembly; order a rod bushing for the new piston rod diameter and you're ready to install. Your original Provenair now needs a magnetic piston? Order a magnet and easily install it and you can select from three types of attachable position sensors.

- Tie bolt construction eliminates rod binding and tie rod torque problems. (Series AN up to 4" bore)
- Series SN all stainless steel cylinders are corrosion resistant and have tie rods.
- Rugged thick walled tubes resist denting.
- NFPA repairable and interchangeable.
- 15 NFPA mounting styles.
- Factory lubricated grease that won't wash out.
- Optional 303 S.S. piston rods provide corrosion resistance. (STD. Series SN)
- Optional oversized rods available to provide extra column strength. (Series AN and SN)
- Optional slippery seals enhance smooth operation and are self-lubricating.
- Available in 1-1/2", 2", 2-1/2", 3-1/4" and 4" bore sizes with extruded barrel (as shown). (Series AN)
- Larger bore sizes 5", 6", 8" and 10" bores have prestressed steel tie rods. (Series AN)
- Series SN, all stainless steel cylinders available in 1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6" and 8" bores.
- SN series cylinders have S.S. tie rods.
- Operates on air pressure up to 250 p.s.i.
- Output forces up to 19,635 lbs. (10" bore at 250 p.s.i.).
- Std. operating temp: 0° to 185°(F), -18° to 82° (C).
- Rotated ports are optional.
- Viton seals for high heat applications (up to 300° F, 149° C)

## Performance Specifications

| Aluminum NFPA Interchangeable        |                                                                                                                                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Bore sizes:                          | 1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6", 8" and 10"                                                                                              |
| Seals:                               | Buna-N, Viton or Slippery (Aluminum alloy piston with lip-type seals)                                                                           |
| Barrel:                              | Profiled Extrusion (5", 6", 8" and 10" have tie rods.) (Patented)                                                                               |
| Bushings:                            | "Floating" Rod bushings for low friction, superior wear and side load resistance                                                                |
| Switches:                            | Metal Jacketed                                                                                                                                  |
| Piston Rods:                         | Chrome plated ground and polished high tensile steel                                                                                            |
| Options:                             | Optional Piston Magnet<br>Double Rod End<br>303 S.S. Piston Rods<br>Studded male rods for 50% stronger threads than cold rolled thread rod ends |
| Stainless Steel NFPA Interchangeable |                                                                                                                                                 |
| Bore sizes:                          | 1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6", and 8"                                                                                                  |
| Rod Bushing:                         | Bronze                                                                                                                                          |
| Rod Wiper:                           | Teflon®                                                                                                                                         |
| External Components:                 | 303/304 – End caps, tie rods, piston rods, mounts (barrel is 316)                                                                               |
| Mounting Styles:                     | 15 NFPA                                                                                                                                         |
| Options:                             | Optional adjustable cushions<br>Piston Magnet<br>Viton Seals (Wiper Teflon)<br>Double rod ends                                                  |



Retained cushion  
adjustment needles

Lightweight aluminum body  
resists dents.

"GripRidge" gives a better bracket  
fastening surface. Brackets and  
switches stay-put.

End caps and mounts resist  
common coolants, cleaners,  
lubricants and corrosion.

### Ordering

#### Series AN (1-1/2' thru 10" Bore)

### Aluminum NFPA

Include dashes ( - ). Dashes are significant.

#### ACTUATORS

Aluminum actuators begin with A

#### SERIES (NFPA)

All Provenair Cylinders are Series N

#### TYPE

- A** Double Acting, Single Rod
- B** Double Acting, Double Rod

#### BORE SIZE

**Note:** 5", 6", 8" & 10" bores have tie rods.

|                  |                 |              |
|------------------|-----------------|--------------|
| <b>Q</b> 1- 1/2" | <b>W</b> 3-1/4" | <b>6</b> 6"  |
| <b>S</b> 2"      | <b>4</b> 4"     | <b>8</b> 8"  |
| <b>T</b> 2- 1/2" | <b>5</b> 5"     | <b>Y</b> 10" |

#### ROD DIAMETER

- K** 5/8" **Note:** Available in 1-1/2", 2" and 2-1/2" bores only.
- M** 1" **Note:** Available in 2", 2-1/2", 3-1/4", 4" and 5" bores only.
- P** 1 3/8" **Note:** Available in 3-1/4", 4", 5", 6" and 8" bores only.
- Q** 1 3/4" **Note:** Available in 6", 8" and 10" bores only.
- S** 2" **Note:** Available in 10" bores only.

#### ROD STYLE

|                                                     |                                          |
|-----------------------------------------------------|------------------------------------------|
| <b>A</b> Chrome, Std Male (KK <sub>1</sub> )        | <b>K</b> S.S., Female (KK <sub>1</sub> ) |
| <b>B</b> Chrome, Intermed. Male(KK <sub>2</sub> )   | <b>L</b> S.S., No Threads                |
| <b>C</b> Chrome, Full Male (CC)                     | <b>1</b> KK <sub>1</sub> Chrome, Studded |
| <b>D</b> Chrome, Female (KK <sub>1</sub> )          | <b>2</b> KK <sub>2</sub> Chrome, Studded |
| <b>F</b> Chrome, No Threads                         | <b>3</b> CC Chrome, Studded              |
| <b>G</b> S.S., Standard Male (KK <sub>1</sub> )     | <b>4</b> KK <sub>1</sub> SS, Studded     |
| <b>H</b> S.S., Intermediate Male (KK <sub>2</sub> ) | <b>5</b> KK <sub>2</sub> SS, Studded     |
| <b>J</b> S.S., Full Male (CC)                       | <b>6</b> CC SS, Studded                  |

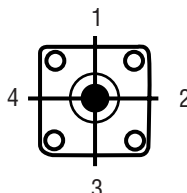
#### SEALS

- B** Buna-N
- V** Viton
- S** Slippery
- G** Buna-N + Magnetic Piston
- H** Viton + Magnetic Piston
- J** Slippery + Magnetic Piston

#### CUSHIONS

- X** No Cushions
- B** Cushion Both Ends
- H** Cushion Head End (Rod End)
- C** Cushion Cap End

**Note:** Highlighted selections denotes most popular models.



Determine port location looking at rod end of cylinder.

#### STROKE

Whole Inches

|                   |    |
|-------------------|----|
| <b>00</b> = 0 in  |    |
| <b>01</b> = 1 in  |    |
| <b>02</b> = 2 in  |    |
| <b>03</b> = 3 in  |    |
| <b>04</b> = 4 in  |    |
| <b>05</b> = 5 in  |    |
| <b>06</b> = 6 in  |    |
| ↑                 | ↑  |
| to                | to |
| <b>99</b> = 99 in |    |

Fractions

|                   |
|-------------------|
| <b>0</b> = 0 in   |
| <b>1</b> = 1/8 in |
| <b>2</b> = 1/4 in |
| <b>3</b> = 3/8 in |
| <b>4</b> = 1/2 in |
| <b>5</b> = 5/8 in |
| <b>6</b> = 3/4 in |
| <b>7</b> = 7/8 in |

#### Note:

Maximum stroke 99 7/8", for longer strokes consult factory. Stroke lengths 20" and longer may require stop tubes, see page 7.

#### MOUNT

(8" and 10" Bore ME3, ME4)  
(Mounts must be factory installed on 5", 6", 8" and 10" Bore)

|                    |                   |
|--------------------|-------------------|
| <b>A</b> MS1       | <b>P</b> MT1      |
| <b>B</b> MS4**     | <b>Q</b> MX1      |
| <b>C</b> MP1**     | <b>T</b> MX2      |
| <b>D</b> MP2**     | <b>U</b> MX3      |
| <b>F</b> MF1/ME3** | <b>X</b> No Mount |
| <b>H</b> MF2/ME4** | <b>1</b> FMB*     |
| <b>K</b> MP4*      | <b>2</b> FMC*     |
| <b>L</b> MS7*      | <b>3</b> FMH*     |
| <b>M</b> MT2       | <b>4</b> FMB/MS4* |

All mounts available through 8" Bore except:

\* 1 1/2" - 4" Bore Only

\*\* Available 1 1/2" - 10" Bore

#### PORT LOCATION

(MS4 mounts: Port locations other than "A", call factory. Trunnion mounts: ports "A" or "C" only.)

|                        |                 |
|------------------------|-----------------|
| <b>A</b> H1, C1 (Std.) | <b>F</b> H2, C1 |
| <b>B</b> H1, C2        | <b>G</b> H2, C2 |
| <b>C</b> H1, C3        | <b>H</b> H2, C3 |
| <b>D</b> H1, C4        | <b>J</b> H2, C4 |

### Ordering

#### Series SN (1-1/2' thru 8" Bore)

NOTE: All SN Series Cylinders have tie rods.

### Stainless Steel NFPA

Include dashes ( - ). Dashes are significant.

S N X X X - X X X X X - X X X

#### ACTUATORS

Stainless Steel actuators begin with S

#### SERIES (NFPA)

All Provenair Cylinders are Series N

#### TYPE

- A** Double Acting, Single Rod  
**B** Double Acting, Double Rod **Note:** Not available in 8" bore.

#### BORE SIZE

|                  |                 |             |
|------------------|-----------------|-------------|
| <b>Q</b> 1- 1/2" | <b>W</b> 3-1/4" | <b>6</b> 6" |
| <b>S</b> 2"      | <b>4</b> 4"     | <b>8</b> 8" |
| <b>T</b> 2- 1/2" | <b>5</b> 5"     |             |

#### ROD DIAMETER

- K** 5/8" **Note:** Available in 1-1/2", 2" and 2-1/2" bores only.  
**M** 1" **Note:** Available in 2", 2-1/2", 3-1/4", 4" and 5" bores only.  
**P** 1 3/8" **Note:** Available in 3-1/4", 4", 5", 6" and 8" bores only.  
**Q** 1 3/4" **Note:** Available in 6" and 8" bores only.

#### ROD STYLE

- G** S.S., Standard Male (KK<sub>1</sub>) **J** S.S., Full Male (CC)  
**H** S.S., Intermediate Male **K** S.S., Female (KK<sub>1</sub>)  
**(KK<sub>2</sub>)** **L** S.S., No Threads

#### SEALS

- B** Buna-N **G** Buna-N + Magnetic Piston **Note:** Teflon Wiper Std.  
**V** Viton **H** Viton + Magnetic Piston  
**S** Slippery **J** Slippery + Magnetic Piston

#### CUSHIONS

- X** No Cushions **H** Cushion Head End (Rod End)  
**B** Cushion Both Ends **C** Cushion Cap End

#### STROKE

Whole Inches

|                   |                   |
|-------------------|-------------------|
| <b>00</b> = 0 in  |                   |
| <b>01</b> = 1 in  |                   |
| <b>02</b> = 2 in  |                   |
| <b>03</b> = 3 in  | <b>0</b> = 0 in   |
| <b>04</b> = 4 in  | <b>1</b> = 1/8 in |
| <b>05</b> = 5 in  | <b>2</b> = 1/4 in |
| <b>06</b> = 6 in  | <b>3</b> = 3/8 in |
| <b>↑</b>          | <b>4</b> = 1/2 in |
| <b>to</b>         | <b>5</b> = 5/8 in |
| <b>99</b> = 99 in | <b>6</b> = 3/4 in |
|                   | <b>7</b> = 7/8 in |

#### Note:

Maximum stroke 99 7/8", for longer strokes consult factory. Stroke lengths 20" and longer may require stop tubes, see page 7.

#### MOUNT

(8" Bore ME3, ME4)  
(Mounts must be factory installed.)

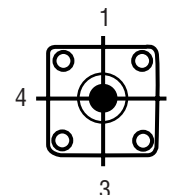
- B** MS4\*\* **P** MT1  
**C** MP1\*\* **Q** MX1  
**F** MF1/ME3\*\* **T** MX2  
**H** MF2/ME4\*\* **U** MX3  
**K** MP4\* **X** No Mount  
**M** MT2

\* 1 1/2" - 6" Bore Only  
\*\* 1 1/2" - 4" Bore Only

#### PORT LOCATION

(MS4 mounts: Port locations other than "A", call factory. Trunnion mounts: ports "A" or "C" only.)

- A** H1, C1 (Std.) **F** H2, C1  
**B** H1, C2 **G** H2, C2  
**C** H1, C3 **H** H2, C3  
**D** H1, C4 **J** H2, C4



Determine port location looking at rod end of cylinder.

**NOTE:** S.S. Cylinders are made to order, contact factory for lead time.

## Attachable Mounting Kits for Series AN

### Series AN (1-1/2" Thru 4" Bore)

#### Mounting Kits with Long Screws

Mount styles B (MS4) and X (No mounts) use mounting kits with long screws to attach through cap into barrel of cylinders.

|                            | 1 1/2" | 2"     | 2 1/2" | 3 1/4" | 4"     |
|----------------------------|--------|--------|--------|--------|--------|
| MS7 Side End Lugs (Steel)  | 119618 | 119619 | 119620 | 119621 | 119622 |
| MF1 Rect. Flange (Steel)   | 119633 | 119634 | 119635 | 119636 | 119637 |
| MF2 Rect. Flange (Steel)   | 119646 | 119647 | 119648 | 119649 | 119650 |
| MP2 HD Clevis (Iron) *     | 119623 | 119624 | 119625 | 119626 | 119627 |
| MP4 HD Eye (Iron)          | 119628 | 119629 | 119630 | 119631 | 119632 |
| MS2 Side Lugs (Alum.)      | 119638 | 119639 | 119640 | 119641 | 119642 |
| MP1 Fixed Clevis (Alum.) * | 119796 | 119797 | 119798 | 119799 | 119800 |



#### Mounting Kits with Short Screws

Mount styles 1 (FMB), 2 (FMC) and 3 (FMH) use mounting kits with short screws to attach to female sleeve bolts.

|                            | 1 1/2" | 2"     | 2 1/2" | 3 1/4" | 4"     |
|----------------------------|--------|--------|--------|--------|--------|
| MS7 Side End Lugs (Steel)  | 115277 | 115278 | 115279 | 115280 | 115281 |
| MP2 HD Clevis (Iron) *     | 118696 | 118697 | 118698 | 118699 | 118700 |
| MP4 HD Eye (Iron)          | 118701 | 118702 | 118703 | 118704 | 118705 |
| MF1, MF2 Flange (Steel)    | 115282 | 115283 | 115284 | 115285 | 115286 |
| MP1 Fixed Clevis (Alum.) * | 115477 | 115478 |        | 115480 | 115481 |
| MP2 Det. Clevis (Alum.) *  | 115287 | 115288 | 115289 | 115290 | 115291 |
| MP4 Det. Clevis (Alum.) *  | 115292 | 115293 | 115294 | 115295 | 115296 |
| MT1 Head Trunnion (Alum.)  | 116357 | 116358 |        |        | 116361 |
| MT2 Head Trunnion (Alum.)  | 116357 | 116358 |        |        | 116361 |



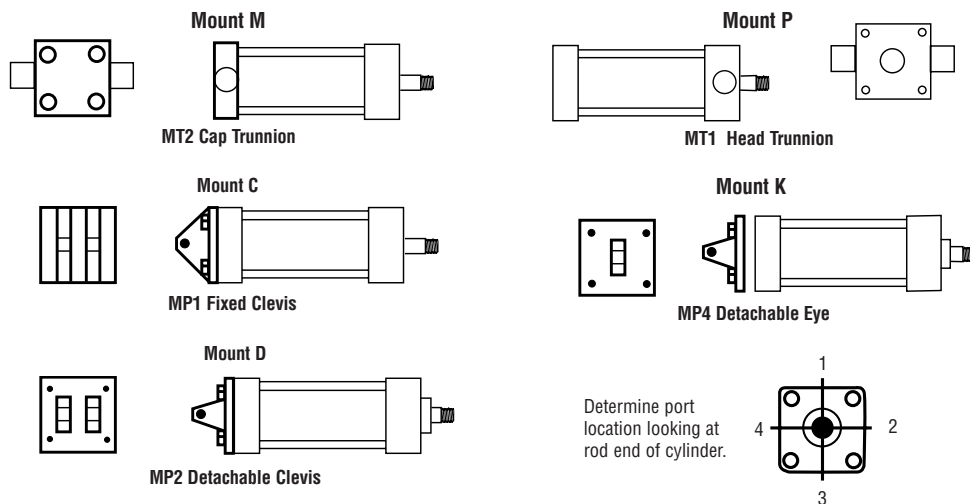
Above kits Include all necessary hardware to complete mounting to Provenair cylinders. AN Series only.

\*Pivot pin included in kit. (Kits not available for 5", 6", 8", or 10" Bores) **(Kits not available for SN Models)**

### MX1, 2 or 3 Tie Rod Extensions 117822-1 117822-2 117822-2 117822-3 117822-3

MX1 requires two tie rod extension bolt kits (four extension studs per kit). Extension bolts can only be used in female retaining bolt mounts: Use mounts 1, 2, 3 or contact factory for conversion kits.

## Factory Installed Mounts



**Note:** Not all mounts are available on stainless steel models.

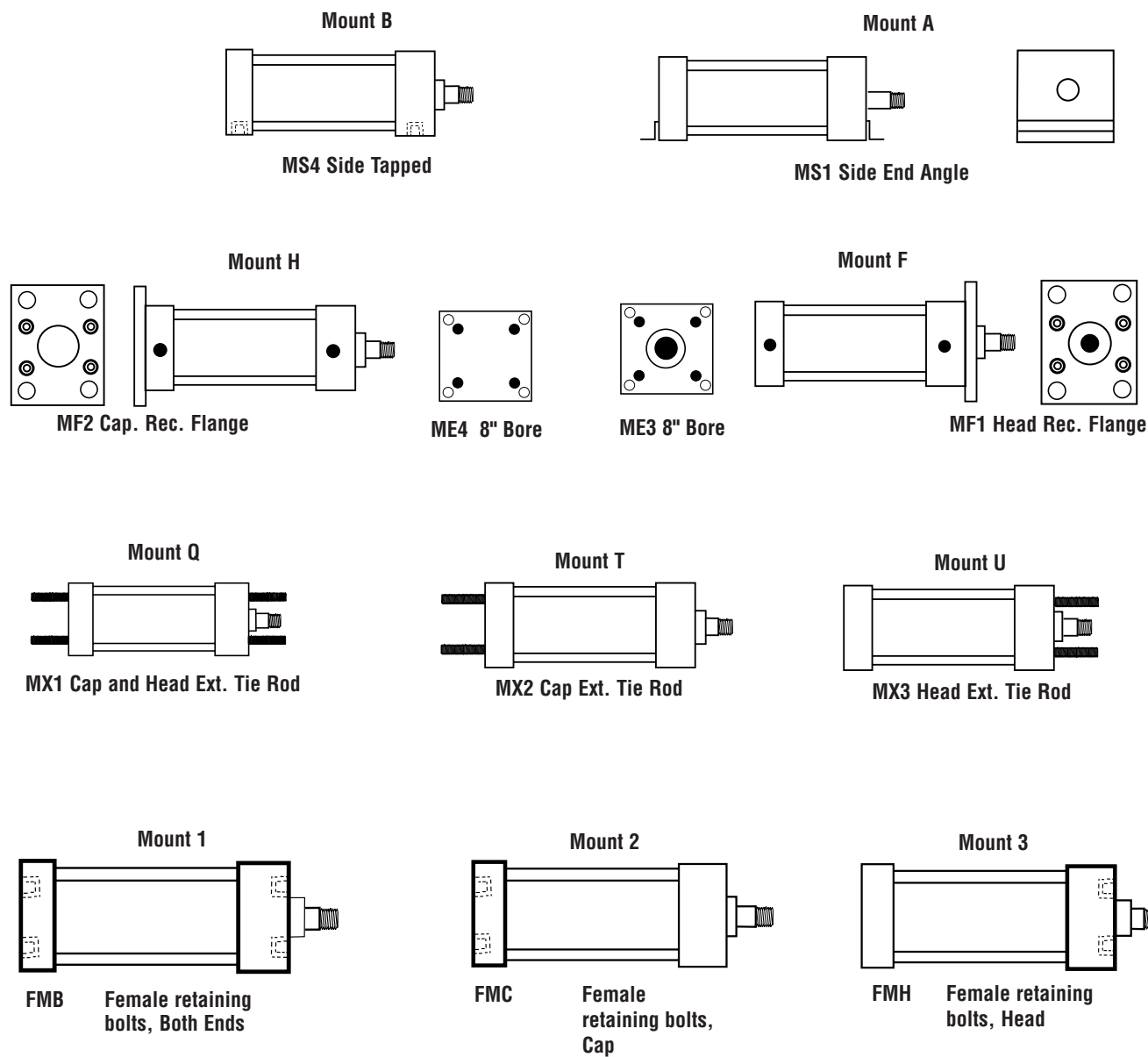
# Pneumatic Cylinders

## Provenair® - Dimensional Data

### Mounting Data

Series AN, SN (1-1/2" Thru 10" Bore)

Factory Installed Mounts



**Note:** Mounts H & F 8" and 10" bore cylinders use oversized end cap as shown (ME3 or ME4). A steel rectangular flange plate is used for all MF1 or MF2 (1 1/2 thru 6" bore).

**Note:** Not all mounts are available on stainless steel models (Series SN)

# Pneumatic Cylinders

## Provenair® - Dimensional Data

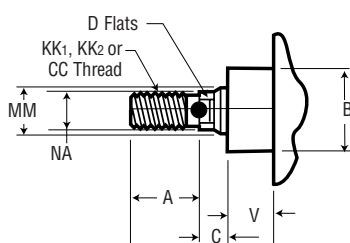
### Dimensional Data

Series AN , SN (Rod End)

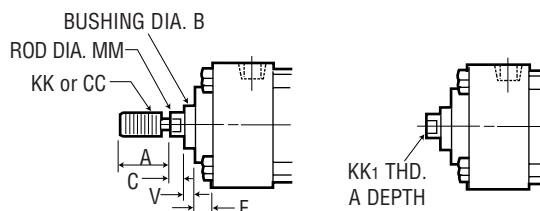
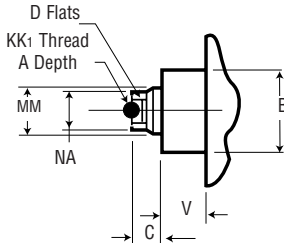
Rod End Dimensions for 1-1/2" – 10" Bore Sizes

|                              | Cylinder Bore (Inches) |          |          |           |         |           |                |           |
|------------------------------|------------------------|----------|----------|-----------|---------|-----------|----------------|-----------|
|                              | 1-1/2, 2, 2-1/2        | 2, 2-1/2 | 3-1/4, 4 | 3-1/4, 4  | 5       | 5, 6, 8   | 6, 8, 10       | 10        |
| <b>Rod Diameter (Inches)</b> | 5/8                    | 1        | 1        | 1-3/8     | 1       | 1-3/8     | 1-3/4          | 2         |
| <b>KK1 THD. ( M OR F )</b>   | 7/16"-20               | 3/4"-16  | 3/4"-16  | 1"-14     | 3/4"-16 | 1"-14     | 1-1/4"-12      | 1-1/2"-12 |
| <b>KK2 THD. (MALE)</b>       | 1/2"-20                | 7/8"-14  | 7/8"-14  | 1-1/4"-12 | 7/8"-14 | 1-1/4"-12 | 1-1/2"-12      | 1-3/4"-12 |
| <b>CC (MALE)</b>             | 5/8"-18                | 1"-14    | 1"-14    | 1-3/8"-12 | 1"-14   | 1-3/8"-12 | 1-3/4"-12      | 2"-12     |
| <b>A</b>                     | .75                    | 1.13     | 1.13     | 1.63      | 1.13    | 1.63      | 2.00           | 2.25      |
| <b>B</b>                     | 1.13                   | 1.50     | 1.50     | 1.50      | 1.50    | 2.00      | 2.38           | 2.38      |
| <b>C</b>                     | .34                    | .62      | .48      | .60       | .50     | .63       | .75            | .88       |
| <b>D</b>                     | .50                    | .88      | .88      | .81       | .81     | 1.13      | 1.50           | 1.75      |
| <b>F</b>                     | .325                   | .325     | .625     | .625      | .625    | .625      | .625           | .75       |
| <b>MM</b>                    | .625                   | 1.00     | 1.00     | 1.00      | 1.00    | 1.375     | 1.75           | 2.00      |
| <b>V</b>                     | .66                    | .75      | .89      | 1.02      | .25     | .38       | .38 *          | .38       |
|                              | —                      | —        | —        | —         | —       | —         | * (.50 on 10") |           |

Selection of oversize piston rod affects the following dimensions: ZB, ZC, ZD, ZE, ZF, ZL, ZM, XC, XD, XE, XG, XJ, XS, XT, V, W, WF, C, V, LA. See rod end dimensions.

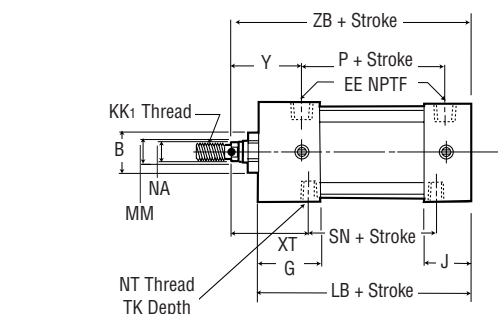


Series AN, SN Bore Sizes 1-1/2", 2", 2-1/2", 3-1/4", 4"

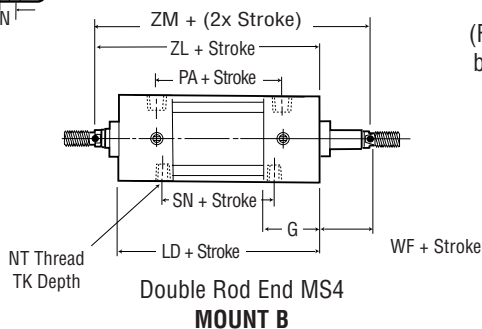
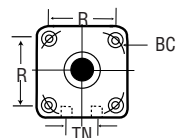


Series AN Bore Sizes 5", 6", 8", 10"  
Series SN all Bore Sizes

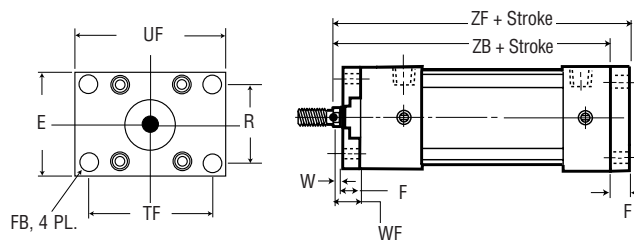
### Series AN , SN (With Standard Rod)



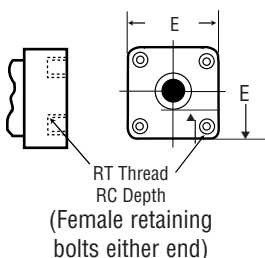
Side Tapped MS4  
MOUNT B



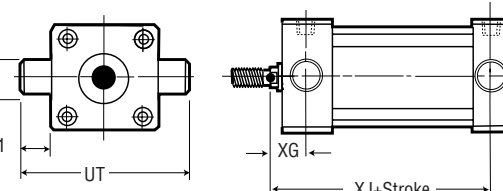
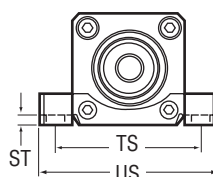
Double Rod End MS4  
MOUNT B



Rect. Flange - Head-MF1, Cap-MF2  
MOUNT F & H (1 1/2" - 4" BORE ONLY)



Head Trunnion MT1  
Cap Trunnion MT2  
MOUNT M & P



Side Lug MS2

Dimensional Information see page 48

# Provenair® - Dimensional Data

## Dimensional Data

Series AN, SN (1-1/2" Thru 4" Bore w/standard rod)

|               | Cylinder Bore (Inches) |         |         |        |        |
|---------------|------------------------|---------|---------|--------|--------|
|               | 1-1/2                  | 2       | 2-1/2   | 3-1/4  | 4      |
| B             | 1.13                   | 1.13    | 1.13    | 1.50   | 1.50   |
| BC            | 2.02                   | 2.60    | 3.10    | 3.90   | 4.70   |
| E             | 2.00                   | 2.50    | 3.00    | 3.75   | 4.50   |
| EE            | 3/8-18                 | 3/8-18  | 3/8-18  | 1/2-14 | 1/2-14 |
| F             | .38                    | .38     | .38     | .63    | .63    |
| FB            | .31                    | .38     | .38     | .44    | .44    |
| G             | 1.44                   | 1.44    | 1.44    | 1.69   | 1.69   |
| J             | .94                    | .94     | .94     | 1.19   | 1.19   |
| KK1 (thread)  | 7/16-20                | 7/16-20 | 7/16-20 | 3/4-16 | 3/4-16 |
| LB            | 3.62                   | 3.62    | 3.75    | 4.25   | 4.25   |
| LD            | 4.12                   | 4.12    | 4.25    | 4.75   | 4.75   |
| MM (rod dia.) | 5/8                    | 5/8     | 5/8     | 1.00   | 1.00   |
| NA            | .59                    | .59     | .59     | .97    | .97    |
| NT            | 1/4-20                 | 5/16-18 | 3/8-16  | 1/2-13 | 1/2-13 |
| P             | 2.25                   | 2.25    | 2.38    | 2.62   | 2.62   |
| PA            | 2.75                   | 2.75    | 2.88    | 3.12   | 3.12   |
| R             | 1.43                   | 1.84    | 2.19    | 2.76   | 3.32   |
| RC            | .41                    | .538    | .41     | .599   | .44    |
| RT            | 1/4-28                 | 5/16-24 | 5/16-24 | 3/8-24 | 3/8-24 |
| SB            | .38                    | .38     | .38     | .50    | .50    |
| SN            | 2.25                   | 2.25    | 2.38    | 2.63   | 2.63   |
| SS            | 2.88                   | 2.88    | 3.00    | 3.25   | 3.25   |
| ST            | .56                    | .69     | .81     | 1.00   | 1.19   |
| SX            | .34                    | .34     | .34     | .47    | .47    |
| SY1           | 1.34                   | 1.53    | 1.53    | 2.13   | 2.19   |
| SY2           | .94                    | 1.13    | 1.13    | 1.50   | 1.56   |
| TF            | 2.75                   | 3.38    | 3.88    | 4.69   | 5.44   |
| TK            | .38                    | .43     | .69     | .75    | .75    |
| TN            | .63                    | .88     | 1.25    | 1.50   | 2.06   |
| TS            | 2.75                   | 3.25    | 3.75    | 4.75   | 5.50   |
| UF            | 3.38                   | 4.13    | 4.63    | 5.50   | 6.25   |
| US            | 3.50                   | 3.69    | 4.50    | 5.75   | 6.50   |
| UT            | 4.00                   | 4.50    | 5.00    | 5.75   | 6.50   |
| W             | .66                    | .66     | .66     | .75    | .75    |
| WF*           | 1.00                   | 1.00    | 1.00    | 1.38   | 1.38   |
| XG*           | 1.75                   | 1.75    | 1.75    | 2.25   | 2.25   |
| XJ*           | 4.12                   | 4.12    | 4.25    | 5.00   | 5.00   |
| XS*           | 1.38                   | 1.38    | 1.38    | 1.88   | 1.88   |
| XT*           | 1.94                   | 1.94    | 1.94    | 2.44   | 2.44   |
| Y*            | 1.94                   | 1.94    | 1.94    | 2.44   | 2.44   |
| ZB*           | 4.63                   | 4.63    | 4.75    | 5.63   | 5.63   |
| ZF*           | 5.00                   | 5.00    | 5.12    | 6.25   | 6.25   |
| ZL*           | 5.12                   | 5.12    | 5.25    | 6.12   | 6.12   |
| ZM*           | 6.15                   | 6.15    | 6.27    | 7.52   | 7.52   |

\* Oversize piston rod option affects these dimensions.  
See rod end dimensions.

### MEETING THE STANDARDS.

ARO Provenair Cylinders meet NFPA standards. Use valves that meet the highest standards – ARO

Alpha and Genesis Valves. Alpha valves are available in body ported and sub-base configurations. Genesis valves are available in sub-base configuration only and have convenient “plug-into-the-base” electronics.

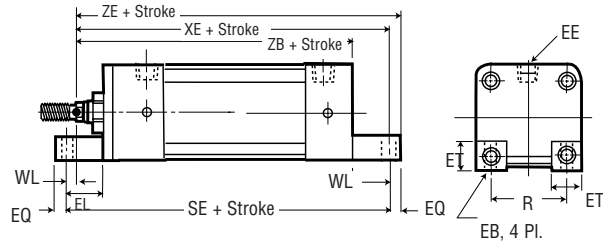


# Pneumatic Cylinders

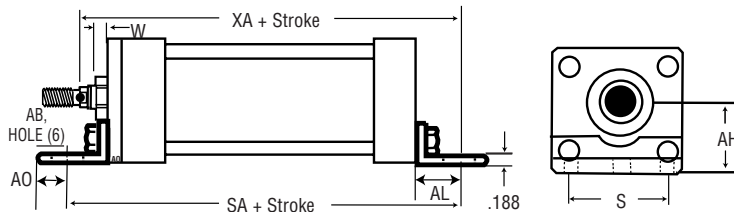
## Provenair® - Dimensional Data

### Dimensional Data

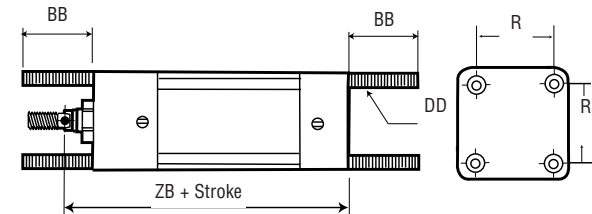
Series AN, SN (1-1/2" Thru 10" Bore w/standard rod)



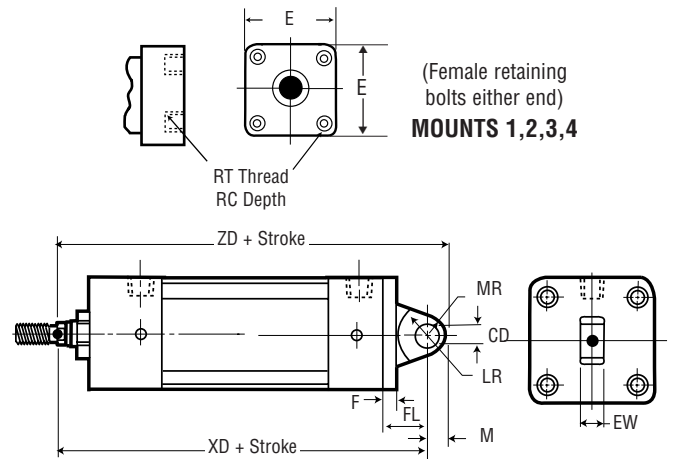
**Side End Lugs MS7  
MOUNT L**



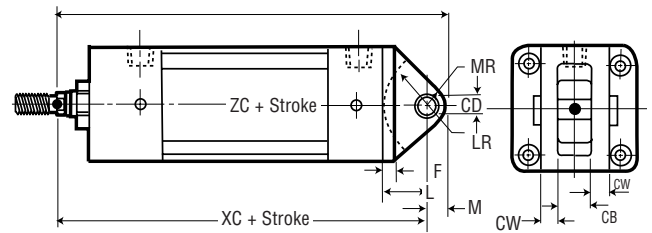
**Angle Mount MS1  
MOUNT A**



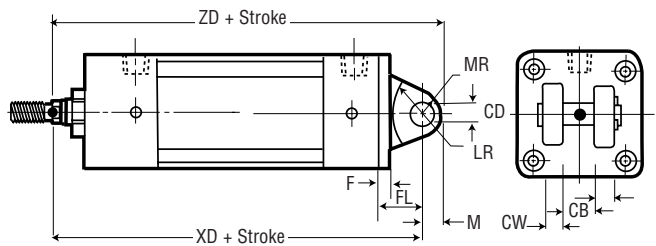
**Tie Rod Mounts  
MX1 Extended Both Ends      MX3 Extended Head End  
MOUNT Q, T & U**



**Detachable Eye MP4  
MOUNT K**



**Fixed Clevis MP1  
MOUNT C**



**Detachable Clevis MP2  
MOUNT D (AN Series only)**

### Dimensional Data Series AN (1-1/2" Thru 4" Bore w/standard rod)

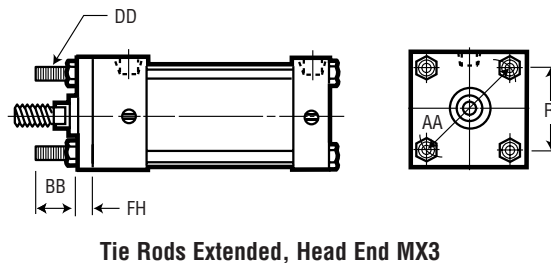
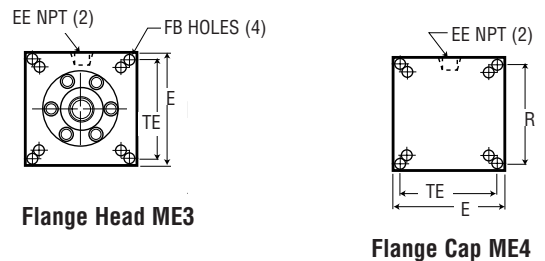
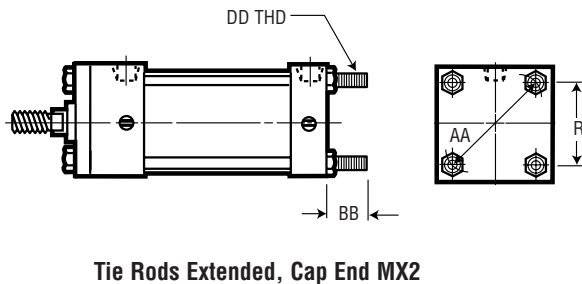
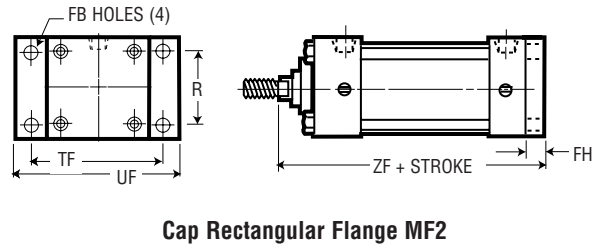
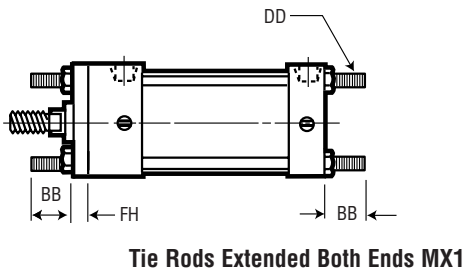
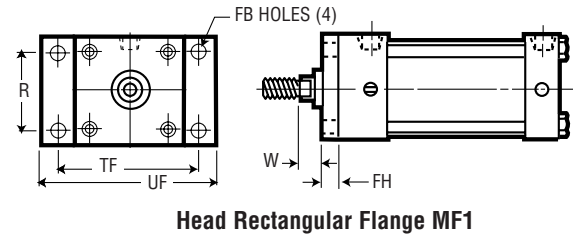
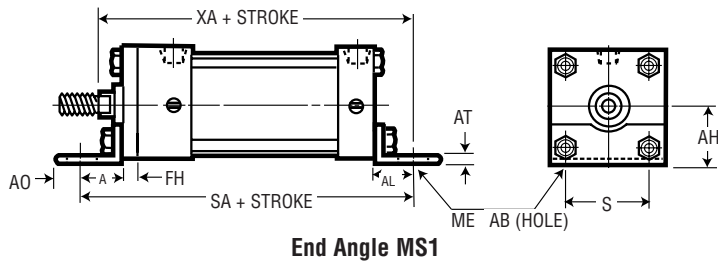
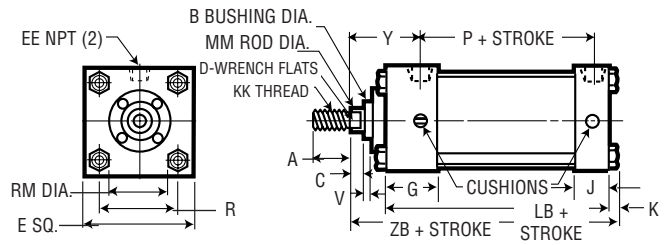
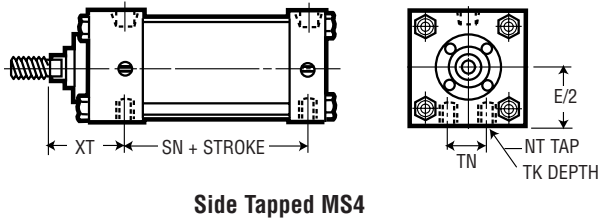
| Cylinder Bore (Inches) |        |         |         |        |        | Cylinder Bore (Inches) |         |         |         |        |        | Cylinder Bore (Inches)                                 |       |      |       |       |      |
|------------------------|--------|---------|---------|--------|--------|------------------------|---------|---------|---------|--------|--------|--------------------------------------------------------|-------|------|-------|-------|------|
|                        | 1-1/2  | 2       | 2-1/2   | 3-1/4  | 4      |                        | 1-1/2   | 2       | 2-1/2   | 3-1/4  | 4      |                                                        | 1-1/2 | 2    | 2-1/2 | 3-1/4 | 4    |
| AB                     | .38    | .38     | .38     | .50    | .50    | EQ                     | .25     | .31     | .31     | .38    | .38    | SE                                                     | 5.50  | 5.88 | 6.25  | 6.63  | 6.88 |
| AH                     | 1.18   | 1.44    | 1.62    | 1.94   | 2.25   | ET                     | .56     | .69     | .81     | 1.00   | 1.19   | W*                                                     | .66   | .66  | .66   | .75   | .75  |
| AL                     | 1.00   | 1.00    | 1.00    | 1.25   | 1.25   | EW                     | .75     | .75     | .75     | 1.25   | 1.25   | WL                                                     | .14   | .33  | .45   | .13   | .25  |
| AO                     | .38    | .38     | .38     | .50    | .50    | F                      | .38     | .38     | .38     | .63    | .63    | XA                                                     | 5.62  | 5.62 | 5.75  | 6.88  | 6.88 |
| BB                     | 1.00   | 1.13    | 1.13    | 1.38   | 1.38   | KK1 (Thread)           | 7/16-20 | 7/16-20 | 7/16-20 | 3/4-16 | 3/4-16 | XC*                                                    | 5.38  | 5.38 | 5.50  | 6.88  | 6.88 |
| CB                     | .75    | .75     | .75     | 1.25   | 1.25   | FL                     | 1-1/8   | 1-1/8   | 1-1/8   | 1-7/8  | 1-7/8  | XD*                                                    | 5.75  | 5.75 | 5.88  | 7.50  | 7.50 |
| CD                     | .50    | .50     | .50     | .75    | .75    | L                      | 3/4     | 3/4     | 3/4     | 1-1/4  | 1-1/4  | XE*                                                    | 5.38  | 5.56 | 5.81  | 6.50  | 6.63 |
| CW                     | .50    | .50     | .50     | .63    | .63    | LR                     | 3/4     | 3/4     | 3/4     | 1-1/4  | 1-1/4  | ZB*                                                    | 4.63  | 4.63 | 4.75  | 5.63  | 5.63 |
| DD                     | 1/4-28 | 5/16-24 | 5/16-24 | 3/8-24 | 3/8-24 | M                      | 5/8     | 5/8     | 5/8     | 7/8    | 7/8    | ZC*                                                    | 5.84  | 5.88 | 6.00  | 7.63  | 7.63 |
| E                      | 2.00   | 2.50    | 3.00    | 3.75   | 4.50   | MR                     | .47     | .50     | .50     | .75    | .75    | ZD*                                                    | 6.22  | 6.25 | 6.38  | 8.25  | 8.25 |
| EB                     | .28    | .34     | .34     | .38    | .38    | R                      | 1.43    | 1.84    | 2.19    | 2.76   | 3.32   | ZE*                                                    | 5.63  | 5.84 | 6.13  | 6.88  | 7.00 |
| EE (NPTF)              | 3/8-18 | 3/8-18  | 3/8-18  | 1/2-14 | 1/2-14 | S                      | 1.25    | 1.75    | 2.25    | 2.75   | 3.50   | * Oversize piston rod option affects these dimensions. |       |      |       |       |      |
| EL                     | .75    | .94     | 1.06    | .88    | 1.00   | SA                     | 6.00    | 6.00    | 6.12    | 7.38   | 7.38   |                                                        |       |      |       |       |      |

# Pneumatic Cylinders

## Provenair® - Dimensional Data

### Dimensional Data

Series AN, SN (5", 6", 8" and 10" Bore)



# Pneumatic Cylinders

## Provenair® - Dimensional Data

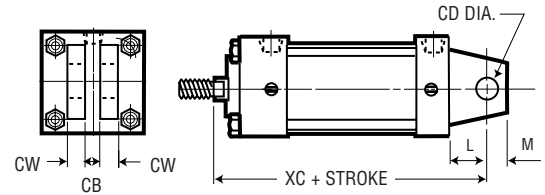
### Dimensional Data

#### Provenair Mounts

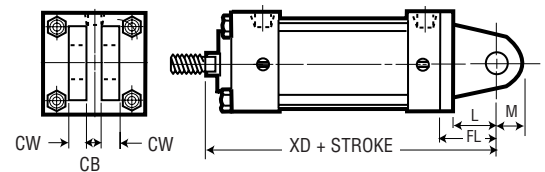
##### Series AN, SN (5", 6", 8", & 10" Bore)

| ROD        | CYLINDER BORE (INCHES) |            |            |            |            |            |             |  |
|------------|------------------------|------------|------------|------------|------------|------------|-------------|--|
|            | 5<br>1                 | 5<br>1-3/8 | 6<br>1-3/8 | 6<br>1-3/4 | 8<br>1-3/8 | 8<br>1-3/4 | 10<br>1-3/4 |  |
| A          | 1.13                   | 1.63       | 1.63       | 2.00       | 1.63       | 2.00       | 2.00        |  |
| AA         | 5.18                   | 5.18       | 6.90       | 6.90       | 9.10       | 9.10       | 11.20       |  |
| AB         | .69                    | .69        | .81        | .81        | .81        | .81        | —           |  |
| AH         | 2.88                   | 2.88       | 3.25       | 3.25       | 4.25       | 4.25       | —           |  |
| AL         | 1.38                   | 1.38       | 1.38       | 1.38       | 1.81       | 1.81       | —           |  |
| AO         | .63                    | .63        | .63        | .63        | .69        | .69        | —           |  |
| AT         | .19                    | .19        | .19        | .19        | .25        | .25        | —           |  |
| B          | 1.50                   | 2.00       | 2.00       | 2.38       | 2.00       | 2.38       | 2.38        |  |
| BB         | 1.81                   | 1.81       | 1.81       | 1.81       | 2.31       | 2.31       | 2.69        |  |
| C          | .50                    | .63        | .63        | .75        | .63        | .75        | .75         |  |
| CB         | 1.25                   | 1.25       | 1.50       | 1.50       | 1.50       | 1.50       | 2.00        |  |
| CD         | .75                    | .75        | 1.00       | 1.00       | 1.00       | 1.00       | 1.38        |  |
| CW         | .63                    | .63        | .75        | .75        | .75        | .75        | 1.00        |  |
| D          | .81                    | 1.13       | 1.13       | 1.50       | 1.13       | 1.50       | 1.50        |  |
| DD         | 1/2"-20                | 1/2"-20    | 1/2"-20    | 1/2"-20    | 5/8"-18    | 5/8"-18    | 3/4"-16     |  |
| E          | 5.50                   | 5.50       | 6.50       | 6.50       | 8.50       | 8.50       | 10.63       |  |
| EE(NPTF)   | 1/2                    | 1/2        | 3/4        | 3/4        | 3/4        | 3/4        | 1.00        |  |
| F          | .63                    | .63        | .63        | .75        | .63        | .75        | .63         |  |
| FB         | .56                    | .56        | .56        | .56        | .69        | .69        | .81         |  |
| FH         | .63                    | .63        | .75        | .75        | —          | —          | .63         |  |
| FL         | 2.13                   | 2.13       | 2.25       | 2.25       | —          | —          | —           |  |
| G          | 1.75                   | 1.75       | 2.00       | 2.00       | 2.00       | 2.00       | 2.25        |  |
| J          | 1.25                   | 1.25       | 1.50       | 1.50       | 1.50       | 1.50       | 2.00        |  |
| K          | .44                    | .44        | .50        | .50        | .63        | .63        | .69         |  |
| KK1 THREAD | 3/4-16                 | 1-14       | 1-14       | 1-1/4-12   | 1-14       | 1-1/4-12   | 1-1/4-12    |  |
| L          | 1.25                   | 1.25       | 1.50       | 1.50       | 1.50       | 1.50       | 2.13        |  |
| LB         | 4.25                   | 4.25       | 5.00       | 5.00       | 5.13       | 5.13       | 6.38        |  |
| LD         | 4.75                   | 4.75       | 5.50       | 5.50       | 5.63       | 5.63       | 6.63        |  |
| M          | .88                    | .88        | 1.00       | 1.00       | 1.00       | 1.00       | 1.38        |  |
| MM         | 1                      | 1-3/8      | 1-3/8      | 1-3/4      | 1-3/8      | 1-3/4      | 1-3/4       |  |
| NT         | 5/8"-11                | 5/8"-11    | 3/4"-10    | 3/4"-10    | 3/4"-10    | 3/4"-10    | 1-8         |  |
| P          | 2.63                   | 2.63       | 3.00       | 3.00       | 3.13       | 3.13       | 4.31        |  |
| R          | 4.10                   | 4.10       | 4.88       | 4.88       | 7.57       | 7.57       | 7.92        |  |
| RM         | 2.63                   | 3.38       | 3.38       | 3.50       | 3.38       | 3.50       | 3.50        |  |
| S          | 4.25                   | 4.25       | 5.25       | 5.25       | 7.13       | 7.13       | 7.13        |  |
| SA         | 7.63                   | 7.63       | 8.50       | 8.50       | 8.75       | 8.75       | —           |  |
| SN         | 2.88                   | 2.88       | 3.13       | 3.13       | 3.25       | 3.25       | 4.13        |  |
| TD         | 1.00                   | 1.00       | 1.38       | 1.38       | 1.38       | 1.38       | —           |  |
| TE         | —                      | —          | —          | —          | 7.57       | 7.57       | 9.40        |  |
| TF         | 6.63                   | 6.63       | 7.63       | 7.63       | 7.57*      | 7.57*      | —           |  |
| TK         | 1.00                   | 1.00       | 1.13       | 1.13       | 1.13       | 1.13       | 1.50        |  |
| TL         | 1.00                   | 1.00       | 1.38       | 1.38       | 1.38       | 1.38       | —           |  |
| TN         | 2.69                   | 2.69       | 3.25       | 3.25       | 4.50       | 4.50       | 5.50        |  |
| UF         | 7.63                   | 7.63       | 8.63       | 8.63       | —          | —          | —           |  |
| UT         | 7.50                   | 7.50       | 9.25       | 9.25       | 11.25      | 11.25      | —           |  |
| V          | .25                    | .38        | .38        | .38        | .38        | .38        | .50         |  |
| W          | .75                    | 1.00       | .88        | 1.13       | 1.63       | 1.88       | 1.88        |  |
| XA         | 7.00                   | 7.25       | 8.00       | 8.25       | 8.56       | 8.81       | —           |  |
| XC         | 6.88                   | 7.13       | 8.13       | 8.38       | 8.25       | 8.50       | 10.38       |  |
| XD         | 7.75                   | 8.00       | 8.88       | 9.13       | —          | —          | —           |  |
| XG         | 2.25                   | 2.50       | 2.63       | 2.88       | 2.63       | 2.88       | —           |  |
| XJ         | 5.00                   | 5.25       | 5.88       | 6.13       | 6.00       | 6.25       | —           |  |
| XT         | 2.31                   | 2.56       | 2.81       | 3.06       | 2.81       | 3.06       | 3.13        |  |
| Y          | 2.44                   | 2.44       | 2.88       | 2.88       | 2.88       | 2.88       | 3.00        |  |
| ZB         | 6.06                   | 6.31       | 7.13       | 7.38       | 7.38       | 7.63       | 8.94        |  |
| ZF         | 6.50                   | 6.75       | 7.38       | 7.63       | 6.75       | 7.00       | 8.25        |  |
| ZM         | 7.75                   | 8.25       | 8.75       | 9.25       | 8.88       | 9.38       | 10.63       |  |

\* R Dimension on 8" bore.

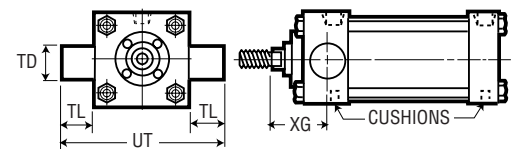


Fixed Clevis MP1

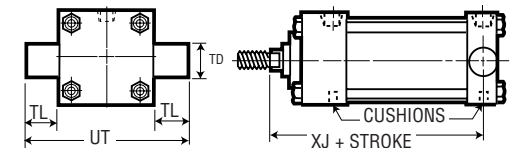


Detachable Clevis MP2  
(Not available on 8-inch bore)

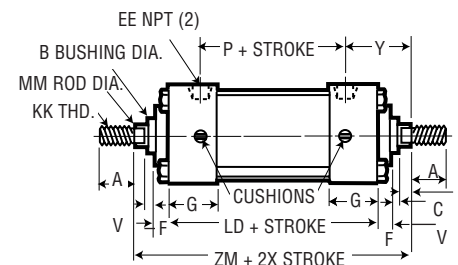
#### Cap Rectangular Flange MF2



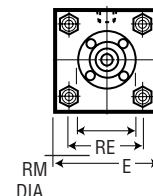
Head Trunnion MT1



Cap Trunnion MT2



#### Double Rod End



# Pneumatic Cylinders

## Provenair® - Dimensional Data

### Accessories

Series AN (5/8" thru 1-3/4" Rod)

Socket Head Rod Studs

|                               | ROD DIAMETER (INCHES)             |                                 |                                     |       |
|-------------------------------|-----------------------------------|---------------------------------|-------------------------------------|-------|
|                               | 5/8<br>Stud Thread<br>Part Number | 1<br>Stud Thread<br>Part Number | 1-3/8<br>Stud Thread<br>Part Number | 1-3/4 |
| <b>KK1</b>                    | 7/16"-20 x 3/4"                   | 3/4"-16 x 1-1/8"                | 1"-14 x 1-1/8"                      | —     |
|                               | 117812-101                        | 117812-201                      | 117812-301                          |       |
| <b>KK1 (2 x length)</b>       | 7/16"-20 x 1-1/2"                 | 3/4"-16 x 2-1/4"                | 1"-14 x 2-1/4"                      | —     |
|                               | 117812-121                        | 117812-221                      | 117812-321                          |       |
| <b>KK2 (1st oversize)</b>     | 1/2"-20 x 3/4"                    | 7/8"-14 x 1-1/8"                | 1-1/4"-12 x 1-5/8"                  | —     |
|                               | 117812-102                        | 117812-202                      | 117812-302                          |       |
| <b>CC Full (2nd oversize)</b> | 5/8"-18 x 3/4"                    | 1"-14 x 1-1/8"                  | 1-3/8"-12 x 1-5/8"                  | —     |
|                               | 117812-103                        | 117812-203                      | 117812-303                          |       |

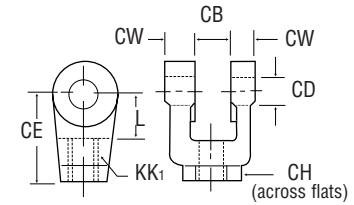
|                                                                  | Rod Thread |          |          |          |
|------------------------------------------------------------------|------------|----------|----------|----------|
|                                                                  | 7/16-20    | 3/4-16   | 1-14     | 1-1/4-12 |
| <b>ROD CLEVIS KIT (includes pin)</b>                             | 116183     | 116046   | 116049   | 116052   |
| <b>ROD EYE KIT</b>                                               | 116184     | 116047   | 116050   | 116053   |
| <b>CLEVIS PIN</b>                                                | 115299     | 115300   | —        | —        |
| <b>PIVOT PIN</b>                                                 | —          | —        | 116048   | 116051   |
| <b>Mating parts to rod end accessories and mounting brackets</b> |            |          |          |          |
| <b>Clevis Bracket (Iron)</b>                                     | —          | 117206-5 | 117206-6 | —        |
| <b>Eye Bracket (Iron)</b>                                        | —          | 117205-5 | 117205-6 | —        |

### Dimensional Data

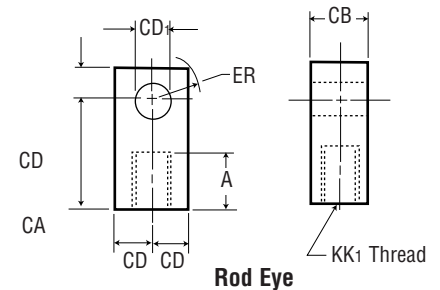
| ROD DIAMETER (INCHES)              | 5/8     | 1      | 1-3/8 | 1-3/4    |
|------------------------------------|---------|--------|-------|----------|
| <b>Rod Eye, Rod Clevis and Pin</b> |         |        |       |          |
| <b>A</b>                           | .75     | 1.13   | 1.63  | 2.00     |
| <b>CA</b>                          | 1.50    | 2.06   | 2.81  | 3.44     |
| <b>CB</b>                          | .75     | 1.25   | 1.50  | 2.00     |
| <b>CD</b>                          | .50     | .75    | 1.00  | 1.38     |
| <b>CD1</b>                         | .44     | .75    | —     | —        |
| <b>CE</b>                          | 1.50    | 2.38   | 3.13  | 4.13     |
| <b>CH</b>                          | 1.00    | 1.25   | 1.50  | 2.00     |
| <b>CW</b>                          | .50     | .63    | .75   | 1.00     |
| <b>ER</b>                          | .72     | 1.06   | 1.00  | 1.38     |
| <b>HP</b>                          | .156    | .156   | —     | —        |
| <b>KK1</b>                         | 7/16-20 | 3/4-16 | 1-14  | 1 1/4-12 |
| <b>L</b>                           | .75     | 1.25   | 1.50  | 2.13     |
| <b>LH</b>                          | 2.25    | 3.13   | 3.75  | 5.00     |
| <b>LP</b>                          | 2.10    | 2.75   | 3.25  | 4.50     |

### Mating parts to rod end accessories and mounting brackets

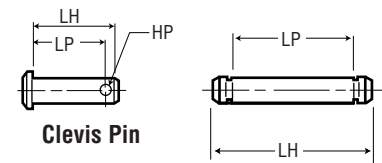
|                |   |        |        |   |
|----------------|---|--------|--------|---|
| <b>BA</b>      | — | 2.56   | 3.25   | — |
| <b>CB</b>      | — | 1.25   | 1.50   | — |
| <b>CD</b>      | — | .75    | 1.00   | — |
| <b>CW</b>      | — | .63    | .75    | — |
| <b>DD DIA.</b> | — | .53    | .66    | — |
| <b>DD TAP</b>  | — | 1/2-20 | 5/8-18 | — |
| <b>E</b>       | — | 3.50   | 4.50   | — |
| <b>F</b>       | — | .63    | .75    | — |
| <b>FL</b>      | — | 1.88   | 2.25   | — |
| <b>M</b>       | — | .75    | 1.00   | — |



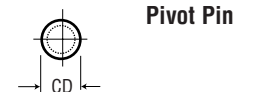
**Rod Clevis**



**Rod Eye**

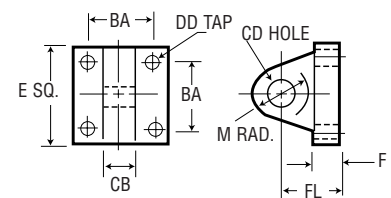


**Clevis Pin**

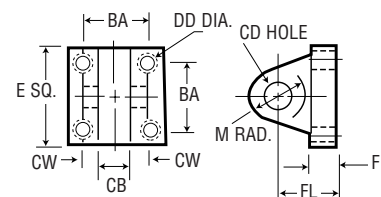


**Pivot Pin**

Use for Both Pins



**Eye Bracket\***



**Clevis Bracket\***

\* These accessory brackets attach to mating cylinder mounts. See Cylinder Mounting Dimensions on page 129.

Ordering

Tanks & Reservoirs (1-1/2" thru 4" Bore)

Two Provenair tank styles provide unique capabilities for your applications.

**Style A**, air-over-oil tanks provide the smooth control hydraulic systems are known for, without the expense, using shop air.

**Style T** reservoirs provide a supply of air near the point of use, allowing your system to use a smaller compressor or smaller system supply lines.

Include dashes ( - ). Dashes are significant.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ACTUATORS</b><br>All actuators begin with A<br><b>SERIES (N)</b><br>All Provenair Cylinders are Series N<br><b>TYPE</b><br>T Tank<br><b>BORE SIZE</b><br>Q 1- 1/2" W 3-1/4"<br>S 2" 4 4"<br>T 2- 1/2"<br><b>ENTER X IN THIS POSITION</b><br><b>TANK STYLE</b><br>A Air / Oil T Air Reservoir<br><b>SEALS</b><br>B Buna-N V Viton<br><b>SIGHT GLASS LOCATION</b><br>X = None A = 1 B = 2 C = 4<br>(X must be used with Tank Style T)<br><b>PORT LOCATION</b> MS4 mounts: Port locations other than "A", call factory.<br>A H1, C1 (Std.) D H1, C4 G H2, C2 U H4, C4<br>B H1, C2 F H2, C1 J H2, C4<br><b>MOUNT</b><br>A MS1 B MS4 L MS7 X No Mount | <b>STROKE</b><br>Whole Inches<br>00 = 0 in<br>01 = 1 in<br>02 = 2 in<br>03 = 3 in<br>04 = 4 in<br>05 = 5 in<br>06 = 6 in<br>↑ to 99 = 99 in<br>Fractions<br>0 = 0 in<br>1 = 1/8 in<br>2 = 1/4 in<br>3 = 3/8 in<br>4 = 1/2 in<br>5 = 5/8 in<br>6 = 3/4 in<br>7 = 7/8 in |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Note:**  
Maximum stroke 99 7/8", for longer strokes consult factory.

**Style T**  
Minimum stroke 2".

**Style A**  
**Note:** Sight glass (required)  
Minimum 5" stroke.

Sight glass available in  
Style A only



Air/Oil Tank  
250 P.S.I.

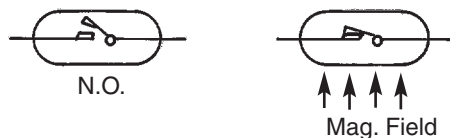


Air Reservoir

## Position Sensors (Switches)

### Reed Switches

Switch is normally open, load can be attached to BROWN or BLUE lead. The BROWN lead is the higher potential side of the switch. In a magnetic field, the two reeds are brought into contact to “make” the circuit. Reed switches have black, ‘two wire’ leads.



### Switch Mounting Brackets

| Bore          | Model Number |
|---------------|--------------|
| 1-1/2"        | 119584       |
| 2", 2-1/2"    | 119585       |
| 3-1/4" and 4" | 119586       |

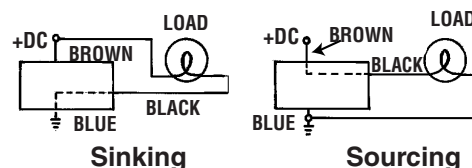
**Note:** Operating temperature is 14 - 140° F and the environmental rating is IEC IP 67 in all three switch types. Std. Red LED requires min 18 mA.

## Switch Specifications

| Model Number       | 119581-1                | 119581-2 | 119581-3 | 119582-1         | 119582-2 | 119582-3 | 119583-1         | 119583-2 | 119583-3 |
|--------------------|-------------------------|----------|----------|------------------|----------|----------|------------------|----------|----------|
| Lead Length/Type   | 1m bare                 | 3m bare  | Plug     | 1m bare          | 3m bare  | Plug     | 1m bare          | 3m bare  | Plug     |
| Lead Color         | Black                   |          |          | Grey             |          |          | Black            |          |          |
| Switch Type        | REED                    |          |          | PNP(SOURCING)    |          |          | NPN (SINKING)    |          |          |
| Input Voltage      | 100 VDC, 125 VAC Max.   |          |          | 10 - 30 VDC      |          |          | 5 - 30 VDC       |          |          |
|                    | -                       |          |          | -                |          |          | 5 - 100mA @ 5V   |          |          |
| Operating Current  | 300mA (150mA Inductive) |          |          | 7 - 100mA @ 12V  |          |          | 10 - 200mA @ 12V |          |          |
|                    | -                       |          |          | 14 - 200mA @ 24V |          |          | 20 - 200mA @ 24V |          |          |
| Detecting Distance | 2.5 mm                  |          |          | 1.5 mm           |          |          | 1.5 mm           |          |          |
| Detecting Width    | -                       |          |          | 3.0 mm           |          |          | 3.0 mm           |          |          |
| Response Time      | 1 mSec. Min.            |          |          | -                |          |          | -                |          |          |
| LED Function       | 18mA Min.               |          |          | 1mA Min.         |          |          | 1mA Min.         |          |          |

### Hall Effect Switches

It is important to note that Hall Effect switches must always have current through them to work. In a magnetic field, the semiconductor generates a voltage across the sense leads. Removing the magnetic field returns the switch to its normally open state. Hall effect switches have ‘three wire’ leads. Black leads are sinking (NPN). Grey leads are sourcing (PNP). Load is controller.



There are two types of Hall Effect switches. Each is connected differently. Check your PLC for the input method used. Sinking (NPN) will sink current to ground. Sourcing (PNP) will provide current from the +VDC.

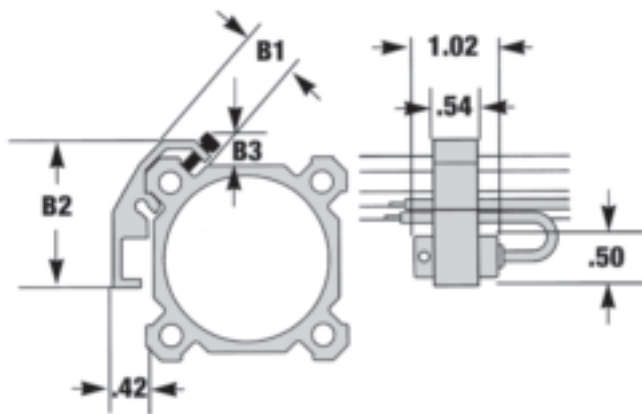
### Technical Information:

1. Do not exceed specification, permanent damage to the sensor may occur.
2. For reed switch type sensors, polarity must be observed for the proper functioning of LED. Connect the brown wire in series with load positive (+) and the blue wire to negative (-) or power source space. If the polarity is reversed, reed switch remains functional but LED will remain in “OFF” state.
3. For solid-state type sensors, polarity must also be observed. Connect brown wire to the positive (+) and the blue to the negative (-) of DC power source. The black wire must connect to the load ONLY. If the black wire is accidentally connected to the power source, permanent damage to the sensor may occur.
4. An external protection circuit may be required if the reed switch is used with inductive load, such as relay or solenoid. For DC inductive load, attach an external diode parallel to the load and use R-C circuit parallel with AC inductive load.
5. Keep sensors away from stray magnetic field to prevent malfunctions.
6. When using reed switch with capacitive load or if the lead wire length exceeds 10-meter, and inductor must be installed in series with the sensor to prevent damage (Sticking effect).

# Pneumatic Cylinders

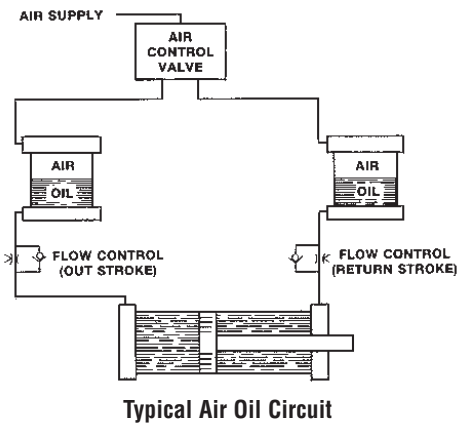
## Provenair® - Dimensional Data

### Dimensional Data



| Cylinder Bore (Inches) |        |            |             |
|------------------------|--------|------------|-------------|
|                        | 1 1/2" | 2 & 2 1/2" | 3 1/4" & 4" |
| B1                     | .51    | .60        | .80         |
| B2                     | 1.50   | 1.77       | 2.45        |
| B3                     | .26    | .26        | .33         |

### Useable Volume Finder

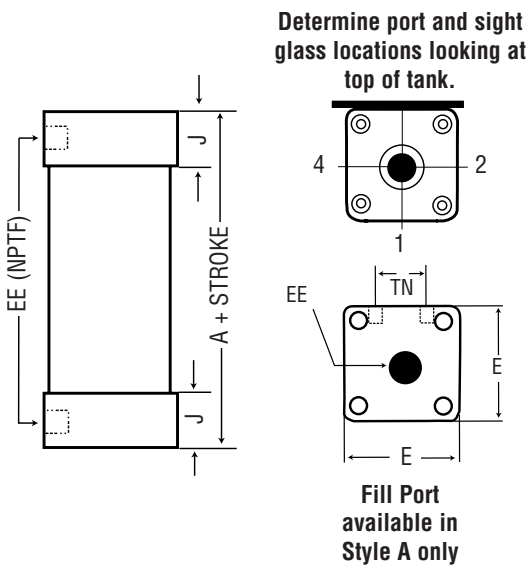


| Useable Volume Finder |        |         |         |
|-----------------------|--------|---------|---------|
|                       | Bore   | Style A | Style T |
| Q                     | 1-1/2" | 1.33    | 1.77    |
| S                     | 2"     | 2.36    | 3.14    |
| T                     | 2-1/2" | 3.68    | 4.91    |
| W                     | 3-1/4" | 6.22    | 8.29    |
| 4                     | 4"     | 9.42    | 12.56   |

#### Style T or A

Derive required circuit volume (V) in Cu. In.  
 Divide (V) by factor from chart above to determine stroke (enter stroke value into model number).  
 Find unit length by adding stroke to dimension A from tank dimension table.

### Tank Dimensions



| Tank Dimensions |        |       |      |      |      |         |
|-----------------|--------|-------|------|------|------|---------|
|                 | BORE   | A     | J    | TN   | E    | EE NPTF |
| Q               | 1-1/2" | 2.005 | 0.94 | 0.63 | 2    | 3/8-18  |
| S               | 2"     | 2.005 | 0.94 | 0.88 | 2.5  | 3/8-18  |
| T               | 2-1/2" | 2.005 | 0.94 | 1.25 | 3    | 3/8-18  |
| W               | 3-1/4" | 2.505 | 1.19 | 1.50 | 3.75 | 1/2-14  |
| 4               | 4"     | 2.505 | 1.19 | 2.06 | 4.5  | 1/2-14  |

# Pneumatic Cylinders

## Repair Kits & Valve/Cylinder Manifold

### Ordering

#### Repair Kits (Single Rod End Rod Bushings Provenair Series)

|                          | Cylinder Bore Size (Inches) |        |        |        |        |        |        |        |
|--------------------------|-----------------------------|--------|--------|--------|--------|--------|--------|--------|
|                          | 1-1/2                       | 2      | 2      | 2-1/2  | 2-1/2  | 3-1/4  | 4      | 4      |
| Rod Diameter             | 5/8                         | 5/8    | 1      | 5/8    | 1      | 1      | 1-3/8  | 1-3/8  |
| Series AN Bushing        | 119454                      | 119455 | 119456 | 119455 | 119456 | 119457 | 119458 | 119457 |
| Series SN Bronze Bushing | 114171                      | 114171 | 114172 | 114171 | 114172 | 114172 | 114173 | 114173 |

|                          | Cylinder Bore Size (Inches) |        |        |        |        |        |        |        |
|--------------------------|-----------------------------|--------|--------|--------|--------|--------|--------|--------|
|                          | 5                           | 5      | 6      | 6      | 8      | 8      | 10     | 10     |
| Rod Diameter             | —                           | 1      | 1-3/8  | 1-3/8  | 1-3/4  | 1-3/8  | 1-3/4  | 2      |
| Series AN Bushing        | —                           | 115074 | 115075 | 115075 | 115076 | 115075 | 115076 | 114130 |
| Series SN Bronze Bushing | —                           | 114172 | 114173 | 114172 | 114173 | 114173 | 114174 | 114175 |

Order two kits for double rod end cylinders.

#### Micro-Air Series 01 (Seal Kits)

|           |      |      |       |
|-----------|------|------|-------|
| BORE SIZE | 1/2  | 3/4  | 1-1/8 |
|           | 7150 | 7151 | 7152  |

#### Seal Kits (Economair Series)

Cylinder Model Number  
EXAMPLE: **28 20 - 5 3 09-040**

To order a repair kit, 1) Obtain model number from label on cylinder. 2) Write "RK" for Repair Kit and 3) Using number from cylinder label, construct proper kit number as directed below.

Order Kit No.:

**RK 24 20 - 1 3**

For All Models Write in RK

BORE SIZE

Take bore size from model number:  
18, 15, 20, 25, 30 or 40.

SERIES NUMBER

If 23, (Noncushion), write 23

If 24 (Cushion), 27 (Cushion, Pin Actuated), or 28 (Cushion, Magnetic) write 24

CYLINDER TYPE

If 1, 3, 4, 5, 6, or 7, write 1.  
If 2, write 2.

PACKING

Take packing identifier from model number: 0, 2, 3, 4, 5, 6, or 8

#### Reciprocating Assembly (Economair Series)

Cylinder Model Number  
EXAMPLE: **28 20 - 2 3 8 9-040**

To order a reciprocating assembly, 1) Obtain model number from label on cylinder. 2) Write "RA" for reciprocating assembly and 3) Using number from cylinder label, construct proper assembly number as directed below.

Order Assembly No.:

**RA 24 20 - 2 0 8 - XXX**

For All Models Write in RA

BORE SIZE

Take bore size from model number: 18, 15, 20, 25, 30 or 40.

SERIES NUMBER

If 23, (Noncushion), write 23

If 24 (Cushion), 27 (Cushion, Pin Actuated), write 24

If 25 (Bumper) or 29 (Bumper, Magnetic), write 25

If 28 (Magnetic), write 28

STROKE

CYLINDER TYPE

If 1, 3, 4, 5, 6, or 7, write 1.  
If 2, write 2.

PACKING

Take packing identifier from model number:  
if 0 or 3 write 0  
if 2, write 2  
if 4, 5 or 6 write 4

ROD MATERIAL PACKING

0 Standard Chrome  
8 Stainless Steel

EXAMPLE RECIPROCATING ASSEMBLY MODEL NUMBER:

**RA 24 20 - 2 0 8 - 0 40**

Supplies a stainless steel rod with 2" O-ring piston for a double rod end, 4" stroke.

# Pneumatic Cylinders

## Repair Kits

### Cylinder Model Number

### Repair Kit Model Number

To order a repair kit, use the model number from the cylinder label. Provenair repair kits start with the letters "RKN", "SKN" and appear in the first three positions. Using the numbers from the cylinder label, construct the remainder of the Repair Kit or number as directed below.

#### Repair Kit Designators

**S or R and K for Repair Kit, N for Provenair.**

#### Type

Double-Acting Single Rod = **A**  
Double Acting Double Rod = **B**

#### Bore Size

1 1/2" **Q** 2" **S** 2 1/2" **T** 3 1/4" **W** 4" **4** 5" **5** 6" **6** 8" **8** 10" **Y**

#### Rod Diameter

5/8" **K** 1" **M** 1-3/8" **P** 1 3/4" **Q** 2" **S**

#### Rod Style Not Used

#### Replacement Seals

|           |          |                                 |                   |
|-----------|----------|---------------------------------|-------------------|
| Buna-N    | <b>B</b> | Buna-N + Mag. Pist.             | G (Use <b>B</b> ) |
| Viton     | <b>V</b> | Viton + Mag. Pist.              | H (Use <b>V</b> ) |
| Self-Lube | <b>S</b> | Self-Lube Slippery + Mag. Pist. | J (Use <b>S</b> ) |

#### Replacement Cushion Seals (All Seal Kits Use "B")

|                    |          |
|--------------------|----------|
| No Cushion Seals   | <b>X</b> |
| Cushions Both Ends | <b>B</b> |
| Cushion Cap        | <b>C</b> |
| Cushion Head       | <b>H</b> |

#### Port Location Not Used, Mounts Not Used, Stroke Not Used

EXAMPLE REPAIR KIT MODEL:

**R K N A W M - V B**

Supplies all Viton seals for a single rod end, 3 1/4" bore, 1" diameter piston rod cylinder. Kit includes Teflon wearband and Viton cushion seals for both ends.

### Cylinder Model Number

### Reciprocating Assembly No.

### Reciprocating Assembly designators

#### Type

Double-Acting Single Rod = **A**  
Double Acting Double Rod = **B**

#### Bore Size

1 1/2" **Q** 2" **S** 2 1/2" **T** 3 1/4" **W** 4" **4** 5" **5** 6" **6** 8" **8** 10" **Y**

#### Rod Diameter

5/8" **K** 1" **M** 1-3/8" **P** 1 3/4" **Q** 2" **S**

#### Rod Style

|                                       |                                        |
|---------------------------------------|----------------------------------------|
| <b>A</b> Chrome, Std Male (KK1)       | <b>G</b> S.S., Standard Male (KK1)     |
| <b>B</b> Chrome, Intermed. Male (KK2) | <b>H</b> S.S., Intermediate Male (KK2) |
| <b>C</b> Chrome, Full Male (CC)       | <b>J</b> S.S., Full Male (CC)          |
| <b>D</b> Chrome, Female (KK1)         | <b>K</b> S.S., Female (KK1)            |
| <b>F</b> Chrome, No Threads           | <b>L</b> S.S., No Threads              |

#### Seals Not Used

#### Replacement Cushioned or Non Cushioned

|                    |          |
|--------------------|----------|
| No Cushion Seals   | <b>X</b> |
| Cushions Both Ends | <b>B</b> |
| Cushion Cap        | <b>C</b> |
| Cushion Head       | <b>H</b> |

#### Port Location Not Used, Mounts Not Used

Not Used

Not Used

#### Stroke

To order a reciprocating assembly, use the model number from the cylinder label. Provenair reciprocating assemblies start with the letters "RAN" or "RSN" and appear in the first three positions. Using the numbers from the cylinder label, construct the remainder of the reciprocating assembly number as directed at left.

EXAMPLE RECIPROCATING ASSEMBLY MODEL:

**R A N A S K - A H - 1 2 0**

Supplies 5/8" diameter chrome rod, KK1 threads, cushion head end, 12" stroke and 2" diameter piston for single rod end cylinder.

## Pneumatic Cylinders

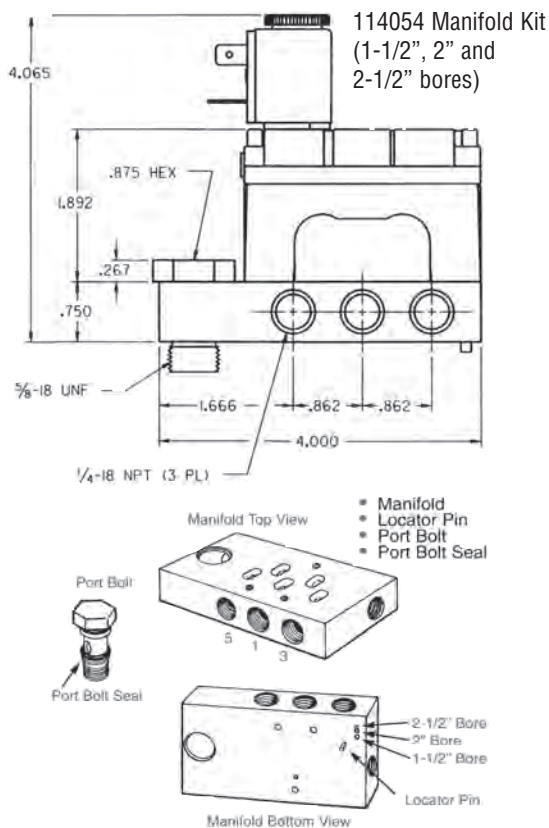
# Valve/Cylinder Manifold

### Features

- Mount any Alpha subbase valve to any NFPA cylinder
- Obtain maximum cylinder response and speeds
- Provides “clean” valve mounting method
- Mounts at cap or head end of cylinder
- Operates any NFPA Cylinder up to 2-1/2” bore
- Any stroke length (Minimum 3”)

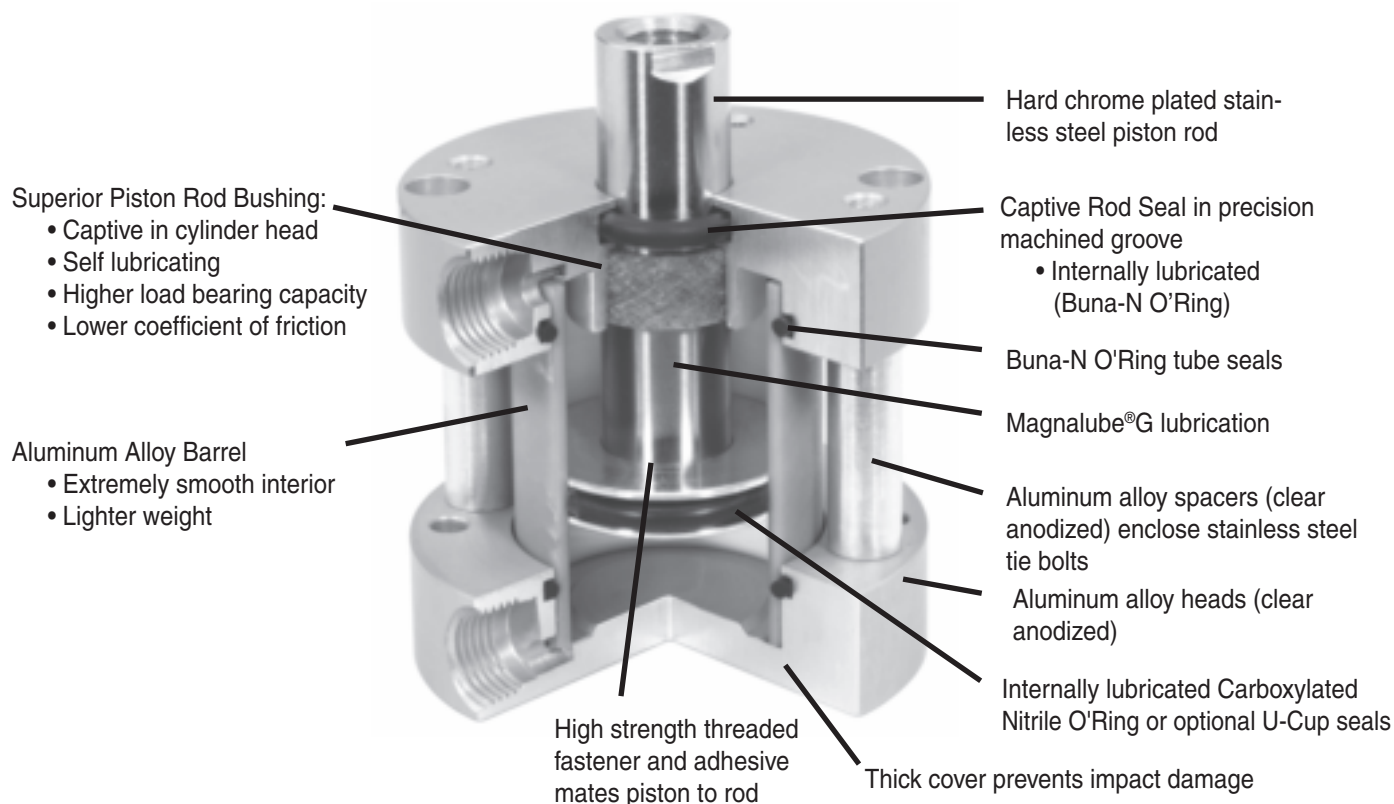


### Dimensional Data



## Compact Cylinders Premair Series

### Premair™ Series Compact, Composite, Interchangeable Cylinders



## Superior Interchangeable Industrial Air Cylinders

**Big Value in a Compact Package—** Stainless steel tie bolts and aluminum spacers lock precision machined heads tightly around a heavy walled, aluminum alloy cylinder barrel. The barrel's extremely smooth, self-lubricating interior surface insures highly reliable performance and extended seal life.

## Compact Cylinders Premair Series



### Available in 4 styles

- Double acting, single end rod (Model SCC)
- Double acting, double end rod (Model SCD)
- Single acting, spring retract rod (Model SCS)
- Reverse acting, spring extend rod (Model SCR)

### 8 Bore sizes 1/2" thru 4" Strokes to 4" standard

#### Ratings

- |                     |                                 |                                  |                                    |
|---------------------|---------------------------------|----------------------------------|------------------------------------|
| • Body .....        | Aluminum Alloy                  | • Stroke tolerance .....         | $\pm 1/64"$                        |
| • Heads .....       | Clear anodized aluminum alloy   | • Media .....                    | Air                                |
| • Tie Bolts .....   | Stainless steel                 | • Pressure rating, maximum ..... | 250 psi                            |
| • Rod .....         | Chrome plated stainless steel   | • Minimum recommended            |                                    |
| • Piston .....      | Aluminum alloy                  | operating pressure .....         | 15 psi                             |
| • Rod end .....     | Female thread with wrench flats | • Temperature rating             |                                    |
| • Ports .....       | Position #1                     | Cylinder .....                   | -25° to +225°F<br>(-32° to +121°C) |
| • Seals .....       | Internally lubricated Nitrile   | • Temperature rating             |                                    |
| • Lubrication ..... | Magnalube®-G                    | Electronic sensors .....         | -5° to +175°F<br>(-20° to +80°C)   |
| • Rod bushing ..... | High density iron               |                                  |                                    |

#### Spring Forces

| Bore (in.) | Maximum Force | Spring Rate (lbs/inch) for Stroke Range |                    |                    |                    |
|------------|---------------|-----------------------------------------|--------------------|--------------------|--------------------|
|            |               | 0.12 to 1" Stroke                       | 1.001 to 2" Stroke | 2.001 to 3" Stroke | 3.001 to 4" Stroke |
| 1/2 (05)   | 5.25          | 4.25                                    | 1.75               | 1.24               | 0.88               |
| 3/4 (07)   | 10.00         | 6.00                                    | 2.50               | 1.76               | 1.25               |
| 1-1/8 (11) | 11.50         | 6.00                                    | 2.50               | 1.76               | 1.25               |
| 1-1/2 (15) | 13.00         | 5.50                                    | 2.25               | 1.60               | 1.13               |
| 2 (20)     | 13.00         | 5.50                                    | 2.25               | 1.60               | 1.13               |
| 2-1/2 (25) | 25.00         | 6.50                                    | 2.75               | 1.93               | 1.38               |
| 3 (30)     | 25.00         | 6.50                                    | 2.75               | 1.93               | 1.38               |
| 4 (40)     | 25.00         | 6.50                                    | 2.75               | 1.93               | 1.38               |

#### Cylinder Sizing Guide

| Bore Diameter (in.)    | 1/2  | 3/4  | 1-1/8 | 1-1/2 | 2    | 2 1/2 | 3    | 4     |
|------------------------|------|------|-------|-------|------|-------|------|-------|
| Rod Diameter (in.)     | 0.25 | 0.31 | 0.50  | 0.63  | 0.75 | 0.75  | 0.88 | 1.00  |
| Rod Area               | 0.05 | 0.08 | 0.19  | 0.31  | 0.44 | 0.44  | 0.60 | 0.79  |
| Push Area (Single Rod) | 0.20 | 0.44 | 0.88  | 1.76  | 3.14 | 4.91  | 7.07 | 12.57 |
| Push Area (Double Rod) | 0.15 | 0.36 | 0.69  | 1.45  | 2.66 | 4.47  | 6.47 | 11.78 |
| Pull Area              | 0.15 | 0.36 | 0.69  | 1.45  | 2.66 | 4.47  | 6.47 | 11.78 |

# Compact Cylinders

## Premair Series

**Select, Compact Type**

**C** Double Acting, Single Rod End  
**D** Double Acting, Double Rod End  
**S** Single Acting  
**R** Reverse Acting

**Bore Size**

**05** 1/2"  
**07** 3/4"  
**11** 1 1/8"  
**15** 1 1/2"  
**20** 2"  
**25** 2 1/2"  
**30** 3"  
**40** 4"

**Mounting Options**

**C** Pivot Mount  
**D** Pivot Mount 90 From Standard  
**E** Trunnion Mount, Both Ends (See Note #5)  
**M** Trunnion Mount, Front (See Note #5)  
**P** Trunnion Mount, Rear (See Note #5)  
**G** Threaded Mounting Holes, Both Ends  
**F** Threaded Mounting Holes, Front  
**H** Threaded Mounting Holes, Rear  
**J** Screw Clearance Holes, Both Ends  
**K** Screw Clearance Holes, Front  
**L** Screw Clearance Holes, Rear  
**N** Nose Mount For SCC, SCR & SCS Only (See Note #6)  
**X** Standard Counterbored Mounting holes

**Stroke (Inches)**

| Tens | Ones | Fractions   |
|------|------|-------------|
| 0    | 0-4  | 0 = 0 in.   |
| 0    |      | 1 = 1/8 in. |
|      |      | 2 = 1/4 in. |
|      |      | 3 = 3/8 in. |
|      |      | 4 = 1/2 in. |
|      |      | 5 = 5/8 in. |
|      |      | 6 = 3/4 in. |
|      |      | 7 = 7/8 in. |

**Head/Port Options**

**H** Heavy Duty Rear Head  
**J** FailSafe Operation (SCS Models Only) (See Note #5)  
**P** Front Port Position #2  
**R** Front Port Position #3  
**S** Front Port Position #4  
**X** No Additional Options Required

**Magnet/Sensor Options**

**E** Magnetic Piston Only (See Note #7)  
**X** No Additional Options Required

**Thread/Rod Options**

**D** Coarse Female Thread, Dimension "E"  
**E** Male Rod End With Coarse Threads  
**H** Hollow Rod, (SCD) Models Only  
**M** Male Rod End, Fine, Thread  
**N** Non-Threaded Rod  
**W** 1/4" Extra Rod Extension  
**Y** 1/2" Extra Rod Extension  
**Z** 1" Extra Rod Extension  
**X** No Additional Options Required

**Bumper/Seal Options**

**B** Bumpers, Both Ends (SCC & SCD Models Only)  
**F** Bumpers, Front Only (SCR Models Only)  
**R** Bumpers, Rear Only (SCS Models Only)  
**L** Low Friction Seals  
**M** Low Friction & Low Temperature Seals  
**N** Low Friction & Viton Seals  
**Q** Low Temperature Operation (-40 F)  
**V** Viton Seals For Media Compatibility (-15F to 225F)  
**W** Rod Wiper, Urethane-N Only  
**X** No Additional Options Required

**NOTES:**  
 5) Not Available On 1/2" Bore Size Models.  
 6) Includes Heavy duty Rear Head (H) and Rod wiper (W)  
 7) 3/8" stroke minimum. Not available with Viton Seals or Low Temperature Seals.

# Compact Cylinders

## Premair Series

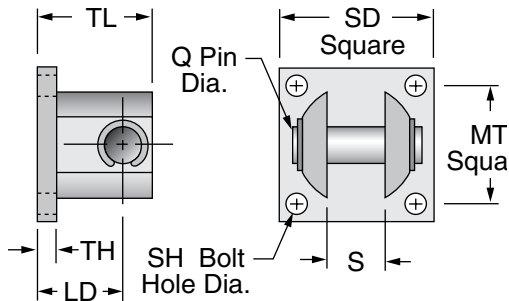
### Accessories

#### Selection Guide

| Accessory        | Standard Series |
|------------------|-----------------|
| Clevis Bracket   | ✓               |
| Trunnion Bracket | ✓               |
| Rod Pivot        | ✓               |

#### Clevis Bracket

Anodized aluminum alloy  
Chrome plated steel pin included



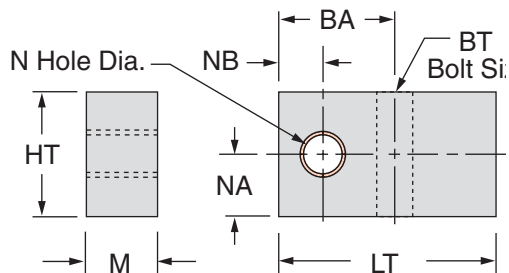
The bracket is intended for mounting with either a rod pivot or pivot mount; it is not intended to mount directly with the rear cylinder head.

#### Dimensions (inches)

| Kit No. | Bore       | LD   | MT   | Q     | S    | SH   | SD   | TH   | TL   |
|---------|------------|------|------|-------|------|------|------|------|------|
| SCABC-1 | 1/2 (05)   | 0.56 | 0.75 | 0.187 | 0.39 | #6   | 1.00 | 0.16 | 0.78 |
|         | 3/4 (07)   |      |      |       |      |      |      |      |      |
|         | 1-1/8 (11) |      |      |       |      |      |      |      |      |
| SCABC-2 | 1-1/2 (15) | 0.94 | 1.38 | 0.375 | 0.75 | #10  | 1.75 | 0.22 | 1.34 |
|         | 2 (20)     |      |      |       |      |      |      |      |      |
| SCABC-3 | 2-1/2 (25) | 1.25 | 2.00 | 0.625 | 1.00 | 0.25 | 2.50 | 0.25 | 1.81 |
|         | 3 (30)     |      |      |       |      |      |      |      |      |
|         | 4 (40)     |      |      |       |      |      |      |      |      |

#### Trunnion Bracket (pair)

Anodized aluminum alloy  
complete with bronze pivot bushings

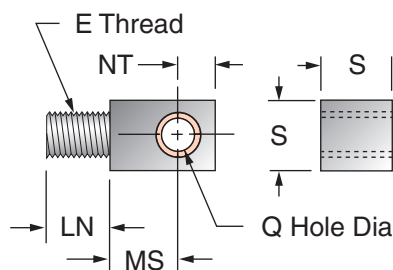


#### Dimensions (inches)

| Kit No. | Bore       | BA   | BT   | HT   | LT   | M    | N     | NA   | NB   |
|---------|------------|------|------|------|------|------|-------|------|------|
| SCABT-1 | 3/4 (07)   | 0.56 | #10  | 0.63 | 1.12 | 0.31 | 0.126 | 0.30 | 0.22 |
|         | 1-1/8 (11) |      |      |      |      |      |       |      |      |
| SCABT-2 | 1-1/2 (15) | 0.81 | 1/4  | 0.88 | 1.50 | 0.50 | 0.251 | 0.38 | 0.31 |
|         | 2 (20)     |      |      |      |      |      |       |      |      |
| SCABT-3 | 2-1/2 (25) | 0.94 | 5/16 | 1.00 | 1.63 | 0.63 | 0.313 | 0.45 | 0.38 |
|         | 3 (30)     |      |      |      |      |      |       |      |      |
| SCABT-4 | 4 (40)     | 1.06 | 3/8  | 1.25 | 1.88 | 0.75 | 0.376 | 0.55 | 0.44 |

#### Rod Pivot

Steel with bronze pivot bushing and nut



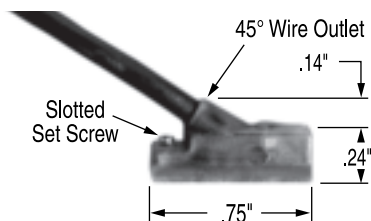
#### Dimensions (inches)

| Kit No. | Bore       | E           | LN   | MS   | NT   | Q     | S    |
|---------|------------|-------------|------|------|------|-------|------|
| SCARP-0 | 1/2 (05)   | #8-32 UNC   | 0.38 | 0.47 | 0.25 | 0.187 | 0.38 |
| SCARP-1 | 3/4 (07)   | #10-32 UNF  | 0.38 | 0.47 | 0.25 | 0.187 | 0.38 |
| SCARP-2 | 1-1/8 (11) | 5/16-24 UNF | 0.63 | 0.47 | 0.25 | 0.187 | 0.38 |
| SCARP-3 | 1-1/2 (15) | 3/8-24 UNF  | 0.63 | 0.72 | 0.44 | 0.375 | 0.75 |
| SCARP-4 | 2 (20)     | 1/2-20 UNF  | 0.75 | 0.72 | 0.44 | 0.375 | 0.75 |
|         | 2-1/2 (25) |             |      |      |      |       |      |
| SCARP-5 | 3 (30)     | 5/8-18 UNF  | 0.88 | 1.00 | 0.63 | 0.625 | 1.00 |
| SCARP-6 | 4 (40)     | 3/4-16 UNF  | 0.88 | 1.00 | 0.63 | 0.625 | 1.00 |

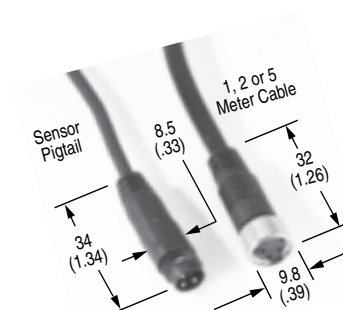
# Compact Cylinders

## Magnetic Position Sensing

### Sensor Specifications & Ordering Information



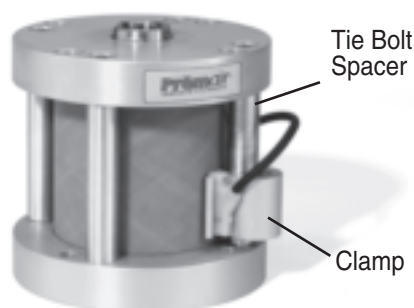
- Encased in a plastic housing, dovetail style electronic sensors are corrosion resistant. 45° wire outlet allows close mounting.
- Two methods of mounting are available:
  1. Tie bolt spacer mounted clamps
  2. Adhesive mounted dovetail extrusions
- **Order sensors separately from the table below**



| Ordering Guide – Dovetail Style Magnetic Sensor with LED |                         |                            |            |                                                               | Sensor Temperature Range<br>-20° to +80° C (-4° to +176° F) | Female Cordsets<br>for<br>Quick Disconnect |
|----------------------------------------------------------|-------------------------|----------------------------|------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------|
| Sensor Type                                              | Prewired 9 ft. Part No. | Quick Disconnect Part No.* | Wire Leads | Electrical Characteristics                                    |                                                             |                                            |
| Electronic                                               | SCAMS-1                 | SCAMS-3                    | 3          | Sourcing PNP 6-24 VDC, 0.20 Amp Max current, 0.5 Voltage Drop |                                                             | Length    Part No.                         |
| Electronic                                               | SCAMS-2                 | SCAMS-4                    | 3          | Sinking NPN 6-24 VDC, 0.20 Amp Max current, 0.5 Voltage Drop  |                                                             | 2 Meters    SCAFC-2                        |
|                                                          |                         |                            |            |                                                               |                                                             | 5 Meters    SCAFC-5                        |

Note\*: Quick disconnect styles are supplied with 6 inch pigtail with male connector. Order female cordsets separately.

### Position sensors with spacer mounted clamps



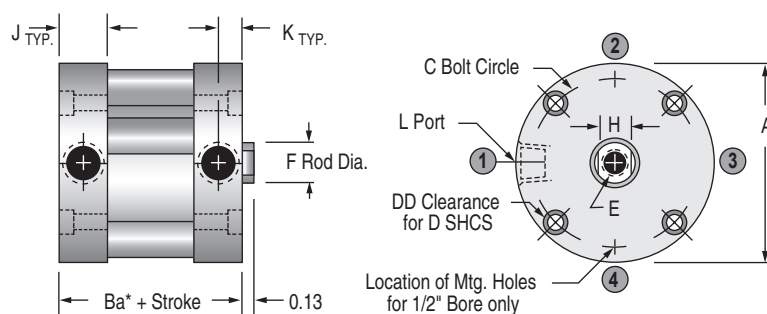
| Clamp Selection Guide |         |         |         |             |             |         |
|-----------------------|---------|---------|---------|-------------|-------------|---------|
| Part No.              | SCAMC-1 | SCAMC-2 | SCAMC-3 | SCAMC-4     | SCAMC-5     | SCAMC-6 |
| To Fit Bore           | 1/2"    | 3/4"    | 1-1/8"  | 1-1/2" & 2" | 2-1/2" & 3" | 4"      |

Order clamps and sensors separately

# Compact Cylinders Premair Series

## Model SCC

Double Acting, Single Rod

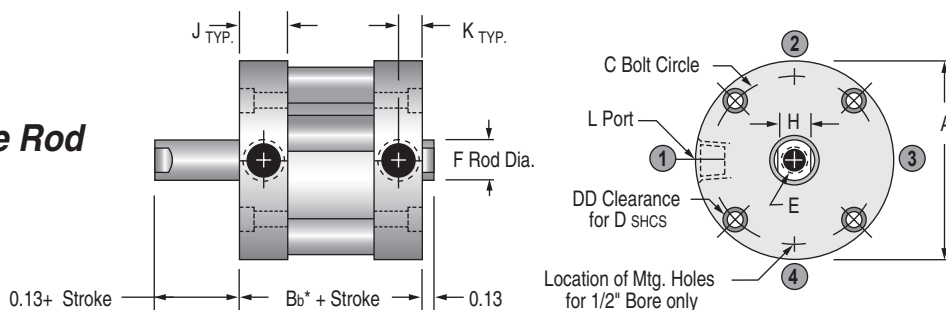


**\*Note: Some options effect cylinder length**

**Standard Strokes – All Models: • 1/8 • 1/4 • 3/8 • 1/2 • 5/8 • 3/4 • 7/8 • 1 • 1-1/4 • 1-1/2 • 1-3/4 • 2 • 2-1/2 • 3 • 3-1/2 • 4**

## Model SCD

Double Acting, Double Rod



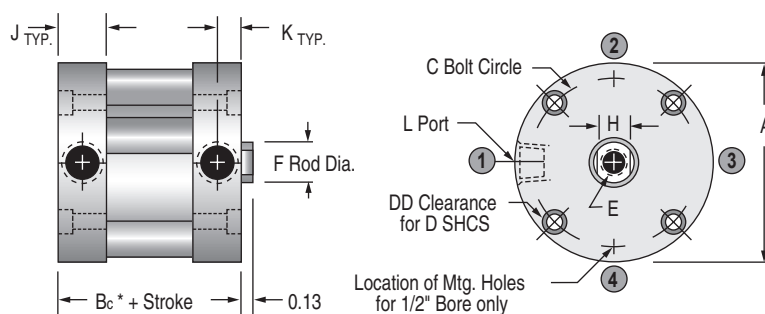
**\*Note: Some options effect cylinder length**

### Dimensions (inches)

| Bore       | A    | Ba*  | Bb*  | Bc* for Stroke Range |         |         |         | Bd* for Stroke Range |         |         |         | C    | DD |
|------------|------|------|------|----------------------|---------|---------|---------|----------------------|---------|---------|---------|------|----|
|            |      |      |      | 0-1                  | 1.001-2 | 2.001-3 | 3.001-4 | 0-1                  | 1.001-2 | 2.001-3 | 3.001-4 |      |    |
| 1/2 (05)   | 1.12 | 0.56 | 0.69 | 0.81                 | 1.38    | 1.96    | 2.52    | 1.06                 | 1.62    | 2.14    | 3.21    | 0.88 | 2  |
| 3/4 (07)   | 1.50 | 0.56 | 0.69 | 0.81                 | 1.38    | 1.94    | 2.50    | 1.06                 | 1.62    | 2.19    | 2.75    | 1.22 | 4  |
| 1-1/8 (11) | 2.00 | 0.88 | 0.94 | 0.88                 | 1.50    | 2.13    | 2.75    | 1.38                 | 2.00    | 2.63    | 3.25    | 1.69 | 4  |
| 1-1/2 (15) | 2.62 | 0.88 | 1.00 | 0.88                 | 1.50    | 2.13    | 2.75    | 1.38                 | 2.00    | 2.63    | 3.25    | 2.19 | 4  |
| 2 (20)     | 3.12 | 0.94 | 1.06 | 0.94                 | 1.56    | 2.19    | 2.81    | 1.44                 | 2.06    | 2.69    | NA      | 2.69 | 4  |
| 2-1/2 (25) | 3.75 | 1.19 | 1.31 | 1.19                 | 2.06    | 2.94    | 3.81    | 1.94                 | 2.81    | 2.81    | NA      | 3.25 | 4  |
| 3 (30)     | 4.25 | 1.25 | 1.38 | 1.25                 | 2.12    | 3.00    | 3.88    | 2.00                 | 2.88    | 2.88    | NA      | 3.78 | 4  |
| 4 (40)     | 5.50 | 1.56 | 1.69 | 1.56                 | 2.44    | 3.31    | 4.19    | 2.31                 | 3.19    | 3.19    | NA      | 4.94 | 4  |

## Model SCS

Single Acting, Spring Retract

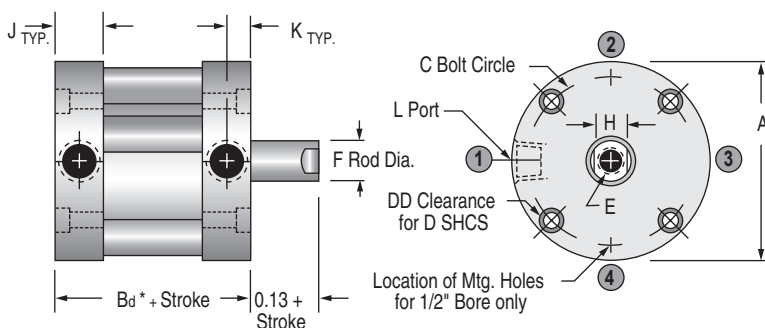


**\*Note: Some options effect cylinder length**

**Standard Strokes – All Models: • 1/8 • 1/4 • 3/8 • 1/2 • 5/8 • 3/4 • 7/8 • 1 • 1-1/4 • 1-1/2 • 1-3/4 • 2**

## Model SCR

Reverse Acting, Spring Extend



**Approximate Cylinder Weights (ounces) SCC, SCS, SCD, SCR**

| Bore       | SCC, SCS |                         | SCD  |                         |                                       | SCR  |                         | Nose Mount Option<br>Adder to Base Weight |
|------------|----------|-------------------------|------|-------------------------|---------------------------------------|------|-------------------------|-------------------------------------------|
|            | Base     | Adder per 1/8 of Stroke | Base | Adder per 1/8 of Stroke | Adder per 1/8 of Stroke for -H Option | Base | Adder per 1/8 of Stroke |                                           |
| 1/2 (05)   | 1.2      | 0.08                    | 1.3  | 0.15                    | 0.1                                   | 1.3  | 0.08                    | 0.1                                       |
| 3/4 (07)   | 1.9      | 0.1                     | 2.1  | 0.2                     | 0.15                                  | 2.0  | 0.1                     | 0.2                                       |
| 1-1/8 (11) | 4.9      | 0.3                     | 5.8  | 0.4                     | 0.3                                   | 5.3  | 0.3                     | 1.1                                       |
| 1-1/2 (15) | 9.6      | 0.4                     | 11.2 | 0.6                     | 0.5                                   | 10.5 | 0.4                     | 1.8                                       |
| 2 (20)     | 13.0     | 0.5                     | 15.2 | 0.7                     | 0.6                                   | 14.0 | 0.5                     | 2.7                                       |
| 2-1/2 (25) | 22.4     | 0.6                     | 28.0 | 0.8                     | 0.7                                   | 25.0 | 0.6                     | 3.1                                       |
| 3 (30)     | 28.9     | 0.8                     | 38.0 | 1.1                     | 0.9                                   | 32.5 | 0.8                     | 3.5                                       |
| 4 (40)     | 55.7     | 1.0                     | 71.8 | 1.3                     | 1.1                                   | 61.8 | 1.0                     | 5.9                                       |

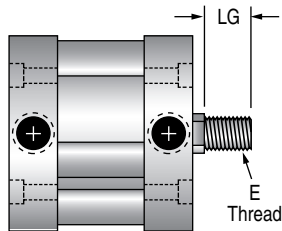
**Dimensions (inches)**

| Bore       | D    | E Standard  | E Depth for Stroke Range |       | F    | H    | J    | K    | L          |
|------------|------|-------------|--------------------------|-------|------|------|------|------|------------|
|            |      |             | 1/8 – 1/2                | 5/8 + |      |      |      |      |            |
| 1/2 (05)   | #4   | #8-32 UNC   | 0.30-0.46                | 0.46  | 0.25 | 0.22 | 0.34 | 0.14 | #10-32 UNF |
| 3/4 (07)   | #6   | #10-32 UNF  | 0.30-0.46                | 0.46  | 0.31 | 0.25 | 0.34 | 0.14 | #10-32 UNF |
| 1-1/8 (11) | #6   | 5/16-24 UNF | 0.37-0.63                | 0.70  | 0.50 | 0.44 | 0.50 | 0.25 | 1/8 NPT    |
| 1-1/2 (15) | #10  | 3/8-24 UNF  | 0.37-0.70                | 0.70  | 0.63 | 0.50 | 0.50 | 0.25 | 1/8 NPT    |
| 2 (20)     | #10  | 1/2-20 UNF  | 0.30-0.63                | 0.70  | 0.75 | 0.63 | 0.53 | 0.25 | 1/8 NPT    |
| 2-1/2 (25) | 1/4  | 1/2-20 UNF  | 0.42-0.70                | 0.70  | 0.75 | 0.63 | 0.66 | 0.33 | 1/4 NPT    |
| 3 (30)     | 1/4  | 5/8-18 UNF  | 0.45-0.73                | 0.73  | 0.88 | 0.75 | 0.69 | 0.33 | 1/4 NPT    |
| 4 (40)     | 5/16 | 3/4-16 UNF  | 0.40-0.70                | 0.80  | 1.00 | 0.88 | 0.84 | 0.42 | 3/8 NPT    |

## Compact Cylinders Premair Series

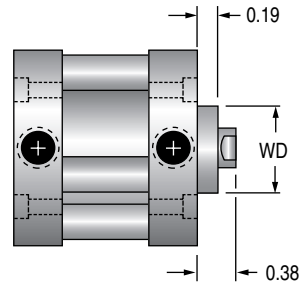
### Model Options

#### Male Rod Ends



| Thread Sizes |             |      |
|--------------|-------------|------|
| E Thread     |             |      |
| Bore         | M (Fine)    | LG   |
| 1/2 (05)     | #8-32 UNC   | 0.38 |
| 3/4 (07)     | #10-32 UNF  | 0.38 |
| 1-1/8 (11)   | 5/16-24 UNF | 0.50 |
| 1-1/2 (15)   | 3/8-24 UNF  | 0.50 |
| 2 (20)       | 1/2-20 UNF  | 0.63 |
| 2-1/2 (25)   | 1/2-20 UNF  | 0.63 |
| 3 (30)       | 5/8-18 UNF  | 0.75 |
| 4 (40)       | 3/4-16 UNF  | 0.75 |

#### Rod Wiper (Buna-N only)

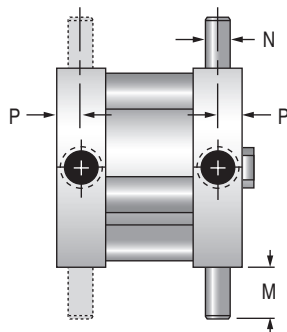


| Boss Dia.  |      |
|------------|------|
| Bore       | WD   |
| 1/2 (05)   | 0.56 |
| 3/4 (07)   | 0.69 |
| 1-1/8 (11) | 0.88 |
| 1-1/2 (15) | 1.00 |
| 2 (20)     | 1.13 |
| 2-1/2 (25) | 1.13 |
| 3 (30)     | 1.25 |
| 4 (40)     | 1.38 |

### Mounting Options

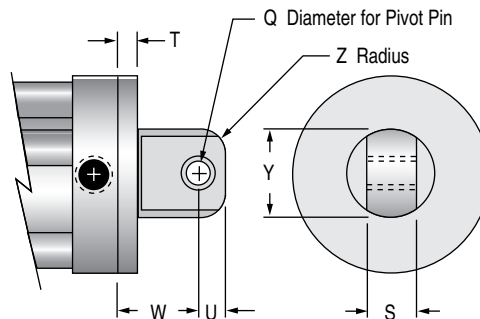
#### Trunnion Mount

Available rear, front or both.  
Not available on 1/2" bore.



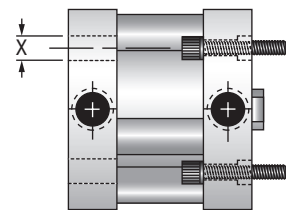
#### Pivot Mount

Complete with bronze pivot bushing.  
Not available as an accessory.



#### Screw Clearance Holes

Available either or both ends.



| Dimensions (inches) |      |       |      |      |      |      |      |      |      |      |      |
|---------------------|------|-------|------|------|------|------|------|------|------|------|------|
| Bore                | M    | N     | P    | Q    | S    | T    | U    | W    | X    | Y    | Z    |
| 1/2 (05)            | NA   | NA    | NA   | 0.19 | 0.38 | 0.19 | 0.25 | 0.75 | 0.17 | 0.63 | 0.19 |
| 3/4 (07)            | 0.31 | 0.125 | 0.17 | 0.19 | 0.38 | 0.19 | 0.25 | 0.75 | 0.23 | 0.75 | 0.19 |
| 1-1/8 (11)          | 0.50 | 0.250 | 0.25 | 0.19 | 0.38 | 0.25 | 0.25 | 0.81 | 0.25 | 0.75 | 0.19 |
| 1-1/2 (15)          | 0.50 | 0.250 | 0.25 | 0.38 | 0.75 | 0.25 | 0.44 | 1.19 | 0.34 | 1.38 | 0.38 |
| 2 (20)              | 0.50 | 0.250 | 0.25 | 0.38 | 0.75 | 0.31 | 0.44 | 1.25 | 0.34 | 1.38 | 0.38 |
| 2-1/2 (25)          | 0.63 | 0.312 | 0.33 | 0.38 | 0.75 | 0.38 | 0.44 | 1.31 | 0.41 | 1.38 | 0.38 |
| 3 (30)              | 0.63 | 0.312 | 0.33 | 0.63 | 1.00 | 0.38 | 0.56 | 1.69 | 0.41 | 1.88 | 0.38 |
| 4 (40)              | 0.75 | 0.375 | 0.42 | 0.63 | 1.00 | 0.44 | 0.56 | 1.75 | 0.50 | 1.88 | 0.38 |

# Compact Cylinders Premair Series

## Deviations from Standard Dimensions

|            | <b>Length Adder (inches)</b> |                                      |                                                 |      |      |
|------------|------------------------------|--------------------------------------|-------------------------------------------------|------|------|
|            | Low Friction<br>Seals        | Heavy Duty<br>Rear Head <sup>†</sup> | Magnetic Position Sensing <sup>†</sup> (E or M) |      |      |
|            |                              |                                      | SCC, SCD                                        | SCS  | SCR  |
| 1/2 (05)   | 0.25                         | 0.13                                 | 0.88                                            | 0.63 | 0.38 |
| 3/4 (07)   | 0.25                         | 0.13                                 | 0.88                                            | 0.88 | 0.88 |
| 1-1/8 (11) | 0.38                         | 0.19                                 | 0.88                                            | 0.88 | 0.88 |
| 1-1/2 (15) | 0.38                         | 0.19                                 | 0.88                                            | 0.88 | 0.88 |
| 2 (20)     | 0.38                         | 0.19                                 | 0.88                                            | 0.88 | 0.88 |
| 2-1/2 (25) | 0.38                         | 0.25                                 | 0.88                                            | 0.88 | 0.88 |
| 3 (30)     | 0.50                         | 0.25                                 | 0.88                                            | 0.88 | 0.88 |
| 4 (40)     | 0.50                         | 0.38                                 | 0.88                                            | 0.88 | 0.88 |

<sup>†</sup> Heavy duty rear head is recommended for applications where the cylinder is mounted on the front face or trunnion-mounted, and impact loading (20 or more cycles/minute) occurs between the piston and rear head. It increases the overall length of the cylinder as shown.

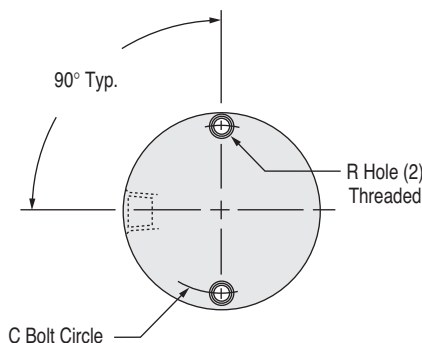
<sup>†</sup> A minimum stroke of 3/8" is required to sense end-of-stroke positions. For low friction seals used in conjunction with magnetic position sensing, use "E" or "M" sensor options only.

## Hollow Rod Option

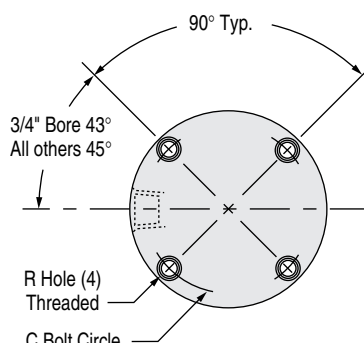
| Bore       | <b>Hole Diameter</b> |                 |
|------------|----------------------|-----------------|
|            | Female Rod Thread    | Male Rod Thread |
| 1/2 (05)   | 0.14                 | N/A             |
| 3/4 (07)   | 0.14                 | 0.09            |
| 1-1/8 (11) | 0.22                 | 0.16            |
| 1-1/2 (15) | 0.28                 | 0.19            |
| 2 (20)     | 0.38                 | 0.25            |
| 2-1/2 (25) | 0.38                 | 0.25            |
| 3 (30)     | 0.44                 | 0.31            |
| 4 (40)     | 0.50                 | 0.38            |

## Threaded Mounting Holes 1/2" Bore

Available either or both ends.



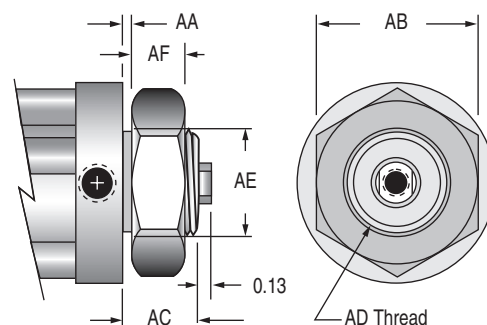
## 3/4" Bore & Up



## Nose Mount

Available on SCC, SCS, SCR.

Included heavy duty rear head. See length adder above.

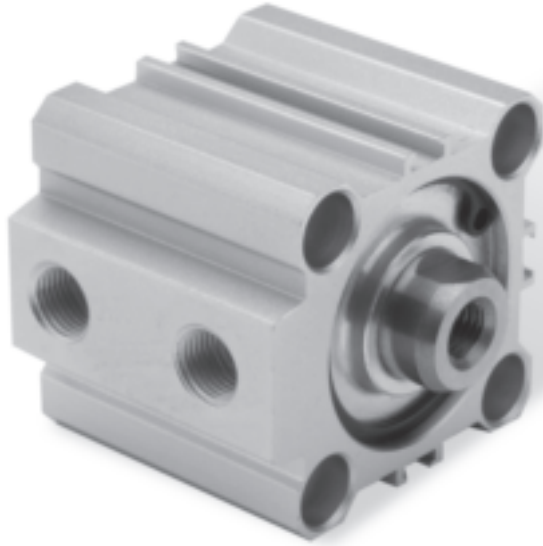


| <b>Dimensions (inches)</b> |     |          |      |                   |      |     |      |               |
|----------------------------|-----|----------|------|-------------------|------|-----|------|---------------|
| Bore                       | AA  | AB       | AC   | AD                | AE   | AF  | C    | R             |
| 1/2 (05)                   | .06 | 0.75 Hex | .38  | 1/2 – 20 UNF-2A   | .50  | .31 | 0.88 | #4 – 40 UNC   |
| 3/4 (07)                   | .06 | 0.75 Hex | .38  | 5/8 – 18 UNF-2A   | .62  | .25 | 1.22 | #6 – 32 UNC   |
| 1-1/8 (11)                 | .13 | 1.50 Hex | .75  | 1 – 14 UNF-2A     | 1.00 | .55 | 1.69 | #6 – 32 UNC   |
| 1-1/2 (15)                 | .13 | 1.88 Hex | .75  | 1-1/4 – 12 UNF-2A | 1.25 | .52 | 2.19 | #10 – 24 UNC  |
| 2 (20)                     | .19 | 1.88 Hex | .88  | 1-3/8 – 12 UNF-2A | 1.38 | .52 | 2.69 | #10 – 24 UNC  |
| 2-1/2 (25)                 | .25 | 1.88 Hex | 1.00 | 1-3/8 – 12 UNF-2A | 1.38 | .52 | 3.25 | 1/4 – 20 UNC  |
| 3 (30)                     | .25 | 1.88 Hex | 1.00 | 1-3/8 – 12 UNF-2A | 1.38 | .52 | 3.78 | 1/4 – 20 UNC  |
| 4 (40)                     | .19 | 2.62 Hex | 1.12 | 1-3/4 – 12 UN-2A  | 1.75 | .88 | 4.94 | 5/16 – 18 UNC |

## Maximum Torque for Nose Mount Option

| Bore       | Foot-Pounds |
|------------|-------------|
| 1/2 (05)   | 12          |
| 3/4 (07)   | 28          |
| 1-1/8 (11) | 100         |
| 1-1/2 (15) | 120         |
| 2 (20)     | 130         |
| 2-1/2 (25) | 130         |
| 3 (30)     | 130         |
| 4 (40)     | 150         |

## Compact Cylinders Premair Series



## 10 Bore Sizes 12mm thru 100mm

- NPT Ports
- Stainless Steel Rod
- Space Saving Design
- Buna Seals Standard
- Light Weight Aluminum Body
- Metric Female Rod Threads Standard

Low-profile, aluminum cylinders are designed for compact, space-saving applications. All models have magnetic pistons and are switch-ready for accurate position sensing. Low-profile, solid state switches slide into machined grooves located on the cylinder body. Viton seals for higher temperature rating than nitrile. Stainless steel piston rods are hard chrome plated for superior wear and corrosion resistance. Piston is attached to rod with a flat head screw to minimize pounding and vibration. Mounting through holes are threaded for easy mounting hardware installation.

### Ratings

- |                                                            |                                                     |
|------------------------------------------------------------|-----------------------------------------------------|
| • Fluid . . . . .AIR                                       | • Rod End Thread . . . . .Female (standard)         |
| • Max. Operating Pressure . . . . .140 PSI                 | • Stroke Tolerance . . . . .0.039 in (+10/-0mm)     |
| • Min. Operating Pressure . . . . .7 PSI                   | • Mounting . . . . .Through Hole (Standard)         |
| • Ambient and Fluid Temperature . . .15-140 F (-10 - 60 C) | • Piston Speed . . . . .2-20inch/sec (50-500mm/sec) |
| • Lubrication . . . . .Not Required                        |                                                     |
| • Cushion . . . . .None                                    |                                                     |

### Cylinder Force

#### Cylinder Force Bore Size

|                       | Operating Pressure PSI |      |      |
|-----------------------|------------------------|------|------|
|                       | 50                     | 75   | 100  |
| <b>012(1/2 nom)</b>   | 8.7                    | 13.1 | 17.5 |
|                       | 6.6                    | 9.8  | 13.1 |
| <b>016(5/8 nom)</b>   | 15.6                   | 23.4 | 31.2 |
|                       | 11.7                   | 17.5 | 23.4 |
| <b>020(3/4 nom)</b>   | 24.3                   | 36.5 | 48.6 |
|                       | 18.2                   | 27.3 | 36.5 |
| <b>025(1 nom)</b>     | 38                     | 57   | 76   |
|                       | 29.3                   | 43.9 | 58.5 |
| <b>032(1 1/4 nom)</b> | 62.3                   | 93.5 | 12.5 |
|                       | 46.8                   | 70.1 | 93.5 |

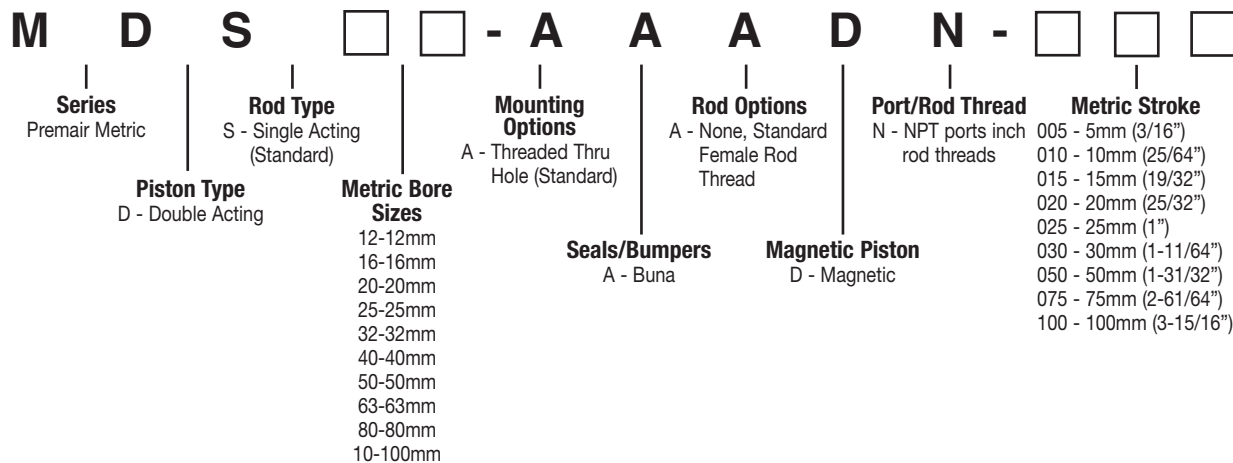
#### Bore Size

|                       | Operating Pressure PSI |      |      |
|-----------------------|------------------------|------|------|
|                       | 50                     | 75   | 100  |
| <b>040(1 1/2 nom)</b> | 97.4                   | 146  | 195  |
|                       | 81.8                   | 123  | 164  |
| <b>050(2 nom)</b>     | 152                    | 228  | 304  |
|                       | 128                    | 192  | 256  |
| <b>063(2 1/2 nom)</b> | 242                    | 362  | 483  |
|                       | 217                    | 326  | 434  |
| <b>080(3 1/4 nom)</b> | 390                    | 584  | 779  |
|                       | 352                    | 527  | 703  |
| <b>100(4 nom)</b>     | 62.3                   | 93.5 | 12.5 |
|                       | 554                    | 831  | 1108 |

### Basic Cylinder Weights

| Basic Cylinder Weights (lbs) |               |             |             |             |             |              |              |              |              |              |              |               |
|------------------------------|---------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| Bore<br>(in)                 | Stroke (inch) |             |             |             |             |              |              |              |              |              |              |               |
|                              | 5<br>(.20)    | 10<br>(.39) | 15<br>(.59) | 20<br>(.79) | 25<br>(.98) | 30<br>(1.18) | 35<br>(1.38) | 40<br>(1.57) | 45<br>(1.77) | 50<br>(1.97) | 75<br>(2.95) | 100<br>(3.94) |
| 1/2                          | 0.110         | 0.126       | 0.141       | 0.157       | 0.172       | 0.187        | -            | -            | -            | -            | -            | -             |
| 5/8                          | 0.157         | 0.181       | 0.207       | 0.232       | 0.256       | 0.280        | -            | -            | -            | -            | -            | -             |
| 3/4                          | 0.229         | 0.271       | 0.315       | 0.359       | 0.406       | 0.450        | 0.494        | 0.540        | 0.584        | 0.631        | -            | -             |
| 1                            | 0.284         | 0.331       | 0.395       | 0.423       | 0.472       | 0.518        | 0.564        | 0.613        | 0.657        | 0.706        | -            | -             |
| 1-1/4                        | 0.571         | 0.598       | 0.624       | 0.650       | 0.701       | 0.750        | 0.800        | 0.851        | 0.902        | 0.961        | 1.22         | 1.47          |
| 1-1/2                        | 0.752         | 0.805       | 0.858       | 0.908       | 0.953       | 0.997        | 1.05         | 1.09         | 1.14         | 1.2          | 1.44         | 1.68          |
| 2                            | -             | 1.10        | 1.17        | 1.25        | 1.34        | 1.43         | 1.5          | 1.58         | 1.66         | 1.78         | 2.18         | 2.5           |
| 2-1/2                        | -             | 1.60        | 1.69        | 1.78        | 1.87        | 1.97         | 2.06         | 2.15         | 2.23         | 2.38         | 2.84         | 3.29          |
| 3-1/4                        | -             | 3.53        | 3.74        | 0.4         | 4.16        | 4.36         | 4.57         | 4.78         | 4.99         | 5.28         | 6.31         | 7.33          |
| 4                            | -             | 5.55        | 5.68        | 5.81        | 6.05        | 6.29         | 6.52         | 6.75         | 6.97         | 7.31         | 8.45         | 9.59          |

# Compact Cylinders Premair Series

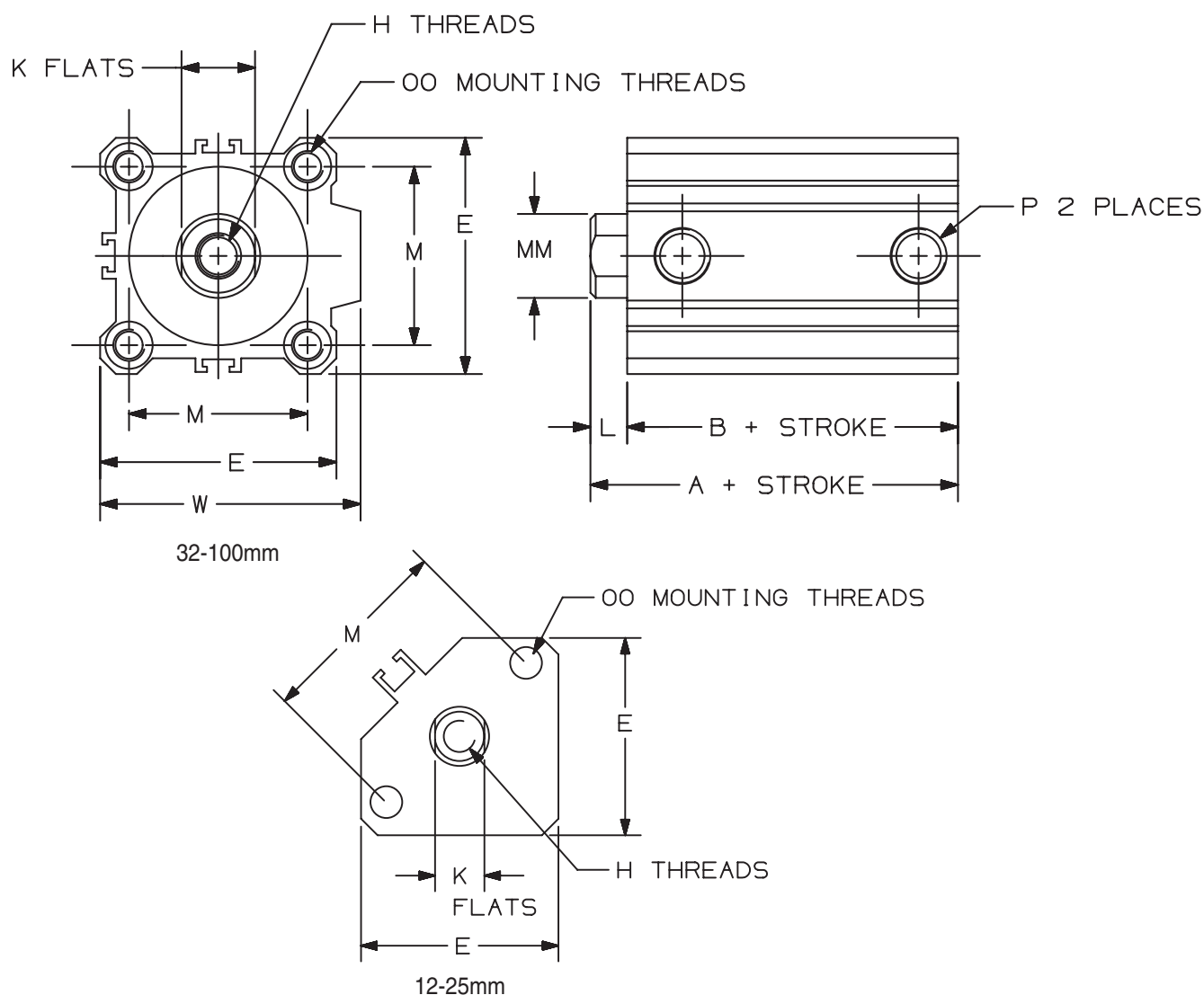


## Available Models

| Bore(mm) | Stroke (mm) | Model number    | Bore(mm) | Stroke (mm) | Model number    |
|----------|-------------|-----------------|----------|-------------|-----------------|
| 12       | .5          | MDS12-AAADN-005 | 40       | .35         | MDS40-AAADN-035 |
| 12       | .10         | MDS12-AAADN-010 | 40       | .40         | MDS40-AAADN-040 |
| 12       | .15         | MDS12-AAADN-015 | 40       | .45         | MDS40-AAADN-045 |
| 12       | .20         | MDS12-AAADN-020 | 40       | .50         | MDS40-AAADN-050 |
| 12       | .25         | MDS12-AAADN-025 | 40       | .75         | MDS40-AAADN-075 |
| 12       | .30         | MDS12-AAADN-030 | 40       | 1.00        | MDS40-AAADN-100 |
| 16       | .5          | MDS16-AAADN-005 | 50       | .10         | MDS50-AAADN-010 |
| 16       | .10         | MDS16-AAADN-010 | 50       | .15         | MDS50-AAADN-015 |
| 16       | .15         | MDS16-AAADN-015 | 50       | .20         | MDS50-AAADN-020 |
| 16       | .20         | MDS16-AAADN-020 | 50       | .25         | MDS50-AAADN-025 |
| 16       | .25         | MDS16-AAADN-025 | 50       | .30         | MDS50-AAADN-030 |
| 16       | .30         | MDS16-AAADN-030 | 50       | .35         | MDS50-AAADN-035 |
| 20       | .5          | MDS20-AAADN-005 | 50       | .40         | MDS50-AAADN-040 |
| 20       | .10         | MDS20-AAADN-010 | 50       | .45         | MDS50-AAADN-045 |
| 20       | .15         | MDS20-AAADN-015 | 50       | .50         | MDS50-AAADN-050 |
| 20       | .20         | MDS20-AAADN-020 | 50       | .75         | MDS50-AAADN-075 |
| 20       | .25         | MDS20-AAADN-025 | 50       | 1.00        | MDS50-AAADN-100 |
| 20       | .30         | MDS20-AAADN-030 | 63       | .10         | MDS63-AAADN-010 |
| 20       | .35         | MDS20-AAADN-035 | 63       | .15         | MDS63-AAADN-015 |
| 20       | .40         | MDS20-AAADN-040 | 63       | .20         | MDS63-AAADN-020 |
| 20       | .45         | MDS20-AAADN-045 | 63       | .25         | MDS63-AAADN-025 |
| 20       | .50         | MDS20-AAADN-050 | 63       | .30         | MDS63-AAADN-030 |
| 25       | .5          | MDS25-AAADN-005 | 63       | .35         | MDS63-AAADN-035 |
| 25       | .10         | MDS25-AAADN-010 | 63       | .40         | MDS63-AAADN-040 |
| 25       | .15         | MDS25-AAADN-015 | 63       | .45         | MDS63-AAADN-045 |
| 25       | .20         | MDS25-AAADN-020 | 63       | .50         | MDS63-AAADN-050 |
| 25       | .25         | MDS25-AAADN-025 | 63       | .75         | MDS63-AAADN-075 |
| 25       | .30         | MDS25-AAADN-030 | 63       | 1.00        | MDS63-AAADN-100 |
| 25       | .35         | MDS25-AAADN-035 | 80       | .10         | MDS80-AAADN-010 |
| 25       | .40         | MDS25-AAADN-040 | 80       | .15         | MDS80-AAADN-015 |
| 25       | .45         | MDS25-AAADN-045 | 80       | .20         | MDS80-AAADN-020 |
| 25       | .50         | MDS25-AAADN-050 | 80       | .25         | MDS80-AAADN-025 |
| 32       | .5          | MDS32-AAADN-005 | 80       | .30         | MDS80-AAADN-030 |
| 32       | .10         | MDS32-AAADN-010 | 80       | .35         | MDS80-AAADN-035 |
| 32       | .15         | MDS32-AAADN-015 | 80       | .40         | MDS80-AAADN-040 |
| 32       | .20         | MDS32-AAADN-020 | 80       | .45         | MDS80-AAADN-045 |
| 32       | .25         | MDS32-AAADN-025 | 80       | .50         | MDS80-AAADN-050 |
| 32       | .30         | MDS32-AAADN-030 | 80       | .75         | MDS80-AAADN-075 |
| 32       | .35         | MDS32-AAADN-035 | 80       | 1.00        | MDS80-AAADN-100 |
| 32       | .40         | MDS32-AAADN-040 | 10       | .10         | MDS10-AAADN-010 |
| 32       | .45         | MDS32-AAADN-045 | 10       | .15         | MDS10-AAADN-015 |
| 32       | .50         | MDS32-AAADN-050 | 10       | .20         | MDS10-AAADN-020 |
| 32       | .75         | MDS32-AAADN-075 | 10       | .25         | MDS10-AAADN-025 |
| 32       | 1.00        | MDS32-AAADN-100 | 10       | .30         | MDS10-AAADN-030 |
| 40       | .5          | MDS40-AAADN-005 | 10       | .35         | MDS10-AAADN-035 |
| 40       | .10         | MDS40-AAADN-010 | 10       | .40         | MDS10-AAADN-040 |
| 40       | .15         | MDS40-AAADN-015 | 10       | .45         | MDS10-AAADN-045 |
| 40       | .20         | MDS40-AAADN-020 | 10       | .50         | MDS10-AAADN-050 |
| 40       | .25         | MDS40-AAADN-025 | 10       | .75         | MDS10-AAADN-075 |
| 40       | .30         | MDS40-AAADN-030 | 10       | 1.00        | MDS10-AAADN-100 |

# Compact Cylinders

## Premair Series



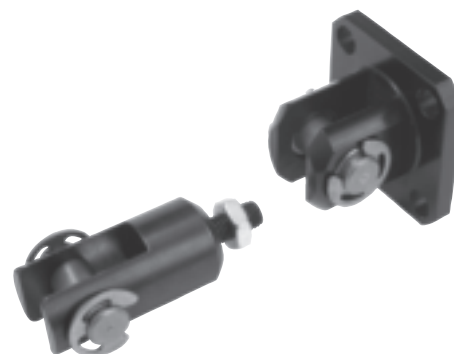
| Dimensions mm (inch)  |             |             |              |             |           |            |           |            |             |            |              |
|-----------------------|-------------|-------------|--------------|-------------|-----------|------------|-----------|------------|-------------|------------|--------------|
| BORE mm<br>(Nom. In.) | A           | B           | E            | H<br>(Inch) | K         | L          | M         | MM         | OO          | P<br>(NPT) | W            |
| 12 (1/2)              | 31.5 (1.24) | 28.0 (1.10) | 25 (0.98)    | 8-32        | 5 (0.20)  | 3.5 (0.14) | 22 (0.87) | 6 (0.236)  | 6.5 (0.26)  | 10-32      | 23 (0.90)    |
| 16 (5/8)              | 34.0 (1.34) | 30.5 (1.20) | 29 (1.14)    | 8-32        | 6 (0.24)  | 3.5 (0.14) | 28 (1.10) | 8 (0.315)  | 6.5 (0.26)  | 10-32      | 27.2 (1.07)  |
| 20 (3/4)              | 36.0 (1.42) | 31.5 (1.24) | 36 (1.42)    | 10-32       | 8 (.031)  | 4.5 (0.18) | 36 (1.42) | 10 (0.394) | 9 (0.35)    | 10-32      | 31.2 (1.23)  |
| 25 (1)                | 37.5 (1.48) | 32.5 (1.28) | 40 (1.57)    | 1/4-28      | 10 (0.39) | 5 (0.20)   | 40 (1.57) | 12 (0.472) | 9 (0.35)    | 10-32      | 36.9 (1.45)  |
| 32 (1-1/4)            | 40.0 (1.57) | 33.0 (1.30) | 44.5 (1.75)  | 5/16-24     | 14 (0.55) | 7 (0.28)   | 34 (1.34) | 16 (0.630) | 9 (0.35)    | 1/8        | 49.3 (1.94)  |
| 40 (1-1/2)            | 46.5 (1.83) | 39.5 (1.56) | 52 (2.05)    | 3/8-24      | 14 (0.55) | 7 (0.28)   | 40 (1.57) | 16 (0.630) | 9 (0.35)    | 1/8        | 57 (2.24)    |
| 50 (2)                | 48.5 (1.91) | 40.5 (1.59) | 63.7 (2.51)  | 1/2-20      | 17 (0.67) | 8 (0.31)   | 50 (1.97) | 20 (0.787) | 11 (0.43)   | 1/4        | 70.6 (2.78)  |
| 63 (2-1/2)            | 54.0 (2.13) | 46.0 (1.81) | 76.7 (3.02)  | 1/2-20      | 17 (0.67) | 8 (0.31)   | 60 (2.36) | 20 (0.787) | 14 (0.55)   | 1/4        | 83.6 (3.29)  |
| 80 (3-1/4)            | 63.5 (2.50) | 53.5 (2.11) | 97.8 (3.85)  | 5/8-18      | 22 (0.87) | 10 (0.39)  | 77 (3.03) | 25 (0.984) | 17.5 (0.69) | 3/8        | 104 (4.09)   |
| 100 (4)               | 75.0 (2.95) | 63.0 (2.48) | 115.3 (4.54) | 3/4-16      | 27 (1.06) | 12 (0.47)  | 94 (3.70) | 30 (1.181) | 17.5 (0.69) | 3/8        | 121.9 (4.80) |

## Compact Cylinders Premair Series

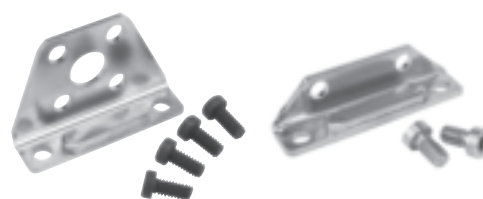
| <b>Rod Clevis</b> |                     |                       |
|-------------------|---------------------|-----------------------|
| Bore<br>mm (in)   | Inch<br>Part Number | Metric<br>Part Number |
| 12 (1/2)          | 114818-12           | 114819-12             |
| 16 (5/8)          | 114818-16           | 114819-16             |
| 20 (3/4)          | 114818-20           | 114819-20             |
| 25 (1)            | 114818-25           | 114819-25             |
| 32 (1-1/4)        | 114818-32           | 114819-32             |
| 40 (1-1/2)        | 114818-40           | 114819-32             |
| 50 (2)            | 114818-50           | 114819-50             |
| 63 (2-1/2)        | 114818-50           | 114819-50             |
| 80 (3-1/4)        | 114818-80           | 114819-80             |
| 100 (4)           | 114818-100          |                       |



| <b>Double Clevis rod clevis &amp; rear clevis</b> |             |                   |
|---------------------------------------------------|-------------|-------------------|
| Bore<br>mm (in)                                   | Part Number | Overall<br>Length |
| 12 (1/2)                                          | 114817-12   | 3/4               |
| 16 (5/8)                                          | 114817-16   | 53/64             |
| 20 (3/4)                                          | 114817-20   | 1 1/16            |
| 25 (1)                                            | 114817-25   | 1 1/12            |
| 32 (1-1/4)                                        | 114817-32   | 1 1/12            |
| 40 (1-1/2)                                        | 114817-40   | 1 17/64           |
| 50 (2)                                            | 114817-50   | 1 21/32           |
| 63 (2-1/2)                                        | 114817-63   | 1 47/64           |
| 80 (3-1/4)                                        | 114817-80   | 2 7/32            |
| 100 (4)                                           | 114817-100  | 4 27/32           |



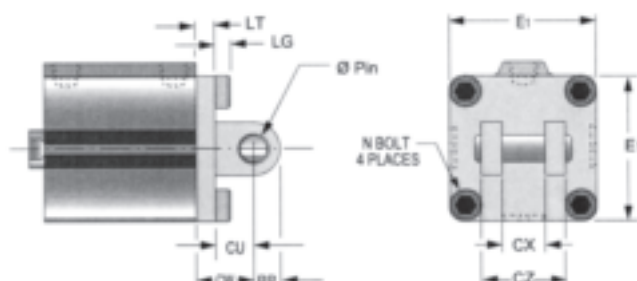
| <b>Flange Mount</b> |             |
|---------------------|-------------|
| Bore<br>mm (in)     | Part Number |
| 12 (1/2)            | 114815-12   |
| 16 (5/8)            | 114815-16   |
| 20 (3/4)            | 114815-20   |
| 25 (1)              | 114815-25   |
| 32 (1-1/4)          | 114815-32   |
| 40 (1-1/2)          | 114815-40   |
| 50 (2)              | 114815-50   |
| 63 (2-1/2)          | 114815-63   |
| 80 (3-1/4)          | 114815-80   |
| 100 (4)             | 114815-100  |



| <b>Foot Mount</b> |             |
|-------------------|-------------|
| Bore<br>mm (in)   | Part Number |
| 12 (1/2)          | 114816-12   |
| 16 (5/8)          | 114816-16   |
| 20 (3/4)          | 114816-20   |
| 25 (1)            | 114816-25   |
| 32 (1-1/4)        | 114816-32   |
| 40 (1-1/2)        | 114816-40   |
| 50 (2)            | 114816-50   |
| 63 (2-1/2)        | 114816-63   |
| 80 (3-1/4)        | 114816-80   |
| 100 (4)           | 114816-100  |

# Compact Cylinders

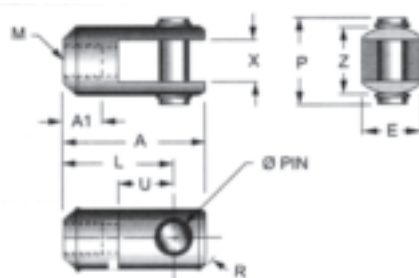
## Premair Series



### Double Clevis

#### Dimensions-inch

| Bore<br>(in) | Pin<br>(in) | CW   | CU   | CX   | CZ   | LT   | LG   | RR   | E1   | N (bolt) |
|--------------|-------------|------|------|------|------|------|------|------|------|----------|
| 12 (1/2)     | 0.187       | 0.55 | 0.28 | 0.02 | 0.39 | 0.20 | 0.11 | 0.24 | 0.98 | M4x.07   |
| 16 (5/8)     | 0.187       | 0.59 | 0.39 | 0.03 | 0.47 | 0.20 | 0.11 | 0.24 | 1.14 | M4x.07   |
| 20 (3/4)     | 0.312       | 0.71 | 0.47 | 0.33 | 0.63 | 0.20 | 0.16 | 0.35 | 1.42 | M6x1.0   |
| 25 (1)       | 0.375       | 0.79 | 0.55 | 0.41 | 0.79 | 0.20 | 0.16 | 0.39 | 1.57 | M6x1.0   |
| 32 (1-1/4)   | 0.375       | 0.79 | 0.55 | 0.72 | 1.42 | 0.24 | 0.16 | 0.39 | 1.75 | M6x1.0   |
| 40 (1-1/2)   | 0.375       | 0.87 | 0.55 | 0.72 | 1.42 | 0.31 | 0.16 | 0.39 | 2.05 | M6x1.0   |
| 50 (2)       | 0.500       | 1.10 | 0.79 | 0.88 | 1.73 | 0.31 | 0.20 | 0.55 | 2.51 | M8x1.25  |
| 63 (2-1/2)   | 0.500       | 1.18 | 0.79 | 0.88 | 1.73 | 0.39 | 0.24 | 0.55 | 3.02 | M10x1.5  |
| 80 (3-1/4)   | 0.750       | 1.50 | 1.07 | 1.11 | 2.20 | 0.43 | 0.28 | 0.71 | 3.85 | M12x1.75 |
| 100 (4)      | 0.875       | 1.77 | 1.22 | 1.27 | 2.52 | 0.55 | 0.28 | 0.87 | 4.54 | M12x1.75 |

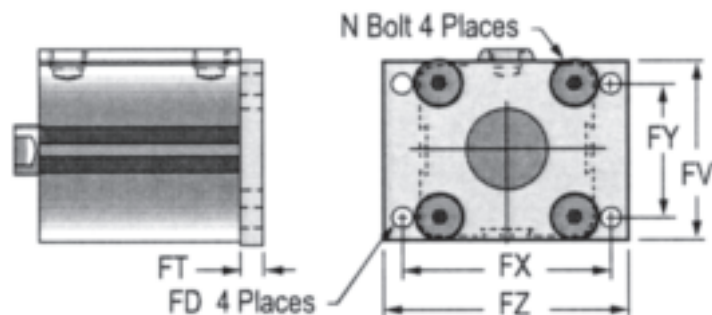


### Rod Clevis

#### Dimensions-inch

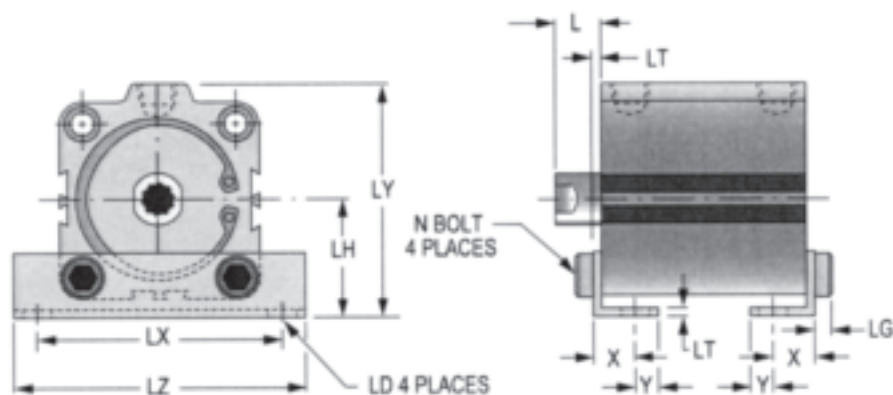
| Bore<br>mm (in) | L    | U    | X    | Z    | P    | E    | A1   | A    | R    | M (thds)<br>inch |
|-----------------|------|------|------|------|------|------|------|------|------|------------------|
| 12 (1/2)        | 0.63 | 0.27 | 0.21 | 0.39 | 0.55 | 0.39 | 0.24 | 0.85 | 0.25 | #8-32            |
| 16 (5/8)        | 0.83 | 0.39 | 0.26 | 0.47 | 0.63 | 0.47 | 0.24 | 1.10 | 0.47 | #8-32            |
| 20 (3/4)        | 0.98 | 0.45 | 0.33 | 0.63 | 0.83 | 0.63 | 0.24 | 1.34 | 0.41 | #10-32           |
| 25 (1)          | 1.18 | 0.55 | 0.41 | 0.78 | 0.98 | 0.78 | 0.31 | 1.61 | 0.50 | 1/4-28           |
| 32 (1-1/4)      | 1.18 | 0.55 | 0.72 | 1.44 | 1.61 | 0.87 | 0.63 | 1.65 | 0.47 | 5/16-24          |
| 40 (1-1/2)      | 1.18 | 0.55 | 0.72 | 1.44 | 1.61 | 0.87 | 0.63 | 1.65 | 0.47 | 3/8-24           |
| 50 (2)          | 1.57 | 0.79 | 0.88 | 1.75 | 1.97 | 1.10 | 0.79 | 2.20 | 0.63 | 1/2-20           |
| 63 (2-1/2)      | 1.57 | 0.79 | 0.88 | 1.75 | 1.97 | 1.10 | 0.79 | 2.20 | 0.63 | 1/2-20           |
| 80 (3-1/4)      | 1.97 | 1.06 | 1.12 | 2.19 | 2.46 | 1.50 | 0.91 | 2.80 | 0.83 | 5/8-18           |
| 100 (4)         | 2.17 | 1.22 | 1.28 | 2.50 | 2.78 | 1.73 | 0.95 | 3.11 | 0.95 | 3/4-16           |

## Compact Cylinders Premair Series



**Flange Mount**  
Dimensions-inch

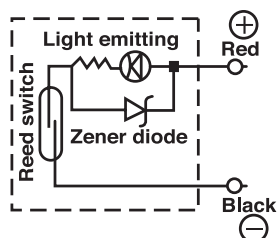
| Bore<br>mm (in) | FT   | L    | N Bolt     | FD   | FY   | FX   | FV   | FZ   |
|-----------------|------|------|------------|------|------|------|------|------|
| 12 (1/2)        | 0.22 | 0.31 | M4 x 0.7   | 1.80 | -    | 1.77 | 0.98 | 2.17 |
| 16 (5/8)        | 0.22 | 0.31 | M4 x 0.7   | 1.80 | -    | 1.77 | 1.18 | 2.17 |
| 20 (3/4)        | 0.31 | 0.26 | M6 x 1.0   | 0.26 | -    | 1.89 | 1.54 | 2.36 |
| 25 (1)          | 0.31 | 0.28 | M6 x 1.0   | 0.26 | -    | 2.05 | 1.65 | 2.52 |
| 32 (1-1/4)      | 0.31 | 0.35 | M6 x 1.0   | 0.22 | 1.34 | 2.20 | 1.89 | 2.56 |
| 40 (1-1/2)      | 0.31 | 0.35 | M6 x 1.0   | 0.22 | 1.57 | 2.44 | 2.13 | 2.83 |
| 50 (2)          | 0.35 | 0.35 | M8 x 1.25  | 0.26 | 1.97 | 2.99 | 2.64 | 3.50 |
| 63 (2-1/2)      | 0.35 | 0.35 | M10 x 1.50 | 0.35 | 2.36 | 3.62 | 3.15 | 4.25 |
| 80 (3-1/4)      | 0.43 | 0.35 | M12 x 1.75 | 0.43 | 3.03 | 4.57 | 3.90 | 5.28 |
| 100 (4)         | 0.43 | 0.43 | M12 x 1.75 | 0.43 | 3.70 | 5.35 | 4.61 | 6.06 |



**Foot Mount**  
Dimensions-inch

| Bore<br>mm (in) | LD   | LH   | LX   | LY   | LZ   | L    | LT   | X    | Y    | LG   |
|-----------------|------|------|------|------|------|------|------|------|------|------|
| 12 (1/2)        | 0.18 | 0.67 | 1.34 | 1.16 | 1.73 | 0.53 | 0.08 | 0.31 | 0.18 | 0.11 |
| 16 (5/8)        | 0.18 | 0.75 | 1.50 | 1.32 | 1.89 | 0.53 | 0.08 | 0.31 | 0.20 | 0.11 |
| 20 (3/4)        | 0.26 | 0.94 | 1.89 | 1.65 | 2.44 | 0.57 | 0.13 | 0.36 | 0.23 | 0.16 |
| 25 (1)          | 0.26 | 1.02 | 2.05 | 1.81 | 2.60 | 0.59 | 0.13 | 0.42 | 0.23 | 0.16 |
| 32 (1-1/4)      | 0.26 | 1.18 | 2.24 | 2.24 | 2.80 | 0.67 | 0.13 | 0.44 | 0.23 | 0.16 |
| 40 (1-1/2)      | 0.26 | 1.30 | 2.52 | 2.52 | 3.07 | 0.67 | 0.13 | 0.44 | 0.28 | 0.60 |
| 50 (2)          | 0.35 | 1.54 | 3.11 | 3.07 | 3.74 | 0.71 | 0.13 | 0.58 | 0.31 | 0.20 |
| 63 (2-1/2)      | 0.43 | 1.81 | 3.74 | 3.60 | 4.45 | 0.71 | 0.13 | 0.64 | 0.35 | 0.24 |
| 80 (3-1/4)      | 0.51 | 2.32 | 4.65 | 4.49 | 5.51 | 0.79 | 0.18 | 0.77 | 0.43 | 0.28 |
| 100 (4)         | 0.51 | 2.80 | 5.39 | 5.35 | 6.38 | 0.87 | 0.24 | 0.91 | 0.49 | 0.28 |

## Sensors



| SENSORS     |                 |                   |                      |
|-------------|-----------------|-------------------|----------------------|
| Part Number | Type            | Switching Current | Switching Voltage    |
| 114811      | Reed Sensor     | 0.5 Amp. Max      | 0-120VDC/VAC         |
| 114812      | Reed Sensor     | 0.03 Amp Max.     | 5-120VDC/VAC         |
| 114813      | Sourcing Sensor | 0.20 Amp Max.     | Sourcing PNP 6-24VDC |
| 114814      | Sinking Sensor  | 0.20 Amp Max.     | Sinking NPN 6-24VDC  |

| MODEL         | 114811       | 114812        | 114813        | 114814       |
|---------------|--------------|---------------|---------------|--------------|
| TYPE          | REED         | REED          | PNP(SOURCING) | NPN(SINKING) |
|               | 2 WIRE       | 2 WIRE        | 3 WIRE        | 3 WIRE       |
| LEAD          | PREWIRED 9'  | PREWIRED 9'   | PREWIRED 9'   | PREWIRED 9'  |
| INPUT VOLTAGE | 0-120VDC/VAC | 5-120 VDC/VAC | 6-24 VDC      | 6-24 VDC     |
| MAX WATTAGE   | 10           | 4             | 0.2           | 0.2          |
| VOLTAGE DROP  |              | 2             | 0.5           | 0.5          |
| LED           | N/A          | YES           | YES           | YES          |

## Repair Kits (Round and Square Cylinders)

| Round  |          |          |          |              |                      |                         |
|--------|----------|----------|----------|--------------|----------------------|-------------------------|
| BORE   | BUNA     | VITON    | LOW TEMP | LOW FRICTION | LOW FRICTION + VITON | LOW FRICTION + LOW TEMP |
| 1/2"   | RKSC05-B | RKSC05-V | RKSC05-Q | RKSC05-L     | RKSC05-N             | RKSC05-M                |
| 3/4"   | RKSC07-B | RKSC07-V | RKSC07-Q | RKSC07-L     | RKSC07-N             | RKSC07-M                |
| 1-1/8" | RKSC11-B | RKSC11-V | RKSC11-Q | RKSC11-L     | RKSC11-N             | RKSC11-M                |
| 1-1/2" | RKSC15-B | RKSC15-V | RKSC15-Q | RKSC15-L     | RKSC15-N             | RKSC15-M                |
| 2"     | RKSC20-B | RKSC20-V | RKSC20-Q | RKSC20-L     | RKSC20-N             | RKSC20-M                |
| 2-1/2" | RKSC25-B | RKSC25-V | RKSC25-Q | RKSC25-L     | RKSC25-N             | RKSC25-M                |
| 3"     | RKSC30-B | RKSC30-V | RKSC30-Q | RKSC30-L     | RKSC30-N             | RKSC30-M                |
| 4"     | RKSC40-B | RKSC40-V | RKSC40-Q | RKSC40-L     | RKSC40-N             | RKSC40-M                |

| Square     |          |
|------------|----------|
| mm (in)    |          |
| 12 (1/2)   | RKM012-V |
| 16 (5/8)   | RKM016-V |
| 20 (3/4)   | RKM020-V |
| 25 (1)     | RKM025-V |
| 32 (1-1/4) | RKM032-V |
| 40 (1-1/2) | RKM040-V |
| 50 (2)     | RKM050-V |
| 63 (2-1/2) | RKM063-V |
| 80 (3-1/4) | RKM080-V |
| 100 (4)    | RKM100-V |

# Pneumatic Valves Flow Controls

## Features

### In-Line, Composite

- Four Stage, tapered needle design provides infinite control settings.
- Composite body is tough and corrosion resistant.
- Color-coded micrometer & calibrated adjustment knob provide instant reference points for repeat settings. Press red locking ring down prevents adjustment. Tamper resistant wire supplied in package.
- Units are threaded for easy remote panel mounting. Order panel nuts below.
- Needle Valve is available with stainless steel needle & inserts. Order 104104-NS2.

## Ordering

### 104104 - X XX

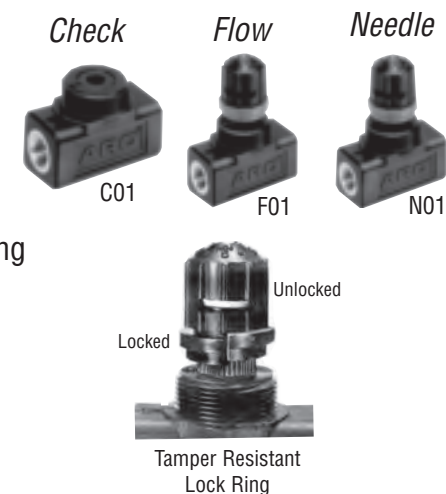
#### Valve Type

| Code     | Description  |
|----------|--------------|
| <b>C</b> | Check Valve  |
| <b>F</b> | Flow Control |
| <b>N</b> | Needle Valve |

#### Port Size

| Code      | Description | Code        | Description                                                       |
|-----------|-------------|-------------|-------------------------------------------------------------------|
| <b>01</b> | 1/8-27 NPTF | <b>04</b>   | 1/2-14 NPTF                                                       |
| <b>02</b> | 1/4-18 NPTF | <b>06</b>   | 3/4-14 NPTF                                                       |
| <b>03</b> | 3/8-18 NPTF | <b>* S2</b> | 1/4-18 NPTF<br>Stainless Steel<br>inserts & stem<br>& viton seals |

\* Available on needle valve only.



### Panel Mounting Nuts

104096  
104094

### Port Size

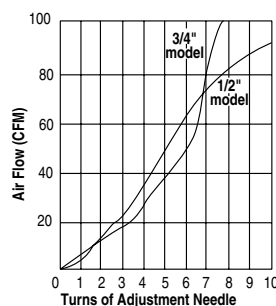
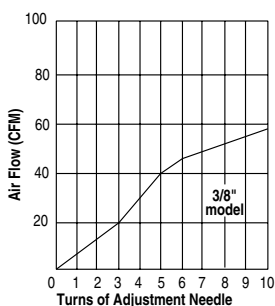
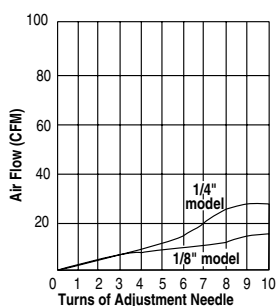
1/8" & 1/4"  
3/8", 1/2" & 3/4"

## Performance Specifications

**Operating Pressure:**  
200 PSI (13.8 bar)

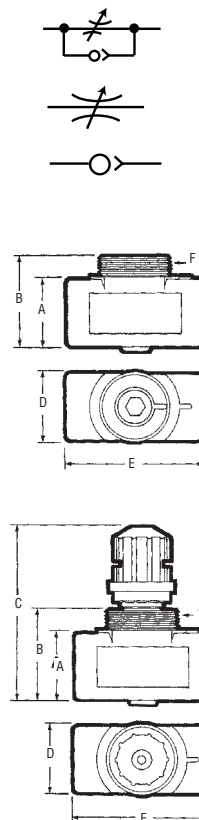
**Operating Temperature:**  
0° - 200°F (-18° - 93°C)

**Flow:**  
100 PSI Inlet



| MODEL     | PORT*<br>NPT(F) | A<br>inches<br>(mm) | B<br>inches<br>(mm) | C<br>inches       |                    | D<br>inches<br>(mm) | E<br>inches<br>(mm) | F<br>inches<br>(mm)  |
|-----------|-----------------|---------------------|---------------------|-------------------|--------------------|---------------------|---------------------|----------------------|
|           |                 |                     |                     | Min.              | Max.               |                     |                     |                      |
| <b>01</b> | 1/8-27          | 15/16<br>(23.8)     | 1-11/32<br>(34.1)   | 2-33/64<br>(63.9) | 2-53/64<br>(71.6)  | 15/16<br>(23.8)     | 1-29/32<br>(48.4)   | 1-20<br>UNEF-2A      |
| <b>02</b> | 1/4-18          | 15/16<br>(23.8)     | 1-11/32<br>(34.1)   | 2-33/64<br>(63.9) | 2-53/64<br>(71.6)  | 15/16<br>(23.8)     | 1-29/32<br>(48.4)   | 1-20<br>UNEF-2A      |
| <b>03</b> | 3/8-18          | 1-5/16<br>(33.3)    | 1-11/16<br>(42.9)   | 3-23/64<br>(85.3) | 3-55/64<br>(97.8)  | 1-5/16<br>(33.3)    | 2-27/32<br>(72.2)   | 1-3/16-18<br>UNEF-2A |
| <b>04</b> | 1/2-14          | 1-5/16<br>(33.3)    | 1-11/16<br>(42.9)   | 3-23/64<br>(85.3) | 3-55/64<br>(97.8)  | 1-5/16<br>(33.3)    | 2-27/32<br>(72.2)   | 1-3/16-18<br>UNEF-2A |
| <b>06</b> | 3/4-14          | 1-9/16<br>(39.7)    | 2<br>(50.8)         | 3-43/64<br>(93.3) | 4-11/64<br>(105.7) | 1-9/16<br>(39.7)    | 3<br>(76.2)         | 1-3/16-18<br>UNEF-2A |

## Dimensional Data



# Pneumatic Valves Flow Controls

## Features

- 360° swivel eases tube alignment. Preapplied thread sealant eliminates Teflon taping.
- Choose threaded or instant tube fitting inlets; slotted or knob flow adjustment.
- Sturdy components include nickel-plated brass body, black anodized aluminum swivel, Buna-N seals and a stainless steel spring.
- Ready for installation on all ARO and competitive cylinders.
- Consult factory for BSP size models.



## Ordering

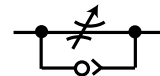
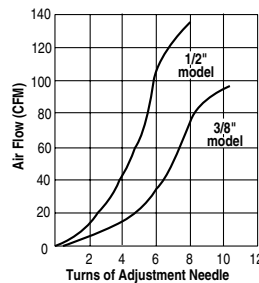
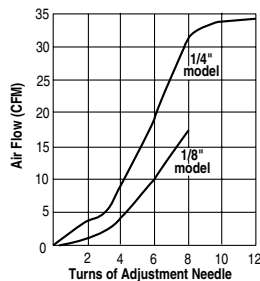
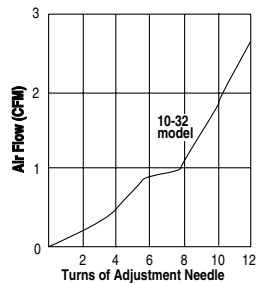
| SLOTTED ADJUST    |                 |                    |               | KNOB ADJUST       |                 |                    |               |
|-------------------|-----------------|--------------------|---------------|-------------------|-----------------|--------------------|---------------|
| 119307-XXX        |                 | 119309-XXX         |               | 119308-XXX        |                 | 119310-XXX         |               |
| Male x Female thd |                 | Male thd x fitting |               | Male x Female thd |                 | Male thd x fitting |               |
| Description       |                 | Description        |               | Description       |                 | Description        |               |
| XXX               | Male x Female   | xxx                | Male x Tubing | xxx               | Male x Female   | XXX                | Male x Tubing |
| 103               | 10-32x10-32     | 103                | 10-32 x 5/32" | 125               | 1/8" x 1/8" NPT | 120                | 1/8" x 5/32"  |
| 125               | 1/8" x 1/8" NPT | 120                | 1/8" x 5/32"  | 250               | 1/4" x 1/4" NPT | 125                | 1/8" x 1/4"   |
| 250               | 1/4" x 1/4" NPT | 125                | 1/8v x 1/4"   | 375               | 3/8" x 3/8" NPT | 250                | 1/4" x 1/4"   |
| 375               | 3/8" x 3/8" NPT | 250                | 1/4" x 1/4"   | 500               | 1/2" x 1/2" NPT | 255                | 1/4" x 3/8"   |
| 500               | 1/2" x 1/2" NPT | 255                | 1/4" x 3/8"   |                   |                 | 375                | 3/8" x 3/8"   |
|                   |                 | 375                | 3/8" x 3/8"   |                   |                 |                    |               |

## Performance Specifications

**Operating Pressure:** 15-150 PSI (1-10 bar)

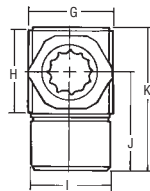
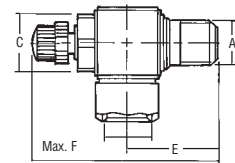
**Operating Temperature:**

-32°F - 158°F

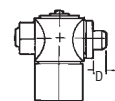
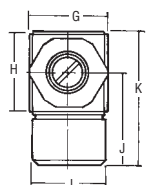
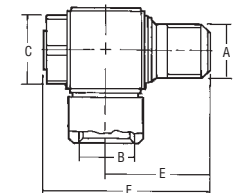


## Dimensional Data

KNOB ADJUST



SLOTTED ADJUST



|                | PORT<br>SIZE<br>"A" & "B" | "C"<br>inches<br>(mm) | "D"<br>inches<br>(mm) | "E"<br>inches<br>(mm) | "F"<br>inches<br>(mm) | "G"<br>inches<br>(mm) | "H"<br>inches<br>(mm) | "I"<br>inches<br>(mm) | "J"<br>inches<br>(mm) | "K"<br>inches<br>(mm) |
|----------------|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                |                           |                       |                       |                       |                       |                       |                       |                       |                       |                       |
| SLOTTED ADJUST | 10/32                     | 5/16<br>(8)           | 1/8<br>(3.2)          | 27/64<br>(11)         | 53/64<br>(21)         | 27/64<br>(11)         | 11/32<br>(9)          | 7/16<br>(11)          | 37/64<br>(14.7)       | 53/64<br>(21.1)       |
|                | 1/8                       | 1/2<br>(13)           | 0                     | 25/32<br>(19.8)       | 1-17/64<br>(32)       | 19/32<br>(15)         | 19/32<br>(15)         | 33/64<br>(13)         | 47/64<br>(18.5)       | 1-3/64<br>(26.7)      |
|                | 1/4                       | 43/64<br>(17)         | 0                     | 1-1/64<br>(25.8)      | 1-39/64<br>(41)       | 3/4<br>(19)           | 3/4<br>(19)           | 23/32<br>(18)         | 7/8<br>(22.5)         | 1-19/64<br>(32.9)     |
|                | 3/8                       | 7/8<br>(22)           | 0                     | 1-9/64<br>(29)        | 1-27/32<br>(47)       | 29/32<br>(23)         | 29/32<br>(23)         | 29/32<br>(23)         | 1-1/8<br>(28.5)       | 1-39/64<br>(41)       |
|                | 1/2                       | 1-1/16<br>(27)        | 0                     | 1-27/64<br>(36)       | 2-9/32<br>(58)        | 1-7/64<br>(28)        | 1-7/64<br>(28)        | 63/64<br>(25)         | 1-7/32<br>(31)        | 1-53/64<br>(46.3)     |
| KNOB ADJUST    | 1/8                       | 33/64<br>(13)         | 0                     | 25/32<br>(19.8)       | 1-7/8<br>(47.5)       | 19/32<br>(15)         | 19/32<br>(15)         | 33/64<br>(13)         | 47/64<br>(18.5)       | 1-3/64<br>(26.7)      |
|                | 1/4                       | 43/64<br>(17)         | 0                     | 1-1/64<br>(25.8)      | 2-9/32<br>(58)        | 3/4<br>(19)           | 3/4<br>(19)           | 45/64<br>(18)         | 57/64<br>(22.5)       | 1-19/64<br>(32.9)     |
|                | 3/8                       | 7/8<br>(22)           | 0                     | 1-9/64<br>(29)        | 2-37/64<br>(65.5)     | 29/32<br>(23)         | 29/32<br>(23)         | 29/32<br>(23)         | 1-1/8<br>(28.5)       | 1-39/64<br>(41)       |
|                | 1/2                       | 1-1/16<br>(27)        | 0                     | 1-27/64<br>(36)       | 3-5/32<br>(80)        | 1-7/64<br>(28)        | 1-7/64<br>(28)        | 63/64<br>(25)         | 1-7/32<br>(31)        | 1-53/64<br>(46.3)     |

# Air System Components

## Ordering

### Standard Filters

Designed to remove rust, scale, condensed water and other debris from compressed air lines which may cause wear and premature failure of tools, valves, cylinders and other pneumatic equipment.

| Port Size                                                           | Model      | Filter Element | Flow* cfm | Bowl                | Bowl Size | Drain  | Max. Inlet Pressure |
|---------------------------------------------------------------------|------------|----------------|-----------|---------------------|-----------|--------|---------------------|
| <b>1/8" &amp; 1/4" Port - ARO Module/Air 1000 Series</b>            |            |                |           |                     |           |        |                     |
| 1/8"                                                                | F25111-200 | 20 Micron      | 28        | Polycarbonate/Guard | 1.0 oz.   | Manual | 200 PSIG            |
| 1/4"                                                                | F25121-200 | 20 Micron      | 38        | Polycarbonate/Guard | 1.0 oz.   | Manual | 200 PSIG            |
| <b>1/4" &amp; 3/8" &amp; 1/2" Port - ARO Module/Air 2000 Series</b> |            |                |           |                     |           |        |                     |
| 1/4"                                                                | F25221-110 | 40 Micron      | 54        | Metal w/sight glass | 6.0 oz.   | Manual | 175 PSIG            |
| 3/8"                                                                | F25231-110 | 40 Micron      | 100       | Metal w/sight glass | 6.0 oz.   | Manual | 175 PSIG            |
| 1/2"                                                                | F25241-110 | 40 Micron      | 122       | Metal w/sight glass | 6.0 oz.   | Manual | 175 PSIG            |
| <b>3/4" &amp; 1" Port - ARO Super-Duty Series</b>                   |            |                |           |                     |           |        |                     |
| 3/4"                                                                | F25451-110 | 40 Micron      | 345       | Metal w/sight glass | 32 oz.    | Manual | 250 PSIG            |
| 1"                                                                  | F25461-110 | 40 Micron      | 345       | Metal w/sight glass | 32 oz.    | Manual | 250 PSIG            |

\* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.

### Coalescing Filters

Designed for paint spraying, instrumentation, controls and other applications where the delivered air must be free of oil and fine particles. Effective in removing 99.9% of oil aerosols. Also effective in removing debris particles down to .3 micron. Recommended for use in conjunction with an upstream filter to maximize the life of replacement element.

| Port Size                                                           | Model      | Filter Element | Flow* cfm | Bowl                | Bowl Size | Drain  | Max. Inlet Pressure |
|---------------------------------------------------------------------|------------|----------------|-----------|---------------------|-----------|--------|---------------------|
| <b>1/8" &amp; 1/4" Port - ARO Module/Air 1000 Series</b>            |            |                |           |                     |           |        |                     |
| 1/8"                                                                | F25111-300 | Coalescing     | 15        | Polycarbonate       | 1.0 oz.   | Manual | 200 PSIG            |
| 1/4"                                                                | F25121-300 | Coalescing     | 17        | Polycarbonate       | 1.0 oz.   | Manual | 200 PSIG            |
| <b>1/4" &amp; 3/8" &amp; 1/2" Port - ARO Module/Air 2000 Series</b> |            |                |           |                     |           |        |                     |
| 1/4"                                                                | F25221-310 | Coalescing     | 40        | Metal w/sight glass | 6.0 oz.   | Manual | 175 PSIG            |
| 3/8"                                                                | F25231-310 | Coalescing     | 51        | Metal w/sight glass | 6.0 oz.   | Manual | 175 PSIG            |
| 1/2"                                                                | F25241-310 | Coalescing     | 53        | Metal w/sight glass | 6.0 oz.   | Manual | 175 PSIG            |
| <b>3/4" &amp; 1" Port - ARO Super-Duty Series</b>                   |            |                |           |                     |           |        |                     |
| 3/4"                                                                | F25452-310 | Coalescing     | 50        | Metal w/sight glass | 32 oz.    | Manual | 250 PSIG            |
| 1"                                                                  | F25462-310 | Coalescing     | 150       | Metal w/sight glass | 32 oz.    | Manual | 250 PSIG            |

\* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.



F25121-200



F25221-110



F25451-110

## Accessories

| Part Number                       | Description        | Part Number                       | Description         |
|-----------------------------------|--------------------|-----------------------------------|---------------------|
| <b>ARO Module/Air 1000 Series</b> |                    | <b>ARO Module/Air 2000 Series</b> |                     |
| 29660-2                           | 20 Micron Element  | 100031-1                          | 40 Micron Element   |
| 29586                             | Coalescing Element | 100032                            | Coalescing Element  |
| 104257                            | Service Kit        | 104068                            | Auto Drain Kit      |
| 104264                            | Auto Drain Kit     | 104204                            | Metal w/sight glass |
| 104258                            | Polycarbonate Bowl | 104176                            | Service Kit         |
| 104259                            | Composite Bowl     | <b>ARO Super/Duty Series</b>      |                     |
|                                   |                    | 104119                            | 40 Micron Element   |
|                                   |                    | 104231                            | Coalescing Element  |
|                                   |                    | 104116                            | Service Kit         |
|                                   |                    | 104068                            | Auto Drain          |
|                                   |                    | 104163                            | Sight Glass Kit     |

# Air System Components

## Ordering

### Piggyback Filter/Regulators

Combined air filtration and regulation in a single, compact unit. Saves space for added system design flexibility. Piggyback Filter Regulators supplied with pressure gauge.

| Port Size                                                           | Model             | Pressure Range | Filter Element | Flow* cfm | Bowl                | Bowl Size | Drain  | Max. Inlet Pressure |
|---------------------------------------------------------------------|-------------------|----------------|----------------|-----------|---------------------|-----------|--------|---------------------|
| <b>1/8" &amp; 1/4" Port - ARO Module/Air 1000 Series</b>            |                   |                |                |           |                     |           |        |                     |
| 1/8"                                                                | <b>P29112-600</b> | 5-125 PSIG     | 20 Micron      | 12        | Polycarbonate/Guard | 1.0 oz.   | Manual | 200 PSIG            |
| 1/4"                                                                | <b>P29122-600</b> | 5-125 PSIG     | 20 Micron      | 12        | Polycarbonate/Guard | 1.0 oz.   | Manual | 200 PSIG            |
| <b>1/4" &amp; 3/8" &amp; 1/2" Port - ARO Module/Air 2000 Series</b> |                   |                |                |           |                     |           |        |                     |
| 1/4"                                                                | <b>P29221-610</b> | 5-125 PSIG     | 40 Micron      | 93        | Metal w/sight glass | 6.0 oz.   | Manual | 175 PSIG            |
| 3/8"                                                                | <b>P29231-610</b> | 5-125 PSIG     | 40 Micron      | 135       | Metal w/sight glass | 6.0 oz.   | Manual | 175 PSIG            |
| 1/2"                                                                | <b>P29241-610</b> | 5-125 PSIG     | 40 Micron      | 140       | Metal w/sight glass | 6.0 oz.   | Manual | 175 PSIG            |

\* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.



P29122-600

P29221-610

## Accessories

### ARO Module/Air 2000 FRL Components

#### A. Threaded Pipe Adapters - Model 104168 ( )

Pipe adapters allow a single component or assembled combo to be removed for service without disturbing hard piping. Also allows for different pipe diameters (in and out) in the plumbing installation. Kit includes two adapters and two spacer kits.

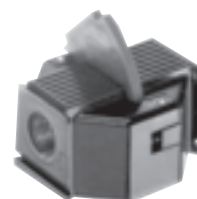
| Port Size | Model           |
|-----------|-----------------|
| 1/4"      | <b>104168-2</b> |
| 3/8"      | <b>104168-3</b> |
| 1/2"      | <b>104168-4</b> |
| 3/4"      | <b>104168-5</b> |



#### B. Safety Shutoff, Lockout Valve - Model 104174 ( )

Exhaust-type safety shutoff valve can be used in either a modular arrangement, with out FRL's or as a stand alone unit. Should be installed upstream from the FRL, and is ideal for isolating and depressurizing a downstream unit requiring maintenance. Valve may be locked in the exhaust position.

| Port Size | Model           |
|-----------|-----------------|
| 1/4"      | <b>104174-2</b> |
| 3/8"      | <b>104174-3</b> |
| 1/2"      | <b>104174-4</b> |



104174-2

#### C. Modular Spacer Kit - Model 104167

One spacer kit is required to connect any two components or accessories. Kit includes the spacer block, two clamps and two O-rings. Fits all port sizes.

104167



#### D. T-Type Wall Mounting Bracket - Model 104171

T-Type Brackets provide heavy duty wall mounting of a single unit or multiple units in a modular arrangement. Kit includes a spacer, bracket and clamp.

104171



#### E. Modular Manifold Block - Model 104170

Provides four additional 1/4" NPT ports for greater circuit design flexibility. Kit includes manifold, two spacer kits and three hole plugs.



#### F. Wall Mounting Kit - Model 104172

May be used to mount FRL combo units which include a regulator, "Piggyback" Filter/Regulator units, or individual regulators. Kit includes Model 29623 Bracket and Model 104173 Panel Mounting Nut. Bracket and Nut may be ordered individually.



104172

# Air System Components

## Air Line Relieving Regulators

Provide controlled, consistent air pressure as required for specific pneumatic equipment connected to the compressed air system. Relieving models vent downstream overpressure. Available spring options enable convenient pressure range conversions as requirements change. Unit supplied with gauge.



| Port Size                                                      | Model             | Pressure Range | Flow* cfm | Gauge Port | Max. Inlet Pressure |
|----------------------------------------------------------------|-------------------|----------------|-----------|------------|---------------------|
| <b>1/8" &amp; 1/4" Port - ARO Module/Air 1000 Series</b>       |                   |                |           |            |                     |
| 1/8"                                                           | <b>R27111-600</b> | 0-125 PSIG     | 13        | 1/8"       | 250 PSIG            |
| 1/4"                                                           | <b>R27121-600</b> | 0-125 PSIG     | 13        | 1/8"       | 250 PSIG            |
| <b>1/4" &amp; 3/8" &amp; 1/2" Port - ARO Module/Air Series</b> |                   |                |           |            |                     |
| 1/4"                                                           | <b>R27221-600</b> | 5-125 PSIG     | 105       | 1/4"       | 200 PSIG            |
| 3/8"                                                           | <b>R27231-600</b> | 5-125 PSIG     | 106       | 1/4"       | 200 PSIG            |
| 1/2"                                                           | <b>R27241-600</b> | 5-125 PSIG     | 125       | 1/4"       | 200 PSIG            |
| <b>1/2" &amp; 3/4" &amp; 1" Port - ARO Heavy-Duty Series</b>   |                   |                |           |            |                     |
| 1/2"                                                           | <b>27344-600</b>  | 5-125 PSIG     | 256       | 1/4"       | 250 PSIG            |
| 3/4"                                                           | <b>27354-600</b>  | 5-125 PSIG     | 287       | 1/4"       | 250 PSIG            |
| 1"                                                             | <b>27364-600</b>  | 5-125 PSIG     | 293       | 1/4"       | 250 PSIG            |

\* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.

## Accessories



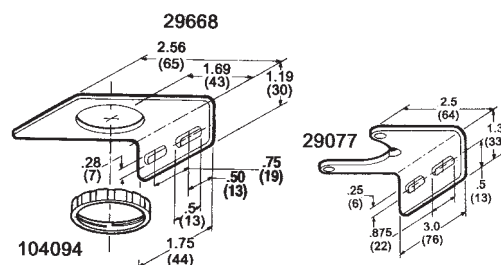
29850



100067



104172



## Air Line Relieving Regulators

### ARO Module/Air 1000 Series

| Part Number       | Description                   |
|-------------------|-------------------------------|
| <b>29846</b>      | Gauge, 0-15 PSIG              |
| <b>29863</b>      | Gauge, 0-60 PSIG              |
| <b>29850</b>      | Gauge, 0-160 PSIG             |
| <b>100095-160</b> | Gauge, 0-150 PSIG             |
| <b>29668</b>      | Mounting Bracket              |
| <b>104094</b>     | Panel Mounting Nut            |
| <b>104255</b>     | Service Kit, Relieving Models |

### ARO Module/Air 2000 Series

| Part Number   | Description                                   |
|---------------|-----------------------------------------------|
| <b>100067</b> | Gauge, 0-160 PSIG                             |
| <b>104172</b> | Wall Mount Kit (Includes Bracket & Panel Nut) |
| <b>104173</b> | Panel Mounting Nut                            |
| <b>104175</b> | Tamper Resistant Kit                          |
| <b>104177</b> | Service Kit, Relieving Models                 |
| <b>29728</b>  | Gauge, 0-160 PSIG Bottomport                  |

### ARO Heavy-Duty Series

| Part Number   | Description           |
|---------------|-----------------------|
| <b>100067</b> | Gauge, 0-160 PSIG     |
| <b>100083</b> | Gauge, 0-300 PSIG     |
| <b>29960</b>  | Service Kit           |
| <b>29077</b>  | Wall Mounting Bracket |

# Air System Components

## Ordering

### Fog-Type Lubricators

Help ensure that pneumatic devices receive the required lubrication to maintain operating performance, reduce wear and prolong service life. They are designed to provide the correct amount of oil needed for most general applications in a pneumatic system, delivering a constant ratio of oil to CFM. Precise oil feed adjustment allows the proper oil delivery rate. Lubricators should be installed close to the downstream application to ensure effective distribution of oil to the pneumatic components.

| Port Size                                                      | Model      | Flow* cfm | Bowl                | Bowl Size | Max. Inlet Pressure |
|----------------------------------------------------------------|------------|-----------|---------------------|-----------|---------------------|
| <b>1/8" &amp; 1/4" Port - ARO Module/Air 1000 Series</b>       |            |           |                     |           |                     |
| 1/8"                                                           | L26111-100 | 41        | Polycarbonate/Guard | 1.0 oz.   | 200 PSIG            |
| 1/4"                                                           | L26121-100 | 60        | Polycarbonate/Guard | 1.0 oz.   | 200 PSIG            |
| <b>1/4" &amp; 3/8" &amp; 1/2" Port - ARO Module/Air Series</b> |            |           |                     |           |                     |
| 1/4"                                                           | L26221-110 | 75        | Metal w/sight glass | 6.0 oz.   | 175 PSIG            |
| 3/8"                                                           | L26231-110 | 100       | Metal w/sight glass | 6.0 oz.   | 175 PSIG            |
| 1/2"                                                           | L26241-110 | 110       | Metal w/sight glass | 6.0 oz.   | 175 PSIG            |
| <b>3/4" &amp; 1" Port - ARO Super-Duty Series</b>              |            |           |                     |           |                     |
| 3/4"                                                           | L26451-110 | 190       | Metal w/sight glass | 32 oz.    | 250 PSIG            |
| 1"                                                             | L26461-110 | 200       | Metal w/sight glass | 32 oz.    | 250 PSIG            |

\* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.

### Lubricator

| Part Number                       | Description              |
|-----------------------------------|--------------------------|
| <b>ARO Module/Air 1000 Series</b> |                          |
| 104181                            | Service Kit              |
| 104260                            | Polycarbonate Bowl       |
| 104261                            | Composite Bowl           |
| 104262                            | Mounting Bracket         |
| <b>ARO Module/Air 2000 Series</b> |                          |
| 104181                            | Service Kit              |
| 104205                            | Metal Bowl w/sight Glass |
| <b>ARO Super-Duty Series</b>      |                          |
| 104118                            | Service Kit              |
| 104163                            | Sight Glass Kit          |

## Accessories

### Air Line Lubricator Oil

ARO Lubricating Oil is recommended for use with pneumatic power tools, motors, valves, cylinders and hoists. It is specially formulated for use in air line lubricators. Proper and regular lubrication helps ensure longer, trouble-free operation by reducing wear, saving power and cutting equipment maintenance costs.

ARO Lubricating Oil is available in 1-quart containers and may be ordered by specifying part number 29665. (Available in cases of 12).

|                        |                                                                      |
|------------------------|----------------------------------------------------------------------|
| <b>Viscosity:</b>      | 100-200 S.S.U. @ 100°F (38° C)<br>min. aniline point of 200°F (93°C) |
| <b>Class:</b>          | II Lubricant                                                         |
| <b>Approx. SEA No:</b> | Light SAE 10, non-detergent.                                         |



L26121-100



L26221-110



L26451-110



29665

# Warnings

## General Information

### Warnings

#### Harmful Compressor Oils & Other Materials

Some oils used in air compressors contain chemicals harmful to Buna-N seals, if not adequately filtered at the compressor. The most common of these oils, in addition to other harmful material, are listed below.

##### COMPRESSOR OILS

Cellulube No. 150 & 220  
Haskel No. 568-023  
Houghton & Co. Oil No. 1120,  
No. 1130, No. 1055  
Houtosafe 1000  
Kano Kroil  
Keystone Penetrating Oil No. 2  
& No. 500 Oils  
Marvel Mystery Oil

##### COMPRESSOR OILS

Phrano  
Pydraul AC  
Sears Regular Motor Oil  
Sinclair Oil "Lily White"  
(Polyurethane)  
Skydrol  
Tenneco Anderol No. 495

##### OTHER MATERIALS

Garlock No. 98403 (Polyurethane)  
Parco No. 3106 (Neoprene)  
Some Loctite Compounds  
Stillman No. SR269-75  
Stillman No. SR513-70 (Neoprene)

**CAUTION:** Compounded oils containing graphite and fillers are not recommended for use with cylinders.

#### Air & Lubrication Requirement

**AIR PRESSURE:** Limited to 200 psig (14 bar) **FILTRATION:** 40 Micron. Proper moisture removal and filtration of contaminants will promote good service life and operation. Install an air regulator to control the operating pressure, insure smooth operation and conserve energy.

**LUBRICATION:** All valve components have been lubricated at the factory and can be operated without additional air line lubrication. Minimal lubrication may extend the life of the valve. 50 Series, E-Series and K-Series Valves use o-ring seals. For maximum performance and life expectancy, standard air line lubrication should be used. If air line cylinders or other air line devices, used in conjunction with ARO valve, require lubrication, be sure the lubricating oils used are compatible with the valve seals and are of sufficient viscosity to assure adequate lubrication.

ARO recommends an oil lubricant with a viscosity of 100-200 SUS at 100° F and an airline point above 200° F.

**NOTICE:** The use of compound oils containing graphite filters, extremely low viscosities and other non-fluid lubricants is not recommended. **RECOMMENDED:** ARO 29665 air line lubricator oil is available in one quart containers.

#### Warning

The following are hazards or unsafe practices which could result in severe personal injury, death or substantial property damage. Heed the following. Use safeguards. Insure that provisions are made to prevent the valve from being accidentally operated (actuated.)

**Hazardous Air Pressure.** Shut off, disconnect and relieve any trapped air pressure from system before performing service or maintenance.

**Hazardous Voltage.** Do not attempt any service without disconnecting all electrical supply sources.

**NOTICE:** Genesis Series Valves must be grounded.

Do not use the valve as a safety device or to operate or control the operation of full revolution clutch systems or brake systems on power presses or similar equipment. These valves are not intended for such applications. Do not subject the valve to any condition that exceeds the limits set forth in the specifications for a particular valve model. Keep all hoses, electrical wiring, fittings and connections in good working condition. Damaged air pressure hoses, electrical wiring, or connections, could cause accidental valve operation (actuation). Only allow qualified technicians to install or maintain the valve system. It is necessary to have a thorough understanding of the operation and application of all valves being used in a particular system and how they interact with the other components of the system.

#### General Information

To obtain information or to receive technical literature for specific cylinders: contact ARO Customer Service at (800) 495-0276 or contact your nearest ARO distributor. Selected parts are provided in kit form. The ARO Parts List/Service Instructions contain Repair Kit information and complete Service

Parts information and are available upon request. Order Manuals as shown. The following Operator's Manuals are available.

| Operator's Manual | Part Number |
|-------------------|-------------|
| ARO CYLINDERS     | 119999-27   |
| PROVENAIR         | 119999-30   |
| ECONOMAIR         | 119999-16   |
| MICROAIR          | 119999-41   |
| PREMAIR COMPACTS  | 119999-78   |
| PROVENAIR TANKS   | 119999-032  |

# Cylinders Warranty

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## Five Year Product Warranty

The ARO Cylinders, in this catalog are backed up by our famous 5-year warranty, as a measure of the confidence we place in the quality of these products. A confidence that you can share.

### FIVE-YEAR WARRANTY

Ingersoll Rand/ARO warrants to the original use purchaser of Ingersoll Rand/ARO manufactured cylinders that Ingersoll Rand/ARO will repair or replace, free of charges, including return shipping costs within the Continental United States of America, any such product which under normal use and service proves defective in material or workmanship, as determined by Ingersoll Rand/ARO Inspection, within FIVE YEARS from date of shipment from Ingersoll Rand/ARO, provided the claimed defective product, or part thereof, is promptly returned to the Ingersoll Rand/ARO factory or Ingersoll Rand/ARO authorized warranty repair center with transportation prepaid.

This warranty does not cover failure of parts or components due to normal wear or damage, which in the judgment of Ingersoll Rand/ARO, arises from misuse, abrasion, corrosion, negligence, accident, substitution of non-Ingersoll Rand/ARO parts, faulty installation or tampering.

If Ingersoll Rand/ARO Inspection discloses no defect in material or workmanship, repair or replacement and return will be made at customary charges.

This warranty covers Ingersoll Rand/ARO manufactured products shipped on or after July 4, 1988.

Equipment not covered by Ingersoll Rand/ARO warranty: accessories or components of equipment sold by Ingersoll Rand/ARO that are not manufactured by Ingersoll Rand/ARO (such as switches, hoses, gasoline engines, etc.) are subject to the warranty, if any, of their manufacturer. Ingersoll Rand/ARO will provide the purchaser with reasonable assistance in making such claims.

The foregoing warranty supersedes, voids and is in lieu of all or any other warranties, express or implied, and no warranty or merchantability or fitness for particular purpose is intended or made. Ingersoll Rand/ARO's sole obligation and the original use purchaser's sole remedy is as stated above and in no event shall Ingersoll Rand/ARO be liable for any special, direct, indirect, incidental, consequential or other damages, or expenses of any nature including, without limitation, loss of profits or production time incurred by the original use purchaser or any other party.





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Ingersoll Rand Industrial Technologies provides products, services, and solutions to enhance the efficiency and productivity of our commercial, industrial, and process customers. Our innovative products include air compressors, air systems components, tools, pumps, material and fluid handling systems and microturbines.

[www.irttools.com/aro](http://www.irttools.com/aro)