



a division of Magnum Integrated Technologies Inc.

Air Cylinders

SERIES

7L



How to Select and Specify Viceroy Fluid Power Cylinders

SERIES
7L

Follow these steps to find the information you will need to specify and order the correct style of cylinder for your application. You will need to specify these items:

1. Quantity.

2. Series.

Decide which Series of cylinders best suits your application and refer to the catalog for that series. The selection will depend upon whether you want air or hydraulic and the size and capacity you need.

3. Mounting Style.

A series of diagrams illustrating mounting styles is on the reverse of this cover page. It is not at all uncommon to furnish cylinders with mixed mounts. For example, a cylinder may have a flange mount on the head end and some form of foot mounting on the cap end.

4. Operating Fluid.

Cylinders are designed to use clean, good grade hydraulic mineral oil. Special packings are required for use with most synthetic fluids. Refer to the Standard Cylinders paragraph under Design and Construction Features on page 8 for a discussion of these and cylinders for water.

5. Bore Size.

This will depend on the amount of force your application requires.

6. Stroke Length.

The distance of travel required by your application determines this.

7. Cushions.

Specify whether without cushions, cushioned head, cap or both ends. These are described in the Design and Construction Features on pages 6,7 and 30.

8. Rod Diameter.

The standard diameter for any given bore size is identified throughout this catalog. It will be furnished if not otherwise specified. For optional rod sizes, specify the desired piston rod diameter. Refer to the Piston Rod Selector Chart on page 4 to be sure you have selected the proper rod diameter for your application. Male rod ends Style 1 as shown on page 3 are furnished unless otherwise specified. Other styles shown are available at no

additional cost, but must be specified by "Style" code letters. If special rod ends are required, specify clearly: (A) "KK" thread diameter and pitch, whether male or female. (B) "A" length or depth of thread. (C) "WF" dimension. Dimension "WF" can be increased without difficulty, but cannot be decreased if standard wrench flats are to be supplied. "WF" equals "C" plus "VB" which is a fixed dimension. "C" is the minimum dimension that will permit standard wrench flats.

9. Rod End Thread. (See above)

10. Piston Type.

Flexible, lip type is furnished as standard. Ring type is offered as an alternate in the 1½" - 8" bore sizes at additional cost.

11. Port Location.

Ports will be located at "Position 1", as shown, unless otherwise specified. If desired in a position other than "Position 1", please specify by position number, as shown on data sheets, for both head and cap end. NOTE: Change of port location on a cushioned cylinder requires that cushion adjusting needle position be specified.

12. Cushion Adjusting Needle Location.

Cushion adjusting needles and ball checks are furnished in the positions shown on the data sheets. If desired in other than standard position, please specify by position number. NOTE: Cushion adjusting needles and ball check valves are interchangeable.

13. Double Rod Cylinders

See Tie Rod Mounting cylinder pages. If both ends are not to be the same, be sure to specify requirements in detail. If cylinder is to be cushioned at one end only, be sure to state clearly which end is to be cushioned (e.g. cushioned at end opposite flange end of cylinder).

14. Trunnion Location.

On styles "E" and "DE" customer must specify "XI" dimension.

15. Tie Rod Extensions.

If other than standard see Tie Rod Mounting cylinder pages and specify "B" dimension.

16. Stop Tube.

When application calls for a stop tube,

as described in the Piston Rod Selector Chart, please specify: (A) Actual working stroke required. (B) Length of stop tube required ("Plus stroke" dimensions in Bulletin will be determined on basis of actual stroke plus length of stop tube).

17. Special Features.

For any special features such as special mounts, piston rods, materials, etc., please furnish sketches with detailed information or specifications.

18. Special Operating Conditions.

The seals and packings furnished as standard in cylinders operate most satisfactorily within a temperature range of -40°F to +200°F. Baffles are recommended to shield cylinders from heat whenever practical. Consult local representative or factory when confronted with special problems such as unusually high or low temperatures, long strokes, corrosive atmosphere, especially dirty conditions, etc.

19. Accessories.

See the Accessories pages 31 and 32

20. Air Bleeds.

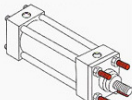
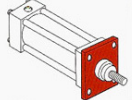
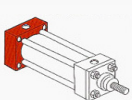
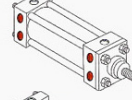


Air bleeds are available at slight additional cost, and are recommended when cylinders are not mounted in self-bleeding position. Please specify by position number, as shown on data sheets, for either or both ends. Air Bleeds are located in heads and caps and therefore should not be specified in the same position as ports or cushion needles and ball checks.

As product improvement is a continuous process, specifications are subject to change without notice.

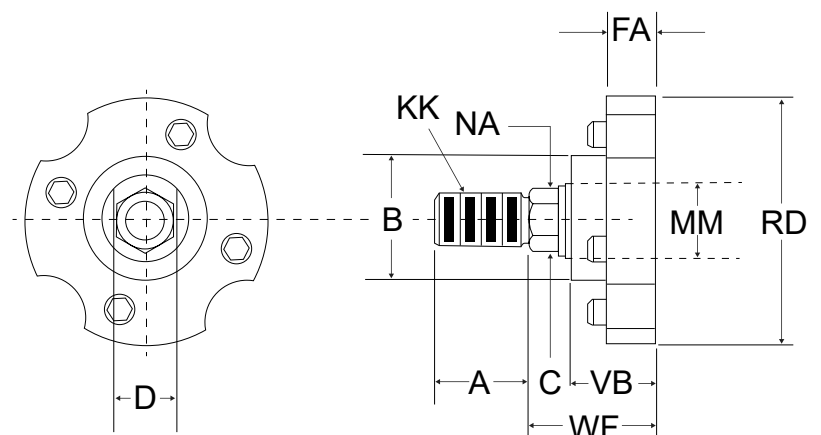
Styles of Mounting

Rod End Styles

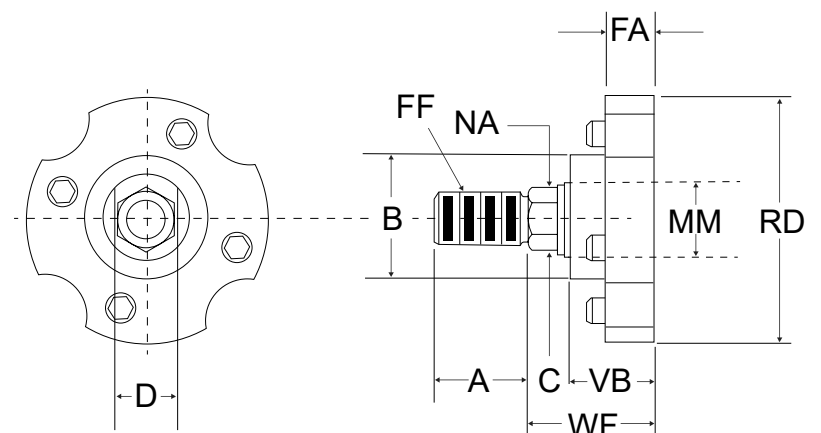
These diagrams illustrate the various styles of mounting cylinders and identifies the Industry Standard description and code letters along with corresponding Viceroy Fluid Power Style letter codes.

| Mounting Description | NFPA Mounting Code | Viceroy Fluid Power Mounting Code |
|---|---------------------------|---|
|  | MX1 MDX1 MX2 MX3 | Style L Style DL Style N Style M |
|  | MF1 | Style B |
|  | MF5 | Style BB |
|  | ME3 | Style QQ |
|  | MF2 | Style A |
|  | MF6 | Style AA |
|  | ME4 | Style PP |
|  | MS2 | Style J |
|  | MS3 | Style K |
|  | MS7 | Style CC |
|  | MS4 | Style H |
|  | MT1 | Style ER |
|  | MT2 | Style EB |
|  | MT4 | Style E |
|  | MP1 | Style G |
|  | | Style GG |
|  | | Style S |

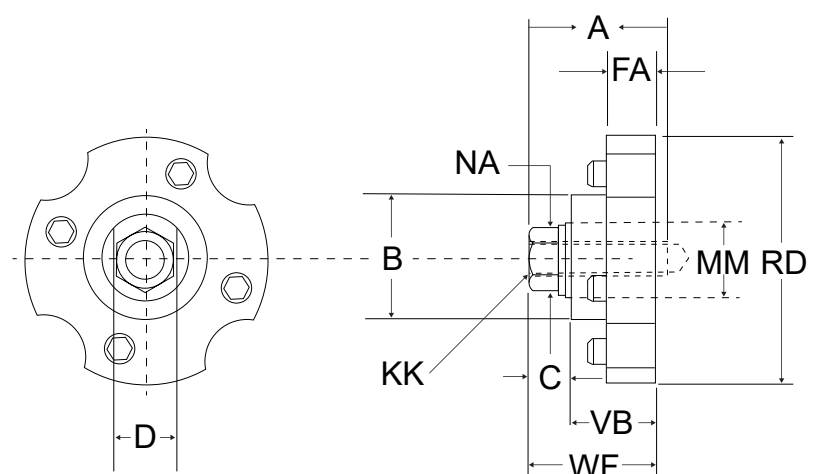
NFPA Style SM (VFP Style 1) Standard Male Rod End (Furnished unless otherwise specified)



NFPA Style IM (VFP Style 2) Optional Male Rod End



NFPA Style SF (VFP Style 3) Female Thread Rod End



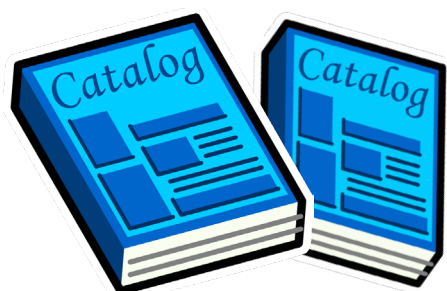
SPECIALS (VFP Style 4) Also available: Special Thread, Extension, etc. Give desired dimensions or furnish dimensional sketch.

*In 10" thru 14" bores dimension "FA" is identical to dimension "F". Socket screw heads do not protrude beyond dimension "FA".
NOTE: Certain bore sizes and diameters will be furnished with round retainers (not scalloped) but dimensions are the same.

How to use This catalog Index

SERIES 7L

This catalog has been organized for maximum convenience in designing with and specifying Viceroy Fluid Power cylinders. Both the front and back covers fold out to display information common to all mounting styles and bore sizes of cylinders.

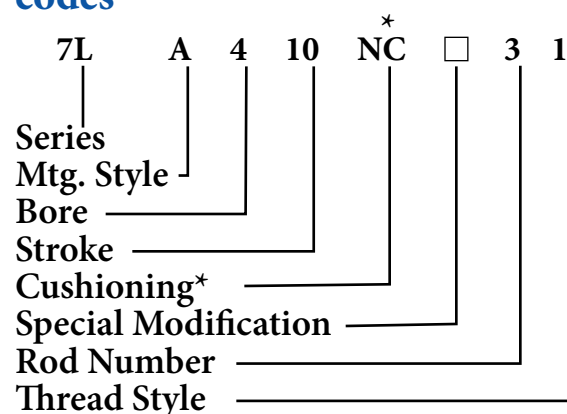


Inside the front cover you will find a guide to the different types of mounting and the rod end styles for all cylinder pages. The back cover contains information on accessories.

Fold out the front and back cover. These pages will be available for reference alongside any of the dimension tables which follow.

A review of the checklist of information headed "How To Select and Specify Viceroy Fluid Power Cylinders and the page opposite will help you in considering all essential details.

How to use Viceroy Fluid Power codes



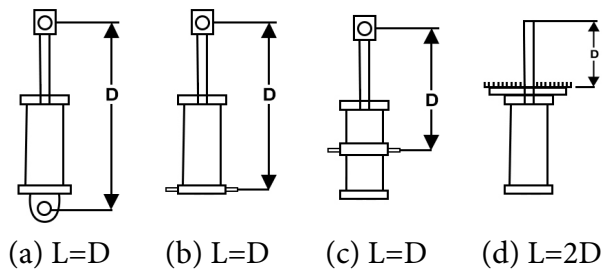
* NC - non-cushioned, CF - cushioned front end, CR - cushioned rear end, CC - cushioned both ends.

The diagram above illustrates the information given by a Viceroy Fluid Power cylinder code. The rod number references the rod diameter. The thread style refers to the rod end. (See Rod End Styles and matching code numbers, page 3.) When Viceroy Fluid Power Style 4 is specified, all rod and cylinder modifications must also be specified.

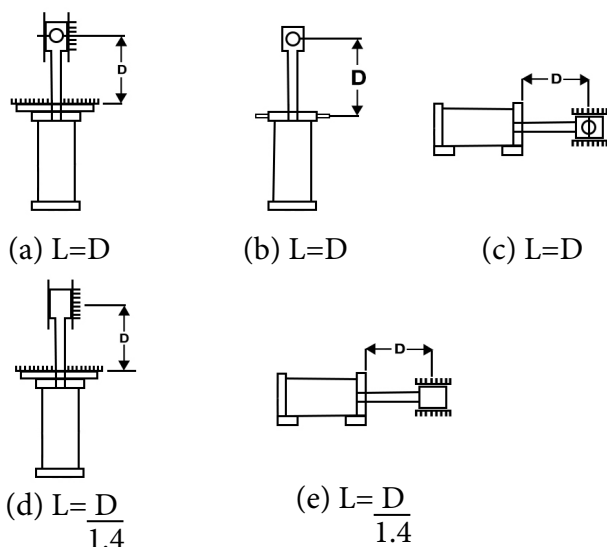
| | Page | | Page |
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Piston Rod Selector Chart

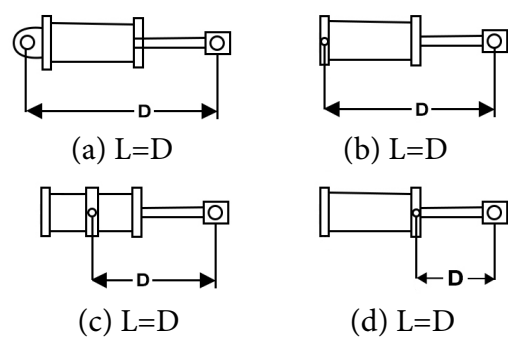
Case 1



Case 2



Case 3



The Piston Rod in a cylinder acts as a column and, as such, is subjected not only to compressive stresses, but also buckling stresses which are a function of the moment of inertia for a constant modulus of elasticity. The "column strength" of a piston rod cannot be increased by using higher tensile strength or heat treated materials. For this reason, it is sometimes necessary to use an oversize piston rod strictly for the purpose of achieving the necessary "column strength."

Data shown in chart form is based on Euler's equation for a vertical column with both ends rounded (see Case I illustration). The values of "L" shown in the chart are approximately one-half of the theoretical limit of "L" as determined by this equation. Factors such as vertical or horizontal mounting, shock or non-shock loading, frequency of operation, etc., should be taken into consideration in selecting a permissible value of "L".

The values of "L" shown in the shaded area of the table can be used when the

| VALUE OF "L" IN INCHES PISTON ROD DIAMETERS | | | | | | | | | | | | |
|---|-----|----|-------|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| Thrust load in Lbs | 5/8 | 1 | 1 1/8 | 1 1/4 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 | 5 | 5 1/2 |
| 300 | 43 | | | | | | | | | | | |
| 350 | 40 | | | | | | | | | | | |
| 400 | 38 | | | | | | | | | | | |
| 450 | 36 | | | | | | | | | | | |
| 500 | 34 | | | | | | | | | | | |
| 600 | 31 | | | | | | | | | | | |
| 700 | 28 | 72 | | | | | | | | | | |
| 800 | 27 | 68 | | | | | | | | | | |
| 900 | 25 | 64 | | | | | | | | | | |
| 1,000 | 24 | 61 | | | | | | | | | | |
| 1,200 | 22 | 55 | 104 | | | | | | | | | |
| 1,400 | 20 | 51 | 97 | | | | | | | | | |
| 1,600 | 19 | 48 | 90 | | | | | | | | | |
| 1,800 | 18 | 45 | 85 | | | | | | | | | |
| 2,000 | 17 | 43 | 81 | 131 | | | | | | | | |
| 2,200 | 16 | 41 | 77 | 125 | | | | | | | | |
| 2,600 | 15 | 38 | 71 | 115 | 150 | | | | | | | |
| 3,000 | 14 | 35 | 66 | 107 | 139 | | | | | | | |
| 4,000 | 12 | 30 | 57 | 93 | 121 | 189 | | | | | | |
| 5,000 | 11 | 27 | 50 | 83 | 108 | 169 | | | | | | |
| 6,000 | | 25 | 47 | 76 | 99 | 154 | 222 | | | | | |
| 7,000 | | 23 | 43 | 70 | 91 | 143 | 205 | | | | | |
| 8,000 | | 22 | 41 | 66 | 85 | 133 | 192 | 261 | | | | |
| 9,000 | | 20 | 38 | 62 | 81 | 126 | 181 | 246 | | | | |
| 10,000 | | 19 | 36 | 59 | 76 | 119 | 172 | 234 | 305 | | | |
| 12,500 | | 17 | 32 | 52 | 68 | 107 | 154 | 209 | 273 | | | |
| 15,000 | | | 30 | 48 | 63 | 98 | 140 | 191 | 249 | 315 | | |
| 17,500 | | | 27 | 44 | 58 | 90 | 130 | 177 | 231 | 292 | 360 | |
| 20,000 | | | 26 | 42 | 54 | 84 | 121 | 165 | 216 | 273 | 337 | |
| 25,000 | | | 23 | 37 | 48 | 76 | 109 | 148 | 193 | 244 | 302 | 365 |
| 30,000 | | | | 34 | 44 | 69 | 99 | 136 | 176 | 223 | 275 | 333 |
| 40,000 | | | | 29 | 38 | 60 | 86 | 117 | 153 | 193 | 238 | 289 |
| 50,000 | | | | | 34 | 54 | 77 | 105 | 137 | 173 | 213 | 258 |
| 60,000 | | | | | | 49 | 70 | 96 | 125 | 158 | 195 | 236 |
| 80,000 | | | | | | 42 | 61 | 83 | 108 | 137 | 169 | 204 |
| 100,000 | | | | | | | 55 | 74 | 97 | 122 | 151 | 182 |
| 120,000 | | | | | | | 50 | 68 | 88 | 112 | 138 | 167 |

attitude of the piston rod is horizontal or vertical. The values of "L" beyond the shaded area can be used with the piston rod in vertical position only.

Example:

Determine rod size required for a horizontal stroke of 130". Maximum cylinder force required in both push and pull directions is 8,000 lbs. The desired cylinder mounting in Case II (c), L=130.

Enter chart at thrust load 8,000 lbs. and move horizontally until "L" dimension over 130 is reached. This would be L=133, reading vertically up, shows that 2 1/2" diameter rod is required. However, the "L" dimension is outside the shaded area of the chart which means that this rod size stroke combination is suitable for vertical mounting only.

Go to the next rod size and observe that the highest "L" dimension in the coloured area is 140. Therefore, 3" diameter is a suitable rod and it will carry a load of

15,000 lbs. with approximately 2:1 factor of safety.

Stop Tubes. The function of a stop tube is to act as a spacer to increase the distance between the piston and piston rod bearing when the piston rod is in its fully extended position. This increase in spacing serves to reduce bearing loads and, at the same time, increases the structural rigidity of the assembly to prevent buckling and jack-knifing.

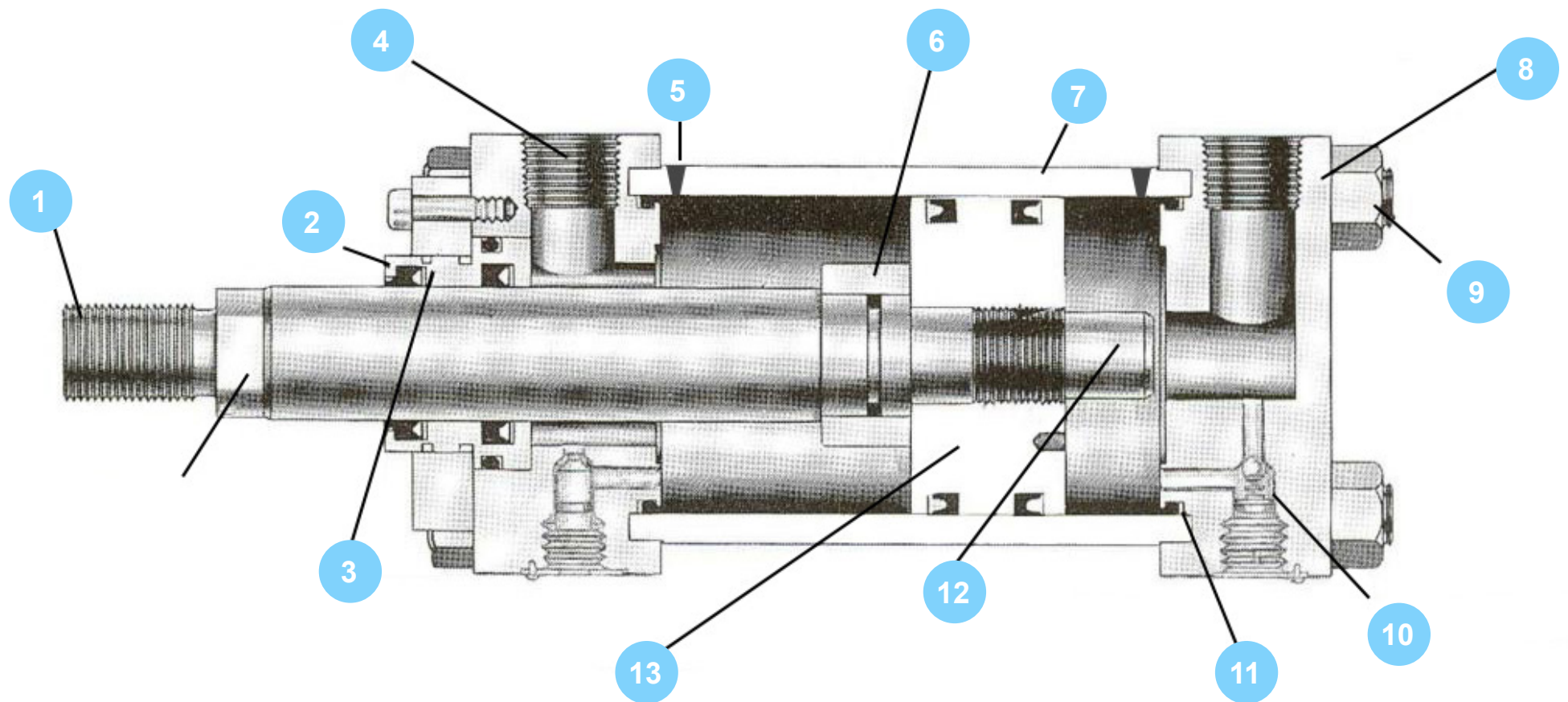
A Stop Tube is required for cylinders mounted as shown in Case I whenever "L" exceeds 40". Length of stop tube (Inches), = $\frac{L-40}{10}$ to the nearest full inch.

$$\frac{L-40}{10}$$

*Cylinder mountings shown in Case II do not need stop tubes.

*Cylinder mountings shown in Case III should be referred to factory stop tube requirements.

Quality Design and Construction Features



Cylinder Parts

1. Piston Rods
2. Rod Wiper
3. Bolted Rod Gland Cartridge
4. Ports
5. Tube Seals
6. Tube
7. Piston Seals
8. Piston
9. Tie Rods and Nuts
10. Heads and Caps
11. Needle valves and Check Valves
12. Cushions
13. Wrench Flats

Quality Design and Construction Features

1. Piston Rods - Piston rods are 100,000 psi minimum yield, medium carbon steel. Sizes $\frac{5}{8}$ " thru $3\frac{1}{2}$ " diameter are induction case hardened to 54 Rockwell C. All piston rods are hard-chrome plated and highly polished.

2. Rod Wiper - Polyurethane, double lip type wiper designed to protect the piston rod, bearing and rod seal, is standard for all rod sizes. Also, metallic scrapers and Viton wipers are available for all rod sizes.

3. Bolted Rod Gland Cartridge - Heavy wall, ductile iron bearing is accurately piloted in head to assure perfect alignment, designed to accept a variety of seal styles. With certain exceptions, the cartridges can be removed without removing mounts or tie rod nuts. This eliminates the necessity of cylinder disassembly to replace the rod seals or rod bearing. Bearings are held in place with bolted steel retainer plates.

Bearings used for a given rod size are interchangeable into any cylinder bore with the same rod diameter (except for bearings used with $\frac{1}{2}$ ", 2" and $2\frac{1}{2}$ " bores with maximum rod sizes).

a. Rod Seal - Synthetic rubber rod seal is wear compensating, flexible lip type, with heavy web section, essential to satisfactory performance and long life.

b. Rod Bearing - Ductile iron material insures low friction, high load capabilities and long life.

4. Ports - Large unrestricted ports permit maximum flow with minimum pressure drop. Heads may be rotated independently at 90° intervals for convenient port location. SAE straight thread ports are optional. Oversize ports, one size larger than standard, can be furnished on most bore sizes by welding a half-coupling to the standard head or cap.

5. Tube Seals - Positive sealing, synthetic rubber O-rings seal on tube I.D.

6. Tube - Steel tubing $1\frac{1}{2}$ " thru 14" bores. All tubes are microhoned to assure smooth operation with minimum friction. The tubes are piloted on the O.D. and the ends bear directly against the end covers. This assures good concentricity, accurate tie rod prestress.

7. Piston Seals - Flexible lip type piston seals with non-extrusion rings provide positive sealing, low friction and long life. Automotive type piston rings are also available in the $1\frac{1}{2}$ " thru 8" bore sizes, but must be specified when required. (Optional extra.)

8. Piston - High grade alloy Iron, $1\frac{1}{2}$ " thru 8" bores, also in 20" bore; steel piston for 10" thru 18" bore sizes. Pistons are one piece, pilot fitted to piston rod and locked.

9. Tie Rods and Nuts - Tie rods are 100,000 psi minimum yield, medium carbon steel, and are prestressed at assembly to minimize the possibility of tie rod elongation. Tie rod lock nuts are prevailing torque type.

10. Heads and Caps - Rolled steel accurately machined to assure perfect alignment of piston rod bearing, piston rod, piston, and tube. Heads and caps pilot on tube O.D. to prevent "breathing" and provide additional insurance against leakage.

11. Needle Valves and Check Valves - Flush type, self-locking needle valves and check valves are interchangeable. Large drilled passages provide maximum control of cushioning effect, and assure rapid, full-power start of return stroke. As an added safety feature, leakage will occur prior to thread disengagement, to eliminate the possibility of valve blow-out.

12. Cushions - Self-aligning, bronze cushion rings machined to close tolerances provide maximum cushioning effect. Needle valve provides further adjustment to suit operating requirements.

13. Wrench Flats - Large wrench flats are chamfered to protect rod gland packing in installation. All standard piston rods through $5\frac{1}{2}$ " diameter are furnished with two wrench flats. Additional flats are available upon request.

Mounts - All mounts are of steel plate or fabricated steel, accurately machined for precise mounting.

JIC - These cylinders are designed to conform to JIC standards.

NFPA - The dimensioning and identification of the cylinders in this Bulletin are in accordance with the NFPA recommended dimension code for fluid power cylinders.

Cylinders for Special Operating Conditions

Optional Features

SERIES 7L

1. Hydraulic Cylinder for High Temperature and Synthetic Fluids

- (Phosphate ester base and chlorinated hydrocarbon fire-resistant fluids) - Series 7LT.

Furnished with viton compound rod and piston seals or long wearing cast iron piston rings. Suitable for operation with most phosphate ester base fluids and temperatures within the range of 20°F to +400°F.

2. Hydraulic Cylinder for Water, Water Glycols, Water-oil Emulsions

- Series 7LW (water), and Series 7LW (water glycols and water-oil emulsions). Viton compound seals furnished to give long and reliable service when operated on water.* Standard chrome-plated steel piston rods are used (chrome-plated stainless steel piston rods available). For cylinders Series 7L, the tubes are chrome-plated steel.

Also, miscellaneous steel parts are cadmium-plated.

3. Hydraulic Cylinders for Air Service

- Cylinders in Series 7L are designed to function as hydraulic cylinders. These cylinders can be safely used for air pressures up to 250 psi, but we cannot be responsible for their operation unless our sales department has been consulted.

4. Stainless Steel Piston Rods

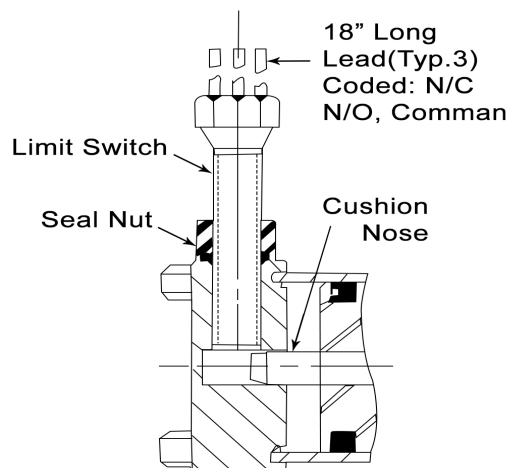
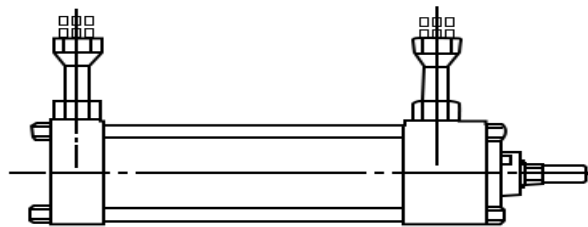
- Whenever stainless steel piston rods are required for 7L cylinders, it is important that Viceroy Fluid Power is advised of the working pressure.

*Because the mineral content of water is not known and can vary, the cylinders of this series are not guaranteed against premature failure due to excessive wear caused by corrosion, electrolysis, or for premature failure of plating.

As product improvement is a continuous process, specifications are subject to change without notice.

1. Hydraulic Cylinders With Limit Switches

- Our 7L cylinder can be furnished with built-in limit switches. They provide electrical signal at the end of the cylinder stroke for any secondary operations or actuations. The switch is insensitive to transients.



Ordering Information: Where: In addition to the cylinder specifications, specify the Limit Switch by following coding:

| | | | |
|----|---|---|---------------------------|
| LS | H | 1 | 1,2,3,4 = Switch Position |
| | C | 2 | |
| | | 3 | |
| | | 4 | |

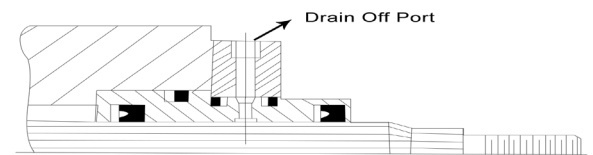
Enclosure NEMA Specifications

| | |
|-----|----|
| 1 | |
| 2 | 7 |
| 3 | 9 |
| 3R | 12 |
| 3S | 13 |
| 4 | |
| 4X1 | |

Switch electrical specifications
Single pole, double throw. Form "C"
2 amps-120/240 VAC-resistive load
½ amp-50 VAC-inductive load
50 MA-24 VDC
(Greater capacities possible with proper arc quenching circuitry-DC volts only.) 0.008 second-max response time.
Housing is 300 series stainless steel.

2. Hydraulic Cylinders With Rod Gland Drain-Off

- When weepage cannot be tolerated, a cylinder with rod gland drain-off should be considered.



3. Cylinders with Limit Switch - Proximity type switch, port mounted, requiring no mechanical contact for actuation. It is hermetically sealed and explosion proof.

4. Tandem Cylinders

- In hydraulic applications can be used as force multipliers in locations where space limitation prevents use of larger bore cylinders.

5. Adjustable Stroke Cylinders

- Ideal for use in applications requiring operation at easily adjustable stroke lengths

Pressure Rating (PSI).

For Cylinders with Standard Rod sizes

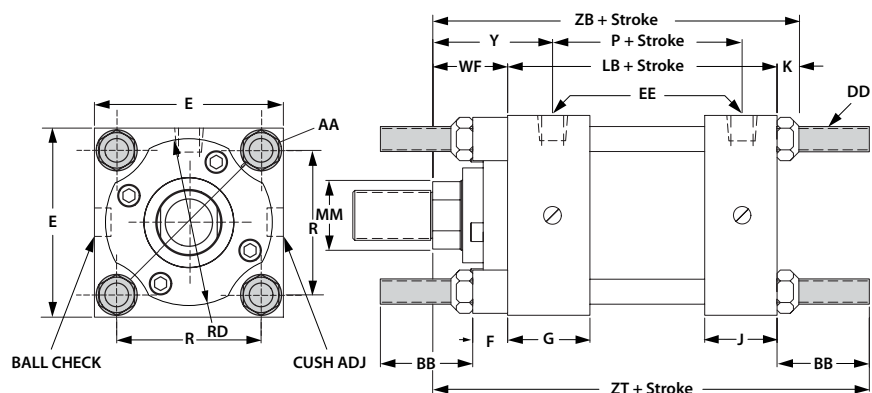
| Bore | Operating Pressures @Estimated Safety Factors (Based on Yield) Shown | | | |
|------|--|------|------|------|
| | Recommended | 4/1/ | 3/1 | 2/1 |
| 1½ | *1500 | 2030 | 2710 | |
| 2 | *1350 | 1045 | 1395 | 2090 |
| 2½ | *1150 | 1115 | 1485 | 2230 |
| 3¼ | *1350 | 990 | 1320 | 1980 |
| 4 | *900 | 700 | 935 | 1400 |
| 5 | *900 | 680 | 910 | 1360 |
| 6 | *750 | 575 | 785 | 1150 |
| 8 | *600 | 510 | 680 | 1020 |
| 10 | *400 | 345 | 460 | 660 |
| 12 | *350 | 330 | 440 | 660 |
| 14 | *350 | 330 | 440 | 66 |

* Recommended pressure refers to standard and oversized rods only. For undersized rods, consult with factory.

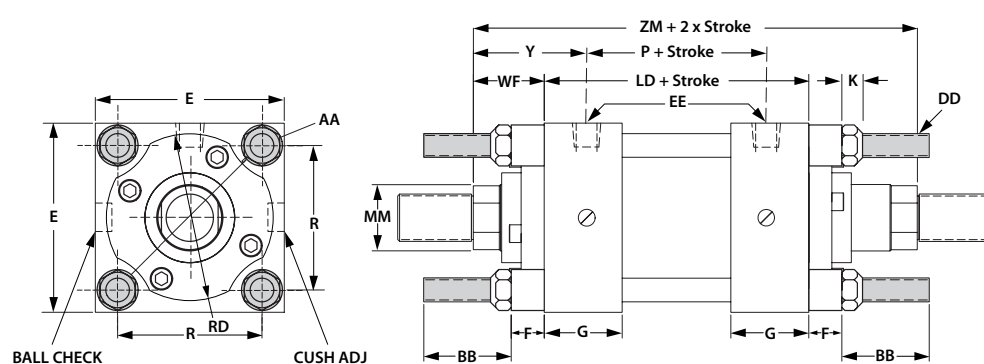
For additional information contact your nearest distributor or the factory sales department..

Tie Rod Mounted Cylinders

1½" to 6" Bores



STYLE L
(NFPA Mounting Style MX1)



STYLE DL
(NFPA Mounting Style MDX1)

Double rod cylinders are available in all styles* except A, AA, EB, and G. Dimensions for other styles are the same as above with mounting added. Add prefix D to style when ordering. Example: DB HYD. CYL.

BB is standard tie rod extension on Styles L, M, N, DL and DM, but will be increased or decreased when specified. To do this, specify BB to be (so many) inches. Extra nuts are available for tie rod ends.

*Consult factory on availability of Style DCC cylinder.

| VFP Mounting style | NFPA Mounting style | Description |
|--------------------|---------------------|--|
| L | MX1 | Tie rods extended both ends(above left) |
| M | MX3 | Tie rods extended head end(rod end) |
| N | MX2 | Tie rods extended cap end(blind end) |
| DL | MDX1 | Tie rods extended both ends(above right) |
| DM | MDX3 | Tie rods extended one end |

Envelope and Mounting Dimensions

| Bore | AA | BB | DD | E | EE NPTF | F | G | J | K | R | ADD STROKE | | |
|------|------|----|------|----|------------|---|----|----|---|------|------------|----|----|
| | | | | | | | | | | | LB | LD | P |
| 1½ | 2.02 | 1 | ¼-28 | 2 | ¾ | ¾ | 1½ | 1 | ¼ | 1.43 | 3⅝ | 4⅛ | 2¼ |
| 2 | 2.6 | 1⅝ | ⅝-24 | 2½ | ¾ | ¾ | 1½ | 1 | ⅝ | 1.84 | 3⅝ | 4⅛ | 2¼ |
| 2½ | 3.1 | 1⅝ | ⅝-24 | 3 | ¾ | ¾ | 1½ | 1 | ⅝ | 2.19 | 3¾ | 4¼ | 2⅝ |
| 3¼ | 3.9 | 1⅝ | ¾-24 | 3¾ | ½ | ⅝ | 1¾ | 1¼ | ¾ | 2.76 | 4¼ | 4¾ | 2⅝ |
| 4 | 4.7 | 1⅝ | ¾-24 | 4½ | ½ | ⅝ | 1¾ | 1¼ | ¾ | 3.32 | 4¼ | 4¾ | 2⅝ |
| 5 | 5.8 | 1⅜ | ½-20 | 5½ | ½ | ⅝ | 1¾ | 1¼ | ⅞ | 4.10 | 4½ | 5 | 2⅞ |
| 6 | 6.9 | 1⅜ | ½-20 | 6½ | ¾ | ¾ | 2 | 1½ | ⅞ | 4.88 | 5 | 5½ | 3⅛ |

SAE straight thread ports are optional on all cylinders except the 1½, 2" and 2½" bore sizes with maximum size rods. On these three sizes the head end NPTF ports are tapped shallow and the head end cushions are non adjustable.

Viceroy 7L Series Cylinders anticipate the ever increasing demands of industry for cylinders with higher pressure ratings, longer service life and reduced maintenance. For greater dependability, rely on the fluid power specialists..

SERIES
7L

Envelope and Mounting Dimensions

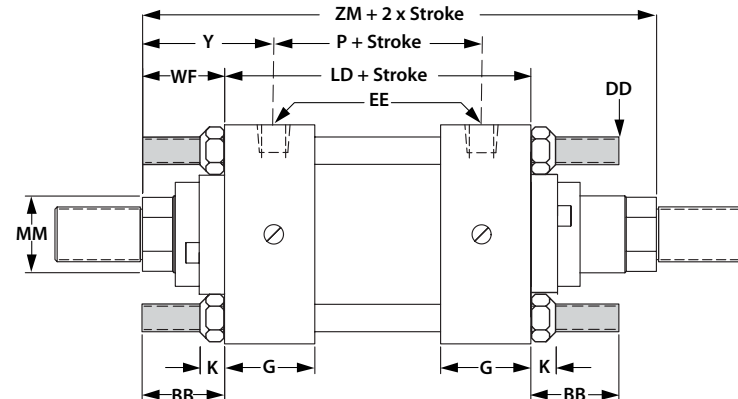
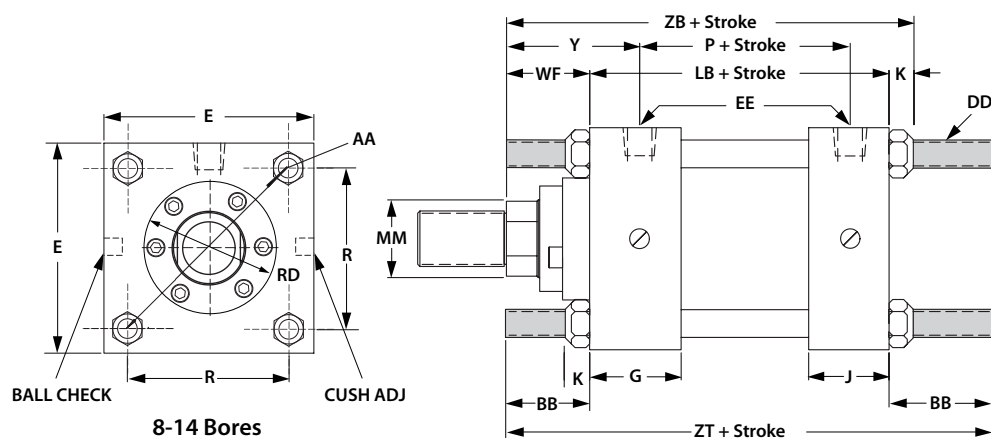
Rod and Dimensions

| BORE | Rod No | Rod Dia. MM | Thread Size | | Rod Extensions and Pilot Dimensions | | | | | | | | WF | Y | ADD STROKE | | ADD 2X Stk. ZM |
|------|--------|----------------|-------------|--------|-------------------------------------|-------------------|-------------------------------|---------------------------------|---------------------------------|----|----|-----|--------------------------------|---------------------------------|---------------------------------|---------------------------------|-------------------------------|
| | | | KK | FF | A | +000 -002 B | C | D | NA | FA | RD | VB | | | ZB | ZT | |
| 1½ | 1(Std) | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | 4 ⁷ / ₈ | 5 ⁵ / ₈ | 6 ¹ / ₈ |
| | 2 | 1 | ¾-16 | 7/8-14 | 1⅛ | 1.499 | ½ | 7/8 | 15/16 | ⅜ | - | 7/8 | 1⅜ | 2 ⁵ / ₁₆ | 5¼ | 6 | 6 ⁷ / ₈ |
| 2 | 1(Std) | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | 4 ¹⁵ / ₁₆ | 5¼ | 6 ¹ / ₈ |
| | 2 | 1 | ¾-16 | 7/8-14 | 1⅛ | 1.499 | ½ | 7/8 | 15/16 | ⅜ | - | 7/8 | 1⅜ | 2 ⁵ / ₁₆ | 5 ⁵ / ₁₆ | 6 ¹ / ₈ | 6 ⁷ / ₈ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ⅝ | 1⅛ | 15/16 | ⅜ | - | 1 | 1⅝ | 2 ⁹ / ₁₆ | 5 ⁹ / ₁₆ | 6 ³ / ₈ | 7 ³ / ₈ |
| 2½ | 2(Std) | 1 | ¾-16 | 7/8-14 | 1⅛ | 1.499 | ½ | 7/8 | 15/16 | ⅜ | 2¾ | 7/8 | 1⅜ | 2 ⁵ / ₁₆ | 5 ⁷ / ₁₆ | 6¼ | 7 |
| | 1 | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | 5 ¹ / ₁₆ | 5 ⁷ / ₈ | 6¼ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 15/16 | ⅜ | - | 1 | 1⅝ | 2 ⁹ / ₁₆ | 5 ¹¹ / ₁₆ | 6½ | 7½ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅜ | - | 1⅛ | 1⅞ | 2 ¹³ / ₁₆ | 5 ¹⁵ / ₁₆ | 6¾ | 8 |
| 3¼ | 2(Std) | 1 | ¾-16 | 7/8-14 | 1⅛ | 1.499 | ½ | 7/8 | 15/16 | ⅜ | 2¾ | 7/8 | 1⅜ | 2 ⁷ / ₁₆ | 6 | 7 | 7½ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 15/16 | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 6¼ | 7¼ | 8 |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅛ | 1⅞ | 2 ¹⁵ / ₁₆ | 6½ | 7½ | 8½ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | - | 1⅛ | 2 | 3 ¹ / ₁₆ | 6 ⁵ / ₈ | 7 ⁵ / ₈ | 8¾ |
| 4 | 3(Std) | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 15/16 | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 6¼ | 7¼ | 8 |
| | 2 | 1 | ¾-16 | 7/8-14 | 1⅛ | 1.499 | ½ | 7/8 | 15/16 | ⅜ | 2¾ | 7/8 | 1⅜ | 2 ⁷ / ₁₆ | 6 | 7 | 7½ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅛ | 1⅞ | 2 ¹⁵ / ₁₆ | 6½ | 7½ | 8½ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅛ | 2 | 3 ¹ / ₁₆ | 6 ⁵ / ₈ | 7 ⁵ / ₈ | 8¾ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 6 ⁷ / ₈ | 7 ⁷ / ₈ | 9¼ |
| 5 | 4(Std) | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅛ | 1⅞ | 2 ¹⁵ / ₁₆ | 6 ¹³ / ₁₆ | 8 ³ / ₁₆ | 8¾ |
| | 2 | 1 | ¾-16 | 7/8-14 | 1⅛ | 1.499 | ½ | 7/8 | 15/16 | ⅜ | 2¾ | 7/8 | 1⅜ | 2 ⁷ / ₁₆ | 6 ⁵ / ₁₆ | 7 ¹¹ / ₁₆ | 7¾ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 15/16 | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 6 ⁹ / ₁₆ | 7 ¹⁵ / ₁₆ | 8¼ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅛ | 2 | 3 ¹ / ₁₆ | 6 ¹⁵ / ₁₆ | 8 ⁵ / ₁₆ | 9 |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 7 ³ / ₁₆ | 8 ⁹ / ₁₆ | 9½ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 7 ³ / ₁₆ | 8 ⁹ / ₁₆ | 9½ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 7 ³ / ₁₆ | 8 ⁹ / ₁₆ | 9½ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹¹ / ₁₆ | 9 ¹ / ₁₆ | 10 |
| 6 | 4(Std) | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅛ | 1⅞ | 3 ¹ / ₁₆ | 7 ⁵ / ₁₆ | 8 ¹¹ / ₁₆ | 9¼ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 15/16 | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹³ / ₁₆ | 7 ¹ / ₁₆ | 8 ⁷ / ₁₆ | 8¾ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅛ | 2 | 3 ³ / ₁₆ | 7 ⁷ / ₁₆ | 8 ¹³ / ₁₆ | 9½ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹¹ / ₁₆ | 9 ¹ / ₁₆ | 10 |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹¹ / ₁₆ | 9 ¹ / ₁₆ | 10 |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹¹ / ₁₆ | 9 ¹ / ₁₆ | 10 |
| 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹¹ / ₁₆ | 9 ¹ / ₁₆ | 10 | |

Tie Rod Mounted Cylinders

8" to 14" Bores

SERIES 7L



STYLE L

(NFPA Mounting Style MX1)

STYLE DL

(NFPA Mounting Style MDX1)

| VFP Mounting style | NFPA Mounting style | Description |
|--------------------|---------------------|--|
| L | MX1 | Tie rods extended both ends(above left) |
| M | MX3 | Tie rods extended head end(rod end) |
| N | MX2 | Tie rods extended cap end(blind end) |
| DL | MDX1 | Tie rods extended both ends(above right) |
| DM | MDX3 | Tie rods extended one end |

Double rod cylinders are available in all styles* except A, AA, EB, and G. Dimensions for other styles are the same as above with mounting added.

Add prefix D to style when ordering. Example: DB HYD. CYL.

BB is standard tie rod extension on Styles L, M, N, DL and DM, but will be increased or decreased when specified. To do this, specify BB to be (so many) inches. Extra nuts are available for tie rod ends.

*Consult factory on availability of Style DCC cylinder.

Envelope and Mounting Dimensions

| Bore | AA | BB | DD | E | EE | | G | J | K | R | Add Stroke | | |
|------|------|---------------------------------|--------|--------------------------------|-------------------------------|-----|-------------------------------|-------------------------------|--------------------------------|-------|-------------------------------|-------------------------------|-------------------------------|
| | | | | | NPTF | SAE | | | | | LB | LD | P |
| 8 | 9.1 | 2 ⁵ / ₁₆ | 5/8-18 | 8 ¹ / ₂ | 3/4 | 12 | 2 | 11/2 | 9/16 | 6.44 | 5/8 | 5/8 | 3 ¹ / ₄ |
| 10 | 11.2 | 2 ¹¹ / ₁₆ | 3/4-16 | 10 ⁵ / ₈ | 1 | 16 | 2 ¹ / ₄ | 2 | 1 ¹ / ₁₆ | 7.92 | 6 ³ / ₈ | 6 ⁵ / ₈ | 4 ¹ / ₈ |
| 12 | 13.3 | 2 ¹¹ / ₁₆ | 3/4-16 | 12 ³ / ₄ | 1 | 16 | 2 ¹ / ₄ | 2 | 1 ¹ / ₁₆ | 9.40 | 6 ⁷ / ₈ | 7 ¹ / ₈ | 4 ⁵ / ₈ |
| 14 | 15.4 | 3 ³ / ₁₆ | 7/8-14 | 14 ³ / ₄ | 1 ¹ / ₄ | 20 | 2 ³ / ₄ | 2 ¹ / ₄ | 1 ³ / ₁₆ | 10.90 | 8 ¹ / ₈ | 8 ⁵ / ₈ | 5 ¹ / ₂ |

NPTF ports furnished unless otherwise specified.

SAE straight thread ports optional.

The exclusive Viceroy Cartridge is standard on every 7L cylinder to help eliminate most causes of cylinder failure. This Cartridge provides the ultimate in sealing plus greater bearing area and resistance to side load stress. For better bearings, rely on the fluid power specialists.

SERIES
7L

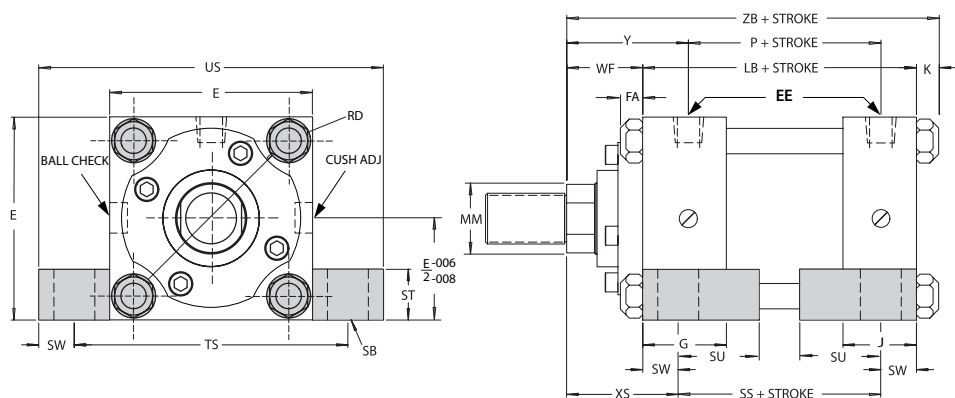
Rod and Dimensions

Envelope and Mounting Dimensions

| Bore | Rod Code No | Rod. Dia. MM | Thread Size | | Rod Extensions and Pilot Dimensions | | | | | | | | WF | Y | Add Stroke | | Add 2x Stk. | |
|------|-------------|--------------|-------------|-------|-------------------------------------|-------------|-------|---------------------------------|---------------------------------|---------------------------------|-------------------------------|----|----|---------------------------------|---------------------------------|----------------------------------|----------------------------------|--------------------------------|
| | | | KK | FF | A | +002 -002 B | C | D | NA | FA | RD | VB | | | ZB | ZT | ZM | |
| 8 | 5 (Std) | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅛ | 1⅛ | 2 | 3 ³ / ₁₆ | 7 ¹¹ / ₁₆ | 9 ⁷ / ₁₆ | 9 ⁵ / ₈ | |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ⅝ | 1⅛ | 1 ⁵ / ₁₈ | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹³ / ₁₆ | 7 ⁵ / ₁₆ | 9 ¹ / ₁₆ | 8 ⁷ / ₈ | |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅛ | 1⅞ | 3 ¹ / ₁₆ | 7 ⁹ / ₁₆ | 9 ⁵ / ₁₆ | 9 ³ / ₈ | |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 9 ¹¹ / ₁₆ | 10 ¹ / ₈ | |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 9 ¹¹ / ₁₆ | 10 ¹ / ₈ | |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 9 ¹¹ / ₁₆ | 10 ¹ / ₈ | |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 9 ¹¹ / ₁₆ | 10 ¹ / ₈ | |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 9 ¹¹ / ₁₆ | 10 ¹ / ₈ | |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 9 ¹¹ / ₁₆ | 10 ¹ / ₈ | |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 9 ¹¹ / ₁₆ | 10 ¹ / ₈ | |
| | 10 | 6 (Std) | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 11 ⁵ / ₁₆ | 11 ¹ / ₈ |
| | | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅛ | 1⅞ | 3 ³ / ₈ | 8 ¹⁵ / ₁₆ | 10 ¹⁵ / ₁₆ | 10 ³ / ₈ |
| 5 | | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅛ | 1⅛ | 2 | 3¼ | 9 ¹ / ₁₆ | 11 ¹ / ₁₆ | 10 ⁵ / ₈ | |
| 7 | | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 11 ⁵ / ₁₆ | 11 ¹ / ₈ | |
| 8 | | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 11 ⁵ / ₁₆ | 11 ¹ / ₈ | |
| 9 | | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 11 ⁵ / ₁₆ | 11 ¹ / ₈ | |
| 10 | | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 11 ⁵ / ₁₆ | 11 ¹ / ₈ | |
| 11 | | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 11 ⁵ / ₁₆ | 11 ¹ / ₈ | |
| 12 | | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 11 ⁵ / ₁₆ | 11 ¹ / ₈ | |
| 12 | | 7 (Std) | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 11 ¹³ / ₁₆ | 11 ⁵ / ₈ |
| | | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅛ | 1⅛ | 2 | 3¼ | 9 ⁹ / ₁₆ | 11 ⁹ / ₁₆ | 11 ¹ / ₈ |
| | | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 11 ¹³ / ₁₆ | 11 ⁵ / ₈ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 11 ¹³ / ₁₆ | 11 ⁵ / ₈ | |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 11 ¹³ / ₁₆ | 11 ⁵ / ₈ | |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 11 ¹³ / ₁₆ | 11 ⁵ / ₈ | |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 11 ¹³ / ₁₆ | 11 ⁵ / ₈ | |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 11 ¹³ / ₁₆ | 11 ⁵ / ₈ | |
| | 14 | 8 (Std) | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 2 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 13 ⁹ / ₁₆ | 13 ¹ / ₈ |
| | | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 13 ⁹ / ₁₆ | 13 ¹ / ₈ |
| | | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 13 ⁹ / ₁₆ | 13 ¹ / ₈ |
| | | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 2 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 13 ⁹ / ₁₆ | 13 ¹ / ₈ |
| 10 | | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 13 ⁹ / ₁₆ | 13 ¹ / ₈ | |
| 11 | | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 13 ⁹ / ₁₆ | 13 ¹ / ₈ | |
| 12 | | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 13 ⁹ / ₁₆ | 13 ¹ / ₈ | |

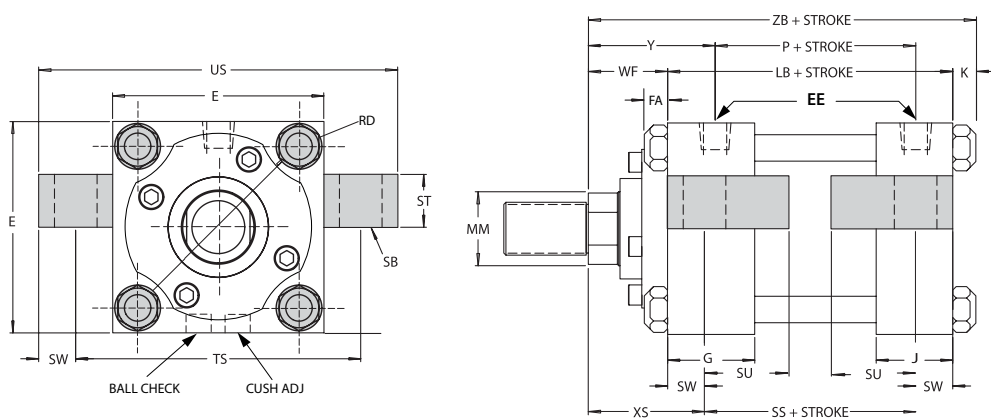
Foot Mounted Cylinders

1½" to 6" Bores

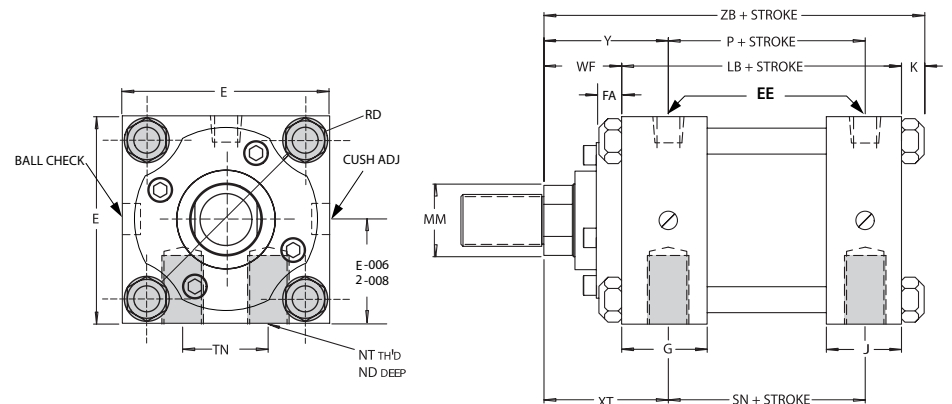


STYLE J - Side Lug Mount
(NFPA Mounting Style MS2)

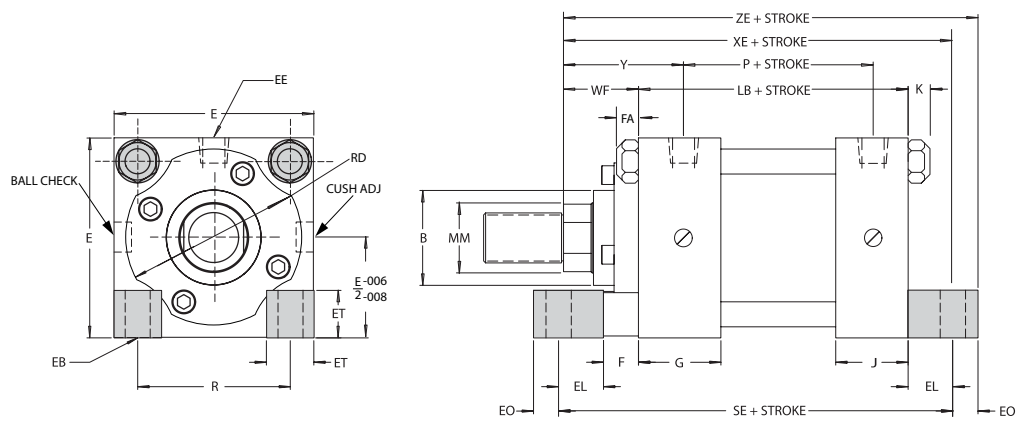
NOTE : Do not specify ports in #2 or #4 position without checking clearance between pipe fitting and mounting bolt head.



STYLE K - Center Line Mount
(NFPA Mounting Style MS3)



STYLE H - Side Flush Mount
(NFPA Mounting Style MS4)



STYLE CC - Foot Mount
(NFPA Mounting Style MS7)

**Foot lugs may interfere with cartridge removal on sizes indicated with * on opposite page.*

Envelope and Mounting Dimensions

| Bore | E | EB* | EE | | EL | EO | ET | F | G | J | K | NT | R | SB* | ST | SU | SW | TN | TS | US | Add Stroke | | | | |
|------|----|------|------|-----|--------|------|-------|-----|----|----|------|---------|------|-----|----|--------|--------|---------|----|----|------------|----|----|----|----|
| | | | NPTF | SAE | | | | | | | | | | | | | | | | | LB | P | SE | SN | SS |
| 1½ | 2 | ¼ | ⅜ | 6 | ¾ | ¼ | ⅑/16 | ⅜ | 1½ | 1 | ¼ | ¼-20 | 1.43 | ⅜ | ½ | 15/16 | ⅜ | ⅝ | 2¾ | 3½ | 3⅝ | 2¼ | 5½ | 2¼ | 2⅞ |
| 2 | 2½ | 5/16 | ⅜ | 6 | 15/16 | 5/16 | 11/16 | ⅜ | 1½ | 1 | 5/16 | 5/16-18 | 1.84 | ⅜ | ½ | 15/16 | ⅜ | 7/8 | 3¼ | 4 | 3⅝ | 2¼ | 5⅞ | 2¼ | 2⅞ |
| 2½ | 3 | 5/16 | ⅜ | 6 | 11/16 | 5/16 | 13/16 | ⅜ | 1½ | 1 | 5/16 | ⅜-16 | 2.19 | ⅜ | ½ | 15/16 | ⅜ | 1¼ | 3¾ | 4½ | 3¾ | 2⅜ | 6¼ | 2⅜ | 3 |
| 3¼ | 3¾ | ⅜ | ½ | 10 | 7/8 | ⅜ | 1 | 5/8 | 1¾ | 1¼ | ⅜ | ½-13 | 2.76 | ½ | ¾ | 1¼ | ½ | 1½ | 4¾ | 5¾ | 4¼ | 2⅝ | 6⅞ | 2⅝ | 3¼ |
| 4 | 4½ | ⅜ | ½ | 10 | 1 | ⅜ | 13/16 | 5/8 | 1¾ | 1¼ | ⅜ | ½-13 | 3.32 | ½ | ¾ | 1¼ | ½ | 2 1/16 | 5½ | 6½ | 4¼ | 2⅝ | 6⅞ | 2⅝ | 3¼ |
| 5 | 5½ | ½ | ½ | 10 | 1 1/16 | ½ | 1⅜ | 5/8 | 1¾ | 1¼ | 7/16 | ⅝-11 | 4.10 | ¾ | 1 | 1 9/16 | 1½ | 2 11/16 | 6⅞ | 8¼ | 4½ | 2⅞ | 7¼ | 2⅞ | 3⅞ |
| 6 | 6½ | ½ | ¾ | 12 | 1 | ½ | 1⅝ | ¾ | 2 | 1½ | 7/16 | ¾-10 | 4.88 | ¾ | 1 | 1 9/16 | 1 1/16 | 3¼ | 7⅞ | 9¼ | 5 | 3⅞ | 7¼ | 3⅞ | 3⅝ |

SAE straight thread ports are optional on all cylinders except the 1½, 2" and 2½" bore sizes with maximum size rods. On these three sizes the head end NPTF ports are tapped shallow and the head end cushions are non adjustable. Styles J, H, K and CC should be pinned or keyed at one end to prevent shifting.

**Mounting holes are 1/16 larger than screw size shown.*

The Viceroy cartridge features include the most advanced rod seal and wiper configurations in the industry. And, this cartridge's one-piece construction with bolted retainer permits fast removal without disassembly of the cylinder. For reduced downtime rely on the fluid power specialists.

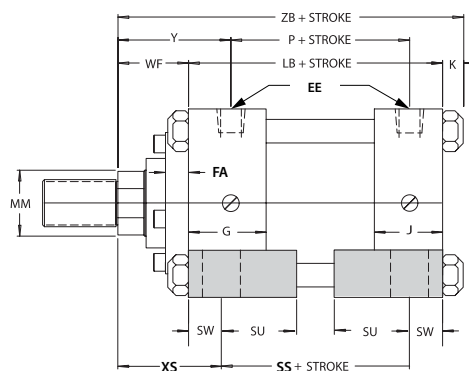
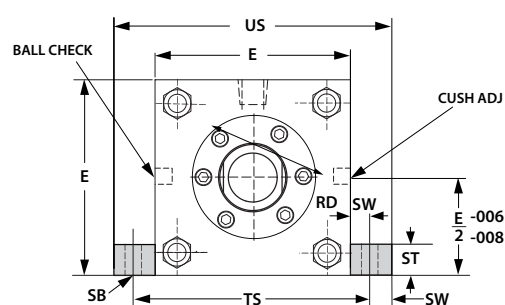
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Rod and Dimensions

Envelope and Mounting Dimensions

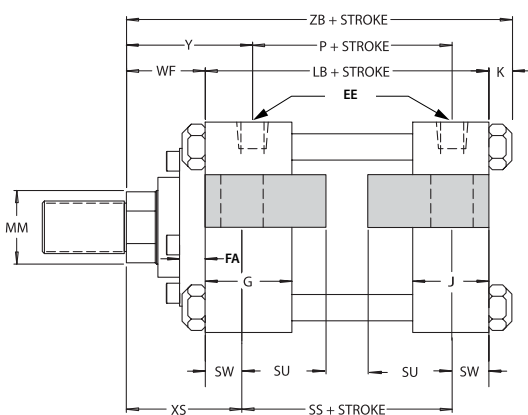
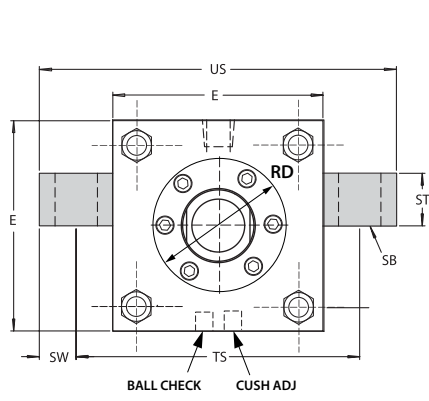
| Bore | Rod Code No | Rod. Dia. MM | Thread Size | | Rod Extensions and Pilot Dimensions | | | | | | | | | | Add Stroke | | | | | |
|------|-------------|--------------|-------------|--------|-------------------------------------|-------------------|-----|---------------------------------|---------------------------------|----|----|-----|-------------------------------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| | | | KK | FF | A | +002 -002 B | C | D | NA | FA | RD | VB | WF | Y | ND | XS | XT | XE | ZB | ZE |
| 1½ | 1(Std) | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | ⅜ | 1 ³ / ₈ | 1 ¹⁵ / ₁₆ | 5 ³ / ₈ | 4 ⁷ / ₈ | 5 ⁵ / ₈ |
| | 2 | 1 | ¾-16 | 7/8-14 | 1⅞ | 1.499 | ½ | 7/8 | 1 ⁵ / ₁₆ | ⅜ | - | 7/8 | 1 ³ / ₈ | 2 ⁵ / ₁₆ | ¼ | 1 ³ / ₄ | 2 ⁵ / ₁₆ | 5 ³ / ₄ | 5 ¹ / ₄ | 6 |
| 2 | 1(Std) | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | ½ | 1 ³ / ₈ | 1 ¹⁵ / ₁₆ | 5 ⁹ / ₁₆ | 4 ¹⁵ / ₁₆ | 5 ⁷ / ₈ |
| | 2 | 1 | ¾-16 | 7/8-14 | 1⅞ | 1.499 | ½ | 7/8 | 1 ⁵ / ₁₆ | ⅜ | - | 7/8 | 1 ³ / ₈ | 2 ⁵ / ₁₆ | 7/16 | 1 ³ / ₄ | 2 ⁵ / ₁₆ | 5 ¹⁵ / ₁₆ | 5 ⁵ / ₁₆ | 6¼ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ⅝ | 1⅞ | 1 ⁵ / ₁₆ | ⅜ | - | 1 | 1 ⁵ / ₈ | 2 ⁹ / ₁₆ | 5/16 | 2 | 2 ⁹ / ₁₆ | 6 ³ / ₁₆ | 5 ⁹ / ₁₆ | 6½ |
| 2½ | 2(Std) | 1 | ¾-16 | 7/8-14 | 1⅞ | 1.499 | ½ | 7/8 | 1 ⁵ / ₁₆ | ⅜ | 2¾ | 7/8 | 1 ³ / ₈ | 2 ⁵ / ₁₆ | 9/16 | 1¾ | 2 ⁵ / ₁₆ | 6 ³ / ₁₆ | 5 ⁷ / ₁₆ | 6½ |
| | 1 | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | 9/16 | 1 ³ / ₈ | 1 ¹⁵ / ₁₆ | 5 ¹³ / ₁₆ | 5 ¹ / ₁₆ | 6⅞ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 1 ⁵ / ₁₆ | ⅜ | - | 1 | 1 ⁵ / ₈ | 2 ⁹ / ₁₆ | ⅜ | 2¼ | 2 ⁹ / ₁₆ | 6 ¹¹ / ₁₆ | 5 ¹⁵ / ₁₆ | 6¾ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅜ | - | 1⅞ | 1 ⁷ / ₈ | 2 ¹³ / ₁₆ | 9/16 | 2 | 2 ¹³ / ₁₆ | 6 ⁷ / ₁₆ | 5 ¹¹ / ₁₆ | 7 |
| 3¼ | 2(Std) | 1 | ¾-16 | 7/8-14 | 1⅞ | 1.499 | ½ | 7/8 | 1 ⁵ / ₁₆ | ⅜ | 2¾ | 7/8 | 1 ³ / ₈ | 2 ⁷ / ₁₆ | ¾ | 1 ⁷ / ₈ | 2 ⁷ / ₁₆ | 6½ | 6 | 6 ⁷ / ₈ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 1 ⁵ / ₁₆ | ⅝ | 3¼ | 1 | 1 ⁵ / ₈ | 2 ¹¹ / ₁₆ | ¾ | 2⅞ | 2 ¹¹ / ₁₆ | 6¾ | 6¼ | 7⅞ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅞ | 1 ⁷ / ₈ | 2 ¹⁵ / ₁₆ | ¾ | 2 ³ / ₈ | 2 ¹⁵ / ₁₆ | 7 | 6½ | 7 ³ / ₈ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | - | 1⅞ | 2 | 3 ¹ / ₁₆ | ½ | 2½ | 3 ¹ / ₁₆ | 7⅞ | 6 ⁵ / ₈ | 7½ |
| 4 | 3(Std) | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 1 ⁵ / ₁₆ | ⅝ | 3¼ | 1 | 1 ⁵ / ₈ | 2 ¹¹ / ₁₆ | ¾ | 2⅞ | 2 ¹¹ / ₁₆ | 6 ⁷ / ₈ | 6¼ | 7¼ |
| | 2 | 1 | ¾-16 | 7/8-14 | 1⅞ | 1.499 | ½ | 7/8 | 1 ⁵ / ₁₆ | ⅜ | 2¾ | 7/8 | 1 ³ / ₈ | 2 ⁷ / ₁₆ | ¾ | 1 ⁷ / ₈ | 2 ⁷ / ₁₆ | 6 ⁵ / ₈ | 6 | 7 |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅞ | 1 ⁷ / ₈ | 2 ¹⁵ / ₁₆ | ¾ | 2 ³ / ₈ | 2 ¹⁵ / ₁₆ | 7⅞ | 6½ | 7½ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ¹ / ₁₆ | ¾ | 2½ | 3 ¹ / ₁₆ | 7¼ | 6 ⁵ / ₈ | 7 ⁵ / ₈ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | ⅝ | 2¾ | 3 ⁵ / ₁₆ | 7½ | 6 ⁷ / ₈ | 7 ⁷ / ₈ |
| 5 | 4(Std) | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅞ | 1 ⁷ / ₈ | 2 ¹⁵ / ₁₆ | 1 ⁵ / ₁₆ | 2 ⁹ / ₁₆ | 2 ¹⁵ / ₁₆ | 7 ⁷ / ₁₆ | 6 ¹³ / ₁₆ | 7 ¹⁵ / ₁₆ |
| | 2 | 1 | ¾-16 | 7/8-14 | 1⅞ | 1.499 | ½ | 7/8 | 1 ⁵ / ₁₆ | ⅜ | 2¾ | 7/8 | 1 ³ / ₈ | 2 ¹⁵ / ₁₆ | 1 ⁵ / ₁₆ | 2 ¹ / ₁₆ | 2 ⁷ / ₁₆ | 6 ¹⁵ / ₁₆ | 6 ⁵ / ₁₆ | 7 ⁷ / ₁₆ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 1 ⁵ / ₁₆ | ⅝ | 3¼ | 1 | 1 ⁵ / ₈ | 2 ¹¹ / ₁₆ | 1 ⁵ / ₁₆ | 2 ⁵ / ₁₆ | 2 ¹¹ / ₁₆ | 7 ³ / ₁₆ | 6 ⁹ / ₁₆ | 7 ¹¹ / ₁₆ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ¹ / ₁₆ | 1 ⁵ / ₁₆ | 2 ¹¹ / ₁₆ | 3 ¹ / ₁₆ | 7 ⁹ / ₁₆ | 6 ¹⁵ / ₁₆ | 8 ¹ / ₁₆ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 1 ⁵ / ₁₆ | 2 ¹⁵ / ₁₆ | 3 ⁵ / ₁₆ | 7 ¹³ / ₁₆ | 7 ³ / ₁₆ | 8 ⁵ / ₁₆ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 1 ⁵ / ₁₆ | 2 ¹⁵ / ₁₆ | 3 ⁵ / ₁₆ | 7 ¹³ / ₁₆ | 7 ³ / ₁₆ | 8 ⁵ / ₁₆ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | ¾ | 2 ¹⁵ / ₁₆ | 3 ⁵ / ₁₆ | 7 ¹³ / ₁₆ | 7 ³ / ₁₆ | 8 ⁵ / ₁₆ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 1 | 2 ¹⁵ / ₁₆ | 3 ⁷ / ₁₆ | 8¼ | 7 ¹¹ / ₁₆ | 8¾ |

Foot Mounted Cylinders 8" to 14" Bores



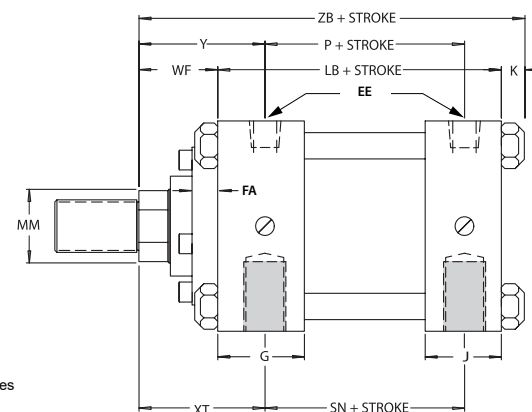
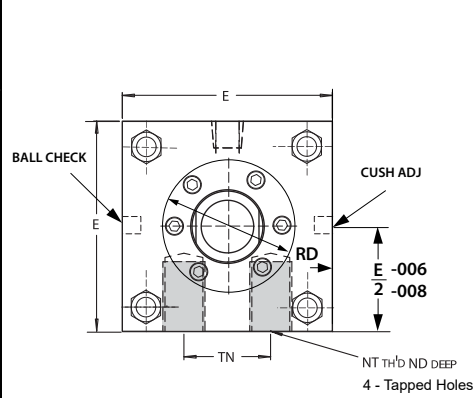
STYLE J - Side Lug Mount
(NFPA Mounting Style MS2)

NOTE : Do not specify ports in #2 or #4 position without checking clearance between pipe fitting and mounting bolt head.

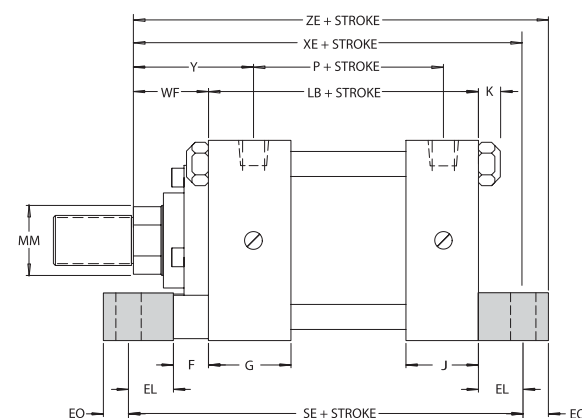
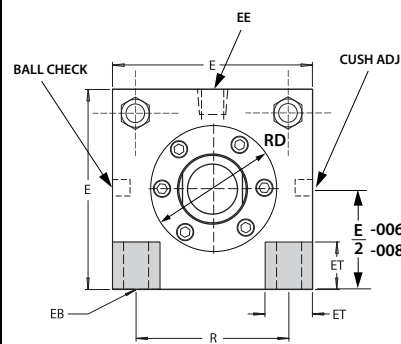


STYLE K - Center Line Mount
(NFPA Mounting Style MS3)

For tie rod size and location see page 11



STYLE H - Side Flush Mount
(NFPA Mounting Style MS4)



STYLE CC - Foot Mount
(NFPA Mounting Style MS7)

Style CC is not available in 16", 18" and 20" bores.

Envelope and Mounting Dimensions

| Bore | E | EB* | EE | | EL | EO | ET | G | J | K | ND | NT | R | SB* | ST | SU | SW | TN | TS | US | Add Stroke | | | | |
|------|-----|-----|------|-----|----|----|----|----|----|----|----|------|-------|-----|----|----|----|----|-----|-----|------------|----|-----|----|----|
| | | | NPTF | SAE | | | | | | | | | | | | | | | | | LB | P | SE | SN | SS |
| 8 | 8½ | ⅝ | ¾ | 12 | 1⅝ | ⅝ | 2⅛ | 2 | 1½ | ⅑ | 1⅝ | ¾-10 | 6.44 | ¾ | 1 | 1⅛ | 1⅛ | 4½ | 9⅞ | 11¼ | 5⅝ | 3¼ | 7⅞ | 3¼ | 3¼ |
| 10 | 10⅝ | ¾ | 1 | 16 | 1⅝ | ⅝ | 2⅛ | 2¼ | 2 | 1⅛ | 1½ | 1-8 | 7.92 | 1 | 1¼ | 2 | ⅞ | 5½ | 12⅞ | 14⅛ | 6⅞ | 4⅞ | 9 | 4⅞ | 4⅝ |
| 12 | 12¾ | ¾ | 1 | 16 | 1⅝ | ⅝ | 3⅛ | 2¼ | 2 | 1⅛ | 1½ | 1-8 | 9.40 | 1 | 1¼ | 2 | ⅞ | 7¼ | 14½ | 16¼ | 6⅞ | 4⅞ | 9½ | 4⅞ | 5⅝ |
| 14 | 14¾ | ⅞ | 1¼ | 20 | 1½ | ¾ | 3⅛ | 2¾ | 2¼ | 1⅛ | 1⅝ | 1¼-7 | 10.90 | 1¼ | 1½ | 2½ | 1⅞ | 8¾ | 17 | 19¼ | 8⅞ | 5½ | 11⅞ | 5½ | 5⅞ |

NPTF ports furnished unless otherwise specified.

SAE straight thread ports optional

Styles J, H, K and CC should be pinned or keyed at one end to prevent shifting.

**Mounting holes are ⅛ larger than screw size shown.*

Viceroy Fluid Power uses only precision machined and ground, rolled steel heads and caps to assure squareness. This, plus Viceroy's unique sealing system assure a leak-free cylinder. For trouble-free cylinders, rely on the fluid power specialists.

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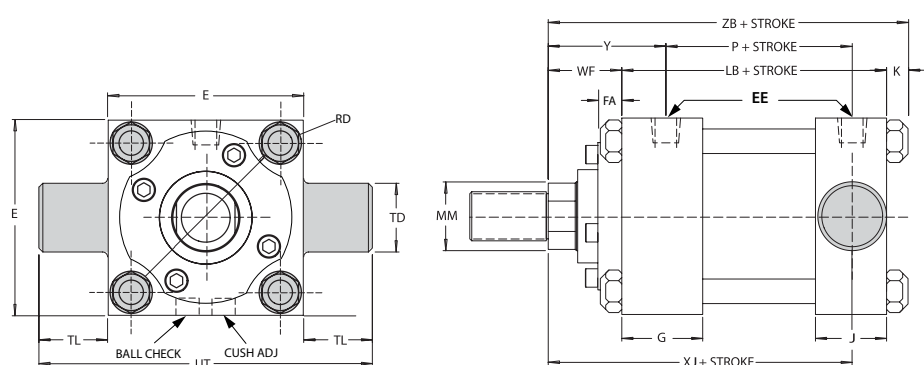
Rod and Dimensions

Envelope and Mounting Dimensions

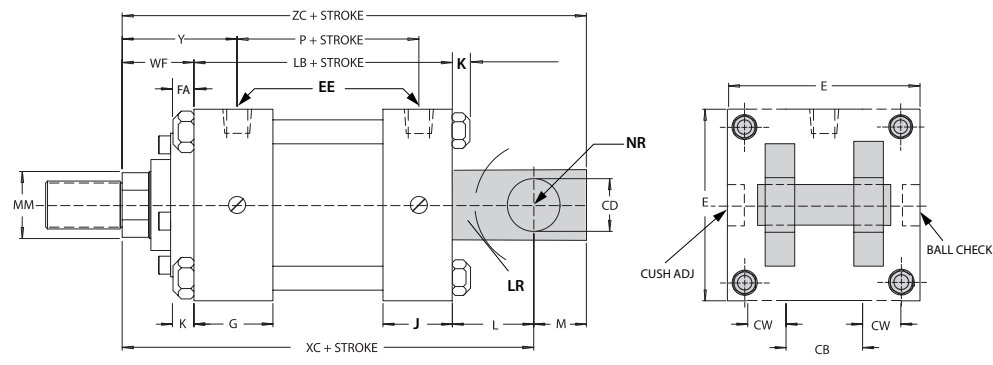
| Bore | Rod Code No | Rod. Dia. MM | Thread Size | | Rod Extensions and Pilot Dimensions | | | | | | | | WF | Y | XS | XT | Add Stroke | | |
|------|-------------|--------------|-------------|-------|-------------------------------------|-------------------|---|---------------------------------|---------------------------------|----|-------------------------------|----|----|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|
| | | | KK | FF | A | +002 -002 B | C | D | NA | FA | RD | VB | | | | | XE | ZB | ZE |
| 8 | 5 (Std) | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ³ / ₁₆ | 2 ¹¹ / ₁₆ | 3 ³ / ₁₆ | 8¼ | 7 ¹¹ / ₁₆ | 8 ⁷ / ₈ |
| | 3 | 1⅞ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ⅝ | 1⅞ | 1 ⁵ / ₁₈ | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹³ / ₁₆ | 2 ⁵ / ₁₆ | 2 ¹³ / ₁₆ | 7 ⁷ / ₈ | 7 ⁵ / ₁₆ | 8½ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¼ | 1⅞ | 1⅞ | 3 ¹ / ₁₆ | 2 ⁹ / ₁₆ | 3 ¹ / ₁₆ | 8⅞ | 7 ⁹ / ₁₆ | 8¾ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 2 ¹⁵ / ₁₈ | 3 ⁷ / ₁₆ | 8½ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 2 ¹⁵ / ₁₆ | 3 ⁷ / ₁₆ | 8½ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 2 ¹⁵ / ₁₆ | 3 ⁷ / ₁₆ | 8½ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 2 ¹⁵ / ₁₆ | 3 ⁷ / ₁₆ | 8½ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 2 ¹⁵ / ₁₆ | 3 ⁷ / ₁₆ | 8½ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 2 ¹⁵ / ₁₆ | 3 ⁷ / ₁₆ | 8½ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 2 ¹⁵ / ₁₆ | 3 ⁷ / ₁₆ | 8½ | 7 ¹⁵ / ₁₆ | 9⅞ |
| 10 | 6 (Std) | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 9 ¹⁵ / ₁₆ | 9 ⁵ / ₁₆ | 10 ⁹ / ₁₆ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¼ | 1⅞ | 1⅞ | 3⅞ | 2¾ | 3⅞ | 9 ⁹ / ₁₆ | 8 ¹⁵ / ₁₆ | 10 ³ / ₁₆ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3¼ | 2 ⁷ / ₈ | 3¼ | 9 ¹¹ / ₁₆ | 9 ¹ / ₁₆ | 10 ⁵ / ₁₆ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 9 ¹⁵ / ₁₆ | 9 ⁵ / ₁₆ | 10 ⁹ / ₁₆ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 9 ¹⁵ / ₁₆ | 9 ⁵ / ₁₆ | 10 ⁹ / ₁₆ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 9 ¹⁵ / ₁₆ | 9 ⁵ / ₁₆ | 10 ⁹ / ₁₆ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 9 ¹⁵ / ₁₆ | 9 ⁵ / ₁₆ | 10 ⁹ / ₁₆ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 9 ¹⁵ / ₁₆ | 9 ⁵ / ₁₆ | 10 ⁹ / ₁₆ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 9 ¹⁵ / ₁₆ | 9 ⁵ / ₁₆ | 10 ⁹ / ₁₆ |
| 12 | 7 (Std) | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 10 ⁷ / ₁₆ | 9 ¹³ / ₁₆ | 11 ¹ / ₁₆ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3¼ | 2 ⁷ / ₈ | 3¼ | 10 ³ / ₁₆ | 9 ⁵ / ₁₆ | 10 ¹³ / ₁₆ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 10 ⁷ / ₁₆ | 9 ¹³ / ₁₆ | 11 ¹ / ₁₆ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 10 ⁷ / ₁₆ | 9 ¹³ / ₁₆ | 11 ¹ / ₁₆ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 10 ⁷ / ₁₆ | 9 ¹³ / ₁₆ | 11 ¹ / ₁₆ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 10 ⁷ / ₁₆ | 9 ¹³ / ₁₆ | 11 ¹ / ₁₆ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 10 ⁷ / ₁₆ | 9 ¹³ / ₁₆ | 11 ¹ / ₁₆ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3½ | 3⅞ | 3½ | 10 ⁷ / ₁₆ | 9 ¹³ / ₁₆ | 11 ¹ / ₁₆ |
| 14 | 8 (Std) | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 2 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅞ | 3 ¹³ / ₁₆ | 11 ⁷ / ₈ | 11 ³ / ₁₆ | 12 ⁵ / ₈ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅞ | 3 ¹³ / ₁₆ | 11 ⁷ / ₈ | 11 ³ / ₁₆ | 12 ⁵ / ₈ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅞ | 3 ¹³ / ₁₆ | 11 ⁷ / ₈ | 11 ³ / ₁₆ | 12 ⁵ / ₈ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 2 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅞ | 3 ¹³ / ₁₆ | 11 ⁷ / ₈ | 11 ³ / ₁₆ | 12 ⁵ / ₈ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅞ | 3 ¹³ / ₁₆ | 11 ⁷ / ₈ | 11 ³ / ₁₆ | 12 ⁵ / ₈ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅞ | 3 ¹³ / ₁₆ | 11 ⁷ / ₈ | 11 ³ / ₁₆ | 12 ⁵ / ₈ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅞ | 3 ¹³ / ₁₆ | 11 ⁷ / ₈ | 11 ³ / ₁₆ | 12 ⁵ / ₈ |

* Not available in Style CC

Trunnion, Clevis and Pivot Mounted Cylinders 1½" to 6" Bores

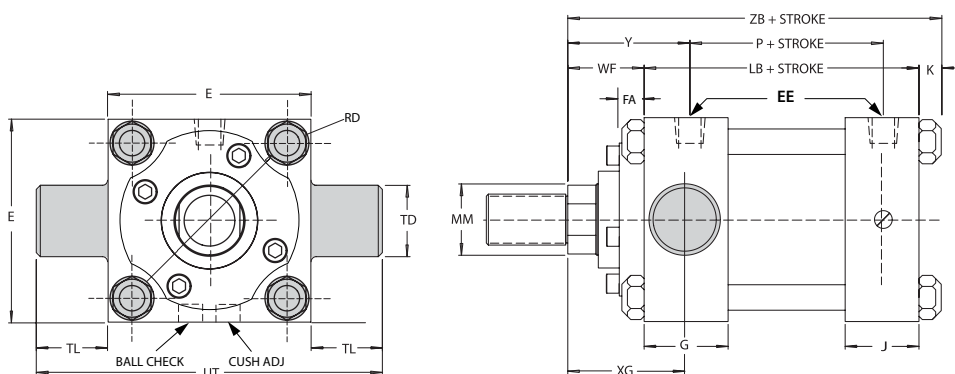


STYLE EB - Trunnion Mount Cap End
(NFPA Mounting Style MT1)

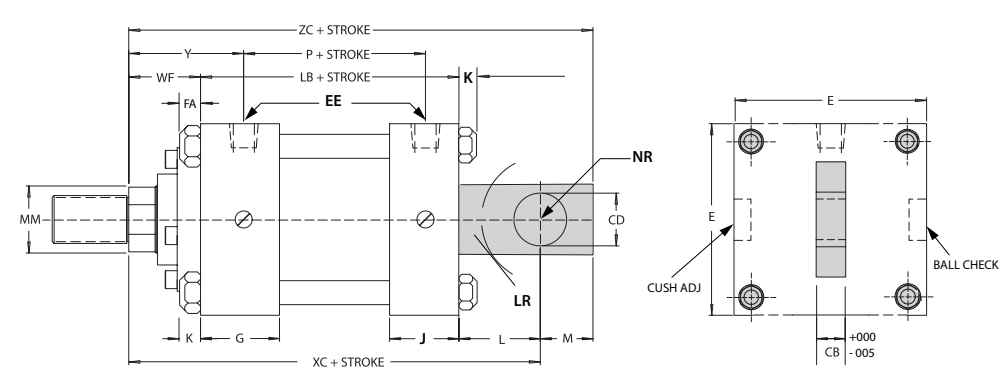


STYLE G - Clevis Mount
(NFPA Mounting Style MP1)

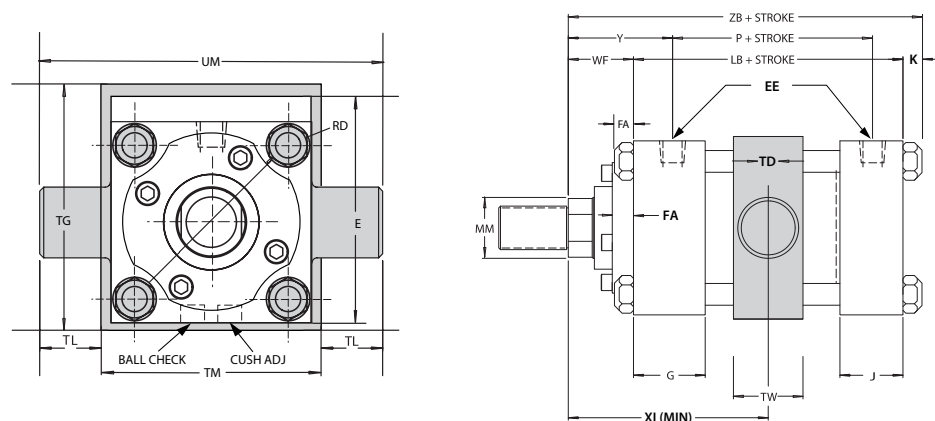
Chrome-plated Clevis Pin Assembly (with Snap Rings) is furnished with all Style G Cylinders.



STYLE ER - Trunnion Mount Head End
(NFPA Mounting Style MT1)

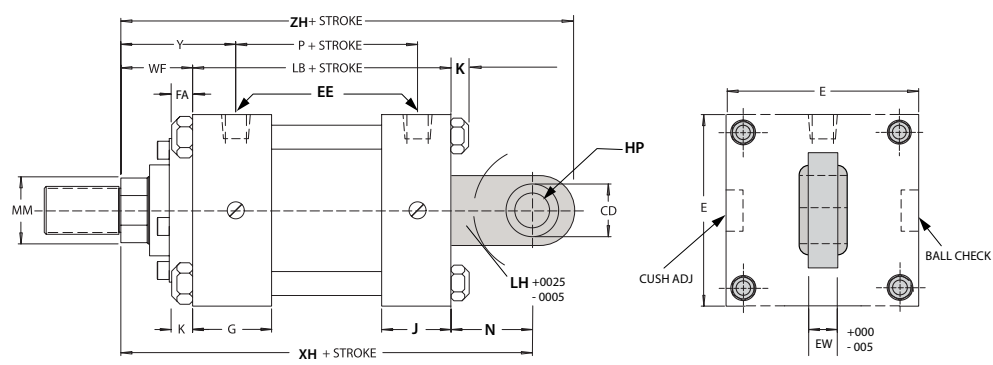


STYLE GG - Cap Single Lug Mount



STYLE E - Intermediate Trunnion Mount
(NFPA Mounting Style MT4)

Customer to Specify Trunnion Location (XI Dim)



STYLE S - Spherical Pivot Mount
(NFPA Mounting Style MP1)

Cylinders Ordered with Rod Eye Listed Under "Accessories" will be Supplied with Rod End Style No.3, and Thread Size KK =
 $\frac{7}{16}$ -20 for Bores 1½" thru 2½"
 $\frac{3}{4}$ -16 for Bores 3¼" thru 5"
 1-14 for 6" Bore

Pintles on trunnion mounted cylinders are designed to withstand shear loads, but not high bending loads. Pillo blocks must be rigidly mounted to provide full support with minimum clearances.

Envelope and Mounting Dimensions

| Bore | CB | CD | CW | E | EW | EE | | G | HP | J | K | L | LH | LR | M | N | NR | +001 -001 TD | TL | TG | TM | TW | UM | UT | Add Stroke | |
|------|----|----|----|----|----|------|-----|----|----|----|-----------------|----|----|-----------------|---|----|-----------------|--------------------|----|----|----|----|-----|----|------------|----|
| | | | | | | NPTF | SAE | | | | | | | | | | | | | | | | | | LB | P |
| 1½ | ¾ | ½ | ½ | 2 | ⅝ | ⅜ | 6 | 1½ | ¾ | 1 | ¼ | ¾ | ⅝ | ⅝ | ½ | ⅞ | ⅑ ₁₆ | 1 | 1 | 2½ | 2½ | 1¼ | 4½ | 4 | 3⅝ | 2½ |
| 2 | ¾ | ½ | ½ | 2½ | ⅝ | ⅜ | 6 | 1½ | ¾ | 1 | ⅕ ₁₆ | ¾ | ⅝ | ⅝ | ½ | ⅞ | ⅑ ₁₆ | 1 | 1 | 3 | 3 | 1½ | 5 | 4½ | 3⅝ | 2¼ |
| 2½ | ¾ | ½ | ½ | 3 | ⅝ | ⅜ | 6 | 1½ | ¾ | 1 | ⅕ ₁₆ | ¾ | ⅝ | ⅝ | ½ | ⅞ | ⅑ ₁₆ | 1 | 1 | 3½ | 3½ | 1½ | 5½ | 5 | 3¼ | 2⅝ |
| 3¼ | 1¼ | ¾ | ⅝ | 3¾ | ⅞ | ½ | 10 | 1¾ | 1¼ | 1¼ | ⅜ | 1¼ | 1 | ⅕ ₁₆ | ¾ | 1¼ | ⅔ ₃₂ | 1 | 1 | 4¼ | 4½ | 2 | 6½ | 5¾ | 4¼ | 2⅝ |
| 4 | 1¼ | ¾ | ⅝ | 4½ | ⅞ | ½ | 10 | 1¾ | 1¼ | 1¼ | ⅜ | 1¼ | 1 | ⅕ ₁₆ | ¾ | 1¼ | ⅔ ₃₂ | 1 | 1 | 5 | 5¼ | 2 | 7¼ | 6½ | 4¼ | 2⅝ |
| 5 | 1¼ | ¾ | ⅝ | 5½ | ⅞ | ½ | 10 | 1¾ | 1¼ | 1¼ | ⅞ ₁₆ | 1¼ | 1 | ⅕ ₁₆ | ¾ | 1¼ | ⅔ ₃₂ | 1 | 1 | 6 | 6¼ | 2 | 8¼ | 7½ | 4½ | 2⅞ |
| 6 | 1½ | 1 | ¾ | 6½ | 1⅜ | ¾ | 12 | 2 | 1¾ | 1½ | ⅞ ₁₆ | 1½ | 1¼ | ⅕ ₁₆ | 1 | 1⅝ | 1⅛ | 1⅜ | 1⅜ | 7 | 7⅝ | 2½ | 10⅜ | 9¼ | 5 | 3⅜ |

SAE straight thread ports are optional on all cylinders except the 1½, 2" and 2½" bore sizes with maximum size rods. On these three sizes the head end NPTF ports are tapped shallow and the head end cushions are non adjustable.

***Trunnion Mounts** - The trunnion pintles on Styles ER and EB are not removable. For information on the availability of removable trunnion pintles, please consult our sales department.

7L Piston Rods have threaded studs for maximum strength and service life. Studs are piloted for true alignment and concentricity; and held securely with LOCTITE. For high strength piston rods, rely on the fluid power specialists.

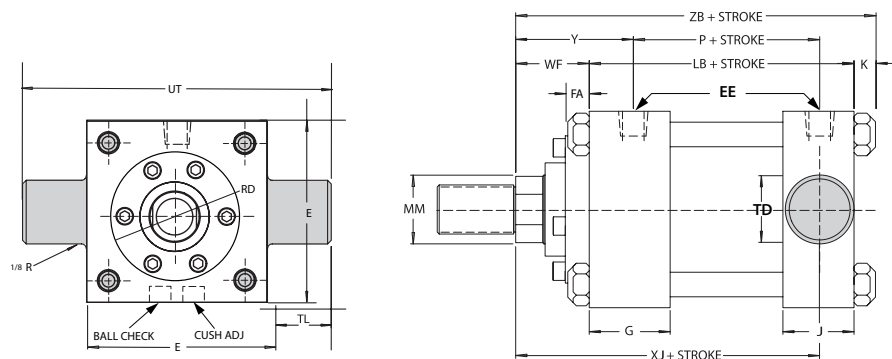
SERIES
7L

Rod and Dimensions

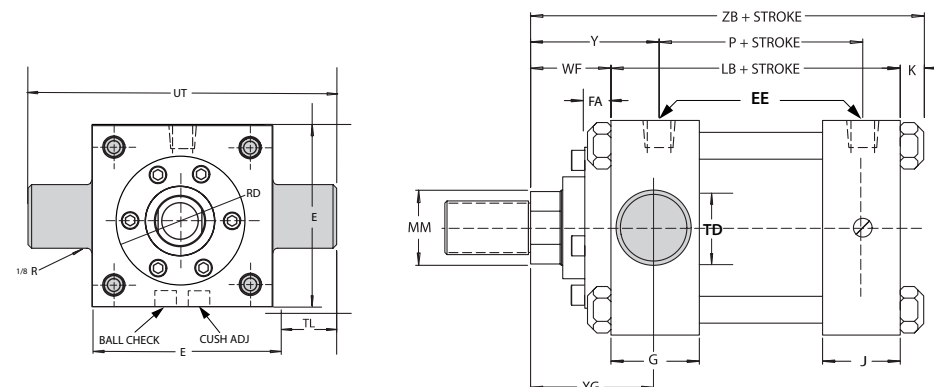
Envelope and Mounting Dimensions

| Bore | Rod No. | Rod Dia. MM | Thread Size | | Rod Extensions and Pilot Dimensions | | | | | | | | WF | Y | XG | MIN XI | Add Stroke | | | | | |
|------|---------|----------------|-------------|-------|-------------------------------------|-------------------|---------------------------------|---------------------------------|---------------------------------|----|----|----|--------------------------------|---------------------------------|----|--------|------------|----|---------------------------------|---------------------------------|-----|-----|
| | | | KK | FF | A | +000 -002 B | C | D | NA | FA | RD | VB | | | | | XC | XH | XJ | ZB | ZC | ZH |
| 1½ | 1(Std) | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | 1¾ | 3⅜ | 5⅜ | 5½ | 4⅞ | 4⅞ | 5⅞ | 6¼ |
| | 2 | 1 | ¾-16 | ⅞-14 | 1⅞ | 1.499 | ½ | ⅞ | 15/16 | ⅜ | - | ⅞ | 1⅜ | 2 ⁵ / ₁₆ | 2⅞ | 3½ | 5¾ | 5⅞ | 4½ | 5¼ | 6¼ | 6⅝ |
| 2 | 1(Std) | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | 1¾ | 3¼ | 5⅜ | 5½ | 4⅞ | 4 ¹⁵ / ₁₆ | 5⅞ | 6¼ |
| | 2 | 1 | ¾-16 | ⅞-14 | 1⅞ | 1.499 | ½ | ⅞ | 15/16 | ⅜ | - | ⅞ | 1⅜ | 2 ⁵ / ₁₆ | 2⅞ | 3⅝ | 5¾ | 5⅞ | 4½ | 5 ⁵ / ₁₆ | 6¼ | 6⅝ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ⅝ | 1⅞ | 15/16 | ⅜ | - | 1 | 1⅝ | 2 ⁹ / ₁₆ | 2⅜ | 3⅞ | 6 | 6⅞ | 4¾ | 5 ⁵ / ₁₆ | 6½ | 6⅞ |
| 2½ | 2(Std) | 1 | ¾-16 | ⅞-14 | 1⅞ | 1.499 | ½ | ⅞ | 15/16 | ⅜ | 2¾ | ⅞ | 1⅜ | 2 ⁵ / ₁₆ | 2⅞ | 3⅝ | 5⅞ | 6 | 4 ⁵ / ₈ | 5 ⁷ / ₁₆ | 6⅞ | 6¾ |
| | 1 | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | 1¾ | 3¼ | 5½ | 5⅝ | 4¼ | 5 ¹ / ₁₆ | 6 | 6⅞ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 15/16 | ⅜ | - | 1 | 1⅝ | 2 ⁹ / ₁₆ | 2⅜ | 3⅞ | 6⅞ | 6¼ | 4⅞ | 5 ¹⁵ / ₁₆ | 6⅝ | 7 |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | - | 1⅞ | 1⅞ | 2 ¹³ / ₁₆ | 2⅝ | 4⅞ | 6⅞ | 6½ | 5⅞ | 5 ¹¹ / ₁₆ | 6⅞ | 7¼ |
| ¾ | 2(Std) | 1 | ¾-16 | ⅞-14 | 1⅞ | 1.499 | ½ | ⅞ | 15/16 | ⅜ | 2¾ | ⅞ | 1⅜ | 2 ⁷ / ₁₆ | 2¼ | 4⅞ | 6⅞ | 6⅞ | 5 | 6 | 7⅞ | 8⅞ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 15/16 | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 2½ | 4⅜ | 7⅞ | 7⅞ | 5¼ | 6¼ | 7⅞ | 8⅞ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¼ | 1⅞ | 1⅞ | 2 ¹⁵ / ₁₆ | 2¾ | 4⅝ | 7⅞ | 7⅞ | 5½ | 6½ | 8⅞ | 8⅝ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | - | 1⅞ | 2 | 3 ¹ / ₁₆ | 2⅞ | 4¾ | 7½ | 7½ | 5⅝ | 6⅝ | 8¼ | 8¾ |
| | 3(Std) | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 15/16 | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 2½ | 4⅜ | 7⅞ | 7⅞ | 5¼ | 6¼ | 7⅞ | 8⅞ |
| 4 | 2 | 1 | ¾-16 | ⅞-14 | 1⅞ | 1.499 | ½ | ⅞ | 15/16 | ⅜ | 2¾ | ⅞ | 1⅜ | 2 ⁷ / ₁₆ | 2¼ | 4⅞ | 6⅞ | 6⅞ | 5 | 6 | 7⅞ | 8⅞ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¼ | 1⅞ | 1⅞ | 2 ¹⁵ / ₁₆ | 2¾ | 4⅝ | 7⅞ | 7⅞ | 5½ | 6½ | 8⅞ | 8⅝ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ¹ / ₁₆ | 2⅞ | 4¾ | 7½ | 7½ | 5⅝ | 6⅝ | 8¼ | 8¾ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2⅜ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 3⅞ | 5 | 7¾ | 7¾ | 5⅞ | 6⅞ | 8½ | 9 |
| | 3(Std) | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 15/16 | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 2½ | 4⅜ | 7⅞ | 7⅞ | 5¼ | 6¼ | 7⅞ | 8⅞ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ¹ / ₁₆ | 2⅞ | 4¾ | 7½ | 7½ | 5⅝ | 6⅝ | 8¼ | 8¾ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2⅜ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 3⅞ | 5 | 8 | 8 | 6⅞ | 7 ³ / ₁₆ | 8¾ | 9¼ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2⅞ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 3⅞ | 5 | 8 | 8 | 6⅞ | 7 ³ / ₁₆ | 8¾ | 9¼ |
| 6 | 4(Std) | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¼ | 1⅞ | 1⅞ | 2 ¹⁵ / ₁₆ | 2¾ | 4⅝ | 7⅞ | 7⅞ | 5¾ | 6 ¹³ / ₁₆ | 8⅞ | 8¾ |
| | 2 | 1 | ¾-16 | ⅞-14 | 1⅞ | 1.499 | ½ | ⅞ | 15/16 | ⅜ | 2¾ | ⅞ | 1⅜ | 2 ¹⁵ / ₁₆ | 2¼ | 4⅞ | 7⅞ | 7⅞ | 5¼ | 6 ⁵ / ₁₆ | 7⅞ | 8⅞ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 15/16 | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 2½ | 4⅜ | 7⅞ | 7⅞ | 5½ | 6 ⁹ / ₁₆ | 8⅞ | 8⅝ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ¹ / ₁₆ | 2⅞ | 4¾ | 7¾ | 7¾ | 5⅞ | 6 ¹⁵ / ₁₆ | 8½ | 9 |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2⅜ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 3⅞ | 5 | 8 | 8 | 6⅞ | 7 ³ / ₁₆ | 8¾ | 9¼ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2⅞ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 3⅞ | 5 | 8 | 8 | 6⅞ | 7 ³ / ₁₆ | 8¾ | 9¼ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3⅜ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 3⅞ | 5 | 8 | 8 | 6⅞ | 7 ³ / ₁₆ | 8¾ | 9¼ |
| | 4(Std) | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¼ | 1⅞ | 1⅞ | 2 ¹⁵ / ₁₆ | 2¾ | 4⅝ | 7⅞ | 7⅞ | 5¾ | 6 ¹³ / ₁₆ | 8⅞ | 8¾ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅞ | 15/16 | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹³ / ₁₆ | 2⅝ | 4⅞ | 8⅞ | 8⅞ | 5⅞ | 7 ¹ / ₁₆ | 9⅞ | 10⅞ |
| 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ³ / ₁₆ | 3 | 5¼ | 8½ | 8¾ | 6¼ | 7 ⁷ / ₁₆ | 9½ | 10½ | |
| 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2⅜ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8¾ | 9 | 6½ | 7 ¹¹ / ₁₆ | 9¾ | 10¾ | |
| 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2⅞ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8¾ | 9 | 6½ | 7 ¹¹ / ₁₆ | 9¾ | 10¾ | |
| 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3⅜ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8¾ | 9 | 6½ | 7 ¹¹ / ₁₆ | 9¾ | 10¾ | |
| 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3⅜ | 3⅞ | ¾ | 6 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8¾ | 9 | 6½ | 7 ¹¹ / ₁₆ | 9¾ | 10¾ | |

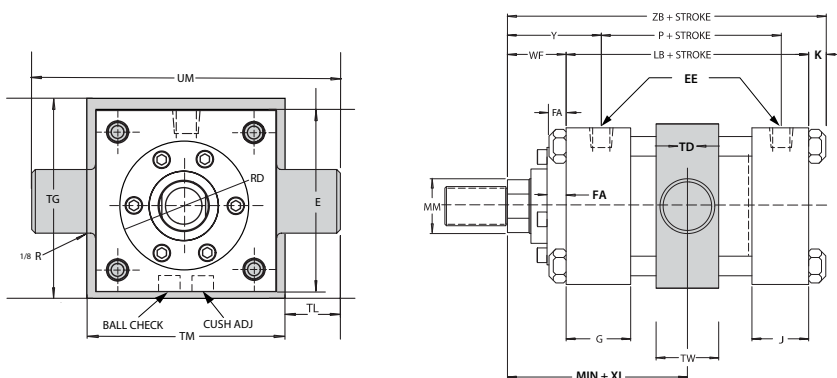
Trunnion and Clevis Mounted Cylinders 8" to 14" Bores



STYLE EB - Trunnion Mount Cap End
(NFPA Mounting Style MT2)



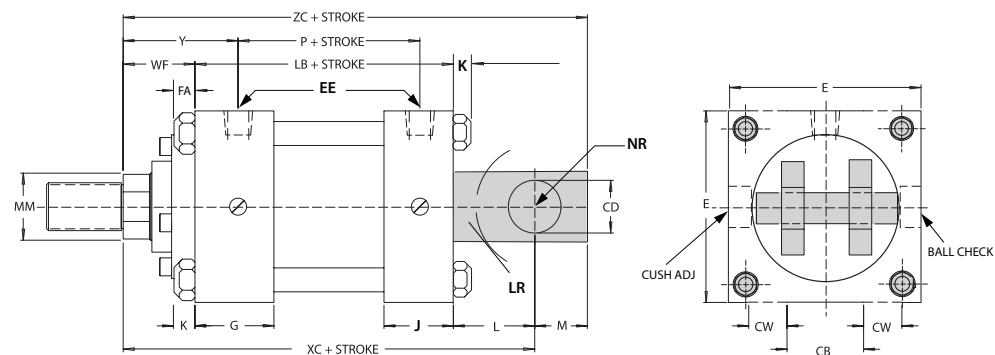
STYLE ER - Trunnion Mount Head End
(NFPA Mounting Style MT1)



STYLE E - Intermediate Trunnion Mount
(NFPA Mounting Style MT2)

Customer to Specify Trunnion Location (XI Dim.)

Style E is not available in 16", 18" and 20" bores.



STYLE G - Clevis Mount
(NFPA Mounting Style MT1)

Chrome-plated Clevis Pin Assembly (with Snap Rings) is furnished with all Style G Cylinders.

For tie rod size and location see page 11

Envelope and Mounting Dimensions

| Bore | CB | ±001 CD | CW | E | EE | | G | J | K | L | LR | M | NR | +001 -001 TD | TL | TG | TM | TW | UM | UT | Add Stroke | |
|------|----|------------|----|-----|------|-----|----|----|-------|----|-------|----|---------------------------------|--------------------|----|-----|-----|----|-----|-----|------------|----|
| | | | | | NPTF | SAE | | | | | | | | | | | | | | | LB | P |
| 8 | 1½ | 1 | ¾ | 8½ | ¾ | 12 | 2 | 1½ | 9/16 | 1½ | 15/16 | 1 | 1½ | 1¾ | 1¾ | 9½ | 9¾ | 2½ | 12½ | 11¼ | 5⅞ | 3¼ |
| 10 | 2 | 1⅜ | 1 | 10⅝ | 1 | 16 | 2¼ | 2 | 11/16 | 2⅝ | 1¾ | 1⅜ | 1½ | 1¾ | 1¾ | 11¾ | 12 | 3 | 15½ | 14⅞ | 6⅞ | 4⅞ |
| 12 | 2½ | 1¾ | 1¼ | 12¾ | 1 | 16 | 2¼ | 2 | 11/16 | 2¼ | 2 | 1¾ | 1 ¹⁵ / ₁₆ | 1¾ | 1¾ | 13¾ | 14 | 3 | 17½ | 16¼ | 6⅞ | 4⅞ |
| 14 | 2½ | 2 | 1¼ | 14¾ | 1¼ | 20 | 2¾ | 2¼ | 13/16 | 2½ | 2¼ | 2 | 2 ³ / ₁₆ | 2 | 2 | 16 | 16¼ | 3½ | 20¼ | 18¾ | 8½ | 5½ |

NPTF ports furnished unless otherwise specified.
Pintles on trunnion mounted cylinders are designed to withstand shear loads, but not high bending loads. Pillow blocks must be rigidly mounted to provide full support with minimum clearances.

***Trunnion Mounts** - The trunnion pintles on the Styles ER and EB are not removable. For information on the availability of removable trunnion pintles, please consult our sales department.

All 7L Series Cylinders feature self-centering floating cushions on both head and cap ends. Self-locking, adjustable needle and check valves are interchangeable and standard; mount flush with end covers. For more effective cushioning, rely on the fluid power specialists.

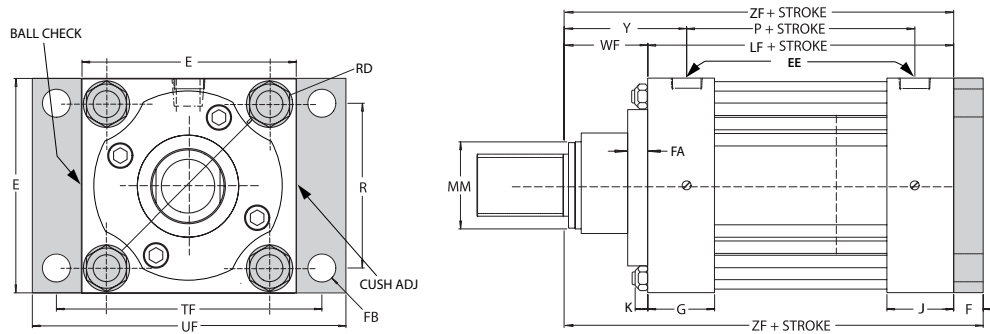
SERIES 7L

Rod and Dimensions

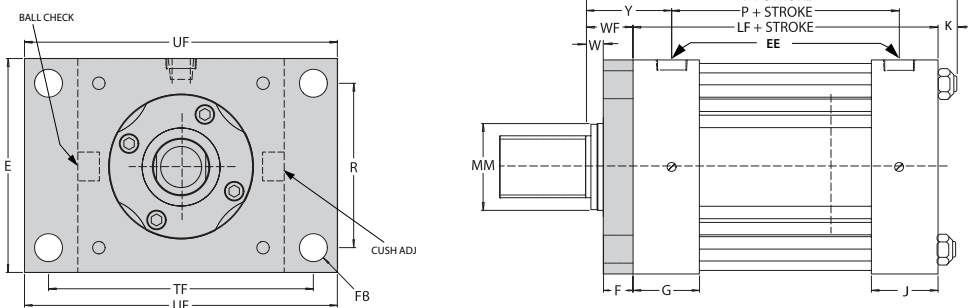
Envelope and Mounting Dimensions

| Bore | Rod Code No | Rod. Dia. MM | Thread Size | | Rod Extensions and Pilot Dimensions | | | | | | | | WF | Y | XG | MIN. XI | Add Stroke | | | |
|------|-------------|--------------|-------------|-------|-------------------------------------|-------------------|---|---------------------------------|---------------------------------|----|----|----|----|---------------------------------|----|---------|------------|----|---------------------------------|-----|
| | | | KK | FF | A | +002 -002 B | C | D | NA | FA | RD | VB | | | | | XC | XJ | ZB | ZC |
| 8 | 5 (Std) | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ³ / ₁₆ | 3 | 5¼ | 8⅝ | 6⅜ | 7 ¹¹ / ₁₆ | 9⅝ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ⅝ | 1⅞ | 1 ⁵ / ₈ | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹³ / ₁₆ | 2⅝ | 4⅞ | 8¼ | 6 | 7 ⁵ / ₁₆ | 9¼ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¼ | 1⅞ | 1⅞ | 3 ¹ / ₁₆ | 2⅞ | 5⅝ | 8½ | 6¼ | 7 ⁹ / ₁₆ | 9½ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2⅜ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8⅞ | 6⅝ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2⅝ | 2⅞ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8⅞ | 6⅝ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3⅜ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8⅞ | 6⅝ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3⅜ | 3⅞ | ¾ | 6 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8⅞ | 6⅝ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3⅞ | 4⅜ | ¾ | 6⅞ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8⅞ | 6⅝ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4⅞ | ¾ | 7¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8⅞ | 6⅝ | 7 ¹⁵ / ₁₆ | 9⅞ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4⅝ | 5⅜ | ¾ | 8 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 3¼ | 5½ | 8⅞ | 6⅝ | 7 ¹⁵ / ₁₆ | 9⅞ |
| 10 | 6 (Std) | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2⅜ | ⅝ | 4½ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 10¾ | 7⅝ | 9 ⁵ / ₁₆ | 12½ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¼ | 1⅞ | 1⅞ | 3⅞ | 3 | 5⅝ | 10⅞ | 7¼ | 8 ¹⁵ / ₁₆ | 11¾ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3¼ | 3⅞ | 5¾ | 10½ | 7⅜ | 9 ¹ / ₁₆ | 11⅞ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2⅝ | 2⅞ | ⅝ | 5¼ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 10¾ | 7⅝ | 9 ⁵ / ₁₆ | 12½ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3⅜ | ⅝ | 5½ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 10¾ | 7⅝ | 9 ⁵ / ₁₆ | 12½ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3⅜ | 3⅞ | ¾ | 6 | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 10¾ | 7⅝ | 9 ⁵ / ₁₆ | 12½ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3⅞ | 4⅜ | ¾ | 6⅞ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 10¾ | 7⅝ | 9 ⁵ / ₁₆ | 12½ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4⅞ | ¾ | 7¼ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 10¾ | 7⅝ | 9 ⁵ / ₁₆ | 12½ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4⅝ | 5⅜ | ¾ | 8 | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 10¾ | 7⅝ | 9 ⁵ / ₁₆ | 12½ |
| 12 | 7 (Std) | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2⅝ | 2⅞ | ⅝ | 5¼ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 11⅜ | 8⅞ | 9 ¹³ / ₁₆ | 13⅞ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3¼ | 3⅞ | 5¾ | 11⅞ | 7⅞ | 9 ⁵ / ₁₆ | 12⅞ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2⅜ | ⅝ | 4½ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 11⅜ | 8⅞ | 9 ¹³ / ₁₆ | 13⅞ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3⅜ | ⅝ | 5½ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 11⅜ | 8⅞ | 9 ¹³ / ₁₆ | 13⅞ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3⅜ | 3⅞ | ¾ | 6 | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 11⅜ | 8⅞ | 9 ¹³ / ₁₆ | 13⅞ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3⅞ | 4⅜ | ¾ | 6⅞ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 11⅜ | 8⅞ | 9 ¹³ / ₁₆ | 13⅞ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4⅞ | ¾ | 7¼ | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 11⅜ | 8⅞ | 9 ¹³ / ₁₆ | 13⅞ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4⅝ | 5⅜ | ¾ | 8 | 1¼ | 2¼ | 3½ | 3⅞ | 6 | 11⅜ | 8⅞ | 9 ¹³ / ₁₆ | 13⅞ |
| 14 | 8 (Std) | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 2⅜ | ⅝ | 5½ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅝ | 6¾ | 12⅞ | 9¼ | 11 ³ / ₁₆ | 14⅞ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2⅜ | ⅝ | 4½ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅝ | 6¾ | 12⅞ | 9¼ | 11 ³ / ₁₆ | 14⅞ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2⅝ | 2⅞ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅝ | 6¾ | 12⅞ | 9¼ | 11 ³ / ₁₆ | 14⅞ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3⅜ | 2⅞ | ¾ | 6 | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅝ | 6¾ | 12⅞ | 9¼ | 11 ³ / ₁₆ | 14⅞ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3⅞ | 4⅜ | ¾ | 6⅞ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅝ | 6¾ | 12⅞ | 9¼ | 11 ³ / ₁₆ | 14⅞ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4⅞ | ¾ | 7¼ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅝ | 6¾ | 12⅞ | 9¼ | 11 ³ / ₁₆ | 14⅞ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4⅝ | 5⅜ | ¾ | 8 | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 3⅝ | 6¾ | 12⅞ | 9¼ | 11 ³ / ₁₆ | 14⅞ |

Flange Mounted Cylinders 1½" to 6" Bores

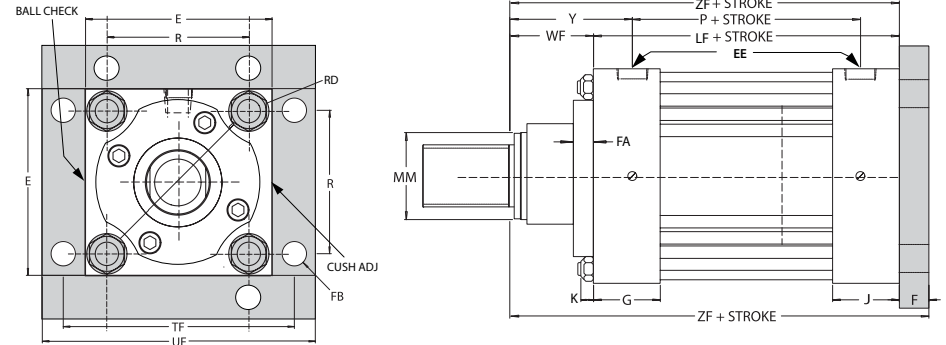


STYLE A - Rectangular Flange Mount Cap End
(NFPA Mounting Style MF2)

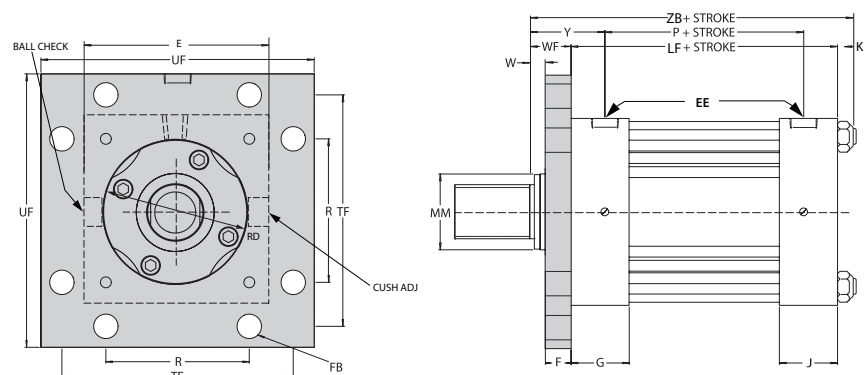


STYLE B - Rectangular Flange Mount Head End
(NFPA Mounting Style MF1)

Styles "AA" or "BB" are recommended for maximum pressures and shock loads.



STYLE AA - Square Flange Mount Cap End
(NFPA Mounting Style MF6)



STYLE BB - Square Flange Mount Head End
(NFPA Mounting Style MF5)

We recommend the use of high tensile mounting bolts on all flange mounted cylinders subjected to maximum pressures and shock loads.

Envelope and Mounting Dimensions

| Bore | E | EE | | F | FB | G | J | K | R | TF | UF | Add Stroke | |
|------|----|---------|-----|---|-----------------|----|----|-----------------|------|---------------------------------|----|------------|----|
| | | EE NPTF | SAE | | | | | | | | | LF | P |
| 1½ | 2 | ⅜ | 6 | ⅜ | ¼ | 1½ | 1 | ¼ | 1.43 | 2¾ | 3⅜ | 4 | 2¼ |
| 2 | 2½ | ⅜ | 6 | ⅜ | ⅝ ₁₆ | 1½ | 1 | ⅝ ₁₆ | 1.84 | 3⅜ | 4⅝ | 4 | 2¼ |
| 2½ | 3 | ⅜ | 6 | ⅜ | ⅝ ₁₆ | 1½ | 1 | ⅝ ₁₆ | 2.19 | 3⅜ | 4⅝ | 4⅝ | 2⅜ |
| 3¼ | 3¾ | ½ | 10 | ⅝ | ⅜ | 1¾ | 1¼ | ⅜ | 2.76 | 4 ¹¹ / ₁₆ | 5½ | 4⅞ | 2⅝ |
| 4 | 4½ | ½ | 10 | ⅝ | ⅜ | 1¾ | 1¼ | ⅜ | 3.32 | 5 ⁷ / ₁₆ | 6¼ | 4⅞ | 2⅝ |
| 5 | 5½ | ½ | 10 | ⅝ | ½ | 1¾ | 1¼ | 7 ₁₆ | 4.10 | 6⅝ | 7⅝ | 5⅝ | 2⅞ |
| 6 | 6½ | ¾ | 12 | ¾ | ½ | 2 | 1½ | 7 ₁₆ | 4.88 | 7⅝ | 8⅝ | 5¾ | 3⅝ |

SAE straight thread ports are optional on all cylinders except the 1½, 2" and 2½" bore sizes with maximum size rods. On these three sizes the head end NPTF ports are tapped shallow and the head end cushions are non adjustable.

*Mounting holes are 1/16 larger than screw size shown.

Viceroy uses only 100,000 psi minimum yield, high carbon steel for tie rods. Rods are prestressed at assembly with self-locking nuts to assure cylinder integrity. For a stronger cylinder design, rely on the fluid power specialists.

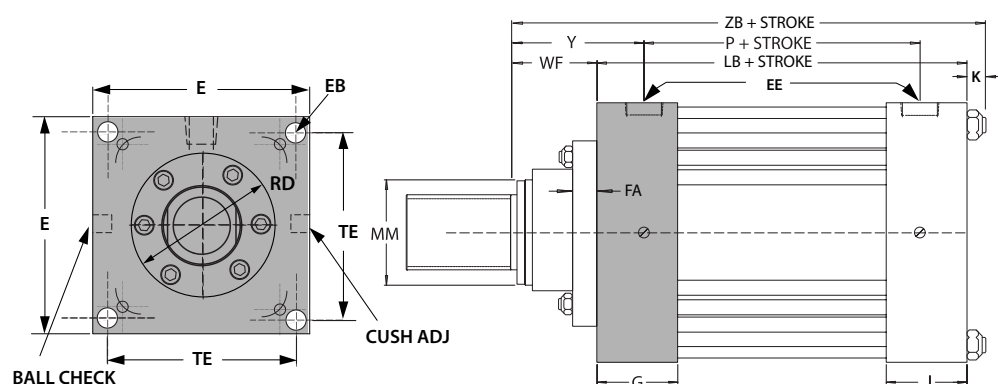
SERIES
7L

Rod and Dimensions

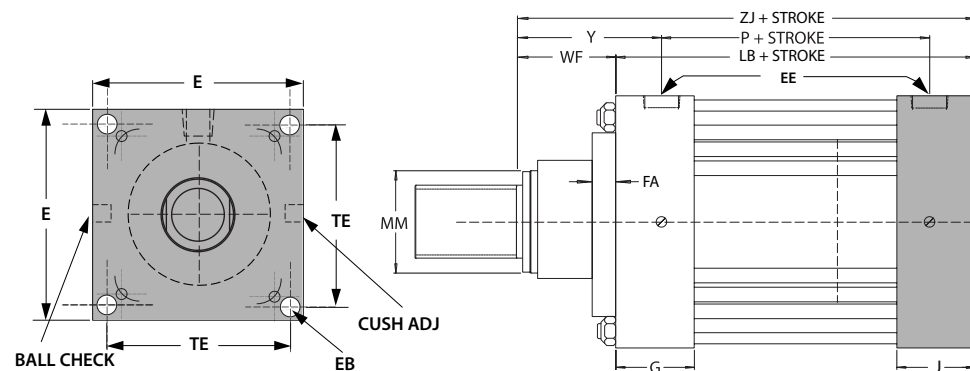
Envelope and Mounting Dimensions

| Bore | Rod No. | Rod Dia. | Rod Extensions and Pilot Dimensions | | | | | | | | | | WF | Y | W | Add Stroke | | |
|------|---------|----------|-------------------------------------|-------|-------|-------------------|----|---------------------------------|---------------------------------|----|----|----|--------------------------------|---------------------------------|----|---------------------------------|---------------------------------|----|
| | | MM | KK | FF | A | +000 -002 B | C | D | NA | FA | RD | VB | | | | ZJ | ZB | ZF |
| 1½ | 1(Std) | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | ⅝ | 4 ⁵ / ₈ | 4 ⁷ / ₈ | 5 |
| | 2 | 1 | ¾-16 | ⅞-14 | 1⅛ | 1.499 | ½ | ⅞ | 1 ⁵ / ₁₆ | ⅜ | - | ⅞ | 1⅜ | 2 ⁵ / ₁₆ | 1 | 5 | 5¼ | 5⅜ |
| 2 | 1(Std) | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | ⅝ | 4 ⁵ / ₈ | 4 ¹⁵ / ₁₆ | 5 |
| | 2 | 1 | ¾-16 | ⅞-14 | 1⅛ | 1.499 | ½ | ⅞ | 1 ⁵ / ₁₆ | ⅜ | - | ⅞ | 1⅜ | 2 ⁵ / ₁₆ | 1 | 5 | 5 ⁵ / ₁₆ | 5⅜ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ⅝ | 1⅛ | 1 ⁵ / ₁₆ | ⅜ | - | 1 | 1⅝ | 2 ⁹ / ₁₆ | 1¼ | 5¼ | 5 ⁹ / ₁₆ | 5⅝ |
| 2½ | 2(Std) | 1 | ¾-16 | ⅞-14 | 1⅛ | 1.499 | ½ | ⅞ | 1 ⁵ / ₁₆ | ⅜ | 2¾ | ⅞ | 1⅜ | 2 ⁵ / ₁₆ | 1 | 5⅞ | 5 ⁷ / ₁₆ | 5½ |
| | 1 | ⅝ | 7/16-20 | ½-20 | ¾ | 1.124 | ⅜ | ½ | 9/16 | ⅜ | 2 | ⅝ | 1 | 1 ¹⁵ / ₁₆ | ⅝ | 4¾ | 5 ¹ / ₁₆ | 5⅞ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 1 ⁵ / ₁₆ | ⅜ | - | 1 | 1⅝ | 2 ⁹ / ₁₆ | 1¼ | 5⅜ | 5 ¹⁵ / ₁₆ | 5¾ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅜ | - | 1⅞ | 1⅞ | 2 ¹³ / ₁₆ | 1½ | 5⅝ | 5 ¹¹ / ₁₆ | 6 |
| 3¼ | 2(Std) | 1 | ¾-16 | ⅞-14 | 1⅛ | 1.499 | ½ | ⅞ | 1 ⁵ / ₁₆ | ⅜ | 2¾ | ⅞ | 1⅜ | 2 ⁷ / ₁₆ | ¾ | 5⅝ | 6 | 6¼ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 1 ⁵ / ₁₆ | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 1 | 5⅞ | 6¼ | 6½ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅞ | 1⅞ | 2 ¹⁵ / ₁₆ | 1¼ | 6⅞ | 6½ | 6¾ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | - | 1⅞ | 2 | 3 ¹ / ₁₆ | 1⅜ | 6¼ | 6⅝ | 6⅞ |
| 4 | 3(Std) | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 1 ⁵ / ₁₆ | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 1 | 5⅞ | 6¼ | 6½ |
| | 2 | 1 | ¾-16 | ⅞-14 | 1⅛ | 1.499 | ½ | ⅞ | 1 ⁵ / ₁₆ | ⅜ | 2¾ | ⅞ | 1⅜ | 2 ⁷ / ₁₆ | ¾ | 5⅝ | 6 | 6¼ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅞ | 1⅞ | 2 ¹⁵ / ₁₆ | 1¼ | 6⅞ | 6½ | 6¾ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ¹ / ₁₆ | 1⅜ | 6¼ | 6⅝ | 6⅞ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 1⅝ | 6½ | 6⅞ | 7⅞ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 1⅝ | 6¾ | 7 ³ / ₁₆ | 7⅞ |
| 5 | 4(Std) | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅞ | 1⅞ | 2 ¹⁵ / ₁₆ | 1¼ | 6⅞ | 6 ¹³ / ₁₆ | 7 |
| | 2 | 1 | ¾-16 | ⅞-14 | 1⅛ | 1.499 | ½ | ⅞ | 1 ⁵ / ₁₆ | ⅜ | 2¾ | ⅞ | 1⅜ | 2 ¹⁵ / ₁₆ | ¾ | 5⅞ | 6 ⁵ / ₁₆ | 6½ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 1 ⁵ / ₁₆ | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹¹ / ₁₆ | 1 | 6⅞ | 6 ⁹ / ₁₆ | 6¾ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ¹ / ₁₆ | 1⅜ | 6½ | 6 ¹⁵ / ₁₆ | 7⅞ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 1⅝ | 6¾ | 7 ³ / ₁₆ | 7⅞ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 1⅝ | 6¾ | 7 ³ / ₁₆ | 7⅞ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 1⅝ | 6¾ | 7 ³ / ₁₆ | 7⅞ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁵ / ₁₆ | 1⅝ | 6¾ | 7 ³ / ₁₆ | 7⅞ |
| 6 | 4(Std) | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | ⅝ | 3¾ | 1⅞ | 1⅞ | 2 ¹⁵ / ₁₆ | 1⅞ | 6⅞ | 7 ⁵ / ₁₆ | 7⅝ |
| | 3 | 1⅜ | 1-14 | 1¼-12 | 1⅝ | 1.999 | ½ | 1⅛ | 1 ⁵ / ₁₆ | ⅝ | 3¼ | 1 | 1⅝ | 2 ¹³ / ₁₆ | ⅞ | 6⅝ | 7 ¹ / ₁₆ | 7⅞ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | ⅞ | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | ⅝ | 4⅞ | 1⅞ | 2 | 3 ³ / ₁₆ | 1¼ | 7 | 7 ⁷ / ₁₆ | 7¾ |
| | 6 | 2½ | 1⅞-12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | ⅝ | 4½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 1½ | 7¼ | 7 ¹¹ / ₁₆ | 8 |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | ⅝ | 5¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 1½ | 7¼ | 7 ¹¹ / ₁₆ | 8 |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | ⅝ | 5½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 1½ | 7¼ | 7 ¹¹ / ₁₆ | 8 |
| 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3⅜ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 1½ | 7¼ | 7 ¹¹ / ₁₆ | 8 | |

Flange Mounted Cylinders 8" to 14" Bores



STYLE QQ - Head Square Mount
(NFPA Mounting Style ME3)



STYLE PP - Cap Square Mount
(NFPA Mounting Style ME4)

NOTE: Use socket head cap screws for mounting Styles "QQ" and "P" 8" bore cylinders, because of tire rod interference with hex bolt heads. We recommend the use of high tensile mounting bolts on all flange mounted cylinders subjected to maximum pressures and shock loads.

Envelope and Mounting Dimensions

| Bore | E | EE | | EB* | G | J | K | TE | Add Stroke | |
|------|-----|------|-----|-----|----|----|-------|-------|------------|----|
| | | NPTF | SAE | | | | | | LB | P |
| 8 | 8½ | ¾ | 12 | ⅝ | 2 | 1½ | ⅑/16 | 7.57 | 5⅝ | 3¼ |
| 10 | 10⅝ | 1 | 16 | ¾ | 2¼ | 2 | 11/16 | 9.40 | 6¾ | 4⅞ |
| 12 | 12¾ | 1 | 16 | ¾ | 2¼ | 2 | 11/16 | 11.10 | 6⅞ | 4⅝ |
| 14 | 14¾ | 1¼ | 20 | ⅞ | 2¾ | 2¼ | 13/16 | 12.87 | 8⅞ | 5½ |

NPTF ports furnished as standard unless otherwise specified.

SAE straight thread ports optional.

**Mounting holes are 1/16" larger than screw size shown.*

Viceroy offers a wide variety of mounting styles. In particular heavy duty Flanges Styles PP and QQ provide excellent rigidity and strength for most rugged applications. For the greatest strength and operational dependability, rely on the fluid power specialists.

SERIES
7L

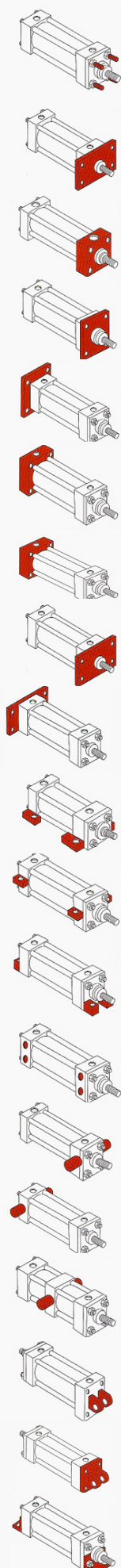
Rod and Dimensions

Envelope and Mounting Dimensions

| Bore | Rod No. | ROD DIA. MM | Thread Size | | Rod Extension and Pilot Dimensions | | | | | | | | Add Stroke | | | |
|------|---------|----------------|-----------------------------------|-------|------------------------------------|-------------------|-----|---------------------------------|---------------------------------|-----|-------------------------------|----|-------------------------------|---------------------------------|---------------------------------|--------------------------------|
| | | | KK | FF | A | +000 -002 B | C | D | NA | FA | RD | VB | WF | Y | ZB | ZJ |
| 8 | 5 (Std) | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | 5/8 | 4½ | 1½ | 2 | 3 ³ / ₁₆ | 7 ¹¹ / ₁₆ | 7½ |
| | 3 | 1¾ | 1-14 | 1¼-12 | 1½ | 1.999 | 5/8 | 1½ | 1 ⁵ / ₁₈ | 5/8 | 3¼ | 1 | 1 ⁵ / ₈ | 2 ¹³ / ₁₈ | 7 ⁵ / ₁₆ | 6¾ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | 5/8 | 3¼ | 1½ | 1 ⁷ / ₈ | 3 ¹ / ₁₈ | 7 ⁹ / ₁₆ | 7 |
| | 6 | 2½ | 1 ⁷ / ₈ -12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | 5/8 | 4½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 7 ³ / ₈ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | 5/8 | 5¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 7 ³ / ₈ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | 5/8 | 5½ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 7 ³ / ₈ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 7 ³ / ₈ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 7 ³ / ₈ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 7 ³ / ₈ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3 ⁷ / ₁₆ | 7 ¹⁵ / ₁₆ | 7 ³ / ₈ |
| 10 | 6 (Std) | 2½ | 1 ⁷ / ₈ -12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | 5/8 | 4½ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 8 ⁵ / ₈ |
| | 4 | 1¾ | 1¼-12 | 1½-12 | 2 | 2.374 | ¾ | 1½ | 1 ¹¹ / ₁₆ | 5/8 | 3¼ | 1½ | 1 ⁷ / ₈ | 3 ¹ / ₈ | 8 ¹⁵ / ₁₆ | 8¼ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | 5/8 | 4½ | 1½ | 2 | 3¼ | 9 ¹ / ₁₆ | 8 ³ / ₈ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | 5/8 | 5¼ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 8 ⁵ / ₈ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | 5/8 | 5½ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 8 ⁵ / ₈ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 8 ⁵ / ₈ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 8 ⁵ / ₈ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 8 ⁵ / ₈ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3½ | 9 ⁵ / ₁₆ | 8 ⁵ / ₈ |
| 12 | 7 (Std) | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | 5/8 | 5¼ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 9½ |
| | 5 | 2 | 1½-12 | 1¾-12 | 2¼ | 2.624 | 7/8 | 1 ¹¹ / ₁₆ | 1 ¹⁵ / ₁₆ | 5/8 | 4½ | 1½ | 2 | 3¼ | 9 ⁹ / ₁₆ | 8 ⁷ / ₈ |
| | 6 | 2½ | 1 ⁷ / ₈ -12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | 5/8 | 4½ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 9½ |
| | 8 | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 3 ³ / ₈ | 5/8 | 5½ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 9½ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 3 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 9½ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 9½ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 9½ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3½ | 9 ¹³ / ₁₆ | 9½ |
| 14 | 8 (Std) | 3½ | 2½-12 | 3¼-12 | 3½ | 4.249 | 1 | 3 | 2 ³ / ₈ | 5/8 | 5½ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 10 ³ / ₈ |
| | 6 | 2½ | 1 ⁷ / ₈ -12 | 2¼-12 | 3 | 3.124 | 1 | 2 ¹ / ₁₆ | 2 ³ / ₈ | 5/8 | 4½ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 10 ³ / ₈ |
| | 7 | 3 | 2¼-12 | 2¾-12 | 3½ | 3.749 | 1 | 2 ⁵ / ₈ | 2 ⁷ / ₈ | 5/8 | 5¼ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 10 ³ / ₈ |
| | 9 | 4 | 3-12 | 3¾-12 | 4 | 4.749 | 1 | 3 ³ / ₈ | 2 ⁷ / ₈ | ¾ | 6 | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 10 ³ / ₈ |
| | 10 | 4½ | 3¼-12 | 4¼-12 | 4½ | 5.249 | 1 | 3 ⁷ / ₈ | 4 ³ / ₈ | ¾ | 6 ⁷ / ₈ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 10 ³ / ₈ |
| | 11 | 5 | 3½-12 | 4¾-12 | 5 | 5.749 | 1 | 4¼ | 4 ⁷ / ₈ | ¾ | 7¼ | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 10 ³ / ₈ |
| | 12 | 5½ | 4-12 | 5¼-12 | 5½ | 6.249 | 1 | 4 ⁵ / ₈ | 5 ³ / ₈ | ¾ | 8 | 1¼ | 2¼ | 3 ¹³ / ₁₆ | 11 ³ / ₁₆ | 10 ³ / ₈ |

NFPA Cylinder Interchange Comparison

These diagrams illustrate the various styles of cylinder mounting as they interchange with other cylinder manufacturers.



| Mounting Description | NFPA Mounting Code | Viceroy Fluid Power | Parker Hannifin | Miller Fluid Power | Hydro-line |
|-----------------------------|---------------------------|---|---|---|-------------------|
| | | Series 7L Hyd. | Series 3L Hyd | Model J Hyd | Series HR2 Hyd |
| Tie Rods Ext. | MX1 MDX1 MX2 MX3 | Style L Style DL Style N Style M | Style TD Style KTD Style TC Style TB | Model J51 Model DJ51 Model J52 Model J53 | L LD N M |
| Head Rectangular Flange | MF1 | Style B | Style J | Model J61 | F |
| Head Square Flange | MF5 | Style BB | Style JB | Model J65 | J |
| Head Square | ME3* | Style QQ | Style JB | Model J63 | G |
| Cap Rectangular Flange | MF2 | Style A | Style H | Model J62 | R |
| Cap Square Flange | MF6 | Style AA | Style HB | Model J66 | S |
| Cap Square | ME4* | Style PP | Style HB | Model J64 | P |
| Head Rectangular | ME5* | - | - | Model J67 | - |
| Cap Rectangular | ME6* | - | - | Model J68 | - |
| Side Lugs | MS2 | Style J | Style C | Model J72 | A |
| Centerline Lugs | MS3 | Style K | Style E | Model J73 | H |
| Side End Lugs | MS7 | Style CC | Style G | Model J77 | E |
| Side Tapped | MS4 | Style H | Style F | Model J74 | B |
| Head Trunnion | MT1* | Style ER | Style D | Model J81 | U |
| Cap Trunnion | MT2* | Style EB | Style DB | Model J82 | W |
| Intermediate Fixed Trunnion | MT4* | Style E | Style DD | Model J83 | TT |
| Cap Fixed Clevis | MP1 | Style G | Style BB | Model J84 | C |
| Cap Detachable Clevis | MP2 | - | Style BC | Model J86 | DC |
| End Angles | MS1 | - | Style CB | - | - |

* Check dimensional interchangeability before ordering.

SERIES 7L

| Milwaukee Cylinder | Sheffer Corp | Aeroquip (T-J) | Hanna | S-P Corp. | Carter Controls | Galland Henning No Pak |
|---|---|---|---------------------------|---|---|---|
| Series LH Hyd. | Series MH Hyd. | Series LS Hyd. | Series L Hyd. | Series D Hyd. | Series JJ Hyd. | Class H6 Hyd. |
| Model LH10 Model LH10D Model LH13 Model LH12 | Style BX Style DBX Style RX Style FX | Model LS-9BE Model LS-9DBE Model LS-9B Model LS-9R | MX1 MDX1 MX2 MX3 | Model DR Model DDR Model DS Model DT | Model T Model TDER Model Y Model Z | Model T Model XT Model TB Model TR |
| Model LH31 | Style FF | Model LS-2 | MF1 | Model DE | Model B | Model D |
| Model LH21 | Style FFX | Model LS-2B | MF5 | Model DC | Model W | Model DD |
| Model LH21 | Style FH | Model LS-2 | ME3 | Model DC | Model B | Model D |
| Model LH32 | Style RF | Model LS-4 | MF2 | Model DD | Model A | Model C |
| Model LH22 | Style RFX | Model LS-4B | MF6 | Model DA | Model V | Model CC |
| Model LH22 | Style RH | Model LS-4 | ME4 | Model DD | Model A | Model C |
| - | - | - | - | - | - | - |
| - | - | - | - | - | - | - |
| Model LH42 | Style SL | Model LS-1 | MS2 | Model DB | Model C | Model A |
| Model LH51 | Style CL | Model LS-7 | MS3 | Model DP | Model K | Model B |
| Model LH43 | - | - | MS7 | Model DL | Model N | - |
| Model LH41 | Style SF | Model LS-1A | MS4 | Model DJ | Model F | Model S |
| Model LH71 | Style TF | Model LS-5R | MT1 | Model DM | Model E | Model FR |
| Model LH72 | Style TR | Model LS-5B | MT2 | ModelDN | Model D | Model FB |
| Model LH73 | Style T | Model LS-5 | MT4 | - | Model M | - |
| Model LH61 | Style C | Model LS-3 | MP1 | Model DG | Model G | Model E |
| - | - | - | MP2 | - | - | Model HE |
| - | Style FB | - | - | - | Model L | Model AP |

Seal Kits

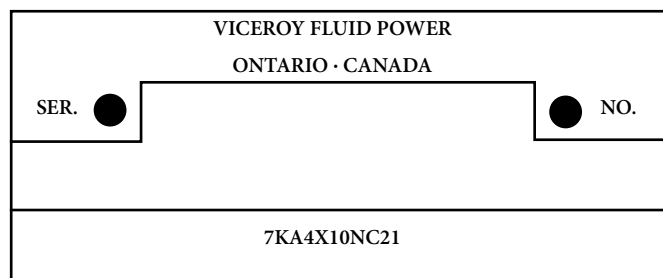
Seal Kits for Viceroy cylinders are designed and packaged to provide the necessary software parts for the normal cylinder repair.

Ease of maintenance is provided through the kits shown, in that each type permits a specific cylinder repair.

A combination of these kits will give sufficient cylinder seals to permit a complete cylinder seal repair.

NOTE: If there is any doubt, please refer to serial number located on the cylinder Identification tag located on the head of cylinder.

Cylinder Identification Tag



Ordering Information

1. Order standard Seal Kits by appropriate number listed in the table, adding bore size.
2. When ordering Viton Seal Kits, specify Viton.
3. Specify rod diameter for all kits.

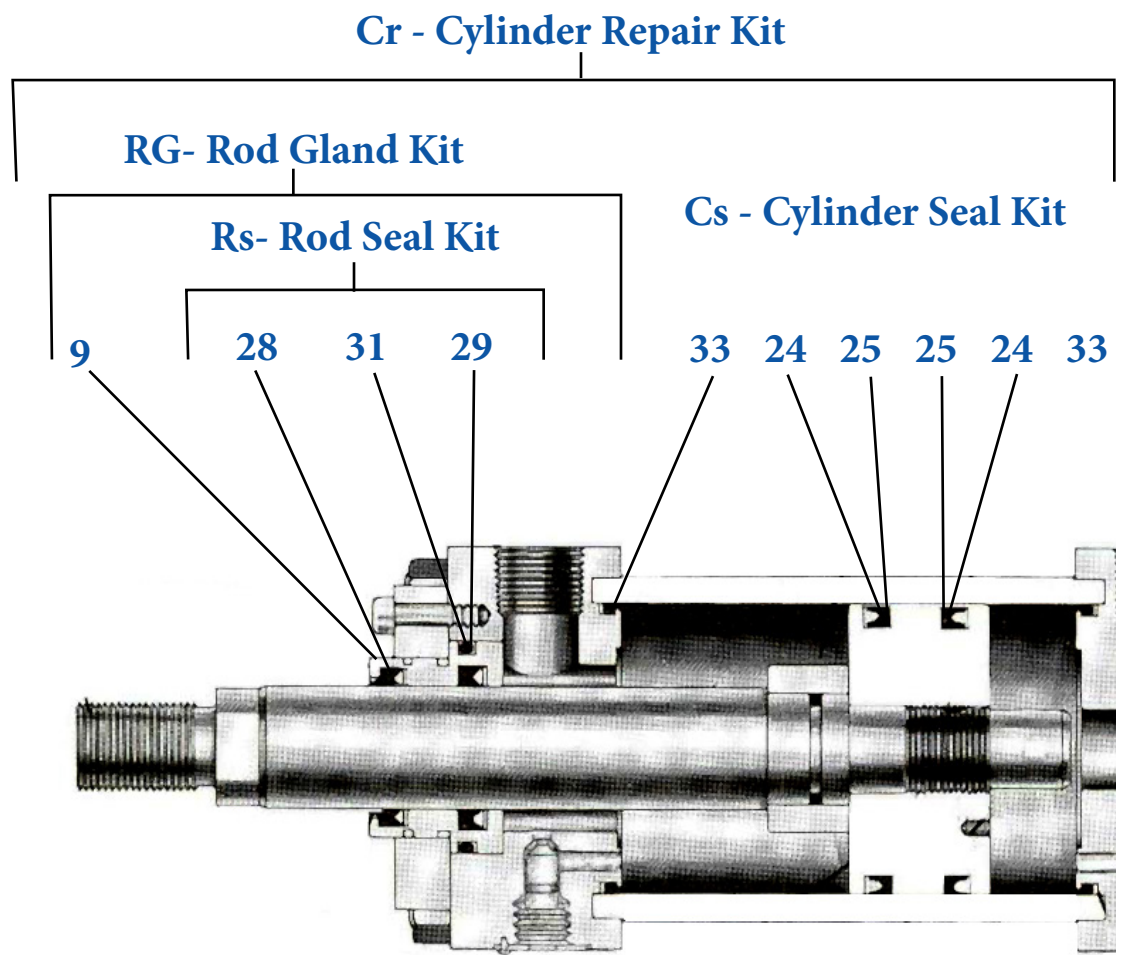
| ROD CODE CHART | |
|----------------|---------|
| Rod Dia. | Rod No. |
| 5/8 | .010 |
| 1 | .020 |
| 1 3/8 | .030 |
| 1 3/4 | .040 |
| 2 | .050 |
| 2 1/2 | .060 |
| 3 | .070 |
| 3 1/2 | .080 |
| 4 | .090 |
| 4 1/2 | .100 |
| 5 | .110 |
| 5 1/2 | .120 |

| Cyl. Bore | CR kit | CS Kit |
|-----------|------------|------------|
| 1 1/2 | 577-7564__ | 577-7574__ |
| 2 | 578-7564__ | 578-7574__ |
| 2 1/2 | 579-7564__ | 579-7579__ |
| 3 1/4 | 581-7564__ | 581-7574__ |
| 4 | 583-7564__ | 583-7574__ |
| 5 | 584-7564__ | 584-7574__ |
| 6 | 585-7564__ | 585-7574__ |
| 8 | 587-7564__ | 587-7574__ |

NOTE - Indicate Rod size by Rod No. in __ above.

| Cyl. Bore | RG kit | RS Kit |
|-----------|------------|------------|
| 1 1/2 | 577-7530__ | 577-7570__ |
| 2 | 578-7530__ | 578-7570__ |
| 2 1/2 | 579-7530__ | 579-7570__ |
| 3 1/4 | 581-7530__ | 581-7570__ |
| 4 | 583-7530__ | 583-7570__ |
| 5 | 584-7530__ | 584-7570__ |
| 6 | 585-7530__ | 585-7570__ |
| 8 | 587-7530__ | 587-7570__ |

NOTE - Indicate Rod size by Rod No. in __ above.



Item Numbers:

- 9-Rod Bearing
- 24-Piston Seal (Block Vee)
- 25-Piston Seal non-extrusion ring
- 28-Rod Wiper (polyurethane)
- 28-Rod Seal (polyurethane)
- 31-Cartridge "O" Ring
- 33-Tube "O" Ring

For complete part identification see Bulletin:
7L-Installation, Service Instructions are General Parts Breakdown.

1. General: The parts drawing on page 36 shows a listing of parts and is applicable to all standard Series 7L Hydraulic cylinders. (½ thru 8.00 Bores only.) For kits not listed, contact your nearest Distributor. This parts drawing, when used in conjunction with the listed kits, should facilitate the ordering of kits.

2. Installation of Cylinder:

Standard cylinders are furnished with seals compatible with petroleum base fluids. These seals work best with in the temperature range of -40° F to 200° F. For fluids other than petroleum base, different seal materials may be used. (Contact your nearest Distributor.) (Reference Series 7LT, 7LW, and 7LG). For the cylinder to perform well, it must be properly installed. Alignment of the cylinder with load is most important. Forcing rod, clevis pins or mounting bolts into position indicates that the cylinder is not properly aligned, and permanent damage may result from such installation.

3. Procedure for Replacement of Rod Seals and Cartridge:

- A.** Disconnect cylinder and drain oil from head end port.
- B.** In cases of circular cartridge retainer, remove socket head screws. In cases of square retainer remove tie rod nuts.
- C.** Remove circular or square retainer.
- D.** Remove rod bearing cartridge from head. To facilitate removal, a screwdriver can be used to pry in the external groove.
- E.** Remove rod wiper, rod seal and rod cartridge O-ring.
- F.** Reassemble the cartridge with corresponding replacement parts, cleaning all parts thoroughly. Swelling, shrinking, wear, nicks, cuts, and indentations are all signs of defective seals. Such seals should be replaced.
- G.** Prior to installation, all rubber parts must be well coated with lubricant. Place the cartridge with new replacement parts on the rod end, and use a twisting motion in starting it onto the rod.
- H.** Guide the cartridge over the rod and carefully insert it into the head end cover, replace cartridge retainer plate and screws. Tighten the screws with a hexagon key. In tightening the socket head screws for circular retainers, use the following torque:

| Screw Size No. | 10-32 | .25-28 | .31-24 |
|-------------------|-------|--------|--------|
| Torque (Ft.-lbs.) | 6 | 15 | 30 |

I. Square retainer (re-installation), see tie rod torque, Page 38.

4. Procedure for Repacking Cylinders:

- A.** Disconnect cylinder and drain oil from head and cap end ports.
- B.** Remove the tie rod nuts and tie rods.
- C.** Remove cap end and then head end. The rod bearing cartridge and cartridge retainer plate will come off with the head end.

D. Remove piston and rod assembly from tube.

E. Remove cartridge retainer plate screws and rod bearing cartridge from head end.

Note: The piston and rod assembly should not require disassembly unless replacement of pistons or the piston rod or head end cushion nose is required

5. Cleaning: Clean all parts thoroughly. The packings and seals in this cylinder are compatible with hydraulic oils, air and neutral fluids. The cleaning agent must also be compatible to avoid damage to packings and seals. Whenever a particular lubricant is specified for an installation, do not deviate from this specification without checking for compatibility.

6. Inspection:

- A.** Inspect all packings and seals for swelling, shrinking, wear, nicks, cuts, and indentations. Discard all damaged packings and seals.
- B.** Check and inspect bore of tube for scratches, excessive wear, and any other defect that might damage piston packing or cause piston bypass.
- C.** Inspect piston rod for signs of wear, nicks, dents, scratches, or anything that may damage rod packing or rod bearing. Excessive wear on one side of piston rod or rod bearing usually indicates misalignment in installation and should be corrected.
- D.** Inspect all remaining items for evidence of damage or wear. In most cases, a little polishing of the various parts will restore them to like-new condition.
- E.** Replace all damaged packings, seals, rod wipers.

7. Reassembly: The procedure for reassembly is essentially the reverse of disassembly. However, the following exceptions and considerations should be

noted:

A. All O-rings should be well coated with lubricant after they are installed in their respective grooves and prior to reassembly with the mating part. Care must be taken when assembling O-rings and packings that they are not damaged, as this will cause leakage.

B. Tie rod threads and nut bearing faces should be well lubricated to allow tightening the nuts evenly for proper prestressing. To avoid twisting of the tie rods during tightening hold with vise grip or clamp. To assure equal prestressing of the tie rods, first turn on nuts even and snug to align assembly; then the nuts are to be tightened alternately. For proper tie rod prestressing, they should be torqued as recommended: (See tie rod torque chart Page 38.)

8. Testing:

- A.** After the cylinder has been completely reassembled, it should be tested, either on a test bench or in the regular installation, Watch for the following as the cylinder is cycled at operating pressure.
 - a. Rod gland leakage.
 - b. Leakage at end cover "O" rings.
 - c. Leakage at cushion adjusting needle.
 - d. Leakage at ball check plug.

Caution

CYLINDERS WITH THE FOLLOWING BORE/ROD COMBINATIONS HAVE NON-BOLTED SQUARE RETAINERS. CARTRIDGE REMOVAL REQUIRES REMOVAL OF TIE ROD NUTS/TIE RODS:

A. All mounts:

- 1.50" bore with 1.00" rod
- 2.00" bore with 1.00" and 1.38" rods
- 2.50" bore with 1.38" and 1.75" rods
- 3.25" bore with 2.00" rod

B. Additional bore/rod combinations in "B" and "BB" mounting styles only

- 1.50" and 2.00" bores with .62" rod
- 2.50" bore with 1.00" rod
- 3.25" bore with 1.38" and 1.75" rods
- 4.00" bore with 1.75", 2.00", and 2.50" rods
- 5.00" bore with 2.50", 3.00", and 3.50" rods
- 6.00" bore with 4.00" rod

Removability of Rod Cartridge in Style CC - Foot Mount.

Foot lugs interfere with cartridge removal in the following sizes:

1.5" bore with .62" and 1.00" rods
 2.0" bore with 1.00" and 1.38" rods
 2.5" bore with 1.38" and 1.75" rods
 3.25" bore with 1.38", 1.75" and 2.00" rods
 4.00" bore with 1.75", 2.00", and 2.50" rods
 5.00" bore with 2.50", 3.00" and 3.50" rods
 6.00" bore with 3.00", 3.50" and 4.00" rods

The following bore-rod combinations are not available in Style CC Mount:
 8" bore with 4.50", 5.00" and 5.50" rods
 10" bore with 5.50" rod

Cushion Adjustment Valve (Identified with C.A. on End Covers) Cushion adjustment valve is provided for controlling cushioning effect of the cylinder.

It contains a safety feature in that during the backing off of the screws, leakage will occur prior to thread disengagement, thus preventing the possibility of valve blow-out.

Do not continue unscrewing the valve if leakage occurs. Ball Check Screw is non-adjustable.

"Neither seller nor manufacturer shall be liable for any injury, loss or damage, direct or consequential, arising out of the misuse

or improper use of or the inability to use the product. Before using, user should determine the suitability of the product for his intended use and assumes all responsibility for such determination. The foregoing may not be altered except in writing signed by an authorized representative of seller and manufacturer."

NOTE: For complete installation and service instructions request Bulletin: 7L Installation, Service Instructions, and General Parts Breakdown.

Mounting Recommendations

In addition to the standard mountings, the following information covers other mountings and mounting ideas that may prove helpful in your applications. When needed, special end covers, flanges or other mountings can be provided. Sketches, together with specifications relative to the application, and forces involved should be submitted.

Mounting Bolts -High tensile socket head screws are recommended for all mounting styles. Use 1/16" smaller than hole size.

Tie Rod Mountings-Styles L, M, & N- Cylinders with tie rod mountings are recommended for applications where

mounting space is limited. The standard tie rod extension is shown as BB in the tables. Longer or shorter extensions are also available.

Flange Mountings-Styles B, BB, Q, & QQ- Cylinders can be located by measuring from the cylinder mounting surface reference the "W" or "WF" dimension. The flanges can be drilled for pins or dowels to prevent shifting after proper alignment.

Lug and Side Tapped Mounting-Styles H, J, & K- Cylinders should be fixed at one end using fitted bolts, pins, in the mounting lugs or shear keys located to resist the major load, whether push or

pull.

Trunnion Mounting-Styles E, EB, & ER-Cylinders require lubricated pillow blocks with minimum bearing clearances. Pillow blocks should be carefully aligned and mounted so the trunnions are not subjected to bending moments. The rod end connection should also be pivoted, with the pivot in the piston rod eye or clevis parallel to the trunnions.

Clevis Mounting-Style G- Cylinders should be pivoted at both ends, with the pivot pin in the piston rod eye or clevis parallel to the pivot pin..

Cushion Information

| Cylinder Bore | Piston Rod Dia. | Cushion Length | | Cushion Cross Sectional Area | |
|---------------|-----------------|----------------|---------|------------------------------|---------|
| | | Head End | Cap End | Head End | Cap End |
| 1½-2 | 5/8 | 11/16 | ¾ | .518 | .110 |
| 2½ | 1 | ¾ | 7/8 | 1.108 | .110 |
| 3¼ | 1 | ¾ | 7/8 | 1.108 | .307 |
| 4 | 1¾ | ¾ | 7/8 | 2.074 | .307 |
| 5 | 1¾ | ¾ | 7/8 | 3.547 | .307 |
| 6 | 1¾ | ¾ | 1 | 3.547 | .601 |
| 8 | 2 | 15/16 | 1 | 4.430 | .601 |
| 10 | 2½ | 15/16 | 15/16 | 6.492 | .785 |
| 12 | 3 | 15/16 | 15/16 | 8.946 | .785 |
| 14 | 3½ | 15/16 | 15/8 | 11.793 | 1.485 |

Recommended Torque for Tie Rod Nuts

| Cylinder Bore | 1½ | 2-2½ | 3¼-4 | 5-6 | 8 | 10-12 | 16 |
|----------------|----|------|------|-----|-----|-------|-----|
| Torque Ft. Lb. | 11 | 16 | 29 | 80 | 120 | 180 | 282 |

NOTE: (1) Values shown above are for well lubricated tie rod threads and nut bearing surfaces.

(2) Avoid twisting of tie rods during tightening. Hold with vise grip pliers or clamp.

Cap end cushions are constant for given bore size, Head end cushions (lengths and areas) are constant for given rod diameter regardless of cylinder bore size.

Hydraulic Cylinders Port Sizes

Piston Speed and Cushions A major factor involved in determining the speed of a hydraulic cylinder piston is the flow through connecting lines, generally expressed in gallons per minute (GPM), and measured as the input/exhaust flow through the cylinder cap end cover port. Due to fluid displacement of the piston rod; flow through the head end port will be less than the cap end port. Fluid velocity in connecting lines should be limited to 15 feet per second to minimize fluid turbulence, pressure drop, and hydraulic shock.

The chart at the right can be used as a guide in determining whether standard cylinder ports are adequate for the application.

The data gives piston speed in feet per minute, by bore size, for standard ports, with connecting lines using Schedule 40 pipe and fluid flow velocity is at 15 feet per second.

If piston speed results in fluid flow in excess of 15 feet per second for port sizes listed, consider the use of larger lines up to the port, with two ports per end cover connected to provide the fluid flow required.

If heavy loads are involved, or piston speeds are in excess of 20 feet per minute, and the piston completes full stroke, cushions are recommended. Cylinder cushions increase cylinder life, reduce impact speeds, and hydraulic shock. Oversize ports available consult your Viceroy Fluid Power Distributor.

| Bore in Inches | Catalog Standard Port | | |
|----------------|-----------------------|------------------------------|---------------------------|
| | Port Size (NPTF) | *G.P.M. Flow at 15 Ft Second | Piston Speed Ft. Per Min. |
| | | 9.0 | 97 |
| 2 | | 9.0 | 55 |
| | | 9.0 | 35 |
| | | 12.0 | 27 |
| 4 | | 12.0 | 18 |
| 5 | | 12.0 | 12 |
| 6 | | 25.1 | 17 |
| 8 | | 25.1 | 10 |
| 10 | 1" | 40.60 | 10 |
| 12 | 1" | 40.60 | 7 |
| 14 | | 70.30 | 9 |

*Based on Standard (Schedule 40) Pipe

Accessories

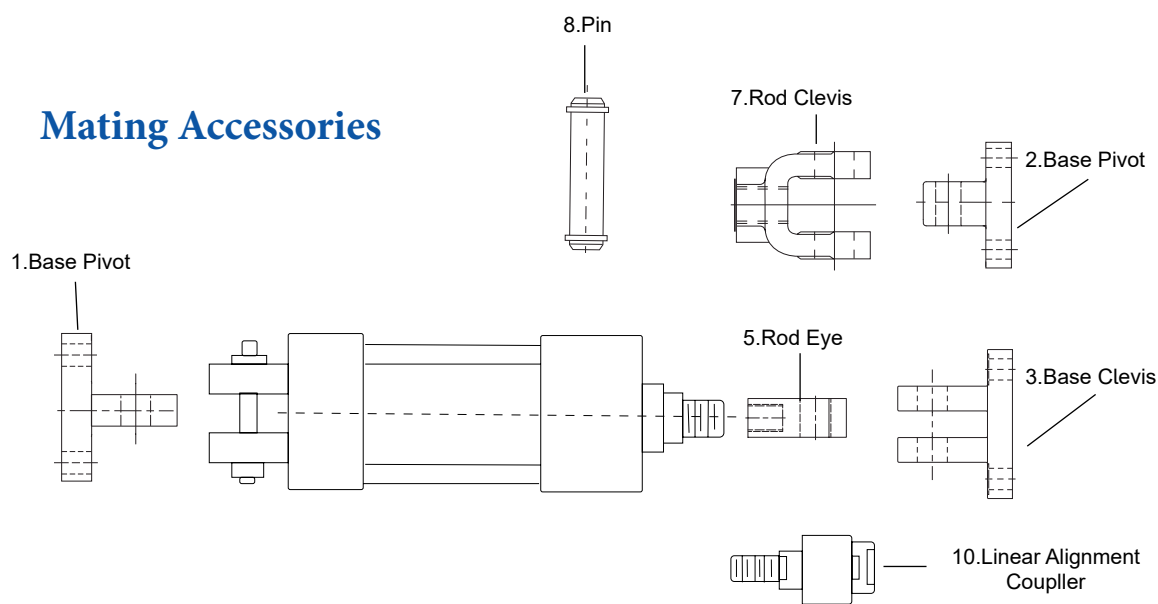
How to specify accessories

Rod end accessories are selected by the thread diameter on the end of the rod. To specify a rod end accessory locate the thread diameter (KK) in the dimension tables for the mounting style and rod end style of the cylinder you are using. Locate the part number for the proper accessory by referring to the Parts Mating diagram and Table A for standard rod end cylinders.

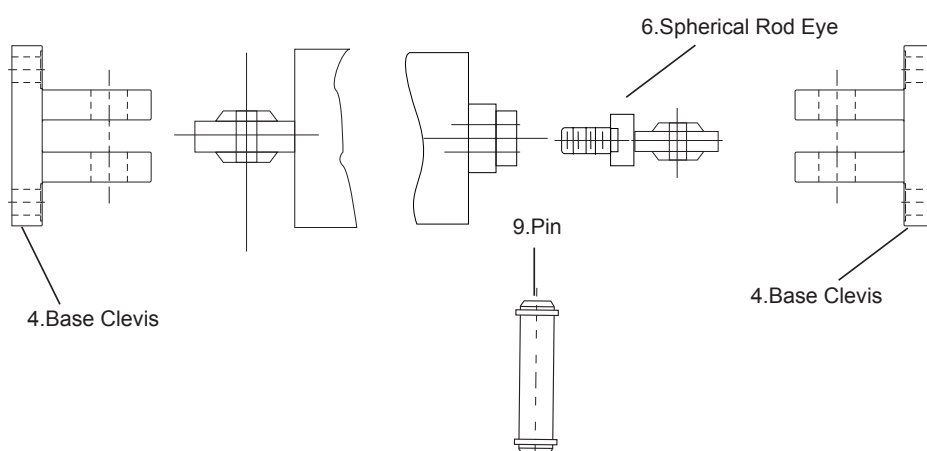
Mounting accessories for the cap end of the cylinder are selected by bore size. Refer to Table B for the part number of the proper base pivot and pin for the bore size of the cylinder you are using.

For spherical pivot mount cylinders, Style S, rod end parts and base clevis for both ends are selected by bore size and can be found in Table C.

Mating Accessories

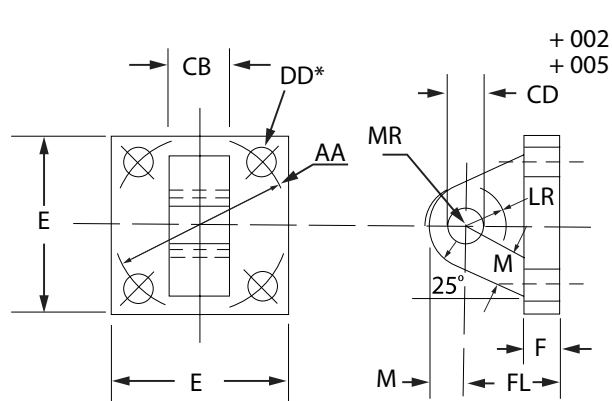


Mating Accessories for Spherical Bearing Mounting Cylinders

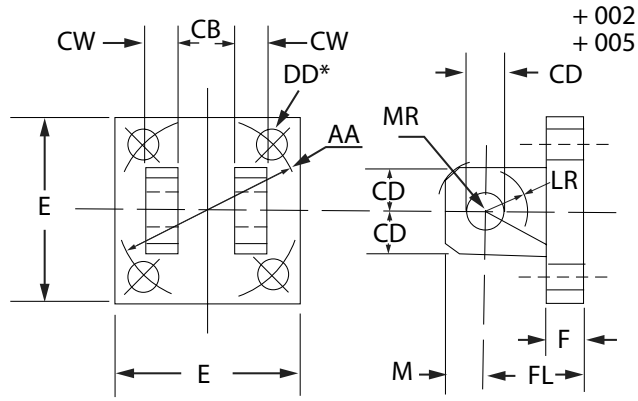


SERIES 7L

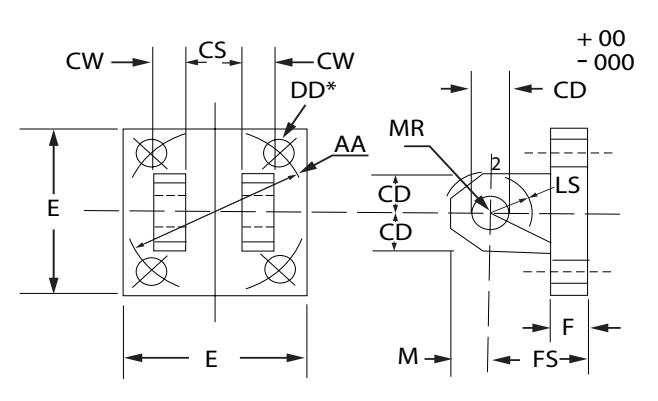
Base Pivot & Base Clevis Accessories



Base Pivot (1) (2)
*Mounting Screw Size

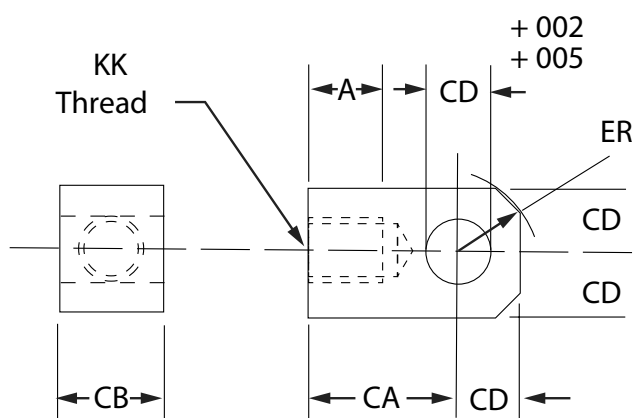


Base Clevis ** (3)
*Mounting Screw Size
(Use socket head cap screws)
**Complete with pin (not shown)

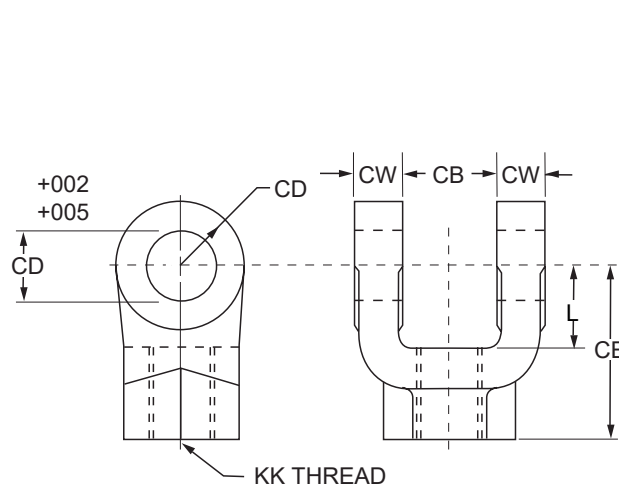


Base Clevis (Spherical Bearing) (4)
*Mounting Screw Size

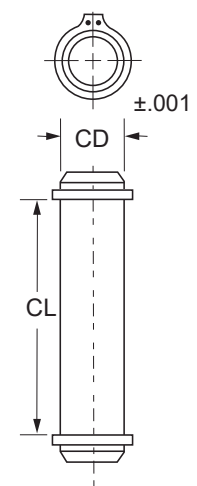
Rod End Accessories



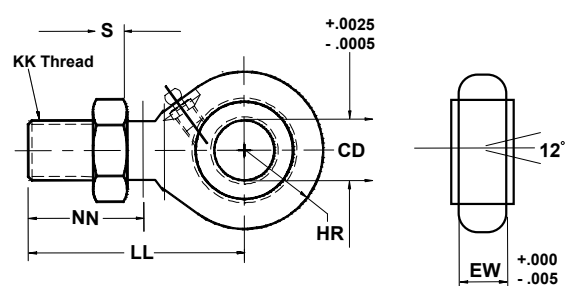
Rod Eye (standard) (5)



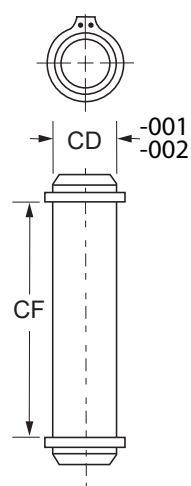
Rod Clevis (7)



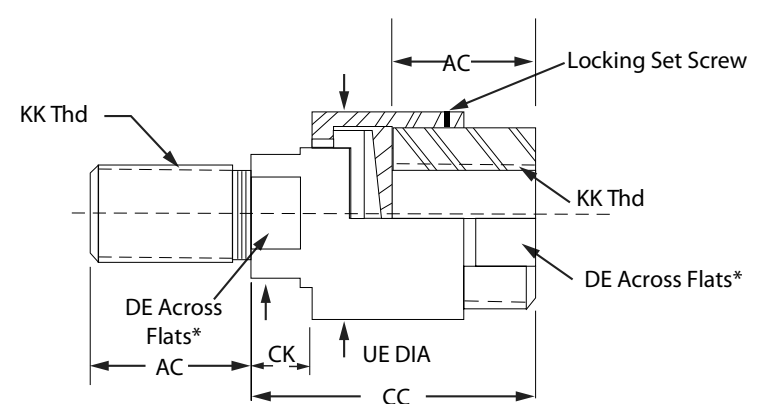
Pin (standard) (8)



Spherical Rod Eye (6)



Pin (For spherical bearing) (8)



Linear Alignment Coupler (10)
*Spanner holes on 526301 and larger

Table A

| Mating Base Pivot to Cap Clevis Standard Rod End Cylinders | | |
|---|-------------------|------------|
| Bore | Base Pivot (1) | Pin (8) |
| 1½-2-2½ | 8430 | 8658-1 |
| 3¼-4-5 | 8431 | 8658-2 |
| 6-8 | 8432 | 8658-3 |
| 10 | 8433 | 8658-4 |
| 12 | 8434 | 8658-5 |
| 14 | 8435 | 8658-6 |

Table B

| Mating Rod End Accessories with Base Mounts-Part Nos. Standard Rod End Cylinders | | | | | | |
|---|-----------------|--------------------|-------------------|-------------------|------------|-----------------|
| Thread Size KK | Rod Eyes (5) | Base Clevis (3) | Rod Clevis (7) | Base Pivot (2) | Pin (8) | Coupler (10) |
| 7/16-20 | 8422 | 75940 | 82262 | 8430 | 8658-1 | 526301-07 |
| ¾-16 | 8423 | 75941 | 82263 | 8431 | 8658-2 | 526301-12 |
| 1-14 | 8424 | 75942 | 82264 | 8432 | 8658-3 | 526301-16 |
| 1¼-12 | 8425 | 75943 | 82265 | 8433 | 8658-4 | 526301-20 |
| 1½-12 | 8426 | 75944 | 82266 | 8434 | 8658-5 | 526301-24 |
| 1⅞-12 | 8427 | 75945 | 82267 | 8435 | 8658-6 | 526301-30 |
| 2¼-12 | 8428 | 86170 | 82268 | 8436 | 8658-17 | 526301-36 |
| 2½-12 | 8429 | 86171 | 82269 | 8437 | 8658-18 | 526301-40 |
| 3¼-12 | 8564 | 86172 | | | 9658-19 | 526301-52 |
| 4-12 | 8565 | 86173 | | | 8658-20 | 526301-64 |

Table C

| Mating Spherical Rod Eye and Base Style S | | | |
|---|------------------------|----------------------------------|------------|
| Bore | Sph. Rod Eye (6) | Base Clevis (Each End) (4) | Pin (9) |
| 1½-2-2½ | 72468 | 72471 | 72474 |
| 3¼-4-5 | 72483 | 72472 | 72475 |
| 6 | 72470 | 72472 | 72476 |

| Rod End Torque (All Rods Within a Bore Size) | |
|---|---------------------|
| Bore | Torque (ft. - lbs.) |
| 1.50 | 15 |
| 2.00 | 25 |
| 2.50 | 40 |
| 3.25 | 100 |
| 4.00 | 115 |
| 5.00 | 125 |
| 6.00 | 180 |
| 8.00 | 220 |
| 10.00 | 440 |
| 12.00 | 675 |
| 14.00 | 1125 |

SERIES 7L

Base Pivot and Base Clevis Dimensions

| Part No. | | | AA | CB | CS | CD | CW | DD | E | F | FL | FS | LR | LS | M | MR | NR |
|---------------|----------------|--------------------------------|-------|-------|-------|-------|-------|-------|--------|---------|---------|-------|--------|----|-------|---------|---------|
| Base Pivot(1) | Base Clevis(3) | Base Clevis for Sph.Bearing(4) | | | | | | | | | | | | | | | |
| 8430 | 75940 | 71471 | 2.31 | 3/4 | 3/4 | 1/2 | 1/2 | 3/8 | 2 1/2 | 3/8 | 1 1/8 | 1 3/8 | 5/8 | | 1/2 | 19/32 | 9/16 |
| 8431 | 75941 | 72472 | 3.61 | 1 1/4 | 1 | 3/4 | 5/8 | 1/2 | 3 1/2 | 5/8 | 1 7/8 | 2 3/8 | 15/16 | | 3/4 | 29/32 | 27/32 |
| 8432 | 75942 | 72473 | 4.60 | 1 1/2 | 1 1/2 | 1 | 3/4 | 5/8 | 4 1/2 | 3/4 | 2 1/4 | 3 | 1 5/16 | | 1 | 1 3/16 | 1 1/8 |
| 8433 | 75943 | | 5.40 | 2 | | 1 3/8 | 1 | 5/8 | 5 | 7/8 | 3 | | 1 3/4 | | 1 3/8 | 1 21/32 | 1 1/2 |
| 8434 | 75944 | | 7.00 | 2 1/2 | | 1 3/4 | 1 1/4 | 7/8 | 6 1/2 | 7/8 | 3 1/8 | | 2 | | 1 3/4 | 1 24/32 | 1 15/16 |
| 8435 | 75945 | | 8.10 | 2 1/2 | | 2 | 1 1/4 | 1 | 7 1/2 | 1 | 3 1/2 | | 2 1/4 | | 2 | 2 3/16 | 2 3/16 |
| 8436 | 86170 | | 9.30 | 3 | | 2 1/2 | 1 1/2 | 1 1/8 | 8 1/2 | 1 | 4 | | 2 3/4 | | 2 1/2 | 2 5/8 | 2 11/16 |
| 8437 | 86171 | | 10.60 | 3 | | 3 | 1 1/2 | 1 1/4 | 9 1/2 | 1 | 4 1/4 | | 3 1/16 | | 2 3/4 | 2 7/8 | 3 |
| | 86172 | | 13.60 | 4 | | 3 1/2 | 2 | 1 3/4 | 12 5/8 | 1 11/16 | 5 11/16 | | 3 5/8 | | 3 1/2 | 3 1/2 | 3 1/2 |
| | 86173 | | 16.20 | 4 1/2 | | 4 | 2 1/4 | 2 | 14 7/8 | 1 15/16 | 6 7/16 | | 4 1/8 | | 4 | 4 | 4 |

Rod End Accessory Dimensions

| Thread kk | A | AC | CA | CB | CC | CD | CE | CK | CL | CF | CW | DC | DE | ER | EW | HR | L | LL | NN | S | UC | UE |
|-----------|-------|-------|---------|-------|---------|-------|---------|-------|-------|-------|--------|--------|-------|---------|-------|---------|--------|-------|---------|------|---------|-------|
| 7/16-20 | 3/4 | 3/4 | 1 1/2 | 3/4 | 2 | 1/2 | 1 1/2 | 1/2 | 1 3/4 | 1 3/4 | 1/2 | 1/2 | 13/16 | 9/16 | 5/8 | 1 1/16 | 3/4 | 27/16 | 1 15/32 | 1/4 | 5/8 | 1 1/4 |
| 3/4-16 | 1 1/8 | 1 1/8 | 2 1/16 | 1 1/4 | 2 5/16 | 3/4 | 2 7/8 | 1/2 | 2 1/2 | 2 1/4 | 5/8 | 13/16 | 1 1/8 | 27/32 | 7/8 | 29/32 | 1 | 2 7/8 | 1 23/32 | 7/16 | 3 1/32 | 1 3/4 |
| 1-14 | 1 5/8 | 1 5/8 | 2 13/16 | 1 1/2 | 2 15/16 | 1 | 2 15/16 | 17/32 | 3 | 3 | 3/4 | 1 5/32 | 1 5/8 | 1 1/8 | 1 3/8 | 1 13/22 | 1 5/16 | 4 1/8 | 2 3/22 | 9/16 | 1 11/32 | 2 1/2 |
| 1 1/4-12 | 2 | 2 | 3 7/16 | 2 | 2 15/16 | 1 3/4 | 3 3/4 | 17/32 | 4 | | 1 5/32 | 1 5/32 | 1 5/8 | 1 1/2 | | | 1 3/4 | | | | 1 11/32 | 2 1/2 |
| 1 1/2-12 | 2 1/4 | 2 1/4 | 4 | 2 1/2 | 4 3/8 | 1 3/4 | 4 1/2 | 7/8 | 5 | | 1 1/4 | 1 3/4 | 2 3/8 | 1 15/16 | | | 2 1/4 | | | | 1 31/32 | 3 1/4 |
| 1 7/8-12 | 3 | 3 | 5 | 2 1/2 | 5 5/8 | 2 | 5 1/2 | 1 | 5 | | 1 1/4 | | | 2 3/16 | | | 2 1/2 | | | | 2 15/32 | 3 3/4 |
| 2 1/4-12 | 3 1/2 | 3 1/2 | 5 13/16 | 3 | 6 3/8 | 2 1/2 | 6 1/2 | 1 | 6 | | 1 1/2 | | | 2 11/16 | | | 3 | | | | 2 31/32 | 4 1/2 |
| 2 1/2-12 | 3 1/2 | 3 1/2 | 6 1/8 | 3 | 6 9/16 | 3 | 6 3/4 | 1 | 6 | | 1 1/2 | | | 3 | | | 3 1/4 | | | | 3 15/32 | 5 |
| 3 1/4-12 | 4 1/2 | 4 1/2 | 7 5/8 | 4 | 8 1/2 | 3 1/2 | | 1 | 8 | | | | | 3 1/2 | | | | | | | 4 15/32 | 6 1/4 |
| 4-12 | 5 1/2 | 5 1/2 | 9 1/8 | 4 1/2 | 9 1/2 | 4 | | 1 | 9 | | | | | 4 | | | | | | | 5 15/32 | 7 1/2 |

Rod end accessories are located by thread size on the rod end. Determine this dimension(KK) by referring to the dimension tables for the cylinder you are using. If you are trying to locate dimensions for an accessory for which you have a part number, locate the thread size for that part in Table B above.

Viceroy Fluid Power "Time-Saver" Capacity Chart

Push Stroke Force and Displacement

| Bore | Piston Area Sq. In. | Push Force in LBS. Obtained at Following Pressures | | | | | | | | | Gallons Per Inch Travel |
|------|------------------------|--|---------|---------|---------|---------|---------|----------|----------|----------|----------------------------|
| | | 100 PSI | 350 PSI | 400 PSI | 600 PSI | 750 PSI | 900 PSI | 1150 PSI | 1350 PSI | 1500 PSI | |
| 1½ | 1.767 | 177 | 618 | 707 | 1060 | 1325 | 1590 | 2032 | 2385 | 2651 | .00765 |
| 2 | 3.142 | 314 | 1100 | 1257 | 1885 | 2356 | 2827 | 3613 | 4241 | 4712 | .0136 |
| 2½ | 4.909 | 491 | 1718 | 1963 | 2945 | 3682 | 4418 | 5645 | 6627 | | .0212 |
| 3¼ | 8.296 | 830 | 2904 | 3318 | 4978 | 6222 | 7466 | 9540 | 11195 | 12444 | .0359 |
| 4 | 12.566 | 1257 | 4308 | 5026 | 7540 | 9425 | 11309 | 14450 | | | .0544 |
| 5 | 19.635 | 1964 | 6872 | 7854 | 11781 | 14726 | 17671 | 22580 | | | .0850 |
| 6 | 28.274 | 2827 | 9896 | 11310 | 16964 | 21206 | 25447 | | | | .1224 |
| 8 | 50.265 | 5027 | 17593 | 20106 | 30159 | 37698 | | | | | .2176 |
| 10 | 78.540 | 7854 | 27489 | 31416 | 47124 | | | | | | .340 |
| 12 | 113.097 | 11310 | 39585 | 45240 | 67860 | | | | | | .490 |
| 14 | 153.938 | 15394 | 53879 | 61576 | 92364 | | | | | | .666 |

Forces shown in non-shaded area are obtainable at V.F.P. recommended operating pressures. Forces shown in shaded area are within range of "7L" Cylinders, but at reduced factors of safety.

| Piston Rod Dia. | Piston Rod Area Sq. In. | For Pull Stroke Deduct from the Push Force, the Force Corresponding to Rod Size and Pressure | | | | | | | | | Gallons Per Inch Travel |
|--------------------|-------------------------------|--|---------|---------|---------|---------|---------|----------|----------|----------|----------------------------|
| | | 100 PSI | 350 PSI | 400 PSI | 600 PSI | 750 PSI | 900 PSI | 1150 PSI | 1350 PSI | 1500 PSI | |
| 5/8 | .307 | 31 | 107 | 123 | 184 | 230 | 276 | 352 | 414 | 460 | .00133 |
| 1 | .785 | 79 | 275 | 314 | 471 | 589 | 706 | 903 | 1060 | 1178 | .0034 |
| 1 3/8 | 1.485 | 148 | 520 | 594 | 891 | 1114 | 1336 | 1707 | 2004 | 2227 | .0067 |
| 1 3/4 | 2.405 | 241 | 842 | 962 | 1143 | 1804 | 2164 | 2766 | 3247 | 3608 | .0104 |
| 2 | 3.142 | 314 | 1100 | 1257 | 1885 | 2356 | 2827 | 3612 | 4241 | 4712 | .0136 |
| 2½ | 4.909 | 491 | 1718 | 1963 | 2945 | 3682 | 4417 | 5645 | 6626 | | .0213 |
| 3 | 7.069 | 707 | 2474 | 2827 | 4241 | 5301 | 6361 | 8129 | | | .0306 |
| 3½ | 9.621 | 962 | 3367 | 3848 | 5773 | 7216 | 8658 | | | | .0417 |
| 4 | 12.566 | 1257 | 4398 | 5026 | 7540 | 9425 | 11309 | | | | .0544 |
| 4½ | 15.904 | 1590 | 5566 | 6362 | 9542 | 11928 | | | | | .0688 |
| 5 | 19.635 | 1964 | 6872 | 7854 | 11781 | | | | | | .0850 |
| 5½ | 23.758 | 2376 | 8315 | 9503 | 14255 | | | | | | .1028 |

Force (lbs) = Effective Piston Area (sq. in.) x Pressure (psi)

Piston Speed (In/Min.) = $\frac{\text{Delivery (GPM)}}{\text{Cylinder Displacement (Gal./In.)}}$

Our Long History of Excellence is Your Guarantee of Success



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