



Industrial Cylinder Products

Hydraulic and Pneumatic Cylinders

*Catalog 0106-7
(01/11)*



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For additional information – call your local Parker Cylinder Distributor.

Wherever in the world machinery is designed, manufactured or used, Parker is there to meet your hydraulic and pneumatic application requirements – with complete component selection and total systems engineering, worldwide availability and technical assistance.

This catalog contains the information you need to order hydraulic and pneumatic cylinders and accessories. Arranged by product group, it contains complete

specifications, dimensions, and ordering information, including technical data and reference material for designers, builders and users of fluid power machinery. No more shuffling through dozens of separate catalogs from dozens of separate suppliers.

And when you're ready to order, call your local Parker distributor for fast delivery and service. Or call your Parker Sales Office see listing on page VI.

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For Cylinder Division Plant Locations – See Page II.



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Fax: (800) 323-0105

Georgia

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Lithia Springs, GA 30122
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Fax: (800) 437-3498

Indiana

Goodland Plant
715 South Iroquois Street
Goodland, IN 47948
Tel.: (219) 297-3182
Fax: (800) 328-8120

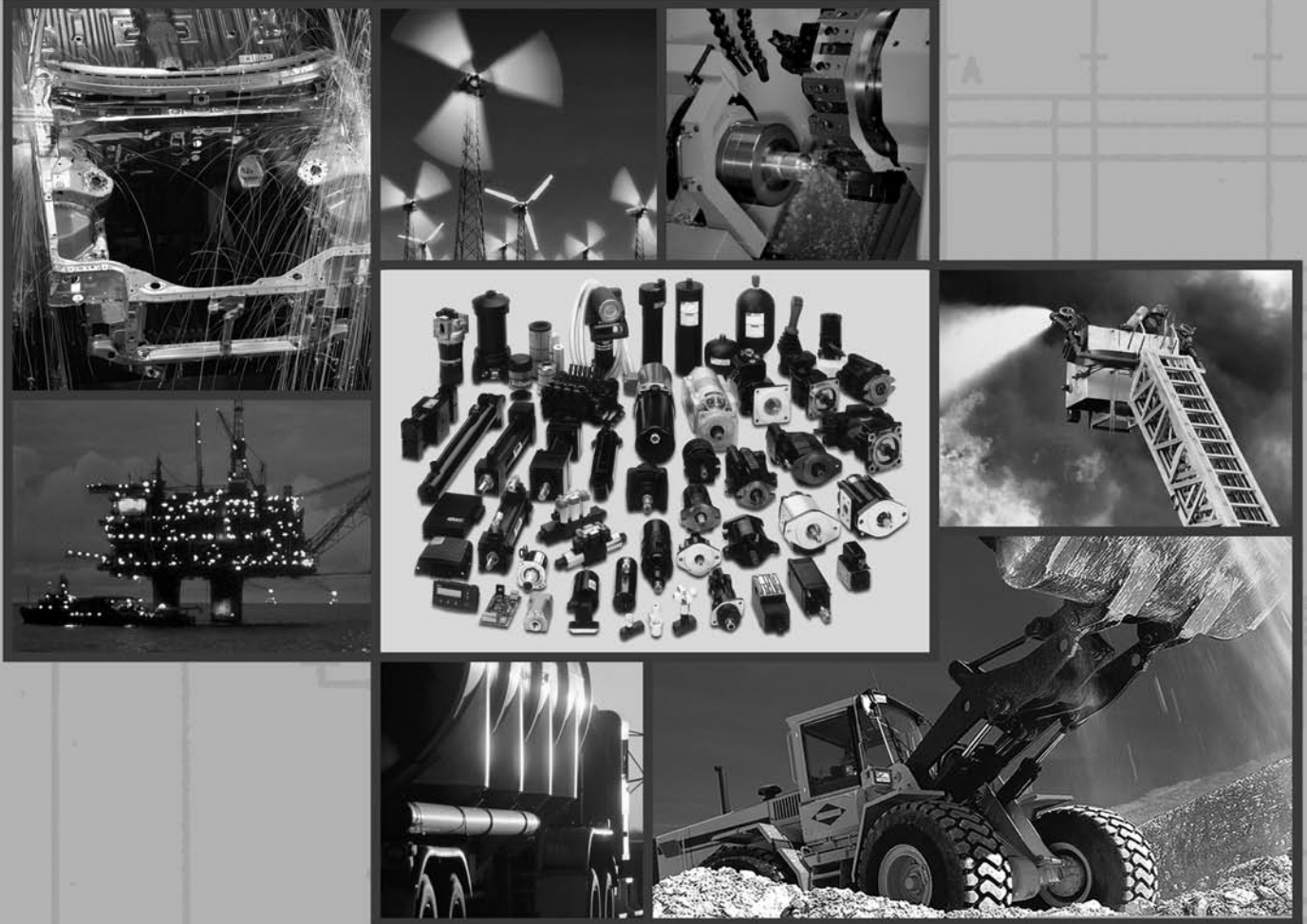
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Fax: (734) 455-1007

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29289 Airport Road
Eugene, OR 97402-0079
Tel.: (541) 689-9111
Fax: (541) 688-6771
Fax: (800) 624-7996

For additional information – call your local Parker Cylinder Distributor.



Hydraulics

Components & System Solutions

P1

LIFT

TELE

PL

PX

CDP161

Components and System Solutions



Parker Hannifin is a Fortune 500 corporation listed on the New York Stock Exchange as PH. Parker is the leading global manufacturer of the widest variety of components and systems designed to control motion, flow

and pressure in all types of machinery and other equipment.

We offer over 1,400 product lines that control motion in 1,000 mobile, industrial and aerospace markets. Parker is the only manufacturer to offer its customers a choice of hydraulic, pneumatic, electromechanical and computer motion control solutions. And we have the largest distribution network in our field, with over 7,500 distributors serving more than 400,000 customers worldwide.

Motors

Our full line of high and low speed motors provides power up to 15,000 in-lbs of torque. A complete range of sizes is offered in gear, gerotor and piston style operating configurations. Fixed and variable placement motors are available. Parker hydraulic motors deliver excellent performance with high efficiency, true wear compensation and longer service life.

Power Units

Parker offers the most complete line of standard, pre-engineered, cataloged hydraulic power units in the industry. We offer everything from five gallon vertical to 165 gallon overhead style platforms; Parker also offers custom power units that are designed and built to customer specifications. These units can be accessorized for almost any application, offering the convenience of one stop shopping in one quality unit.

Parker products are found around the globe: in satellites orbiting the earth, machine tools, mobile equipment, oil rigs and refineries, laboratories and hospitals—any place where machines depend on motion or fluid control.

Parker offers one of the world's most extensive hydraulic product lines. From pumps and valves to motors and motion controllers, all of our products share a common heritage of advanced technology for your applications. They incorporate electronic control for precise motion, innovative new designs to reduce size, and a greater choice of functions than ever before. Parker hydraulic components and systems are designed to deliver precise, reliable control in space-saving, weight-saving packages.



Cylinders

Parker is a leading manufacturer of hydraulic cylinders for your most demanding applications. Our cylinders keep on performing like you would only expect from Parker. By offering you more power per pound and more power per dollar over millions of trouble-free cycles, Parker cylinders have proven to be the most reliable and cost effective cylinders available today.

Components and System Solutions

Hydraulic Valves and Controls

We make hydraulic control valves for virtually every equipment application, from simple on/off functions to precise motion control. These include threaded cartridge valves, integrated hydraulic circuit blocks, bankable control valves, control valves, motion controllers, pressure control valves, manifold mounted directional and proportional valves.

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Parker offers a full line of hydrostatic steering units for a wide range of applications. These rugged components are designed to withstand system contaminant and engineered to handle higher oil pressure and temperatures than competitive products. A choice of sizes is offered in open center, closed center and load sense configurations.

Rotary Actuators

Parker is an industry leader in the design and manufacture of hydraulic rack and pinion, and vane style rotary actuators with torque output to 63 million in-lbs. In conjunction with our standard offering of rotary actuators, we work with customers on designs to meet specific application requirements. Rotary actuators provide smooth motion to perform a variety of actions including upending, turning, rolling over, tilting, indexing, transferring, mixing, valve operating, tensioning and clamping.

Pumps

Parker's broad line of energy-efficient hydraulic pumps includes fixed or variable displacement models in piston, vane and gear pumps. Designed to handle a wide range of applications, Parker hydraulic pumps are available with a full complement of electronic and computer controls. Like all Parker products, these pumps are manufactured with the finest materials under strict quality control. The result is a pump that delivers high efficiency and low maintenance under the toughest operating conditions.

Accumulators

Parker is the industry's most complete source for hydraulic accumulators and related products. We offer a complete range of piston, bladder and diaphragm type accumulators, as well as gas bottles, KleenVent reservoir isolators and other accessories. These reliable components improve hydraulic system efficiency by maintaining pressure, supplementing pump flow and absorbing system shocks. Sturdy construction provides years of efficient, reliable service.

Filtration

Filtration products by Parker are designed to maximize the reliability of your hydraulic systems and components with positive protection against fluid contaminants. Our comprehensive line of pressure and return line filters enhances machine life, reduces maintenance and lowers costs. High, medium and low pressure filters are offered, as well as portable filter carts and replacement elements.

Fluid Connectors

Parker has a complete line of fluid connector products and services for hydraulic systems. Products range from high-quality state-of-the-art fittings, valves and quick couplings to pressure hose that is available in a wide range of core-tube materials, reinforcement designs and outer covers. Our global distribution network and strategically located service centers ensure that you can get the products you need when and where you need them.



Your source for complete hydraulic system solutions.

Complete System Solutions

We are putting our 70 years of application engineering expertise to work for you by being the single source solution for your entire hydraulic system. Ordering a complete hydraulic system from Parker brings with it all of the benefits you have come to expect: quality, system integrity, worldwide distribution, extensive field support and premier customer service.

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Parker Actuator Products

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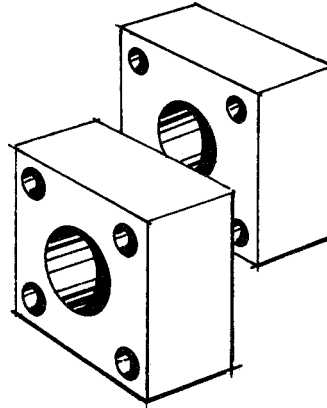


Quality features, proven reliability Parker cylinders...The Cylinders

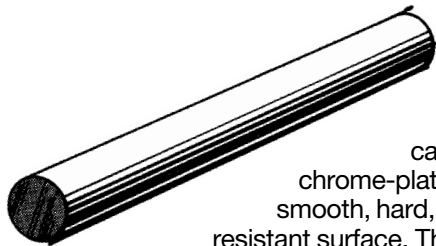
Parker cylinders have proven themselves in the only "test" that matters...the one you give it on the job.

Year after year, in all types of industrial applications, Parker Cylinders give reliability you can count on with minimum maintenance. The benefits to you are increased productivity at lower operating costs.

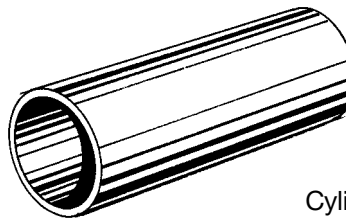
Parker offers an unmatched combination of quality features in the widest selection of industrial cylinders available. All to give you job-matched top performance and proven reliability.



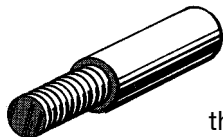
Square Steel heads and caps provide concentricity for mating parts. Both the steel head and cap are bored and grooved to assure concentricity to a common centerline for the cylinder body.



For example, the piston rod is case-hardened and chrome-plated to guarantee a smooth, hard, dent and scratch resistant surface. This increases seal and bearing life, reduces maintenance costs and assures dependable *long-life service*.



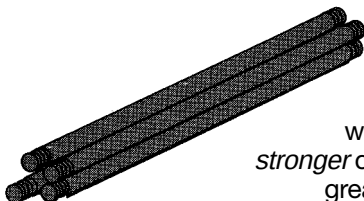
Cylinder bodies Hard chrome plated bore, steel tubing honed to a 15 micro inch finish.



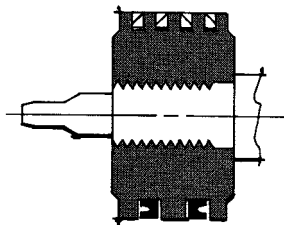
The high strength rod end stud has rolled threads providing threads reducing the possibility of fatigue failure. *Interchangeability*, easy conversion and/or repair of rod ends allow low cost modification or on-the-job repair. Anaerobic adhesive is used to permanently lock the stud to the piston rod.



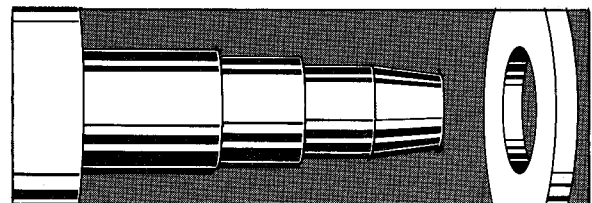
Parker cushions are the *longest* in the industry, providing the finest cushioning control available in a standard cylinder. The floating, self-centering bushing delivers high efficiency by increasing "out-stroke" speed. This all adds up to a no-compromise design that provides longer machine life, safer deceleration and greater reliability. Cushions are furnished when ordered without increasing overall cylinder length.



Tie rods are also high strength material with rolled threads for a *stronger* cylinder assembly and greater product reliability.



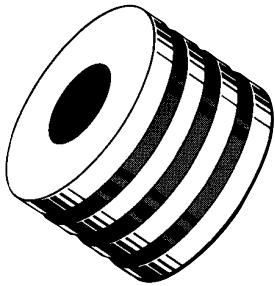
The long, full size piston-to-rod thread *connection* acts as a shock absorber and helps resist side loading. For added strength the piston-to-rod thread increases with the rod diameter thereby increasing the thread strength up to 314% for safety-assured performance in a given bore size.



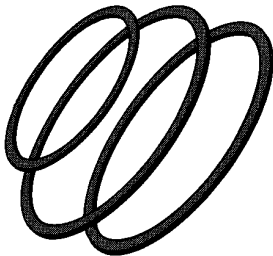
Parker's *new adjustable, floating stepped cushion design* is economical and flexible for even the most demanding applications. It provides superior performance in reducing hydraulic shock. Cushioning time is reduced up to 50%, permitting faster machine operating cycles for increased productivity. It reduces machine noise for less downtime and lower maintenance costs.

For additional information – call your local Parker Cylinder Distributor.

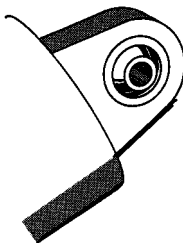
and service are the hallmark of all Preferred Around the World.



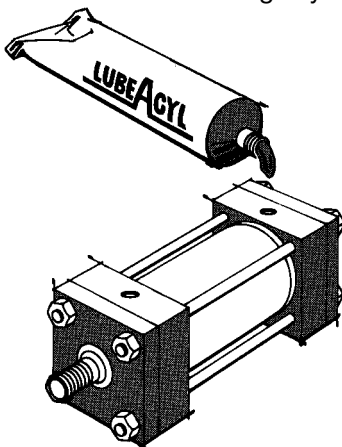
The *one-piece, wide surface*, nodular iron piston reduces bearing loads. The piston is piloted to ensure concentricity. Loctite is used to permanently lock the piston to the rod.



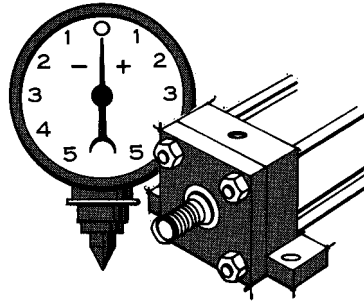
Static O-ring body seals are *pressure energized*, compensating and positive sealing for less maintenance cost and downtime saving oil losses and allowing quick, easy repair.



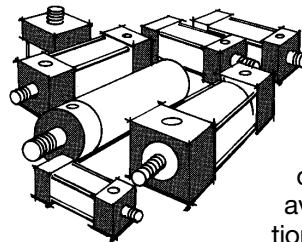
Parker spherical bearings virtually eliminate alignment problems normally associated with the use of pivoting cylinders. Spherical bearings simplify difficulties with machine alignment. Even with misalignment of up to 4.5° performance remains satisfactory without creating any excessive cylinder wear.



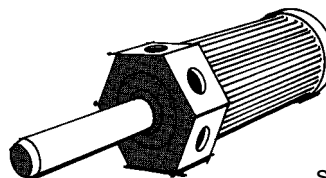
Air cylinders are factory pre-lubricated with Parker Lube-A-Cyl for normal operation and provide *millions of trouble-free cycles*. This greatly reduces both operating and maintenance costs.



Feature after feature, the Parker story is the same. Parker cylinders are premium quality cylinders and have what it takes to give you the top performance you require. Cylinders designed and engineered for *greater production profitability* to save you unnecessary cost in downtime. To make sure every cylinder is premium quality, we subject each one, not just batch samples to tough inspection and performance tests.



More selection and availability. Parker offers you the largest selection of sizes, bores, strokes, mountings, options, and accessories available. The kind of selection that lets you "customize" cylinders to fit your application. There are over 5 million different cylinders in our standard line alone. Parker's engineering capabilities are backed by over 60 years of manufacturing experience to meet all your cylinder requirements of today...and tomorrow.



Specials? Absolutely! Parker has the Sales, Engineering and Manufacturing capability and experience to provide special cylinders to meet your custom specifications and requirements. Let your imagination be your guide. We're ready to give you any technical assistance you might need. We will help turn your ideas into reality by providing special cylinder designs for you to create new machinery...solve a difficult production problem...or improve existing equipment.



The best in factory-trained fluidpower technical help is available from your Parker distributor's servicemen who are as close as your phone. They receive intensive training in cylinder design, application and maintenance at Parker facilities and regional training centers. They're always ready, eager and able to service all your cylinder requirements.

For Cylinder Division Plant Locations – See Page II.

Parker Pneumatic Check Seal Cushion

New Series MA air cylinder check seal cushions provides fast response, low wear, and low pressure drop.



Parker engineers have developed a new concept in air cylinder cushions...the "check seal". The new Parker check seal cushion combines the sealing capabilities of a lipseal for efficient capture of air for effective cushioning with check valve action for quick stroke reversal.

The lipseal design also provides "floating cushions" to assure cushion repeatability and long life. At the start of the stroke in each direction, the check valve design allows full fluid flow to piston face with a minimum pressure drop for maximum power stroke.

Additional benefits of the new check seal cushions are increased productivity and top performance for faster cycle time, minimum wear, easy adjustment, and low pressure drop.

The basic cushion design, is optional on the Series "MA" cylinder and is available on either the head end, cap end or both ends without change in envelope or mounting dimensions. A cushion adjusting needle is supplied for easy, precise adjustment on all bore sizes.

At the **head end** of the cylinder, the check seal is assembled into a groove in the central bore of the head, with the groove being slightly wider and larger in diameter than the check seal, so that it floats laterally and radially within predetermined limits. The check seal has four grooves molded into the face to provide flow passages; the assembly is put together with the lip of the seal facing toward the inside of the cylinder.

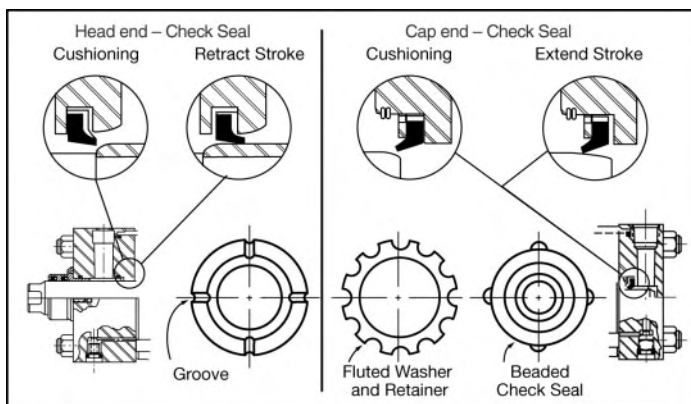
A cushion sleeve is mounted on the piston rod, so that as the rod extends, air ahead of the piston flows freely out the head-end port. When the end of the cushion sleeve reaches the lip of the check seal, it seals on the wall of the groove, trapping air for cushioning.

As pressure is applied to the head-end port on retraction, the air forces the seal towards the inside of the cylinder. The air then flows around the O.D. of the seal and through the flutes of the seal washer. Full-flow, quick starts with little or no pressure drop is just one of the major benefits of the design.

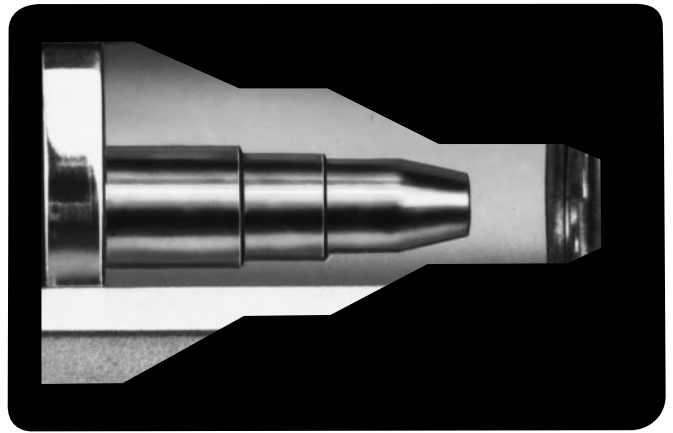
At the **cap end** of the cylinder, the check seal is assembled into a cavity in the face of the cap with four beads molded on the O.D. to provide a flow passage. A fluted washer and retaining ring, rather than a groove, and a cushion spear which extends from the rear face of the piston complete the cap end assembly. When the rounded, tapered portion of the cushion spear reaches the lip of the seal, the seal seats against the rear wall of the cavity, trapping air for cushioning.

The configuration of the check-seal lip, and the controlled shape of the cushion sleeve together prevent the lip from rolling over or extruding. A check seal used at both ends provides the benefits of floating cushions with check valve action for maximum cushion effectiveness and quick stroke reversal. This new check-seal design has been tested in millions of cycles, in the lab and in the field.

Series MA cushions are the longest in the industry and are designed for maximum customer benefit.



For additional information – call your local Parker Cylinder Distributor.



A

the **Great Shape**

a new
cushion design
that makes
**Parker hydraulic cylinders
perform even better**

- Faster cushioning time
- Reduced hydraulic shock
- Reduced machine noise
- Lower machine maintenance

Hydraulic Cylinder Cushioning:

The control of kinetic energy

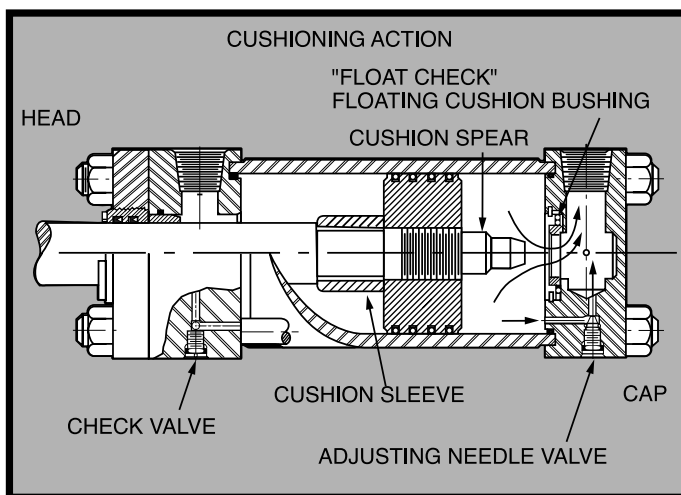
Moving loads faster with heavy-duty hydraulic cylinders

– In today's machinery and machine tools, hydraulic cylinders are required to stop heavy loads at increasingly faster rates. Every second saved can increase productivity and reduce costs. So the machine designer must find ways to operate cylinders as fast as possible.

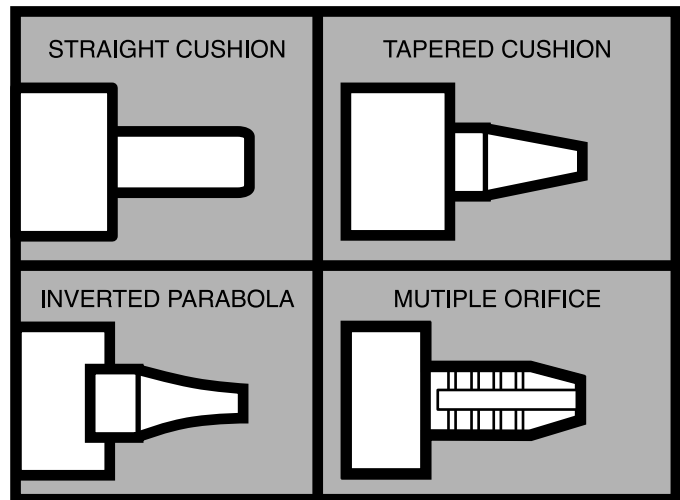
Merely speeding up a cylinder eventually leads to unacceptable hydraulic shock loads. The high inertial forces developed at the end of the stroke must be stopped without damaging the cylinder or the load.

Cushioning to control kinetic energy – One way to maintain a higher average velocity in cylinders is to incorporate cushions at the end of the stroke. These integral deceleration devices are designed to minimize excessive deceleration forces and peak hydraulic pressures which result from a sudden change of velocity.

Ideally, the cushion should achieve constant deceleration by developing constant pressure during the time of deceleration. In hydraulic cylinders, special shaping or contouring of the cushion spear or sleeve has been employed to provide programmed deceleration for the unit.



Design of Cylinder Cushions – In cushioning of hydraulic cylinders, the spear or sleeve closes the main exhaust passage in the cylinder head or cap, confining the fluid between the piston and the head or cap. The trapped fluid is metered at a somewhat controlled rate around the cushion spear and through bypass orifice that is adjusted with a needle valve. In the reverse direction, fluid bypasses the needle valve by means of check valve in the cylinder. The cushion must center itself properly regardless of the piston and bore clearance situation. To facilitate mechanical engagement with the mating orifice, a short taper is used on the leading portion of the cushion spear or sleeve. In



addition, the clearance annulus must be concentric so the fluid flow characteristics remain consistent from one stroke to the next. Parker cylinders use floating bushings and floating cushion sleeves to assure concentricity of the flow annuli. Some designs, however, do not provide the floating feature, thereby increasing the chances of eccentricity of mating cushion parts. When cushion parts do not mate concentrically on each cycle, undercushioning or erratic cushioning results.

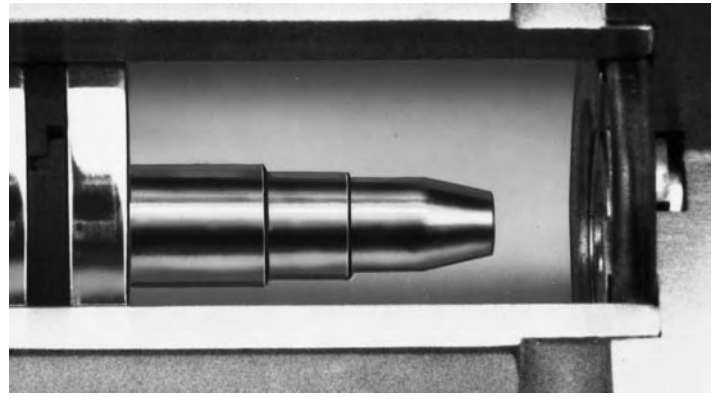
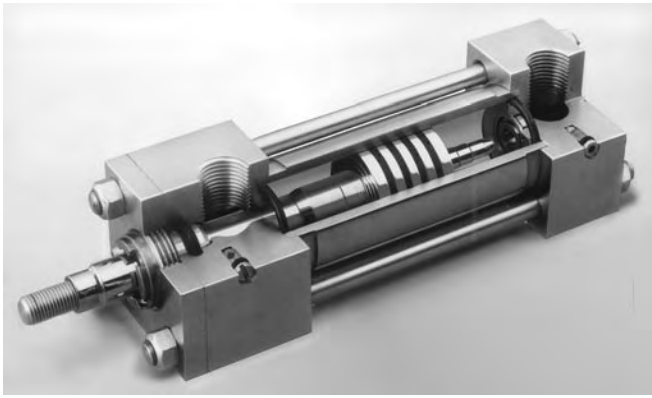
The most common cushion design is a straight spear or sleeve with a fixed clearance. The straight cushion has been used in a broad range of cylinder applications. It is economical to produce, but provides cushioning in a relatively narrow combination of loads and speeds.

Another common cushion design is the tapered configuration. Most often, it consists of a 1/2 degree taper for 2/3 the length of the cushion stroke, followed by a straight diameter for the last 1/3 of the stroke. Although economical to produce, the tapered cushion normally requires a series of multiple tapers to achieve the desired performance.

In conventional hydraulic cylinders, the theoretical shape for a constant deceleration cushion is an inverted parabola properly sized for the cylinder. This design is extremely expensive to machine, so cannot be economically used on a broad range of products.

Another design, using a series of orifice holes in the cushion sleeve or spear, can also achieve constant deceleration. This multiple orifice or piccolo type cushion is also very expensive to machine and control. As a result, it is only used on specially engineered cylinders.

For additional information – call your local Parker Cylinder Distributor.



A

The Stepped Cushion

A new shape with great performance advantages

Stepped cushions combine the best features of known cushion technology – The stepped cushion is a totally new approach in cushioning of hydraulic cylinders. By engineering a new design configuration, Parker has developed a cushion that increases performance over conventional straight and tapered cushions used in heavy duty cylinders.

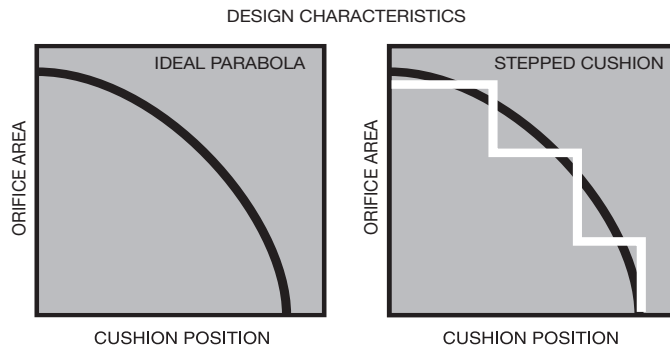
Advantages of hydraulic cylinders equipped with the Parker stepped cushion include:

- Faster cushioning time
- Reduced internal and external shock
- Reduced machine noise
- Lower machine maintenance

cushion as a standard option on Parker Series 2H heavy duty hydraulic cylinders. And they're available at the same price as the previous straight cushions.

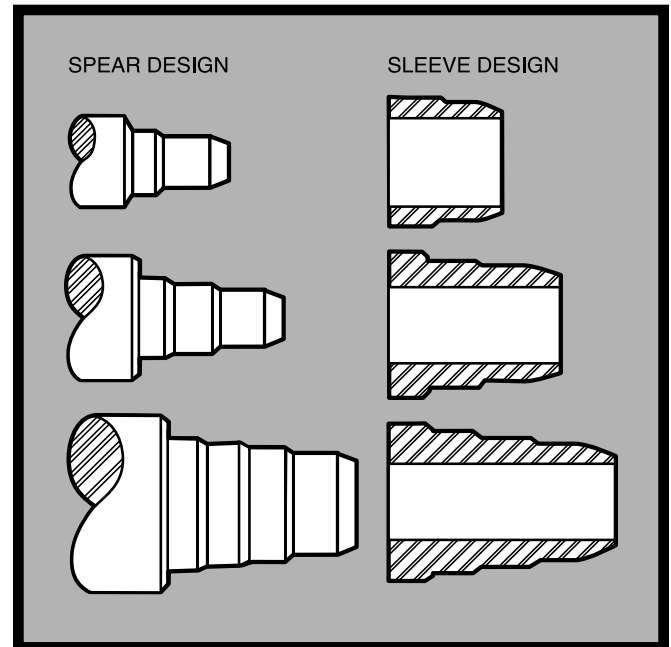
The new cushions can be supplied at the head end, cap end or on both ends. The cushion spear or sleeve is machined to close tolerances, assuring that the steps provide the proper deceleration characteristics.

Three types of spear and sleeve designs are employed on Series 2H cylinders. They are required, because in analyzing bore sizes to maximize performance, tests showed that more steps were needed for the higher energy absorption common to larger bore cylinders.



Success of the new design lies in a stepped spear or sleeve which for specific load and velocity conditions, achieves deceleration curves that come very close to the ideal performance curve. The ideal cushioning curve is one which is developed through the use of an inverted parabola cushion which achieves rapid reduction of orifice area near the end of the cushion stroke. With the stepped cushion, a series of steps are calculated to approximate the theoretical orifice area curve. The shape of the cushion allows kinetic energy to be absorbed gradually and smoothly over the entire cushioning stroke.

New standard option in Parker heavy duty hydraulic cylinders – The stepped cushion replaces the straight



Specify the Stepped Cushion to meet demanding performance requirements – Evaluate all the facts about the new stepped cushion from Parker. And consider its performance advantages when you specify heavy duty hydraulic cylinders.

More details are available in the Parker Series 2H Catalog.

For Cylinder Division Plant Locations – See Page II.

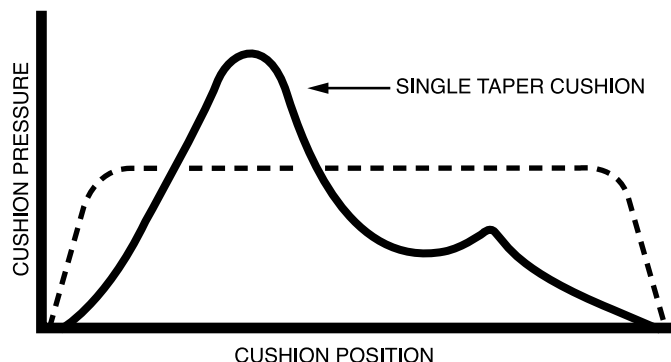


Cushion Performance:

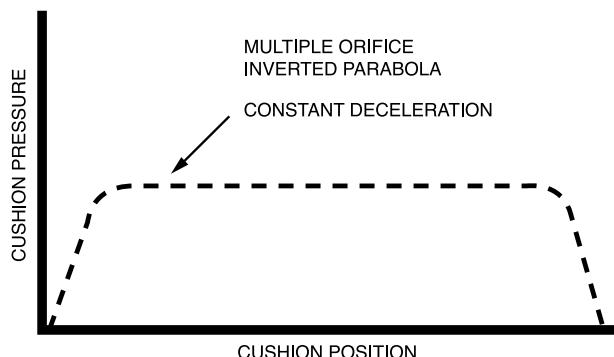
Designing for effective deceleration

Performance of the various cushion designs can be measured by the pressure changes that occur as the cushion stroke takes place. Since cushion pressure is a measure of the retarding force, it shows the resulting deceleration forces.

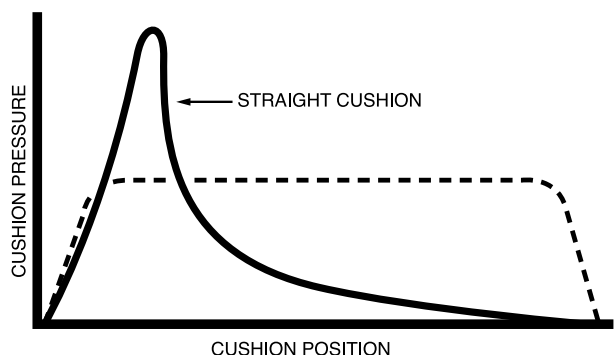
Pressure curves developed by the various cushion designs demonstrate cushioning performance. The theoretically ideal pressure-stroke curve is a straight line, showing that cushion action had constant pressure characteristics. The total area under the curve represents the kinetic energy absorbed. This constant deceleration curve can be produced with the ideal inverted parabola and multiple orifice cushion designs. However, neither of these designs are economical for most hydraulic cylinder applications in industry today.



approximate the constant deceleration curve. Pressure peaks are lower than those of both the straight and tapered cushions, resulting in significantly lower hydraulic shock.

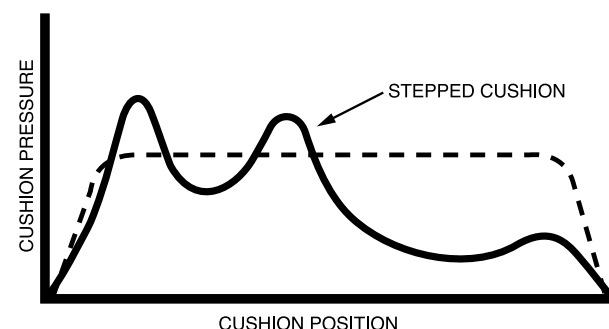


The straight cushion typically develops a very high initial pressure peak. Then, it degrades gradually as the stroke continues with fluid being metered through the fixed clearance annulus. As a result of high peak pressure, the straight cushion produces high shock levels, contributing to machine vibration, noise, and wear.

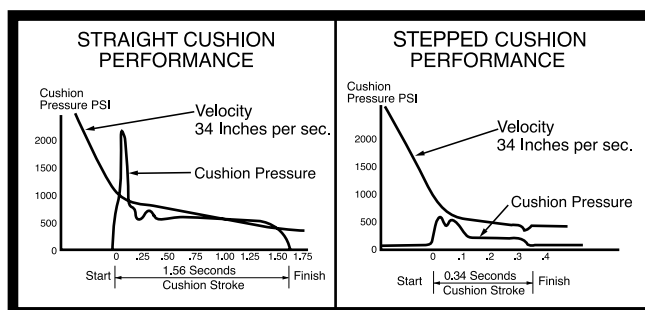


A single taper cushion develops lower initial shock than the straight design, but often delays pressure development, resulting in under cushioning.

The new Parker stepped cushion design (with a three-step spear) develops three pressure pulses which more closely



A comparison of actual pressure traces produced by a stepped cushion versus a straight cushion under the same conditions further demonstrates advantages of the new design. The stepped cushion not only reduces internal and external shock, it also saves time during the cushion stroke. It can reduce shock up to 90% and reduce cushioning time up to 50% — a dramatic performance improvement. As a result, faster machine operating cycles are possible. And lower shock reduces machine noise and maintenance.



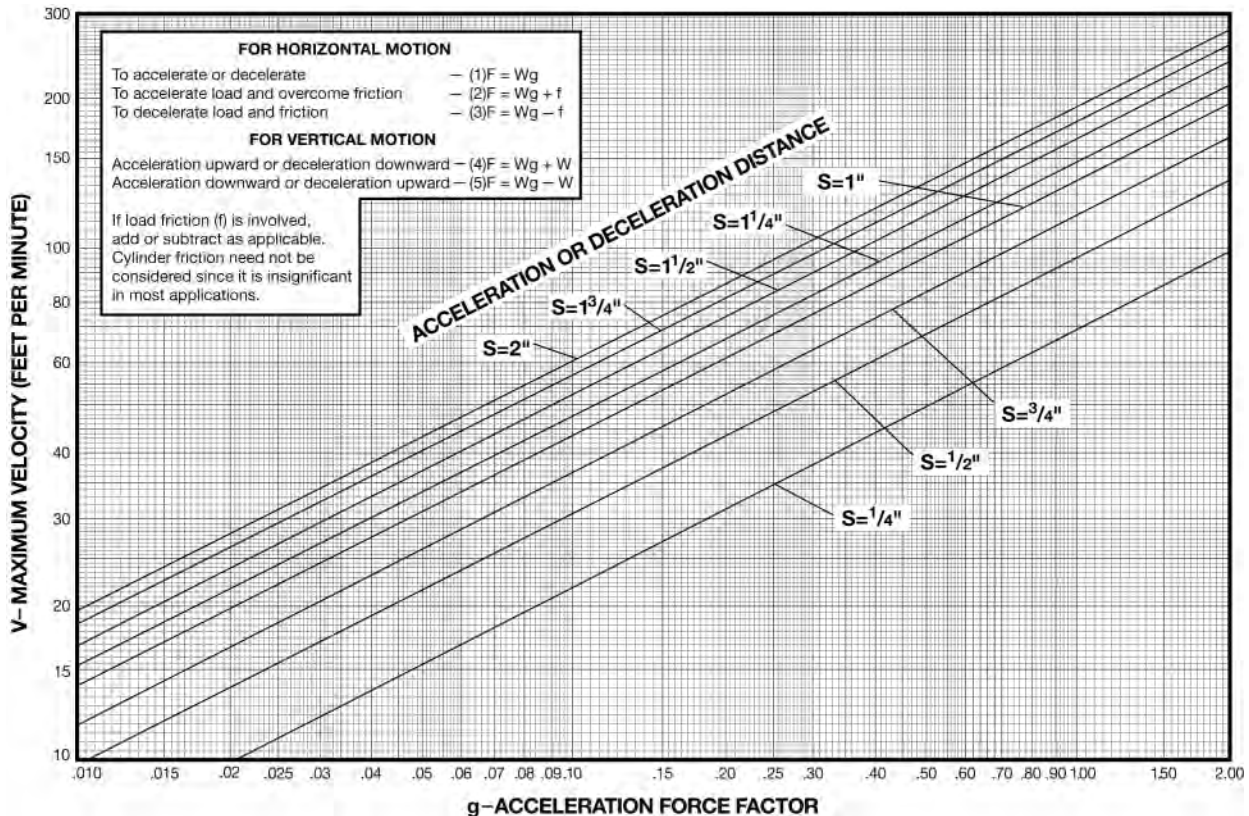
For additional information – call your local Parker Cylinder Distributor.

Acceleration and Deceleration Force Determination

The uniform acceleration force factor chart and the accompanying formula can be used to rapidly determine the forces required to accelerate and decelerate a cylinder load. To determine these forces, the following factors must be known: total weight to be moved, maximum piston speed, distance available to start or stop the weight (load), direction of movement, i.e. horizontal or vertical, and load friction. By use of the known factors and the "g" factor from the chart, the force necessary to

accelerate or decelerate a cylinder load may be found by solving the formula (as shown in chart below) applicable to a given set of conditions.

The chart represents ideal conditions and makes no allowance for losses. Possible losses due to leakage past the cushion fits or through the adjustable needle valve result in a .85 efficiency factor for deceleration in cushioning.



Nomenclature

- V = Velocity in feet per minute
- S = Distance in inches
- F = Force in pounds
- W = Weight of load in pounds
- g = Force factor
- f = Friction of load on machine ways in pounds

To determine the force factor "g" from the chart, locate the intersection of the maximum piston velocity line and the line representing the available distance. Project downward to locate "g" on the horizontal axis. To calculate the "g" factor for distances and velocities exceeding those shown on the chart, the following formula can be used:

$$g = \frac{V^2}{S} \times .0000517$$

EXAMPLE: Horizontal motion of a free moving 6,000 pound load is required with a distance of $\frac{1}{4}$ " to a maximum speed of 120 feet per minute. Formula (1) $F = Wg$ should be used.

$$F = 6,000 \text{ pounds} \times 1.50 \text{ (from chart)} = 9,000 \text{ pounds}$$

Assuming a maximum available pump pressure of 1,000 pounds p.s.i., a 4" bore cylinder should be selected, operating on push stroke at approximately 750 p.s.i. pressure at the cylinder to allow for pressure losses from the pump to the cylinder.

Assume the same load to be sliding on ways with a coefficient of friction of 0.15. The resultant friction load would be $6,000 \times 0.15 = 900$ lbs. Formula (2) $F = Wg + f$ should be used.

$$F = 6,000 \text{ pounds} \times 1.5 \text{ (from chart)} + 900 = 9,900 \text{ lbs.}$$

Again allowing 750 p.s.i. pressure at the cylinder, a 5" bore cylinder is indicated.

EXAMPLE: Horizontal deceleration of a 6,000 pound load is required by using a 1" long cushion in a 5" bore cylinder having a 2" diameter piston rod. Cylinder bore area (19.64 Sq. In.) minus the rod area (3.14 Sq. In.) results in a minor area of 16.5 Sq. In. at head end of cylinder. A 1,000 p.s.i. pump delivering 750 p.s.i. at the cylinder is being used to push the load at 120 feet per minute. Friction coefficient is 0.15 or 900 lbs.

In this example, the total deceleration force is the sum of the force needed to decelerate the 6,000 pound load, and the force required to counteract the thrust produced by the pump.

- W = Load in pounds = 6,000
- S = Deceleration distance in inches = 1"
- V = Maximum piston speed in feet per minute = 120
- g = .74 (from chart)
- f = 900 pounds

Use formula (3) $F = Wg - f$

$$(F = Wg - f) = (F = 6,000 \times .74 - 900) = 3,540 \text{ Pounds}$$

The pump is delivering 750 p.s.i. acting on the 19.64 Sq. In. piston area producing a force (F_2) of 14,730 pounds. This force must be included in our calculations. Thus $F + F_2 = 3,540 + 14,730 = 18,270$ pounds total force to be decelerated. Correct for cushion delivery of .85 or $18,270 \div .85 = 21,495$.

The total deceleration force is developed by the fluid trapped between the piston and the head. The fluid pressure is equal to the force (21,495 pounds) divided by the minor area (16.5 Sq. In.) equals 1303 p.s.i. This pressure should not exceed the non-shock rating of the cylinder.

Cushioning practice is to select a "g" factor of between .2 and 1.5.

For Cylinder Division Plant Locations – See Page II.

Specify The Parker Stepped Cushion



For

- **reduced shock up to 90%**
- **less noise**
- **less maintenance**
- **cushioning time reduced up to 50%**

**We're In Great
Shape To Serve You!**

For additional information – call your local Parker Cylinder Distributor.

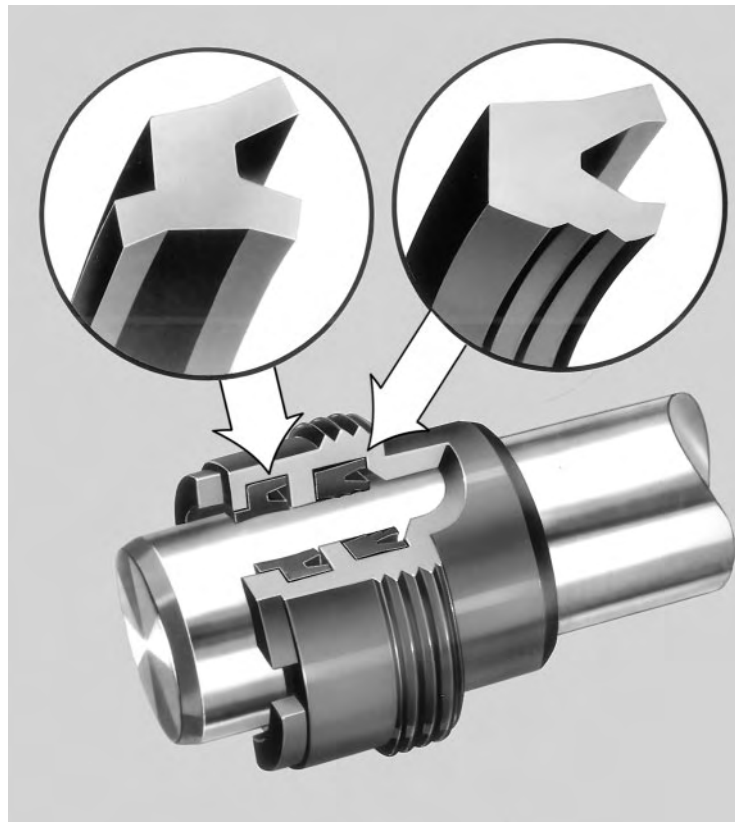
The “Jewel” Gland

An exclusive feature of Parker cylinders

Now with Parker Cylinder’s Exclusive
TS-2000 Rod Sealing System

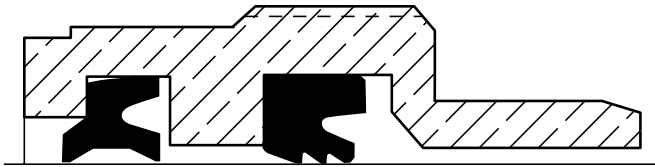
A

- What Is It? • Why Is It Required? • How Does It Work?



For Cylinder Division Plant Locations – See Page II.

What Is It?



The Parker "Jewel" gland cartridge is a combination of elements designed exclusively for sealing fluids when used in conjunction with reciprocating shafts.

Why Is It Required?

Throughout the history of fluid power, the one seemingly insurmountable problem faced by the user of reciprocating hydraulic equipment was a "wet rod". The problem had been lived with for so many years that the sight of a puddle of oil under the rod end of the cylinder was almost characteristic, and no one seemed to be doing anything about it. With the increase in demand for the advantages of fluid power in such industries as food, medical instruments, etc, plus the increasing costs of maintenance, it became obvious that the old, previously accepted standards were no longer acceptable.

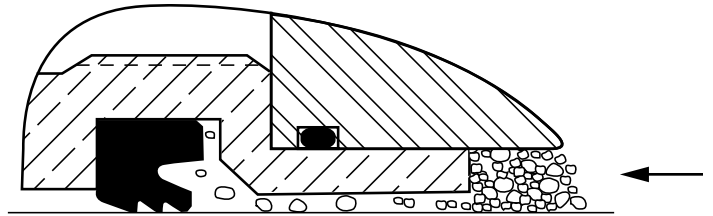
How Does It Work?

The "Jewel" gland assembly consists of the cartridge gland, serrated TS-2000 rod seal, and Wiperseal. Each has a multiple job to perform.

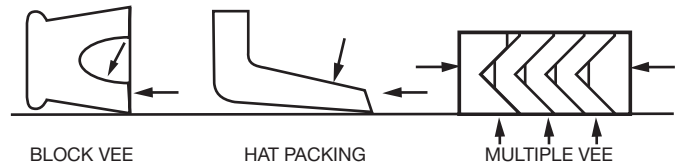
Let's start from the beginning. The fluid approaches the rod end of the cylinder and tends to follow the rod out. The fluid has a natural tendency to grip the rod (adhesion) with a force depending upon the viscosity (among other factors) of the fluid. Now note that the gland bearing is inboard of the sealing members. This not only keeps the bearing lubricated, which is in itself an important feature, but it also results in an initial shearing of the viscous fluid which occurs as the rod passes through the bearing.

This leading edge of the bearing also acts as a pressure snubber when subjected to high hydraulic shocks from the system, and it tends to tame the pressure variations felt by the TS-2000 rod seal.

The serrated TS-2000 rod seal is a truly pressure compensating *unitary* rod seal. Look for a moment at the conventional seals.

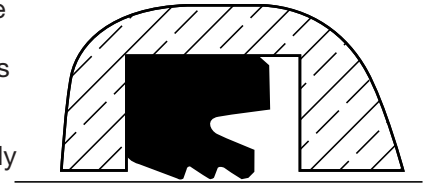


The block vee and hat packing are both low friction type seals and depend upon fine line contact with the rod to effect the seal at a minimum friction value. By scientific optical methods, investigation has indicated this "theory" is short lived as pressure increases. As the pressure increases, the critical edge lifts from the rod, or you might say the line of contact moves away from the pressure.



Essentially, what you now have is an O-ring type contact. The critical shearing edge is gone.

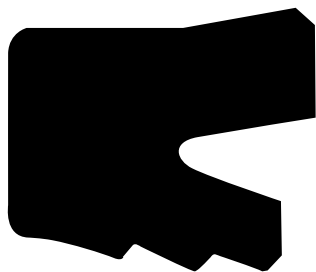
As an example of this, hold a tablet of paper with one edge on the desk. A single sheet of paper will not pass under. Roll the edge of the tablet up and the single sheet easily passes under.



In the compression type packing, (multiple vee) the natural inclination of the maintenance man is to increase the compressive force on the seal gland in an effort to seal off the leak, but this only makes matters worse. The additional friction adds to the wear and the seals quickly wear out and have to be replaced. Multiple vee's tend to wedge open and throw the point of maximum contact pressure of the seal against the rod, away from the theoretical sealing edge.

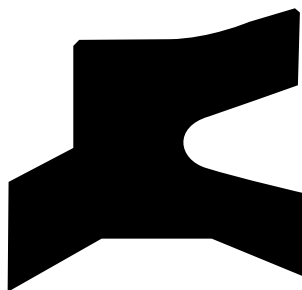
For additional information – call your local Parker Cylinder Distributor.

The serrated TS-2000 rod seal, on the other hand, has three shearing edges on a common lip. As the pressure increases and the line contact moves forward, a “new” shearing edge takes over. The increase in friction with increase in pressure is held to a minimum, yet the sealing qualities of the unitary seal are constant throughout the pressure range.

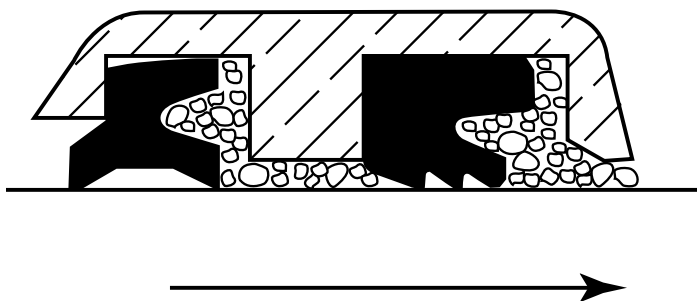


The only fluid adhering to the rod at this point is that very thin layer which is usually “scraped” off the rod on the return stroke by the rugged rod wiper. The solution to this is relatively simple. Don’t let it get out.

We can accomplish this with the Parker developed double-lip Wiperseal. Note the sturdy inner lip. This, in essence, is a scraper. It removes the “last” layer of oil that clings to the bitter end, and traps it between the Wiperseal and TS-2000 rod seal. The rod emerges from the cylinder dry. (Note: “Dry” is a relative term. In our usage, we mean that there is not enough excess oil left on the rod to be scraped off and “collar”. In reality, due to the mirror-structure of the ground, polished and plated surface of the rod, some lubrication remains, which cannot be wiped off.) There is nothing left to be removed by the wiper lip on the return stroke except the dirt and grit which it is designed to remove.



Let’s look at the return stroke now. What happens to the fluid trapped between the Wiperseal and TS-2000 rod seal? (Note the general configuration of the TS-2000 rod seal.)



With the rod extending, the seal is rigid, digging in, resisting the motion of the rod. Now look at it from the other direction, with the rod retracting. It is flexible, able to move out of the way and ride over the oil clinging to the rod on the way back. It acts like a built-in check valve. The fluid trapped in the chamber between the seal is thus carried back into the cylinder on the return stroke. In addition to the oil “carried” back, if sufficient oil gets past the TS-2000 on the way out to build up a pressure between the seals, the pressure “pops” the oil back at the end of the stroke in normal applications when pressure in the head end of the cylinder drops to a low value during reversal.

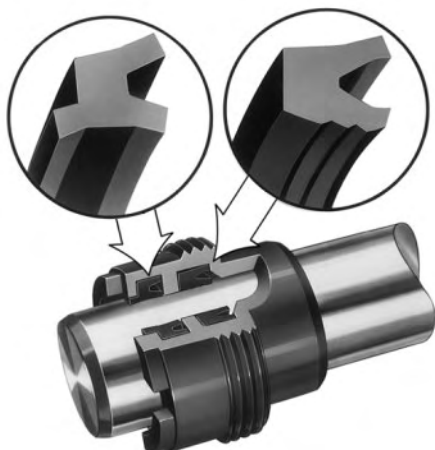
Now, let’s look at the gland in general. The O-ring seal provided for the O.D. of the gland also serves as a prevailing torque locking device, to prevent rotation of the gland when in service.

Realizing that the gland and seal combination is subject to normal wear and will eventually need attention, the gland has been designed to minimize down time and maintenance costs. The threaded design is far superior for several reasons. The snap ring retained type always has some end play. This results in wipeage of the hydraulic fluid past the O.D. sealing ring. The totally retained type requires the cylinder tie rod nuts to be removed and, in reality, the cylinder almost disassembled. With the threaded design, the gland assembly can be removed without disturbing the rest of the cylinder, and yet is securely held during service.



Why Is The Parker “Jewel” The Best Gland On The Market?

Because it is designed with superior oil and water resisting seals of the fully dynamic type. The TS-2000 Rod Seal compensates automatically for pressure, temperature and wear conditions. This feature, coupled with our method of retaining these seals in the gland, results in a practically tamper-proof seal.



Look at a cross-section of the “JEWEL.” As the rod strokes out from the seal, the rod motion and its friction tend to dynamically flex the inner edge of the TS-2000 rod seal in contact with the rod. This provides a cutting action to shear the oil from the rod, allowing the rod to pass out of the TS-2000 rod seal practically dry. Imagine that some oil wipes past the TS-2000 rod seal as the piston rod strokes out. It won't get far for it is stopped by the inner lip of the Wiperseal and is held between it and the TS-2000 rod seal. As the rod returns, any dirt or foreign matter which has collected on the rod is wiped off by the leading edge, or outer lip of the Wiperseal.

At the same time, any oil which may be trapped between the Wiperseal and the TS-2000 rod seal tends to adhere to the rod; and because of the rod motion, a dynamic flexing action of the TS-2000 rod seal occurs which causes the oil to be returned past the TS-2000 rod seal into the cylinder proper. In other words, we have an automatic check valve that prevents any appreciable amount of oil to leak past the seals, and then returns any that has managed to wipe by the TS-2000 rod seal.

The location of the bearing area of this remarkable gland is unique. Note that the major bearing surface is on the *cylinder* side of the seals. This assures optimum lubrication and cooling of this vital surface by the fluid used in the cylinder.

The O-ring seal on the O.D. of the gland also serves as a prevailing torque locking device to prevent rotation of the gland when in service.

Realizing that even the best gland and seal combination will eventually need attention, Parker-Hannifin engineers have designed the gland to minimize down time and maintenance costs. A threaded gland is more expensive to make than a snap ring retained type. However, we feel that the threaded design is far superior for at least two reasons. First, the snap ring retained type always has some end play. This results in wipeage of the hydraulic fluid past the O.D. sealing ring. Second, the threaded construction is preferred by hydraulic maintenance men. They prefer to unscrew a part rather than to “fish it out” (providing they have managed to locate the tools to remove a snap ring.)

Almost every hydraulic engineer to whom we have shown the “Jewel” has exclaimed... “This makes SENSE!”

For additional information – call your local Parker Cylinder Distributor.

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Parker Series 2A Air Cylinder

When the job calls for reliable, heavy-duty performance, specify Series 2A. A 100,000 psi yield strength chrome-plated, case-hardened piston rod. A 125,000 psi yield strength rod-end stud with rolled threads. 100,000 psi yield strength tie rods. With construction like this, the Parker Series 2A is rated for air service to 250 psi. This is one heavy-duty air cylinder that's really heavy duty.

They're truly premium quality cylinders, factory prelubricated for millions of maintenance-free cycles. And to make sure every cylinder is premium quality, we subject each and every one – not just batch samples – to tough inspection and performance tests. See pages 18 and 19 for the inside story on all the features that make Series 2A the high performance, long lasting choice for all your heavy-duty air applications.



For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Specifications/ Mountings

Standard Specifications

- Heavy Duty Service – ANSI/NFPA T3.6.7R2-1996 Specifications and Mounting Dimension Standards
- Standard Construction – Square Head – Tie Rod Design
- Nominal Pressure – Up to 250 PSI Air Service
- Standard Fluid – Filtered Air
- Standard Temperature – -10°F. to +165°F.
- Bore Sizes – 1" through 14" (Larger sizes available)

In line with our policy of continuing product improvement, specifications in this catalog are subject to change.

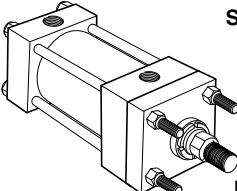
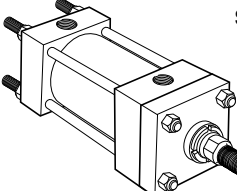
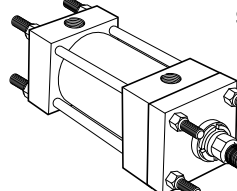
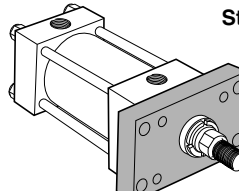
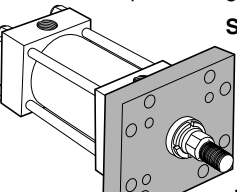
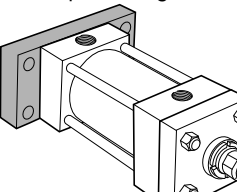
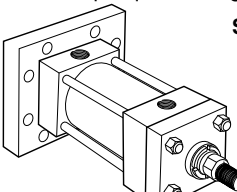
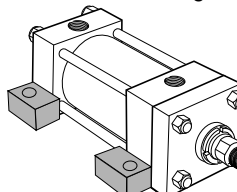
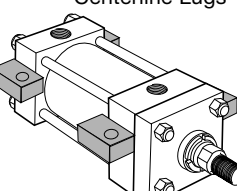
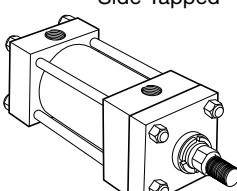
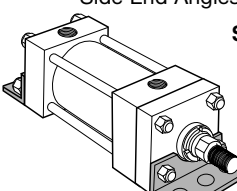
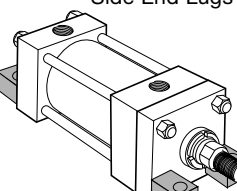
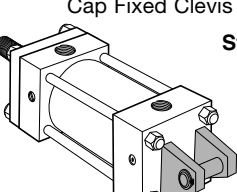
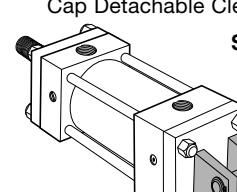
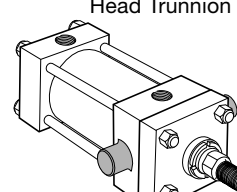
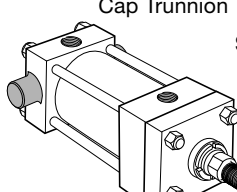
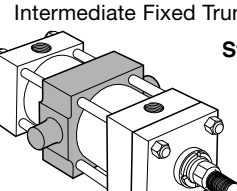
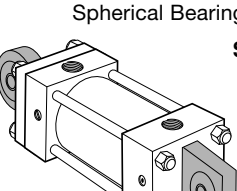
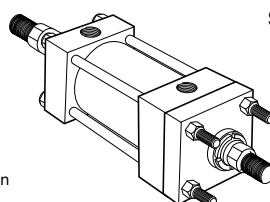
Note: Series 2A Air Cylinders fully meet ANSI/NFPA T3.6.7R2-1996 Specifications and Mounting Dimension Standards for Square Head Industrial Fluid Power Cylinders.

Parker Style TB, JB, HB, C, DB, and BB are available in 7" bore size, see page 32.

- Piston Rod Diameter – 1/2" through 5 1/2"
- Mounting Styles – 17 standard styles at various application ratings
- Strokes – Available in any practical stroke length
- Cushions – Optional at either end or both ends of stroke. "Float Check" at cap end.
- Rod Ends – Three Standard Choices – Specials to Order

*See section C, "Operating Fluids and Temperature Range" for higher temperature service.

Available Mounting Styles

Tie Rods Extended Head End Style TB  1"-6", Page 20 (NFPA MX3) 8"-14", Page 34	Tie Rods Extended Cap End Style TC  1"-6", Page 20 (NFPA MX2) 8"-14", Page 34	Tie Rods Extended Both Ends Style TD  1"-6", Page 20 (NFPA MX1) 8"-14", Page 34	Head Rectangular Flange Style J  1"-6", Page 20 (NFPA MF1)
Head Square Flange Style JB  1"-6", Page 22 (NFPA MF5) 8"-14", Page 34	Cap Rectangular Flange Style H  1"-6", Page 20 (NFPA MF2)	Cap Square Flange Style HB  1"-6", Page 22 (NFPA MF6) 8"-14", Page 34	Side Lug Style C  1"-6", Page 24 (NFPA MS2) 8"-14", Page 36
Centerline Lugs Style E  1 1/2"-6", Page 24 (NFPA MS3) 8"-14", Page 36	Side Tapped Style F  1"-6", Page 24 (NFPA MS4) 8"-14", Page 38	Side End Angles Style CB  1"-6", Page 26 (NFPA MS1) 8"-14", Page 40	Side End Lugs Style G  1"-6", Page 26 (NFPA MS7) 8"-14", Page 38
Cap Fixed Clevis Style BB  1"-6", Page 30 (NFPA MP1) 8"-14", Page 40	Cap Detachable Clevis Style BC  1"-6", Page 30 (NFPA MP2)	Head Trunnion Style D  1"-6", Page 28 (NFPA MT1) 8"-14", Page 42	Cap Trunnion Style DB  1"-6", Page 28 (NFPA MT2) 8"-14", Page 42
Intermediate Fixed Trunnion Style DD  1 1/2"-6", Page 28 (NFPA MT4) 8"-14", Page 42	Spherical Bearing Style SB  1 1/2"-6", Page 44 8"-14", Page 45	Double Rod Cylinders Style KTB Shown  Most of the above illustrated mounting styles are available in double rod cylinders. See Catalog Page 46.	

For Cylinder Division Plant Locations – See Page II.

The inside story on why Series 2A is your best choice in heavy duty pneumatic cylinders

Primary Seal – Unique Serrated Lipseal™ is a proven leakproof design, completely self-compensating and self-relieving to withstand variations and conform to mechanical deflection that may occur.

Piston Rod Stud – Furnished on 2" diameter rods and smaller when standard style #4 rod end threads are required or on 1 3/8" diameter rods and smaller when style #8 threads are required. Also available in 2 times the catalog "A" dimension length. Studs have rolled threads and are made from high strength steel. Anaerobic adhesive is used to permanently lock the stud to the piston rod.

"Jewel" Rod Gland Assembly – Externally removable without cylinder disassembly. Long bearing surface is inboard of the seals, assuring positive lubrication from within the cylinder. An "O" ring is used as a seal between gland and head, and also serves as a prevailing torque-type lock.

Secondary Seal – Double-Service Wiperseal™ – acts as a secondary pressure seal on the extend stroke and cleans the rod on the return stroke.

High Strength Tie Rods – Made from 100,000 psi minimum yield steel with rolled threads for added strength.

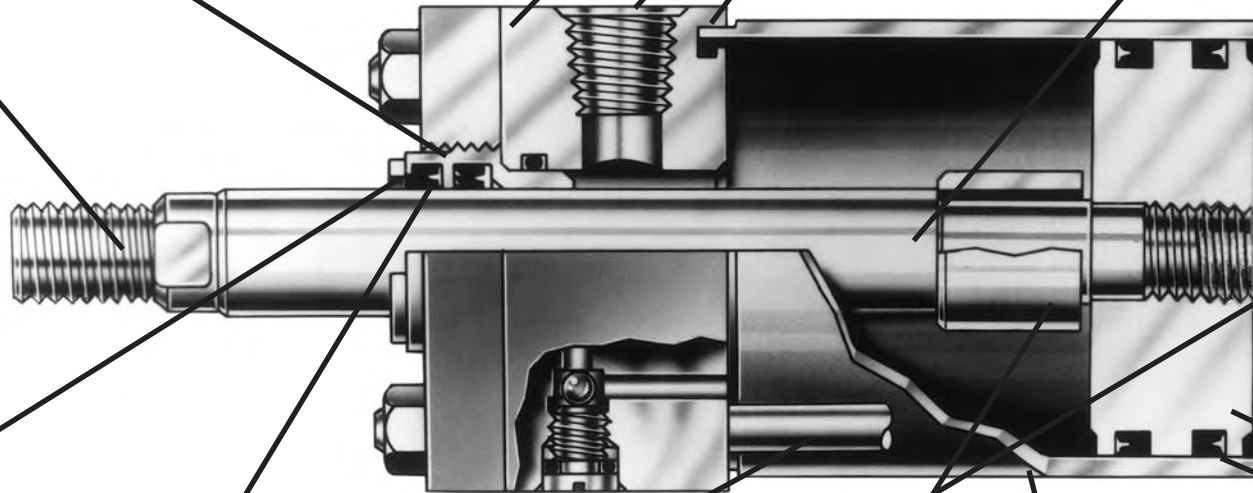
Adjustable Floating Cushions – Cushions are optional and can be supplied at head end, cap end, or both ends without change in envelope or mounting dimensions.

Steel Head – Bored and grooved to provide concentricity for mating parts.

Ports – NPTF ports are standard.

End Seals – Pressure-actuated cylinder body-to-head and cap "O" rings.

The Cylinder Body – Hard chrome-plated bore, steel tubing honed to a 15 micro inch finish on 1 1/2" through 14" bore sizes. 1" bore size is aluminum with hard-coated bore.



Adjustable floating cushions

Cushions are optional, and can be supplied at head end, cap end, or both ends without change in envelope or mounting dimensions. All Parker cushions are adjustable. The Series 2A cylinder design incorporates the longest cushion sleeve and cushion spear that can be provided in the standard envelope without decreasing the rod bearing and piston bearing lengths.

(1) When a cushion is specified at the head end:

- A self-centering sleeve is furnished on the piston rod assembly.
- A needle valve is provided that is flush with the side of the head when wide open. It may be identified by the fact that it is socket-keyed. It is located on side number 2, in all mounting styles except D, DB, DD, and E. In these styles it is located on side number 3.
- A springless check valve is provided that is also flush with the side of the head and is mounted

adjacent to the needle valve except on certain bores of mounting style C where it is mounted opposite the needle valve. It may be identified by the fact that it is slotted.

- The check and needle valves are interchangeable in the head.

(2) When a cushion is specified at the cap end:

- A cushion spear is provided on the piston rod assembly.
- A "float check" self-centering bushing is provided which incorporates a large flow check valve for fast "out-stroke" action.
- A socket-keyed needle valve is provided that is flush with the side of the cap when wide open. It is located on side number 2 in all mounting styles except D, DB, DD, and E. In these styles it is located on side number 3.

For additional information – call your local Parker Cylinder Distributor.

Piston Rod – Medium carbon steel, induction case-hardened, hard chrome-plated and polished to 10 RMS finish. Piston rods are made from 90,000 to 100,000 psi minimum yield material in 1/2" through 4" diameters. Larger diameters vary between 57,000 and 90,000 psi minimum material, depending on rod diameter. The piston thread equals the catalog style #4 rod end thread for each rod diameter to assure proper piston-to-rod thread strength. Two wrench flats are provided for rod end attachment.

Ports – NPTF ports are standard.

Steel Cap – Bored and grooved to provide concentricity for mating parts.

Alloy Steel Tie Rod Nuts

Align-A-Groove – A 3/16" wide surface machined at each end of the cylinder body. Makes precise mounting quick and easy.

One-Piece Nodular Iron Piston – The wide piston surface contacting cylinder bore reduces bearing loads. Anaerobic adhesive is used to permanently lock and seal the piston to the rod.

Piston Lipseal – Fully dynamic and self-compensating for variations in pressure, mechanical deflections and wear.

The exclusive "Jewel" gland gives you longer cylinder life, better performance and lower costs.

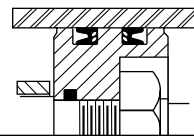


An extra-long inboard bearing surface insures lubrication from within the cylinder. Outboard of the bearing surface are two leakproof seals – The Lipseal and Wiperseal. The serrated Lipseal (primary seal) is completely self-compensating and self-relieving. It adjusts to mechanical deflections or any pressure variation from near-zero to rated operating pressure. The result is positive, no-leak sealing – regardless of conditions.

The Wiperseal does double duty. On the advance stroke, it acts as a secondary pressure seal. On the return, it wipes away any dirt on the rod. This means less wear on bearing surfaces and internal parts. Longer life for working parts. And, less loss of fluid. Plus, you can replace a "Jewel" gland without removing the tie rods or the retainer. Just a few twists with a spanner wrench does the job.

Prelubricated Wearing Surfaces

Parker Series 2A Air Cylinders are factory prelubricated. Lube-A-Cyl applied to seals, piston, cylinder bore, piston rod and gland surfaces provides lubrication for normal operation. Lube-A-Cyl has been field and laboratory tested, and is recommended by Parker for air cylinders where lubricant should remain in the cylinder and not be expelled into the atmosphere.



Piston with Retainer Nut – Optional at extra charge.

Cushion Length

Cylinder Bore (Inches)	Rod Diameter* (Inches)	Rod Number	Cushion Length (Inches)	
			Head*	Cap
1 1/2	5/8	1	7/8	13/16
	1	2	7/8	13/16
2	5/8	1	7/8	13/16
	1 3/8	2	7/8	13/16
2 1/2	5/8	1	7/8	13/16
	1 3/4	2	7/8	13/16
3 1/4	1	1	1 1/8	1
	2	2	13/16	1
4	1	1	1 1/8	1
	2 1/2	2	13/16	1
5	1	1	1 1/8	1
	3 1/2	2	13/16	1

Cylinder Bore (Inches)	Rod Diameter* (Inches)	Rod Number	Cushion Length (Inches)	
			Head*	Cap
6	1 3/8	1	1 3/8	1 1/4
	4	2	1 1/16	1 1/4
7	1 3/8	1	1 1/16	1 1/4
	2	4	1 1/16	1 1/4
8	1 3/8	1	1 1/16	1 1/4
	5 1/2	2	15/16	1 1/4
10	1 3/4	1	1 5/16	1 3/4
	5 1/2	0	1 3/16	1 3/4
12	2	1	1 5/16	1 3/4
	5 1/2	9	1 3/16	1 3/4
14	2 1/2	1	1 3/4	2
	5 1/2	8	1 11/16	2

*Head end cushions for rod diameters not listed have cushion lengths with the limits shown. For cushion selection and sizing see Section C.

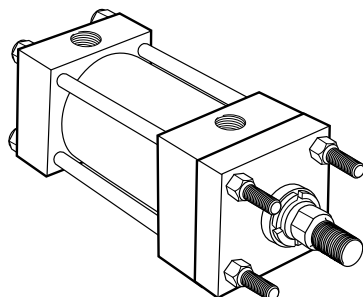
For Cylinder Division Plant Locations – See Page II.



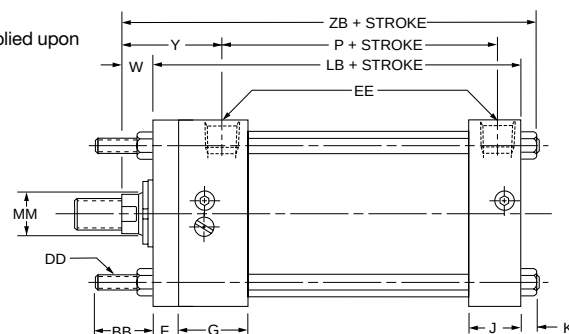
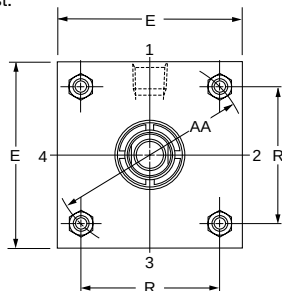
Tie Rod and Rectangular Flange Mountings 1" to 6" Bore Sizes

Series 2A Heavy Duty Air Cylinders

Tie Rods Extended Style TB (NFA Style MX3)

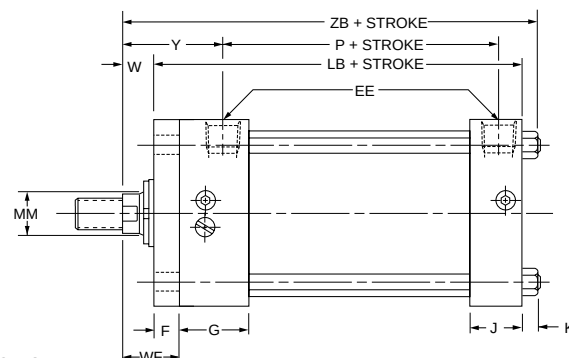
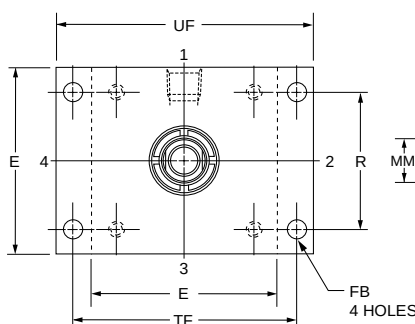
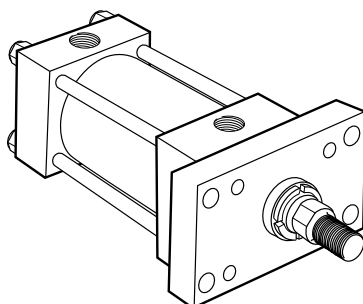


Basic Mounting (T) —
NFA MX0 — no tie rods extended can be supplied upon request.

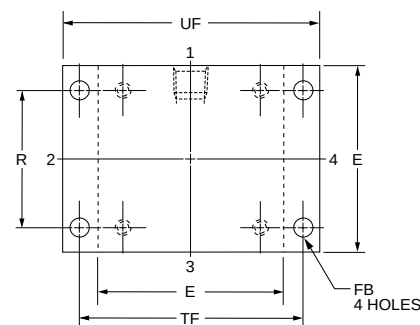
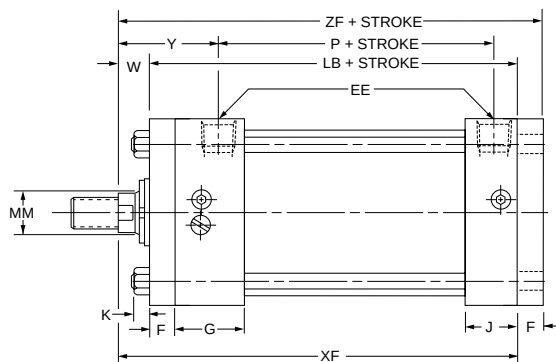
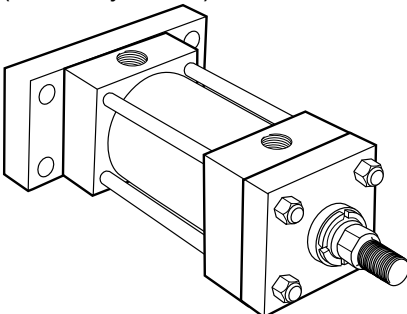


Style TB (NFA MX3). Head Tie Rods Extended, illustrated: Style TC (NFA MX2), Cap Tie Rods Extended; and Style TD (NFA MX1). Both Ends Tie Rods Extended are also available. All "T" styles can be dimensioned from Style TB drawing at right.

Head Rectangular Flange Style J (NFA Style MF1)

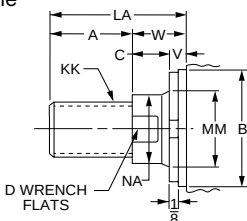


Cap Rectangular Flange Style H (NFA Style MF2)



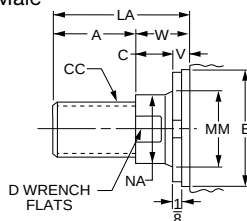
Rod End Dimensions — see table 2

Thread Style 4 (NFA Style SM) Small Male



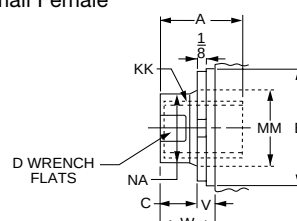
A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8 (NFA Style IM) Intermediate Male



recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9 (NFA Style SF) Small Female



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available. To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information — call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Tie Rod and
Rectangular Flange Mountings
1" to 6" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	AA	BB	DD	E	EE NPTF	F	FB	G	J	K	R	TF	UF	Add Stroke	
														LB	P
1*	1.53	3/4	10-24	■	1/4	3/8	1/4	11/2	1	3/16	1.08	2	2 1/2	37/8	2 1/8
1 1/2	2.02	1	1/4-28	2	3/8**	3/8	5/16	11/2	1	1/4	1.43	2 3/4	3 3/8	4	2 1/4
2	2.6	1 1/8	5/16-24	2 1/2	3/8**	3/8	3/8	11/2	1	5/16	1.84	3 3/8	4 1/8	4	2 1/4
2 1/2	3.1	1 1/8	5/16-24	3	3/8**	3/8	3/8	11/2	1	5/16	2.19	3 7/8	4 5/8	4 1/8	2 3/8
3 1/4	3.9	1 3/8	3/8-24	3 3/4	1/2	5/8	7/16	1 3/4	1 1/4	3/8	2.76	4 11/16	5 1/2	4 7/8	2 5/8
4	4.7	1 3/8	3/8-24	4 1/2	1/2	5/8	7/16	1 3/4	1 1/4	3/8	3.32	5 7/16	6 1/4	4 7/8	2 5/8
5	5.8	1 13/16	1/2-20	5 1/2	1/2	5/8	9/16	1 3/4	1 1/4	7/16	4.10	6 5/8	7 5/8	5 1/8	2 7/8
6	6.9	1 13/16	1/2-20	6 1/2	3/4	3/4	9/16	2	1 1/2	7/16	4.88	7 5/8	8 5/8	5 3/4	3 1/8

* Cushions not available on 1" bore.

** On 1", 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with No. 2 rods. Minimum of three full threads available.

■ 1" bore head dimension is 1 3/4" x 1 1/2". See page B20.

Table 2—Rod Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								WF	Y	Add Stroke		
			Style 8 CC	Style 4 & 9 KK	A	+ .000 - .002 B	C	D	LA	NA	V	W			XF	ZB	ZF
1	1(Std.)	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	11/4	7/16	1/4	5/8	1	1 15/16	4 1/2	4 11/16	4 7/8
	2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1	1 15/16	4 1/2	4 11/16	4 7/8
1 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1	1 15/16	4 5/8	4 7/8	5
	2	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	1 3/8	2 5/16	5	5 1/4	5 3/8
2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1	1 15/16	4 5/8	4 15/16	5
	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 7/8	15/16	5/8	1 1/4	1 5/8	2 9/16	5 1/4	5 9/16	5 5/8
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	1 3/8	2 5/16	5	5 5/16	5 3/8
2 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1	1 15/16	4 3/4	5 1/16	5 1/8
	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/2	1 11/16	3/4	1 1/2	1 7/8	2 13/16	5 5/8	5 15/16	6
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	1 3/8	2 5/16	5 1/8	5 7/16	5 1/2
	4	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 7/8	15/16	5/8	1 1/4	1 5/8	2 9/16	5 3/8	5 11/16	5 3/4
3 1/4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	15/16	1/4	3/4	1 3/8	2 7/16	5 5/8	6	6 1/4
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	2	3 1/16	6 1/4	6 5/8	6 7/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	1 5/8	2 11/16	5 7/8	6 1/4	6 1/2
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	1 7/8	2 15/16	6 1/8	6 1/2	6 3/4
4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	15/16	1/4	3/4	1 3/8	2 7/16	5 5/8	6	6 1/4
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	2 1/4	3 5/16	6 1/2	6 7/8	7 1/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	1 5/8	2 11/16	5 7/8	6 1/4	6 1/2
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	1 7/8	2 15/16	6 1/8	6 1/2	6 3/4
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	2	3 1/16	6 1/4	6 5/8	6 7/8
5	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	15/16	1/4	3/4	1 3/8	2 7/16	5 7/8	6 5/16	6 1/2
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5 1/8	3 3/8	5/8	1 5/8	2 1/4	3 5/16	6 3/4	7 3/16	7 3/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	1 5/8	2 11/16	6 1/8	6 9/16	6 3/4
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	1 7/8	2 15/16	6 3/8	6 13/16	7
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	6	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	2 1/4	3 5/16	6 3/4	7 3/16	7 3/8
	7	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5 1/8	2 7/8	5/8	1 5/8	2 1/4	3 5/16	6 3/4	7 3/16	7 3/8
6	1(Std.)	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 1/2	15/16	1/4	7/8	1 5/8	2 13/16	6 5/8	7 1/16	7 3/8
	2	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/2	3 7/8	1/2	1 1/2	2 1/4	3 7/16	7 1/4	7 11/16	8
	3	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/8	1 11/16	3/8	1 1/8	1 7/8	3 1/16	6 7/8	7 5/16	7 5/8
	4	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	1 15/16	3/8	1 1/4	2	3 3/16	7	7 7/16	7 3/4
	5	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 1/2	2 3/8	1/2	1 1/2	2 1/4	3 7/16	7 1/4	7 11/16	8
	6	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5	2 7/8	1/2	1 1/2	2 1/4	3 7/16	7 1/4	7 11/16	8
	7	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5	3 3/8	1/2	1 1/2	2 1/4	3 7/16	7 1/4	7 11/16	8

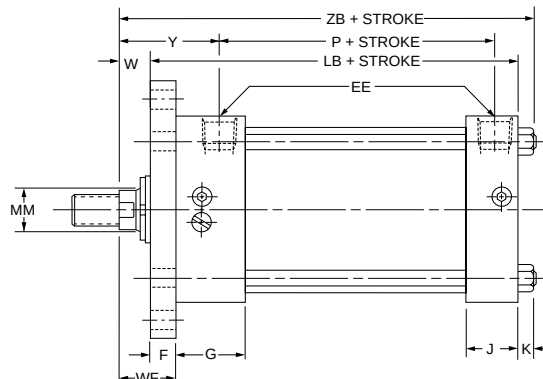
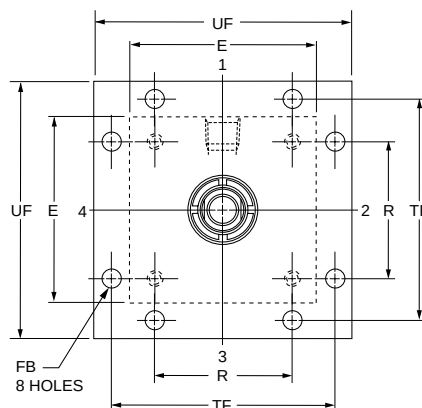
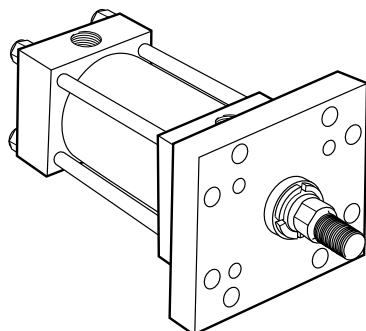
For Cylinder Division Plant Locations – See Page II.



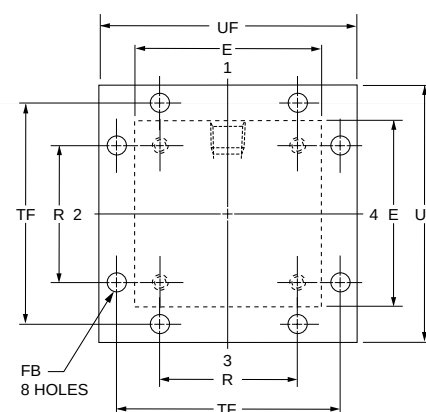
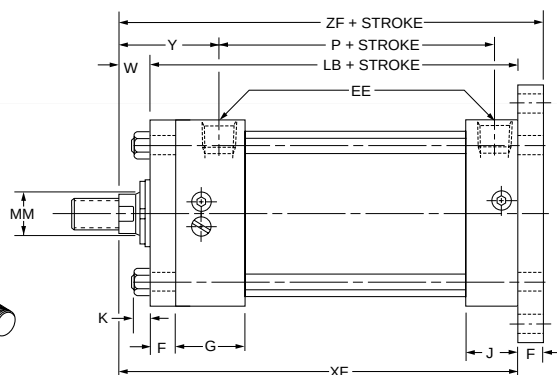
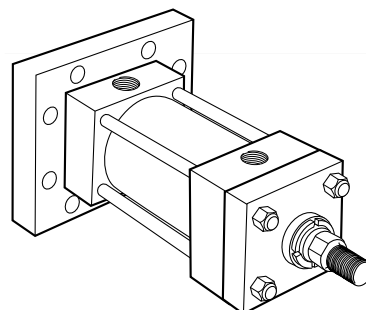
Square Flange Mountings 1" to 6" Bore Sizes

Series 2A Heavy Duty Air Cylinders

Head Square Flange Style JB (NFPA Style MF5)

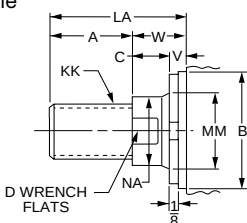


Cap Square Flange Style HB (NFPA Style MF6)

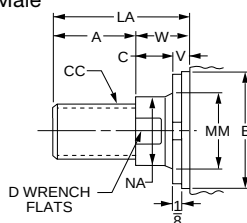


Rod End Dimensions — see table 2

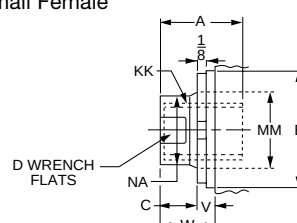
Thread Style 4 (NFPA Style SM) Small Male



Thread Style 8 (NFPA Style IM) Intermediate Male



Thread Style 9 (NFPA Style SF) Small Female



“Special” Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available. To order, specify “Style 3” and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

For additional information – call your local Parker Cylinder Distributor.

Series 2A

Heavy Duty Air Cylinders

Square Flange Mountings
1" to 6" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	FB	G	J	K	R	TF	UF	Add Stroke	
											LB	P
1*	■	1/4	3/8	1/4	1 1/2	1	3/16	1.08	2	2 1/2	37/8	2 1/8
1 1/2	2	3/8**	3/8	5/16	1 1/2	1	1/4	1.43	2 3/4	3 3/8	4	2 1/4
2	2 1/2	3/8**	3/8	3/8	1 1/2	1	5/16	1.84	3 3/8	4 1/8	4	2 1/4
2 1/2	3	3/8**	3/8	3/8	1 1/2	1	5/16	2.19	37/8	45/8	4 1/8	2 3/8
3 1/4	3 3/4	1/2	5/8	7/16	1 3/4	1 1/4	3/8	2.76	4 11/16	5 1/2	47/8	2 5/8
4	4 1/2	1/2	5/8	7/16	1 3/4	1 1/4	3/8	3.32	5 7/16	6 1/4	47/8	2 5/8
5	5 1/2	1/2	5/8	9/16	1 3/4	1 1/4	7/16	4.10	6 5/8	7 5/8	5 1/8	27/8
6	6 1/2	3/4	3/4	9/16	2	1 1/2	7/16	4.88	7 5/8	8 5/8	5 3/4	3 1/8

* Cushions not available on 1" bore.

** On 1", 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with No. 2 rods. Minimum of three full threads available.

■ 1" bore head dimension is 1 3/4" x 1 1/2". See page B20.

Table 3 — Envelope and Mounting Dimensions

Table 2—Rod Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								WF	Y	Add Stroke		
			Style 8 CC	Style 4 & 9 KK	A	+ .000 - .002 B	C	D	LA	NA	V	W			XF	ZB	ZF
1	1(Std.)	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	11/4	7/16	1/4	5/8	1	1 15/16	4 1/2	4 11/16	47/8
	2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1	1 15/16	4 1/2	4 11/16	47/8
1 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1	1 15/16	4 5/8	47/8	5
	2	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	1 3/8	2 5/16	5	5 1/4	5 3/8
2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1	1 15/16	4 5/8	4 15/16	5
	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	27/8	15/16	5/8	1 1/4	1 5/8	2 9/16	5 1/4	5 9/16	5 5/8
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	1 3/8	2 5/16	5	5 5/16	5 3/8
2 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1	1 15/16	4 3/4	5 1/16	5 1/8
	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/2	1 11/16	3/4	1 1/2	1 7/8	2 13/16	5 5/8	5 15/16	6
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	1 3/8	2 5/16	5 1/8	5 7/16	5 1/2
	4	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	27/8	15/16	5/8	1 1/4	1 5/8	2 9/16	5 3/8	5 11/16	5 3/4
3 1/4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	17/8	15/16	1/4	3/4	1 3/8	2 7/16	5 5/8	6	6 1/4
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	2	3 1/16	6 1/4	6 5/8	6 7/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	1 5/8	2 11/16	5 7/8	6 1/4	6 1/2
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	1 7/8	2 15/16	6 1/8	6 1/2	6 3/4
4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	17/8	15/16	1/4	3/4	1 3/8	2 7/16	5 5/8	6	6 1/4
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	2 1/4	3 5/16	6 1/2	6 7/8	7 1/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	1 5/8	2 11/16	5 7/8	6 1/4	6 1/2
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	1 7/8	2 15/16	6 1/8	6 1/2	6 3/4
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	2	3 1/16	6 1/4	6 5/8	6 7/8
5	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	17/8	15/16	1/4	3/4	1 3/8	2 7/16	5 7/8	6 5/16	6 1/2
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5 1/8	3 3/8	5/8	1 5/8	2 1/4	3 5/16	6 3/4	7 3/16	7 3/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	1 5/8	2 11/16	6 1/8	6 9/16	6 3/4
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	1 7/8	2 15/16	6 3/8	6 13/16	7
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	2	3 1/16	6 1/2	6 15/16	7 1/8
	6	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	2 1/4	3 5/16	6 3/4	7 3/16	7 3/8
	7	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5 1/8	2 7/8	5/8	1 5/8	2 1/4	3 5/16	6 3/4	7 3/16	7 3/8
6	1(Std.)	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 1/2	15/16	1/4	7/8	1 5/8	2 13/16	6 5/8	7 1/16	7 3/8
	2	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/2	3 7/8	1/2	1 1/2	2 1/4	3 7/16	7 1/4	7 11/16	8
	3	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/8	1 11/16	3/8	1 1/8	1 7/8	3 1/16	6 7/8	7 5/16	7 5/8
	4	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	1 15/16	3/8	1 1/4	2	3 3/16	7	7 7/16	7 3/4
	5	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 1/2	2 3/8	1/2	1 1/2	2 1/4	3 7/16	7 1/4	7 11/16	8
	6	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5	2 7/8	1/2	1 1/2	2 1/4	3 7/16	7 1/4	7 11/16	8
	7	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5	3 3/8	1/2	1 1/2	2 1/4	3 7/16	7 1/4	7 11/16	8

For Cylinder Division Plant Locations – See Page II.



A

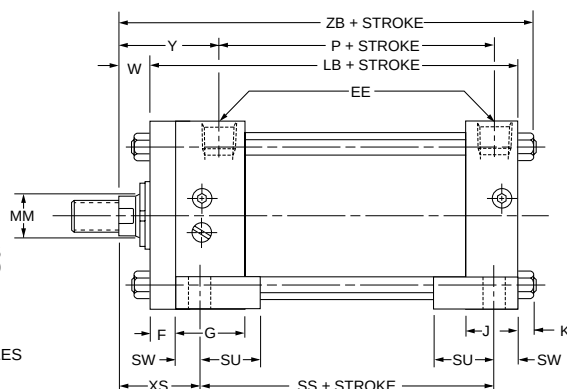
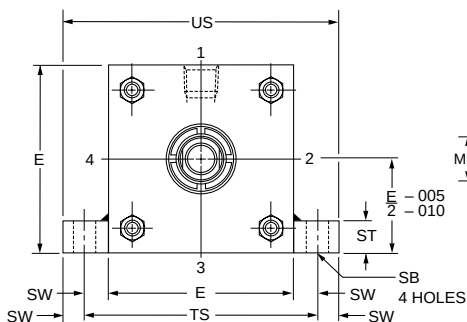
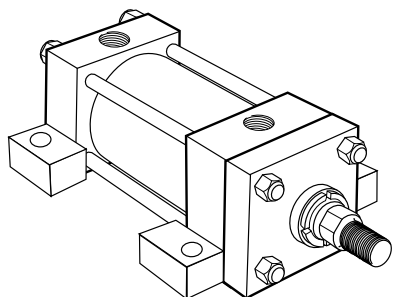
Side Lugs, Centerline Lugs and Side Tapped Mountings 1" to 6" Bore Sizes

Series 2A Heavy Duty Air Cylinders

Side Lug

Style C

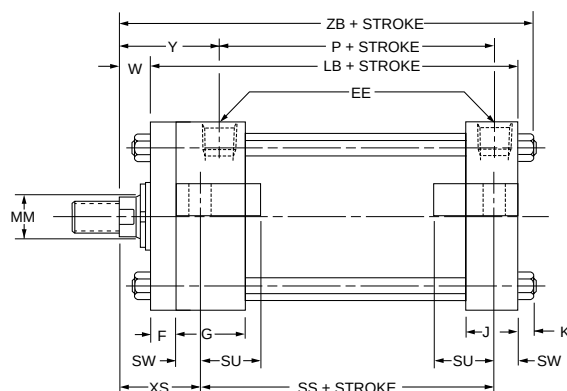
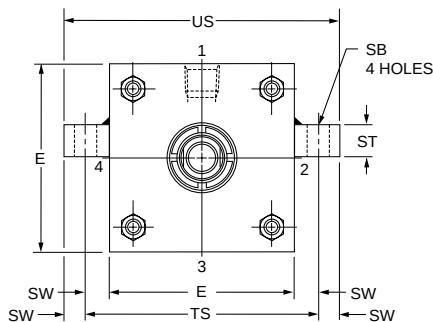
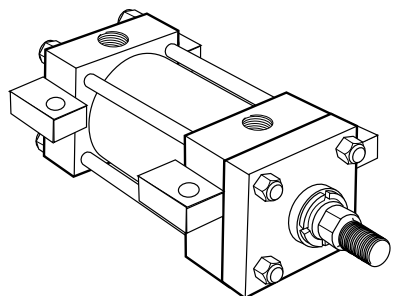
(NFFPA Style MS2)



Centerline Lugs

Style E

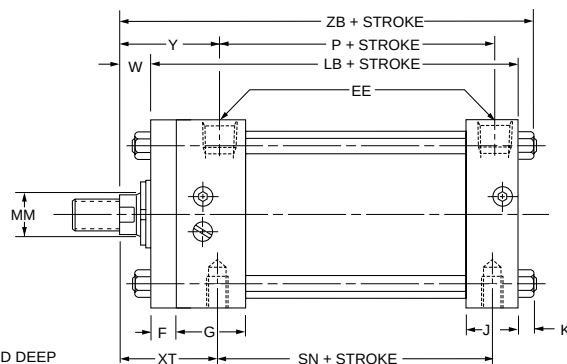
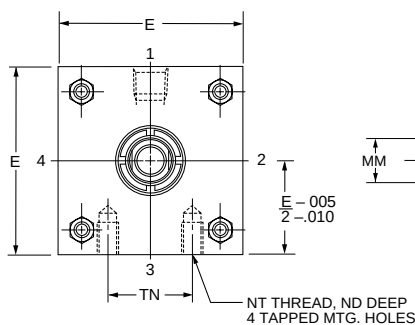
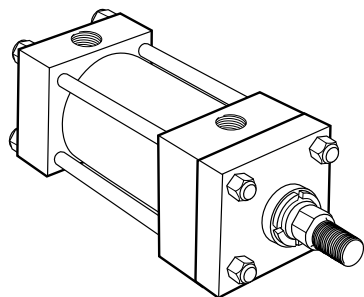
(NFFPA Style MS3)



Side Tapped

Style F

(NFFPA Style MS4)

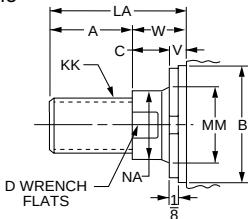


Rod End Dimensions — see table 2

Thread Style 4

(NFFPA Style SM)

Small Male

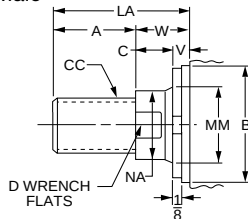


A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8

(NFFPA Style IM)

Intermediate Male

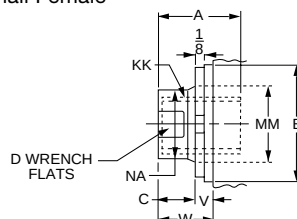


recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9

(NFFPA Style SF)

Small Female



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information — call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Side Lugs, Centerline Lugs
and Side Tapped Mountings
1" to 6" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	G	J	K	NT	SB•	ST	SU	SW	TN	TS	US	Add Stroke			
															LB	P	SN	SS
1*	■	1/4	3/8	1 1/2	1	3/16	10-24	9/32†	5/16†	3/4†	5/16†	9/16	2 1/8†	2 3/4†	37/8	2 1/8	2 1/8	27 7/8†
1 1/2	2	3/8**	3/8	1 1/2	1	1/4	1/4-20	7/16	1/2	15/16	3/8	5/8	2 3/4	3 1/2	4	2 1/4	2 1/4	27 7/8
2	2 1/2	3/8**	3/8	1 1/2	1	5/16	5/16-18	7/16	1/2	15/16	3/8	7/8	3 1/4	4	4	2 1/4	2 1/4	27 7/8
2 1/2	3	3/8**	3/8	1 1/2	1	5/16	3/8-16	7/16	1/2	15/16	3/8	1 1/4	3 3/4	4 1/2	4 1/8	2 3/8	2 3/8	3
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	1/2-13	9/16	3/4	1 1/4	1/2	1 1/2	4 3/4	5 3/4	47/8	2 5/8	2 5/8	3 1/4
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	1/2-13	9/16	3/4	1 1/4	1/2	2 1/16	5 1/2	6 1/2	47/8	2 5/8	2 5/8	3 1/4
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	5/8-11	13/16	1	1 9/16	1 1/16	2 11/16	6 7/8	8 1/4	5 1/8	27/8	27/8	3 1/8
6	6 1/2	3/4	3/4	2	1 1/2	7/16	3/4-10	13/16	1	1 9/16	1 1/16	3 1/4	7 7/8	9 1/4	5 3/4	3 1/8	3 1/8	3 5/8

* Cushions not available on 1" bore.

** On 1", 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with No. 2 rods. Minimum of three full threads available.

• Upper surface spot-faced for socket head screws.

† Mounting style E not available in 1" bore. ■ 1" bore head dimension is 1 3/4" x 1 1/2". See page B20.

Table 3 — Envelope and
Mounting Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								ND	XS	XT	Y	Add Stroke ZB
			Style 8 CC	Style 4 & 9 KK	A	+ .000 - .002 B	C	D	LA	NA	V	W					
1	1(Std.)	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	1 1/4	7/16	1/4	5/8	1/4	15 1/16*	1 15/16	1 15/16	4 11/16
	2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1/4	15 1/16*	1 15/16	1 15/16	4 11/16
1 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	5/16	13/8	1 15/16	1 15/16	47/8
	2	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	5/16	1 3/4	2 5/16	2 5/16	5 1/4
2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	11/32	1 3/8	1 15/16	1 15/16	4 15/16
	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	27/8	15/16	5/8	1 1/4	11/32	2	2 9/16	2 9/16	5 9/16
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	11/32	1 3/4	2 5/16	2 5/16	5 5/16
2 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	7/16	1 3/8	1 15/16	1 15/16	5 1/16
	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/2	1 11/16	3/4	1 1/2	7/16	2 1/4	2 13/16	2 13/16	5 15/16
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	7/16	1 3/4	2 5/16	2 5/16	5 7/16
	4	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	27/8	15/16	5/8	1 1/4	7/16	2	2 9/16	2 9/16	5 11/16
3 1/4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	17/8	15/16	1/4	3/4	1/2	17/8	27/16	27/16	6
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	1/2	2 1/2	3 1/16	3 1/16	6 5/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	1/2	2 1/8	2 11/16	2 11/16	6 1/4
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	1/2	2 3/8	2 15/16	2 15/16	6 1/2
4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	17/8	15/16	1/4	3/4	5/8	17/8	27/16	27/16	6
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	5/8	2 3/4	3 5/16	3 5/16	6 7/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	5/8	2 1/8	2 11/16	2 11/16	6 1/4
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	5/8	2 3/8	2 15/16	2 15/16	6 1/2
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	5/8	2 1/2	3 1/16	3 1/16	6 5/8
5	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	17/8	15/16	1/4	3/4	3/4	2 1/16	27/16	27/16	6 5/16
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5 1/8	3 3/8	5/8	1 5/8	3/4	2 15/16	3 5/16	3 5/16	7 3/16
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	3/4	2 5/16	2 11/16	2 11/16	6 9/16
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	3/4	2 9/16	2 15/16	2 15/16	6 13/16
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	3/4	2 11/16	3 1/16	3 1/16	6 15/16
	6	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	3/4	2 15/16	3 5/16	3 5/16	7 3/16
	7	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5 1/8	2 7/8	5/8	1 5/8	3/4	2 15/16	3 5/16	3 5/16	7 3/16
6	1(Std.)	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 1/2	1 5/16	1/4	7/8	7/8	2 5/16	2 13/16	2 13/16	7 1/16
	2	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/2	3 7/8	1/2	1 1/2	7/8	2 15/16	3 7/16	3 7/16	7 11/16
	3	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/8	1 11/16	3/8	1 1/8	7/8	2 9/16	3 1/16	3 1/16	7 5/16
	4	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	1 15/16	3/8	1 1/4	7/8	2 11/16	3 3/16	3 3/16	7 7/16
	5	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 1/2	2 3/8	1/2	1 1/2	7/8	2 15/16	3 7/16	3 7/16	7 11/16
	6	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5	2 7/8	1/2	1 1/2	7/8	2 15/16	3 7/16	3 7/16	7 11/16
	7	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5	3 3/8	1/2	1 1/2	7/8	2 15/16	3 7/16	3 7/16	7 11/16

* Mounting style E not available in 1" bore.

For Cylinder Division Plant Locations – See Page II.

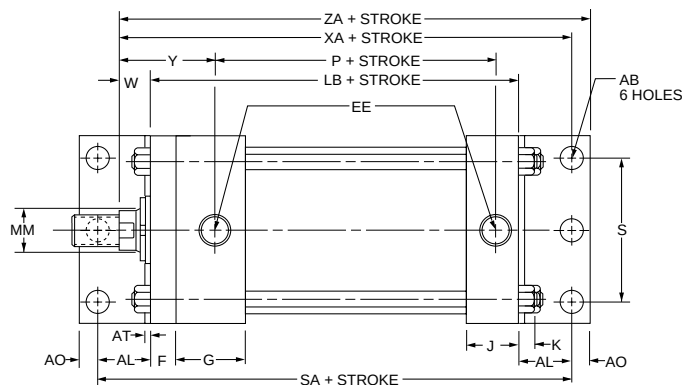
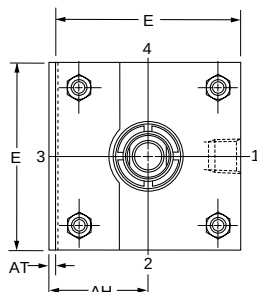
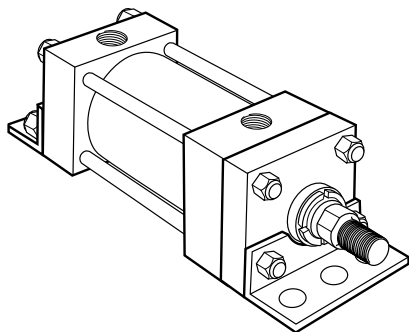


A

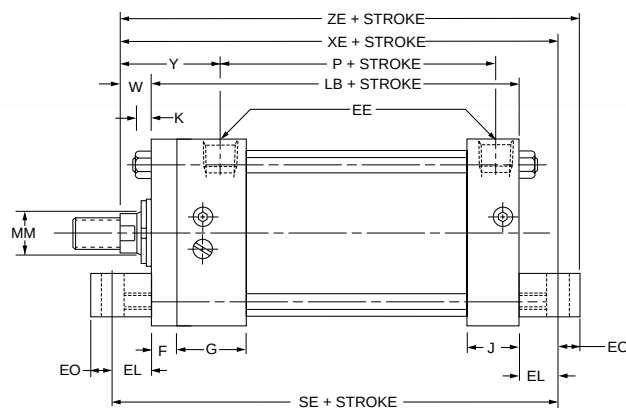
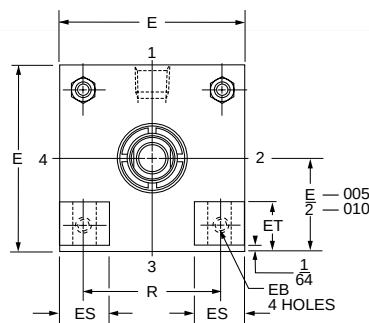
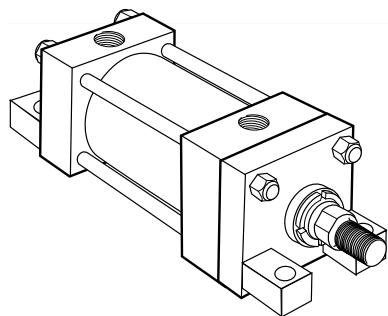
Side End Angles and Side End Lugs Mountings 1" to 6" Bore Sizes

Series 2A Heavy Duty Air Cylinders

Side End Angles Style CB (NFPA Style MS1)

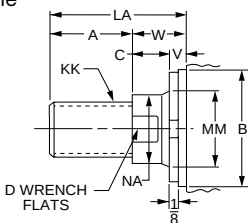


Side End Lugs Style G (NFPA Style MS7)



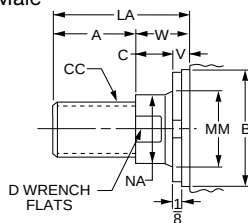
Rod End Dimensions — see table 2

Thread Style 4 (NFPA Style SM) Small Male



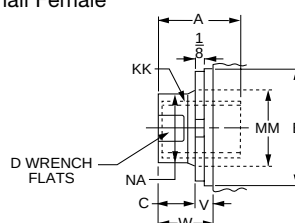
A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8 (NFPA Style IM) Intermediate Male



recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9 (NFPA Style SF) Small Female



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Side End Angles and
Side End Lugs Mountings
1" to 6" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	AB	AH	AL	AO	AT	E	EB	EE NPTF	EL	EO	ES	ET	F	G	J	K	R	S	Add Stroke			
																			LB	P	SA	SE
1*	3/8†	1†	13/16†	5/16†	1/8†	■	•	1/4	•	•	•	•	3/8	11/2	1	3/16	1.08•	15/16†	37/8	2 1/8	5 1/2†	•
1 1/2	7/16	13/16	1	3/8	1/8	2	5/16	3/8**	3/4	1/4	9/16	17/32	3/8	11/2	1	1/4	1.43	1 1/4	4	2 1/4	6	5 1/2
2	7/16	17/16	1	3/8	1/8	2 1/2	3/8	3/8**	15/16	5/16	5/8	5/8	3/8	11/2	1	5/16	1.84	1 3/4	4	2 1/4	6	5 7/8
2 1/2	7/16	15/8	1	3/8	1/8	3	3/8	3/8**	11/16	5/16	13/16	25/32	3/8	11/2	1	5/16	2.19	2 1/4	4 1/8	23/8	6 1/8	6 1/4
3 1/4	9/16	1 15/16	1 1/4	1/2	1/8	3 3/4	7/16	1/2	7/8	3/8	1	15/16	5/8	13/4	1 1/4	3/8	2.76	2 3/4	4 7/8	25/8	7 3/8	6 5/8
4	9/16	2 1/4	1 1/4	1/2	1/8	4 1/2	7/16	1/2	1	3/8	1 1/4	15/32	5/8	13/4	1 1/4	3/8	3.32	3 1/2	4 7/8	25/8	7 3/8	6 7/8
5	1 1/16	2 3/4	1 3/8	5/8	3/16	5 1/2	9/16	1/2	1 1/16	1/2	1 3/8	1 3/8	5/8	13/4	1 1/4	7/16	4.10	4 1/4	5 1/8	27/8	7 7/8	7 1/4
6	1 3/16	3 1/4	1 3/8	5/8	3/16	6 1/2	9/16	3/4	1	1/2	1 3/4	1 19/32	3/4	2	1 1/2	7/16	4.88	5 1/4	5 3/4	3 1/8	8 1/2	7 3/4

* Cushions not available on 1" bore.

** On 1", 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with No. 2 rods. Minimum of three full threads available.

† Mounting style CB available in 1" bore for rod No. 1 only.

‡ Mounting style CB for 1" bore only is furnished with four mounting holes (two each end). Center holes omitted.

■ 1" bore head dimension is 1 3/4" x 1 1/2". See page B20.

• Mounting style G not available in 1" bore.

Table 2—Rod Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								Y	Add Stroke			
			Style 8 CC	Style 4 & 9 KK	A	+0.000 -0.002 B	C	D	LA	NA	V	W		XA	XE	ZA	ZE
1	1(Std.)	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	11/4	7/16	1/4	5/8	1 15/16	55/16*	•	55/8*	•
	2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1 15/16	*	•	*	•
1 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1 15/16	55/8	53/8	6	55/8
	2	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	2 5/16	6	5 3/4	6 3/8	6
2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1 15/16	55/8	59/16	6	57/8
	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	27/8	15/16	5/8	1 1/4	2 9/16	6 1/4	6 3/16	6 5/8	6 1/2
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	2 5/16	6	5 15/16	6 3/8	6 1/4
2 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	13/8	9/16	1/4	5/8	1 15/16	53/4	513/16	6 1/8	6 1/8
	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/2	1 11/16	3/4	1 1/2	2 13/16	6 5/8	6 11/16	7	7
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	2 5/16	6 1/8	6 3/16	6 1/2	6 1/2
	4	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	27/8	15/16	5/8	1 1/4	2 9/16	6 3/8	6 7/16	6 3/4	6 3/4
3 1/4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	17/8	15/16	1/4	3/4	2 7/16	6 7/8	6 1/2	7 3/8	6 7/8
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	3 1/16	7 1/2	7 1/8	8	7 1/2
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	25/8	15/16	3/8	1	2 11/16	7 1/8	6 3/4	7 5/8	7 1/8
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 15/16	7 3/8	7	7 7/8	7 3/8
4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	17/8	15/16	1/4	3/4	2 7/16	6 7/8	6 5/8	7 3/8	7
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	45/8	23/8	5/8	1 5/8	3 5/16	7 3/4	7 1/2	8 1/4	7 7/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	25/8	15/16	3/8	1	2 11/16	7 1/8	6 7/8	7 5/8	7 1/4
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 15/16	7 3/8	7 1/8	7 7/8	7 1/2
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	3 1/16	7 1/2	7 1/4	8	7 5/8
5	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	17/8	15/16	1/4	3/4	2 7/16	7 1/4	6 15/16	7 7/8	7 7/16
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5 1/8	33/8	5/8	1 5/8	3 5/16	8 1/8	7 13/16	8 3/4	8 5/16
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	25/8	15/16	3/8	1	2 11/16	7 1/2	7 3/16	8 1/8	7 11/16
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 15/16	7 3/4	7 7/16	8 3/8	7 15/16
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	3 1/16	7 7/8	7 9/16	8 1/2	8 1/16
	6	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	45/8	23/8	5/8	1 5/8	3 5/16	8 1/8	7 13/16	8 3/4	8 5/16
	7	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5 1/8	27/8	5/8	1 5/8	3 5/16	8 1/8	7 13/16	8 3/4	8 5/16
6	1(Std.)	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 1/2	15/16	1/4	7/8	2 13/16	8	7 5/8	8 5/8	8 1/8
	2	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/2	37/8	1/2	1 1/2	3 7/16	8 5/8	8 1/4	9 1/4	8 3/4
	3	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/8	1 11/16	3/8	1 1/8	3 1/16	8 1/4	7 7/8	8 7/8	8 3/8
	4	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	1 15/16	3/8	1 1/4	3 3/16	8 3/8	8	9	8 1/2
	5	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 1/2	23/8	1/2	1 1/2	3 7/16	8 5/8	8 1/4	9 1/4	8 3/4
	6	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5	27/8	1/2	1 1/2	3 7/16	8 5/8	8 1/4	9 1/4	8 3/4
	7	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5	33/8	1/2	1 1/2	3 7/16	8 5/8	8 1/4	9 1/4	8 3/4

* Mounting style CB available in 1" bore for rod No. 1 only.

• Mounting style G not available in 1" bore.

Caution: When using mounting styles CB and G, check clearance between mounting members and rod attachment or accessory. If necessary, specify longer rod extension to avoid interference with mounting members.

For Cylinder Division Plant Locations – See Page II.

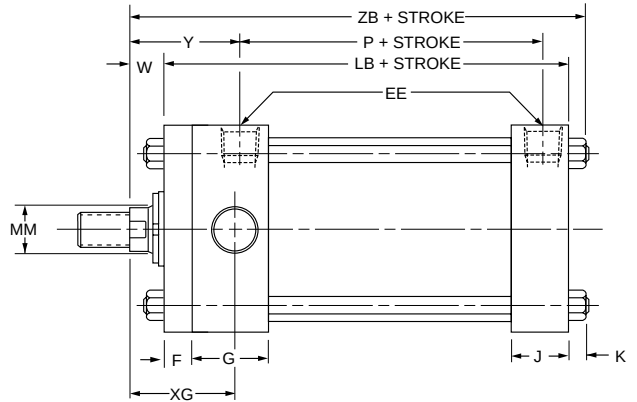
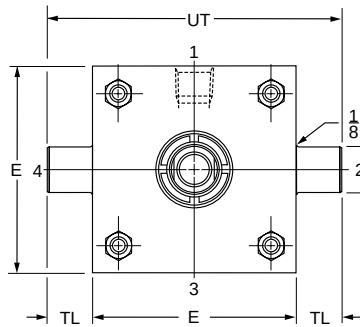
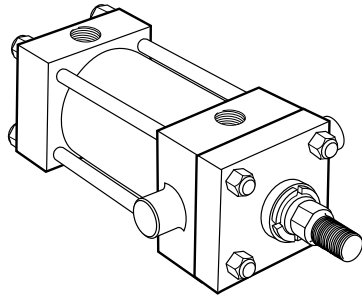


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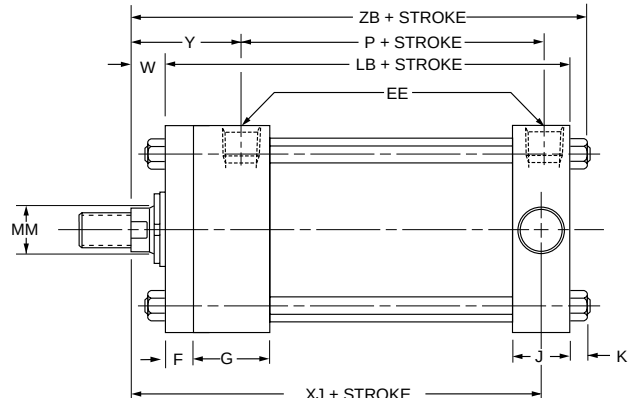
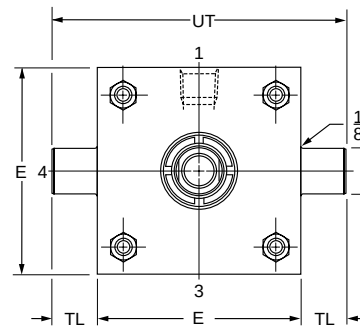
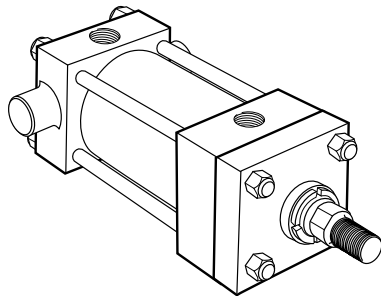
Trunnion Mountings 1" to 6" Bore Sizes

Series 2A Heavy Duty Air Cylinders

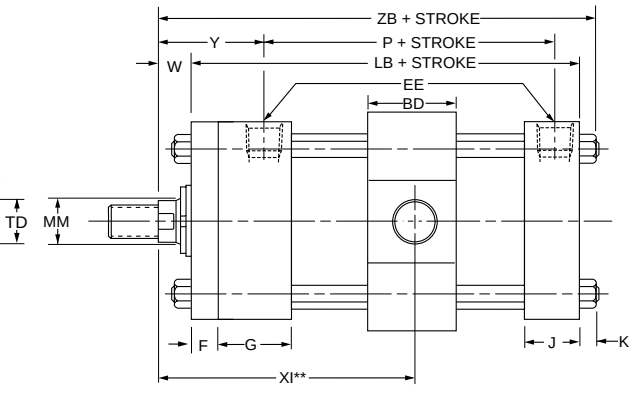
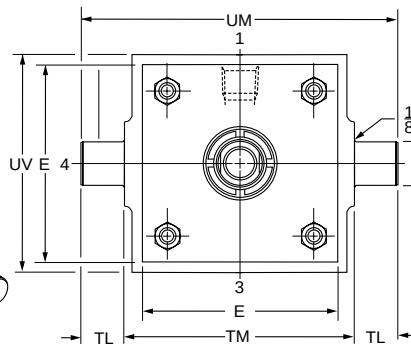
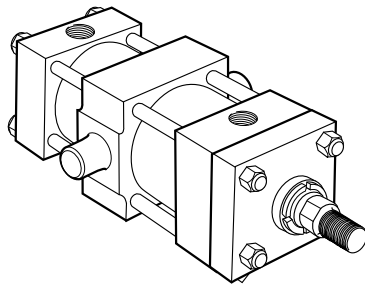
Head Trunnion Style D (NFPA Style MT1)



Cap Trunnion Style DB (NFPA Style MT2)

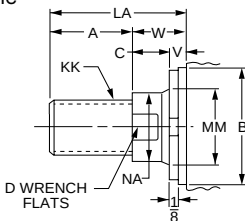


Intermediate Fixed Trunnion Style DD (NFPA Style MT4)

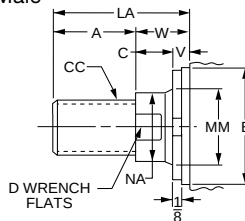


Rod End Dimensions — see table 2

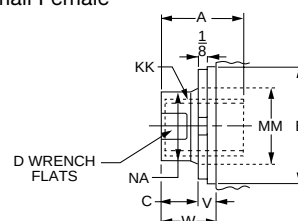
Thread Style 4 (NFPA Style SM) Small Male



Thread Style 8 (NFPA Style IM) Intermediate Male



Thread Style 9 (NFPA Style SF) Small Female



“Special” Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available. To order, specify “Style 3” and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Trunnion Mountings
1" to 6" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	BD	E	EE NPTF	F	G	J	K	+0.000 TD -.001	TL	TM	UM	UT	UV	Add Stroke		Style DD Min. Stroke
														LB	P	
1*	•	■	1/4	3/8	1 1/2	1	3/16	.750	3/4	•	•	3	•	37/8	2 1/8	•
1 1/2	1 1/4	2	3/8**	3/8	1 1/2	1	1/4	1.000	1	2 1/2	4 1/2	4	2 1/2	4	2 1/4	1/4
2	1 1/2	2 1/2	3/8**	3/8	1 1/2	1	5/16	1.000	1	3	5	4 1/2	3	4	2 1/4	1/2
2 1/2	1 1/2	3	3/8**	3/8	1 1/2	1	5/16	1.000	1	3 1/2	5 1/2	5	3 1/2	4 1/8	2 3/8	3/8
3 1/4	2	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	1.000	1	4 1/2	6 1/2	5 3/4	4 1/4	4 7/8	2 5/8	7/8
4	2	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	1.000	1	5 1/4	7 1/4	6 1/2	5	4 7/8	2 5/8	7/8
5	2	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	1.000	1	6 1/4	8 1/4	7 1/2	6	5 1/8	2 7/8	5/8
6	2 1/2	6 1/2	3/4	3/4	2	1 1/2	7/16	1.375	1 3/8	7 5/8	10 3/8	9 1/4	7	5 3/4	3 1/8	1 1/8

* Cushions not available on 1" bore.

** On 1", 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with No. 2 rods. Minimum of three full threads available.

• Mounting style not available in 1" bore.

■ 1" bore head dimension is 1 3/4" x 1 1/2". See page B20.

Table 3 — Envelope and Mounting Dimensions

Table 2—Rod Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								XG	Min. XI	Y	Add Stroke	
			Style 8 CC	Style 4 & 9 KK	A	+0.000 -.002 B	C	D	LA	NA	V	W				XJ	ZB
1	1(Std.)	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	1 1/4	7/16	1/4	5/8	1 3/4	*	1 15/16	4	4 11/16
	2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	1 3/8	9/16	1/4	5/8	1 3/4	*	1 15/16	4	4 11/16
1 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	1 3/8	9/16	1/4	5/8	1 3/4	3 3/16	1 15/16	4 1/8	4 7/8
	2	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	1 5/16	1/2	1	2 1/8	3 9/16	2 5/16	4 1/2	5 1/4
2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	1 3/8	9/16	1/4	5/8	1 3/4	3 5/16	1 15/16	4 1/8	4 5/16
	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 7/8	1 5/16	5/8	1 1/4	2 3/8	3 15/16	2 9/16	4 3/4	5 9/16
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	1 5/16	1/2	1	2 1/8	3 11/16	2 5/16	4 1/2	5 5/16
2 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	1 3/8	9/16	1/4	5/8	1 3/4	3 5/16	1 15/16	4 1/4	5 1/16
	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/2	1 11/16	3/4	1 1/2	2 5/8	4 3/16	2 13/16	5 1/8	5 5/16
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	1 5/16	1/2	1	2 1/8	3 11/16	2 5/16	4 5/8	5 7/16
	4	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 7/8	1 5/16	5/8	1 1/4	2 3/8	3 15/16	2 9/16	4 7/8	5 11/16
3 1/4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	1 5/16	1/4	3/4	2 1/4	4 3/16	2 7/16	5	6
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	2 7/8	4 13/16	3 1/16	5 5/8	6 5/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	1 5/16	3/8	1	2 1/2	4 7/16	2 11/16	5 1/4	6 1/4
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 3/4	4 11/16	2 15/16	5 1/2	6 1/2
4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	1 5/16	1/4	3/4	2 1/4	4 3/16	2 7/16	5	6
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	3 1/8	5 1/16	3 5/16	5 7/8	6 7/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	1 5/16	3/8	1	2 1/2	4 7/16	2 11/16	5 1/4	6 1/4
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 3/4	4 11/16	2 15/16	5 1/2	6 1/2
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	2 7/8	4 13/16	3 1/16	5 5/8	6 5/8
5	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	1 5/16	1/4	3/4	2 1/4	4 5/16	2 7/16	5 1/4	6 5/16
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5 1/8	3 3/8	5/8	1 5/8	3 1/8	5 1/16	3 5/16	6 1/8	7 3/16
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	1 5/16	3/8	1	2 1/2	4 7/16	2 11/16	5 1/2	6 9/16
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 3/4	4 11/16	2 15/16	5 3/4	6 13/16
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	2 7/8	4 13/16	3 1/16	5 7/8	6 15/16
	6	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	3 1/8	5 1/16	3 5/16	6 1/8	7 3/16
	7	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5 1/8	2 7/8	5/8	1 5/8	3 1/8	5 1/16	3 5/16	6 1/8	7 3/16
6	1(Std.)	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 1/2	1 5/16	1/4	7/8	2 5/8	4 15/16	2 13/16	5 7/8	7 1/16
	2	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/2	3 7/8	1/2	1 1/2	3 1/4	5 9/16	3 7/16	6 1/2	7 11/16
	3	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/8	1 11/16	3/8	1 1/8	2 7/8	5 3/16	3 1/16	6 1/8	7 5/16
	4	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	1 15/16	3/8	1 1/4	3	5 5/16	3 3/16	6 1/4	7 7/16
	5	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 1/2	2 3/8	1/2	1 1/2	3 1/4	5 9/16	3 7/16	6 1/2	7 11/16
	6	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5	2 7/8	1/2	1 1/2	3 1/4	5 9/16	3 7/16	6 1/2	7 11/16

* Mounting style DD not available in 1" bore.

**Dimension XI to be specified by customer.

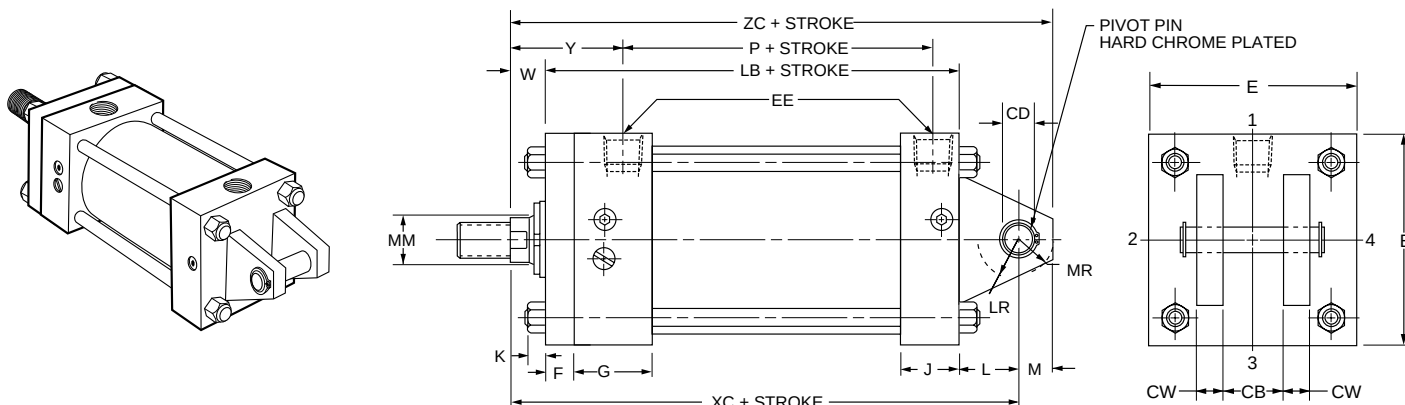
For Cylinder Division Plant Locations – See Page II.



Clevis Mountings 1" to 6" Bore Sizes

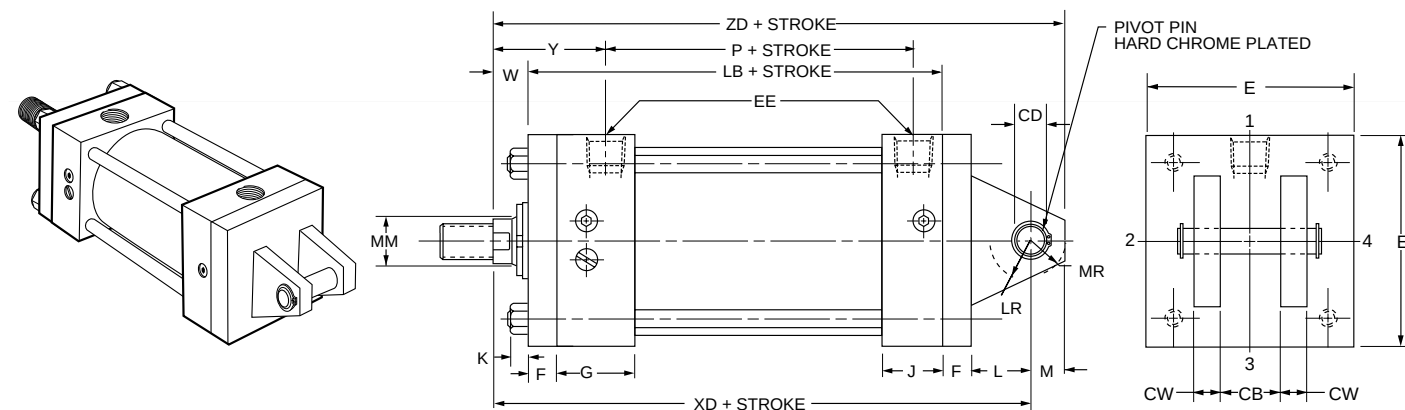
Series 2A Heavy Duty Air Cylinders

Cap Fixed Clevis Style BB (NFA Style MP1)



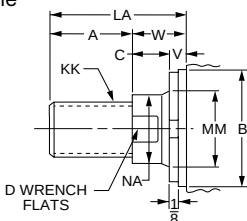
The 1", 4", 5" and 6" bore sizes have tie rod nuts at both ends as shown. Tie rods thread into cap on all other bore sizes.

Cap Detachable Clevis Style BC (NFA Style MP2)



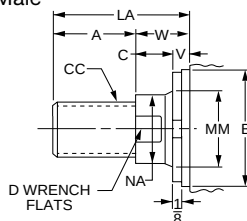
Rod End Dimensions — see table 2

Thread Style 4 (NFA Style SM) Small Male



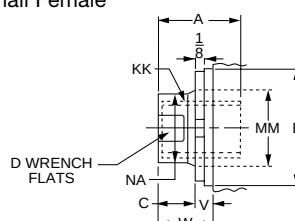
A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8 (NFA Style IM) Intermediate Male



recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9 (NFA Style SF) Small Female



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available. To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Clevis Mountings
1" to 6" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	CB	+.000 CD -.002	CW	E	EE NPTF	F	G	J	K	L	LR	M	MR	Add Stroke	
														LB	P
1*	†	.441†	†	■	1/4	3/8	1 1/2	1	3/16	1 1/2†	1 1/2†	7/16†	1/2†	37/8	2 1/8
1 1/2	3/4	.501	1/2	2	3/8**	3/8	1 1/2	1	1/4	3/4	3/4	1/2	5/8	4	2 1/4
2	3/4	.501	1/2	2 1/2	3/8**	3/8	1 1/2	1	5/16	3/4	3/4	1/2	5/8	4	2 1/4
2 1/2	3/4	.501	1/2	3	3/8**	3/8	1 1/2	1	5/16	3/4	3/4	1/2	5/8	4 1/8	2 3/8
3 1/4	1 1/4	.751	5/8	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	1 1/4	1	3/4	15/16	4 7/8	2 5/8
4	1 1/4	.751	5/8	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	1 1/4	1	3/4	15/16	4 7/8	2 5/8
5	1 1/4	.751	5/8	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	1 1/4	1	3/4	15/16	5 1/8	2 7/8
6	1 1/2	1.001	3/4	6 1/2	3/4	3/4	2	1 1/2	7/16	1 1/2	1 1/4	1	13/16	5 3/4	3 1/8

* Cushions not available on 1" bore.

** On 1", 1 1/2", 2" and 2 1/2" bore sizes, the head-end (only) pipe thread is not full depth on cylinders with No. 2 rods. Minimum of three full threads available.

† In 1" bore size model only, a single eye mounting, 7/16" thick, is used. Dimension CD (.441") is hole diameter – pin not supplied.

• Dimension CD is pin diameter except in 1" bore. ■ 1" bore head dimension is 1 3/4" x 1 1/2". See page B20.

Table 3 — Envelope and Mounting Dimensions

Table 2—Rod Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								Y	Add Stroke			
			Style 8 CC	Style 4 & 9 KK	A	+.000 -.002 B	C	D	LA	NA	V	W		XC	XD	ZC	ZD
1	1(Std.)	1/2	7/16-20	5/16-24	5/8	.999	3/8	3/8	1 1/4	7/16	1/4	5/8	1 15/16	5	5 3/8	5 7/16	5 13/16
	2	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	1 3/8	9/16	1/4	5/8	1 15/16	5	5 3/8	5 7/16	5 13/16
1 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	1 3/8	9/16	1/4	5/8	1 15/16	5 3/8	5 3/4	5 7/8	6 1/4
	2	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	2 5/16	5 3/4	6 1/8	6 1/4	6 5/8
2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	1 3/8	9/16	1/4	5/8	1 15/16	5 3/8	5 3/4	5 7/8	6 1/4
	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 7/8	15/16	5/8	1 1/4	2 9/16	6	6 3/8	6 1/2	6 7/8
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	2 5/16	5 3/4	6 1/8	6 1/4	6 5/8
2 1/2	1(Std.)	5/8	1/2-20	7/16-20	3/4	1.124	3/8	1/2	1 3/8	9/16	1/4	5/8	1 15/16	5 1/2	5 7/8	6	6 3/8
	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/2	1 11/16	3/4	1 1/2	2 13/16	6 3/8	6 3/4	6 7/8	7 1/4
	3	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	2 1/8	15/16	1/2	1	2 5/16	5 7/8	6 1/4	6 3/8	6 3/4
	4	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 7/8	15/16	5/8	1 1/4	2 9/16	6 1/8	6 1/2	6 5/8	7
3 1/4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	15/16	1/4	3/4	2 7/16	6 7/8	7 1/2	7 5/8	8 1/4
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	3 1/16	7 1/2	8 1/8	8 1/4	8 7/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	2 11/16	7 1/8	7 3/4	7 7/8	8 1/2
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 15/16	7 3/8	8	8 1/8	8 3/4
4	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	15/16	1/4	3/4	2 7/16	6 7/8	7 1/2	7 5/8	8 1/4
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	3 5/16	7 3/4	8 3/8	8 1/2	9 1/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	2 11/16	7 1/8	7 3/4	7 7/8	8 1/2
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 15/16	7 3/8	8	8 1/8	8 3/4
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	3 1/16	7 1/2	8 1/8	8 1/4	8 7/8
5	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	15/16	1/4	3/4	2 7/16	7 1/8	7 3/4	7 7/8	8 1/2
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5 1/8	3 3/8	5/8	1 5/8	3 5/16	8	8 5/8	8 3/4	9 3/8
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	15/16	3/8	1	2 11/16	7 3/8	8	8 1/8	8 3/4
	4	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 15/16	7 5/8	8 1/4	8 3/8	9
	5	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 5/8	1 15/16	1/2	1 3/8	3 1/16	7 3/4	8 3/8	8 1/2	9 1/8
	6	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 5/8	2 3/8	5/8	1 5/8	3 5/16	8	8 5/8	8 3/4	9 3/8
	7	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5 1/8	2 7/8	5/8	1 5/8	3 5/16	8	8 5/8	8 3/4	9 3/8
6	1(Std.)	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 1/2	1 5/16	1/4	7/8	2 13/16	8 1/8	8 7/8	9 1/8	9 7/8
	2	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/2	3 7/8	1/2	1 1/2	3 7/16	8 3/4	9 1/2	9 3/4	10 1/2
	3	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/8	1 11/16	3/8	1 1/8	3 1/16	8 3/8	9 1/8	9 3/8	10 1/8
	4	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	1 15/16	3/8	1 1/4	3 3/16	8 1/2	9 1/4	9 1/2	10 1/4
	5	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 1/2	2 3/8	1/2	1 1/2	3 7/16	8 3/4	9 1/2	9 3/4	10 1/2
	6	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	5	2 7/8	1/2	1 1/2	3 7/16	8 3/4	9 1/2	9 3/4	10 1/2
	7	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	5	3 3/8	1/2	1 1/2	3 7/16	8 3/4	9 1/2	9 3/4	10 1/2

For Cylinder Division Plant Locations – See Page II.

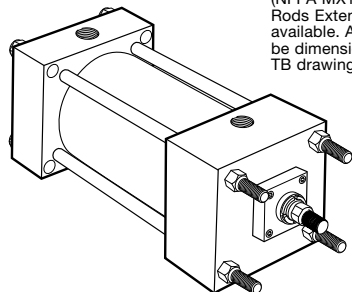


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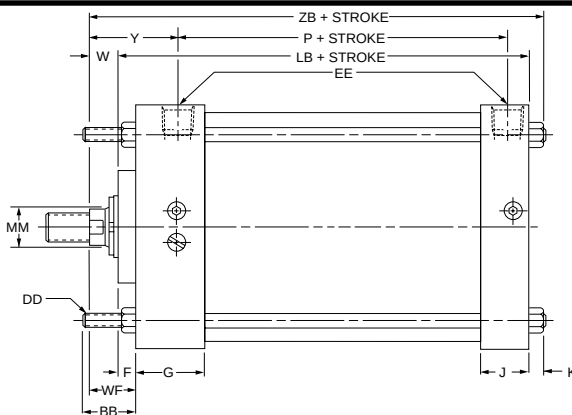
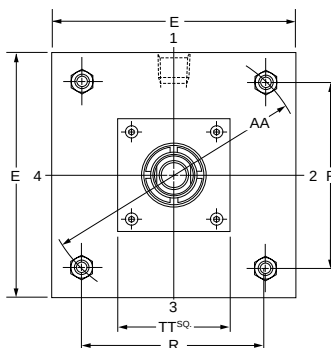
Tie Rod, Head Square and Cap Square Mountings 7" Bore Size

Series 2A Heavy Duty Air Cylinders

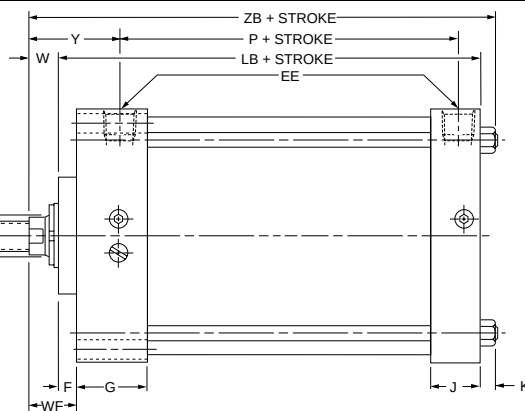
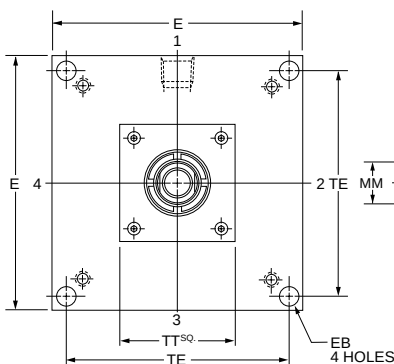
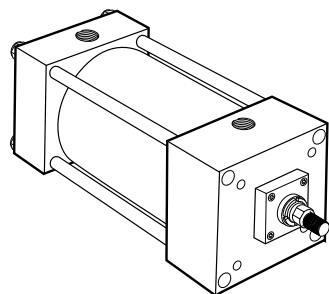
Tie Rods Extended Style TB (NFA Style MX3)



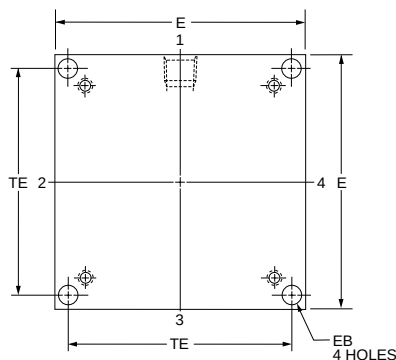
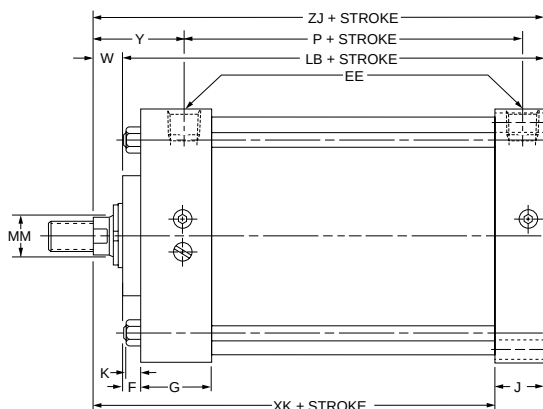
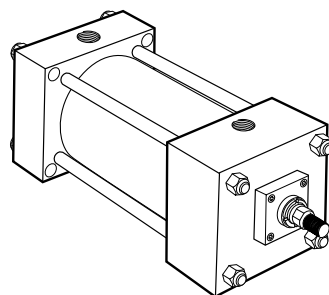
Style TB (NFA MX3) Head Tie Rods Extended, illustrated: Style TC (NFA MX2), Cap Tie Rods Extended; and Style TD (NFA MX1), Both Ends Tie Rods Extended are also available. All "T" styles can be dimensioned from Style TB drawing at right.



Head Square Flange Style JB (NFA Style ME3)

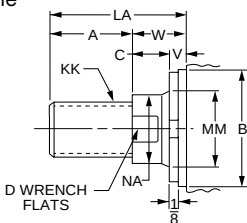


Cap Square Flange Style HB (NFA Style ME4)



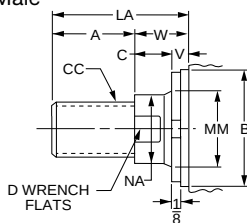
Rod End Dimensions — see table 2

Thread Style 4 (NFA Style SM) Small Male



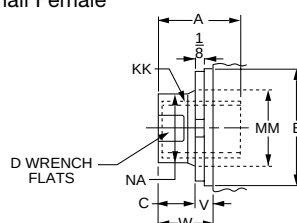
A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8 (NFA Style IM) Intermediate Male



recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9 (NFA Style SF) Small Female



"Special" Thread Style 3

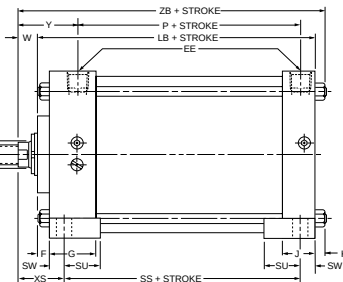
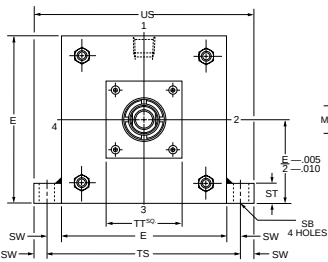
Special thread, rod eye, blank, etc., are also available. To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensional sketch.

For additional information – call your local Parker Cylinder Distributor.

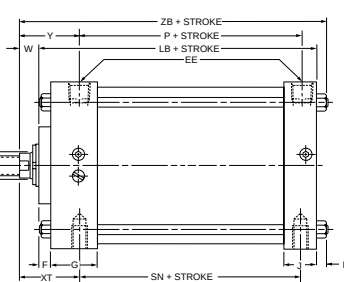
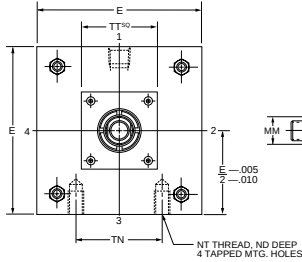
Series 2A Heavy Duty Air Cylinders

Side Lug, Side Tapped,
Cap Trunnion, Head Trunnion,
Cap Fixed Clevis Mountings
7" Bore Size

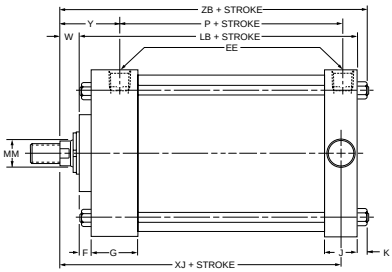
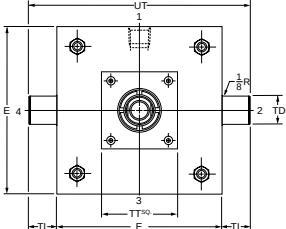
Side Lug Style C (NFFA Style MS2)



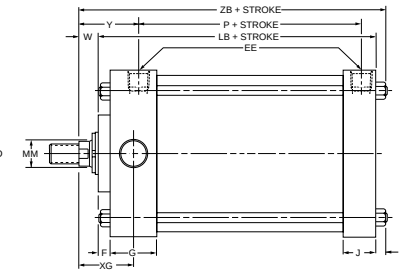
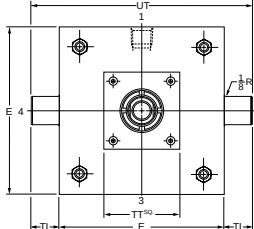
Side Tapped Style F (NFFA Style MS4)



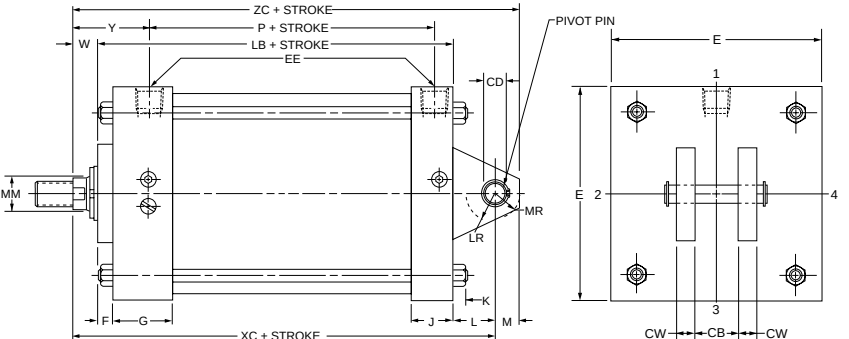
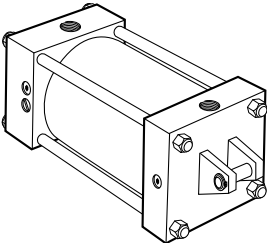
Cap Trunnion Style DB (NFFA Style MT2)



Head Trunnion Style D (NFFA Style MT1)



Cap Fixed Clevis Style BB (NFFA Style MP1)



Note: Other mounting styles and double rod end cylinders are available on request. Consult factory for details.

Table 1—Envelope and Mounting Dimensions

Bore	AA	BB	CB	+0.000 CD -0.002	CW	DD	E	EB	EE	F	G	J	K	L	LR	M	MR	ND	NT	R	SB	ST	SU	SW	+0.000 TD -0.001	TE	TL	TN	TS	US	UT	AddStroke			
																																LB	P	SN	SS
7	8.1	2 5/16	1 1/2	1.001	3/4	5/8-18	7 1/2	9/16	3/4	3/4	2	1 1/2	9/16	1 1/2	1 1/4	1	1 1/16	1 1/8	3/4-10	5.73	13/16	1	1 9/16	1 1/16	1.375	6 3/4	1 3/8	3 1/2	8 7/8	10 1/4	10 1/4	5 7/8	3 1/4	3 1/4	3 3/4

Table 2—Rod Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions									
			Style 8 CC	Style 4 & 9 KK	A	+0.000 -0.002 B	C	D	LA	NA	V	W	WF	Y
7	1	13/8	11/4-12	1-14	15/8	1.999	5/8	11/8	21/2	15/16	1/4	7/8	15/8	213/16
	3	13/4	11/2-12	11/4-12	2	2.374	3/4	11/2	31/8	111/16	3/8	11/8	17/8	31/16
	4	2	13/4-12	11/2-12	21/4	2.624	7/8	111/16	31/2	115/16	3/8	11/4	2	33/16

Table 3 — Envelope and Mounting Dimensions

				Add Stroke					
TT	XG	XS	XT	XC	XJ	XK	ZB	ZC	ZJ
4	2 ⁵ / ₈	2 ⁵ / ₁₆	2 ¹³ / ₁₆	8 ¹ / ₄	6	5 ¹ / ₄	7 ⁵ / ₁₆	9 ¹ / ₄	6 ³ / ₄
4	2 ⁷ / ₈	2 ⁹ / ₁₆	3 ¹ / ₁₆	8 ¹ / ₂	6 ¹ / ₄	5 ¹ / ₂	7 ⁹ / ₁₆	9 ¹ / ₂	7
4	3	2 ¹¹ / ₁₆	3 ³ / ₁₆	8 ⁵ / ₈	6 ³ / ₈	5 ⁵ / ₈	7 ¹¹ / ₁₆	9 ⁵ / ₈	7 ¹ / ₈

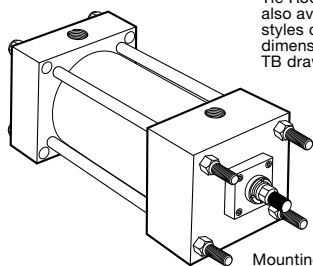
For Cylinder Division Plant Locations – See Page II.



Tie Rod, Head Square and Cap Square Mountings 8" to 14" Bore Size

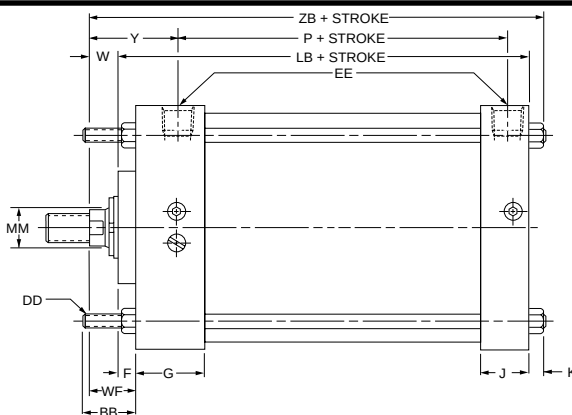
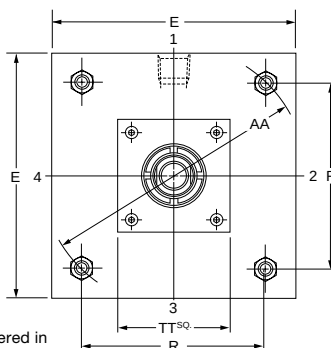
Series 2A Heavy Duty Air Cylinders

Tie Rods Extended Style TB (NFPA Style MX3)

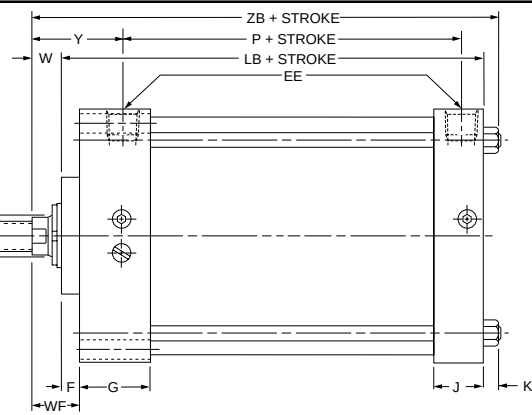
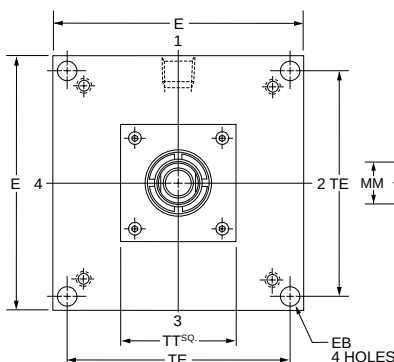
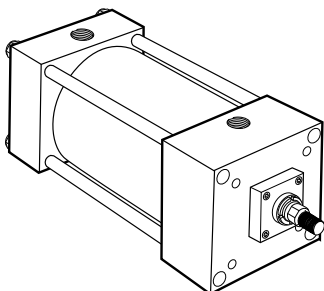


Style TB (NFPA MX3) Head Tie Rods Extended, illustrated: Style TC (NFPA MX2), Cap Tie Rods Extended; and Style TD (NFPA MX1), Both Ends Tie Rods Extended are also available. All "T" styles can be dimensioned from Style TB drawing at right.

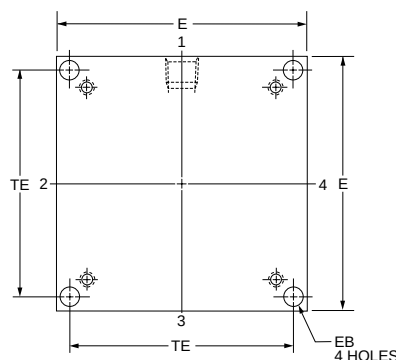
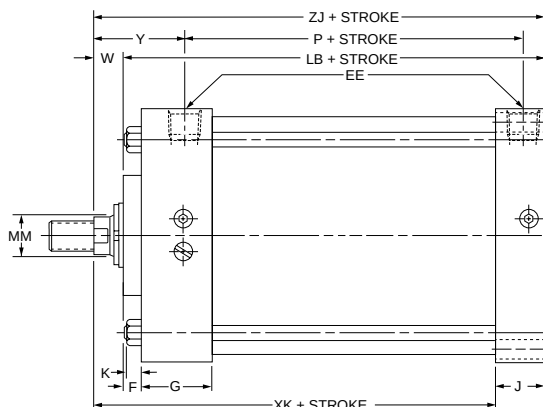
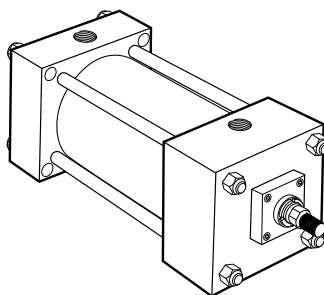
Mounting styles TB & TD not offered in 8" bore, rod codes #2, 9 and 0.



Head Square Flange Style JB (NFPA Style ME3)

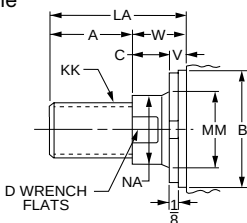


Cap Square Flange Style HB (NFPA Style ME4)



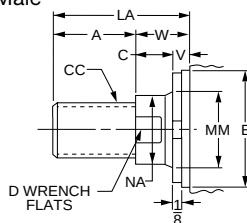
Rod End Dimensions — see table 2

Thread Style 4 (NFPA Style SM) Small Male



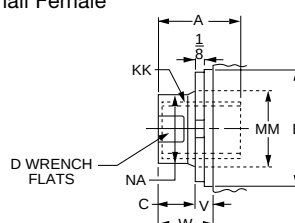
A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8 (NFPA Style IM) Intermediate Male



recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9 (NFPA Style SF) Small Female



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensional sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Tie Rod, Head Square and
Cap Square Mountings
8" to 14" Bore Size

Table 1—Envelope and Mounting Dimensions

Bore	AA	BB	DD	E	EB	EE NPTF	F	G	J	K	R	TE	Add Stroke LB P
8	9.1	2 ⁵ / ₁₆	5 ⁷ / ₈ -18	8 ¹ / ₂	1 ¹ / ₁₆	3 ³ / ₄	3 ³ / ₄	2	1 ¹ / ₂	9 ¹ / ₁₆	6.44	7.57	5 ⁷ / ₈ 3 ¹ / ₄
10	11.2	2 ¹¹ / ₁₆	3 ³ / ₄ -16	10 ⁵ / ₈	1 ³ / ₁₆	1	3 ³ / ₄	2 ¹ / ₄	2	1 ¹ / ₁₆	7.92	9.40	7 ¹ / ₈ 4 ¹ / ₈
12	13.3	2 ¹¹ / ₁₆	3 ³ / ₄ -16	12 ³ / ₄	1 ³ / ₁₆	1	3 ³ / ₄	2 ¹ / ₄	2	1 ¹ / ₁₆	9.40	11.10	7 ⁵ / ₈ 4 ⁵ / ₈
14	15.4	3 ³ / ₁₆	7 ⁷ / ₈ -14	14 ³ / ₄	1 ⁵ / ₁₆	1 ¹ / ₄	3 ³ / ₄	2 ³ / ₄	2 ¹ / ₄	3 ³ / ₄	10.90	12.87	8 ⁷ / ₈ 5 ¹ / ₂

Table 2—Rod Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								Add Stroke					
			Style 8 CC	Style 4 & 9 KK	A	+ .000 - .002 B	C	D	LA	NA	V	W	TT	WF	Y	XK	ZB	ZJ
8	1(Std.)	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	5 ⁷ / ₈	1 ¹ / ₈	2 ¹ / ₂	1 ⁵ / ₁₆	1 ¹ / ₄	7 ⁷ / ₈	4	1 ⁵ / ₈	2 ¹³ / ₁₆	5 ¹ / ₄	7 ⁵ / ₁₆	6 ³ / ₄
	2	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈
	3	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	3 ³ / ₄	1 ¹ / ₂	3 ¹ / ₈	1 ¹¹ / ₁₆	3 ³ / ₈	1 ¹ / ₈	4	1 ⁷ / ₈	3 ¹ / ₁₆	5 ¹ / ₂	7 ⁹ / ₁₆	7
	4	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7 ⁷ / ₈	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3 ³ / ₈	1 ¹ / ₄	4	2	3 ³ / ₁₆	5 ⁵ / ₈	7 ¹¹ / ₁₆	7 ¹ / ₈
	5	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	4	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈
	6	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈
	7	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈
	8	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈
	9	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈
10	0	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ⁷ / ₁₆	5 ⁷ / ₈	7 ¹⁵ / ₁₆	7 ³ / ₈
	1(Std.)	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	3 ³ / ₄	1 ¹ / ₂	3 ¹ / ₈	1 ¹¹ / ₁₆	3 ³ / ₈	1 ¹ / ₈	4	1 ⁷ / ₈	3 ¹ / ₁₆	6 ¹ / ₄	8 ¹⁵ / ₁₆	8 ¹ / ₄
	3	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7 ⁷ / ₈	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3 ³ / ₈	1 ¹ / ₄	4	2	3 ¹ / ₁₆	6 ³ / ₈	9 ¹ / ₁₆	8 ³ / ₈
	4	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	4	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈
	5	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈
	6	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈
	7	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈
	8	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈
	9	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈
12	0	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ¹ / ₂	6 ⁵ / ₈	9 ⁵ / ₁₆	8 ⁵ / ₈
	1(Std.)	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7 ⁷ / ₈	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3 ³ / ₈	1 ¹ / ₄	4	2	3 ¹ / ₁₆	6 ⁷ / ₈	9 ⁹ / ₁₆	8 ⁷ / ₈
	3	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	4	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈
	4	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈
	5	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈
	6	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈
	7	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈
	8	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈
	9	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ¹ / ₂	7 ¹ / ₈	9 ¹³ / ₁₆	9 ¹ / ₈
14	1(Std.)	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	4	2 ¹ / ₄	3 ¹³ / ₁₆	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈
	3	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ¹³ / ₁₆	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈
	4	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ¹³ / ₁₆	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈
	5	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹ / ₄	3 ¹³ / ₁₆	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈
	6	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ¹³ / ₁₆	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈
	7	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ¹³ / ₁₆	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈
14	8	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	2 ¹ / ₄	3 ¹³ / ₁₆	8 ¹ / ₈	11 ¹ / ₈	10 ³ / ₈

For Cylinder Division Plant Locations – See Page II.



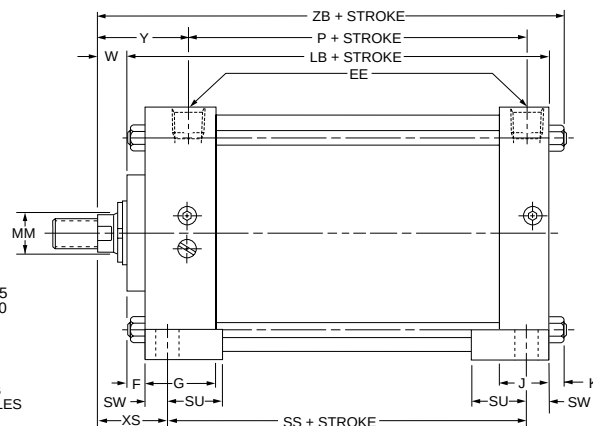
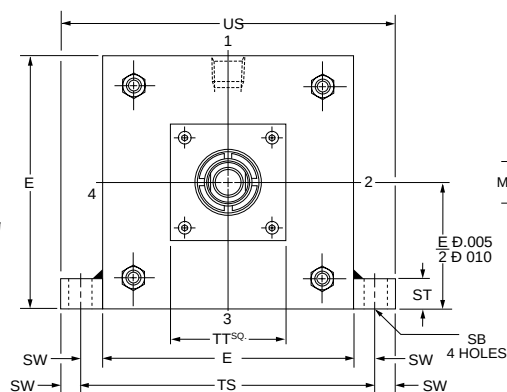
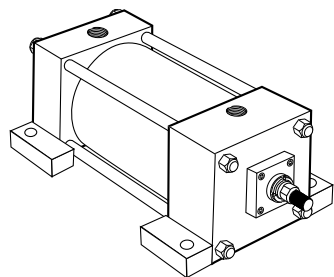
Side Lugs and Centerline Lugs Mountings 8" to 14" Bore Size

Series 2A Heavy Duty Air Cylinders

Side Lug

Style C

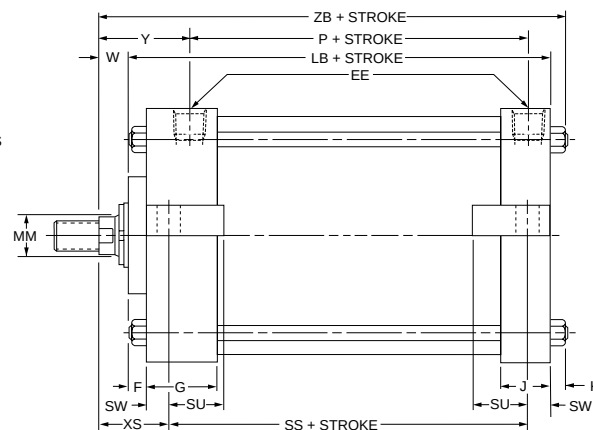
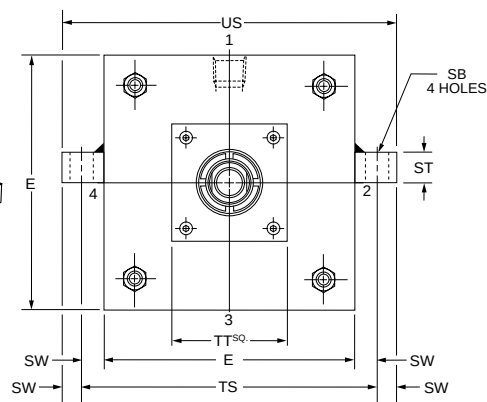
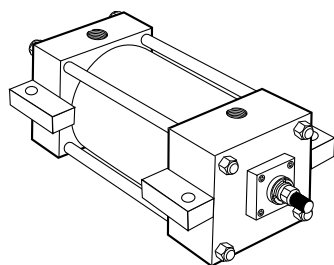
(NFPA Style MS2)



Centerline Lugs

Style E

(NFPA Style MS3)

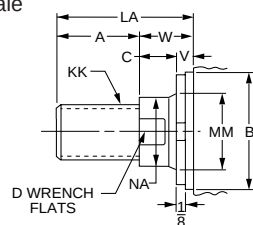


Rod End Dimensions — see table 2

Thread Style 4

(NFPA Style SM)

Small Male

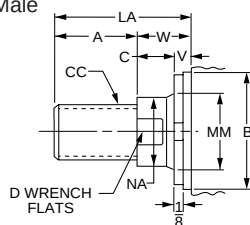


A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8

(NFPA Style IM)

Intermediate Male

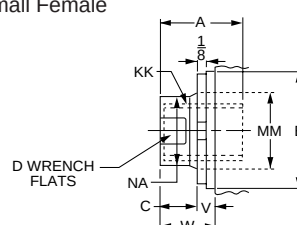


recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9

(NFPA Style SF)

Small Female



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensional sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Side Lugs and
Centerline Lugs Mountings
8" to 14" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	E	EE NPTF	F	G	J	K	SB*	ST	SU	SW	TS	US	Add Stroke		
													LB	P	SS
8	8 ¹ / ₂	³ / ₄	³ / ₄	2	1 ¹ / ₂	⁹ / ₁₆	¹³ / ₁₆	1	1 ⁹ / ₁₆	¹¹ / ₁₆	9 ⁷ / ₈	11 ¹ / ₄	5 ⁷ / ₈	3 ¹ / ₄	3 ³ / ₄
10	10 ⁵ / ₈	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	¹¹ / ₁₆	1 ¹ / ₄	2	⁷ / ₈	12 ³ / ₈	14 ¹ / ₈	7 ¹ / ₈	4 ¹ / ₈	4 ⁵ / ₈
12	12 ³ / ₄	1	³ / ₄	2 ¹ / ₄	2	¹¹ / ₁₆	¹¹ / ₁₆	1 ¹ / ₄	2	⁷ / ₈	14 ¹ / ₂	16 ¹ / ₄	7 ⁵ / ₈	4 ⁵ / ₈	5 ¹ / ₈
14	14 ³ / ₄	1 ¹ / ₄	³ / ₄	2 ³ / ₄	2 ¹ / ₄	³ / ₄	1 ⁵ / ₁₆	1 ¹ / ₂	2 ¹ / ₂	1 ¹ / ₈	17	19 ¹ / ₄	8 ⁷ / ₈	5 ¹ / ₂	5 ⁷ / ₈

* Upper surface spotfaced for socket head screws.

Table 3 — Envelope and
Mounting Dimensions

Table 2—Rod Dimensions

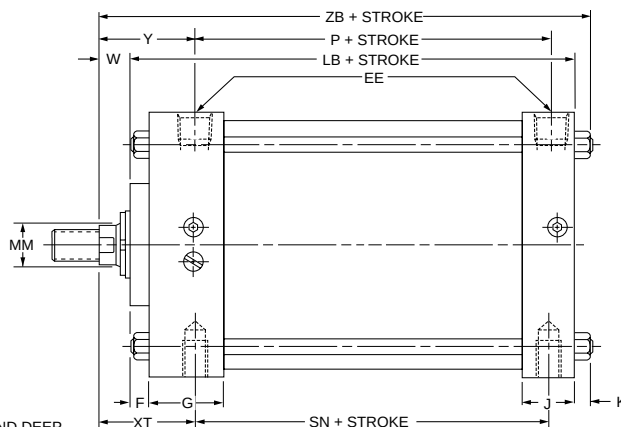
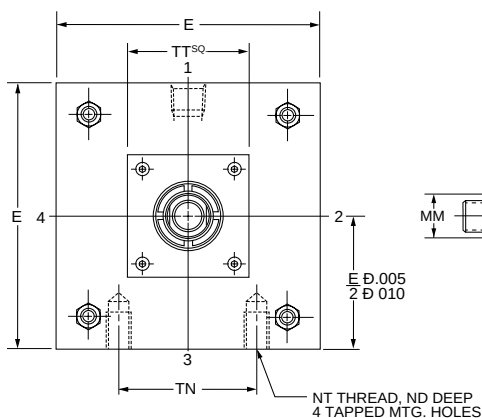
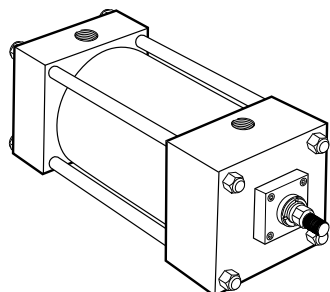
Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								TT	XS	Y	Add Stroke ZB
			Style 8 CC	Style 4 & 9 KK	A	+ .000 - .002 B	C	D	LA	NA	V	W				
8	1(Std.)	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	⁵ / ₈	1 ¹ / ₈	2 ¹ / ₂	1 ⁵ / ₁₆	¹ / ₄	⁷ / ₈	4	2 ⁵ / ₁₆	2 ¹³ / ₁₆	7 ⁵ / ₁₆
	2	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	¹ / ₂	1 ¹ / ₂	7	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆
	3	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	3 ¹ / ₈	1 ¹¹ / ₁₆	³ / ₈	1 ¹ / ₈	4	2 ⁹ / ₁₆	3 ¹ / ₁₆	7 ⁹ / ₁₆
	4	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	³ / ₈	1 ¹ / ₄	4	2 ¹¹ / ₁₆	3 ³ / ₁₆	7 ¹¹ / ₁₆
	5	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	¹ / ₂	1 ¹ / ₂	4	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆
	6	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆
	7	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆
	8	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆
	9	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	¹ / ₂	1 ¹ / ₂	7	2 ¹⁵ / ₁₆	3 ⁷ / ₁₆	7 ¹⁵ / ₁₆
10	1(Std.)	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	³ / ₄	1 ¹ / ₂	3 ¹ / ₈	1 ¹¹ / ₁₆	³ / ₈	1 ¹ / ₈	4	2 ⁹ / ₁₆	3 ¹ / ₈	8 ¹⁵ / ₁₆
	3	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	³ / ₈	1 ¹ / ₄	4	2 ⁷ / ₈	3 ¹ / ₄	9 ¹ / ₁₆
	4	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	¹ / ₂	1 ¹ / ₂	4	3 ¹ / ₈	3 ¹ / ₂	9 ⁵ / ₁₆
	5	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	9 ⁵ / ₁₆
	6	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	9 ⁵ / ₁₆
	7	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	9 ⁵ / ₁₆
	8	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₈	3 ¹ / ₂	9 ⁵ / ₁₆
	9	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₈	3 ¹ / ₂	9 ⁵ / ₁₆
	0	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₈	3 ¹ / ₂	9 ⁵ / ₁₆
12	1(Std.)	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	⁷ / ₈	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	³ / ₈	1 ¹ / ₄	4	2 ⁷ / ₈	3 ¹ / ₄	9 ⁹ / ₁₆
	3	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	¹ / ₂	1 ¹ / ₂	4	3 ¹ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆
	4	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆
	5	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆
	6	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆
	7	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆
	8	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆
	9	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆
	0	6	5 ³ / ₄ -12	4 ¹ / ₂ -12	6	6.749	1	4 ⁹ / ₈	8	5 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	8	3 ¹ / ₈	3 ¹ / ₂	9 ¹³ / ₁₆
14	1(Std.)	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	¹ / ₂	1 ¹ / ₂	4	3 ¹ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈
	3	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈
	4	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈
	5	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈
	6	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈
	7	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₈	3 ¹³ / ₁₆	11 ¹ / ₈

For Cylinder Division Plant Locations – See Page II.

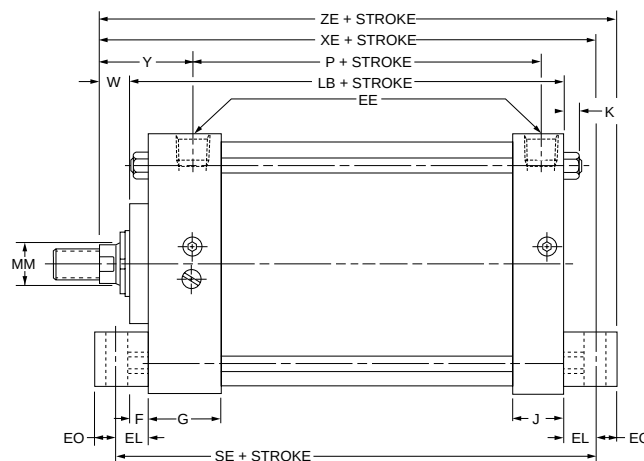
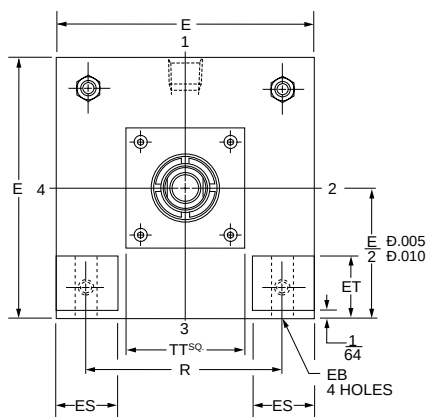
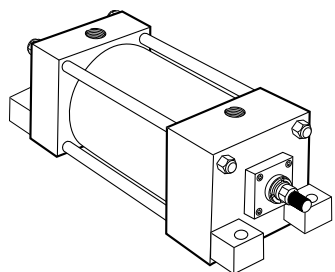
Side Tapped and Side End Lugs Mountings 8" to 14" Bore Size

Series 2A Heavy Duty Air Cylinders

Side Tapped Style F (NFPA Style MS4)



Side End Lugs Style G (NFPA Style MS7)

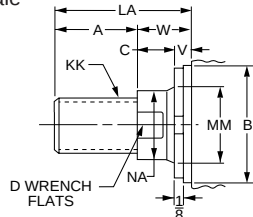


Cylinders with this mounting style are mounted on the precision ground surfaces of the head and cap. There must be a minimum gap of at least $\frac{1}{64}$ of an inch between the bottom of the lug and the mounting surface before the mounting bolts are tightened.

Not offered in the following sizes: 8" bore, rod codes #2, 6, 7, 8, 9 and 0; 10" bore, rod codes #8, 9 and 0; and 12" bore, rod codes #7, 8 and 9.

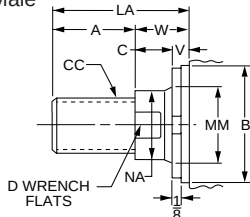
Rod End Dimensions — see table 2

Thread Style 4 (NFPA Style SM) Small Male



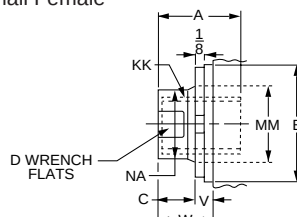
A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8 (NFPA Style IM) Intermediate Male



recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9 (NFPA Style SF) Small Female



Special Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensional sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Side Tapped and
Side End Lugs Mountings
8" to 14" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	E	EB	EE NPTF	EL	EO	ES	ET	F	G	J	K	ND	NT	R	TN	Add Stroke			
																LB	P	SE	SN
8	8 ¹ / ₂	1 ¹ / ₁₆	3/4	1 ¹ / ₈	5/8	2 ¹ / ₄	2 ¹ / ₃₂	3/4	2	1 ¹ / ₂	9/16	1 ¹ / ₈	3/4-10	6.44	4 ¹ / ₂	5 ⁷ / ₈	3 ¹ / ₄	7 ³ / ₈	3 ¹ / ₄
10	10 ⁵ / ₈	1 ³ / ₁₆	1	1 ⁵ / ₁₆	5/8	2 ³ / ₄	2 ¹¹ / ₁₆	3/4	2 ¹ / ₄	2	1 ¹ / ₁₆	1 ¹ / ₂	1-8	7.92	5 ¹ / ₂	7 ⁵ / ₈	4 ¹ / ₈	9	4 ¹ / ₈
12	12 ³ / ₄	1 ³ / ₁₆	1	1 ⁵ / ₁₆	5/8	3 ¹ / ₂	3 ⁵ / ₁₆	3/4	2 ¹ / ₄	2	1 ¹ / ₁₆	1 ¹ / ₂	1-8	9.40	7 ¹ / ₄	7 ⁵ / ₈	4 ⁵ / ₈	9 ¹ / ₂	4 ⁵ / ₈
14	14 ³ / ₄	1 ⁵ / ₁₆	1 ¹ / ₄	1 ¹ / ₂	3/4	4	3 ¹³ / ₁₆	3/4	2 ³ / ₄	2 ¹ / ₄	3/4	1 ⁷ / ₈	1 ¹ / ₄ -7	10.90	8 ³ / ₈	8 ⁷ / ₈	5 ¹ / ₂	11 ¹ / ₈	5 ¹ / ₂

Table 2—Rod Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								TT	XT	Y	Add Stroke		
			Style 8 CC	Style 4 & 9 KK	A	+0.000 -0.002 B	C	D	LA	NA	V	W				XE	ZB	ZE
8	1(Std.)	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	5/8	1 ¹ / ₈	2 ¹ / ₂	1 ⁵ / ₁₆	1/4	7/8	4	2 ¹³ / ₁₆	2 ¹³ / ₁₆	7 ⁷ / ₈	7 ⁵ / ₁₆	8 ¹ / ₂
	2	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ⁷ / ₁₆	3 ⁷ / ₁₆	*	7 ¹⁵ / ₁₆	*
	3	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	3/4	1 ¹ / ₂	3 ¹ / ₈	1 ¹¹ / ₁₆	3/8	1 ¹ / ₈	4	3 ¹ / ₁₆	3 ¹ / ₁₆	8 ¹ / ₈	7 ⁹ / ₁₆	8 ³ / ₄
	4	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7/8	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3/8	1 ¹ / ₄	4	3 ³ / ₁₆	3 ³ / ₁₆	8 ¹ / ₄	7 ¹¹ / ₁₆	8 ⁷ / ₈
	5	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	4	3 ⁷ / ₁₆	3 ⁷ / ₁₆	8 ¹ / ₂	7 ¹⁵ / ₁₆	9 ¹ / ₈
	6	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ⁷ / ₁₆	3 ⁷ / ₁₆	*	7 ¹⁵ / ₁₆	*
	7	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ⁷ / ₁₆	3 ⁷ / ₁₆	*	7 ¹⁵ / ₁₆	*
	8	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ⁷ / ₁₆	3 ⁷ / ₁₆	*	7 ¹⁵ / ₁₆	*
	9	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ⁷ / ₁₆	3 ⁷ / ₁₆	*	7 ¹⁵ / ₁₆	*
10	0	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ⁷ / ₁₆	3 ⁷ / ₁₆	*	7 ¹⁵ / ₁₆	*
	1(Std.)	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	3/4	1 ¹ / ₂	3 ¹ / ₈	1 ¹¹ / ₁₆	3/8	1 ¹ / ₈	4	3 ¹ / ₁₆	3 ¹ / ₁₆	9 ⁹ / ₁₆	8 ¹⁵ / ₁₆	10 ³ / ₁₆
	3	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7/8	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3/8	1 ¹ / ₄	4	3 ¹ / ₁₆	3 ¹ / ₁₆	9 ¹¹ / ₁₆	9 ¹ / ₁₆	10 ⁵ / ₁₆
	4	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	4	3 ¹ / ₁₆	3 ¹ / ₁₆	9 ¹⁵ / ₁₆	9 ⁵ / ₁₆	10 ⁹ / ₁₆
	5	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₁₆	3 ¹ / ₁₆	9 ¹⁵ / ₁₆	9 ⁵ / ₁₆	10 ⁹ / ₁₆
	6	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₁₆	3 ¹ / ₁₆	9 ¹⁵ / ₁₆	9 ⁵ / ₁₆	10 ⁹ / ₁₆
	7	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₁₆	3 ¹ / ₁₆	9 ¹⁵ / ₁₆	9 ⁵ / ₁₆	10 ⁹ / ₁₆
	8	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₁₆	3 ¹ / ₁₆	*	9 ⁵ / ₁₆	*
	9	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₁₆	3 ¹ / ₁₆	*	9 ⁵ / ₁₆	*
12	0	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₁₆	3 ¹ / ₁₆	*	9 ⁵ / ₁₆	*
	1(Std.)	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7/8	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3/8	1 ¹ / ₄	4	3 ¹ / ₁₆	3 ¹ / ₁₆	10 ³ / ₁₆	9 ⁹ / ₁₆	10 ¹³ / ₁₆
	3	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	4	3 ¹ / ₁₆	3 ¹ / ₁₆	10 ⁷ / ₁₆	9 ¹³ / ₁₆	11 ¹ / ₁₆
	4	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₁₆	3 ¹ / ₁₆	10 ⁷ / ₁₆	9 ¹³ / ₁₆	11 ¹ / ₁₆
	5	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₁₆	3 ¹ / ₁₆	10 ⁷ / ₁₆	9 ¹³ / ₁₆	11 ¹ / ₁₆
	6	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₁₆	3 ¹ / ₁₆	10 ⁷ / ₁₆	9 ¹³ / ₁₆	11 ¹ / ₁₆
	7	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₁₆	3 ¹ / ₁₆	*	9 ¹³ / ₁₆	*
	8	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₁₆	3 ¹ / ₁₆	*	9 ¹³ / ₁₆	*
	9	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ¹ / ₁₆	3 ¹ / ₁₆	*	9 ¹³ / ₁₆	*
14	1(Std.)	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	4	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ⁷ / ₈	11 ¹ / ₈	12 ⁵ / ₈
	3	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ⁷ / ₈	11 ¹ / ₈	12 ⁵ / ₈
	4	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ⁷ / ₈	11 ¹ / ₈	12 ⁵ / ₈
	5	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ⁷ / ₈	11 ¹ / ₈	12 ⁵ / ₈
	6	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ⁷ / ₈	11 ¹ / ₈	12 ⁵ / ₈
	7	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ⁷ / ₈	11 ¹ / ₈	12 ⁵ / ₈
14	8	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	7	3 ¹³ / ₁₆	3 ¹³ / ₁₆	11 ⁷ / ₈	11 ¹ / ₈	12 ⁵ / ₈

* Mounting style G not offered in this rod size.

Caution: When using mounting style G, check clearance between mounting members and rod attachment or accessory. If necessary, specify longer rod extension to avoid interference with mounting members.

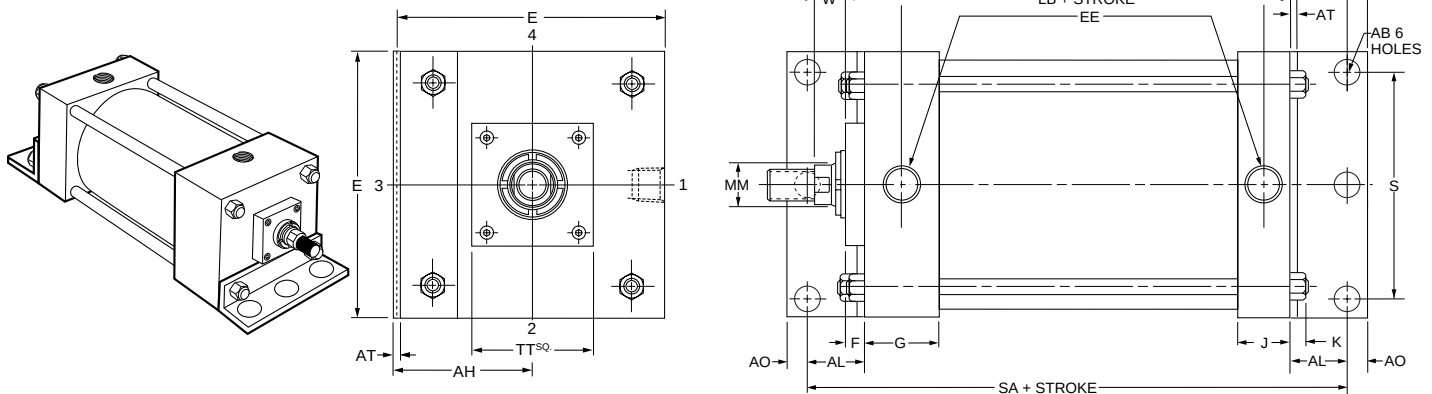
For Cylinder Division Plant Locations – See Page II.



Side End Angle and Clevis Mountings 8" to 14" Bore Sizes

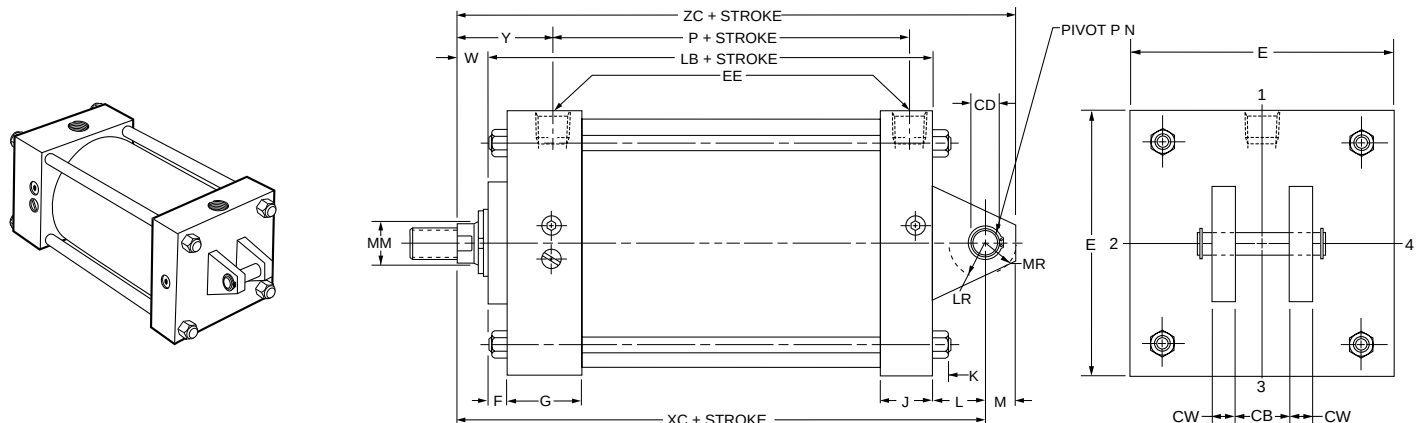
Series 2A Heavy Duty Air Cylinders

Side End Angles Style CB (NFPA Style MS1)



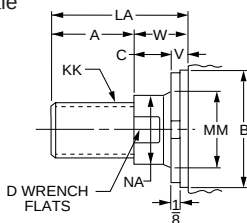
Not offered in the following sizes: 8" bore, rod codes #2, 6, 7, 8, 9 and 0; 10" bore, rod codes #8, 9 and 0.

Cap Fixed Clevis Style BB (NFPA Style MP1)



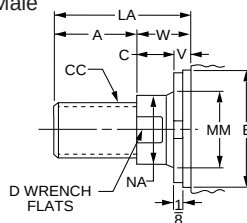
Rod End Dimensions — see table 2

Thread Style 4 (NFPA Style SM) Small Male



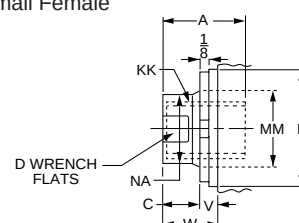
A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8 (NFPA Style IM) Intermediate Male



recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9 (NFPA Style SF) Small Female



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensional sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Side End Angles and
Clevis Mountings
8" to 14" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	AB	AH	AL	AO	AT	CB	+0.000 CD* -0.002	CW	E	EE NPTF	F	G	J	K	L	LR	M	MR	S	Add Stroke		
																				LB	P	SA
8	1 ³ / ₁₆	4 ¹ / ₄	1 ¹³ / ₁₆	1 ¹¹ / ₁₆	1 ¹ / ₄	1 ¹ / ₂	1.001	3 ₄	8 ¹ / ₂	3 ₄	3 ₄	2	1 ¹ / ₂	9 ₁₆	1 ¹ / ₂	1 ¹ / ₄	1	1 ³ / ₁₆	7 ¹ / ₈	5 ⁷ / ₈	3 ¹ / ₄	8 ³ / ₄
10	1 ¹ / ₁₆	5 ⁵ / ₁₆	2 ¹ / ₈	7 ₈	1 ¹ / ₄	2	1.376	1	10 ⁵ / ₈	1	3 ₄	2 ¹ / ₄	2	1 ¹¹ / ₁₆	2 ¹ / ₈	1 ⁷ / ₈	1 ³ / ₈	1 ⁵ / ₈	8 ⁷ / ₈	7 ¹ / ₈	4 ¹ / ₈	10 ⁵ / ₈
12	1 ¹ / ₁₆	6 ³ / ₈	2 ¹ / ₈	7 ₈	3 ₈	2 ¹ / ₂	1.751	1 ¹ / ₄	12 ³ / ₄	1	3 ₄	2 ¹ / ₄	2	1 ¹¹ / ₁₆	2 ¹ / ₈	2 ¹ / ₈	1 ³ / ₄	2 ¹ / ₈	11	7 ⁵ / ₈	4 ⁵ / ₈	11 ¹ / ₈
14	1 ⁵ / ₁₆	7 ³ / ₈	2 ⁷ / ₁₆	1 ¹ / ₁₆	3 ₈	2 ¹ / ₂	2.001	1 ¹ / ₄	14 ³ / ₄	1 ¹ / ₄	3 ₄	2 ³ / ₄	2 ¹ / ₄	3 ₄	2 ¹ / ₂	2 ³ / ₈	2	2 ³ / ₈	12 ⁵ / ₈	8 ⁷ / ₈	5 ¹ / ₂	13

* CD is pin diameter.

Table 2—Rod Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								TT	Y	Add Stroke			
			Style 8 CC	Style 4 & 9 KK	A	+0.000 -0.002 B	C	D	LA	NA	V	W			XA	XC	ZA	ZC
8	1(Std.)	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	5 ₈	1 ¹ / ₈	2 ¹ / ₂	1 ⁵ / ₁₆	1 ₄	7 ₈	4	2 ¹³ / ₁₆	8 ⁹ / ₁₆	8 ¹ / ₄	9 ¹ / ₄	9 ¹ / ₄
	2	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ₂	1 ¹ / ₂	7	3 ⁷ / ₁₆	*	8 ⁷ / ₈	*	9 ⁷ / ₈
	3	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	3 ₄	1 ¹ / ₂	3 ¹ / ₈	1 ¹¹ / ₁₆	3 ₈	1 ¹ / ₈	4	3 ¹ / ₁₆	8 ¹³ / ₁₆	8 ¹ / ₂	9 ¹ / ₂	9 ¹ / ₂
	4	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7 ₈	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3 ₈	1 ¹ / ₄	4	3 ³ / ₁₆	8 ¹⁵ / ₁₆	8 ⁵ / ₈	9 ⁵ / ₈	9 ⁵ / ₈
	5	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ₂	1 ¹ / ₂	4	3 ⁷ / ₁₆	9 ³ / ₁₆	8 ⁷ / ₈	9 ⁷ / ₈	9 ⁷ / ₈
	6	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ⁷ / ₁₆	*	8 ⁷ / ₈	*	9 ⁷ / ₈
	7	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ⁷ / ₁₆	*	8 ⁷ / ₈	*	9 ⁷ / ₈
	8	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ⁷ / ₁₆	*	8 ⁷ / ₈	*	9 ⁷ / ₈
	9	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ₂	1 ¹ / ₂	7	3 ⁷ / ₁₆	*	8 ⁷ / ₈	*	9 ⁷ / ₈
10	1(Std.)	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	3 ₄	1 ¹ / ₂	3 ¹ / ₈	1 ¹¹ / ₁₆	3 ₈	1 ¹ / ₈	4	3 ¹ / ₈	10 ³ / ₈	10 ³ / ₈	11 ¹ / ₄	11 ³ / ₄
	3	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7 ₈	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3 ₈	1 ¹ / ₄	4	3 ¹ / ₄	10 ¹ / ₂	10 ¹ / ₂	11 ³ / ₈	11 ⁷ / ₈
	4	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ₂	1 ¹ / ₂	4	3 ¹ / ₂	10 ³ / ₄	10 ³ / ₄	11 ⁵ / ₈	12 ¹ / ₈
	5	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₂	10 ³ / ₄	10 ³ / ₄	11 ⁵ / ₈	12 ¹ / ₈
	6	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₂	10 ³ / ₄	10 ³ / ₄	11 ⁵ / ₈	12 ¹ / ₈
	7	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₂	10 ³ / ₄	10 ³ / ₄	11 ⁵ / ₈	12 ¹ / ₈
	8	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹ / ₂	*	10 ³ / ₄	*	12 ¹ / ₈
	9	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹ / ₂	*	10 ³ / ₄	*	12 ¹ / ₈
	0	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹ / ₂	*	10 ³ / ₄	*	12 ¹ / ₈
12	1(Std.)	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7 ₈	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3 ₈	1 ¹ / ₄	4	3 ¹ / ₄	11	11 ¹ / ₈	11 ⁷ / ₈	12 ⁷ / ₈
	3	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ₂	1 ¹ / ₂	4	3 ¹ / ₂	11 ¹ / ₄	11 ³ / ₈	12 ¹ / ₈	13 ¹ / ₈
	4	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₂	11 ¹ / ₄	11 ³ / ₈	12 ¹ / ₈	13 ¹ / ₈
	5	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₂	11 ¹ / ₄	11 ³ / ₈	12 ¹ / ₈	13 ¹ / ₈
	6	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹ / ₂	11 ¹ / ₄	11 ³ / ₈	12 ¹ / ₈	13 ¹ / ₈
	7	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹ / ₂	11 ¹ / ₄	11 ³ / ₈	12 ¹ / ₈	13 ¹ / ₈
	8	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹ / ₂	11 ¹ / ₄	11 ³ / ₈	12 ¹ / ₈	13 ¹ / ₈
	9	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹ / ₂	11 ¹ / ₄	11 ³ / ₈	12 ¹ / ₈	13 ¹ / ₈
	0	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹ / ₂	11 ¹ / ₄	11 ³ / ₈	12 ¹ / ₈	13 ¹ / ₈
14	1(Std.)	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ¹ / ₂	2 ³ / ₈	1 ₂	1 ¹ / ₂	4	3 ¹³ / ₁₆	12 ¹³ / ₁₆	12 ⁷ / ₈	13 ⁷ / ₈	14 ⁷ / ₈
	3	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	5	2 ⁷ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹³ / ₁₆	12 ¹³ / ₁₆	12 ⁷ / ₈	13 ⁷ / ₈	14 ⁷ / ₈
	4	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	5	3 ³ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹³ / ₁₆	12 ¹³ / ₁₆	12 ⁷ / ₈	13 ⁷ / ₈	14 ⁷ / ₈
	5	4	3 ³ / ₄ -12	3-12	4	4.749	1	3 ³ / ₈	5 ¹ / ₂	3 ⁷ / ₈	1 ₂	1 ¹ / ₂	5 ¹ / ₂	3 ¹³ / ₁₆	12 ¹³ / ₁₆	12 ⁷ / ₈	13 ⁷ / ₈	14 ⁷ / ₈
	6	4 ¹ / ₂	4 ¹ / ₄ -12	3 ³ / ₄ -12	4 ¹ / ₂	5.249	1	3 ⁷ / ₈	6	4 ³ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹³ / ₁₆	12 ¹³ / ₁₆	12 ⁷ / ₈	13 ⁷ / ₈	14 ⁷ / ₈
	7	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	5	5.749	1	4 ¹ / ₄	6 ¹ / ₂	4 ⁷ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹³ / ₁₆	12 ¹³ / ₁₆	12 ⁷ / ₈	13 ⁷ / ₈	14 ⁷ / ₈
14	8	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	5 ¹ / ₂	6.249	1	4 ⁵ / ₈	7	5 ³ / ₈	1 ₂	1 ¹ / ₂	7	3 ¹³ / ₁₆	12 ¹³ / ₁₆	12 ⁷ / ₈	13 ⁷ / ₈	14 ⁷ / ₈

* Mounting style G not offered in this rod size.

Caution: When using mounting style G, check clearance between mounting members and rod attachment or accessory. If necessary, specify longer rod extension to avoid interference with mounting members.

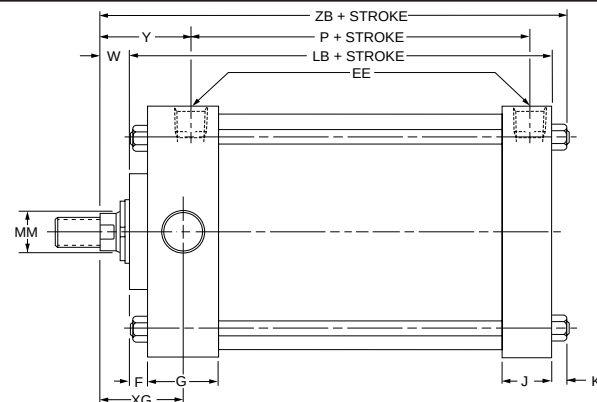
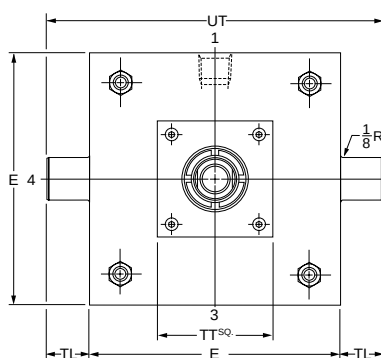
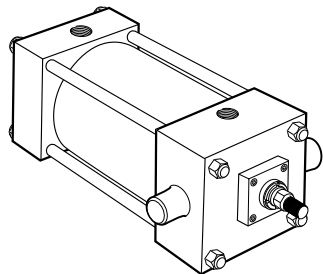
For Cylinder Division Plant Locations – See Page II.



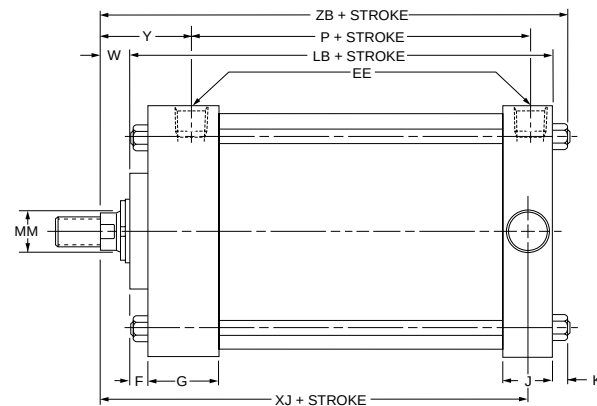
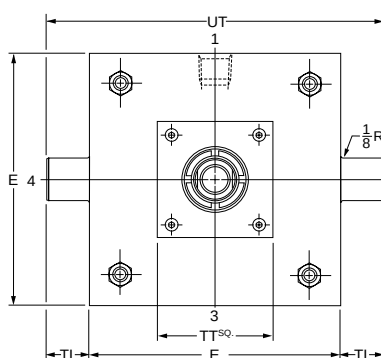
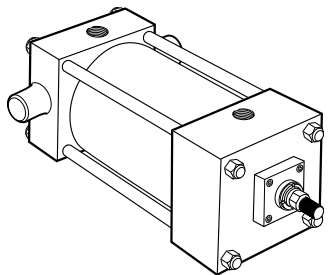
Trunnion Mountings 8" to 14" Bore Sizes

Series 2A Heavy Duty Air Cylinders

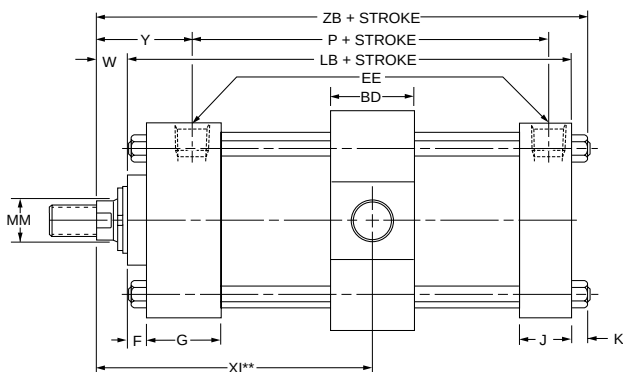
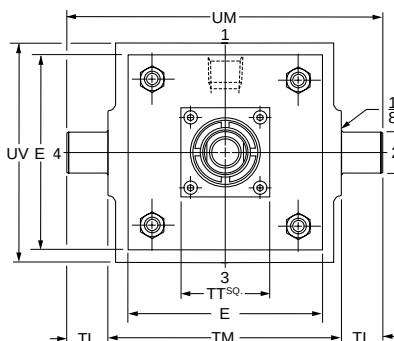
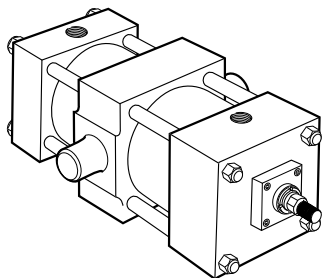
Head Trunnion Style D (NFPA Style MT1)



Cap Trunnion Style DB (NFPA Style MT2)

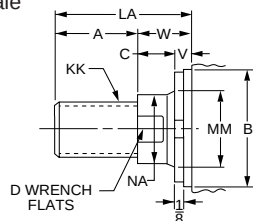


Intermediate Fixed Trunnion Style DD (NFPA Style MT4)



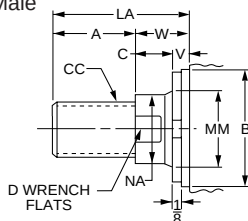
Rod End Dimensions — see table 2

Thread Style 4 (NFPA Style SM) Small Male



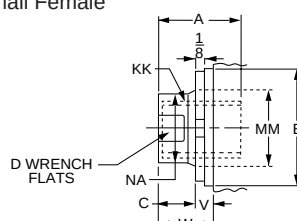
A high strength rod end stud is supplied on thread style 4 through 2" diameter rods and on thread style 8 through 1 3/8" diameter rods. Larger sizes or special rod ends are cut threads. Style 4 rod ends are recommended where the workpiece is secured against the rod shoulder. When the workpiece is not shouldered, style 4 rod ends are

Thread Style 8 (NFPA Style IM) Intermediate Male



recommended through 2" piston rod diameters and style 8 rod ends are recommended on larger diameters. Use style 9 for applications where female rod end threads are required. If rod end is not specified, style 4 will be supplied.

Thread Style 9 (NFPA Style SF) Small Female



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensional sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Trunnion Mountings
8" to 14" Bore Sizes

Table 1—Envelope and Mounting Dimensions

Bore	BD	E	EE NPTF	F	G	J	K	+0.000 TD -0.001	TL	TM	UM	UT	UV	Add Stroke		Style DD Min. Stroke
														LB	P	
8	2½	8½	¾	¾	2	1½	9/16	1.375	1¾	9¾	12½	11¼	9½	5⅞	3¼	7/8
10	3	10⅝	1	¾	2¼	2	11/16	1.750	1¾	12	15½	14⅞	11¾	7⅞	4⅞	7/8
12	3	12¾	1	¾	2¼	2	11/16	1.750	1¾	14	17½	16¼	13¾	7⅞	4⅞	3/8
14	3½	14¾	1¼	¾	2¾	2¼	¾	2.000	2	16¼	20¼	18¾	16	8⅞	5½	3/8

Table 2—Rod Dimensions

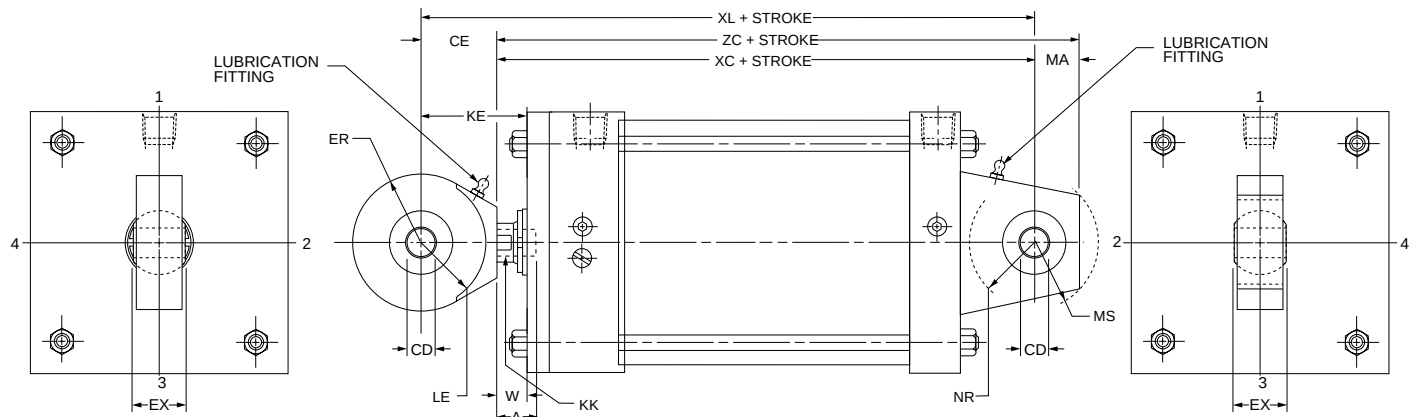
Bore	Rod No.	Rod Dia. MM	Thread		Rod Extensions and Pilot Dimensions								TT	XG	Min.** XI	Y	Add Stroke	
			Style 8 CC	Style 4 & 9 KK	A	+0.000 -0.002 B	C	D	LA	NA	V	W					XJ	ZB
8	1(Std.)	1¾	1¼-12	1-14	1⅝	1.999	5/8	1⅞	2½	1⅝	¼	7/8	4	2⅝	4⅝	2⅜	6	7⅝
	2	5½	5¼-12	4-12	5½	6.249	1	4⅝	7	5⅝	½	1½	7	3¼	5⅞	3⅞	6⅝	7⅝
	3	1¾	1½-12	1¼-12	2	2.374	3/8	1½	3⅞	1⅝	3/8	1⅞	4	2⅞	5⅞	3⅞	6¼	7⅞
	4	2	1¾-12	1½-12	2¼	2.624	7/8	1⅝	3½	1⅝	3/8	1¼	4	3	5⅞	3⅞	6⅞	7⅝
	5	2½	2¼-12	1⅞-12	3	3.124	1	2⅞	4½	2⅝	½	1½	4	3¼	5⅞	3⅞	6⅞	7⅝
	6	3	2¾-12	2¼-12	3½	3.749	1	2⅝	5	2⅞	½	1½	5½	3¼	5⅞	3⅞	6⅞	7⅝
	7	3½	3¼-12	2½-12	3½	4.249	1	3	5	3⅞	½	1½	5½	3¼	5⅞	3⅞	6⅞	7⅝
	8	4	3¼-12	3-12	4	4.749	1	3⅞	5½	3⅞	½	1½	5½	3¼	5⅞	3⅞	6⅞	7⅝
	9	4½	4¼-12	3¼-12	4½	5.249	1	3⅞	6	4⅞	½	1½	7	3¼	5⅞	3⅞	6⅞	7⅝
10	1(Std.)	1¾	1½-12	1¼-12	2	2.374	3/8	1½	3⅞	1⅝	3/8	1⅞	4	3	5⅞	3⅞	7¼	8⅝
	3	2	1¾-12	1½-12	2¼	2.624	7/8	1⅝	3½	1⅝	3/8	1¼	4	3⅞	5⅞	3⅞	7⅞	9⅝
	4	2½	2¼-12	1⅞-12	3	3.124	1	2⅞	4½	2⅝	½	1½	4	3⅞	6⅞	3½	7⅞	9⅝
	5	3	2¾-12	2¼-12	3½	3.749	1	2⅝	5	2⅞	½	1½	5½	3⅞	6⅞	3½	7⅞	9⅝
	6	3½	3¼-12	2½-12	3½	4.249	1	3	5	3⅞	½	1½	5½	3⅞	6⅞	3½	7⅞	9⅝
	7	4	3¼-12	3-12	4	4.749	1	3⅞	5½	3⅞	½	1½	5½	3⅞	6⅞	3½	7⅞	9⅝
	8	4½	4¼-12	3¼-12	4½	5.249	1	3⅞	6	4⅞	½	1½	7	3⅞	6⅞	3½	7⅞	9⅝
	9	5	4¾-12	3½-12	5	5.749	1	4¼	6½	4⅞	½	1½	7	3⅞	6⅞	3½	7⅞	9⅝
	0	5½	5¼-12	4-12	5½	6.249	1	4⅝	7	5⅝	½	1½	7	3⅞	6⅞	3½	7⅞	9⅝
12	1(Std.)	2	1¾-12	1½-12	2¼	2.624	7/8	1⅝	3½	1⅝	3/8	1¼	4	3⅞	5⅞	3⅞	7⅞	9⅝
	3	2½	2¼-12	1⅞-12	3	3.124	1	2⅞	4½	2⅝	½	1½	4	3⅞	6⅞	3½	8⅞	9⅝
	4	3	2¾-12	2¼-12	3½	3.749	1	2⅝	5	2⅞	½	1½	5½	3⅞	6⅞	3½	8⅞	9⅝
	5	3½	3¼-12	2½-12	3½	4.249	1	3	5	3⅞	½	1½	5½	3⅞	6⅞	3½	8⅞	9⅝
	6	4	3¾-12	3-12	4	4.749	1	3⅞	5½	3⅞	½	1½	5½	3⅞	6⅞	3½	8⅞	9⅝
	7	4½	4¼-12	3¼-12	4½	5.249	1	3⅞	6	4⅞	½	1½	7	3⅞	6⅞	3½	8⅞	9⅝
	8	5	4¾-12	3½-12	5	5.749	1	4¼	6½	4⅞	½	1½	7	3⅞	6⅞	3½	8⅞	9⅝
	9	5½	5¼-12	4-12	5½	6.249	1	4⅝	7	5⅝	½	1½	7	3⅞	6⅞	3½	8⅞	9⅝
	0	6	5¼-12	4-12	6	6.749	1	4⅝	8	6⅝	½	1½	7	3⅞	6⅞	3½	8⅞	9⅝
14	1(Std.)	2½	2¼-12	1⅞-12	3	3.124	1	2⅞	4½	2⅝	½	1½	4	3⅞	6⅞	3⅞	9¼	11⅞
	3	3	2¾-12	2¼-12	3½	3.749	1	2⅝	5	2⅞	½	1½	5½	3⅞	6⅞	3⅞	9¼	11⅞
	4	3½	3¼-12	2½-12	3½	4.249	1	3	5	3⅞	½	1½	5½	3⅞	6⅞	3⅞	9¼	11⅞
	5	4	3¾-12	3-12	4	4.749	1	3⅞	5½	3⅞	½	1½	5½	3⅞	6⅞	3⅞	9¼	11⅞
	6	4½	4¼-12	3¼-12	4½	5.249	1	3⅞	6	4⅞	½	1½	7	3⅞	6⅞	3⅞	9¼	11⅞
	7	5	4¾-12	3½-12	5	5.749	1	4¼	6½	4⅞	½	1½	7	3⅞	6⅞	3⅞	9¼	11⅞

**Dimension XI to be specified by customer.

For Cylinder Division Plant Locations – See Page II.



A



Bore	Rod No.	Rod Dia. MM	Thread		A	W	Add Stroke			KE	CD*	CE	ER	EX	LE	MA	MS	NR	Max. Oper. PSI 2A
			Style 9 KK	Style 7 KK			XC	XL	ZC										
1½	1(Std.)	5/8	7/16-20	—	3/4	5/8	5 3/8	6 1/4	6 1/8	1 1/2	-.0005	7/8	13/16	7/16	3/4	3/4	15/16	5/8	250
	2	1	**	7/16-20	3/4	1	5 3/4	6 5/8	6 1/2	1 7/8	.5000								
2	1(Std.)	5/8	7/16-20	—	3/4	5/8	5 3/8	6 1/4	6 1/8	1 1/2	-.0005	7/8	13/16	7/16	3/4	3/4	15/16	5/8	250
	2	1 3/8	**	7/16-20	3/4	1 1/4	6	6 7/8	6 3/4	2 1/8	.5000								
	3	1	**	7/16-20	3/4	1	5 3/4	6 5/8	6 1/2	1 7/8									
2½	1(Std.)	5/8	7/16-20	—	3/4	5/8	5 1/2	6 3/8	6 1/4	1 1/2	-.0005	7/8	13/16	7/16	3/4	3/4	15/16	5/8	250
	2	1 3/4	**	7/16-20	3/4	1 1/2	6 3/8	7 1/4	7 1/8	2 3/8	.5000								
	3	1	**	7/16-20	3/4	1	5 7/8	6 3/4	6 5/8	1 7/8									
	4	1 3/8	**	7/16-20	3/4	1 1/4	6 1/8	7	6 7/8	2 1/8									
3¾	1(Std.)	1	3/4-16	—	1 1/8	3/4	6 7/8	8 1/8	7 7/8	2	-.0005	1 1/4	1 1/8	2 1/32	1 1/16	1	1 3/8	1	250
	2	2	**	3/4-16	1 1/8	1 3/8	7 1/2	8 3/4	8 1/2	2 5/8	.7500								
	3	1 3/8	**	3/4-16	1 1/8	1	7 1/8	8 3/8	8 1/8	2 1/4									
	4	1 3/4	**	3/4-16	1 1/8	1 1/4	7 3/8	8 5/8	8 3/8	2 1/2									
4	1(Std.)	1	3/4-16	—	1 1/8	3/4	6 7/8	8 1/8	7 7/8	2	-.0005	1 1/4	1 1/8	2 1/32	1 1/16	1	1 3/8	1	250
	2	2 1/2	**	3/4-16	1 1/8	1 5/8	7 3/4	9	8 3/4	2 7/8	.7500								
	3	1 3/8	**	3/4-16	1 1/8	1	7 1/8	8 3/8	8 1/8	2 1/4									
	4	1 3/4	**	3/4-16	1 1/8	1 1/4	7 3/8	8 5/8	8 3/8	2 1/2									
	5	2	**	3/4-16	1 1/8	1 3/8	7 1/2	8 3/4	8 1/2	2 5/8									
5	1(Std.)	1	3/4-16	—	1 1/8	3/4	7 1/8	8 3/8	8 1/8	2	-.0005	1 1/4	1 1/8	2 1/32	1 1/16	1	1 3/8	1	250
	2	3 1/2	**	3/4-16	1 1/8	1 5/8	8	9 1/4	9	2 7/8	.7500								
	3	1 3/8	**	3/4-16	1 1/8	1	7 3/8	8 5/8	8 3/8	2 1/4									
	4	1 3/4	**	3/4-16	1 1/8	1 1/4	7 5/8	8 7/8	8 5/8	2 1/2									
	5	2	**	3/4-16	1 1/8	1 3/8	7 3/4	9	8 3/4	2 5/8									
	6	2 1/2	**	3/4-16	1 1/8	1 5/8	8	9 1/4	9	2 7/8									
6	1(Std.)	1 3/8	1-14	—	1 5/8	7/8	8 1/8	10	9 3/8	2 3/4	-.0005	1 7/8	1 1/4	7/8	1 7/16	1 1/4	1 11/16	1 1/4	250
	2	4	**	1-14	1 5/8	1 1/2	8 3/4	10 5/8	10	3 3/8	10000								
	3	1 3/4	**	1-14	1 5/8	1 1/8	8 3/8	10 1/4	9 5/8	3									
	4	2	**	1-14	1 5/8	1 1/4	8 1/2	10 3/8	9 3/4	3 1/8									
	5	2 1/2	**	1-14	1 5/8	1 1/2	8 3/4	10 5/8	10	3 3/8									
	6	3	**	1-14	1 5/8	1 1/2	8 3/4	10 5/8	10	3 3/8									
	7	3 1/2	**	1-14	1 5/8	1 1/2	8 3/4	10 5/8	10	3 3/8									

Maximum operating pressure at 4:1 design factor is based on tensile strength of material. Pressure ratings are based on standard commercial bearing ratings.

Note: For additional dimensions see Series 2A, page 30.

* Dimension CD is hole diameter.

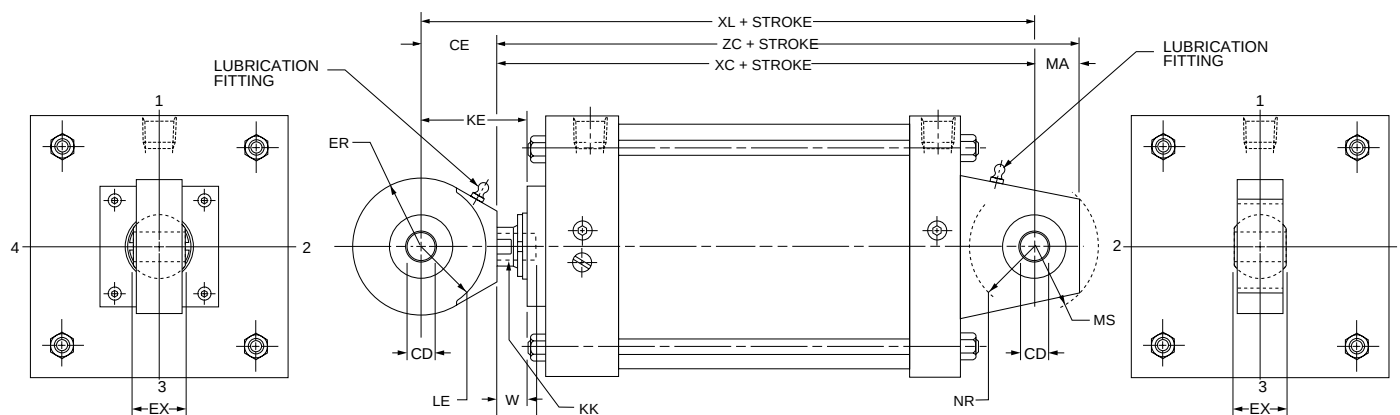
** Corresponding rod eye pin diameter may not match pin diameter of cap.

Rod No. 1 is standard.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Spherical Bearing Mounting
Style SB
8" to 14" Bore Sizes



Bore	Rod No.	Rod Dia. MM	Thread		A	W	Add Stroke				CD*	CE	ER	EX	LE	MA	MS	NR	Max. Oper. PSI 2A
			Style 9 KK	Style 7 KK			XC	XL	ZC	KE									
8	1(Std.)	1 3/8	1-14	—	1 5/8	7/8	8 1/4	10 1/8	9 1/2	2 3/4	-.0005 1.0000	1 7/8	1 1/4	7/8	1 7/16	1 1/4	1 11/16	1 1/4	250
	2	5 1/2	**	1-14	1 5/8	1 1/2	8 7/8	10 3/4	10 1/8	3 3/8									
	3	1 3/4	**	1-14	1 5/8	1 1/8	8 1/2	10 3/8	9 3/4	3									
	4	2	**	1-14	1 5/8	1 1/4	8 5/8	10 1/2	9 7/8	3 1/8									
	5	2 1/2	**	1-14	1 5/8	1 1/2	8 7/8	10 3/4	10 1/8	3 3/8									
	6	3	**	1-14	1 5/8	1 1/2	8 7/8	10 3/4	10 1/8	3 3/8									
	7	3 1/2	**	1-14	1 5/8	1 1/2	8 7/8	10 3/4	10 1/8	3 3/8									
	8	4	**	1-14	1 5/8	1 1/2	8 7/8	10 3/4	10 1/8	3 3/8									
	9	4 1/2	**	1-14	1 5/8	1 1/2	8 7/8	10 3/4	10 1/8	3 3/8									
10	1(Std.)	1 3/4	1 1/4-12	—	2	1 1/8	10 3/8	12 1/2	12 1/4	3 1/4	-.0005 1.3750	2 1/8	1 11/16	1 3/16	1 7/8	1 7/8	2 7/16	1 5/8	250
	3	2	**	1 1/4-12	2	1 1/4	10 1/2	12 5/8	12 3/8	3 3/8									
	4	2 1/2	**	1 1/4-12	2	1 1/2	10 3/4	12 7/8	12 5/8	3 5/8									
	5	3	**	1 1/4-12	2	1 1/2	10 3/4	12 7/8	12 5/8	3 5/8									
	6	3 1/2	**	1 1/4-12	2	1 1/2	10 3/4	12 7/8	12 5/8	3 5/8									
	7	4	**	1 1/4-12	2	1 1/2	10 3/4	12 7/8	12 5/8	3 5/8									
	8	4 1/2	**	1 1/4-12	2	1 1/2	10 3/4	12 7/8	12 5/8	3 5/8									
	9	5	**	1 1/4-12	2	1 1/2	10 3/4	12 7/8	12 5/8	3 5/8									
	0	5 1/2	**	1 1/4-12	2	1 1/2	10 3/4	12 7/8	12 5/8	3 5/8									
12	1(Std.)	2	1 1/2-12	—	2 1/4	1 1/4	11 1/8	13 5/8	13 5/8	4 1/4	-.0005 1.7500	2 1/2	2 1/16	1 17/32	2 1/8	2 1/2	2 7/8	2 1/16	250
	3	2 1/2	**	1 1/2-12	2 1/4	1 1/2	11 3/8	13 7/8	13 7/8	4									
	4	3	**	1 1/2-12	2 1/4	1 1/2	11 3/8	13 7/8	13 7/8	4									
	5	3 1/2	**	1 1/2-12	2 1/4	1 1/2	11 3/8	13 7/8	13 7/8	4									
	6	4	**	1 1/2-12	2 1/4	1 1/2	11 3/8	13 7/8	13 7/8	4									
	7	4 1/2	**	1 1/2-12	2 1/4	1 1/2	11 3/8	13 7/8	13 7/8	4									
	8	5	**	1 1/2-12	2 1/4	1 1/2	11 3/8	13 7/8	13 7/8	4									
	9	5 1/2	**	1 1/2-12	2 1/4	1 1/2	11 3/8	13 7/8	13 7/8	4									
	0	6	**	1 1/2-12	2 1/4	1 1/2	11 3/8	13 7/8	13 7/8	4									
14	1(Std.)	2 1/2	1 7/8-12	—	3	1 1/2	12 7/8	15 5/8	15 3/8	4 1/4	-.0005 2.0000	2 3/4	2 1/2	1 3/4	2 1/2	2 1/2	3 5/16	2 3/8	250
	3	3	**	1 7/8-12	3	1 1/2	12 7/8	15 5/8	15 3/8	4 1/4									
	4	3 1/2	**	1 7/8-12	3	1 1/2	12 7/8	15 5/8	15 3/8	4 1/4									
	5	4	**	1 7/8-12	3	1 1/2	12 7/8	15 5/8	15 3/8	4 1/4									
	6	4 1/2	**	1 7/8-12	3	1 1/2	12 7/8	15 5/8	15 3/8	4 1/4									
	7	5	**	1 7/8-12	3	1 1/2	12 7/8	15 5/8	15 3/8	4 1/4									
14	8	5 1/2	**	1 7/8-12	3	1 1/2	12 7/8	15 5/8	15 3/8	4 1/4									
	9	6	**	1 7/8-12	3	1 1/2	12 7/8	15 5/8	15 3/8	4 1/4									
	0	6 1/2	**	1 7/8-12	3	1 1/2	12 7/8	15 5/8	15 3/8	4 1/4									

Maximum operating pressure at 4:1 design factor is based on tensile strength of material. Pressure ratings are based on standard commercial bearing ratings.

Note: For additional dimensions see Series 2A, page 40.

* Dimension CD is hole diameter.

** Corresponding rod eye pin diameter may not match pin diameter of cap.

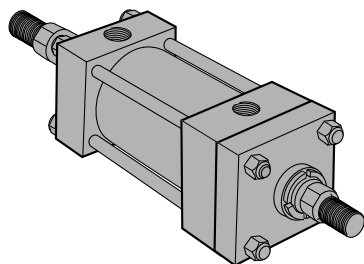
Rod No. 1 is standard.

For Cylinder Division Plant Locations – See Page II.



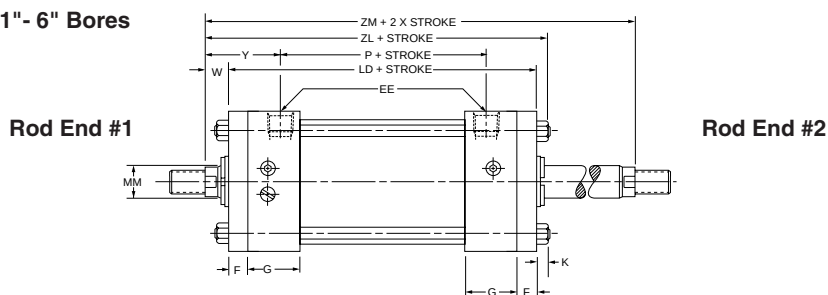
Double Rod Models 1" to 14" Bore Sizes

Series 2A Heavy Duty Air Cylinders

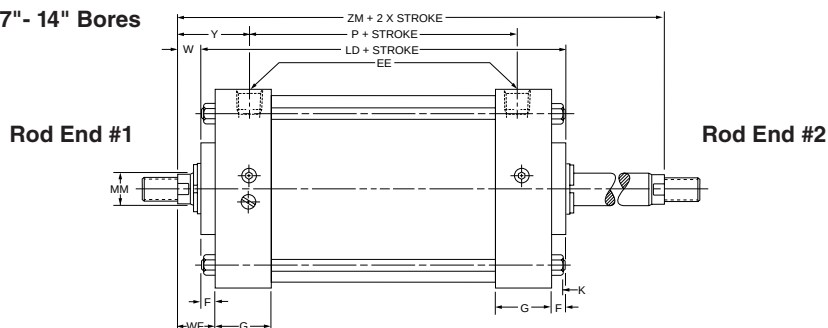


How to Use Double Rod Cylinder Dimensioned Drawings

1" - 6" Bores



7" - 14" Bores



Mounting Styles for Single Rod Models	Mounting Styles for Corresponding Double Rod Models*	Dimensions Shown on This Page Supplement Dimensions on Pages Listed Below	
		1"-6" Bores Page No.	8"-14" Bores Page No.
T	KT	20	34
TB**	KTB	20	34
TD	KTD	20	34
J	KJ	20	—
JB**	KJB	22	34
C**	KC	24	36
E	KE	24	36
F	KF	24	38
CB	KCB	26	40
G	KC	26	38
D	KD	28	42
DD	KDD†	28	42

*If only one end of these Double Rod Cylinders is to be cushioned, be sure to specify clearly which end this will be.

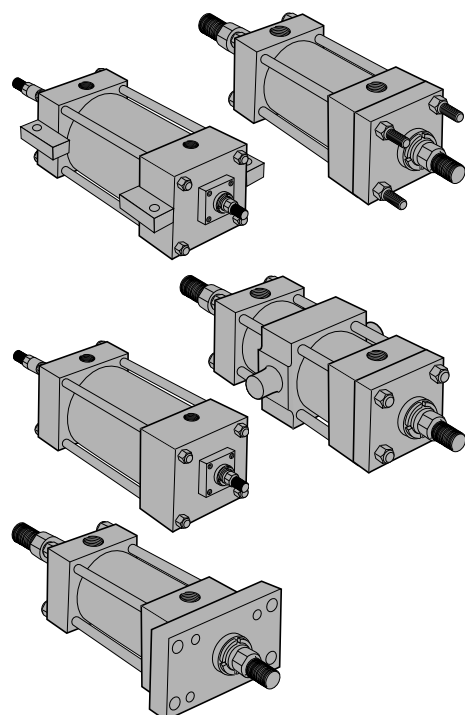
**Available in 7" bore, page 32.

†Specify XI dimension from rod end #1.

To determine dimensions for a double rod cylinder, first refer to the desired single rod mounting style cylinder shown on preceding pages of this catalog. (See table at left.) After selecting necessary dimensions from that drawing, return to this page supplement the single rod dimensions with those shown on drawings at right and dimension table below. Note that double rod cylinders have a head (Dim. G) at both ends and that dimension LD replace LB and ZL replaces ZB, etc. The double rod dimensions differ from, or are in

addition to those for single rod cylinders shown on preceding pages and provide the information needed to completely dimension a double rod cylinder.

On a double rod cylinder where the two rod ends are different, be sure to clearly state which rod end is to be assembled at which end. Port position 1 is standard. If other than standard, specify pos. 2, 3 or 4 when viewed from rod end #1 only. See port position information in Section C.



All dimensions are in inches and apply to Code 1 rod sizes only. For alternate rod sizes, determine all envelope dimensions (within LD dim.) as described above and then use appropriate rod end dimensions for proper rod size from single rod cylinder.

Bore	Rod No.	Rod Dia. MM	Add Stroke										Add 2X Stroke
			LD	ZL	SA _K	XA _K	ZA _K	SS _K	SN _K	SE _K	XE _K	ZE _K	
1	1	1/2	4 3/4	5 1/2	6 3/8	6 3/16	6 1/2	3 3/8*	2 1/8	*	*	*	6
1 1/2	1	5/8	4 7/8	5 3/4	6 7/8	6 1/2	6 7/8	3 3/8	2 1/4	6 3/8	6 1/4	6 1/2	6 1/8
2	1	5/8	4 7/8	5 13/16	6 7/8	6 1/2	6 7/8	3 3/8	2 1/4	6 3/4	6 7/16	6 3/4	6 1/8
2 1/2	1	5/8	5	5 15/16	7	6 5/8	7	3 1/2	2 3/8	7 1/8	6 11/16	7	6 1/4
3 1/4	1	1	6	7 1/8	8 1/2	8	8 1/2	3 3/4	2 5/8	7 3/4	7 5/8	8	7 1/2
4	1	1	6	7 1/8	8 1/2	8	8 1/2	3 3/4	2 5/8	8	7 3/4	8 1/8	7 1/2
5	1	1	6 1/4	7 7/16	9	8 3/8	9	3 5/8	2 7/8	8 3/8	8 1/16	8 9/16	7 3/4
6	1	1 3/8	7	8 5/16	9 3/4	9 1/4	9 7/8	4 1/8	3 3/8	9	8 7/8	9 3/8	8 3/4
7	1	1 3/8	7 1/8	—	—	—	—	4 1/4	3 3/4	—	—	—	8 7/8
8	1	1 3/8	7 1/8	—	9 1/4	9 1/16	9 3/4	4 1/4	3 3/4	7 7/8	8 3/8	9	8 7/8
10	1	1 3/4	8 1/8	—	10 7/8	10 5/8	11 1/2	4 7/8	4 1/8	9 1/4	9 13/16	10 7/16	10 3/8
12	1	2	8 5/8	—	11 3/8	11 1/4	12 1/8	5 3/8	4 5/8	9 3/4	10 7/16	11 1/16	11 1/8
14	1	2 1/2	10 1/8	—	13 1/2	13 5/16	14 3/8	6 3/8	5 1/2	11 5/8	12 3/8	13 3/8	13 1/8
Replaces: On single rod mounting styles:			LB	ZB	SA	XA	ZA	SS	SN	SE	XE	ZE	—
			All Mtg. Styles					CB	C,E	F	G		All Mtgs.

* Mounting styles KE, KG and KDD not available in 1" and 7" bore sizes.

For additional information – call your local Parker Cylinder Distributor.

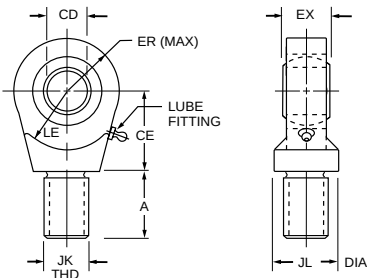
Series 2A Heavy Duty Air Cylinders

Cylinder Accessories Spherical Bearing Mounting Style SB

Parker offers a complete range of Cylinder Accessories to assure you of the greatest versatility in present or future cylinder applications. Accessories offered for the respective

cylinder include the Rod Eye, Pivot Pin and Clevis Bracket. To select the proper part number for any desired accessory refer to the charts below.

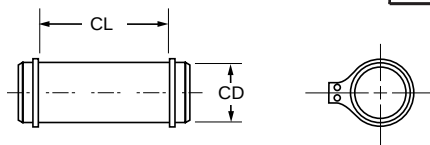
Spherical Rod Eye



Order to fit Piston Rod Thread Size.

Bore Sizes	Series 2A	1 1/2, 2 & 2 1/2	3 1/4, 4 & 5	6 & 8	10	12	14
Rod Eye	Part No.	132290	132291	132292	132293	132294	132295
CD		.5000 ^{-.0005}	.7500 ^{-.0005}	1.0000 ^{-.0005}	1.3750 ^{-.0005}	1.7500 ^{-.0005}	2.0000 ^{-.0005}
A		11/16	1	1 1/2	2	2 1/8	2 7/8
CE		7/8	1 1/4	1 7/8	2 1/8	2 1/2	2 3/4
EX		7/16	2 1/32	7/8	1 3/16	1 17/32	1 3/4
ER		13/16	1 1/8	1 1/4	1 11/16	2 1/16	2 1/2
LE		3/4	1 1/16	1 7/16	1 7/8	2 1/8	2 1/2
JK		7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
JL		7/8	1 5/16	1 1/2	2	2 1/4	2 3/4
LOAD CAPACITY LBS.		2644	9441	16860	28562	43005	70193

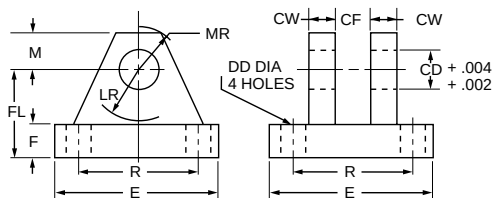
Pivot Pin



Pivot Pins are furnished with
(2) Retainer Rings.

Bore Sizes	Series 2A	1 1/2, 2 & 2 1/2	3 1/4, 4 & 5	6 & 8	10	12	14
Pivot Pin	Part No.	83962	83963	83964	83965	83966	83967
CD		.4997 ^{-.0004}	.7497 ^{-.0005}	.9997 ^{-.0005}	1.3746 ^{-.0006}	1.7496 ^{-.0006}	1.9996 ^{-.0007}
CL		1 9/16	2 1/32	2 1/2	3 5/16	4 7/32	4 15/16
LOAD CAPACITY LBS.		8600	19300	34300	65000	105200	137400

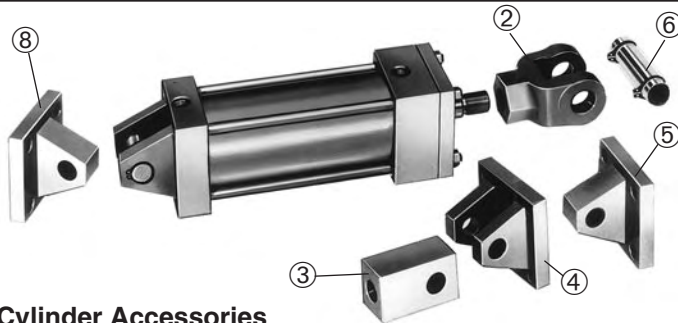
Clevis Bracket



Order to fit Mounting Plate or Rod Eye.

Bore Sizes	Series 2A	1 1/2, 2 & 2 1/2	3 1/4, 4 & 5	6 & 8	10	12	14
Clevis Bracket	Part No.	83947	83948	83949	83950	83951	83952
CD		1/2	3/4	1	1 3/8	1 3/4	2
CF		7/16	2 1/32	7/8	1 3/16	1 17/32	1 3/4
CW		1/2	5/8	3/4	1	1 1/4	1 1/2
DD		13/32	17/32	17/32	2 1/32	2 9/32	2 9/32
E		3	3 3/4	5 1/2	6 1/2	8 1/2	10 5/8
F		1/2	5/8	3/4	7/8	1 1/4	1 1/2
FL		1 1/2	2	2 1/2	3 1/2	4 1/2	5
LR		15/16	1 3/8	1 11/16	2 7/16	2 7/8	3 5/16
M		1/2	7/8	1	1 3/8	1 3/4	2
MR		5/8	1	1 3/16	1 5/8	2 1/16	2 3/8
R		2.05	2.76	4.10	4.95	6.58	7.92
LOAD CAPACITY LBS.		5770	9450	14300	20322	37800	50375

For Cylinder Division Plant Locations – See Page II.



Cylinder Accessories

Parker offers a complete range of cylinder accessories to assure you of greatest versatility in present or future cylinder applications.

Rod End Accessories

Accessories offered for the rod end of the cylinder include Rod Clevis, Eye Bracket, Knuckle, Clevis Bracket and Pivot Pin. To select the proper part number for any desired accessory, refer to Chart A below and look opposite the thread size of the rod end as indicated in the first column. The Pivot Pins, Eye Brackets and Clevis Brackets are listed opposite the thread size which their mating Knuckles or Clevises fit.

Chart A

Thread Size	Mating Parts			Mating Parts			Alignment Coupler
	Rod Clevis	Eye Bracket	Pin	Knuckle	Clevis Bracket	Pin	
⁵ / ₁₆ -24	51221	74077	—	74075	74076	74078	134757 0031
⁷ / ₁₆ -20	50940	69195	68368	69089	69205	68368	134757 0044
¹ / ₂ -20	50941	69195	68368	69090	69205	68368	134757 0050
³ / ₄ -16	50942	69196	68369	69091	69206†	68369	134757 0075
³ / ₄ -16	133284	69196	68369	69091	69206	68369	134757 0075
⁷ / ₈ -14	50943	*85361	68370	69092	69207	68370	134757 0088
1-14	50944	*85361	68370	69093	69207	68370	134757 0100
1-14	133285	*85361	68370	69093	69207	68370	134757 0100
¹ / ₄ -12	50945	69198	68371	69094	69208	68371	134757 0125
¹ / ₄ -12	133286	69198	68371	69094	69208	68371	134757 0125
¹ / ₂ -12	50946	*85362	68372	69095	69209	68372	133739 0150
¹ / ₄ -12	50947	*85363	68373	69096	69210	69215	133739 0175
¹ / ₈ -12	50948	*85363	68373	69097	69210	69215	133739 0188
² / ₁ -12	50949	*85364	68374	69098	69211	68374	Consult Factory
² / ₁ -12	50950	*85365	68375	69099	69212	68375	
² / ₃ -12	50951	*85365	68375	69100	69213	69216	
³ / ₄ -12	50952	73538	73545	73536	73542	73545	
³ / ₂ -12	50953	73539	73547	73437	73542	73545	
4-12	50954	73539	73547	73438	73543	82181	
⁴ / ₂ -12	—	—	—	73439	73544	73547	

†For alignment coupler dimensions, see Section C.

*Cylinder accessory dimensions conform to NFPA recommended standard NFPA/T3.6.8 R1-1984, NFPA recommended standard fluid power systems — cylinder — dimensions for accessories for cataloged square head industrial types. Parker adopted this standard in April, 1985. Eye Brackets or Mounting Plates shipped before this date may have different dimensions and will not necessarily interchange with the NFPA standard. For dimensional information on older style Eye Brackets or Mounting Plates consult Drawing #144805 or previous issues of this catalog.

NOTE: For economical accessory selection, it is recommended that rod end style 4 be specified on your cylinder order.

Accessory Load Capacity

The various accessories on Pages 48 and 49 have been load rated for your convenience. The load capacity in lbs. shown on page 49, is the recommended maximum load for that accessory based on a 4:1 design factor in tensions. (Pivot Pin is rated in shear.) Before specifying, compare the actual load or the tension (pull) force at maximum operating pressure of the cylinder with the load capacity of the accessory you plan to use. If load or pull force of cylinder exceeds load capacity of accessory, consult factory.

Mounting Plates

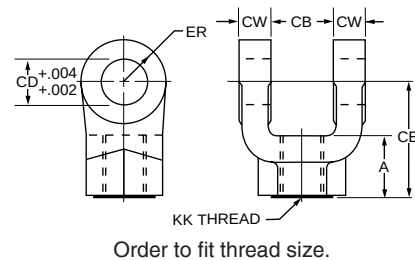
Mounting Plates for Style BB and Style BC (Clevis mounted) cylinders are offered. To select proper part number for your application, refer to Chart B, above right.

Chart B

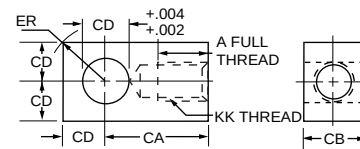
Mtg. Plate	Series 2A
Part No.	Bore Size
74076‡	1"
69195	1½", 2", 2½"
69196	3¼", 4", 5"
*85361	6", 7", 8"
69198	10"
*85362	12"
*85363	14"

‡Mounting plate for 1" bore single lug BC & BB cylinder mounting style is Clevis Bracket P/N 74076.

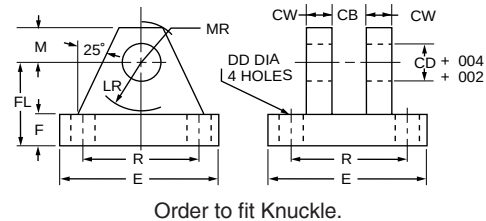
② Female Rod Clevis



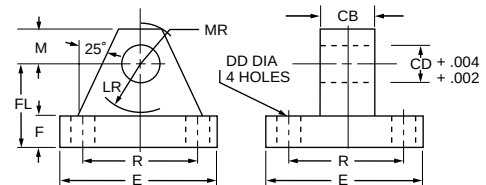
③ Knuckle (Female Rod Eye)



④ Clevis Bracket for Knuckle

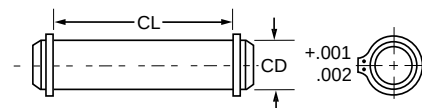


⑧ Mounting Plate or ⑤ Eye Bracket



- When used to mate with the Rod Clevis, select from Chart A.
- When used to mount the Style BB or BC cylinders, select from the Mounting Plate Selection Table. See Chart B at lower left.

⑥ Pivot Pin



- Pivot Pins are furnished with Clevis Mounted Cylinders as standard.
- Pivot Pins are furnished with (2) Retainer Rings.
- Pivot Pins must be ordered as a separate item if to be used with Knuckles, Rod Clevises, or Clevis Brackets.

For additional information – call your local Parker Cylinder Distributor.

Series 2A Heavy Duty Air Cylinders

Cylinder Accessories

	Female Rod Clevis Part Number																		
	51221†	50940	50941	50942	133284	50943	50944	133285	50945	133286	50946	50947	50948	50949	50950	50951	50952	50953	50954
A	¹³ / ₁₆	³ / ₄	³ / ₄	¹ / ₈	¹ / ₈	¹ / ₂	¹ / ₂	¹ / ₂	¹ / ₂	2	² / ₄	3	3	³ / ₂	³ / ₂	³ / ₂	³ / ₂ ‡	4‡	4‡
CB	¹¹ / ₃₂	³ / ₄	³ / ₄	¹ / ₄	¹ / ₄	¹ / ₂	¹ / ₂	¹ / ₂	2	2	² / ₂	² / ₂	² / ₂	3	3	3	4	⁴ / ₂	⁴ / ₂
CD	⁵ / ₁₆	¹ / ₂	¹ / ₂	³ / ₄	³ / ₄	1	1	1	¹ / ₈	¹ / ₈	¹ / ₄	2	2	² / ₂	3	3	³ / ₂	4	4
CE	² / ₄	¹ / ₂	¹ / ₂	² / ₈	² / ₈	² / ₁₆	² / ₁₆	³ / ₈	³ / ₄	⁴ / ₈	⁴ / ₂	⁵ / ₂	⁵ / ₂	⁶ / ₂	⁶ / ₄	⁶ / ₄	⁷ / ₄	⁸ / ₁₆	⁸ / ₁₆
CW	¹³ / ₆₄	¹ / ₂	¹ / ₂	⁵ / ₈	⁵ / ₈	³ / ₄	³ / ₄	³ / ₄	1	1	¹ / ₄	¹ / ₄	¹ / ₄	¹ / ₂	¹ / ₂	¹ / ₂	2	² / ₄	² / ₄
ER	¹⁹ / ₆₄	¹ / ₂	¹ / ₂	³ / ₄	³ / ₄	1	1	1	¹ / ₈	¹ / ₈	¹ / ₄	2	2	² / ₂	² / ₄	² / ₄	³ / ₂	4	4
KK	⁵ / ₁₆ -24	⁷ / ₁₆ -20	¹ / ₂ -20	³ / ₄ -16	³ / ₄ -16	⁷ / ₈ -14	1-14	1-14	¹ / ₄ -12	¹ / ₄ -12	¹ / ₂ -12	¹ / ₄ -12	¹ / ₈ -12	² / ₄ -12	² / ₂ -12	² / ₄ -12	³ / ₄ -12	³ / ₂ -12	4-12
Load Capacity Lbs.⊖	2600	4250	4900	11200	11200	18800	19500	19500	33500	33500	45600	65600	65600	98200	98200	98200	156700	193200	221200

	Knuckle Part Number																
	74075	69089	69090	69091	69092	69093	69094	69095	69096	69097	69098	69099	69100	73536	73437	73438	73439
A	³ / ₄	³ / ₄	³ / ₄	1 ¹ / ₈	1 ¹ / ₈	1 ⁵ / ₈	2	2 ¹ / ₄	2 ¹ / ₄	3	3 ¹ / ₂	3 ¹ / ₂	3 ⁵ / ₈	4 ¹ / ₂	5	5 ¹ / ₂	5 ¹ / ₂
CA	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₂	2 ¹ / ₁₆	2 ³ / ₈	2 ¹³ / ₁₆	3 ⁷ / ₁₆	4	4 ³ / ₈	5	5 ¹³ / ₁₆	6 ¹ / ₈	6 ¹ / ₂	7 ⁵ / ₈	7 ⁵ / ₈	9 ¹ / ₈	9 ¹ / ₈
CB	⁷ / ₁₆	³ / ₄	³ / ₄	1 ¹ / ₄	1 ¹ / ₂	1 ¹ / ₂	2	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₂	3	3	3 ¹ / ₂	4	4	4 ¹ / ₂	5
CD	⁷ / ₁₆	¹ / ₂	¹ / ₂	³ / ₄	1	1	1 ³ / ₈	1 ³ / ₄	2	2	2 ¹ / ₂	3	3	3 ¹ / ₂	3 ¹ / ₂	4	4
ER	¹⁹ / ₃₂	²³ / ₃₂	²³ / ₃₂	1 ¹ / ₁₆	1 ⁷ / ₁₆	1 ⁷ / ₁₆	1 ³¹ / ₃₂	2 ¹ / ₂	2 ²⁷ / ₃₂	2 ²⁷ / ₃₂	3 ⁹ / ₁₆	4 ¹ / ₄	4 ¹ / ₄	4 ³¹ / ₃₂	4 ³¹ / ₃₂	5 ¹ / ₁₆	5 ¹¹ / ₁₆
KK	⁵ / ₁₆ -24	⁷ / ₁₆ -20	¹ / ₂ -20	³ / ₄ -16	⁷ / ₈ -14	1-14	1 ¹ / ₄ -12	1 ¹ / ₂ -12	1 ³ / ₄ -12	1 ⁷ / ₈ -12	2 ¹ / ₄ -12	2 ¹ / ₂ -12	2 ³ / ₄ -12	3 ¹ / ₄ -12	3 ¹ / ₂ -12	4-12	4 ¹ / ₂ -12
Load Capacity Lbs.⊖	3300	5000	5700	12100	13000	21700	33500	45000	53500	75000	98700	110000	123300	161300	217300	273800	308500

	Clevis Bracket for Knuckle Part Number												
	74076	69205	69206	69207	69208	69209	69210	69211	69212	69213	73542	73543	73544
CB	¹⁵ / ₃₂	³ / ₄	¹ / ₄	¹ / ₂	2	² / ₂	² / ₂	3	3	³ / ₂	4	⁴ / ₂	5
CD	⁷ / ₁₆	¹ / ₂	³ / ₄	1	¹ / ₈	¹ / ₄	2	² / ₂	3	3	³ / ₂	4	4
CW	³ / ₈	¹ / ₂	⁵ / ₈	³ / ₄	1	¹ / ₄	¹ / ₂	¹ / ₂	¹ / ₂	¹ / ₂	2	2	2
DD	¹⁷ / ₆₄	¹³ / ₃₂	¹⁷ / ₃₂	²¹ / ₃₂	²¹ / ₃₂	²⁹ / ₃₂	¹ / ₁₆	¹ / ₁₆	¹ / ₁₆	¹ / ₁₆	¹ / ₁₆	² / ₁₆	² / ₁₆
E	² / ₄	³ / ₂	5	⁶ / ₂	⁷ / ₂	⁹ / ₂	¹² / ₄	¹² / ₄	¹² / ₄	¹² / ₄	¹⁵ / ₂	¹⁷ / ₂	¹⁷ / ₂
F	³ / ₈	¹ / ₂	⁵ / ₈	³ / ₄	⁷ / ₈	⁷ / ₈	1	1	1	1	¹ / ₁₆	¹ / ₁₆	¹ / ₁₆
FL	1	¹ / ₂	¹ / ₈	² / ₄	3	³ / ₈	⁴ / ₄	⁴ / ₂	6	6	⁶ / ₁₆	⁷ / ₁₆	⁷ / ₁₆
LR	⁵ / ₈	³ / ₄	¹ / ₁₆	¹ / ₂	2	² / ₄	³ / ₁₆	³ / ₂	⁴ / ₄	⁴ / ₄	5	⁵ / ₄	⁵ / ₄
M	³ / ₈	¹ / ₂	³ / ₄	1	¹ / ₈	¹ / ₄	² / ₄	² / ₂	3	3	³ / ₂	4	4
MR	¹ / ₂	⁵ / ₈	²⁹ / ₃₂	¹ / ₄	¹ / ₃₂	² / ₃₂	² / ₃₂	³ / ₈	³ / ₃₂	³ / ₃₂	⁴ / ₈	⁴ / ₈	⁴ / ₈
R	1.75	2.55	3.82	4.95	5.73	7.50	9.40	9.40	9.40	9.40	12.00	13.75	13.75
Load Capacity Lbs.⊖	3600	7300	14000	19200	36900	34000	33000	34900	33800	36900	83500	102600	108400

	Eye Bracket and Mounting Plate Part Number										
	74077	69195	69196	85361*	69198	85362*	85363*	85364*	85365*	73538	73539
CB	⁵ / ₁₆	³ / ₄	¹ / ₄	¹ / ₂	2	² / ₂	² / ₂	3	3	4	⁴ / ₂
CD	⁵ / ₁₆	¹ / ₂	³ / ₄	1	¹ / ₈	¹ / ₄	2	² / ₂	3	³ / ₂	4
DD	¹⁷ / ₆₄	¹³ / ₃₂	¹⁷ / ₃₂	²¹ / ₃₂	²¹ / ₃₂	²⁹ / ₃₂	¹ / ₁₆	¹ / ₁₆	¹ / ₁₆	¹ / ₁₆	² / ₁₆
E	² / ₄	² / ₂	³ / ₂	⁴ / ₂	5	⁶ / ₂	⁷ / ₂	⁸ / ₂	⁹ / ₂	¹² / ₈	¹⁴ / ₈
F	³ / ₈	³ / ₈	⁵ / ₈	⁷ / ₈	⁷ / ₈	¹ / ₈	¹ / ₂	¹ / ₄	2	¹ / ₁₆	¹ / ₁₆
FL	1	¹ / ₈	¹ / ₈	² / ₈	3	³ / ₈	4	⁴ / ₃	⁵ / ₄	⁵ / ₁₆	⁶ / ₁₆
LR	⁵ / ₈	³ / ₄	¹ / ₄	¹ / ₂	² / ₈	² / ₄	² / ₂	3	³ / ₄	4	⁴ / ₂
M	³ / ₈	¹ / ₂	³ / ₄	1	¹ / ₈	¹ / ₄	2	² / ₂	² / ₄	³ / ₂	4
MR	¹ / ₂	⁹ / ₁₆	⁷ / ₈	¹ / ₄	¹ / ₈	² / ₈	² / ₁₆	3	³ / ₄	⁴ / ₈	⁵ / ₄
R	1.75	1.63	2.55	3.25	3.82	4.95	5.73	6.58	7.50	9.62	11.45
Load Capacity Lbs.⊖	1700	4100	10500	20400	21200	49480	70000	94200	121900	57400	75000

	Pivot Pin Part Number													
	74078	68368	68369	68370	68371	68372	68373	69215	68374	68375	69216	73545	82181	73547*
CD	⁷ / ₁₆	¹ / ₂	³ / ₄	1	1 ³ / ₈	1 ³ / ₄	2	2	2 ¹ / ₂	3	3	3 ¹ / ₂	4	4
CL	1 ⁵ / ₁₆	1 ⁷ / ₈	2 ⁵ / ₈	3 ¹ / ₈	4 ⁷ / ₈	5 ³ / ₁₆	5 ³ / ₁₆	5 ¹¹ / ₁₆	6 ³ / ₁₆	6 ¹ / ₄	6 ³ / ₄	8 ¹ / ₄	8 ⁵ / ₈	9
Shear Capacity Lbs.⊖	6600	8600	19300	34300	65000	105200	137400	137400	214700	309200	309200	420900	565800	565800

*Cylinder accessory dimensions conform to NFPA recommended standard NFPA/T3.6.8 R1-1984. NFPA recommended standard fluid power systems — cylinder — dimensions for accessories for cataloged square head industrial types. Parker adopted this standard in April, 1985. Eye Brackets or Mounting Plates shipped before this date may have different dimensions and will not necessarily interchange with the NFPA standard. For dimensional information on older style Eye Brackets or Mounting Plates consult Drawing #144805 or previous issues of this catalog.

⊖ See Accessory Load Capacity note on page 48.

*These sizes supplied with cotter pins.

†Includes Pivot Pin.

‡Consult appropriate cylinder rod end dimensions for compatibility.

For Cylinder Division Plant Locations – See Page II.



Series 2A Heavy Duty Air Cylinders

How to Order

How to Order Series “2A” Cylinders

When ordering Series 2A cylinders, please review the following:

Note: Duplicate cylinders can be ordered by giving the SERIAL NUMBER from the nameplate of the original cylinder. Factory records supply a quick positive identification.

Piston Rods: Specify rod code number based on diameter. Give thread style number for a standard thread or specify dimensions. See “Style 3 Rod End” below.

Cushions: If cushions are required specify according to the model number on the next page. If the cylinder is to have a double rod and only one cushion is required, be sure to specify clearly which end of the cylinder is to be cushioned.

Special Modifications: Additional information is required on orders for cylinders with special modifications. This is best handled with descriptive notes. For further information, consult factory.

Fluid Medium: Series 2A hydraulic cylinders are equipped with seals for use with lubricated air.

Class 1 Seals

Class 1 seals are the seals provided as standard in a cylinder assembly unless otherwise specified. For further information on fluid compatibility or operating limitations of all components, see section C.

For the 2A series cylinders the following make-up Class 1 Seals:
Primary Piston Rod Seal – Nitrile with PTFE back-up washers

Piston Rod Wiper – Nitrile
Piston Seals – Nitrile with polymyte back-up washers
O-Rings – Nitrile

Combination Mountings

Single Rod End The first mounting is the one called out on the head end of the cylinder. The second or subsequent mountings are called out as they appear in the assembly moving away from the rod end. Exception: When tie rod mountings are part of a combination, the model number should contain an “S” (Special) in the model code and a note in the body of the order clarifying the mounting arrangement. The “P” is used to define a thrust key and is not considered to be a mounting. However, it is located at the primary end.

Example: 4.00 CCBB2ALTS14AC x 10.000

Combination “C” mounting head only. “BB” mounting cap end
This cylinder is also cushioned at both ends.

Double Rod End In general, the model number is read left to right corresponding to the cylinder as viewed from left to right with the

primary end at rod end #1. See Double Rod Models information page in this section. For this option the piston rod number, piston rod end, and piston rod threads are to be specified for both ends. The simplest are for symmetric cylinders such as: TD, C, E, F, G, and CB mounts. All other mounting styles, the description of the first rod end will be at the mounting end. In the case of multiple mounts, the description of the first rod end will be at the primary mounting end. For “DD” mounts, the description of the first rod end will be the same location as the “XI” dimension.

Example: 4.00 KDD2ALT24A/18A x 10.000 XI=8

This is a center trunnion mounting cylinder with the XI dimension measured from the code 2 rod side of the cylinder which has the style 4 thread. The opposite end code 1 rod with the style 8 thread.

Style 3 Rod End

A style 3 rod end indicates a special rod end configuration. All special piston rod dimensions must have **all three:** KK; A; W/WF or LA/LAF specified with the rod fully retracted. A sketch or drawing should be submitted for rod ends requiring special machining such as snap ring grooves, keyways, tapers, multiple diameters, etc. It is good design practice to have this machining done on a diameter at least 0.065 inches smaller than the piston rod diameter. This allows the piston rod to have a chamfer preventing rod seal damage during assembly or

maintenance. Standard style 55 rod ends with a longer than standard WG dimension should call out a style 3 rod end and the note: **same as 55 except WG=_____**. A drawing should be submitted for special 55 rod ends that have specific tolerances or special radii. Special rod ends that have smaller than standard male threads, larger than standard female threads, or style 55 rod ends with smaller than standard AF or AE dimensions are to be reviewed by Engineering for proper strength at operating pressure.

Service Policy

On cylinders returned to the factory for repairs, it is standard policy for the Cylinder Division to make such part replacements as will put the cylinder in as good as new condition. Should the condition of the returned cylinder be such that expenses for repair would exceed the costs of a new one, you will be notified.

Address all correspondence and make shipments to, Service Department at your nearest regional plant listed in the pages of this catalog.

Certified Dimensions

Parker Cylinder Division guarantees that all cylinders ordered from this catalog will be built to dimensions shown. All dimensions are certified to be correct, and thus it is not necessary to request certified drawings.

For additional information – call your local Parker Cylinder Distributor.

Series 2A

Heavy Duty Air Cylinders

Model Numbers

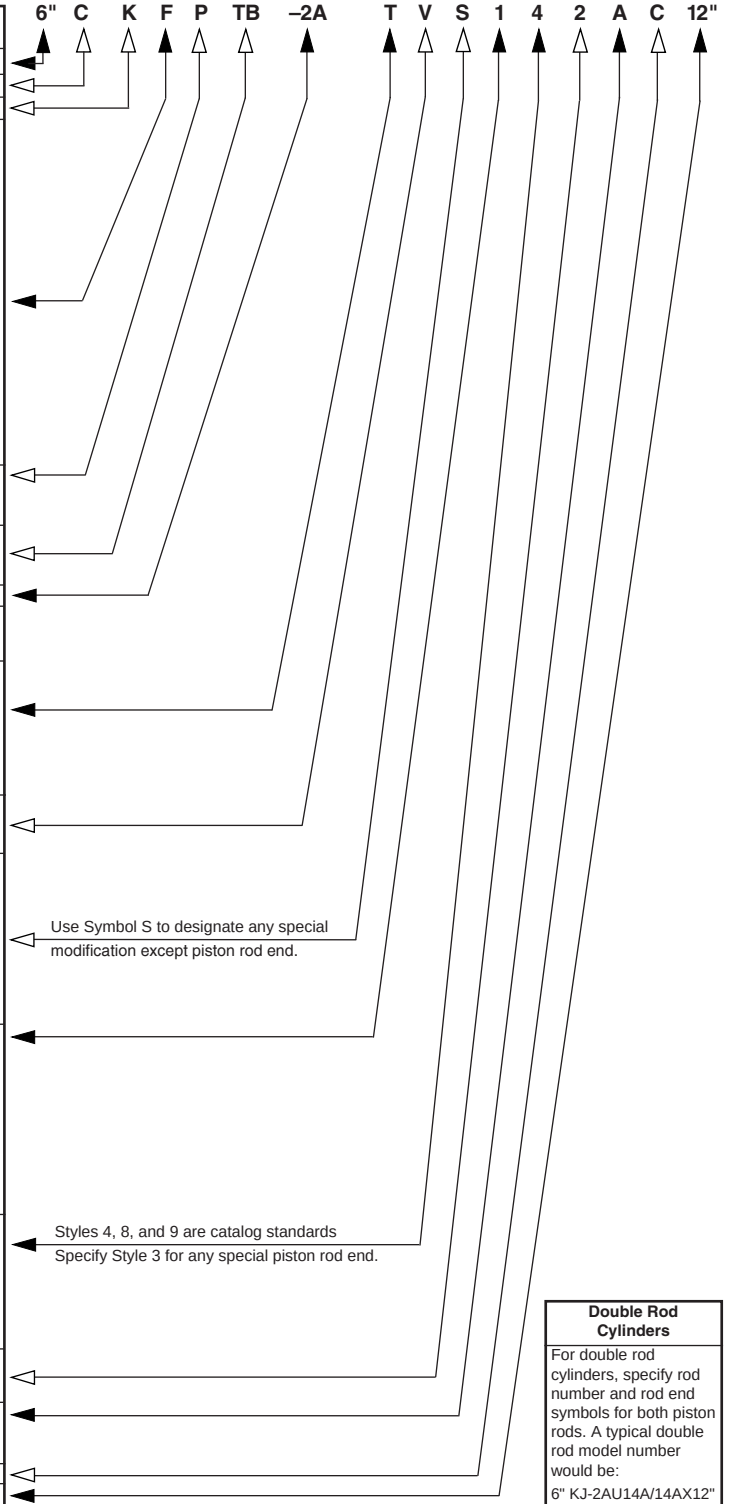
Series 2A Model Numbers – How to Develop Them – How to “Decode” Them

Parker Series 2A cylinders can be completely and accurately described by a model number consisting of coded symbols. To develop a model

number, select only those symbols that represent the cylinder required, and place them in the sequence indicated below.

Note: Page numbers with a letter prefix, ie: C77, are located in section C of this catalog.

Feature	Description	Page No.	Symbol
Bore*	Specify in inches	—	—
Cushion-Head	Used only if cushion required	C101-103	C
Double-Rod	Used only if double-rod cylinder is required	A46	K
Mounting* Style	Head Tie Rods Extended	20 & 34	TB
	Cap Tie Rods Extended	20 & 34	TC
	Both End Tie Rods Extended	20 & 34	TD
	Head Rectangular Flange	20	J
	Cap Rectangular Flange	20	H
	Head Square Flange	22 & 34	JB
	Cap Square Flange	22 & 34	HB
	Side Lugs	24 & 36	C
	Centerline Lugs	24 & 36	E
	Side Tapped	24 & 38	F
	Side End Angles	26 & 40	CB
	Side End Lugs	26 & 38	G
	Cap Fixed Clevis	30 & 40	BB
	Head Trunnion	28 & 42	D
	Cap Trunnion	28 & 42	DB
	Intermediate Fixed Trunnion ‡	28 & 42	DD
	Cap Detachable Clevis	30	BC
	Spherical Bearing	44 & 45	SB
Mounting Modifications	Thrust Key (Styles C,F,G, & CB only)	C93	P
	Manifold Port O-Ring Seal (Style C only)	C89-91	M
	Removable Trunnions	C88	R
Combination Mounting Style	Any Practical Mounting Style	—	As
	Listed Above	—	listed
		—	above
Series*	Used in all 2A Model Numbers	—	-2A
Piston	Lipseal™ Piston standard. No need for symbol in model number. Piston Bumper Seals	— C20	— 4
Ports*	NPTF (Dry Seal Pipe Thread) is standard.	C89-91	U
	Used only for SAE Straight Thread O-Ring Port	C89-91	T
	Used only for BSP (Parallel Thread SO 228)	C89-91	R
	Used only for BSPT (Taper Thread ISO 7-Rc)	C89-91	B
	Used only for Metric Thread	C89-91	G
	Used only for Metric Thread per SO 6149	C89-91	Y
Common Modifications	Nut Retained Piston	A19	F
	Fluorocarbon Seals	C83	V
	Water Service	C83	W
Special Modifications	Used only if special Modifications are required:		
	Oversize Ports	C89-91	
	Port Position Change	C89-91	
	Rod End Bellows	C104	
	Special Seals	C83	S
	Stop Tube†	C95	
	Stroke Adjuster	C93	
	Tie Rod Supports	C93	
	Water Service Modification	C83	
Piston Rod* Number	For Single Rod Cylinders, select one only. Refer to Rod number listing, Table 2, Pages 20 through 43. Note: Check chart in Section C, page 96 for minimum piston rod diameter	— — — — — — — — — —	1 2 3 4 5 6 7 8 9 0
Piston* Rod End	Select:		
	Style 4 Small Male	C92	4
	Style 7 Female Thread for Spherical Rod Eye	A44, 45	7
	Style 8 Intermediate Male	C92	8
	Style 9 Short Female	C92	9
	Style 55 Rod End for Flange Coupling	C19	55
Piston Rod Alternate Thread	Used only for stud two times longer than standard.	C92	2
Piston Rod* Threads	UNF Standard	C92	A
	BSF (British Fine)	C92	W
	Metric	C101-C103	M
Cushion-Cap	Used only if cushion required	C93	C
Stroke*†	Specify in inches	—	—



*Required for Basic Cylinder Model Number

Dark Arrows Indicate Basic Minimum Model Number

‡Specify XI dimension

†In case of Stop Tube, call out gross stroke length.

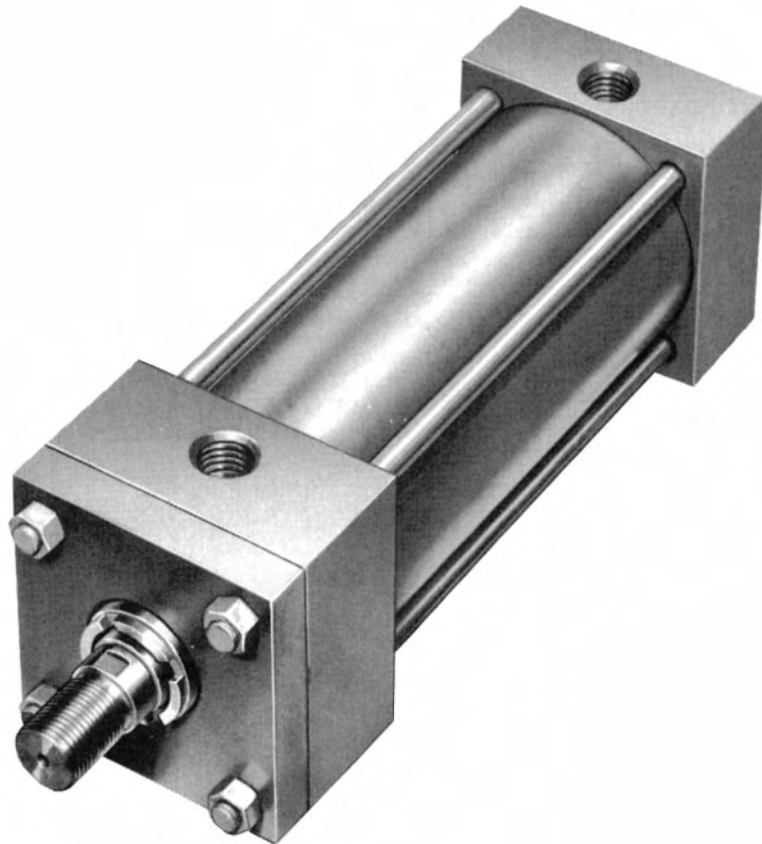
Cylinder serial numbers are factory production record numbers and are assigned to each cylinder, in addition to the model number.

For Cylinder Division Plant Locations – See Page II.



Parker Non-Lube Heavy Duty Air Cylinders

Series 2AN



For millions of trouble free cycles

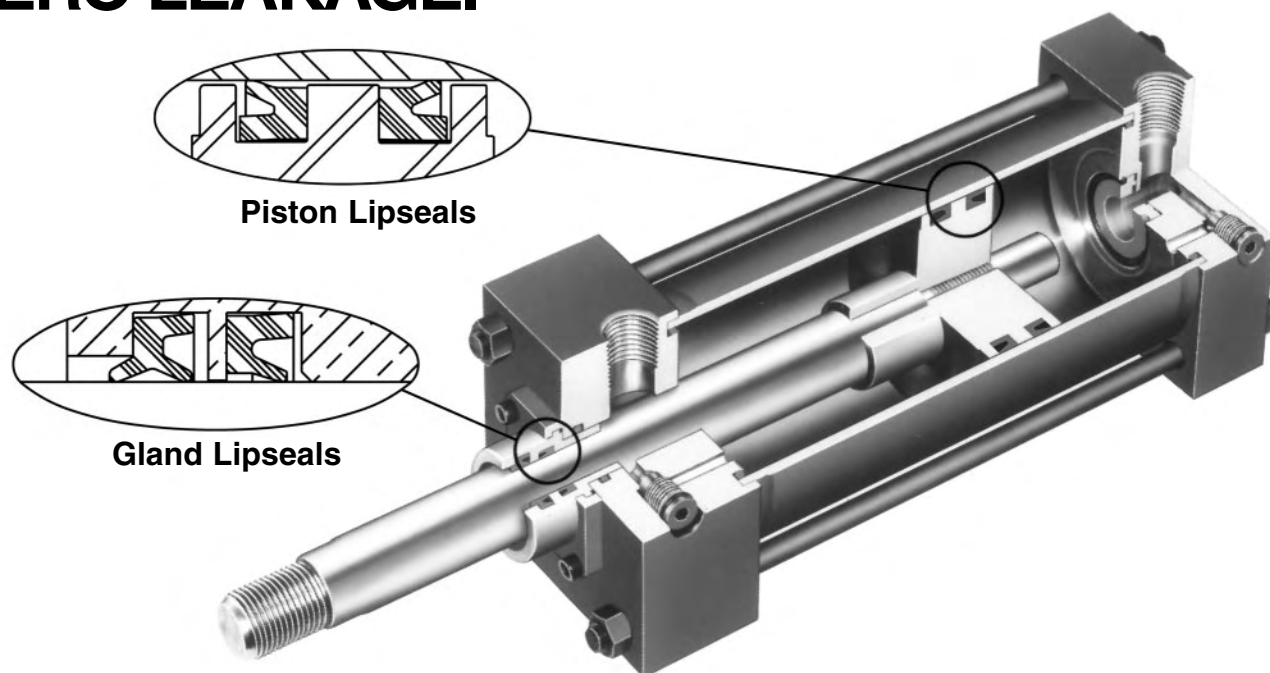
- Nominal Pressure – 250 PSI – Air Service
- Standard Bore Sizes 1½" through 14"
- Piston Rod Diameters – ⅝" through 5½"
- 17 Standard Mounting Styles
- N.F.P.A. Interchangeable
- Exceeds Automotive Specifications

For additional information – call your local Parker Cylinder Distributor.

Another Parker Cylinder Innovation...

The SERIES 2AN Non-Lube Air Cylinder with Proven Performance.

Over 21 million trouble free cycles with... ZERO LEAKAGE.



Design Data

In 1971 Parker experimented with the use of specially designed composite materials in the piston and gland of their cylinders. Their use of storing lubricating oil met with good results. Through extensive testing it was learned that the outside diameter of the material in the piston and the inside diameter on the material in the gland showed signs of wear and ultimately would lose contact with the surface of the cylinder body bore or piston rod. As a result, the cylinders lost their self lubricating capacity.

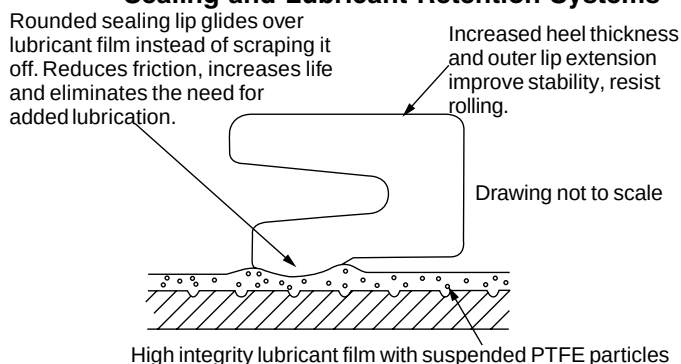
Today's industrial market demands more from a pneumatic cylinder. Cylinders are still required to handle tough, heavy-duty applications. But, more and more, these cylinders operate in environments or circumstances where it is not possible or advantageous to add lubrication to the compressed air entering the cylinder. Certain packaging and assembly operations, food environments, and microprocessor chip manufacturing are typical examples of areas where the exhausting of oil into the environment is not desirable. In many other situations, "non-lube" systems are used when proper air line lubrication is not present because of the time and expense of keeping lubricators filled and operating correctly.

Increased market demand and continuous research and testing efforts inspired the development of the

Series 2AN Non-Lubricated Air Cylinder. In bore sizes to 12" diameter and rod diameters to 2-1/2", the Parker Series 2AN air cylinder features rounded lip rod and piston seals. These seals glide over the PTFE based lubricant that is provided at the time of manufacture. The Parker Series 2AN Non Lubricated Air Cylinder maintains the lubricant film where it belongs; on the seals bearing surfaces, piston rod and cylinder bore.

Benefits include... long seal and bearing life. No oil needs to be added through the use of lubricators. As the cylinder strokes, no oil is expelled into the atmosphere with the exhaust air.

Anatomy of Series 2AN Sealing and Lubricant Retention Systems



For Cylinder Division Plant Locations – See Page II.



In the Series 2AN you get all the cost saving benefits and features of the popular heavy duty Series 2A air cylinder including...

- The Jewel Rod Gland Assembly for positive no leak sealing
- Steel tube cylinder body with chrome-plated micro finish bore...
- Piston rod, hard chrome plated and case hardened steel
- **PLUS** the innovative "NON-LUBE" feature which further increases your benefits of lower operating and maintenance costs.
- High strength rolled thread Piston Rod Stud

Standard Specifications

- Heavy Duty Service—ANSI/(NFPA) T3.6.7R2-1996 Specifications and Mounting Dimension Standards.
 - Standard Fluid—Filtered Dry Air.
 - Standard Construction—Square Head —Tie Rod Design.
 - Strokes—Available in any Practical Stroke Length.
 - Standard Temperature— -10°F. to +165°F.
 - Cushions—Optional at either end or both ends of stroke. "Float Check" at cap end.
- In line with our policy of continuing product improvement, specifications in this catalog are subject to change.*

Available Bore and Rod Sizes*

Bore Sizes Available	1½"	2"	2½"	3¼"	4"	5"	6"	8"	10"	12"	14"
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Rod Sizes Available	5/8"	1"	1⅜"	1¾"	2"	2½"	3"	3½"	4"	4½"	5"	5½"
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*For specific cylinder bore size/piston rod availabilities and dimensions, see Series 2A Cylinder.

For additional information – call your local Parker Cylinder Distributor.

How to order Series “2AN” Non-Lube Air Cylinders

Data Required on all 2AN Cylinder Orders

When ordering Series “2AN” cylinders, be sure to specify each of the following requirements:

(Note: Duplicate cylinders can be ordered by giving the SERIAL NUMBER from the nameplate of the original cylinder. Factory records supply a quick, positive identification.)

a) Bore Size

b) Mounting Style

Specify your choice of mounting style — as shown and dimensioned in Series 2A. If double rod is wanted, specify “with double rod”.

c) Series Designation (“2AN”)

d) Length of Stroke

e) Piston Rod Diameter

Specify rod diameter or rod code number. In Series “2AN” cylinders, standard rod diameters (code No. 1) will be furnished if not otherwise specified, unless length of stroke makes the application questionable.

f) Piston Rod End Thread Style

Give thread style number or specify dimensions. Thread style number 4 will be supplied if not otherwise specified.

g) Cushions (if required)

Specify “Cushion-head end”, “Cushion-cap end” or “Cushion-both ends” as required. If cylinder is to have a double rod and only one cushion is required, be sure to specify clearly which end of the cylinder is to be cushioned.

Note: Parker Series 2AN cylinders can be completely and accurately described by a model number consisting of coded symbols. To develop a model number select only those symbols that represent the cylinder required and place them in the sequence as shown in the chart below.

Series 2AN Model Numbers – How to Develop Them – How to Decode Them.

	BORE SIZE	CUSHION HEAD END	DOUBLE ROD	MOUNTING STYLE	MOUNTING MOD.	COMBINA- TION MOUNTING STYLE	SERIES	PORT	SPECIAL FEATURES	ROD NO.	ROD END THREAD STYLE NO.	THREAD TYPE	CUSHION CAP END	STROKE
	3 1/4"	C	K	F	P	TB	2AN	U	S	1	4	A	C	X12
E X A M P L E	Specify 1 1/2" thru 14"	Specify only if cushion head end is required	Use only if Double Rod Cylinder is required	Specify— Mounting Style BB, BC, C, CB, D, DB, DD, E, F, G, H, HB, J, JB, T, TB, TC, TD	Specify: P—for Thrust Key—Mtg. Style C, F, G & CB only	Specify any practical Mount- ing Style available	Specify Series 2AN	Specify— Port Type required: U = NPTF T = S.A.E. R = BSP B = BSPT G = METRIC	Specify: Only if special modifica- tion is required Note: Do not use symbol “S” for Rod End Modifica- tions	Specify: Rod Code No.	Specify: Style 4 Small Male	Specify: A = UNF W = BSF M = METRIC	Specify only if Cushion Cap End is Req'd.	Specify in inches. Show Symbol “X” just ahead of stroke length.
					M—for Manifold Ports Style C only						Style 8 Inter- mediate Male			
					R—for Remov- able Trunnion Mtg. Style D & DB only						Style 9 Short Female			
											Style 3 Special. Specify KK, A, LA or W Dim.			

Modifications: All modifications that apply to the Series 2A Air Cylinder also apply to the Series 2AN *except* the use of Fluorocarbon seals. The maximum temperature of the Series 2AN is +165°F. Consult factory for higher temperature applications.

Warranty

Seller warrants the goods sold hereunder to be free from defects in material and workmanship. This warranty shall terminate eighteen months after date of shipment from Seller's plant and claims not made in writing within such period are waived.

The above warranty does not extend to goods damaged after date of shipment from Seller's plant where the damage is not directly due to a defect in material or workmanship, nor does it apply to goods altered or repaired by anyone other than Seller's authorized employees, nor to goods furnished by Buyer or acquired at Buyer's request and/or to Buyer's specifications.

If the goods are in accordance with or in reference to an engineering drawing specified by or furnished to the customer, the specifications and information on the drawing shall be applicable in determining such correct use, operation and application.

When claiming a breach of warranty, Buyer must notify Seller promptly whereupon Seller will either examine the goods at their site, or issue shipping instructions for return to Seller (transportation costs prepaid by Buyer). When any goods sold hereunder are proved not as warranted, Seller's sole obligation under this warranty shall be to repair or replace the goods, at its option, without charge to Buyer.

The above warranty comprises Seller's sole and entire warranty obligation and liability to Buyer, its customers and assigns in connection with goods sold hereunder. All other warranties, express or implied, including but not limited to, warranties of merchantability and fitness, are expressly excluded.

For Cylinder Division Plant Locations – See Page II.



Series MA

The No-Compromise Design

N.F.P.A. Air Cylinder from Parker

Proven Parker reliability at a cost that makes it right for your air cylinder application.



**Exclusive
with the New Parker
Check Seal Cushions:**

- Faster Cycle Time
- Easy Precision Adjustment
- Minimum Wear
- Low Pressure Drop

Factory Prelubricated

200 psi nominal air pressure

Standard bore sizes: 1½", 2", 2½", 3¼", 4", 5" and 6"

12 Standard mounting styles

For additional information – call your local Parker Cylinder Distributor.

Parker Series MA

N.F.P.A. Industrial Air Cylinders

Parker Series MA air cylinders meet or exceed N.F.P.A. Pneumatic Standards and except for Tie Rod Mount Styles conform to ANSI Standard B93.15-1981 for mounting dimensions of Square Head Industrial Fluid Power Cylinders.

For heavy-duty applications see Parker Series 2A cylinder page 17.

Standard Specifications

- Seven bore sizes – 1½" through 6"
- Three rod diameters – 5/8", 1" and 1⅜"
- Twelve mounting styles
- Choice of three rod end styles
- Cushions at head, cap or both ends

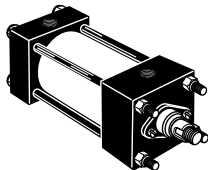
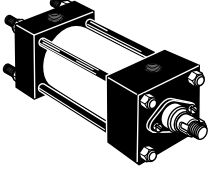
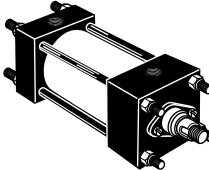
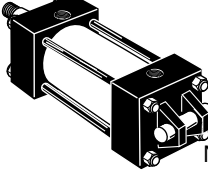
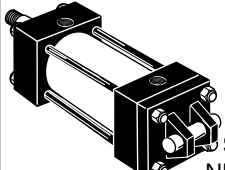
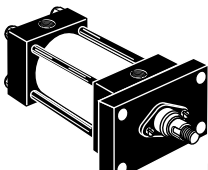
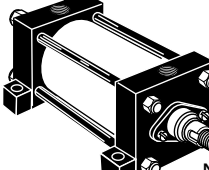
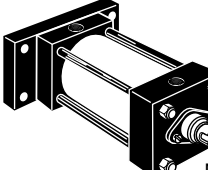
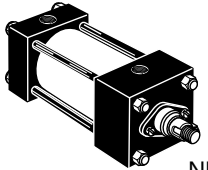
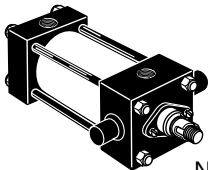
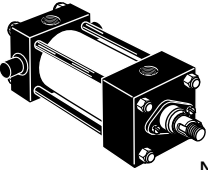
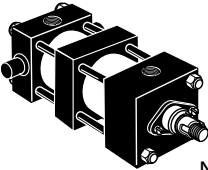
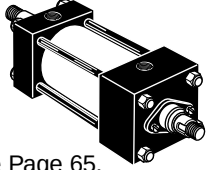
- Double rod models in six mounting styles
- JIC interchangeable
- Temperature Range – 10° F. to 165° F.*

*See Section C for higher temperature service, operating fluids, and temperature range.

For complete ordering information, see Page 69.

AVAILABLE MOUNTINGS

For Single Rod Styles, see Pages 60 through 63.

Tie Rods Extended Head End  Style TB	Tie Rods Extended Cap End  Style TC NFPA MX2	Tie Rods Extended Both Ends  Style TD	Cap Fixed Clevis  Style BB NFPA MP1
Cap Detachable Clevis  Style BC NFPA MP2	Head Rectangular Flange  Style J NFPA MF1	Side Lugs  Style C NFPA MS2	Cap Rectangular Flange  Style H NFPA MF2
Side Tapped  Style F NFPA MS4	Head Trunnion  Style D NFPA MT1	Cap Trunnion  Style DB NFPA MT2	Intermediate Trunnion  Style DD NFPA MT4
Double Rod Cylinders  Style KTB For Double Rod Styles, see Page 65.			

For Cylinder Division Plant Locations – See Page II.

Parker Series MA

N.F.P.A. Industrial Air Cylinders

The inside story on the no-compromise design

Here's an inside look at the solid design and construction that makes Parker Series MA the high performing, longer-lasting, economical choice for your air cylinder applications.

Rugged square steel heads and caps resist shock and provide maximum strength within minimum space. Factory-treated to resist corrosion.

Piston rod lipseal/wiper combination is completely self-compensating for zero leakage at all pressures. Keeps pressure in, contamination out.

High strength piston rod end stud (125,000 psi minimum yield steel) with rolled threads for 52% greater strength at this critical fatigue point. Choice of male or female thread at no extra cost. Anaerobic adhesive is used to permanently lock the stud to the rod.

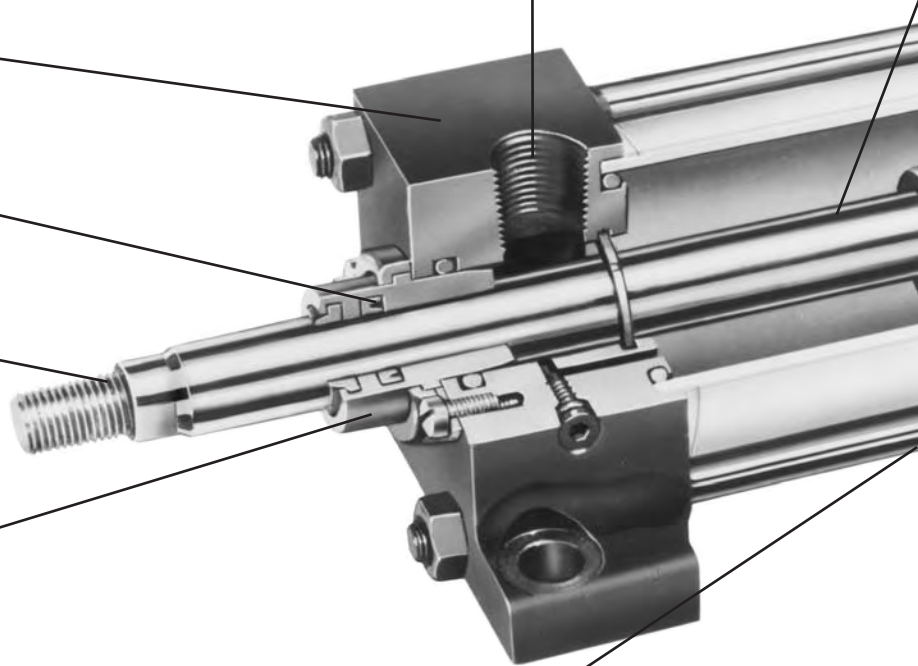
Bolt-on, high strength, rod gland removes screwdriver-easy on all mounting styles and bore sizes for fast, on-the-job rod seal replacement if needed.

Extra long inboard bearing surface insures lubrication from within the cylinder for longer life.

Factory prelubrication of rod and piston seal surfaces (rod bearing and cylinder bore surfaces).

Tie rods are 100,000 psi minimum yield steel with rolled threads for added strength. High strength nuts provide extra margin of safety.

Ports
N.P.T.F. ports are standard.



Parker's New Exclusive Check Seal Cushions For Increased Productivity and Maximum Performance

The Parker check seal cushion is new and different from ordinary cushion designs. It combines the sealing capabilities of a lipseal for efficient capture of air for effective cushioning with check valve action for quick stroke reversal.

The lipseal design also provides "floating cushions" to assure cushion repeatability and long life. At the start of the stroke in each direction, the check valve design allows full fluid flow to piston face with a minimum pressure drop for maximum power stroke.

Additional benefits of the new check seal cushions are increased productivity and top performance for faster cycle time, minimum wear, easy adjustment and low pressure drop.

The basic cushion design is optional and available on either the head end, cap end or both ends without change in envelope or mounting dimensions. A cushion adjusting needle is supplied for easy, precise adjustment on all bore sizes.

At the **head end** of the cylinder, the check seal is assembled into a groove in the central bore of the head, with the groove being slightly wider and larger in diameter than the check seal, so that it floats laterally and radially within predetermined limits. The check seal has four grooves molded into the face to provide flow passages; the assembly is put together with the lip of the seal facing toward the inside of the cylinder.

A cushion sleeve is mounted on the piston rod, so that as the rod extends, air ahead of the piston flows freely out the head-end port. When the end of the cushion sleeve reaches the lip of the check seal, it seals on the wall of the groove, trapping air for cushioning.

As pressure is applied to the head-end port on retraction, the air forces the seal towards the inside of the cylinder. The air

For additional information – call your local Parker Cylinder Distributor.

Hard chrome-plated and polished piston rod of 100,000 psi yield, high tensile strength steel for reliable performance and long rod seal life, less friction.

Cylinder body O-ring seals are pressure-actuated for positive sealing. Commercially available and easily replaced, if necessary.

Unique “check seal” cushions with molded flow passages combine the benefits of floating cushions with check valve action, provides effective cushioning and quick stroke reversal for more cycles per hour and higher production rates. Cushion needle valves make precise adjustment quick and easy.

Longest standard cushions in the industry for maximum cushioning capability.

Fully dynamic, self-compensating Lipseal™ piston seals designed for no-leak service at all operating pressures; easily replaced, if needed, without removing piston from rod.

One-piece, nodular iron piston, positively locked to rod – retains lubrication and provides a wide bearing surface. An anaerobic adhesive is used to permanently lock and seal the piston to the rod.

Piston-to-rod thread diameter increases with rod diameter for added strength and is equal to outer end Style 4 thread on all rod sizes.

Aluminum Alloy cylinder body with corrosion resistant smooth hard coated bore on 1½" and 2" bores.

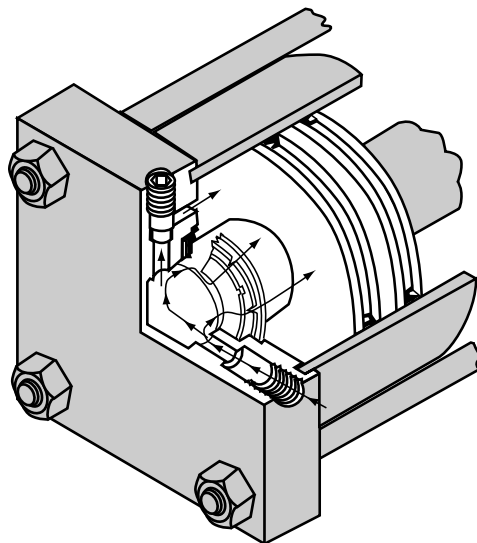
Chrome Plated Steel Tubing honed to a 15 micro inch finish on 2½", 3¼", 4", 5" and 6" bores (cylinders supplied with reed switches are equipped with aluminum barrels).

then flows around the OD of the seal and through the flutes of the seal washer. Full-flow, quick starts with little or no pressure drop is just one of the major benefits of the design.

At the **cap end** of the cylinder, the check seal is assembled into a cavity in the face of the cap with four beads molded on the OD to provide a flow passage. A fluted washer and retaining ring, rather than a groove, and a cushion spear which extends from the rear face of the piston complete the cap end assembly. When the rounded, tapered portion of the cushion spear reaches the lip of the seal, the seal seats against the rear wall of the cavity, trapping air for cushioning.

The configuration of the check-seal lip, and the controlled shape of the cushion sleeve together prevent the lip from rolling over or extruding. A check seal used at both ends provides the benefits of floating cushions with check valve action for maximum cushion effectiveness and quick stroke reversal. This new check-seal design has been tested in millions of cycles, in the lab and in the field.

Series MA cushions are the longest in the industry and are designed for maximum customer benefit.



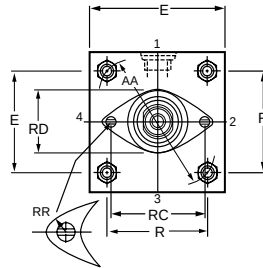
For Cylinder Division Plant Locations – See Page II.

Basic Cylinder Style T (NFFA Style MX0)

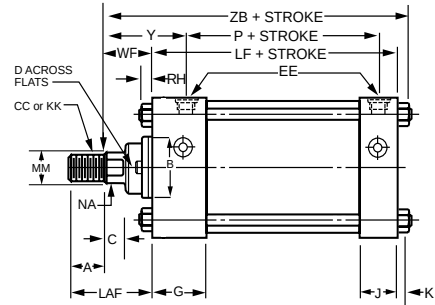
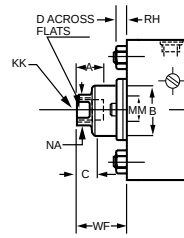
Rod end Style 4 is standard per dimension KK. Styles 8 or 9 are optional at no extra charge. A high strength rod end stud is standard on Styles 4 and 8 for all rod sizes.

For special rod ends such as nonstandard threads, rod extensions, blanks, etc., specify Style 3 and furnish desired dimensions for CC, KK, A, WF, LA and LAF.

If rod end is not specified, Style 4 will be supplied.



Style 9 Rod End
NFFA SF

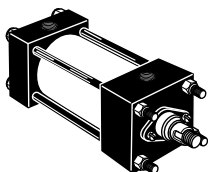


Style 4 & 8 Rod End
NFFA SM & IM

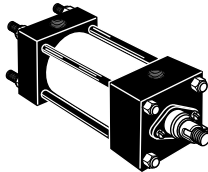
Rod End Dimensions – Styles 9 (NFFA SF), 4 (NFFA SM) and 8 (NFFA IM)																				Basic Envelope and Mounting Dimensions								
Bore	Rod No.	Rod Dia. MM	Thread		A	+0.000 -0.002 B	C	D	LA	LAF	NA	RC	RD	RH	RR	V	W	WF	Y	AA	E	(NPTF) EE	G	J	K	Add Stroke		
			Style 8 CC	Style 4 & 9 KK																						LF	P	ZB
1½	1	⅝	½-20	7/16-20	¾	.999	⅜	½	1⅜	1¾	9/16	11 1/16	15/16	3/16	11/64	¼	⅝	1	15 1/16	2.02	2	⅜	1½	1	¼	3⅝	2¼	47/8
2	1	⅝	½-20	7/16-20	¾	.999	⅜	½	1⅜	1¾	9/16	11 1/16	15/16	3/16	11/64	¼	⅝	1	15 1/16	2.6	2½	⅜	1½	1	5/16	3⅝	2¼	415/16 55/16
	3	1	7/8-14	¾-16	1⅜	1.499	½	7/8	2⅛	2½	15/16	23/16	113/16	3/16	11/64	¼	1	1⅜	25/16									
2½	1	⅝	½-20	7/16-20	¾	.999	⅜	½	1⅜	1¾	9/16	11 1/16	15/16	3/16	11/64	¼	⅝	1	15 1/16	3.1	3	⅜	1½	1	5/16	3¾	2⅜	5¼ 51/16
	3	1	7/8-14	¾-16	1⅜	1.499	½	7/8	2⅛	2½	15/16	23/16	113/16	3/16	11/64	½	1	1⅜	25/16									
3¼	1	1	7/8-14	¾-16	1⅜	1.499	½	7/8	17/8	2½	15/16	23/16	113/16	3/16	11/64	¼	¾	1⅜	27/16	3.9	3¾	½	1¾	1¼	¾	4¼	2⅝	6 6¼
	3	1⅜	1¼-12	1-14	1⅝	1.874	5/8	1⅞	2⅝	3¼	15/16	211/16	215/64	7/32	13/64	¾	1	1⅝	211/16									
4	1	1	7/8-14	¾-16	1⅜	1.499	½	7/8	17/8	2½	15/16	23/16	113/16	3/16	11/64	¼	¾	1⅜	27/16	4.7	4½	½	1¾	1¼	¾	4¼	2⅝	6 6¼
	3	1⅜	1¼-12	1-14	1⅝	1.874	5/8	1⅞	2⅝	3¼	15/16	211/16	215/64	7/32	13/64	¾	1	1⅝	211/16									
5	1	1	7/8-14	¾-16	1⅜	1.499	½	7/8	17/8	2½	15/16	23/16	113/16	3/16	11/64	¼	¾	1⅜	27/16	5.8	5½	½	1¾	1¼	7/16	4½	27/8	6⅝ 69/16
	3	1⅜	1¼-12	1-14	1⅝	1.874	5/8	1⅞	2⅝	3¼	15/16	211/16	215/64	7/32	13/64	¾	1	1⅝	211/16									

Tie Rod Mounted Styles TB, TC, TD

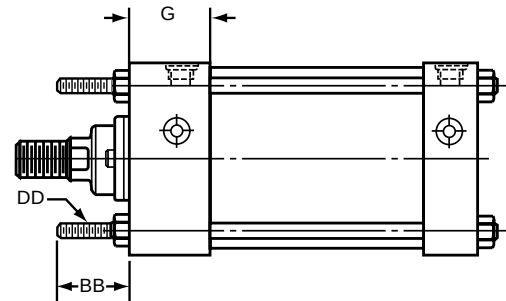
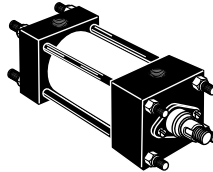
Style TB



Style TC
NFFA
(MX2)



Style TD



Style TB, Tie Rods Extended, is illustrated at right. Style TC, Cap Tie Rods Extended, and Style TD, Both Ends Tie Rods Extended, can be dimensioned from Style TB drawing.

Dimensions for Specific Series MA Mounting Styles H, J, C, F, BB and BC

Bore	Rod No.	Rod Dia. MM	BB	CB	+0.000 -0.002 CD	CW	DD	F	FB	L	LR	M	MR	ND	NT	R	SB*
1 1/2	1	5/8	1	3/4	.501	1 1/2	1 1/4-28	3/8	5/16	3/4	3/4	1/2	5/8	5/16	1 1/4-20	1.43	7/16
2	1	5/8	1 1/8	3/4	.501	1 1/2	5 1/16-24	3/8	3/8	3/4	3/4	1/2	5/8	11 1/32	5 1/16-18	1.84	7/16
	3	1															
2 1/2	1	5/8	1 1/8	3/4	.501	1 1/2	5 1/16-24	3/8	3/8	3/4	3/4	1/2	5/8	7/16	3 1/8-16	2.19	7/16
	3	1															
3 1/4	1	1	1 3/8	1 1/4	.751	5/8	3 1/8-24	5/8	7/16	1 1/4	1	3/4	15 1/16	1/2	1 1/2-13	2.76	9/16
	3	1 3/8															
4	1	1	1 3/8	1 1/4	.751	5/8	3 1/8-24	5/8	7/16	1 1/4	1	3/4	15 1/16	5/8	1 1/2-13	3.32	9/16
	3	1 3/8															
5	1	1	1 13/16	1 1/4	.751	5/8	1 1/2-20	5/8	9/16	1 1/4	1	3/4	15 1/16	3/4	5 1/8-11	4.10	13/16
	3	1 3/8															

*Upper surface spotfaced for socket head screws.

For additional information – call your local Parker Cylinder Distributor.

Tie Rod Mountings

Single Rod

The image contains three technical drawings of hydraulic cylinders, each with its own set of dimensions and labels.

- Single Acting Hydraulic Cylinder:**
 - Dimensions: ZF + STROKE, Y, WF, P + STROKE, LF + STROKE, RH, EE, MM, B, K, LAF, G, XF + STROKE, J, F.
 - Labels: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
- Double Acting Hydraulic Cylinder:**
 - Dimensions: UF, R, E, RD, 2, R, KK, NA, C, F, WF, J, K.
 - Labels: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.
- Telescopic Hydraulic Cylinder:**
 - Dimensions: Y, YB + STROKE, P + STROKE, LB + STROKE, EE, MM, B, K, LAF, G, XF + STROKE, J, K.
 - Labels: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Style J (NFPA MF1)

Style F (NFPA MS4)

Style BC (NFPA MP2)

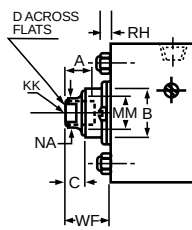
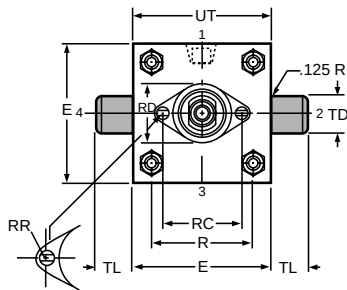
ST	SU	SW	TF	TN	TS	UF	US	LB	Add Stroke									
									SN	SS	XC	XD	XF	XS	XT	ZC	ZF	ZD
1/2	15/16	3/8	23/4	5/8	23/4	33/8	31/2	4	21/4	27/8	53/8	53/4	45/8	13/8	115/16	57/8	5	61/4
1/2	15/16	3/8	33/8	7/8	31/4	41/8	4	4	21/4	27/8	53/8 53/4	53/4 61/8	45/8 5	13/8 13/4	115/16 25/16	57/8 61/4	5 53/8	61/4 65/8
1/2	15/16	3/8	37/8	11/4	33/4	45/8	41/2	41/8	23/8	3	51/2 57/8	57/8 61/4	43/4 51/8	13/8 13/4	115/16 25/16	6 63/8	51/8 51/2	63/8 63/4
3/4	11/4	1/2	411/16	11/2	43/4	51/2	53/4	47/8	25/8	31/4	67/8 71/8	71/2 73/4	55/8 57/8	17/8 21/8	27/16 211/16	75/8 77/8	61/4 61/2	81/4 81/2
3/4	11/4	1/2	57/16	21/16	51/2	61/4	61/2	47/8	25/8	31/4	67/8 71/8	71/2 73/4	55/8 57/8	17/8 21/8	27/16 211/16	75/8 77/8	61/4 61/2	81/4 81/2
1	19/16	11/16	65/8	211/16	67/8	75/8	81/4	51/8	27/8	31/8	71/8 73/8	73/4 8	57/8 61/8	21/16 25/16	27/16 211/16	77/8 81/8	61/2 63/4	81/2 83/4



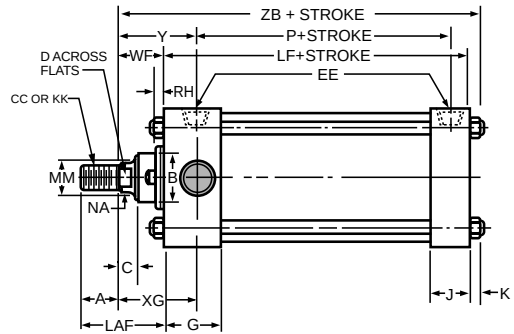
Series MA NFPA Industrial Air Cylinders

Trunnion Mountings

Head Trunnion Mounting Style D (NFPA Style MT1)

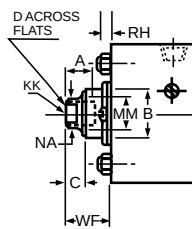
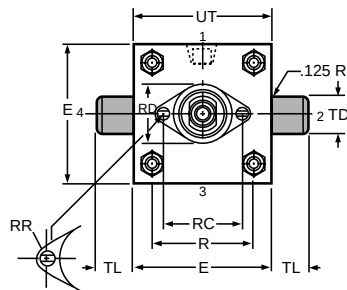


Style 9 Rod End
(NFPA SF)

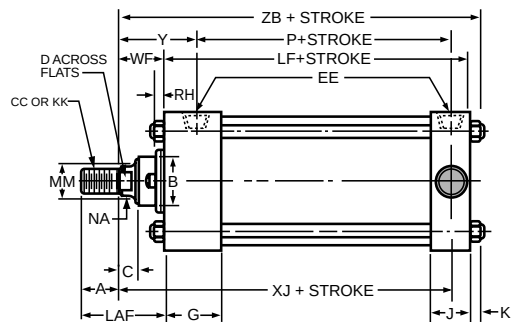


Style 4 & 8 Rod End
(NFPA SM & IM)

Cap Trunnion Mounting Style DB (NFPA Style MT2)



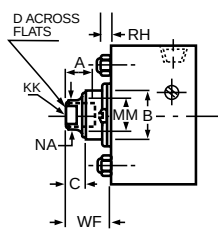
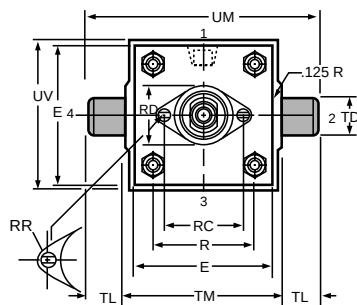
Style 9 Rod End
(NFPA SF)



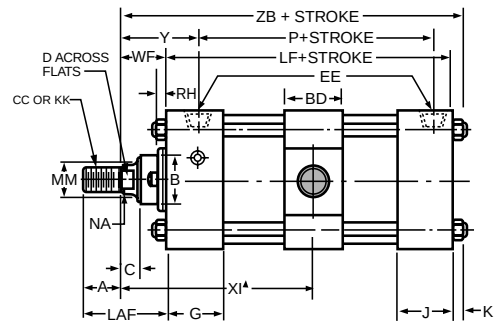
Style 4 & 8 Rod End
(NFPA SM & IM)

Intermediate Fixed Trunnion Mounting

Style DD (NFPA Style MT4)



Style 9 Rod End
(NFPA SF)



Style 4 & 8 Rod End
(NFPA SM & IM)

Note: For Rod End Dimensions See Page 60.					Basic Envelope and Mounting Dimensions																	
Bore	Rod No.	Rod Dia. MM	Thread		BD	E	(NPTF) EE	G	J	K	+0.000 TD -0.001	TL	TM	UM	UT	UV	XG	Min. XI▲	Add Stroke			
			Style 8 CC	Style 4 & 9 KK															LF	P	XJ	ZB
1½	1	5/8	1/2-20	7/16-20	1¼	2	3/8	1½	1	¼	1.000	1	2½	4½	4	2½	1¾	33/16	35/8	2¼	4⅛	47/8
2	1 3	5/8 1	1/2-20 7/8-14	7/16-20 3/4-16	1½	2½	3/8	1½	1	5/16	1.000	1	3	5	4½	3	1¾ 2⅛	35/16 311/16	35/8	2¼	4⅛ 4½	415/16 51/16
2½	1 3	5/8 1	1/2-20 7/8-14	7/16-20 3/4-16	1½	3	3/8	1½	1	5/16	1.000	1	3½	5½	5	3½	1¾ 2⅛	35/16 311/16	3¾	23/8	4¼ 45/8	51/16 57/16
3¼	1 3	1 13/8	7/8-14 1¼-12	3/4-16 1-14	2	3¾	1/2	1¾	1¼	3/8	1.000	1	4½	6½	5¾	4¼	2¼ 2½	43/16 47/16	4¼	25/8	5 5¼	6 6¼
4	1 3	1 13/8	7/8-14 1¼-12	3/4-16 1-14	2	4½	1/2	1¾	1¼	3/8	1.000	1	5¼	7¼	6½	5	2¼ 2½	43/16 47/16	4¼	25/8	5 5¼	6 6¼
5	1 3	1 13/8	7/8-14 1¼-12	3/4-16 1-14	2	5½	1/2	1¾	1¼	7/16	1.000	1	6¼	8¼	7½	6	2¼ 2½	43/16 47/16	4½	27/8	5¼ 5½	65/16 69/16

▲ Dimension XI to be specified by customer

For additional information – call your local Parker Cylinder Distributor.

Series MA, 6" Bore NFPA Industrial Air Cylinders

Tie Rod and Flange Mountings
6" Bore Size

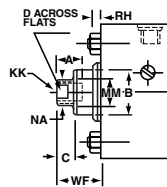
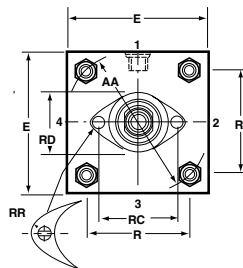
Basic Cylinder Style T (NFPA Style MX0)

Rod end Style 4 is standard per dimension KK. Styles 8 or 9 are optional at no extra charge. A high strength rod end stud is standard on Styles 4 and 8 for all rod sizes.

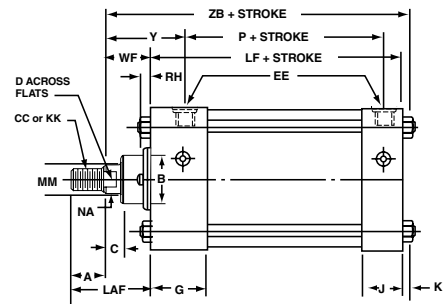
For special rod ends such as nonstandard threads, rod extensions, blanks, etc., specify Style 3 and furnish desired dimensions for CC, KK, A, WF, LA and LAF.

If rod end is not specified, Style 4 will be supplied.

See Table 3 for rod end dimensions.

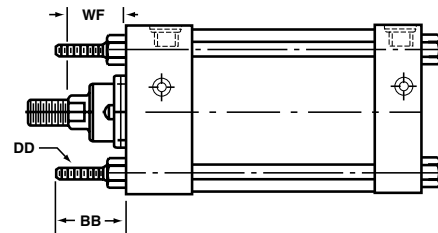
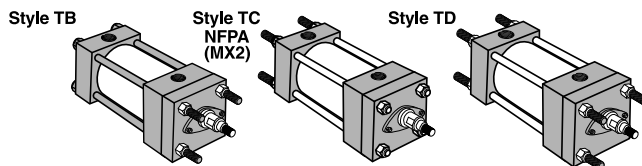


Parker Style 9 Rod End
NFPA SF



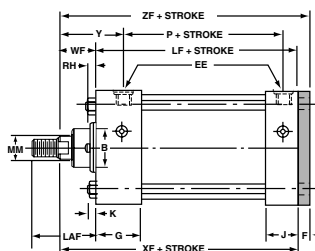
Parker Style 4 & 8 Rod End
NFPA SM & IM

Tie Rod Mounted Styles, TB, TC, TD

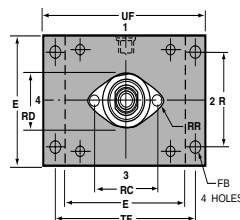
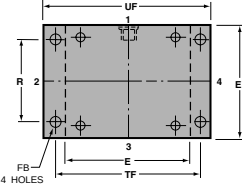


Style TB, Tie Rods Extended, is illustrated at right. Style TC, Cap Tie Rods Extended, and Style TD, Both Ends Tie Rods Extended, can be dimensioned from Style TB drawing.

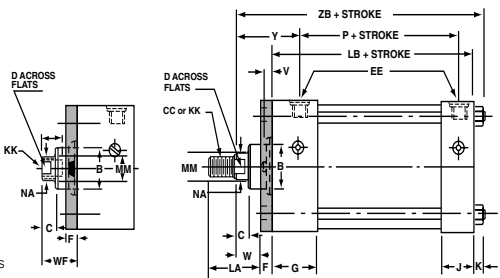
Flange Mountings Styles H, J



Style H (NFPA MF2)

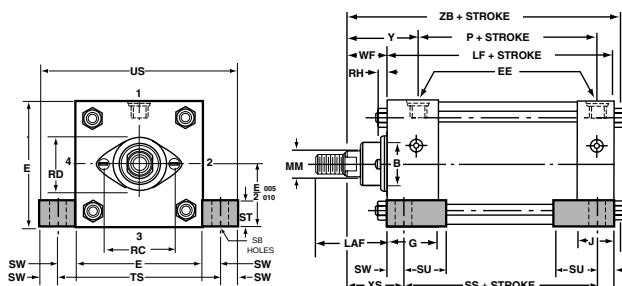


Style 9 Rod End (NFPA SF)

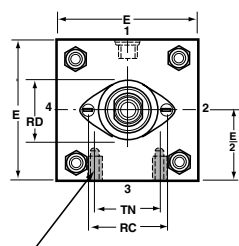


Style J (NFPA MF1)

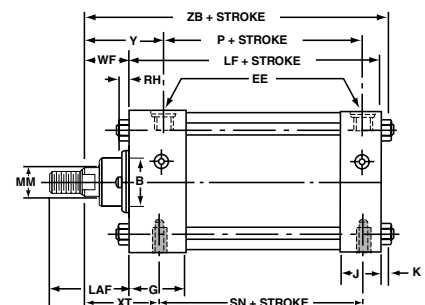
Side Mountings Styles C, F



Style C (NFPA MS2)



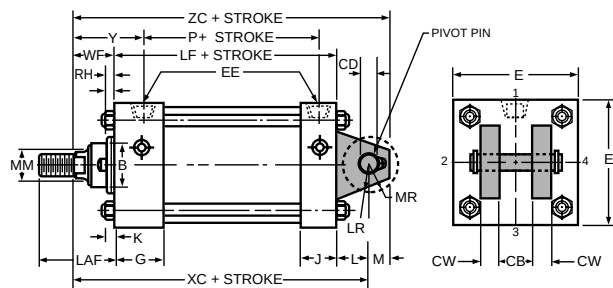
NT THREAD, ND DEEP
4 TAPED MTG. HOLES



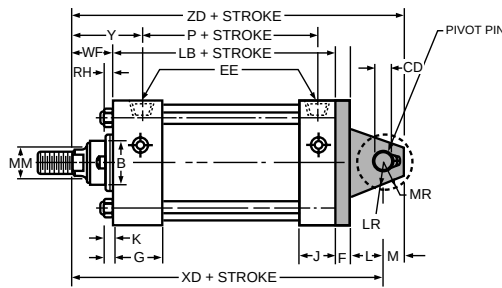
Style F (NFPA MS4)

For Cylinder Division Plant Locations – See Page II.

Pivot Mountings Styles BB, BC

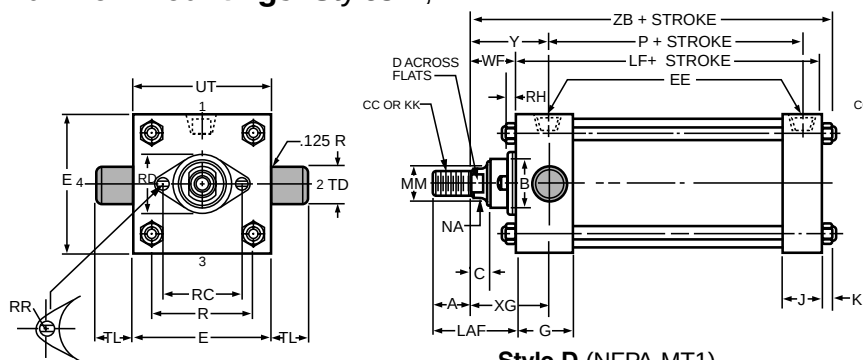


Style BB (NFPA MP1)

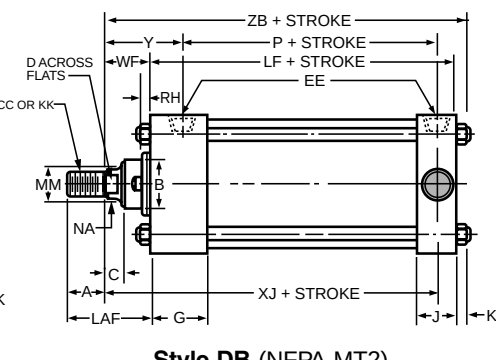


Style BC (NFPA MP2)

Trunnion Mountings Styles D, DB

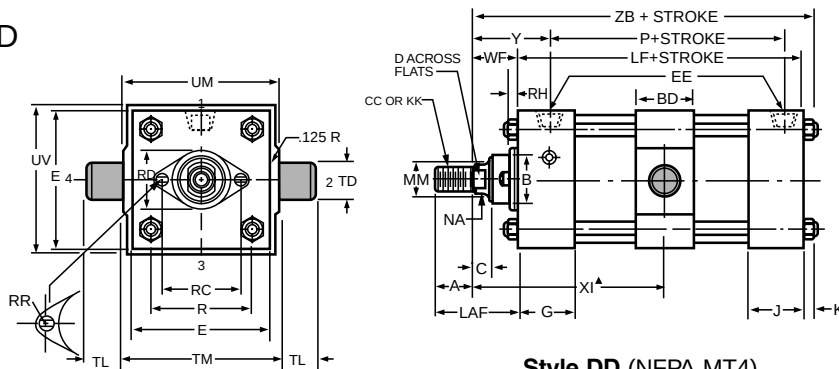


Style D (NFPA MT1)



Style DB (NFPA MT2)

Trunnion Mounting Style DD



Style DD (NFPA MT4)

Table 3 Rod End Dimensions—Styles 9 (NFPA SF), 4 (NFPA SM) and 8 (NFPA IM)

Bore	Rod No.	Rod Dia. MM	Thread		A	+0.000 -0.002 B	MIN. C	D	LA	LAF	NA	RC	RD	RH	RR	V	W	WF	Y
			Style 8 CC	Style 4 & 9 KK															
6	1	1 3/8	1 1/4-12	1-14	15/8	1.874	5/8	1 1/8	2 1/2	3 1/4	15 1/16	2 11/16	2 15/64	7/32	13/64	1/4	7/8	1 5/8	2 13/16

Table 4 Basic Envelope and Mounting Dimensions

Bore	Rod No.	Rod Dia. MM	AA	BB	BD	CB	+0.000 -0.002 CD	CW	DD	E	(NPTF) EE	F	FB	G	J	K	L	LR	M	MR	ND	NT	R	SB•	ST	SU	SW
6	1	1 3/8	6.9	1 13/16	2 1/2	1 1/2	1.001	3/4	1 1/2-20	6 1/2	3/4	3/4	9/16	2	1 1/2	7/16	1 1/2	1 1/4	1	1 13/16	7/8	3/4-10	4.88	13/16	1	1 9/16	1 11/16

Basic Envelope and Mounting Dimensions (cont.)

Bore	Rod No.	Rod Dia. MM	+0.000 TD -0.002													MIN. XI ▲	ADD STROKE															
				TF	TL	TM	TN	TS	UF	UM	US	UT	UV	XG	LB		LF	P	SN	SS	XC	XD	XF	XJ	XS	XT	ZB	ZC	ZF			
6	1	13/8	1.375	75/8	13/8	75/8	31/4	77/8	85/8	103/8	91/4	91/4	7	25/8	415/16	53/4	5	31/8	31/8	35/8	81/8	87/8	65/8	57/8	251/16	213/16	71/16	91/8	73/8			

• Upper surface spotfaced for socket head screws. ▲ Dimension XI to be specified by customer.

For additional information – call your local Parker Cylinder Distributor.

Series MA

NFPA Industrial Air Cylinders

Double Rod Models
1" to 6" bore sizes

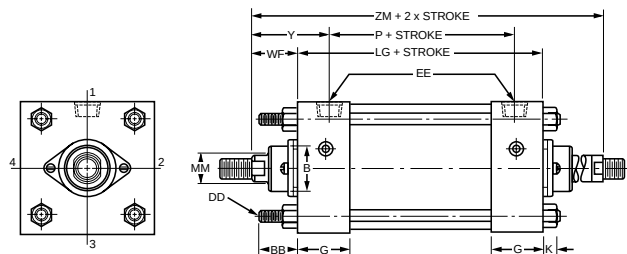
To dimension double rod cylinders, select the desired mounting style and refer to corresponding single rod model on pages 60-

64. After obtaining necessary dimensions from that drawing, supplement those with the drawings and tables below.

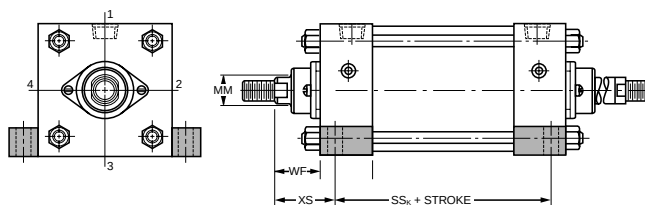
Tie Rods Extended Parker Style KT

Tie Rods Extended Head End, Style **KTB**.

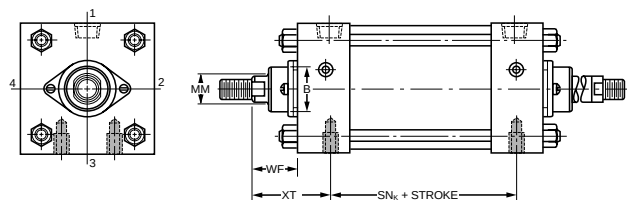
Tie Rods Extended Both Ends, Style **KTD**.



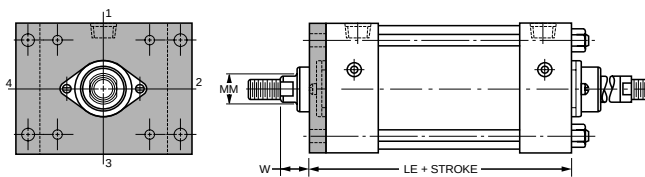
Side Lug Mounting Parker Style KC



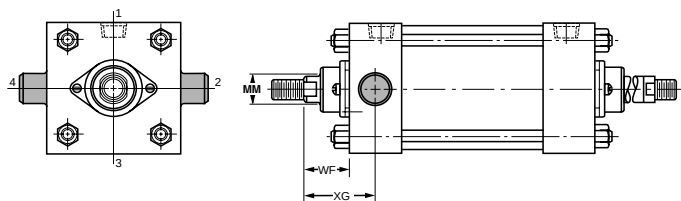
Side Tapped Mounting Parker Style KF



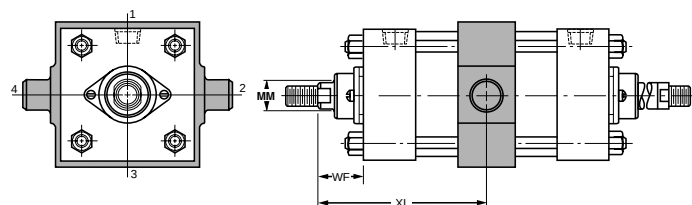
Rectangular Flange Mounting Parker Style KJ



Head Trunnion Mounting Parker Style KD



Intermediate Fixed Trunnion Mounting Parker Style KDD



Double Rod Cylinder Dimensions

Bore	Rod Dia.	Rod No.	Add Stroke				Add 2x Stroke ZM
			LG	LE	SS _K	SN _K	
1 1/2	5/8	1	4 1/8	4 1/2	3 3/8	2 1/4	6 1/8
2	5/8	1	4 1/8	4 1/2	3 3/8	2 1/4	6 1/8
	1	3					6 7/8
2 1/2	5/8	1	4 1/4	4 5/8	3 1/2	2 3/8	6 1/4
	1	3					7
3 1/4	1	1	4 3/4	5 3/8	3 3/4	2 5/8	7 1/2
	1 3/8	3					8
4	1	1	4 3/4	5 3/8	3 3/4	2 5/8	7 1/2
	1 3/8	3					8
5	1	1	5	5 5/8	3 5/8	2 7/8	7 3/4
	1 3/8	3					8 1/4
6	1 3/8	1	5 1/2	6 1/4	4 1/8	3 1/8	8 3/4
REPLACES DIMENSION			LF	LB	SS	SN	-
ON SINGLE ROD MOUNTING STYLES			T, TB, TC, C, F, D & DD	J	C	F	ALL

On a double rod cylinder where the two rod ends will be different, be sure to state very clearly which rod end is to go at which end of the cylinder.

NOTE: For Rod End Dimensions, see pages 60 and 64.

For Cylinder Division Plant Locations – See Page II.

Series MA NFFPA Industrial Air Cylinders

Accessories

Cylinder Accessories

Parker offers a range of heavy-duty cylinder accessories for convenient mounting of pivot mount cylinders or for use at rod end of fixed mount types. All are load capacity rated for use at 4:1 design factor in tension or compression (pivot pin is rated in shear)

when used on bore sizes recommended in tables below. Select rod clevises or knuckles by bore and thread size along with mating parts shown. Pivot pin must be ordered as separate item, if needed.

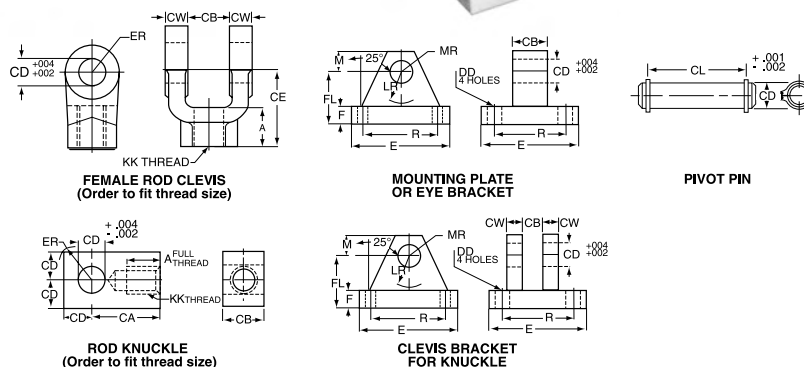
Mounting Plate



Mounting Plates

Mounting plates for Style BB and Style BC (clevis mounted) cylinders are offered. To select proper part number for your application, refer to Chart below.

Mounting Plate	Series "MA"
Part No.	Bore Size
69195	1½", 2", 2½"
69196	3¼", 4", 5"
▲85361	6"



Dimensions for Rod Clevis and Mating Parts

Bore Size	Rod Dia.	KK Thread Size	Rod Clevis	Eye Brkt.	Pivot Pin	A	CB	CD	CE	CL	CW	DD	E	ER	F	FL	LR	M	MR	R
1½	5/8	7/16-20	50940	69195	68368	3/4	3/4	1/2	11½	17/8	1/2	13/32	2½	1/2	3/8	11/8	3/4	1/2	9/16	1.63
2	5/8	7/16-20	50940	69195	68368	3/4	3/4	1/2	11½	17/8	1/2	13/32	2½	1/2	3/8	11/8	3/4	1/2	9/16	1.63
	1	3/4-16	50942 133284	69196	68369	1½	1¼	3/4	21/8 23/8	25/8	5/8	17/32	3½	3/4	5/8	17/8	1¼	3/4	7/8	2.55
2½	5/8	7/16-20	50940	69195	68368	3/4	3/4	1/2	11½	17/8	1/2	13/32	2½	1/2	3/8	11/8	3/4	1/2	9/16	1.63
	1	3/4-16	50942 133284	69196	68369	1½	1¼	3/4	21/8 23/8	25/8	5/8	17/32	3½	3/4	5/8	17/8	1¼	3/4	7/8	2.55
3¼	1	3/4-16	50942 133284	69196	68369	1½	1¼	3/4	21/8 23/8	25/8	5/8	17/32	3½	3/4	5/8	17/8	1¼	3/4	7/8	2.55
	1¾	1-14	50944 133285	85361▲	68370	15/8	1½	1	215/16 31/8	31/8	3/4	21/32	4½	1	7/8	23/8	1½	1	1¼	3.25
4 & 5	1	3/4-16	50942 133284	69196	68369	1½	1¼	3/4	21/8 23/8	25/8	5/8	17/32	3½	3/4	5/8	17/8	1¼	3/4	7/8	2.55
	1¾	1-14	50944 133285	85361▲	68370	15/8	1½	1	215/16 31/8	31/8	3/4	21/32	4½	1	7/8	23/8	1½	1	1¼	3.25
-	1¾	1-14	50944 133285	85361▲	68370	15/8	1½	1	215/16 31/8	31/8	3/4	21/32	4½	1	7/8	23/8	1½	1	1¼	3.25

Dimensions for Rod Knuckle and Mating Parts

Bore Size	Rod Dia.	KK Thread Size	Knuckle	Clevis Brkt.	Pivot Pin	A	CA	CB	CD	CL	CW	DD	E	ER	F	FL	LR	M	MR	R
1½	5/8	7/16-20	69089	69205	68368	3/4	1½	3/4	1/2	17/8	1/2	13/32	3½	23/32	1/2	1½	3/4	1/2	5/8	2.55
2	5/8	7/16-20	69089	69205	68368	3/4	1½	3/4	1/2	17/8	1/2	13/32	3½	23/32	1/2	1½	3/4	1/2	5/8	2.55
	1	3/4-16	69091	69206	68369	1½	21/16	1¼	3/4	25/8	5/8	17/32	5	11/16	5/8	17/8	13/16	3/4	29/32	3.82
2½	5/8	7/16-20	69089	69205	68368	3/4	1½	3/4	1/2	17/8	1/2	13/32	3½	23/32	1/2	1½	3/4	1/2	5/8	2.55
	1	3/4-16	69091	69206	68369	1½	21/16	1¼	3/4	25/8	5/8	17/32	5	11/16	5/8	17/8	13/16	3/4	29/32	3.82
3¼	1	3/4-16	69091	69206	68369	1½	21/16	1¼	3/4	25/8	5/8	17/32	5	11/16	5/8	17/8	13/16	3/4	29/32	3.82
	1¾	1-14	69093	69207	68370	15/8	213/16	1½	1	31/8	3/4	21/32	6½	17/16	3/4	2¼	1½	1	1¼	4.95
4 & 5	1	3/4-16	69091	69206	68369	1½	21/16	1¼	3/4	25/8	5/8	17/32	5	11/16	5/8	17/8	13/16	3/4	29/32	3.82
	1¾	1-14	69093	69207	68370	15/8	213/16	1½	1	31/8	3/4	21/32	6½	17/16	3/4	2¼	1½	1	1¼	4.95
6	1¾	1-14	69093	69207	68370	15/8	213/16	1½	1	31/8	3/4	21/32	6½	17/16	3/4	2¼	1½	1	1¼	4.95

▲Cylinder accessory dimensions conform to NFPA recommended standard NFPA/T3.6.8 R1-1984, NFPA recommended standard fluid power systems – cylinder – dimensions for accessories for cataloged square head industrial types. Parker adopted his standard in April, 1985. Eye brackets or mounting plates shipped before this date may have different dimensions and will not necessarily interchange with the NFPA standard. For dimensional information on older style eye brackets or mounting plates consult Drawing #144805.

For additional information – call your local Parker Cylinder Distributor.

NOTES

A

For Cylinder Division Plant Locations – See Page II.

Series MA

NFPA Industrial Air Cylinders

How to Order

How to Order Series “MA” Cylinders

When ordering Series MA cylinders, please review the following:

Note: Duplicate cylinders can be ordered by giving the SERIAL NUMBER from the nameplate of the original cylinder. Factory records supply a quick positive identification.

Piston Rods: Specify rod code number based on diameter. Give thread style number for a standard thread or specify dimensions. See “Style 3 Rod End” below.

Cushions: If cushions are required specify according to the model number on the next page. If the cylinder is to have a double rod and only one cushion is required, be sure to specify clearly which end of the cylinder is to be cushioned.

Special Modifications: Additional information is required on orders for cylinders with special modifications. This is best handled with descriptive notes. For further information, consult factory.

Fluid Medium: Series MA hydraulic cylinders are equipped with seals for use with lubricated air.

Class 1 Seals

Class 1 seals are the seals provided as standard in a cylinder assembly unless otherwise specified. For further information on fluid compatibility or operating limitations of all components, see section C.

For the MA series cylinders the following make-up Class 1 Seals:
Primary Piston Rod Seal – Nitrile with PTFE back-up washers

Piston Rod Wiper – Nitrile

Piston Seals – Nitrile with polymyte back-up washers

O-Rings – Nitrile

Combination Mountings

Single Rod End The first mounting is the one called out on the head end of the cylinder. The second or subsequent mountings are called out as they appear in the assembly moving away from the rod end. Exception: When tie rod mountings are part of a combination, the model number should contain an “S” (Special) in the model code and a note in the body of the order clarifying the mounting arrangement. The “P” is used to define a thrust key and is not considered to be a mounting. However, it is located at the primary end.

Example: 4.00 CCBMALTS14AC x 10.000

Combination “C” mounting head only. “BB” mounting cap end
This cylinder is also cushioned at both ends.

Double Rod End In general, the model number is read left to right corresponding to the cylinder as viewed from left to right with the primary end at rod end #1. See Double Rod Models information page

in this section. For this option the piston rod number, piston rod end, and piston rod threads are to be specified for both ends. The simplest are for symmetric cylinders such as: TD, C, E, F, G, and CB mounts. All other mounting styles, the description of the first rod end will be at the mounting end. In the case of multiple mounts, the description of the first rod end will be at the primary mounting end. For “DD” mounts, the description of the first rod end will be the same location as the “XI” dimension.

Example: 4.00 KDDMALT24A/18A x 10.000 XI=8

This is a center trunnion mounting cylinder with the XI dimension measured from the code 2 rod side of the cylinder which has the style 4 thread. The opposite end code 1 rod with the style 8 thread.

Style 3 Rod End

A style 3 rod end indicates a special rod end configuration. All special piston rod dimensions must have **all three:** KK; A; W/WF or LA/LAF specified with the rod fully retracted. A sketch or drawing should be submitted for rod ends requiring special machining such as snap ring grooves, keyways, tapers, multiple diameters, etc. It is good design practice to have this machining done on a diameter at least 0.065 inches smaller than the piston rod diameter. This allows the piston rod to have a chamfer preventing rod seal damage during assembly or maintenance. Standard style 55 rod ends with a longer than standard

WG dimension should call out a style 3 rod end and the note: **same as 55 except WG=_____**. A drawing should be submitted for special 55 rod ends that have specific tolerances or special radii. Special rod ends that have smaller than standard male threads, larger than standard female threads, or style 55 rod ends with smaller than standard AF or AE dimensions are to be reviewed by Engineering for proper strength at operating pressure.

Service Policy

On cylinders returned to the factory for repairs, it is standard policy for the Cylinder Division to make such part replacements as will put the cylinder in as good as new condition. Should the condition of the returned cylinder be such that expenses for repair would exceed the costs of a new one, you will be notified.

Address all correspondence and make shipments to, Service Department at your nearest regional plant listed in the pages of this catalog.

Certified Dimensions

Parker Cylinder Division guarantees that all cylinders ordered from this catalog will be built to dimensions shown. All dimensions are certified to be correct, and thus it is not necessary to request certified drawings.

For additional information – call your local Parker Cylinder Distributor.

Series MA

NFPA Industrial Air Cylinders

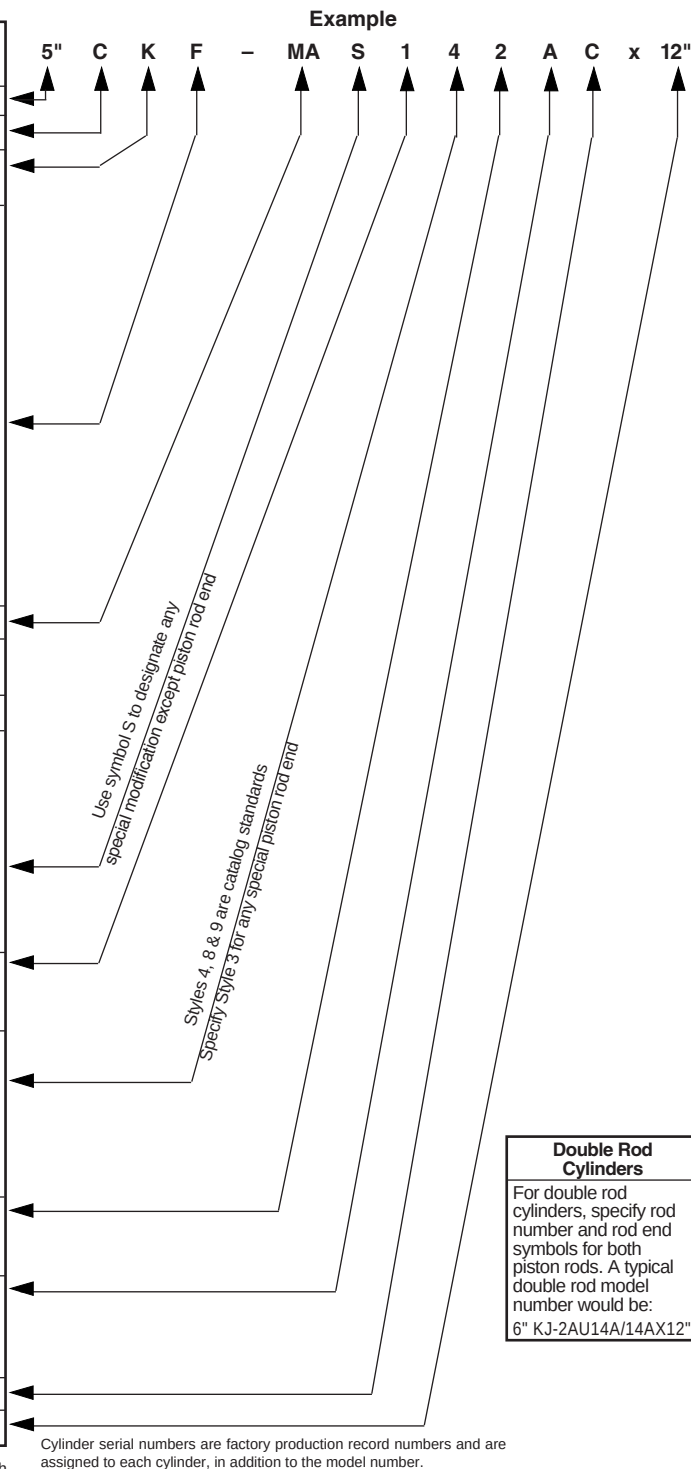
Model Numbers

Series MA Model Numbers – How to Develop Them – How to “Decode” Them

Parker Series MA cylinders can be completely and accurately described by a model number consisting of coded symbols. To develop a model number, select only those symbols that represent the cylinder required, and place them in the sequence indicated below.

Note: Page numbers with a letter prefix, ie: C77, are located in section C of this catalog.

Feature	Description	Page No.	Symbol
Bore	Specify in inches	—	—
Cushion Head	Used only if cushion head is required	58	C
Double Rod	Used only if double rod cylinder is required	65	K
Mounting Style	Head Tie Rods Extended		T B
	Cap Tie Rods Extended		T C
	Both End Tie Rods Extended		T D
	Head Rectangular Flange		J
	Cap Rectangular Flange	60, 61	H
	Side Lug	62, 63,	C
	Side Tapped	64 & 65	F
	Cap Fixed Clevis		B B
	Cap Detachable Clevis		B C
	Head Trunnion		D
	Cap Trunnion		D B
	Intermediate Fixed Trunnion		D D
Series	Used in all MA Model Numbers	—	MA
Piston	Lipseal™ Piston standard. No need for symbol in model number.	—	—
Ports	NPTF (Dry Seal) Ports are standard.	C 89-91	—
Special Modifications	Used only if special modifications are required:		
	Oversize Ports	C 89-91	
	Port Position Change	C 89-91	
	Stop Tube•	C 95	S
	Stroke Adjuster	C 93	
	Fluorocarbon Seals	C 83	
Piston Rod Number	For Single Rod Cylinders, Select only one. Check chart on Page C96 for minimum piston rod diameter.	60 & 65	1 3
Piston Rod End	Select:		
	Style 4 Small Male		4
	Style 8 Intermediate Male	60, 62, 64, 65	8
	Style 9 Short Female		9
Piston Rod Alternate Threads	Style 3 Special (Specify)		3
	Used only for two times longer than standard.	C 92	2
Piston Rod Threads	UNF Standard		A
	BSF (British Fine)	C 92	W
	Metric		M
Cushion Cap	Used only if cushion cap is required	58	C
Stroke•	Specify in inches	C 93	—



*Required for Basic Cylinder Model Number •In case of stop tube, call out gross stroke length.
Dark Arrows Indicate Basic Minimum Model Number.

For Cylinder Division Plant Locations – See Page II.

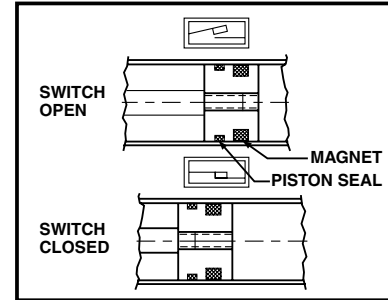
Series MA NFA Industrial Air Cylinders

Switches

Magnetically Actuated Switches

The MA adjustable switch has been designed for use on Series MA Pneumatic Cylinders. It is a normally open switch. The compact design of the switch causes a minimum interference with cylinder envelope dimensions. The MA switch will sense the magnetic piston through a non-ferrous cylinder barrel. Several MA switches may be mounted on a single cylinder to control or sequence several functions.

The MA switch is mounted on a single tie rod with an aluminum extrusion for easy adjustment. Its rugged construction will provide millions of trouble free cycles. It is ideally suited as an input to programmable controllers or to activate an industrial relay.



Switch Specifications

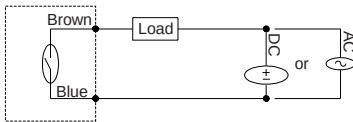
	Reed Switch Assembly MAR-2 L074480000	Solid State Switch Assembly MAS-3 PNP Sourcing L074490000 MAS-4 NPN Sinking L074500000		Reed Switch Assembly MAR-2 L074480000	Solid State Switch Assembly MAS-3 PNP Sourcing L074490000 MAS-4 NPN Sinking L074500000
Switching Logic	Normally Open, SPST	NPN or PNP	Operating Temperature	14° to 140°F (-10° to 60°C)	14° to 158°F (-10° to 70°C)
Supply Voltage Range	5 to 125 V AC/DC	5 TO 30 VDC	Storage Temperature	-4° to 158°F (-20° to 70°C)	-4° to 176°F (-20° to 80°C)
Max. Switching Power	10 Watts (Resistive) 5 Watts (Inductive)	6 Watts	LED Indicator	Red, Target Present When On	Red, Target Present When On
Max. Switching Current	300 mA (Resistive) 150 mA (Inductive)	200 mA at 24 VDC	Minimum Current To Light LED	18 mA	1 mA
Circuit Current Consumption	—	Max 14 mA at 24 VDC	Lead Wire Lengths	39 Inches, 1 Meter	39 Inches, 1 Meter
Short Circuit Interruption Current	—	370 mA			
Leakage Current	—	10 µA Maximum			
Residual Voltage	Maximum 3 V	1.5 V Maximum			
On State Voltage Drop	1.7V Maximum	See Below			
Response	1000 Hz Maximum	1000 Hz Maximum			
Shock Resistance	30G Non-Repeated Shock	30G Non-Repeated Shock			
Degree Of Protection	IEC IP 67	IEC IP 67			

*Polarity is restricted to DC operation: (+) to Brown (-) to Blue
If these connections are reversed the contacts will close, but the LED will not light.
Note: For switches with connectors and cordsets, see Section C.

Circuits

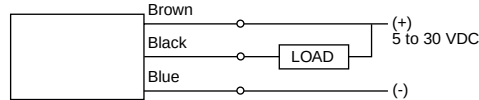
Reed Switch (MAS-2)

Part No. L074480000
NOTE: Polarity must be observed for DC operation only.



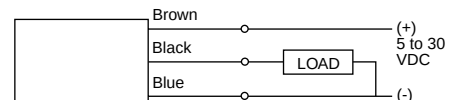
NPN Sinking Output (MAS-4)

Part No. L074500000
Color of Cable Black
"On" State Voltage Drop 0.7V Maximum



PNP Sourcing Output (MAS-3)

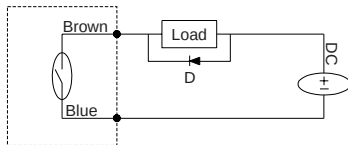
Part No. L074490000
Color of Cable Gray
"On" State Voltage Drop 0.2V Maximum



Circuit for Switching Contact Protection (Inductive Loads)

(Required for proper operation 24V DC)

Put Diode parallel to loads following polarity as shown below.



D: Diode: select a Diode with the breakdown voltage and current rating according to the load.

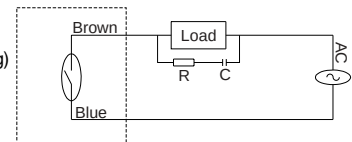
Typical Example—100 Volt, 1 Amp Diode

Load: Relay coil (under 0.5W coil rating) (Recommended for longer life 125 VAC)

Put a resistor and capacitor in parallel with the load. Select the resistor and capacitor according to the load.

Typical Example:

Load: Relay coil (under 2W coil rating)
R: Resistor 1 KΩ - 5 KΩ, 1/4 W
C: Capacitor 0.1 µF, 600 V



⚠ Caution

- Use an ammeter to test reed switch current. Testing devices such as incandescent light bulbs may subject the reed switch to high in-rush loads.
- NOTE:** When checking an unpowered reed switch for continuity with a digital ohmmeter the resistance reading will change from infinity to a very large resistance (2 M ohm) when the switch is activated. This is due to the presence of a diode in the reed switch.
- Anti-magnetic shielding is recommended for reed switches exposed to high external RF or magnetic fields.
- The magnetic field strength of the piston magnet is designed to operate with our switches. Other manufacturers' switches or sensors may not operate correctly in conjunction with these magnets.

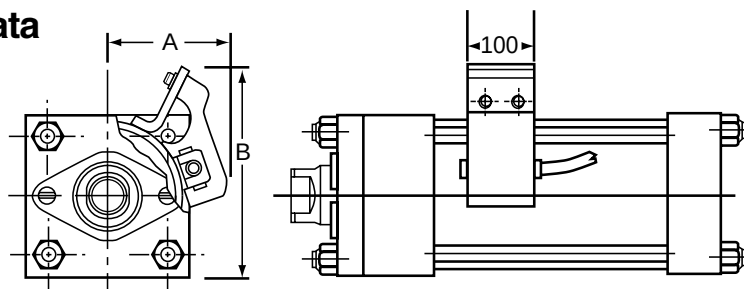
- Current capabilities are relative to operational temperatures.
- Use relay coils for reed switch contact protection.
- The operation of some 120 VAC PLC's (especially some older Allen-Bradley PLC's) can overload the reed switch. The switch may fail to release after the piston magnet has passed. This problem may be corrected by the placement of a 700 to 1K OHM resistor between the switch and the PLC input terminal. Consult the manufacturer of the PLC for appropriate circuit.
- Switches with long wire leads (greater than 15 feet) can cause capacitance build-up and sticking will result. Attach a resistor in series with the reed switch (the resistor should be installed as close as possible to the switch). The resistor should be selected such that $R \text{ (ohms)} > E/0.3$.

For additional information – call your local Parker Cylinder Distributor.

Series MA NFPA Industrial Air Cylinders

Switch Mounting Data

MA Switch Mounting Data



Bore	A	B	PISTON TRAVEL AT MIDSTROKE (SWITCH ON) (±.01)	MINIMUM ACTIVATION DISTANCE FROM END OF STROKE	
				Head	Cap
1½	1.90	2.71	.37	.20	.20
2	2.10	3.25	.37	.20	.20
2½*	2.20	3.60	.37	.13	.13
3¼*	2.70	4.25	.37	.13	.13
4*	2.90	4.90	.37	.13	.13
5*†	3.20	5.85	.37	0	0
6*†	3.82	6.70	.37	0	0

NOTE:

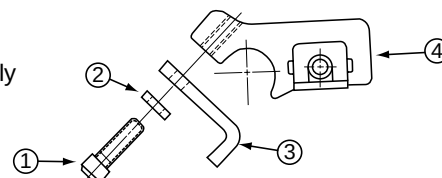
* To maintain minimum activation distance switch can only be mounted with "LED" against end plate because of cable interference on 'End of Stroke' applications.

† On 5.0" and 6.0" bore cylinders, end of stroke activation will occur without the switch physically touching the head or cap.

Standard MA Switch Assembly

Consists of:

- 0106280032 (2) #8-32 Sh. Cap Screw
- 0108850008 (2) Lockwasher
- 0854530000 (1) Bracket Clamp
- (1) Switch & Bracket Sub-Assembly
MAR-2 – 0862580000
MAS-3 – 0862590000
MAS-4 – 0862600000



How to Order:

MA switches are not mounted to the cylinder prior to shipment. When ordering a cylinder to accommodate a MA switch:

- Derive a proper model number as shown in the table below.
- Place an "S" in the special features column.
- Underneath the model number specify:
1) Cylinder prepared for MA switch.
- As a separate item specify the number of switch assemblies required.

	BORE SIZE	CUSHION HEAD END	DOUBLE ROD	MOUNTING STYLE	SERIES	SPECIAL FEATURES	PISTON ROD NO.	PISTON ROD END	PISTON ROD ALTERNATE THREADS	THREAD TYPE	CUSHION CAP END	STROKE
E X A M P L E	6	C	K	J	MA	S	1	4	2	A	C	X12
	Specify 1½" thru 6"	Specify only if cushion head end is required	Use only if Double Rod Cylinder is required	Specify Mounting Style: T, TB, TC, TD, J, H, C, F, BB, BC, D, DB or DD	Specify Series MA	Specify for cylinder prepared for switches and/or other modifications	Specify Rod Code No.	Specify Style 4 Small Male Style 8 Intermediate Male Style 9 Short Female Style 3 Special Specify KK, A, LA, LAF, W, WF Dim.	Use only for 2x longer than standard rod end thread	Specify: A = UNF W = BSF M = METRIC	Specify only if Cushion Cap End is required	Specify in inches. Show Symbol "X" just ahead of stroke length

Example: To order a 2½" x 10" MA cylinder with MA switches to sense the end of stroke at both the head and cap end specify:

Item	Qty.	Description	
A	(1)	2.50 C J MAS 14A C x 10.000 (1) Cylinder prepared for MA Switch	* #L074480000 – MAR-2 #L074490000 – MAS-3 #L074500000 – MAS-4
B	(2)	(*) Switch Assemblies	

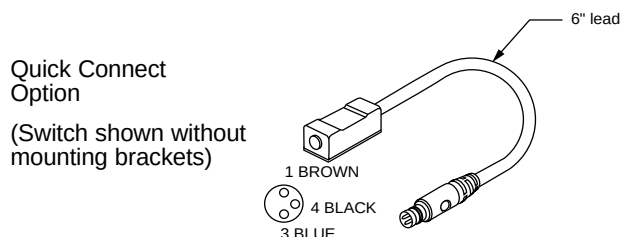
For Cylinder Division Plant Locations – See Page II.



Magnet Actuated Switches with Quick Connect

Magnet Actuated Switches are available for Series SRM, P, 2MA, MP, and RC cylinders. Refer to the appropriate Catalog information for electrical specifications on each switch. The standard lead wire length is 39" (1 meter).

Switches for the above cylinders are also offered with a 6 (six) inch lead with a male quick connect option.



Switches with 6" Lead and Quick Connect Male End

Series	Reed	NPN Sinking	PNP Sourcing
SR, P	145903000C	146714000C	146715000C
MA	L07448000C	L07450000C	L07449000C
2MA (1½"-2½", 5", 6") (3¼", 4", 8")	L07486000C L07487000C	L07488000C L07490000C	L07491000C L07492000C
MP 32mm, 40mm 50mm, 63mm 80mm, 100mm	L07525000C L07526000C L07527000C	L07528000C L07529000C L07530000C	L07531000C L07532000C L07533000C
RC	L07480000C	L07481000C	L07482000C

Switches are supplied with the bracket to mount the switch to the cylinder. Refer to the switch information for each series for bracket dimensions.

**Cordset with Female Quick Connect
(Order Separately)**

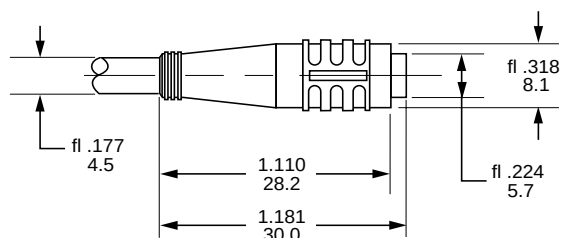
A female connector is available for all switches with the male quick connect option. The male plug will accept a snap-on or threaded connector. Cylinder Division cordset part numbers and other manufacturer's part numbers are listed below:

Manufacturer	Snap-On Version	Threaded Version
Parker	086620S005	086620T005

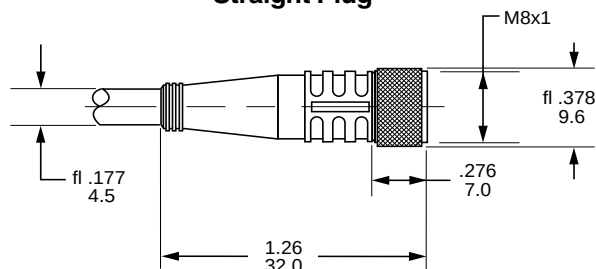
Cordset Specifications:

Connector:	Oil resistant polyurethane body material, PA 6 (Nylon) contact carrier, spacings to VDE 0110 Group C, (150 VAC / DC)
Contacts:	Gold plated beryllium copper, machined from solid stock
Coupling Method:	Snap-Lock or chrome plated brass nut
Cord Construction:	Oil resistant black PUR jacket, non-wicking, non-hygroscopic, 300V. Cable end is stripped and tinned.
Conductors:	Extra high flex stranding, PVC insulation
Temperature:	-40° to 185°F (-40° to 85°C)
Protection:	NEMA 1, 3, 4, 6P and IEC IP67
Cable Length:	6.56 ft (2m) or 16.4 ft (5m)

**Snap-On
Straight Plug**



**Threaded
Straight Plug**



For additional information – call your local Parker Cylinder Distributor.

Parker *inPHorm*TM

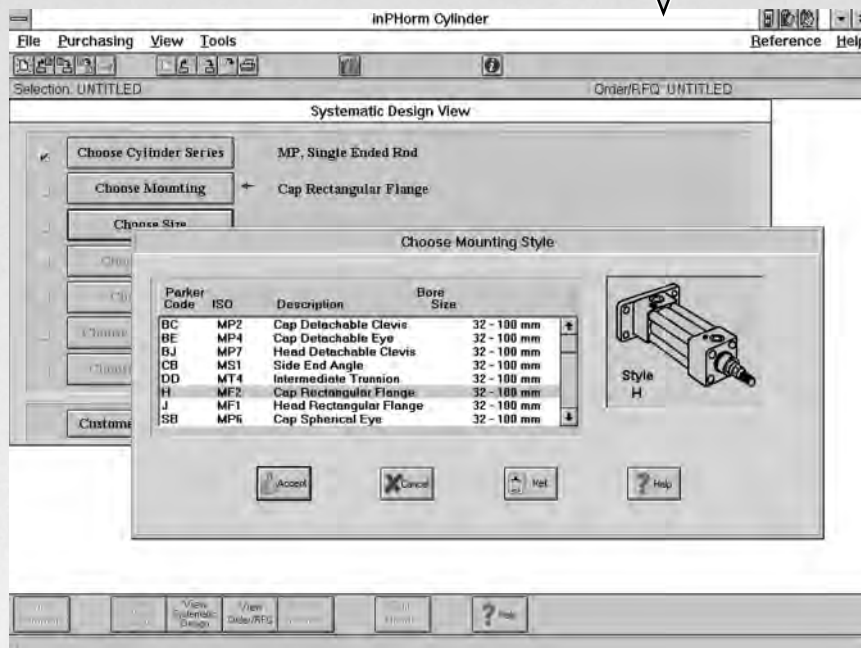
Cylinder Sizing, Selection, and Parametric CAD Software

Parker is pleased to introduce Version 1.5 of ***inPHorm*TM for Cylinders**. This program allows you to select the proper Parker cylinder for your application. ***inPHorm* for Cylinders** will increase your efficiency and minimize the engineering time required to design in cylinders. This new release, ***inPHorm* 0860 CD/USA Version 1.5** has been updated with new product lines and seal kit information.

***inPHorm* for Cylinders** is written for use with Windows, which makes it extremely user friendly. You can use the program to develop a model number. ***inPHorm* for Cylinders** guides you through the selection process, performs the calculations, and eases the process of sorting through catalog drawings, charts and tables. You can also employ the "Direct Part Number Entry" module to input a known model number. In either case, you can view a dimensioned

drawing, generate a print or DXF file and even create a quote request or order form.

"Advisor" options within the program offer additional assistance with special modifications and design considerations.



During any portion of the program, reference material can be accessed or printed for future use.

The ***inPHorm*** cylinders sizing, selection and parametric CAD software is designed around the user to assist in the design process and minimize the time required to specify, draw and file your favorite Parker Cylinder product. By working with the Parker ***inPHorm* for Cylinders** software, the design, selection and specification of Parker cylinders becomes easier and faster for the most effective use of your valuable time.

System Highlights

- Cylinder Sizing and Selection
- Parametric Drawing Creation
- Windows-based
- Input Formats:
 - Direct Part Number Entry
 - Systematic Design
- Available Information
 - Outputs:
 - HPGL CAD Drawing
 - CAD File (*.dxf)
 - Selection Summary
 - Printout
 - RFQ/Order Sheet Printout

For further details, or to purchase your copy of ***inPHorm* for Cylinders**, call your local Parker distributor or 1-800-C-Parker (272-7537). To try ***inPHorm*** visit our web site at www.Parker.com/cylinder.

Worldclass
Quality Products
and Service



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B

For Cylinder Division Plant Locations – See Page II.

Hydraulic Cylinders

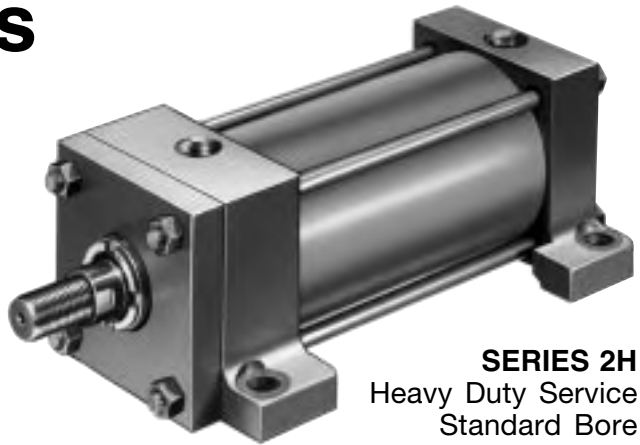
SERIES HMI

Heavy Duty Service
ISO Bore Sizes 25mm-200mm



SERIES 2H

Heavy Duty Service
Standard Bore
Sizes
1½" through 6"



SERIES 3L

Medium Duty Service
Standard Bore Sizes
1" through 8"



SERIES 3H

Heavy Duty Service
Bore Sizes
7" through 20"



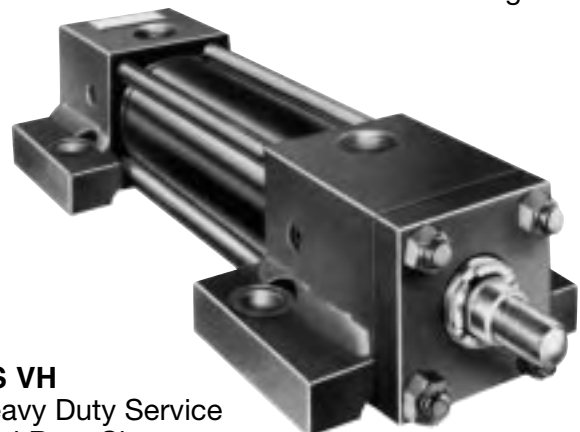
SERIES HD

Heavy Duty Service
Standard Bore Sizes
1½" through 8"



SERIES VH

Very Heavy Duty Service
Standard Bore Sizes
2½" through 8"

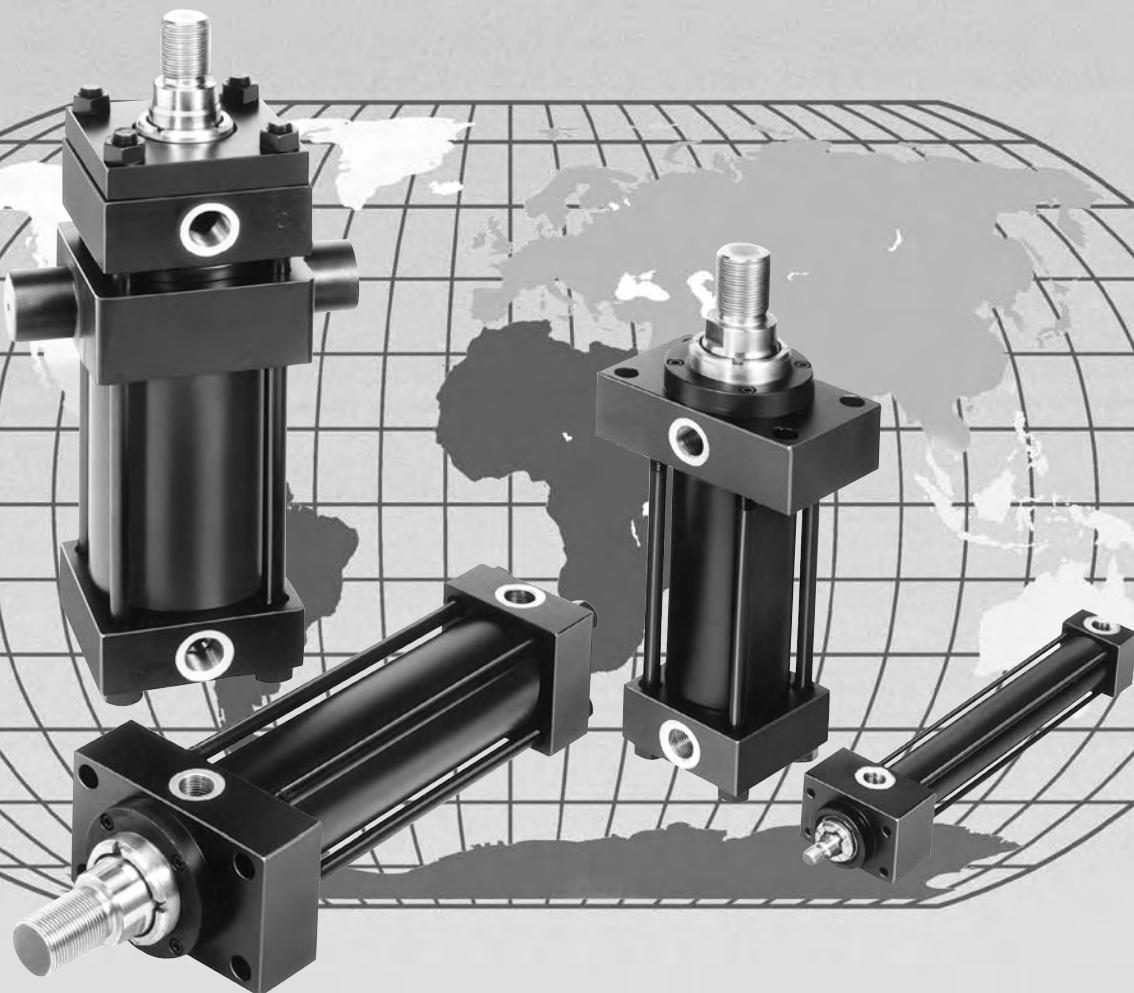


For additional information – call your local Parker Cylinder Distributor.



Metric Hydraulic Cylinders Series HMI

Conforms to ISO 6020/2 (1991)
For working pressures up to 210 bar



*Vital Technologies for
Motion and Control*

For Cylinder Division Plant Locations – See Page II.



Parker Series HMI Metric Hydraulic Cylinders

As the world leader in the design and manufacture of tie-rod cylinders, Parker Cylinder Division introduces the Parker Series HMI *metric* hydraulic cylinder. Parker's HMI Series cylinders are designed to meet the requirements of ISO 6020/2 (1991), 160 Bar Compact Series. HMI Series cylinders may be used for working pressures up to 210 Bar.



Parker HMI Series cylinders are the true *world standard*, available all over the globe from Parker's worldwide manufacturing facilities. Whether you or your machine are in Europe, Asia, South America, Canada, Mexico, or the United States, you can rely on the engineering expertise, manufacturing experience, and commitment to quality that you've come to expect from the Parker Cylinder Division.

For additional information – call your local Parker Cylinder Distributor.

Parker Series HMI Metric Hydraulic Cylinders

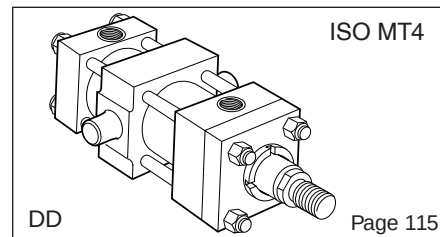
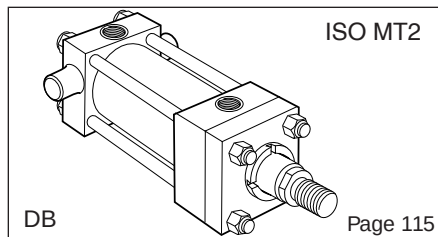
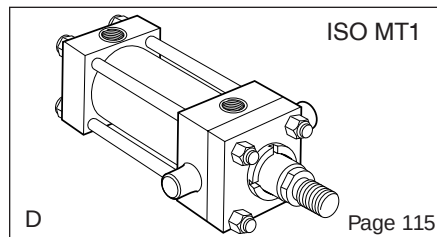
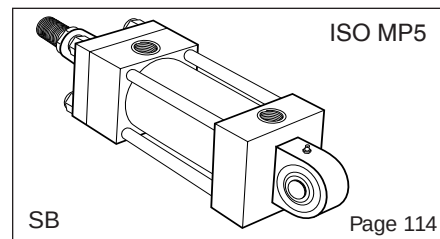
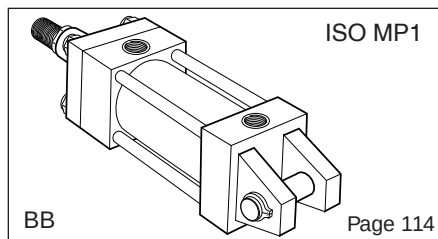
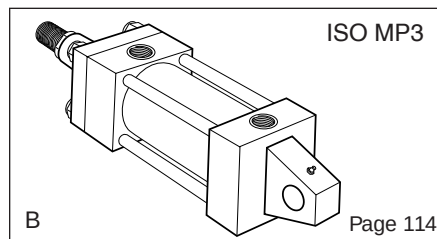
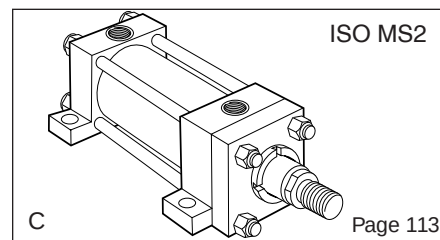
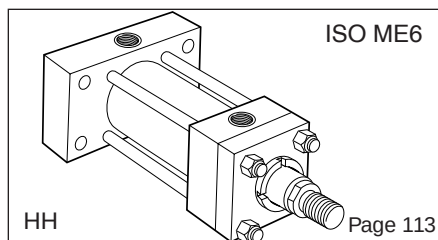
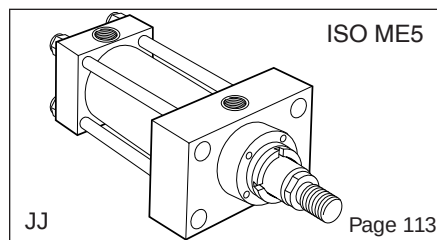
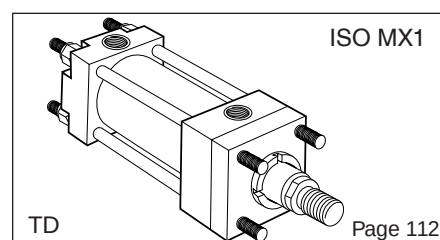
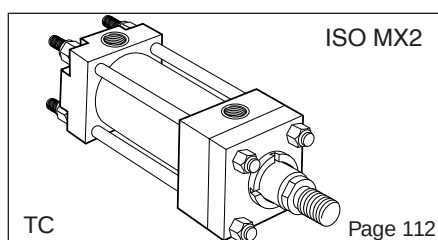
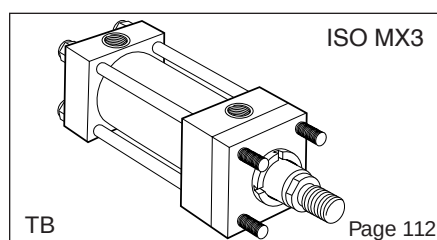
Features, Specifications and Mountings

Series HMI Standard Features and Specifications

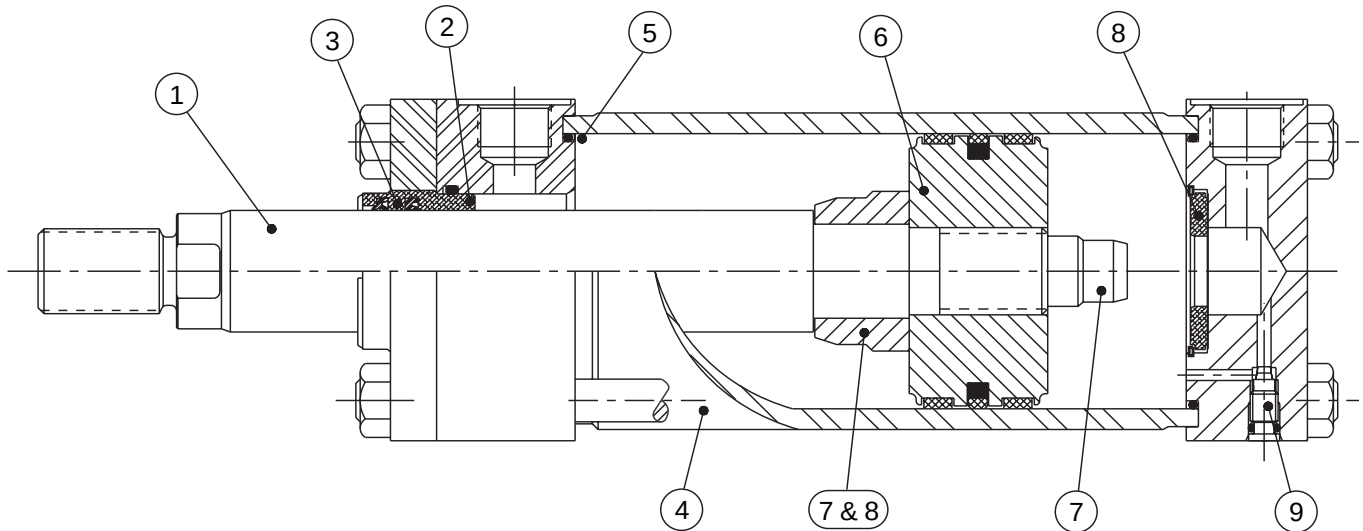
- ISO 6020/2 mounting interchangeable
- 12 standard mounting styles
- Up to 3 rod sizes per bore
- Wide range of mounting accessories
- Up to 3 male and 3 female rod end threads per bore
- Bore sizes – 25mm to 200mm
- Strokes – available in any practical stroke length
- Working pressure up to 210 bar
- Piston rods – 12mm to 140mm
- Single and Double rod designs
- Cushions available at either end
- Temperature Range – -20°C to 150°C depending on seal type
- Seal types to suit a wide variety of operating environments

In line with our policy of continuing product improvement, specifications in this catalog are subject to change.

Available Mountings and Where To Find Them



For Cylinder Division Plant Locations – See Page II.

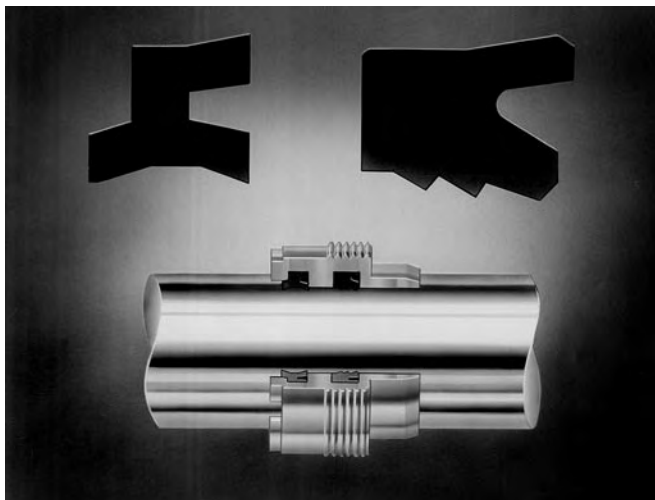


1 Piston Rod

Gland seal life is maximized by manufacturing piston rods from precision ground, high tensile carbon alloy steel, hard chrome plated and polished to 0.2µm max.

2 Parker's 'Jewel' Gland

Continuous lubrication, and therefore longer gland life, are provided by the long bearing surface inboard of the primary seal. The Jewel gland, complete with rod seals, can easily



be removed without dismantling the cylinder, so servicing is quicker – and therefore more economical.

3 Rod Seals

The TS-2000 primary seal has a series of sealing edges which take over successively as pressure increases, providing efficient sealing under all operating conditions. On the return stroke the serrations act as a check valve, allowing the oil adhering to the rod to pass back into the cylinder.

The double lip wiperseal acts as a secondary seal, trapping excess lubricating film in the chamber between the wiper and

lip seals. Its outer lip prevents the ingress of dirt into the cylinder, extending the life of gland and seals.

The TS-2000 is manufactured from an enhanced polyurethane, giving efficient retention of pressurized fluid and long service life.

4 Cylinder Body

Strict quality control standards and precision manufacture ensure that all tubes meet rigid standards of straightness, roundness and surface finish. The steel tubing is surface finished to minimize internal friction and prolong seal life.

5 Cylinder Body Seals

To make sure that the cylinder body remains leaktight, even under pressure shock conditions, Parker utilizes pressure-energized body seals.

6 One-Piece Piston

Side loading is resisted by the wide bearing surfaces of the pistons. A long thread engagement secures the piston to the piston rod and, as an added safety feature, pistons are secured by an anaerobic adhesive.

7 Cushioning

Progressive deceleration is available by using profiled cushions at the head and cap – see Section C for details. The head end cushion is self aligning, while the polished cap end spear is an integral part of the piston rod.

8 Floating Cushion Bushings and Sleeves

Closer tolerances – and therefore more effective cushioning – are permitted by the use of a floating cushion sleeve at the head end of the cylinder, and a floating cushion bushing at the cap end. A slotted cushion sleeve at the head end and the floating bronze cushion bushing in the cap, provide minimum fluid restriction at the start of the return stroke. This allows full pressure to be applied over the entire area of the piston, providing full power and fast cycle times.

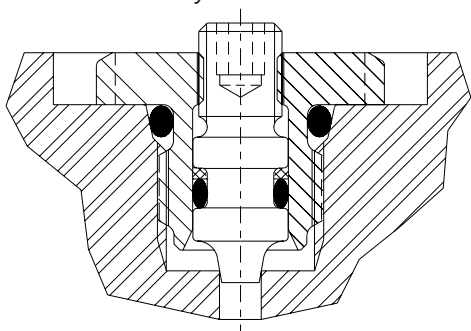
For additional information – call your local Parker Cylinder Distributor.

Parker Series HMI Metric Hydraulic Cylinders

Design Features and Benefits

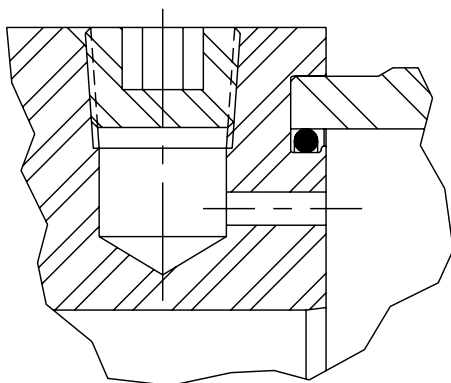
9 Cushion Adjustment

Needle valves are provided at both ends of the cylinder for precise cushion adjustment. 63 mm bores and smaller contain cartridge cushion assembly shown below.



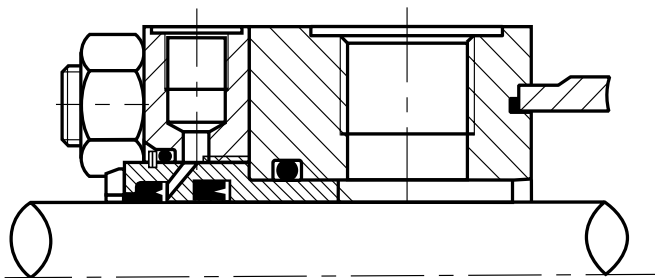
Air Bleeds

Available as an option at both ends, the air bleeds are recessed into the head and cap.



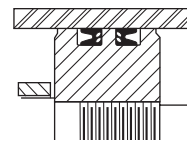
Gland Drains

The accumulation of fluid behind the gland wiperseal of long stroke cylinders, or cylinders with constant back pressure, can be relieved by specifying the option of a gland drain. A port between the wiperseal and primary seal allows fluid to be piped back to a reservoir. By fitting a transparent tube between the port and the reservoir, fluid loss from concealed or inaccessible cylinders can be monitored to provide an early indication of the need for gland servicing. Gland drains are described in greater detail in Section C of this catalog.

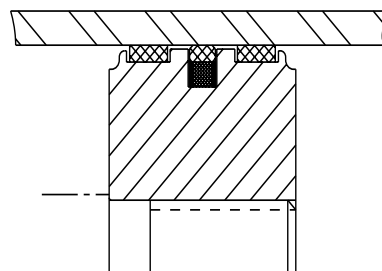


Piston Seals

Standard on 25mm, 32mm and 40mm bore sizes, Parker's Lipseal™ Piston provides zero leakage under static conditions for hydraulic pressures up to 3000 psi. Seals are self-compensating to conform to variations in pressure, mechanical deflection, and wear. Back-up washers prevent extrusion.



Standard on 50mm bore sizes and larger, Parker's B style piston is a single seal design which incorporates two wear strips. This design provides smooth operation, long bearing life, and high load carrying capacity.



Mixed Media Piston Seals

For applications requiring different media on either side of the piston specify Mixed Media Piston Seals with a W piston code. This option is ideal when hydraulic oil is on one side of the piston and air on the opposite side; and it can be equally effective when dissimilar fluids are on either side of the piston. Superior low-friction bi-directional sealing is accomplished by combining an energized filled PTFE seal with a redundant elastomer seal.

Servo Cylinders

Servo cylinders permit fine control of acceleration, velocity and position in applications where very low friction and an absence of stick-slip are required. They may be used in conjunction with integral or external transducers. Servo cylinders combine low friction piston and gland seals with specially selected tubes and rods. For low-friction applications – consult factory.

Seal Classes

To accommodate the many types of fluids and the varying temperature ranges used in industry, Parker offers a range of rod gland, piston and body seals. These are described in detail in Section C of this catalog.

For Cylinder Division Plant Locations – See Page II.



ISO Cylinder Mounting Styles and Where to Find Them

The standard range of Parker Series HMI cylinders comprises 12 ISO mounting styles, to suit the majority of applications. General guidance for the selection of ISO cylinders is given below, with dimensional information about each mounting style shown on the following pages. Application-specific mounting information is shown in the mounting information section, Section C of this catalog.

Extended Tie Rods

Cylinders with TB, TC and TD mountings are suitable for straight line force transfer applications, and are particularly useful where space is limited. For compression (push) applications, cap end tie rod mountings are most appropriate; where the major load places the piston rod in tension (pull applications), head end mounting styles should be specified. Cylinders with tie rods extended at both ends may be attached to the machine member from either end, allowing the free end of the cylinder to support a bracket or switch.

Flange Mounted Cylinders

These cylinders are also suitable for use on straight line force transfer applications. Two flange mounting styles are available, offering either a head flange (JJ) or a cap flange (HH). Selection of the correct flange mounting style depends on whether the major force applied to the load will result in compression (push) or tension (pull) stresses on the piston rod. For compression-type applications, the cap mounting style is most appropriate; where the major load places the piston rod in tension, a head mounting should be specified.

Foot Mounted Cylinders

Style C, foot mounted cylinders do not absorb forces on their centerline. As a result, the application of force by the cylinder produces a moment which attempts to rotate the cylinder about its mounting bolts. It is important, therefore, that the cylinder should be firmly secured to the mounting surface and that the load should be effectively guided to avoid side loads being applied to rod gland and piston bearings. A thrust key modification may be specified to provide positive cylinder location.

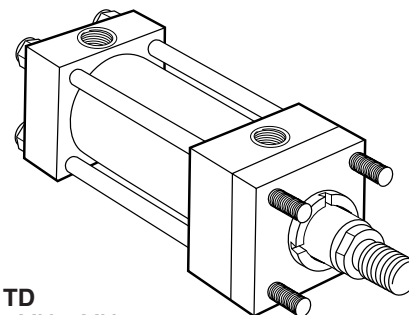
Pivot Mountings

Cylinders with pivot mountings, which absorb forces on their centerlines, should be used where the machine member to be moved travels in a curved path. Pivot mountings may be used for tension (pull) or compression (push) applications. Cylinders using a fixed clevis, styles BB and B, may be used if the curved path of the piston rod travel is in a single plane; for applications where the piston rod will travel in a path on either side of the true plane of motion, a spherical bearing mounting SB is recommended.

Trunnion Mounted Cylinders

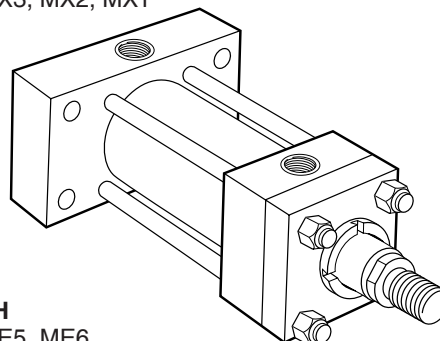
These cylinders, styles D, DB and DD, are designed to absorb force on their centerlines. They are suitable for tension (pull) or compression (push) applications, and may be used where the machine member to be moved travels in a curved path in a single plane. Trunnion pins are designed for shear loads only and should be subjected to minimum bending stresses.

Styles TB, TC, TD
ISO Styles MX3, MX2, MX1



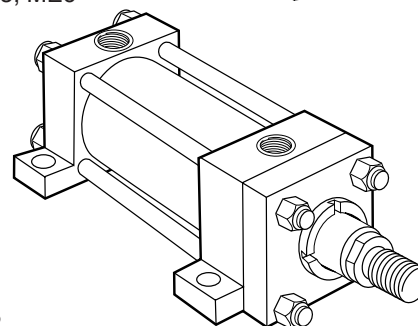
TB

Styles JJ, HH
ISO Styles ME5, ME6



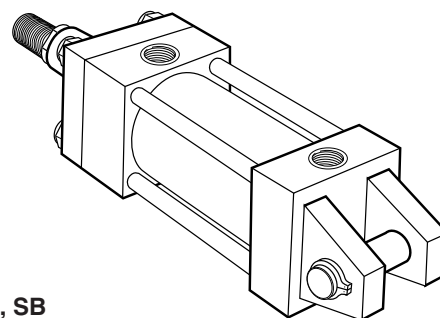
HH

Style C
ISO Style MS2



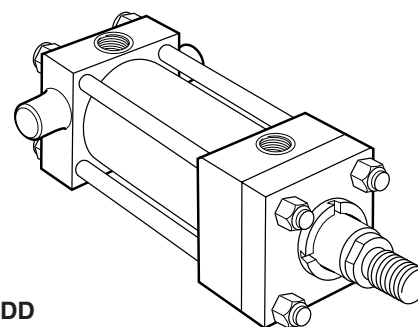
C

Styles B, BB, SB
ISO Styles MP3, MP1, MP5



BB

Styles D, DB, DD
ISO Styles MT1, MT2, MT4

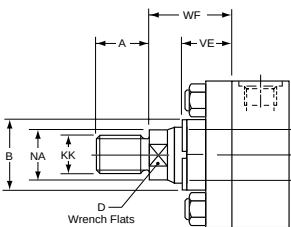


DB

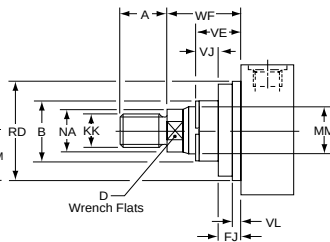
For additional information – call your local Parker Cylinder Distributor.

Parker Series HMI Metric Hydraulic Cylinders

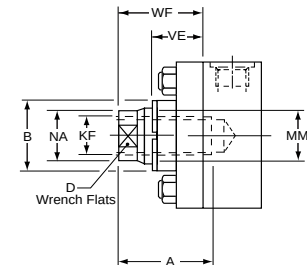
Parker Thread Styles 4 & 7 – All Except JJ Mount



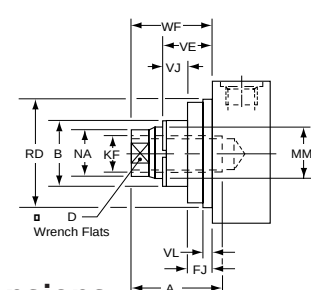
Parker Thread Styles 4 & 7 – JJ Mount



Parker Thread Style 9 – All Except JJ Mount



Parker Thread Style 9 – JJ Mount



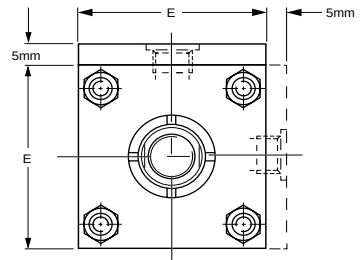
Piston Rod End Dimensions

Bore φ	Rod No.	MM Rod φ	Style 4		Style 7		Style 9		B f9	D	NA	VE	WF	JJ Mount Only			
			KK	A	KK	A	KF	A						VL min	RD f8	VJ	FJ
25	1	12	M10x1.25	14	-	-	M8x1	14	24	10	11	16	25	3	38	6	10
	2	18	M14x1.5	18	M10x1.25	14	M12x1.25	18	30	15	17	16					
32	1	14	M12x1.25	16	-	-	M10x1.25	16	26	12	13	22	35	3	42	12	10
	2	22	M16x1.5	22	M12x1.25	16	M16x1.5	22	34	18	21	22					
40	1	18	M14x1.5	18	-	-	M12x1.25	18	30	15	17	16	35	3	62	6	10
	2	28	M20x1.5	28	M14x1.5	18	M20x1.5	28	42	22	26	22					
50	1	22	M16x1.5	22	-	-	M16x1.5	22	34	18	21	22	41	4	74	6	16
	2	36	M27x2	36	M16x1.5	22	M27x2	36	50	30	34	25				9	
	3	28	M20x1.5	28	M16x1.5	22	M20x1.5	28	42	22	26	22				6	
63	1	28	M20x1.5	28	-	-	M20x1.5	28	42	22	26	22	48	4	75	6	16
	2	45	M33x2	45	M20x1.5	28	M33x2	45	60	39	43	29				13	
	3	36	M27x2	36	M20x1.5	28	M27x2	36	50	30	34	25				9	
80	1	36	M27x2	36	-	-	M27x2	36	50	30	34	25	51	4	82	5	20
	2	56	M42x2	56	M27x2	36	M42x2	56	72	48	54	29				9	
	3	45	M33x2	45	M27x2	36	M33x2	45	60	39	43	29					
100	1	45	M33x2	45	-	-	M33x2	45	60	39	43	29	57	5	92	7	22
	2	70	M48x2	63	M33x2	45	M48x2	63	88	62	68	32				10	
	3	56	M42x2	56	M33x2	45	M42x2	56	72	48	54	29				7	
125	1	56	M42x2	56	-	-	M42x2	56	72	48	54	29	57	5	105	9	20
	2	90	M64x3	85	M42x2	56	M64x3	85	108	80	88	32				10	
	3	70	M48x2	63	M42x2	56	M48x2	63	88	62	68	32					
160	1	70	M48x2	63	-	-	M48x2	63	88	62	68	32	57	5	125	10	22
	2	110	M80x3	95	M48x2	63	M80x3	95	133	100	108	32				7	
	3	90	M64x3	85	M48x2	63	M64x3	85	108	80	88	32					
200	1	90	M64x3	85	-	-	M64x3	85	108	80	88	32	57	5	150	10	22
	2	140	M100x3	112	M64x3	85	M100x3	112	163	128	138	32				7	
	3	110	M80x3	95	M64x3	85	M80x3	95	133	100	108	32					

All dimensions are in millimeters unless otherwise stated.

Piston Rod End Data and Threads

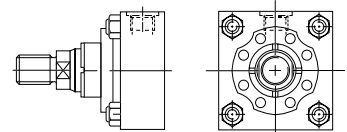
25 & 32mm Bore Cylinders



5mm extra height applies to port face at head end only.

Gland Retainer – 160 and 200mm Bore

On all 160mm and 200mm bore ISO mounting styles except TB and TD, the gland retainer is separately bolted to the head, as shown.

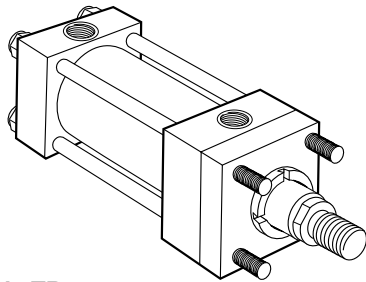


For Cylinder Division Plant Locations – See Page II.

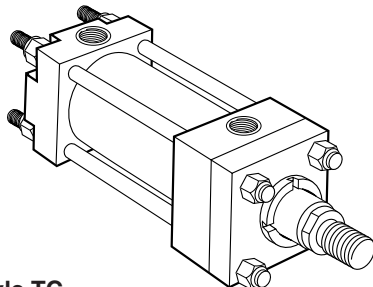
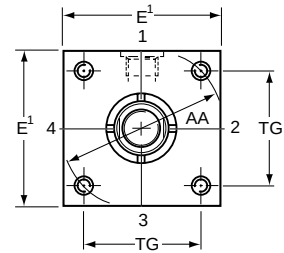
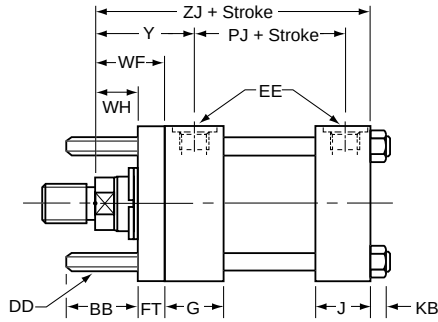


Parker Series HMI Metric Hydraulic Cylinders

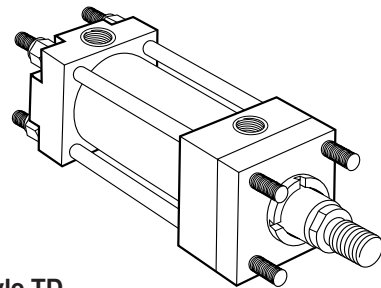
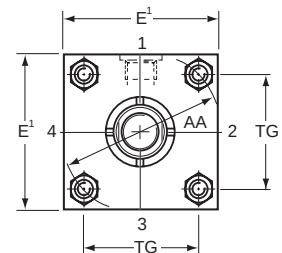
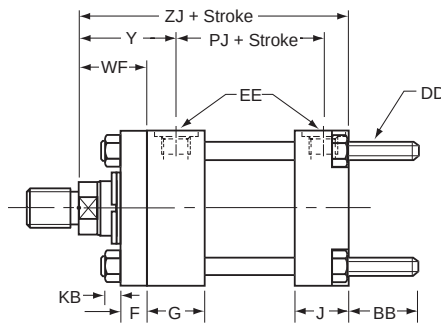
Extended Tie Rod Mountings



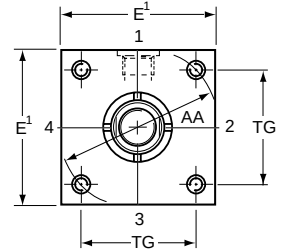
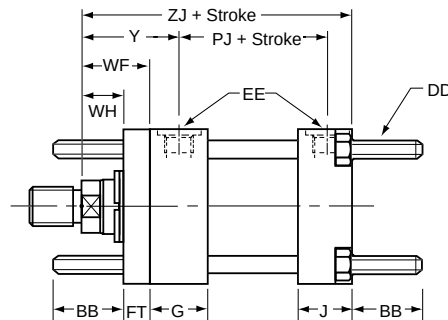
Style TB
Tie Rods Extended Head End
(ISO Style MX3)



Style TC
Tie Rods Extended Cap End
(ISO Style MX2)



Style TD
Tie Rods Extended Both Ends
(ISO Style MX1)



¹Head depth increased by 5mm to accommodate port on 25mm and 32mm bore cylinders – see page 111

Dimensions – TB, TC & TD See also Rod End Dimensions, page 111

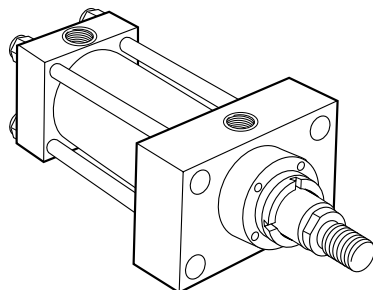
Bore φ	AA	BB	DD	E	EE BSP/G inches	F	FT	G	J	KB	TG	WF	WH	Y	+ Stroke	
															PJ	ZJ
25	40	19	M5x0.8	40 ¹	1/4	10	10	40	25	4	28.3	25	15	50	53	114
32	47	24	M6x1	45 ¹	1/4	10	10	40	25	5	33.2	35	25	60	56	128
40	59	35	M8x1	63	3/8	10	10	45	38	6.5	41.7	35	25	62	73	153
50	74	46	M12x1.25	75	1/2	16	16	45	38	10	52.3	41	25	67	74	159
63	91	46	M12x1.25	90	1/2	16	16	45	38	10	64.3	48	32	71	80	168
80	117	59	M16x1.5	115	3/4	20	20	50	45	13	82.7	51	31	77	93	190
100	137	59	M16x1.5	130	3/4	22	22	50	45	13	96.9	57	35	82	101	203
125	178	81	M22x1.5	165	1	22	22	58	58	18	125.9	57	35	86	117	232
160	219	92	M27x2	205	1	25	25	58	58	22	154.9	57	32	86	130	245
200	269	115	M30x2	245	1-1/4	25	25	76	76	24	190.2	57	32	98	165	299

All dimensions are in millimeters unless otherwise stated.

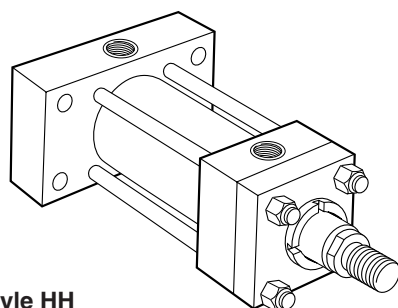
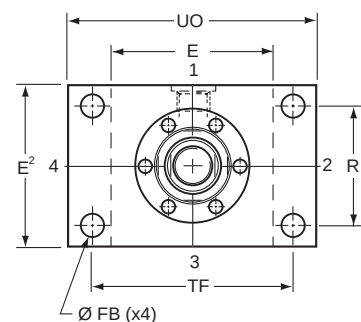
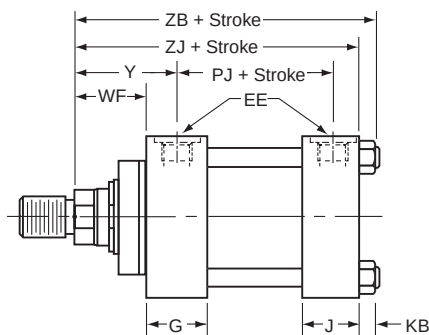
For additional information – call your local Parker Cylinder Distributor.

Parker Series HMI Metric Hydraulic Cylinders

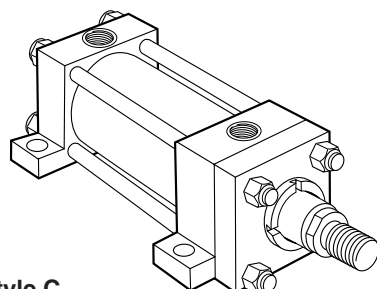
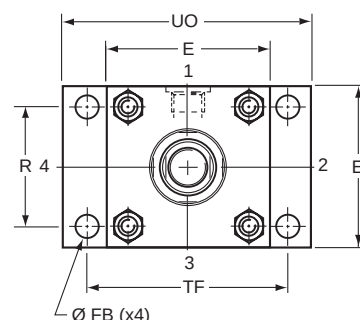
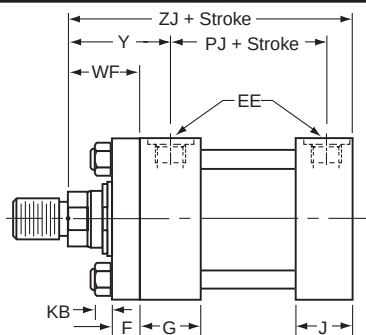
Flange and Side Lugs Mountings



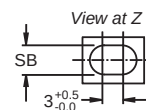
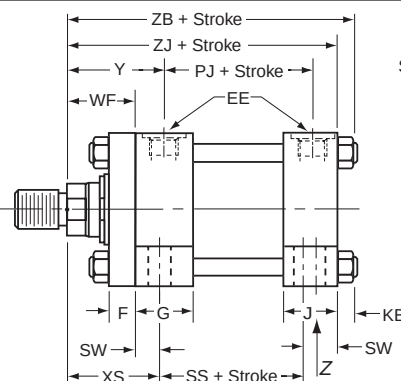
Style JJ
Head Rectangular Flange
(ISO Style ME5)



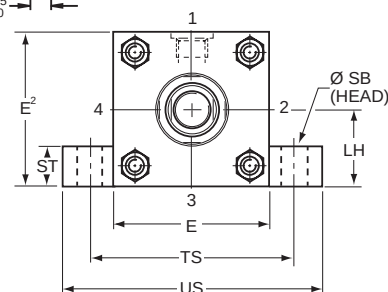
Style HH
Cap Rectangular Flange
(ISO Style ME6)



Style C
Side Lugs
(ISO Style MS2)



A thrust key may be used with this mounting style.



¹Head depth increased by 5mm to accommodate port on 25mm and 32mm bore cylinders – see page 111.

²On 25mm and 32 mm bore C mount and JJ mount cylinders with port in position 2 or 4, head depth E is increased by 5mm in position 1.

Dimensions – JJ, HH & C See also Rod End Dimensions, page 111

Bore φ	E	EE BSP/G inches	F	FB	G	J	KB	LH	R	SB	ST	SW	TF	TS	UO	US	WF	XS	Y	+ Stroke			
																				PJ	SS	ZB	ZJ
25	40 ¹	1/4	10	5.5	40	25	4	19	27	6.6	8.5	8	51	54	65	72	25	33	50	53	72	121	114
32	45 ¹	1/4	10	6.6	40	25	5	22	33	9	12.5	10	58	63	70	84	35	45	60	56	72	137	128
40	63	3/8	10	11	45	38	6.5	31	41	11	12.5	10	87	83	110	103	35	45	62	73	97	166	153
50	75	1/2	16	14	45	38	10	37	52	14	19	13	105	102	130	127	41	54	67	74	91	176	159
63	90	1/2	16	14	45	38	10	44	65	18	26	17	117	124	145	161	48	65	71	80	85	185	168
80	115	3/4	20	18	50	45	13	57	83	18	26	17	149	149	180	186	51	68	77	93	104	212	190
100	130	3/4	22	18	50	45	13	63	97	26	32	22	162	172	200	216	57	79	82	101	101	225	203
125	165	1	22	22	58	58	18	82	126	26	32	22	208	210	250	254	57	79	86	117	130	260	232
160	205	1	25	26	58	58	22	101	155	33	38	29	253	260	300	318	57	86	86	130	129	279	245
200	245	1-1/4	25	33	76	76	24	122	190	39	44	35	300	311	360	381	57	92	98	165	171	336	299

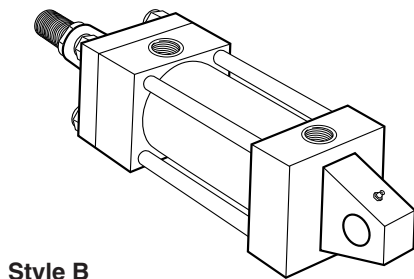
All dimensions are in millimeters unless otherwise stated.

For Cylinder Division Plant Locations – See Page II.



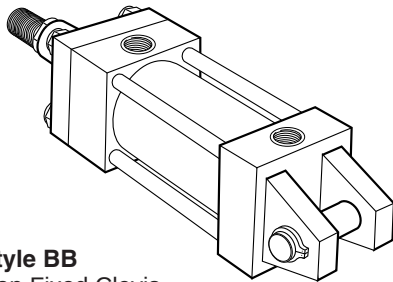
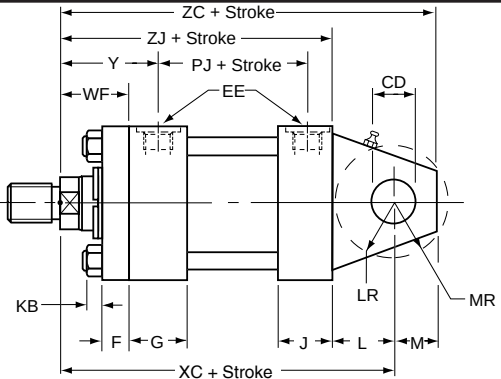
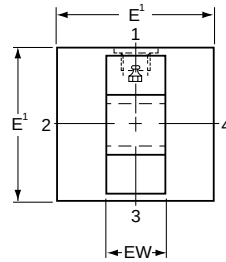
Parker Series HMI Metric Hydraulic Cylinders

Pivot Mountings



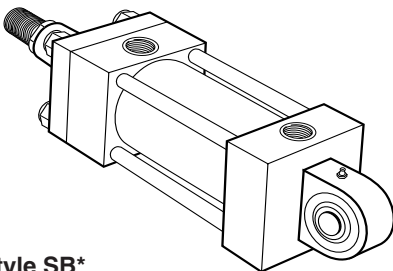
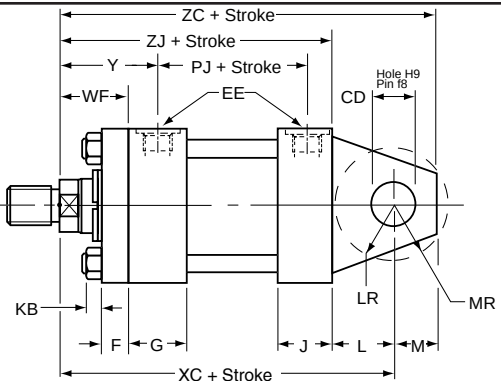
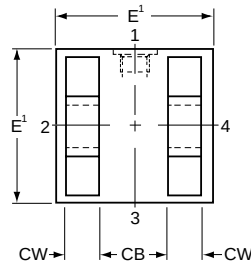
Style B
Cap Fixed Eye
(ISO Style MP3)

Pivot pin not supplied



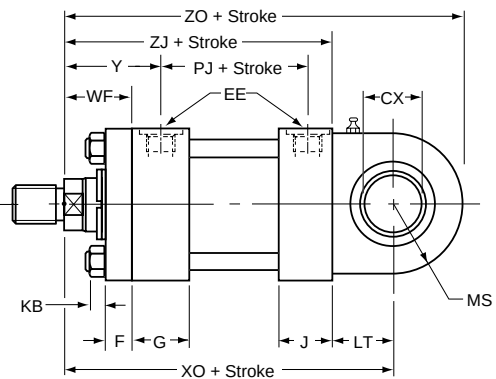
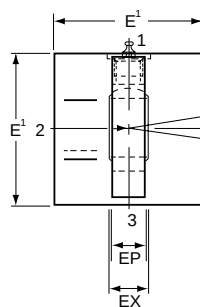
Style BB
Cap Fixed Clevis
(ISO Style MP1)

Supplied complete with pivot pin



Style SB*
Cap Fixed Eye
(ISO Style MP5)

Pivot pin not supplied



¹Head depth increased by 5mm to accommodate port on 25mm and 32mm bore cylinders – see page 111

*Parker Style SB is also known as Style SBd under Parker's European model code system

Dimensions – B, BB & SB See also Rod End Dimensions, page 111

Bore ϕ	CB	CD	CW	CX	E	EE BSP/G inches	EP	EW	EX	F	G	J	KB	L	LR	LT	M	MR	MS	WF	Y	+ Stroke					
	A16	H9																	max			PJ	XC	XO	ZC	ZJ	ZO
25	12	10	6	12-0.008	40 ¹	1/4	8	12	10	10	40	25	4	13	12	16	10	12	20	25	50	53	127	130	137	114	150
32	16	12	8	16-0.008	45 ¹	1/4	11	16	14	10	40	25	5	19	17	20	12	15	22.5	35	60	56	147	148	159	128	170.5
40	20	14	10	20-0.012	63	3/8	13	20	16	10	45	38	6.5	19	17	25	14	16	29	35	62	73	172	178	186	153	207
50	30	20	15	25-0.012	76	1/2	17	30	20	16	45	38	10	32	29	31	20	25	33	41	67	74	191	190	211	159	223
63	30	20	15	30-0.012	90	1/2	19	30	22	16	45	38	10	32	29	38	20	25	40	48	71	80	200	206	220	168	246
80	40	28	20	40-0.012	115	3/4	23	40	28	20	50	45	13	39	34	48	28	34	50	51	77	93	229	238	257	190	288
100	50	36	25	50-0.012	130	3/4	30	50	35	22	50	45	13	54	50	58	36	44	62	57	82	101	257	261	293	203	323
125	60	45	30	60-0.015	165	1	38	60	44	22	58	58	18	57	53	72	45	53	80	57	86	117	289	304	334	232	384
160	70	56	35	80-0.015	205	1	47	70	55	25	58	58	22	63	59	92	59	59	100	57	86	130	308	337	367	245	437
200	80	70	40	100-0.020	245	1-1/4	57	80	70	25	76	76	24	82	78	116	70	76	120	57	98	165	381	415	451	299	535

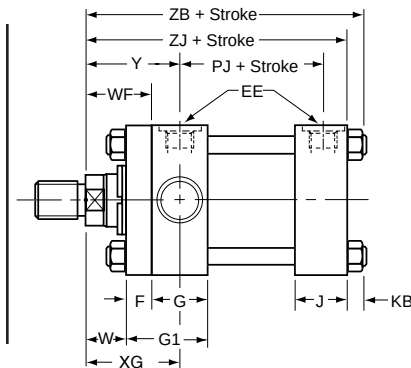
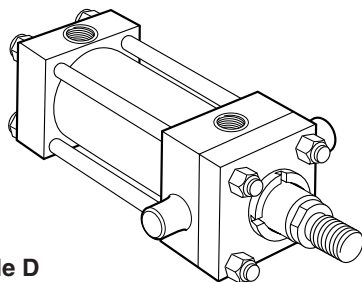
All dimensions are in millimeters unless otherwise stated.

For additional information – call your local Parker Cylinder Distributor.

Parker Series HMI Metric Hydraulic Cylinders

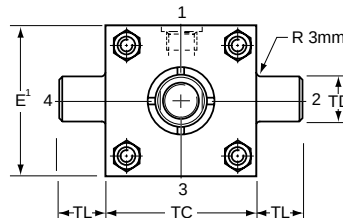
Trunnion Mountings

Style D
Head Trunnion
(ISO Style MT1)

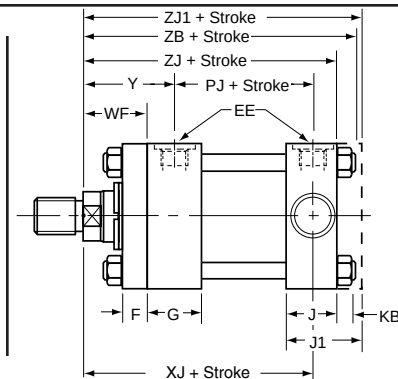
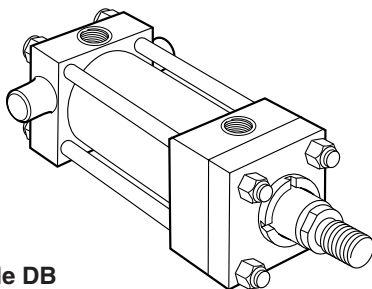


Notes:

A one-piece head and retainer is used on 100mm-200mm bore sizes – G1 dimension. On 160 and 200mm bores, the bolted gland is recessed, with tie rods screwed into the head.

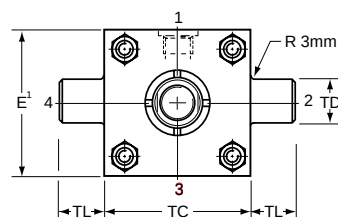


Style DB
Cap Trunnion
(ISO Style MT2)

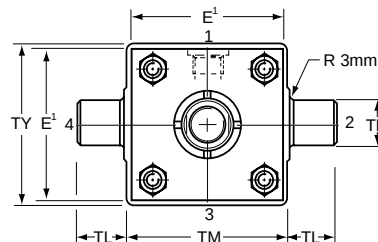
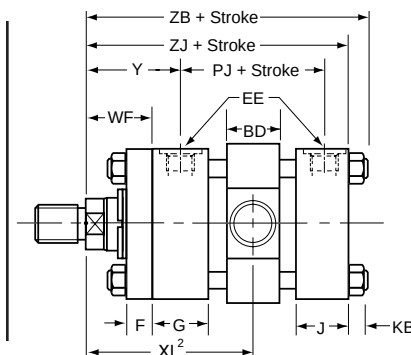
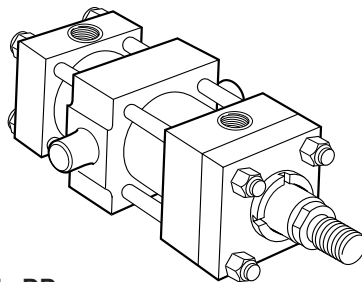


Note:

On 100-200mm bore cylinders, dimension J becomes J1. ZJ1 replaces ZB, and tie rods are screwed directly into the cap.



Style DD
Intermediate Fixed Trunnion
(ISO Style MT4)



¹Head depth increased by 5mm to accommodate port on 25mm and 32mm bore cylinders – see page 111

²Dimensions to be specified by customer

Dimensions – D, DB & DD See also Rod End Dimensions, page 111

Bore ϕ	BD	E	EE BSP/G inches	F	G	G1	J	J1	KB	TC	TD f8	TL	TM	TY	W	WF	XG	Y	+ Stroke					Style DD min stroke	Min XI dim'n
																			PJ	XJ	ZJ	ZJ1	ZB		
25	20	40 ¹	1/4	10	40	-	25	-	4	38	12	10	48	45	-	25	44	50	53	101	114	-	121	10	78
32	25	45 ¹	1/4	10	40	-	25	-	5	44	16	12	55	54	-	35	54	60	56	115	128	-	137	10	90
40	30	63	3/8	10	45	-	38	-	6.5	63	20	16	76	76	-	35	57	62	73	134	153	-	166	15	97
50	40	76	1/2	16	45	-	38	-	10	76	25	20	89	89	-	41	64	67	74	140	159	-	176	15	107
63	40	90	1/2	16	45	-	38	-	10	89	32	25	100	95	-	48	70	71	80	149	168	-	185	15	114
80	50	115	3/4	20	50	-	45	50	13	114	40	32	127	127	-	51	76	77	93	168	190	194	212	20	127
100	60	130	3/4	22	50	72	45	58	13	127	50	40	140	140	35	57	71	82	101	187	203	216	225	20	138
125	73	165	1	22	58	80	58	71	18	165	63	50	178	178	35	57	75	86	117	209	232	245	260	25	153
160	90	205	1	25	58	88	58	88	22	203	80	63	215	216	32	57	75	86	130	230	245	275	279	30	161
200	110	245	1-1/4	25	76	108	76	108	24	241	100	80	279	280	32	57	85	98	165	276	299	330	336	30	190

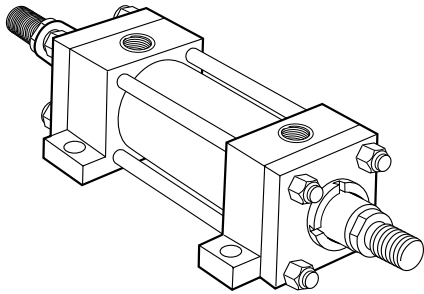
All dimensions are in millimeters unless otherwise stated.

For Cylinder Division Plant Locations – See Page II.



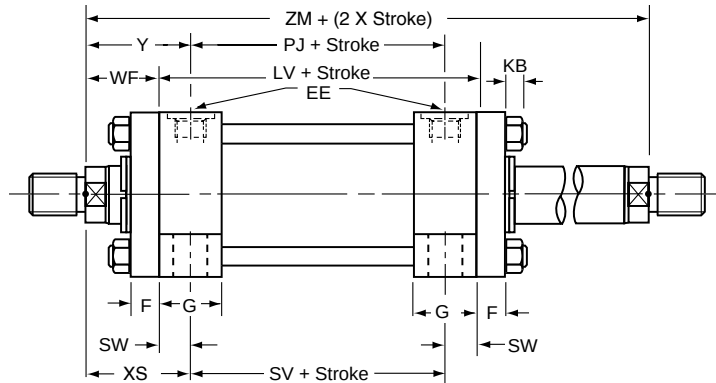
Parker Series HMI Metric Hydraulic Cylinders

Double Rod Cylinders



Double Rod Cylinder

Available with Styles TB, TD, JJ, C, D, DD (Style C illustrated)



Mounting Styles and Codes

Double rod cylinders are denoted by a 'K' in the ISO cylinder model code.

Dimensions

To obtain dimensional information for double rod cylinders, first select the desired mounting style by referring to the corresponding single rod model. Dimensions for the appropriate single rod model should be supplemented by those from the table opposite to provide a full set of dimensions.

Minimum Stroke Length – Style 9 Rod End

Where a style 9 (female) piston rod end is required on a double rod cylinder with a stroke of 80mm or less, and a bore of 80mm or above, please consult the factory.

Cushioning

Double rod cylinders can be supplied with cushions at either or both ends. Cushioning requirements should be specified by inserting a 'C' in the ordering code. See cushioning section, Section C of this catalog.

Double Rod Cylinders

For double rod cylinders, specify rod number and rod end symbols for both piston rods. A typical model number for a double rod cylinder would be:

100	K	JJ	HMI	R	E	1	4	M	1	4	M	125	M	11	44
-----	---	----	-----	---	---	---	---	---	---	---	---	-----	---	----	----

Bore φ	Rod		Add Stroke			Add 2x Stroke
	No.	MM φ	LV	PJ	SV	ZM
25	1	12	104	53	88	154
	2	18				
32	1	14	108	56	88	178
	2	22				
40	1	18	125	73	105	195
	2	28				
50	1	22				
	2	36	125	74	99	207
	3	28				
63	1	28				
	2	45	127	80	93	223
	3	36				
80	1	36				
	2	56	144	93	110	246
	3	45				
100	1	45				
	2	70	151	101	107	265
	3	56				
125	1	56				
	2	90	175	117	131	289
	3	70				
160	1	70				
	2	110	188	130	130	302
	3	90				
200	1	90				
	2	140	242	160	172	356
	3	110				

All dimensions are in millimeters unless otherwise stated.

For additional information – call your local Parker Cylinder Distributor.

Parker Series HMI Metric Hydraulic Cylinders

Accessories

Accessory Selection

Accessories for the rod end of a cylinder are selected by reference to the rod end thread, while the same accessories, when used at the cap end, are selected by cylinder bore size. See tables of part numbers below, and on the following pages.

The rod clevises, plain rod eyes and spherical bearings fitted as accessories to the rod end have the same pin diameters as those used at the cylinder cap ends of the corresponding mounting styles – B, BB and SB – when fitted with the No. 1 rod, or the No. 2 or No. 3 rods with Style 7 rod end.

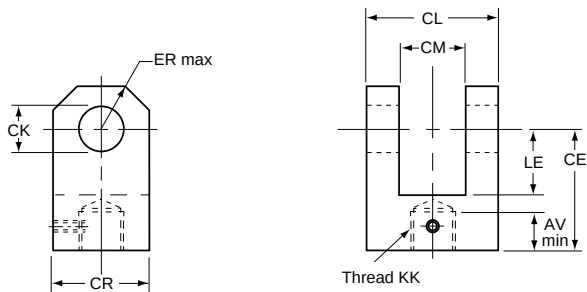
Rod and Cap End Accessories

Accessories for the HMI ISO cylinder include:

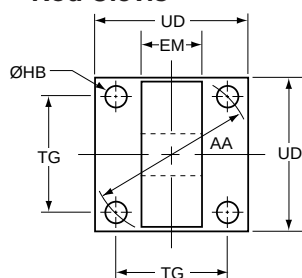
- Rod End** – rod clevis, eye bracket and pivot pin
 – plain rod eye, clevis bracket and pivot pin
 – rod eye with spherical bearing
- Cap End** – eye bracket for style BB mounting
 – clevis bracket for style B mounting
 – pivot pin for eye bracket and clevis bracket

Rod Clevis, Eye Bracket and Pivot Pin

Thread KK	Rod Clevis	Eye Bracket	Pivot Pin	Nominal Force kN	Weight kg
M10x1.25	143447	144808	143477	8	0.3
M12x1.25	143448	144809	143478	12.5	0.6
M14x1.5	143449	144810	143479	20	0.8
M16x1.5	143450	144811	143480	32	2.2
M20x1.5	143451	144812	143480	50	2.7
M27x2	143452	144813	143481	80	5.9
M33x2	143453	144814	143482	125	9.4
M42x2	143454	144815	143483	200	17.8
M48x2	143455	144816	143484	320	26.8
M64x3	143456	144817	143485	500	39.0



Rod Clevis



Eye Bracket

All dimensions are in millimeters unless otherwise stated.

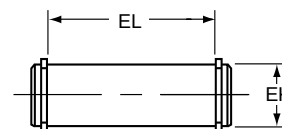
Rod Clevis Dimensions

Part No.	AV	CE	CK H9	CL	CM A16	CR	ER	KK	LE kg	Weight
143447	14	32	10	26	12	20	12	M10x1.25	14	0.08
143448	16	36	12	34	16	32	17	M12x1.25	19	0.25
143449	18	38	14	42	20	30	17	M14x1.5	19	0.32
143450	22	54	20	62	30	50	29	M16x1.5	32	1.0
143451	28	60	20	62	30	50	29	M20x1.5	32	1.1
143452	36	75	28	83	40	60	34	M27x2	39	2.3
143453	45	99	36	103	50	80	50	M33x2	54	2.6
143454	56	113	45	123	60	102	53	M42x2	57	5.5
143455	63	126	56	143	70	112	59	M48x2	63	7.6
143456	85	168	70	163	80	146	78	M64x3	83	13.0

Eye Bracket Dimensions

Part No.	CK H9	EM h13	FL	MR max	LE min	AA	HB	TG	UD
144808	10	12	23	12	13	40	5.5	28.3	40
144809	12	16	29	17	19	47	6.6	33.2	45
144810	14	20	29	17	19	59	9	41.7	65
144811	20	30	48	29	32	74	13.5	52.3	75
144812	20	30	48	29	32	91	13.5	64.3	90
144813	28	40	59	34	39	117	17.5	82.7	115
144814	36	50	79	50	54	137	17.5	96.9	130
144815	45	60	87	53	57	178	26	125.9	165
144816	56	70	103	59	63	219	30	154.9	205
144817	70	80	132	78	82	269	33	190.2	240

Pivot Pin for Clevis Bracket and Plain Rod Eye – Dimensions



Part No.	EK f8	EL	Weight kg
143477	10	29	0.02
143478	12	37	0.05
143479	14	45	0.08
143480	20	66	0.2
143481	28	87	0.4
143482	36	107	1.0
143483	45	129	1.8
143484	56	149	4.2
143485	70	169	6.0

Eye Bracket – Cap End Mounting for Style BB

Bore Φ	Eye Bracket	Nominal Force kN	Weight kg
25	144808	8	0.2
32	144809	12.5	0.3
40	144810	20	0.4
50	144811	32	1.0
63	144812	50	1.4
80	144813	80	3.2
100	144814	125	5.6
125	144815	200	10.5
160	144816	320	15.0
200	144817	500	20.0

For Cylinder Division Plant Locations – See Page II.



Parker Series HMI Metric Hydraulic Cylinders

Accessories

Plain Rod Eye, Clevis Bracket and Pivot Pin

Thread KK	Plain Rod Eye	Clevis Bracket	Pivot Pin	Nominal Force kN	Weight kg
M10x1.25	143457	143646	143477	8	0.5
M12x1.25	143458	143647	143478	12.5	1.0
M14x1.5	143459	143648	143479	20	1.3
M16x1.5	143460	143649	143480	32	3.2
M20x1.5	143461	143649	143480	50	3.8
M27x2	143462	143650	143481	80	6.9
M33x2	143463	143651	143482	125	12.5
M42x2	143464	143652	143483	200	26.0
M48x2	143465	143653	143484	320	47.0
M64x3	143466	143654	143485	500	64.0

Plain Rod Eye/Knuckle Dimensions

Part No.	AW	CA	CB	CD	CK H9	EM h13	ER	KK	LE	Weight kg
143457	14	32	18	9	10	12	12	M10x1.25	13	0.08
143458	16	36	22	11	12	16	17	M12x1.25	19	0.15
143459	18	38	20	12.5	14	20	17	M14x1.5	19	0.22
143460	22	54	30	17.5	20	30	29	M16x1.5	32	0.5
143461	28	60	30	20	20	30	29	M20x1.5	32	1.1
143462	36	75	40	25	28	40	34	M27x2	39	1.5
143463	45	99	50	35	36	50	50	M33x2	54	2.5
143464	56	113	65	50	45	60	53	M42x2	57	4.2
143465	63	126	90	56	56	70	59	M48x2	63	11.8
143466	85	168	110	70	70	80	78	M64x3	83	17.0

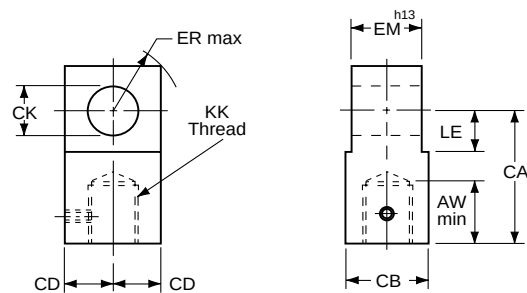
Clevis Bracket Dimensions

Part No.	CK H9	CM A16	CW	FL	MR max	HB	LE min	RC	TB	UR	UH
143646	10	12	6	23	12	5.5	13	18	47	35	60
143647	12	16	8	29	17	6.6	19	24	57	45	70
143648	14	20	10	29	17	9	19	30	68	55	85
143649	20	30	15	48	29	13.5	32	45	102	80	125
143650	28	40	20	59	34	17.5	39	60	135	100	170
143651	36	50	25	79	50	17.5	54	75	167	130	200
143652	45	60	30	87	53	26	57	90	183	150	230
143653	56	70	35	103	59	30	63	105	242	180	300
143654	70	80	40	132	78	33	82	120	300	200	360

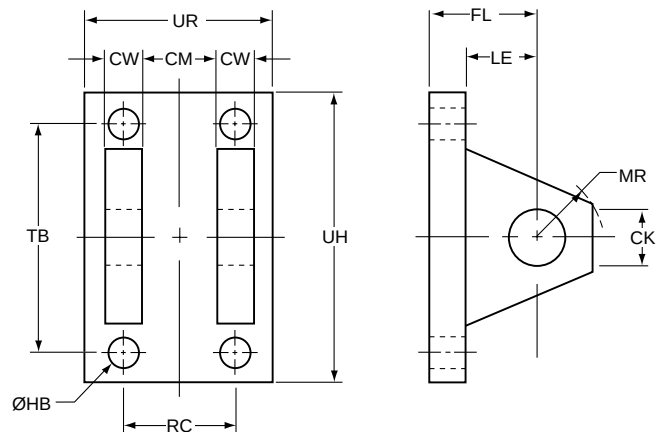
Clevis Bracket – For Style B

Bore φ	Clevis Bracket	Nominal Force kN	Weight kg
25	143646	8	0.4
32	143647	12.5	0.8
40	143648	20	1.0
50	143649	32	2.5
63	143649	50	2.5
80	143650	80	5.0
100	143651	125	9.0
125	143652	200	20.0
160	143653	320	31.0
200	143654	500	41.0

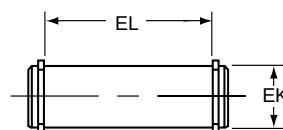
Plain Rod Eye/Knuckle



Clevis Bracket



Pivot Pin for Clevis Bracket and Plain Rod Eye – Dimensions



Part No.	EK f8	EL	Weight kg
143477	10	29	0.02
143478	12	37	0.05
143479	14	45	0.08
143480	20	66	0.2
143481	28	87	0.4
143482	36	107	1.0
143483	45	129	1.8
143484	56	149	4.2
143485	70	169	6.0

All dimensions are in millimeters unless otherwise stated.

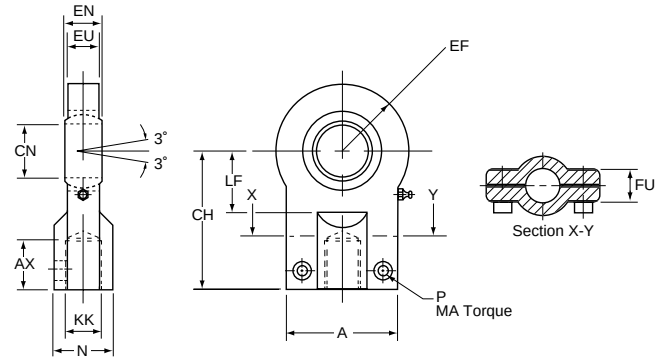
For additional information – call your local Parker Cylinder Distributor.

Parker Series HMI Metric Hydraulic Cylinders

Accessories

Rod Eye with Spherical Bearing, Mounting Bracket and Pivot Pin

Thread KK	Rod Eye with Spherical Bearing	Mounting Bracket and Pivot Pin	Nominal Force kN	Weight kg
M10x1.25	145254	145530	8	0.2
M12x1.25	145255	145531	12.5	0.3
M14x1.5	145256	145532	20	0.4
M16x1.5	145257	145533	32	0.7
M20x1.5	145258	145534	50	1.3
M27x2	145259	145535	80	2.3
M33x2	145260	145536	125	4.4
M42x2	145261	145537	200	8.4
M48x2	145262	145538	320	15.6
M64x3	145263	145539	500	28.0



Rod Eye with Spherical Bearing

All spherical bearings should be re-packed with grease when servicing. In unusual or severe working conditions, consult the factory regarding the suitability of the bearing chosen.

Rod Eye with Spherical Bearing Dimensions

Part No.	A max	AX min	EF max	CH	CN	EN	EU	FU	KK	LF min	N max	MA max Nm	P
145254	40	15	20	42	12 -0.008	10 -0.012	8	13	M10x1.25	16	17	10	M6
145255	45	17	22.5	48	16 -0.008	14 -0.012	11	13	M12x1.25	20	21	10	M6
145256	55	19	27.5	58	20 -0.012	16 -0.012	13	17	M14x1.5	25	25	25	M8
145257	62	23	32.5	68	25 -0.012	20 -0.012	17	17	M16x1.5	30	30	25	M8
145258	80	29	40	85	30 -0.012	22 -0.012	19	19	M20x1.5	35	36	45	M10
145259	90	37	50	105	40 -0.012	28 -0.012	23	23	M27x2	45	45	45	M10
145260	105	46	62.5	130	50 -0.012	35 -0.012	30	30	M33x2	58	55	80	M12
145261	134	57	80	150	60 -0.015	44 -0.015	38	38	M42x2	68	68	160	M16
145262	156	64	102.5	185	80 -0.015	55 -0.015	47	47	M48x2	92	90	310	M20
145263	190	86	120	240	100 -0.020	70 -0.020	57	57	M64x3	116	110	530	M24

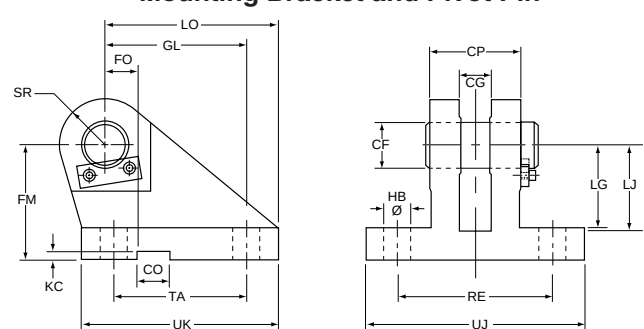
Mounting Bracket and Pivot Pin Dimensions - For Style SB

Part No.	CF K7/h6	CG +0.1, +0.3	CO N9	CP	FM js11	FO js14	GL js13	HB	KC 0, +0.30	LG	LJ	LO	RE js13	SR max	TA js13	UJ	UK
145530	12	10	10	30	40	16	46	9	3.3	28	29	56	55	12	40	75	60
145531	16	14	16	40	50	18	61	11	4.3	37	38	74	70	16	55	95	80
145532	20	16	16	50	55	20	64	14	4.3	39	40	80	85	20	58	120	90
145533	25	20	25	60	65	22	78	16	5.4	48	49	98	100	25	70	140	110
145534	30	22	25	70	85	24	97	18	5.4	62	63	120	115	30	90	160	135
145535	40	28	36	80	100	24	123	22	8.4	72	73	148	135	40	120	190	170
145536	50	35	36	100	125	35	155	30	8.4	90	92	190	170	50	145	240	215
145537	60	44	50	120	150	35	187	39	11.4	108	110	225	200	60	185	270	260
145538	80	55	50	160	190	35	255	45	11.4	140	142	295	240	80	260	320	340
145539	100	70	63	200	210	35	285	48	12.4	150	152	335	300	100	300	400	400

Cap Mounting Bracket and Pivot Pin

Bore φ	Mounting Bracket and Pivot Pin	Nominal Force kN	Weight kg
25	145530	8	0.6
32	145531	12.5	1.3
40	145532	20	2.1
50	145533	32	3.2
63	145534	50	6.5
80	145535	80	12.0
100	145536	125	23.0
125	145537	200	37.0
160	145538	320	79.0
200	145539	500	140.0

Mounting Bracket and Pivot Pin



All dimensions are in millimeters unless otherwise stated.

For Cylinder Division Plant Locations – See Page II.



How to Order ISO Cylinders

Data Required On All Cylinder Orders

When ordering Series HMI cylinders, be sure to specify each of the following requirements:

(NOTE: – Duplicate cylinders can be ordered by giving the SERIAL NUMBER from the nameplate of the original cylinder. Factory records supply a quick, positive identification.)

a) Bore Size

b) Mounting Style

Specify your choice of mounting style – as shown and dimensioned in this catalog. If double rod is required, specify “with double rod.”

c) Series Designation (“HMI”)

d) Length of Stroke

e) Piston Rod Diameter

Call out rod diameter or rod code number. In Series HMI cylinders, standard rod diameters (Code No. 1) will be furnished if not otherwise specified, unless length of stroke makes the application questionable.

f) Piston Rod End Thread Style

Call out thread style number or specify dimensions. Thread style number 4 will be furnished if not otherwise specified.

g) Cushions (if required)

Specify “Cushion-head end,” “Cushion-cap end” or “Cushion-both ends” as required. If cylinder is to have a double rod and only one cushion is required, be sure to specify clearly which end of the cylinder is to be cushioned.

h) Piston

Parker B style pistons are standard. Fluorocarbon also available.

i) Ports

BSP (ISO 228) are standard.

j) Fluid Medium

Series HMI hydraulic cylinders are equipped with seals for use with hydraulic oil. If other than hydraulic oil will be used, consult factory.

ADDITIONAL DATA is required on orders for cylinders with special modifications.
For further information, consult factory.

Service Policy

On cylinders returned to the factory for repairs, it is standard policy for the Cylinder Division to make such part replacements as will put the cylinder in as good as new condition. Should the condition of the returned cylinder be such that expenses for repair would exceed the costs of a new one, you will be notified.

Address all correspondence to Service Department at your nearest regional plant listed in the pages of this catalog.

Certified Dimensions

Parker Cylinder Division guarantees that all cylinders ordered from this catalog will be built to dimensions shown. All dimensions are certified to be correct, and thus it is not necessary to request certified drawings.

For additional information – call your local Parker Cylinder Distributor.

Parker Series HMI Metric Hydraulic Cylinders

Model Numbers

Series HMI Model Numbers – How to Develop and “Decode” Them

Parker Series HMI cylinders can be completely and accurately described by a model number consisting of coded symbols.

To develop a model number, select only those symbols that represent the cylinder required, and place them in the sequence indicated below.

Feature	Description	Page	Symbol	Example																																	
				80	C	K	C	K	HMI	R	B	S	1	4	M	C	230	M	11	44																	
Bore	Millimeters		—	●	○	○	●	○	●	●	●	○	●	●	●	○	●	●	●	●																	
Cushion – Head	If required	C117	C	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
Double Rod	If required	116	K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
Mounting Style	Head Tie Rods Extended	112	TB	● *Mounting Style SB is also known as Parker Style SBd in Parker's European model code system. ‡Specify XI dimension. ○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
	Cap Tie Rods Extended	112	TC																																		
	Both Ends Tie Rods Extended	112	TD																																		
	Head Rectangular	113	JJ																																		
	Cap Rectangular	113	HH																																		
	Side Lugs	113	C																																		
	Cap Fixed Eye	114	B																																		
	Cap Fixed Clevis	114	BB																																		
	Cap Fixed Eye with Spherical Bearing*	114	SB*																																		
	Head Trunnion	115	D																																		
	Cap Trunnion	115	DB																																		
	Intermediate Fixed Trunnion‡	115	DD																																		
Mounting Modifications	Thrust Key for Style C mounting only – Thrust key - 25mm & 32mm bores – Thrust key - 40mm bore and larger	C112 C112	P K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
Series	Series name		HMI	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●																		
Ports	BSP (ISO 228) – standard	C121	R	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
	BSPT (Taper Thread)	C121	B																																		
	Metric Thread	C121	M																																		
	Metric Thread per ISO 6149	C121	Y																																		
	SAE – Straight Thread O-ring Port	C121	T																																		
	NPTF (Dry Seal Pipe Thread)	C121	U																																		
	SAE – Flange Ports (3000 PSI)	C121	P																																		
Piston	Lipseal™ Piston** (standard 25mm - 40mm bores)	109	L	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
	B-Style Low Friction filled PTFE seals (standard 50mm - 200mm bores)	109	B																																		
	Mixed Media Low Friction Piston seal (Optional 25mm - 200mm bores)	109	W																																		
Special Features	One or more of the following: Gland Drain Port Oversize Ports Rod End Bellows Stop Tube Stroke Adjuster Tie Rod Supports Water Service Modifications Or to detailed descriptions or drawings supplied by customer	C123 C120 C123 C115 C123 C113 C122	S	Key: ● Essential information ○ Optional features	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
	Piston Rod Number	Rod No. 1	111																		1																
		Rod No. 2	111																		2																
		Rod No. 3	111																		3																
	Piston Rod End	Style 4	111																		4	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
		Style 7	111																		7																
		Style 9	111																		9																
		Style 3 (Special) Please supply description or drawing	111																		3																
Rod Thread	Metric (standard)	111	M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
Cushion – Cap	If required	C117	C	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
Gross Stroke	Millimeters		—	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
Fluid Medium ISO 6743/4 (1982)	Mineral Oil HH, HL, HLP, – Group 1 HLP-D, HM, HV, MIL-H-5606 Oil, Air, Nitrogen	C122	M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
	Fluorocarbon – Group 5	C122	D																																		
Port Positions	Head position 1-4 Cap position 1-4	C120 C120	1 1	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○																	
	Air Bleeds	Head position 1-4	C120																		4																
Cap position 1-4		C120	4																																		
No Air Bleed		C120	00																																		

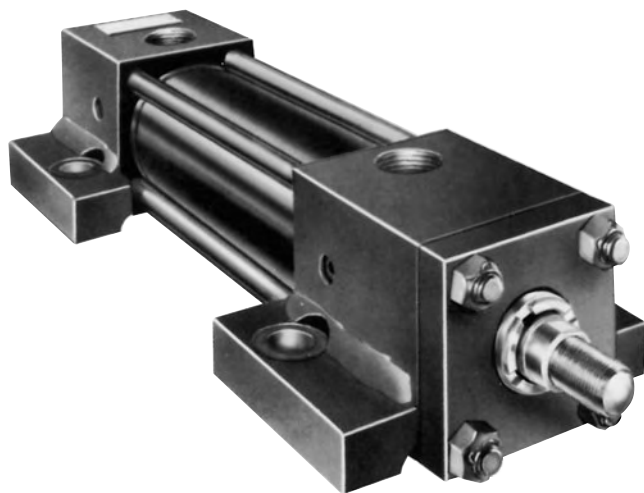
Key: ● Essential information
○ Optional features

Note: Page numbers with a letter prefix, ie: C117, are located in section C of this catalog.

For Cylinder Division Plant Locations – See Page II.



Series VH Hydraulic Cylinders



Extra-long Tapered Cushions Oversize Ports Meets N.F.P.A. Specifications

Nominal Pressure - 3000 PSI
Standard Bore Sizes - 2½" Through 8"
Piston Rod Diameters - 1" Through 5½"
Fifteen Standard Mounting Styles

Series "VH" very heavy-duty hydraulic cylinders are premium quality cylinders—with operating capacities of 3,000 PSI. They fully meet NFPA standards. And to make sure every cylinder is premium-quality, Parker Hannifin subjects each and every one – not just batch samples – to tough inspection and performance tests.

OTHER SERIES "VH" FEATURES AND SPECIFICATIONS

Ports

Series "VH" ports are two sizes or larger than NFPA standards. Standard location is position 1 as shown in dimensional drawings. Where mountings do not interfere, ports may be located at positions 2, 3, or 4. Ports are not available at positions 2 or 4 on mounting style C, 2½" thru 5" bore cylinders. SAE straight thread O-ring ports will be supplied unless otherwise specified.

Cushions

Cushions on Series "VH" cylinders are 3" long on all sizes except 3¼" and 4" bore sized equipped with 2" and 2½" diameter piston rods which are supplied with cushions 2¹³/₁₆" long at head end. Self-centering floating cushion sleeve at head end and cushion spear at cap is tapered for ²/₃ its length to give maximum cushioning effect for ¹/₃ its length.

Thrust Key

An extended retainer plate, to serve as a thrust key, can be supplied on mounting styles C and F. The thrust key would be the same as used on Parker Hannifin "2H" hydraulic cylinders.

Air Bleeds

When specified, ⅛" NPTF bleed ports are available at either head or cap end. For design and location, ask for Drawing 81292.

Accessories

Mounting accessories for Series "VH" are the same as used on Parker Hannifin Series 2H hydraulic cylinders. For dimensional data for rod clevis, knuckle, clevis bracket, mounting plate and pivot pin, see the Parker Series 2H section of this catalog.

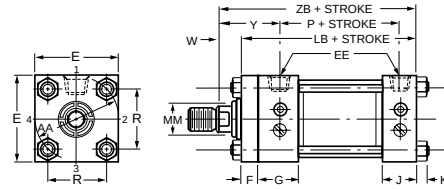
*See Section C for actual design factors.

For additional information – call your local Parker Cylinder Distributor.

Parker Series VH Hydraulic Cylinders

Mounting Styles Dimensions

Basic Cylinder Style T (NFPA Style MX01)

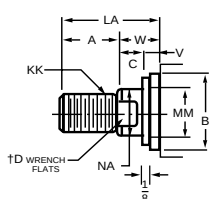


Rod end dimensions

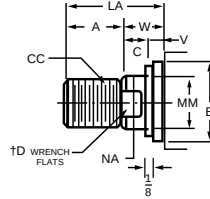
BORE	ROD NO.	ROD DIA.	THREAD			ROD EXTENSIONS AND PILOT DIMENSIONS										BASIC ENVELOPE AND MOUNTING DIMENSIONS									
			MM	CC	KK	A	B +0.000 -0.002	C	D	LA	NA	V	W	Y	E	EE		F	G	J	K	ADD STROKE			
																NPTF	SAE					LB	P	ZB	
2 ^{1/2}	1(Std.)	1	7/8-14	3/4-16	1 1/8	1.499	1/2	7/8	1 7/8	1 ⁵ / ₁₆	1/4	3/4	4 1/8	3 1/2	1	16	5/8	3 3/4	3 1/2	7/16	9 3/8	3 1/2	10 ⁹ / ₁₆		
	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 ¹¹ / ₁₆	1/2	1 1/4	4 5/8											10 ¹¹ / ₁₆	
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	1 5/16	3/8	1	4 3/8												10 ¹³ / ₁₆
3 ¹ / ₄	1(Std.)	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 1/2	1 5/16	1/4	7/8	4 3/16	4 1/2	1 1/4	20	3/4	3 3/4	3 1/2	9/16	9 3/4	4 1/8	11 ³ / ₁₆		
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	1 15/16	3/8	1 1/4	4 9/16											11 ⁹ / ₁₆	
	3	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 3/8	1 11/16	3/8	1 1/8	4 7/16												11 ⁷ / ₁₆
4	1(Std.)	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3	1 11/16	3/8	1	4 7/16	5	1 1/4	20	7/8	3 3/4	3 1/2	9/16	10 1/8	4 3/8	11 ¹¹ / ₁₆		
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 3/8	2 3/8	3/8	1 3/8	4 13/16											12 1/16	
	3	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 3/8	1 15/16	1/4	1 1/8	4 9/16												11 ¹³ / ₁₆
5	1(Std.)	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 3/8	1 15/16	1/4	1 1/8	4 11/16	6 1/2	1 1/2	24	7/8	4	3 3/4	13/16	11 1/8	5 1/8	13 1/16		
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	4 7/8	3 3/8	3/8	1 3/8	4 15/16											13 5/16	
	3	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 3/8	2 3/8	3/8	1 3/8	4 15/16												13 3/16
6	1(Std.)	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 1/4	2 3/8	1/4	1 1/4	4 7/8	7 1/2	2	32	1	4 1/4	4 1/4	7/8	12 3/8	6 1/8	14 1/2		
	2	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/4	3 7/8	1/4	1 1/4	4 7/8											14 1/2	
	3	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	4 3/4	2 7/8	1/4	1 1/4	4 7/8												14 1/2
7	1(Std.)	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	4 3/4	3 3/8	1/4	1 1/4	4 3/4	8 1/2	2	32	1	4 1/4	4 1/4	1 1/4	12 1/2	6 1/2	15		
	2	5	4 3/4-12	3 1/2-12	5	5.749	1	4 1/4	6 1/4	4 7/8	1/4	1 1/4	4 3/4											15	
	3	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	4 3/4	3 3/8	1/4	1 1/4	4 3/4												15
8	1(Std.)	4 1/4	4 1/4-12	3 1/4-12	4 1/2	5.249	1	3 7/8	5 3/4	4 3/8	1/4	1 1/4	4 3/4	9 1/2	2 1/2	32	1	4 1/2	4 1/2	1 1/2	13 1/2	7 1/2	16 1/4		
	2	5 1/2	5 1/4-12	4-12	5 1/2	6.249	1	4 5/8	6 3/4	5 3/8	1/4	1 1/4	4 3/4											16 1/4	
	3	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/4	3 7/8	1/4	1 1/4	4 3/4												16 1/4
9	1(Std.)	4 1/2	4 1/4-12	3 1/4-12	4 1/2	5.249	1	3 7/8	5 3/4	4 3/8	1/4	1 1/4	4 3/4	9 1/2	2 1/2	32	1	4 1/2	4 1/2	1 1/2	13 1/2	7 1/2	16 1/4		
	2	5	4 3/4-12	3 1/2-12	5	5.749	1	4 1/4	6 1/4	4 7/8	1/4	1 1/4	4 3/4											16 1/4	
	3	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/4	3 7/8	1/4	1 1/4	4 3/4												16 1/4
10	1(Std.)	4 3/4	4 1/4-12	3 1/4-12	4 1/2	5.249	1	3 7/8	5 3/4	4 3/8	1/4	1 1/4	4 3/4	9 1/2	2 1/2	32	1	4 1/2	4 1/2	1 1/2	13 1/2	7 1/2	16 1/4		
	2	5	4 3/4-12	3 1/2-12	5	5.749	1	4 1/4	6 1/4	4 7/8	1/4	1 1/4	4 3/4											16 1/4	
	3	4	3 3/4-12	3-12	4	4.749	1	3 3/8	5 1/4	3 7/8	1/4	1 1/4	4 3/4												16 1/4

◆ SAE straight thread ports are standard and are indicated by port number. For dimensional information see Section C.
° NPTF ports are available at no extra charge.

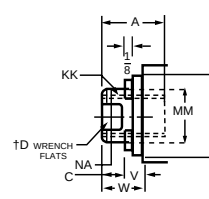
PISTON ROD END THREADS



**PARKER THREAD
STYLE 4
(NFPA SM)**



**PARKER THREAD
STYLE 8
(NFPA IM)**



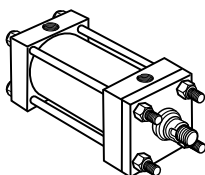
**PARKER THREAD
STYLE 9
(NFPA SF)**

Style 4 Rod Ends recommended for applications where workpiece is secured against rod shoulder. When workpiece is not shouldered, Style 4 Rod Ends are recommended through 2" rod diameter, Style 8 on larger diameters. If rod end is not specified, Style 4 will be furnished.

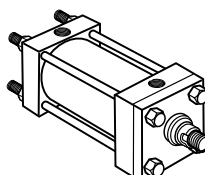
NOTE: Special piston rod end threads, two times length are available on 2 1/2" diameter piston rods and smaller. To order, specify thread Style 42 which has KK thread dia. or Style 82 which has CC thread dia. Other piston rod threads are available. To order, specify Style 3 and give desired dimensions for CC or KK, A and LA. For other specials, send dimensions or sketch.

† On 4 1/2" diameter rods and larger, 4 each .515 diameter spanner wrench holes will be provided.

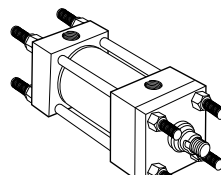
Tie Rod Mounted Styles TB, TC, TD (NFPA Styles MX3, MX2, MX1)



**Style TB
(MX3)**

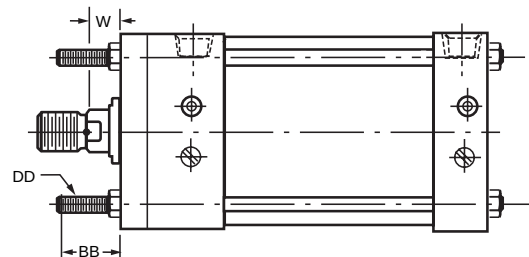


**Style TC
(MX2)**



**Style TD
(MX1)**

Style TB, Tie Rods Extended, is illustrated at right. Style TC, Cap Tie Rods Extended, and Style TD, Both Ends Tie Rods Extended, can be dimensioned from Style TB drawing.



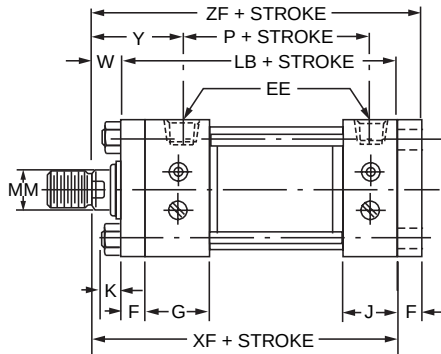
For Cylinder Division Plant Locations – See Page II.

Mounting Styles Dimensions

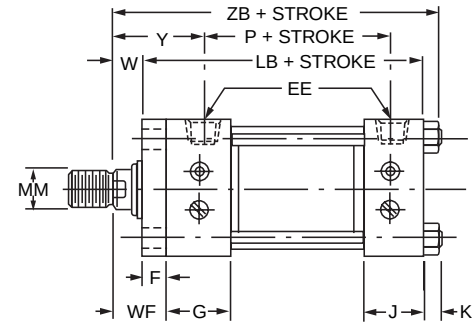
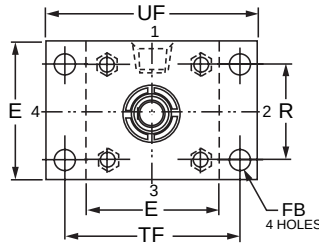
Parker Series VH Hydraulic Cylinders

Flange Mountings

Style H, J, HB, JB



STYLE H (NFPA MF2)



STYLE J (NFPA MF1)

For Style "H" Mount

Bore Size	Max. PSI - Pull*				
	Rod Code				
	1	2	3	4	5
2 1/2	3000	3000	3000	—	—
3 1/4	3000	3000	3000	—	—
4	3000	3000	3000	—	—
5	2000	3000	2000	2500	—
6	1800	2500	2000	2000	—
7	2000	3000	2000	2500	2800
8	1700	2500	1700	1800	2200

* Maximum pressure rating - pull application

For Style "J" Mount

Bore Size	Max. PSI - Push*				
	Rod Code				
	1	2	3	4	5
2 1/2	2000	1100	1500	—	—
3 1/4	1800	1300	1400	—	—
4	1800	1300	1700	—	—
5	1300	800	1200	1000	—
6	1200	800	1000	900	—
7	1400	800	1200	1100	1000
8	1100	800	1000	1000	800

* Maximum pressure rating - push application

Specific Dimensions for Series VH Mounting Styles (in inches)

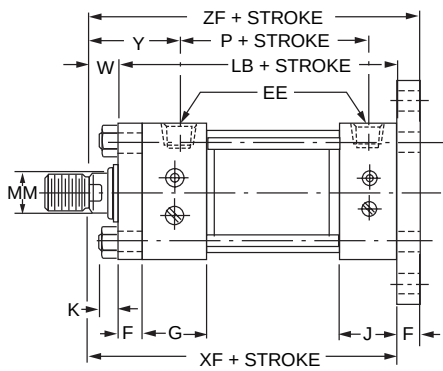
BORE	ROD NO.	ROD DIA.	AA	BB	BD	CB	+0.000 CD♦ -0.002	CW	DD	+0.000 FA -0.003	FB	L	+0.000 LH -0.002	LR	M	MR	ND	NT	PA	PC	PD	PF	R	SB•	ST
2½	1	1	3.6	1 ¹³ / ₁₆	1½	1¼	.751	5/8	1½-20	.562	9/16	1¼	1.744	15/16	¾	15/16	9/16	5/8-11	5/16	2¾	2¹/16	3¹/16	2.55	13/16	1
	2	1¾															9/16								
	3	1¾															9/16								
3¼	1	1¾	4.6	2 ⁵ / ₁₆	2	1½	1.001	¾	5/8-18	.687	11/16	1½	2.244	1¼	1	13/16	7/8	11/16	¾-10	¾	2½	2 ¹⁵ / ₁₆	3.25	13/16	1
	2	2															11/16								
	3	1¾															7/8								
4	1	1¾	5.4	2 ⁵ / ₁₆	2	2	1.376	1	5/8-18	.812	11/16	2¹/8	2.494	1¾	1¾	15/8	1	1-8	7/16	2 ¹¹ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	3.82	1¹/16	1¼
	2	2½															1								
	3	2															1								
5	1	2	7.0	3 ³ / ₁₆	2	2½	1.751	1¼	7/8-14	.812	15/16	2¼	3.244	2¹/16	1¾	2¹/8	1¹/8	1-8	7/16	2 ¹⁵ / ₁₆	3 ¹¹ / ₁₆	3³/16	4.95	1¹/16	1¼
	2	3½															1								
	3	2½															1¹/8								
6	1	2½	8.1	3 ⁵ / ₈	3	2½	2.001	1¼	1-14	.937	1¹/16	2½	3.744	2 ⁵ / ₁₆	2	2³/8	1¾	1¼-7	½	3³/16	4¼	3 ⁵ / ₁₆	5.73	1 ⁵ / ₁₆	1½
	2	4															1¼								
	3	3															1¾								
7	1	3	9.3	4¹/8	3	3	2.501	1½	1¹/8-12	.937	1¾	3	4.244	2¾	2½	2 ⁷ / ₈	1¹/8	1¹/2-6	½	2 ¹⁵ / ₁₆	4¾	3¹/8	6.58	1 ⁹ / ₁₆	1¾
	2	5															1¹/8								
	3	3½															1¹/8								
8	1	3½	10.6	4½	3½	3	3.001	1½	1¼-12	.937	1 ⁵ / ₁₆	3¼	4.744	3¼	2¾	3¹/8	1½	1¹/2-6	½	2 ¹⁵ / ₁₆	5¼	3¼	7.50	1 ⁹ / ₁₆	1¾
	2	5½															1½								
	3	4															1½								
	4	4½															1½								
	5	5															1½								

♦ Dimension CD is pin diameter. • Upper surface spotfaced for socket head screws. ♦♦ Dimension to be specified by customer.

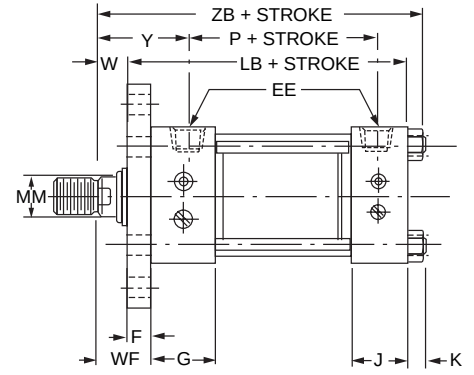
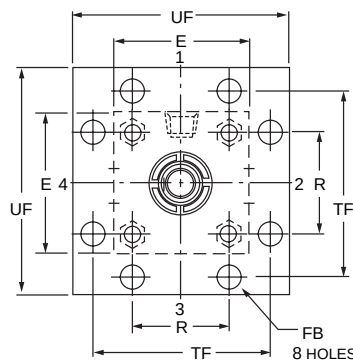
For additional information – call your local Parker Cylinder Distributor.

Parker Series VH Hydraulic Cylinders

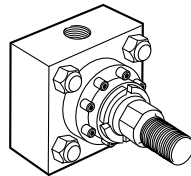
Mounting Styles Dimensions



STYLE HB (NFPA MF6)



STYLE JB (NFPA MF5)



For 7" & 8" bores, this style
retainer configuration applies
to all but J and JB mounts.

For Style "JB" Mount

Bore Size	Max. PSI - Push*				
	Rod Code				
	1	2	3	4	5
2 1/2	3000	3000	3000	—	—
3 1/4	3000	3000	3000	—	—
4	3000	3000	3000	—	—
5	3000	3000	3000	3000	—
6	3000	2700	3000	2700	—
7	3000	2700	3000	3000	3000
8	3000	2300	2500	2500	2500

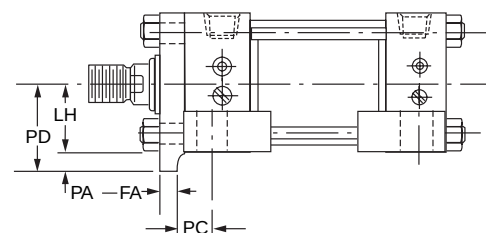
* Maximum pressure rating - push application

SU	SW	SY	+0.000 TD -0.001	TF	TL	TM	TN	TS	TY	UF	UM	UT	US	UW	XG	MIN. XI ◆	DD MTG. MIN. STK.	XS	XT	add stroke						
																				SN	SS	XC	XF	XJ	ZC	ZF
1 ⁹ / ₁₆	1 ¹¹ / ₁₆	2 ¹¹ / ₁₆	1.375	4 ⁵ / ₈	1 ³ / ₈	4	1 ⁵ / ₁₆	4 ⁷ / ₈	3 ³ / ₄	5 ³ / ₈	6 ³ / ₄	6 ¹ / ₄	6 ¹ / ₄	4 ⁵ / ₈	4 ¹ / ₄ 4 ³ / ₄ 4 ¹ / ₂	5 ¹⁵ / ₁₆ 6 ⁷ / ₁₆ 6 ³ / ₁₆	1 ¹ / ₈	4 ¹ / ₁₆ 4 ⁹ / ₁₆ 4 ⁵ / ₁₆	4 ³ / ₈ 4 ⁷ / ₈ 4 ⁵ / ₈	3	3 ³ / ₈	11 ³ / ₈ 11 ⁷ / ₈ 11 ⁵ / ₈	10 ¹ / ₈ 10 ⁵ / ₈ 10 ⁷ / ₈	7 ³ / ₈ 7 ¹ / ₈ 7 ⁵ / ₈	12 ¹ / ₈ 12 ⁵ / ₈ 12 ³ / ₈	10 ³ / ₄ 11 ¹ / ₄ 11
1 ⁹ / ₁₆	1 ¹¹ / ₁₆	2 ⁷ / ₁₆	1.750	5 ⁷ / ₈	1 ³ / ₄	5	1 ¹ / ₂	5 ⁷ / ₈	4 ³ / ₄	7 ¹ / ₈	8 ¹ / ₂	8	7 ¹ / ₄	5 ¹³ / ₁₆	4 ³ / ₄ 4 ⁵ / ₈ 4 ³ / ₄	6 ⁷ / ₁₆ 6 ¹³ / ₁₆ 6 ¹¹ / ₁₆	3 ³ / ₈	4 ¹ / ₁₆ 4 ⁷ / ₁₆ 4 ⁵ / ₁₆	4 ¹ / ₂ 4 ⁷ / ₈ 4 ³ / ₄	3 ¹ / ₂	4 ¹ / ₈	12 ¹ / ₈ 12 ¹ / ₂ 12 ³ / ₈	10 ⁵ / ₈ 11 10 ⁷ / ₈	8 8 ¹ / ₈ 8 ³ / ₈	13 ¹ / ₈ 13 ¹ / ₂ 13 ³ / ₈	11 ³ / ₈ 11 ³ / ₄ 11 ⁵ / ₈
2	7 ⁷ / ₈	2 ⁵ / ₈	1.750	6 ³ / ₈	1 ³ / ₄	5 ¹ / ₂	2 ¹ / ₁₆	6 ³ / ₄	5 ¹ / ₄	7 ⁵ / ₈	9	8 ¹ / ₂	8 ¹ / ₂	6 ³ / ₈	4 ⁵ / ₈ 5 4 ³ / ₄	6 ¹¹ / ₁₆ 7 ¹ / ₁₆ 6 ¹³ / ₁₆	1 ¹ / ₈	4 ¹ / ₈ 4 ¹ / ₈ 4 ⁵ / ₈	4 ³ / ₄ 5 ¹ / ₈ 4 ⁵ / ₈	3 ³ / ₄	4	13 ³ / ₄ 13 ⁵ / ₈ 13 ³ / ₈	11 ¹ / ₂ 11 ¹ / ₂ 11 ¹ / ₄	8 ¹ / ₈ 8 ¹ / ₈ 8 ⁵ / ₈	15 15 14 ³ / ₄	12 ¹ / ₈ 12 ¹ / ₈ 12 ¹ / ₈
2	7 ⁷ / ₈	2 ⁷ / ₈	1.750	8 ³ / ₁₆	1 ³ / ₄	7	2 ¹⁵ / ₁₆	8 ¹ / ₄	6 ³ / ₄	9 ³ / ₄	10 ¹ / ₂	10	10	7 ³ / ₄	5 ⁵ / ₄ 5 ¹ / ₄ 5 ¹ / ₄	7 ¹ / ₁₆ 7 ⁵ / ₁₆ 7 ⁵ / ₁₆	0	4 ⁷ / ₈ 5 ¹ / ₈ 5 ¹ / ₈	5 ⁵ / ₈ 5 ³ / ₈ 5 ³ / ₈	4 ¹ / ₄	4 ¹ / ₂	14 ¹ / ₂ 14 ³ / ₄ 14 ³ / ₄	12 ¹ / ₄ 12 ¹ / ₂ 12 ¹ / ₂	9 ³ / ₈ 9 ⁵ / ₈ 9 ⁵ / ₈	16 ¹ / ₄ 16 ¹ / ₂ 16 ¹ / ₂	13 ¹ / ₈ 13 ³ / ₈ 13 ³ / ₈
2 ¹ / ₂	1 ¹ / ₈	3 ¹ / ₈	2.000	9 ⁷ / ₁₆	2	8 ¹ / ₂	3 ⁵ / ₁₆	9 ³ / ₄	7 ³ / ₄	11 ¹ / ₄	12 ¹ / ₂	11 ¹ / ₂	12	10 ³ / ₄	5 ³ / ₈ 5 ³ / ₈ 5 ³ / ₈	8 ¹ / ₁₆ 8 ¹ / ₁₆ 8 ¹ / ₁₆	1 ¹ / ₄	5 ³ / ₈ 5 ³ / ₈ 5 ³ / ₈	5 ¹ / ₂ 5 ¹ / ₂ 5 ¹ / ₂	5 ¹ / ₈	5 ¹ / ₈	16 ¹ / ₈ 16 ¹ / ₈ 16 ^{1/₈}	13 ³ / ₈ 13 ³ / ₈ 13 ³ / ₈	10 ³ / ₈ 10 ³ / ₈ 10 ³ / ₈	18 ¹ / ₈ 18 ¹ / ₈ 18 ¹ / ₈	14 ⁵ / ₈ 14 ⁵ / ₈ 14 ⁵ / ₈
2 ⁷ / ₈	1 ³ / ₈	2 ⁷ / ₈	2.500	10 ⁵ / ₈	2 ¹ / ₂	9 ³ / ₄	3 ³ / ₄	11 ¹ / ₄	8 ³ / ₄	12 ⁵ / ₈	14 ³ / ₄	13 ¹ / ₂	14	11 ¹ / ₂	5 ¹ / ₈ 5 ¹ / ₈ 5 ¹ / ₈	8 ¹ / ₁₆ 8 ¹ / ₁₆ 8 ¹ / ₁₆	1 ¹ / ₈	5 ¹ / ₈ 5 ¹ / ₈ 5 ¹ / ₈	5 ⁵ / ₁₆ 5 ⁵ / ₁₆ 5 ⁵ / ₁₆	5 ⁷ / ₈	5 ³ / ₄	16 ³ / ₄ 16 ^{3/₄ 16^{3/₄}}	13 ³ / ₄ 13 ³ / ₄ 13 ³ / ₄	10 ⁷ / ₈ 10 ⁷ / ₈ 10 ⁷ / ₈	19 ¹ / ₄ 19 ¹ / ₄ 19 ¹ / ₄	14 ³ / ₄ 14 ³ / ₄ 14 ³ / ₄
2 ⁷ / ₈	1 ³ / ₈	2 ⁷ / ₈	3.000	11 ¹³ / ₁₆	3	11	4 ¹ / ₄	12 ¹ / ₄	9 ³ / ₄	14	17	15 ¹ / ₂	15	13 ³ / ₈	5 ¹ / ₄ 5 ¹ / ₄ 5 ¹ / ₄	8 ⁹ / ₁₆ 8 ⁹ / ₁₆ 8 ⁹ / ₁₆	1 ¹ / ₈	5 ¹ / ₈ 5 ¹ / ₈ 5 ¹ / ₈	5 ⁵ / ₁₆ 5 ⁵ / ₁₆ 5 ⁵ / ₁₆	6 ⁵ / ₈	6 ³ / ₄	18 18 18	14 ³ / ₄ 14 ³ / ₄ 14 ³ / ₄	11 ³ / ₄ 11 ³ / ₄ 11 ³ / ₄	20 ³ / ₄ 20 ³ / ₄ 20 ³ / ₄	15 ³ / ₄ 15 ³ / ₄ 15 ³ / ₄

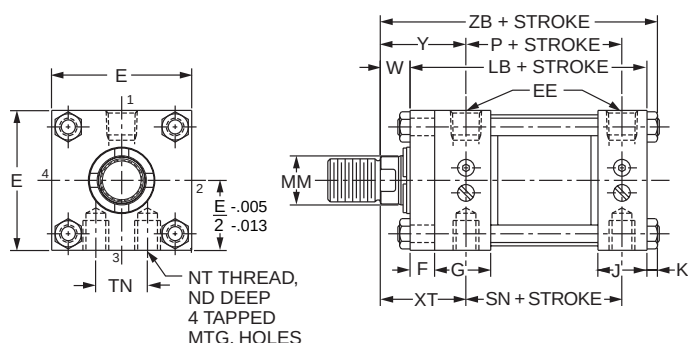
For Cylinder Division Plant Locations – See Page II.

Parker Series VH Hydraulic Cylinders

Style C, CP, F, FP



STYLE CP Side Lugs with Thrust Key Modification



STYLE FP Side Tapped with Thrust Key Modification

BORE	ROD NO.	ROD DIA.	AA	BB	BD	CB	+0.000 CD◆ -.002	CW	DD	+0.000 FA -.003	FB	L	+0.000 LH -.002	LR	M	MR	ND	NT	PA	PC	PD	PF	R	SB•	ST
2 1/2	1 2 3	1 1 3/4 1 3/8	3.6	1 13/16	1 1/2	1 1/4	.751	5/8	1/2-20	.562	9/16	1 1/4	1.744	15/16	3/4	15/16	9/16 1/2	5/8-11	5/16	2 3/4	2 1/16	3 1/16	2.55	13/16	1
3 1/4	1 2 3	1 3/8 2 1 3/4	4.6	2 5/16	2	1 1/2	1.001	3/4	5/8-18	.687	11/16	1 1/2	2.244	1 1/4	1	1 3/16	7/8 11/16 7/8	3/4-10	3/8	2 1/2	2 5/8	2 15/16	3.25	13/16	1
4	1 2 3	1 3/4 2 1/2 2	5.4	2 5/16	2	2	1.376	1	5/8-18	.812	11/16	2 1/8	2.494	1 3/4	1 3/8	1 5/8	1 11/16 1	1-8	7/16	2 11/16	2 15/16	2 15/16	3.82	1 1/16	1 1/4
5	1 2 3 4	2 3 1/2 2 1/2 3	7.0	3 3/16	2	2 1/2	1.751	1 1/4	7/8-14	.812	15/16	2 1/4	3.244	2 1/16	1 3/4	2 1/8	1 1 1 1/8 1 1/8	1-8	7/16	2 15/16	3 11/16	3 3/16	4.95	1 1/16	1 1/4
6	1 2 3 4	2 1/2 3 4 3 1/2	8.1	3 5/8	3	2 1/2	2.001	1 1/4	1-14	.937	1 1/16	2 1/2	3.744	2 5/16	2	2 3/8	1 3/4 1 3/4 1 1/2	1 1/4-7	1 1/2	3 3/16	4 1/4	3 5/16	5.73	1 5/16	1 1/2
7	1 2 3 4 5	3 5 3 1/2 4 4 1/2	9.3	4 1/8	3	3	2.501	1 1/2	1 1/8-12	.937	1 3/16	3	4.244	2 3/4	2 1/2	2 7/8	1 1/8 1 1/8 1 1/8 1 1/8	1 1/2-6	1 1/2	2 15/16	4 3/4	3 1/8	6.58	1 9/16	1 3/4
8	1 2 3 4 5	3 1/2 5 1/2 4 4 1/2 5	10.6	4 1/2	3 1/2	3	3.001	1 1/2	1 1/4-12	.937	1 5/16	3 1/4	4.744	3 1/4	2 3/4	3 1/8	1 1/2 1 1/2 1 1/2 1 1/2	1 1/2-6	1 1/2	2 15/16	5 1/4	3 1/4	7.50	1 9/16	1 3/4

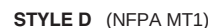
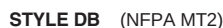
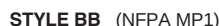
◆ Dimension CD is pin diameter. • Upper surface spotfaced for socket head screws. ◆◆ Dimension to be specified by customer.

For additional information – call your local Parker Cylinder Distributor.

Mounting Styles

Dimensions

Styles BB, DB, D, DD



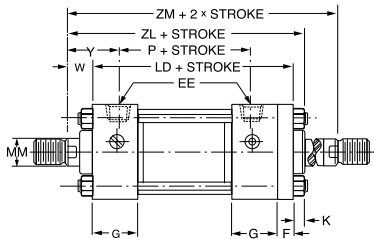
SU	SW	SY	+0.000 TD -.001	TF	TL	TM	TN	TS	TY	UF	UM	UT	US	UW	XG	MIN. X1 ◆X1	DD MTG. MIN. STK.	XS	XT	ADD STROKE						
																				SN	SS	XC	XF	XJ	ZC	ZF
1 ⁹ / ₁₆	1 ¹ / ₁₆	2 ¹¹ / ₁₆	1.375	4 ⁵ / ₈	1 ³ / ₈	4	1 ⁵ / ₁₆	4 ⁷ / ₈	3 ³ / ₄	5 ³ / ₈	6 ³ / ₄	6 ¹ / ₄	6 ¹ / ₄	4 ⁵ / ₈	4 ¹ / ₄ 4 ³ / ₄ 4 ¹ / ₂	5 ¹⁵ / ₁₆ 6 ⁷ / ₁₆ 6 ³ / ₁₆	1/8	4 ¹ / ₁₆ 4 ⁹ / ₁₆ 4 ⁵ / ₁₆	4 ³ / ₈ 4 ⁷ / ₈ 4 ⁵ / ₈	3	3 ³ / ₈	11 ³ / ₈ 11 ⁷ / ₈ 11 ⁵ / ₈	10 ¹ / ₈ 10 ⁵ / ₈ 10 ³ / ₈	7 ³ / ₈ 7 ⁷ / ₈ 7 ⁵ / ₈	12 ¹ / ₈ 12 ⁵ / ₈ 12 ³ / ₈	10 ³ / ₄ 11 ¹ / ₄ 11
1 ⁹ / ₁₆	1 ¹ / ₁₆	2 ⁷ / ₁₆	1.750	5 ⁷ / ₈	1 ³ / ₄	5	1 ¹ / ₂	5 ⁷ / ₈	4 ³ / ₄	7 ¹ / ₈	8 ¹ / ₂	8	7 ¹ / ₄	5 ¹³ / ₁₆	4 ³ / ₄ 4 ³ / ₄ 4 ³ / ₄	6 ¹⁷ / ₁₆ 6 ¹³ / ₁₆ 6 ¹¹ / ₁₆	3/8	4 ¹ / ₁₆ 4 ⁷ / ₁₆ 4 ⁵ / ₁₆	4 ¹ / ₂ 4 ⁷ / ₈ 4 ³ / ₄	3 ¹ / ₂	4 ¹ / ₈	12 ¹ / ₈ 12 ¹ / ₂ 12 ³ / ₈	10 ⁵ / ₈ 11 10 ⁷ / ₈	8 8 ³ / ₈ 8 ¹ / ₄	13 ¹ / ₈ 13 ¹ / ₂ 13 ³ / ₈	11 ³ / ₈ 11 ³ / ₄ 11 ⁵ / ₈
2	7/8	2 ⁵ / ₈	1.750	6 ³ / ₈	1 ³ / ₄	5 ¹ / ₂	2 ¹ / ₁₆	6 ³ / ₄	5 ¹ / ₄	7 ⁵ / ₈	9	8 ¹ / ₂	8 ¹ / ₂	6 ³ / ₈	4 ³ / ₈ 5 4 ³ / ₄	6 ¹¹ / ₁₆ 7 ¹ / ₁₆ 6 ¹³ / ₁₆	1/8	4 ¹ / ₈ 4 ⁷ / ₈ 4 ⁵ / ₈	4 ¹ / ₄ 5 ¹ / ₈ 4 ⁷ / ₈	3 ³ / ₄	4	13 ³ / ₈ 13 ⁵ / ₈ 13 ⁷ / ₈	11 ¹ / ₂ 11 ¹ / ₂ 11 ¹ / ₄	8 ¹ / ₈ 8 ⁷ / ₈ 8 ⁵ / ₈	15 15 14 ³ / ₄	12 ³ / ₈ 12 ³ / ₈ 12 ¹ / ₈
2	7/8	2 ⁷ / ₈	1.750	8 ³ / ₁₆	1 ³ / ₄	7	2 ¹⁵ / ₁₆	8 ¹ / ₄	6 ³ / ₄	9 ³ / ₄	10 ¹ / ₂	10	10	7 ³ / ₄	5 5 ¹ / ₄ 5 ¹ / ₄	7 ¹ / ₁₆ 7 ⁹ / ₁₆ 7 ⁵ / ₁₆	0	4 ⁷ / ₈ 5 ¹ / ₈ 5 ¹ / ₈	5 ¹ / ₈ 5 ³ / ₈ 5 ³ / ₈	4 ¹ / ₄	4 ¹ / ₂	14 ¹ / ₂ 14 ³ / ₄ 14 ³ / ₄	12 ¹ / ₄ 12 ¹ / ₂ 12 ¹ / ₂	9 ⁵ / ₈ 9 ⁵ / ₈ 9 ⁵ / ₈	16 ¹ / ₄ 16 ^{1/₂ 16^{1/₂}}	13 ¹ / ₈ 13 ³ / ₈ 13 ³ / ₈
2 ¹ / ₂	1 ¹ / ₈	3 ¹ / ₈	2.000	9 ⁷ / ₁₆	2	8 ¹ / ₂	3 ⁵ / ₁₆	9 ³ / ₄	7 ³ / ₄	11 ¹ / ₄	12 ¹ / ₂	11 ¹ / ₂	12	10 ³ / ₄	5 ³ / ₈ 5 ³ / ₈ 5 ³ / ₈	8 ¹ / ₁₆ 8 ¹ / ₁₆ 8 ¹ / ₁₆	1/4	5 ³ / ₈ 5 ³ / ₈ 5 ³ / ₈	5 ¹ / ₂ 5 ¹ / ₂ 5 ¹ / ₂	5 ¹ / ₈	5 ¹ / ₈	16 ¹ / ₈ 16 ¹ / ₈ 16 ¹ / ₈	13 ⁵ / ₈ 13 ⁵ / ₈ 13 ⁵ / ₈	10 ³ / ₈ 10 ³ / ₈ 10 ³ / ₈	18 ¹ / ₈ 18 ¹ / ₈ 18 ¹ / ₈	14 ⁵ / ₈ 14 ⁵ / ₈ 14 ⁵ / ₈
2 ⁷ / ₈	1 ³ / ₈	2 ⁷ / ₈	2.500	10 ⁵ / ₈	2 ¹ / ₂	9 ³ / ₄	3 ³ / ₄	11 ¹ / ₄	8 ³ / ₄	12 ⁵ / ₈	14 ³ / ₄	13 ¹ / ₂	14	11 ¹ / ₂	5 ¹ / ₈ 5 ¹ / ₈ 5 ¹ / ₈	8 ¹ / ₁₆ 8 ¹ / ₁₆ 8 ¹ / ₁₆	1/8	5 ¹ / ₈ 5 ¹ / ₈ 5 ¹ / ₈	5 ⁵ / ₁₆ 5 ⁵ / ₁₆ 5 ⁵ / ₁₆	5 ⁷ / ₈	5 ³ / ₄	16 ³ / ₄ 16 ³ / ₄ 16 ³ / ₄	13 ³ / ₄ 13 ³ / ₄ 13 ³ / ₄	10 ⁷ / ₈ 10 ⁷ / ₈ 10 ⁷ / ₈	19 ¹ / ₄ 19 ¹ / ₄ 19 ¹ / ₄	14 ³ / ₄ 14 ^{3/₄ 14^{3/₄}}
2 ⁷ / ₈	1 ³ / ₈	2 ⁷ / ₈	3.000	11 ¹³ / ₁₆	3	11	4 ¹ / ₄	12 ¹ / ₄	9 ³ / ₄	14	17	15 ¹ / ₂	15	13 ³ / ₈	5 ¹ / ₄ 5 ¹ / ₄ 5 ¹ / ₄	8 ¹ / ₁₆ 8 ¹ / ₁₆ 8 ¹ / ₁₆	1/8	5 ¹ / ₈ 5 ¹ / ₈ 5 ¹ / ₈	5 ⁷ / ₁₆ 5 ⁷ / ₁₆ 5 ⁷ / ₁₆	6 ⁵ / ₈	6 ³ / ₄	18 18 18	14 ³ / ₄ 14 ³ / ₄ 14 ³ / ₄	11 ³ / ₄ 11 ³ / ₄ 11 ³ / ₄	20 ³ / ₄ 20 ³ / ₄ 20 ³ / ₄	15 ³ / ₄ 15 ³ / ₄ 15 ³ / ₄



Parker
Cylinder

DIMENSIONS

DOUBLE ROD CYLINDERS



To obtain dimensioning information on a double rod cylinder, first select the desired mounting style and refer to the corresponding single rod cylinder model shown on the preceding pages. After you have determined all necessary dimensions from that drawing, turn back to this page and supplement those dimensions with additional ones from this drawing and the table at right. These added dimensions provide the additional information needed to completely dimension a double rod cylinder model.

On a double rod cylinder where the two rod ends will be different, be sure to state which rod end is to go at which end of the cylinder.

BORE SIZE	ROD NO.	ROD DIA.	ADD STROKE				ADD 2X STROKE
			LD	ZL	SN _k	SS _k	ZM
2½	1	1	10¼	11 ⁷ / ₁₆	3	3 ⁵ / ₈	11 ³ / ₄
	2	1¾		11 ¹⁵ / ₁₆			12 ³ / ₄
	3	1⅝		11 ¹¹ / ₁₆			12 ¹ / ₄
3¼	1	1⅝	10¾	12 ³ / ₁₆	3½	4 ³ / ₈	12½
	2	2		12 ⁹ / ₁₆			13¼
	3	1		12 ⁷ / ₁₆			13
4	1	1¾	11¼	12 ¹³ / ₁₆	3¾	4¼	13¼
	2	2½		13 ³ / ₁₆			14
	3	2		12 ¹⁵ / ₁₆			13½
5	1	2	12¼	14 ³ / ₁₆	4¼	4¾	14½
	2	3½		14 ⁷ / ₁₆			15
	3	2½		14 ⁷ / ₁₆			15
6	1	3	13¾	14 ⁷ / ₁₆	4½	5¼	15
	2	4		14 ⁷ / ₁₆			15
	3	3		14 ⁷ / ₁₆			15
7	1	2½	13¾	15½	4⅞	5⅞	15⅞
	2	4		15½			16
	3	3½		15¾			16
8	1	3	14½	16 ¹³ / ₁₆	5⅞	6¾	17
	2	5½		16 ¹³ / ₁₆			17
	3	4		16 ¹³ / ₁₆			17
9	1	4	15	17	6	7	18
	2	5		17			18
	3	4½		17			18
REPLACES			LB	ZB	SN	SS	—
ON SINGLE ROD			ALL MTG.				ALL
MOUNTING STYLE			STYLES		F	C	MTG.

HOW TO ORDER SERIES VH CYLINDERS

Note: Parker Series VH Cylinders can be completely & accurately described by a model number consisting of coded symbols. To develop a model number select

only those symbols that represent the cylinder required and place them in the sequence shown in the chart below.

SERIES VH MODEL NUMBERS—HOW TO DEVELOP THEM—HOW TO DECODE THEM.

E	BORE SIZE	CUSHION HEAD END	DOUBLE ROD	MOUNTING STYLE	MOUNTING MOD.	COMBINATION MOUNTING STYLE	SERIES	PISTON	PORTS	COMMON MODIFICATION	SPECIAL MODIFICATIONS	PISTON ROD NO.	ROD END THREAD STYLE NO.	ALTERNATE STANDARD ROD END THD. LENGTH	THREAD TYPE	CUSHION CAP END	STROKE
X																	
A	6	C	K	C	P	TB	VH		T	V	S	1	4	2	A	C	X50
M	Specify 2½" thru 8"	Specify only if Cushion Head End is required	Use only if Double Rod Cyl. is required	Specify mounting style T, TB, TC, TD, F, H, J, BB, C, D, DB, DD, HB, JB.	Specify P-for Thrust Key Mtg. M-for Manifold Ports	Specify any practical mtg. style available	Specify Series VH	For ring type piston no letter req'd. Use K for Hi-load Piston	Specify Port Type req'd. U=NPTF T=S.A.E. P=S.A.E. Flange Ports R=BSP B=BSPT G=Metric Y=metric ISO 6149	If required specify V=Fluorocarbon Seals F=Nut Retained Piston X=E.P.R. Seals W=Water Service J=High Water Content Fluid See Section C	Specify only if special modifications are required. Do not use symbol "S" for rod end modifications.	Specify rod code no. See chart in Section C for min. Piston rod diameter	Specify Style 4 Small Male Style 8 Intermediate Male Style 9 Short Female Style 3 Special. Specify KK, A, LA or W dim. req'd	Specify only if 2 times Standard Catalog "A" dim. is required	Specify A=UNF W=BSF M=Metric	Specify only if Cushion Cap End is required	Specify in inches. Show symbol "X" just ahead of stk. length.
P																	
L																	
E																	

Class 1 SEALS

Class 1 seals are the seals provided as standard in a cylinder assembly unless otherwise specified. For further information on fluid compatibility on operating limitations of all compounds, see Section C.
For the VH series cylinders the following make-up Class 1 Seals:

Primary Piston Rod Seal—Enhanced Polyurethane

Piston Rod Wiper—Nitrile

Piston Seals—Cast Iron Rings

Option—Nitrile lipseals with polymyte back-up washers

Option—Hi-Load, Filled P.T.F.E. seals with a nitrite expander

O-rings—Nitrile (nitrile back-up washer when used)

For additional information – call your local Parker Cylinder Distributor.

Hydraulic and Electrohydraulic Actuators

Series 2HX



Featuring...

- Two Valve Manifold Options
 - 7 Standard Bolt-on Manifolds
 - 4 Standard Integral Manifolds
- Two Feedback Options
 - LDT
 - LRT

For Cylinder Division Plant Locations – See Page II.

Parker Series 2HX Actuators...

Bolt-on and Integral Servo/Proportional/NFPA Valve Manifolds and Two Feedback Options

Series 2HX Electrohydraulic Actuators are specifically designed to meet today's demand for more efficient, low cost actuators that meet your application requirements.

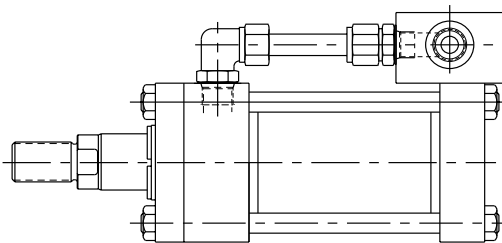
To ensure that every electrohydraulic actuator is premium quality, we subject each and every one – not just batch samples – to tough inspection **and** performance tests. Plus as the world's largest and lowest cost cylinder producer, we offer you the Series 2HX electrohydraulic actuator at the lowest cost that helps you stretch those tight design budgets without sacrificing quality.

Worldwide Distribution

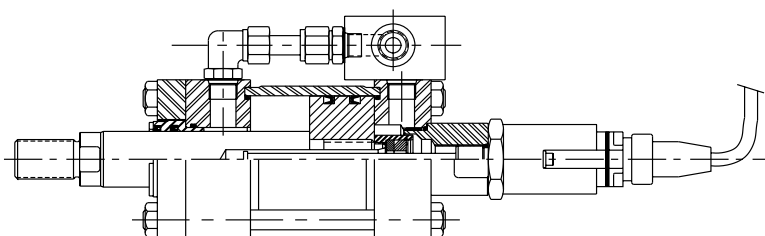
The Parker System is a worldwide network of manufacturing plants and distribution centers for fast, dependable service and delivery. Parker provides you with local sales and technical assistance from hundreds of stocking distributors and regional offices.

Contact Parker Cylinder Division for further assistance or information on designing the Series 2HX electrohydraulic actuator to meet your motion control requirements.

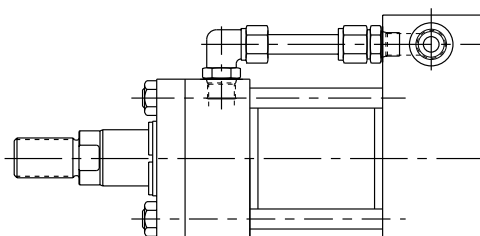
2HX with Bolt-On Manifold



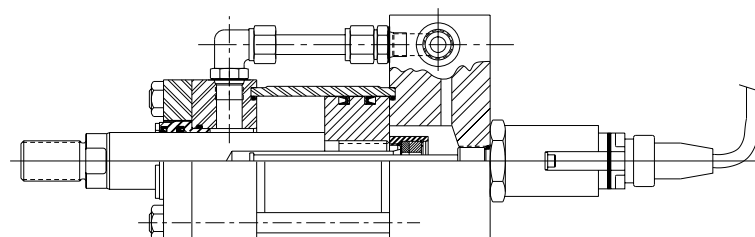
2HX with Bolt-On Manifold and LDT



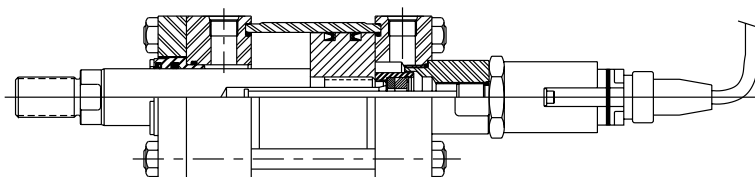
2HX with Integral Manifold



2HX with Integral Manifold and LDT



2HX with LDT Feedback Only



For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

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Note: for application information relating to the selection of cylinders based on bore sizes, rod diameters and mounting styles, refer to your current Parker Hydraulic Cylinder Catalog 0106, Section C or consult your Parker distributor.

Table A – Available Mounting and Manifold Position

MOUNTING STYLE	DESCRIPTION	BOLT-ON-MANIFOLD MOUNTING POSITION		INTEGRAL MANIFOLD	APPLICABLE FEEDBACK DEVICES
		CAP END ¹	HEAD END ¹	CAP END ONLY	
TB	Head Tie Rods Extended	1,2,3,4	1,2,3,4	1	LRT and LDT†
TC	Cap Tie Rods Extended	1,2,3,4	1,2,3,4	N/A	
TD	Both Ends Tie Rods Extended	1,2,3,4	1,2,3,4	N/A	
J	Head Rectangular Flange	1,2,3,4	CF	1	LRT and LDT
JB	Head Square Flange	1,2,3,4	CF	1	
JJ	Head Rectangular	1,2,3,4	CF	1	
H	Cap Rectangular Flange	CF	1,2,3,4	N/A	LRT
HB	Cap Square Flange	CF	1,2,3,4	N/A	
HH	Cap Rectangular	CF	1,2,3,4	N/A	
C	Side Lug	1	1	1	LRT and LDT
E	Centerline Lug	1,3	1,3	N/A	
F	Side Tapped	1;2&4 CF	1;2&4 CF	1	
CB	Side End Angles	1;2&4 CF	1;2&4 CF	N/A	LRT
G	Side End Lugs	1;2&4 CF	1;2&4 CF	N/A	
BB*	Cap Fixed Clevis	CF	1,2,3,4	1	
D	Head Trunnion	1,2,3,4	1,3	1	LRT and LDT
DB	Cap Trunnion	1,3	1,2,3,4	N/A	
DD	Intermediate Fixed Trunnion	1,2,3,4	1,2,3,4	1	
SB*	Spherical Bearing	CF	1,2,3,4	1	LRT and LDT††

Note:

* Overhang of Bolt-On-Manifold may affect mounting and application of cylinder, consult factory.

1 If cylinder has cushions, needle and check valve will be located at standard positions.

† LDT Feedback devices extend beyond the face of the cap and may interfere with cap end mounts – consult LDT dimensions in this catalog.

†† When LDT Feedback devices are selected with cap end mounts a false stage cylinder body is required. See dimensions and information on page 194.

N/A = Not Available

CF = Consult Factory

For Cylinder Division Plant Locations – See Page II.



Linear Displacement Transducer Series 2HX-LDT

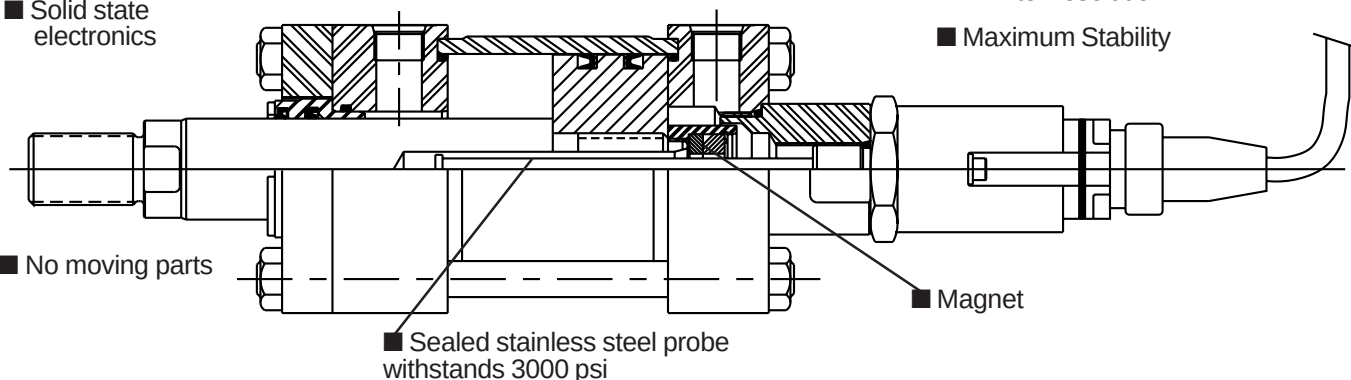
■ Solid state electronics

■ No moving parts

■ Compact design for easy installation

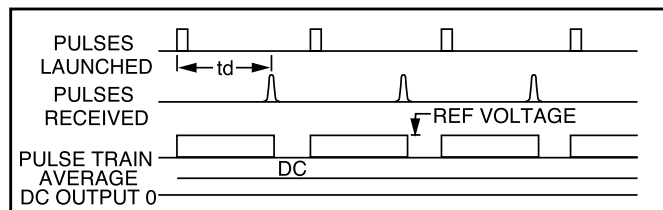
■ Infinite Resolution

■ Maximum Stability



Magnetostriction

In a LDT position sensor, a pulse is induced in a specially-designed magnetostrictive waveguide by the momentary interaction of two magnetic fields. One field comes from a movable magnet which passes along the outside of the sensor tube, the other field comes from a current pulse or interrogation pulse launched along the waveguide. The interaction between the two magnetic fields produces a strain pulse, which travels at sonic speed along the waveguide until the pulse is detected at the head of the sensor. The position of the magnet is determined with high precision by measuring the elapsed time between the launching of the electronic interrogation pulse and the arrival of the strain pulse. As a result, accurate non-contact position sensing is achieved with absolutely no wear to the sensing components.



An average of 200 ultrasonic strain pulses are launched for every reading. With so many readings taken for each position, vibration and shock have negligible effect on the readings. The transducer assembly is shielded to eliminate interference caused by electromagnetic fields in the radio frequency range. In addition, static magnetic fields of several hundred gauss must get as close as 3/16" from the protective tube before any interference in transducer operation occurs.

Standard Specifications

Parameter	Specification
Resolution:	<i>Analog:</i> Infinite <i>Digital:</i> $1 \div [\text{gradient} \times \text{crystal freq. (mHz)} \times \text{circulation}]$
Non-Linearity:	$\pm 0.02\%$ or $\pm 0.05 \text{ mm}$ ($\pm 0.002 \text{ in.}$), whichever is greater 0.002 in. is the minimum absolute linearity and varies with sensor model
Repeatability:	Equal to resolution
Hysteresis:	$< 0.02 \text{ mm}$ (0.0008 in.)
Outputs:	<i>Analog:</i> Voltage or Current <i>Digital:</i> Start/Stop or PWM
Measuring Range:	<i>Analog:</i> 25 to 2540 mm (1 to 100 in.) <i>Digital:</i> 25 to 7600 mm (1 to 300 in.)
Operating Voltage:	+13.5 to 26.4 Vdc ($\pm 0\%$): Strokes $\leq 1525 \text{ mm}$ (60 in.) +24 Vdc ($\pm 10\%$): Strokes $> 1525 \text{ mm}$ (60 in.)
Power Consumption:	100 mA
Operating Temperature:	<i>Head Electronics:</i> -40 to 85°C (-40 to 185°F) <i>Sensing Element:</i> -40 to 105°C (-40 to 221°F)
EMC Test*:	DIN EN 50081-1 (Emissions); DIN EN 50082-2 (Immunity)
Shock Rating:	100 g (single hit)/IEC standard 68-2-27 (survivability)
Vibration Rating:	5 g/10-150 Hz/IEC standard 68-2-6
Adjustability: (for active sensors only)	Field adjustable zero and span to 5% of active stroke
Update Time:	<i>Analog:</i> $\leq 1 \text{ ms}$ <i>Digital:</i> Minimum = $[\text{Stroke (specified in inches)} + 3] \times 9.1 \mu\text{s}$
Operating Pressure:	5000 psi static; 10,000 psi spike
Housing Style/Enclosure:	Aluminum die-cast head, IP 67 stainless steel rod & flange (LH flange: M18 x 1.5 or 3/4-16 UNF-3A)

*EMC test specification does not include sensors with the RB connection style.

The above specifications for analog sensors are assuming that output ripple is averaged by the measuring device as with any typical analog device. Specifications are subject to change without notice. Consult the factory for specifications critical to your needs.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

Basic 2HX with LDT
Mounting Styles
Envelope and Rod End Dimensions

Cylinder with Linear Displacement Transducer

Cylinders utilizing LDT feedback are available in the following mounting styles: TB, TC, TD, J, JB, JJ, C, E, F, CB, G, D, DB and DD.

Note: On styles H, HB, BB and SB, consult factory for dimensional changes. Styles F, CB and G are not available in 2" bore.

Basic Series 2HX Cylinders

Style T Mounting

Envelope and Rod End Dimensions –
See Table 1

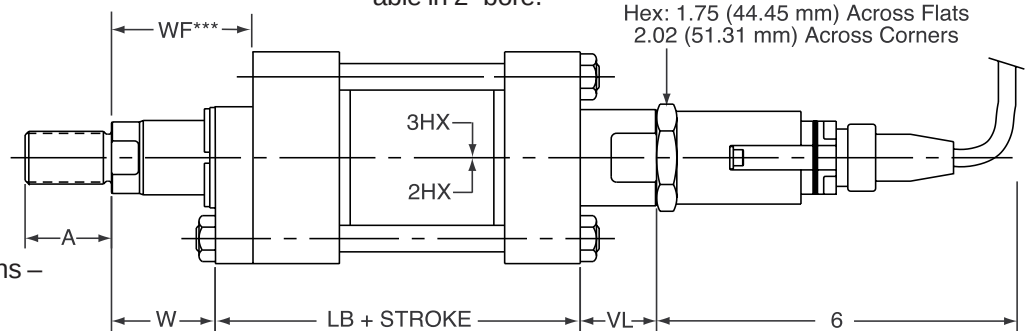


Table 1 – Envelope and Rod End Dimensions

For additional dimensions, consult Series 2H and Series 3H 7" and 8" Bore, of this catalog.

Bore	Rod No.	Rod Dia. mm	A	KK Style 4	CC Style 8	LB Add Stroke	VL	4 to 1 Design Factor (PSI)**
2	1	1	1 ¹ / ₈	³ / ₄ - 16	⁷ / ₈ - 14	5 ¹ / ₄	1 ³ / ₈	3000
	2	1 ³ / ₈	1 ⁵ / ₈	1-14	1 ¹ / ₄ - 12	5 ¹ / ₄	1 ³ / ₈	3000
2 ¹ / ₂	1	1	1 ¹ / ₈	³ / ₄ - 16	⁷ / ₈ - 14	5 ³ / ₈	1 ³ / ₈	1800
	2	1 ³ / ₄	2	1 ¹ / ₄ - 12	1 ¹ / ₂ - 12	5 ³ / ₈	1 ³ / ₈	3000
	3	1 ³ / ₈	1 ⁵ / ₈	1-14	1 ¹ / ₄ - 12	5 ³ / ₈	1 ³ / ₈	3000
3 ¹ / ₄	1	1 ³ / ₈	1 ⁵ / ₈	1-14	1 ¹ / ₄ - 12	6 ¹ / ₄	1 ¹ / ₄	2130
	2	2	2 ¹ / ₄	1 ¹ / ₂ - 12	1 ³ / ₄ - 12	6 ¹ / ₄	1 ¹ / ₄	3000
	3	1 ³ / ₄	2	1 ¹ / ₄ - 12	1 ¹ / ₂ - 12	6 ¹ / ₄	1 ¹ / ₄	3000
4	1	1 ³ / ₄	2	1 ¹ / ₄ - 12	1 ¹ / ₂ - 12	6 ⁵ / ₈	1 ¹ / ₄	2580
	2	2 ¹ / ₂	3	1 ⁷ / ₈ - 12	2 ¹ / ₄ - 12	6 ⁵ / ₈	1 ¹ / ₄	3000
	3	2	2 ¹ / ₄	1 ¹ / ₂ - 12	1 ³ / ₄ - 12	6 ⁵ / ₈	1 ¹ / ₄	3000
5	1	2	2 ¹ / ₄	1 ¹ / ₂ - 12	1 ³ / ₄ - 12	7 ¹ / ₈	1 ¹ / ₄	2510
	2	3 ¹ / ₂	3 ¹ / ₂	2 ¹ / ₂ - 12	3 ¹ / ₄ - 12	7 ¹ / ₈	1 ¹ / ₄	3000
	3	2 ¹ / ₂	3	1 ⁷ / ₈ - 12	2 ¹ / ₄ - 12	7 ¹ / ₈	1 ¹ / ₄	3000
	4	3	3 ¹ / ₂	2 ¹ / ₄ - 12	2 ³ / ₄ - 12	7 ¹ / ₈	1 ¹ / ₄	3000
6	1	2 ¹ / ₂	3	1 ⁷ / ₈ - 12	2 ¹ / ₄ - 12	8 ³ / ₈	1 ³ / ₈	3000
	2	4	4	3 - 12	3 ³ / ₄ - 12	8 ³ / ₈	1 ³ / ₈	3000
	3	3	3 ¹ / ₂	2 ¹ / ₄ - 12	2 ³ / ₄ - 12	8 ³ / ₈	1 ³ / ₈	3000
	4	3 ¹ / ₂	3 ¹ / ₂	2 ¹ / ₂ - 12	3 ¹ / ₄ - 12	8 ³ / ₈	1 ³ / ₈	3000
7*	1	3	3 ¹ / ₂	2 ¹ / ₄ - 12	2 ³ / ₄ - 12	9 ¹ / ₂	1 ³ / ₃₂	3000
	2	5	5	3 ¹ / ₂ - 12	4 ³ / ₄ - 12	9 ¹ / ₂	1 ³ / ₃₂	3000
	3	3 ¹ / ₂	3 ¹ / ₂	2 ¹ / ₂ - 12	3 ¹ / ₄ - 12	9 ¹ / ₂	1 ³ / ₃₂	3000
	4	4	4	3 - 12	3 ³ / ₄ - 12	9 ¹ / ₂	1 ³ / ₃₂	3000
	5	4 ¹ / ₂	4 ¹ / ₂	3 ¹ / ₄ - 12	4 ¹ / ₄ - 12	9 ¹ / ₂	1 ³ / ₃₂	3000
8*	1	3 ¹ / ₂	3 ¹ / ₂	2 ¹ / ₂ - 12	3 ¹ / ₄ - 12	10 ¹ / ₂	1 ³ / ₃₂	3000
	2	5 ¹ / ₂	5 ¹ / ₂	4 - 12	5 ¹ / ₄ - 12	10 ¹ / ₂	1 ³ / ₃₂	3000
	3	4	4	3 - 12	3 ³ / ₄ - 12	10 ¹ / ₂	1 ³ / ₃₂	3000
	4	4 ¹ / ₂	4 ¹ / ₂	3 ¹ / ₄ - 12	4 ¹ / ₄ - 12	10 ¹ / ₂	1 ³ / ₃₂	3000
	5	5	5	3 ¹ / ₂ - 12	4 ³ / ₄ - 12	10 ¹ / ₂	1 ³ / ₃₂	3000

†**Note:** The rod end dimensions shown are based on the use of a linear displacement transducer with a rod end dead zone of 2.5 inches or less. LDT's with longer dead zones require a rod extension. The LDT will be permanently damaged if the proper rod extension is not used. Consult factory if an LDT with longer dead band is going to be used.

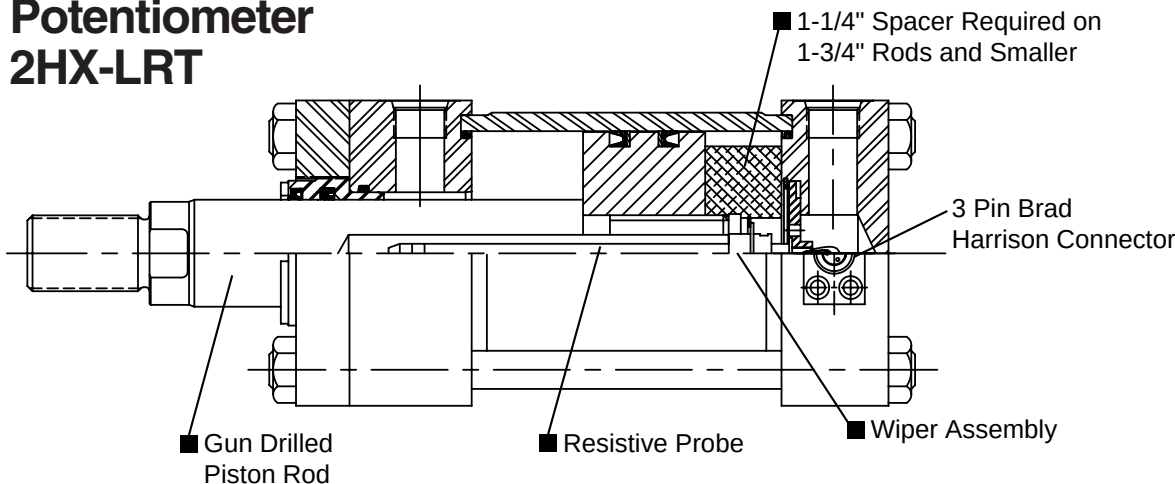
**The 4:1 design factor is based on the tensile strength of the piston to rod connection.

*Specify Series 3HX.

***For 7-8" Bore 3HX callout dimension WF.

For Cylinder Division Plant Locations – See Page II.

Linear Potentiometer
Series 2HX-LRT

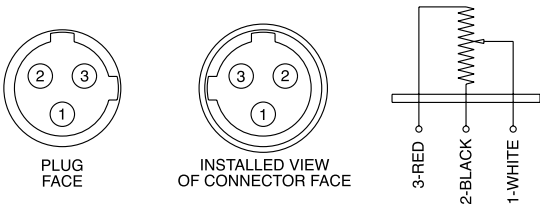


Standard Features

- Available in strokes to 120".
- Unique, easy to apply cylinder position sensing system.
- Infinite resolution, high linearity and repeatability.
- Innovative, resistive element is made of conductive plastic.
- 3 pin Brad Harrison electrical connector available at any cap position not occupied by a port or mount.

How It Works

The Parker LRT is a uniquely designed position sensor that uses a resistive element and wiper assembly to provide an analog output signal of a cylinder's position. The LRT is a dual element type linear potentiometer with two independent elements mounted on either side of a anodized aluminum extrusion. The LRT operates as a voltage divider. This is done by shorting through the extrusion with the wiper assembly. The position of the wiper changes the resistive load proportional to its position along the cylinder stroke. The LRT is energized by applying a voltage across the unit, typically 10 VDC. As the resistive load changes with the cylinder stroke, the output voltage changes proportionally. The output voltage at the end point of the cylinder stroke is dictated by the input voltage applied across the device. The probe is mounted into the cylinder cap and inserted into the gun drilled piston rod. The compactness of the design only adds to the envelope dimensions of cylinders with 1-3/4" rods and smaller. Envelope dimensions of cylinders with larger rods are unaffected.



Pin Chart

Pin Number	On Cable	On LRT	Function
1	Green	White (wiper)	Output
2	Red w/Blk	Black (resistor base)	V-
3	Red w/White	Red (resistor tip. power)	V+

Standard Specifications

Non-Linearity: Less than 0.1% of full scale up to 48" stroke. Less than 1.0% of full scale over 48" stroke.

Repeatability: .001 inch

Input Voltage: Nominal 5-50 Vdc

Operating Temperature Range: -40°F to +160°F*

Cylinder Stroke Length: Up to 120"

Electrical Connector: Brad Harrison 3-pin micro connector interface at pos. #4 standard. (Unless occupied by a port or mount.)

Total Resistance: 800Ω per inch of stroke (±20%) + end resistance.

End Resistance: 800Ω

Maximum Velocity: 30 inches per second

Life Expectancy: Greater than 50 x 10⁶ cycles (Based on 1" stroke @ 10 ips)

Fluid Medium: Petroleum based hydraulic fluids

End Voltage Loss: (V source) x 400/stroke x 800

Power Dissipation: supply voltage squared, divided by the total resistance.

The LRT requires a high impedance interface greater than 100K ohms. A maximum of 1 microamp should be required from the LRT.

The accuracy of a given feedback device is a composite of the following factors:

Temperature Coefficient: The shift in output due to temperature change. This is a combination of the effect of temperature on the cylinder, the transducer and the electronics.

These factors which are normally additive refer to the feedback device itself. The performance achieved by a given system depends on the various factors such as system stiffness, valve performance, friction, temperature variation, and backlash in mechanical linkages to the cylinder.

In the case of front flange mounted cylinders, the stretch of the cylinder due to hydraulic pressure changes may affect position repeatability and system performance.

*A high temperature option is offered to 300°F (consult factory).

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

Basic 2HX with LRT
Mounting Styles
Envelope and Rod End Dimensions

Cylinder with Linear Potentiometer Feedback (LRT)

Cylinders utilizing LRT feedback are available in the following mounting styles: TB, TC, TD, J, JB, JJ, C, E, F, CB, G, D, DB, DD, H, HB, HH, BB, SB.

Basic Series 2HX Cylinders

Style T Mounting

Envelope and Rod End Dimensions –
See Table 1

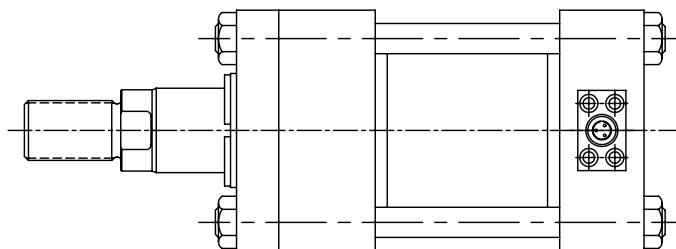


Table 1 – Envelope and Rod End Dimensions

For additional dimensions, consult Series 2H and Series 3H 7" and 8" Bore, of this catalog.

Bore	Rod No.	Rod Dia. mm	A	Thread Sizes		†† LB Add Stroke	4 to 1 Design Factor (PSI)**
				KK Style 4	CC Style 8		
2	1	1	1 ¹ / ₈	³ / ₄ - 16	⁷ / ₈ - 14	6 ¹ / ₂	3000
	2	1 ³ / ₈	1 ⁵ / ₈	1-14	1 ¹ / ₄ - 12	6 ¹ / ₂	3000
2 ¹ / ₂	1	1	1 ¹ / ₈	³ / ₄ - 16	⁷ / ₈ - 14	6 ⁵ / ₈	1800
	2	1 ³ / ₄	2	1 ¹ / ₄ - 12	1 ¹ / ₂ - 12	6 ⁵ / ₈	3000
	3	1 ³ / ₈	1 ⁵ / ₈	1-14	1 ¹ / ₄ - 12	6 ⁵ / ₈	3000
3 ¹ / ₄	1	1 ³ / ₈	1 ⁵ / ₈	1-14	1 ¹ / ₄ - 12	7 ¹ / ₂	2130
	2	2	2 ¹ / ₄	1 ¹ / ₂ - 12	1 ³ / ₄ - 12	6 ¹ / ₄	3000
	3	1 ³ / ₄	2	1 ¹ / ₄ - 12	1 ¹ / ₂ - 12	7 ¹ / ₂	3000
4	1	1 ³ / ₄	2	1 ¹ / ₄ - 12	1 ¹ / ₂ - 12	7 ⁷ / ₈	2580
	2	2 ¹ / ₂	3	1 ⁷ / ₈ - 12	2 ¹ / ₄ - 12	6 ⁵ / ₈	3000
	3	2	2 ¹ / ₄	1 ¹ / ₂ - 12	1 ³ / ₄ - 12	6 ⁵ / ₈	3000
5	1	2	2 ¹ / ₄	1 ¹ / ₂ - 12	1 ³ / ₄ - 12	7 ¹ / ₈	2510
	2	3 ¹ / ₂	3 ¹ / ₂	2 ¹ / ₂ - 12	3 ¹ / ₄ - 12	7 ¹ / ₈	3000
	3	2 ¹ / ₂	3	1 ⁷ / ₈ - 12	2 ¹ / ₄ - 12	7 ¹ / ₈	3000
	4	3	3 ¹ / ₂	2 ¹ / ₄ - 12	2 ³ / ₄ - 12	7 ¹ / ₈	3000
6	1	2 ¹ / ₂	3	1 ⁷ / ₈ - 12	2 ¹ / ₄ - 12	8 ³ / ₈	3000
	2	4	4	3 - 12	3 ³ / ₄ - 12	8 ³ / ₈	3000
	3	3	3 ¹ / ₂	2 ¹ / ₄ - 12	2 ³ / ₄ - 12	8 ³ / ₈	3000
	4	3 ¹ / ₂	3 ¹ / ₂	2 ¹ / ₂ - 12	3 ¹ / ₄ - 12	8 ³ / ₈	3000
7*	1	3	3 ¹ / ₂	2 ¹ / ₄ - 12	2 ³ / ₄ - 12	9 ¹ / ₂	3000
	2	5	5	3 ¹ / ₂ - 12	4 ³ / ₄ - 12	9 ¹ / ₂	3000
	3	3 ¹ / ₂	3 ¹ / ₂	2 ¹ / ₂ - 12	3 ³ / ₄ - 12	9 ¹ / ₂	3000
	4	4	4	3 - 12	3 ³ / ₄ - 12	9 ¹ / ₂	3000
	5	4 ¹ / ₂	4 ¹ / ₂	3 ¹ / ₄ - 12	4 ¹ / ₄ - 12	9 ¹ / ₂	3000
8*	1	3 ¹ / ₂	3 ¹ / ₂	2 ¹ / ₂ - 12	3 ¹ / ₄ - 12	10 ¹ / ₂	3000
	2	5 ¹ / ₂	5 ¹ / ₂	4 - 12	5 ¹ / ₄ - 12	10 ¹ / ₂	3000
	3	4	4	3 - 12	3 ³ / ₄ - 12	10 ¹ / ₂	3000
	4	4 ¹ / ₂	4 ¹ / ₂	3 ¹ / ₄ - 12	4 ¹ / ₄ - 12	10 ¹ / ₂	3000
	5	5	5	3 ¹ / ₂ - 12	4 ³ / ₄ - 12	10 ¹ / ₂	3000

††Cylinders with rod sizes less than 2" require the addition of a 1¹/₄" spacer on the cap end of the piston to carry the wiper assembly. These LB dimensions reflect the additional length.

†A mini LRT (MLRT) is available for ⁵/₈" rods – consult factory.

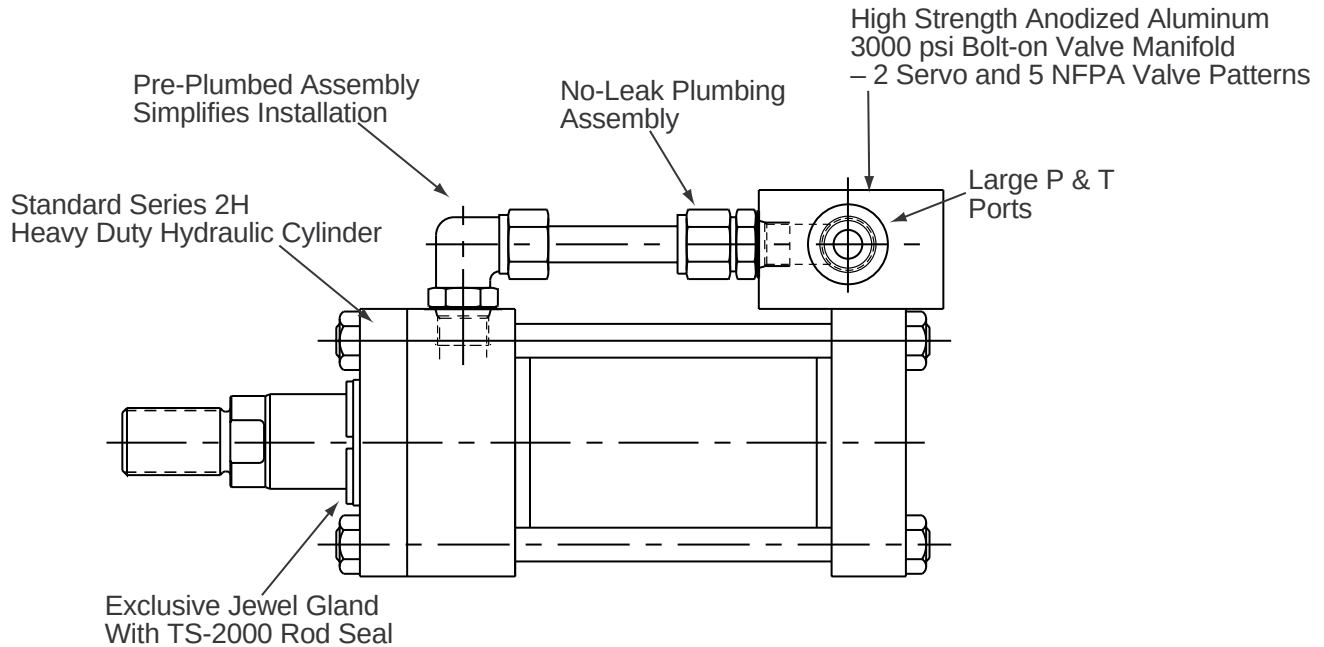
**The 4:1 design factor is based on the tensile strength of the piston to rod connection.

*Specify Series 3HX.

***For 7-8" Bore 3HX callout dimension WF.

For Cylinder Division Plant Locations – See Page II.

Hydraulic Linear Actuator with Bolt-on Servo/NFPA Valve Manifold and Two Feedback Options



Innovative Motion Control

Parker's new Series 2HX is an integrated assembly that eliminates transducer mounting brackets, valve manifolds, plumbing and other items associated with using separate components. The versatility of the Series 2HX allows you to design cost effective actuators for accurate position and velocity control for your specific application.

Features and Benefits

- Minimum hydraulic line runs with closed cylinder and valve coupling
- Simplified machine design with integrated components
- Eliminates the need for limit switches, deceleration valves, shock absorbers, and mechanical linkages in many applications
- Minimum interference with standard mounting dimensions
- Manifold may be mounted on head or cap end at any position not occupied by a mount

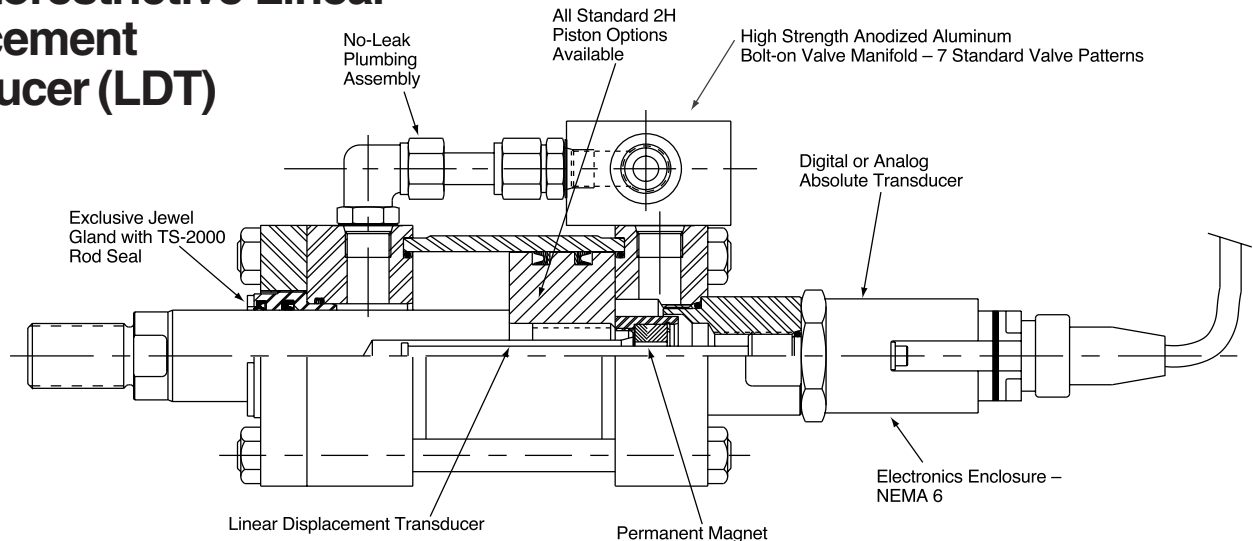
- 7 standard valve patterns
- Integral mounted valve eliminates assembly time and fittings.
- Custom manifolds available – consult factory

Custom Options Available

- Low friction rod gland – see the end of this series section.
- Hi-Load Piston
- Protective feedback enclosures
- Intrinsically safe modifications
- Explosion proof linear transducers
- Feedback devices in stock for quick delivery of common stroke lengths
- Closed-loop control for maximum productivity
- Performance-tested actuators
- Complete, tested cylinder/feedback assemblies customized to your needs

For additional information – call your local Parker Cylinder Distributor.

2HX with Bolt-on Manifold and Magnetorestrictive Linear Displacement Transducer (LDT)



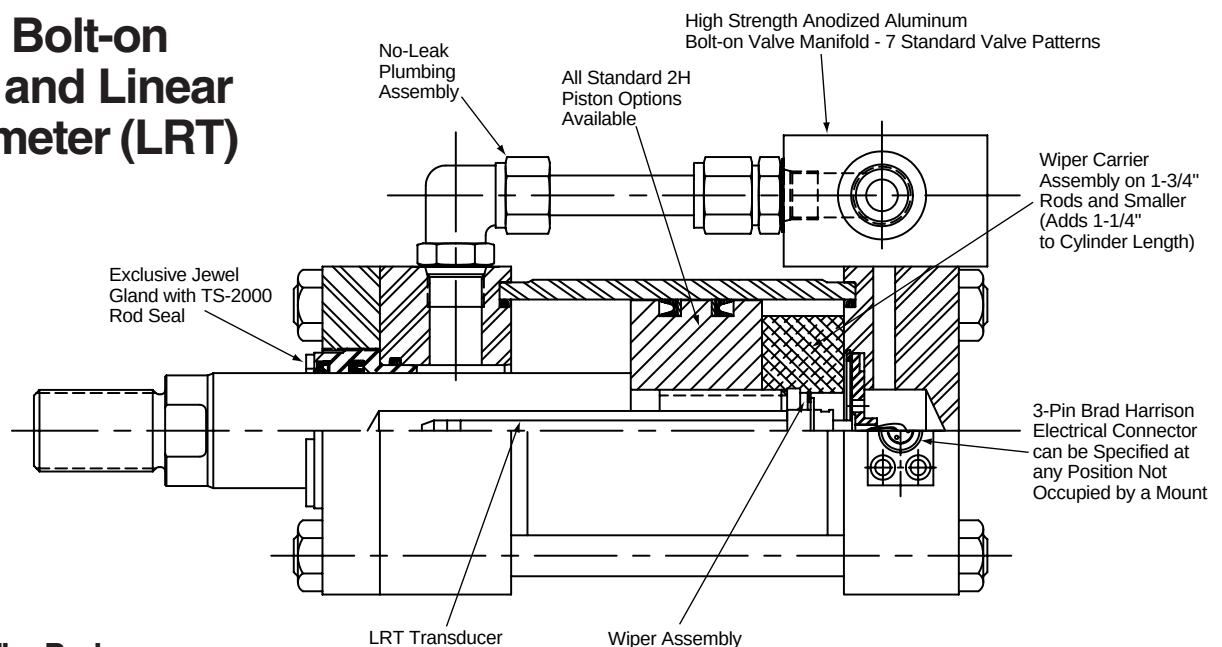
Here's How The Parker LDT Feeds Back Linear Position

The linear displacement transducer is rigidly attached to the cap end of the cylinder, and runs the full stroke length inside a hollow piston rod. A magnet is attached to the cylinder piston. As the piston moves through the stroke, the transducer is able to define the exact position of the

magnet by measuring the time interval between the initiation and the return of the strain pulses launched in the transducer wave guide.

For LDT specifications see page 204.

2HX with Bolt-on Manifold and Linear Potentiometer (LRT)



Here's How The Parker LRT Feeds Back Linear Position

The LRT feedback device is essentially a linear potentiometer which provides a cost effective solution for applications where a contacting device is acceptable. The potentiometer is fixed to the rear cap of the cylinder and runs the full length inside a hollow piston rod. The

wiper assembly is fixed to the piston. As the piston moves through the stroke, the wiper voltage changes in proportion to the cylinder position.

For specifications on the LRT see page 209.

Bolt-on Manifolds

Parker Series 2HX cylinders are available with Bolt-on Manifolds. Manifolds can be mounted on the head or cap end of a Parker Series 2H or 3H cylinders.

Available Bolt-on Manifold Valve Patterns

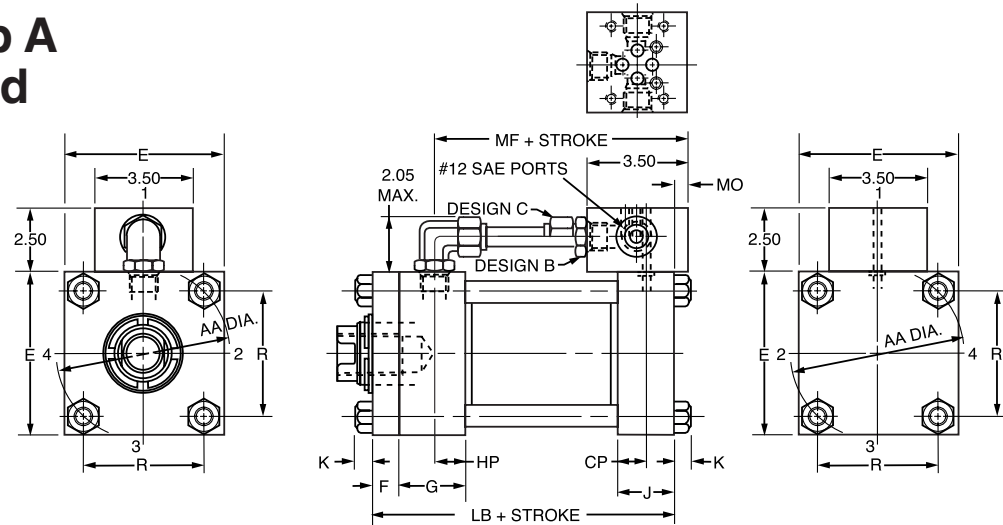
Group A – Servo	Servo Valve Mount Interchange Chart <table border="1"> <thead> <tr> <th>Group A</th><th>Group D</th></tr> </thead> <tbody> <tr> <td>PARKER BD-15</td><td>PARKER BD-30</td></tr> <tr> <td>ATCHLEY 215A-XXX</td><td>ATCHLEY 240-XXX</td></tr> <tr> <td>MOOG 62 SERIES</td><td>MOOG 78 SERIES</td></tr> <tr> <td>MOOG 73 SERIES</td><td></td></tr> <tr> <td>MOOG 760 SERIES</td><td></td></tr> <tr> <td>PEGASUS M & MP SERIES</td><td>PEGASUS 180L</td></tr> <tr> <td></td><td>PEGASUS 180R</td></tr> <tr> <td>VICKERS SM4-20-X-X-10</td><td>VICKERS SM4-40-X-X-10</td></tr> </tbody> </table>	Group A	Group D	PARKER BD-15	PARKER BD-30	ATCHLEY 215A-XXX	ATCHLEY 240-XXX	MOOG 62 SERIES	MOOG 78 SERIES	MOOG 73 SERIES		MOOG 760 SERIES		PEGASUS M & MP SERIES	PEGASUS 180L		PEGASUS 180R	VICKERS SM4-20-X-X-10	VICKERS SM4-40-X-X-10
Group A	Group D																		
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Group D – Servo	Group J – NFPA D06																		
Group G – NFPA D03	Group K – NFPA D07																		
Group H – NFPA D05	Group M – NFPA D08																		

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

2HX with Bolt-on Manifold Group A Dimensions

2HX with Group A Bolt-on Manifold Cap End (Parker BD-15 Servo)



Group A/Parker BD-15 Valve Manifold, Cap End Mounted, Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	.562	3.000	4.187	.750	.750	.625	1.75	1.50	.438	2.9	2.05	5.250	1.625	2.875
2.50	.562	3.500	4.312	.750	.750	.625	1.75	1.50	.438	3.6	2.55	5.375	1.500	2.750
3.25	.468	4.500	4.875	.906	.906	.750	2.00	1.75	.562	4.6	3.25	6.250	.875	2.125
4.00	.468	5.000	5.125	.906	.906	.875	2.00	1.75	.562	5.4	3.82	6.625	.625	1.875
5.00	.468	6.500	5.625	.906	.906	.875	2.00	1.75	.812	7.0	4.95	7.125	.125	1.375
6.00†	.062	7.500	6.187	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	8.375	0	.875

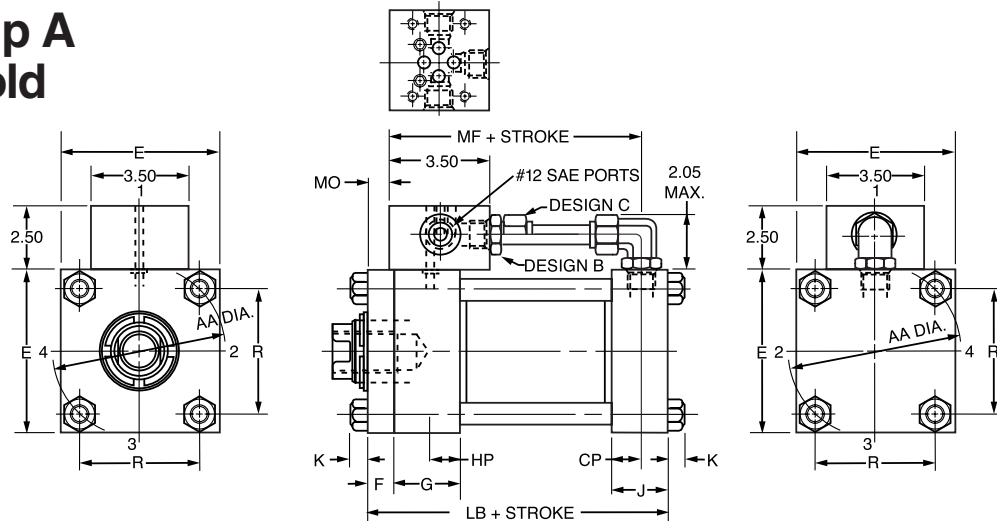
*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

†Consult Factory for 6" Bore DD Mount.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Standard Operating Pressure is 3000 PSI.

2HX with Group A Bolt-on Manifold Head End (Parker BD-15 Servo)



Group A/Parker BD-15 Valve Manifold, Head End Mounted, Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	.312	3.000	4.187	.750	.750	.625	1.75	1.50	.438	2.9	2.05	5.250	1.625	2.875
2.50	.312	3.500	4.312	.750	.750	.625	1.75	1.50	.438	3.6	2.55	5.375	1.500	2.750
3.25	.532	4.500	4.875	.906	.906	.750	2.00	1.75	.562	4.6	3.25	6.250	.875	2.125
4.00	.657	5.000	5.125	.906	.906	.875	2.00	1.75	.562	5.4	3.82	6.625	.625	1.875
5.00	.657	6.500	5.625	.906	.906	.875	2.00	1.75	.812	7.0	4.95	7.125	.125	1.375
6.00†	.938	7.500	6.187	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	8.375	0	.875

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

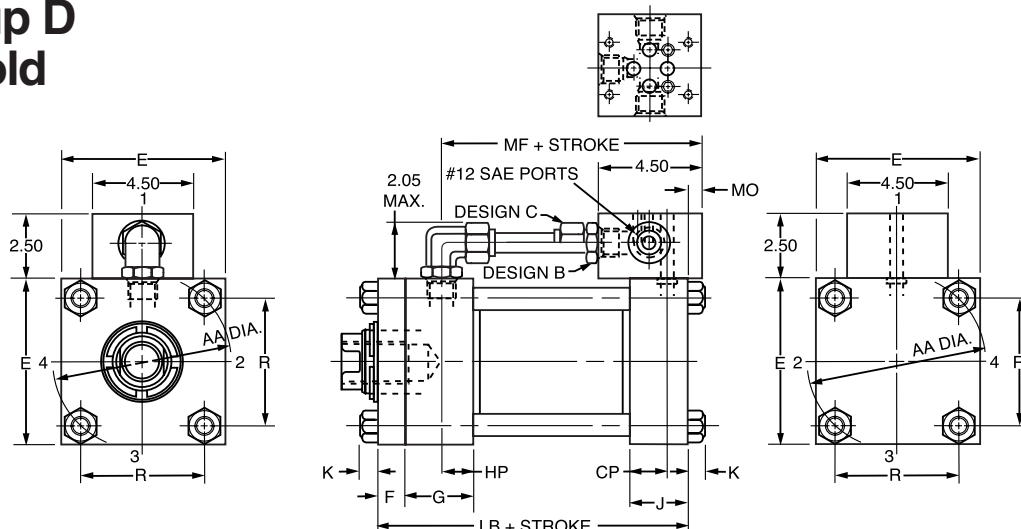
†Consult Factory for 6" Bore DD Mount.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Standard Operating Pressure is 3000 PSI.

For Cylinder Division Plant Locations – See Page II.

2HX with Group D Bolt-on Manifold Cap End (Parker BD-30 Servo)



Group D/Parker BD-30 Valve Manifold, Cap End Mounted, Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
3.25	.531	4.500	4.937	.906	.906	.750	2.00	1.75	.562	4.6	3.25	6.250	1.875	3.125
4.00	.531	5.000	5.187	.906	.906	.875	2.00	1.75	.562	5.4	3.82	6.625	1.625	2.875
5.00	.531	6.500	5.687	.906	.906	.875	2.00	1.75	.812	7.0	4.95	7.125	1.125	2.375
6.00†	.125	7.500	6.250	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	8.375	.500	1.750

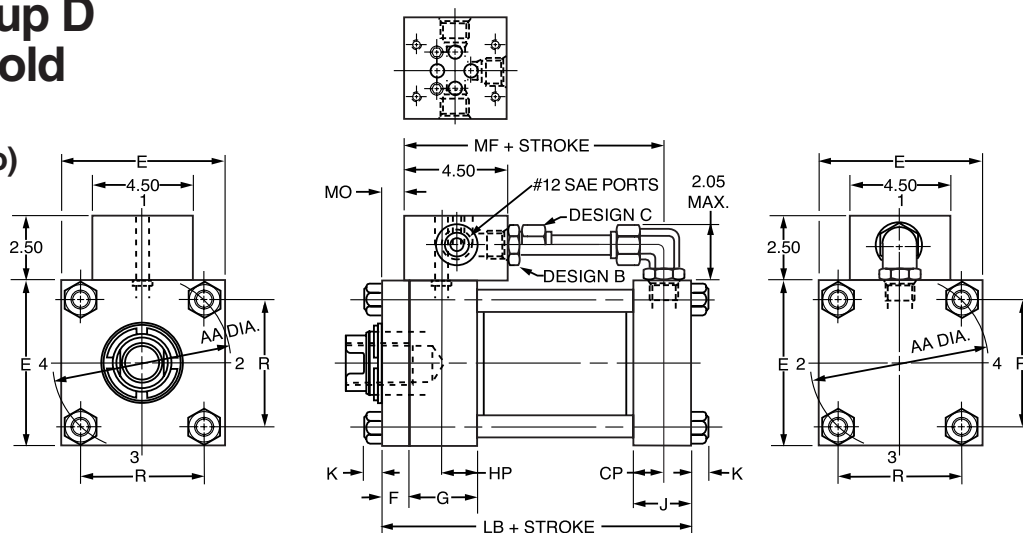
*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

†Consult Factory for 6" Bore DD Mount.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Standard Operating Pressure is 3000 PSI.

2HX with Group D Bolt-on Manifold Head End (Parker BD-30 Servo)



Group A/Parker BD-30 Valve Manifold, Head End Mounted Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
3.25	.469	4.500	4.937	.906	.906	.750	2.00	1.75	.562	4.6	3.25	6.250	1.875	3.125
4.00	.594	5.000	5.187	.906	.906	.875	2.00	1.75	.562	5.4	3.82	6.625	1.625	2.875
5.00	.594	6.500	5.687	.906	.906	.875	2.00	1.75	.812	7.0	4.95	7.125	1.125	2.375
6.00†	.875	7.500	6.250	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	8.375	.500	1.750

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

†Consult Factory for 6" Bore DD Mount.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

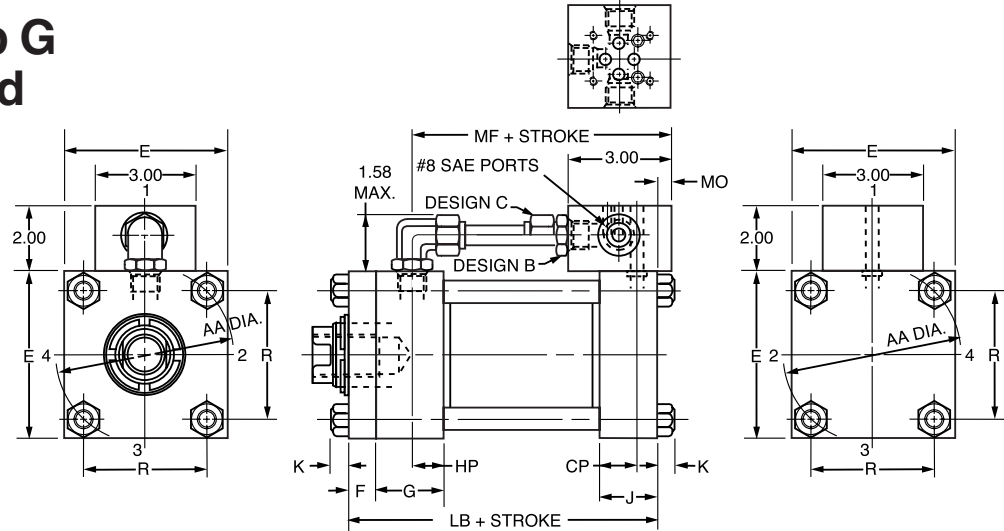
Standard Operating Pressure is 3000 PSI.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

2HX with Bolt-on Manifold
Group G Dimensions

2HX with Group G Bolt-on Manifold Cap End (NFPA D03)



Group G/NFPA D03 Valve Manifold, Cap End Mounted Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	.406	3.000	4.031	.750	.750	.625	1.75	1.50	.438	2.9	2.05	5.250	.875	1.750
2.50	.406	3.500	4.156	.750	.750	.625	1.75	1.50	.438	3.6	2.55	5.375	.750	1.625
3.25	.312	4.500	4.718	.906	.906	.750	2.00	1.75	.562	4.6	3.25	6.250	.250	1.000
4.00	.312	5.000	4.968	.906	.906	.875	2.00	1.75	.562	5.4	3.82	6.625	0	.750
5.00	.312	6.500	5.468	.906	.906	.875	2.00	1.75	.812	7.0	4.95	7.125	0	.250
6.00†	N/A	7.500	6.031	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	8.375	0	0

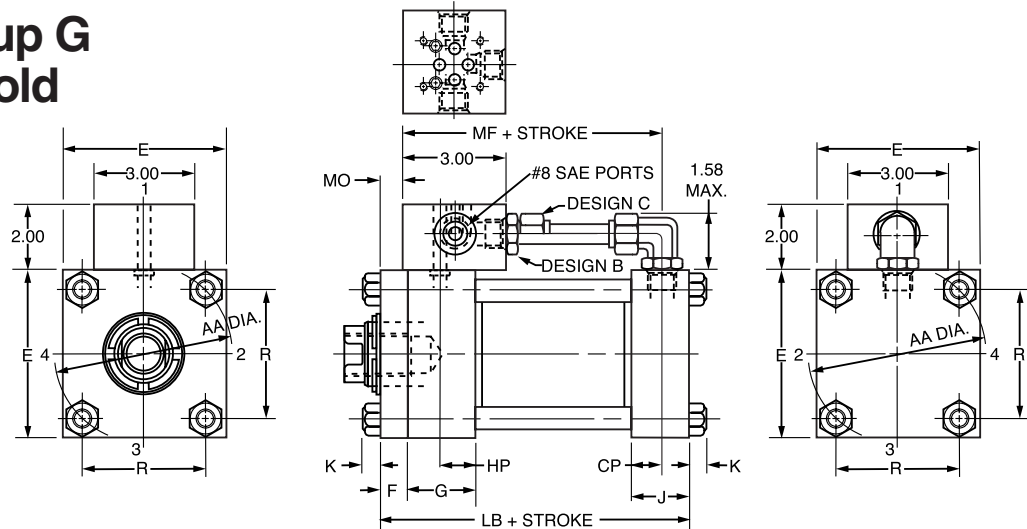
*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

†Consult Factory for 6" Bore DD Mount.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Standard Operating Pressure is 3000 PSI.

2HX with Group G Bolt-on Manifold Head End (NFPA D03)



Group G/NFPA D03 Valve Manifold, Head End Mounted, Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	.468	3.000	4.031	.750	.750	.625	1.75	1.50	.438	2.9	2.05	5.250	.875	1.750
2.50	.468	3.500	4.156	.750	.750	.625	1.75	1.50	.438	3.6	2.55	5.375	.750	1.625
3.25	.688	4.500	4.718	.906	.906	.750	2.00	1.75	.562	4.6	3.25	6.250	.250	1.000
4.00	.813	5.000	4.968	.906	.906	.875	2.00	1.75	.562	5.4	3.82	6.625	0	.750
5.00	.813	6.500	5.468	.906	.906	.875	2.00	1.75	.812	7.0	4.95	7.125	0	.250
6.00†	1.109	7.500	6.031	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	8.375	0	0

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

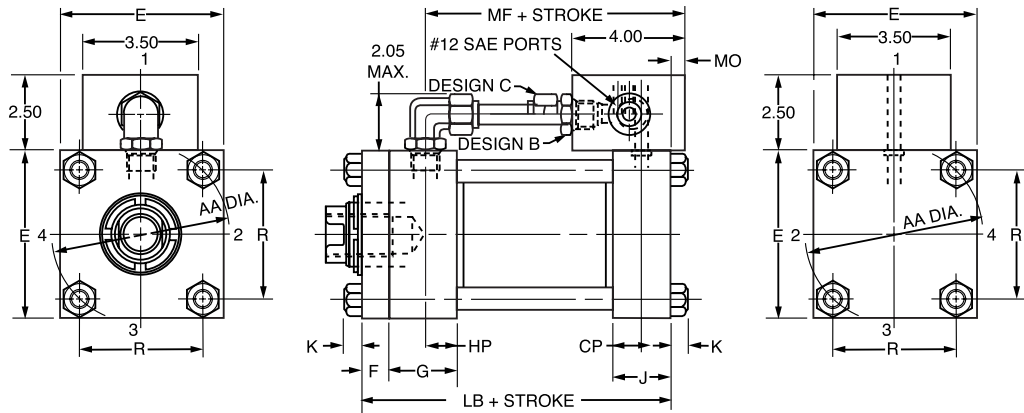
†Consult Factory for 6" Bore DD Mount.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Standard Operating Pressure is 3000 PSI.

For Cylinder Division Plant Locations – See Page II.

2HX with Group H Bolt-on Manifold Cap End (NFPA D05)



Group H/NFPA D05 Valve Manifold, Cap End Mounted Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	.891	3.000	4.51	.750	.750	.625	1.750	1.500	.438	2.9	2.05	5.250	1.750	3.000
2.50	.891	3.500	4.64	.750	.750	.625	1.750	1.500	.438	3.6	2.55	5.375	1.625	2.875
3.25	.797	4.500	5.2	.906	.906	.750	2.000	1.750	.562	4.6	3.25	6.250	1.125	2.375
4.00	.797	5.000	5.45	.906	.906	.875	2.000	1.750	.562	5.4	3.82	6.625	.875	2.125
5.00	.797	6.500	5.95	.906	.906	.875	2.000	1.750	.812	7.0	4.95	7.125	.375	1.625
6.00†	.391	7.500	6.51	1.000	1.000	1.000	2.250	2.250	.875	8.1	5.73	8.375	0	1.000

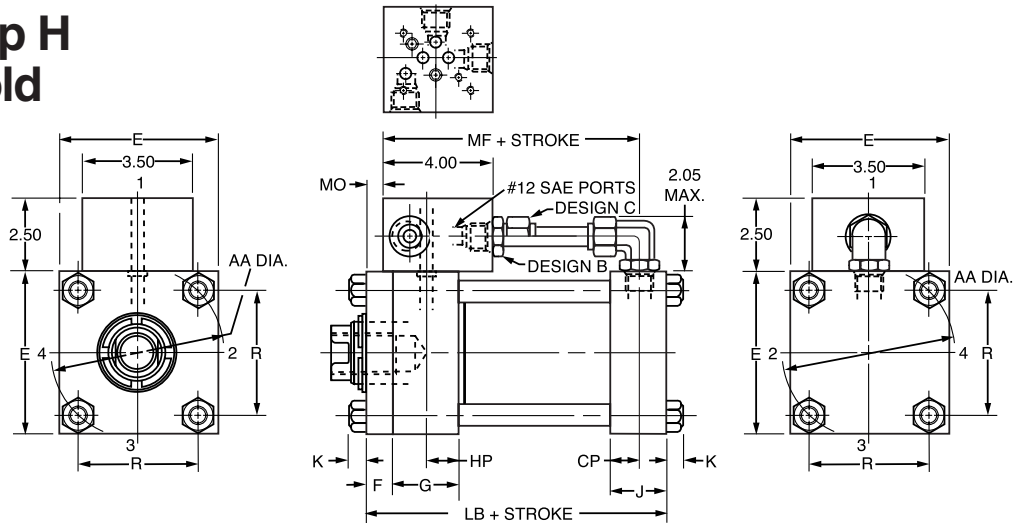
*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

†Consult Factory for 6" Bore DD Mount.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Standard Operating Pressure is 3000 PSI.

2HX with Group H Bolt-on Manifold Head End (NFPA D05)



Group H/NFPA D05 Valve Manifold, Head End Mounted Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	0	3.000	4.51	.750	.750	.625	1.75	1.50	.438	2.9	2.05	5.250	1.750	3.000
2.50	0	3.500	4.64	.750	.750	.625	1.75	1.50	.438	3.6	2.55	5.375	1.625	2.875
3.25	.203	4.500	5.20	.906	.906	.750	2.00	1.75	.562	4.6	3.25	6.250	1.125	2.375
4.00	.328	5.000	5.45	.906	.906	.875	2.00	1.75	.562	5.4	3.82	6.625	.875	2.125
5.00	.328	6.500	5.95	.906	.906	.875	2.00	1.75	.812	7.0	4.95	7.125	.375	1.625
6.00†	.609	7.500	6.51	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	8.375	0	1.000

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

†Consult Factory for 6" Bore DD Mount.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

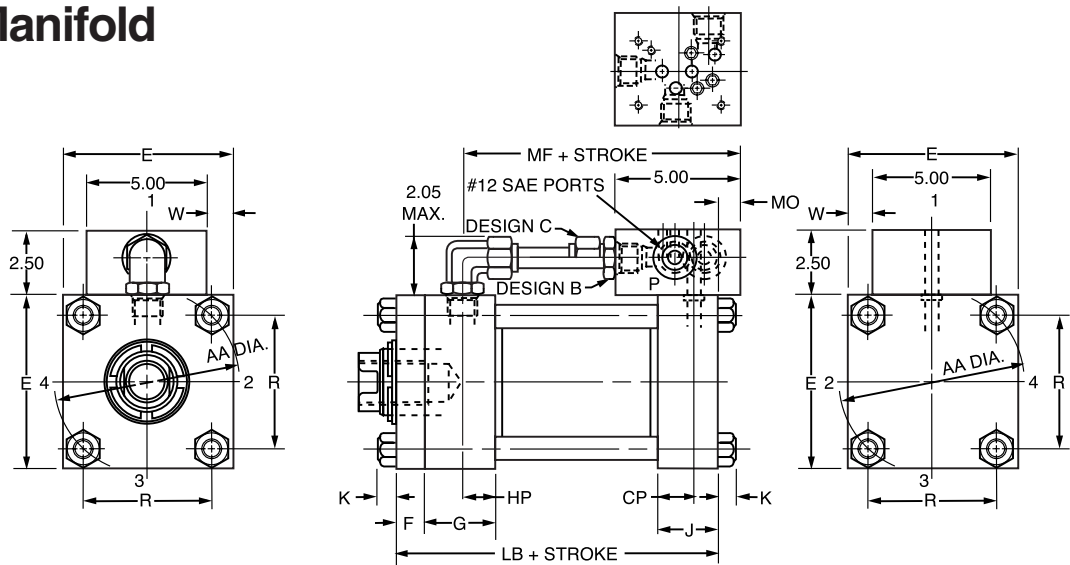
Standard Operating Pressure is 3000 PSI.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

2HX with Bolt-on Manifold
Group J Dimensions

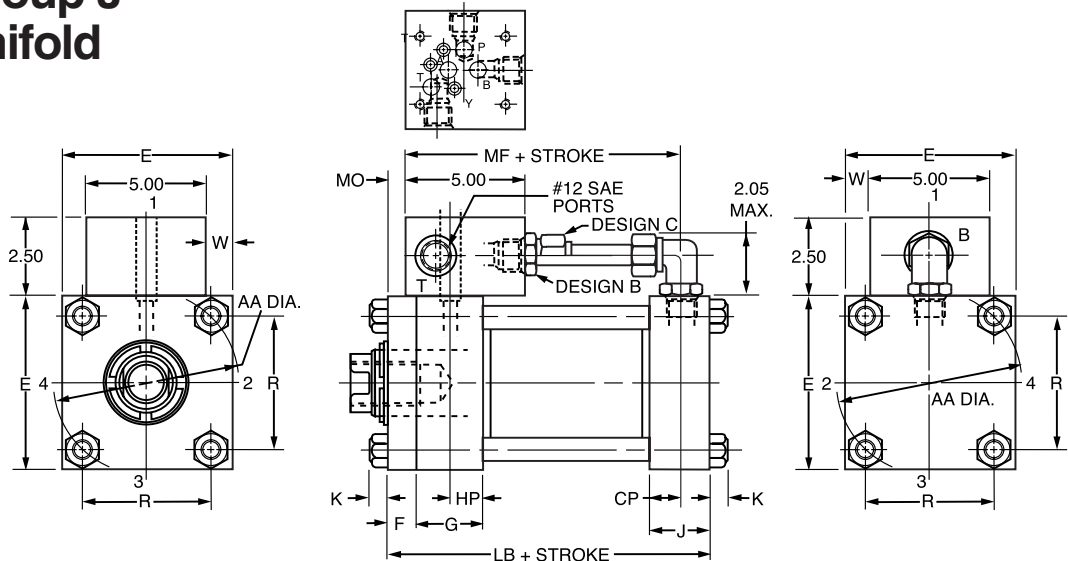
2HX with Group J Bolt-on Manifold Cap End (NFPA D06)



Group J/NFPA D06 Valve Manifold, Cap End Mounted Series 2HX Cylinder														Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	W	Min. Stroke	Min. Stroke
6.00	.620	7.500	6.745	1.000	1.000	1.000	2.250	2.250	.875	8.100	5.730	8.375	1.250	.625	1.750

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart. Consult Factory for DD Mount.
 *Design C used only for strokes in "Design C" column on chart and greater strokes. Standard Operating Pressure is 3000 PSI.

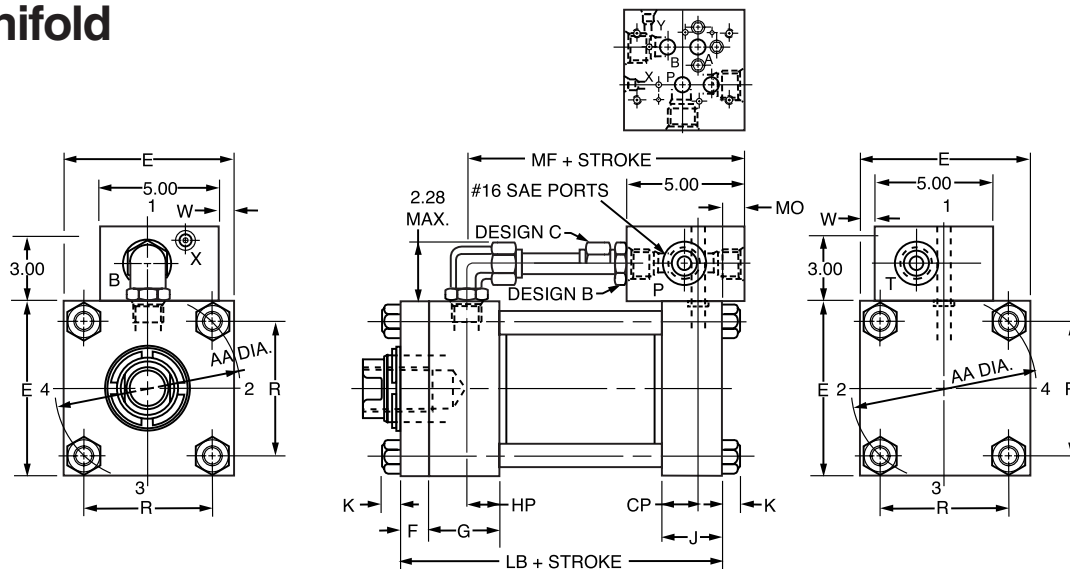
2HX with Group J Bolt-on Manifold Head End (NFPA D06)



Group J/NFPA D06 Valve Bolt-on Manifold, Head End Mounted, Series 2HX Cylinder														Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	W	LB	Min. Stroke	Min. Stroke
6.00	.380	7.500	6.745	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	1.250	8.375	.625	1.750

Design A (not shown) used only if stroke is shorter than minimum stroke shown for "Design B" on chart; consult factory, engineering required.
 *Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart. Consult Factory for DD Mount.
 *Design C used only for strokes in "Design C" column on chart and greater strokes. Standard Operating Pressure is 3000 PSI.

2HX with Group K Bolt-on Manifold Cap End (NFPA D07)



Group K/NFPA D07 Valve Manifold, Cap End Mounted Series 2HX Cylinder														Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	W	Min. Stroke	Min. Stroke
6.00	.590	7.500	6.715	1.000	1.000	1.000	2.250	2.250	.875	8.100	5.730	8.375	.435	1.104	2.285

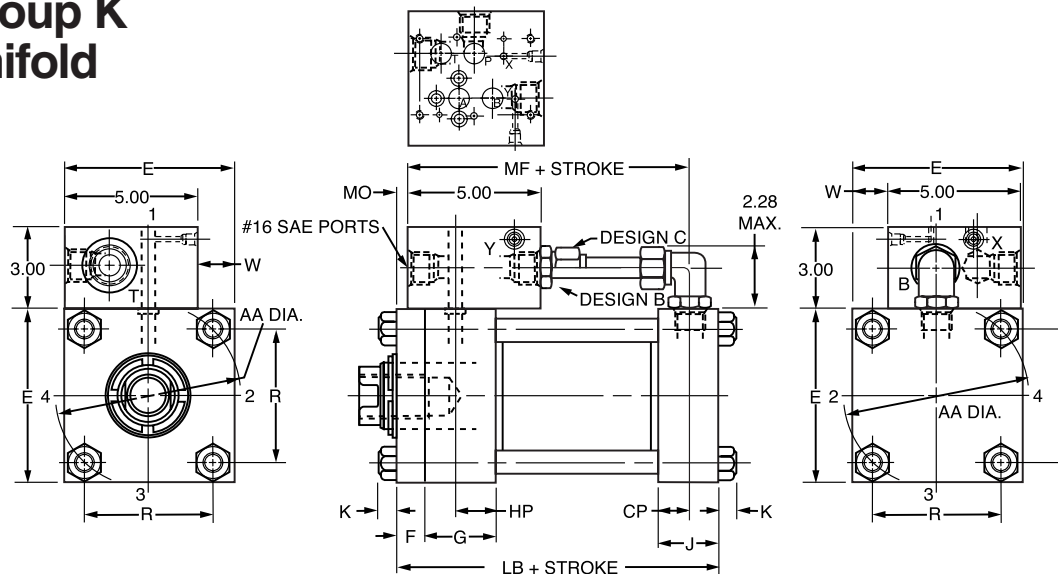
*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Consult Factory for DD Mount.

Standard Operating Pressure is 3000 PSI.

2HX with Group K Bolt-on Manifold Head End (NFPA D07)



Group J/NFPA D07 Valve Bolt-on Manifold, Head End Mounted, Series 2HX Cylinder														Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	W	LB	Min. Stroke	Min. Stroke
6.00	.410	7.500	6.715	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	2.065	8.375	1.104	2.285

Design A (not shown) used only if stroke is shorter than minimum stroke shown for "Design B" on chart; consult factory, engineering required.

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Consult Factory for DD Mount.

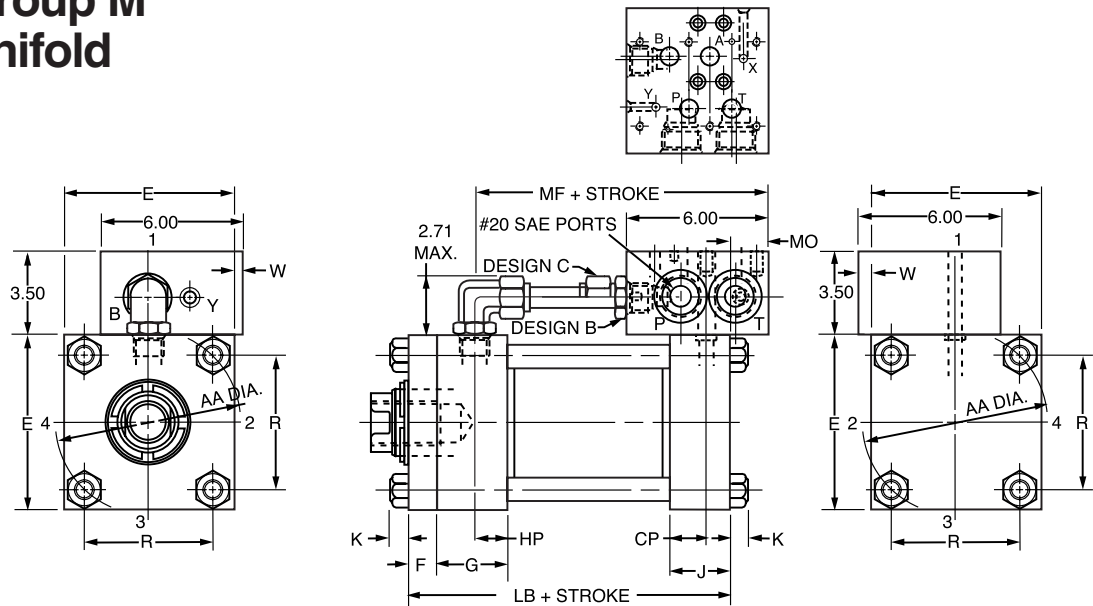
Standard Operating Pressure is 3000 PSI.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

2HX with Bolt-on Manifold
Group M Dimensions

2HX with Group M Bolt-on Manifold Cap End (NFPA D08)



Group M/NFPA D08 Valve Manifold, Cap End Mounted Series 2HX Cylinder														Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	W	Min. Stroke	Min. Stroke
6.00	1.566	7.500	7.816	1.286	1.125	1.000	2.250	2.250	.875	8.100	5.730	8.375	.250	1.75	3.00

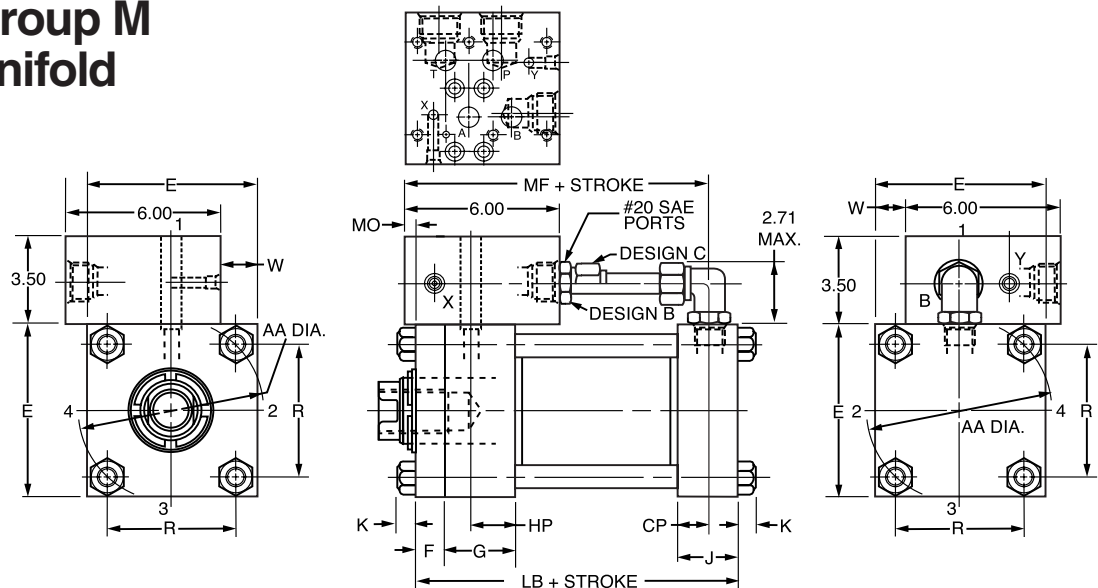
*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Consult Factory for DD Mount.

Standard Operating Pressure is 3000 PSI.

2HX with Group M Bolt-on Manifold Head End (NFPA D08)



Group M/NFPA D08 Valve Bolt-on Manifold, Head End Mounted, Series 2HX Cylinder														Design B*	Design C*
Bore	MO ^Δ	E	MF	CP	HP	F	G	J	K	AA	R	W [†]	LB	Min. Stroke	Min. Stroke
6.00	.500	7.500	7.813	1.188	1.220	1.000	2.25	2.25	.875	8.1	5.73	1.755	8.375	1.75	3.00

Design A (not shown) used only if stroke is shorter than minimum stroke shown for "Design B" on chart; consult factory, engineering required.

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

^ΔBOM will overhang past head face.

Consult Factory for DD Mount.

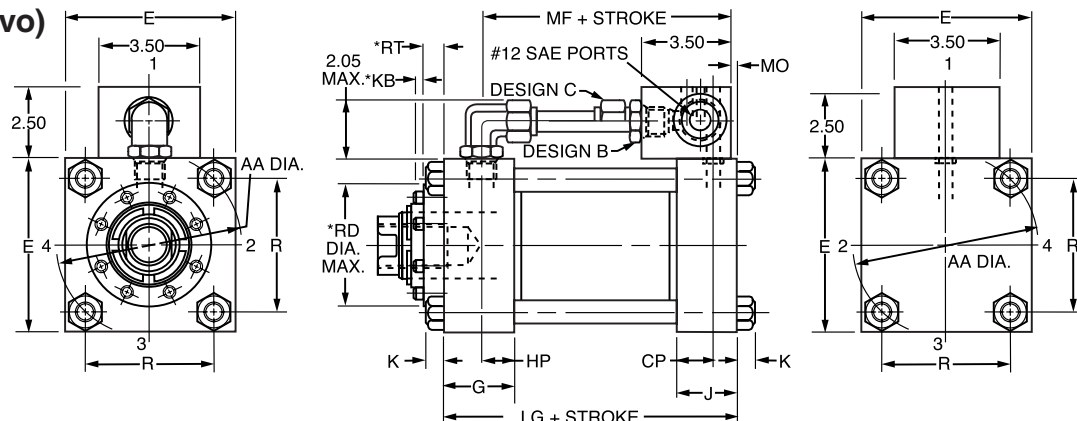
Standard Operating Pressure is 3000 PSI.

[†]BOM will overhang past head face.

For Cylinder Division Plant Locations – See Page II.



3HX with Group A Bolt-on Manifold Cap End (Parker BD-15 Servo)



Group A/Parker BD-15 Valve Manifold, Cap End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.188	8.500	6.813	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	.375
8.00	.313	9.500	7.563	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	N/A	0

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

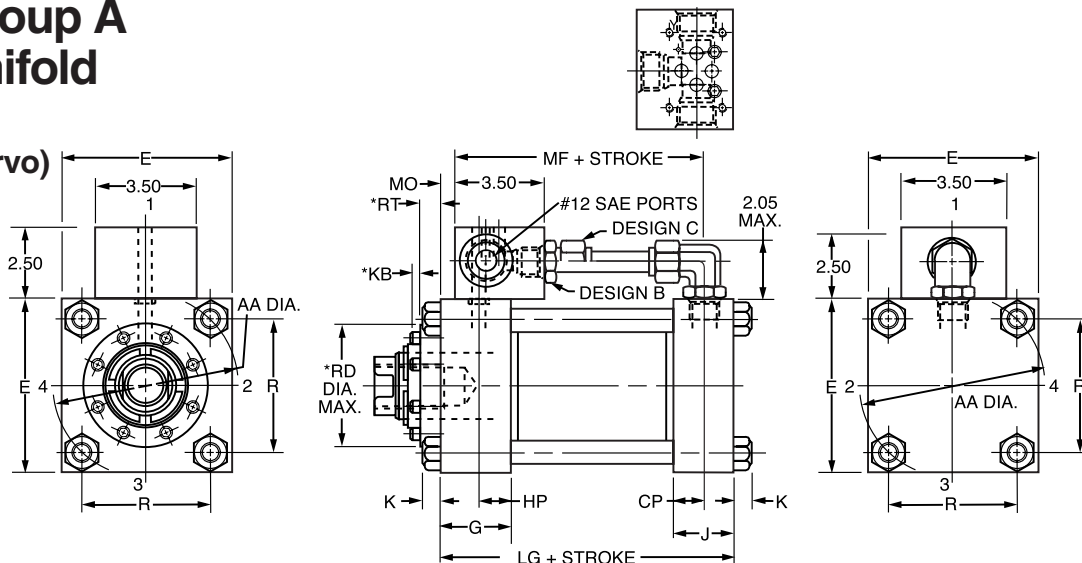
*Design C used only for strokes in "Design C" column on chart and greater strokes.

*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

Consult Factory for DD Mount.

3HX with Group A Bolt-on Manifold Head End (Parker BD-15 Servo)



Group A/Parker BD-15 Valve Manifold, Head End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.188	8.500	6.813	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	.375
8.00	.313	9.500	7.563	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	N/A	0

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

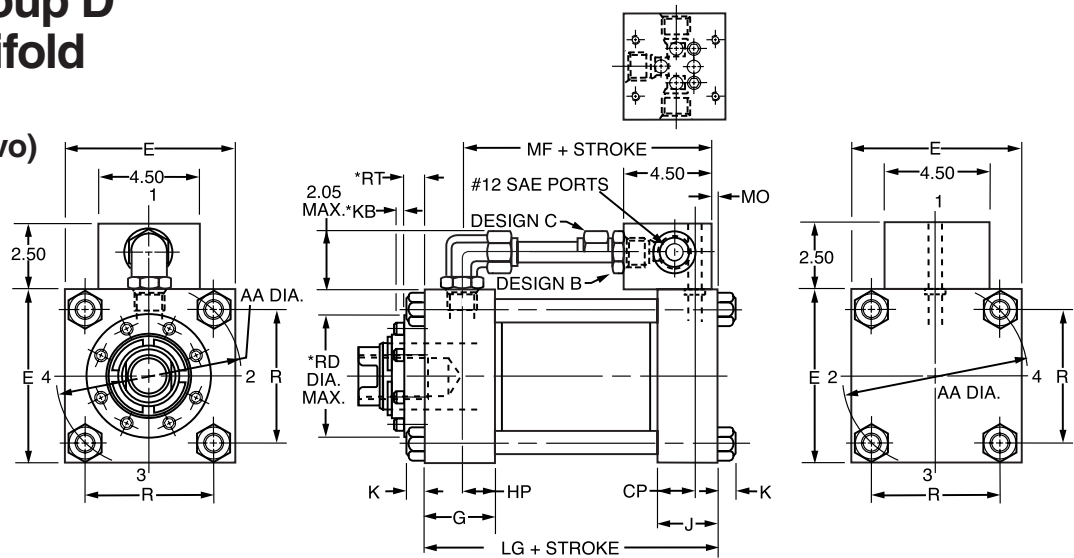
Consult Factory for DD Mount.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

3HX with Bolt-on Manifold
Group D Dimensions, 7" & 8" Bores

3HX with Group D Bolt-on Manifold Cap End (Parker BD-30 Servo)



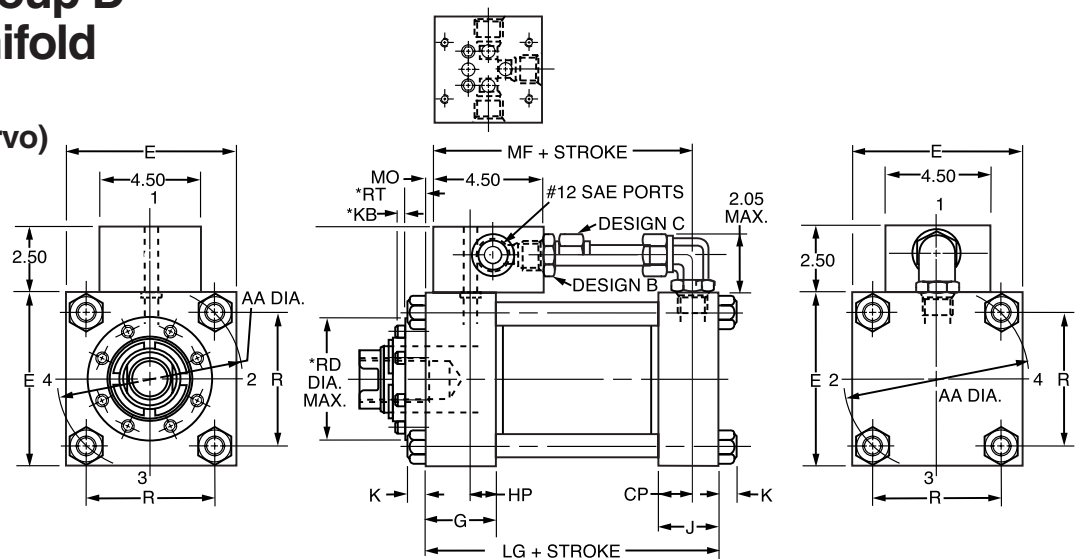
Group D/Parker BD-30 Valve Manifold, Cap End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.125	8.500	6.875	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	1.250
8.00	.250	9.500	7.625	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	0	.500

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

*See Parker Series 3H for dimensions.
Standard Operating Pressure is 3000 PSI.
Consult Factory for DD Mount.

3HX with Group D Bolt-on Manifold Head End (Parker BD-30 Servo)



Group D/Parker BD-30 Valve Manifold, Head End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.125	8.500	6.875	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	1.250
8.00	.250	9.500	7.625	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	0	.500

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

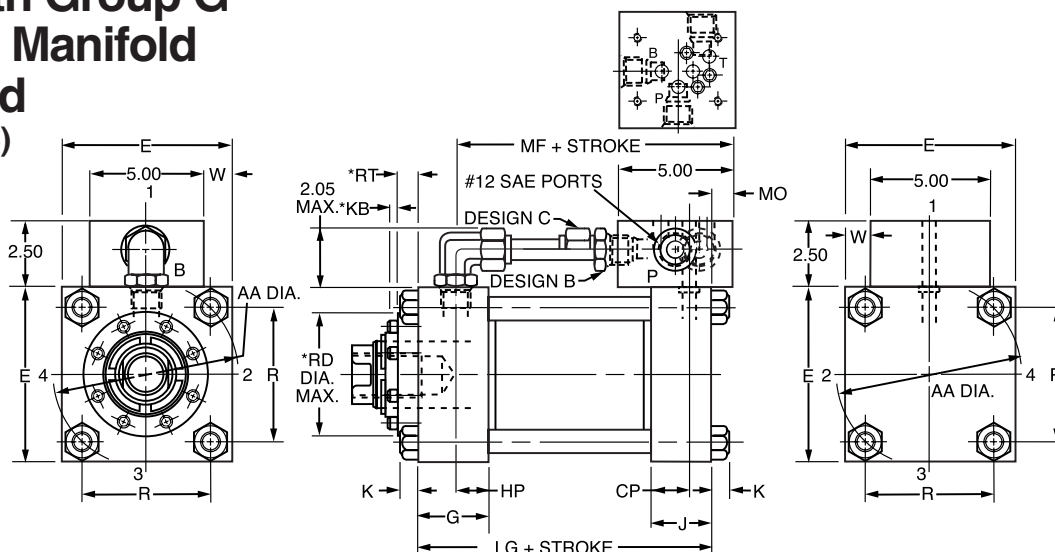
*See Parker Series 3H for dimensions.
Standard Operating Pressure is 3000 PSI.
Consult Factory for DD Mount.

For Cylinder Division Plant Locations – See Page II.



B

3HX with Group G Bolt-on Manifold Cap End (NFPA D03)



Group G/NFPA D03 Valve Manifold, Cap End Mounted Series 3HX Cylinder

Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG
7.00	.344	8.500	6.656	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50
8.00	.469	9.500	7.406	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

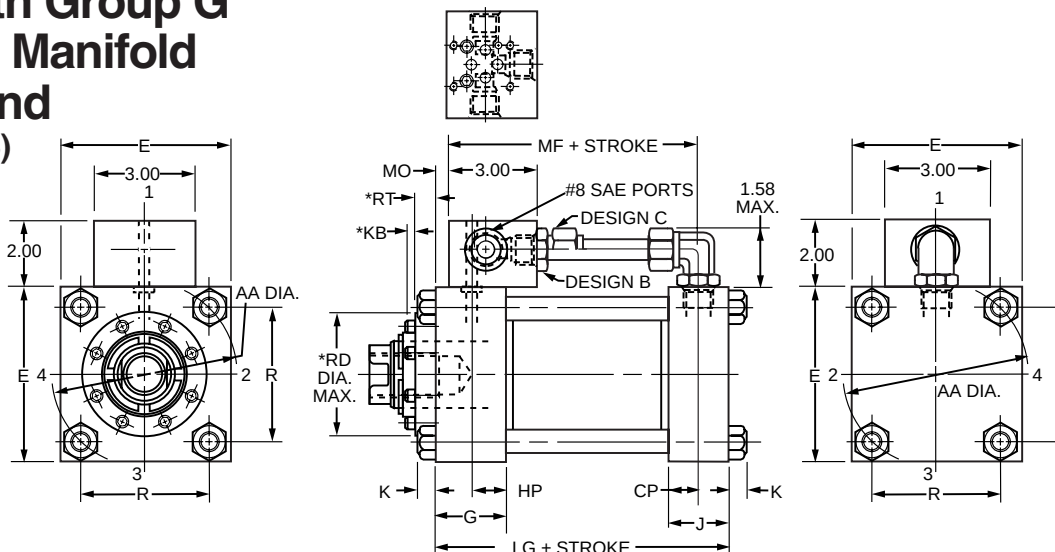
*Design C used only for strokes in "Design C" column on chart and greater strokes.

*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

Consult Factory for DD Mount.

3HX with Group G Bolt-on Manifold Head End (NFPA D03)



Group G/NFPA D03 Valve Manifold, Head End Mounted Series 3HX Cylinder

Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG
7.00	.344	8.500	6.656	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50
8.00	.469	9.500	7.406	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

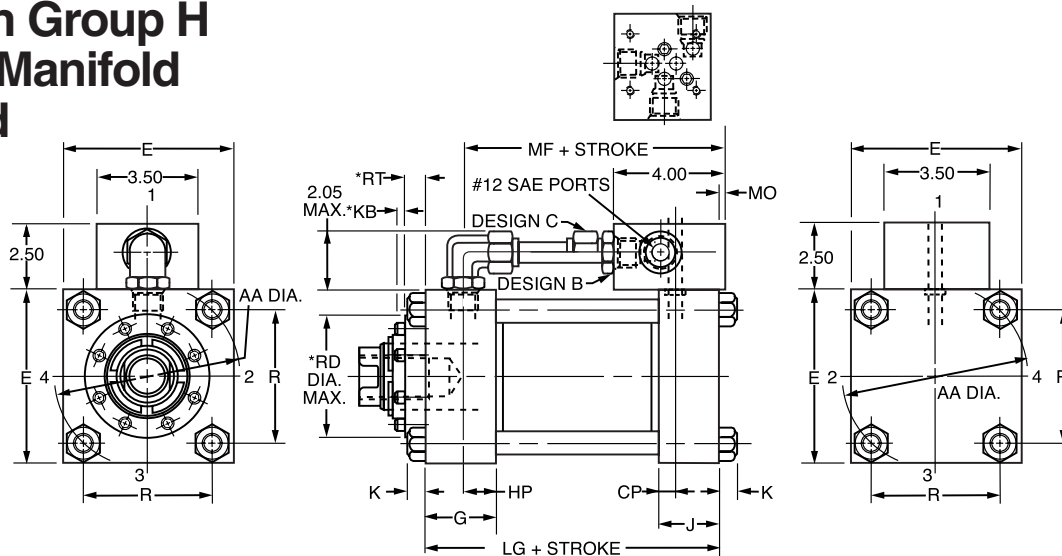
Consult Factory for DD Mount.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

3HX with Bolt-on Manifold
Group H Dimensions, 7" & 8" Bores

3HX with Group H Bolt-on Manifold Cap End (NFFA D05)



Group H/NFFA D05 Valve Manifold, Cap End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.141 ^Δ	8.500	7.141	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	.50
8.00	.016 ^Δ	9.500	7.891	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	N/A	0

^ΔBOM will overhang cap face

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

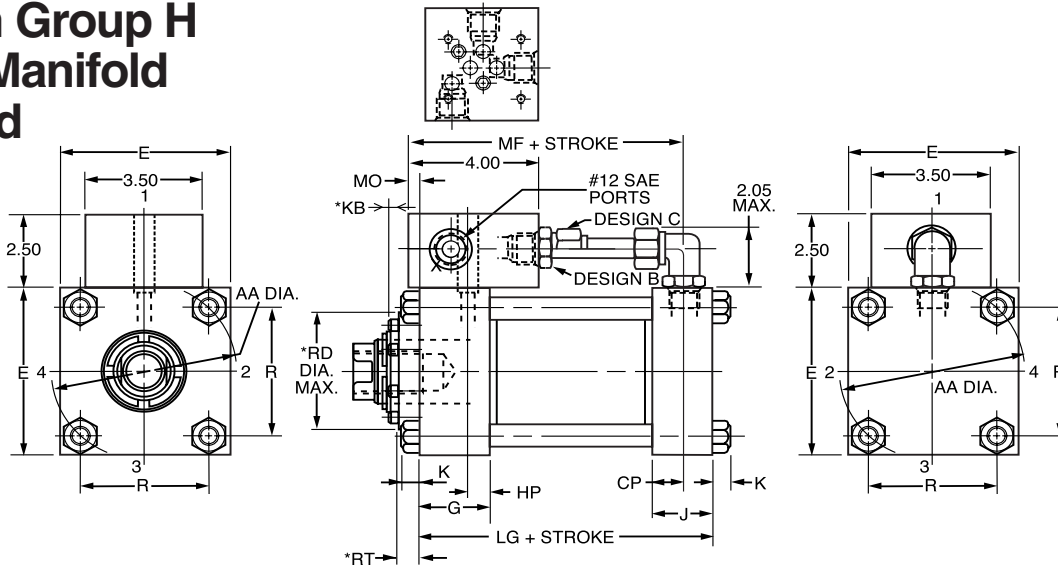
*Design C used only for strokes in "Design C" column on chart and greater strokes.

*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

Consult Factory for DD Mount.

3HX with Group H Bolt-on Manifold Head End (NFFA D05)



Group H/NFFA D05 Valve Manifold, Head End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.141 ^Δ	8.500	7.141	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	.50
8.00	.016 ^Δ	9.500	7.891	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	N/A	0

^ΔBOM will overhang cap face

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

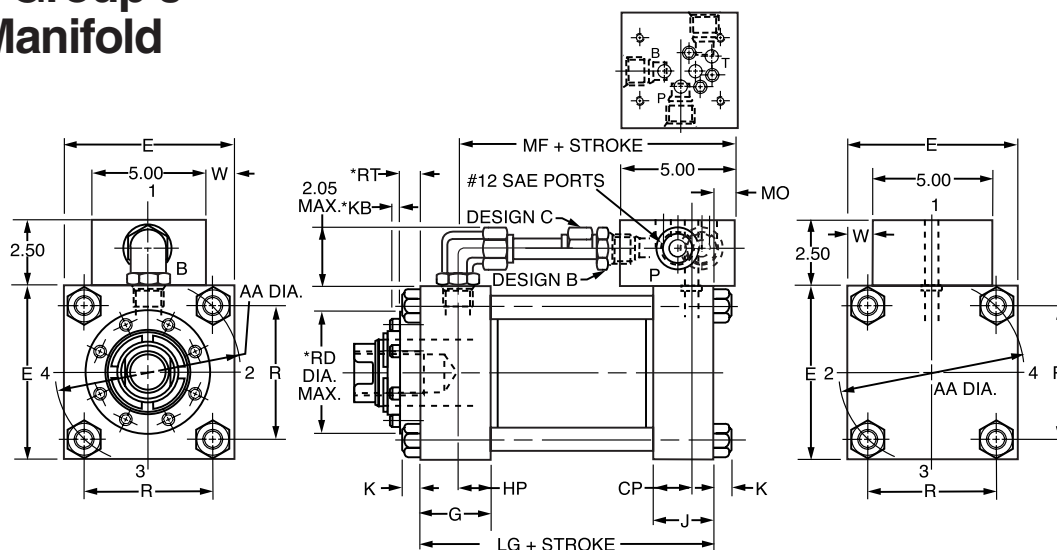
*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

Consult Factory for DD Mount.

For Cylinder Division Plant Locations – See Page II.

3HX with Group J Bolt-on Manifold Cap End (NFPA D06)



Group J/NFPA D06 Valve Manifold, Cap End Mounted Series 3HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	W	Min. Stroke	Min. Stroke
7.00	.375Δ	8.500	7.375	1.250	1.250	2.750	2.750	1.000	9.300	6.580	8.500	1.750	.25	1.125
8.00	.250Δ	9.500	8.125	1.375	1.375	3.000	3.000	1.062	10.600	7.500	9.500	2.250	0	.375

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

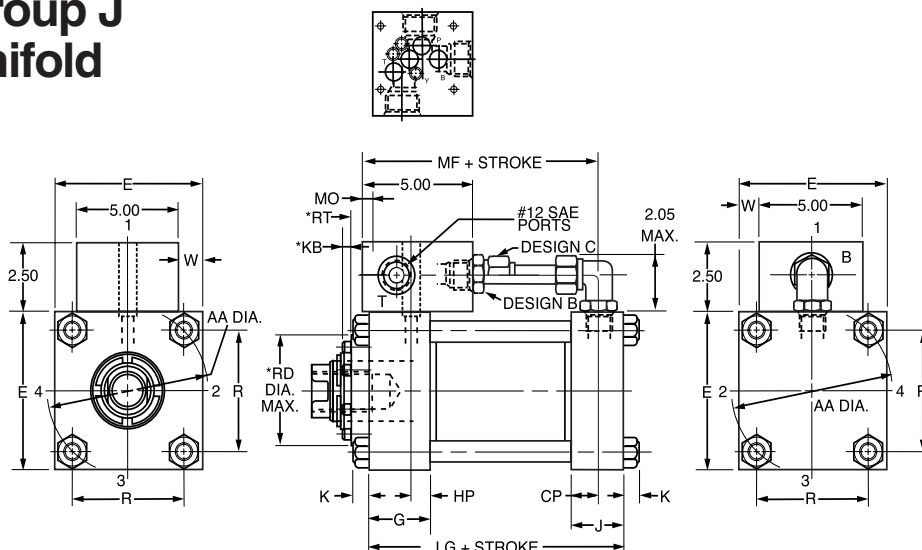
^ΔBOM will overhang past cap face.

*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

Consult Factory for DD Mount.

3HX with Group J Bolt-on Manifold Head End (NFPA D06)



Group J/NFPA D06 Valve Bolt-on Manifold, Head End Mounted, Series 3HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	W	Min. Stroke	Min. Stroke
7.00	.375 ^Δ	8.500	7.375	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	1.75	.250	1.125
8.00	.250 ^Δ	9.500	8.125	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	2.25	0	.375

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

^ΔBOM will overhang past head face.

*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

Consult Factory for DD Mount.

For additional information – call your local Parker Cylinder Distributor.

3HX with Bolt-on Manifold Group K Dimensions, 7" & 8" Bores

Group K Manifold

Technical drawing of a Group K Manifold, showing three views: front view, side view, and end view. The drawing includes dimensions and labels for various components and ports.

Front View Dimensions:

- Overall width: E
- Port spacing: 5.00
- Port diameter: 1
- Port diameter: 3.00
- Port diameter: $AA \text{ DIA.}$
- Port diameter: 2 R
- Port diameter: 4
- Port diameter: 3 R
- Port diameter: R

Side View Dimensions:

- Overall length: $MF + \text{STROKE}$
- Port spacing: 5.00
- Port diameter: 1
- Port diameter: 3.00
- Port diameter: $AA \text{ DIA.}$
- Port diameter: 2 R
- Port diameter: 4
- Port diameter: 3 R
- Port diameter: R

End View Dimensions:

- Overall width: E
- Port spacing: 5.00
- Port diameter: 1
- Port diameter: 3.00
- Port diameter: $AA \text{ DIA.}$
- Port diameter: 2 R
- Port diameter: 4
- Port diameter: 3 R
- Port diameter: R

Labels and Callouts:

- $*RT$
- $2.28 \text{ MAX.} *KB$
- $*RD \text{ DIA. MAX.}$
- K
- HP
- G
- $LG + \text{STROKE}$
- CP
- J
- K
- MO
- P
- $#16 \text{ SAE PORTS}$
- $DESIGN C$
- $DESIGN B$

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.	*See Parker Series 3H for dimensions.
*Design C used only for strokes in "Design C" column on chart and greater strokes.	Standard Operating Pressure is 3000 PSI.
△BOM will overhang past cap face.	Consult Factory for DD Mount.

Technical drawing of a 4-port manifold, showing three views: front, side, and top. The drawing includes dimensions and labels for various components and features.

Front View Dimensions:

- Overall width: E
- Overall height: W
- Port spacing (horizontal): 5.00
- Port spacing (vertical): 3.00
- Port diameter: $AA \text{ DIA.}$
- Port offset: R

Side View Dimensions:

- Manifold width: $MF + \text{STROKE}$
- Port offset: 5.00
- Port diameter: 2.28 MAX.
- Port offset: HP
- Port offset: CP
- Port offset: J
- Port offset: $LG + \text{STROKE}$
- Port offset: K

Top View Dimensions:

- Overall width: E
- Overall height: W
- Port spacing (horizontal): 5.00
- Port spacing (vertical): 3.00
- Port diameter: $AA \text{ DIA.}$
- Port offset: R

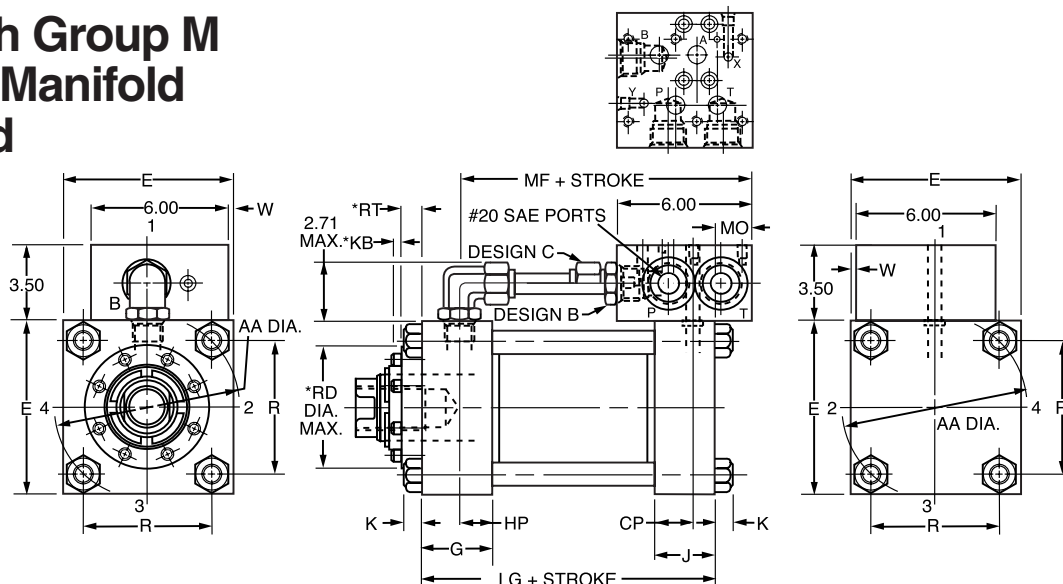
Labels and Features:

- #16 SAE PORTS:** Indicated on the side view.
- *RT:** Indicated on the side view.
- *KB:** Indicated on the side view.
- *RD DIA. MAX.:** Indicated on the side view.
- DESIGN C:** Indicated on the side view.
- DESIGN B:** Indicated on the side view.
- AA DIA.:** Indicated on the front and top views.
- HP:** Indicated on the side view.
- CP:** Indicated on the side view.
- J:** Indicated on the side view.
- LG + STROKE:** Indicated on the side view.
- K:** Indicated on the side view.

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart. *See Parker Series 3H for dimensions.
 *Design C used only for strokes in "Design C" column on chart and greater strokes. Standard Operating Pressure is 3000 PSI.
 ΔBOM will overhang past head face. Consult Factory for DD Mount.



3HX with Group M Bolt-on Manifold Cap End (NFFA D08)



Group M/NFFA D08 Valve Manifold, Cap End Mounted Series 3H Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	W	Min. Stroke	Min. Stroke
7.00	1.031 Δ	8.500	8.031	1.250	1.250	2.750	2.750	1.000	9.300	6.580	8.500	.250	1.375	2.625
8.00	.906 Δ	9.500	8.781	1.375	1.375	3.000	3.000	1.062	10.600	7.500	9.500	.750	.625	1.938

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

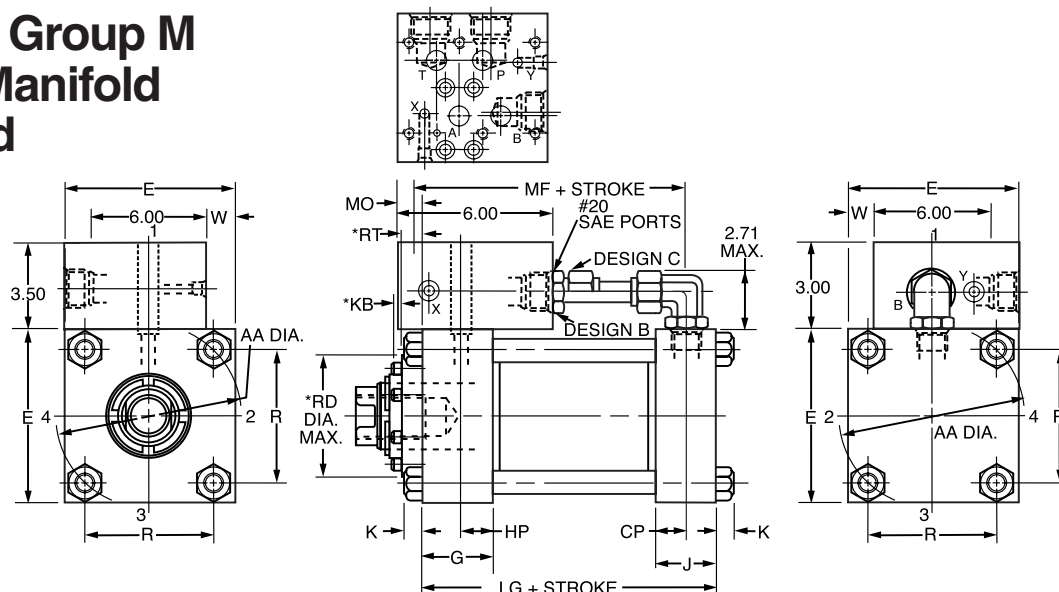
Δ BOM will overhang past cap face.

*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

Consult Factory for DD Mount.

3HX with Group M Bolt-on Manifold Head End (NFFA D08)



Group M/NFFA D08 Valve Bolt-on Manifold, Head End Mounted, Series 3HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	W	Min. Stroke	Min. Stroke
7.00	1.031 Δ	8.500	8.031	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	2.250	1.375	2.625
8.00	.906 Δ	9.500	8.781	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	2.750	.625	1.938

*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.

*Design C used only for strokes in "Design C" column on chart and greater strokes.

Δ BOM will overhang past head face.

*See Parker Series 3H for dimensions.

Standard Operating Pressure is 3000 PSI.

Consult Factory for DD Mount.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

2HX with Bolt-on Manifold
Mounting Dimensions

Series 2HX and 3HX Mounting Dimensions

The Parker Series 2HX and 3HX Bolt-on Manifold option does not affect the standard envelope and mounting dimensions of the base Parker Series 2H or 3H Heavy Duty Hydraulic Cylinder except where noted on previous pages of this catalog. All standard Parker Series 2H and 3H mounting styles are available with the Series 2HX and 3HX Bolt-on Manifold option. For base cylinder dimensions refer to the Parker Series 2H and 3H sections of the Parker Actuator Catalog.

Series 2HX and 3HX Bolt-on Manifolds may be specified at any

head or cap position which does not interfere with the mounting style selected. For available manifold mounting positions see Table A on page B-165. Manifold position must be specified when ordering.

For Parker mounting style DD refer to the minimum and maximum XI dimensions in Table 1 and Table 2 below.

Consult Factory for 6" Bore 2HX and 7"-8" Bore 3HX with Style DD Mounts.

Table 1 – Head End Mounted Bolt-on Manifold Maximum and Minimum 'XI' Location for Style DD Mounts

Series	Bore	MX	MN Bolt-on Manifold						
			Group A	Group D	Group G	Group H	Group J	Group K	Group M
2HX	2	3	4.563	N/A	4.219	4.734	N/A	N/A	N/A
	2.5	3.125	4.563	N/A	4.219	4.734	N/A	N/A	N/A
	3.25	3.5	5.032	5.969	4.688	5.203	N/A	N/A	N/A
	4	3.875	5.156	6.094	4.813	5.328	N/A	N/A	N/A
	5	4.375	5.156	6.094	4.813	5.328	N/A	N/A	N/A
3HX	6		CONSULT FACTORY						
	7		CONSULT FACTORY						
	8		CONSULT FACTORY						
3LX	2	2.25	N/A	N/A	3.906	N/A	N/A	N/A	N/A
	2.5	2.375	N/A	N/A	3.906	N/A	N/A	N/A	N/A
	3.25	2.625	4.875	N/A	4.531	5.047	N/A	N/A	N/A
	4	2.625	4.875	N/A	4.531	5.047	N/A	N/A	N/A
	5	2.875	4.875	N/A	4.531	5.047	N/A	N/A	N/A
	6	3	5.375	6.313	5.031	5.547	N/A	N/A	N/A
	8	3.125	5.375	6.313	5.031	5.547	N/A	N/A	N/A

Maximum and Minimum 'XI' Location

2H & 3L Series

Min. 'XI' = W + MN

Max. 'XI' = W + MX + Stroke

3H Series

Min. 'XI' = WF + MN

Max. 'XI' = W + MX + Stroke

Table 2 – Cap End Mounted Bolt-on Manifold Maximum and Minimum 'XI' Location for Style DD Mounts

Series	Bore	MN	MX Bolt-on Manifold						
			Group A	Group D	Group G	Group H	Group J	Group K	Group M
2HX	2	3.125	1.562	N/A	1.906	1.391	N/A	N/A	N/A
	2.5	3.125	1.687	N/A	2.031	1.516	N/A	N/A	N/A
	3.25	3.75	2.218	1.281	2.563	2.047	N/A	N/A	N/A
	4	3.875	2.593	1.656	2.938	2.422	N/A	N/A	N/A
	5	3.875	3.093	2.156	3.438	2.922	N/A	N/A	N/A
3HX	6		CONSULT FACTORY						
	7		CONSULT FACTORY						
	8		CONSULT FACTORY						
3LX	2	2.625	N/A	N/A	0.969	N/A	N/A	N/A	N/A
	2.5	2.625	N/A	N/A	1.094	N/A	N/A	N/A	N/A
	3.25	3.375	1.125	N/A	1.469	0.953	N/A	N/A	N/A
	4	3.375	1.125	N/A	1.469	0.953	N/A	N/A	N/A
	5	3.375	1.375	N/A	1.719	1.203	N/A	N/A	N/A
	6	4	1.625	0.687	1.969	1.453	N/A	N/A	N/A
	8	4	1.75	0.812	2.093	1.578	N/A	N/A	N/A

Maximum and Minimum 'XI' Location

2H & 3L Series

Min. 'XI' = W + MN

Max. 'XI' = W + MX + Stroke

3H Series

Min. 'XI' = WF + MN

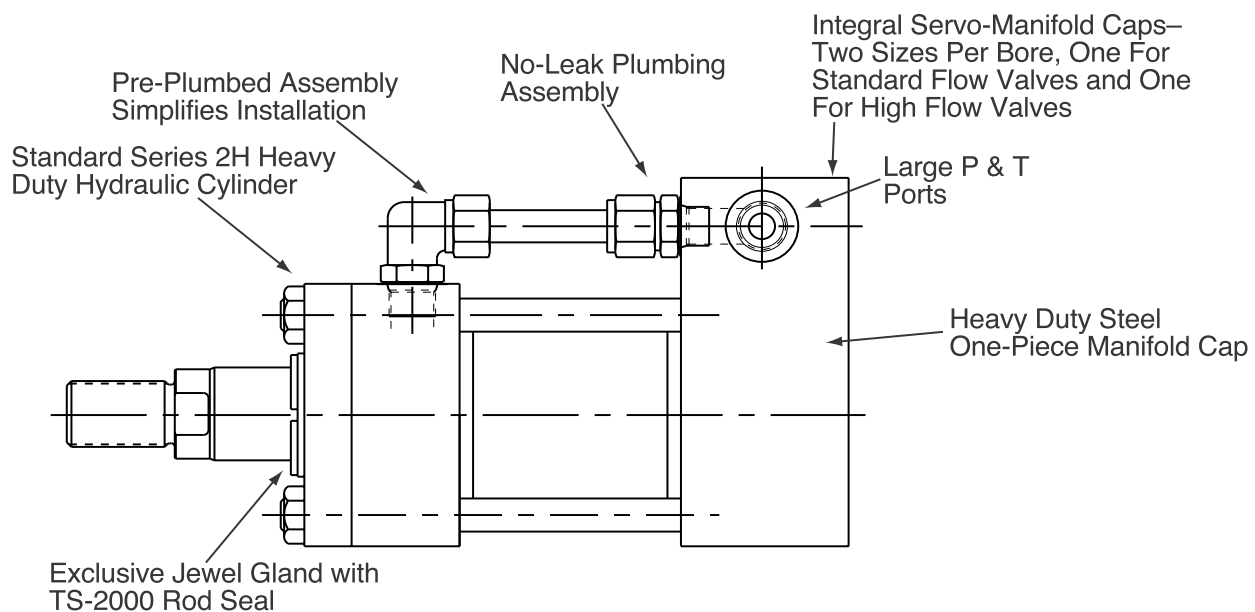
Max. 'XI' = W + MX + Stroke

For Cylinder Division Plant Locations – See Page II.



B

Hydraulic Linear Actuator with Integral Servo/NFPA Valve Manifold and Two Feedback Options



Innovative Motion Control

Parker's new Series 2HX is an integrated assembly that eliminates transducer mounting brackets, valve manifolds, plumbing and other items associated with using separate components. The versatility of the Series 2HX allows you to design an actuator for accurate position and velocity control for your specific application.

Features and Benefits

- Minimum hydraulic line runs with close cylinder and valve coupling.
- Simplified machine design with integrated components.
- Eliminates need for limit switches, deceleration valves, shock absorbers, and mechanical linkages in many applications.
- Minimum interference with standard mounting dimensions.
- Blank manifold caps can be machined to meet customer valve mounting specifications.

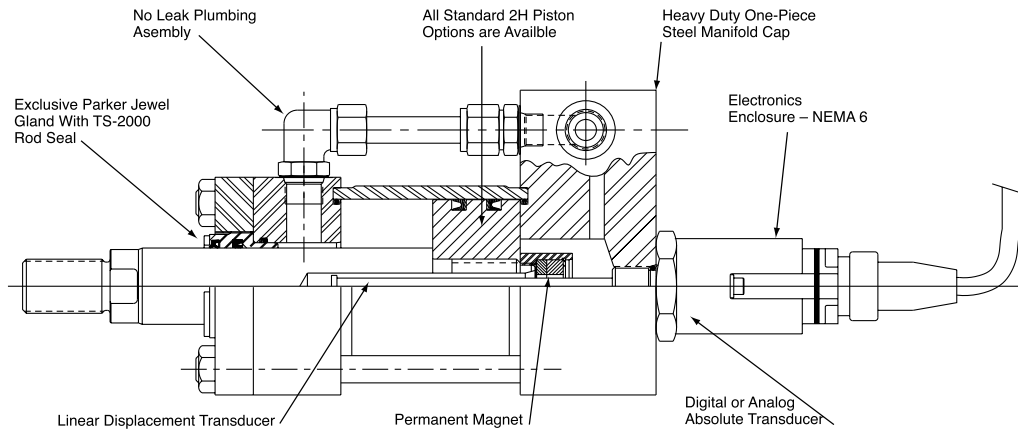
- Integral mounted valve eliminates assembly time and fittings.
- Custom supplied servo valve and equivalent feedback device can be integrated into the cylinder.

Custom Options Available

- Low friction rod gland – see page 211 for specifications.
- Low friction piston – see page C34 for specifications.
- Protective feedback enclosures.
- Intrinsically safe modifications.
- Explosion proof linear transducers.
- Feedback devices in stock for quick delivery of common stroke lengths.
- Closed-loop control for maximum productivity.
- Performance-tested actuators.
- Complete, tested cylinder/feedback assemblies customized to your needs.

For additional information – call your local Parker Cylinder Distributor.

2HX with Integral Valve Manifold and Magnetostrictive Linear Displacement Transducer (LDT)



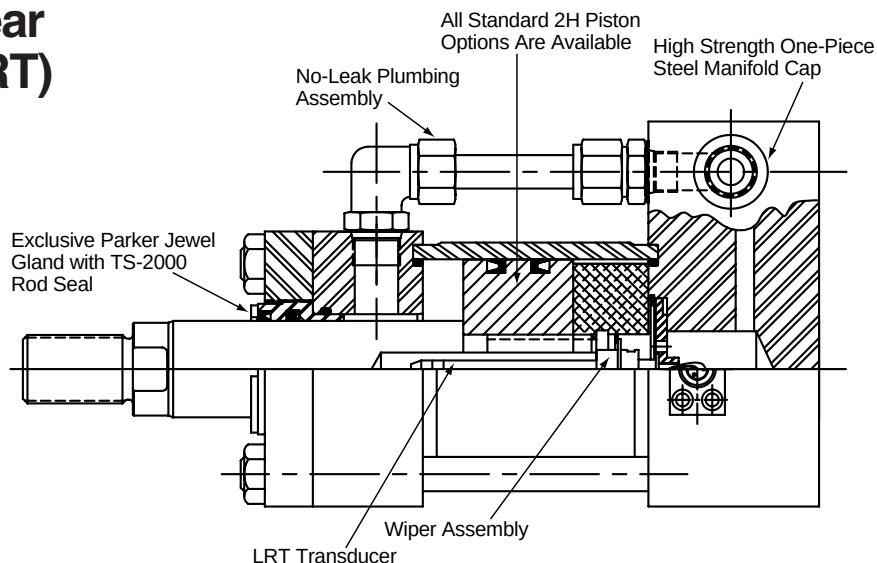
Here's How The Parker LDT Feeds Back Linear Position

The linear displacement transducer is rigidly attached to the cap end of the cylinder, and runs the full stroke length inside a hollow piston rod. A magnet is attached to the cylinder piston. As the piston moves through the stroke, the transducer is able to define the exact position of the

magnet by measuring the time interval between the initiation and the return of strain pulses launched in the transducer wave guide.

For LDT specifications see page 204.

2HX with Integral Valve Manifold and Linear Potentiometer (LRT)



Here's How The Parker LRT Feeds Back Linear Position

The LRT feedback device is essentially a linear potentiometer which provides a cost effective solution for applications where a contacting device is acceptable. The potentiometer is fixed to the rear cap of the cylinder and runs the full length inside a hollow piston rod. The wiper assembly is fixed to the

piston. As the piston moves through the stroke, the wiper voltage changes in proportion to the cylinder position.

For specifications on the LRT see page 209.

For Cylinder Division Plant Locations – See Page II.

Integral Manifolds

Parker Series 2HX cylinders are available with integral valve mounts. There are four standard patterns available. All Integral Valve Patterns will be supplied on the

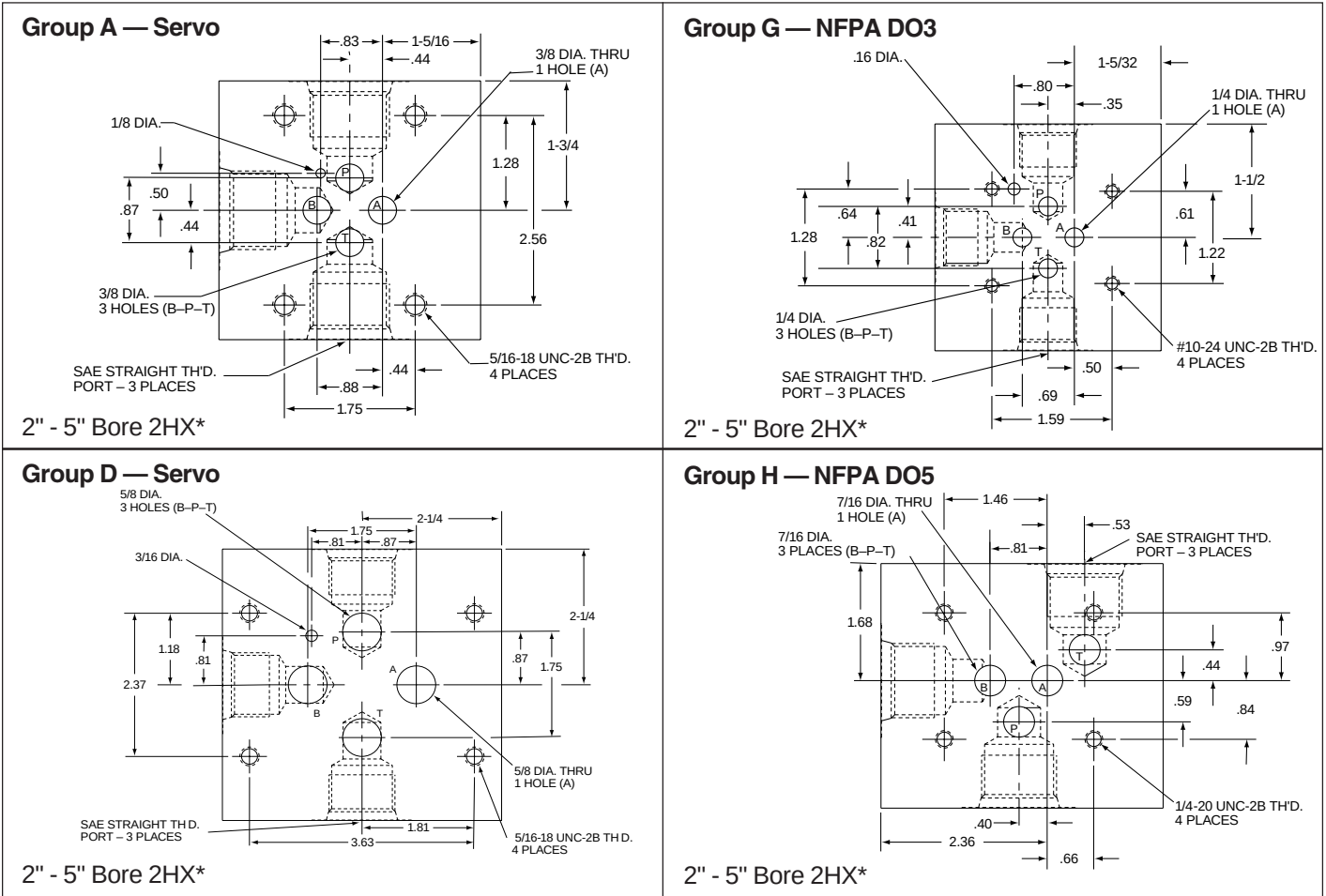
cap end at position #1. Special Valve Patterns may be supplied — consult factory. Integral Valve Mounts are available on 2" through 5" Bores.

Servo Valve Mounting Interchange Chart

(All Valves in Each Group Have Interchangeable Mounts)

Group A	Group D
Parker BD-15	Parker BD-30
Atchley 215A-XXX	Atchley 240-XXX
MOOG 62 Series	MOOG 78 Series
MOOG 73 Series	
MOOG 760 Series	
Pegasus M & MP Series	Pegasus 180L Pegasus 180R
Vickers SM4-20-X-X-10	Vickers SM4-40-X-X-10

Standard Integral Valve Patterns



*Note: For Integral Manifolds on larger bore sizes consult factory.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

2HX with
Integral Manifold
Technical Information

2HX with Integral Manifold — General Information

Bore & Rod Diameters

Standard bore and rod diameters for electro-hydraulic actuators are shown on the following pages of this catalog. Other sizes can be supplied as specials on request.

For heavy-duty or high-cycling applications, the use of a larger rod diameter is recommended. Refer to Section C, page 96 for proper sizing of piston rods.

Stroke Length

If an integrally mounted position transducer is specified, the maximum stroke length will normally be limited by the type of transducer.

Stop Tube

An internal stop tube (piston spacer) is recommended in cases where the combination of stroke length and mounting

style option could result in excessive bearing loads on the piston or rod gland. Please refer to Section C of this catalog.

A stop tube may also be used to eliminate the need for an extended rod end with the LDT Model.

Mounting Styles

Mounting styles available as standard on 2HX integral manifold actuators are shown in this catalog. If other mountings are required, please consult factory.

Cushioning

On cylinders fitted with integral feedback, cushioning is available as a standard option at both ends. Double rod (equal area) cylinders can have the normal cushion option at both ends.

Pressure Ratings

Series 2HX integral manifold actuators have a nominal working pressure of 3000 psi. Recommended maximum working pressures for 2HX integral manifold actuators with Feedback option (LDT or LRT) are given below. These pressure ratings are given as a guide for typical applications. For applications involving high cycle rates, high frequencies or shock loads, please consult factory.

Parker Series 2HX Pressure Ratings

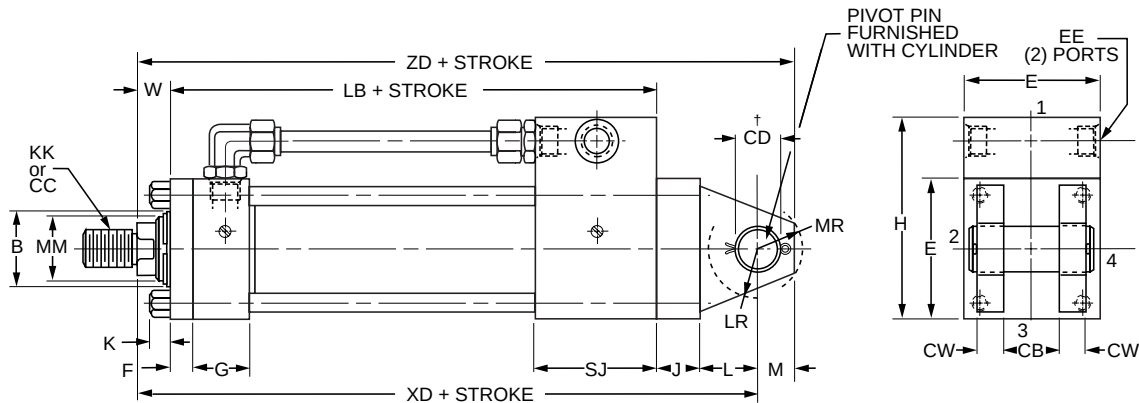
Bore	Rod No.	Rod Dia. MM	4 to 1 Design Factor (PSI)*
2	1	1	3000†
	2	1 ³ / ₈	3000
2 ¹ / ₂	1	1	1800†
	2	1 ³ / ₄	3000
	3	1 ³ / ₈	3000
3 ¹ / ₄	1	1 ³ / ₈	2130
	2	2	3000
	3	1 ³ / ₄	3000
4	1	1 ³ / ₄	2580
	2	2 ¹ / ₂	3000
	3	2	3000
5	1	2	2510
	2	3 ¹ / ₂	3000
	3	2 ¹ / ₂	3000
	4	3	3000

*The 4 to 1 design factor is based on the tensile strength of the piston to rod connection.

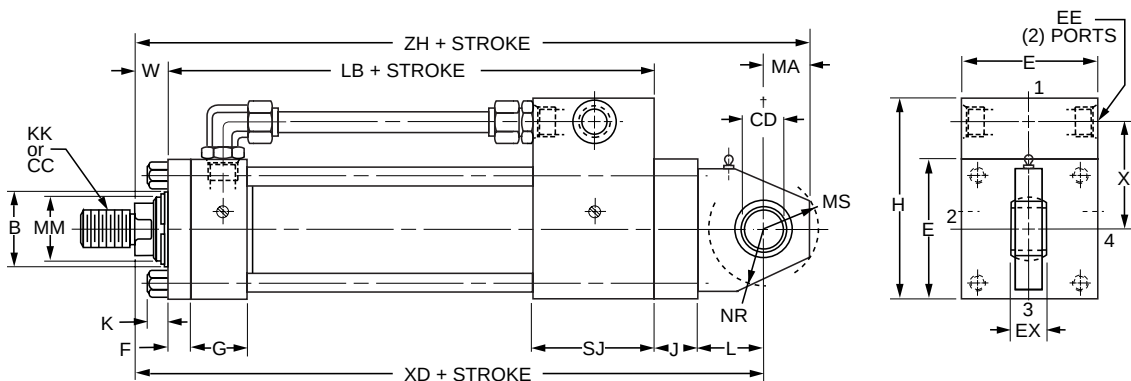
†A mini LRT (MLRT) is available for 1" Rods – Consult Factory.

For Cylinder Division Plant Locations – See Page II.

Cap Fixed Clevis
Style BB with No Feedback



Cap Spherical Bearing
Style SB with No Feedback

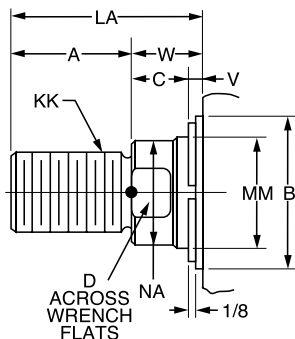


SB	Pressure Rating
2"	2200
2½"	1450
3¼"	1500
4	1850
5"	2000

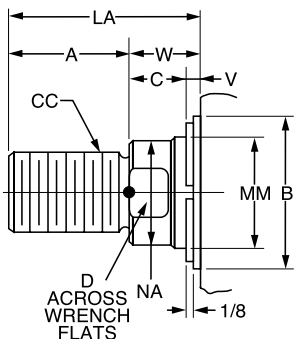
Pressure rating is for maximum life of cylinder and bearing based on dynamic load of commercial bearing.

Rod End Dimensions — See Table 2

Thread Style 4
(NFPA Style SM)



Thread Style 8
(NFPA Style IM)



“Special” Thread
Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 3” and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

Integral Manifold
Cap Fixed Clevis
Cap Spherical Bearing
2" – 5" Bore

Table 1 — Envelope and Mounting Dimensions

Bore	E	SAE EE		F	G	H		J	K	L	M	X		LR	MR	CB	CW	+.000 -.002 CD†	EX	MA	MS	NR	LB Add Stroke		SJ	
		*	**			*	**					*	**										*	**	*	**
2	3	10	NA	5/8	13/4	47/8	NA	1 1/2	7/16	1 1/4	3/4	17/8	NA	1	15/16	1 1/4	5/8	.751	2 1/32	1	13/8	1	6 5/8	8 1/8	2 7/8	NA
2 1/2	3 1/2	10	12	5/8	13/4	5 3/8	5 5/8	1 1/2	7/16	1 1/4	3/4	2 1/4	3.04	15/16	15/16	1 1/4	5/8	.751	2 1/32	1	13/8	1	6 3/4	8 1/4	2 7/8	4 3/8
3 1/4	4 1/2	12	12	3/4	2	6 5/8	6 5/8	1 1/2	9/16	1 1/2	1	2 3/4	3.54	1 1/4	1 3/16	1 1/2	3/4	1.001	7/8	1 1/4	1 11/16	1 1/4	7 3/8	8 7/8	2 7/8	4 3/8
4	5	12	12	7/8	2	7 1/8	7 1/8	1 3/4	9/16	2 1/8	1 3/8	3 1/8	3.125	1 3/4	1 5/8	2	1	1.376	1 3/16	1 7/8	2 7/16	1 5/8	9 1/4	9 1/4	4 3/8	4 3/8
5	6 1/2	12	12	7/8	2	8 5/8	8 5/8	1 3/4	13/16	2 1/4	1 3/4	3 5/8	3.625	2 1/16	2 1/8	2 1/2	1 1/4	1.751	1 17/32	2 1/2	2 7/8	2 1/2	9 3/4	9 3/4	4 3/8	4 3/8

†Dimension CD is pin diameter.

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

** For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H.

Table 2 — Rod End and Envelope Dimensions

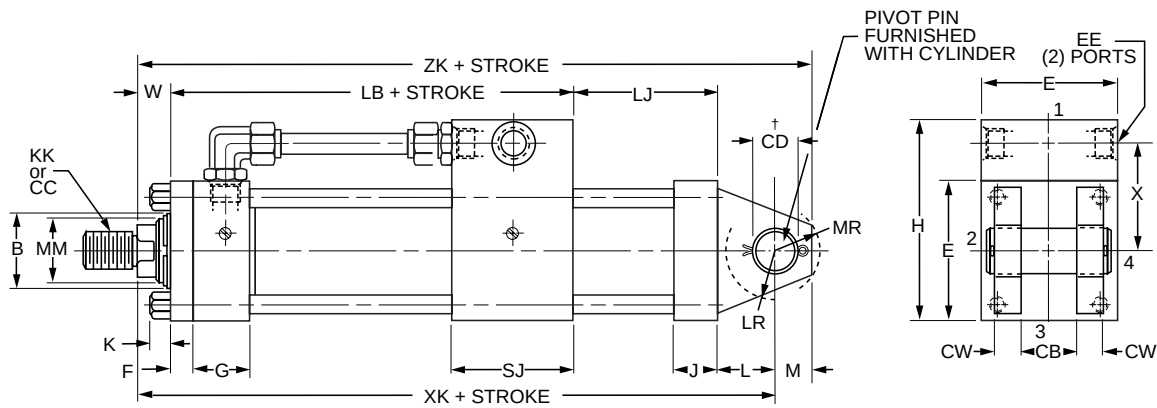
Bore	Rod No.	Rod Dia. MM	Thread		A	+.000 -.002 B	C	D	LA	NA	V	W	Add Stroke					
			CC	KK									XD		ZD		ZH	
													*	**	*	**	*	**
2	2	13/8	11/4-12	1-14	15/8	1.999	5/8	11/8	25/8	151/16	3/8	1	103/8	117/8	111/8	125/8	113/8	127/8
2 1/2	2	13/4	11/2-12	11/4-12	2	2.374	3/4	11/2	31/4	1111/16	1/2	11/4	103/4	1211/4	111/2	13	113/4	1311/2
	3	13/8	11/4-12	1-14	15/8	1.999	5/8	11/8	25/8	151/16	3/8	1	101/2	12	111/4	123/4	111/2	13
3 1/4	1	13/8	11/4-12	1-14	15/8	1.999	5/8	11/8	21/2	151/16	1/4	7/8	111/4	123/4	121/4	133/4	121/2	14
	2	2	13/4-12	11/2-12	21/4	2.624	7/8	1111/16	31/2	1151/16	3/8	11/4	115/8	133/8	125/8	141/8	127/8	143/8
	3	13/4	11/2-12	11/4-12	2	2.374	3/4	11/2	31/8	1111/16	3/8	11/8	111/2	13	121/2	14	123/4	1411/4
4	1	13/4	11/2-12	11/4-12	2	2.374	3/4	11/2	3	1111/16	1/4	1	141/8	141/8	151/2	151/2	16	16
	2	21/2	21/4-12	17/8-12	3	3.124	1	21/16	43/8	23/8	3/8	13/8	141/2	141/2	157/8	157/8	163/8	163/8
	3	2	13/4-12	11/2-12	21/4	2.624	7/8	1111/16	33/8	1151/16	1/4	11/8	141/4	141/4	155/8	155/8	161/8	161/8
5	1	2	13/4-12	11/2-12	21/4	2.624	7/8	1111/16	33/8	1151/16	1/4	11/8	147/8	147/8	165/8	165/8	173/8	173/8
	2	31/2	31/4-12	21/2-12	31/2	4.249	1	3	47/8	33/8	3/8	13/8	151/8	151/8	167/8	167/8	175/8	175/8
	3	21/2	21/4-12	17/8-12	3	3.124	1	21/16	43/8	23/8	3/8	13/8	151/8	151/8	167/8	167/8	175/8	175/8
	4	3	23/4-12	21/4-12	31/2	3.749	1	25/8	47/8	27/8	3/8	13/8	151/8	151/8	167/8	167/8	175/8	175/8

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

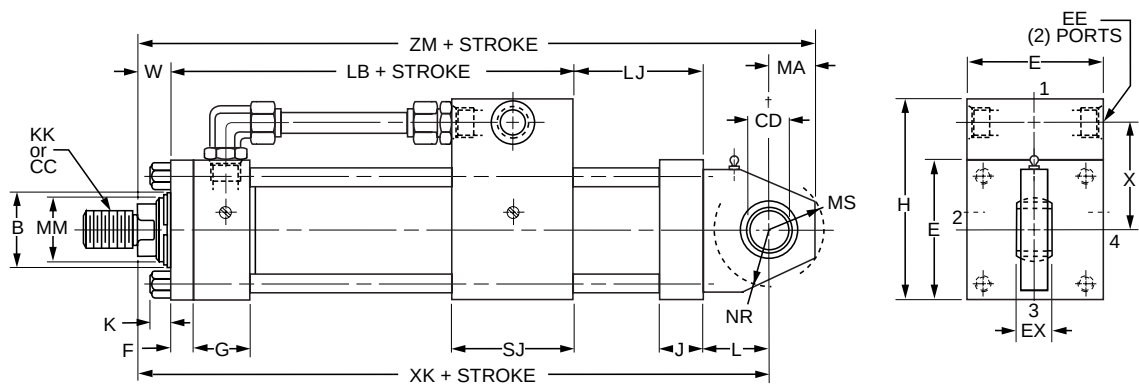
** For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H.

For Cylinder Division Plant Locations – See Page II.

Cap Fixed Clevis
Style BB with LDT and LRT Feedback



Cap Spherical Bearing
Style SB with LDT and LRT Feedback

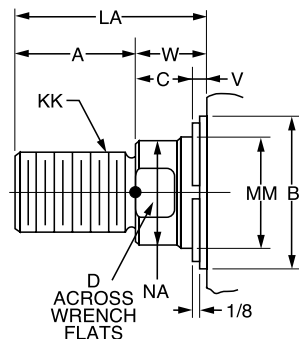


SB	Pressure Rating
2"	2200
2½"	1350
3¼"	1350
4"	1400
5"	1800

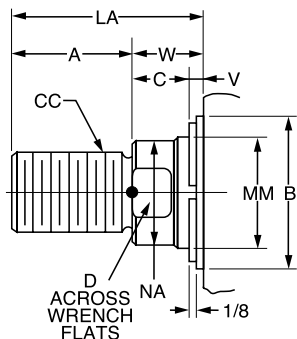
Pressure rating is for maximum life of cylinder and bearing based on dynamic load of commercial bearing.

Rod End Dimensions — See Table 2

Thread Style 4
(NFPA Style SM)



Thread Style 8
(NFPA Style IM)



“Special” Thread
Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify “Style 3” and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

Integral Manifold
Cap Fixed Clevis
Cap Spherical Bearing
2" – 5" Bore

Table 1 — Envelope and Mounting Dimensions

Bore	E	SAE EE		F	G	H		J	K	L	M	X		LR	MR	CB	CW	+0.000 -0.002 CD†	EX	MA	MS	NR	LB Add Stroke		SJ		LJ††
		*	**			*	**					*	**										*	**	*	**	
2	3	10	NA	5/8	13/4	47/8	NA	1 1/2	7/16	1 1/4	3/4	17/8	NA	1	15/16	1 1/4	5/8	.751	21/32	1	13/8	1	65/8	NA	27/8	NA	5 1/2
2 1/2	3 1/2	10	12	5/8	13/4	53/8	55/8	1 1/2	7/16	1 1/4	3/4	2 1/4	3.04	15/16	15/16	1 1/4	5/8	.751	21/32	1	13/8	1	63/4	8 1/4	27/8	43/8	5 1/2
3 1/4	4 1/2	12	12	3/4	2	65/8	65/8	1 1/2	9/16	1 1/2	1	2 3/4	3.54	1 1/4	1 3/16	1 1/2	3/4	1.001	7/8	1 1/4	1 11/16	1 1/4	73/8	87/8	27/8	43/8	5 1/2
4	5	12	12	7/8	2	7 1/8	7 1/8	1 3/4	9/16	2 1/8	1 3/8	3 1/8	3.125	1 3/4	1 5/8	2	1	1.376	1 3/16	17/8	27/16	1 5/8	9 1/4	9 1/4	43/8	43/8	5 3/4
5	6 1/2	12	12	7/8	2	85/8	85/8	1 3/4	13/16	2 1/4	1 3/4	3 5/8	3.625	2 1/8	2 1/8	2 1/2	1 1/4	1.751	1 17/32	2 1/2	27/8	2 1/2	93/4	93/4	43/8	43/8	5 3/4

†Dimension CD is pin diameter.

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

** For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H.

††“RO” style integral cable only on LDT.

For RB style connection on LDT consult factory for LJ, ZK, XK dimensions.

Velocity of LRT actuators must not exceed 30 ips.

Table 2 — Rod End and Envelope Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		A	+0.000 -0.002 B	C	D	LA	NA	V	W	Add Stroke					
			CC	KK									XK		ZK		ZM	
													*	**	*	**	*	**
2	2	13/8	1 1/4-12	1-14	15/8	1.999	5/8	1 1/8	25/8	15 1/16	3/8	1	14 3/8	157/8	15 1/8	165/8	15 3/8	167/8
2 1/2	2	13/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	14 3/4	16 1/14	15 1/2	17	15 3/4	17 1/4
	3	13/8	1 1/4-12	1-14	15/8	1.999	5/8	1 1/8	25/8	15 1/16	3/8	1	14 1/2	16	15 1/4	16 3/4	15 1/2	17
3 1/4	1	13/8	1 1/4-12	1-14	15/8	1.999	5/8	1 1/8	2 1/2	15 1/16	1/4	7/8	15 1/4	16 3/4	16 1/4	17 3/4	16 1/2	18
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	1 15/16	3/8	1 1/4	15 5/8	17 1/8	16 5/8	18 1/8	16 7/8	18 3/8
	3	13/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/8	1 11/16	3/8	1 1/8	15 1/2	17	16 1/2	18	16 3/4	18 1/4
4	1	13/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3	1 11/16	1/4	1	18 1/8	18 1/8	19 1/2	19 1/2	20	20
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 3/8	2 3/8	3/8	1 3/8	18 1/2	18 1/2	19 7/8	19 7/8	20 3/8	20 3/8
	3	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 3/8	1 15/16	1/4	1 1/8	18 1/4	18 1/4	19 5/8	19 5/8	20 1/8	20 1/8
5	1	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 3/8	1 15/16	1/4	1 1/8	18 7/8	18 7/8	20 5/8	20 5/8	21 3/8	21 3/8
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	4 7/8	3 3/8	3/8	1 3/8	19 1/8	19 1/8	20 7/8	20 7/8	21 5/8	21 5/8
	3	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 3/8	2 3/8	3/8	1 3/8	19 1/8	19 1/8	20 7/8	20 7/8	21 5/8	21 5/8
	4	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	4 7/8	2 7/8	3/8	1 3/8	19 1/8	19 1/8	20 7/8	20 7/8	21 5/8	21 5/8

Note: Electrical port or connector will be provided at position 1 of rear cap.

Mounting styles BB, B, SB with analog LDT feedback require the use of Analog Output Module (AOM).

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

** For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H.

For Cylinder Division Plant Locations – See Page II.

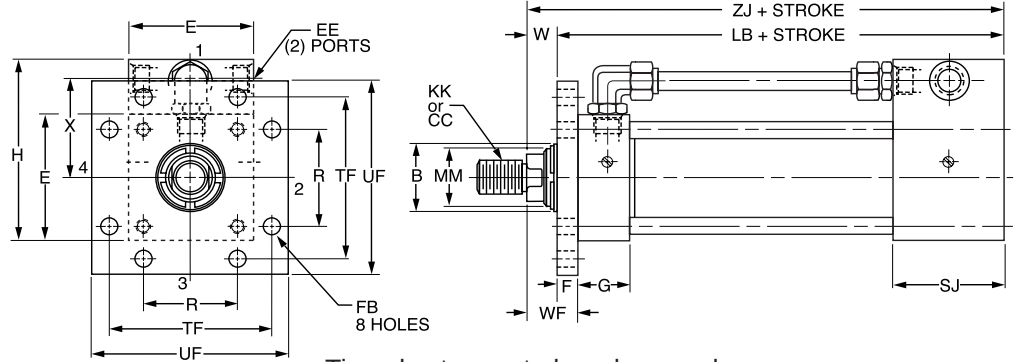


**Integral Manifold
Head Square Flange
Head Rectangular Flange
Head Rectangular, 2" – 5" Bore**

Series 2HX Electrohydraulic Actuators

Head Square Flange

Style JB — All Feedback Types



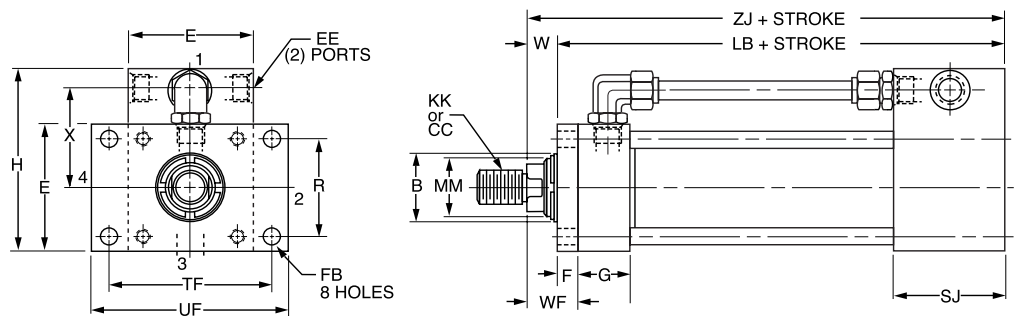
Tie rod nuts counterbored cap end.

Head Rectangular Flange

Style J — All Feedback Types

Bore Size	Max. PSI — Push*				
	Rod Code				
	1	2	3	4	5
1½	2500	1500	—	—	—
2	2500	1500	—	—	—
2½	2500	1500	1900	—	—
3¼	2500	1500	2100	—	—
4	2500	1500	1800	—	—
5	2200	750	1650	1200	—

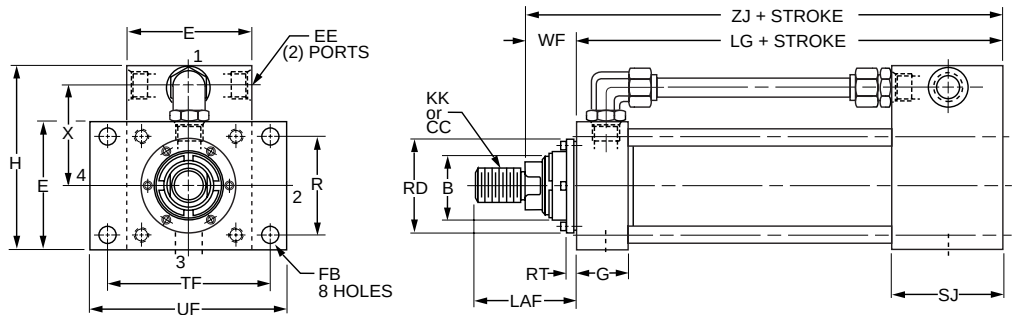
*Maximum pressure rating — push application.



Tie rod nuts counterbored cap end.

Head Rectangular

Style JJ — All Feedback Types

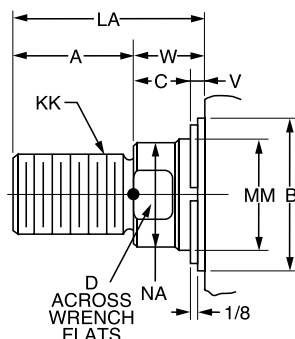


Tie rod nuts counterbored cap end.

Rod End Dimensions — See Table 2

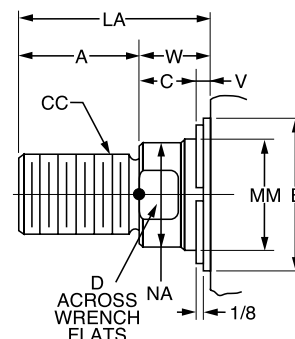
Thread Style 4

(NFPA Style SM)



Thread Style 8

(NFPA Style IM)



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information — call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

Integral Manifold
Head Square Flange
Head Rectangular Flange
Head Rectangular, 2" – 5" Bore

Table 1 — Envelope and Mounting Dimensions

Bore	E	SAE EE		F	G	H		K	R	X		FB	TF	UF	LB Add Stroke		LG Add Stroke		SJ	
		*	**			*	**			*	**				*	**	*	**	*	**
2	3	10	NA	5/8	1 3/4	4 7/8	NA	7 1/6	2.05	1 7/8	NA	9 1/6	4 1/8	5 1/8	6 5/8	NA	6	NA	2 7/8	NA
2 1/2	3 1/2	10	12	5/8	1 3/4	5 3/8	5 5/8	7 1/6	2.55	2 1/4	3.04	9 1/6	4 5/8	5 5/8	6 3/4	8 1/4	6 1/8	7 5/8	2 7/8	4 3/8
3 1/4	4 1/2	12	12	3/4	2	6 5/8	6 5/8	9 1/6	3.25	2 3/4	3.54	11 1/6	5 7/8	7 1/8	7 3/8	8 7/8	6 5/8	8 1/8	2 7/8	4 3/8
4	5	12	12	7/8	2	7 1/8	7 1/8	9 1/6	3.82	3 1/8	3.125	11 1/6	6 3/8	7 5/8	9 1/4	9 1/4	8 3/8	8 3/8	4 3/8	4 3/8
5	6 1/2	12	12	7/8	2	8 5/8	8 5/8	13 1/6	4.95	3 5/8	3.625	15 1/6	8 3/8	9 3/4	9 3/4	9 3/4	8 7/8	8 7/8	4 3/8	4 3/8

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

**For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H. Velocity of LRT actuators must not exceed 30 ips.

Table 2 — Rod End and Envelope Dimensions

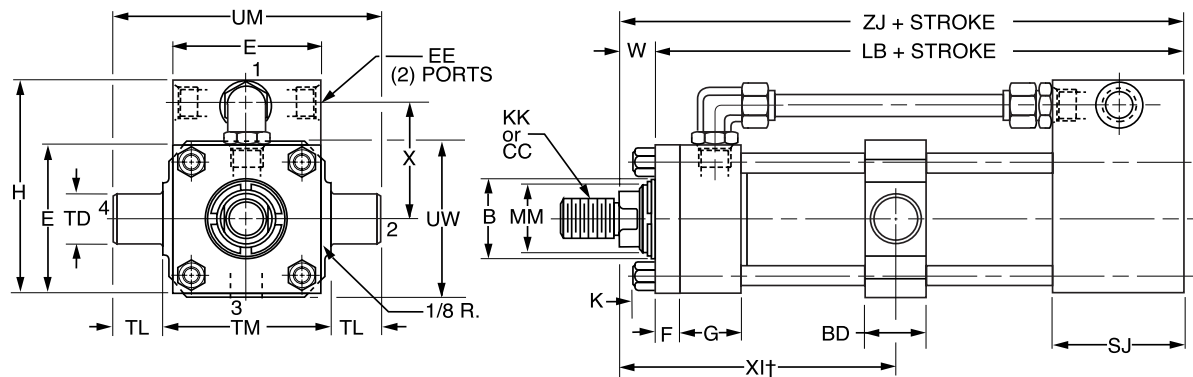
Bore	Rod No.	Rod Dia. MM	Thread		A	+0.000 -0.002 B	C	D	LA	LAF	NA	V	W	Max. RD	RT	WF	ZJ Add Stroke	
			CC	KK													*	**
2	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	3 1/4	1 5/16	3/8	1	3	3/8	1 5/8	7 5/8	9 1/8
2 1/2	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	3 7/8	1 11/16	1/2	1 1/4	3 1/2	3/8	1 7/8	8	9 1/2
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	3 1/4	1 5/16	3/8	1	3	3/8	1 5/8	7 3/4	9 1/4
3 1/4	1	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 1/2	3 1/4	1 5/16	1/4	7/8	3	3/8	1 5/8	8 1/4	9 3/4
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	4 1/4	1 15/16	3/8	1 1/4	4	5/8	2	8 5/8	10 1/8
	3	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/8	3 7/8	1 11/16	3/8	1 1/8	3 1/2	3/8	1 7/8	8 1/2	10
4	1	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3	3 7/8	1 11/16	1/4	1	3 1/2	3/8	1 7/8	10 1/4	10 1/4
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 3/8	5 1/4	2 3/8	3/8	1 3/8	4 1/2	5/8	2 1/4	10 5/8	10 5/8
	3	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 3/8	4 1/4	1 15/16	1/4	1 1/8	4	5/8	2	10 3/8	10 3/8
5	1	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 3/8	4 1/4	1 15/16	1/4	1 1/8	4	5/8	2	10 7/8	10 7/8
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	4 7/8	5 3/4	3 3/8	3/8	1 3/8	5 3/4	5/8	2 1/4	11 1/8	11 1/8
	3	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	4 3/8	5 1/4	2 3/8	3/8	1 3/8	4 1/2	5/8	2 1/4	11 1/8	11 1/8
	4	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	2 5/8	4 7/8	5 3/4	2 7/8	3/8	1 3/8	5 1/4	5/8	2 1/4	11 1/8	11 1/8

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

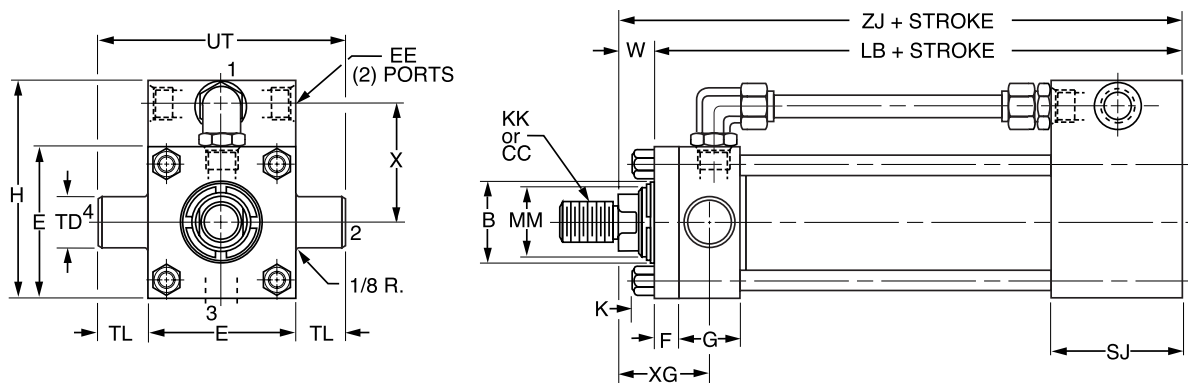
**For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H. Velocity of LRT actuators must not exceed 30 ips.

For Cylinder Division Plant Locations – See Page II.

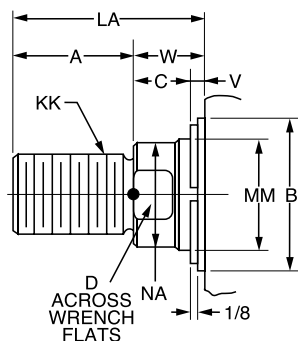
Intermediate Trunnion
Style DD — All Feedback Types



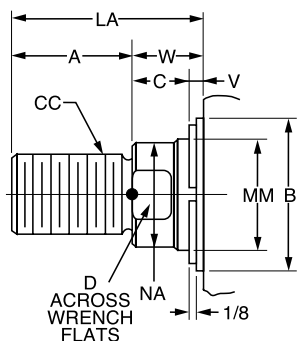
Head Trunnion
Style D — All Feedback Types



Rod End Dimensions — See Table 2
Thread Style 4
(NFA Style SM)



Thread Style 8
(NFA Style IM)



“Special” Thread Style 3
Special thread, extension, rod eye, blank, etc., are also available.
To order, specify “Style 3” and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

Integral Manifold
Head Trunnion
Intermediate Trunnion
2" – 5" Bore

Table 1 — Envelope and Mounting Dimensions

Bore	BD	E	SAE EE		F	G	H		K	X		+0.000 -0.001 TD	TL	TM	UW	UM	UT	LB Add Stroke		SJ	
			*	**			*	**		*	**							*	**	*	**
2	1½	3	10	NA	5/8	1¾	47/8	NA	7/16	17/8	NA	1.375	13/8	3½	4½	6¼	5¾	65/8	NA	27/8	NA
2½	1½	3½	10	12	5/8	1¾	53/8	55/8	7/16	2¼	3.04	1.375	13/8	4	45/8	6¾	6¼	6¾	8¼	27/8	43/8
3¼	2	4½	12	12	¾	2	65/8	65/8	9/16	2¾	3.54	1.750	1¾	5	513/16	8½	8	73/8	87/8	27/8	43/8
4	2	5	12	12	5/8	2	71/8	71/8	9/16	31/8	3.125	1.750	1¾	5½	63/8	9	8½	9¼	9¼	43/8	43/8
5	2	6½	12	12	7/8	2	85/8	85/8	13/16	35/8	3.625	1.750	1¾	7	7¾	10½	10	9¾	9¾	43/8	43/8

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

** For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H. Velocity of LRT actuators must not exceed 30 ips.

Table 2 — Rod End and Envelope Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		A	+0.000 -0.002 B	C	D	LA	NA	V	W	XG	Min. XI†	ZJ Add Stroke	
			CC	KK											*	**
2	2	13/8	1¼-12	1-14	15/8	1.999	5/8	11/8	25/8	15/16	3/8	1	2½	43/16	75/8	91/8
2½	2	1¾	1½-12	1¼-12	2	2.374	¾	1½	3¼	111/16	1/2	1¼	2¾	47/16	8	9½
	3	13/8	1¼-12	1-14	15/8	1.999	5/8	11/8	25/8	15/16	3/8	1	2½	43/16	7¾	9¼
3¼	1	13/8	1¼-12	1-14	15/8	1.999	5/8	11/8	2½	15/16	¼	7/8	25/8	411/16	8¼	9¾
	2	2	1¾-12	1½-12	2¼	2.624	7/8	111/16	3½	115/16	3/8	1¼	3	51/16	85/8	101/8
	3	1¾	1½-12	1¼-12	2	2.374	¾	1½	31/8	111/16	3/8	11/8	27/8	415/16	8½	10
4	1	1¾	1½-12	1¼-12	2	2.374	¾	1½	3	111/16	¼	1	27/8	415/16	10¼	10¼
	2	2½	2¼-12	17/8-12	3	3.124	1	21/16	43/8	23/8	3/8	13/8	3¼	55/16	105/8	105/8
	3	2	1¾-12	1½-12	2¼	2.624	7/8	111/16	33/8	115/16	¼	11/8	3	51/16	103/8	103/8
5	1	2	1¾-12	1½-12	2¼	2.624	7/8	111/16	33/8	115/16	¼	11/8	3	51/16	97/8	107/8
	2	3½	3¼-12	2½-12	3½	4.249	1	3	47/8	33/8	3/8	13/8	3¼	55/16	111/8	111/8
	3	2½	2¼-12	17/8-12	3	3.124	1	21/16	43/8	23/8	3/8	13/8	3¼	55/16	111/8	111/8
	4	3	2¾-12	2¼-12	3½	3.749	1	25/8	47/8	27/8	3/8	13/8	3¼	55/16	111/8	111/8

†Dimension XI to be specified by customer.

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

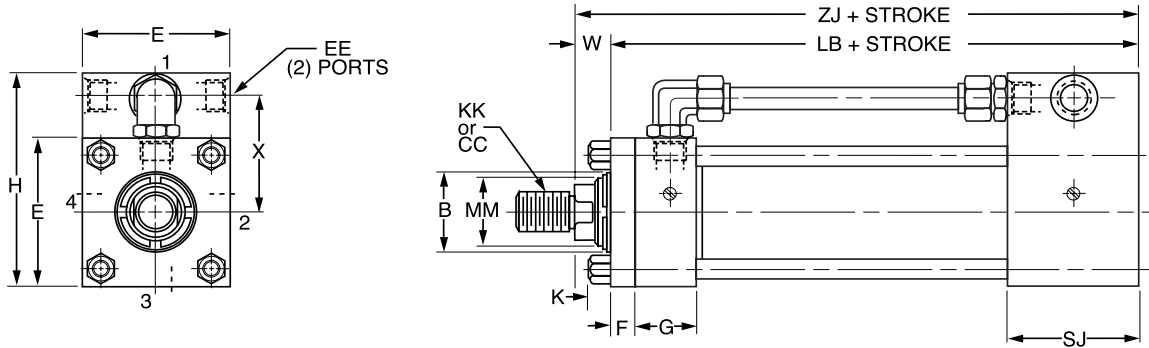
** For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H.

For Cylinder Division Plant Locations – See Page II.

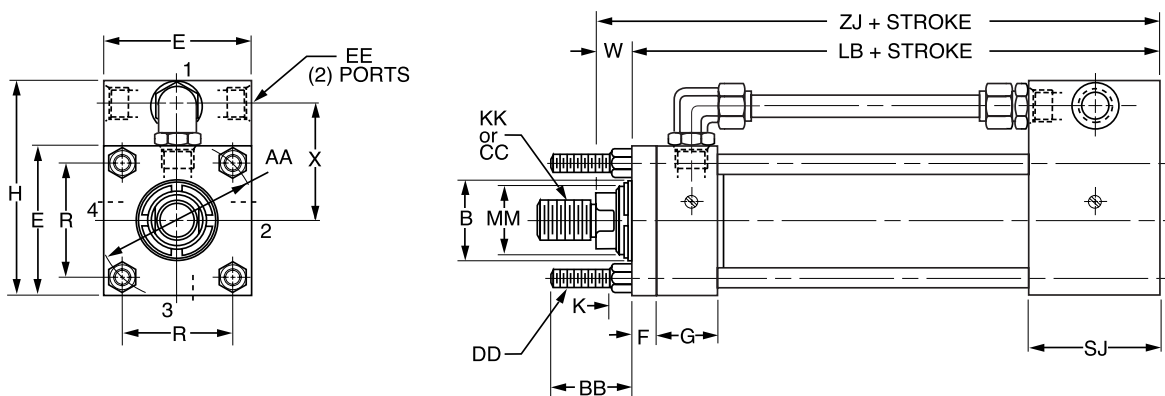
Integral Mount
No Mount
Tie Rods Extended Head End
2" – 5" Bore

Series 2HX
Electrohydraulic Actuators

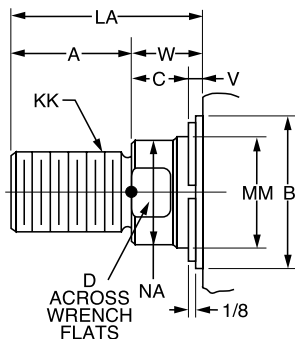
No Mount
Style T — All Feedback Types



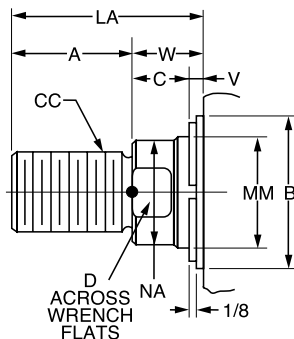
Tie Rods Extended Head End
Style TB — All Feedback Types



Rod End Dimensions — See Table 2
Thread Style 4
(NFPA Style SM)



Thread Style 8
(NFPA Style IM)



“Special” Thread
Style 3
Special thread, extension, rod eye, blank, etc., are also available.
To order, specify “Style 3” and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

Integral Manifold
No Mount
Tie Rods Extended Head End
2" – 5" Bore

Table 1 — Envelope and Mounting Dimensions

Bore	AA	BB	DD	E	SAE EE		F	G	H		K	R	X		LB Add Stroke		SJ	
					*	**			*	**			*	**	*	**	*	**
2	2.90	1 ¹³ / ₁₆	1/2-20	3	10	NA	5/8	1 ³ / ₄	4 ⁷ / ₈	NA	7 ¹ / ₁₆	2.05	1 ⁷ / ₈	NA	6 ⁵ / ₈	NA	2 ⁷ / ₈	NA
2 ¹ / ₂	3.60	1 ¹³ / ₁₆	1/2-20	3 ¹ / ₂	10	12	5/8	1 ³ / ₄	5 ³ / ₈	5 ⁵ / ₈	7 ¹ / ₁₆	2.55	2 ¹ / ₄	3.04	6 ³ / ₄	8 ¹ / ₄	2 ⁷ / ₈	4 ³ / ₈
3 ¹ / ₄	4.60	2 ⁵ / ₁₆	5/8-18	4 ¹ / ₂	12	12	3/4	2	6 ⁵ / ₈	6 ⁵ / ₈	9 ¹ / ₁₆	3.25	2 ³ / ₄	3.54	7 ³ / ₈	8 ⁷ / ₈	2 ⁷ / ₈	4 ³ / ₈
4	5.40	2 ⁵ / ₁₆	5/8-18	5	12	12	7/8	2	7 ¹ / ₈	7 ¹ / ₈	9 ¹ / ₁₆	3.82	3 ¹ / ₈	3.125	9 ¹ / ₄	9 ¹ / ₄	4 ³ / ₈	4 ³ / ₈
5	7.00	3 ³ / ₁₆	7/8-14	6 ¹ / ₂	12	12	7/8	2	8 ⁵ / ₈	8 ⁵ / ₈	1 ³ / ₁₆	4.95	3 ⁵ / ₈	3.625	9 ³ / ₄	9 ³ / ₄	4 ³ / ₈	4 ³ / ₈

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

**For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H. Velocity of LRT actuators must not exceed 30 ips.

Table 2 — Rod End and Envelope Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		A	+0.000 -0.002 B	C	D	LA	NA	V	W	ZJ Add Stroke	
			CC	KK									*	**
2	2	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	5/8	1 ¹ / ₈	2 ⁵ / ₈	1 ⁵ / ₁₆	3/8	1	7 ⁵ / ₈	9 ¹ / ₈
2 ¹ / ₂	2	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	3/4	1 ¹ / ₂	3 ¹ / ₄	1 ¹¹ / ₁₆	1/2	1 ¹ / ₄	8	9 ¹ / ₂
	3	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	5/8	1 ¹ / ₈	2 ⁵ / ₈	1 ⁵ / ₁₆	3/8	1	7 ³ / ₄	9 ¹ / ₄
3 ¹ / ₄	1	1 ³ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1.999	5/8	1 ¹ / ₈	2 ¹ / ₂	1 ⁵ / ₁₆	1/4	7/8	8 ¹ / ₄	9 ³ / ₄
	2	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7/8	1 ¹¹ / ₁₆	3 ¹ / ₂	1 ¹⁵ / ₁₆	3/8	1 ¹ / ₄	8 ⁵ / ₈	10 ¹ / ₈
	3	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	3/4	1 ¹ / ₂	3 ¹ / ₈	1 ¹¹ / ₁₆	3/8	1 ¹ / ₈	8 ¹ / ₂	10
4	1	1 ³ / ₄	1 ¹ / ₂ -12	1 ¹ / ₄ -12	2	2.374	3/4	1 ¹ / ₂	3	1 ¹¹ / ₁₆	1/4	1	10 ¹ / ₄	10 ¹ / ₄
	2	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ³ / ₈	2 ³ / ₈	3/8	1 ³ / ₈	10 ⁵ / ₈	10 ⁵ / ₈
	3	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7/8	1 ¹¹ / ₁₆	3 ³ / ₈	1 ¹⁵ / ₁₆	1/4	1 ¹ / ₈	10 ³ / ₈	10 ³ / ₈
5	1	2	1 ³ / ₄ -12	1 ¹ / ₂ -12	2 ¹ / ₄	2.624	7/8	1 ¹¹ / ₁₆	3 ³ / ₈	1 ¹⁵ / ₁₆	1/4	1 ¹ / ₈	9 ⁷ / ₈	10 ⁷ / ₈
	2	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	3 ¹ / ₂	4.249	1	3	4 ⁷ / ₈	3 ³ / ₈	3/8	1 ³ / ₈	11 ¹ / ₈	11 ¹ / ₈
	3	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	3	3.124	1	2 ¹ / ₁₆	4 ³ / ₈	2 ³ / ₈	3/8	1 ³ / ₈	11 ¹ / ₈	11 ¹ / ₈
	4	3	2 ³ / ₄ -12	2 ¹ / ₄ -12	3 ¹ / ₂	3.749	1	2 ⁵ / ₈	4 ⁷ / ₈	2 ⁷ / ₈	3/8	1 ³ / ₈	11 ¹ / ₈	11 ¹ / ₈

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

**For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H.

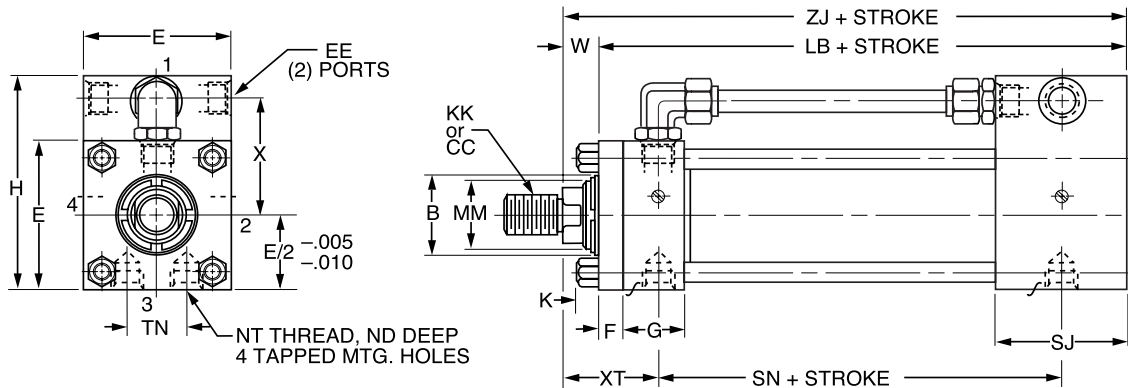
For Cylinder Division Plant Locations – See Page II.

Integral Manifold
Side Tapped
Side Lugs
2" – 5" Bore

Series 2HX Electrohydraulic Actuators

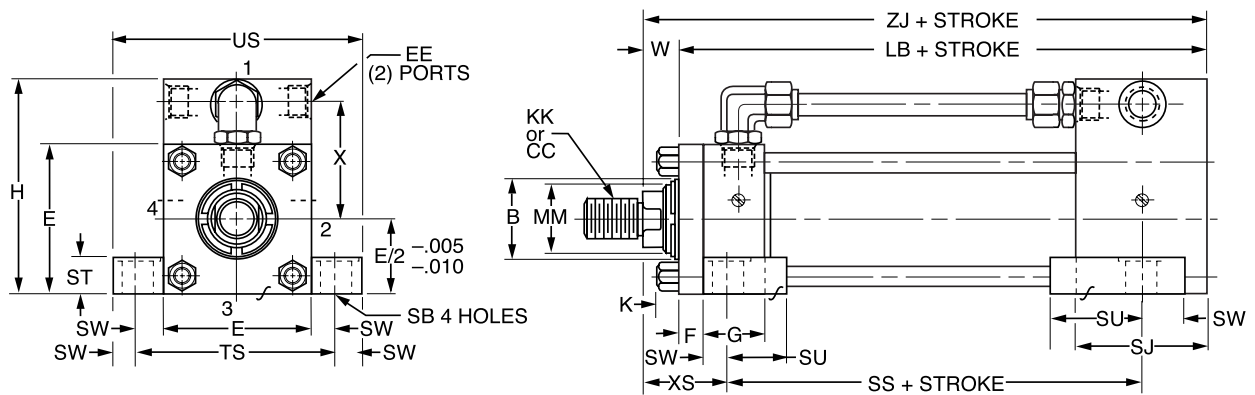
Side Tapped

Style F — All Feedback Types



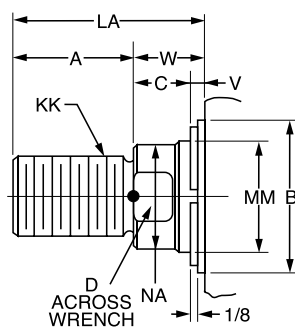
Side Lugs

Style C — All Feedback Types

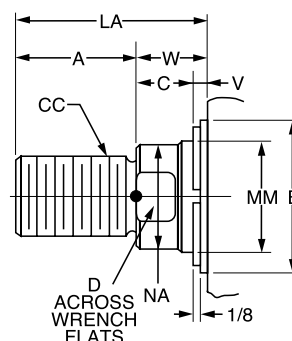


Rod End Dimensions — See Table 2

Thread Style 4
(NFPA Style SM)



Thread Style 8
(NFPA Style IM)



"Special" Thread Style 3

Special thread, extension, rod eye, blank, etc., are also available.

To order, specify "Style 3" and give desired dimensions for CC or KK, A and LA. If otherwise special, furnish dimensioned sketch.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

Integral Manifold
Side Tapped
Side Lugs
2" – 5" Bore

Table 1 — Envelope and Mounting Dimensions

Bore	E	SAE EE		F	G	H		J	K	X		NT	SB†	ST	SU	SW	TN	TS	US	LB Add Stroke		SJ		Add Stroke	
		*	**			*	**			*	**									*	**	*	**	SS	SN
2	3	10	NA	5/8	13/4	47/8	NA	1 1/2	7/16	17/8	NA	1 1/2-13	9/16	3/4	1 1/4	1/2	15/16	4	5	65/8	NA	27/8	NA	35/8	27/8
2 1/2	3 1/2	10	12	5/8	13/4	53/8	55/8	1 1/2	7/16	2 1/4	3.04	5/8-11	13/16	1	1 9/16	11/16	15/16	47/8	6 1/4	63/4	8 1/4	27/8	43/8	33/8	3
3 1/4	4 1/2	12	12	3/4	2	65/8	65/8	1 1/2	9/16	2 3/4	3.54	3/4-10	13/16	1	1 9/16	11/16	1 1/2	57/8	7 1/4	73/8	87/8	27/8	43/8	41/8	3 1/2
4	5	12	12	7/8	2	7 1/8	7 1/8	1 3/4	9/16	3 1/8	3.125	1-8	1 1/16	1 1/4	2	7/8	2 1/16	63/4	8 1/2	9 1/4	9 1/4	43/8	43/8	4	3 3/4
5	6 1/2	12	12	7/8	2	85/8	85/8	1 3/4	13/16	35/8	3.625	1-8	1 1/16	1 1/4	2	7/8	2 15/16	8 1/4	10	93/4	93/4	43/8	43/8	4 1/2	4 1/4

*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

**For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H. Velocity of LRT actuators must not exceed 30 ips.

† Upper surface spot faced for socket head screws.

Table 2 — Rod End and Envelope Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		A	+0.000 -0.002 B	C	D	LA	NA	V	W	ND	XS	XT	ZJ Add Stroke	
			Style 8 CC	Style 4 & 9 KK												*	**
2	2	13/8	1 1/4-12	1-14	15/8	1.999	5/8	1 1/8	25/8	15/16	3/8	1	7/16	2 1/8	25/8	75/8	9 1/8
2 1/2	2	13/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	1/2	29/16	27/8	8	9 1/2
	3	13/8	1 1/4-12	1-14	15/8	1.999	5/8	1 1/8	25/8	15/16	3/8	1	1/2	25/16	25/8	73/4	9 1/4
3 1/4	1	13/8	1 1/4-12	1-14	15/8	1.999	5/8	1 1/8	2 1/2	15/16	1/4	7/8	11/16	25/16	23/4	8 1/4	9 3/4
	2	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	3 1/2	1 15/16	3/8	1 1/4	11/16	2 11/16	3 1/8	85/8	10 1/8
	3	13/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/8	1 11/16	3/8	1 1/8	11/16	29/16	3	8 1/2	10
4	1	13/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3	1 11/16	1/4	1	11/16	23/4	3	10 1/4	10 1/4
	2	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	43/8	2 3/8	3/8	13/8	11/16	3 1/8	33/8	10 5/8	10 5/8
	3	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	33/8	1 15/16	1/4	1 1/8	11/16	27/8	3 1/8	10 3/8	10 3/8
5	1	2	1 3/4-12	1 1/2-12	2 1/4	2.624	7/8	1 11/16	33/8	1 15/16	1/4	1 1/8	1	27/8	3 1/8	97/8	107/8
	2	3 1/2	3 1/4-12	2 1/2-12	3 1/2	4.249	1	3	47/8	3 3/8	3/8	13/8	1	3 1/8	33/8	11 1/8	11 1/8
	3	2 1/2	2 1/4-12	1 7/8-12	3	3.124	1	2 1/16	43/8	2 3/8	3/8	13/8	1	3 1/8	33/8	11 1/8	11 1/8
	4	3	2 3/4-12	2 1/4-12	3 1/2	3.749	1	25/8	47/8	27/8	3/8	13/8	1	3 1/8	33/8	11 1/8	11 1/8

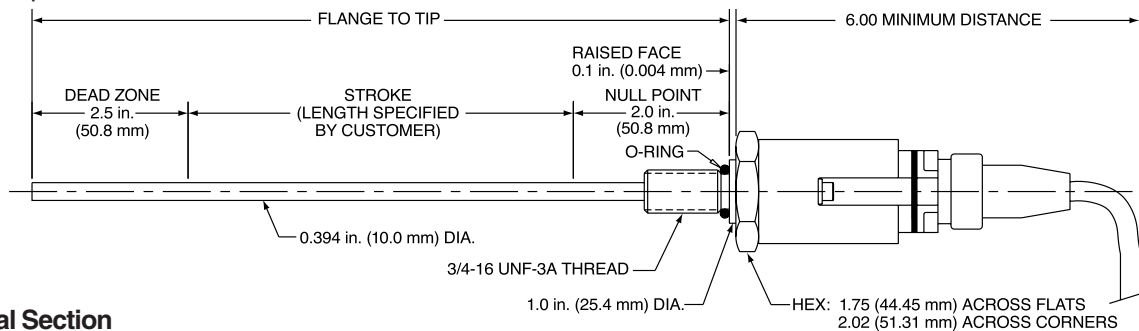
*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.

**For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H.

For Cylinder Division Plant Locations – See Page II.

Transducer

LDT Technical Specifications



LDT Technical Section

The 2HX-LDT Actuator is the most versatile actuator that we offer. Utilizing the Temposonics LH™ feedback device, there are three distinct outputs available to suit most applications. Velocity is limited primarily by the limits of mechanical components outside of the actuator, although position update

time can affect the system ramp-down. The 2HX-LDT Actuator is the industry favorite in tough, rugged machinery applications. A key advantage is the absolute position output which is not lost if there is a power failure.

Magnetostriction

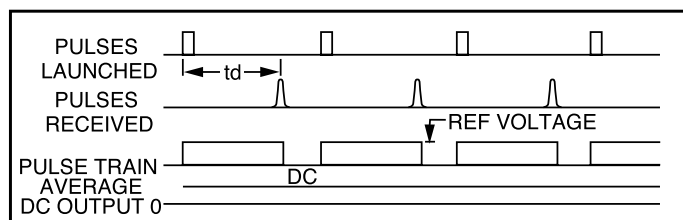
In a LDT position sensor, a pulse is induced in a specially-designed magnetostrictive waveguide by the momentary interaction of two magnetic fields. One field comes from a movable magnet which passes along the outside of the sensor tube, the other field comes from a current pulse or interrogation pulse launched along the waveguide. The interaction between the two magnetic fields produces a strain pulse, which travels at sonic speed along the waveguide until the pulse is detected at the head of the sensor. The position of the magnet is determined with high precision by measuring the elapsed time between the launching of the electronic interrogation pulse and the arrival of the strain pulse. As a result, accurate non-contact position sensing is achieved with absolutely no wear to the sensing components.

An average of 200 ultrasonic strain pulses are launched for every reading. With so many readings taken for each position, vibration and shock have negligible effect on the readings. The transducer assembly is shielded to eliminate interference caused by electromagnetic fields in the radio frequency range. In addition, static magnetic fields of several hundred gauss must get as close as $\frac{3}{16}$ " from the protective tube before any interference in transducer operation occurs.

Features

- High immunity to shock and vibration
- Replaceable sensing element
- Single voltage input +13 to 26.4Vdc
- 3000 psi operating pressure
- Multiple outputs from on-board electronics
- Easy installation and maintenance
- Standard strokes up to 100" (analog), 120" (digital)
- Includes 5' extension cable with RB connector standard

If cylinder includes false stage enclosure, LDT will be supplied with RO Integral Pigtail Cable (5' length). Refer to pages 194 and 195 for "LJ" and "E" dimensions.



Feedback Accuracy

The accuracy of a given feedback device is a composite of a number of factors, the most important of which are:

Resolution – The smallest movement of the device that will produce a measurable output.

Non-Linearity – The deviation of the signal from a straight line output.

Repeatability – The maximum deviation of output signal for repeated positioning to a fixed point.

Hysteresis – The deviation of the signal when approaching a fixed point from opposite directions.

Temperature Coefficient – The shift in output due to temperature change. This is a combination of the effect of temperature on the cylinder, the transducer and the electronics.

These factors which are normally additive refer to the feedback device itself. The performance achieved by a given system depends on the various factors such as system stiffness, valve performance, friction, temperature variation, and backlash in mechanical linkages to the cylinder.

In the case of front flange mounted cylinders, the stretch of the cylinder due to hydraulic pressure changes may affect position repeatability and system performance.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

LDT Specifications Output Options Analog Output Module

Standard Specifications

Parameter	Specification
Resolution:	<i>Analog:</i> Infinite <i>Digital:</i> $1 \div [\text{gradient} \times \text{crystal freq. (MHz)} \times \text{circulation}]$
Non-Linearity:	$\pm 0.02\%$ or $\pm 0.05 \text{ mm}$ ($\pm 0.002 \text{ in.}$), whichever is greater 0.002 in. is the minimum absolute linearity and varies with sensor model
Repeatability:	Equal to resolution
Hysteresis:	$< 0.02 \text{ mm}$ (0.0008 in.)
Outputs:	<i>Analog:</i> Voltage or Current <i>Digital:</i> Start/Stop or PWM
Measuring Range:	<i>Analog:</i> 25 to 2540 mm (1 to 100 in.) <i>Digital:</i> 25 to 7600 mm (1 to 300 in.)
Operating Voltage:	+13.5 to 26.4 Vdc ($\pm 0\%$): Strokes $\leq 1525 \text{ mm}$ (60 in.) +24 Vdc ($\pm 10\%$): Strokes $> 1525 \text{ mm}$ (60 in.)
Power Consumption:	100 mA
Operating Temperature:	<i>Head Electronics:</i> -40 to 85°C (-40 to 185°F) <i>Sensing Element:</i> -40 to 105°C (-40 to 221°F)

EMC Test*:	DIN EN 50081-1 (Emissions); DIN EN 50082-2 (Immunity)
Shock Rating:	100 g (single hit)/IEC standard 68-2-27 (survivability)
Vibration Rating:	5 g/10-150 Hz/IEC standard 68-2-6
Adjustability: (for active sensors only)	Field adjustable zero and span to 5% of active stroke
Update Time:	<i>Analog:</i> $\leq 1 \text{ ms}$ <i>Digital:</i> Minimum = [Stroke (specified in inches) + 3] $\times 9.1 \mu\text{s}$
Operating Pressure:	5000 psi static; 10,000 psi spike
Housing Style/ Enclosure:	Aluminum die-cast head, IP 67 stainless steel rod & flange (LH flange: M18 x 1.5 or 3/4-16 UNF-3A)

*EMC test specification does not include sensors with the RB connection style.

The above specifications for analog sensors are assuming that output ripple is averaged by the measuring device as with any typical analog device. Specifications are subject to change without notice. Consult the factory for specifications critical to your needs.

Note: LDT comes standard with an RB style connector and 5' extension cable. If cylinder includes style A protective enclosure, LDT will be supplied with RO Integral Pigtail Cable (5' length).

Note: Velocity output or velocity and position output requires use of an AOM.

LDT Output Options

The LDT utilizes on-board electronics contained in the sensor head to generate several absolute output options. The required output must be specified at the time of order. In applications where it is desirable to locate the output electronics in a remote location, or where the sensor head is not accessible, an optional Analog Output Module (AOM) is available. The standard outputs for each option are listed below.

Standard LDT Outputs

- Analog Position (absolute)
0 to +10V DC or +10 to 0V DC
4 to 20mA or 20 to 4mA (grounded)
0 to 20mA or 20 to 0mA (grounded)

- Digital Position (absolute)
Differential Start/Stop
PWM Pulse Duration
- Neuter (For use with AOM)
Single Pulse Square Wave

Note: Velocity output or velocity and position output requires use of an AOM.

Analog Output Module: AOM Option

The Analog Output Module provides an absolute analog displacement or optional velocity output signal. It contains the electronics to send the interrogation pulse to the LDT and receive the return pulse from the LDT. The AOM is mounted separately from the LDT and comes standard with strain relief connectors. Optional MS connectors are available.

Note: An LDT with Neuter output is required for use with an AOM. AOM is recommended to allow adjustment for cap mounting styles B, BB and SB.

Optional metal MS connectors are only available for connection to the AOM. The connection at the probe requires an MS-style connector. For applications requiring true MS connectors at the probe, consult factory.

AOM Output Specifications

Displacement Outputs:

Voltage

- 0 to 10V DC — forward and reverse acting (forward standard)
- 0 to -10V DC — forward and reverse acting
- 10 to +10V DC — forward and reverse acting
- 0 to +5V DC — forward and reverse acting
- 5 to +5V DC — forward and reverse acting

Current

- 4 to 20 mA grounded (forward and reverse)
- 4 to 20 mA ungrounded (forward and reverse)

Velocity Outputs:

- # inches/second = $\pm 10\text{V DC}$
(1 to 400 in/sec)

Power Supply:

- +24V DC standard
- $\pm 15\text{V DC}$ optional

For Cylinder Division Plant Locations – See Page II.

LDT Connector Options

The LDT is available with three standard Connector Options as shown below. The style RB connector with a 5' extension cable is standard except for BB and SB mounting styles. RO

style connector is standard for BB and SB mounting styles with a false stage enclosure. Please specify the connector option at the time of order.

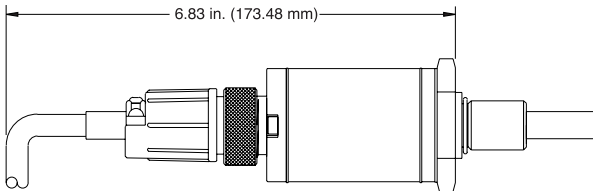
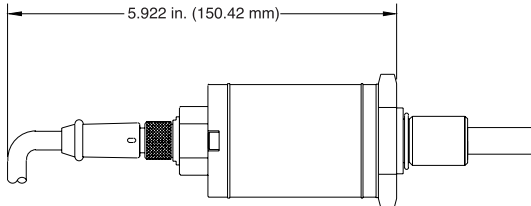
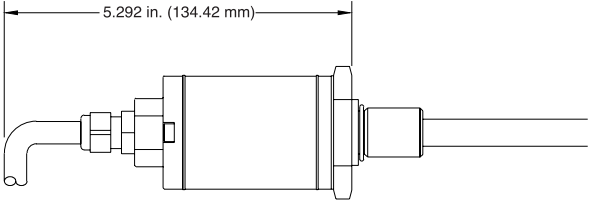
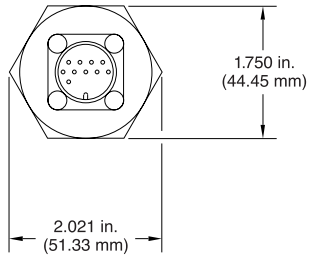
Style RB — Connector with Cable 	Style RG — Connector with Cable 
Style RO — Integral Pigtail Cable 	Hex Dimensions  TOP VIEW

Table A — LDT Wiring with RB* Style Connector and Cable

For Temposonics LH™		Pulse-Duration Output (External Interrogation)	Pulse-Duration Output (Internal Interrogation)	Start/Stop Output	Neuter Output	Analog Output (Voltage or Current)	
Pin No.	Wire Color Solid Leads (Note 2)	Function	Function	Function	Function	Function	Function
1	White	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground
2	Brown	Frame Ground	Frame Ground	Frame Ground	Frame Ground	Frame Ground	Frame Ground
3	Gray	(-) Gate	(-) Gate	(-) Gate	—	0 - 10 Vdc Return	Current Return
4	Pink	(+) Gate	(+) Gate	(+) Gate	—	0 to 10 Vdc	4 to 20 mA or 0 to 20 mA or 20 to 4mA or 20 to 0 mA (See Figure A-1)
5	Red	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc
6	Blue	—	—	—	—	—	—
7	Black	—	—	—	Signal Return	10 to 0 Vdc	—
8	Violet	—	—	—	Signal Output	10 - 0 Vdc Return	—
9	Yellow	(+) Interrogation (Note 4)	—	(+) Interrogation	(+) Interrogation (Note 3)	—	—
10	Green	(-) Interrogation (Note 4)	—	(-) Interrogation	(+) Interrogation (Note 3)	—	—

Notes for Table A:

- Interrogation pulse: 1 to 4 microseconds maximum pulse duration.
- WARNING:** For single-ended interrogation, the unused interrogation lead must be connected to DC ground.
- When using a Temposonics LH™ position sensor with a pulse-width-modulated output (w/external interrogation) or Start/Stop output, it is recommended that both the positive and negative interrogations leads are connected to a differentiated driving source to produce a differential interrogation signal.

4. **Important:** Frame ground should always be connected. When using MT, M, FT or F extension cables frame ground is the BROWN wire.

* RB style connectors are supplied as standard on all LDT's unless specified otherwise.

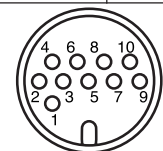


Figure A-1 — LDT Pin Diagram

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

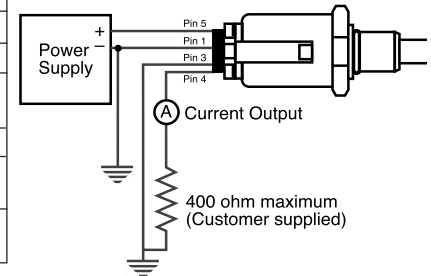
LDT Specifications Wiring Information Digital Output Signal

Table B: LDT Wiring with Integral Pigtail Cable*

	Pulse-Duration Output (External Interrogation)	Pulse-Duration Output (Internal Interrogation)	Start/Stop Output	Neuter Output	Analog Output (Voltage or Current)	
Integral Cable Color Code	Function	Function	Function	Function	Function (Voltage)	Function (Current)
White	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground
Drain Wire	Frame Ground	Frame Ground	Frame Ground	Frame Ground	Frame Ground	Frame Ground
Gray	(-) Gate	(-) Gate	(-) Gate	Signal Return	0 - 10 Vdc Return	4 to 20 mA Out
Pink	(+) Gate	(+) Gate	(+) Gate	Signal Output	0 to 10 Vdc	Return (See Figure B-1)
Red	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc	+13.5 to 26.4 Vdc
Yellow	(+) Interrogation (Note 3)	—	(+) Interrogation (Note 3)	(+) Interrogation (Note 2)	10 to 0 Vdc	
Green	(-) Interrogation (Note 3)	—	(-) Interrogation (Note 3)	(-) Interrogation (Note 2)	10 - 0 Vdc Return	

Notes for Table A:

1. Interrogation pulse: 1 to 4 microseconds maximum pulse duration.
2. **Warning:** For single-ended interrogation, the unused interrogation lead must be connected to DC ground.
3. When replacing a Temposonics II™ position sensor with a pulse-duration output (with external interrogation) or a Start/Stop output, it is recommended that both the positive and negative interrogation leads are connected to a differentiated driving source to produce a differential interrogation signal.
4. **Important:** Frame ground should always be connected.



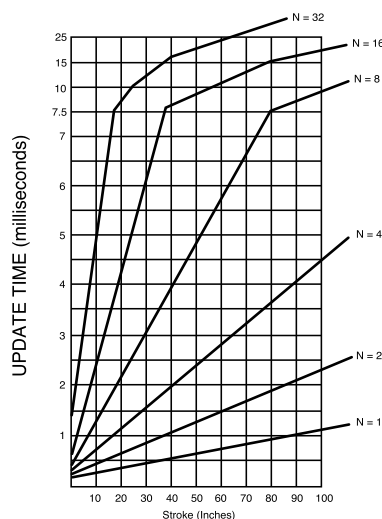
**Figure B-1 —
LDT with Current Output**

Note: Style RO Integral Pigtail Cables are supplied as standard on LDTs used with styles A and F protective enclosures.

Digital Output Signal (PWM)

The Digital Output Electronics mounted in the head of the LDT provides the interrogation pulse to the probe. The pulse is reflected to the Digital Output Electronics by the magnet which strokes along the length of the transducer.

Figure 1. Update time (ms) = [(4.5 + stroke) inches x 0.01086 ms] x N



The LDT with PWM Digital Output provides a 5 Vdc TTL compatible pulse with modulated square wave signal which can be transmitted to a digital counter card, Parker PMC Motion Controller, or various other customer supplied devices. The amount of time, in milliseconds, that the output is “Hi,” or near 5 volts, is directly proportional to the position of the cylinder piston. This time can also be called the “width” of the square wave in milliseconds. Besides being proportional to the position of the cylinder piston, this width can be controlled by varying the signal sampling rate (called “recirculations”). The advantage of increasing the recirculations is in improved resolution. The sacrifice is in update time and maximum stroke length. Figure 1 shows the relationship of recirculations, minimum update time, and stroke length. Figure 2 shows the relationship of recirculations, resolution, and stroke.

We recommend the TTL interface for most LDT applications requiring digital feedback; many electronic controllers are equipped to utilize this output. BCD and natural binary outputs are available — consult factory.

**Figure 2 —
Recirculations, Resolutions and Stroke Length**

Term Base = 28 Megahertz Clock					
Recirculations	1	2	4	8	15
Resolution (inches/pulse)	0.004	0.002	0.001	0.0005	0.00035
Maximum stroke (inches)	258	127	61	28	12

For Cylinder Division Plant Locations – See Page II.

Parker Series 2HX with LDT and Analog Output Module (AOM)

Wiring Connections and Analog Output Module Dimensions

An electrical Noise Filter and Low Ripple Output Filter are standard.

Analog Output Module

Shown with strain relief cable connectors.

Refer to Installation Bulletin 1170-TSD-2 for more detailed wiring information.

Terminal Block Connections

Terminal Block 1 — Output Signal Connections

- TB1-A Displacement Output (+)
- TB1-B Displacement Output (-)
- TB1-C Velocity (+) (Optional)
- TB1-D Velocity (-) (Optional)
- TB1-E Reserved for Options
- TB1-F Reserved for Options
- TB1-G Reserved for Options

Note: For the optional pin assignments refer to the label inside the module.

Terminal Block 2 — Transducer Connections (LDT with Neuter Output)

Terminal	Pre-1995 Cable Colors	1995 Cable Colors	Function
TB2-B	White/Blue Stripe Blue/White Stripe White/Brown Stripe Gray/White Stripe	White Brown Black Green	DC Ground Frame Return DC Ground
TB2-C	Brown/White Stripe	Violet	Return Pulse Output
TB2-E	White/Gray Stripe	Yellow	Interrogation Pulse
TB2-F	White/Green Stripe	Red	VCC (12 Vdc)

Note: Cable must be grounded at or near AOM.

Note: The Transducer is supplied with a pre-wired cable.

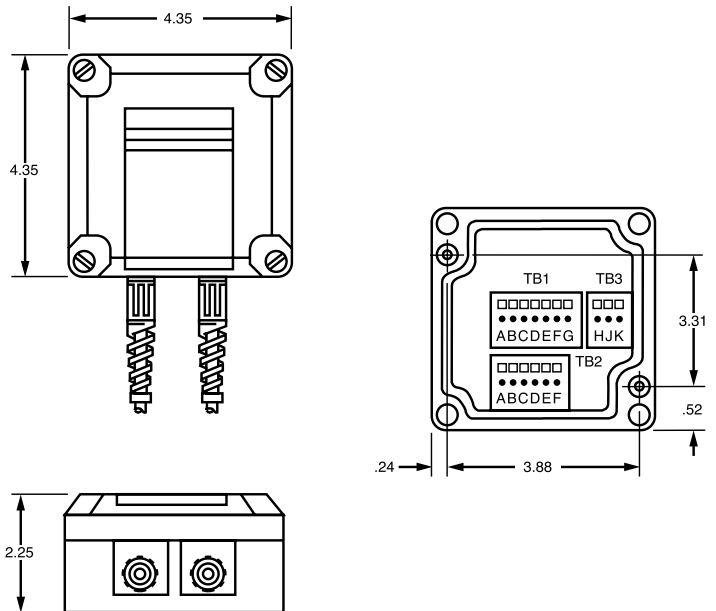
Terminal Block 3 — Power Supply Connections

- TB3-H +15 Vdc
- TB3-J -15 Vdc
- TB3-K DC Common

Mounting

- (2) Socket Hex Cap Screws
- #10-32 UNF-2A Thread

Max. distance from transducer - 250 ft.

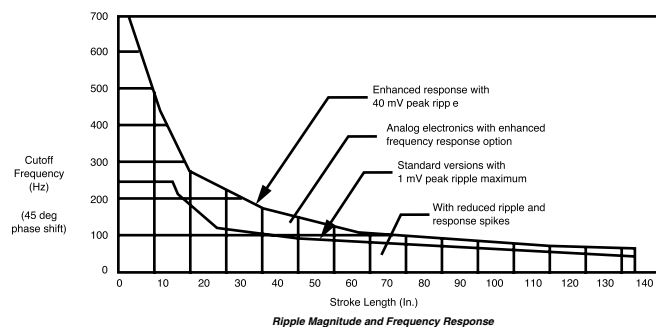


Note: AOMs require the use of an LDT with Neuter Output.

Frequency Response

Analog Systems

The analog output module produces a DC output signal with an AC ripple component. The graph shown illustrates the following relationship between frequency response and AC ripple.



It shows that the AC ripple fundamental frequency is related to stroke length. For shorter strokes, this frequency is usually beyond the response capability of the analog control loop. Notice that the ripple frequency equals the frequency of the interrogation pulse.

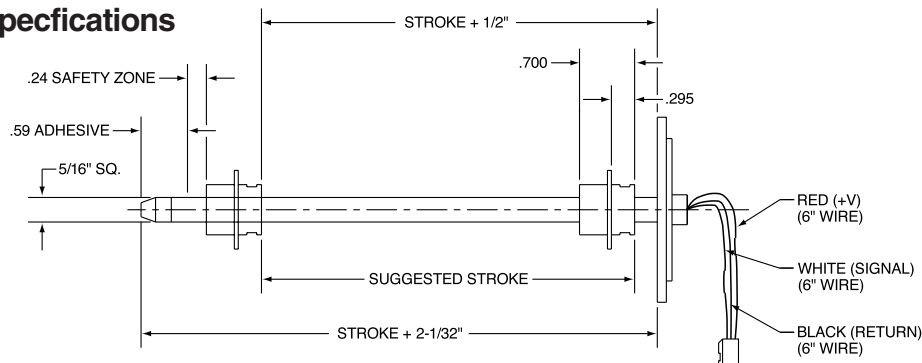
It shows how the magnitude of the ripple is related to frequency response. You can enhance response by allowing the ripple to increase. Alternatively, you can use a low level of ripple, with reduced response, for applications where response is less critical, such as required for A/D converters with high resolution. Unless specified, the response will be on the 1 mV curve.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

LRT Specifications Technical Information

Transducer LRT Technical Specifications

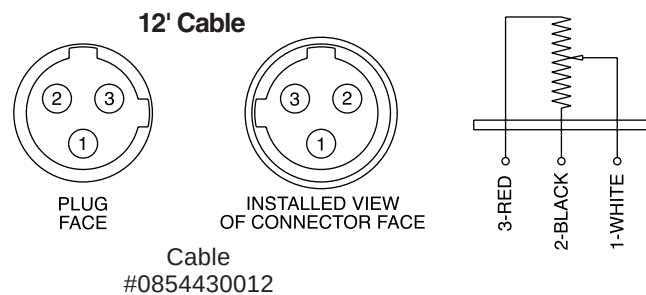


Standard Features

- Available in strokes to 120".
- Unique, easy to apply cylinder position sensing system.
- Infinite resolution, high linearity and repeatability.
- Innovative, resistive element is made of conductive plastic.
- 3 pin Brad Harrison electrical connector available at any cap position not occupied by a port or mount.

How It Works

The Parker LRT is a uniquely designed position sensor that uses a resistive element and wiper assembly to provide an analog output signal of a cylinder's position. The LRT is a dual element type linear potentiometer with two independent elements mounted on either side of an anodized aluminum extrusion. The LRT operates as a voltage divider. This is done by shorting through the extrusion with the wiper assembly. The position of the wiper changes the resistive load proportional to its position along the cylinder stroke. The LRT is energized by applying a voltage across the unit, typically 10 VDC. As the resistive load changes with the cylinder stroke, the output voltage changes proportionally. The output voltage at the end point of the cylinder stroke is dictated by the input voltage applied across the device. The probe is mounted into the cylinder cap and inserted into the gun drilled piston rod. The compactness of the design only adds to the envelope dimensions of cylinders with 1-3/4" rods and smaller. Envelope dimensions of cylinders with larger rods and integral cap style cylinders are unaffected.



Standard Specifications

Non-Linearity: Less than 0.1% of full scale up to 48" stroke. Less than 1.0% of full scale over 48" stroke.

Repeatability: .001 inch

Input Voltage: Nominal 5-50 Vdc

Operating Temperature Range: -40°F to +160°F*

Cylinder Stroke Length: Up to 120"

Electrical Connector: Brad Harrison 3-pin micro connector interface at position #4 standard.

Total Resistance: 800 per inch of stroke ($\pm 20\%$) + end resistance.

End Resistance: 800

Maximum Velocity: 30 inches per second

Life Expectancy: Greater than 50×10^6 cycles (Based on 1" stroke @ 10 ips)

Fluid Medium: Petroleum based hydraulic fluids. May not be used with water based or high water content fluids.

End Voltage Loss: (V source) $\times$ (400/stroke $\times$ 800)

Power Dissipation: supply voltage squared, divided by the total resistance.

The LRT requires a high impedance interface greater than 100K ohms. A maximum of 1 microamp should be required from the LRT.

The accuracy of a given feedback device is a composite of the following factors:

Temperature Coefficient: The shift in output due to temperature change. This is a combination of the effect of temperature on the cylinder, the transducer and the electronics.

These factors which are normally additive refer to the feedback device itself. The performance achieved by a given system depends on the various factors such as system stiffness, valve performance, friction, temperature variation, and backlash in mechanical linkages to the cylinder.

In the case of front flange mounted cylinders, the stretch of the cylinder due to hydraulic pressure changes may affect position repeatability and system performance.

*A high temperature option is offered to 300°F (consult factory).

Pin Chart

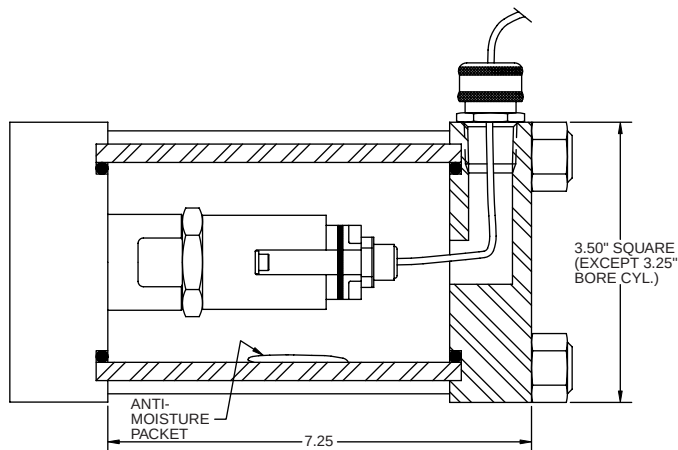
Pin Number	On Cable	On LRT	Function
1	Green	White (wiper)	Output
2	Red w/Blk	Black (resistor base)	V-
3	Red w/White	Red (resistor tip. power)	V+

For Cylinder Division Plant Locations – See Page II.

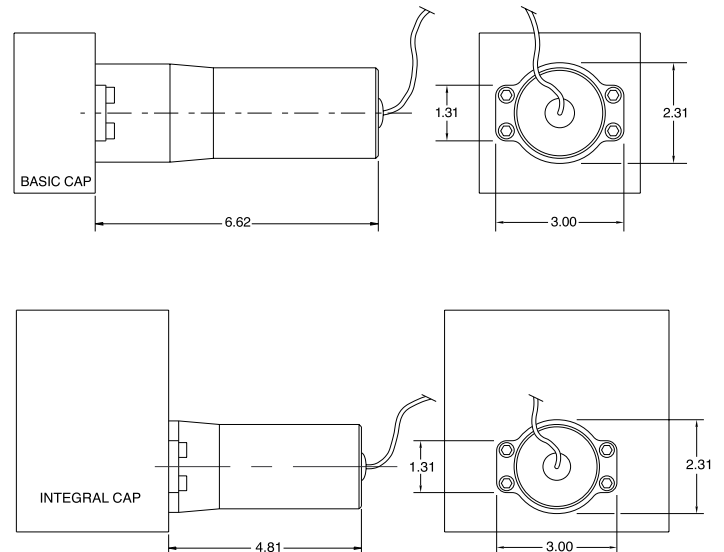
Protective Enclosures for Feedback Devices

Style A — For LDT and LRT, all bore sizes. Extra heavy-duty enclosure consisting of cylinder body tube and end cap. Consult factory for dimensions. Connector type must be specified.

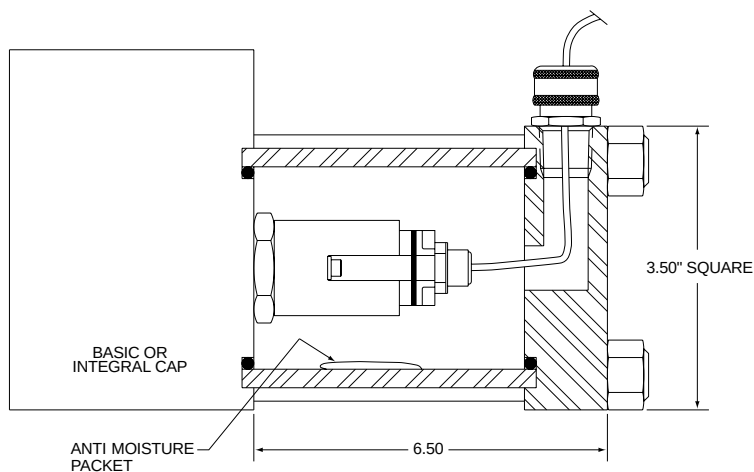
Note: Since this design uses common tie rods, the actuator must be disassembled to service or install feedback devices.



Style D — For LDT Basic and Integral Cap. Specify connector type (not available on 2" bore).



Style F — For LDT and LRT
For 4" bore and larger only.
Use Style A for 2½" and 3¼" bore.



Intrinsically Safe LDT

An intrinsically safe system is a system approved by Factory Mutual as intrinsically safe for use in Class I, Division I, Group A, B, C, or D hazardous locations. The system requires approved safety barriers and a 6 wire LDT. Consult factory for detailed information.

Explosion Proof LDT

Factory Mutual Approved

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

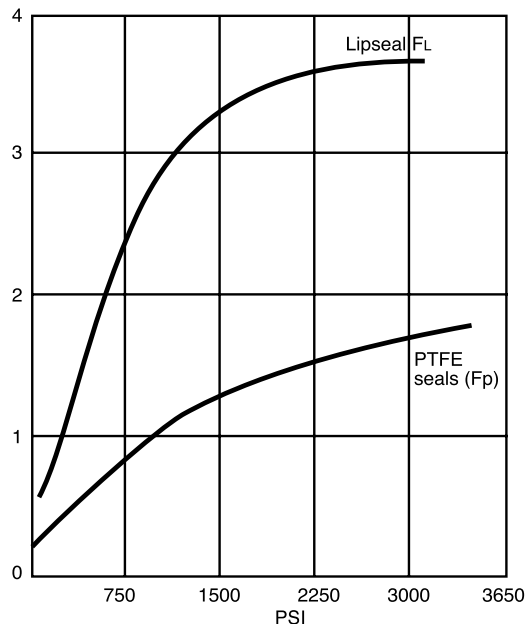
Technical Section General Data Low Friction Gland

Gland Drain

Available for high speed applications is a gland drain fitted with the low friction option to prevent pressure buildup between the seals, and must be piped back to tank independent of the return line. If an independent drain line is not possible, alternative designs can be supplied.

Seal Friction

Seal friction under a given set of working conditions is not easily calculated due the multiplicity of variables involved. The following graph is offered as a guide for use in performance calculations, but for critical applications measurements should be made under simulated or actual working conditions.



Calculation of Running Friction

The seal friction attributable to the cylinder is calculated as the sum of the friction due to the individual sealing elements = (wiper seal friction + rod seal friction + piston seal friction), using the following formulae:

Seal Option:

Lipseal Rod + Piston

Lipseal Rod w/ Low Friction Piston

Low Friction Rod + Piston

Where: d = rod dia. (in.)

F_L = friction factor for lipseals (F_L)

F_p = friction factor for PTFE (F_p)

Formula:

$12d + 12F_Ld + 24F_LD$

$12d + 12F_Ld + 12F_pD$

$12d + 30F_p d + 6F_p D$

D = bore dia. (in.)

Breakaway Friction

Breakaway friction may be calculated by applying the following correction factors:

Correction factors:

Lipseals:

$F_L \times 1.5$

Low Friction:

$F_p \times 1.0$

Sample Calculation

2HX cylinder with 3.25 dia. bore + 1.75 dia. piston rod with low friction seals at 1500 psi.

Running Friction Calculation

Friction (lbs. force) $\cong 12d + 30F_p d + 6F_p D$

Friction (lbs. force) $\cong 12 (1.75) + 30 (1.3 \times 1.75) + 6 (1.3 \times 3.25)$

Friction (lbs. force) $\cong 115$

Breakaway Friction Calculation

$F_p \times 1.0 \cong F_p$

Based on zero pressure:

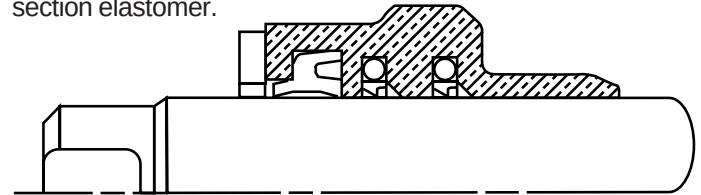
Friction (lbs. force) $\cong 12d + 30F_p d + 6F_p D$

Friction (lbs. force) $\cong 12 (1.75) + 30 (1.3 \times 1.75) + 6 (1.3 \times 3.25)$

Friction (lbs. force) $\cong 43$

Low Friction Gland

Below is a cross-sectional representation of a Parker Series 2HX low friction gland. The dual step seals are of a bronze-filled PTFE material. The expanders are a square cross section elastomer.



Operating Temperature Danger

The piston to piston-rod threaded connection is secured with an anaerobic adhesive which is temperature sensitive. Operation of the cylinder outside of the following guidelines can cause the piston rod to unthread itself from the piston. Cylinders ordered with standard seals are assembled with anaerobic adhesive with a maximum temperature rating of +165°F. Cylinders ordered with Fluorocarbon seals are assembled with an anaerobic adhesive with a maximum temperature rating of +250°F. When cylinders are intended for use above +250°F, a pinned piston to piston-rod connection must be specified. Consult factory for details.

Consult factory for the compatibility of Fluorocarbon with specific hydraulic fluids.

Fluid Compatibility

Parker Series 2HX actuators are equipped with seals and materials compatible with petroleum base hydraulic oils. For other fluids, consult factory.

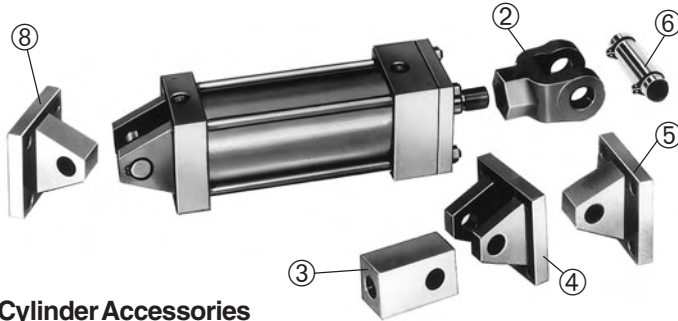
How to Order Low Friction Rod Gland

Place an "S" in the "special" position in the model number and specify "Low Friction Rod Gland."

For Cylinder Division Plant Locations – See Page II.

Cylinder Accessories

Series 2HX Electrohydraulic Actuators



Cylinder Accessories

Parker offers a complete range of cylinder accessories to assure you of greatest versatility in present or future cylinder applications.

Rod End Accessories

Accessories offered for the rod end of the cylinder include Rod Clevis, Eye Bracket, Knuckle, Clevis Bracket and Pivot Pin. To select the proper part number for any desired accessory, refer to Chart A below and look opposite the thread size of the rod end as indicated in the first column. The Pivot Pins, Eye Brackets and Clevis Brackets are listed opposite the thread size which their mating Knuckles or Clevises fit.

Chart A

Thread Size	Mating Parts			Mating Parts			Alignment Coupler
	Rod Clevis	Eye Bracket	Pin	Knuckle	Clevis Bracket	Pin	
5/16-24	51221	74077	—	74075	74076	74078	134757 0031
7/16-20	50940	69195	68368	69089	69205	68368	134757 0044
1/2-20	50941	69195	68368	69090	69205	68368	134757 0050
3/4-16	50942	69196	68369	69091	69206	68369	134757 0075
3/4-16	133284	69196	68369	69091	69206	68369	134757 0075
7/8-14	50943	*85361	68370	69092	69207	68370	134757 0088
1-14	50944	*85361	68370	69093	69207	68370	134757 0100
1-14	133285	*85361	68370	69093	69207	68370	134757 0100
1 1/4-12	50945	69198	68371	69094	69208	68371	134757 0125
1 1/4-12	133286	69198	68371	69094	69208	68371	134757 0125
1 1/2-12	50946	*85362	68372	69095	69209	68372	133739 0150
1 3/4-12	50947	*85363	68373	69096	69210	69215	133739 0175
1 7/8-12	50948	*85363	68373	69097	69210	69215	133739 0188
2 1/4-12	50949	*85364	68374	69098	69211	68374	Consult Factory
2 1/2-12	50950	*85365	68375	69099	69212	68375	
2 3/4-12	50951	*85365	68375	69100	69213	69216	
3 1/4-12	50952	73538	73545	73536	73542	73545	
3 1/2-12	50953	73539	73547	73437	73542	73545	
4-12	50954	73539	73547	73438	73543	82181	
4 1/2-12	—	—	—	73439	73544	73547	

*Cylinder accessory dimensions conform to NFPA recommended standard NFPA/T3.6.8 R1-1984, NFPA recommended standard fluid power systems — cylinder — dimensions for accessories for cataloged square head industrial types. Parker adopted this standard in April, 1985. Eye Brackets or Mounting Plates shipped before this date may have different dimensions and will not necessarily interchange with the NFPA standard. For dimensional information on older style Eye Brackets or Mounting Plates consult Drawing #144805 or previous issues of this catalog.

Accessory Load Capacity

The various accessories on this and the following page have been load rated for your convenience. The load capacity in lbs., shown on the opposite page is the recommended maximum load for that accessory based on a 4:1 design factor in tension. (Pivot pin is rated in shear.) Before specifying, compare the actual load or the tension (pull) force at maximum operating pressure of the cylinder with the load capacity of the accessory you plan to use. If load or pull force of cylinder exceeds load capacity of accessory, consult factory.

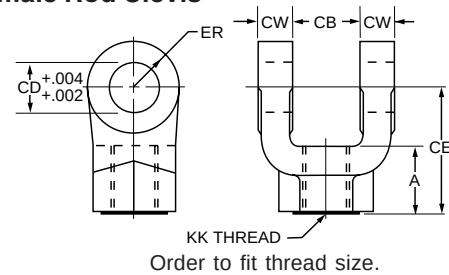
Mounting Plates

Mounting Plates for Style BB (clevis mounted) cylinders are offered. To select proper part number for your application, refer to Chart B to above right.

Chart B

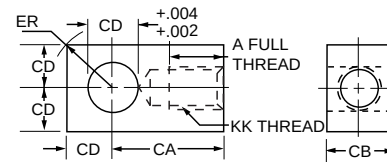
Mtg. Plate Part No.	Series 2HX Bore Size
69195	1 1/2"
69196	2", 2 1/2"
*85361	3 1/4"
69198	4"
*85362	5"
*85363	6"
*85364	7"
*85365	8"

② Female Rod Clevis



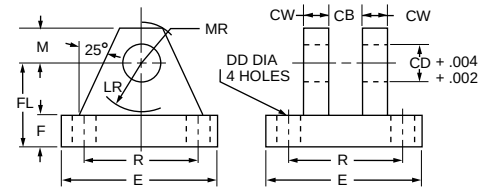
Order to fit thread size.

③ Knuckle (Female Rod Eye)



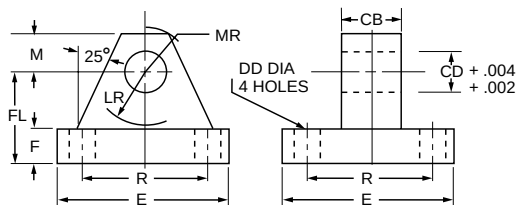
Order to fit thread size.

④ Clevis Bracket for Knuckle



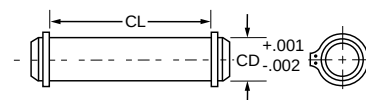
Order to fit Knuckle.

⑧ Mounting Plate or ⑤ Eye Bracket



1. When used to mate with the Rod Clevis, select from Chart A.
2. When used to mount the Style BB cylinders, select from the Mounting Plate Selection Table. See Chart B at lower left.

⑥ Pivot Pin



1. Pivot Pins are furnished with Clevis Mounted Cylinders as standard.
2. Pivot Pins are furnished with (2) Retainer Rings.
3. Pivot Pins must be ordered as separate item if to be used with Knuckles, Rod Clevises, or Clevis Brackets.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

Cylinder Accessories

	Female Rod Clevis Part Number																		
	51221†	50940	50941	50942	133284	50943	50944	133285	50945	133286	50946	50947	50948	50949	50950	50951	50952	50953	50954
A	13⁄16	3⁄4	3⁄4	1 1⁄8	1 1⁄8	1 5⁄8	1 5⁄8	1 5⁄8	1 7⁄8	2	2 1⁄4	3	3	3 1⁄2	3 1⁄2	3 1⁄2	3 1⁄2††	4††	4††
CB	1 1⁄32	3⁄4	3⁄4	1 1⁄4	1 1⁄4	1 1⁄2	1 1⁄2	1 1⁄2	2	2	2 1⁄2	2 1⁄2	2 1⁄2	3	3	3	4	4 1⁄2	4 1⁄2
CD	5⁄16	1⁄2	1⁄2	3⁄4	3⁄4	1	1	1	1 3⁄8	1 3⁄8	1 3⁄4	2	2	2 1⁄2	3	3	3 1⁄2	4	4
CE	2 1⁄4	1 1⁄2	1 1⁄2	2 1⁄8	2 3⁄8	2 15⁄16	2 15⁄16	3 1⁄8	3 3⁄4	4 1⁄8	4 1⁄2	5 1⁄2	5 1⁄2	6 1⁄2	6 3⁄4	6 3⁄4	7 3⁄4	8 13⁄16	8 13⁄16
CW	13⁄64	1⁄2	1⁄2	5⁄8	5⁄8	3⁄4	3⁄4	3⁄4	1	1	1 1⁄4	1 1⁄4	1 1⁄4	1 1⁄2	1 1⁄2	1 1⁄2	2	2 1⁄4	2 1⁄4
ER	19⁄64	1⁄2	1⁄2	3⁄4	3⁄4	1	1	1	1 3⁄8	1 3⁄8	1 3⁄4	2	2	2 1⁄2	2 3⁄4	2 3⁄4	3 1⁄2	4	4
KK	5⁄16-24	7⁄16-20	1⁄2-20	3⁄4-16	3⁄4-16	7⁄8-14	1-14	1-14	1 1⁄4-12	1 1⁄4-12	1 1⁄2-12	1 3⁄4-12	1 7⁄8-12	2 1⁄4-12	2 1⁄2-12	2 3⁄4-12	3 1⁄4-12	3 1⁄2-12	4-12
Load Capacity Lbs. ♂	2600	4250	4900	11200	11200	18800	19500	19500	33500	33500	45600	65600	65600	98200	98200	98200	156700	193200	221200

	Knuckle Part Number																
	74075	69089	69090	69091	69092	69093	69094	69095	69096	69097	69098	69099	69100	73536	73437	73438	73439
A	3/4	3/4	3/4	1 1/8	1 1/8	1 5/8	2	2 1/4	2 1/4	3	3 1/2	3 1/2	3 5/8	4 1/2	5	5 1/2	5 1/2
CA	1 1/2	1 1/2	1 1/2	2 1/16	2 3/8	2 13/16	3 7/16	4	4 3/8	5	5 13/16	6 1/8	6 1/2	7 5/8	7 5/8	9 1/8	9 1/8
CB	7/16	3/4	3/4	1 1/4	1 1/2	1 1/2	2	2 1/2	2 1/2	2 1/2	3	3	3 1/2	4	4	4 1/2	5
CD	7/16	1/2	1/2	3/4	1	1	1 3/8	1 3/4	2	2	2 1/2	3	3	3 1/2	3 1/2	4	4
ER	19/32	23/32	23/32	1 1/16	1 7/16	1 7/16	1 31/32	2 1/2	2 27/32	2 27/32	3 9/16	4 1/4	4 1/4	4 31/32	4 31/32	5 11/16	5 11/16
KK	5/16-24	7/16-20	1/2-20	3/4-16	7/8-14	1-14	1 1/4-12	1 1/2-12	1 3/4-12	1 7/8-12	2 1/4-12	2 1/2-12	2 3/4-12	3 1/4-12	3 1/2-12	4-12	4 1/2-12
Load Capacity Lbs. Ⓞ	3300	5000	5700	12100	13000	21700	33500	45000	53500	75000	98700	110000	123300	161300	217300	273800	308500

	Clevis Bracket for Knuckle Part Number												
	74076	69205	69206	69207	69208	69209	69210	69211	69212	69213	73542	73543	73544
CB	15/32	3/4	1 1/4	1 1/2	2	2 1/2	2 1/2	3	3	3 1/2	4	4 1/2	5
CD	7/16	1/2	3/4	1	1 3/8	1 3/4	2	2 1/2	3	3	3 1/2	4	4
CW	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2
DD	17/64	13/32	17/32	21/32	21/32	29/32	1 1/16	1 3/16	1 5/16	1 5/16	1 13/16	2 1/16	2 1/16
E	2 1/4	3 1/2	5	6 1/2	7 1/2	9 1/2	12 3/4	12 3/4	12 3/4	12 3/4	15 1/2	17 1/2	17 1/2
F	3/8	1/2	5/8	3/4	7/8	7/8	1	1	1	1	1 11/16	1 15/16	1 15/16
FL	1	1 1/2	1 7/8	2 1/4	3	3 5/8	4 1/4	4 1/2	6	6	6 11/16	7 11/16	7 11/16
LR	5/8	3/4	1 3/16	1 1/2	2	2 3/4	3 3/16	3 1/2	4 1/4	4 1/4	5	5 3/4	5 3/4
M	3/8	1/2	3/4	1	1 3/8	1 3/4	2 1/4	2 1/2	3	3	3 1/2	4	4
MR	1/2	5/8	29/32	1 1/4	1 21/32	2 7/32	2 25/32	3 1/8	3 19/32	3 19/32	4 1/8	4 7/8	4 7/8
R	1.75	2.55	3.82	4.95	5.73	7.50	9.40	9.40	9.40	9.40	12.00	13.75	13.75
Load Capacity Lbs. Ⓞ	3600	7300	14000	19200	36900	34000	33000	34900	33800	36900	83500	102600	108400

	Eye Bracket and Mounting Plate Part Number										
	74077	69195	69196	85361*	69198	85362*	85363*	85364*	85365*	73538	73539
CB	5/16	3/4	1 1/4	1 1/2	2	2 1/2	2 1/2	3	3	4	4 1/2
CD	5/16	1/2	3/4	1	1 3/8	1 3/4	2	2 1/2	3	3 1/2	4
DD	17/64	13/32	17/32	21/32	21/32	29/32	1 1/16	1 3/16	1 5/16	1 13/16	2 1/16
E	2 1/4	2 1/2	3 1/2	4 1/2	5	6 1/2	7 1/2	8 1/2	9 1/2	12 5/8	14 7/8
F	3/8	3/8	5/8	7/8	7/8	1 1/8	1 1/2	1 3/4	2	1 11/16	1 15/16
FL	1	1 1/8	1 7/8	2 3/8	3	3 3/8	4	4 3/4	5 1/4	5 11/16	6 7/16
LR	5/8	3/4	1 1/4	1 1/2	2 1/8	2 1/4	2 1/2	3	3 1/4	4	4 1/2
M	3/8	1/2	3/4	1	1 3/8	1 3/4	2	2 1/2	2 3/4	3 1/2	4
MR	1/2	9/16	7/8	1 1/4	1 5/8	2 1/8	2 7/16	3	3 1/4	4 1/8	5 1/4
R	1.75	1.63	2.55	3.25	3.82	4.95	5.73	6.58	7.50	9.62	11.45
Load Capacity Lbs. Ⓞ	1700	4100	10500	20400	21200	49480	70000	94200	121900	57400	75000

	Pivot Pin Part Number													
	74078	68368	68369	68370	68371	68372	68373	69215	68374	68375	69216	73545	82181	73547
CD	7 ¹ / ₁₆	1 ¹ / ₂	3 ¹ / ₄	1	1 ³ / ₈	1 ³ / ₄	2	2	2 ¹ / ₂	3	3	3 ¹ / ₂	4	4
CL	1 ⁵ / ₁₆	1 ⁷ / ₈	2 ⁵ / ₈	3 ¹ / ₈	4 ¹ / ₈	5 ³ / ₁₆	5 ³ / ₁₆	5 ¹¹ / ₁₆	6 ³ / ₁₆	6 ¹ / ₄	6 ³ / ₄	8 ¹ / ₄	8 ⁵ / ₈	9
Shear Capacity Lbs.⊖	6600	8600	19300	34300	65000	105200	137400	137400	214700	309200	309200	420900	565800	565800

*Cylinder accessory dimensions conform to NFPA recommended standard NFPA/T3.6.8 R1-1984, NFPA recommended standard fluid power systems — cylinder — dimensions for accessories for cataloged square head industrial types. Parker adopted this standard in April, 1985. Eye Brackets or Mounting Plates shipped before this date may have different dimensions and will not necessarily interchange with the NFPA standard. For dimensional information on older style Eye Brackets or Mounting Plates consult Drawing #144805 or previous issues of this catalog.

Ⓞ See Accessory Load Capacity note on previous page.

*These sizes supplied with cotter pins.

†Includes Pivot Pin.

Consult appropriate cylinder rod end dimensions for compatibility.

For Cylinder Division Plant Locations – See Page II.



How to Order

Parker Series 2HX cylinders can be completely described by a model number consisting of coded symbols of digits and letters used in a prescribed sequence. To develop a model number, select only those symbols that represent the cylinder required, and place them in the sequence indicated by the example in Table A opposite. The example makes use of all places, although many model numbers will not require them all, as in the case where cushioning, double rod, or special modifications are not required. For additional cylinder specifications and dimensions see Parker Series 2H section.

When a Series 2HX actuator is ordered the following information must be developed.

- 1) The basic actuator model number including 2HX under Series as shown in Table A opposite.
- 2) If a rod extension is required, specify rod end thread Style 3.
- 3) A six digit code describing the valve and feedback type if any, and the supplier (Parker or customer).
- 4) If an actuator is to accept a D03, D05, D06, D07, or D08 pattern valve no additional information is necessary. If an actuator is to accept a servo valve or include any valve furnished by Parker, a manufacturer and model number should be supplied below the five digit code.
- 5) If a cylinder is to include a feedback device the following information must be called out below the six digit code:

Linear Displacement Transducer (LDT)

Analog Position

- 1) Position Output Signal and connection type (RB, RO)
- 2) Electrical Cable Length (from probe if integral cable)
- 3) Cable Length to AOM (if AOM specified)

Analog Position and Velocity

- 1) Position Output Signal
- 2) Velocity Output Signal and maximum piston velocity for calibration in inches per second
- 3) Electrical Cable Length to AOM

Digital Position

- 1) Specify Pulse Duration Output only (Specify Internal or External Interrogation and the number of circulations)
- 2) Data Ready Line
- 3) Update Time

Linear Potentiometer (LRT)

- 1) Electrical connector position 1-4 cap end
- 2) Gross and net stroke if 1.75" rod dia. or smaller

Other Feedback Device

- 1) Device Type, Manufacturer, and Model Number
- 2) Output Signal

Integral Manifold Option

The integral manifold option is only available with the Parker Series 2HX 2" through 5" bores. All integral manifolds are available at the cap end position #1 only. For special integral manifolds for Parker Series 3LX and 3HX — consult factory.

Bolt-On Manifold Option

The bolt-on manifold option is available with Parker Series 2HX, 3LX and 3HX. Manifolds may be located on either the head or cap end at any position that does not interfere with mounting. For manifolds available by bore size, see the dimensions section of the catalog.

Feedback Option

Parker Series 2HX, 3LX, and 3HX actuators may be ordered prepared for a feedback device or prepared for and supplied with a feedback device. The Parker LRT option may only be ordered installed at the factory. See the ordering code on the opposite page. Parker's standard LDT option is a Temposonics™ LH position sensor. To specify another manufacturer's magneto-restrictive position sensor place an "S" in the cylinder model code and specify the manufacturer's name and model number. Parker will install any other type and brand of feedback specified by the customer as long as it is reasonably designed to fit into an NFPA type cylinder — consult factory.

WARNING

Failure or improper selection or improper use of the products and/or systems described herein or related items can cause death, personal injury and property damage.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

For additional information – call your local Parker Cylinder Distributor.

Series 2HX Electrohydraulic Actuators

How to Order Valve and Feedback Codes

2HX Series Model Codes

The Parker 2HX Series model code is based on the standard Parker 2H Series model code system. The common modifications available for the Parker 2H are available with the Parker 2HX configuration as long as the modifications do not interfere with the Valve and Feedback options selected. The Bolt-On Manifold and Feedback options described in this

catalog and outlined below are available with the Parker 3L Series medium-duty hydraulic cylinder and with the Parker 3H Series (7" and 8" bore) heavy-duty hydraulic cylinder. Specify "3LX" and "3HX" respectively in the model code described below. Integral manifolds are **not** available as standard for the 3LX and 3HX.

Table A — Basic Model Numbers

Bore Size	Cushion Head End	Double Rod	Mounting Style	Mounting Modification	Series	Piston	Ports	Common Modifications	Special Modifications	Piston Rod Number	Rod End Thread Style	Thread Type	Cushion Cap End	Stroke
4.00	C	—	TC	P	2HX	L	T	V*	S	1	4	A	—	X24.00
Specify. Consult dimension tables for available bore sizes. Also see Parker Series 2H.	Specify only if cushion Head End is required.	Consult factory for double rod cylinders.	Specify Mounting Style. Consult dimension tables for available mounting styles. Also see Parker Series 2H.	Specify P- for thrust key mounting. *ONLY IF REQUIRED.	Specify Series 2HX for 2"-6" bores, 3HX for 7" and 8" bores, 3LX for medium-duty 2" - 6" bores.	Use L for Lipseal Piston. Use K for Hi-Load Piston. Use C for ring type piston.	Specify "T" for SAE straight thread ports. (all manifolds) Optional ports available without manifolds (see 2H).	If required specify V = Viton Seals E = EPR Seals. Consult Section C, page 83 for fluid compatibility information.	Specify an "S" for all special modifications not called out in the six digit code below.	Specify rod code number. Consult dimension tables for available rod diameters and section C, page 96 for rod buckling considerations.	Specify Style 4, Small Male. Style 8, Intermediate Male. Style 3, Special. Specify KK, A, LA or W dimension required.	Specify A = UNF W = BSF M = Metric	Cap End Cushions are not available with LDT or LRT feedback. Specify C for cap cushion with no feedback.	Specify in inches. Show symbol "x" just ahead of stroke length.

**Table B — Valve and Feedback Codes
(Required for 2HX Ordering)**

Valve Manifold	Valve Pattern Group	Valve Location	Feedback Option	Feedback Furnished	Feedback Protective Enclosures
N = None B = Bolt-On* I = Integral**	N = Not applicable A = Servo Group A†† D = Servo Group D†† G = D03 (Group G) H = D05 (Group H) J = D06 (Group J)† K = D07 (Group K)† M = D08 (Group M)† X = Other*** (Please Specify)***	N = Not Applicable H = Head C = Cap	N = None C = LDT• F = LRT•• X = Other*** (Please specify)*** B = BALLUFF	N = Not Applicable 1 = Prepare to accept 2 = Included	N = Not Applicable A = False Stage D = Light Duty F = Medium Duty

* Bolt-On Manifolds will be located at position #1 unless an "S" is placed in the cylinder model code and the mounting position is indicated. Bolt-On Manifolds may be positioned on either the head or cap end at any location not occupied by a mount or port or cushion.

** Integral Manifolds are only available at cap end position #1.

*** When selecting "other" an "S" must be placed in the model code and the valve or feedback device must be specified by the customer.

† Valve patterns D06 (Group J), D07 (Group K), and D08 (Group M) are *only* available as Bolt-On Manifolds. Consult factory for DD Mounts.

†† See Valve group table on page 154 & 174 for Servo Valve mounting pattern descriptions.

• When an LDT is to be supplied by the customer, Parker prepares the actuator with an SAE port, magnet, and gun drilled to accept a 2.5" dead zone LDT.

•• LRTs can *only* be installed by Parker at the factory. Electrical connector will be at position #4 standard.

Example 1: Actuator with LDT feedback only (2.5" dead band LDT), and 0 to 10 VDC grounded output with 15 foot electrical cable.

2.50" C-2HXT 34 x 12.000"
NNNC2N

- 1) 0 to 10 VDC
- 2) 15 foot electrical cord

Example 2: Actuator to **accept** a BD-30 servo valve and to **include** analog LDT with velocity output, 15 ips max velocity, low friction seals and extra-heavy-duty enclosure. Cushioned head end.

6.0 CC 2HX TS 14 A x 60
BDCC2A
Low friction piston and rod seals
Velocity calibration: +10 VDC = 15 ips extending

For Cylinder Division Plant Locations – See Page II.



B

Parker TS-2000 seal designed to eliminate cylinder rod seal leakage.

Parker Series 2H Heavy Duty and Series 3L Medium Duty Hydraulic Cylinders with the TS-2000 seal offers positive protection against cylinder rod leakage under the most demanding applications.

The TS-2000 seal is the product of countless hours of research, development and extensive field testing and is only available on Parker Cylinders.

Based on the popular Parker Serrated Lipseal rod design, the TS-2000 incorporates the pressure-compensated, uni-directional characteristics of a U-cup with the multiple edge sealing effectiveness of compression-type stacked-packings.

The goal for the Parker team was to design a rod seal suitable for all types of applications, regardless of pressure profile. It had to be composed of a



“Jewel” gland with wiperseal and TS-2000 cylinder rod seal.

material that would not react chemically with hydraulic fluids. And it had to produce better and more reliable “dry rod” performance than the standard serrated lip-seal design in a broad range of applications.

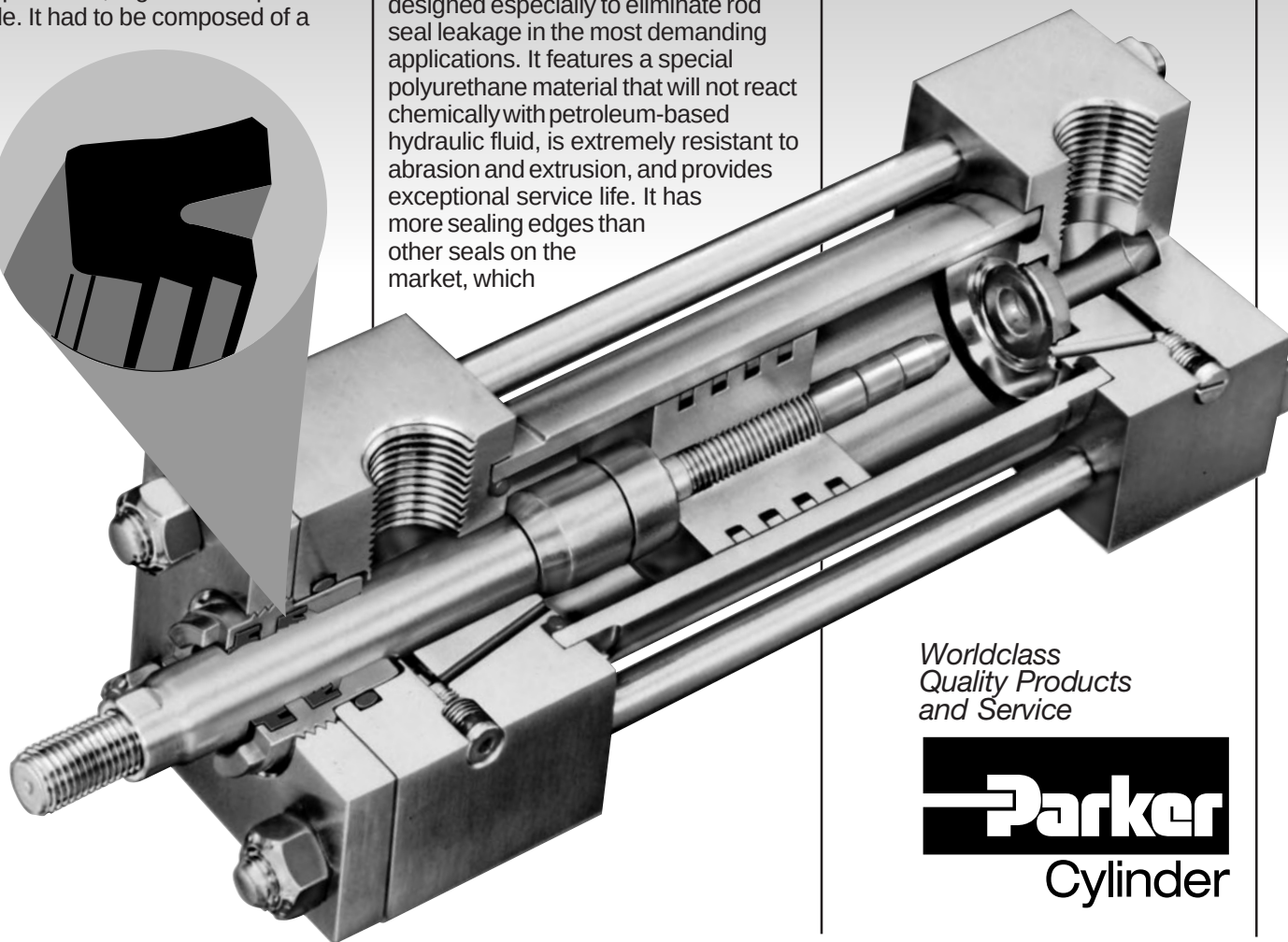
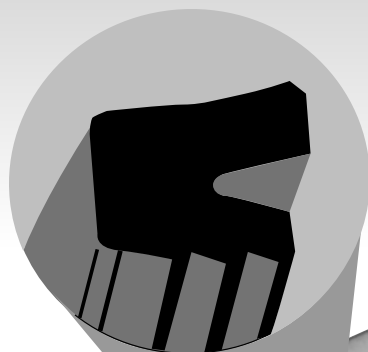
The result is the TS-2000 seal, designed especially to eliminate rod seal leakage in the most demanding applications. It features a special polyurethane material that will not react chemically with petroleum-based hydraulic fluid, is extremely resistant to abrasion and extrusion, and provides exceptional service life. It has more sealing edges than other seals on the market, which

in turn produces “dry rod” performance. The seal geometry was refined for maximum stability in the groove and has excellent performance characteristics throughout a broad range of pressures and piston rod velocities.

The Parker design team was successful!

TS-2000 rod seal has not failed in any of the test applications in the lab or on the job, no matter how tough or demanding.

For more information on the TS-2000 call or write your local Parker distributor or Parker Hannifin Corporation, Cylinder Division, 500 S. Wolf Road, Des Plaines, IL 60016, 847-298-2400.



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