Cylinder

Hydraulic and Electrohydraulic Actuators

Series 2HX

B

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.

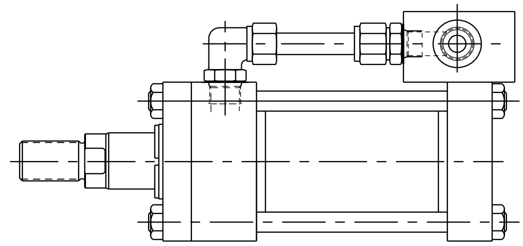
To ensure that every electrohydraulic actuator is premium quality, we subject each and every one – not just batch samples – to tough inspection **and** performance tests. Plus as the world's largest and lowest cost cylinder producer, we offer you the Series 2HX electrohydraulic actuator at the lowest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

Worldwide Distribution

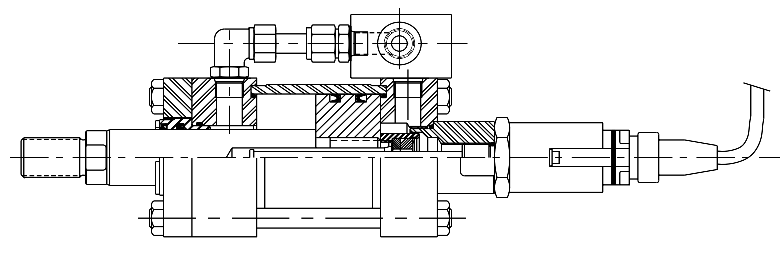
The Parker System is a worldwide network of manufacturing plants and distribution centers for fast, dependable service and delivery. Parker provides you with local sales and technical assistance from hundreds of stocking distributors and regional offices.

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

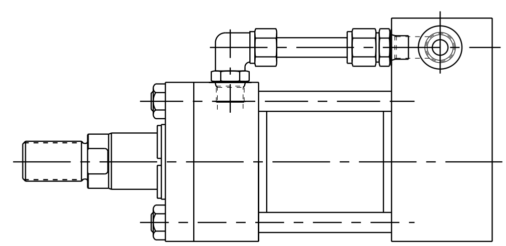
2HX with Bolt-On Manifold



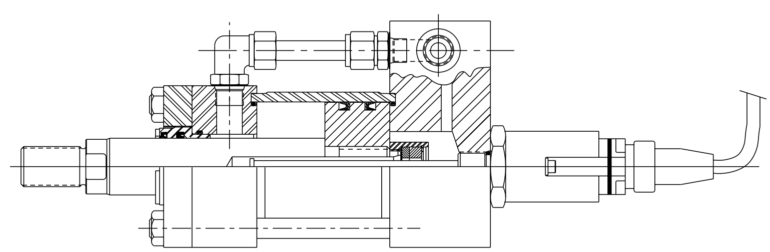
2HX with Bolt-On Manifold and LDT



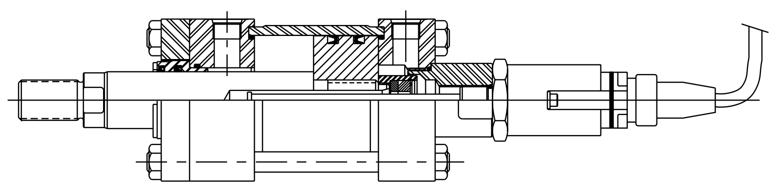
2HX with Intergral Manifold



2HX with Integral Manifold and LDT



2HX with LDT Feedback Only



For additional information – call your local Parker Cylinder Distributor.

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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.

B

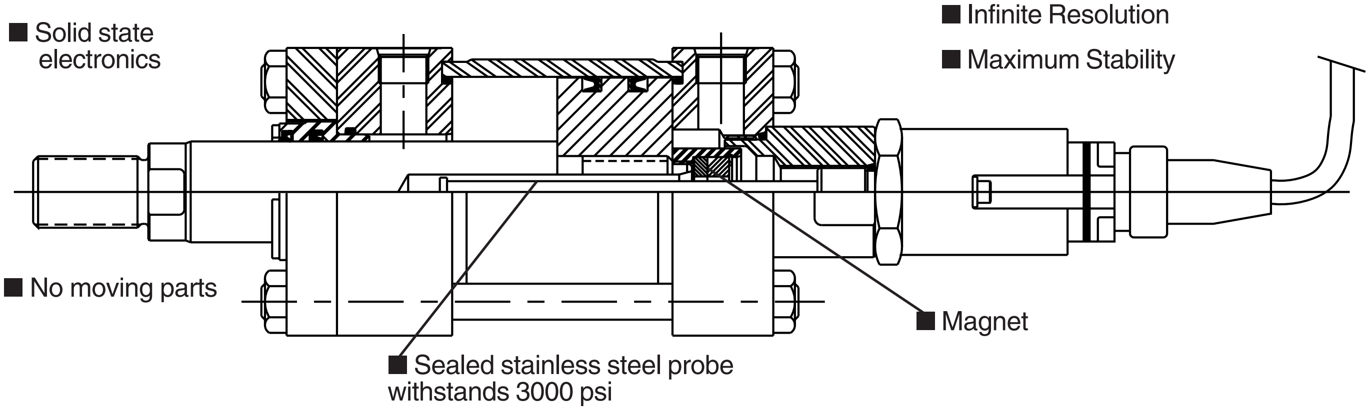
Table A – Available Mounting and Manifold Position

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	LRT and LDT†
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	LRT and LDT††
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.

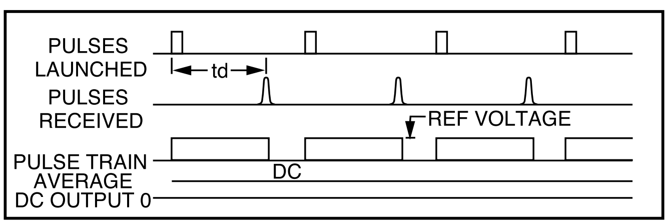
N/A = Not Available
CF = Consult Factory

Linear Displacement Transducer Series 2HX-LDT



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:	*Analog:* Infinite *Digital:* 1 ÷ [gradient x crystal freq. (mHz) x circulation]
Non-Linearity:	±0.02% or ±0.05 mm (±0.002 in.), whichever is greater 0.002 in. is the minimum absolute linearity and varies with sensor model
Repeatability:	Equal to resolution
Hysteresis:	<0.02 mm (0.0008 in.)
Outputs:	*Analog:* Voltage or Current *Digital:* Start/Stop or PWM
Measuring Range:	*Analog:* 25 to 2540 mm (1 to 100 in.) *Digital:* 25 to 7600 mm (1 to 300 in.)
Operating Voltage:	+13.5 to 26.4 Vdc (±0%): Strokes $\leq$1525 mm (60 in.) +24 Vdc (±10%): Strokes > 1525 mm (60 in.)
Power Consumption:	100 mA
Operating Temperature:	*Head Electronics:* -40 to 85°C (-40 to 185°F) *Sensing Element:* -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:	*Analog:* $\leq$1 ms *Digital:* Minimum = [Stroke (specified in inches) + 3] x 9.1 µs
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.

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

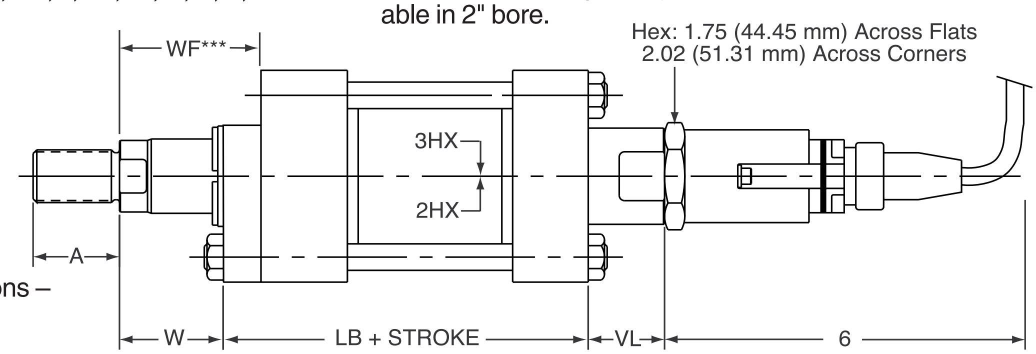


Table 1 – Envelope and Rod End Dimensions

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	13/32	3000
	2	5	5	3 1/2 - 12	4 3/4 - 12	9 1/2	13/32	3000
	3	3 1/2	3 1/2	2 1/2 - 12	3 1/4 - 12	9 1/2	13/32	3000
	4	4	4	3 - 12	3 3/4 - 12	9 1/2	13/32	3000
	5	4 1/2	4 1/2	3 1/4 - 12	4 1/4 - 12	9 1/2	13/32	3000
8*	1	3 1/2	3 1/2	2 1/2 - 12	3 1/4 - 12	10 1/2	13/32	3000
	2	5 1/2	5 1/2	4 - 12	5 1/4 - 12	10 1/2	13/32	3000
	3	4	4	3 - 12	3 3/4 - 12	10 1/2	13/32	3000
	4	4 1/2	4 1/2	3 1/4 - 12	4 1/4 - 12	10 1/2	13/32	3000
	5	5	5	3 1/2 - 12	4 3/4 - 12	10 1/2	13/32	3000

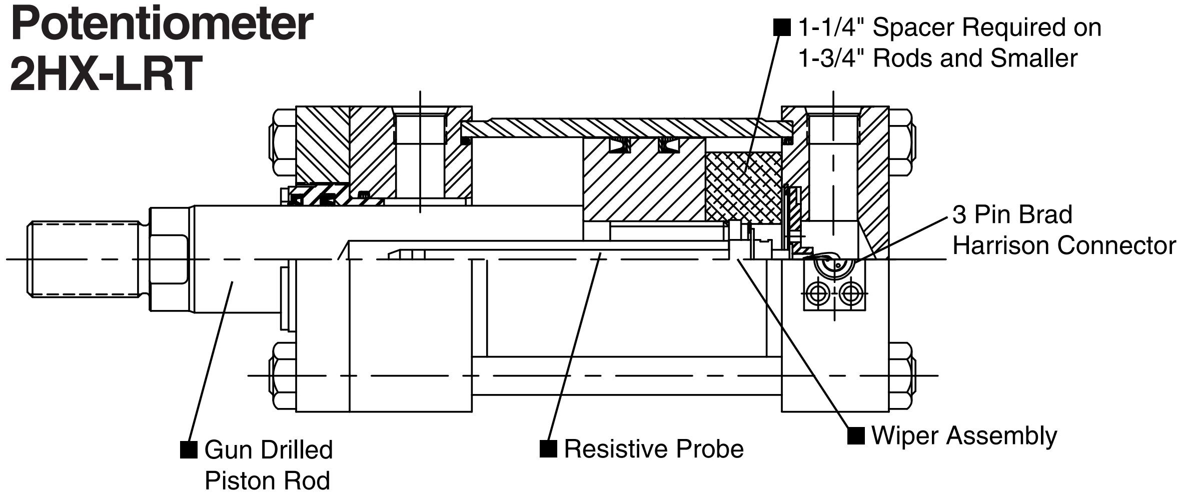
†**Note:** The rod end dimensions shown are based on the use of a linear displacement transducer with a rod end dead zone of 2.5 inches or less. LDT's with longer dead zones require a rod extension. The LDT will be permanently damaged if the proper rod extension is not used. Consult factory if an LDT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

Linear Potentiometer
Series 2HX-LRT

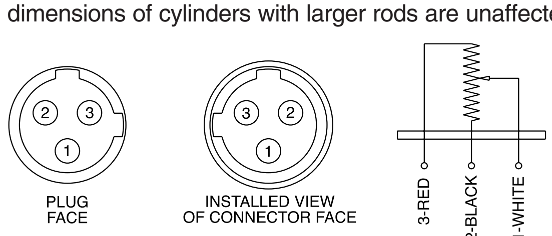


Standard Features

- 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 that 50 x 10^6 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.

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

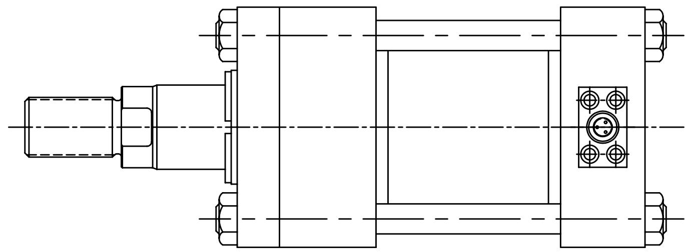


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Table 1 – Envelope and Rod End Dimensions

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 KK Style 4	Thread Sizes CC Style 8	†† LB Add Stroke	4 to 1 Design Factor (PSI)**
2	1	1	$1\frac{1}{8}$	$\frac{3}{4}$ - 16	$\frac{7}{8}$ - 14	$6\frac{1}{2}$	3000
	2	$1\frac{3}{8}$	$1\frac{5}{8}$	1-14	$1\frac{1}{4}$ - 12	$6\frac{1}{2}$	3000
$2\frac{1}{2}$	1	1	$1\frac{1}{8}$	$\frac{3}{4}$ - 16	$\frac{7}{8}$ - 14	$6\frac{5}{8}$	1800
	2	$1\frac{3}{4}$	2	$1\frac{1}{4}$ - 12	$1\frac{1}{2}$ - 12	$6\frac{5}{8}$	3000
	3	$1\frac{3}{8}$	$1\frac{5}{8}$	1-14	$1\frac{1}{4}$ - 12	$6\frac{5}{8}$	3000
$3\frac{1}{4}$	1	$1\frac{3}{8}$	$1\frac{5}{8}$	1-14	$1\frac{1}{4}$ - 12	$7\frac{1}{2}$	2130
	2	2	$2\frac{1}{4}$	$1\frac{1}{2}$ - 12	$1\frac{3}{4}$ - 12	$6\frac{1}{4}$	3000
	3	$1\frac{3}{4}$	2	$1\frac{1}{4}$ - 12	$1\frac{1}{2}$ - 12	$7\frac{1}{2}$	3000
4	1	$1\frac{3}{4}$	2	$1\frac{1}{4}$ - 12	$1\frac{1}{2}$ - 12	$7\frac{7}{8}$	2580
	2	$2\frac{1}{2}$	3	$1\frac{7}{8}$ - 12	$2\frac{1}{4}$ - 12	$6\frac{5}{8}$	3000
	3	2	$2\frac{1}{4}$	$1\frac{1}{2}$ - 12	$1\frac{3}{4}$ - 12	$6\frac{5}{8}$	3000
5	1	2	$2\frac{1}{4}$	$1\frac{1}{2}$ - 12	$1\frac{3}{4}$ - 12	$7\frac{1}{8}$	2510
	2	$3\frac{1}{2}$	$3\frac{1}{2}$	$2\frac{1}{2}$ - 12	$3\frac{1}{4}$ - 12	$7\frac{1}{8}$	3000
	3	$2\frac{1}{2}$	3	$1\frac{7}{8}$ - 12	$2\frac{1}{4}$ - 12	$7\frac{1}{8}$	3000
	4	3	$3\frac{1}{2}$	$2\frac{1}{4}$ - 12	$2\frac{3}{4}$ - 12	$7\frac{1}{8}$	3000
6	1	$2\frac{1}{2}$	3	$1\frac{7}{8}$ - 12	$2\frac{1}{4}$ - 12	$8\frac{3}{8}$	3000
	2	4	4	3 - 12	$3\frac{3}{4}$ - 12	$8\frac{3}{8}$	3000
	3	3	$3\frac{1}{2}$	$2\frac{1}{4}$ - 12	$2\frac{3}{4}$ - 12	$8\frac{3}{8}$	3000
	4	$3\frac{1}{2}$	$3\frac{1}{2}$	$2\frac{1}{2}$ - 12	$3\frac{1}{4}$ - 12	$8\frac{3}{8}$	3000
7*	1	3	$3\frac{1}{2}$	$2\frac{1}{4}$ - 12	$2\frac{3}{4}$ - 12	$9\frac{1}{2}$	3000
	2	5	5	$3\frac{1}{2}$ - 12	$4\frac{3}{4}$ - 12	$9\frac{1}{2}$	3000
	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$2\frac{1}{2}$ - 12	$3\frac{3}{4}$ - 12	$9\frac{1}{2}$	3000
	4	4	4	3 - 12	$3\frac{3}{4}$ - 12	$9\frac{1}{2}$	3000
	5	$4\frac{1}{2}$	$4\frac{1}{2}$	$3\frac{1}{4}$ - 12	$4\frac{1}{4}$ - 12	$9\frac{1}{2}$	3000
8*	1	$3\frac{1}{2}$	$3\frac{1}{2}$	$2\frac{1}{2}$ - 12	$3\frac{1}{4}$ - 12	$10\frac{1}{2}$	3000
	2	$5\frac{1}{2}$	$5\frac{1}{2}$	4 - 12	$5\frac{1}{4}$ - 12	$10\frac{1}{2}$	3000
	3	4	4	3 - 12	$3\frac{3}{4}$ - 12	$10\frac{1}{2}$	3000
	4	$4\frac{1}{2}$	$4\frac{1}{2}$	$3\frac{1}{4}$ - 12	$4\frac{1}{4}$ - 12	$10\frac{1}{2}$	3000
	5	5	5	$3\frac{1}{2}$ - 12	$4\frac{3}{4}$ - 12	$10\frac{1}{2}$	3000

††Cylinders with rod sizes less than 2" require the addition of a $1\frac{1}{4}$" spacer on the cap end of the piston to carry the wiper assembly. These LB dimensions reflect the additional length.

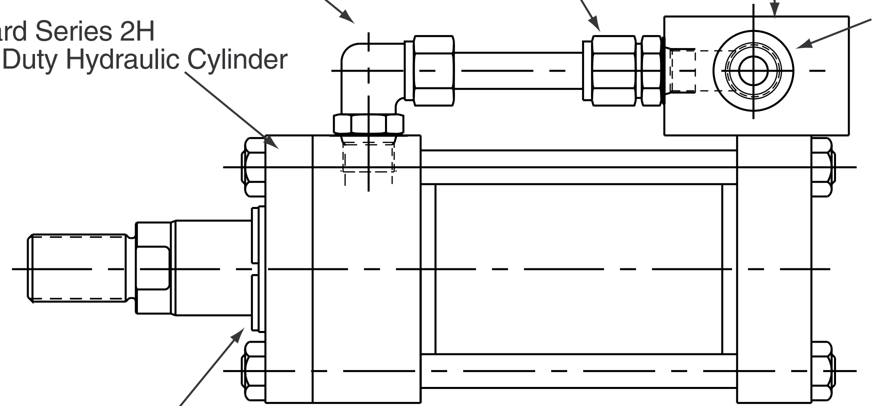
†A mini LRT (MLRT) is available for $\frac{5}{8}$" rods – consult factory.

**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.

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

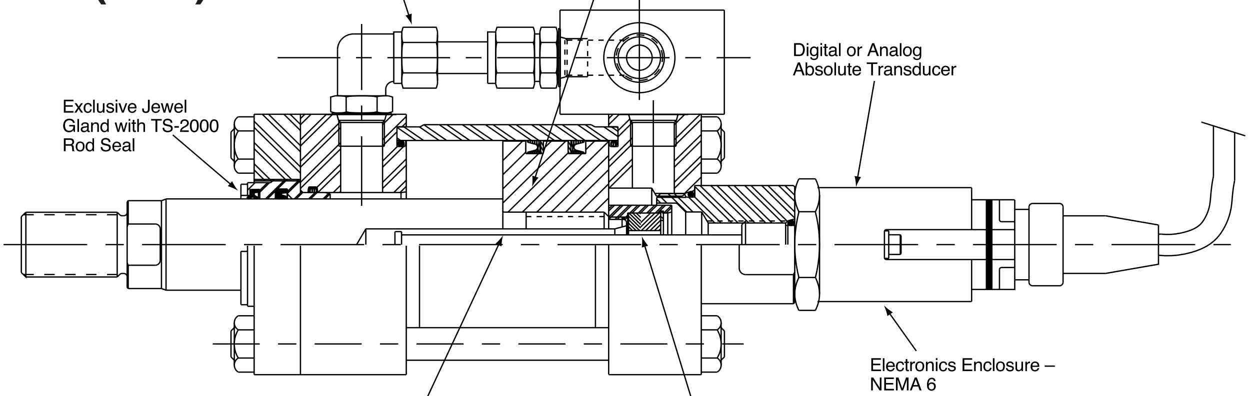
- Minimum hydraulic line runs with closed cylinder and valve coupling
- Simplified machine design with integrated components
- Eliminates the need for limit switches, deceleration valves, shock absorbers, and mechanical linkages in many applications
- Minimum interference with standard mounting dimensions
- 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)

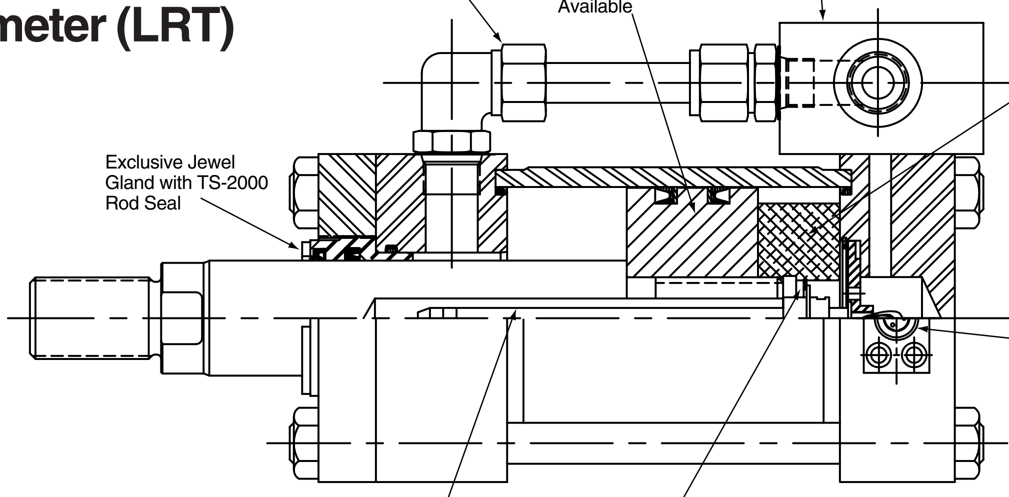


Here's How The Parker LDT Feeds Back Linear Position

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.

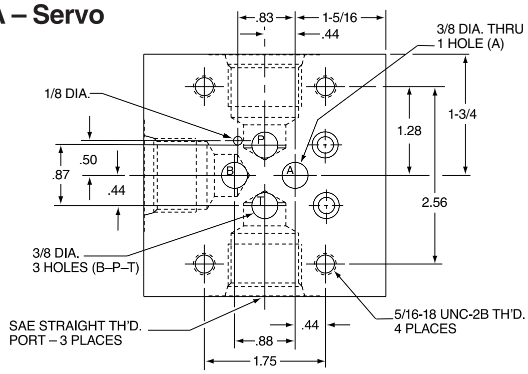
B

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

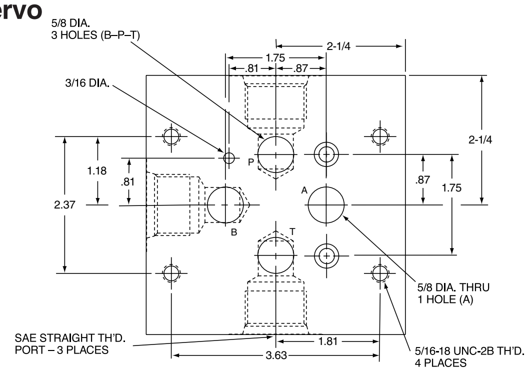
Group A – Servo



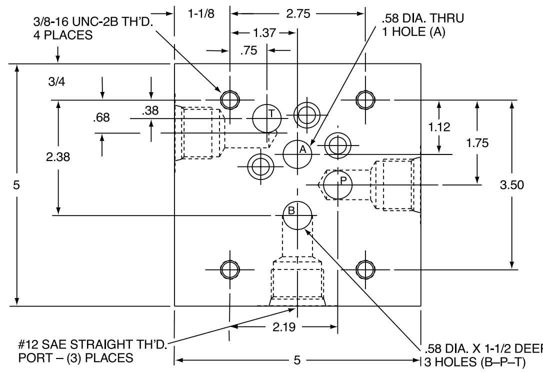
Servo Valve Mount Interchange Chart

Group A	Group D
PARKER BD-15	PARKER BD-30
ATCHLEY 215A-XXX	ATCHLEY 240-XXX
MOOG 62 SERIES	
MOOG 73 SERIES	MOOG 78 SERIES
MOOG 760 SERIES	
PEGASUS M & MP SERIES	PEGASUS 180L PEGASUS 180R
VICKERS SM4-20-X-X-10	VICKERS SM4-40-X-X-10

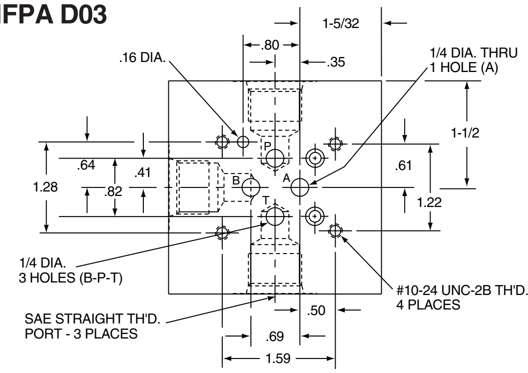
Group D – Servo



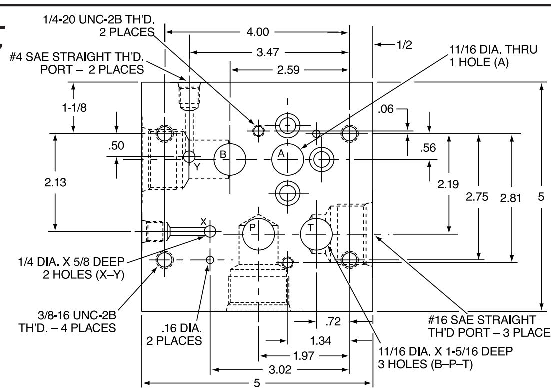
Group J – NFPA D06



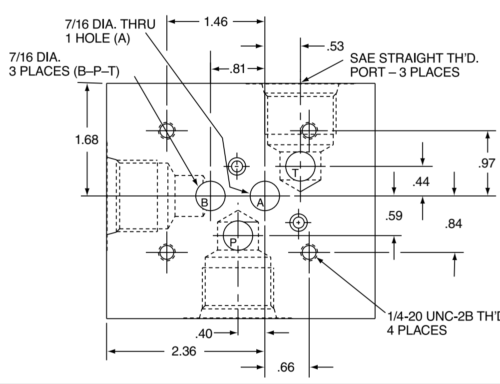
Group G – NFPA D03



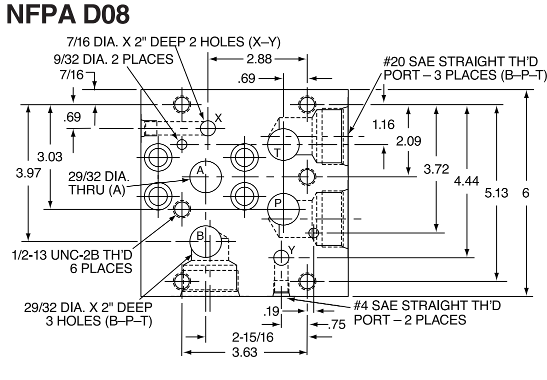
Group K – NFPA D07



Group H – NFPA D05



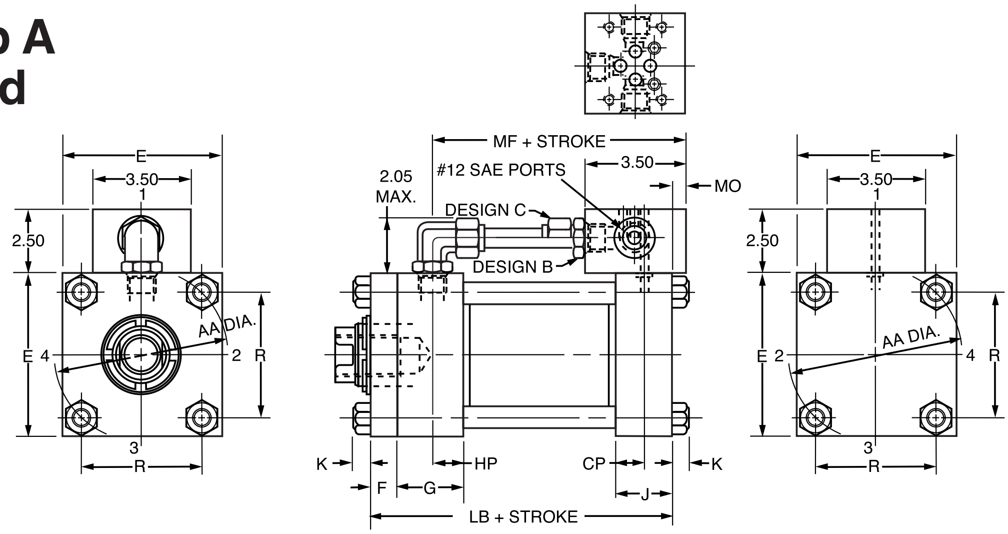
Group M – NFPA D08



For additional information – call your local Parker Cylinder Distributor.

2HX with Group A Bolt-on Manifold Cap End

(Parker BD-15 Servo)



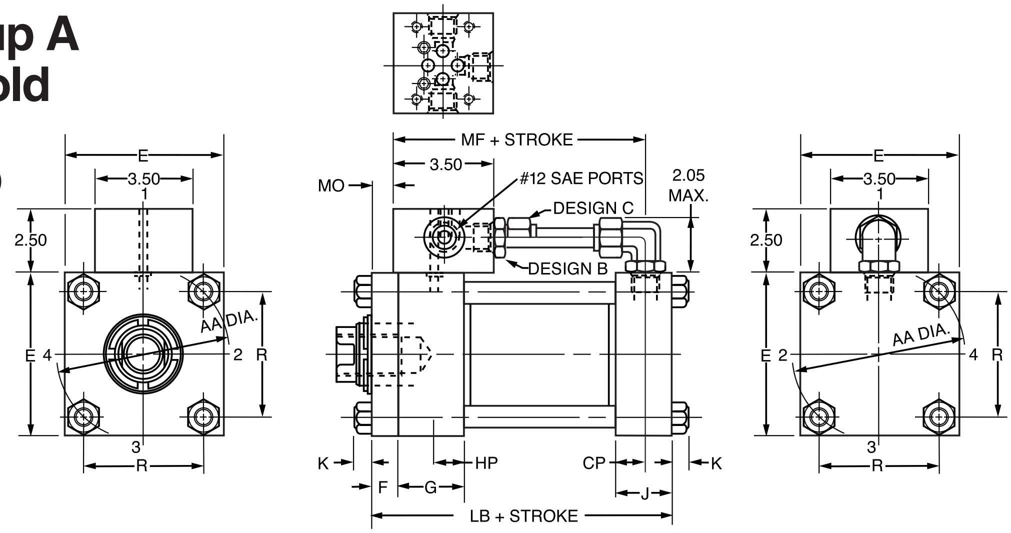
Group A/Parker BD-15 Valve Manifold, Cap End Mounted, Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	.562	3.000	4.187	.750	.750	.625	1.75	1.50	.438	2.9	2.05	5.250	1.625	2.875
2.50	.562	3.500	4.312	.750	.750	.625	1.75	1.50	.438	3.6	2.55	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.
*Design C used only for strokes in “Design C” column on chart and greater strokes.

†Consult Factory for 6" Bore DD Mount.
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

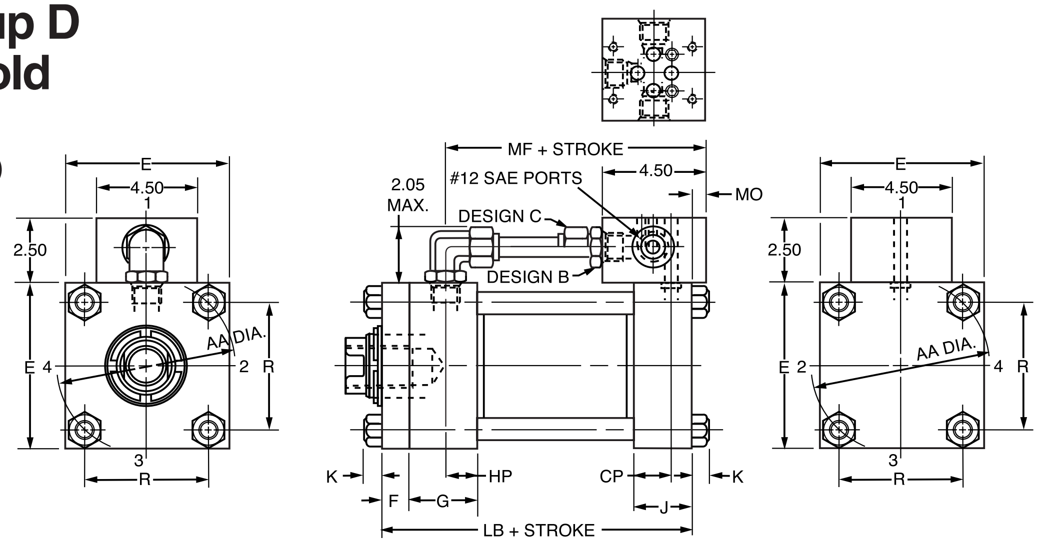
*Design B used only if stroke falls in between “Design B” and “Design C” min. stroke columns on chart.
*Design C used only for strokes in “Design C” column on chart and greater strokes.

†Consult Factory for 6" Bore DD Mount.
Standard Operating Pressure is 3000 PSI.

B

2HX with Group D Bolt-on Manifold Cap End

(Parker BD-30 Servo)



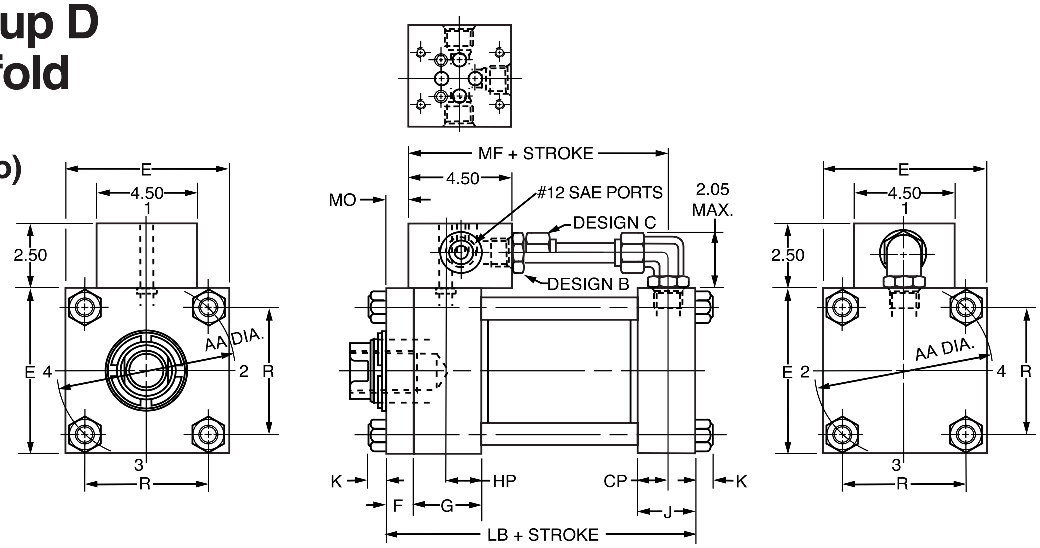
Group D/Parker BD-30 Valve Manifold, Cap End Mounted, Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
3.25	.531	4.500	4.937	.906	.906	.750	2.00	1.75	.562	4.6	3.25	6.250	1.875	3.125
4.00	.531	5.000	5.187	.906	.906	.875	2.00	1.75	.562	5.4	3.82	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.
*Design C used only for strokes in “Design C” column on chart and greater strokes.

†Consult Factory for 6" Bore DD Mount.
Standard Operating Pressure is 3000 PSI.

2HX with Group D Bolt-on Manifold Head End

(Parker BD-30 Servo)



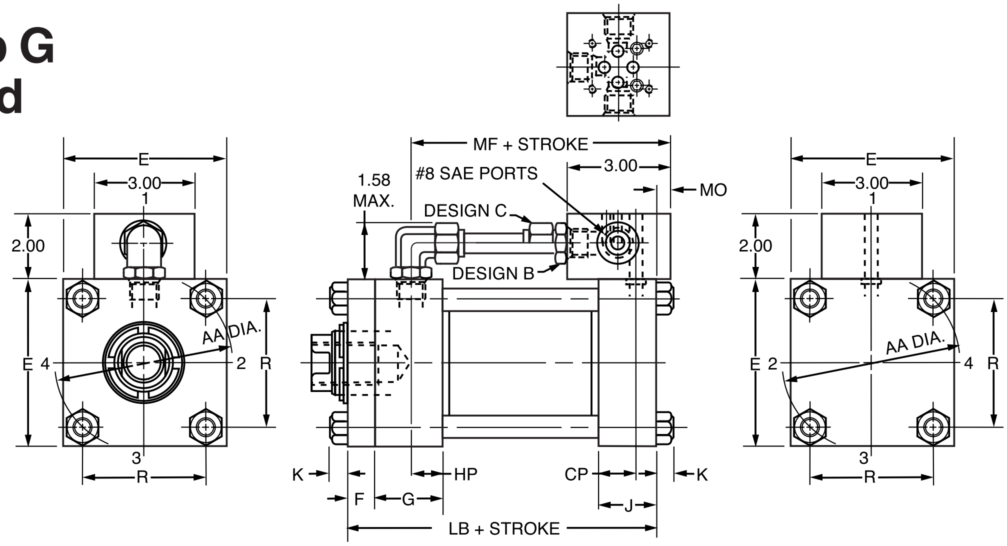
Group A/Parker BD-30 Valve Manifold, Head End Mounted Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
3.25	.469	4.500	4.937	.906	.906	.750	2.00	1.75	.562	4.6	3.25	6.250	1.875	3.125
4.00	.594	5.000	5.187	.906	.906	.875	2.00	1.75	.562	5.4	3.82	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.
*Design C used only for strokes in “Design C” column on chart and greater strokes.

†Consult Factory for 6" Bore DD Mount.
Standard Operating Pressure is 3000 PSI.

For additional information – call your local Parker Cylinder Distributor.

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

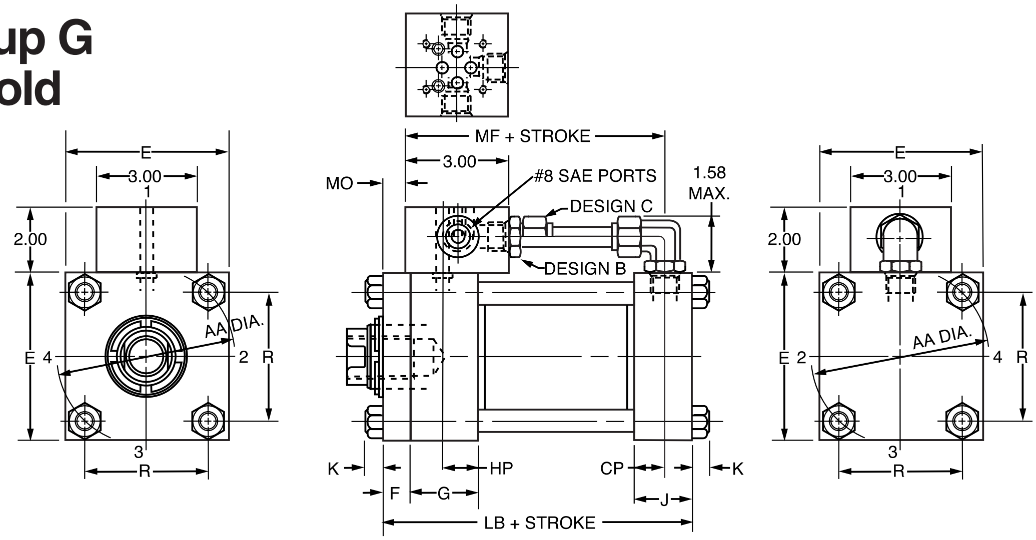


Group G/NFPA D03 Valve Manifold, Cap End Mounted Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	.406	3.000	4.031	.750	.750	.625	1.75	1.50	.438	2.9	2.05	5.250	.875	1.750
2.50	.406	3.500	4.156	.750	.750	.625	1.75	1.50	.438	3.6	2.55	5.375	.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.
*Design C used only for strokes in "Design C" column on chart and greater strokes.

†Consult Factory for 6" Bore DD Mount.
Standard Operating Pressure is 3000 PSI.

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



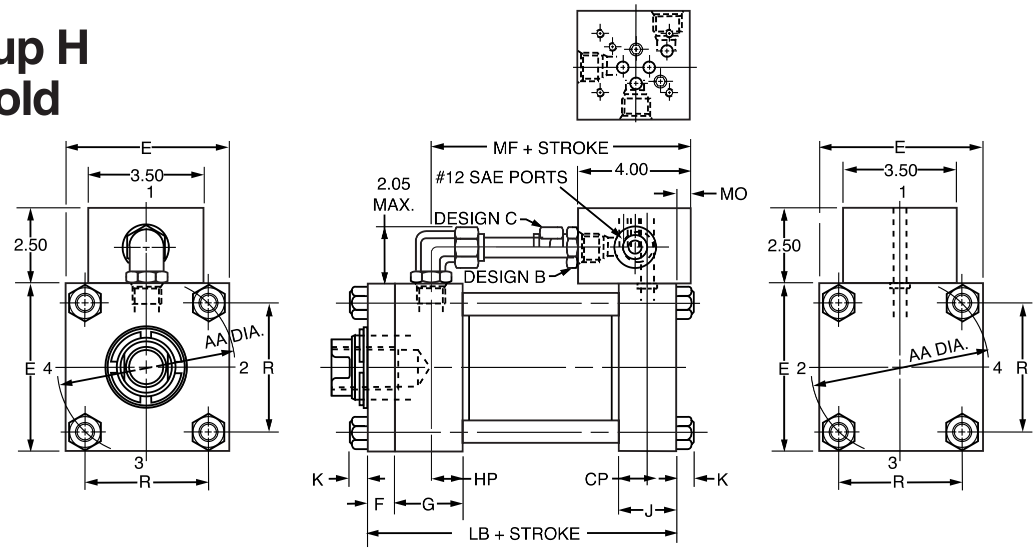
Group G/NFPA D03 Valve Manifold, Head End Mounted, Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	.468	3.000	4.031	.750	.750	.625	1.75	1.50	.438	2.9	2.05	5.250	.875	1.750
2.50	.468	3.500	4.156	.750	.750	.625	1.75	1.50	.438	3.6	2.55	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.
*Design C used only for strokes in "Design C" column on chart and greater strokes.

†Consult Factory for 6" Bore DD Mount.
Standard Operating Pressure is 3000 PSI.

2HX with Group H Bolt-on Manifold Cap End

(NFPA D05)



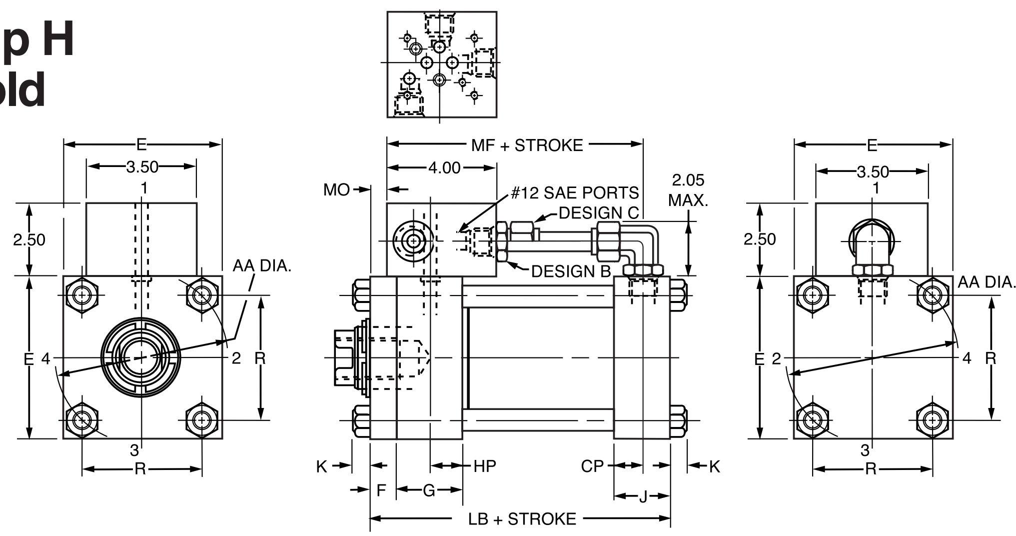
Group H/NFPA D05 Valve Manifold, Cap End Mounted Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	.891	3.000	4.51	.750	.750	.625	1.750	1.500	.438	2.9	2.05	5.250	1.750	3.000
2.50	.891	3.500	4.64	.750	.750	.625	1.750	1.500	.438	3.6	2.55	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.
*Design C used only for strokes in "Design C" column on chart and greater strokes.

†Consult Factory for 6" Bore DD Mount.
Standard Operating Pressure is 3000 PSI.

2HX with Group H Bolt-on Manifold Head End

(NFPA D05)



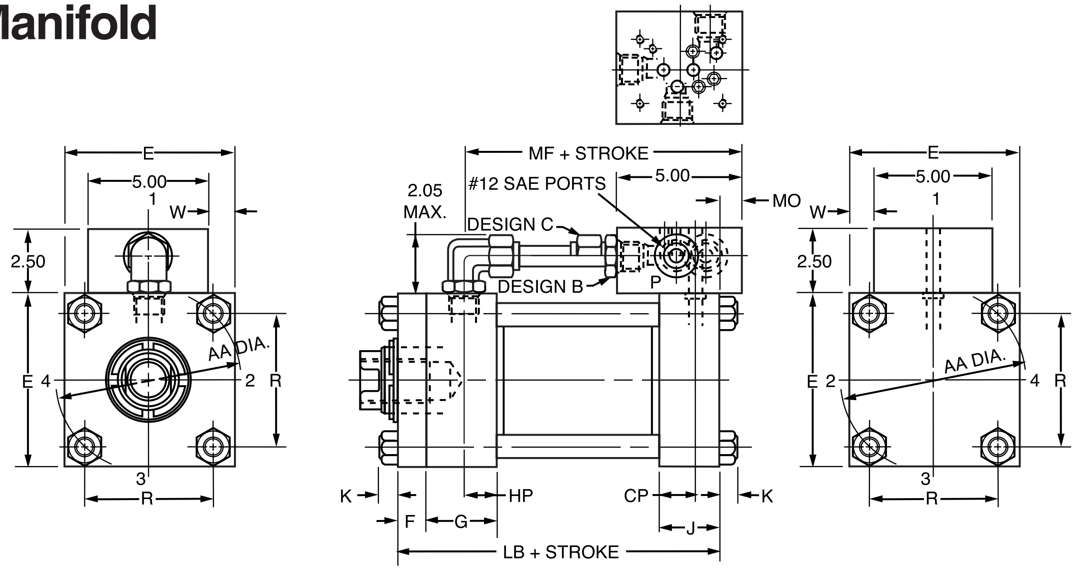
Group H/NFPA D05 Valve Manifold, Head End Mounted Series 2HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	Min. Stroke	Min. Stroke
2.00	0	3.000	4.51	.750	.750	.625	1.75	1.50	.438	2.9	2.05	5.250	1.750	3.000
2.50	0	3.500	4.64	.750	.750	.625	1.75	1.50	.438	3.6	2.55	5.375	1.625	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.
*Design C used only for strokes in "Design C" column on chart and greater strokes.

†Consult Factory for 6" Bore DD Mount.
Standard Operating Pressure is 3000 PSI.

For additional information – call your local Parker Cylinder Distributor.

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

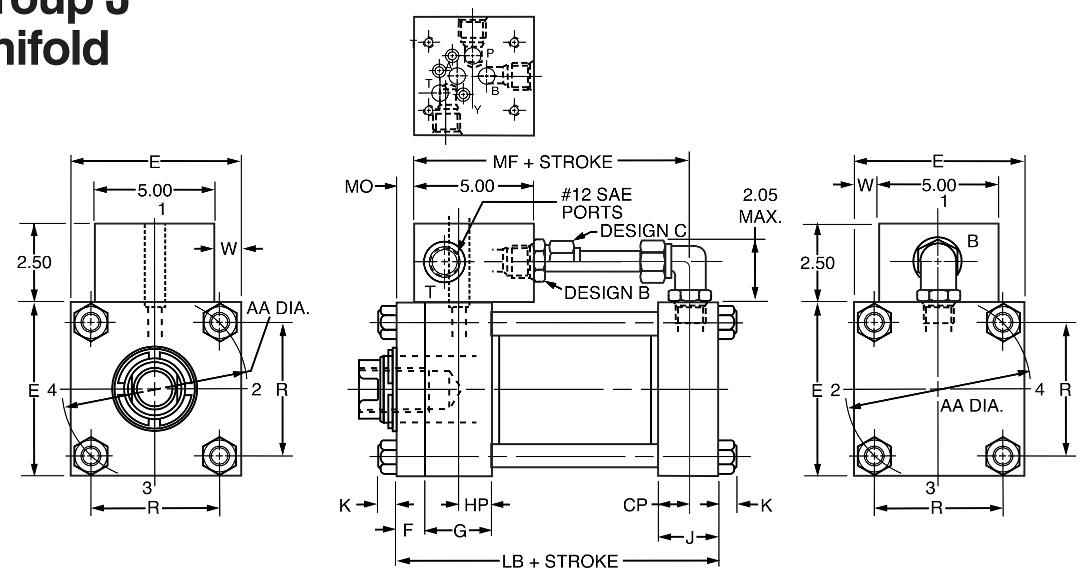


Group J/NFPA D06 Valve Manifold, Cap End Mounted Series 2HX Cylinder														Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	W	Min. Stroke	Min. Stroke
6.00	.620	7.500	6.745	1.000	1.000	1.000	2.250	2.250	.875	8.100	5.730	8.375	1.250	.625	1.750

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

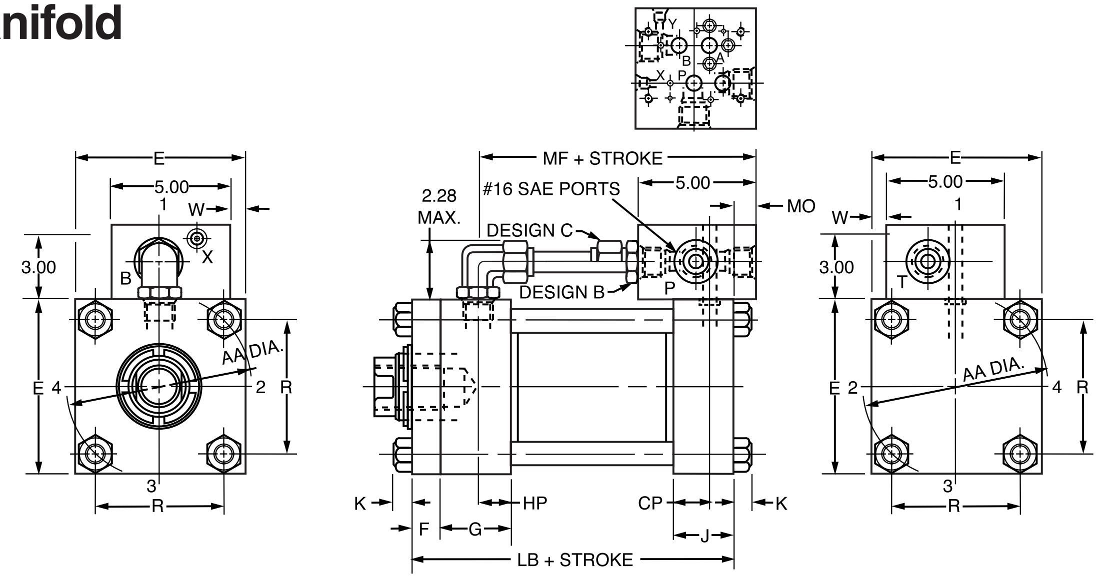
Design A (not shown) used only if stroke is shorter than minimum stroke shown for "Design B" on chart; consult factory, engineering required.
*Design B used only if stroke falls in between “Design B” and “Design C” min. stroke columns on chart.
*Design C used only for strokes in “Design C” column on chart and greater strokes.

Consult Factory for DD Mount.
Standard Operating Pressure is 3000 PSI.

B

2HX with Group K Bolt-on Manifold Cap End

(NFPA D07)



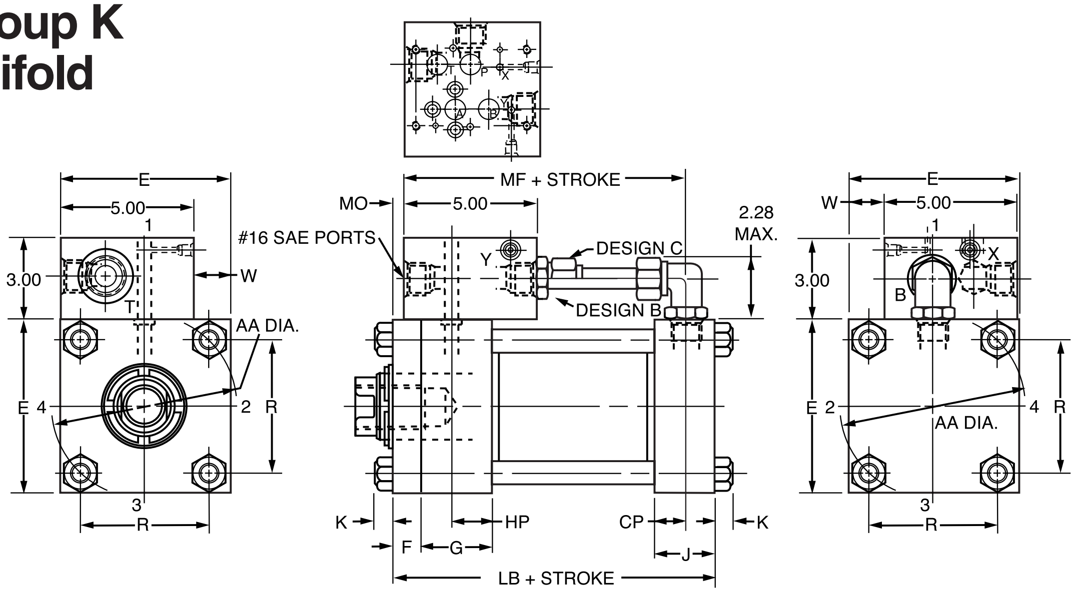
Group K/NFPA D07 Valve Manifold, Cap End Mounted Series 2HX Cylinder														Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	W	Min. Stroke	Min. Stroke
6.00	.590	7.500	6.715	1.000	1.000	1.000	2.250	2.250	.875	8.100	5.730	8.375	.435	1.104	2.285

*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)



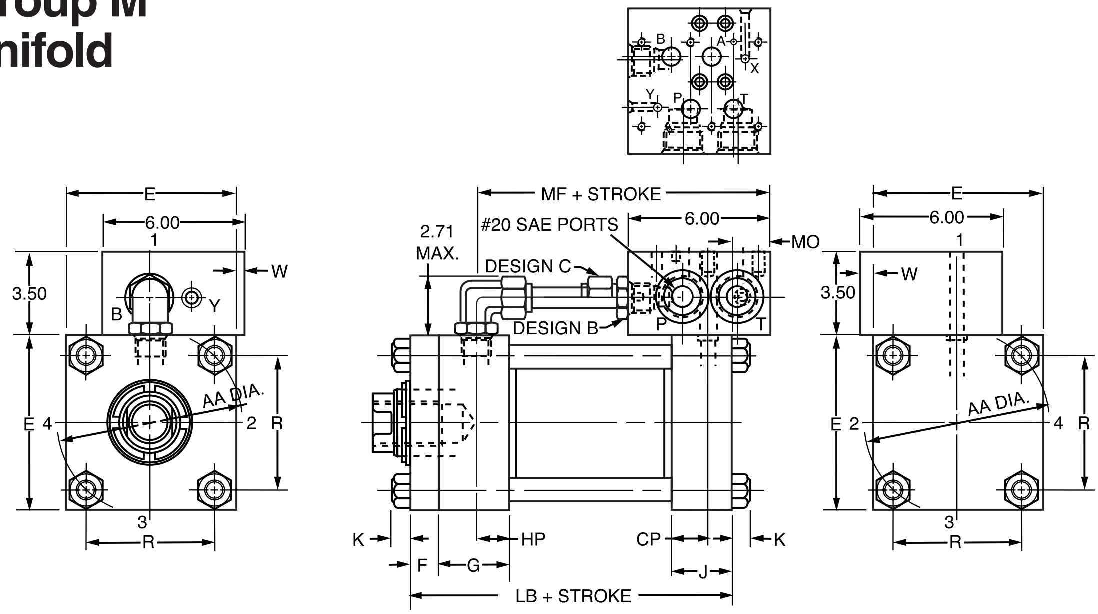
Group J/NFPA D07 Valve Bolt-on Manifold, Head End Mounted, Series 2HX Cylinder														Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	W	LB	Min. Stroke	Min. Stroke
6.00	.410	7.500	6.715	1.000	1.000	1.000	2.25	2.25	.875	8.1	5.73	2.065	8.375	1.104	2.285

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.

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

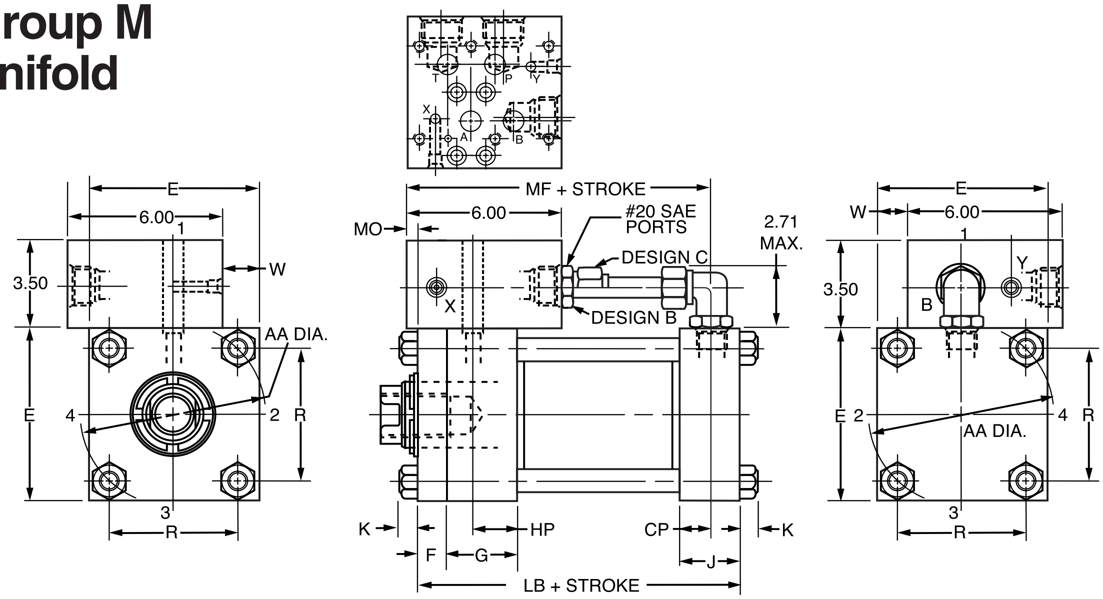


Group M/NFPA D08 Valve Manifold, Cap End Mounted Series 2HX Cylinder														Design B*	Design C*
Bore	MO	E	MF	CP	HP	F	G	J	K	AA	R	LB	W	Min. Stroke	Min. Stroke
6.00	1.566	7.500	7.816	1.286	1.125	1.000	2.250	2.250	.875	8.100	5.730	8.375	.250	1.75	3.00

*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)



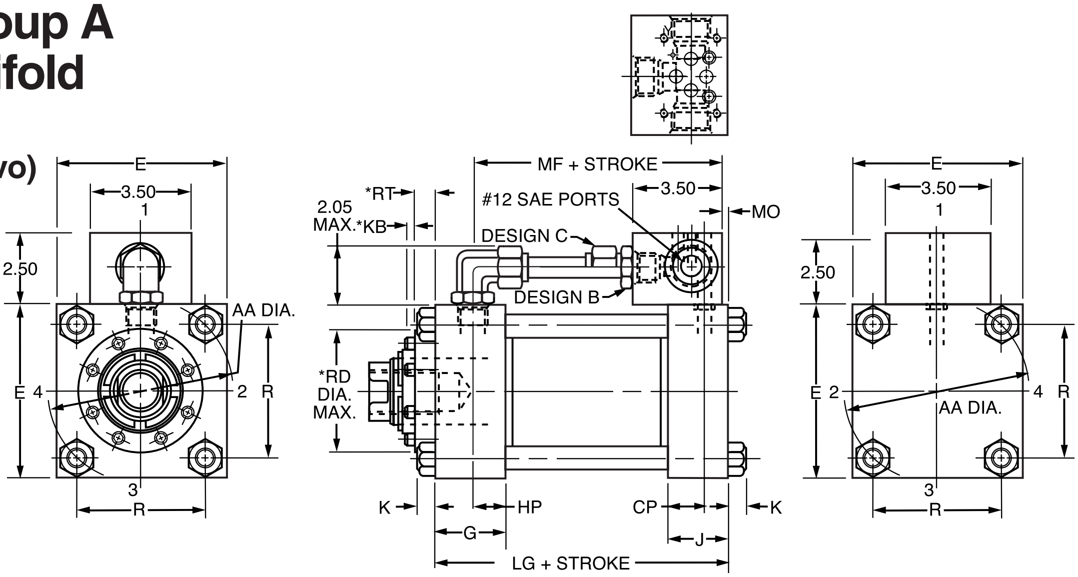
Group M/NFPA D08 Valve Bolt-on Manifold, Head End Mounted, Series 2HX Cylinder														Design B*	Design C*
Bore	MO△	E	MF	CP	HP	F	G	J	K	AA	R	W†	LB	Min. Stroke	Min. Stroke
6.00	.500	7.500	7.813	1.188	1.220	1.000	2.25	2.25	.875	8.1	5.73	1.755	8.375	1.75	3.00

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.
△BOM will overhang past head face.

Consult Factory for DD Mount.
Standard Operating Pressure is 3000 PSI.
†BOM will overhang past head face.

3HX with Group A Bolt-on Manifold Cap End

(Parker BD-15 Servo)



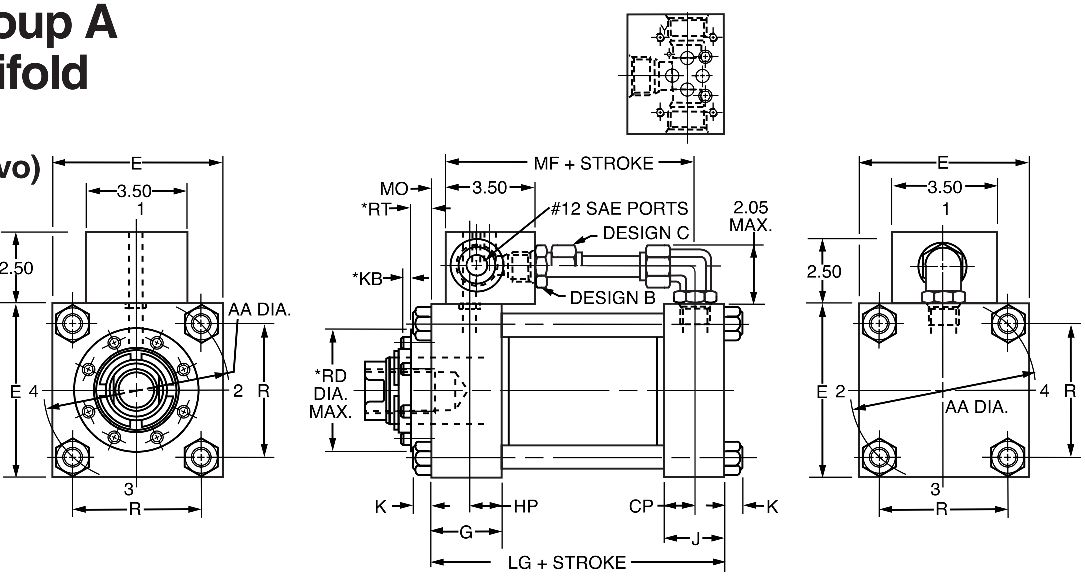
Group A/Parker BD-15 Valve Manifold, Cap End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.188	8.500	6.813	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	.375
8.00	.313	9.500	7.563	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	N/A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

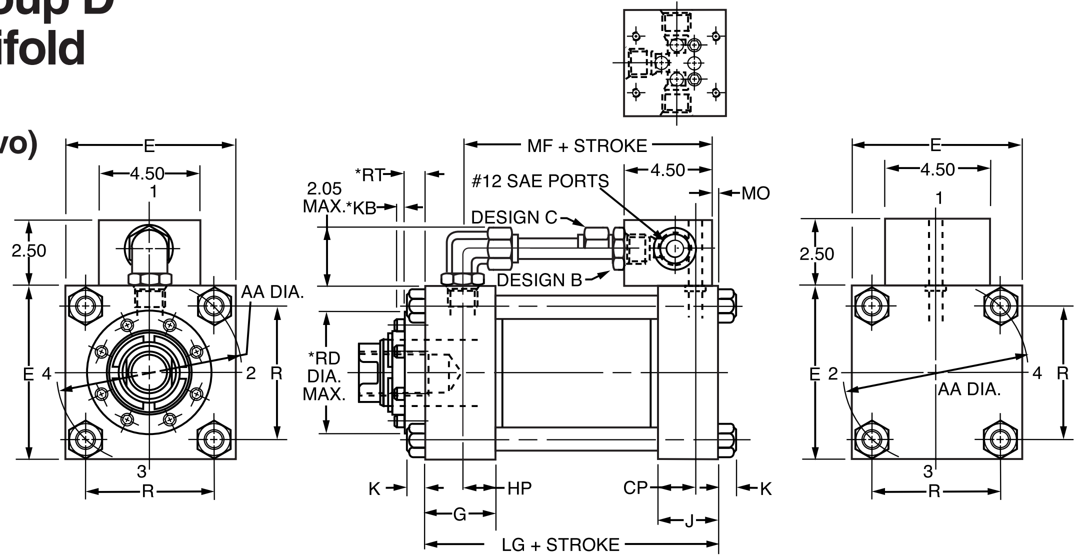
*Design B used only if stroke falls in between “Design B” and “Design C” min. stroke columns on chart.
*Design C used only for strokes in “Design C” column on chart and greater strokes.

*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.

3HX with Group D Bolt-on Manifold Cap End

(Parker BD-30 Servo)



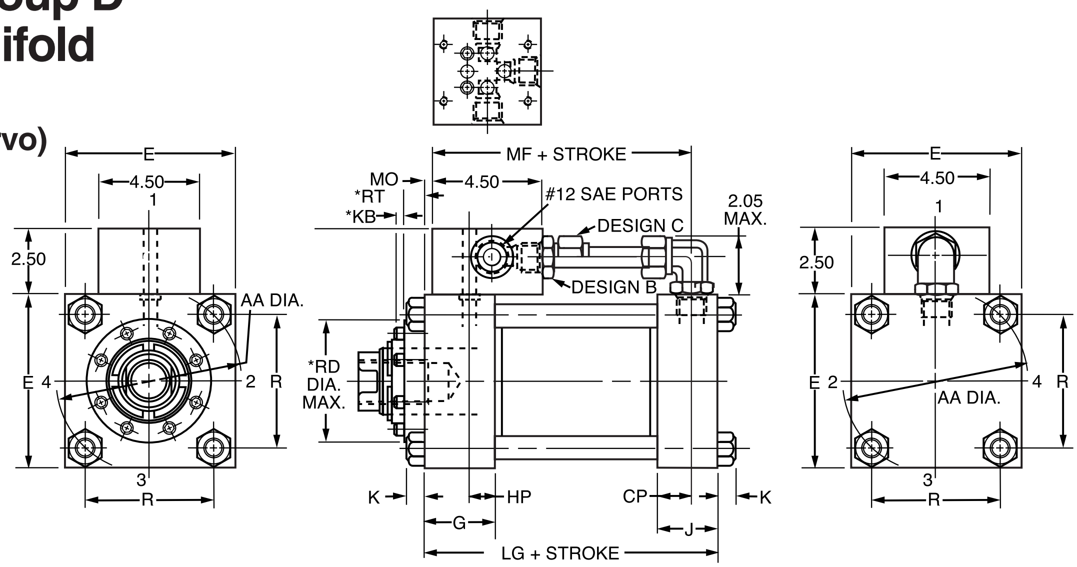
Group D/Parker BD-30 Valve Manifold, Cap End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.125	8.500	6.875	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	1.250
8.00	.250	9.500	7.625	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	0	.500

*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)



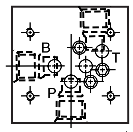
Group D/Parker BD-30 Valve Manifold, Head End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.125	8.500	6.875	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	1.250
8.00	.250	9.500	7.625	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	0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

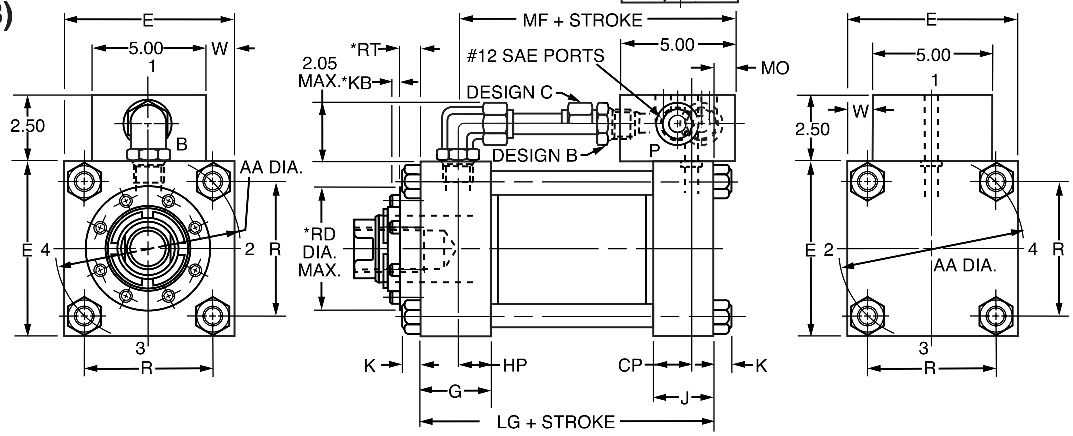
*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.
*Design C used only for strokes in "Design C" column on chart and greater strokes.

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

B

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



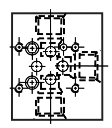


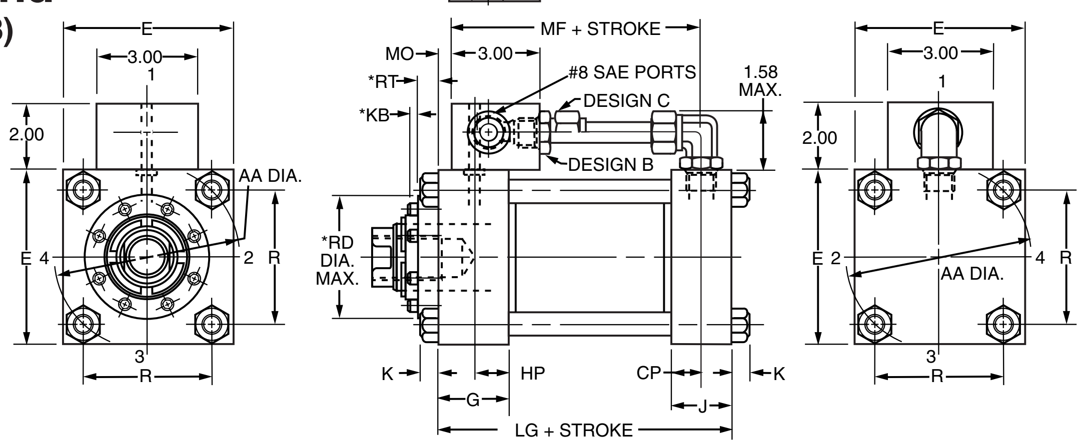
Group G/NFPA D03 Valve Manifold, Cap End Mounted Series 3HX Cylinder											
Bore	**MO**	**E**	**MF**	**CP**	**HP**	**G**	**J**	**K**	**AA**	**R**	**LG**
7.00	.344	8.500	6.656	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50
8.00	.469	9.500	7.406	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50

*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)





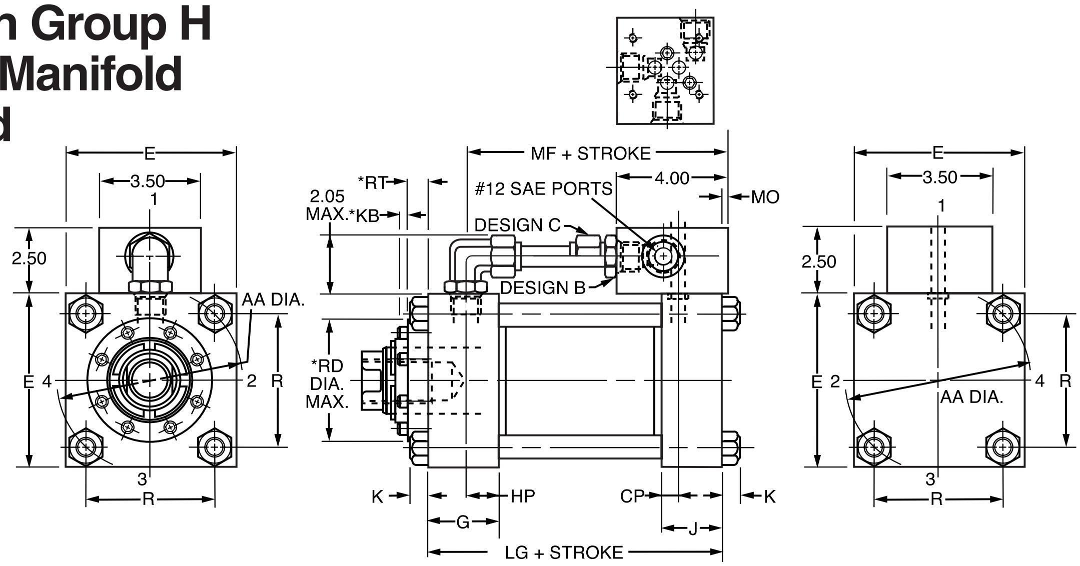
Group G/NFPA D03 Valve Manifold, Head End Mounted Series 3HX Cylinder											
Bore	**MO**	**E**	**MF**	**CP**	**HP**	**G**	**J**	**K**	**AA**	**R**	**LG**
7.00	.344	8.500	6.656	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50
8.00	.469	9.500	7.406	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50

*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.

3HX with Group H Bolt-on Manifold Cap End

(NFPA D05)



Group H/NFPA 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△	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△	9.500	7.891	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	N/A	0

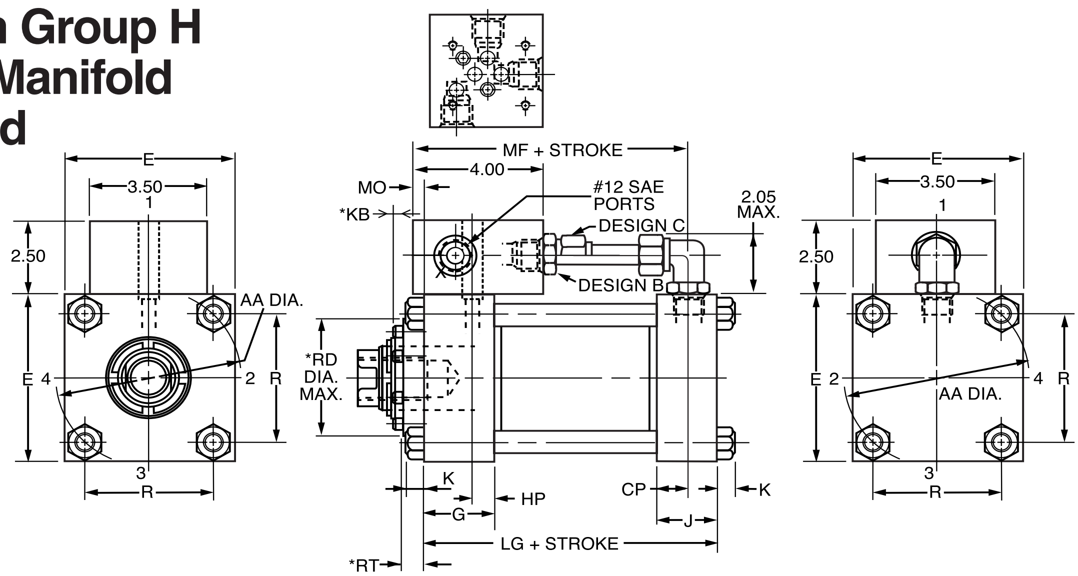
△BOM will overhang cap face
*Design B used only if stroke falls in between “Design B” and “Design C” min. stroke columns on chart.
*Design C used only for strokes in “Design C” column on chart and greater strokes.

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

B

3HX with Group H Bolt-on Manifold Head End

(NFPA D05)

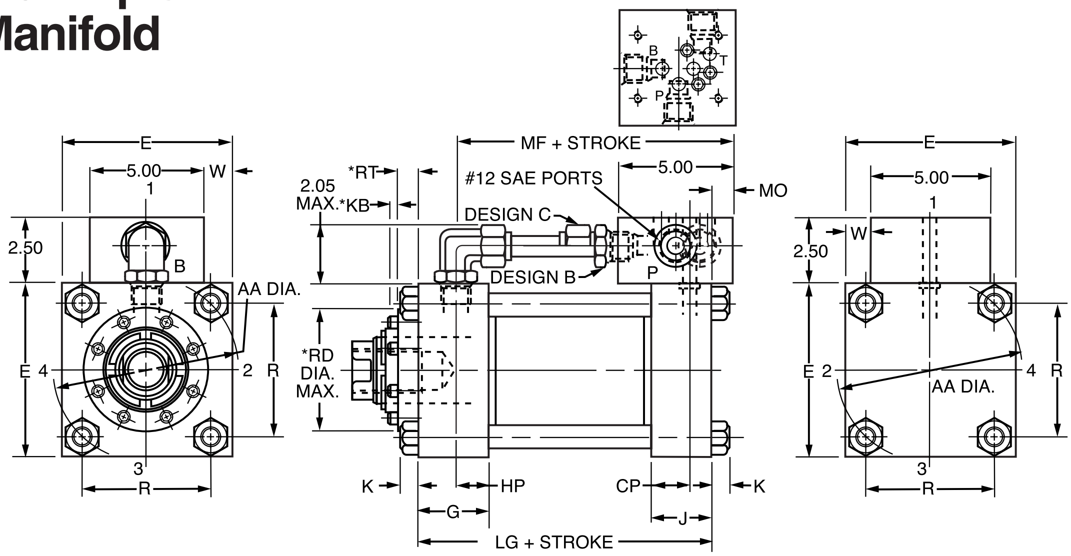


Group H/NFPA D05 Valve Manifold, Head End Mounted Series 3HX Cylinder												Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	Min. Stroke	Min. Stroke
7.00	.141△	8.500	7.141	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	0	.50
8.00	.016△	9.500	7.891	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	N/A	0

△BOM 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 J Bolt-on Manifold Cap End
(NFPA D06)

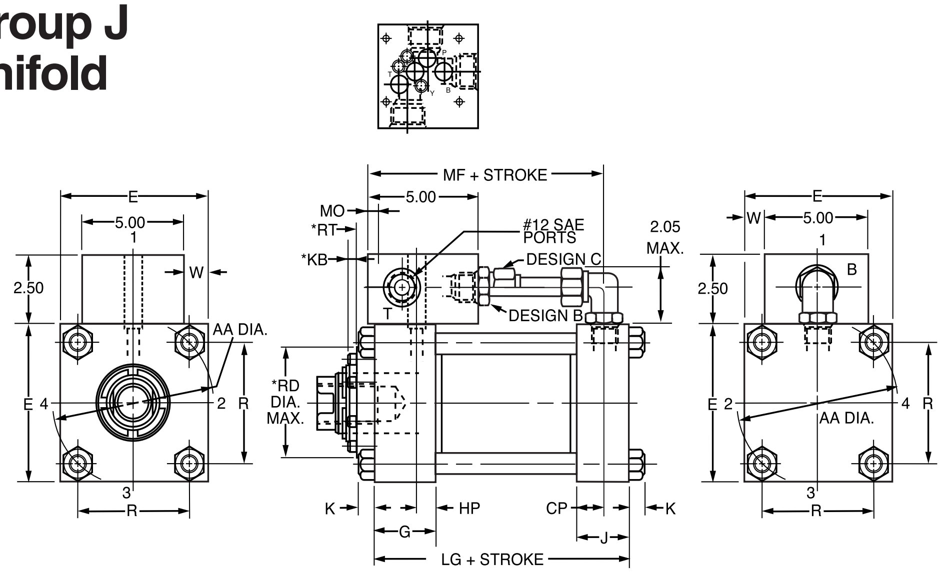


Group J/NFPA D06 Valve Manifold, Cap End Mounted Series 3HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	W	Min. Stroke	Min. Stroke
7.00	.375△	8.500	7.375	1.250	1.250	2.750	2.750	1.000	9.300	6.580	8.500	1.750	.25	1.125
8.00	.250△	9.500	8.125	1.375	1.375	3.000	3.000	1.062	10.600	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.
△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 J Bolt-on Manifold Head End
(NFPA D06)



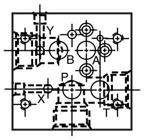
Group J/NFPA D06 Valve Bolt-on Manifold, Head End Mounted, Series 3HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	W	Min. Stroke	Min. Stroke
7.00	.375△	8.500	7.375	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	1.75	.250	1.125
8.00	.250△	9.500	8.125	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	2.25	0	.375

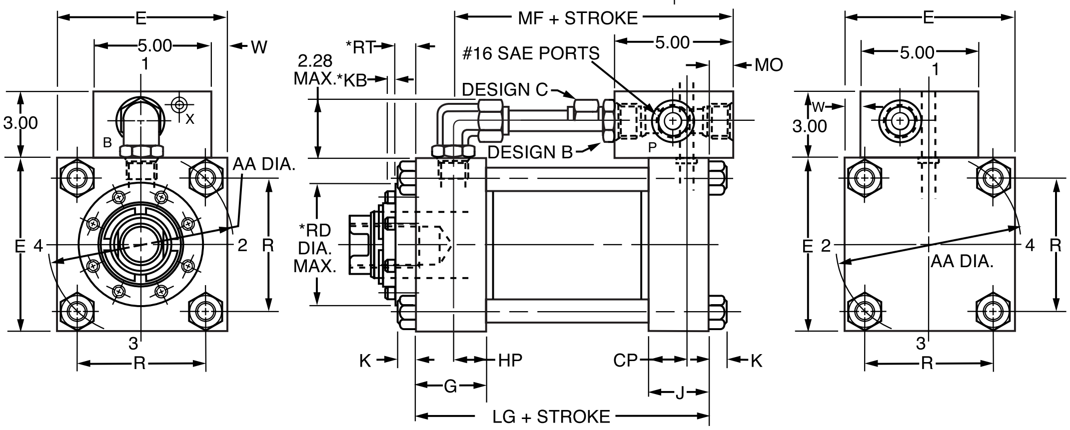
*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.
*Design C used only for strokes in "Design C" column on chart and greater strokes.
△BOM will overhang past head face.

*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.

3HX with Group K Bolt-on Manifold Cap End
(NFPA D07)



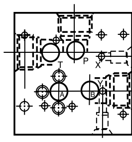


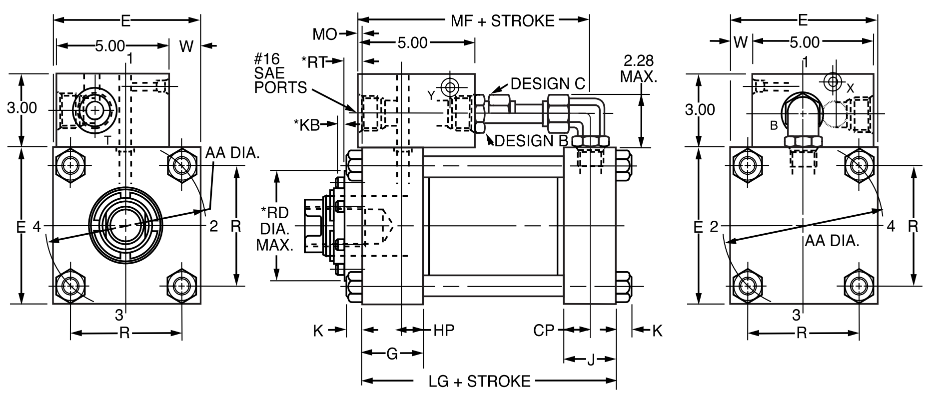
Group K/NFPA D07 Valve Manifold, Cap End Mounted Series 3HX Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	W	Min. Stroke	Min. Stroke
7.00	.344△	8.500	7.344	1.250	1.250	2.750	2.750	1.000	9.300	6.580	8.500	.935	.750	1.750
8.00	.219△	9.500	8.094	1.375	1.375	3.000	3.000	1.062	10.600	7.500	9.500	1.435	0	1.000

*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.
△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 K Bolt-on Manifold Head End
(NFPA D07)





Group K/NFPA D07 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	.344△	8.500	7.344	1.250	1.250	2.75	2.75	1.000	9.3	6.58	8.50	2.565	.750	1.75
8.00	.219△	9.500	8.094	1.375	1.375	3.00	3.00	1.062	10.6	7.50	9.50	3.065	0	1.000

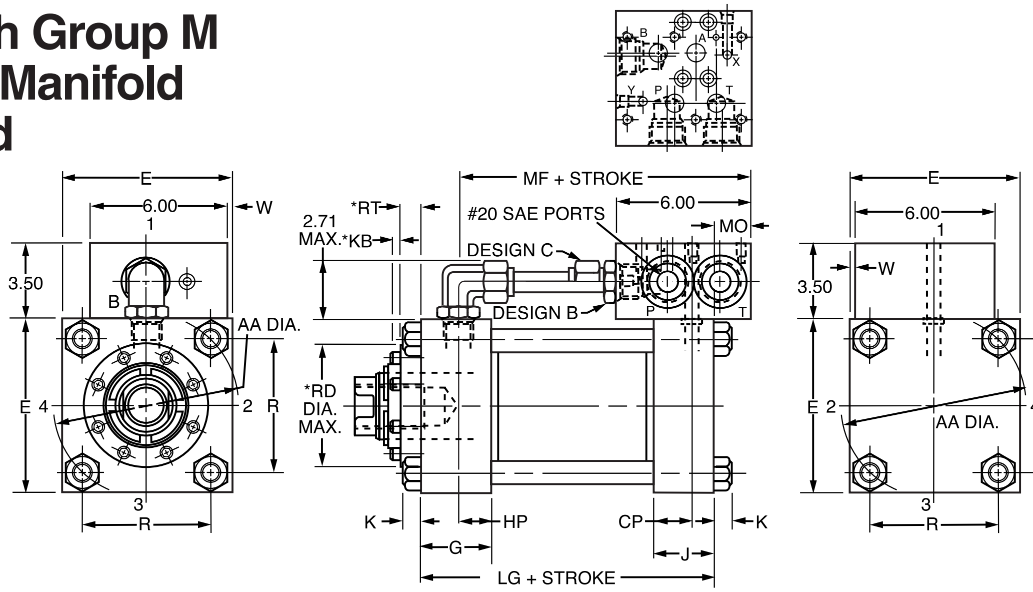
*Design B used only if stroke falls in between "Design B" and "Design C" min. stroke columns on chart.
*Design C used only for strokes in "Design C" column on chart and greater strokes.
△BOM will overhang past head face.

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

B

For Cylinder Division Plant Locations – See Page II.

3HX with Group M Bolt-on Manifold Cap End
(NFPA D08)

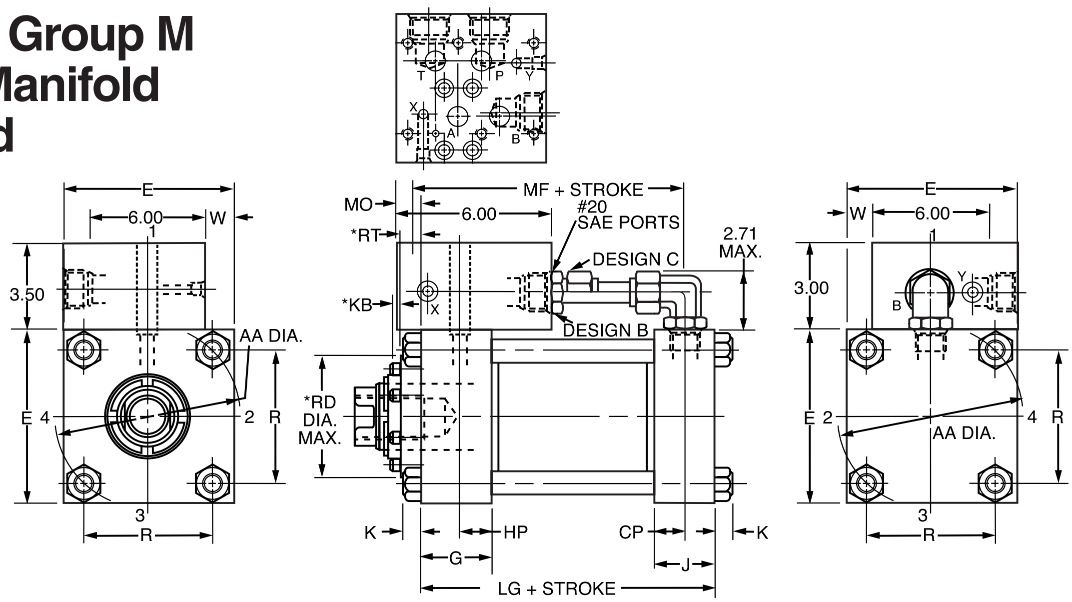


Group M/NFPA D08 Valve Manifold, Cap End Mounted Series 3H Cylinder													Design B*	Design C*
Bore	MO	E	MF	CP	HP	G	J	K	AA	R	LG	W	Min. Stroke	Min. Stroke
7.00	1.031△	8.500	8.031	1.250	1.250	2.750	2.750	1.000	9.300	6.580	8.500	.250	1.375	2.625
8.00	.906△	9.500	8.781	1.375	1.375	3.000	3.000	1.062	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.
△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
(NFPA D08)



Group M/NFPA 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△	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△	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.
△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 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
	6	CONSULT FACTORY							
3HX	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

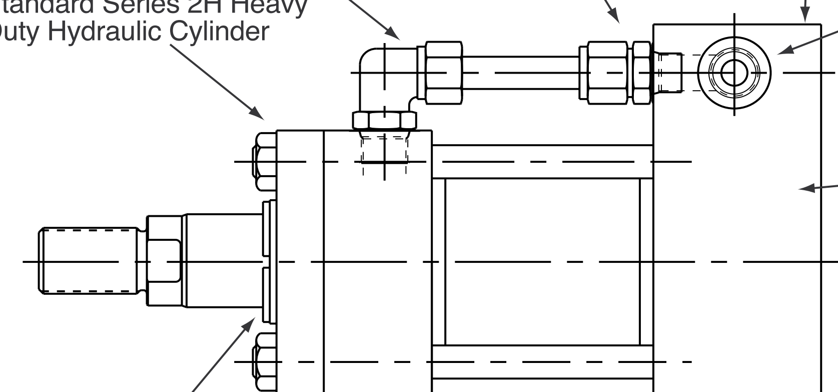
Series	Bore	MN	MX Bolt-on Manifold						
			Group A	Group D	Group G	Group H	Group J	Group K	Group M
2HX	2	3.125	1.562	N/A	1.906	1.391	N/A	N/A	N/A
	2.5	3.125	1.687	N/A	2.031	1.516	N/A	N/A	N/A
	3.25	3.75	2.218	1.281	2.563	2.047	N/A	N/A	N/A
	4	3.875	2.593	1.656	2.938	2.422	N/A	N/A	N/A
	5	3.875	3.093	2.156	3.438	2.922	N/A	N/A	N/A
	6	CONSULT FACTORY							
3HX	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

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

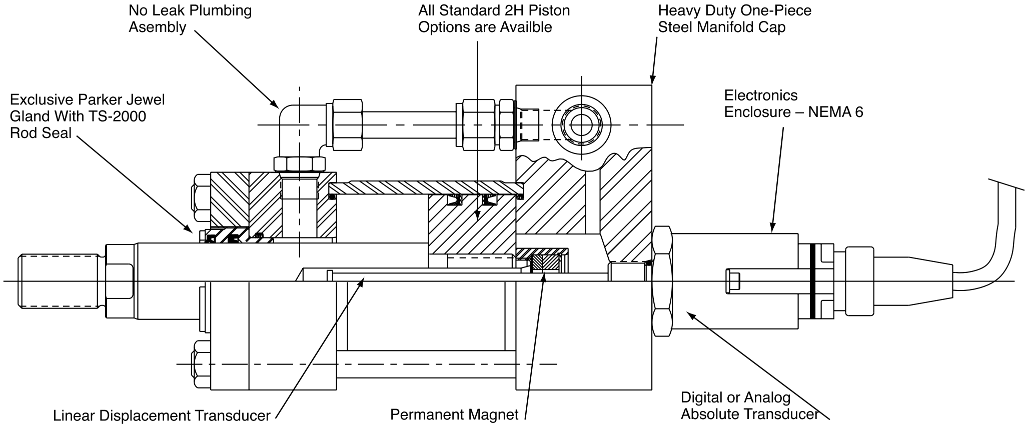
- Minimum hydraulic line runs with close cylinder and valve coupling.
- Simplified machine design with integrated components.
- Eliminates need for limit switches, deceleration valves, shock absorbers, and mechanical linkages in many applications.
- Minimum interference with standard mounting dimensions.
- 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 Magnetorestrictive Linear Displacement Transducer (LDT)

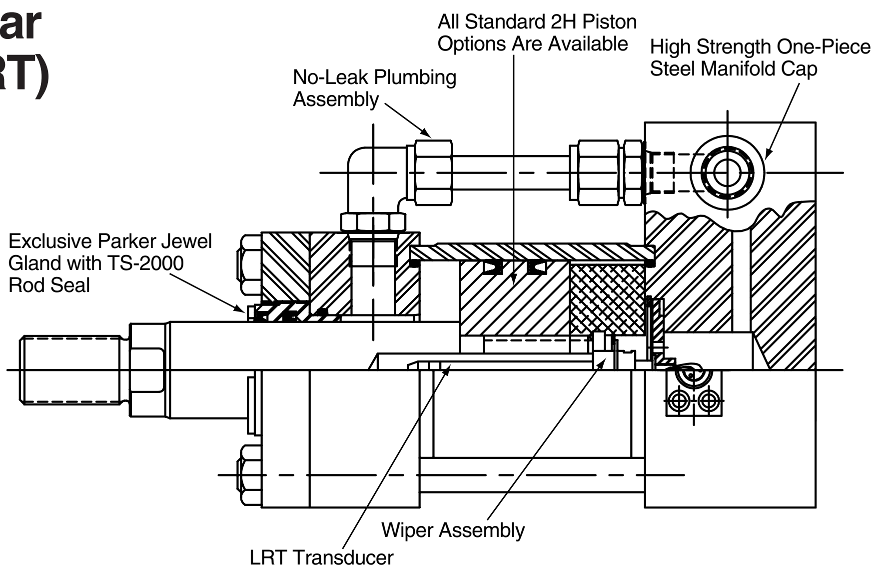


Here's How The Parker LDT Feeds Back Linear Position

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 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.

Series 2HX Electrohydraulic Actuators

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.

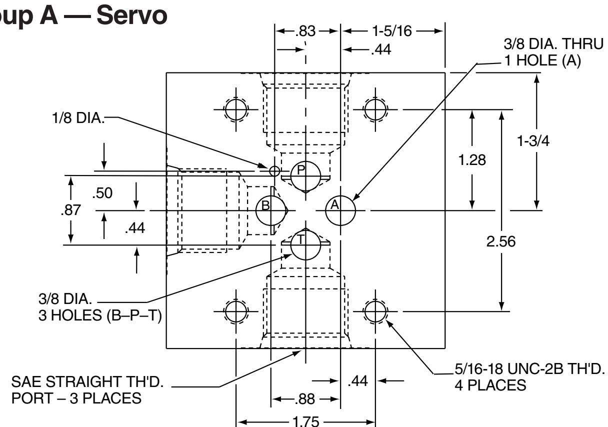
Servo Valve Mounting Interchange Chart

(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 73 Series MOOG 760 Series	MOOG 78 Series
Pegasus M & MP Series	Pegasus 180L Pegasus 180R
Vickers SM4-20-X-X-10	Vickers SM4-40-X-X-10

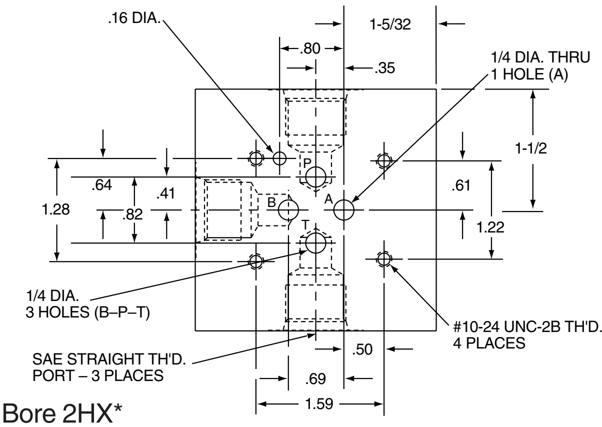
Standard Integral Valve Patterns

Group A — Servo



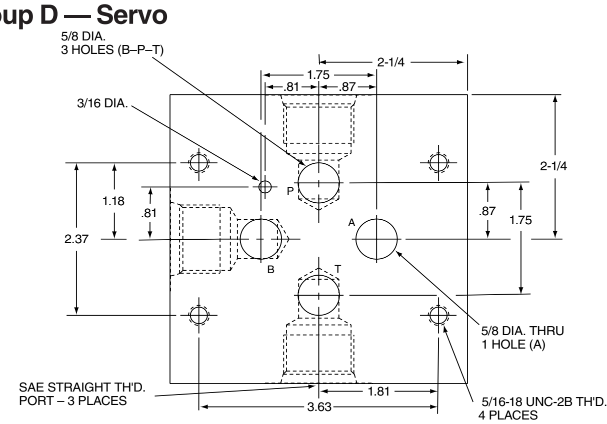
2" - 5" Bore 2HX*

Group G — NFPA DO3



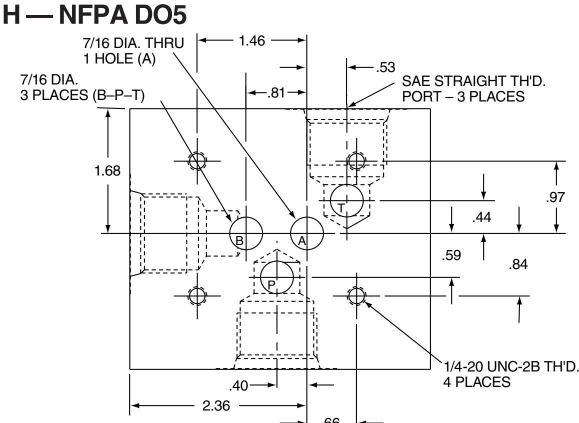
2" - 5" Bore 2HX*

Group D — Servo



2" - 5" Bore 2HX*

Group H — NFPA DO5



2" - 5" Bore 2HX*

*Note: For Integral Manifolds on larger bore sizes consult factory.

For additional information – call your local Parker Cylinder Distributor.

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

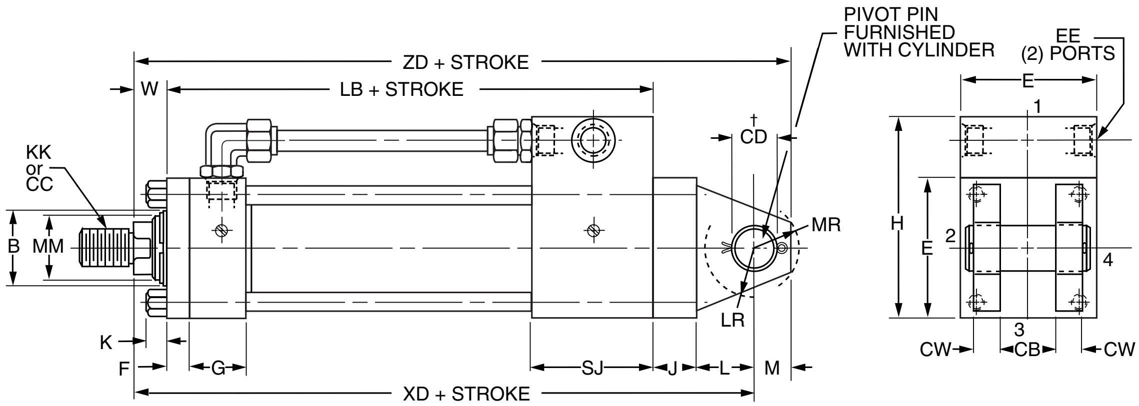
*The 4 to 1 design factor is based on the tensile strength of the piston to rod connection.

†A mini LRT (MLRT) is available for 1" Rods – Consult Factory.

Series 2HX Electrohydraulic Actuators

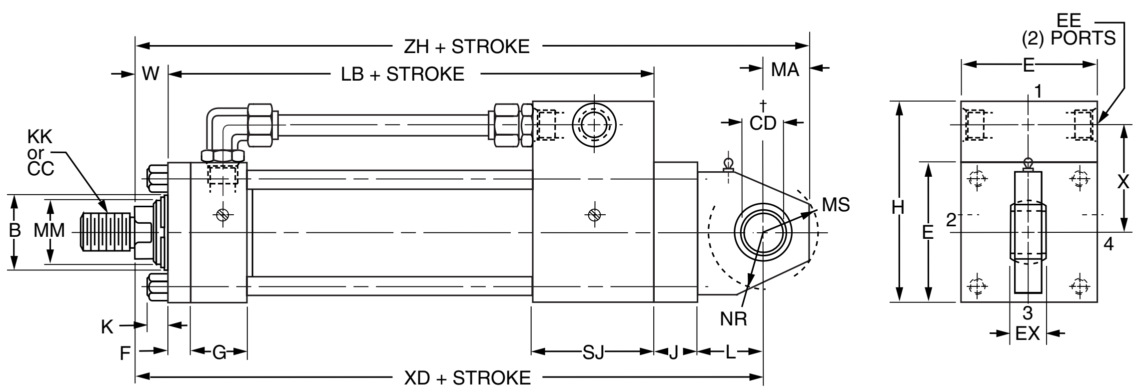
Cap Fixed Clevis

Style BB with No Feedback



Cap Spherical Bearing

Style SB with No Feedback

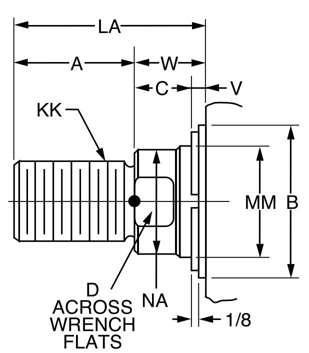


SB	Pressure Rating
2"	2200
2½"	1450
3¼"	1500
4	1850
5"	2000

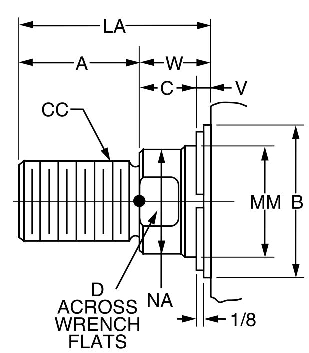
Pressure rating is for maximum life of cylinder and bearing based on dynamic load of commercial bearing.

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

Table 1 — Envelope and Mounting Dimensions

		SAE EE				H						X						+.000 -.002					LB Add Stroke		SJ	
Bore	E	*	**	F	G	*	**	J	K	L	M	*	**	LR	MR	CB	CW	CD†	EX	MA	MS	NR	*	**	*	**
2	3	10	NA	5/8	1 3/4	4 7/8	NA	1 1/2	7/16	1 1/4	3/4	1 7/8	NA	1	15/16	1 1/4	5/8	.751	21/32	1	1 3/8	1	6 5/8	8 1/8	2 7/8	NA
2 1/2	3 1/2	10	12	5/8	1 3/4	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	21/32	1	1 3/8	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 1/16	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

			Thread										Add Stroke					
													XD		ZD		ZH	
Bore	Rod No.	Rod Dia. MM	CC	KK	A	+.000 -.002 B	C	D	LA	NA	V	W	*	**	*	**	*	**
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	10 3/8	11 7/8	11 1/8	12 5/8	11 3/8	12 7/8
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	10 3/4	12 1/14	11 1/2	13	11 3/4	13 1/4
	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	10 1/2	12	11 1/4	12 3/4	11 1/2	13
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	11 1/4	12 3/4	12 1/4	13 3/4	12 1/2	14
	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 5/8	13 1/8	12 5/8	14 1/8	12 7/8	14 3/8
	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	11 1/2	13	12 1/2	14	12 3/4	14 1/4
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	14 1/8	14 1/8	15 1/2	15 1/2	16	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	14 1/2	14 1/2	15 7/8	15 7/8	16 3/8	16 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	14 1/4	14 1/4	15 5/8	15 5/8	16 1/8	16 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	14 7/8	14 7/8	16 5/8	16 5/8	17 3/8	17 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	15 1/8	15 1/8	16 7/8	16 7/8	17 5/8	17 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	15 1/8	15 1/8	16 7/8	16 7/8	17 5/8	17 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	15 1/8	15 1/8	16 7/8	16 7/8	17 5/8	17 5/8

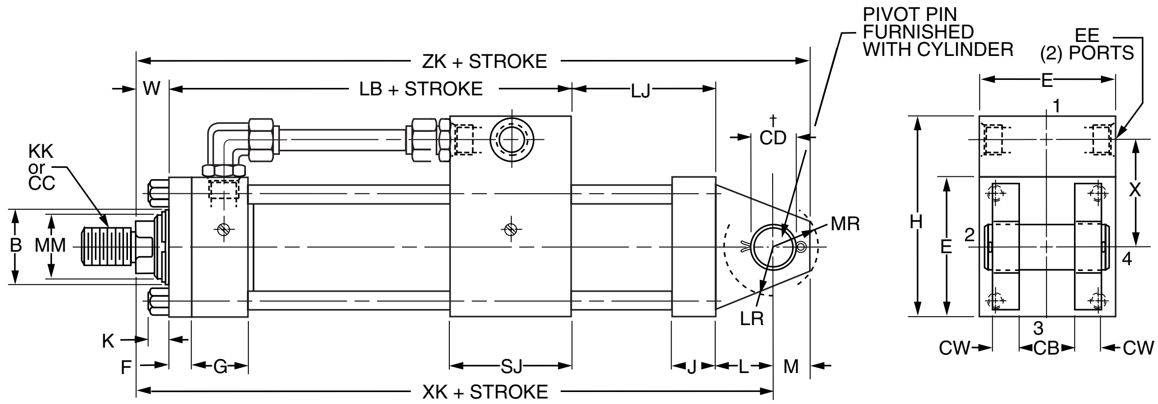
*For lower flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group A, G.
** For higher flow valves — see Standard Integral Valve Patterns in this 2HX Section, Group D, H.

B

Series 2HX Electrohydraulic Actuators

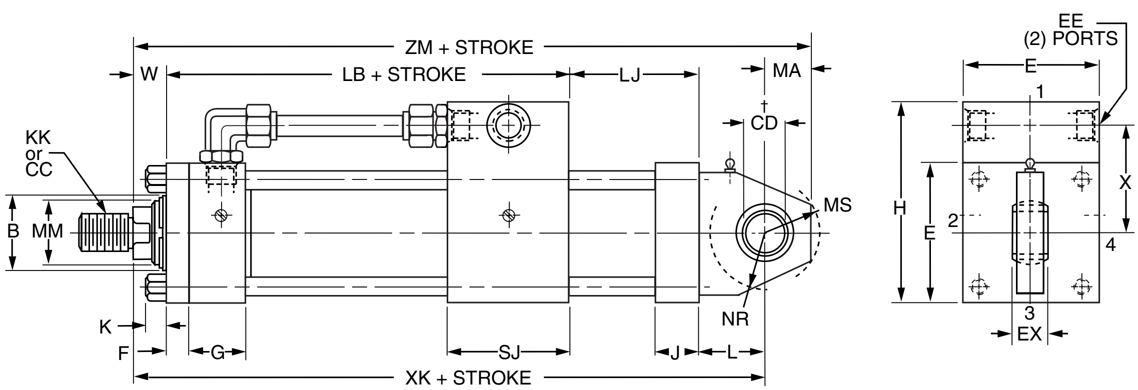
Cap Fixed Clevis

Style BB with LDT and LRT Feedback



Cap Spherical Bearing

Style SB with LDT and LRT Feedback

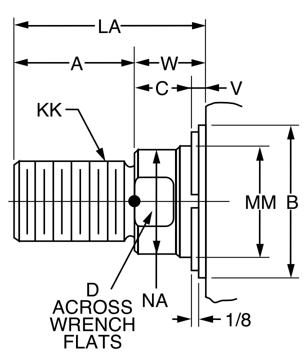


SB	Pressure Rating
2"	2200
2½"	1350
3¼"	1350
4"	1400
5"	1800

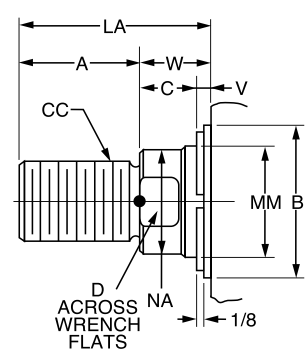
Pressure rating is for maximum life of cylinder and bearing based on dynamic load of commercial bearing.

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.

Table 1 — Envelope and Mounting Dimensions

Bore	E	SAE EE		F	G	H		J	K	L	M	X		LR	MR	CB	CW	+.000 -.002	EX	MA	MS	NR	LB Add Stroke		SJ		LJ††
		*	**			*	**					*	**					CD†					*	**	*	**	
2	3	10	NA	5/8	1 3/4	4 7/8	NA	1 1/2	7/16	1 1/4	3/4	1 7/8	NA	1	15/16	1 1/4	5/8	.751	21/32	1	1 3/8	1	6 5/8	NA	2 7/8	NA	5 1/2
2 1/2	3 1/2	10	12	5/8	1 3/4	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	21/32	1	1 3/8	1	6 3/4	8 1/4	2 7/8	4 3/8	5 1/2
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	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	1 7/8	2 7/16	1 5/8	9 1/4	9 1/4	4 3/8	4 3/8	5 3/4
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 1/16	9 3/4	9 3/4	4 3/8	4 3/8	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.

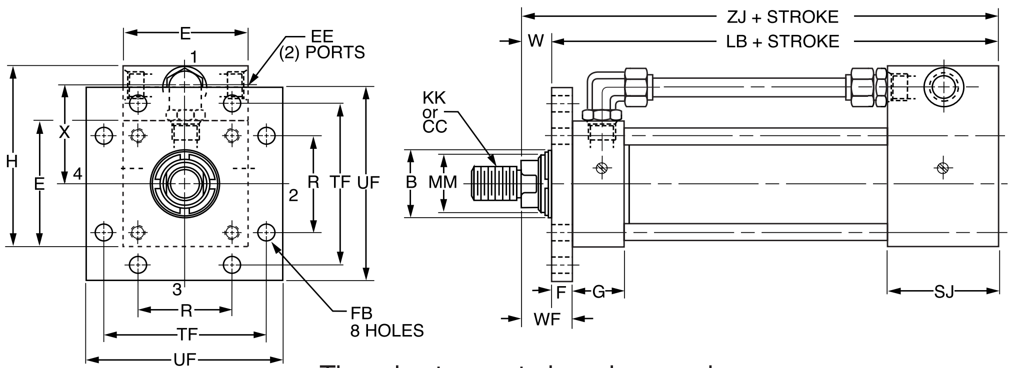
Table 2 — Rod End and Envelope Dimensions

Bore	Rod No.	Rod Dia. MM	Thread		A	+.000 -.002	C	D	LA	NA	V	W	Add Stroke					
													XK		ZK		ZM	
			CC	KK		B							*	**	*	**	*	**
2	2	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	14 3/8	15 7/8	15 1/8	16 5/8	15 3/8	16 7/8
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	14 3/4	16 1/14	15 1/2	17	15 3/4	17 1/4
	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	14 1/2	16	15 1/4	16 3/4	15 1/2	17
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	15/16	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	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	15 1/2	17	16 1/2	18	16 3/4	18 1/4
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	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.

B

Head Square Flange
Style JB — All Feedback Types

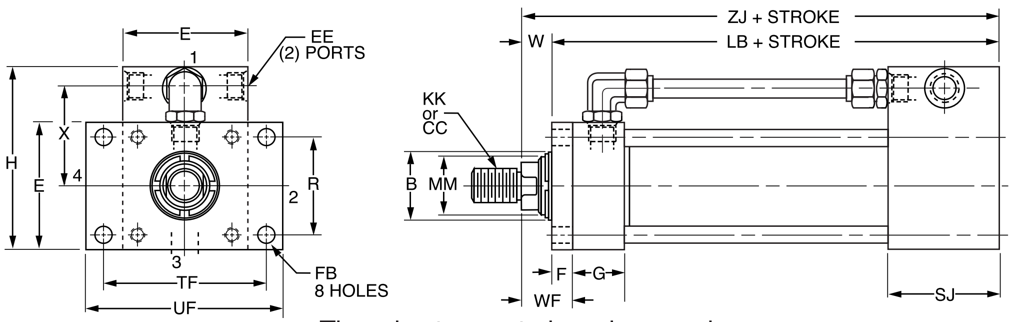


Tie rod nuts counterbored cap end.

Head Rectangular Flange
Style J — All Feedback Types

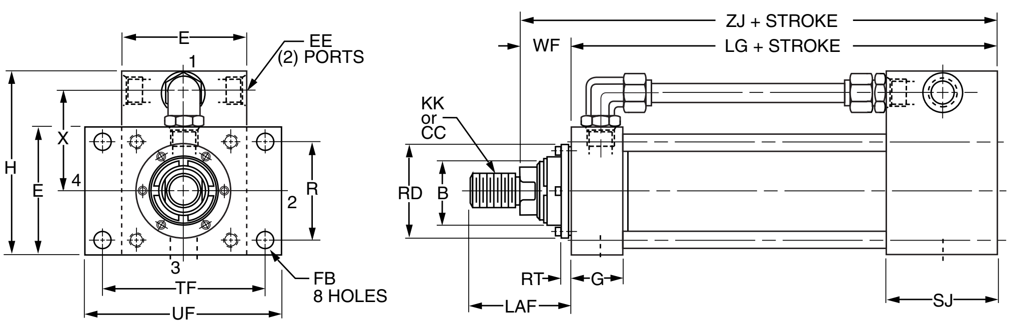
Bore Size	Max. PSI — Push* Rod Code 1	2	3	4	5
1 1/2	2500	1500	—	—	—
2	2500	1500	—	—	—
2 1/2	2500	1500	1900	—	—
3 1/4	2500	1500	2100	—	—
4	2500	1500	1800	—	—
5	2200	750	1650	1200	—

*Maximum pressure rating — push application.



Tie rod nuts counterbored cap end.

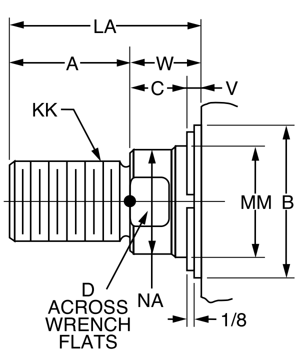
Head Rectangular
Style JJ — All Feedback Types



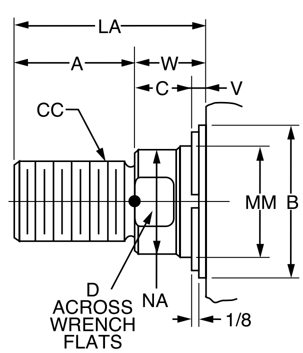
Tie rod nuts counterbored cap end.

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.

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	7/16	2.05	1 7/8	NA	9/16	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	7/16	2.55	2 1/4	3.04	9/16	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	9/16	3.25	2 3/4	3.54	11/16	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	9/16	3.82	3 1/8	3.125	11/16	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	13/16	4.95	3 5/8	3.625	15/16	8 3/16	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

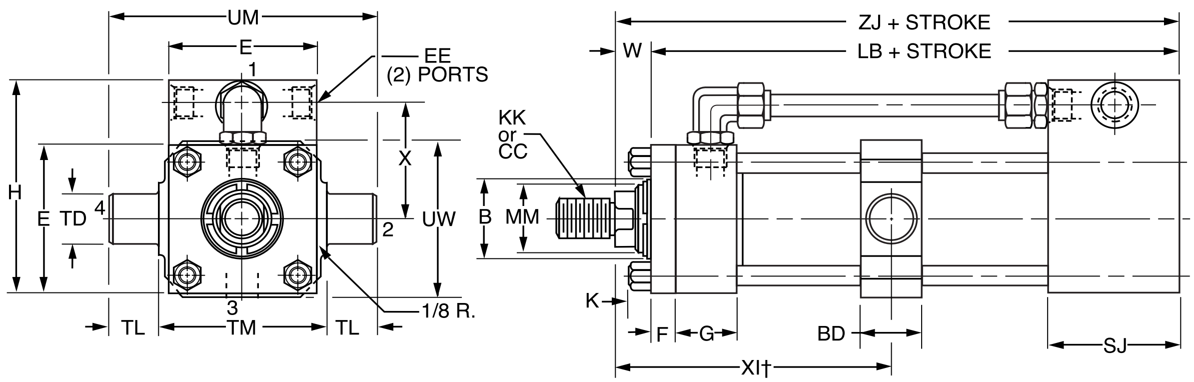
Bore	Rod No.	Rod Dia. MM	Thread CC	Thread KK	A	+.000 -.002 B	C	D	LA	LAF	NA	V	W	Max. RD	RT	WF	ZJ Add Stroke *	ZJ Add Stroke **
2	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	3 1/4	15/16	3/8	1	3	3/8	1 5/8	7 5/8	9 1/8
2 1/2	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	3 7/8	1 11/16	1/2	1 1/4	3 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	15/16	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	15/16	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.

B

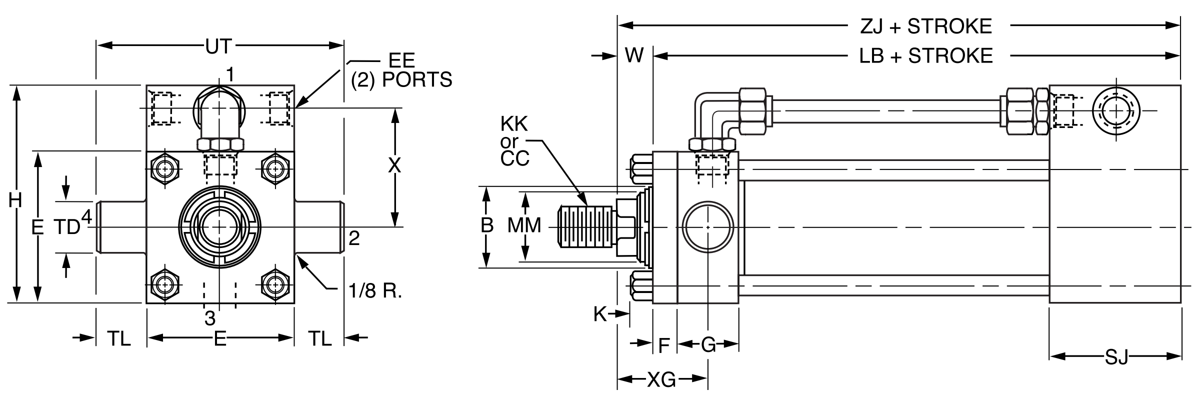
Intermediate Trunnion

Style DD — All Feedback Types



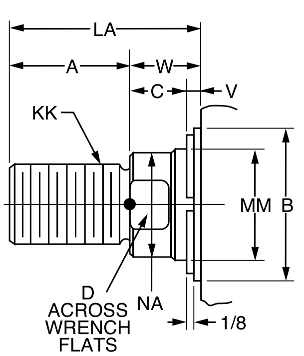
Head Trunnion

Style D — All Feedback Types

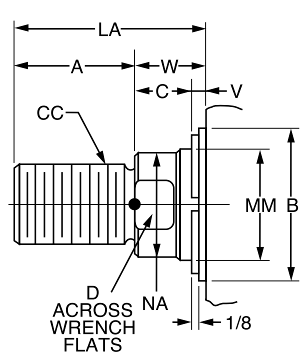


Rod End Dimensions — See Table 2

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.

Table 1 — Envelope and Mounting Dimensions

Bore	BD	E	SAE EE *	SAE EE **	F	G	H *	H **	K	X *	X **	TD +.000 -.001	TL	TM	UW	UM	UT	LB Add Stroke *	LB Add Stroke **	SJ *	SJ **
2	1 1/2	3	10	NA	5/8	1 3/4	4 7/8	NA	7/16	1 7/8	NA	1.375	1 3/8	3 1/2	4 1/8	6 1/4	5 3/4	6 5/8	NA	2 7/8	NA
2 1/2	1 1/2	3 1/2	10	12	5/8	1 3/4	5 3/8	5 5/8	7/16	2 1/4	3.04	1.375	1 3/8	4	4 5/8	6 3/4	6 1/4	6 3/4	8 1/4	2 7/8	4 3/8
3 1/4	2	4 1/2	12	12	3/4	2	6 5/8	6 5/8	9/16	2 3/4	3.54	1.750	1 3/4	5	5 13/16	8 1/2	8	7 3/8	8 7/8	2 7/8	4 3/8
4	2	5	12	12	5/8	2	7 1/8	7 1/8	9/16	3 1/8	3.125	1.750	1 3/4	5 1/2	6 3/8	9	8 1/2	9 1/4	9 1/4	4 3/8	4 3/8
5	2	6 1/2	12	12	7/8	2	8 5/8	8 5/8	13/16	3 5/8	3.625	1.750	1 3/4	7	7 3/4	10 1/2	10	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

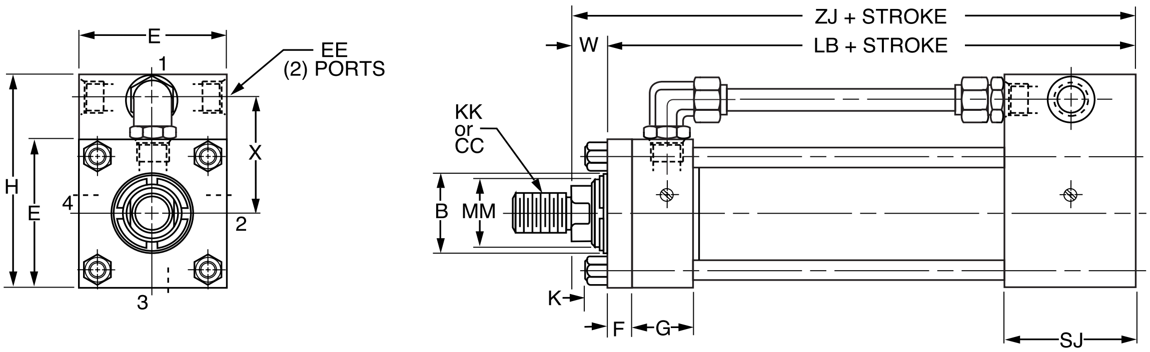
Bore	Rod No.	Rod Dia. MM	Thread CC	Thread KK	A	B +.000 -.002	C	D	LA	NA	V	W	XG	Min. XI†	ZJ Add Stroke *	ZJ Add Stroke **
2	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	1 5/16	3/8	1	2 1/2	4 3/16	7 5/8	9 1/8
2 1/2	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	2 3/4	4 7/16	8	9 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	2 1/2	4 3/16	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	2 5/8	4 11/16	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	3	5 1/16	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	2 7/8	4 15/16	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	2 7/8	4 15/16	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	3 1/4	5 5/16	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	3	5 1/16	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	3	5 1/16	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	3 1/4	5 5/16	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	3 1/4	5 5/16	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	3 1/4	5 5/16	11 1/8	11 1/8

†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.

Series 2HX Electrohydraulic Actuators

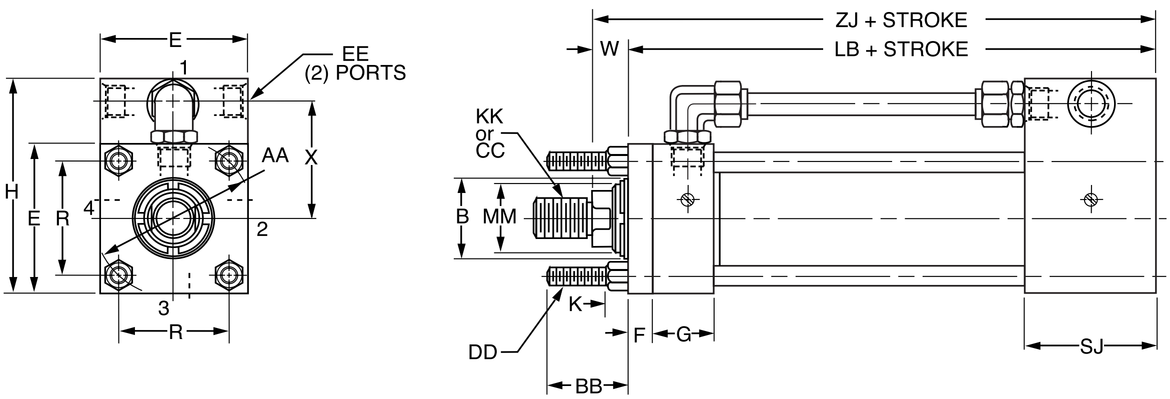
No Mount

Style T — All Feedback Types



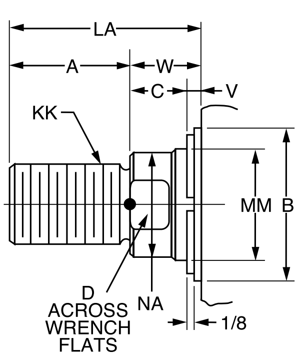
Tie Rods Extended Head End

Style TB — All Feedback Types

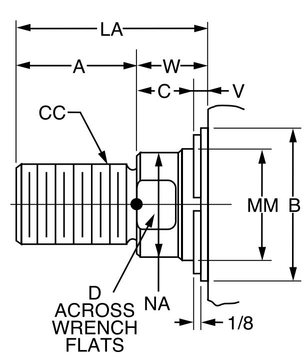


Rod End Dimensions — See Table 2

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.

Table 1 — Envelope and Mounting Dimensions

Bore	AA	BB	DD	E	SAE EE *	SAE EE **	F	G	H *	H **	K	R	X *	X **	LB Add Stroke *	LB Add Stroke **	SJ *	SJ **
2	2.90	1 13/16	1/2-20	3	10	NA	5/8	1 3/4	4 7/8	NA	7/16	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	7/16	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	9/16	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	9/16	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	13/16	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

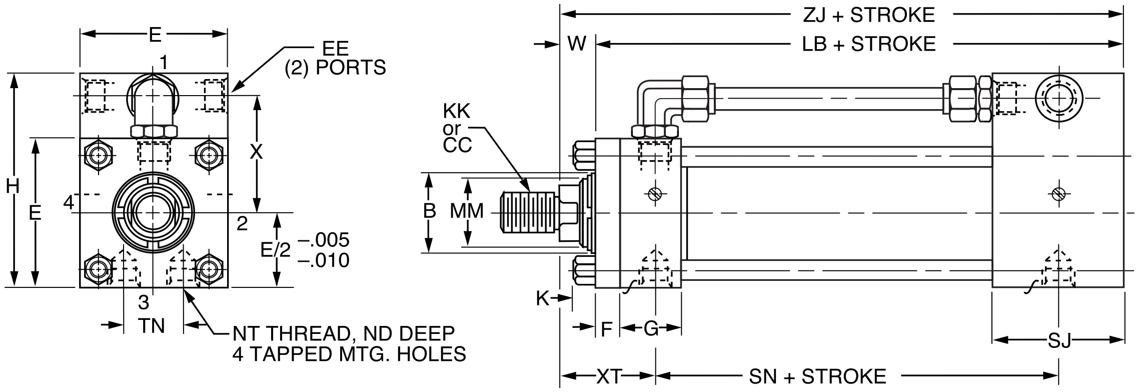
Bore	Rod No.	Rod Dia. MM	Thread CC	Thread KK	A	+.000 -.002 B	C	D	LA	NA	V	W	ZJ Add Stroke *	ZJ Add Stroke **
2	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	1 5/16	3/8	1	7 5/8	9 1/8
2 1/2	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	8	9 1/2
	3	1 3/8	1 1/4-12	1-14	1 5/8	1.999	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.

B

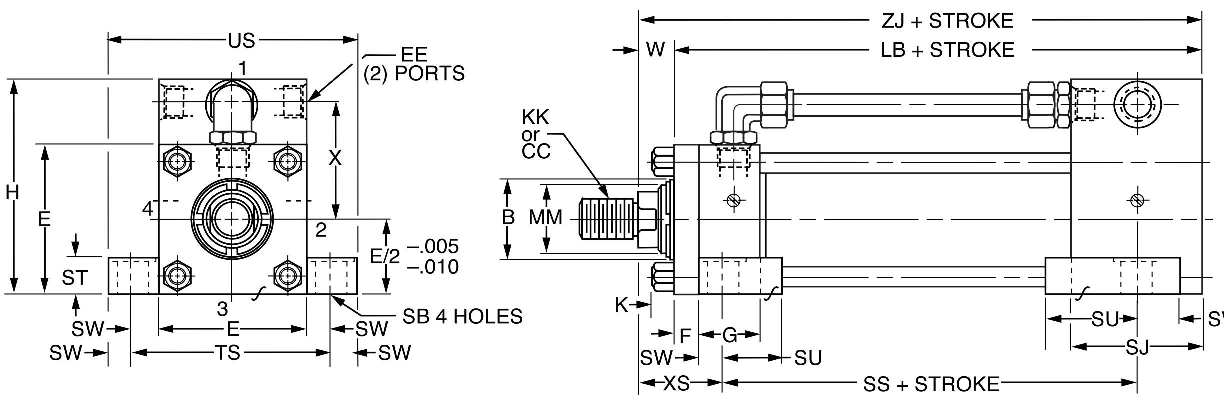
Side Tapped

Style F — All Feedback Types



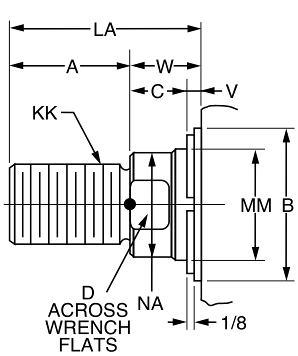
Side Lugs

Style C — All Feedback Types

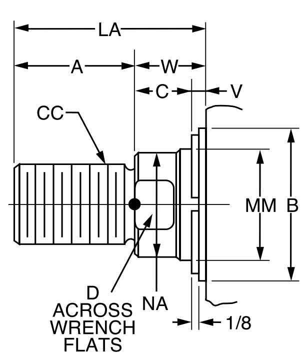


Rod End Dimensions — See Table 2

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.

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	1 3/4	4 7/8	NA	1 1/2	7/16	1 7/8	NA	1/2-13	9/16	3/4	1 1/4	1/2	15/16	4	5	6 5/8	NA	2 7/8	NA	3 5/8	2 7/8
2 1/2	3 1/2	10	12	5/8	1 3/4	5 3/8	5 5/8	1 1/2	7/16	2 1/4	3.04	5/8-11	13/16	1	1 9/16	11/16	1 5/16	4 7/8	6 1/4	6 3/4	8 1/4	2 7/8	4 3/8	3 3/8	3
3 1/4	4 1/2	12	12	3/4	2	6 5/8	6 5/8	1 1/2	9/16	2 3/4	3.54	3/4-10	13/16	1	1 9/16	11/16	1 1/2	5 7/8	7 1/4	7 3/8	8 7/8	2 7/8	4 3/8	4 1/8	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	6 3/4	8 1/2	9 1/4	9 1/4	4 3/8	4 3/8	4	3 3/4
5	6 1/2	12	12	7/8	2	8 5/8	8 5/8	1 3/4	13/16	3 5/8	3.625	1-8	1 1/16	1 1/4	2	7/8	2 15/16	8 1/4	10	9 3/4	9 3/4	4 3/8	4 3/8	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

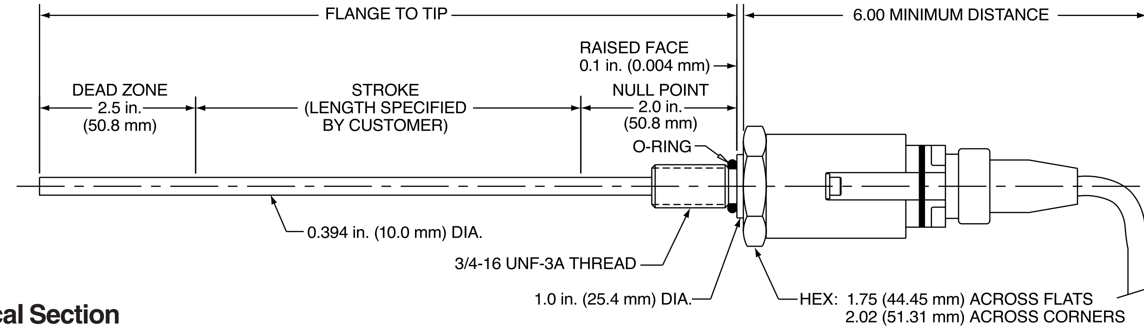
Bore	Rod No.	Rod Dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	A	+.000 -.002 B	C	D	LA	NA	V	W	ND	XS	XT	ZJ Add Stroke	
																*	**
2	2	1 3/8	1 1/4-12	1-14	1 5/8	1.999	5/8	1 1/8	2 5/8	1 5/16	3/8	1	7/16	2 1/8	2 5/8	7 5/8	9 1/8
2 1/2	2	1 3/4	1 1/2-12	1 1/4-12	2	2.374	3/4	1 1/2	3 1/4	1 11/16	1/2	1 1/4	1/2	2 9/16	2 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	1 5/16	3/8	1	1/2	2 5/16	2 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	1 5/16	1/4	7/8	11/16	2 5/16	2 3/4	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	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	11/16	2 9/16	3	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	11/16	2 3/4	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	4 3/8	2 3/8	3/8	1 3/8	11/16	3 1/8	3 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	11/16	2 7/8	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	3 3/8	1 15/16	1/4	1 1/8	1	2 7/8	3 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	1	3 1/8	3 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	1	3 1/8	3 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	1	3 1/8	3 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.

B

Transducer

LDT Technical Specifications

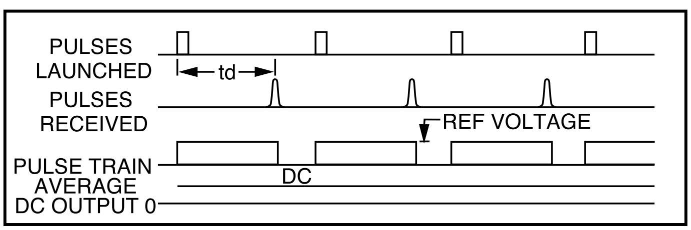


LDT Technical Section

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 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.

Standard Specifications

Parameter	Specification
Resolution:	*Analog:* Infinite *Digital:* 1 ÷ [gradient x crystal freq. (mHz) x circulation]
Non-Linearity:	±0.02% or ±0.05 mm (±0.002 in.), whichever is greater 0.002 in. is the minimum absolute linearity and varies with sensor model
Repeatability:	Equal to resolution
Hysteresis:	<0.02 mm (0.0008 in.)
Outputs:	*Analog:* Voltage or Current *Digital:* Start/Stop or PWM
Measuring Range:	*Analog:* 25 to 2540 mm (1 to 100 in.) *Digital:* 25 to 7600 mm (1 to 300 in.)
Operating Voltage:	+13.5 to 26.4 Vdc (±0%): Strokes $\leq$1525 mm (60 in.) +24 Vdc (±10%): Strokes > 1525 mm (60 in.)
Power Consumption:	100 mA
Operating Temperature:	*Head Electronics:* -40 to 85°C (-40 to 185°F) *Sensing Element:* -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:	*Analog:* $\leq$1 ms *Digital:* Minimum = [Stroke (specified in inches) + 3] x 9.1 µs
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.

B

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 = ±10V DC
(1 to 400 in/sec)

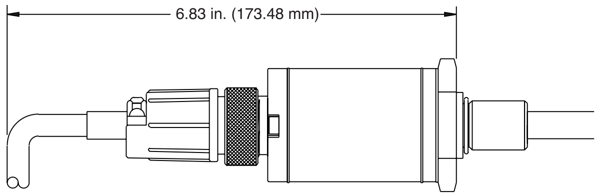
Power Supply:

+24V DC standard
±15V DC optional

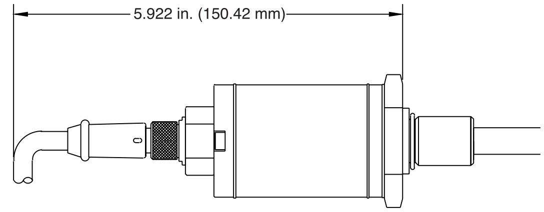
LDT Connector Options

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.

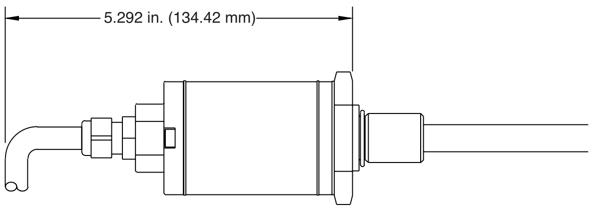
Style RB — Connector with Cable



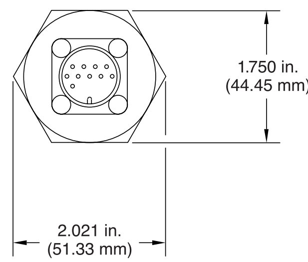
Style RG – Connector with Cable



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:

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 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 positiive 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.

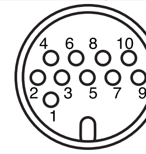


Figure A-1 — LDT Pin Diagram

For additional information – call your local Parker Cylinder Distributor.

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.

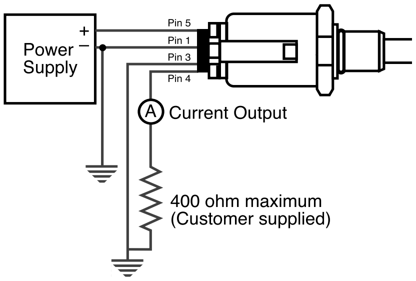


Figure B-1 —
LDT with Current Output

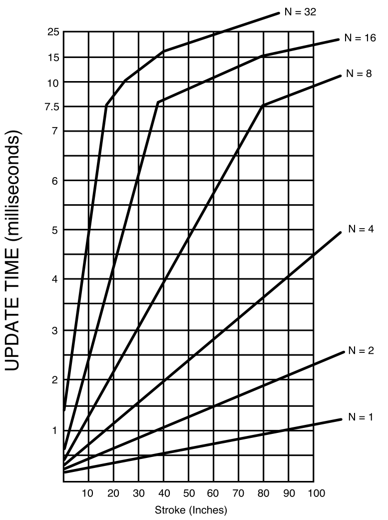
Note: Style RO Integral Pigtail Cables are supplied as standard on LDTs used with styles A and F protective enclosures.

B

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

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)

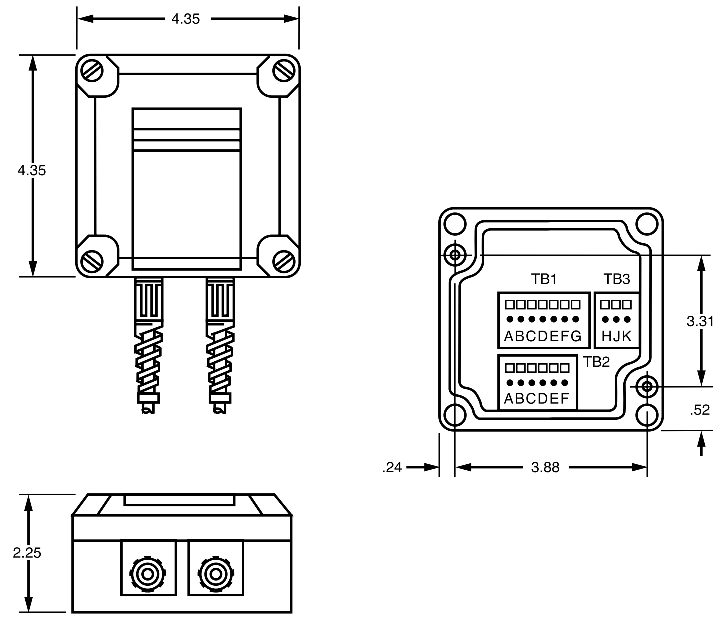
Terminal	Pre-1995 Cable Colors	1995 Cable Colors	Function
TB2-B	White/Blue Stripe	White	DC Ground
	Blue/White Stripe	Brown	Frame
	White/Brown Stripe	Black	Return
	Gray/White Stripe	Green	DC Ground
TB2-C	Brown/White Stripe	Violet	Return Pulse Output
TB2-E	White/Gray Stripe	Yellow	Interrogation Pulse
TB2-F	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

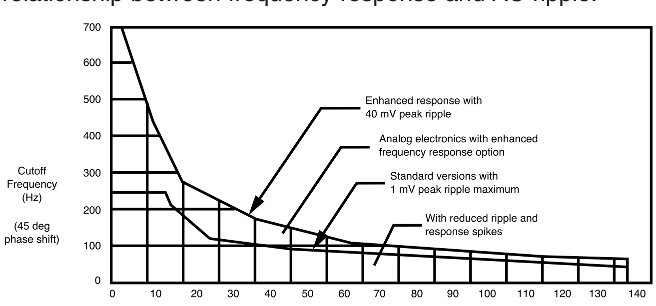
Max. distance from transducer - 250 ft.



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 group shown illustrates the following relationship between frequency response and AC ripple.

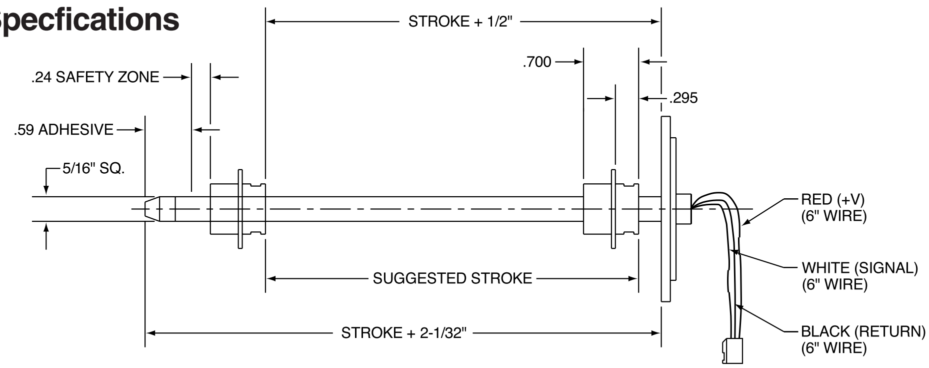


Ripple Magnitude and Frequency Response

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.

Transducer LRT Technical Specfications



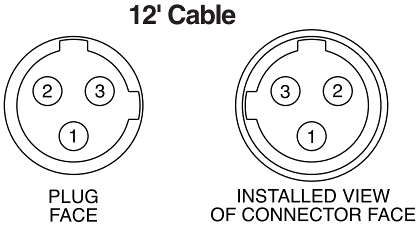
Standard Features

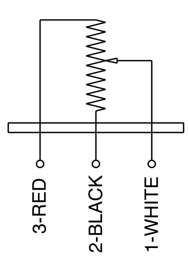
- Available in strokes to 120".
- Unique, easy to apply cylinder position sensing system.
- Infinite resolution, high linearity and repeatability.
- Innovative, resistive element is made of conductive plastic.
- 3 pin Brad Harrison electrical connector available at any cap position not occupied by a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

12' Cable





Cable
#0854430012

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 (±20%) + end resistance.

End Resistance: 800

Maximum Velocity: 30 inches per second

Life Expectancy: Greater that 50 x 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) 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 feed-back 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)	Ouput
2	Red w/Blk	Black (resistor base)	V-
3	Red w/White	Red (resistor tip. power)	V+

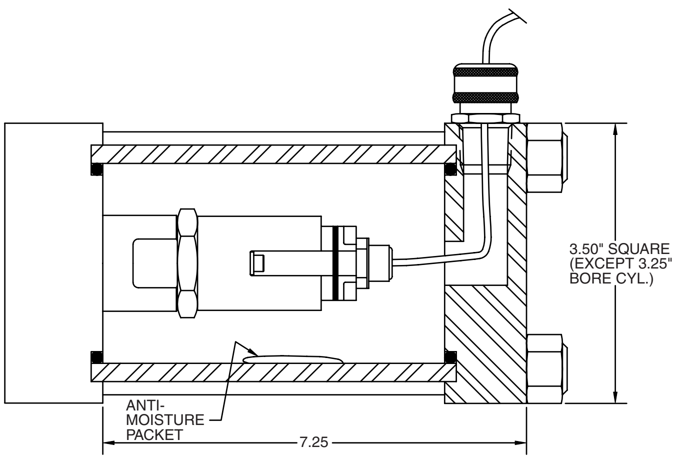
B

Series 2HX Electrohydraulic Actuators

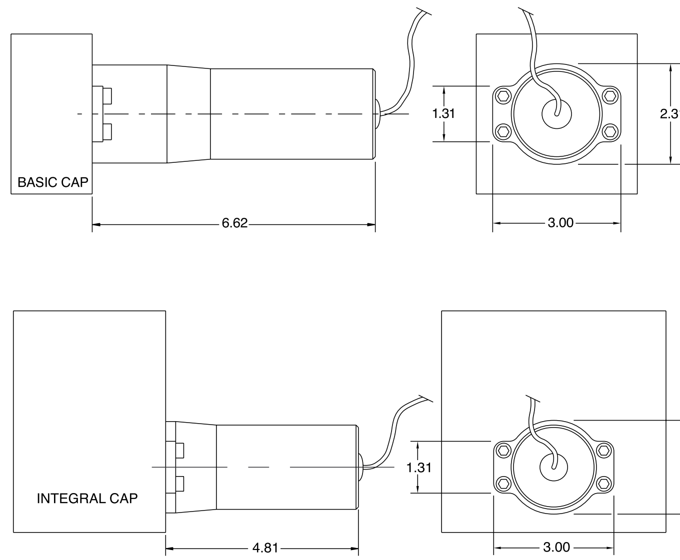
Protective Enclosures for Feedback Devices

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.

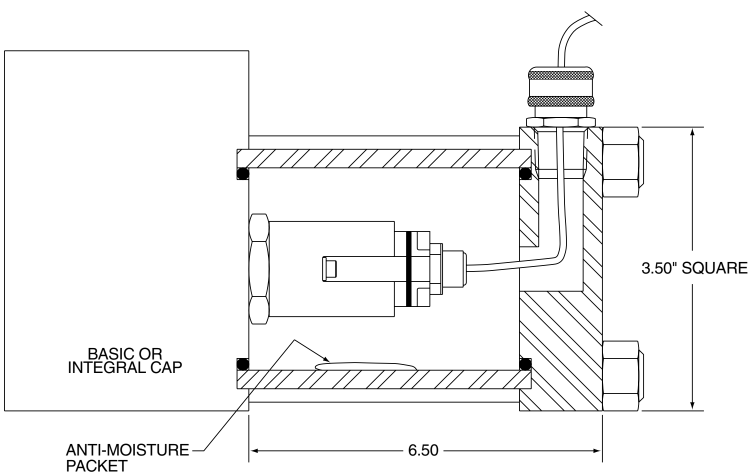
Note: Since this design uses common tie rods, the actuator must be disassembled to service or install feedback devices.



Style D — For LDT Basic and Intergral 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 $2^1/_2$" and $3^1/_4$" 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.

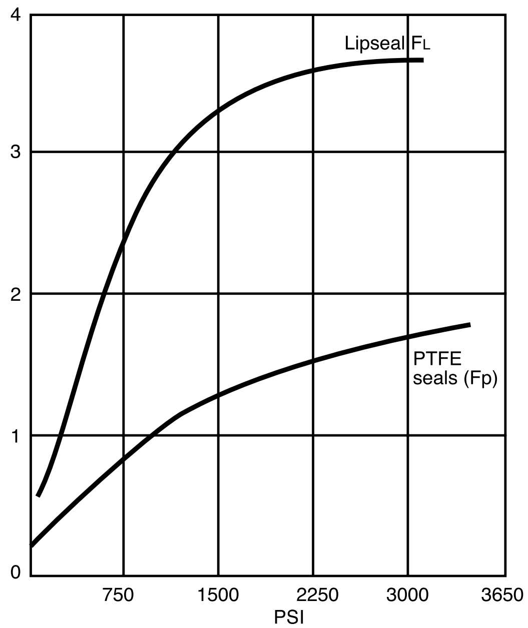
Explosion Proof LDT
Factory Mutual Approved

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:	**Formula:**
Lipseal Rod + Piston	$12d + 12F_Ld + 24F_LD$
Lipseal Rod w/ Low Friction Piston	$12d + 12F_Ld + 12F_pD$
Low Friction Rod + Piston	$12d + 30F_pd + 6F_pD$
Where: d = rod dia. (in.)	D = bore dia. (in.)

F_L = friction factor for lipseals (F_L)
F_p = friction factor for PTFE (F_p)

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) $\cong 12d + 30F_pd + 6F_pD$
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

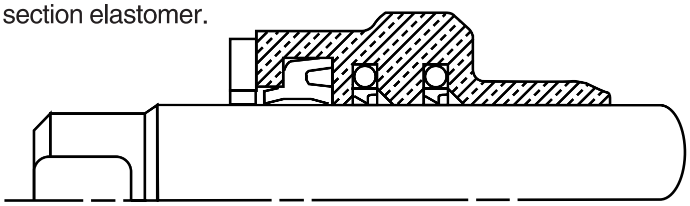
$F_p \times 1.0 \cong F_p$

Based on zero pressure:

Friction (lbs. force) $\cong 12d + 30F_pd + 6F_pD$
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.

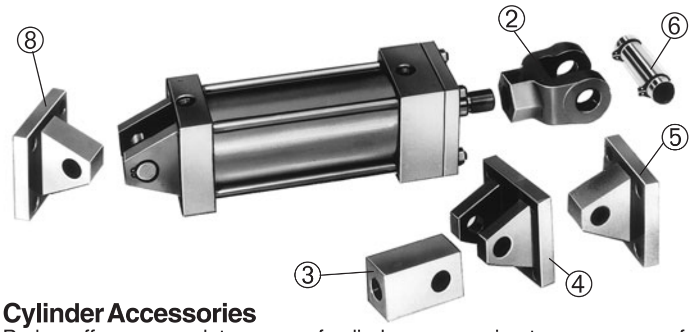
Fluid Compatibility

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.”

B



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

	Mating Parts			Mating Parts			
Thread Size	Rod Clevis	Eye Bracket	Pin	Knuckle	Clevis Bracket	Pin	Alignment Coupler
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.

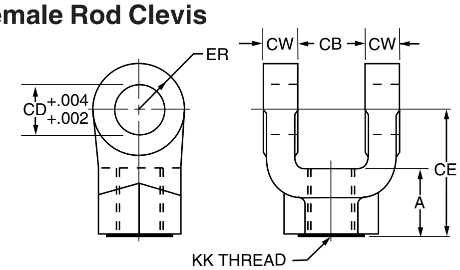
Chart B

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"

Mounting Plates

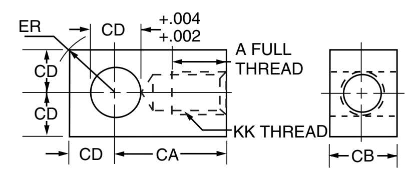
Mounting Plates for Style BB (clevis mounted) cylinders are offered. To select proper part number for your application, refer to Chart B to above right.

2 Female Rod Clevis



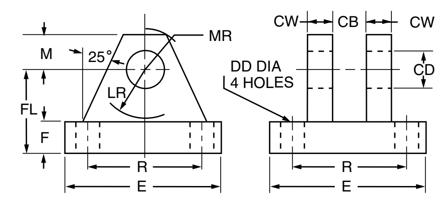
Order to fit thread size.

3 Knuckle (Female Rod Eye)



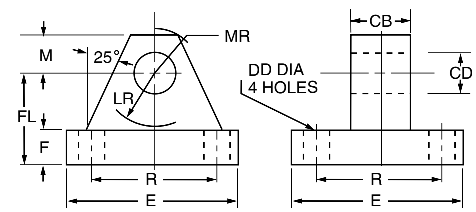
Order to fit thread size.

4 Clevis Bracket for Knuckle



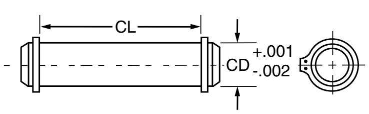
Order to fit Knuckle.

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.

	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	11/32	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	7/16	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 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.

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.

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 Modifi-cation	Series	Piston	Ports	Common Modifi-cations	Special Modifi-cations	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 compatability 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 consider-ations.	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.

B

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	N = Not applicable	N = Not Applicable	N = None	N = Not Applicable	N = Not Applicable
B = Bolt-On*	A = Servo Group A††	H = Head	C = LDT•	1 = Prepare to accept	A = False Stage
I = Integral**	D = Servo Group D††	C = Cap	F = LRT••	2 = Included	D = Light Duty
	G = D03 (Group G)		X = Other***		F = Medium Duty
	H = D05 (Group H)		(Please specify)***		
	J = D06 (Group J)†				
	K = D07 (Group K)†		B = BALLUFF		
	M = D08 (Group M)†				
	X = Other***				
	(Please Specify)***				

* 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

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 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.

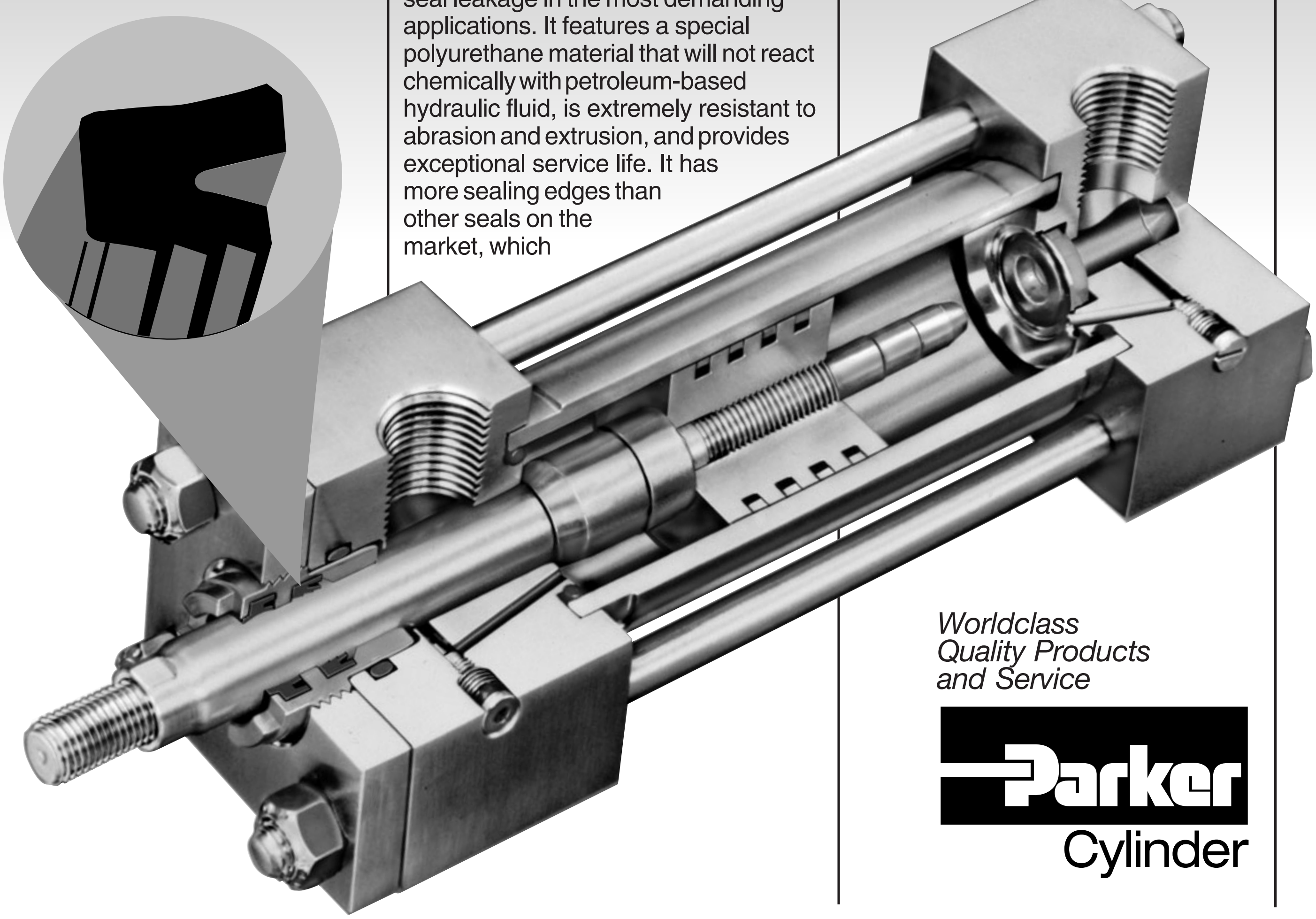
"Jewel" gland with wiperseal and TS-2000 cylinder rod seal.

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.



Worldclass Quality Products and Service

Parker Cylinder

For additional information – call your local Parker Cylinder Distributor.