



SHEFFER™

PNEUMATIC & HYDRAULIC CYLINDERS



ELECTRONIC

POSITIONING CYLINDERS

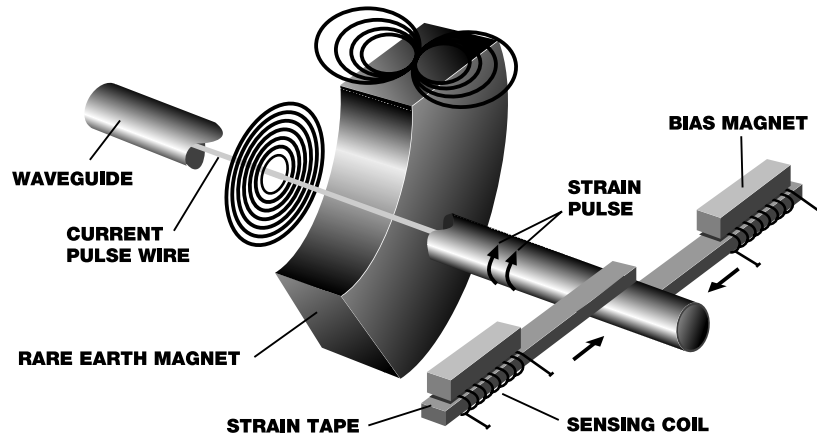
► **Electronic Positioning Cylinders**

Terms

Dead Zone	The last 2.5 inches of the transducer rod from the end of stroke to the end of the rod. The magnet must not be permitted to enter the dead zone, which causes an unpredictable output.	Resolution	The smallest increment of stroke that can be detected and indicated on the output.
Hysteresis	The maximum error that can be expected when returning to a point from the opposite direction.	Null Space	The distance from the transducer head face and the start of the stroke.
Repeatability	The ability to return to the same linear measurement with the same direction of travel. This is generally more important than non-linearity for most applications.	Null Position	The magnet position on the transducer rod which produces a zero or minimum output signal.
Non-Linearity	The deviation of the actual from the theoretical position of the output signal. For most applications the non-linearity is considered the same as "Accuracy".	Stroke	The active or sensing portion of the transducer rod.
		Analog	Transducer output that yields 10-0 or 0-10 V off two separate wires, where final voltage output is proportional to the magnet position.
		Digital	Transducer output produces start/stop signals with outputs in counts, square wave in quadrature or parallel binary/BCD.

Magnetostrictive Sensing

In MTS' magnetostrictive sensor, the interaction of two magnetic fields induces a torsional strain pulse in a waveguide. One field emanates from a rare earth magnet; the other is generated by a current pulse launched on a wire inside the guide. Magnet position is sensed by measuring the time lapse between the launch of the current pulse and the arrival of the strain pulse.



Performance Specifications

LDT (Linear Displacement Transducer)

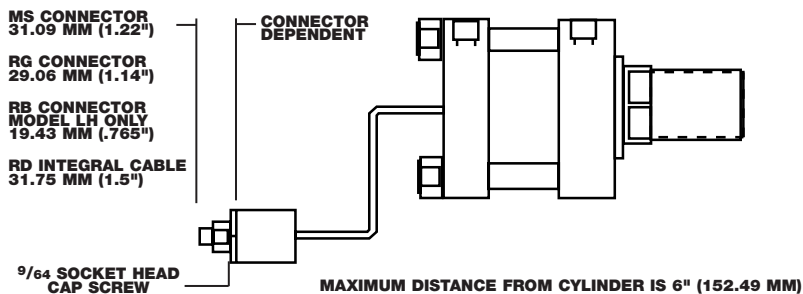
Operating Voltage	+13.5 to +24 Volts DC
Non-Linearity	<+0.03% of full stroke or +0.05 mm (+0.0002 inches), whichever is greater
Resolution	0.10 mm (0.004 inches) with on circulation with 28 MHz counter (Digital) infinite (Analog)
Hysteresis	<0.02 mm (0.0008 inches)
Response Time	(Analog) <3ms (Digital) Update 10,000 measurements per second
Measuring Range	Analog (1-78 inches, US customary) Metric 25-2000mm Digital (1-120 inches, US customary) Metric 25-2000 mm
Operating Pressure	5,000 psi static; maximum 10,000 psi spike Enclosure Designed to meet NEMA 6

LRT (Linear Resistor Transducer)

Input Voltage	5-50 Volts DC
Non-Linearity	0.1% of total stroke up to 48 inches 1% of total stroke to 130 inches
Repeatability	0.001 inches
Life	500 million inches of travel
Velocity	Hydraulic = 30 inches per second Pneumatic = 50 inches per second
Output	Analog, DC voltage only
Operating Pressure	5,000 psi maximum

▶ Electronic Positioning Cylinders

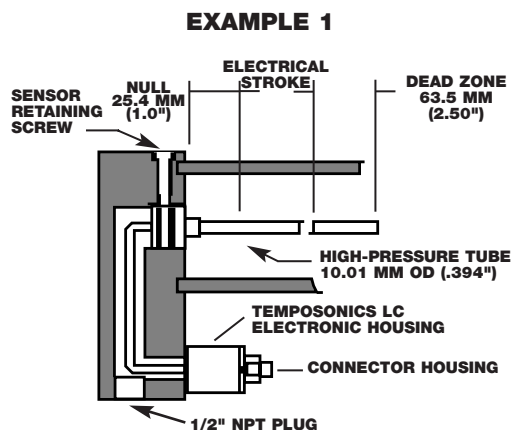
LDT-LC Without Manifold & Piping or Specific Mounting



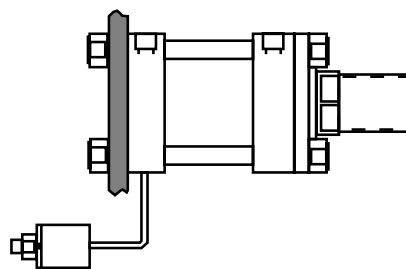
NOTE:

All mounting options are available with the LDT-LC version. See general catalogs for series specific dimensions. Some modifications may be necessary. Please contact factory for details on your specific needs.

Mounting Possibilities for the LDT-LC Version

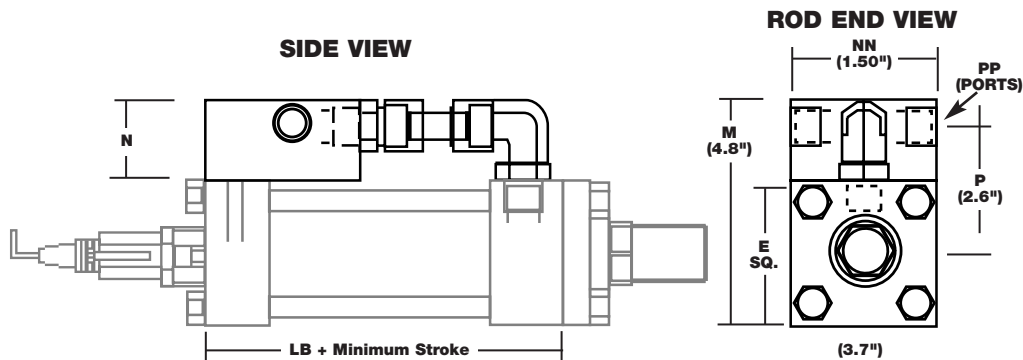


EXAMPLE 2



Electronic Housing may be mounted anywhere with 6 inches of rear head such as in a control panel, cool box or on the machine. **Note:** The interconnected cable is not fully shielded and may be susceptible to external noise. When mounted as shown in Example 1 the interconnect cable is shielded by the cylinder end cap. When the LC housing is mounted in an alternative manner, proper care must be taken to shield the cable.

Valve Manifold Option



LDT cylinders have the transducer attached to the center rear face of the cap. Any mounting that does not interfere with the center face of the cap can be used with this standard design.

Note:

1. Minimum stroke is required for piping installation. May use stop tube to compensate this stroke.
2. Some manifold block will extend beyond the side of the rear cap on position (2, 6). Contact engineering for those sizes.

Bore	E	LB	Use on DO3 & DO5					Use on DO8 Only					PP	
			M	N	NN	O	P	M	N	NN	O	P		
2"	3"	4 5/8"	5"	2"	3"	1 3/8"	2 27/32"							-10 SAE
2 1/2"	3 1/2"	4 3/4"	5 1/2"	2"	3"	1 3/8"	3 3/32"							-10 SAE
3 1/4"	4 1/2"	5 1/2"	7 3/8"	2 7/8"	3 1/2"	1 1/8"	4 1/8"	7 1/2"	3"	5"	1 1/8"	3 11/16"		-12 SAE
4"	5"	5 3/4"	7 7/8"	2 7/8"	3 1/2"	1 1/8"	4 3/8"	8"	3"	5"	1 1/8"	3 15/16"		-12 SAE
5"	6 1/2"	6 1/4"	9 3/8"	2 7/8"	3 1/2"	1 1/8"	5 1/8"	9 1/2"	3"	5"	1 1/8"	4 11/16"		-12 SAE
6"	7 1/2"	7 3/8"	10 15/16"	3 7/16"	4 1/2"	1 1/2"	5 15/16"	11 3/16"	3 11/16"	5"	1 1/2"	5 3/8"		-16 SAE
7"	8 1/2"	8 1/2"	11 15/16"	3 7/16"	4 1/2"	0"	6 5/8"	12 3/16"	3 11/16"	5"	0"	5 31/32"		-20 SAE
8"	9 1/2"	9 1/2"	13 3/16"	3 11/16"	5"	0"	7 13/32"	13 7/16"	3 15/16"	5"	0"	6 39/64"		-24 SAE

Bore	Minimum Stroke Required			
	DO3	DO5	DO8	Servo Valve
2"	4"			4"
2 1/2"	3 7/8"			3 7/8"
3 1/4"		4 5/8"	6 1/2"	4 5/8"
4"		4 3/8"	6 1/4"	4 3/8"
5"		3 7/8"	5 3/4"	3 7/8"
6"		3 3/4"	5 5/8"	3 3/4"
7"		3 1/4"	5 1/8"	3 1/4"
8"		2 1/2"	4 3/8"	2 1/2"

► Electronic Positioning Cylinders

MH & A Series Cylinders

BORE SIZE	ROD DIA.	A	MALE ROD END NOT STUDED*			FEMALE ROD END		LB (ADD STROKE)	VL	THE AMOUNT OF EXTRA PLAIN ROD EXTENSION		PRESS RATING IN PSI**
			CC THREAD	KK THREAD	STD. WF	KK THREAD	MIN. WF			MALE ROD END	FEMALE ROD END	
1	2	3	4	5	6	7	8	9	10	11	12	13
2	13/8	15/8	11/4-12	1-14	15/8	1-14	21/8	35/8	17/8	—	1/2	2,450
2 1/2	13/8	15/8	11/4-12	1-14	15/8	1-14	2	33/4	17/8	—	3/8	1,550
	13/4	2	11/2-12	11/4-12	17/8	11/4-12	21/2	33/4	17/8	—	5/8	1,550
3 1/4	13/8	15/8	11/4-12	1-14	15/8	1-14	15/8	4 1/4	15/8	—	—	1,400
	13/4	2	11/2-12	11/4-12	17/8	11/4-12	21/8	4 1/4	15/8	—	1/4	1,400
	2	2 1/4	13/4-12	11/2-12	2	11/2-12	23/8	4 1/4	15/8	—	3/8	1,400
4	13/8	15/8	11/4-12	1-14	15/8	1-14	15/8	4 1/4	15/8	—	—	925
	13/4	2	11/2-12	11/4-12	17/8	11/4-12	21/8	4 1/4	15/8	—	1/4	925
	2	2 1/4	13/4-12	11/2-12	2	11/2-12	23/8	4 1/4	15/8	—	3/8	925
	2 1/2	3	2 1/4-12	17/8-12	2 1/4	17/8-12	3	4 1/4	15/8	—	3/4	925
5	13/8	15/8	11/4-12	1-14	15/8	1-14	15/8	4 1/2	15/8	—	—	675
	13/4	2	11/2-12	11/4-12	17/8	11/4-12	17/8	4 1/2	15/8	—	—	675
	2	2 1/4	13/4-12	11/2-12	2	11/2-12	21/8	4 1/2	15/8	—	1/8	1,075
	2 1/2	3	2 1/4-12	17/8-12	2 1/4	17/8-12	2 1/2	4 1/2	15/8	—	1/2	1,075
	3	3 1/2	23/4-12	2 1/4-12	2 1/4	2 1/4-12	37/8	4 1/2	15/8	—	15/8	1,075
	3 1/2	3 1/2	3 1/4-12	2 1/2-12	2 1/4	2 1/2-12	37/8	4 1/2	15/8	—	15/8	1,075
6	13/8	15/8	11/4-12	1-14	15/8	1-14	15/8	5	13/8	—	—	525
	13/4	2	11/2-12	11/4-12	17/8	11/4-12	17/8	5	13/8	—	—	800
	2	2 1/4	13/4-12	11/2-12	2	11/2-12	2	5	13/8	—	—	800
	2 1/2	3	2 1/4-12	17/8-12	2 1/4	17/8-12	2 1/2	5	13/8	—	1/4	800
	3	3 1/2	23/4-12	2 1/4-12	2 1/4	2 1/4-12	35/8	5	13/8	—	13/8	800
	3 1/2	3 1/2	3 1/4-12	2 1/2-12	2 1/4	2 1/2-12	33/4	5	13/8	—	1 1/2	800
	4	4	33/4-12	3-12	2 1/4	3-12	4 1/2	5	13/8	—	2 1/4	800
7	13/8	15/8	11/4-12	1-14	15/8	1-14	15/8	5 1/8	13/8	—	—	380
	13/4	2	11/2-12	11/4-12	17/8	11/4-12	17/8	5 1/8	13/8	—	—	625
	2	2 1/4	13/4-12	11/2-12	2	11/2-12	2	5 1/8	13/8	—	—	625
	2 1/2	3	2 1/4-12	17/8-12	2 1/4	17/8-12	2 1/2	5 1/8	13/8	—	1/4	875
	3	3 1/2	23/4-12	2 1/4-12	2 1/4	2 1/4-12	35/8	5 1/8	13/8	—	13/8	875
	3 1/2	3 1/2	3 1/4-12	2 1/2-12	2 1/4	2 1/2-12	33/4	5 1/8	13/8	—	1 1/2	875
	4	4	33/4-12	3-12	2 1/4	3-12	43/8	5 1/8	13/8	—	2 1/8	875
	4 1/2	4 1/2	4 1/4-12	3 1/4-12	2 1/4	3 1/4-12	47/8	5 1/8	13/8	—	25/8	875
	5	5	43/4-12	3 1/2-12	2 1/4	3 1/2-12	55/8	5 1/8	13/8	—	33/8	875
8	13/8	15/8	11/4-12	1-14	15/8	1-14	15/8	5 1/8	13/8	—	—	290
	13/4	2	11/2-12	11/4-12	17/8	11/4-12	17/8	5 1/8	13/8	—	—	475
	2	2 1/4	13/4-12	11/2-12	2	11/2-12	2	5 1/8	13/8	—	—	675
	2 1/2	3	2 1/4-12	17/8-12	2 1/4	17/8-12	2 1/2	5 1/8	13/8	—	1/4	675
	3	3 1/2	23/4-12	2 1/4-12	2 1/4	2 1/4-12	35/8	5 1/8	13/8	—	13/8	675
	3 1/2	3 1/2	3 1/4-12	2 1/2-12	2 1/4	2 1/2-12	33/4	5 1/8	13/8	—	1 1/2	675
	4	4	33/4-12	3-12	2 1/4	3-12	43/8	5 1/8	13/8	—	2 1/8	675
	4 1/2	4 1/2	4 1/4-12	3 1/4-12	2 1/4	3 1/4-12	47/8	5 1/8	13/8	—	25/8	675
	5	5	43/4-12	3 1/2-12	2 1/4	3 1/2-12	55/8	5 1/8	13/8	—	33/8	675
	5 1/2	5 1/2	5 1/4-12	4-12	2 1/4	4-12	63/16	5 1/8	13/8	—	3 15/16	675

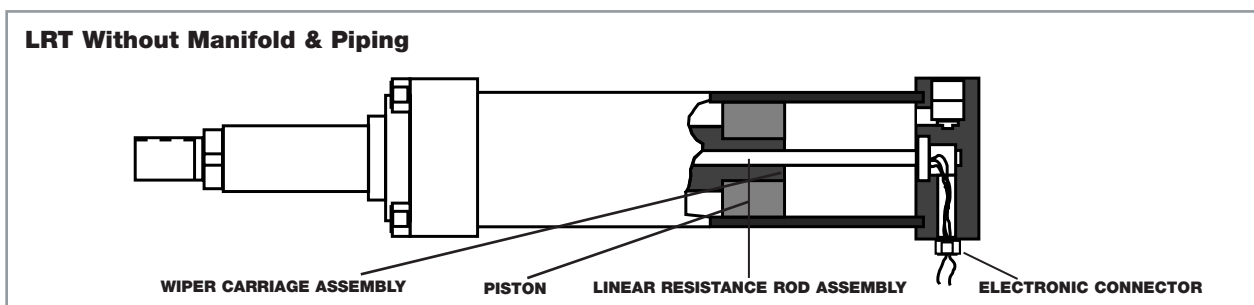
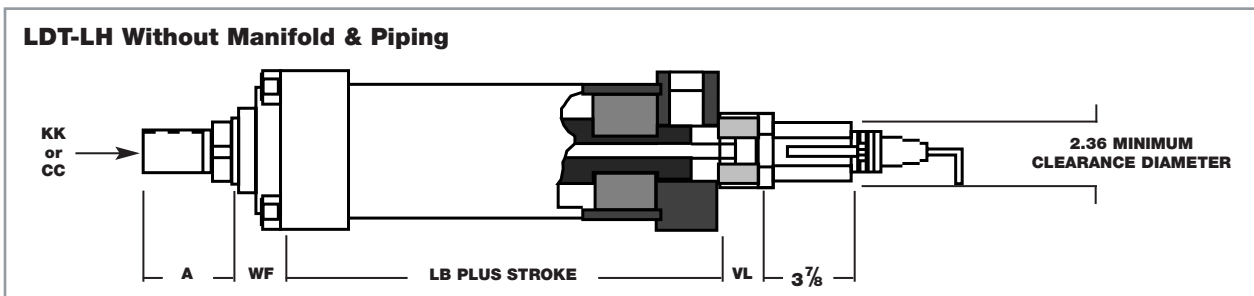
► Electronic Positioning Cylinders

HH Series Cylinders

BORE SIZE	ROD DIA.	A	MALE ROD END NOT STUDDED *			FEMALE ROD END		LB (ADD STROKE)	VL	THE AMOUNT OF EXTRA PLAIN ROD EXTENSION		PRESS RATING IN PSI**
			CC THREAD	KK THREAD	STD. WF	KK THREAD	MIN. WF			MALE ROD END	FEMALE ROD END	
1	2	3	4	5	6	7	8	9	10	11	12	13
2	1 ³ / ₈	1 ⁵ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1-14	—	4 ⁵ / ₈	1 ³ / ₈	—	—	3,000
2 ¹ / ₂	1 ³ / ₈	1 ⁵ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1-14	—	4 ³ / ₄	1 ³ / ₈	—	—	1,000
	1 ³ / ₄	2	1 ¹ / ₂ -12	1 ¹ / ₄ -12	1 ⁷ / ₈	1 ¹ / ₄ -12	—	4 ³ / ₄	1 ³ / ₈	—	—	3,000
3 ¹ / ₄	1 ³ / ₈	1 ⁵ / ₈	1 ¹ / ₄ -12	1-14	1 ⁵ / ₈	1-14	—	5 ¹ / ₂	1 ¹ / ₈	—	—	1,900
	1 ³ / ₄	2	1 ¹ / ₂ -12	1 ¹ / ₄ -12	1 ⁷ / ₈	1 ¹ / ₄ -12	—	5 ¹ / ₂	1 ¹ / ₈	—	—	1,900
	2	2 ¹ / ₄	1 ³ / ₄ -12	1 ¹ / ₂ -12	2	1 ¹ / ₂ -12	—	5 ¹ / ₂	1 ¹ / ₈	—	—	3,000
4	1 ³ / ₄	2	1 ¹ / ₂ -12	1 ¹ / ₄ -12	1 ⁷ / ₈	1 ¹ / ₄ -12	—	5 ³ / ₄	1 ¹ / ₈	—	—	2,275
	2	2 ¹ / ₄	1 ³ / ₄ -12	1 ¹ / ₂ -12	2	1 ¹ / ₂ -12	—	5 ³ / ₄	1 ¹ / ₈	—	—	2,275
	2 ¹ / ₂	3	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	2 ¹ / ₄	1 ⁷ / ₈ -12	—	5 ³ / ₄	1 ¹ / ₈	—	—	3,000
5	2	2 ¹ / ₄	1 ³ / ₄ -12	1 ¹ / ₂ -12	2	1 ¹ / ₂ -12	—	6 ¹ / ₄	1 ¹ / ₈	—	—	2,350
	2 ¹ / ₂	2 ¹ / ₂	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	2 ¹ / ₄	1 ⁷ / ₈ -12	—	6 ¹ / ₄	1 ¹ / ₈	—	—	2,350
	3	3 ¹ / ₂	2 ³ / ₄ -12	2 ¹ / ₄ -12	2 ¹ / ₄	2 ¹ / ₄ -12	—	6 ¹ / ₄	1 ¹ / ₈	—	—	2,350
	3 ¹ / ₂	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	2 ¹ / ₄	2 ¹ / ₂ -12	2 ⁷ / ₈	6 ¹ / ₄	1 ¹ / ₈	—	7 ⁷ / ₈	3,000
6	2 ¹ / ₂	3	2 ¹ / ₄ -12	1 ⁷ / ₈ -12	2 ¹ / ₄	1 ⁷ / ₈ -12	—	7 ³ / ₈	1 ¹ / ₂	—	—	2,820
	3	3 ¹ / ₂	2 ³ / ₄ -12	2 ¹ / ₄ -12	2 ¹ / ₄	2 ¹ / ₄ -12	—	7 ³ / ₈	1 ¹ / ₂	—	—	2,820
	3 ¹ / ₂	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	2 ¹ / ₄	2 ¹ / ₂ -12	—	7 ³ / ₈	1 ¹ / ₂	—	—	2,820
	4	4	3 ³ / ₄ -12	3-12	2 ¹ / ₄	3-12	2 ³ / ₄	7 ³ / ₈	1 ¹ / ₂	—	1'	3,000
7	3	3 ¹ / ₂	2 ³ / ₄ -12	2 ¹ / ₄ -12	2 ¹ / ₄	2 ¹ / ₄ -12	—	8 ¹ / ₂	—	—	—	3,000
	3 ¹ / ₂	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	2 ¹ / ₄	2 ¹ / ₂ -12	—	8 ¹ / ₂	—	—	—	3,000
	4	4	3 ³ / ₄ -12	3-12	2 ¹ / ₄	3-12	—	8 ¹ / ₂	—	—	—	2,875
	4 ¹ / ₂	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	2 ¹ / ₄	3 ¹ / ₄ -12	2 ⁵ / ₈	8 ¹ / ₂	—	—	7 ⁷ / ₈	1,900
8	5	5	4 ³ / ₄ -12	3 ¹ / ₂ -12	2 ¹ / ₄	3 ¹ / ₂ -12	3 ⁵ / ₈	8 ¹ / ₂	—	—	1 ¹ / ₂	3,000
	3 ¹ / ₂	3 ¹ / ₂	3 ¹ / ₄ -12	2 ¹ / ₂ -12	2 ¹ / ₄	2 ¹ / ₂ -12	—	9 ¹ / ₂	—	—	—	3,000
	4	4	3 ³ / ₄ -12	3-12	2 ¹ / ₄	3-12	—	9 ¹ / ₂	—	—	—	3,000
	4 ¹ / ₂	4 ¹ / ₂	4 ¹ / ₄ -12	3 ¹ / ₄ -12	2 ¹ / ₄	3 ¹ / ₄ -12	—	9 ¹ / ₂	—	—	—	2,075
	5 ¹ / ₂	5 ¹ / ₂	5 ¹ / ₄ -12	4-12	2 ¹ / ₄	4-12	3 ¹ / ₈	9 ¹ / ₂	—	—	1'	3,000

* For studded male rod end, use column 12 dimension instead of column 6.

** Pressure rating based on material yield strength with a 3:1 safety factor. For all other dimensions, see standard catalog for respective series.



How to use this form:

1. Photocopy the Requirements List on page EP-6.
2. On your copy, fill in the blanks at each section with your requirements.
3. If you do not need what is offered in a section, please mark N/A in the blank.
4. If your requirement is not listed as a selection, please write in your requirement.
5. Once completed, contact your Sheffer distributor to fax requirements for price and availability.
6. You may also go to the Sheffer web site at www.sheffercorp.com to obtain your distributor name and additional information on contacting Sheffer.

Options (Consult Factory)

- Intrinsically safe
- Explosion proof
 - Mill duty
 - Strokes to 240"
- Special configurations
- Double piston/stop tube
- Rear protective housing

Chart A

Mounting Styles		
<p>BX - Basic Cylinder, Tie Rods Extended, Both Ends</p> <p>C - Clevis</p> <p>CL - Center Line Lug</p> <p>EL - End Lug</p> <p>FB - Foot Bracket</p> <p>FF - Front Flange</p> <p>FFX - Front Flange, Extra Size</p> <p>FH - Front Head (7" thru 14" A and MH-16" thru 24" HH)</p>	<p>FHF - Front Head Flange</p> <p>FX - Basic Cylinder, Tie Rods Extended, Front End</p> <p>NX - Basic Cylinder, No Tie Rod Extension</p> <p>P - Pivot</p> <p>RF - Rear Flange</p> <p>RFX - Rear Flange, Extra Size</p> <p>RH - Rear Head (7" thru 14" A and MH-16" thru 24" HH)</p>	<p>RHF - Rear Head Flange</p> <p>RX - Basic Cylinder, Tie Rods Extended, Rear End</p> <p>SF - Side Flush</p> <p>SL - Side Lug</p> <p>SP - Sub Plate</p> <p>T - Trunnion, Between Heads</p> <p>TF - Trunnion, Front</p> <p>TR - Trunnion, Rear</p>

Policy:
The policy of the Sheffer Corporation is one of continual improvement in design and manufacture to assure still finer products, hence, specifications are subject to change without notice.

Limited Warranty:
Sheffer warrants its products to be free from defects in material and workmanship for a period of one year from the date of shipment. This warranty does not cover field labor charges for parts removal and replacement, adjustments, repairs or other work, corrosion, electrolysis, mineral deposits or normal deterioration, misapplication, modification, or change in original operating conditions; components supplied by others; defects in parts resulting from abuse, negligence, accident, fire or explosion, or seals and other components subject to normal wear.

The sole and exclusive remedy against Sheffer shall be for the repair or replacement of parts returned transportation prepaid to Sheffer's factory and found by Sheffer to be defective. Replacement parts provided shall not extend the warranty period for said parts or for the total unit.

IN CONSIDERATION OF THIS EXPRESS WARRANTY NO OTHER REMEDY (INCLUDING BUT NOT LIMITED TO INCIDENTAL OR CONSEQUENTIAL DAMAGES) SHALL BE AVAILABLE. THIS WARRANTY SHALL BE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ALL OTHER OBLIGATIONS ON THE PART OF SHEFFER.

Sheffer neither assumes, nor authorizes any person to assume for it, any other obligation or warranty.

► Requirements List

Photocopy This Page As Needed

Bore
As Required

Use Fractions
Where Required

Requirement _____

Model

HH Heavy-Duty Hydraulic
MH Medium-Duty Hydraulic
A Heavy-Duty Pneumatic

Requirement _____

Rod Diameter
1³/₈ Min.

Requirement _____

Stroke
As Required

Use Fractions Where Required

Shown as Gross
Stroke Including
Dual Piston or
Stop Tube Length

Requirement _____

Cushions

CF Cushion Front
CR Cushion Rear
CC Cushion Both Ends

Requirement _____

Mounting
See Chart A
(Page EP-5)

Requirement _____

Feedback Mount

H Standard Rear Head Mount
D Detachable (MTS Only)
O Customer Supplied Feedback Device
C Rear Head Mount with Clevis Mount
& Enclosure

Requirement _____

Feedback Brand

FX Fitted for Customer Probe
MT MTS Standard LH
MC MTS Standard LC
BA Balluf Standard
GE Gemco Standard

Requirement _____

Feedback Type

1 LDT Analog Output
2 LDT Digital Output
3 LRT
4 None (Customer
supplied)

Requirement _____

Input

1 13.5 to 26.4 VDC
2 24 VDC

Requirement _____

Valve Mount

0 None Required
1 Servo Valve Manifold Base
(Customer to supply footprint)
2 Standard DO Pattern
(Please specify)

Requirement _____

Output

1 Analog 4-20 MA
2 Analog 0-10 VDC
3 Analog 20-4 MA
4 Analog 10-0 VDC
5 Digital RS422 PWM
6 Digital RS422 P/P
7 Digital Binary

Requirement _____

Connector

RG Standard 7 Pin Micro
RB 10 Pin Threaded Connector
MS 10 Pin Bayonet Style
RO Integral Cable Pigtail
Connection
HO Integral Cable with Heavy-
Duty Jacket (Specify length)

Requirement _____

**For any questions on base cylinder, refer
to specific brochure or visit our web site at
www.sheffercorp.com**



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