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Cylinder Selection

A fluid power cylinder is a device consisting essentially of a movable piston and rod assembly contained within a cylindrical bore which is actuated by an operating medium and uses the pressure of that fluid to produce mechanical force and linear motion.

The power output, or thrust produced is the product of the system pressure (psi) multiplied by the square inch area of the internal piston surface upon which that pressure acts.

The proper selection of a fluid power cylinder requires the consideration of numerous factors influenced by the expected application conditions.

Those factors include the cylinder mounting style, stroke length, cycle speed, operating pressure, operating media, mounting attitude, direction of work force, and means of stopping the work load after it is put in motion.

Prior to selecting a model for use, the engineering information section which follows should be thoroughly reviewed and the final cylinder specifications established as a result of determinations based on design recommendations applicable to the intended use.

The given information will aid in the selection of the proper cylinder bore, mounting, rod diameter, and the inclusion of recommended optional construction features.

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Mounting Information

Cylinders are manufactured in innumerable combinations of bore, rod, and stroke sizes with various standard mounting styles.

There is a direct relationship between the cylinder mounting style and the effects of the operating pressure upon the unit. The following information should be considered to assist in the selection of the proper style mounting for use in the intended application.

Standard mounting styles for fluid power cylinders are divided into two general classifications and three groups based upon the combined effects of force direction and mounting conditions. Those classifications are as follows:

Class I: *Cylinders which produce a straight line transfer of force.*

This class consists of models having fixed mounting styles that are secured in a rigid condition. Cylinder mountings of this type are divided into two groups: those models which absorb force on the cylinder centerline and those styles which do not absorb force on the centerline of the unit.

Class II: *Pivoted cylinders which transfer force along a variable path.*

This group consists of mounting styles which pivot around a fixed pin and are able to compensate for alignment changes in one plane during operation.

The way in which a cylinder is mounted is critical to its performance and service life. Improper mounting can result in damage to the cylinder as well as to the equipment on which it is being used. Inaccurate installation, or the use of an inappropriate mounting style may result in misalignment which causes harmful side loading, bending, and the

Cylinders Having Fixed Centerline Mounting

Mounting styles which allow the thrust produced by the cylinder to be absorbed in a plane coincident with the centerline of the unit are most desirable since the mounting bolts are subjected to straight line shear or tension loads only. Cylinders are not subject to forces which tend to sway or flex the unit as occurs with certain alternate style mountings. Cylinder mountings of the fixed centerline class are models C, D, K, L, P, R, T, and X.

FLANGE TYPE MOUNTINGS

Proper selection of a flange mounting style depends upon whether the primary work direction results in tension or compression loads being carried by the cylinder rod.

Front flange mounted units are preferred for "pull type" applications where the rod is held in tension. "Push type" applications which subject the cylinder rod to compression loads are best suited for rear flange style mountings.

Flange mount models are of the fixed centerline class, but if improperly mounted by the backside of the flange (mounted against flange face nearest the cylinder body) they may be subjected to destructive bending forces that can distort the mounting plate or fatigue the fasteners holding the assembly.

The only flange styles suitable for backside mounting are models "X" and "T" which feature the end cap and flange combined as an integral component.

Rectangular flange mount styles (models "C" and "D") may be subject to pressure limitations which vary with bore size, rod diameter, and stroke length. These conditions are explained in greater detail in the text material pertaining to the various models available in these mounting styles.

In applications which involve operating pressure levels in excess of those permitted with rectangular flange models, the square flange mounting styles (models "P" and "R") should be considered. This style provides a stronger mounting flange which permits operation at higher working pressure and provides more stable support for long stroke cylinders.

Mounting styles "X" and "T" feature an integral rectangular end cap and flange. This model provides the most rigid flange mounting available and is preferred for high pressure applications or those involving long stroke lengths. Rectangular head flanges of this type are the only flange mountings suitable for backside mounting.

EXTENDED TIE ROD MOUNTING

Cylinders which use extended tie rods for mounting purposes are available with the tie rod extension on the rod end, blind end, or both ends as required to suit application conditions. The location of the tie rod extension must be specified at the time of order placement.

The general use recommendations given for flange mount models also apply to units mounted by the tie rods. This mounting style provides a stable means of handling thrust loads and may be used whenever available clearances permit the installation of this model. Consideration should be given to providing added support to the cylinder body on horizontally mounted units having long stroke lengths.

CENTERLINE LUG MOUNTING

Model "K", centerline lug mounting is the most stable of the fixed mounting styles secured with mounting bolts perpendicular to the unit centerline since it is the only model which has the mounting points located on a plane coincident with the cylinder centerline.

Holding bolts are subject to straight line shear or tension loads only rather than more complex forces which are developed in all other models which have the mounting bolts similarly positioned but at non-centerline locations.

In applications involving high pressure or shock loads, the cylinder should be secured to the mounting surface by dowel pins placed through the mounting lugs. The lugs include sufficient clearance for the addition of such pins.

Dowel pins, which minimize deflection should be placed at one end of the cylinder only regardless of stroke length, with the end to be pinned determined by the primary work force direction and application conditions.

Cylinders should be pinned on both sides of one end and never through only one lug. Pinning one corner, or two corners located diagonally across the unit can result in severe warping and distortion of the cylinder assembly.

Fixed Non-Centerline Type Mountings

Cylinders with fixed non-centerline mounting styles (models "A", "G", "J", and "W") are secured by fasteners located on a plane which is parallel to, but not coincident with the centerline of the unit.

Since the mounting bolts are not on a common plane with the cylinder centerline, they are subjected to stresses which tend to flex the end caps about the mounting bolts resulting in a swaying type motion.

This motion in itself is not harmful to the cylinder, but does compound stress forces acting upon the mounting bolts. Due to the forces developed, high tensile cap screws are recommended for mounting all cylinders.

To protect the cylinder mounting from the effects of high stress levels, the use of shear keys or dowel pins should be considered. These components absorb shear forces developed at the cylinder mounting surfaces and reduce the load carried by the mounting bolts.

Shear keys should be placed at the proper end of the cylinder as determined by the primary work force direction. They should be located behind the front or rear head of the cylinder when the work direction places the rod in compression, and on the front side of the front head when the rod is in tension.

An extended key retainer plate is available and should be considered for use when a keyway can be milled into the surface on which the cylinder will be mounted. This optional feature absorbs shear loads and promotes accurate alignment during installation of the unit.

Dowel pins can also be used to absorb shear forces and assist in maintaining proper alignment. The mounting lugs of foot mount (model "A") cylinders have sufficient length for the addition of these locating pins. Pins should be placed through both lugs at either end of the unit as determined by application conditions.

Cylinders should never be pinned through one lug only, diagonally across corners, or through all four lugs at both ends of the unit. Improper pinning may result in severe warping, distortion, and possible damage to the unit.

Pivoted Centerline Mounts

When the application requires the cylinder rod to travel a curvilinear path, a unit with a pivoted type mounting is necessary. Available mountings of this group are models B, BR, BX, UB, E, F, and N.

The application conditions dictate which style mounting is best suited for use. Consideration should be given to the path of travel and possible locations for the placement of fixtures necessary to mount the various model units.

When using cylinders with pivoted mountings, it is necessary to include a rod end attachment which will allow rotation in one plane.

Front trunnion (model "E") and intermediate trunnion (model "N") models having the trunnion pins located close to the front head can use smaller diameter rods without danger of buckling than can other models which have the mounting located toward the rear end of the unit.

Front pivoted models are also less likely to require stop tubing than cylinders which pivot from the rear. Refer to the stop tube information located within the engineering section for an explanation of this requirement.

TRUNNION MOUNT MODELS

Trunnion mounted cylinders (models "E", "F" and "N") require rigidly anchored, accurately aligned pillow blocks mounted over the trunnion pins placed as close to the cylinder end cap as clearances will permit. Bearing support should be provided for the full length of the pins. Trunnion pins are intended to carry shear loads only and should not be subjected to bending loads.

Self aligning bushings should never be used to support the trunnion pins since they will allow bending forces to act on the cylinder mounting.

Intermediate trunnion models can have the trunnion centerline located at any point between the cylinder end caps. The desired trunnion position (designated as the "XI" dimension) should be specified at the time of order placement. While the trunnion centerline can be specified at virtually any position, its location cannot be altered significantly after construction is complete.

CLEVIS AND PIVOT MOUNT MODELS

Clevis and pivot mounted cylinders (models "B", "BR", "BX", and "UB") are pivoted around a fixed pin located at the rear end of the unit.

A clevis pin of sufficient diameter to withstand the shear loads generated by the cylinder when operated at the maximum rated pressure is available for use with these models.

Spherical bushing mount (model "UB") is the only mounting style designed to allow for misalignment. See model "UB" bulletin for more details.

When selecting an accessory to satisfy the requirement for a pivoted rod end connection, a component with a pin diameter equal in size to the mounting base pin should be chosen if possible.

Thread modifications, either to the rod end or accessory, are alternate construction options that should be considered for use to obtain equal pin diameters at both ends of the cylinder.

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Standard Cylinder Seals (Buna-N and Polyurethane)

Standard cylinders include seals of Buna-N, Polyurethane, and Teflon with the seal compound and location of use dependent on the design purpose of each model.

Seals of Buna-N are predominant as they are used for static seals in all cylinders to prevent leakage between non-moving surfaces, and as dynamic rod or piston seals in other models.

Seals of internally lubricated Polyurethane are also used as rod and piston seals with the material selected for use based on its performance characteristics and the application requirements.

Teflon is used to seal the Cushion Adjusting Screw and Ball Check assemblies and for Piston Seals and Back Up Washers for certain seals in units suitable for high pressure service.

The seal material specifications for any particular cylinder can be determined by referring to the "Design Feature" information given for available models.

Seals of standard cylinders are compatible with the following types of operating media:
- **Air**
- **Petroleum oils and fluids**
- **Water soluble oil (to + 150°F Max.)**
- **Water Glycol fluids (to + 150°F Max.)**
- **Water/Oil Emulsions (to + 150°F Max.)**

Buna-N material is suitable for use within a temperature range of -40°F to +250°F. Polyurethane may be used from -65°F to +200°F. Teflon is unaffected by extreme temperatures and is not a factor in limiting service conditions.

Cylinder operation is not suggested near either end of the seal temperature range. Standard models are recommended for use at temperatures from -20°F to +180°F (-29°C to +83°C). When the operating fluid contains water, the maximum operating temperature should not exceed +150°F due to adverse effects of hot water on seals of Polyurethane.

Alternate seal materials are available upon request for use with other types of operating fluid or higher temperature requirements.

Cylinder Cushion Information

Internal cushions at the end of the cylinder stroke are optional and can be supplied at either one or both ends of the unit as desired. The use of a cushion is recommended for high speed, high impact applications to reduce noise, vibration, and the destructive hammering effect of the piston assembly bottoming against the cylinder end cap. The use of cushions does not affect cylinder envelope or mounting dimensions.

The cushion functions by closing off the inner exhaust orifice, trapping the operating media (either air or hydraulic fluid), and developing a backpressure against the advancing piston which slows, or cushions, the travel speed.

As the piston approaches the cushioned end of the cylinder, the exhaust flow is closed off by a bushing or plunger which enters the close fitting cushion cavity of the end cap.

A cushion adjusting screw and ball check valve are provided in the end cap of all cushioned models with the exception of the rod end head of 1^{1}/$_{2}$, 2, and 2^{1}/$_{2}$ bore cylinders equipped with the largest available oversize piston rod. These size combinations are provided with a non-adjustable cushion due to insufficient clearance in the head for adjustment and ball check fittings.

The rate of effective cushioning can be regulated by use of the cushion adjusting screw. When the mating cushion surfaces engage, and the operating media being exhausted is trapped by the advancing piston, the exhaust flow closes off the ball check valve by seating the ball against the bottom of its orifice.

The cushion screw orifice then provides the primary passageway for trapped pressure to escape the cylinder. The degree of cushion effect can be regulated by metering the flow of trapped operating media through the orifice. Turning the adjusting screw affects the rate at which the trapped pressure is relieved and permits control of the cushion to the desired level.

The function of the ball check valve is to assist in disengaging the cushion when the stroke direction is to be reversed.

Without the ball check valve, fluid pressure applied through the cylinder port can act only upon the cross sectional area of the cushion itself. The ball check orifice permits incoming flow from the port to go directly to the full face of the piston, thus greatly increasing the cylinder thrust capability and reduces the time necessary to breakaway from the engaged cushion.

Cushion adjusting screw and ball check valves are interchangeable with each other and do not protrude beyond the edge of the cylinder head.

The cushion adjusting screw is normally located on side #2 unless the mounting style or port position does not permit. This component can be identified by the socket head of the screw. The cushion effect can be controlled by turning the inner screw with a standard hex key wrench. Turning this screw in a clockwise direction will increase the cushion effect, while turning it in a counterclockwise direction will decrease the cushion effect.

The ball check valve is normally located on side #4 unless the mounting style or port position does not permit. This component may be identified by its slotted plug. The ball check valve requires no adjusting and need not be changed from its initial setting.

Cylinders having the cushion adjusting screw at a position other than on side #2 may be ordered if desired. Include this information with order and specify the position by using the reference number assigned to the side location required. Refer to the "model number development" instructions given in the ordering information pertaining to the model desired for data related to numbered side locations.

CYLINDER FORCE

The output force, or thrust developed by a cylinder is a product of the operating pressure acting upon the square inch surface area of its inner piston.

Cylinder thrust on the forward stroke utilizes the full piston area to develop maximum power. The piston surface subject to pressure on the retract stroke is reduced by the area of the piston rod to give the "net effective area" for force development in the "pull" direction.

The chart below shows output force measured in "pounds" produced at various input pressure levels. Figures given are theoretical values and do not include losses due to friction.

When selecting a cylinder for air service, it should be sized to overpower the work load by at least 25% for moderate cycle speed, to 100% for rapid speed applications.

Hydraulic cylinders should be considered to operate at 95% efficiency for sizing purposes with allowance given for pressure losses in the system between the pump and cylinder.

CYL. BORE DIA.	ROD DIA.	WORK AREA SQ.IN.	OPERATING PRESSURE													
			60	80	100	120	150	200	250	500	750	1000	1500	2000	2500	3000
1 1/2	NONE	1.767	106	141	177	212	265	354	442	884	1326	1767	2650	3534	4418	5301
	5/8	1.460	88	117	146	176	219	292	365	730	1095	1460	2190	2920	3650	4380
	1	.982	59	79	98	118	147	196	246	491	737	982	1473	1964	2455	2946
2	NONE	3.141	188	251	314	377	471	628	785	1571	2356	3141	4712	6282	7853	9423
	5/8	2.834	170	227	283	340	425	566	709	1417	2126	2834	4251	--	--	--
	1	2.356	141	188	236	283	353	471	589	1178	1767	2356	3534	4712	5890	7068
	1 3/8	1.656	99	132	166	199	248	332	414	828	1242	1656	2484	3312	4140	4968
2 1/2	NONE	4.909	295	393	491	589	736	982	1227	2455	3682	4909	7364	9818	12273	14727
	5/8	4.601	276	368	460	552	690	920	1150	2301	3451	4601	--	--	--	--
	1	4.123	247	330	412	495	618	825	1031	2062	3092	4123	6185	8246	10308	12369
	1 3/4	2.503	150	200	250	300	375	500	626	1252	1877	2503	3755	5006	6258	7509
3 1/4	NONE	8.295	498	666	830	995	1244	1660	2074	4148	6221	8295	12443	16590	20738	24885
	1	7.510	451	601	751	901	1127	1502	1878	3755	4230	7510	11265	--	--	--
	1 3/8	6.810	409	545	681	817	1022	1362	1703	3405	5108	6810	10215	13620	17025	20430
	2	5.154	309	412	515	618	773	1030	1289	2577	3866	5154	7731	10308	12885	15462
4	NONE	12.566	754	1005	1257	1508	1885	2514	3142	6283	9425	12566	18849	25132	31415	37698
	1	11.781	707	942	1178	1414	1767	2356	2945	5891	8836	11781	--	--	--	--
	1 3/4	10.161	610	813	1016	1219	1524	2032	2540	5081	7621	10161	15242	20322	25403	30483
	2 1/2	7.658	459	613	766	919	1149	1532	1915	3829	5744	7658	11487	15316	19145	22974
5	NONE	19.635	1178	1571	1964	2356	2945	3928	4909	9818	14726	19635	29453	39270	49088	58905
	1	18.850	1131	1508	1885	2262	2828	3770	4713	9425	14138	--	--	--	--	--
	2	16.494	990	1320	1649	1979	2474	3299	4124	8247	12371	16494	24741	32988	41235	49482
	3 1/2	10.014	601	801	1001	1202	1502	2002	2504	5007	7511	10014	15021	20028	25035	30042
6	NONE	28.274	1696	2262	2827	3392	4241	5654	7096	14137	21206	28274	42411	56548	70685	84822
	1 3/8	26.789	1607	2143	2679	3215	4018	5358	6697	13395	20092	--	--	--	--	--
	2 1/2	23.366	1402	1869	2337	2804	3505	4673	5842	11683	17525	23366	35049	46732	58415	70098
	4	15.708	942	1257	1571	1884	2356	3142	3927	7854	11781	15709	23562	31416	39270	47124
7	NONE	38.485	2309	3079	3849	4618	5773	7697	9621	19243	28864	38485	57728	76970	96213	115455
	3	31.416	1885	2513	3142	3770	4712	6283	7854	15708	23562	31416	47125	62832	78540	94248
	5	18.850	1131	1508	1885	2262	2828	3770	4713	9425	14138	18850	28275	37700	47125	56550
8	NONE	50.265	3016	4021	5027	6032	7540	10054	12566	25133	37689	50265	75398	100530	125663	150795
	1 3/8	48.780	2927	3902	4878	5854	7317	9756	12195	24390	--	--	--	--	--	--
	3 1/2	40.644	2439	3252	4064	4877	6097	8129	10161	20322	30483	40644	60966	81288	101610	121932
	5 1/2	26.507	1590	2121	2651	3180	3976	5302	6627	13254	19880	26507	39761	53014	66268	79521
10	NONE	78.540	4712	6283	7854	9424	11781	15708	19637	39270	58905	78540	117810	157080	196350	235620
	1 3/4	76.135	4568	6091	7614	9136	11420	15228	19034	38068	--	--	--	--	--	--
	4 1/2	62.636	3758	5011	6264	7516	9395	12527	15659	31318	46977	62636	93954	125272	156590	187908
	5 1/2	54.782	3287	4383	5478	6574	8217	10956	13696	27391	41087	54782	82173	109564	136955	164364
12	NONE	113.10	6786	9048	11310	13572	16965	22620	28275	56550	84825	113100	169650	226200	282750	339300
	2	109.96	6598	8797	10996	13196	16494	21992	27490	54980	--	--	--	--	--	--
	5 1/2	89.34	5360	7147	8934	10720	13401	17868	22335	44670	67005	89340	134010	178680	223350	268020
	7	74.61	4477	5969	7461	8953	11192	14922	18653	37305	55958	74610	111915	149220	186525	223830
14	NONE	153.94	9236	12315	15394	18473	23091	30788	38485	76970	115455	153940	230910	307880	384850	461820
	2 1/2	149.03	8942	11922	14903	17884	22355	29806	37258	74515	--	--	--	--	--	--
	5	130.18	7811	10414	13018	15622	19527	26036	32545	65090	97635	130180	195270	260360	325450	390540
	7	115.45	6927	9236	11545	13854	17318	23090	28863	57725	86588	115450	173175	230900	288625	346350

To determine force developed in "pull" direction with rod diameters other than those shown above, deduct the area of selected piston rod given in table below from full bore area and multiply this "net effective area" by the system operating pressure.

ROD DIA.	1	1 3/8	1 3/4	2	2 1/2	3	3 1/2	4	4 1/4	4 1/2	5	5 1/2	5 3/4	7	8	9
AREA SQ.IN.	.785	1.485	2.405	3.141	4.909	7.069	9.621	12.566	14.186	15.904	19.635	23.758	25.967	38.485	50.265	63.617

PISTON ROD DIAMETER SELECTION

Selection of the proper Piston Rod Diameter is important and requires careful consideration. Most cylinder models are offered with several rod sizes from which one must be chosen.

The smallest diameter available within each bore size is termed the "standard" rod. Rods of this description are suitable for use in all cylinders in which work loads are applied in the "pull" direction only. "Standard" rods are also suitable for many "push" applications, but other factors then become involved that may restrict their use. The cylinder mounting style, rod end condition, stroke length, and output force expressed in terms of "pounds of thrust" combine to produce variables which affect the rod size requirement as determined by column strength limitations.

After selection of the cylinder bore diameter, the procedure below should be followed to determine the recommended Piston Rod Diameter.

Step 1. **Locate the cylinder mounting style and applicable rod end connection "Class" in the charted data below and calculate the Value of "L" using the appropriate formula. Information pertaining to the use of Stop Tubes with certain cylinder**

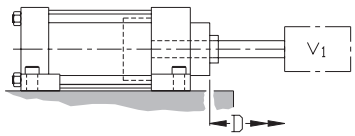
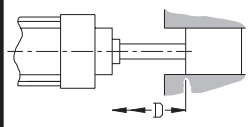
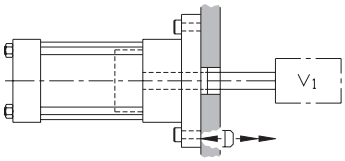
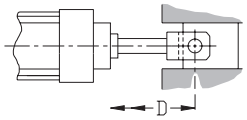
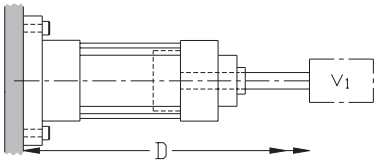
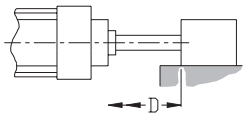
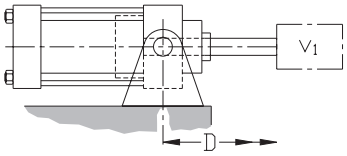
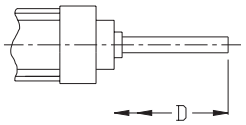
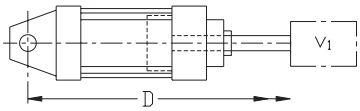
Step 2. **Using the calculated Value of "L", refer to the chart located on next page to find the "Recommended Stop Tube Length." If the use of a "Stop Tube" is indicated, review the "D" factor for possible equal increase in length. When applicable, recalculate the Value of "L" using this adjusted figure to determine length of Stop Tube recommended.**

Step 3. **Locate the Cylinder Thrust value in the "Rod Diameter Selection" chart located on the next page. If the exact cylinder thrust is not listed, use the next highest charted value. After locating the proper "Cylinder Thrust" column, read across until reaching the first figure which exceeds the computed Value of "L". The column heading under which this value is located indicates the recommended Piston Rod Diameter.**

If the recommended piston rod diameter exceeds that of the largest available within the selected cylinder size, it would then be necessary to reconsider design parameters. The first cylinder of a larger size having the recommended rod diameter as an available option should be selected for use at a reduced operating pressure to develop an output force equivalent to that of the unit initially selected.

VALUE OF "L" FACTOR

FOR USE IN SELECTING PISTON ROD DIAMETER AND DETERMINING STOP TUBE RECOMMENDATIONS.

CYLINDER MOUNTING	LENGTH OF "D" WITH STROKE EXTENDED	FORMULAS FOR THE VALUE OF "L"				ROD END CLASS (V_1 CONNECTION)
		CLASS I	CLASS II	CLASS III	CLASS IV	
FOOT MOUNT MODEL "A" MODEL "W" CENTERLINE LUG MT. MODEL "K" SIDE MOUNT MODEL "G" END LUG MOUNT MODEL "J"		$L=\frac{D}{2}$	$L=\frac{D}{1.4}$	L=D	L=4D	FIXED, SUPPORTED, AND GUIDED 
		Stop Tube Not Req'd.	Stop Tube Usually Not Req'd But Application Conditions May Make Use Desirable.			CLASS I
FRONT FLANGE MOUNT MODEL "C" MODEL "P" MODEL "X" EXT'D TIE ROD MT. MODEL "L" FRONT END MTD.		$L=\frac{D}{2}$	$L=\frac{D}{1.4}$	L=D	L=4D	PIVOTED, SUPPORTED, AND GUIDED 
		Stop Tube Not Req'd.	Stop Tube Usually Not Req'd But Application Conditions May Make Use Desirable.			CLASS II
REAR FLANGE MOUNT MODEL "D" MODEL "R" MODEL "T" EXT'D TIE ROD MT. MODEL "L" REAR END MTD.		$L=\frac{D}{2}$	$L=\frac{D}{1.4}$	L=D	L=4D	FIXED, SUPPORTED, AND UNGUIDED 
		Value of "D" is same as for Front Flange Mt. Model when Front Head is rigidly supported.				CLASS III
FRONT TRUNNION MT. MODEL "E" REAR TRUNNION MT. MODEL "F" INTERMEDIATE TRUNNION MOUNT MODEL "N"		Not Suitable	L=D	Not Suitable	Not Suitable	UNSUPPORTED, AND UNGUIDED 
		Model "E" Front Trunnion Mt. Models do not require Stop Tube if in vertical position when stroke is extended.				
CLEVIS MOUNT MODEL "B" DETACH. CLEVIS MT. MODEL "BR" SINGLE LUG PIVOT MT. MODEL "BX" SPHERICAL BUSH. MT. MODEL "UB"		Not Suitable	L=D	Not Suitable	Not Suitable	
		CLASS I	CLASS II	CLASS III	CLASS IV	CLASS IV

LYNAIR INC.

STOP TUBE RECOMMENDATIONS FOR AIR AND HYDRAULIC CYLINDERS

A Stop Tube is a construction feature recommended for use in certain single rod end cylinders when the calculated Value of "L" exceeds a minimum level.

Its function is to increase the distance between the piston and rod bearing support surfaces when the stroke is fully extended. This added distance improves the structural rigidity of the assembly, increases rod buckling resistance, and reduces the possibility of bearing surface overloads.

Stop Tube design information is explained in greater detail on the following page. This data should be reviewed to gain information on construction variations and order options applicable when the use of a Stop Tube is indicated.

ENGINEERING INFORMATION

Stop Tube use recommendations can be determined by following the same procedure explained on the preceding page pertaining to the selection of the Piston Rod Diameter.

Steps 1 and 2 relate to Stop Tube requirements. The calculated Value of "L" should be located in the charted information below to find the suggested Stop Tube length. If the use of a Stop Tube is indicated, the original Value of "L" should be adjusted to include this additional length and rechecked to determine any possible effects on the selected rod diameter or Stop Tube requirements.

Cylinders with Fixed, Rigid Mounting Styles (groups headed by Models "A" and "C" in chart on preceding page) used with Class II and III Rod End Connections usually do not require the use of Stop Tubes. However, if the cylinder stroke is very long, or other conditions exist which may be improved by use of a Stop Tube, its inclusion may be warranted in view of those conditions as a matter of customer preference.

VALUE OF "L" AS DETERMINED BY MOUNTING STYLE AND STROKE LENGTH

0 TO 40	41 TO 50	51 TO 60	61 TO 70	71 TO 80	81 TO 90	91 TO 100	101 TO 110	111 TO 120	121 TO 130	131 TO 140	141 TO 150	151 TO 160	161 TO 170	171 TO 180	181 TO 190	191 TO 200
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

RECOMMENDED STOP TUBE LENGTH (INCHES)

For Values of "L" greater than 200, the recommended Stop Tube length may be calculated by using the formula:

STOP TUBE LENGTH = (L - 40) ÷ 10

Round off answer to next even inch.

SELECTION OF PISTON ROD DIAMETER BASED ON VALUE OF "L".

CYLINDER THRUST	PISTON ROD DIAMETER														
	5/8	1	1 3/8	1 3/4	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	7	8	9
150	58	104													
250	45	93	145												
400	35	84	135	186											
700	31	67	118	168	202	276									
1000	26	60	106	152	191	258	330								
1200	24	57	100	148	182	250	316								
1400	22	54	92	142	174	244	308	384							
1800	19	48	83	128	160	230	295	366	440						
2400	17	45	74	114	145	213	282	346	416	488					
3200	15	42	68	104	131	195	261	330	400	462					
4000	13	38	63	93	119	174	240	310	378	446					
5000	8	35	60	88	111	164	225	290	359	426	494				
6000	7	30	56	81	102	152	209	274	342	410	476				
8000		26	51	76	94	137	187	245	310	375	446				
10,000		21	45	69	88	125	172	222	280	348	412	480			
12,000		17	41	65	85	118	155	210	269	326	388	454			
16,000		9	33	57	75	110	142	188	235	291	350	420			
20,000			28	52	68	104	136	173	218	270	326	385			
30,000			12	39	55	87	120	156	190	230	284	326			
40,000			11	23	44	75	108	142	177	210	246	294			
50,000			9	15	30	66	97	130	166	200	234	268	410		
60,000				14	18	57	88	120	154	190	225	256	380		
80,000				12	16	36	71	104	137	170	204	240	330		
100,000					14	22	56	91	120	154	190	222	320	400	
120,000					12	21	44	76	109	144	174	206	310	370	
140,000						19	27	64	98	124	160	194	300	360	
160,000						17	26	47	86	118	148	182	280	350	420
200,000						14	23	31	66	98	126	160	260	330	400
250,000							19	28	36	72	108	140	230	300	370
300,000								25	32	40	90	120	210	280	350
350,000									28	38	50	100	190	260	320
400,000										34	42	70	180	240	300
500,000										30	38	46	150	210	270

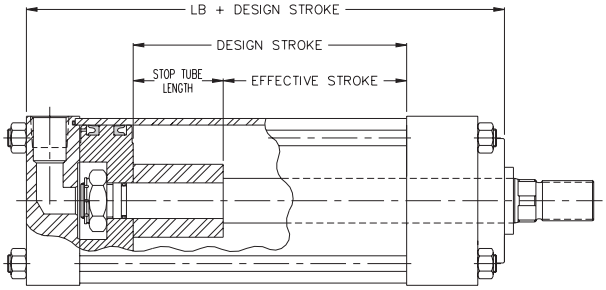
STOP TUBE CONSTRUCTION DETAILS

A Stop Tube is a construction feature that increases the distance between the piston and rod bearing support surfaces when the cylinder stroke is fully extended. Increasing this distance adds structural rigidity, improves rod buckling resistance, and reduces harmful effect of loads transmitted to bearing surface areas. In use, bearing loads should not exceed 250 pounds per square inch of supporting surface area. When the Piston Rod Diameter and Stop Tube Length are determined by using the value of "L" as described on the preceding page, the load developed should, under usual conditions, remain within acceptable limits.

Two types of construction are used to satisfy Stop Tube requirements. The style suggested for use is dependent on certain cylinder specifications and the length of Stop Tube being considered.

The Spacer Style Stop Tube is recommended for use in all hydraulic cylinders when its length is under 6 inches, and with air operated models that do not include a rod end cushion.

Typical construction details which illustrate the rod mounted spacer located in front of a single piston are shown in the view below.

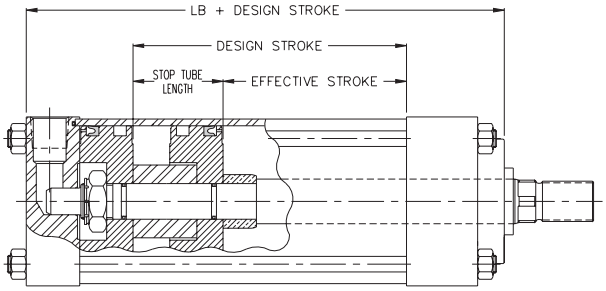


A Dual Piston Stop Tube consists of two pistons mounted on the rod separated by a confined spacer, with the overall length of the assembly made to suit order requirements.

While either style Stop Tube may be ordered, the Dual Piston type is recommended for use in all cylinders whenever the required length is 6 inches or more. It is mandatory, however, to use the Dual Piston style when a Stop Tube is required for an air operated cylinder having a cushion on the rod end.

Dual Piston construction is preferred for use because the wider piston assembly improves stability over the entire stroke length while the Spacer type is effective only when the cylinder stroke is fully extended.

Typical construction details are shown in the view below.



When ordering a cylinder equipped with a Stop Tube, it is necessary to provide clear information stating the desired requirements. A callout of the cylinder Design Stroke (effective stroke plus stop tube length), Stop Tube Length, and net Effective Stroke should be included to avoid possible misunderstanding of order specifications.

SELECTION OF OPTIONAL ROD BOOT

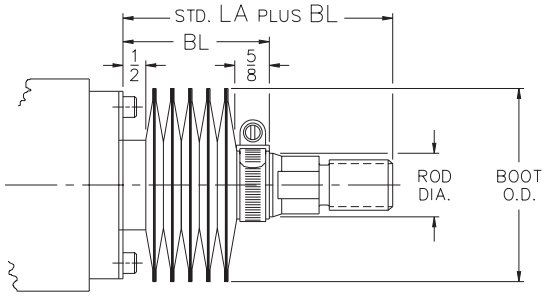
Rod Boots offer protection to the piston rod from harmful effects of severe operating environments and are available for all cylinders. When used, it is necessary to provide additional piston rod extension to allow space for the compressed boot length and end connections. The required extension varies with the rod diameter, stroke length, and boot cover material.

Cover materials suitable for a wide range of operating conditions are available. The standard boot material is a Neoprene coated nylon fabric of sewn construction suitable for use within a temperature range of -45° F to +220° F. Consult LYNAIR, INC. for information on available alternate materials.

The chart below provides data needed to determine boot envelope and rod extension dimensions. The given figures are related to the standard boot size used for each rod size. Other boot sizes with larger diameters having shorter closed length factors, or with smaller diameters having longer closed length factors are available for all rod sizes upon request. Consult LYNAIR, INC. for dimensional information pertaining to these alternate sizes if desired.

To determine the amount of additional Piston Rod Extension, multiply the charted "LF" Factor for the cylinder rod size by the stroke length, add 1 1/8 inches for the end connections, and adjust answer to the nearest 1/8 inch increment. The value produced is termed the "BL" dimension. This value must then be added to the standard "LA" dimension applicable to the given cylinder to determine the total piston rod projection. The adjusted value should then be designated as the required "LA" dimension for order information purposes.

The dimensional requirements described are illustrated in the view below.



BL = (LF x STROKE) PLUS 1-1/8 ADJUSTED TO NEAREST 1/8 INCH INCREMENT.

DIMENSIONS VARIABLE WITH CYLINDER ROD SIZE

ROD DIA.	5/8	7/8, 1	1 1/8, 1 3/8	1 5/8, 1 3/4	2, 2 1/8	2 1/2	3
"LF" Factor	.09	.09	.09	.09	.09	.09	.06
Boot O.D.	3	3 3/8	3 3/4	4 1/8	4 5/8	5 1/8	7
ROD DIA.	3 1/2	4, 4 1/4	4 1/2	5	5 1/2	5 3/4, 7	8
"LF" Factor	.06	.06	.06	.06	.06	.06	.06
Boot O.D.	7 1/2	8 1/4	8 3/4	9	9 1/2	11	12

VITON* SEALS

Cylinders may be equipped with seals of Viton (fluorocarbon rubber) to suit elevated temperature or fluid compatibility requirements when application conditions preclude use of standard materials. Viton is recommended for use with:

- Pneumatic service
- Petroleum oils and fluids
- Selected phosphate ester fluids
- Halogenated hydrocarbons
- Silicone fluids

Viton is suitable for use at temperatures from -20° F to +400° F (-29° C to +204° C). This material will withstand intermittent use to +550° F, but is subject to substantial seal life reduction with prolonged exposure to temperatures above +400° F.

When this option is desired, indicate if use is to suit temperature or fluid compatibility requirements.

Style 5 Rod End (with studded thread) should not be used at temperatures over +250° F. Other standard rod end styles are not subject to this limitation.

**Trade name of E.I. duPont deNemours & Company*

CARBOXYLATED NITRILE SEALS

Carboxylated Nitrile (CN) Seals are available for use in high speed/high cycle applications for air or hydraulic service. They are also suitable for use with water or water based fluids. CN Seals are recommended for:

- Pneumatic service
- High speed/high cycle applications
- Water/water based fluids to 210° F
- HWBF (high water base fluids)

STAINLESS STEEL PISTON ROD

Chrome plated piston rods of Series 17-4 stainless steel are available for use in cylinders which require corrosion resistance greater than that provided by standard construction. The strength of this material is slightly higher than standard rod stock, making it suitable for use in air or high pressure hydraulic applications.

Alternate grades of stainless steel, such as Series 304, are available. Rods of this material are suitable for use in most air and light duty hydraulic models, but may not have sufficient strength for high pressure service.

Consult Lynair, Inc. to obtain material recommendation or price information when an alternate grade of stainless steel is desired.

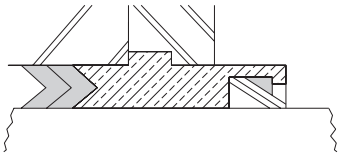
HARDENED PISTON ROD MATERIAL

Chrome plated piston rod material with a minimum case hardness of Rc-50 is available in all sizes. This option provides added resistance to damage resulting from foreign elements contacting the rod surface.

Hardened rod stock and standard rod stock have similar strength properties, however hardened material has increased brittleness which makes its use in applications subject to misalignment or high stress loading undesirable.

METALLIC ROD SCRAPER

Cylinders for use in areas containing abrasive particles or self adhering contaminants that could become embedded in the standard wiper should be ordered with a metallic scraper. Twin knife like edges will clean rod surface to prevent such harmful contaminants from entering sensitive inner bearing and seal areas. Hardened Piston Rod option is recommended when a metallic scraper is included.



SEAL DESIGN MODIFICATIONS

Rod and piston seals are available in a variety of design configurations. While standard Lynair cylinders include seals proven to be satisfactory for general purpose use, alternate styles designed to provide specific performance characteristics are available when application requirements make their use desirable. Seals that offer extended service life, greater sealing efficiency, lower friction, constructed of materials, or in sizes better suited to meet particular design requirements may be specified.

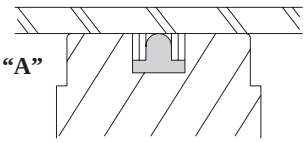


Fig. "A"

A glass fiber filled teflon sealing ring installed over an elastomer expander provides a long wearing, bidirectional, low bypass piston seal suitable for air or hydraulic service.

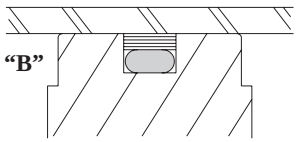


Fig. "B"

Wear rings of similar material are often used with this type of seal. Their use eliminates metal to metal contact between piston and bore surfaces which improves wear conditions and is especially effective when used in models having long stroke length.

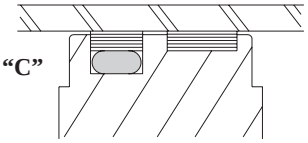
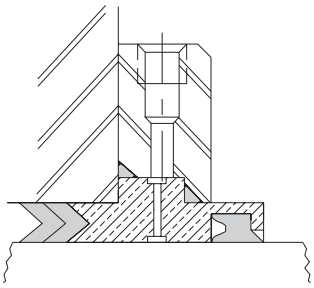


Fig. "C"

Seal construction options are an extra cost feature available upon request in all cylinders. Consult Lynair, Inc. to obtain design recommendations and price adders when this optional feature is being considered.

BEARING DRAINBACK PORT *(HYD. MODELS)*
ROD SEAL LUBE PORT *(AIR MODELS)*

A 1/8 NPTF port is available on hydraulic models to permit fluid that accumulates between the primary rod seal and outer wiperseal to be drained back to the system reservoir. This port, usually located in the bearing retainer, may be specified at any one of the four numbered side positions used to designate operating port location.



Air cylinders may be modified in the same way to permit lubrication of rod seal and inner bearing surfaces.

PROXIMITY SWITCH OPTION

Proximity switches to signal "end of stroke" position may be ordered at either one or both ends of all cylinders for operation with air or hydraulic service to 3000 PSI.

Proximity switch housings contain epoxy potted, solid state electronics with sealed sensing probe that extends into cylinder to detect presence of rod mounted actuator with no surface contact. Switches operate with no parts subject to wear, adjustment, or tampering.

Preferred cylinder construction is suitable for use with either Turck Series "CRS" or Namco Style "EE 230" switches. Other commercial brand switches may be used to suit customer preference, but availability is dependent on construction modifications necessary.

Cylinders may be ordered with or without the proximity switch included. If ordered without the switch, Lynair, Inc. will advise the proper probe length necessary for operation.

Proximity switches may be located at any one of the four numbered side positions not occupied by an operating port or obstructed by the cylinder mounting.

"Stroke To Go" refers to the stroke travel remaining when the switch actuates. Lynair, Inc. cylinders are designed to give a standard stroke to go distance of 3/16 inch. Cylinders can be furnished with custom "Stroke To Go" dimensions to suit customer requirements.

Switch detail dimensions, electrical specifications, and related technical data are detailed in Lynair, Inc. Bulletin "PS".

REED OR HALL EFFECT SWITCH OPTIONS

Series "AL" cylinders with piston mounted magnet option are available for use with tie rod mounted Reed or Hall Effect Switches.

Switch positions on tie rods may be adjusted to sense end of stroke or intermediate stroke positions. Multiple switches may be used as desired.

Switch detail dimensions, electrical specifications, and related technical data are detailed in Lynair, Inc. Bulletin "AL".

PORT SIZE OPTIONS

Standard cylinders are equipped with NPTF taper pipe thread ports usually of the largest size that will fit into either the front or rear end cap.

Ports smaller than standard will be supplied upon request in all models at no additional cost.

Oversize ports, either NPTF or SAE straight thread style one size larger than standard may be ordered, but a construction modification may be necessary. If the port cannot be placed directly in the end cap, a welded extension that protrudes from the head surface housing the port will be attached.

Use of an oversize port does not insure that increased flow volume can enter the cylinder without restriction. Component sizes not subject to alteration may limit internal flow capabilities, especially when cushions are included. Cylinders designed to have oversize ports with "full flow" capability may be ordered, but special construction necessary may alter basic envelope dimensions.

NON-ROTATING PISTON ROD

Internal modifications that prevent the piston rod from rotating during operation may be ordered as a construction feature with restrictions on model availability and length of stroke.

A guide rod anchored in the center of the rear end cap slides through a mating sleeve fixed within a hollow area in the piston rod preventing rotary motion.

A minimum rod diameter of 1.000 inch is necessary and inclusion of a blind end cushion is not possible without modifications affecting basic envelope dimensions.

The non-rotating feature is not designed to support or prevent rotation resulting from externally applied offset loads. The function of this feature is to prevent the inherent rotation that will occur when the cylinder is operated with an unguided rod end. Consult Lynair, Inc. for additional information when this feature is desired.

ELECTRONIC POSITION SENSING

Hydraulic cylinders constructed to include an integrally mounted Linear Displacement Transducer (LDT) are available in bore sizes 2" thru 14". This non-contact, magnetostrictive sensing device is installed through the middle of the rear end cap with its wave guide probe centered within a hollow section of the cylinder piston rod. Reliable, solid state electronics provide highly accurate measurements of piston position and/or velocity during stroke operation. Detail information on LDT electrical specifications, available options, and modified cylinder dimensions are available from Lynair, Inc. upon request.

WATER SERVICE CYLINDERS

Hydraulic cylinders are available with modifications making them suitable for use with water as the operating medium. Water fitted models may be ordered with alternate construction features which provide protection levels proportionate to their cost.

Construction features recommended to provide a minimum level of adequate protection include a stainless steel piston rod, tubing of brass or steel having the bore surface specially chrome plated, and the remaining interior surface plated with zinc or cadmium. Electroless nickel plating of interior surfaces will provide greater protection at additional cost.

Series "PW" Water Cylinders are highly recommended to provide long service life. All wetted components are brass or stainless steel. This series meets American Water Works Association (AWWA) and tire industry standards. See Bulletin "PW".

Stainless steel cylinder tubes, or cylinders constructed entirely of stainless material to provide maximum protection are available in limited sizes.

Various other construction options are available for water service. Some of these include plastic heads & pistons, bronze or bronze-clad steel pistons, and piston wear rings. Consult Lynair, Inc. regarding your application.

SPRING LOADED CYLINDERS

Standard cylinders are double acting models designed to operate with system pressure applied alternately to each side of the piston.

Double acting units may be modified to include a spring which serves as a "fail-safe" feature. In such applications, the cylinder is operated and controlled by pressure in both directions while the internal spring insures that the rod will return to a predetermined position in the event of system pressure failure.

Single acting, spring return cylinders are available with the spring positioned to either "extend" or "retract" the stroke direction. The operating spring must be partially compressed when installed at assembly to develop a "preload force" that exceeds the combined value of the work load, weight of the rod assembly, and operating friction.

The system working pressure and force necessary for spring compression may affect the cylinder bore size required. When a spring loaded cylinder is desired, consult Lynair, Inc. Advise if the unit is to be "single" or "double acting", and describe the basic cylinder specifications, operating pressure, spring preload force, and spring function as being "fail-safe", "spring to extend", or "spring to retract".

Quotations based on submitted details will be furnished upon request.

CUSTOM EXTERIOR COATINGS

Cylinders that require exterior surface protection superior to that provided by standard enamel finish are available on a special order basis.

Available types of finish include:

- Zinc, Cadmium, or Electroless Nickel plate
- Black Oxide
- Epoxy or custom paint
- Stainless steel pigment epoxy paint (see Bulletin-SS496)

SPECIAL CYLINDERS

In addition to the standard lines of fluid power products that are described in this catalog and the available construction options that have been defined, Lynair, Inc. is known as a specialist in the design and manufacture of quality custom cylinders and boosters to meet specific application requirements. For assistance in meeting your needs in the area of specials, contact our factory or your local authorized Lynair representative. Features available on a special order basis include:

- Modified mounting dimensions
- Special mounting styles
- Use of non-standard materials
- Bolted flange type porting
- Integrally mounted control valves
- Mechanical limit switch actuators
- Special purpose boosters
- Cylinders with 1.000 inch bore
- Hollow center piston rods

  Double rod end models with center hole thru piston rod are available when rod size is 1.000 inch or larger. The piston rod will be of one piece construction when details permit.

- Back to Back Cylinders

  Independent double acting cylinders connected by common tie rods with piston rods facing opposite directions form unit capable of multiple stroke positions constructed from standard components.

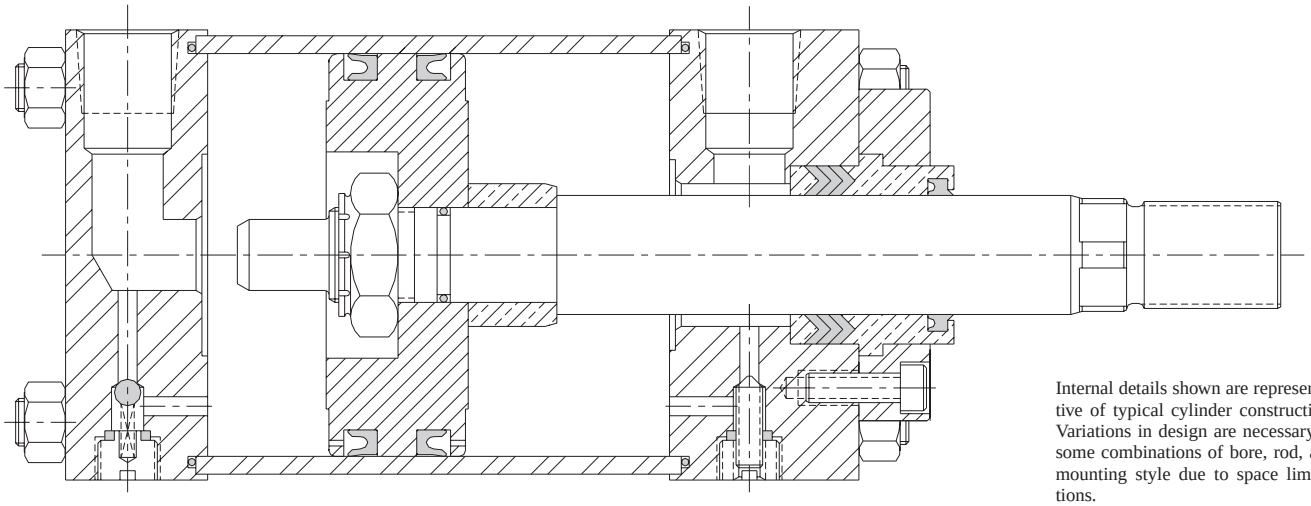
- Tandem Cylinders

  Single rod end unit consists of two or more cylinder sections constructed in line with pistons mounted on common rod to multiply output force without increasing bore size or operating pressure.

- Duplex Cylinders

  Single rod end unit includes independent, double acting rod assemblies facing in the same direction to provide multiple stroke positions or boost output force by controlling actuating sequence.

Infinite variations in construction limited only by the imagination of the designer in developing solutions for uncommon application problems may be available upon request. Lynair, Inc. will consider all such requests and provide quotation information for those designs that we feel are compatible with our manufacturing capabilities.



Internal details shown are representative of typical cylinder construction. Variations in design are necessary in some combinations of bore, rod, and mounting style due to space limitations.

Typical Construction Features Of Lynair Series "A" Air Cylinders

INDUSTRY STANDARD MOUNTING DIMENSIONS

LYNAIR Series "A" models conform to ANSI Standard B93.15-1971 for Mounting Dimensions of Square Head Industrial Fluid Power Cylinders and meet or exceed JIC Pneumatic Standards.

PISTON ROD

Precision ground, polished, and hard chrome plated piston rods made from high yield strength steel are offered with the choice of seven end style options. Male rod threads thru 1 1/2 diameter are rolled for maximum strength and uniformity. Four wrench flats are provided to aid in making the rod end connection. The rod surface is reduced in size in area of flats to eliminate contact with seals at assembly.

ADJUSTABLE CUSHION OPTION

Cushions are optional at either one or both ends of the cylinder. When provided, close fitting surfaces of mating components trap air which decelerates the piston speed before reaching the end of stroke position. Flush fitting Cushion Screw permits adjustment in deceleration rate while interchangeable Ball Check aids start up upon reversal of travel direction.

CYLINDER PORTS

NPTF Ports are unobstructed permitting use of maximum flow area.

National FLUID POWER Association

PRESSURE RATING

Series "A" air cylinders are rated for maximum service to 250 PSI.

ROD BEARING/ REMOVABLE RETAINERS

Precision machined bronze bearing maintains concentricity between rod and bore while providing support for V-Ring seal Set. Bearing Retainer construction allows removal of seals for maintenance purposes without tie rod disassembly in most models.

ROD SEALS

Pressure energized multiple lip packing set consists of three Buna-N V-rings supported by a bronze male adapter which aids seal expansion in response to pressure. Seals are self compensating to adjust for normal wear while providing long lasting, low friction service.

ROD WIPER

Double Lip Wiper cleans rod surface of contaminants and prevents entry of harmful particles into sensitive bearing and seal areas. Integral cup form on inboard side of wiper serves as secondary seal to insure leak-free performance.

LUBRICATION

All Series "A" cylinders are pre-lubricated at assembly with grease containing molydenum disulfide for added oxidation stability and resistance to corrosion. Pre-lubrication is helpful for use in non-lubricated pneumatic systems, but properly filtered, moisture free, lubricated air is recommended for maximum service life.

EXTERIOR MATERIALS/ EXTERNAL FINISH

Front and Rear Heads are accurately machined from precision square steel blocks. Cylinder Tubes, Bearing Retainers, and mountings are constructed of steel for maximum strength and durability.

Cylinders have enamel finish on exterior with mounting and machined surfaces protected by anti-rust film lubricant at time of shipment.

PISTON/SECURELY LOCKED

One piece, high tensile cast iron piston provides maximum bearing surface. Piston is secured by self-locking nut when sizes permit. Alternate piston designs are retained by hex nut or internal threads are secured with anaerobic adhesive and pinned with positive locking device

PISTON SEALS

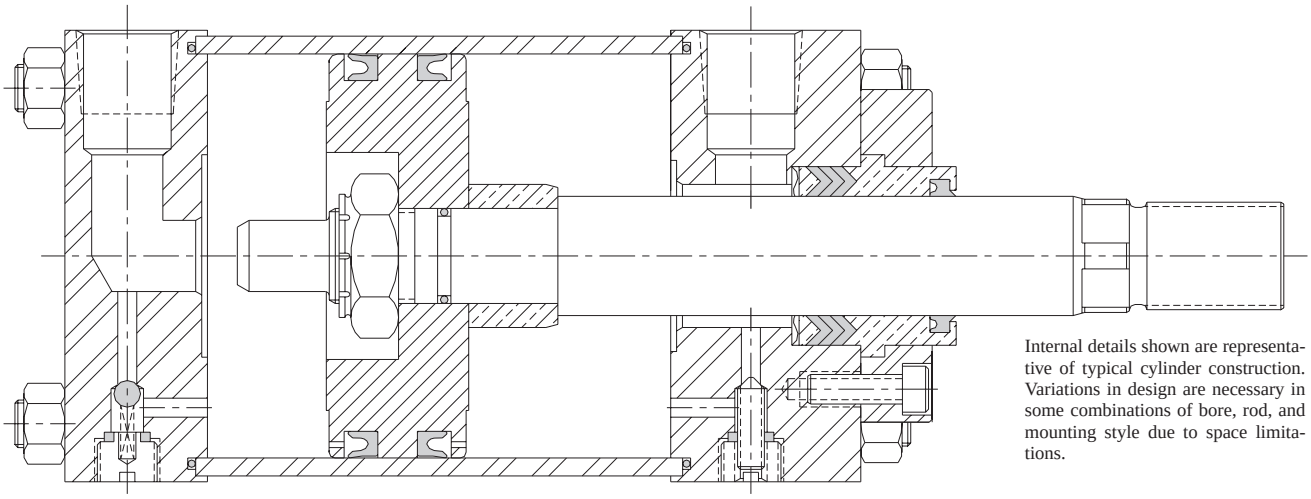
Low friction, self compensating cup type seals provide long, trouble free service. Cylinder sizes thru 6" Bore have seals of lubricated (silicone) urethane material. Other bore sizes are equipped with seals of Buna-N. Piston seals are elastic and snap into piston grooves for easy installation.

CYLINDER TUBE

Steel tubing is honed to 15 micro inch finish and hard chrome plated on the bore surface to resist wear and promote optimum seal life. Buna-N Square-rings (1 1/2 thru 6 bores) or 'O'-Rings (8 thru 14 bores) provide positive tube end seal.

TIE RODS

Made from steel having 100,000 PSI minimum yield strength (125,000 PSI for diameters larger than 1/2") with rolled threads for maximum strength and uniformity.



Internal details shown are representative of typical cylinder construction. Variations in design are necessary in some combinations of bore, rod, and mounting style due to space limitations.

Typical Construction Features Of Lynair Series "LH" Hydraulic Cylinders

PRESSURE RATINGS

Series "LH" Hydraulic cylinders are rated for use at operating pressure levels that vary with bore size, rod diameter, mounting style, and stroke length.

The maximum recommended operating pressure for Flange mount Models "C" and "D" are given on pages showing dimensional information for these mounting styles.

Refer to data on "Piston Rod Size Selection" given on page 7 for effects of stroke length on Maximum Recommended Operating Pressure.

CYL. BOR	MAXIMUM RATED PRES-	
	WITH SMALLEST AVAILABLE ROD	WITH ALTERNATE ROD DIAMETERS
1 1/2	1500	1500
2	1500	1500
2 1/2	1000	1200
3 1/4	1500	1500
4	1000	1000
5	750	750
6	750	750
8	500	500
10	500	500
12	500	500
14	500	500

INDUSTRY STANDARD MOUNTING DIMENSIONS

LYNAIR Series "LH" models conform to ANSI Standard B93.15-1971 for Mounting Dimensions of Square Head Industrial Fluid Power Cylinders and meet or exceed JIC Hydraulic Standards.

CYLINDER PORTS

N.P.T.F. ports are standard and provided unless otherwise requested. S.A.E. 'O'-Ring style ports are optional and may be specified at no additional cost. Standard sizes are shown below.

CYL. BORE	PORT SIZE	CYL. BORE	PORT SIZE
1 1/2	#6♦	6	#12
2	#6♦	8	#12
2 1/2	#6♦	10	#16
3 1/4	#8	12	#16
4	#8	14	#20
5	#8		

♦ Series A & LH Cylinders furnished with SAE #4 ports in these bore sizes furnished with the largest available rod diameter.

GENERAL CONSTRUCTION INFORMATION

Series "LH" Hydraulic models are made with the same quality features as Series "A" Air cylinders detailed on the preceding page. The two types of cylinders share common exterior and mounting dimensions with the only construction variations being in the rod seal set as noted.

EXTERIOR MATERIALS

Front and Rear Heads are accurately machined from precision square steel blocks. Cylinder Tubes, Bearing Retainers, and mountings are constructed of steel for maximum strength and durability.

ROD SEALS WITH SPRING EXPANDER

Pressure energized multiple lip packing set consists of three Buna-N V-rings supported by a bronze male adapter which aids seal expansion in response to system pressure. A wave spring exerts sufficient preloading to prevent weeping when system pressure is off.

ADJUSTABLE CUSHION OPTION

Cushions are optional at either one or both ends of the cylinder. When provided, close fitting surfaces of mating components trap air which decelerates the piston speed before reaching the end of stroke position. Flush fitting Cushion Screw permits adjustment in deceleration rate while interchangeable Ball Check aids start up upon reversal of travel direction.

ORDERING INFORMATION
SERIES "A" AND LH" CYLINDERS

A Model Numbering system for describing cylinder size and variable construction features that are available for use in all "standard" cylinders is explained below.

This Model Number consists of Letter and Number Codes which represent the desired choices between available variables which make up the cylinder construction details.

Cylinders may be ordered with many non-standard features that cannot be identified in coded number terms. When special features are desired, clearly describe requirements with supplemental callout of details.

SAMPLE MODEL NUMBER

NOTE: INCLUDE "DASH" MARKS ONLY AS SHOWN

A - 3¼ B42 - 10 - 1⅜ - P1

SERIES DESIGNATION

"A" or "LH" required to indicate type of cylinder construc-

CYLINDER BORE SIZE

Diameter of bore in inches. Available in sizes 1 1/2" thru 14".

MOUNTING STYLE CODE

Mounting style designated by use of assigned Code Letter. List of available models shown below.

PORT POSITION

Variable positions available to suit customer preference. Port position indicated by use of assigned location number with prefix "P". See below.

PISTON ROD DIAMETER

Size of cylinder rod in inches. Available sizes limited to those offered with Bore size selected.

STROKE LENGTH

Length of cylinder stroke in inches. If Stop Tube is included, indicate "Design" stroke, "Effective" stroke, and "Stop Tube" length required.

CUSHION OPTION CODE NUM-

Code Number identifies choice of available construction options.

ROD END STYLE NUMBER

Assigned Code Number designates style of available Rod End option.

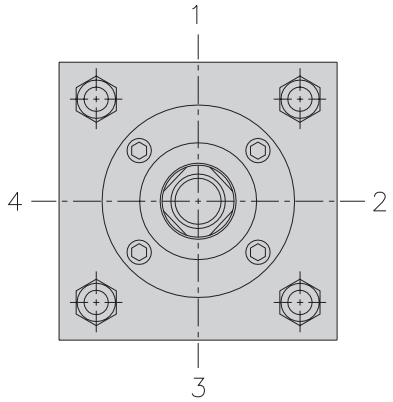
MOUNTING STYLE CODE LETTERS

CODE LETTER	DESCRIPTION
A	Foot Mount NFPA style MS2
B	Clevis Mount NFPA style MP1
BR	Detachable Clevis Mount NFPA style MP2
BX	Single Lug Pivot Mount NFPA style MP3
C	Front Flange Mount NFPA style MF1 & ME3
D	Rear Flange Mount NFPA style MF2 & ME4
E	Front Trunnion Mount NFPA style MT1
F	Rear Trunnion Mount NFPA style MT2
G	Side Mount NFPA style MS4
J	End Lug Mount NFPA style MS7
K	Centerline Lug Mount NFPA style MS3
L	Extended Tie Rod Mount NFPA style MX1, MX2, & MX3
N	Intermediate Trunnion Mount NFPA style MT4
P	Square Front Flange Mount NFPA style MF5
R	Square Rear Flange Mount NFPA style MF6
UB	Spherical Bushing Mount NFPA style MPU3
W	Angle Foot Mount NFPA style MS1

CUSHION CODE NUMBERS

CODE NUMBER	DESCRIPTION
0	Non-cushioned (No cushion at either end)
2	Adjustable Cushion on Rod End (Cushion at Front Head End only)
3	Adjustable Cushion on Blind End (Cushion at Rear Head End only)
4	Adjustable Cushion on Both Ends

PORT LOCATION POSITION NUMBERS



ROD END STYLE CODE NUMBERS

CODE NUMBER	DESCRIPTION
	STANDARD
2	Small Male Thread NFPA type SM
4	Short Style Female Thread NFPA type SF
	OPTIONAL
1	Full Diameter Male Thread NFPA type FM
3	Long Style Female Thread NFPA type LF
5	Studded Male Thread Dimensions equal to Style 2 Rod End
6	Special Rod End Made per custom specifications
8	Intermediate Male Thread NFPA type IM
0	Plain Rod End

Cylinder side positions are numbered in a clockwise direction when viewing the unit from the rod end with location #1 being at the top as shown in the reference view.

Double rod end models are numbered in a similar manner with the primary mounting end being considered as the "rod end" for side numbering purposes. If the cylinder ports are in line at both ends of the unit, use only one number to designate the required position. When the cylinder is to be provided with multiple ports, specify the side position numbers which correspond to the desired locations.

M .....Double Rod End Model
Insert "M" in front of Mtg. Style Code Letter to designate Double Rod End construction. Mounting styles available are: MA, MC, ME, MG, MJ, MK, ML, MN, MP, and MW.

NON-STANDARD MODIFICATIONS AVAILABLE

Variations in construction involving use of non-standard dimensions, materials, or cylinder feature modifications are available upon request. Clearly describe any such requirement that is not identifiable by coded Model Number.

AVAILABLE OPTIONS

Optional construction features may be ordered for Series "A" and "LH" cylinders to satisfy specific application requirements. When such options are desired, a callout describing feature details must be provided in addition to the basic cylinder specifications as noted on the preceding page.

Many of these optional features are explained in detail on pages 8 thru 11. Among the options that may be ordered are:

- **Rod end modifications**
  See descriptive information on this page.
- **Modified mounting dimensions**
- **Custom mounting style**
- **Optional seal materials**
  Viton, Polyurethane, Carboxylated Nitrile
- **Optional seal styles**
  Alternate piston seal designs
  Cup type rod seals
- **Extended Thrust Key**
  Refer to information on page 20.
- **Stop Tube stroke limitation**
  Refer to information on pages 7 and 8.
- **Protective Rod Boot**
  Refer to information on page 8.
  Requires additional rod extension ("LA" dim)
- **Stainless steel Piston Rod**
- **Metallic Rod Scraper**
- **Hardened Piston Rod material**
- **Bearing Drainback port**
  Available with Series "LH" only
- **Rod Seal Lube port**
  Available with Series "A" only
- **Alternate port sizes**
- **SAE straight thread o-ring style ports**
- **Proximity switch option**
- **Custom exterior finish**
- **Special construction modifications**
  Refer to information on page 11.

STROKE LENGTH TOLERANCE

The cylinder stroke is subject to a normal length variation of $\pm 1/32$".

Tolerance limits on mating machined surfaces and the elastic nature of cylinder tube and tie rod components makes a closer limit impractical without the custom fitting of parts.

Cylinders with "close stroke tolerance" that are within .015 of specified length are available for air or hydraulic service on a special order basis.

ROD END MODIFICATIONS

Standard cylinder rod end styles may be altered to include specific dimensional requirements upon request.

Variations in the length of rod extension ("LA" dim.), thread length ("A" dim.), or thread details may be ordered to suit application purposes.

When such variations are desired, the order information should be expressed in standard letter code terms.

An example of this callout form is:
"LA" dim .= $6^1/_2$"
(length of rod extension)

"A" dim. = 3"
(non-standard thread length)

"KK" dim. = $^3/_4$-10 UNC
(non-standard thread form)

Changes involving these dimensions do not necessitate the use of a "Style 6" rod end code number. That designation is assigned only to those rod ends having special design features rather than those with minor variations in length dimensions or thread details.

Thread sizes other than those furnished as standard are available upon request and usually are provided without additional cost.

MOUNTING STYLE COMBINATIONS

Two or more standard mounting styles may be combined for use on the same cylinder if so desired. The styles selected, however, must be compatible for use with each other based on construction limitations.

When multiple mountings are to be provided, the code letter applicable to each mounting style should be included in the cylinder model number.

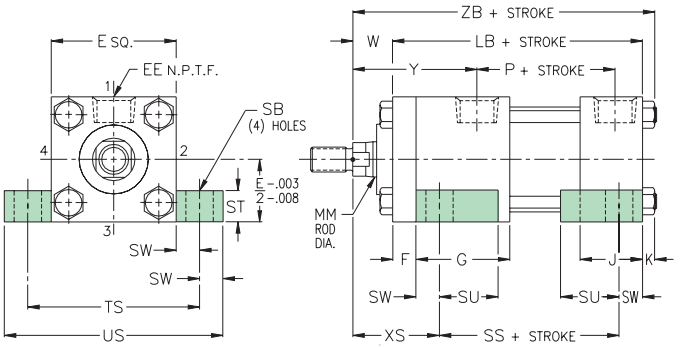
MODEL NUMBER MODIFICATION

Letter code "S" will be added to the normal cylinder model number when the use of an optional feature results in significant changes in construction details or alters standard mounting dimensions.

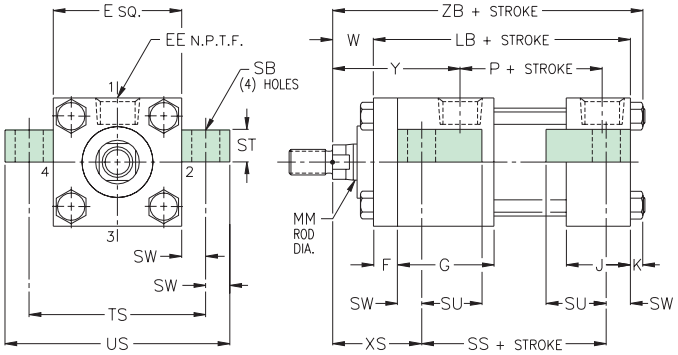
When a requested option changes basic cylinder construction, the code letter "S" will be placed in front of the "series designation" letter.

It is not necessary to include this "code letter" in the model number information submitted at the time of order entry. Lynair, Inc. will determine when this code letter should be used based on the optional features included and their effect on cylinder construction.

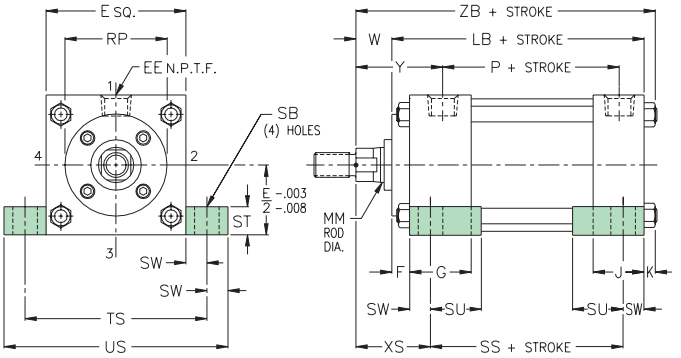
FOOT MOUNT MODEL "A" NFPA STYLE MS2

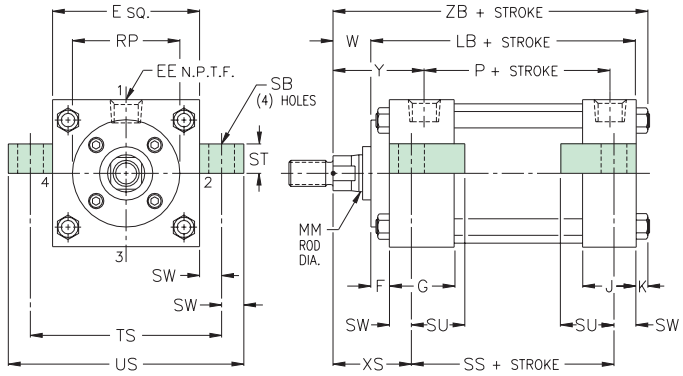


CENTERLINE LUG MOUNT MODEL "K" NFPA STYLE MS3

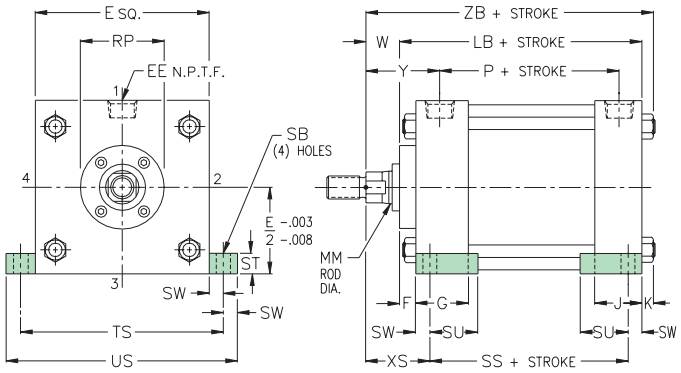


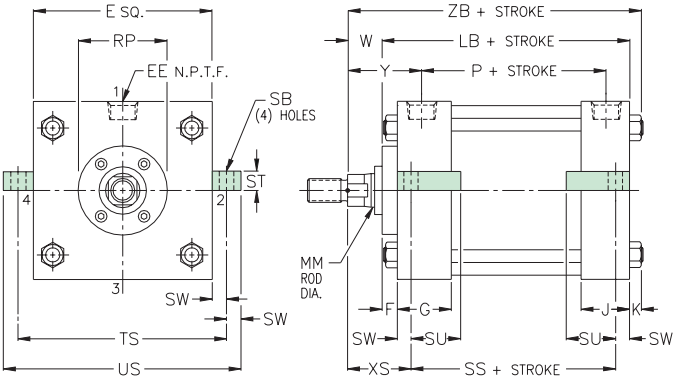
BORE	E	EE	F	G	J	K	P	LB	SB♦	SS	ST	SU	SW	TS	US
1 1/2	2	3/8❖	3/8	1 1/2	1	1/4	2 7/32	4	3/8	2 7/8	1/2	15/16	3/8	2 3/4	3 1/2
2	2 1/2	3/8❖	3/8	1 1/2	1	5/16	2 7/32	4	3/8	2 7/8	1/2	15/16	3/8	3 1/4	4
2 1/2	3	3/8❖	3/8	1 1/2	1	5/16	2 11/32	4 1/8	3/8	3	1/2	15/16	3/8	3 3/4	4 1/2





BORE	E	EE	F	G	J	K	P	LB	SB♦	SS	ST	SU	SW	TS	US
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	4 7/8	1/2	3 1/4	3/4	1 1/4	1/2	4 3/4	5 3/4
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	4 7/8	1/2	3 1/4	3/4	1 1/4	1/2	5 1/2	6 1/2
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	2 7/8	5 1/8	3/4	3 1/8	1	1 9/16	11/16	6 7/8	8 1/4
6	6 1/2	3/4	3/4	2	1 1/2	7/16	3 1/8	5 3/4	3/4	3 5/8	1	1 9/16	11/16	7 7/8	9 1/4





BORE	E	EE	F	G	J	K	P	LB	SB♦	SS	ST	SU	SW	TS	US
8	8 1/2	3/4	3/4	2	1 1/2	9/16	3 1/4	5 7/8	3/4	3 3/4	1	1 9/16	11/16	9 7/8	11 1/4
10	10 5/8	1	3/4	2 1/4	2	11/16	4 1/8	7 1/8	1	4 5/8	1 1/4	2	7/8	12 3/8	14 1/8
12	12 3/4	1	3/4	2 1/4	2	11/16	4 5/8	7 5/8	1	5 1/8	1 1/4	2	7/8	14 1/2	16 1/4
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	5 1/2	8 7/8	1 1/4	5 7/8	1 1/2	2 1/2	1 1/8	17	19 1/4

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	XS	Y	ZB	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 3/8	1 31/32	4 7/8	––
	*1	1/2	1	2 1/8	1 3/4	2 11/32	5 1/4	––
2	5/8	1/4	5/8	1 3/8	1 3/8	1 31/32	4 15/16	––
	1	1/2	1	2 1/8	1 3/4	2 11/32	5 5/16	––
	*1 3/8	5/8	1 1/4	2 7/8	2	2 19/32	5 9/16	––
2 1/2	5/8	1/4	5/8	1 3/8	1 3/8	1 31/32	5 1/16	––
	1	1/2	1	2 1/8	1 3/4	2 11/32	5 7/16	––
	1 3/8	5/8	1 1/4	2 7/8	2	2 19/32	5 11/16	––
	*1 3/4	3/4	1 1/2	3 1/2	2 1/4	2 27/32	5 15/16	––
3 1/4	1	1/4	3/4	1 7/8	1 7/8	2 7/16	6	3 1/4
	1 3/8	3/8	1	2 5/8	2 1/8	2 11/16	6 1/4	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 3/8	2 15/16	6 1/2	□
	2	1/2	1 3/8	3 5/8	2 1/2	3 1/16	6 5/8	□
4	1	1/4	3/4	1 7/8	1 7/8	2 7/16	6	3 1/4
	1 3/8	3/8	1	2 5/8	2 1/8	2 11/16	6 1/4	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 3/8	2 15/16	6 1/2	3 3/4
	2	1/2	1 3/8	3 5/8	2 1/2	3 1/16	6 5/8	4
	2 1/2	5/8	1 5/8	4 5/8	2 3/4	3 5/16	6 7/8	□
5	1	1/4	3/4	1 7/8	2 1/16	2 7/16	6 5/16	3 1/4
	1 3/8	3/8	1	2 5/8	2 5/16	2 11/16	6 9/16	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 9/16	2 15/16	6 13/16	3 3/4
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	2 1/2	5/8	1 5/8	4 5/8	2 15/16	3 5/16	7 3/16	4 1/2
	3	5/8	1 5/8	5 1/8	2 15/16	3 5/16	7 3/16	□
	3 1/2	5/8	1 5/8	5 1/8	2 15/16	3 5/16	7 3/16	□
6	1 3/8	1/4	7/8	2 1/2	2 5/16	2 13/16	7 1/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	2 9/16	3 1/16	7 5/16	3 3/4
	2	3/8	1 1/4	3 1/2	2 11/16	3 3/16	7 7/16	4
	2 1/2	1/2	1 1/2	4 1/2	2 15/16	3 7/16	7 11/16	4 1/2
	3	1/2	1 1/2	5	2 15/16	3 7/16	7 11/16	5 1/2
	3 1/2	1/2	1 1/2	5	2 15/16	3 7/16	7 11/16	5 7/8
	4	1/2	1 1/2	5 1/2	2 15/16	3 7/16	7 11/16	□
8	1 3/8	1/4	7/8	2 1/2	2 5/16	2 13/16	7 5/16	3 1/4
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	4 1/2	1/2	1 1/2	6	2 15/16	3 7/16	7 15/16	7 1/8
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	5 1/2	1/2	1 1/2	7	2 15/16	3 7/16	7 15/16	7 SQ
10	1 3/4	3/8	1 1/8	3 1/8	2 3/4	3 1/8	8 15/16	3 3/4
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	5	1/2	1 1/2	6 1/2	3 1/8	3 1/2	9 5/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/8	3 1/2	9 5/16	8 3/8
12	2	3/8	1 1/4	3 1/2	2 7/8	3 1/4	9 9/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/8	3 1/2	9 13/16	4 1/2
	3	1/2	1 1/2	5	3 1/8	3 1/2	9 13/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/8	3 1/2	9 13/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/8	3 1/2	9 13/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/8	3 1/2	9 13/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/8	3 1/2	9 13/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/8	3 1/2	9 13/16	8 3/8
14	2 1/2	1/2	1 1/2	4 1/2	3 3/8	3 13/16	11 1/8	4 1/2
	3	1/2	1 1/2	5	3 3/8	3 13/16	11 1/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 3/8	3 13/16	11 1/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 3/8	3 13/16	11 1/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 3/8	3 13/16	11 1/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 3/8	3 13/16	11 1/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 3/8	3 13/16	11 1/8	8 3/8

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2	2 1/2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12	2 1/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12	2 1/2-12
A	3/4	1 1/8	1 5/8	2	2 1/4	3
B	1.124	1.499	1.999	2.374	2.624	3.124
C	3/8	1/2	5/8	3/4	7/8	1
D	1/2	7/8	1 3/16	1 17/32	1 3/4	2 1/8
NA	9/16	15/16	1 5/16	1 23/32	1 15/16	2 7/16

LETTER DIM.	3	3 1/2	4	4 1/2	5	5 1/2
KK	2 1/4-12	2 1/2-12	3-12	3 1/4-12	3 1/2-12	4-12
CC	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	3-12	3 1/2-12	4-12	4 1/2-12	5-12	5 1/2-12
A	3 1/2	3 1/2	4	4 1/2	5	5 1/2
B	3.749	4.249	4.749	5.249	5.749	6.249
C	1	1	1	1	1	1
D	2 5/8	3	3 1/2	3 7/8	4 1/4	4 5/8
NA	2 15/16	3 7/16	3 15/16	4 7/16	4 15/16	5 7/16

✱ Cushion at rod end is non-adjustable in these size combinations.

□ Circular retainer not used in these size combinations. Plate furnished is "E" square.

❖ Series "A & LH" cylinders furnished with 1/4 N.P.T.F. ports in these bore sizes ordered with largest available rod diameter.

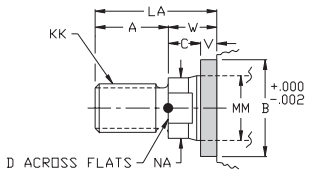
♦ "SB" is diameter of mounting bolt.

1 1/2 Bore FOOT MOUNT models should not have ports specified at location #2 or #4 due to insufficient clearance past mounting bolts.

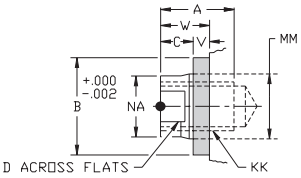
Extended Thrust Key suggested for Model "A" cylinders thru 6" Bore subject to severe load conditions. Dimensional information is located on page 20.

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

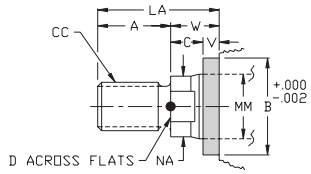


STYLE 4: Short Female Thread NFPA Type SF

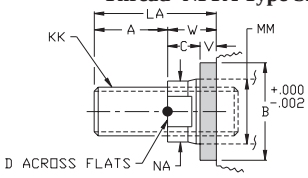


OPTIONAL ROD END STYLES

STYLE 8: Intermediate Male Thread -NFPA Type IM

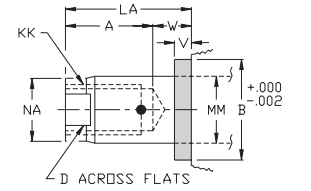


STYLE 5: Studded Small Male Thread -NFPA Type SM

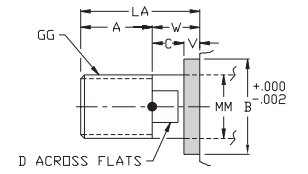


Male #5 additional cost

STYLE 3: Long Female Thread

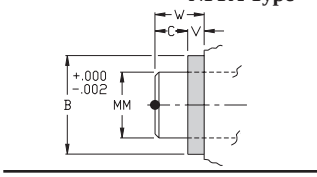


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



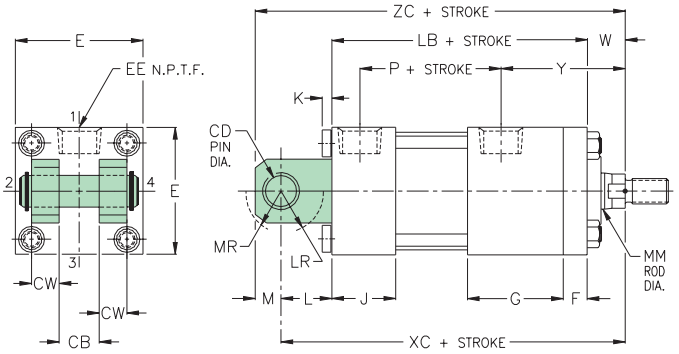
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

CLEVIS MOUNT MODEL "B" NFPA STYLE MP1

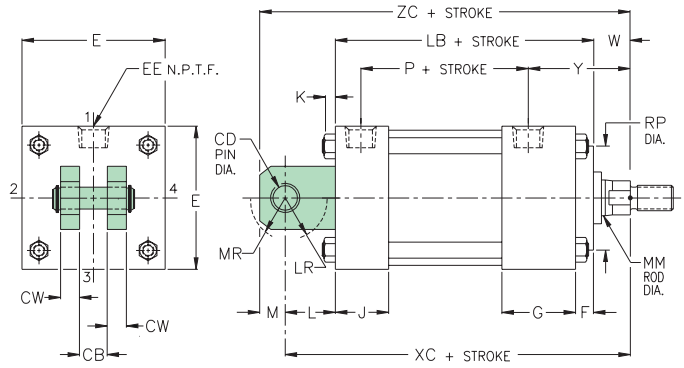


SINGLE LUG PIVOT MOUNT AVAILABLE MODELS.

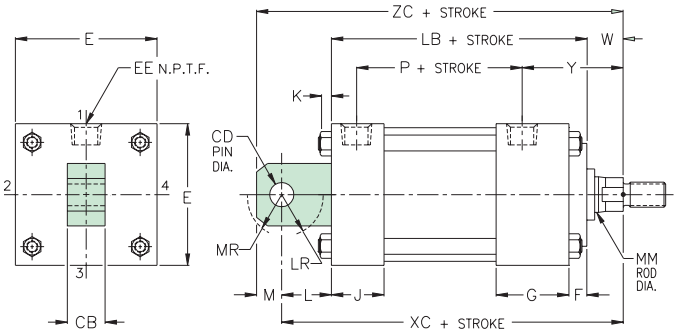
MODEL "BX" SINGLE LUG PIVOT NFPA STYLE MP3
Standard models are available in bore sizes 1 1/2" thru 14". Dimensional data is shown in view below. Bearing retainer construction details are same as shown for Model "B" units. Pivot pin is not included with this mounting style.

MODEL "UB" SPHERICAL BUSHING MT.
NFPA STYLE MPU3
Model with spherical bushing in mounting pin hole available in bore sizes 1 1/2" thru 14". See Model "UB" bulletin for dimensional information of desired model. Rod end attachments fitted with spherical bushings are also shown in bulletin.

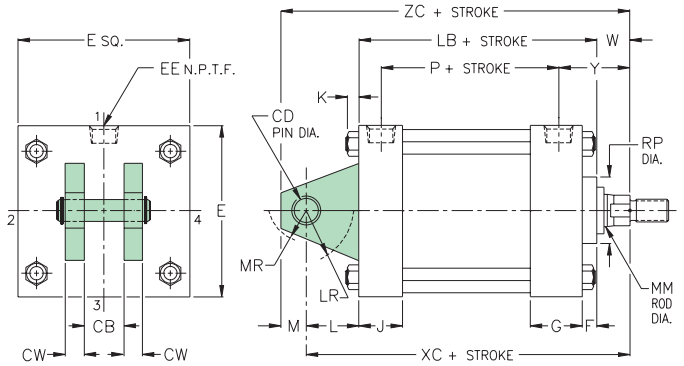
BORE	E	EE	F	G	J	K	P	LB	CB	CW	CD +.000 -.002	L	LR	M	MR
1 1/2	2	3/8❖	3/8	1 1/2	1	3/16	2 7/32	4	3/4	1/2	.500	3/4	5/8	1/2	9/16
2	2 1/2	3/8❖	3/8	1 1/2	1	5/16	2 7/32	4	3/4	1/2	.500	3/4	5/8	1/2	9/16
2 1/2	3	3/8❖	3/8	1 1/2	1	5/16	2 11/32	4 1/8	3/4	1/2	.500	3/4	5/8	1/2	9/16



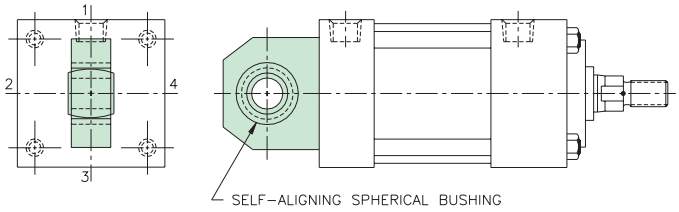
MODEL "BX" SINGLE LUG



BORE	E	EE	F	G	J	K	P	LB	CB	CW	CD +.000 -.002	L	LR	M	MR
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	4 7/8	1 1/4	5/8	.750	1 1/4	1	3/4	15/16
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	4 7/8	1 1/4	5/8	.750	1 1/4	1	3/4	15/16
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	2 7/8	5 1/8	1 1/4	5/8	.750	1 1/4	1	3/4	15/16
6	6 1/2	3/4	3/4	2	1 1/2	7/16	3 1/8	5 3/4	1 1/2	3/4	1.000	1 1/2	1 1/4	1	1 3/16



MODEL "UB" SPHERICAL BUSHING



SEE MODEL "UB" BULLETIN

BORE	E	EE	F	G	J	K	P	LB	CB	CW	CD +.000 -.002	L	LR	M	MR
8	8 1/2	3/4	3/4	2	1 1/2	9/16	3 1/4	5 7/8	1 1/2	3/4	1.000	1 1/2	1 1/4	1	1 3/16
10	10 5/8	1	3/4	2 1/4	2	11/16	4 1/8	7 1/8	2	1	1.375	2 1/8	1 7/8	1 3/8	1 5/8
12	12 3/4	1	3/4	2 1/4	2	11/16	4 5/8	7 5/8	2 1/2	1 1/4	1.750	2 1/4	2 1/8	1 3/4	2 1/8
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	5 1/2	8 7/8	2 1/2	1 1/4	2.000	2 1/2	2 3/8	2	2 3/8

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	XC	ZC	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 31/32	5 3/8	5 7/8	––
	*1	1/2	1	2 1/8	2 11/32	5 3/4	6 1/4	––
2	5/8	1/4	5/8	1 3/8	1 31/32	5 3/8	5 7/8	––
	1	1/2	1	2 1/8	2 11/32	5 3/4	6 1/4	––
	*1 3/8	5/8	1 1/4	2 7/8	2 19/32	6	6 1/2	––
2 1/2	5/8	1/4	5/8	1 3/8	1 31/32	5 1/2	6	––
	1	1/2	1	2 1/8	2 11/32	5 7/8	6 3/8	––
	1 3/8	5/8	1 1/4	2 7/8	2 19/32	6 1/8	6 5/8	––
	*1 3/4	3/4	1 1/2	3 1/2	2 27/32	6 3/8	6 7/8	––
3 1/4	1	1/4	3/4	1 7/8	2 7/16	6 7/8	7 5/8	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	7 1/8	7 7/8	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	7 3/8	8 1/8	☐
	2	1/2	1 3/8	3 5/8	3 1/16	7 1/2	8 1/4	☐
4	1	1/4	3/4	1 7/8	2 7/16	6 7/8	7 5/8	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	7 1/8	7 7/8	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	7 3/8	8 1/8	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	7 1/2	8 1/4	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	7 3/4	8 1/2	☐
5	1	1/4	3/4	1 7/8	2 7/16	7 1/8	7 7/8	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	7 3/8	8 1/8	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	7 5/8	8 3/8	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	7 3/4	8 1/2	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	8	8 3/4	4 1/2
	3	5/8	1 5/8	5 1/8	3 5/16	8	8 3/4	☐
	3 1/2	5/8	1 5/8	5 1/8	3 5/16	8	8 3/4	☐
6	1 3/8	1/4	7/8	2 1/2	2 13/16	8 1/8	9 1/8	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	8 3/8	9 3/8	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	8 1/2	9 1/2	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	8 3/4	9 3/4	4 1/2
	3	1/2	1 1/2	5	3 7/16	8 3/4	9 3/4	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	8 3/4	9 3/4	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	8 3/4	9 3/4	☐
8	1 3/8	1/4	7/8	2 1/2	2 13/16	8 1/4	9 1/4	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	8 1/2	9 1/2	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	8 5/8	9 5/8	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	8 7/8	9 7/8	4 1/2
	3	1/2	1 1/2	5	3 7/16	8 7/8	9 7/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	8 7/8	9 7/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	8 7/8	9 7/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 7/8	8 7/8	9 7/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 7/16	8 7/8	9 7/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 7/16	8 7/8	9 7/8	7SQ
10	1 3/4	3/8	1 1/8	3 1/8	3 1/8	10 3/8	11 3/4	3 3/4
	2	3/8	1 1/4	3 1/2	3 1/4	10 1/2	11 7/8	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	10 3/4	12 1/8	4 1/2
	3	1/2	1 1/2	5	3 1/2	10 3/4	12 1/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	10 3/4	12 1/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	10 3/4	12 1/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	10 3/4	12 1/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	10 3/4	12 1/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	10 3/4	12 1/8	8 3/8
12	2	3/8	1 1/4	3 1/2	3 1/4	11 1/8	12 7/8	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	11 3/8	13 1/8	4 1/2
	3	1/2	1 1/2	5	3 1/2	11 3/8	13 1/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	11 3/8	13 1/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	11 3/8	13 1/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	11 3/8	13 1/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	11 3/8	13 1/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	11 3/8	13 1/8	8 3/8
14	2 1/2	1/2	1 1/2	4 1/2	3 13/16	12 7/8	14 7/8	4 1/2
	3	1/2	1 1/2	5	3 13/16	12 7/8	14 7/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 13/16	12 7/8	14 7/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 13/16	12 7/8	14 7/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 13/16	12 7/8	14 7/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 13/16	12 7/8	14 7/8	7 9/16

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2	2 1/2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12	2 1/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12	2 1/2-12
A	3/4	1 1/8	1 5/8	2	2 1/4	3
B	1.124	1.499	1.999	2.374	2.624	3.124
C	3/8	1/2	5/8	3/4	7/8	1
D	1/2	7/8	1 3/16	1 17/32	1 3/4	2 1/8
NA						

LETTER DIM.	3	3 1/2	4	4 1/2	5	5 1/2
KK	2 1/4-12	2 1/2-12	3-12	3 1/4-12	3 1/2-12	4-12
CC	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	3-12	3 1/2-12	4-12	4 1/2-12	5-12	5 1/2-12
A	3 1/2	3 1/2	4	4 1/2	5	5 1/2
B	3.749	4.249	4.749	5.249	5.749	6.249
C	1	1	1	1	1	1
D	2 5/8	3	3 1/2	3 7/8	4 1/4	4 5/8
NA	2 15/16	3 7/16	3 15/16	4 7/16	4 15/16	5 7/16

***Cushion at rod end is non-adjustable in these size combinations.**

☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

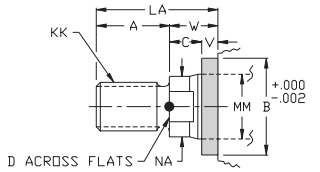
❖ Series "A & LH" cylinders furnished with 1/4 N.P.T.F. ports in these bore sizes ordered with largest available rod diameter.

Chrome plated Clevis Pin with snap ring retainers furnished with all Model "B" cylinders.

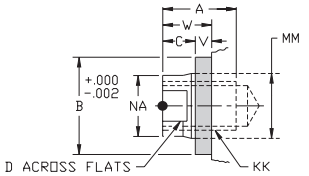
"B", "BX" and "UB" models are "pin" type mounting styles that must be fitted with suitable rod end attachment that allows pivoting at both ends. Rod end accessories for this purpose are shown on page 36.

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

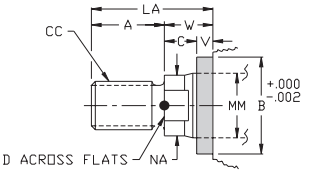


STYLE 4: Short Female Thread NFPA Type SF

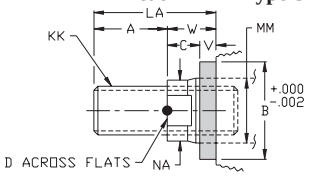


OPTIONAL ROD END STYLES

STYLE 8: Intermediate Male Thread - NFPA Type IM

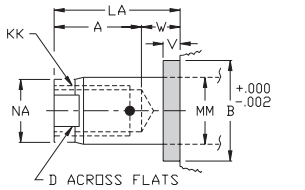


STYLE 5: Studded Small Male Thread - NFPA Type SM

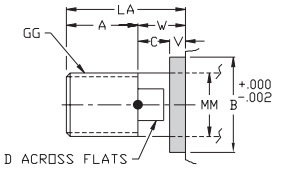


Male #5 additional cost

STYLE 3: Long Female Thread

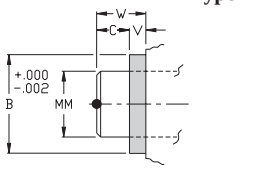


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



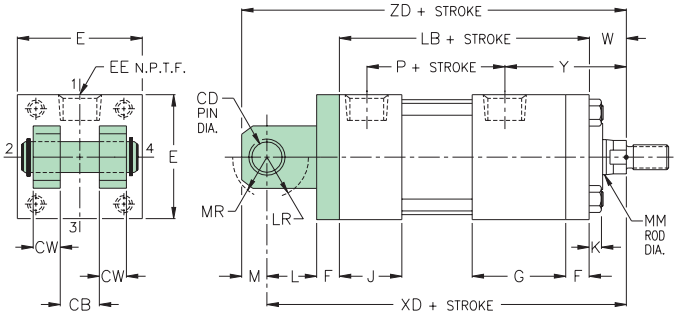
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

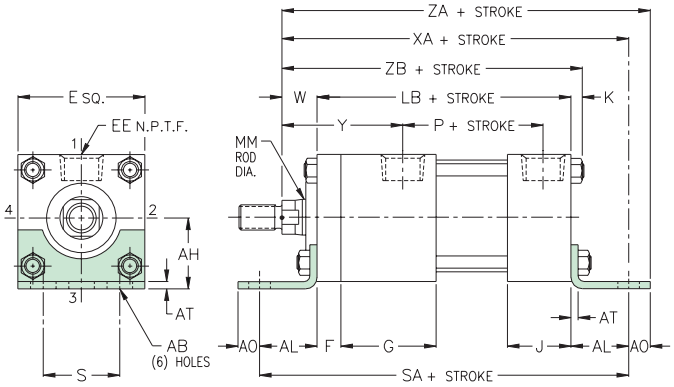
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

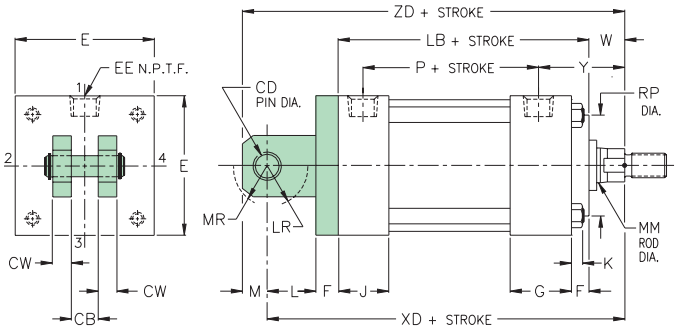
DETACHABLE CLEVIS MOUNT

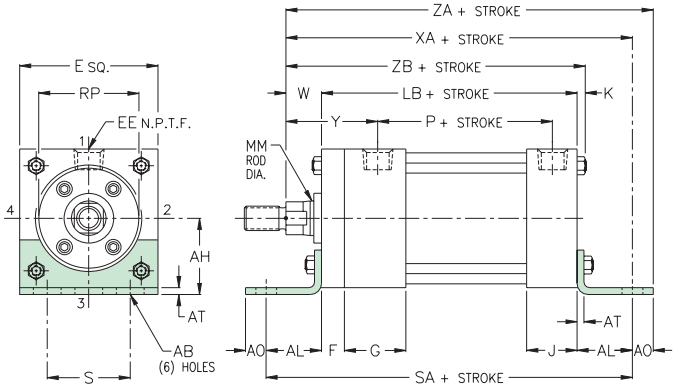


ANGLE FOOT MOUNT MODEL "W" NFPA STYLE MS1



BORE	E	EE	F	G	J	K	L	M	P	CB	CD $^{+.000}_{-.002}$	CW	LB	LR	MR	S	AB♦	AH	AL	AO	AT	SA
1 1/2	2	3/8❖	3/8	1 1/2	1	1/4	3/4	1/2	2 7/32	3/4	.500	1/2	4	5/8	9/16	1 1/4	3/8	1 3/16	1	3/8	1/8	6
2	2 1/2	3/8❖	3/8	1 1/2	1	5/16	3/4	1/2	2 7/32	3/4	.500	1/2	4	5/8	9/16	1 3/4	3/8	1 7/16	1	3/8	1/8	6
2 1/2	3	3/8❖	3/8	1 1/2	1	5/16	3/4	1/2	2 11/32	3/4	.500	1/2	4 1/8	5/8	9/16	2 1/4	3/8	1 5/8	1	3/8	1/8	6 1/8





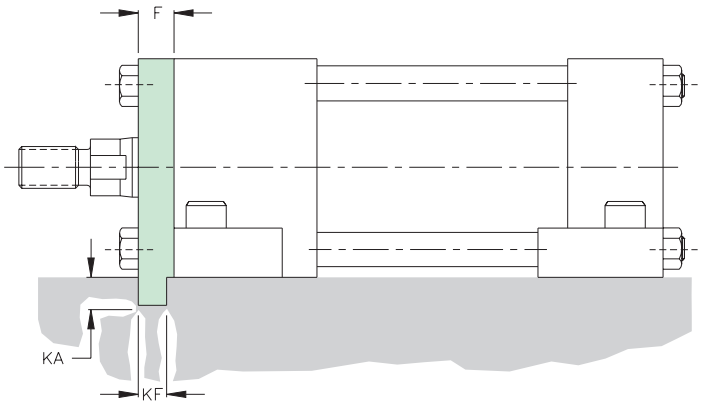
BORE	E	EE	F	G	J	K	L	M	P	CB	CD $^{+.000}_{-.002}$	CW	LB	LR	MR	S	AB♦	AH	AL	AO	AT	SA
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	1 1/4	3/4	2 5/8	1 1/4	.750	5/8	4 7/8	1	15/16	2 3/4	1/2	1 15/16	1 1/4	1/2	1/8	7 3/8
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	1 1/4	3/4	2 5/8	1 1/4	.750	5/8	4 7/8	1	15/16	3 1/2	1/2	2 1/4	1 1/4	1/2	1/8	7 3/8
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	1 1/4	3/4	2 7/8	1 1/4	.750	5/8	5 1/8	1	15/16	4 1/4	5/8	2 3/4	1 3/8	5/8	3/16	7 7/8
6	6 1/2	3/4	3/4	2	1 1/2	7/16	1 1/2	1	3 1/8	1 1/2	1.000	3/4	5 3/4	1 1/4	1 3/16	5 1/4	3/4	3 1/4	1 3/8	5/8	3/16	8 1/2
8	8 1/2	3/4	3/4	2	1 1/2	9/16	1 1/2	1	3 1/4	1 1/2	1.000	3/4	5 7/8	1 1/4	1 3/16	7 1/8	3/4	4 1/4	1 13/16	11/16	1/4	8 3/4

OPTIONAL CONSTRUCTION FEATURE EXTENDED THRUST KEY
(KEY RETAINER PLATE)

Cylinders with fixed non-centerline class mountings (Models "A", "G", and "J") may be ordered to include an extended thrust key suitable for mating with a keyway milled into the mounting surface.

This feature, when used in conjunction with the standard cylinder mounting provides a rigid assembly that will not shift under severe load conditions and eliminates the need for fitted bolts, pins, or welded external keys.

The table below contains dimensional data for thrust key provided when this optional feature is specified.



SERIES "A" AND "LH" DIMENSIONS

LETTER DIM.	CYLINDER BORE						
	1 1/2	2	2 1/2	3 1/4	4	5	6
F	3/8	3/8	3/8	5/8	5/8	5/8	3/4
KF $^{+.000}_{-.002}$	.312	.312	.312	.562	.562	.562	.687
KA	3/16	3/16	3/16	5/16	5/16	5/16	3/8

Extended Thrust Key available on special order basis for cylinders larger than 6" bore. Dimensional information available upon request.

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	XA	ZA	ZB	XD	ZD	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 31/32	5 5/8	6	4 7/8	5 3/4	6 1/4	––
	*1	1/2	1	2 1/8	2 11/32	6	6 3/8	5 1/4	6 1/8	6 5/8	––
2	5/8	1/4	5/8	1 3/8	1 31/32	5 5/8	6	4 15/16	5 3/4	6 1/4	––
	1	1/2	1	2 1/8	2 11/32	6	6 3/8	5 5/16	6 1/8	6 5/8	––
	*1 3/8	5/8	1 1/4	2 7/8	2 19/32	6 1/4	6 5/8	5 9/16	6 3/8	6 7/8	––
2 1/2	5/8	1/4	5/8	1 3/8	1 31/32	5 3/4	6 1/8	5 1/16	5 7/8	6 3/8	––
	1	1/2	1	2 1/8	2 11/32	6 1/8	6 1/2	5 7/16	6 1/4	6 3/4	––
	1 3/8	5/8	1 1/4	2 7/8	2 19/32	6 3/8	6 3/4	5 11/16	6 1/2	7	––
	*1 3/4	3/4	1 1/2	3 1/2	2 27/32	6 5/8	7	5 15/16	6 3/4	7 1/4	––
3 1/4	1	1/4	3/4	1 7/8	2 7/16	6 7/8	7 3/8	6	7 1/2	8 1/4	3 1/4 ♦
	1 3/8	3/8	1	2 5/8	2 11/16	7 1/8	7 5/8	6 1/4	7 3/4	8 1/2	3 1/4 ♦
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	7 3/8	7 5/8	6 1/2	8	8 3/4	□
	2	1/2	1 3/8	3 5/8	3 1/16	7 1/2	8	6 5/8	8 1/8	8 7/8	□
4	1	1/4	3/4	1 7/8	2 7/16	6 7/8	7 3/8	6	7 1/2	8 1/4	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	7 1/8	7 5/8	6 1/4	7 3/4	8 1/2	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	7 3/8	7 7/8	6 1/2	8	8 3/4	3 3/4 ♦
	2	1/2	1 3/8	3 5/8	3 1/16	7 1/2	8	6 5/8	8 1/8	8 7/8	4 ♦
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	7 3/4	8 1/4	6 7/8	8 3/8	9 1/8	□
5	1	1/4	3/4	1 7/8	2 7/16	7 1/4	7 7/8	6 5/16	7 3/4	8 1/2	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	7 1/2	8 1/8	6 9/16	8	8 3/4	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	7 3/4	8 3/8	6 13/16	8 1/4	9	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	7 7/8	8 1/2	6 15/16	8 3/8	9 1/8	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	8 1/8	8 3/4	7 3/16	8 5/8	9 3/8	4 1/2
	3	5/8	1 5/8	5 1/8	3 5/16	8 1/8	8 3/4	7 3/16	8 5/8	9 3/8	□
	3 1/2	5/8	1 5/8	5 1/8	3 5/16	8 1/8	8 3/4	7 3/16	8 5/8	9 3/8	□
6	1 3/8	1/4	7/8	2 1/2	2 13/16	8	8 5/8	7 1/16	8 7/8	9 7/8	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	8 1/4	8 7/8	7 5/16	9 1/8	10 1/8	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	8 3/8	9	7 7/16	9 1/4	10 1/4	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	8 5/8	9 1/4	7 11/16	9 1/2	10 1/2	4 1/2
	3	1/2	1 1/2	5	3 7/16	8 5/8	9 1/4	7 11/16	9 1/2	10 1/2	5 1/2 ♦
	3 1/2	1/2	1 1/2	5	3 7/16	8 5/8	9 1/4	7 11/16	9 1/2	10 1/2	5 7/8 ♦
	4	1/2	1 1/2	5 1/2	3 7/16	8 5/8	9 1/4	7 11/16	9 1/2	10 1/2	□
8	1 3/8	1/4	7/8	2 1/2	2 13/16	8 9/16	9 1/4	7 5/16	9	10	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	8 13/16	9 1/2	7 9/16	9 1/4	10 1/4	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	8 15/16	9 5/8	7 11/16	9 3/8	10 3/8	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	9 3/16	9 7/8	7 15/16	9 5/8	10 5/8	4 1/2
	3	1/2	1 1/2	5	3 7/16	9 3/16	9 7/8	7 15/16	9 5/8	10 5/8	5 1/2 ♦
	3 1/2	1/2	1 1/2	5	3 7/16	9 3/16	9 7/8	7 15/16	9 5/8	10 5/8	5 7/8 ♦
	4	1/2	1 1/2	5 1/2	3 7/16	9 3/16	9 7/8	7 15/16	9 5/8	10 5/8	6 7/16 ♦
	4 1/2	1/2	1 1/2	6	3 7/16	9 3/16	9 7/8	7 15/16	––	––	7 1/8 ⌘
	5	1/2	1 1/2	6 1/2	3 7/16	9 3/16	9 7/8	7 15/16	––	––	7 9/16 ⌘

TIE ROD SUPPORT DATA

Cylinders with long stroke lengths, in addition to possible "Stop Tube" requirements, may need external support between the end caps to provide the stability needed to secure tie rod fasteners without causing the cylinder tube to buckle during assembly.

The table below indicates the stroke length limits at which Tie Rod Supports become necessary. The stroke length given represents the cylinder "design stroke". When cylinder includes a Stop Tube, this value is the length of "effective stroke" plus the "stop tube" length.

Tie Rod Support construction details may vary with stroke length, but part dimensions will not interfere with cylinder mountings.

Cylinders in bore sizes 8" thru 14" do not require the use of Tie Rod Supports. These units generally are available with a maximum "design stroke" length of 236".

TIE ROD SUPPORT REQUIREMENTS BASED ON "DESIGN STROKE" LENGTH (INCHES).

CYL. BORE	MAX. STROKE NO SUPPORT	MAX. STROKE ONE SUPPORT	MAX. STROKE TWO SUPPORTS	MAX. DESIGN STROKE
1 1/2	44	90	131	166
2	58	118	166	166
2 1/2	72	146	214	214
3 1/4	93	178	238	238
4	115	238	––	238
5	141	237	––	237

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2	2 1/2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12	2 1/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12	2 1/2-12
A	3/4	1 1/8	1 5/8	2	2 1/4	3
B	1.124	1.499	1.999	2.374	2.624	3.124
C	3/8	1/2	5/8	3/4	7/8	1
D	1/2	7/8	1 3/16	1 17/32	1 3/4	2 1/8
NA						

LETTER DIM.	3	3 1/2	4	4 1/2	5	5 1/2
KK	2 1/4-12	2 1/2-12	3-12	3 1/4-12	3 1/2-12	4-12
CC	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	3-12	3 1/2-12	4-12	4 1/2-12	5-12	5 1/2-12
A	3 1/2	3 1/2	4	4 1/2	5	5 1/2
B	3.749	4.249	4.749	5.249	5.749	6.249
C	1	1	1	1	1	1
D	2 5/8	3	3 1/2	3 7/8	4 1/4	4 5/8
NA						

***Cushion at rod end is non-adjustable in these size combinations.**

Model "W" cylinders with circular bearing retainer have part recessed thru "E" square Filler Plate.

□ Circular retainer not used in these size combinations. Plate furnished is "E" square.

♦ Dimension applies to Model "BR" cylinders only. Model "W" furnished with "E" square retainer.

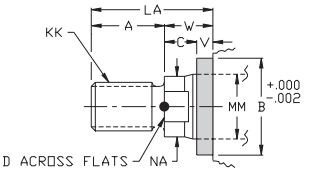
⌘ Dimension applies to Model "BR" cylinders only. Model "W" not available in these size combinations.

⧫ "AB" is diameter of mounting bolt.

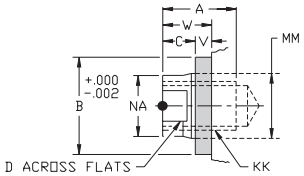
❖ Series "A & LH" cylinders furnished with 1/4 N.P.T.F. ports in these bore sizes ordered with largest available rod diameter.

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

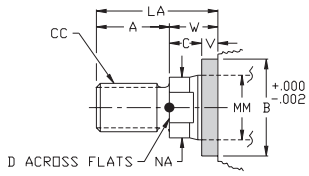


STYLE 4: Short Female Thread NFPA Type SF

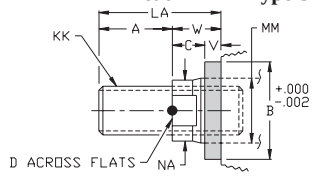


OPTIONAL ROD END STYLES

STYLE 8: Intermediate Male Thread - NFPA Type IM

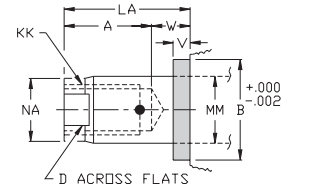


STYLE 5: Studded Small Male Thread - NFPA Type SM

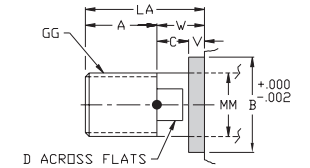


Male #5 additional cost

STYLE 3: Long Female Thread

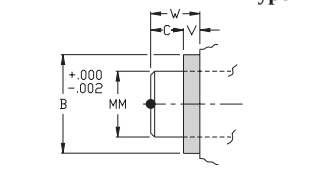


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



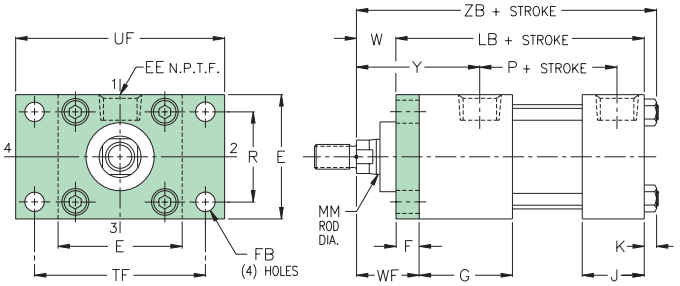
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

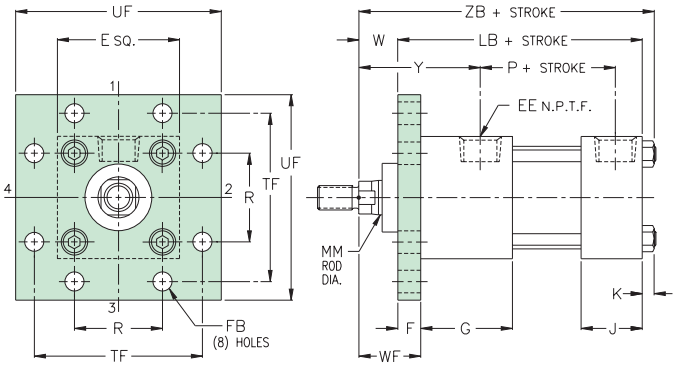
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

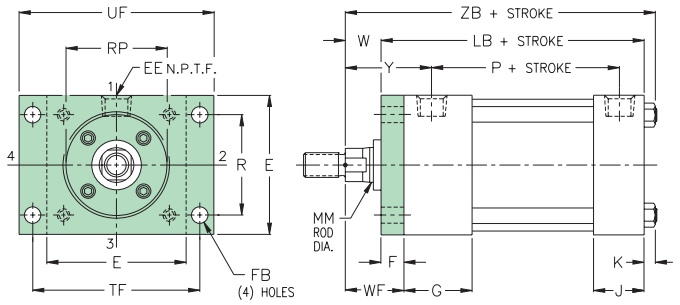
RECTANGULAR FRONT FLANGE

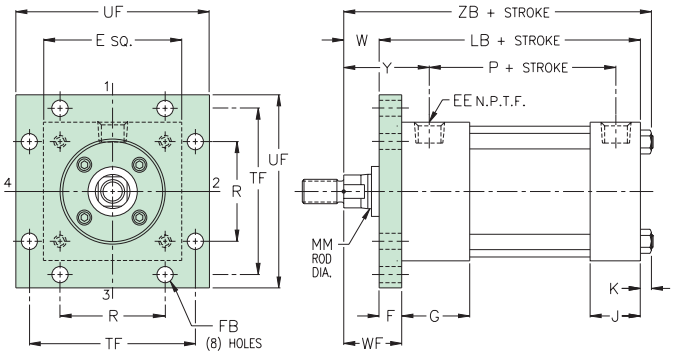


SQUARE FRONT FLANGE MT. MODEL "P" NFPA STYLE MF5



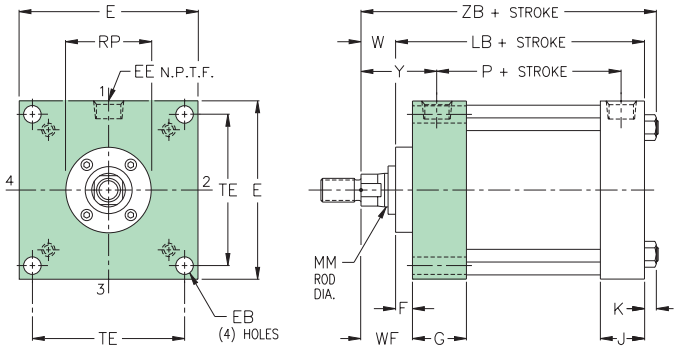
BORE	E	EE	F	G	J	K	P	R	LB	FB♦	TF	UF
1 1/2	2	3/8❖	3/8	1 1/2	1	1/4	2 7/32	1.43	4	1/4	2 3/4	3 3/8
2	2 1/2	3/8❖	3/8 +	1 1/2 +	1	5/16	2 7/32	1.84	4	5/16	3 3/8	4 1/8
2 1/2	3	3/8❖	3/8 +	1 1/2 +	1	5/16	2 11/32	2.19	4 1/8	5/16	3 7/8	4 5/8





BORE	E	EE	F	G	J	K	P	R	LB	FB♦	TF	UF
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	2.76	4 7/8	3/8	4 11/16	5 1/2
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	3.32	4 7/8	3/8	5 7/16	6 1/4
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	2 7/8	4.10	5 1/8	1/2	6 5/8	7 5/8
6	6 1/2	3/4	3/4	2	1 1/2	7/16	3 1/8	4.88	5 3/4	1/2	7 5/8	8 5/8

MODEL "C" NFPA STYLE ME3



Series "LH" Hydraulic Cylinders with Model "C", Rectangular Front Flange mounting may be rated for use at lower operating pressure levels than apply to other available models.

Suggested maximum operating pressures (PSI) are shown in the chart below. Model "P" Square Front Flange models are not subject to given limitations.

CYL. BORE	ROD DIAMETERS								
	5/8	1	1 3/8	1 3/4	2	2 1/2	3	3 1/2	4
1 1/2	1500	1000							
2	1200	1000	800						
2 1/2	1000	1000	800	600					
3 1/4		1500	1200	1000	800				
4		1000	1000	1000	800	600			
5		750	750	750	750	700	600	500	

BORE	E	EE	F	G	J	K	P	LB	TE	EB♦
8	8 1/2	3/4	3/4	2	1 1/2	9/16	3 1/4	5 7/8	7.57	5/8
10	10 5/8	1	3/4	2 1/4	2	11/16	4 1/8	7 1/8	9.40	3/4
12	12 3/4	1	3/4	2 1/4	2	11/16	4 5/8	7 5/8	11.10	3/4
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	5 1/2	8 7/8	12.87	7/8

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	WF	ZB	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 31/32	1	4 7/8	--
	*1	1/2	1	2 1/8	2 11/32	1 3/8	5 1/4	--
2	5/8	1/4	5/8	1 3/8	1 31/32	1	4 15/16	--
	1	1/2	1	2 1/8	2 11/32	1 3/8	5 5/16	--
	*1 3/8	5/8	1 1/4	2 7/8	2 19/32	1 3/4	5 9/16	--
2 1/2	5/8	1/4	5/8	1 3/8	1 31/32	1	5 1/16	--
	1	1/2	1	2 1/8	2 11/32	1 3/8	5 7/16	--
	1 3/8	5/8	1 1/4	2 7/8	2 19/32	1 5/8	5 11/16	--
	*1 3/4	3/4	1 1/2	3 1/2	2 27/32	2	5 15/16	--
3 1/4	1	1/4	3/4	1 7/8	2 7/16	1 3/8	6	☐
	1 3/8	3/8	1	2 5/8	2 11/16	1 5/8	6 1/4	☐
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	1 7/8	6 1/2	☐
	2	1/2	1 3/8	3 5/8	3 1/16	2	6 5/8	☐
4	1	1/4	3/4	1 7/8	2 7/16	1 3/8	6	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	1 5/8	6 1/4	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	1 7/8	6 1/2	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	2	6 5/8	☐
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	2 1/4	6 7/8	☐
5	1	1/4	3/4	1 7/8	2 7/16	1 3/8	6 5/16	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	1 5/8	6 9/16	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	1 7/8	6 13/16	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	2	6 15/16	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	2 1/4	7 3/16	☐
	3	5/8	1 5/8	5 1/8	3 5/16	2 1/4	7 3/16	☐
	3 1/2	5/8	1 5/8	5 1/8	3 5/16	2 1/4	7 3/16	☐
6	1 3/8	1/4	7/8	2 1/2	2 13/16	1 5/8	7 1/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	1 7/8	7 5/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	2	7 7/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	2 1/4	7 11/16	4 1/2
	3	1/2	1 1/2	5	3 7/16	2 1/4	7 11/16	☐
	3 1/2	1/2	1 1/2	5	3 7/16	2 1/4	7 11/16	☐
	4	1/2	1 1/2	5 1/2	3 7/16	2 1/4	7 11/16	☐
8	1 3/8	1/4	7/8	2 1/2	2 13/16	1 5/8	7 5/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	1 7/8	7 9/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	2	7 11/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	2 1/4	7 15/16	4 1/2
	3	1/2	1 1/2	5	3 7/16	2 1/4	7 15/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	2 1/4	7 15/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	2 1/4	7 15/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 7/16	2 1/4	7 15/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 7/16	2 1/4	7 15/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 7/16	2 1/4	7 15/16	7SQ
10	1 3/4	3/8	1 1/8	3 1/8	3 1/8	1 7/8	8 15/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 1/4	2	9 1/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	2 1/4	9 5/16	4 1/2
	3	1/2	1 1/2	5	3 1/2	2 1/4	9 5/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	2 1/4	9 5/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	2 1/4	9 5/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	2 1/4	9 5/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	2 1/4	9 5/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	2 1/4	9 5/16	8 3/8
12	2	3/8	1 1/4	3 1/2	3 1/4	2	9 9/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	2 1/4	9 13/16	4 1/2
	3	1/2	1 1/2	5	3 1/2	2 1/4	9 13/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	2 1/4	9 13/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	2 1/4	9 13/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	2 1/4	9 13/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	2 1/4	9 13/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	2 1/4	9 13/16	8 3/8
14	2 1/2	1/2	1 1/2	4 1/2	3 13/16	2 1/4	11 1/8	4 1/2
	3	1/2	1 1/2	5	3 13/16	2 1/4	11 1/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 13/16	2 1/4	11 1/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 13/16	2 1/4	11 1/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 13/16	2 1/4	11 1/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 13/16	2 1/4	11 1/8	7 9/16

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2	2 1/2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12	2 1/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12	2 1/2-12
A	3/4	1 1/8	1 5/8	2	2 1/4	3
B	1.124	1.499	1.999	2.374	2.624	3.124
C	3/8	1/2	5/8	3/4	7/8	1
D	1/2	7/8	1 3/16	1 17/32	1 3/4	2 1/8
NA						

LETTER DIM.	3	3 1/2	4	4 1/2	5	5 1/2
KK	2 1/4-12	2 1/2-12	3-12	3 1/4-12	3 1/2-12	4-12
CC	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	3-12	3 1/2-12	4-12	4 1/2-12	5-12	5 1/2-12
A	3 1/2	3 1/2	4	4 1/2	5	5 1/2
B	3.749	4.249	4.749	5.249	5.749	6.249
C	1	1	1	1	1	1
D	2 5/8	3	3 1/2	3 7/8	4 1/4	4 5/8
NA						

***Cushion at rod end is non-adjustable in these size combinations.**

☐ Recessed circular bearing retainer is not used in these size combinations. Bearing is retained by flange parts.

❖ Series "A & LH" cylinders furnished with 1/4 N.P.T.F. ports in these bore sizes ordered with largest available rod diameter.

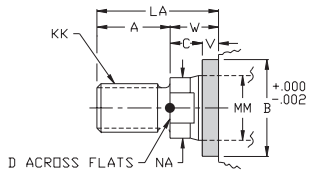
+ "F" Dim. =1/2" and "G" dim=1 3/8" in cylinders of this size furnizhed with the largest available rod diameter.

♦"FB" and "EB" is diameter of mounting bolt.

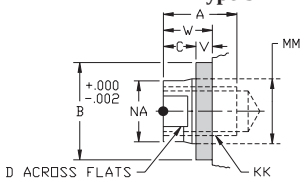
"PSI Ratings" shown are recommended maximum operating pressure limits based on strength of cylinder mounting. Stroke length and resultant column strength factors may reduce recommended operating pressure. Refer to page 6 for data to determine effects of stroke length on this value.

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

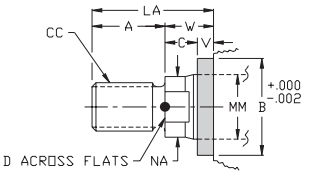


STYLE 4: Short Female Thread NFPA Type SF

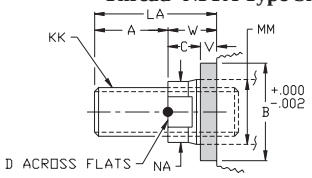


OPTIONAL ROD END STYLES

STYLE 8: Intermediate Male Thread -NFPA Type IM

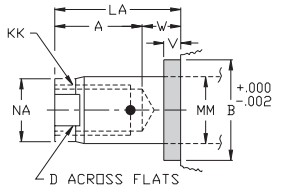


STYLE 5: Studded Small Male Thread -NFPA Type SM

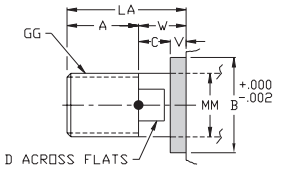


Male #5 additional cost

STYLE 3: Long Female Thread

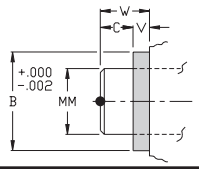


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



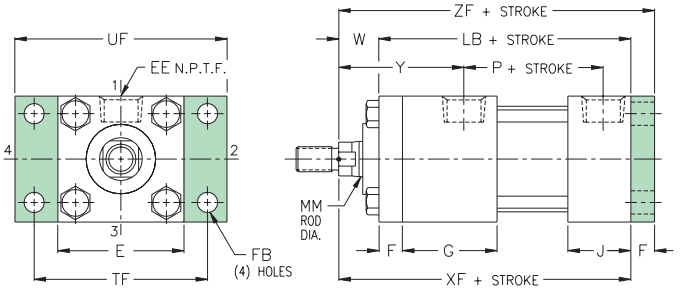
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

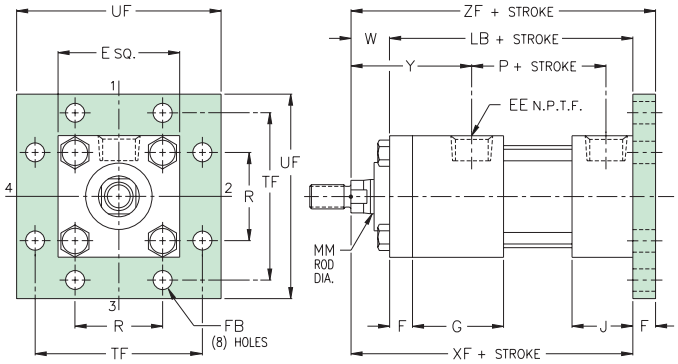
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

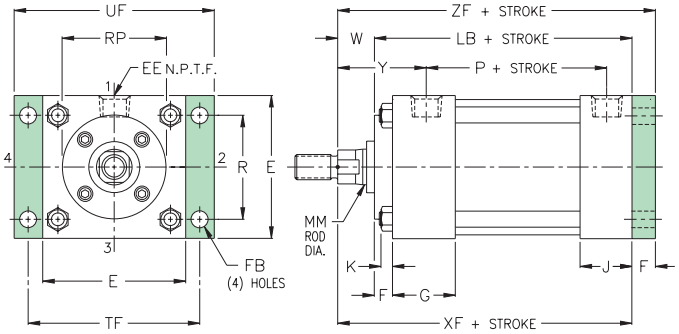
RECTANGULAR REAR FLANGE

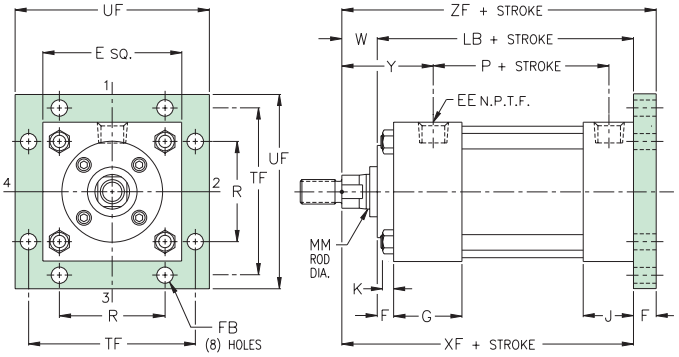


SQUARE REAR FLANGE MT. MODEL "R" NFPA STYLE MF6



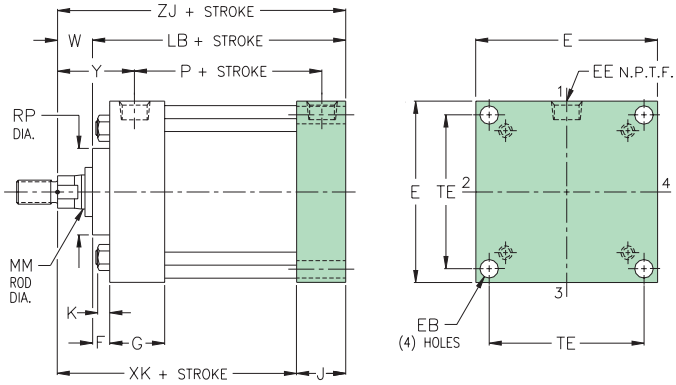
BORE	E	EE	F	G	J	P	R	LB	FB♦	TF	UF
1 1/2	2	3/8❖	3/8	1 1/2	1	2 7/32	1.43	4	1/4	2 3/4	3 3/8
2	2 1/2	3/8❖	3/8	1 1/2	1	2 7/32	1.84	4	5/16	3 3/8	4 1/8
2 1/2	3	3/8❖	3/8	1 1/2	1	2 11/32	2.19	4 1/8	5/16	3 7/8	4 5/8





BORE	E	EE	F	G	J	K	P	R	LB	FB♦	TF	UF
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	2.76	4 7/8	3/8	4 11/16	5 1/2
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	3.32	4 7/8	3/8	5 7/16	6 1/4
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	2 7/8	4.10	5 1/8	1/2	6 5/8	7 5/8
6	6 1/2	3/4	3/4	2	1 1/2	7/16	3 1/8	4.88	5 3/4	1/2	7 5/8	8 5/8

MODEL "D" NFPA STYLE ME4



Series "LH" Hydraulic Cylinders with Model "D" Rectangular Rear Flange mounting style may be rated for use at lower operating pressure levels than apply to other available models. Suggested maximum operating pressures (PSI) are shown in the chart below.

Model "R" Square Rear Flange models are not subject to given limitations.

CYLINDER BORE SIZE						
1 1/2	2	2 1/2	3 1/4	4	5	6
1500	1200	1000	1500	1000	750	750
MAXIMUM RECOMMENDED OPERATING PRESSURE						

BORE	E	EE	F	G	J	K	P	LB	EB♦	TE
8	8 1/2	3/4	3/4	2	1 1/2	9/16	3 1/4	5 7/8	5/8	7.57
10	10 5/8	1	3/4	2 1/4	2	11/16	4 1/8	7 1/8	3/4	9.40
12	12 3/4	1	3/4	2 1/4	2	11/16	4 5/8	7 5/8	3/4	11.10
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	5 1/2	8 7/8	7/8	12.87

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	ZF/ZJ	XF/XK	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 31/32	5	4 5/8	––
	*1	1/2	1	2 1/8	2 11/32	5 3/8	5	––
2	5/8	1/4	5/8	1 3/8	1 31/32	5	4 5/8	––
	1	1/2	1	2 1/8	2 11/32	5 3/8	5	––
	*1 3/8	5/8	1 1/4	2 7/8	2 19/32	5 5/8	5 1/4	––
2 1/2	5/8	1/4	5/8	1 3/8	1 31/32	5 1/8	4 3/4	––
	1	1/2	1	2 1/8	2 11/32	5 1/2	5 1/8	––
	1 3/8	5/8	1 1/4	2 7/8	2 19/32	5 3/4	5 3/8	––
	*1 3/4	3/4	1 1/2	3 1/2	2 27/32	6	5 5/8	––
3 1/4	1	1/4	3/4	1 7/8	2 7/16	6 1/4	5 5/8	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	6 1/2	5 7/8	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	6 3/4	6 1/8	☐
	2	1/2	1 3/8	3 5/8	3 1/16	6 7/8	6 1/4	☐
4	1	1/4	3/4	1 7/8	2 7/16	6 1/4	5 5/8	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	6 1/2	5 7/8	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	6 3/4	6 1/8	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	6 7/8	6 1/4	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	7 1/8	6 1/2	☐
5	1	1/4	3/4	1 7/8	2 7/16	6 1/2	5 7/8	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	6 3/4	6 1/8	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	7	6 3/8	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	7 1/8	6 1/2	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	7 3/8	6 3/4	4 1/2
	3	5/8	1 5/8	5 1/8	3 5/16	7 3/8	6 3/4	☐
	3 1/2	5/8	1 5/8	5 1/8	3 5/16	7 3/8	6 3/4	☐
6	1 3/8	1/4	7/8	2 1/2	2 13/16	7 3/8	6 5/8	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	7 5/8	6 7/8	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	7 3/4	7	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	8	7 1/4	4 1/2
	3	1/2	1 1/2	5	3 7/16	8	7 1/4	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	8	7 1/4	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	8	7 1/4	☐
8	1 3/8	1/4	7/8	2 1/2	2 13/16	6 3/4	5 1/4	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	7	5 1/2	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	7 1/8	5 5/8	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	7 3/8	5 7/8	4 1/2
	3	1/2	1 1/2	5	3 7/16	7 3/8	5 7/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	7 3/8	5 7/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	7 3/8	5 7/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 7/16	7 3/8	5 7/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 7/16	7 3/8	5 7/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 7/16	7 3/8	5 7/8	7 SQ
10	1 3/4	3/8	1 1/8	3 1/8	3 1/8	8 1/4	6 1/4	3 3/4
	2	3/8	1 1/4	3 1/2	3 1/4	8 3/8	6 3/8	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	8 5/8	6 5/8	4 1/2
	3	1/2	1 1/2	5	3 1/2	8 5/8	6 5/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	8 5/8	6 5/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	8 5/8	6 5/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	8 5/8	6 5/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	8 5/8	6 5/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	8 5/8	6 5/8	8 3/8
12	2	3/8	1 1/4	3 1/2	3 1/4	8 7/8	6 7/8	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	9 1/8	7 1/8	4 1/2
	3	1/2	1 1/2	5	3 1/2	9 1/8	7 1/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	9 1/8	7 1/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	9 1/8	7 1/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	9 1/8	7 1/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	9 1/8	7 1/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	9 1/8	7 1/8	8 3/8
14	2 1/2	1/2	1 1/2	4 1/2	3 13/16	10 3/8	8 1/8	4 1/2
	3	1/2	1 1/2	5	3 13/16	10 3/8	8 1/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 13/16	10 3/8	8 1/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 13/16	10 3/8	8 1/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 13/16	10 3/8	8 1/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 13/16	10 3/8	8 1/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 13/16	10 3/8	8 1/8	8 3/8

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2	2 1/2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12	2 1/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12	2 1/2-12
A	3/4	1 1/8	1 5/8	2	2 1/4	3
B	1.124	1.499	1.999	2.374	2.624	3.124
C	3/8	1/2	5/8	3/4	7/8	1
D	1/2	7/8	1 3/16	1 17/32	1 3/4	2 1/8
NA	9/16	15/16	1 5/16	1 23/32	1 15/16	2 7/16

LETTER DIM.	3	3 1/2	4	4 1/2	5	5 1/2
KK	2 1/4-12	2 1/2-12	3-12	3 1/4-12	3 1/2-12	4-12
CC	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	3-12	3 1/2-12	4-12	4 1/2-12	5-12	5 1/2-12
A	3 1/2	3 1/2	4	4 1/2	5	5 1/2
B	3.749	4.249	4.749	5.249	5.749	6.249
C	1	1	1	1	1	1
D	2 5/8	3	3 1/2	3 7/8	4 1/4	4 5/8
NA	2 15/16	3 7/16	3 15/16	4 7/16	4 15/16	5 7/16

***Cushion at rod end is non-adjustable in these size combinations.**

☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

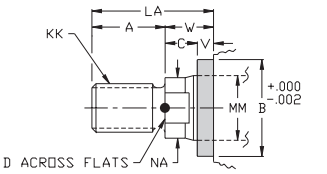
❖ Series "A & LH" cylinders furnished with 1/4 N.P.T.F. ports in these bore sizes ordered with largest available rod diameter.

♦"FB" and "EB" is diameter of mounting bolt.

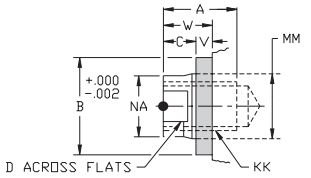
"PSI Ratings" shown are recommended maximum operating pressure limits based on strength of cylinder mounting. Stroke length and resultant column strength factors may reduce recommended operating pressure. Refer to page 6 for data to determine effects of stroke length on this value.

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

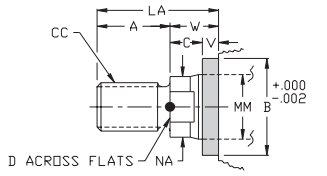


STYLE 4: Short Female Thread NFPA Type SF

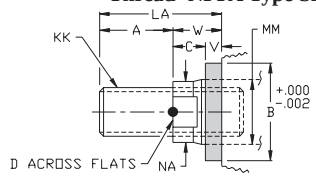


OPTIONAL ROD END STYLES

STYLE 8: Intermediate Male Thread - NFPA Type IM

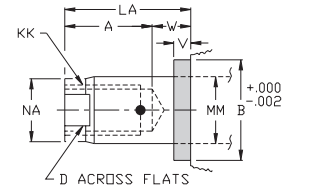


STYLE 5: Studded Small Male Thread - NFPA Type SM

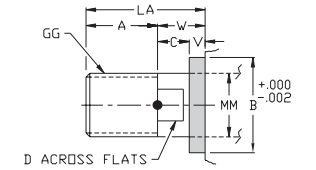


Male #5 additional cost

STYLE 3: Long Female Thread

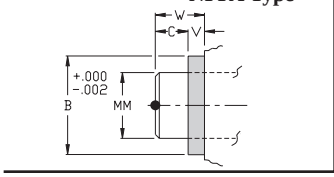


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



STYLE 6: Special Rod End

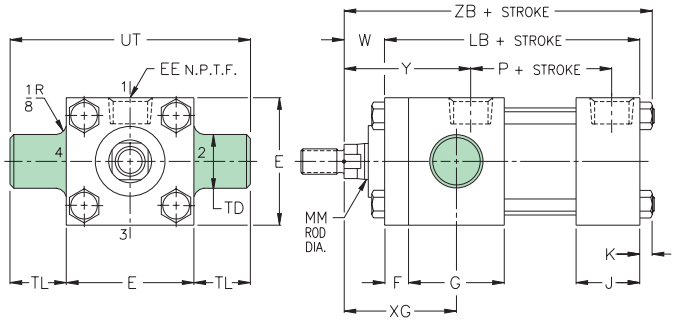
Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

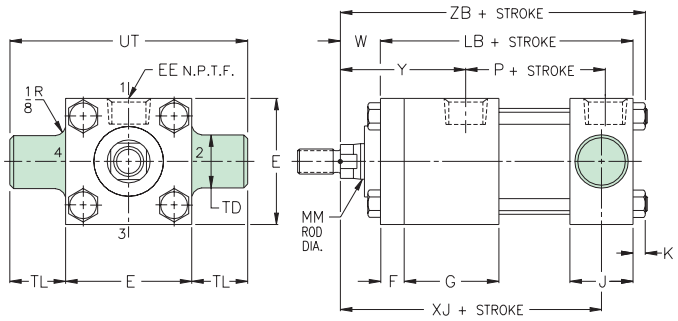
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

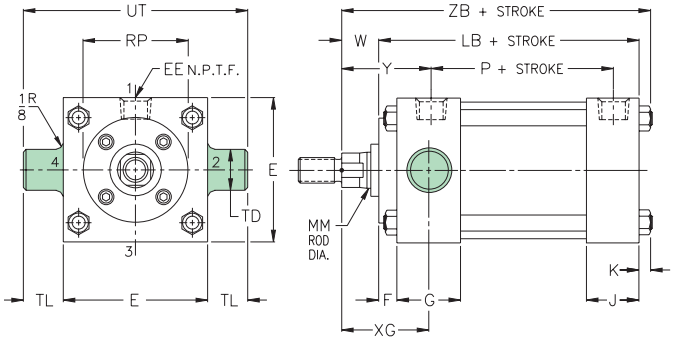
FRONT TRUNNION MOUNT MODEL "E" NFPA STYLE MT1

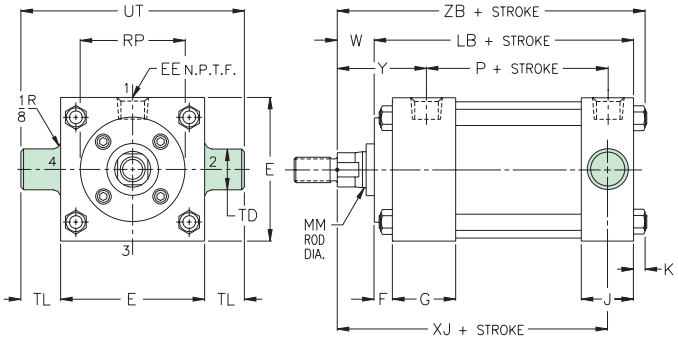
REAR TRUNNION MOUNT MODEL "F" NFPA STYLE MT2



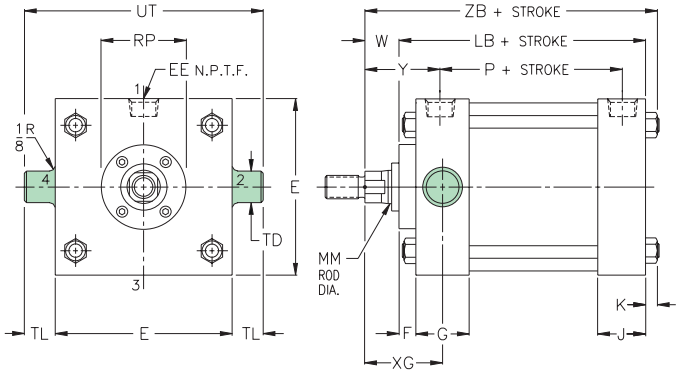


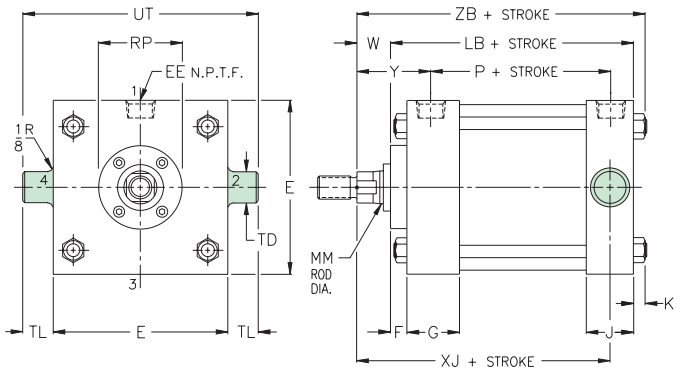
BORE	E	EE	F	G	J	K	P	LB	TD +.000 --.002	TL	UT
1 1/2	2	3/8❖	3/8	1 1/2	1	1/4	2 7/32	4	1.000	1	4
2	2 1/2	3/8❖	3/8	1 1/2	1	5/16	2 7/32	4	1.000	1	4 1/2
2 1/2	3	3/8❖	3/8	1 1/2	1	5/16	2 11/32	4 1/8	1.000	1	5





BORE	E	EE	F	G	J	K	P	LB	TD +.000 --.002	TL	UT
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	4 7/8	1.000	1	5 3/4
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	4 7/8	1.000	1	6 1/2
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	2 7/8	5 1/8	1.000	1	7 1/2
6	6 1/2	3/4	3/4	2	1 1/2	7/16	3 1/8	5 3/4	1.375	1 3/8	9 1/4





BORE	E	EE	F	G	J	K	P	LB	TD +.000 --.002	TL	UT
8	8 1/2	3/4	3/4	2	1 1/2	9/16	3 1/4	5 7/8	1.375	1 3/8	11 1/4
10	10 5/8	1	3/4	2 1/4	2	11/16	4 1/8	7 1/8	1.750	1 3/4	14 1/8
12	12 3/4	1	3/4	2 1/4	2	11/16	4 5/8	7 5/8	1.750	1 3/4	16 1/4
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	5 1/2	8 7/8	2.000	2	18 3/4

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	XG	XJ	ZB	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 31/32	1 3/4	4 1/8	4 7/8	--
	*1	1/2	1	2 1/8	2 11/32	2 1/8	4 1/2	5 1/4	--
2	5/8	1/4	5/8	1 3/8	1 31/32	1 3/4	4 1/8	4 15/16	--
	1	1/2	1	2 1/8	2 11/32	2 1/8	4 1/2	5 5/16	--
	*1 3/8	5/8	1 1/4	2 7/8	2 19/32	2 3/8	4 3/4	5 9/16	--
2 1/2	5/8	1/4	5/8	1 3/8	1 31/32	1 3/4	4 1/4	5 1/16	--
	1	1/2	1	2 1/8	2 11/32	2 1/8	4 5/8	5 7/16	--
	1 3/8	5/8	1 1/4	2 7/8	2 19/32	2 3/8	4 7/8	5 11/16	--
	*1 3/4	3/4	1 1/2	3 1/2	2 27/32	2 5/8	5 1/8	5 15/16	--
3 1/4	1	1/4	3/4	1 7/8	2 7/16	2 1/4	5	6	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	2 1/2	5 1/4	6 1/4	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	2 3/4	5 1/2	6 1/2	☐
	2	1/2	1 3/8	3 5/8	3 1/16	2 7/8	5 5/8	6 5/8	☐
4	1	1/4	3/4	1 7/8	2 7/16	2 1/4	5	6	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	2 1/2	5 1/4	6 1/4	3 1/4
	1 3/4	1/2	1 1/4	3 1/2	2 15/16	2 3/4	5 1/2	6 1/2	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	2 7/8	5 5/8	6 5/8	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	3 1/8	5 7/8	6 7/8	☐
5	1	1/4	3/4	1 7/8	2 7/16	2 1/4	5 1/4	6 5/16	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	2 1/2	5 1/2	6 9/16	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	2 3/4	5 3/4	6 13/16	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	2 7/8	5 7/8	6 15/16	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	3 1/8	6 1/8	7 3/16	4 1/2
	3	5/8	1 5/8	5 1/8	3 5/16	3 1/8	6 1/8	7 3/16	☐
	3 1/2	5/8	1 5/8	5 1/8	3 5/16	3 1/8	6 1/8	7 3/16	☐
6	1 3/8	1/4	7/8	2 1/2	2 13/16	2 5/8	5 7/8	7 1/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	2 7/8	6 1/8	7 5/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	3	6 1/4	7 7/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	3 1/4	6 1/2	7 11/16	4 1/2
	3	1/2	1 1/2	5	3 7/16	3 1/4	6 1/2	7 11/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	3 1/4	6 1/2	7 11/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	3 1/4	6 1/2	7 11/16	☐
8	1 3/8	1/4	7/8	2 1/2	2 13/16	2 5/8	6	7 5/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	2 7/8	6 1/4	7 9/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	3	6 3/8	7 11/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	3 1/4	6 5/8	7 15/16	4 1/2
	3	1/2	1 1/2	5	3 7/16	3 1/4	6 5/8	7 15/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	3 1/4	6 5/8	7 15/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	3 1/4	6 5/8	7 15/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 7/16	3 1/4	6 5/8	7 15/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 7/16	3 1/4	6 5/8	7 15/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 7/16	3 1/4	6 5/8	7 15/16	7SQ
10	1 3/4	3/8	1 1/8	3 1/8	3 1/8	3	7 1/4	8 15/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 1/4	3 1/8	7 3/8	9 1/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	3 3/8	7 5/8	9 5/16	4 1/2
	3	1/2	1 1/2	5	3 1/2	3 3/8	7 5/8	9 5/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	3 3/8	7 5/8	9 5/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	3 3/8	7 5/8	9 5/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	3 3/8	7 5/8	9 5/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	3 3/8	7 5/8	9 5/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	3 3/8	7 5/8	9 5/16	8 3/8
12	2	3/8	1 1/4	3 1/2	3 1/4	3 1/8	7 7/8	9 9/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	3 3/8	8 1/8	9 13/16	4 1/2
	3	1/2	1 1/2	5	3 1/2	3 3/8	8 1/8	9 13/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	3 3/8	8 1/8	9 13/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	3 3/8	8 1/8	9 13/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	3 3/8	8 1/8	9 13/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	3 3/8	8 1/8	9 13/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	3 3/8	8 1/8	9 13/16	8 3/8
14	2 1/2	1/2	1 1/2	4 1/2	3 13/16	3 5/8	9 1/4	11 1/8	4 1/2
	3	1/2	1 1/2	5	3 13/16	3 5/8	9 1/4	11 1/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 13/16	3 5/8	9 1/4	11 1/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 13/16	3 5/8	9 1/4	11 1/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 13/16	3 5/8	9 1/4	11 1/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 13/16	3 5/8	9 1/4	11 1/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 13/16	3 5/8	9 1/4	11 1/8	8 3/8

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2	2 1/2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12	2 1/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12	2 1/2-12
A	3/4	1 1/8	1 5/8	2	2 1/4	3
B	1.124	1.499	1.999	2.374	2.624	3.124
C	3/8	1/2	5/8	3/4	7/8	1
D	1/2	7/8	1 3/16	1 17/32	1 3/4	2 1/8
NA						

LETTER DIM.	3	3 1/2	4	4 1/2	5	5 1/2
KK	2 1/4-12	2 1/2-12	3-12	3 1/4-12	3 1/2-12	4-12
CC	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	3-12	3 1/2-12	4-12	4 1/2-12	5-12	5 1/2-12
A	3 1/2	3 1/2	4	4 1/2	5	5 1/2
B	3.749	4.249	4.749	5.249	5.749	6.249
C	1	1	1	1	1	1
D	2 5/8	3	3 1/2	3 7/8	4 1/4	4 5/8
NA	2 15/16	3 7/16	3 15/16	4 7/16	4 15/16	5 7/16

***Cushion at rod end is non-adjustable in these size combinations.**

☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

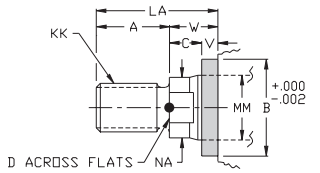
❖ Series "A & LH" cylinders furnished with 1/4 N.P.T.F. ports in these bore sizes ordered with largest available rod diameter.

NFPA Standards allow two sets of acceptable dimensions for "XG" and "XJ" which designate the trunnion pin centerline distance from the rod reference point. If given dimension does not satisfy location requirement, the alternate NFPA pin positions available upon request are:

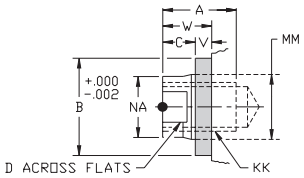
1 1/2 thru 8, and 14 Bore: ALTERNATE "XG"= GIVEN "XG" plus 3/16".
ALTERNATE "XJ"= GIVEN "XJ" plus 1/16".
10" and 12" Bore: ALTERNATE "XG"= GIVEN "XG" plus 1/8".

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

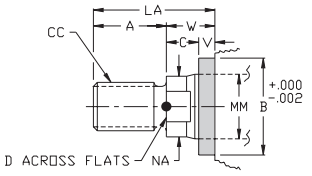


STYLE 4: Short Female Thread NFPA Type SF

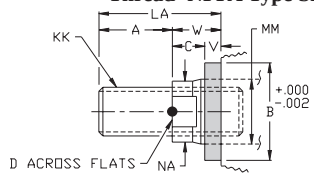


OPTIONAL ROD END STYLES

STYLE 8: Intermediate Male Thread - NFPA Type IM

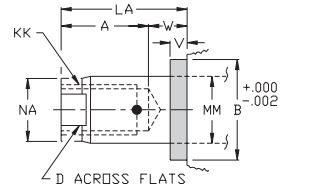


STYLE 5: Studded Small Male Thread - NFPA Type SM

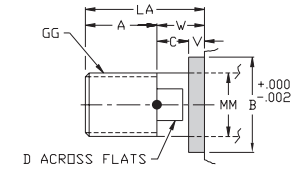


Male #5 additional cost

STYLE 3: Long Female Thread

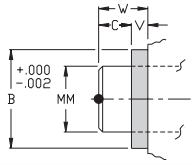


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



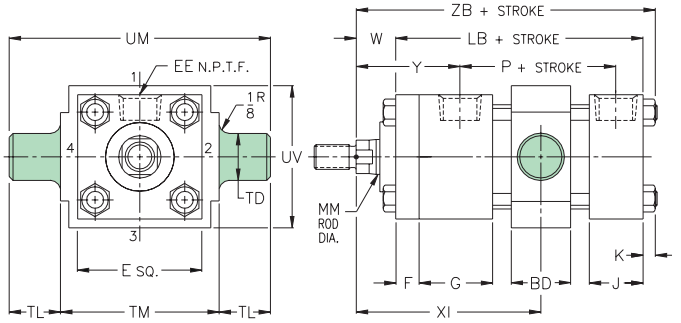
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

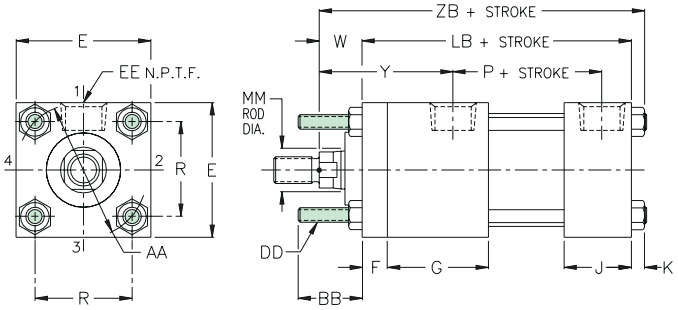
"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

INTERMEDIATE TRUNNION MT.



Customer must specify "XI" dimension. Mounting pin position limited by trunnion ring clearance with cylinder end caps.

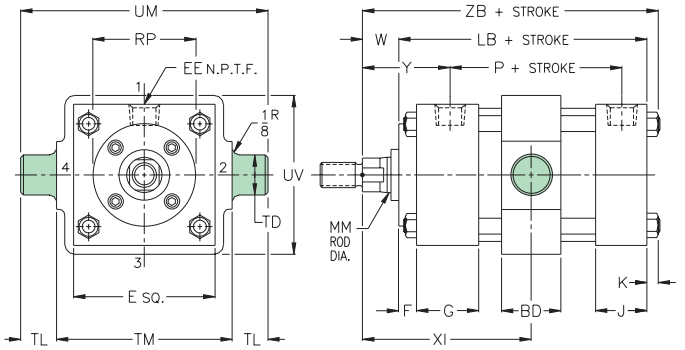
EXTENDED TIE ROD MOUNT MODEL "L" NFPA STYLES MX1, MX2, &



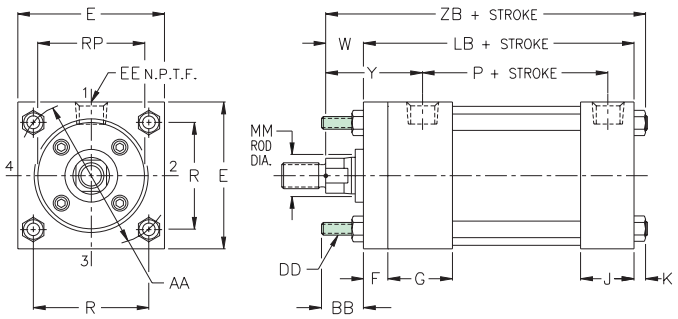
Specify on order which tie rods are to be extended.

STYLE MX1	STYLE MX2	STYLE MX3	STYLE MX0
Tie rods extended on both ends.	Tie rods extended on Rear Head end.	Tie rods extended on Front Head end.	Plain mounting style. No tie rods extended.

BORE	E	EE	F	G	J	K	P	R	LB	AA	BB	DD	TD +.000 -.002	TL	TM	UM	UV	BD
1 1/2	2	3/8❖	3/8	1 1/2	1	1/4	2 7/32	1.43	4	2.02	1	1/4-28	1.000	1	2 1/2	4 1/2	2 1/2	1 1/4
2	2 1/2	3/8❖	3/8	1 1/2	1	5/16	2 7/32	1.84	4	2.60	1 1/8	5/16-24	1.000	1	3	5	3	1 1/4
2 1/2	3	3/8❖	3/8	1 1/2	1	5/16	2 11/32	2.19	4 1/8	3.10	1 1/8	5/16-24	1.000	1	3 1/2	5 1/2	3 1/2	1 1/4



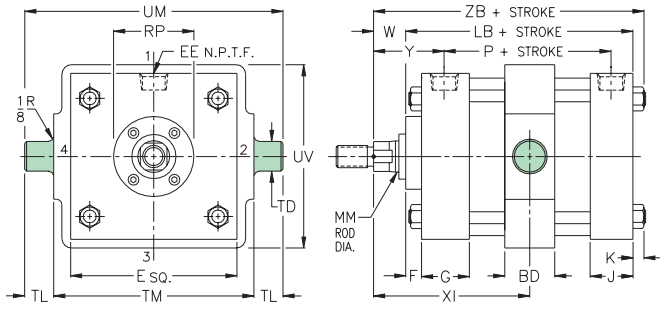
Customer must specify "XI" dimension. Mounting pin position limited by trunnion ring clearance with cylinder end caps.



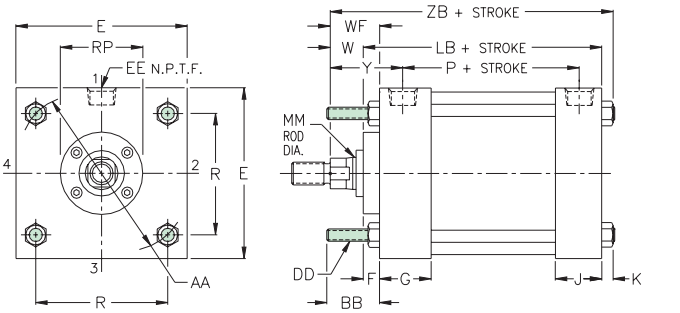
Specify on order which tie rods are to be extended.

STYLE MX1	STYLE MX2	STYLE MX3	STYLE MX0
Tie rods extended on both ends.	Tie rods extended on Rear Head end.	Tie rods extended on Front Head end.	Plain mounting style. No tie rods extended.

BORE	E	EE	F	G	J	K	P	R	LB	AA	BB	DD	TD +.000 -.002	TL	TM	UM	UV	BD
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	2.76	4 7/8	3.90	1 3/8	3/8-24	1.000	1	4 1/2	6 1/2	4 1/4	1 1/2
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	3.32	4 7/8	4.70	1 3/8	3/8-24	1.000	1	5 1/4	7 1/4	5	1 1/2
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	2 7/8	4.10	5 1/8	5.80	1 13/16	1/2-20	1.000	1	6 1/4	8 1/4	6	2
6	6 1/2	3/4	3/4	2	1 1/2	7/16	3 1/8	4.88	5 3/4	6.90	1 13/16	1/2-20	1.375	1 3/8	7 5/8	10 3/8	7	2



Customer must specify "XI" dimension. Mounting pin position limited by trunnion ring clearance with cylinder end caps.



Specify on order which tie rods are to be extended.

STYLE MX1	STYLE MX2	STYLE MX3	STYLE MX0
Tie rods extended on both ends.	Tie rods extended on Rear Head end.	Tie rods extended on Front Head end.	Plain mounting style. No tie rods extended.

BORE	E	EE	F	G	J	K	P	R	LB	AA	BB	DD	TD +.000 -.002	TL	TM	UM	UV	BD
8	8 1/2	3/4	3/4	2	1 1/2	9/16	3 1/4	6.44	5 7/8	9.10	2 5/16	5/8-18	1.375	1 3/8	9 3/4	12 1/2	9 1/2	2 1/4
10	10 5/8	1	3/4	2 1/4	2	11/16	4 1/8	7.99	7 1/8	11.30	2 11/16	3/4-16	1.750	1 3/4	12	15 1/2	11 3/4	2 1/2
12	12 3/4	1	3/4	2 1/4	2	11/16	4 5/8	9.62	7 5/8	13.60	2 11/16	3/4-16	1.750	1 3/4	14	17 1/2	13 3/4	2 1/2
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	5 1/2	11.38	8 7/8	16.10	3 3/16	7/8-14	2.000	2	16 1/4	20 1/4	16	3

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	WF	ZB	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 31/32	--	4 7/8	--
	*1	1/2	1	2 1/8	2 11/32	--	5 1/4	--
2	5/8	1/4	5/8	1 3/8	1 31/32	--	4 15/16	--
	1	1/2	1	2 1/8	2 11/32	--	5 5/16	--
	*1 3/8	5/8	1 1/4	2 7/8	2 19/32	--	5 9/16	--
2 1/2	5/8	1/4	5/8	1 3/8	1 31/32	--	5 1/16	--
	1	1/2	1	2 1/8	2 11/32	--	5 7/16	--
	1 3/8	5/8	1 1/4	2 7/8	2 19/32	--	5 11/16	--
	*1 3/4	3/4	1 1/2	3 1/2	2 27/32	--	5 15/16	--
3 1/4	1	1/4	3/4	1 7/8	2 7/16	--	6	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	--	6 1/4	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	--	6 1/2	☐
	2	1/2	1 3/8	3 5/8	3 1/16	--	6 5/8	☐
4	1	1/4	3/4	1 7/8	2 7/16	--	6	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	--	6 1/4	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	--	6 1/2	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	--	6 5/8	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	--	6 7/8	☐
5	1	1/4	3/4	1 7/8	2 7/16	--	6 5/16	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	--	6 9/16	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	--	6 13/16	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	--	6 15/16	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	--	7 3/16	4 1/2
	3	5/8	1 5/8	5 1/8	3 5/16	--	7 3/16	☐
	3 1/2	5/8	1 5/8	5 1/8	3 5/16	--	7 3/16	☐
6	1 3/8	1/4	7/8	2 1/2	2 13/16	--	7 1/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	--	7 5/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	--	7 7/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	--	7 11/16	4 1/2
	3	1/2	1 1/2	5	3 7/16	--	7 11/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	--	7 11/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	--	7 11/16	☐
8	1 3/8	1/4	7/8	2 1/2	2 13/16	1 5/8	7 5/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	1 7/8	7 9/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	2	7 11/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	2 1/4	7 15/16	4 1/2
	3	1/2	1 1/2	5	3 7/16	2 1/4	7 15/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	2 1/4	7 15/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	2 1/4	7 15/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 7/16	2 1/4	7 15/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 7/16	2 1/4	7 15/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 7/16	2 1/4	7 15/16	7SQ
10	1 3/4	3/8	1 1/8	3 1/8	3 1/8	1 7/8	8 15/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 1/4	2	9 1/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	2 1/4	9 5/16	4 1/2
	3	1/2	1 1/2	5	3 1/2	2 1/4	9 5/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	2 1/4	9 5/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	2 1/4	9 5/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	2 1/4	9 5/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	2 1/4	9 5/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	2 1/4	9 5/16	8 3/8
12	2	3/8	1 1/4	3 1/2	3 1/4	2	9 9/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	2 1/4	9 13/16	4 1/2
	3	1/2	1 1/2	5	3 1/2	2 1/4	9 13/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	2 1/4	9 13/16	5 7/8
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	4 1/2	1/2	1 1/2	6	3 1/2	2 1/4	9 13/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	2 1/4	9 13/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	2 1/4	9 13/16	8 3/8
14	2 1/2	1/2	1 1/2	4 1/2	3 13/16	2 1/4	11 1/8	4 1/2
	3	1/2	1 1/2	5	3 13/16	2 1/4	11 1/8	5 1/2
	3 1/2	1/2	1 1/2	5	3 13/16	2 1/4	11 1/8	5 7/8
	4	1/2	1 1/2	5 1/2	3 13/16	2 1/4	11 1/8	6 7/16
	4 1/2	1/2	1 1/2	6	3 13/16	2 1/4	11 1/8	7 1/8
	5	1/2	1 1/2	6 1/2	3 13/16	2 1/4	11 1/8	7 9/16
	5 1/2	1/2	1 1/2	7	3 13/16	2 1/4	11 1/8	8 3/8

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2	2 1/2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12	2 1/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12	2 1/2-12
A	3/4	1 1/8	1 5/8	2	2 1/4	3
B	1.124	1.499	1.999	2.374	2.624	3.124
C	3/8	1/2	5/8	3/4	7/8	1
D	1/2	7/8	1 3/16	1 17/32	1 3/4	2 1/8
NA	9/16	15/16	1 5/16	1 23/32	1 15/16	2 7/16

LETTER DIM.	3	3 1/2	4	4 1/2	5	5 1/2
KK	2 1/4-12	2 1/2-12	3-12	3 1/4-12	3 1/2-12	4-12
CC	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	3-12	3 1/2-12	4-12	4 1/2-12	5-12	5 1/2-12
A	3 1/2	3 1/2	4	4 1/2	5	5 1/2
B	3.749	4.249	4.749	5.249	5.749	6.249
C	1	1	1	1	1	1
D	2 5/8	3	3 1/2	3 7/8	4 1/4	4 5/8
NA	2 15/16	3 7/16	3 15/16	4 7/16	4 15/16	5 7/16

***Cushion at rod end is non-adjustable in these size combinations.**

Model "L" cylinders with circular bearing retainer have part recessed thru "E" square Filler Plate when tie rods are extended at front head end.

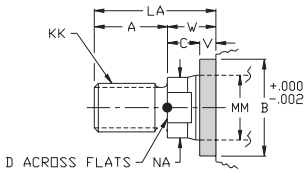
☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

❖ Series "A & LH" cylinders furnished with 1/4 N.P.T.F. ports in these bore sizes ordered with largest available rod diameter.

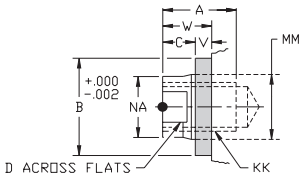
"XI" dimension on Model "N" cylinders is made to customer specifications and must be included to complete the cylinder description. The trunnion location is not adjustable on the cylinder after manufacture.

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

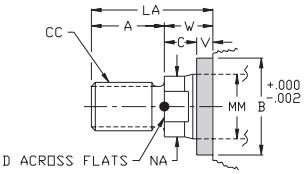


STYLE 4: Short Female Thread NFPA Type SF

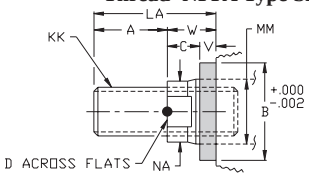


OPTIONAL ROD END STYLES

STYLE 8: Intermediate Male Thread - NFPA Type IM

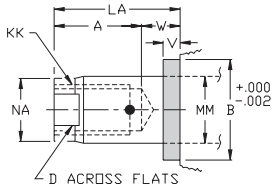


STYLE 5: Studded Small Male Thread - NFPA Type SM

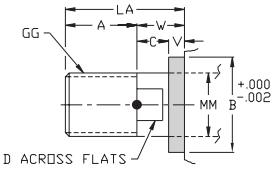


Male #5 additional cost

STYLE 3: Long Female Thread

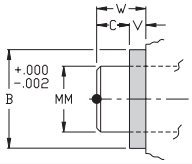


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



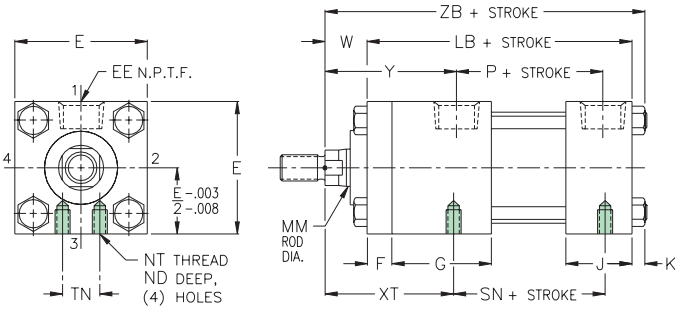
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

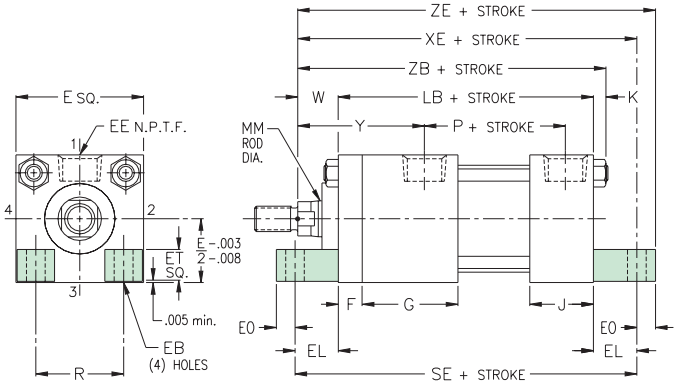
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

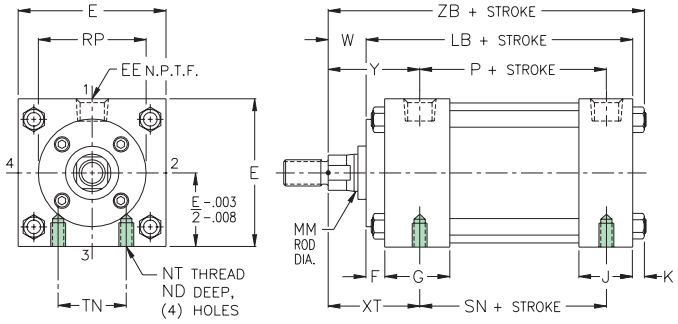
SIDE MOUNT MODEL "G" NFPA STYLE MS4

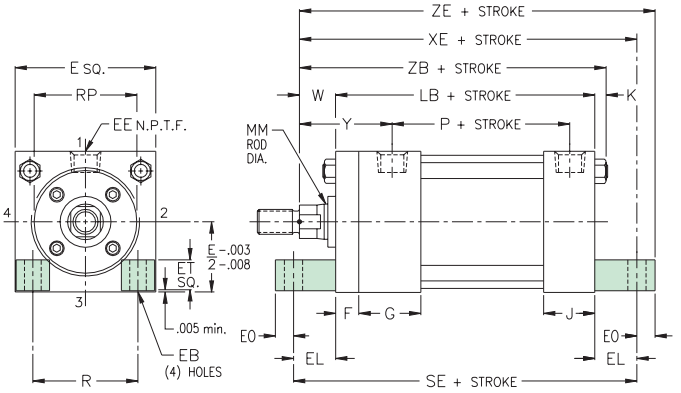


END LUG MOUNT MODEL "J" NFPA STYLE MS7

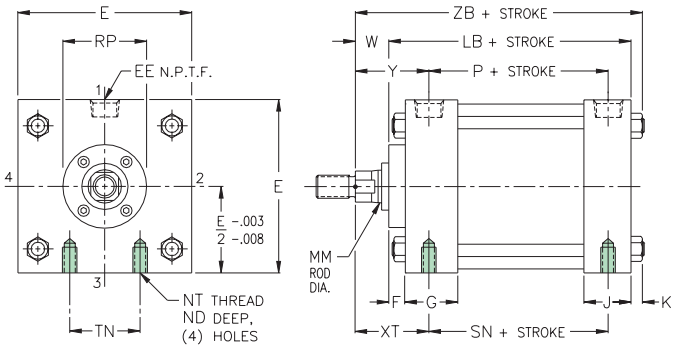


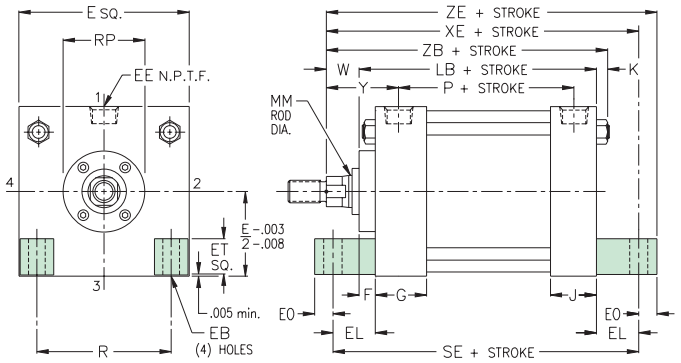
BORE	E	EE	F	G	J	K	P	LB	NT	TN	SN	R	EB♦	ET	EL	EO	SE
1 1/2	2	3/8❖	3/8	1 1/2	1	1/4	2 7/32	4	1/4-20	5/8	2 1/4	1.43	1/4	9/16	3/4	1/4	5 1/2
2	2 1/2	3/8❖	3/8	1 1/2	1	5/16	2 7/32	4	5/16-18	7/8	2 1/4	1.84	5/16	11/16	15/16	5/16	5 7/8
2 1/2	3	3/8❖	3/8	1 1/2	1	5/16	2 11/32	4 1/8	3/8-16	1 1/4	2 3/8	2.19	5/16	13/16	1 1/16	5/16	6 1/4





BORE	E	EE	F	G	J	K	P	LB	NT	TN	SN	R	EB♦	ET	EL	EO	SE
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	4 7/8	1/2-13	1 1/2	2 5/8	2.76	3/8	1	7/8	3/8	6 5/8
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	2 5/8	4 7/8	1/2-13	2 1/16	2 5/8	3.32	3/8	1 3/16	1	3/8	6 7/8
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	2 7/8	5 1/8	5/8-11	2 11/16	2 7/8	4.10	1/2	1 3/8	1 1/16	1/2	7 1/4
6	6 1/2	3/4	3/4	2	1 1/2	7/16	3 1/8	5 3/4	3/4-10	3 1/4	3 1/8	4.88	1/2	1 9/16	1	1/2	7 3/4





BORE	E	EE	F	G	J	K	P	LB	NT	TN	SN	R	EB♦	ET	EL	EO	SE
8	8 1/2	3/4	3/4	2	1 1/2	9/16	3 1/4	5 7/8	3/4-10	4 1/2	3 1/4	6.44	5/8	2	1 1/8	5/8	7 3/8
10	10 5/8	1	3/4	2 1/4	2	11/16	4 1/8	7 1/8	1-8	5 1/2	4 1/8	7.99	3/4	2 5/8	1 5/16	5/8	9
12	12 3/4	1	3/4	2 1/4	2	11/16	4 5/8	7 5/8	1-8	7 1/4	4 5/8	9.62	3/4	3 1/8	1 5/16	5/8	9 1/2
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	5 1/2	8 7/8	1 1/4-7	8 3/8	5 1/2	11.38	7/8	3 3/8	1 1/2	3/4	11 1/8

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	ND	XT	XE	ZE	Y	ZB	RP
1 1/2	5/8	1/4	5/8	1 3/8	3/8	1 15/16	5 3/8	5 5/8	1 31/32	4 7/8	––
	*1	1/2	1	2 1/8	⌘	⌘	5 3/4	6	2 11/32	5 1/4	––
2	5/8	1/4	5/8	1 3/8	5/8	1 15/16	5 9/16	5 7/8	1 31/32	4 15/16	––
	1	1/2	1	2 1/8	7/16	2 5/16	5 15/16	6 1/4	2 11/32	5 5/16	––
	*1 3/8	5/8	1 1/4	2 7/8	3/8	2 9/16	6 3/16	6 1/2	2 19/32	5 9/16	––
2 1/2	5/8	1/4	5/8	1 3/8	3/4	1 15/16	5 13/16	6 1/8	1 31/32	5 1/16	––
	1	1/2	1	2 1/8	3/4	2 5/16	6 3/16	6 1/2	2 11/32	5 7/16	––
	1 3/8	5/8	1 1/4	2 7/8	5/8	2 9/16	6 7/16	6 3/4	2 19/32	5 11/16	––
	*1 3/4	3/4	1 1/2	3 1/2	7/16	2 13/16	6 11/16	7	2 27/32	5 15/16	––
3 1/4	1	1/4	3/4	1 7/8	7/8	2 7/16	6 1/2	6 7/8	2 7/16	6	3 1/4♦
	1 3/8	3/8	1	2 5/8	7/8	2 11/16	6 3/4	7 1/8	2 11/16	6 1/4	3 1/4♦
	1 3/4	1/2	1 1/4	3 1/4	7/8	2 15/16	7	7 3/8	2 15/16	6 1/2	☐
	2	1/2	1 3/8	3 5/8	5/8	3 1/16	7 1/8	7 1/2	3 1/16	6 5/8	☐
4	1	1/4	3/4	1 7/8	7/8	2 7/16	6 5/8	7	2 7/16	6	3 1/4♦
	1 3/8	3/8	1	2 5/8	7/8	2 11/16	6 7/8	7 1/4	2 11/16	6 1/4	3 1/4♦
	1 3/4	1/2	1 1/4	3 1/4	7/8	2 15/16	7 1/8	7 1/2	2 15/16	6 1/2	3 3/4♦
	2	1/2	1 3/8	3 5/8	7/8	3 1/16	7 1/4	7 5/8	3 1/16	6 5/8	4♦
	2 1/2	5/8	1 5/8	4 5/8	7/8	3 5/16	7 1/2	7 7/8	3 5/16	6 7/8	☐
5	1	1/4	3/4	1 7/8	1	2 7/16	6 15/16	7 7/16	2 7/16	6 5/16	3 1/4
	1 3/8	3/8	1	2 5/8	1	2 11/16	7 3/16	7 11/16	2 11/16	6 9/16	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	1	2 15/16	7 7/16	7 15/16	2 15/16	6 13/16	3 3/4
	2	1/2	1 3/8	3 5/8	1	3 1/16	7 9/16	8 1/16	3 1/16	6 15/16	4
	2 1/2	5/8	1 5/8	4 5/8	1	3 5/16	7 13/16	8 5/16	3 5/16	7 3/16	4 1/2♦
	3	5/8	1 5/8	5 1/8	1	3 5/16	7 13/16	8 5/16	3 5/16	7 3/16	☐
	3 1/2	5/8	1 5/8	5 1/8	1	3 5/16	7 13/16	8 5/16	3 5/16	7 3/16	☐
6	1 3/8	1/4	7/8	2 1/2	1 1/8	2 13/16	7 5/8	8 1/8	2 13/16	7 1/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	1 1/8	3 1/16	7 7/8	8 3/8	3 1/16	7 5/16	3 3/4
	2	3/8	1 1/4	3 1/2	1 1/8	3 3/16	8	8 1/2	3 3/16	7 7/16	4
	2 1/2	1/2	1 1/2	4 1/2	1 1/8	3 7/16	8 1/4	8 3/4	3 7/16	7 11/16	4 1/2
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	4	1/2	1 1/2	5 1/2	7/8	3 7/16	8 1/4	8 3/4	3 7/16	7 11/16	☐
8	1 3/8	1/4	7/8	2 1/2	1 1/8	2 13/16	7 7/8	8 1/2	2 13/16	7 5/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	1 1/8	3 1/16	8 1/8	8 3/4	3 1/16	7 9/16	3 3/4
	2	3/8	1 1/4	3 1/2	1 1/8	3 3/16	8 1/4	8 7/8	3 3/16	7 11/16	4
	2 1/2	1/2	1 1/2	4 1/2	1 1/8	3 7/16	8 1/2	9 1/8	3 7/16	7 15/16	4 1/2
	3	1/2	1 1/2	5	1 1/8	3 7/16	#	#	3 7/16	7 15/16	5 1/2
	3 1/2	1/2	1 1/2	5	1 1/8	3 7/16	#	#	3 7/16	7 15/16	5 7/8
	4	1/2	1 1/2	5 1/2	1 1/8	3 7/16	#	#	3 7/16	7 15/16	6 7/16
	4 1/2	1/2	1 1/2	6	1 1/8	3 7/16	#	#	3 7/16	7 15/16	7 1/8
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	2 1/2	1/2	1 1/2	4 1/2	1 1/2	3 1/2	9 15/16	10 9/16	3 1/2	9 5/16	4 1/2
	3	1/2	1 1/2	5	1 1/2	3 1/2	9 15/16	10 9/16	3 1/2	9 5/16	5 1/2
	3 1/2	1/2	1 1/2	5	1 1/2	3 1/2	9 15/16	10 9/16	3 1/2	9 5/16	5 7/8
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	4 1/2	1/2	1 1/2	6	1 1/2	3 1/2	#	#	3 1/2	9 5/16	7 1/8
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12	2	3/8	1 1/4	3 1/2	1 1/2	3 1/4	10 3/16	10 13/16	3 1/4	9 9/16	4
	2 1/2	1/2	1 1/2	4 1/2	1 1/2	3 1/2	10 7/16	11 1/16	3 1/2	9 13/16	4 1/2
	3	1/2	1 1/2	5	1 1/2	3 1/2	10 7/16	11 1/16	3 1/2	9 13/16	5 1/2
	3 1/2	1/2	1 1/2	5	1 1/2	3 1/2	10 7/16	11 1/16	3 1/2	9 13/16	5 7/8
	4	1/2	1 1/2	5 1/2	1 1/2	3 1/2	10 7/16	11 1/16	3 1/2	9 13/16	6 7/16
	4 1/2	1/2	1 1/2	6	1 1/2	3 1/2	10 7/16	11 1/16	3 1/2	9 13/16	7 1/8
	5	1/2	1 1/2	6 1/2	1 1/2	3 1/2	10 7/16	11 1/16	3 1/2	9 13/16	7 9/16
	5 1/2	1/2	1 1/2	7	1 1/2	3 1/2	10 7/16	11 1/16	3 1/2	9 13/16	8 3/8
14	2 1/2	1/2	1 1/2	4 1/2	1 7/8	3 13/16	11 7/8	12 5/8	3 13/16	11 1/8	4 1/2
	3	1/2	1 1/2	5	1 7/8	3 13/16	11 7/8	12 5/8	3 13/16	11 1/8	5 1/2
	3 1/2	1/2	1 1/2	5	1 7/8	3 13/16	11 7/8	12 5/8	3 13/16	11 1/8	5 7/8
	4	1/2	1 1/2	5 1/2	1 7/8	3 13/16	11 7/8	12 5/8	3 13/16	11 1/8	6 7/16
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	5	1/2	1 1/2	6 1/2	1 7/8	3 13/16	11 7/8	12 5/8	3 13/16	11 1/8	7 9/16
	5 1/2	1/2	1 1/2	7	1 7/8	3 13/16	11 7/8	12 5/8	3 13/16	11 1/8	8 3/8

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2	2 1/2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12	2 1/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12	2 1/2-12
A	3/4	1 1/8	1 5/8	2	2 1/4	3
B	1.124	1.499	1.999	2.374	2.624	3.124
C	3/8	1/2	5/8	3/4	7/8	1
D	1/2	7/8	1 3/16	1 17/32	1 3/4	2 1/8
NA	9/16	15/16	1 5/16	1 23/32	1 15/16	2 7/16

LETTER DIM.	3	3 1/2	4	4 1/2	5	5 1/2
KK	2 1/4-12	2 1/2-12	3-12	3 1/4-12	3 1/2-12	4-12
CC	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	3-12	3 1/2-12	4-12	4 1/2-12	5-12	5 1/2-12
A	3 1/2	3 1/2	4	4 1/2	5	5 1/2
B	3.749	4.249	4.749	5.249	5.749	6.249
C	1	1	1	1	1	1
D	2 5/8	3	3 1/2	3 7/8	4 1/4	4 5/8
NA	2 15/16	3 7/16	3 15/16	4 7/16	4 15/16	5 7/16

***Cushion at rod end is non-adjustable in these size combinations.**

Model "J" cylinders with circular bearing retainer have part recessed thru "E" square Filler Plate.

☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

♦ Dimension applies to Model "G" cylinders only. Model "J" furnished with "E" square retainer.

⌘ Model "G" not available in this size combination.

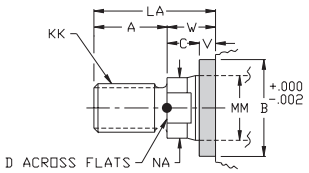
 # Model "J" not available in these size combinations.

⧫ "EB" is diameter of mounting bolt.

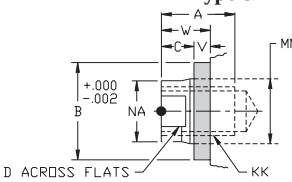
❖ Series "A & LH" cylinders furnished with 1/4 N.P.T.F. ports in these bore sizes ordered with largest available rod diameter.

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

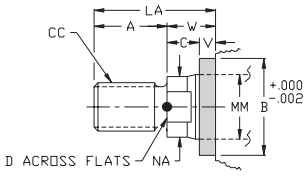


STYLE 4: Short Female Thread NFPA Type SF

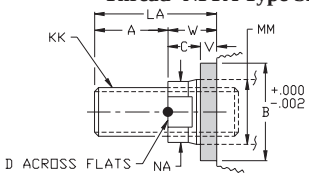


OPTIONAL ROD END STYLES

STYLE 8: Intermediate Male Thread -NFPA Type IM

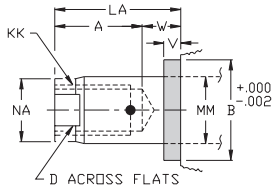


STYLE 5: Studded Small Male Thread -NFPA Type SM

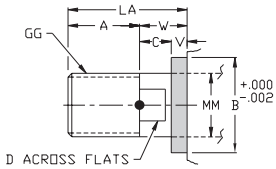


Male #5 additional cost

STYLE 3: Long Female Thread

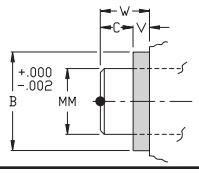


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

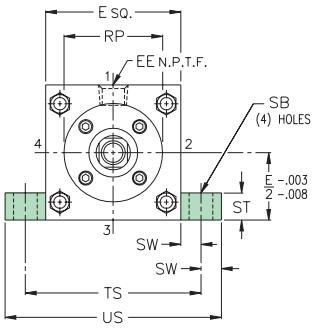
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

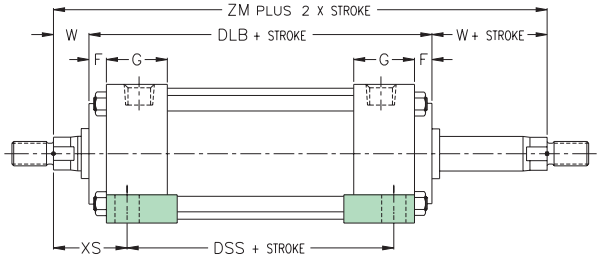
"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

DOUBLE ROD END cylinders are available with the same rod size and end style options as SINGLE ROD END cylinders having the same style mounting.
Dimensional information given provides basic envelope and mounting dimensions applicable to DOUBLE ROD END UNITS.
Data pertaining to variable rod end and bearing retainer details can be determined by referring to the SINGLE ROD END information located on preceding pages.
Cylinders having different rod end styles on opposite ends are available. If desired, clearly specify which end style is to be located at the mounting end, or the end from which the port positions are numbered.
Special models having different rod sizes at each end are available upon request.

Double Rod End cylinders are furnished with solid, one-piece piston rods in all standard models. Unique, proven construction permits piston removal while using no snap rings, pins, or threaded retainers for load retention. This exclusive LYNAIR feature minimizes end to end rod runout improving alignment and smoothness of operation compared to cylinders having the rod constructed from two connected sections as is common in this type of unit.

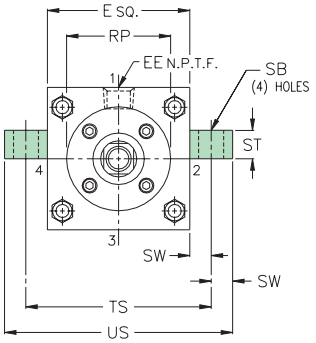
FOOT MOUNT -- MODEL



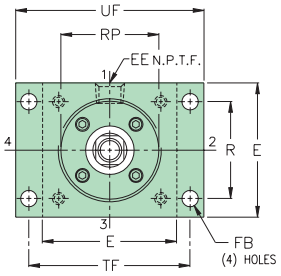


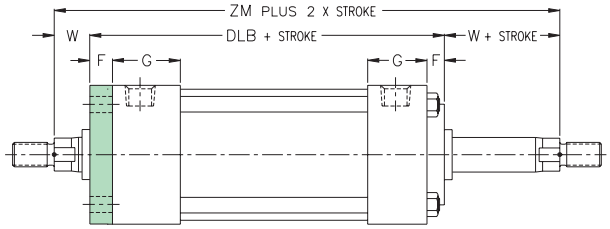
Side view of FOOT MT. Model "MA" above also represents dimensions applicable to CENTERLINE LUG MT. Model "MK". These models differ only in the position of mounting lugs relative to cylinder centerline.

FRONT VIEW - MODEL



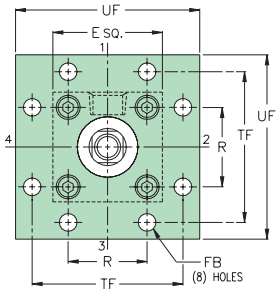
FRONT FLANGE MOUNT





Side view of RECTANGULAR FLANGE MT. Model "MC" also represents dimensions applicable to SQUARE FLANGE MT. Model

FRONT VIEW - MODEL "MP"

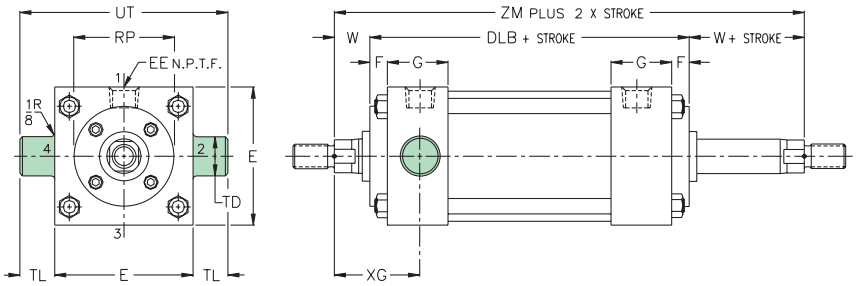


CYL. BORE	DIMS. COMMON TO ALL MODELS					MODEL "MA", "MK" MOUNTING DIMS.						"MC", "MP" MTG. DIMS.			
	E	EE	F	G	DLB	SB■	ST	SW	TS	US	DSS	FB■	R	TF	UF
1 1/2	2	3/8	3/8	1 1/2	4 7/8	3/8	1/2	3/8	2 3/4	3 1/2	3 3/8	1/4	1.43	2 3/4	3 3/8
2	2 1/2	3/8	3/8	1 1/2	4 7/8	3/8	1/2	3/8	3 1/4	4	3 3/8	5/16	1.84	3 3/8	4 1/8
2 1/2	3	3/8	3/8	1 1/2	5	3/8	1/2	3/8	3 3/4	4 1/2	3 1/2	5/16	2.19	3 7/8	4 5/8
3 1/4	3 3/4	1/2	5/8	1 3/4	6	1/2	3/4	1/2	4 3/4	5 3/4	3 3/4	3/8	2.76	4 11/16	5 1/2
4	4 1/2	1/2	5/8	1 3/4	6	1/2	3/4	1/2	5 1/2	6 1/2	3 3/4	3/8	3.32	5 7/16	6 1/4
5	5 1/2	1/2	5/8	1 3/4	6 1/4	3/4	1	11/16	6 7/8	8 1/4	3 5/8	1/2	4.10	6 5/8	7 5/8
6	6 1/2	3/4	3/4	2	7	3/4	1	11/16	7 7/8	9 1/4	4 1/8	1/2	4.88	7 5/8	8 5/8
8	8 1/2	3/4	3/4	2	7 1/8	3/4	1	11/16	9 7/8	11 1/4	4 1/4				
10	10 5/8	1	3/4	2 1/4	8 1/8	1	1 1/4	7/8	12 3/8	14 1/8	4 7/8				
12	12 3/4	1	3/4	2 1/4	8 5/8	1	1 1/4	7/8	14 1/2	16 1/4	5 3/8				
14	14 3/4	1 1/4	3/4	2 3/4	10 1/8	1 1/4	1 1/2	1 1/8	17	19 1/4	6 3/8				

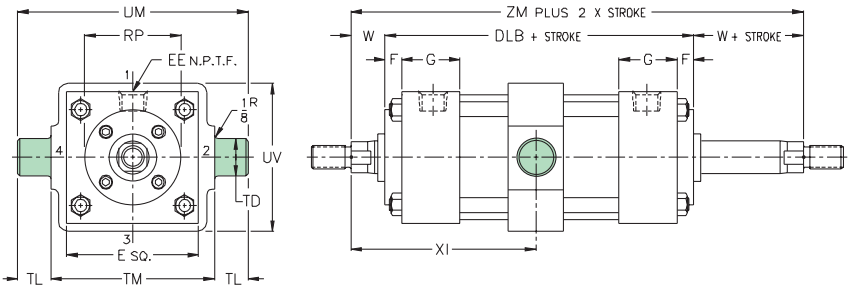
DOUBLE ROD END Model "MC" is available in bore sizes 8" thru 14". Refer to SINGLE ROD END Model "C" for applicable mounting dimensions. Basic envelope dimensions given for D.R.E. construction do apply to this mounting style.
■"SB," "FB," and "EB" is diameter of mounting bolt.

CYL. BORE	MODEL "ME", "MN" MOUNTING DIMS.						MODEL "ML", "MG", "MJ", "MW" MOUNTING DIMENSIONS								
	TD +.000 -.002	TL	UT	TM	UM	UV	R	AA	TN	NT	SN	EB■	ET	EL	DSA	DSE
1 1/2	1.000	1	4	2 1/2	4 1/2	2 1/2	1.43	2.02	5/8	1/4-20	2 1/4	1/4	9/16	3/4	6 7/8	6 3/8
2	1.000	1	4 1/2	3	5	3	1.84	2.60	7/8	5/16-18	2 1/4	5/16	11/16	15/16	6 7/8	6 3/4
2 1/2	1.000	1	5	3 1/2	5 1/2	3 1/2	2.19	3.10	1 1/4	3/8-16	2 3/8	5/16	13/16	1 1/16	7	7 1/8
3 1/4	1.000	1	5 3/4	4 1/2	6 1/2	4 1/4	2.76	3.90	1 1/2	1/2-13	2 5/8	3/8	1	7/8	8 1/2	7 3/4
4	1.000	1	6 1/2	5 1/4	7 1/4	5	3.32	4.70	2 1/16	1/2-13	2 5/8	3/8	1 3/16	1	8 1/2	8
5	1.000	1	7 1/2	6 1/4	8 1/4	6	4.10	5.80	2 11/16	5/8-11	2 7/8	1/2	1 3/8	1 1/16	9	8 3/8
6	1.375	1 3/8	9 1/4	7 5/8	10 3/8	7	4.88	6.90	3 1/4	3/4-10	3 1/8	1/2	1 9/16	1	9 3/4	9
8	1.375	1 3/8	11 1/4	9 3/4	12 1/2	9 1/2	6.44	9.10	4 1/2	3/4-10	3 1/4	5/8	2	1 1/8	10	8 5/8
10	1.750	1 3/4	14 1/8	12	15 1/2	11 3/4	7.99	11.30	5 1/2	1-8	4 1/8	3/4	2 5/8	1 5/16	11 5/8	10
12	1.750	1 3/4	16 1/4	14	17 1/2	13 3/4	9.62	13.60	7 1/4	1-8	4 5/8	3/4	3 1/8	1 15/16	12 1/8	10 1/2
14	2.000	2	18 3/4	16 1/4	20 1/4	16	11.38	16.10	8 3/8	1 1/4-7	5 1/2	7/8	3 3/8	1 1/2	14 1/4	12 3/8

FRONT TRUNNION MOUNT MODEL "ME"

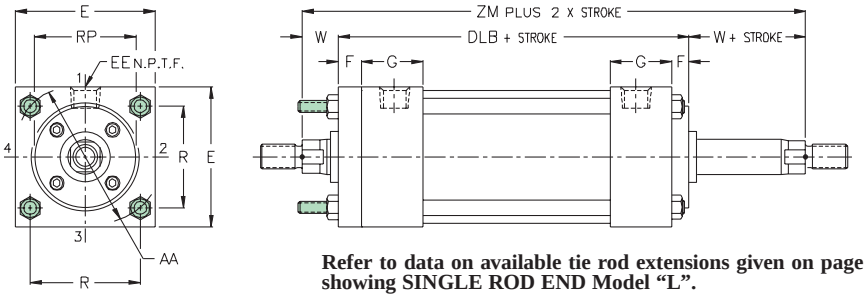


INTERMEDIATE TRUNNION MOUNT MODEL



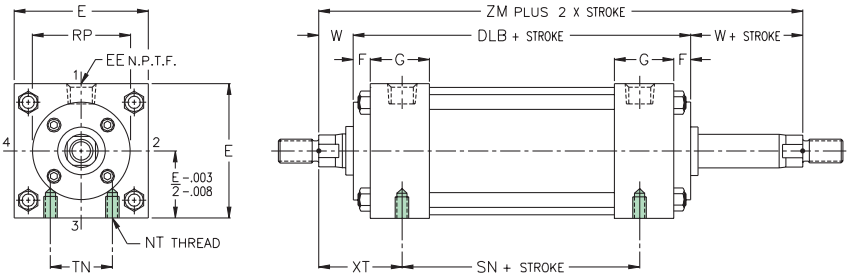
CUSTOMER MUST SPECIFY "XI" DIMENSION.

EXTENDED TIE ROD MOUNT MODEL

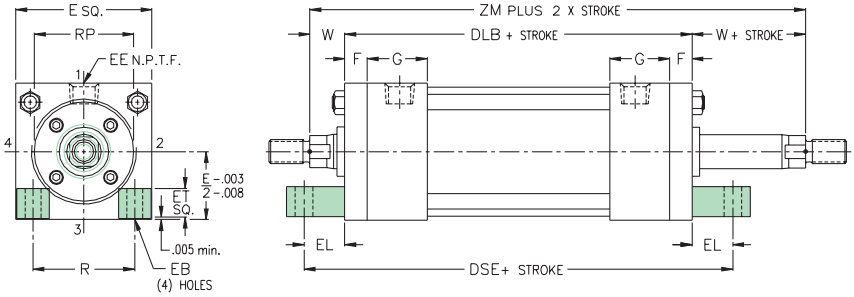


Refer to data on available tie rod extensions given on page showing SINGLE ROD END Model "L".

SIDE MOUNT MODEL "MG"



END LUG MOUNT MODEL "MJ"



ANGLE FOOT MOUNT Model "MW" not shown, but is available in bore sizes 1½" thru 8". Basic envelope dimensions match those shown for Model "MJ" with substitution of "DSA" for "DSE", and "AL" for "EL". Refer to SINGLE ROD END Model "W" for "AL" and other applicable dimensions.

CYL. BORE	VARIABLE DIMENSIONS					
	Rod Dia. MM	W	ZM	XG	XS	XT
1½	5/8	5/8	6 1/8	1 3/4	1 3/8	1 15/16
	1*	1	6 7/8	2 1/8	1 3/4	--
2	5/8	5/8	6 1/8	1 3/4	1 3/8	1 15/16
	1	1	6 7/8	2 1/8	1 3/4	2 5/16
	1 3/8*	1 1/4	7 3/8	2 3/8	2	2 9/16
2½	5/8	5/8	6 1/4	1 3/4	1 3/8	1 15/16
	1	1	7	2 1/8	1 3/4	2 5/16
	1 3/8	1 1/4	7 1/2	2 3/8	2	2 9/16
	1 3/4*	1 1/2	8	2 5/8	2 1/4	2 13/16
3¼	1	3/4	7 1/2	2 1/4	1 7/8	2 7/16
	1 3/8	1	8	2 1/2	2 1/8	2 11/16
	1 3/4	1 1/4	8 1/2	2 3/4	2 3/8	2 15/16
	2	1 3/8	8 3/4	2 7/8	2 1/2	3 1/16
4	1	3/4	7 1/2	2 1/4	1 7/8	2 7/16
	1 3/8	1	8	2 1/2	2 1/8	2 11/16
	1 3/4	1 1/4	8 1/2	2 3/4	2 3/8	2 15/16
	2	1 3/8	8 3/4	2 7/8	2 1/2	3 1/16
	2 1/2	1 5/8	9 1/4	3 1/8	2 3/4	3 5/16
5	1	3/4	7 3/4	2 1/4	2 1/16	2 7/16
	1 3/8	1	8 1/4	2 1/2	2 5/16	2 11/16
	1 3/4	1 1/4	8 3/4	2 3/4	2 9/16	2 15/16
	2	1 3/8	9	2 7/8	2 11/16	3 1/16
	2 1/2	1 5/8	9 1/2	3 1/8	2 15/16	3 5/16
	3	1 5/8	9 1/2	3 1/8	2 15/16	3 5/16
	3 1/2	1 5/8	9 1/2	3 1/8	2 15/16	3 5/16
6	1 3/8	7/8	8 3/4	2 5/8	2 5/16	2 13/16
	1 3/4	1 1/8	9 1/4	2 7/8	2 9/16	3 1/16
	2	1 1/4	9 1/2	3	2 11/16	3 3/16
	2 1/2	1 1/2	10	3 1/4	2 15/16	3 7/16
	3	1 1/2	10	3 1/4	2 15/16	3 7/16
	3 1/2	1 1/2	10	3 1/4	2 15/16	3 7/16
	4	1 1/2	10	3 1/4	2 15/16	3 7/16
8	1 3/8	7/8	8 7/8	2 5/8	2 5/16	2 13/16
	1 3/4	1 1/8	9 3/8	2 7/8	2 9/16	3 1/16
	2	1 1/4	9 5/8	3	2 11/16	3 3/16
	2 1/2	1 1/2	10 1/8	3 1/4	2 15/16	3 7/16
	3	1 1/2	10 1/8	3 1/4	2 15/16	3 7/16
	3 1/2	1 1/2	10 1/8	3 1/4	2 15/16	3 7/16
	4	1 1/2	10 1/8	3 1/4	2 15/16	3 7/16
	4 1/2	1 1/2	10 1/8	3 1/4	2 15/16	3 7/16
	5	1 1/2	10 1/8	3 1/4	2 15/16	3 7/16
	5 1/2	1 1/2	10 1/8	3 1/4	2 15/16	3 7/16
10	1 3/4	1 1/8	10 3/8	3	2 3/4	3 1/8
	2	1 1/4	10 5/8	3 1/8	2 7/8	3 1/4
	2 1/2	1 1/2	11 1/8	3 3/8	3 1/8	3 1/2
	3	1 1/2	11 1/8	3 3/8	3 1/8	3 1/2
	3 1/2	1 1/2	11 1/8	3 3/8	3 1/8	3 1/2
	4	1 1/2	11 1/8	3 3/8	3 1/8	3 1/2
	4 1/2	1 1/2	11 1/8	3 3/8	3 1/8	3 1/2
	5	1 1/2	11 1/8	3 3/8	3 1/8	3 1/2
	5 1/2	1 1/2	11 1/8	3 3/8	3 1/8	3 1/2
12	2	1 1/4	11 1/8	3 1/8	2 7/8	3 1/4
	2 1/2	1 1/2	11 5/8	3 3/8	3 1/8	3 1/2
	3	1 1/2	11 5/8	3 3/8	3 1/8	3 1/2
	3 1/2	1 1/2	11 5/8	3 3/8	3 1/8	3 1/2
	4	1 1/2	11 5/8	3 3/8	3 1/8	3 1/2
	4 1/2	1 1/2	11 5/8	3 3/8	3 1/8	3 1/2
	5	1 1/2	11 5/8	3 3/8	3 1/8	3 1/2
	5 1/2	1 1/2	11 5/8	3 3/8	3 1/8	3 1/2
14	2 1/2	1 1/2	13 1/8	3 5/8	3 3/8	3 13/16
	3	1 1/2	13 1/8	3 5/8	3 3/8	3 13/16
	3 1/2	1 1/2	13 1/8	3 5/8	3 3/8	3 13/16
	4	1 1/2	13 1/8	3 5/8	3 3/8	3 13/16
	4 1/2	1 1/2	13 1/8	3 5/8	3 3/8	3 13/16
	5	1 1/2	13 1/8	3 5/8	3 3/8	3 13/16
	5 1/2	1 1/2	13 1/8	3 5/8	3 3/8	3 13/16

Cylinder Maintenance

Suggested cylinder maintenance includes the replacement of seals subject to wear under normal operating conditions and the inspection of vital rod, bearing, and tube surfaces for abnormal wear or damage resulting from misalignment, particle contamination, or accidental abuse.

When maintenance is to be performed, the cylinder should be removed to a clean work area. The unit should be disassembled as described below to replace desired seal items.

Prior to reassembly, it is recommended that all cylinder surfaces and replacement parts be thoroughly cleaned and lubricated.

ROD SEAL REPLACEMENT

1. Extend cylinder rod several inches and provide adequate support to avoid cocking the piston inside tube.

2. Inspect rod wrench flat area and remove any burrs to prevent damage to rod bearing upon its removal.

3. Remove fasteners and detach bearing retainer plate.

4. Remove bearing from rod by pulling with a slow twisting motion.

5. Remove v-ring rod seals from cylinder end cap using a hook tool or thin screwdriver. Use care not to scratch head surfaces. Low pressure air may be applied thru front port to assist in seal removal. If used, rod should be fully retracted before such pressure is applied.

6. Remove rod wiper, clean, and inspect inner surface of the rod bearing. If finish of bore is not uniform, measure for variations in size. If wear is apparent, replace rod bearing in addition to seal components.

7. After cleaning cylinder surfaces and lubricating replacement seals, install v-ring packing set into front head cavity.

8. Install new rod wiper, lubricate, and slide bearing onto rod using a slow twisting motion.

9. Reattach bearing retainer using appropriate fasteners. Torque requirements for proper reassembly are included on this page.

PISTON AND TUBE END SEAL REPLACEMENT

1. Pull cylinder rod to its fully extended position and provide adequate support to avoid cocking the piston inside tube.

2. Remove tie rod fasteners from end of unit most convenient for service purposes.

3. Remove rear end cap and separate front head from cylinder tube. Tubing must be supported to prevent cocking against piston during disassembly.

4. Slide piston out of cylinder tube to expose both seals. Remove packing by inserting blunt screwdriver under heel section and stretching seals over face of piston.

5. Clean piston and cylinder bore surfaces. Install new piston seals with cup form of each facing in opposite directions away from each other.

6. Remove tube end seal (either gasket or square-ring/o-ring), clean head surface, and install replacement component. Lubricate prior to reassembly.

7. Insert piston into tube by depressing lip of seal with a blunt edge tool around circumference using care not to nick or scratch seal surface.

8. Align tube ends squarely with end cap pilots, slide together, and reattach tie rod fasteners. Use care not to shear square-ring/o-ring when applicable.

9. With piston rod in fully extended position, hand tighten tie rod fasteners. Torque gradually to recommended level by alternately tightening fasteners in a diagonal, corner crossing pattern.

10. If cylinder size permits, push piston rod to rear of unit to check alignment. If binding occurs, loosen tie rods and repeat torquing procedure. Cylinders with cushions should be assembled with the front cushion fully engaged. When assembled, proper alignment will allow full rotation of rod within the cushion at each end of cylinder.

11. After reassembly is complete, the cylinder should be pressure tested to inspect operating condition and checked for leakage before being placed back in service.

Torque Specifications

When tie rod nuts are removed to perform cylinder maintenance, they must be reassembled with proper torque to secure the assembly.

To prevent twisting, attach vice grip pliers or a locking clamp to tie rod near end of unit where torque will be applied. Recommended torque values apply to lubricated threads.

Cyl. Bore	1 1/2	2	2 1/2	3 1/4	4	5
Tie Rod Dia.	1/4	5/16	5/16	3/8	3/8	1/2
Torque Ft. Lbs.	8	18	18	34	34	62

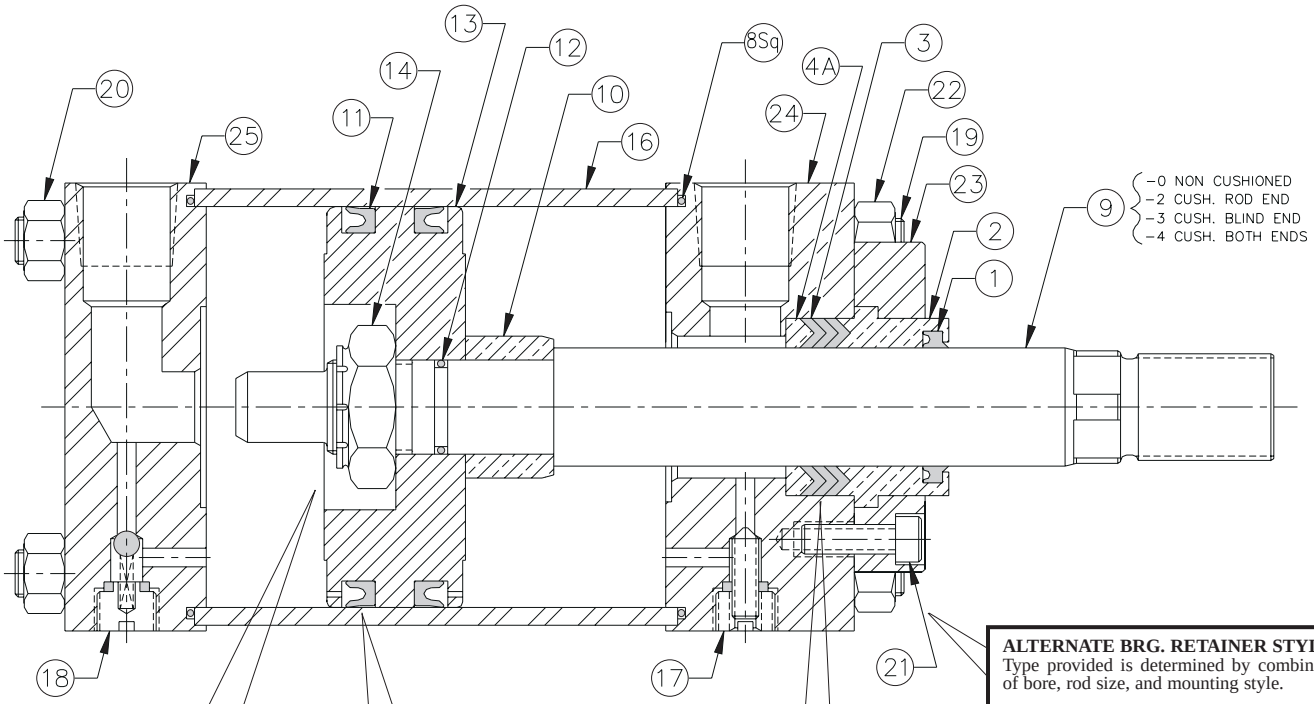
Cyl. Bore	6	8	10	12	14
Tie Rod Dia.	1/2	5/8	3/4	3/4	7/8
Torque Ft. Lbs.	78	115	185	220	280

Bearing retainers are secured by various size and style fasteners in different model cylinders.
The chart below shows torque value applicable to each type used.

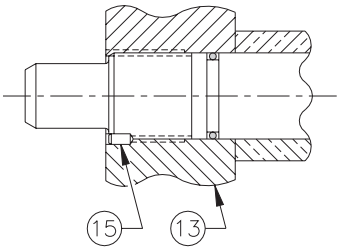
All fasteners are secured with breakable bond locking adhesive to insure against self disassembly.

Thread Size	1/4-28	5/16-24	3/8-24	1/2-20	5/18-18
Hex. Hd. C.S.	7	14	26	64	128
Soc. Hd. C.S.	14	27	48	114	222
Low Hd. C.S.	6.6	13	23	52	---

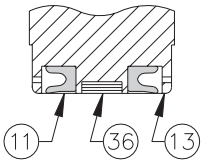
PART IDENTIFICATION NUMBERS FOR SERIES "A" AIR AND SERIES "LH" HYDRAULIC CYLINDERS



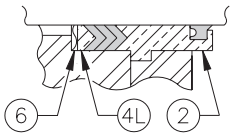
ALTERNATE PISTON CONSTRUCTION
Construction method used to secure Piston is determined by space available with bore and rod size combination.



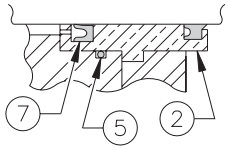
ALTERNATE PISTON DESIGN
Bronze-filled teflon wear ring



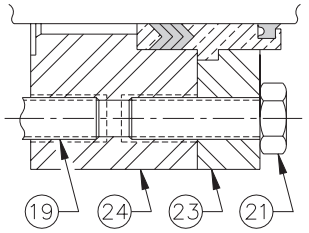
SERIES "LH" ROD SEAL CONSTRUCTION
Consists of V-Ring seal set with wave spring expander.

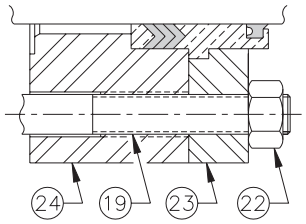


STYLE "C2" ALTERNATE ROD SEAL
Cup type rod seal for air service available upon request.



ALTERNATE BRG. RETAINER STYLES
Type provided is determined by combination of bore, rod size, and mounting style.





ORDER INFORMATION REQUIREMENTS
When ordering replacement parts, clearly specify the item number, name, and quantity of the desired component. It is essential to provide the correct model and serial number of the cylinder in which the parts will be used. By providing both numbers, a cross check of reference data can be made to assure accurate fulfillment of order requirements.

BASIC PARTS LIST

ITEM NUMBER	PART NAME
1	Rod Wiper
2	Rod Bearing
3	Rod Packing Set
4A	Support Ring (Series "A")
4L	Support Ring (Series "LH")
5	O-Ring - Bearing to Head for Style "C2" bearing only
6	Wave Spring
7	Rod Seal - Style "C2" only
8A	Tube End Gasket (Obsolete)
8Sq	Tube End Seal
9	Piston Rod add dash number to indicate cushion style
10	Cushion Bushing
11	Piston Packing
12	O-Ring - Piston to Rod
13	Piston
14	Piston Nut
15	Locking Pin
16	Cylinder Tube
17	Cushion Adjusting Screw Assy
18	Ball Check Assembly
19	Tie Rod
20	Rear Tie Rod Fastener
21	Bearing Retainer Cap Screw
22	Front Tie Rod Fastener
23	Bearing Retainer
24*	Front Head
25*	Rear Head
36	Wear Ring

(*) Model number code letter used to indicate mounting style should be included with item number to describe part. Example: Item 24-A Front Head w/Foot Mounting.

MOUNTING COMPONENT PARTS LIST

ITEM NUMBER	MTG. STYLE	PART NAME
26	"BR"	Detachable Clevis Plate
27	"C"	Rect. Front Flange Plate
28	"P"	Square Front Flange Plate
29	"D"	Rect. Rear Flange Plate
30	"R"	Square Rear Flange Plate
31	"N"	Intermediate Trunnion Ring
32	"J"	End Lug Mounting Blocks
33	"J"	Bearing Retainer Filler Plate
34	"L"	Bearing Retainer Filler

SERVICE PARTS MAY BE ORDERED AS FOLLOWS:

SEAL KIT: Series "A" & "LH" - Consists of item numbers 1, 3, 8Sq, and 11.

SEAL KIT w/BEARING: Series "A" - Consists of item numbers 1, 2, 3, 4A, 8Sq, and 11.
Series "LH" - Consists of item numbers 1, 2, 3, 4L, 6, 8Sq, and 11.

CARTRIDGE ASSEMBLY: Series "A" - Consists of item numbers 1, 2, 3, and 4A.
Series "LH" - Consists of item numbers 1, 2, 3, 4L, and 6.

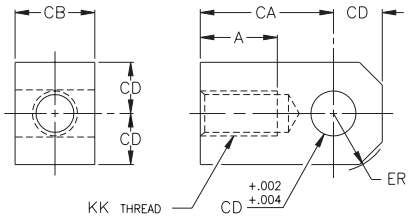
NOTE: LYNAIR will substitute items to suit Style "C2" bearing construction when applicable.

PISTON AND ROD ASSEMBLY: Consists of item numbers 9, 11, 12, 13, and 10, 14, or 15 as required.

NOTE: Ordered parts will be supplied to suit construction details indicated by record data of original serial number.

LYNAIR, INC.
3515 Scheele Drive P.O. Box 720
Jackson, Michigan 49204
Phone (517)787-2240 FAX (517)787-4521

ROD EYE



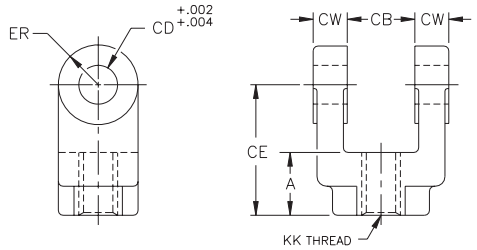
ORDER TO FIT ROD END THREAD SIZE.

MATERIAL: DUCTILE IRON CASTING OR CARBON STEEL

PIVOT PIN MUST BE ORDERED IF DESIRED FOR USE WITH THIS ACCESSORY.

PART NUMBER	ROD DIA.	Dimensions					
		KK	CD	CB	CA	A	ER
RE-0604	5/8	7/16-20	.500	3/4	1 1/2	3/4	9/16
RE-0605	5/8	1/2-20	.500	3/4	1 1/2	3/4	9/16
RE-0606	5/8	5/8-18	.500	3/4	1 1/2	3/4	9/16
RE-1007	1	3/4-16	.750	1 1/4	2 1/16	1 1/8	15/16
RE-1008	1	7/8-14	1.000	1 1/2	2 3/8	1 1/8	1 3/16
RE-1310	1 3/8	1-14	1.000	1 1/2	2 13/16	1 5/8	1 3/16
RE-1712	1 3/4	1 1/4-12	1.375	2	3 7/16	2	1 13/16
RE-2015	2	1 1/2-12	1.750	2 1/2	4	2 1/4	1 15/16
RE-2017	2	1 3/4-12	2.000	2 1/2	4 3/8	2 1/4	2 3/16
RE-2518	2 1/2	1 7/8-12	2.000	2 1/2	5	3	2 3/16
RE-3022	3	2 1/4-12	2.500	3	5 13/16	3 1/2	2 11/16
RE-3525	3 1/2	2 1/2-12	3.000	3	6 1/8	3 1/2	2 15/16
RE-4030	4	3-12	3.000	4	7 1/8	4	2 15/16
RE-4532	4 1/2	3 1/4-12	3.500	4	7 5/8	4 1/2	3 7/8
RE-5035M	5	3 1/2-12	3.500	4	7 5/8	5	3 7/8
RE-5540	5 1/2	4-12	4.000	4 1/2	9 1/8	5 1/2	4 1/16

ROD CLEVIS

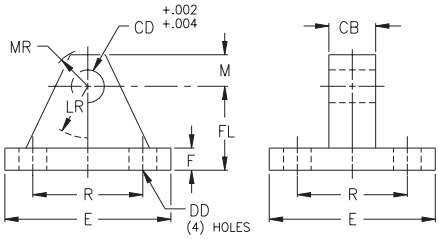


ORDER TO FIT ROD END THREAD SIZE.
MATERIAL: FORGED STEEL, DUCTILE IRON CASTING, OR CARBON STEEL.

PIVOT PIN IS PROVIDED WITH THIS WITH THIS ACCESSORY.

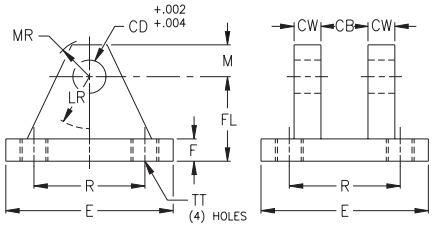
PART NUMBER	ROD DIA.	Dimensions						
		KK	CD	CB	CW	CE	A	ER
RC-0604	5/8	7/16-20	.500	.765	1/2	1 1/2	3/4	1/2
RC-0605	5/8	1/2-20	.500	.765	1/2	1 1/2	3/4	1/2
RC-0606	5/8	5/8-18	.500	.765	1/2	1 1/2	3/4	1/2
RC-1007	1	3/4-16	.750	1.265	5/8	2 3/8	1 1/8	3/4
RC-1008	1	7/8-14	1.000	1.515	3/4	2 15/16	1 5/8	1
RC-1310	1 3/8	1-14	1.000	1.515	3/4	3 1/8	1 5/8	1
RC-1712	1 3/4	1 1/4-12	1.375	2.015	1	4 1/8	2	1 3/8
RC-2015	2	1 1/2-12	1.750	2.515	1 1/4	4 1/2	2 1/4	1 3/4
RC-2017	2	1 3/4-12	2.000	2.515	1 1/4	5 1/2	3	2
RC-2518	2 1/2	1 7/8-12	2.000	2.515	1 1/4	5 1/2	3	2
RC-3022	3	2 1/4-12	2.500	3.015	1 1/2	6 1/2	3 1/2	2 1/4
RC-3525	3 1/2	2 1/2-12	3.000	3.015	1 1/2	6 3/4	3 1/2	3
RC-4030	4	3-12	3.000	3.015	1 1/2	7 1/2	4	3
RC-4532	4 1/2	3 1/4-12	3.500	4.015	2	8 1/2	4 1/2	3
RC-5035	5	3 1/2-12	3.500	4.015	2	9 1/2	5	3
RC-5540	5 1/2	4-12	4.000	4.515	2 1/4	10	5 1/2	4

EYE BRACKET



MATERIAL: FORGED STEEL, DUCTILE IRON CASTING, OR CARBON STEEL.
PIVOT PINS ARE INCLUDED WITH CLEVIS MOUNTED CYLINDERS AND ROD CLEVISES WHICH MATE WITH THIS ACCESSORY.

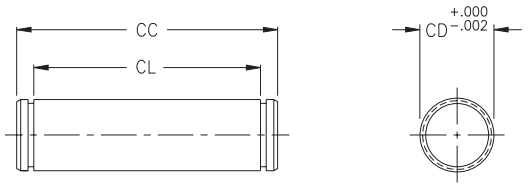
CLEVIS BRACKET



MATERIAL: FORGED STEEL, DUCTILE IRON CASTING, OR CARBON STEEL.
PIVOT PIN IS PROVIDED WITH THIS ACCESSORY.

EYE BRACKET	CLEVIS BRACKET	FITS CYL. SIZE	Dimensions											
			CD	CB	CW	E	R	FL	F	M	MR	LR	DD	TT
MB-0507	CB-0500	1 1/2,2,2 1/2	.500	3/4	1/2	2 1/2	1 5/8	1 1/8	3/8	1/2	9/16	5/8	13/32	3/8-24
MB-0712	CB-0750	3 1/4,4,5	.750	1 1/4	5/8	3 1/2	2 9/16	1 7/8	5/8	3/4	15/16	1	17/32	1/2-20
MB-1015	CB-1000	6,8	1.000	1 1/2	3/4	4 1/2	3 1/4	2 1/4	3/4	1	1 3/16	1 1/4	21/32	5/8-18
MB-1015H		6,8	1.000	1 1/2		4 1/2	3 1/4	2 3/8	7/8	1	1 3/16	1 1/4	21/32	
MB-1320	CB-1375	10	1.375	2	1	5	3 13/16	3	7/8	1 3/8	1 13/16	1 7/8	21/32	5/8-18
MB-1725	CB-1750	12	1.750	2 1/2	1 1/4	6 1/2	4 15/16	3 1/8	7/8	1 3/4	1 15/16	2	29/32	7/8-14
MB-1725H		12	1.750	2 1/2		6 1/2	4 15/16	3 3/8	1 1/8	1 3/4	1 15/16	2	29/32	
MB-2025	CB-2000	14	2.000	2 1/2	1 1/4	7 1/2	5 3/4	3 1/2	1	2	2 3/16	2 1/4	1 1/16	1-14
MB-2025H		14	2.000	2 1/2		7 1/2	5 3/4	4	1 1/2	2	2 3/16	2 1/4	1 1/16	
MB-2530	CB-2500		2.500	3	1 1/2	8 1/2	6 19/32	4	1	2 1/2	2 11/16	2 3/4	1 3/16	1 1/8-12
MB-2530H			2.500	3		8 1/2	6 19/32	4 3/4	1 3/4	2 1/2	2 11/16	2 3/4	1 3/16	
MB-3030	CB-3000		3.000	3	1 1/2	9 1/2	7 1/2	4 1/4	1	2 3/4	2 15/16	3	1 5/16	1 1/4-12
MB-3030H			3.000	3		9 1/2	7 1/2	5 1/4	2	2 3/4	2 15/16	3	1 5/16	
MB-3540	CB-3500		3.500	4	2	12 5/8	9 5/8	5 11/16	1 11/16	3 1/2	3 11/16	3 3/4	1 13/16	1 3/4-12
MB-4045	CB-4000		4.000	4 1/2	2 1/4	14 7/8	11 1/2	6 7/16	1 15/16	4	4 1/16	4 1/8	2 1/16	2-12

PIVOT PIN



PIVOT PINS ARE FURNISHED WITH (2) RETAINER RINGS.

MATERIAL: GROUND, CHROME PLATED HIGH STRENGTH STEEL

PIVOT PINS ARE INCLUDED WITH CLEVIS MOUNTED CYLIN-

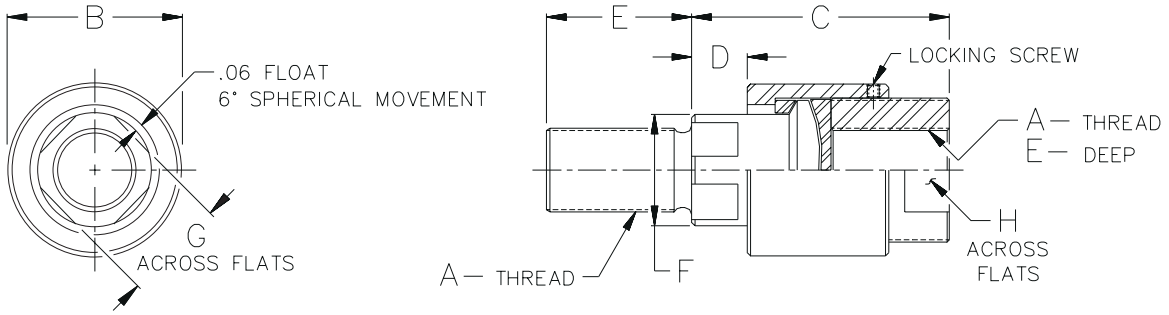
PART NUMBER	Order To. Fit Rod Eye	Dimensions		
		CD	CL	CC
CP-0522	RE-0604	.500	$1\frac{27}{32}$	$2\frac{7}{32}$
CP-0730	RE-1007	.750	$2\frac{5}{8}$	3
CP-1036	RE-1310	1.000	$3\frac{1}{8}$	$3\frac{9}{16}$
CP-1345	RE-1712	1.375	$4\frac{1}{8}$	$4\frac{1}{2}$
CP-1757	RE-2015	1.750	$5\frac{1}{8}$	$5\frac{3}{4}$
CP-2060	RE-2518	2.000	$5\frac{1}{8}$	6
CP-2570	RE-3022	2.500	$6\frac{1}{8}$	7
CP-3070	RE-3525	3.000	$6\frac{1}{8}$	7
CP-3590	RE-4532	3.500	$8\frac{1}{8}$	9
CP-40100	RE-5540	4.000	$9\frac{1}{8}$	10
CP-50130	RE-7055	5.000	$12\frac{1}{8}$	13

Rod end accessories shown on pg. 36 are recommended for use with style 2 or style 5 rod ends which include a shoulder surface against which the attachment can be secured.

If accessory is used with non-shouldered style thread, the thread length should be extended and the attachment secured with a locking nut.

SELF ALIGNING ROD END COUPLER

- **PREVENTS BINDING AND ERRATIC MOVEMENT CAUSED BY MISALIGNMENT.**
- **PERMITS GREATER TOLERANCE BETWEEN CYLINDER CENTERLINE AND MATING MEMBER.**
- **REDUCES ROD SEAL AND BEARING WEAR.**
- **EQUALLY WELL SUITED FOR "PUSH" OR "PULL" APPLICATIONS.**



PART NUMBER	SUGGESTED ROD DIA.	ROD END COUPLER DIMENSIONS								
		A-THREAD	B	C	D	E	F	G	H	Max. Pull Force
LC-1-07A	$\frac{5}{8}$	$\frac{7}{16}$-20	$1\frac{3}{8}$	2	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{13}{16}$	2,535
LC-1-08A	$\frac{5}{8}$	$\frac{1}{2}$-20	$1\frac{3}{8}$	2	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{13}{16}$	3,500
LC-1-10A	$\frac{5}{8}$	$\frac{5}{8}$-18	$1\frac{3}{8}$	2	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{13}{16}$	4,750
LC-1-12A	1	$\frac{3}{4}$-16	2	$2\frac{5}{16}$	$\frac{1}{2}$	$1\frac{1}{8}$	$\frac{31}{32}$	$\frac{13}{16}$	$1\frac{1}{8}$	8,750
LC-1-14A	1	$\frac{7}{8}$-14	2	$2\frac{5}{16}$	$\frac{1}{2}$	$1\frac{1}{8}$	$\frac{31}{32}$	$\frac{13}{16}$	$1\frac{1}{8}$	9,750
LC-1-16A	$1\frac{3}{8}$	1-14	$3\frac{1}{8}$	$2\frac{15}{16}$	$\frac{17}{32}$	$1\frac{5}{8}$	$1\frac{11}{32}$	$1\frac{5}{32}$	$1\frac{5}{8}$	16,125
LC-1-20A	$1\frac{3}{4}$	$1\frac{1}{4}$-12	$3\frac{1}{8}$	$2\frac{15}{16}$	$\frac{17}{32}$	2	$1\frac{11}{32}$	$1\frac{5}{32}$	$1\frac{5}{8}$	19,600
LC-1-24A	2	$1\frac{1}{2}$-12	4	$4\frac{3}{8}$	$\frac{7}{8}$	$2\frac{1}{4}$	$1\frac{31}{32}$	$1\frac{3}{4}$	$2\frac{3}{8}$	34,000
LC-1-28A	2	$1\frac{3}{4}$-12	4	$4\frac{3}{8}$	1	$2\frac{1}{4}$	$1\frac{31}{32}$	$1\frac{3}{4}$	$2\frac{3}{8}$	34,000
LC-1-30A	$2\frac{1}{2}$	$1\frac{7}{8}$-12	5	$5\frac{5}{8}$	1	3	$2\frac{15}{32}$	$1\frac{15}{16}$	$2\frac{5}{8}$	41,250
LC-1-32A	$2\frac{1}{2}$	2-12	5	$5\frac{5}{8}$	1	3	$2\frac{15}{32}$	$1\frac{15}{16}$	$2\frac{5}{8}$	41,250
LC-1-36A	3	$2\frac{1}{4}$-12	$6\frac{3}{4}$	$6\frac{3}{8}$	1	$3\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{8}$	$2\frac{7}{8}$	60,000
LC-1-40A	$3\frac{1}{2}$	$2\frac{1}{2}$-12	7	$6\frac{1}{2}$	1	$3\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{7}{8}$	$3\frac{3}{8}$	86,250
LC-1-44A	$3\frac{1}{2}$	$2\frac{3}{4}$-12	7	$6\frac{1}{2}$	1	$3\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{7}{8}$	$3\frac{3}{8}$	86,250
LC-1-48A	4	3-12	7	$6\frac{1}{2}$	1	$3\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{7}{8}$	$3\frac{3}{8}$	86,250
LC-1-52A	$4\frac{1}{2}$	$3\frac{1}{4}$-12	$9\frac{1}{4}$	$8\frac{1}{2}$	1	$4\frac{1}{2}$	4	$3\frac{3}{8}$	$4\frac{1}{2}$	134,250

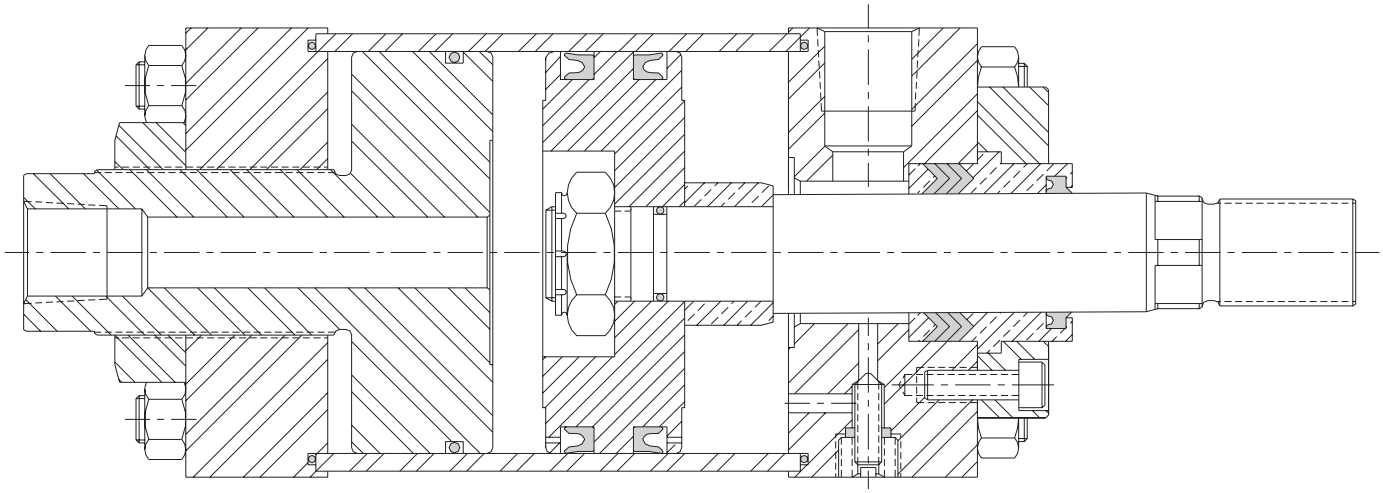
Self aligning rod end couplers are suitable for use with cylinders having fixed mounting styles only. Rod end styles 2 and 5 having shouldered male threads are recommended when using an alignment coupler. When used with non-shouldered style rod ends (styles 1 or 8), jam nut should be used to lock the coupler in position. Maximum pull force values given allow a 4 to 1 safety factor.

ADJUSTABLE STROKE MODEL SERIES "AJ" AIR CYLINDER

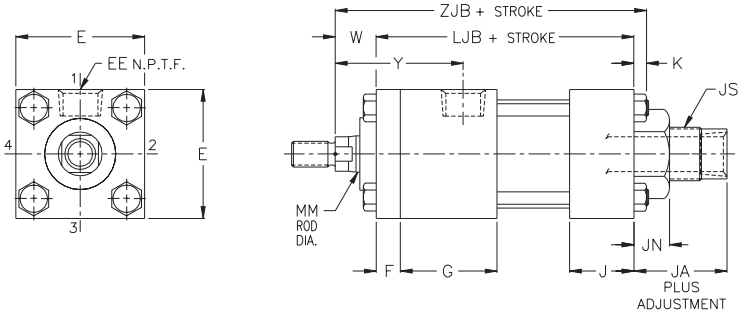
Series "AJ" models are Series "A" air cylinders modified to include an externally adjustable screw component that allows the stroke length to be changed by altering the retracted position of the piston rod.
Wrench flats are provided to aid in making screw adjustments and a lock nut is included to secure position settings.
The blind end port passes through the center of the adjusting screw to conserve air by limiting usage to that volume necessary for operation of the effective stroke.

CUSHION OPTIONS

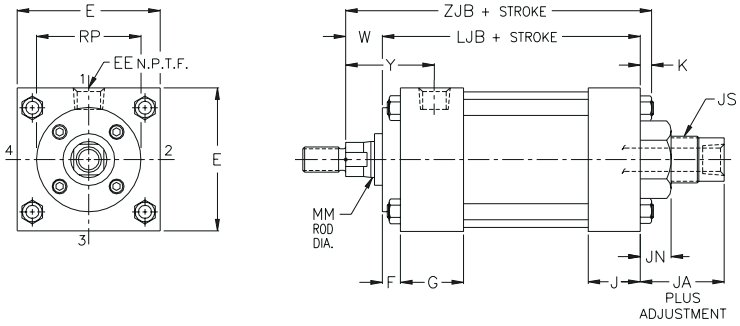
Series "AJ" cylinders are available as non-cushioned or with a rod end cushion only as standard order options.
A non-adjustable blind end cushion may be ordered on a special basis if so desired.
Internal construction modifications are necessary to provide this feature, the cost of which exceeds that of the normal cushion adder. Price information for this special construction option is available upon request.



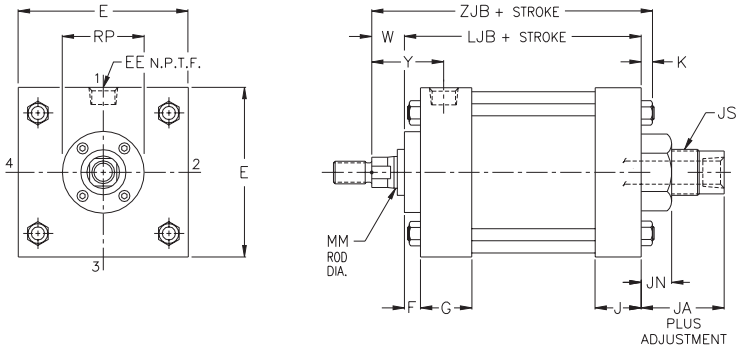
1 1/2 THRU 2 1/2 BORE



3 1/4 THRU 6 BORE



8 THRU 14 BORE



AVAILABLE MOUNTING STYLES

Series "AJ" cylinders are available in the following mounting styles: A, K, C, P, E, F, N, L (type MX3 only), and G.
Refer to Series "A" section for applicable mounting dimensions.
While Series "AJ" and "A" cylinders share common dimensions, the stroke adjusting feature adds length to the body of these cylinders. This added length affects those models which utilize the rear head for mounting purposes. The difference between letter dimensions "LJB" (Ser. "AJ") and "LB" (Ser. "A") is the amount that must be added to mounting dimensions that are measured between points on both ends of Models A, K, F, and G.

ENVELOPE DIMENSIONS

LETTER DIM.	CYLINDER BORE					
	1 1/2	2	2 1/2	3 1/4	4	5
E	2	2 1/2	3	3 3/4	4 1/2	5 1/2
EE	3/8	3/8	3/8	1/2	1/2	1/2
F	3/8	3/8	3/8	5/8	5/8	5/8
G	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4
J	1	1	1	1 1/4	1 1/4	1 1/4
K	1/4	5/16	5/16	3/8	3/8	7/16
JA	1 1/2	1 1/2	2	2 1/2	2 1/2	2 1/2
JN	5/8	3/4	7/8	1	1	1 1/8
JS	1-8	1 1/4-7	1 1/2-6	1 3/4-5	1 3/4-5	2-4 1/2
LJB	5 1/8	5 1/8	5 3/8	6 1/8	6 1/8	6 5/8

LETTER DIM.	CYLINDER BORE				
	6	8	10	12	14
E	6 1/2	8 1/2	10 5/8	12 3/4	14 3/4
EE	3/4	3/4	1	1	1 1/4
F	3/4	3/4	3/4	3/4	3/4
G	2	2	2 1/4	2 1/4	2 3/4
J	1 1/2	1 1/2	2	2	2 1/4
K	7/16	9/16	11/16	11/16	3/4
JA	2 3/4	3	3 1/8	3 1/8	3 1/4
JN	1 1/4	1 1/2	1 5/8	1 5/8	1 3/4
JS	2 1/4-4 1/2	2 1/2-4	2 3/4-4	2 3/4-4	3-4
LJB	7 1/4	7 1/2	9 1/4	10 1/4	12

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	ZJB	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 31/32	6	––
	*1	1/2	1	2 1/8	2 11/32	6 3/8	––
2	5/8	1/4	5/8	1 3/8	1 31/32	6 1/16	––
	1	1/2	1	2 1/8	2 11/32	6 7/16	––
	*1 3/8	5/8	1 1/4	2 7/8	2 19/32	6 11/16	––
2 1/2	5/8	1/4	5/8	1 3/8	1 31/32	6 5/16	––
	1	1/2	1	2 1/8	2 11/32	6 11/16	––
	1 3/8	5/8	1 1/4	2 7/8	2 19/32	6 15/16	––
	*1 3/4	3/4	1 1/2	3 1/2	2 27/32	7 3/16	––
3 1/4	1	1/4	3/4	1 7/8	2 7/16	7 1/4	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	7 1/2	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	7 3/4	□
	2	1/2	1 3/8	3 5/8	3 1/16	7 7/8	□
4	1	1/4	3/4	1 7/8	2 7/16	7 1/4	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	7 1/2	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	7 3/4	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	7 7/8	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	8 1/8	□
5	1	1/4	3/4	1 7/8	2 7/16	7 13/16	3 1/4
	1 3/8	3/8	1	2 5/8	2 11/16	8 1/16	3 1/4
	1 3/4	1/2	1 1/4	3 1/4	2 15/16	8 5/16	3 3/4
	2	1/2	1 3/8	3 5/8	3 1/16	8 7/16	4
	2 1/2	5/8	1 5/8	4 5/8	3 5/16	8 11/16	4 1/2
	3	5/8	1 5/8	5 1/8	3 5/16	8 11/16	□
	3 1/2	5/8	1 5/8	5 1/8	3 5/16	8 11/16	□
6	1 3/8	1/4	7/8	2 1/2	2 13/16	8 9/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	8 13/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	8 15/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	9 3/16	4 1/2
	3	1/2	1 1/2	5	3 7/16	9 3/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	9 3/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	9 3/16	□
8	1 3/8	1/4	7/8	2 1/2	2 13/16	8 15/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3 1/16	9 3/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	9 5/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	9 9/16	4 1/2
	3	1/2	1 1/2	5	3 7/16	9 9/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 7/16	9 9/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 7/16	9 9/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 7/16	9 9/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 7/16	9 9/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 7/16	9 9/16	7 SQ
10	1 3/4	3/8	1 1/8	3 1/8	3 1/8	11 1/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 1/4	11 3/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	11 7/16	4 1/2
	3	1/2	1 1/2	5	3 1/2	11 7/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	11 7/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	11 7/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	11 7/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	11 7/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	11 7/16	8 3/8
12	2	3/8	1 1/4	3 1/2	3 1/4	12 3/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 1/2	12 7/16	4 1/2
	3	1/2	1 1/2	5	3 1/2	12 7/16	5 1/2
	3 1/2	1/2	1 1/2	5	3 1/2	12 7/16	5 7/8
	4	1/2	1 1/2	5 1/2	3 1/2	12 7/16	6 7/16
	4 1/2	1/2	1 1/2	6	3 1/2	12 7/16	7 1/8
	5	1/2	1 1/2	6 1/2	3 1/2	12 7/16	7 9/16
	5 1/2	1/2	1 1/2	7	3 1/2	12 7/16	8 3/8
14	2 1/2	1/2	1 1/2	4 1/2	3 13/16	14 1/4	4 1/2
	3	1/2	1 1/2	5	3 13/16	14 1/4	5 1/2
	3 1/2	1/2	1 1/2	5	3 13/16	14 1/4	5 7/8
	4	1/2	1 1/2	5 1/2	3 13/16	14 1/4	6 7/16
	4 1/2	1/2	1 1/2	6	3 13/16	14 1/4	7 1/8
	5	1/2	1 1/2	6 1/2	3 13/16	14 1/4	7 9/16
	5 1/2	1/2	1 1/2	7	3 13/16	14 1/4	8 3/8

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2	2 1/2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	1 7/8-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12	2 1/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12	2 1/2-12
A	3/4	1 1/8	1 5/8	2	2 1/4	3
B	1.124	1.499	1.999	2.374	2.624	3.124
C	3/8	1/2	5/8	3/4	7/8	1
D	1/2	7/8	1 3/16	1 17/32	1 3/4	2 1/8
NA	9/16	15/16	1 5/16	1 23/32	1 15/16	2 7/16

LETTER DIM.	3	3 1/2	4	4 1/2	5	5 1/2
KK	2 1/4-12	2 1/2-12	3-12	3 1/4-12	3 1/2-12	4-12
CC	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	3-12	3 1/2-12	4-12	4 1/2-12	5-12	5 1/2-12
A	3 1/2	3 1/2	4	4 1/2	5	5 1/2
B	3.749	4.249	4.749	5.249	5.749	6.249
C	1	1	1	1	1	1
D	2 5/8	3	3 1/2	3 7/8	4 1/4	4 5/8
NA	2 15/16	3 7/16	3 15/16	4 7/16	4 15/16	5 7/16

CYLINDER MODEL NUMBER INFORMATION

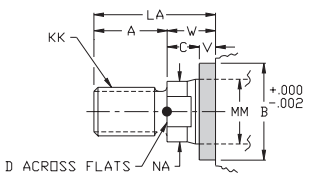
Series "AJ" model number development is similar to that required for Series "A" air cylinders as described on page 14 with the following differences:
Substitute "AJ" for "A" as the "Series" designation.
Standard cushion code options are restricted to either type "O" or "2".
Indicate length of stroke adjustment with a callout of desired amount.

Example: AJ - 3 1/4CO2 - 10 - 1 3/8 - P1
4" of stroke adjustment

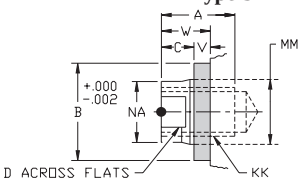
***Cushion at rod end is non-adjustable in these size combinations.**
□ Circular retainer not used in these size combinations. Plate furnished is "E" square.

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

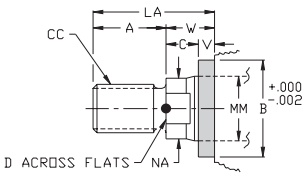


STYLE 4: Short Female Thread NFPA Type SF

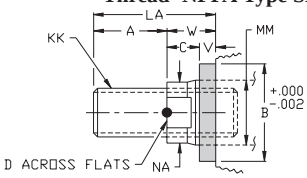


OPTIONAL ROD END STYLES

STYLE 5: Intermediate Male Thread -NFPA Type IM

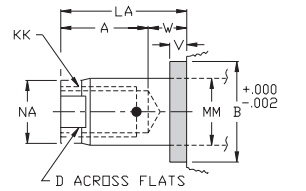


STYLE 5: Studded Small Male Thread -NFPA Type SM

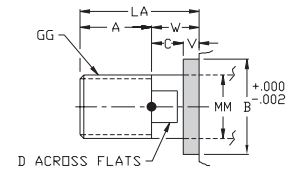


Male #5 additional cost

STYLE 3: Long Female Thread

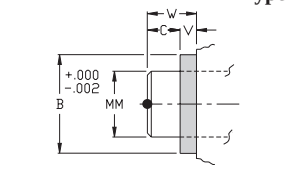


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

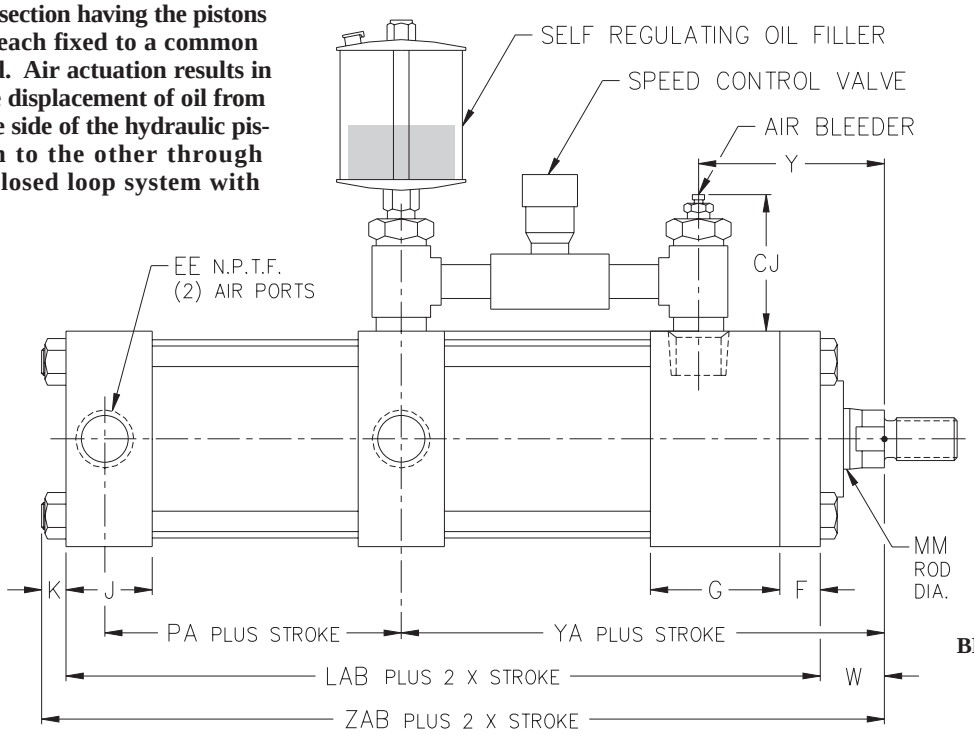
"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

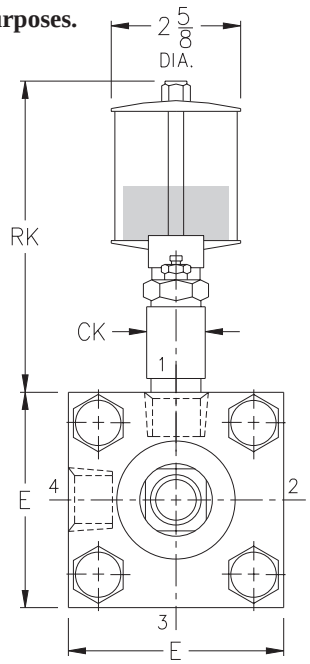
SERIES "AD" AIRDRAULIC CYLINDERS ENVELOPE DIMENSIONS

Series "AD" Airdraulic cylinders cycle with the smooth, uniform motion characteristic of hydraulic actuation while using air pressure to supply the power for operation.

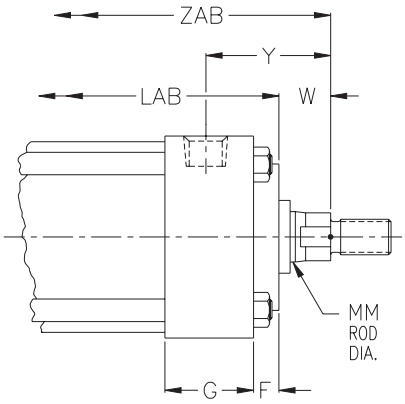
This unique cylinder adaptation consists of a double acting air cylinder coupled in tandem with a self contained hydraulic section having the pistons of each fixed to a common rod. Air actuation results in the displacement of oil from one side of the hydraulic piston to the other through a closed loop system with the maximum travel speed of the unit being a function of the fluid rate of flow.

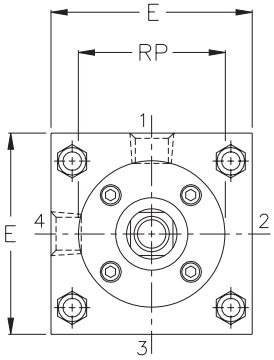
Available valving options allow precise regulation of the travel speed in either one or both directions as desired to suit application purposes.



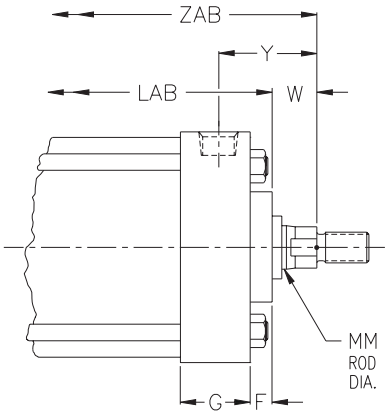


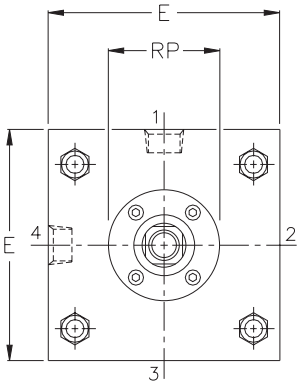
BEARING RETAINER CONSTRUTION
1 1/2 THRU 2 1/2 BORE





BEARING RETAINER CONSTRTION
3 1/4 THRU 6 BORE





BEARING RETAINER CONSTRUTION
8 THRU 14 BORE

ENVELOPE DIMENSIONS

CYL. BORE	E	EE	F	G	J	K
1 1/2	2	1/4	3/8	1 1/2	1	1/4
2	2 1/2	1/4	3/8	1 1/2	1	5/16
2 1/2	3	1/4	3/8	1 1/2	1	5/16
3 1/4	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8
4	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8
5	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16
6	6 1/2	3/4	3/4	2	1 1/2	7/16
8	8 1/2	3/4	3/4	2	1 1/2	9/16
10	10 5/8	1	3/4	2 1/4	2	11/16
12	12 3/4	1	3/4	2 1/4	2	11/16
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4

CYL. BORE	CJ	CK	RK	PA	LAB
1 1/2	2 1/2	7/8	5 7/8	2 5/16	6 3/8
2	2 1/2	7/8	5 7/8	2 5/16	6 3/8
2 1/2	2 1/2	7/8	5 7/8	2 7/16	6 5/8
3 1/4	3 3/16	1 1/4	6 9/16	2 13/16	7 7/8
4	3 3/16	1 1/4	6 9/16	2 13/16	7 7/8
5	3 3/16	1 1/4	6 9/16	3 1/16	8 3/8
6	3 11/16	1 1/2	7 1/16	3 3/16	9
8	3 11/16	1 1/2	7 1/16	3 5/16	9 1/4
10	4 7/16	1 7/8	7 13/16	4 1/8	11 1/4
12	4 7/16	1 7/8	7 13/16	4 5/8	12 1/4
14	5	2 1/4	8 3/8	5 7/16	14 1/4

ROD SELECTION/VARIABLE DIMENSIONS

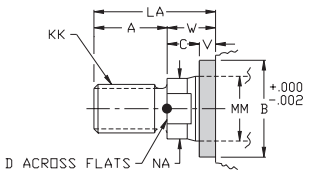
BORE	Rod Dia. MM	V	W	LA	Y	YA	ZAB	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 31/32	4 1/4	7 1/4	––
2	5/8	1/4	5/8	1 3/8	1 31/32	4 1/4	7 5/16	––
2 1/2	5/8	1/4	5/8	1 3/8	1 31/32	4 3/8	7 9/16	––
	1	1/2	1	2 1/8	2 11/32	4 3/4	7 15/16	––
3 1/4	1	1/4	3/4	1 7/8	2 3/8	5 1/4	9	3 1/4
	1 3/8	3/8	1	2 5/8	2 5/8	5 1/2	9 1/4	3 1/4
4	1	1/4	3/4	1 7/8	2 3/8	5 1/4	9	3 1/4
	1 3/8	3/8	1	2 5/8	2 5/8	5 1/2	9 1/4	3 1/4
5	1	1/4	3/4	1 7/8	2 3/8	5 1/2	9 9/16	3 1/4
	1 3/8	3/8	1	2 5/8	2 5/8	5 3/4	9 13/16	3 1/4
6	1 3/8	1/4	7/8	2 1/2	2 3/4	6	10 5/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3	6 1/4	10 9/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 1/8	6 3/8	10 11/16	4
8	1 3/8	1/4	7/8	2 1/2	2 3/4	6 1/8	10 11/16	3 1/4
	1 3/4	3/8	1 1/8	3 1/8	3	6 3/8	10 15/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 1/8	6 1/2	11 1/16	4
10	1 3/4	3/8	1 1/8	3 1/8	3 1/16	7 1/4	13 1/16	3 3/4
	2	3/8	1 1/4	3 1/2	3 3/16	7 3/8	13 3/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	7 5/8	13 7/16	4 1/2
12	2	3/8	1 1/4	3 1/2	3 3/16	7 7/8	14 3/16	4
	2 1/2	1/2	1 1/2	4 1/2	3 7/16	8 1/8	14 7/16	4 1/2
	3	1/2	1 1/2	5	3 7/16	8 1/8	14 7/16	5 1/2
14	2 1/2	1/2	1 1/2	4 1/2	3 13/16	9 1/4	16 1/2	4 1/2
	3	1/2	1 1/2	5	3 13/16	9 1/4	16 1/2	5 1/2

MOUNTING DIMENSIONS (SEE NOTE BELOW)

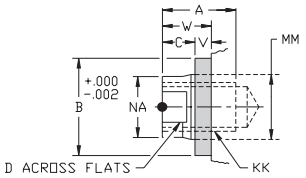
MODEL A, K		B, BX	BR	D, R	F	MODEL G		J	W
XS	SS	XC	XD	XF/XK	XJ	XT	SN	SE	SA
1 3/8	5 1/4	7 3/4	8 1/8	7	6 1/2	1 15/16	4 5/8	7 7/8	8 3/8
1 3/8	5 1/4	7 3/4	8 1/8	7	6 1/2	1 15/16	4 5/8	8 1/4	8 3/8
1 3/8	5 1/2	8	8 3/8	7 1/4	6 3/4	1 15/16	4 7/8	8 3/4	8 5/8
1 3/4	5 1/2	8 3/8	8 3/4	7 5/8	7 1/8	2 5/16	4 7/8	8 3/4	8 5/8
1 7/8	6 1/4	9 7/8	10 1/2	8 5/8	8	2 7/16	5 5/8	9 5/8	10 3/8
2 1/8	6 1/4	10 1/8	10 3/4	8 7/8	8 1/4	2 11/16	5 5/8	9 5/8	10 3/8
1 7/8	6 1/4	9 7/8	10 1/2	8 5/8	8	2 7/16	5 5/8	9 7/8	10 3/8
2 1/8	6 1/4	10 1/8	10 3/4	8 7/8	8 1/4	2 11/16	5 5/8	9 7/8	10 3/8
2 1/16	6 3/8	10 3/8	11	9 1/8	8 1/2	2 7/16	6 1/8	10 1/2	11 1/8
2 5/16	6 3/8	10 5/8	11 1/4	9 3/8	8 3/4	2 11/16	6 1/8	10 1/2	11 1/8
2 5/16	6 7/8	11 3/8	12 1/8	9 7/8	9 1/8	2 13/16	6 3/8	11	11 3/4
2 9/16	6 7/8	11 5/8	12 3/8	10 1/8	9 3/8	3 1/16	6 3/8	11	11 3/4
2 11/16	6 7/8	11 3/4	12 1/2	10 1/4	9 1/2	3 3/16	6 3/8	11	11 3/4
2 5/16	7 1/8	11 5/8	12 3/8	10 1/8	9 3/8	2 13/16	6 5/8	10 3/4	12 1/8
2 9/16	7 1/8	11 7/8	12 5/8	10 3/8	9 5/8	3 1/16	6 5/8	10 3/4	12 1/8
2 11/16	7 1/8	12	12 3/4	10 1/2	9 3/4	3 3/16	6 5/8	10 3/4	12 1/8
2 3/4	8 3/4	14 1/2	––	12 3/8	11 3/8	3 1/8	8 1/4	13 1/8	––
2 7/8	8 3/4	14 5/8	––	12 1/2	11 1/2	3 1/4	8 1/4	13 1/8	––
3 1/8	8 3/4	14 7/8	––	12 3/4	11 3/4	3 1/2	8 1/4	13 1/8	––
2 7/8	9 3/4	15 3/4	––	13 1/2	12 1/2	3 1/4	9 1/4	14 1/8	––
3 1/8	9 3/4	16	––	13 3/4	12 3/4	3 1/2	9 1/4	14 1/8	––
3 1/8	9 3/4	16	––	13 3/4	12 3/4	3 1/2	9 1/4	14 1/8	––
3 3/8	11 1/4	18 1/4	––	15 3/4	14 5/8	3 13/16	10 7/8	16 1/2	––
3 3/8	11 1/4	18 1/4	––	15 3/4	14 5/8	3 13/16	10 7/8	16 1/2	––
	3 1/2	1/2	1 1/2	5	3 13/16	9 1/4	16 1/2	5 7/8	3 3/8

STANDARD ROD END STYLES

STYLE 2: Small Male Thread NFPA Type SM

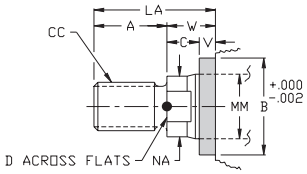


STYLE 4: Short Female Thread NFPA Type SF

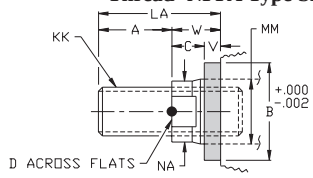


OPTIONAL ROD END STYLES

STYLE 8: Intermediate Male Thread - NFPA Type IM

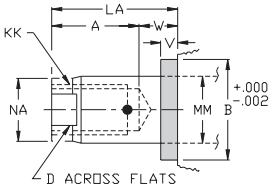


STYLE 5: Studded Small Male Thread - NFPA Type SM

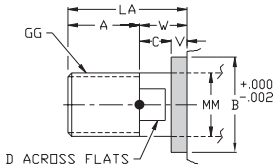


Male #5 additional cost

STYLE 3: Long Female Thread

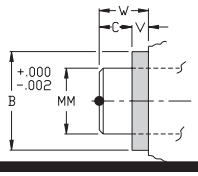


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

Airdraulic models are available in the same mounting styles as Series "A" air cylinders.
While constructed as tandem units, Airdraulic cylinders use many standard Series "A" and "LH" component parts including those which establish basic mounting dimensions.
To determine mounting dimensions of Airdraulic models, refer to selected mounting style in Series "A" section and substitute the letter dimensions noted above where applicable.
Dimensions other than those indicated are the same for both Series "A" and "AD" models.

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4
KK	7/16-20	3/4-16	1-14	1 1/4-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12
A	3/4	1 1/8	1 5/8	2
B	1.124	1.499	1.999	2.374
C	3/8	1/2	5/8	3/4
D	1/2	7/8	1 3/16	1 17/32
NA	9/16	15/16	1 5/16	1 23/32

LETTER DIM.	2	2 1/2	3	3 1/2
KK	1 1/2-12	1 7/8-12	2 1/4-12	2 1/2-12
CC	1 3/4-12	2 1/4-12	2 3/4-12	3 1/4-12
GG	2-12	2 1/2-12	3-12	3 1/2-12
A	2 1/4	3	3 1/2	3 1/2
B	2.624	3.124	3.749	4.249
C	7/8	1	1	1
D	1 3/4	2 1/8	2 5/8	3
NA	1 15/16	2 7/16	2 15/16	3 7/16

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assembly. Rod ends of this type are recommended for use when design permits.

Control Valve Options

Series "AD" Airdraulic cylinders offer control valve options that allow uniform regulation of the travel speed as desired to suit application purposes.
Available valve options are:

TYPE #1 VALVING

A needle type control valve permits variable but equal speed in both "extend" and "retract" stroke directions.

TYPE #2 VALVING

A single flow control valve allows variable speed control in one direction with an open, free flow return. Control valve may be installed to regulate speed in either "extend" or "retract" direction. When this valve style is desired, the direction of stroke travel to be controlled must be specified.

TYPE #3 VALVING

A double flow control valve allows independent regulation of travel speed in both "forward" and "retract" stroke directions.

STANDARD CONTROL VALVE SIZE DATA				
CYL. BORE	1 1/2-2 1/2	3 1/4-5	6-8	10-14
Valve Size (NPT)	1/4"	1/2"	3/4"	1"
Max Flow (GPM)	6	12	27	40

Ordering Information

A model numbering system that consists of letter and number codes to designate specific cylinder size and construction details is explained below.

Sample Model Number

AD-3 1/4 A2-10-1-TYPE #3 VALVING

SERIES
CYLINDER BORE SIZE
MOUNTING STYLE CODE
ROD END STYLE NUMBER
STROKE LENGTH
PISTON ROD DIAMETER
CONTROL VALVE STYLE

Standard models are supplied with oil ports and related control components at position #1, and air section ports at position #4. Alternate port locations are available upon request.

The oil filler is normally installed to suit horizontal mounting. Adjustment of filler position to suit vertical mounting is optional, but customer must advise intended direction of cylinder rod.

Airdraulic models do not include a "cushion" feature as a standard order option. If adjustable cushions are desired, they can be provided on a special order basis at either one or both ends of all units.

Double rod end models are also available upon request.

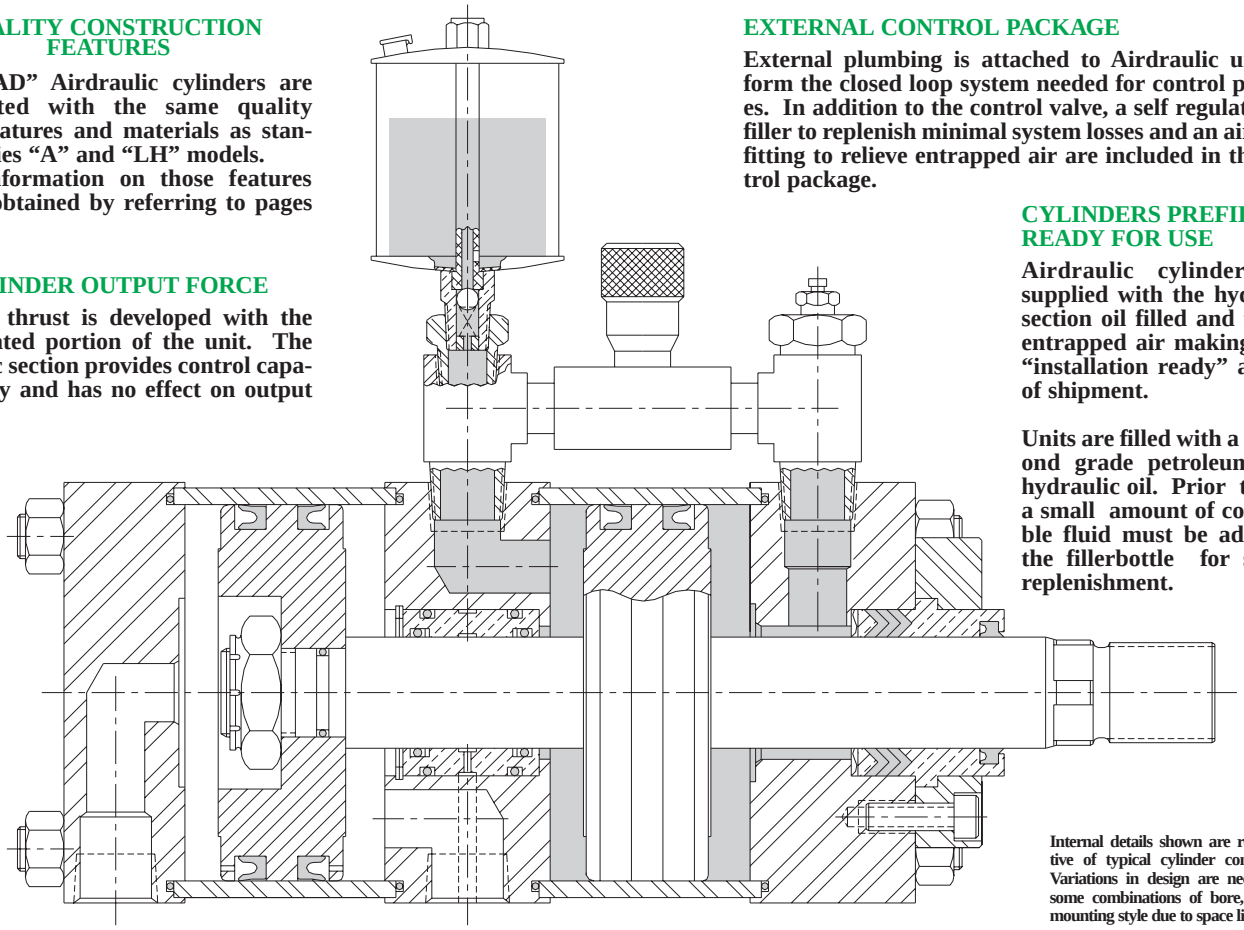
SERIES "AD" AIRDRAULIC CYLINDER - GENERAL INFORMATION

QUALITY CONSTRUCTION FEATURES

Series "AD" Airdraulic cylinders are constructed with the same quality design features and materials as standard Series "A" and "LH" models. Detail information on those features may be obtained by referring to pages

CYLINDER OUTPUT FORCE

Cylinder thrust is developed with the air operated portion of the unit. The hydraulic section provides control capability only and has no effect on output force.



EXTERNAL CONTROL PACKAGE

External plumbing is attached to Airdraulic units to form the closed loop system needed for control purposes. In addition to the control valve, a self regulating oil filler to replenish minimal system losses and an air bleed fitting to relieve entrapped air are included in the control package.

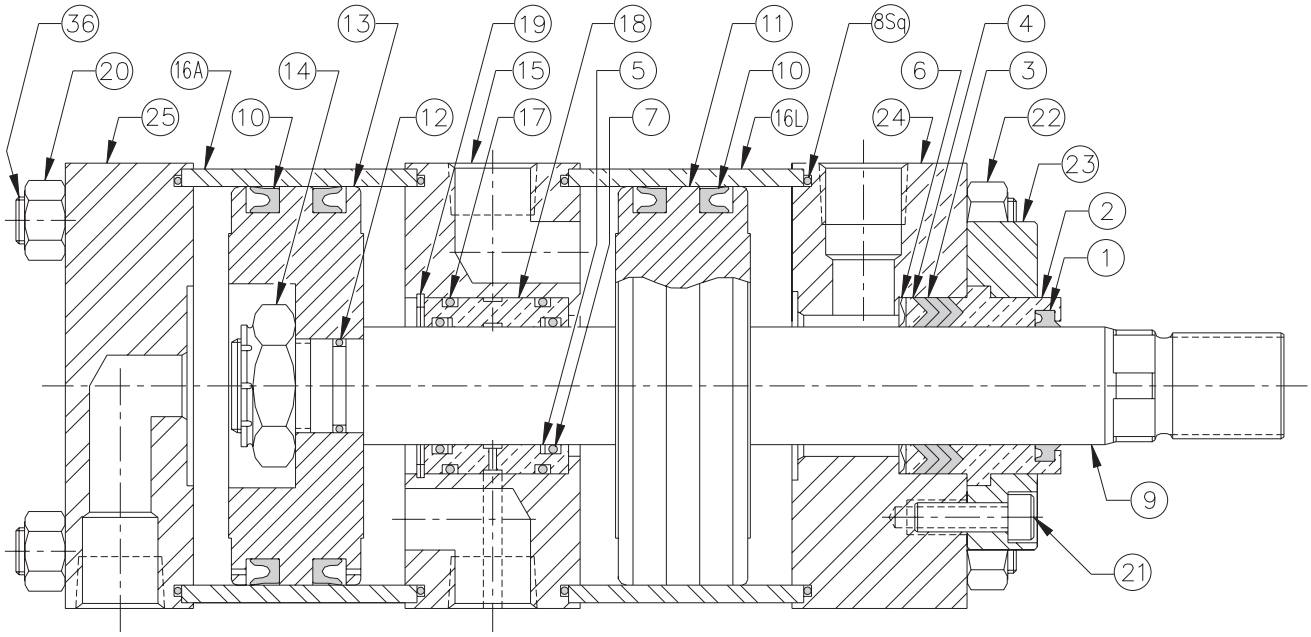
CYLINDERS PREFILLED, READY FOR USE

Airdraulic cylinders are supplied with the hydraulic section oil filled and free of entrapped air making them "installation ready" at time of shipment.

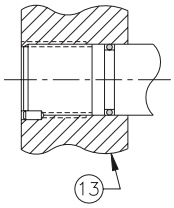
Units are filled with a 32 second grade petroleum base hydraulic oil. Prior to use, a small amount of compatible fluid must be added to the fillerbottle for system replenishment.

Internal details shown are representative of typical cylinder construction. Variations in design are necessary in some combinations of bore, rod, and mounting style due to space limitations.

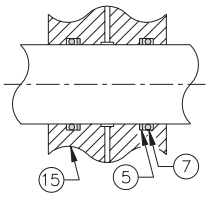
PART IDENTIFICATION NUMBERS FOR SERIES "AD" AIRDRAULIC CYLINDERS



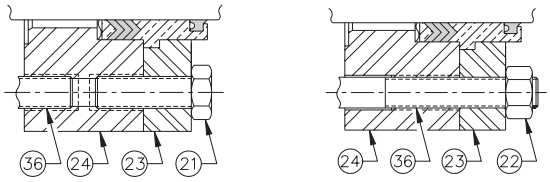
ALTERNATE PISTON CONSTRUCTION
Construction method used to secure piston is determined by space available with bore and rod size combination.



ALTERNATE CENTER HEAD
Used when clearance does not permit use of Item 18, Center Bearing.



ALTERNATE BEARING RETAINER STYLES
Type provided is determined by combination of bore, rod size, and mounting style.



BASIC PARTS LIST

ITEM NUMBER	PART NAME
1	Rod Wiper
2	Rod Bearing
3	Rod Packing Set
4	Seal Support Ring
5	Back Up Washer
6	Wave Spring
7	O-Ring - Bearing to Rod
8Sq	Tube End Seal (Air section)
8Sq	Tube End Seal (Hyd. section)
9	Piston Rod
10	Piston Packing
11	Piston - Hydraulic section
12	O-Ring - Piston to Rod
13	Piston - Air Section
14	Piston Nut
15	Center Head
16A	Cylinder Tube (Air section)
16L	Cylinder Tube (Hyd. section)
17	O-Ring - Bearing to Head
18	Center Rod Bearing
19	Retaining Ring
20	Rear Tie Rod Fastener
21	Bearing Retainer Cap Screw
22	Front Tie Rod Fastener
23	Bearing Retainer
24*	Front Head
25*	Rear Head
36	Tie Rod

(*) Model number code letter used to indicate mounting style should be included with item number to describe part.
Example: Item 24-A Front Head w/Foot Mtg.

MOUNTING COMPONENT PARTS LIST

ITEM NUMBER	MTG. STYLE	PART NAME
26	"BR"	Detachable Clevis Plate
27	"C"	Rect. Front Flange Plate
28	"P"	Square Front Flange Plate
29	"D"	Rect. Rear Flange Plate
30	"R"	Square Rear Flange Plate
31	"N"	Intermediate Trunnion Ring
32	"J"	End Lug Mounting Blocks
33	"J"	Bearing Retainer Filler Plate
34	"L"	Bearing Retainer Filler Plate
35	"W"	Angle Foot Mtg. Brackets

ORDER INFORMATION REQUIREMENTS
When ordering replacement parts, clearly specify the item number, name, and quantity of the desired component. It is essential to provide the correct model and serial number of the cylinder in which the parts will be used.
By providing both numbers, a cross check of reference data can be made to assure accurate fulfillment of order requirements.

SERVICE PARTS MAY BE ORDERED AS FOLLOWS:

SEAL KIT: Consists of item numbers 1, 3, 5, 7, 8Sq, 10, and 17.

SEAL KIT w/BEARINGS: Consists of above items with addition of part numbers 2, 4, 6 and 18 when applicable.

If cylinder is constructed with alternate center head design, Item 18 is deleted. Item 15, Center Head is not provided unless specifically ordered.

CARTRIDGE ASSEMBLY: Consists of item numbers 1, 2, 3, 4 and 6.

PISTON AND ROD ASSEMBLY: Consists of item numbers 9, 10, 11, 12, 13, 14.

NOTE: Ordered parts will be supplied to suit construction details indicated by record data of original serial number.

LYNAIR, INC.
3515 Scheele Drive P.O. Box 720
Jackson, Michigan 49204
Phone (517)787-2240 FAX (517)787-4521

AIR TO AIR BOOSTER

The Lynair Automatic Airline Booster Pump was designed to boost airline pressure automatically in surge tanks or die cushions, or for any high pressure application, such as testing, where small quantities of high pressure air are needed.

To operate this booster you simply pipe airline pressure to the master control valve, to the intake side of the booster, and run a high pressure line from the booster to your surge tank. The booster will then operate automatically to boost pressure in the die cushion or surge tank in the desired ratio. This booster is completely valved, ready to operate, with only three airline connections necessary. The booster is completely air actuated with no electrical connections necessary.

This booster can be purchased in varying ratios from 1.44 to 1 through 6.25 to 1. For example you could buy a booster to boost air pressure from 100 PSI to 144 PSI, or from 100 PSI to 625 PSI. The booster will start and stop stop automatically to keep the desired high pressure in your surge tank or die cushion.

This booster has proven itself extremely useful in testing work where commercial refrigeration units have to be tested under water at high pressure. The booster is easily moved from one location to another in your factory and is very economical to operate.

A pressure regulator, filter, and lubricator can be furnished with Lynair boosters as a service to the customer at extra cost.

The construction of the Lynair booster is the same high quality construction as our series "A" air cylinders. Detail information on construction features may be obtained by referring to pages 12 and 13.

C.F.M. CAPACITY OF BOOSTER

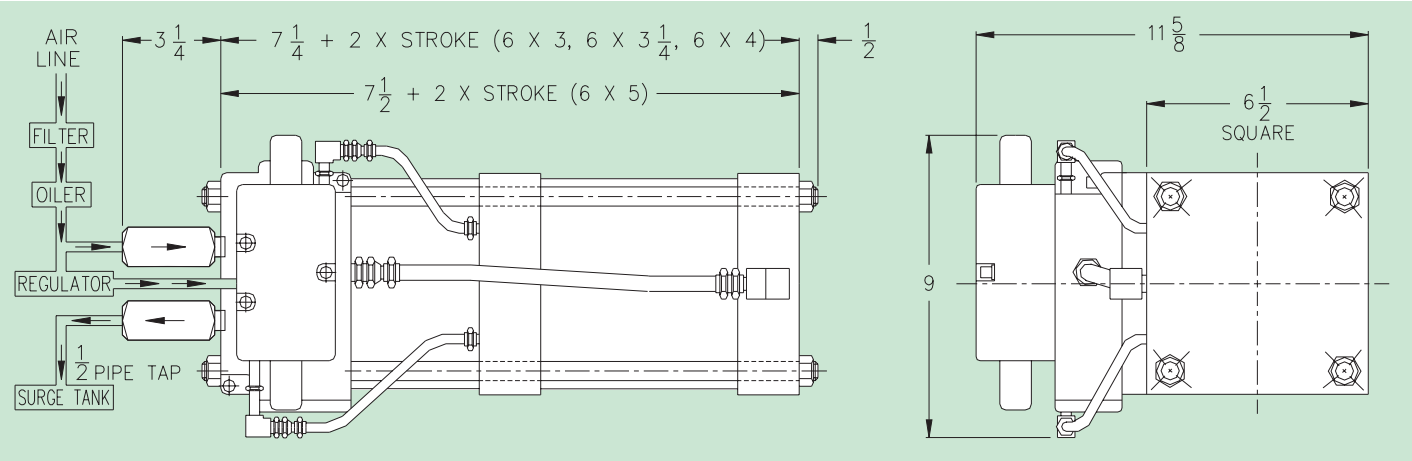
To determine the cubic feet per minute (C.F.M.) capacity of the booster, the steps below should be used;

1. **The area of the high pressure cylinder should be multiplied by the stroke of the booster. This gives you the cubic inch volume of air pumped per stroke.**

2. **This answer should be multiplied by the average number of strokes per minute that the booster cycles, which averages 25. This gives you the cubic inch volume of air pumped per minute.**

3. **Divide the cubic inch volume of air pumped per minute by the booster ratio to determine the volume of high pressure air produced. You must now convert this answer from cubic inches to cubic feet (1728 cu. in. equals 1 cu. ft.) to determine the C.F.M. capacity of the booster.**

6" BORE DRIVING CYLINDER

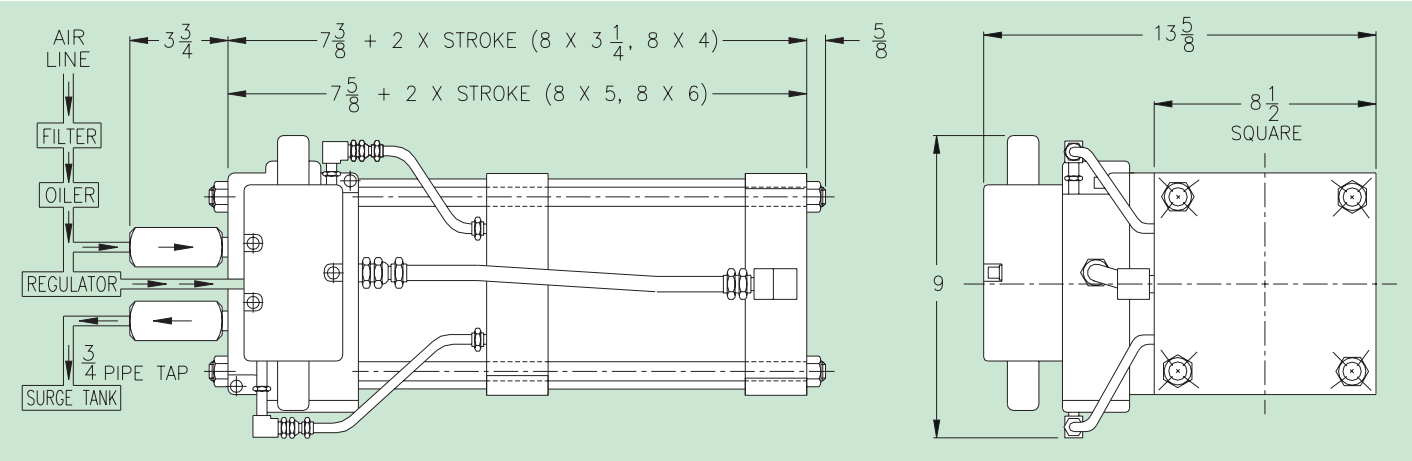


For Mounting Information refer to Series "A" section of catalog.

Mounting Styles offered:
- **Model "A" Foot Mount**
- **Model "D" Flange Mount**
- **Model "G" Side Mount**
- **Model "J" End Lug Mount**
- **Model "K" Center Line**
- **Model "L" Extended Tie Rod**

Driving Cylinder		High Pressure Cylinder		Booster Ratio	Theoretical High Pressure Output (in PSI) With Input Pressures Of		Approximate High Pressure Output Volume
Dia.	Area	Dia.	Area		80 PSI	100 PSI	Cubic Ft./Min.
6	28.274	3	7.069	4.00	320	400	.15
6	28.274	3 1/4	8.296	3.41	272	341	.21
6	28.274	4	12.566	2.25	180	225	.49
6	28.274	5	19.635	1.44	115	144	1.19

8" BORE DRIVING CYLINDER

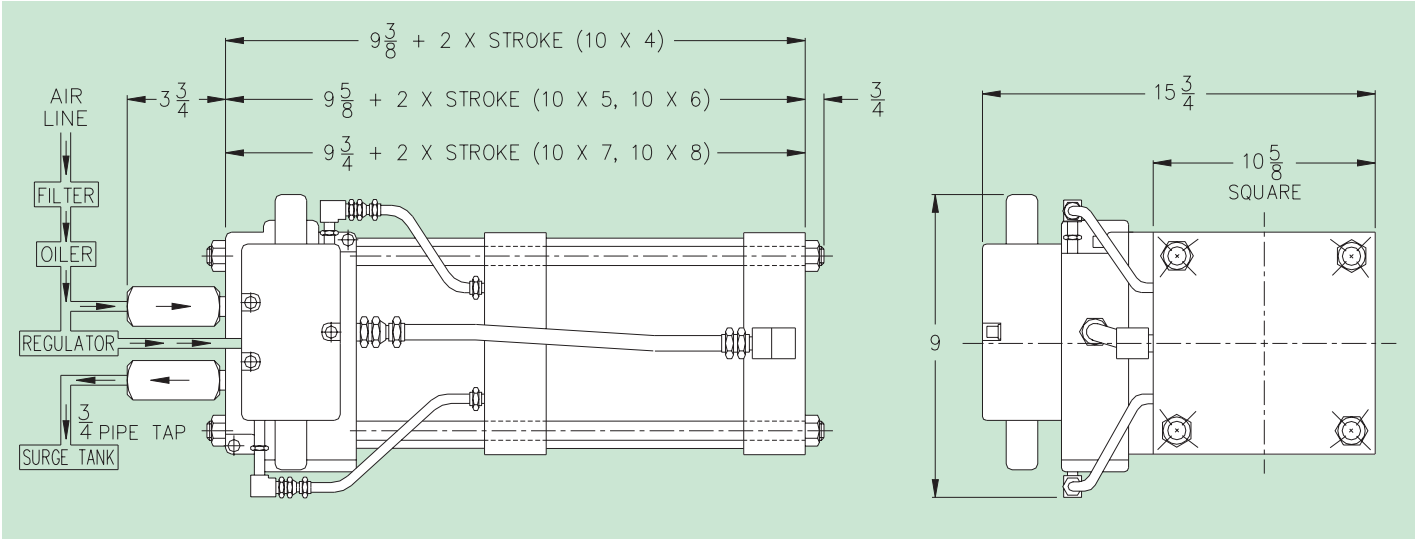


For Mounting Information refer to Series "A" section of catalog.

Mounting Styles offered:
- **Model "A" Foot Mount**
- **Model "D" Flange Mount**
- **Model "G" Side Mount**
- **Model "J" End Lug Mount**
- **Model "K" Center Line**
- **Model "L" Extended Tie Rod**

Driving Cylinder		High Pressure Cylinder		Booster Ratio	Theoretical High Pressure Output (in PSI) With Input Pressures Of		Approximate High Pressure Output Volume
Dia.	Area	Dia.	Area		80 PSI	100 PSI	Cubic Ft./Min.
8	50.265	3 1/4	8.296	6.05	484	605	.12
8	50.265	4	12.566	4.00	320	400	.27
8	50.265	5	19.635	2.56	204	256	.67
8	50.265	6	28.274	1.77	142	177	1.39

10" BORE DRIVING CYLINDER



For Mounting Information refer to Series "A" section of catalog.

Mounting Styles offered:

- **Model "A" Foot Mount**
- **Model "D" Flange Mount**
- **Model "G" Side Mount**
- **Model "J" End Lug Mount**
- **Model "K" Center Line**
- **Model "L" Extended Tie Rod**

Driving Cylinder		High Pressure Cylinder		Booster Ratio	Theoretical High Pressure Output (in PSI) With Input Pressures Of		Approximate High Pressure Output Volume
Dia.	Area	Dia.	Area		80 PSI	100 PSI	Cubic Ft./Min.
10	78.54	4	12.566	6.25	500	625	.14
10	78.54	5	19.635	4.00	320	400	.34
10	78.54	6	28.274	2.78	222	278	.70
10	78.54	7	38.485	2.04	163	204	1.31
10	78.54	8	50.265	1.56	125	156	2.24

ORDERING INFORMATION

SAMPLE MODEL NUMBER

Series	Mounting Code	Driving Cylinder Bore	High Pressure Cylinder Bore	Stroke
AB -	A	6x	4x	6

DESIGN FEATURES OF LYNAIR AIR-OIL BOOSTERS.

OUTPUT PRESSURES OVER 4500 PSI

FINISH

All LYNAIR cylinders are finish painted prior to shipment. This finish provides adequate surface protection by itself, and also forms an effective base if additional painting is desired.

250 PSI OPERATING PRESSURE

Lynair Air-Oil Boosters are rated for 250 PSI maximum operating pressure.

TIE ROD CONSTRUCTION

Tie rods eliminate axial tension loads on cylinder tubing and are preferred for severe shock loads.

CYLINDER HEADS

Machined from precision square steel

PORTS

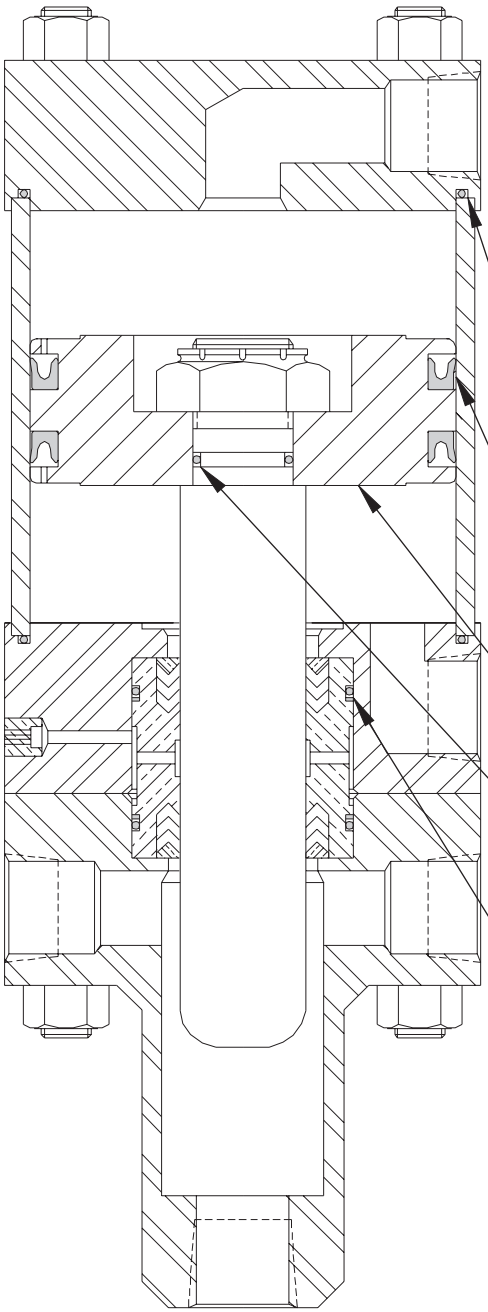
Ports are large to give maximum speed and power.

CHROME PLATED PISTON ROD

All piston rods are of high tensile turned, ground and polished shafting, hard chrome plated .001 on diameter.

CHROME PLATED HONED SEAMLESS STEEL TUBING

Tubing is cold drawn for greater strength, honed to 15-20 rms. All shells are hard chrome plated to resist wear and rusting.



BRONZE ROD BEARING

Long, accurately machined bearing centers and gives maximum side support for piston rod.

RIGIDLY LOCKED PISTON

Piston is secured with self locking nut when sizes permit. Alternate fastening methods also provide positive locking measures.

TUBE END SEAL

'O'-ring provides positive seal.

PISTON PACKING

Low friction, self compensating cup type seals provide long, trouble free service.

PISTON

One piece, high tensile cast iron piston provides maximum bearing surface.

PISTON "O"-RING

'O'-ring seals against piston and rod. This prevents bypass or creep.

BUSHING "O"RING

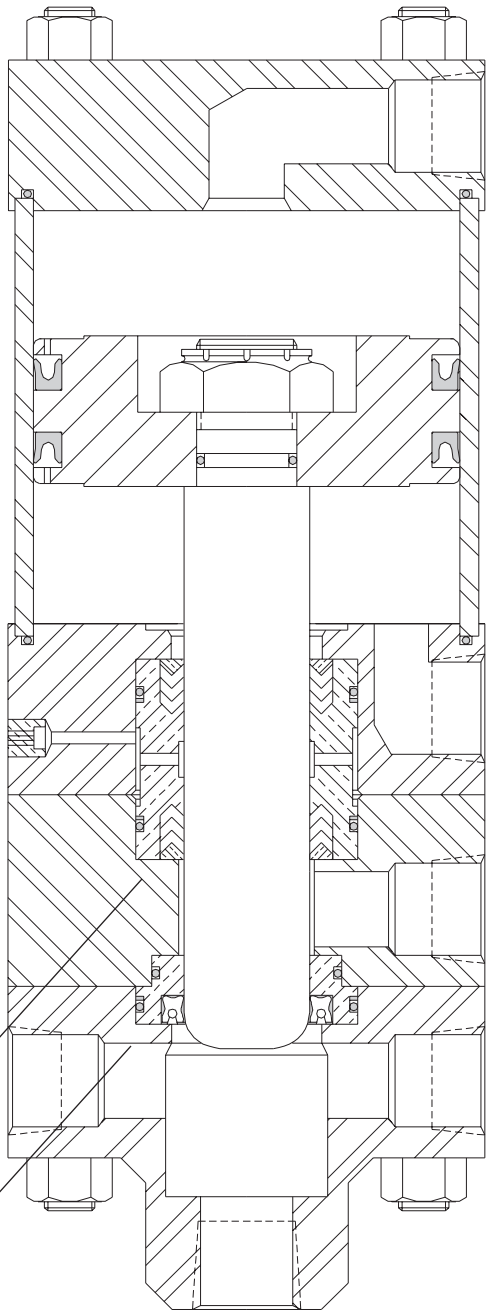
'O'-ring with backup washer provides positive

ROD PACKING

Homogeneous Vee Ring packing is nonadjustable and provides long, trouble-free service.

ROD SEAL

High pressure rod seal of polyurethane material permits leakproof operation of power stroke.

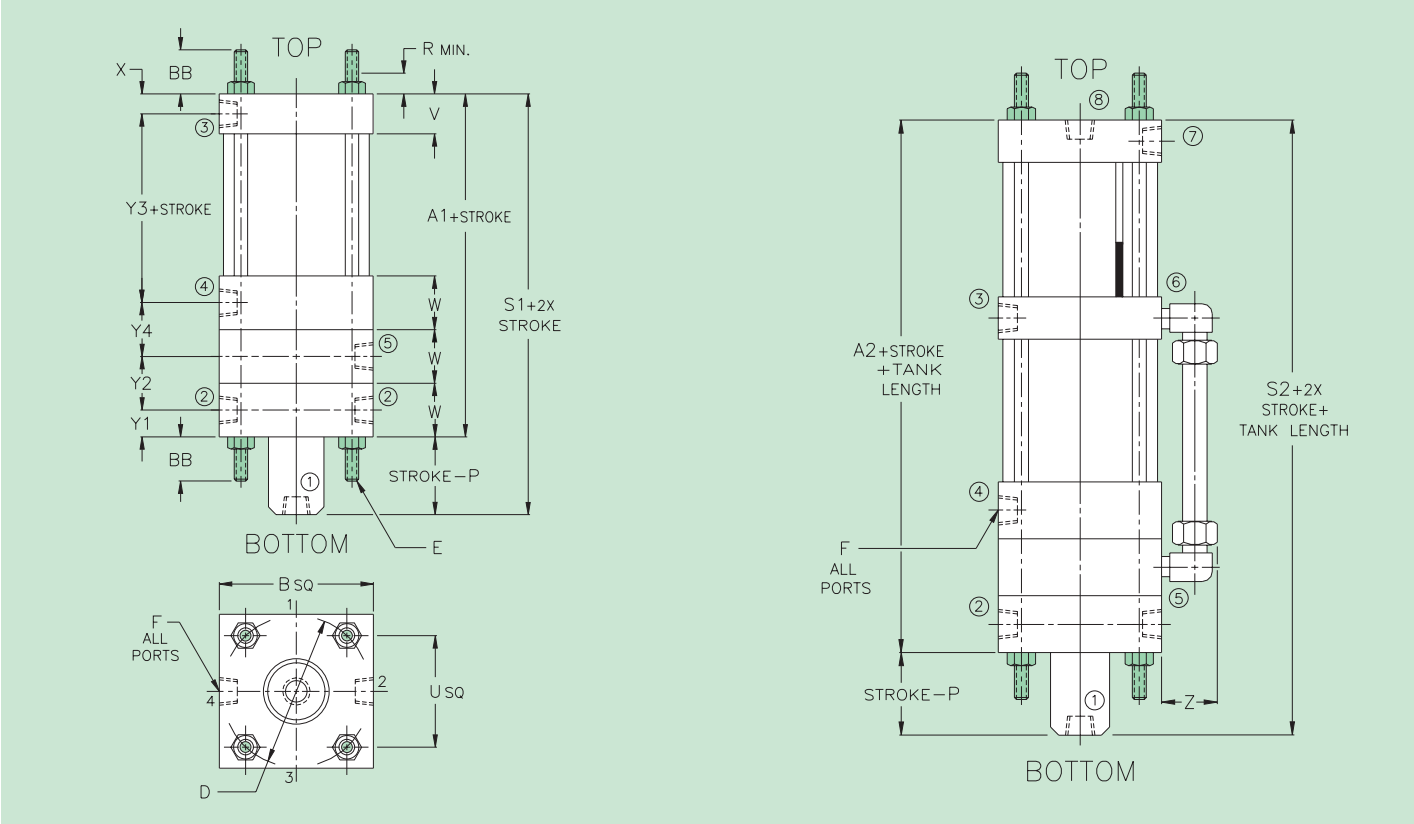


SERIES "H-BA8"
SINGLE PRESSURE

SERIES "H-B4"
DUAL PRESSURE

SERIES H-B4
EXTENDED TIE ROD MOUNT

SERIES H-B4I
(With Integral Tank)



MODEL H-B4-L

MODEL H-B4I-L

Specify if Tie Rods are to be Extended on Top, Bottom, or Both

BORE	A1	A2	B	D	E	F	P	R	S1	S2	U	V	W	X	Y1	Y2	Y3	Y4	Z	BB
3 1/4	7 3/4	10 1/4	3 3/4	3.9	3/8-24	1/2	5/8	3/8	7 1/8	9 5/8	2.76	1 1/4	1 3/4	9/16	11/16	1 3/4	2 5/8	2 1/8	1 5/8	1 3/8
4	7 3/4	10 1/4	4 1/2	4.7	3/8-24	1/2	5/8	3/8	7 1/8	9 5/8	3.32	1 1/4	1 3/4	9/16	11/16	1 3/4	2 5/8	2 1/8	1 5/8	1 3/8
5	8	10 1/2	5 1/2	5.8	1/2-20	1/2	5/8	7/16	7 3/8	9 7/8	4.10	1 1/4	1 3/4	9/16	11/16	1 3/4	2 7/8	2 1/8	1 5/8	1 13/16
6	9	12	6 1/2	6.9	1/2-20	3/4	7/8	7/16	8 1/8	11 1/8	4.88	1 1/2	2	11/16	13/16	2	3 1/8	2 3/8	1 7/8	1 13/16
7	9 1/8	12 1/8	7 1/2	8.1	5/8-18	3/4	7/8	9/16	8 1/4	11 1/4	5.70	1 1/2	2	11/16	13/16	2	3 1/4	2 3/8	1 7/8	2 5/16
8	9 1/8	12 1/8	8 1/2	9.1	5/8-18	3/4	7/8	9/16	8 1/4	11 1/4	6.44	1 1/2	2	11/16	13/16	2	3 1/4	2 3/8	1 7/8	2 5/16
10	10 7/8	14 7/8	10 5/8	11.3	3/4-16	1	1 1/8	11/16	9 3/4	13 3/4	7.99	2	2 1/4	1	1	2 1/4	4 1/8	2 1/2	2 5/16	2 11/16
12	11 3/8	15 3/8	12 3/4	13.6	3/4-16	1	1 1/8	11/16	10 1/4	14 1/4	9.62	2	2 1/4	1	1	2 1/4	4 5/8	2 1/2	2 5/16	2 11/16
14	13 5/8	18 1/8	14 3/4	16.1	7/8-14	1 1/4	1 5/8	13/16	12	16 1/2	11.38	2 1/4	2 3/4	1 1/16	1 3/16	2 3/4	5 1/2	3 1/8	2 7/8	3 3/16

Series H-B4 (without tank) Boosters may be mounted in any position
Series H-B4I (with integral tank) Boosters must be mounted vertically

PORT IDENTIFICATION

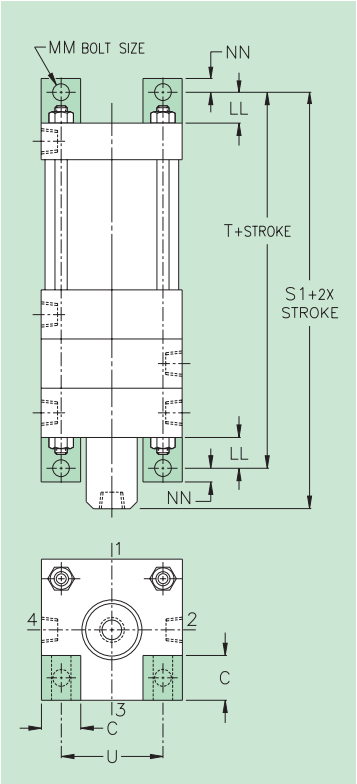
1=High Pressure Hydraulic Outlet
2=Alternate High Pressure Hydraulic Outlet
3=Booster Low Pressure Inlet ---- Ram Advance
4=Booster Low Pressure Inlet ---- Ram Return
5=Low Pressure Hydraulic Inlet ---- Supply
6=Air Oil Tank ---- Oil Outlet
7=Air Oil Tank ---- Air Inlet
8=Air Oil Tank ---- Filler Plug

TYPICAL MODEL NUMBER FOR ORDERING

H-B4 ---- A ---- 6 ---- 2 ---- 14

SERIES MOUNT BORE RAM STROKE

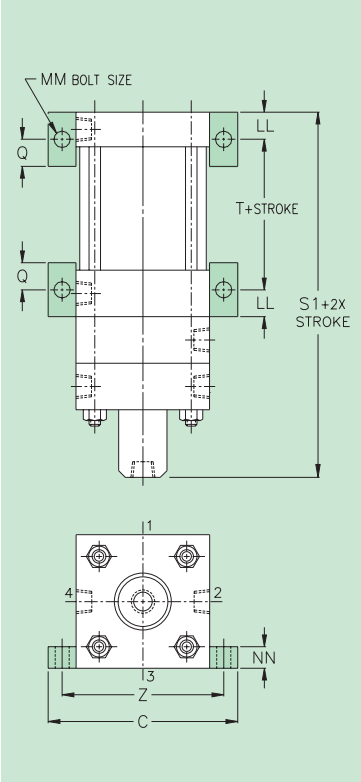
MODEL H-B4-J
END LUG MOUNT



BORE	C	S1	T	U
3 1/4	1	8	9 1/2	2.76
4	1 3/16	8 1/8	9 3/4	3.32
5	1 3/8	8 7/16	10 1/8	4.10
6	1 5/8	9 1/8	11	4.88
7	2 1/16	9 1/4	11 1/4	5.70
8	2 1/16	9 3/8	11 3/8	6.44
10	2 5/8	11 1/16	13 1/2	7.99
12	3 1/8	11 9/16	14	9.62
14	3 3/8	13 1/2	16 5/8	11.38

BORE	LL	MM	NN
3 1/4	7/8	3/8	3/8
4	1	3/8	3/8
5	1 1/16	1/2	1/2
6	1	1/2	1/2
7	1 1/8	5/8	5/8
8	1 1/8	5/8	5/8
10	1 5/16	3/4	5/8
12	1 5/16	3/4	5/8
14	1 1/2	7/8	3/4

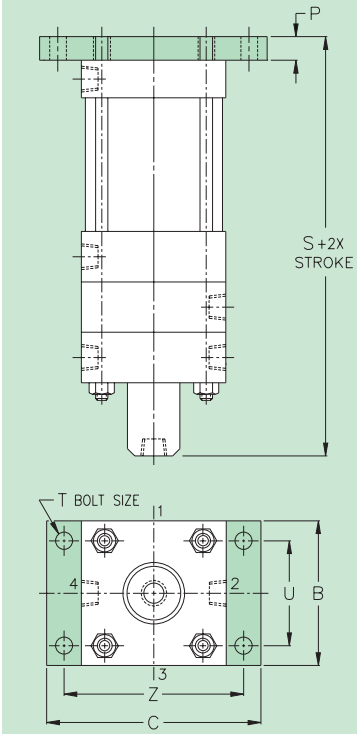
MODEL H-B4-A
FOOT MOUNT



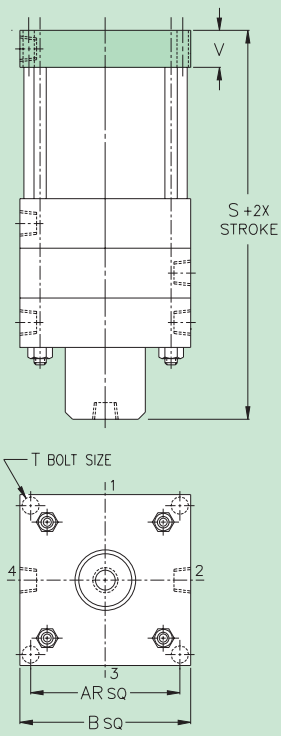
BORE	C	MM	Q	S1
3 1/4	5 3/4	1/2	1 1/4	7 1/8
4	6 1/2	1/2	1 1/4	7 1/8
5	8 1/4	3/4	1 9/16	7 3/8
6	9 1/4	3/4	1 9/16	8 1/8
7	10 1/4	3/4	1 9/16	8 1/4
8	11 1/4	3/4	1 9/16	8 1/4
10	14 1/8	1	2	9 3/4
12	16 1/4	1	2	10 1/4
14	19 1/4	1 1/4	2 1/2	12

BORE	T	Z	LL	NN
3 1/4	3 1/4	4 3/4	1/2	3/4
4	3 1/4	5 1/2	1/2	3/4
5	3 1/8	6 7/8	11/16	1
6	3 5/8	7 7/8	11/16	1
7	3 3/4	8 7/8	11/16	1
8	3 3/4	9 7/8	11/16	1
10	4 5/8	12 3/8	7/8	1 1/4
12	5 1/8	14 1/2	7/8	1 1/4
14	5 7/8	17	1 1/8	1 1/2

MODEL H-B4-D
REAR FLANGE MOUNT



BORE	B	C	P	S	T	U	V	Z	AR
3 1/4	3 3/4	5 1/2	5/8	7 3/4	3/8	2.76		4 11/16	
4	4 1/2	6 1/4	5/8	7 3/4	3/8	3.32		5 7/16	
5	5 1/2	7 5/8	5/8	8	1/2	4.10		6 5/8	
6	6 1/2	8 5/8	3/4	8 7/8	1/2	4.88		7 5/8	
7	7 1/2			8 1/4	1/2		1 1/2		6.75
8	8 1/2			8 1/4	5/8		1 1/2		7.57
10	10 5/8			9 3/4	3/4		2		9.40
12	12 3/4			10 1/4	3/4		2		11.10
14	14 3/4			12	7/8		2 1/4		12.87

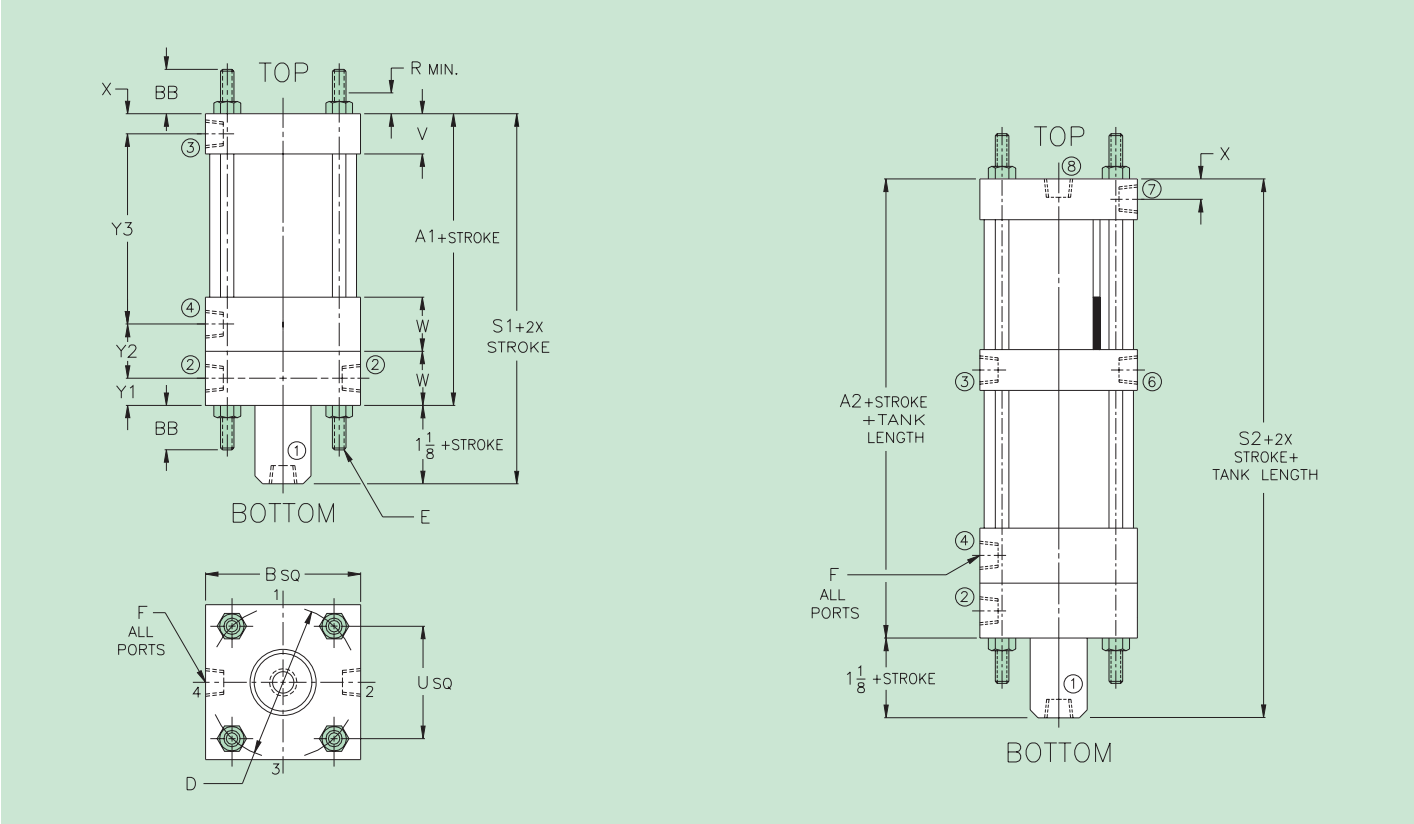


3 1/4 THRU 6 BORE

7 THRU 14 BORE

MODEL H-BA8
EXTENDED TIE ROD MOUNT

MODEL H-BA8I
(With Integral Tank)



MODEL H-BA8-L

MODEL H-BA8I-L

Specify if Tie Rods are to be Extended on Top, Bottom, or Both

BORE	A1	A2	B	D	E	F	R	S1	S2	U	V	W	X	Y1	Y2	Y3	BB
3 1/4	6	8 1/2	3 3/4	3.9	3/8-24	1/2	3/8	7 1/8	9 5/8	2.76	1 1/4	1 3/4	9/16	11/16	2 1/8	2 5/8	1 3/8
4	6	8 1/2	4 1/2	4.7	3/8-24	1/2	3/8	7 1/8	9 5/8	3.32	1 1/4	1 3/4	9/16	11/16	2 1/8	2 5/8	1 3/8
5	6 1/4	8 3/4	5 1/2	5.8	1/2-20	1/2	7/16	7 3/8	9 7/8	4.10	1 1/4	1 3/4	9/16	11/16	2 1/8	2 7/8	1 13/16
6	7	10	6 1/2	6.9	1/2-20	3/4	7/16	8 1/8	11 1/8	4.88	1 1/2	2	11/16	13/16	2 3/8	3 1/8	1 13/16
7	7 1/8	10 1/8	7 1/2	8.1	5/8-18	3/4	9/16	8 1/4	11 1/4	5.70	1 1/2	2	11/16	13/16	2 3/8	3 1/4	2 5/16
8	7 1/8	10 1/8	8 1/2	9.1	5/8-18	3/4	9/16	8 1/4	11 1/4	6.44	1 1/2	2	11/16	13/16	2 3/8	3 1/4	2 5/16
10	8 5/8	12 5/8	10 5/8	11.3	3/4-16	1	11/16	9 3/4	13 3/4	7.99	2	2 1/4	1	1	2 1/2	4 1/8	2 11/16
12	9 1/8	13 1/8	12 3/4	13.6	3/4-16	1	11/16	10 1/4	14 1/4	9.62	2	2 1/4	1	1	2 1/2	4 5/8	2 11/16
14	10 7/8	15 3/8	14 3/4	16.1	7/8-14	1 1/4	13/16	12	16 1/2	11.38	2 1/4	2 3/4	1 1/16	1 3/16	3 1/8	5 1/2	3 3/16

Series H-BA8 (without tank) Boosters may be mounted in any position.
Series H-BA8I (with integral tank) Boosters must be mounted vertically.

PORT IDENTIFICATION

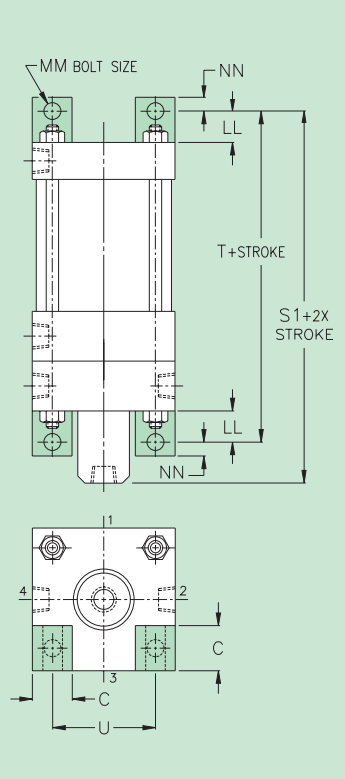
1=High Pressure Hydraulic Outlet
2=Alternate High Pressure Hydraulic Outlet
3=Booster Low Pressure Inlet ---- Ram Advance
4=Booster Low Pressure Inlet ---- Ram Return
6=Air Oil Tank ---- Oil Outlet
7=Air Oil Tank ---- Air Inlet
8=Air Oil Tank ---- Filler Plug

TYPICAL MODEL NUMBER FOR ORDERING

H-BA8 ---- A ---- 6 ---- 2 ---- 14

SERIES MOUNT BORE RAM STROKE

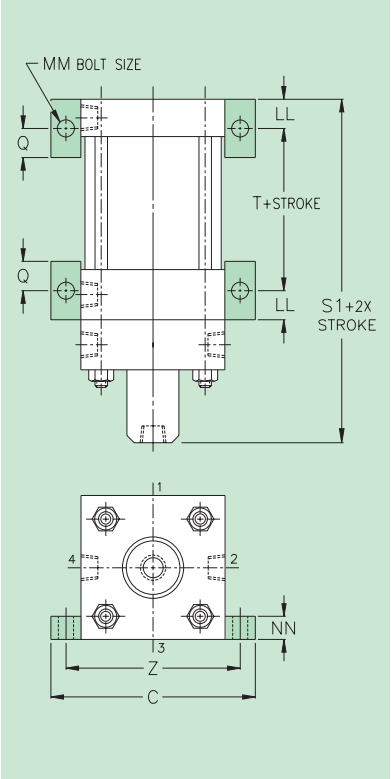
MODEL H-BA8-J
END LUG MOUNT



BORE	C	S1	T	U
3 1/4	1	8	7 3/4	2.76
4	1 3/16	8 1/8	8	3.32
5	1 3/8	8 7/16	8 3/8	4.10
6	1 5/8	9 1/8	9	4.88
7	2 1/16	9 1/4	9 1/4	5.70
8	2 1/16	9 3/8	9 3/8	6.44
10	2 5/8	11 1/16	11 1/4	7.99
12	3 1/8	11 9/16	11 3/4	9.62
14	3 3/8	13 1/2	13 7/8	

BORE	LL	MM	NN
3 1/4	7/8	3/8	3/8
4	1	3/8	3/8
5	1 1/16	1/2	1/2
6	1	1/2	1/2
7	1 1/8	5/8	5/8
8	1 1/8	5/8	5/8
10	1 5/16	3/4	5/8
12	1 5/16	3/4	5/8
14	1 1/2	7/8	3/4

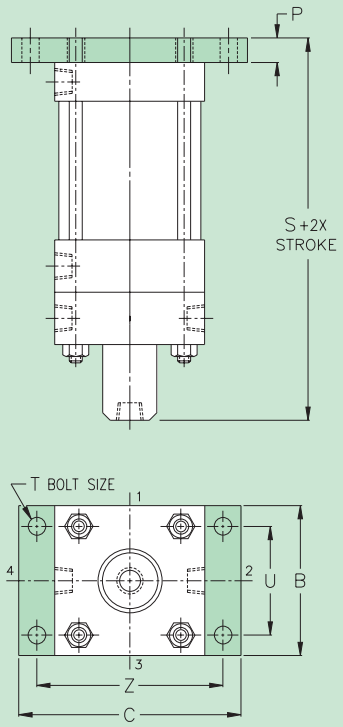
MODEL H-BA8-A
FOOT MOUNT



BORE	C	MM	Q	S1
3 1/4	5 3/4	1/2	1 1/4	7 1/8
4	6 1/2	1/2	1 1/4	7 1/8
5	8 1/4	3/4	1 9/16	7 3/8
6	9 1/4	3/4	1 9/16	8 1/8
7	10 1/4	3/4	1 9/16	8 1/4
8	11 1/4	3/4	1 9/16	8 1/4
10	14 1/8	1	2	9 3/4
12	16 1/4	1	2	10 1/4
14	19 1/4	1 1/4	2 1/2	12

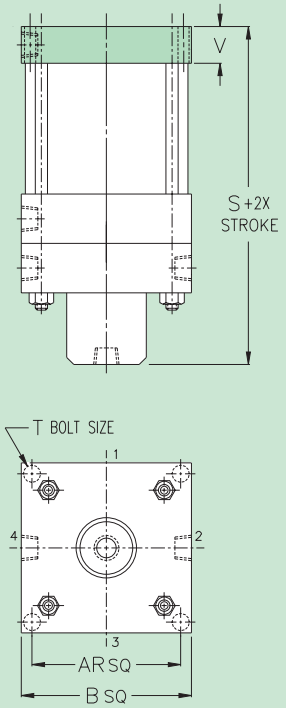
BORE	T	Z	LL	NN
3 1/4	3 1/4	4 3/4	1/2	3/4
4	3 1/4	5 1/2	1/2	3/4
5	3 1/8	6 7/8	11/16	1
6	3 5/8	7 7/8	11/16	1
7	3 3/4	8 7/8	11/16	1
8	3 3/4	9 7/8	11/16	1
10	4 5/8	12 3/8	7/8	1 1/4
12	5 1/8	14 1/2	7/8	1 1/4
14	5 7/8	17	1 1/8	1 1/2

MODEL H-BA8-D
REAR FLANGE MOUNT



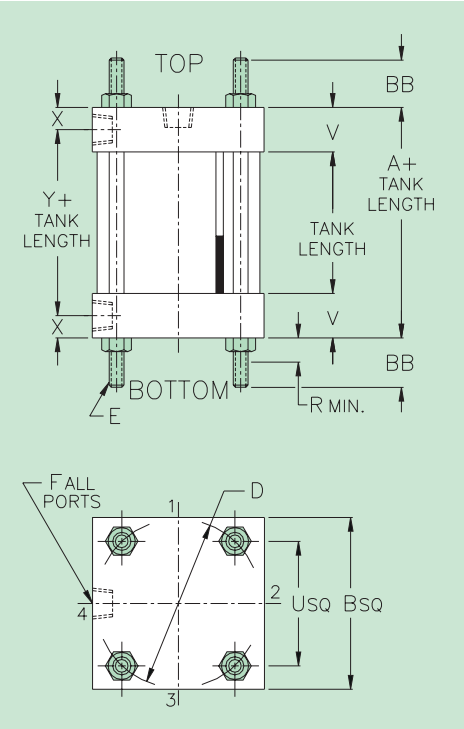
3 1/4 THRU 6 BORE

BORE	B	C	P	S	T	U	V	Z	AR
3 1/4	3 3/4	5 1/2	5/8	7 3/4	3/8	2.76		4 11/16	
4	4 1/2	6 1/4	5/8	7 3/4	3/8	3.32		5 7/16	
5	5 1/2	7 5/8	5/8	8	1/2	4.10		6 5/8	
6	6 1/2	8 5/8	3/4	8 7/8	1/2	4.88		7 5/8	
7	7 1/2			8 1/4	1/2		1 1/2		6.75
8	8 1/2			8 1/4	5/8		1 1/2		7.57
10	10 5/8			9 3/4	3/4		2		9.40
12	12 3/4			10 1/4	3/4		2		11.10
14	14 3/4			12	7/8		2 1/4		12.87



7 THRU 14 BORE

MODEL T-L
EXTENDED TIE ROD MOUNT



Specify If Tie Rods Are To Be Extended On Top, Bottom or Both Ends.

BORE	A	B	D	E	F	R	U	V	X	Y	BB
$3^{1}/_{4}$	$2^{1}/_{2}$	$3^{3}/_{4}$	3.9	$^{3}/_{8}$-24	$^{1}/_{2}$	$^{3}/_{8}$	2.76	$1^{1}/_{4}$	$^{9}/_{16}$	$1^{3}/_{8}$	$1^{3}/_{8}$
4	$2^{1}/_{2}$	$4^{1}/_{2}$	4.7	$^{3}/_{8}$-24	$^{1}/_{2}$	$^{3}/_{8}$	3.32	$1^{1}/_{4}$	$^{9}/_{16}$	$1^{3}/_{8}$	$1^{3}/_{8}$
5	$2^{1}/_{2}$	$5^{1}/_{2}$	5.8	$^{1}/_{2}$-20	$^{1}/_{2}$	$^{7}/_{16}$	4.10	$1^{1}/_{4}$	$^{9}/_{16}$	$1^{3}/_{8}$	$1^{13}/_{16}$
6	3	$6^{1}/_{2}$	6.9	$^{1}/_{2}$-20	$^{3}/_{4}$	$^{7}/_{16}$	4.88	$1^{1}/_{2}$	$^{11}/_{16}$	$1^{5}/_{8}$	$1^{13}/_{16}$
7	3	$7^{1}/_{2}$	8.1	$^{5}/_{8}$-18	$^{3}/_{4}$	$^{9}/_{16}$	5.70	$1^{1}/_{2}$	$^{11}/_{16}$	$1^{5}/_{8}$	$2^{5}/_{16}$
8	3	$8^{1}/_{2}$	9.1	$^{5}/_{8}$-18	$^{3}/_{4}$	$^{9}/_{16}$	6.44	$1^{1}/_{2}$	$^{11}/_{16}$	$1^{5}/_{8}$	$2^{5}/_{16}$
10	4	$10^{5}/_{8}$	11.3	$^{3}/_{4}$-16	1	$^{11}/_{16}$	7.99	2	1	2	$2^{11}/_{16}$
12	4	$12^{3}/_{4}$	13.6	$^{3}/_{4}$-16	1	$^{11}/_{16}$	9.62	2	1	2	$2^{11}/_{16}$
14	$4^{1}/_{2}$	$14^{3}/_{4}$	16.1	$^{7}/_{8}$-14	$1^{1}/_{4}$	$^{13}/_{16}$	11.38	$2^{1}/_{4}$	$1^{1}/_{16}$	$2^{3}/_{8}$	$3^{3}/_{16}$

Minimum Tank Length = 4 Inches

USEABLE TANK CAPACITIES -- CUBIC INCHES

TANK DIAS.	TANK LENGTHS															
	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26	28
$3^{1}/_{4}$	12	20	27	34	42	49	56	70	85	100	114	128	143	158	172	187
4	19	30	41	52	63	74	85	107	129	151	173	195	217	239	261	283
5	29	47	64	81	98	115	133	167	200	236	270	304	340	375	410	445
6	42	67	92	117	141	166	190	240	290	340	390	440	490	540	590	640
7	58	91	125	159	192	226	260	330	395	465	530	600	665	735	800	865
8	75	120	163	207	251	295	340	430	515	605	690	780	870	955	1045	1130
10	118	186	255	325	395	460	530	670	805	945	1080	1220	1355	1500	1630	1770
12	170	270	370	470	565	665	765	960	1160	1360	1555	1755	1950	2150	2350	2545
14	230	365	500	635	770	900	1040	1310	1580	1850	2120	2390	2660	2930	3200	3470

TANK SELECTION

Required Information

A=Area of work cylinder piston, S=Stroke of work cylinder
Minimum Tank Capacity=A x S

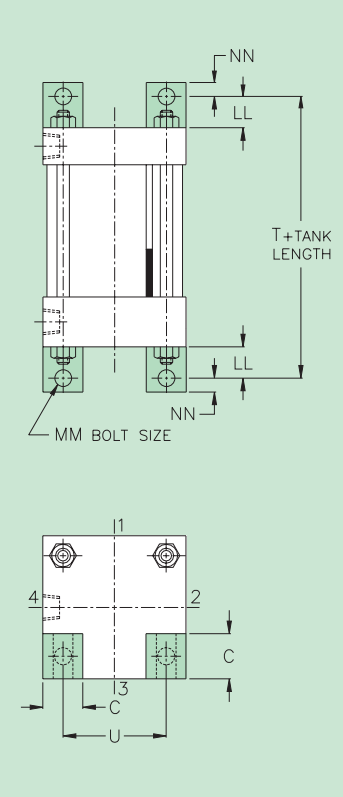
EXAMPLE:

What size tank will be required for a 4" bore, 10" stroke work cylinder?
Area of 4" bore cylinder=12.566 sq. in.=A, Stroke=10"=S
Minimum Tank Capacity=A x S=12.566 x 10=126 cu. in.

Checking the tank capacity chart for equal or next highest capacities, we find several combinations of diameters and lengths that will suit the required 126 cu. in. capacity, i.e., $3^{1}/_{4}$" diameter x 20" long, 4" diameter x 14" long, 5" diameter x 10" long, etc.

In most cases the smallest diameter and longest length tank that will fit the installation will be the least expensive tank to use.

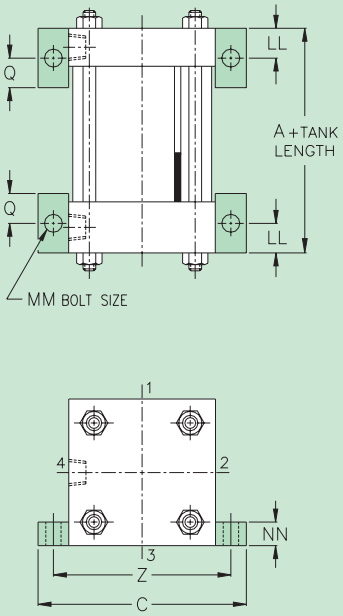
MODEL T-J
END LUG MOUNT



BORE	C	T	U
3 1/4	1	4 1/4	2.76
4	1 3/16	4 1/2	3.32
5	1 3/8	4 5/8	4.10
6	1 5/8	5	4.88
7	2 1/16	5 1/4	5.70
8	2 1/16	5 1/4	6.44
10	2 5/8	6 5/8	7.99
12	3 1/8	6 5/8	9.62
14	3 3/8	7 1/2	11.38

BORE	LL	MM	NN
3 1/4	7/8	3/8	3/8
4	1	3/8	3/8
5	1 1/16	1/2	1/2
6	1	1/2	1/2
7	1 1/8	5/8	5/8
8	1 1/8	5/8	5/8
10	1 5/16	3/4	5/8
12	1 5/16	3/4	5/8
14	1 1/2	7/8	3/4

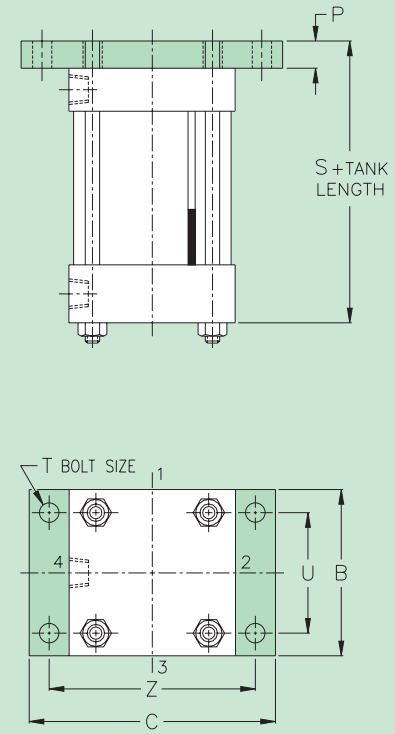
MODEL T-A
FOOT MOUNT



BORE	A	C	MM	Q
3 1/4	2 1/2	5 3/4	1/2	1 1/4
4	2 1/2	6 1/2	1/2	1 1/4
5	2 1/2	8 1/4	3/4	1 9/16
6	3	9 1/4	3/4	1 9/16
7	3	10 1/4	3/4	1 9/16
8	3	11 1/4	3/4	1 9/16
10	4	14 1/8	1	2
12	4	16 1/4	1	2
14	4 1/2	19 1/4	1 1/4	2 1/2

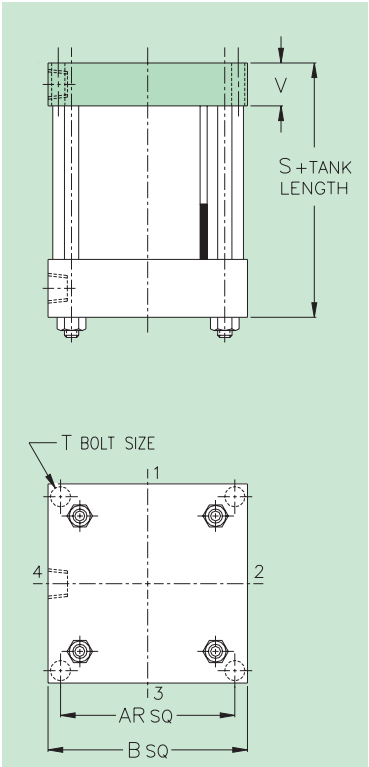
BORE	Z	LL	NN
3 1/4	4 3/4	1/2	3/4
4	5 1/2	1/2	3/4
5	6 7/8	11/16	1
6	7 7/8	11/16	1
7	8 7/8	11/16	1
8	9 7/8	11/16	1
10	12 3/8	7/8	1 1/4
12	14 1/2	7/8	1 1/4
14	17	1 1/8	1 1/2

MODEL T-D
REAR FLANGE MOUNT



3 1/4 THRU 6 BORE

BORE	B	C	P	S	T	U	V	Z	AR
3 1/4	3 3/4	5 1/2	5/8	3 1/8	3/8	2.76		4 11/16	
4	4 1/2	6 1/4	5/8	3 1/8	3/8	3.32		5 7/16	
5	5 1/2	7 5/8	5/8	3 1/8	1/2	4.10		6 5/8	
6	6 1/2	8 5/8	3/4	3 3/4	1/2	4.88		7 5/8	
7	7 1/2			3	1/2		1 1/2		6.75
8	8 1/2			3	5/8		1 1/2		7.57
10	10 5/8			4	3/4		2		9.40
12	12 3/4			4	3/4		2		11.10
14	14 3/4			4 1/2	7/8		2 1/2		12.87



7 THRU 14 BORE

LYNAIR INC.

BOOSTER SELECTION CHART

Theoretical P.S.I. Output of Ram at Input Pressure of			Booster Ratio	Hydraulic Ram		Booster Piston	
80 P.S.I.	100 P.S.I.	250 P.S.I.		Dia.	Volume Cu. In. per In. of Stroke	Dia.	Area
1	2	3	6	7	8	9	10
846	1057	2642	10.57	1	.785	3 1/4	8.296
447	559	1397	5.59	1 3/8	1.485		
276	345	862	3.45	1 3/4	2.405		
211	264	660	2.64	2	3.142		
1280	1600	4000	16.00	1	.785	4	12.566
680	850	2125	8.50	1 3/8	1.485		
416	520	1300	5.20	1 3/4	2.405		
320	400	1000	4.00	2	3.142		
208	260	650	2.60	2 1/2	4.909		
2000	2500		25.00	1	.785	5	19.635
1058	1322	3305	13.22	1 3/8	1.485		
653	816	2040	8.16	1 3/4	2.405		
500	625	1562	6.25	2	3.142		
320	400	1000	4.00	2 1/2	4.909		
222	278	695	2.78	3	7.069		
163	204	510	2.04	3 1/2	9.621		
1523	1904	4757	19.04	1 3/8	1.485	6	28.274
941	1176	2940	11.76	1 3/4	2.405		
720	900	2250	9.00	2	3.142		
462	577	1442	5.77	2 1/2	4.909		
320	400	1000	4.00	3	7.069		
235	294	735	2.94	3 1/2	9.621		
180	225	562	2.25	4	12.566		
2073	2591		25.91	1 3/8	1.485	7	38.485
1280	1600	4000	16.00	1 3/4	2.405		
980	1225	3062	12.25	2	3.142		
499	624	1560	6.24	2 1/2	4.909		
435	544	1360	5.44	3	7.069		
320	400	1000	4.00	3 1/2	9.621		
245	306	765	3.06	4	12.566		
194	242	605	2.42	4 1/2	15.904		
157	196	490	1.96	5	19.635		
130	162	405	1.62	5 1/2	23.758		
2708	3385		33.85	1 3/8	1.485	8	50.265
1672	2090		20.90	1 3/4	2.405		
1280	1600	4000	16.00	2	3.142		
821	1026	2565	10.26	2 1/2	4.909		
569	711	1777	7.11	3	7.069		
418	522	1305	5.22	3 1/2	9.621		
320	400	1000	4.00	4	12.566		
253	316	790	3.16	4 1/2	15.904		
205	256	640	2.56	5	19.635		
170	212	530	2.12	5 1/2	23.758		
2613	3266		32.66	1 3/4	2.405	10	78.540
2000	2500		25.00	2	3.142		
1282	1603	4007	16.03	2 1/2	4.909		
889	1111	2777	11.11	3	7.069		
653	816	2040	8.16	3 1/2	9.621		
500	625	1562	6.25	4	12.566		
395	494	1235	4.94	4 1/2	15.904		
320	400	1000	4.00	5	19.635		
265	331	827	3.31	5 1/2	23.758		
2880	3600		36.00	2	3.142	12	113.10
1846	2308		23.08	2 1/2	4.909		
1280	1600	4000	16.00	3	7.069		
940	1157	2937	11.75	3 1/2	9.621		
720	900	2250	9.00	4	12.566		
569	711	1777	7.11	4 1/2	15.904		
461	576	1440	5.76	5	19.635		
381	476	1190	4.76	5 1/2	23.758		
2514	3142		31.42	2 1/2	4.909	14	153.94
1742	2178		21.78	3	7.069		
1280	1600	4000	16.00	3 1/2	9.621		
980	1225	3062	12.25	4	12.566		
774	968	2420	9.68	4 1/2	15.904		
627	784	1960	7.84	5	19.635		
518	648	1620	6.48	5 1/2	23.758		

SINGLE PRESSURE BOOSTER SELECTION

F =Required work cylinder force
A_1 =Area of work cylinder piston (Col. 10)
A_2 =Area of booster hydraulic ram (Col. 8)
S_1 =Stroke of work cylinder
S_2 =Stroke of booster
P_1 =Maximum shop line pressure
P_2 =Shop line pressure to be used
R_1 =Exact booster ratio
R_2 =Selected booster ratio (equal to or next higher than R1) (Col. 6)

EXAMPLE: What bore, ratio and stroke booster will be required for a 4" bore, 6" stroke, 80 P.S.I. shop line pressure. Cylinder to have 3500 lbs. thrust.

$$R_1=\frac{F}{P_1 \times A_1}, \quad R_1=\frac{3500}{80 \times 12.6}, \quad R_1=3.47 \quad R_2=4.00$$

$$P_2=\frac{F}{R_2 \times A_1}, \quad P_2=\frac{3500}{4.00 \times 12.6}, \quad P_2=70 \text{ P.S.I.}$$

Select smallest bore booster with required ratio, =4" bore, 2" hydraulic ram

$$S_2=1+\frac{1.02 \times A_1 \times S_1}{A_2}, \quad S_2=\frac{1.02 \times 12.6 \times 6}{3.14}, \quad S_2=26"$$

Required booster=4" bore, 4.00 to 1 ratio, 26" stroke at 70 P.S.I.

DUAL PRESSURE BOOSTER SELECTION

F =Required high pressure work cylinder force
A_1 =Area of work cylinder piston (Col. 10)
A_2 =Area of booster hydraulic ram (Col. 8)
S_1 =Total stroke of work cylinder
SH =High pressure work cylinder stroke
S_2 =Stroke of Booster
P_1 =Maximum shop line pressure
P_2 =Shop line pressure to be used
R_1 =Exact booster ratio
R_2 =Selected booster ratio (equal to or next higher than R1) (Col. 6)

EXAMPLE: What bore, ratio and stroke booster will be required for a 4" bore, 6" stroke, 1½" high pressure work cylinder stroke, 80 P.S.I. shop line pressure, cylinder to have 3500 lbs. high pressure thrust.

$$R_1=\frac{F}{P_1 \times A_1}, \quad R_1=\frac{3500}{80 \times 12.6}, \quad R_1=3.47 \quad R_2=4.00$$

$$P_2=\frac{F}{R_2 \times A_1}, \quad P_2=\frac{3500}{4.00 \times 12.6}, \quad P_2=70 \text{ P.S.I.}$$

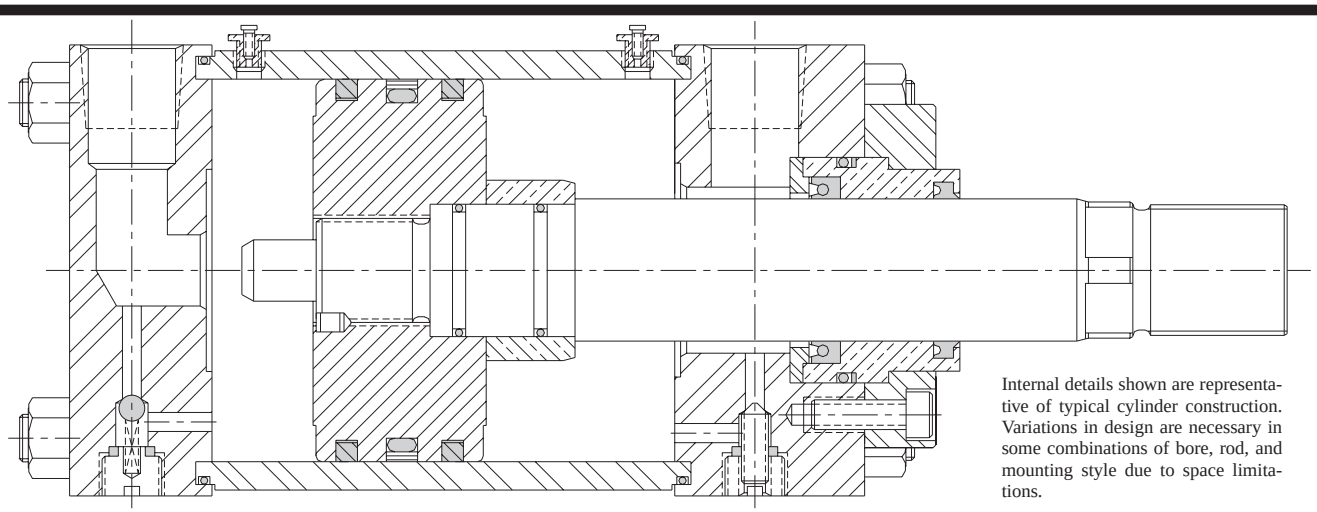
Select smallest bore booster with required ratio, =4" bore, 2" hydraulic ram

$$S_2=2" + \frac{(0.02 \times A1 \times S1) + (A1 \times SH)}{A_2}$$

$$S_2=2" + \frac{(0.02 \times 12.6 \times 6) + (12.6 \times 1.5)}{3.14}, \quad S_2 = 8"$$

Required booster=4" bore, 4.00 to 1 ratio, 8" stroke at 70 P.S.I.

In most cases the smallest diameter and longest stroke booster that will fit the installation will be the least expensive booster to use.



Internal details shown are representative of typical cylinder construction. Variations in design are necessary in some combinations of bore, rod, and mounting style due to space limitations.

Typical Construction Features Of Lynair Series "H" Hydraulic Cylinders

INDUSTRY STANDARD MOUNTING DIMENSIONS

LYNAIR Series "H" models conform to ANSI Standard B93.15-1971 for Mounting Dimensions of Square Head Industrial Fluid Power Cylinders and meet or exceed JIC Hydraulic Standards.

PISTON ROD

Precision ground, polished, and hard chrome plated piston rods made from high yield strength steel are offered with the choice of seven end style options. Male rod threads thru 1 1/2 diameter are rolled for maximum strength and uniformity. Four wrench flats are provided to aid in making the rod end connection. The rod surface is reduced in size in area of flats to eliminate contact with seals at assembly.

PISTON

One piece high tensile cast iron piston with wide surface area contacting cylinder bore stabilizes rod and reduces bearing loads. The piston is threaded onto rod with mating pilot diameters to ensure concentricity, and secured by anaerobic adhesive and locking pin.

PISTON SEALS

A glass fiber filled teflon sealing ring installed over an elastomer expander provides a long wearing, low bypass seal. Two cast iron rings with overlapping joint design protect the teflon seal and provide a back-up seal with superior service life. If seal bypass is undesirable, Block Vee cup seals with anti-extrusion back-up rings are optional at no additional charge.

Other alternate seal options are available upon request.

O-RING TUBE END SEALS

Close fitting tube end pilot diameters include an o-ring seal to provide a leak-free joint. Operating pressure expands tubular section, reducing joint clearance and seal extrusion gap.

PRESSURE RATING

Series "H" hydraulic cylinders are rated for maximum service to 3000 P.S.I.

ADJUSTABLE CUSHION OPTION

Cushions are optional at either one or both ends of the cylinder. When provided, close fitting surfaces of mating components trap operating fluid to decelerate the piston before reaching the end of stroke position. Flush fitting Cushion Screw permits adjustment in deceleration rate while interchangeable Ball Check aids start up upon reversal of travel direction.

CYLINDER TUBE

Steel tubing is honed to 15 micro inch finish and hard chrome plated on the bore surface to resist wear and promote optimum seal life.

CYLINDER PORTS

N.P.T.F. ports are standard and provided unless otherwise requested. S.A.E. "O"-Ring style ports are optional and may be specified at no additional cost.

TIE RODS

Made from steel having 100,000 P.S.I. minimum yield strength (125,000 P.S.I. for diameters larger than 1/2") with rolled threads for maximum strength and uniformity.

OPTIONAL AIR BLEEDERS

Tube mounted Air Bleed fittings are available upon request without additional cost in cylinder sizes 3 1/4 and larger equipped with standard (cast iron ring) piston seals. Other bore sizes, or cylinders having alternate type piston seals, may be ordered with air bleeders installed in end caps positioned to avoid interference with port and mountings.

EXTERIOR MATERIALS/ EXTERNAL FINISH

Front and Rear Heads are accurately machined from precision square steel blocks. Cylinder Tubes, Bearing Retainers, and mountings are constructed of steel for maximum strength and durability.
Cylinders have enamel finish on exterior with mounting and machined surfaces protected by anti-rust film lubricant at time of shipment.

ROD BEARING/ REMOVABLE RETAINERS

Precision machined bronze bearing supports and centers rod to maintain concentricity with bore while housing rod seal and wiper. Retainer construction allows removal without tie rod disassembly when bore, rod size, and mounting style combination permits.

ROD SEALS

Durable, self-energizing polyurethane rod seal provides long lasting, leak free sealing regardless of operating pressure level. Deep seal design provides stability insuring against premature failure due to "roll over" or extrusion.

ROD WIPER

Double Lip Wiper cleans rod surface of contaminants and prevents entry of harmful particles into sensitive bearing and seal areas. Integral cup form on inboard side of wiper serves as secondary seal to insure leak-free performance.

National FLUID POWER Association

ORDERING INFORMATION
SERIES "H" CYLINDERS

A Model Numbering system for describing cylinder size and variable construction features that are available for use in all "standard" cylinders is explained below.

This Model Number consists of Letter and Number Codes which represent the desired choices between available variables which make up the cylinder construction details.

Cylinders may be ordered with many non-standard features that cannot be identified in coded number terms. When special features are desired, clearly describe requirements with supplemental callout of details.

SAMPLE MODEL NUMBER

NOTE: INCLUDE "DASH" MARKS ONLY AS SHOWN

H - 3¼ B42 - 10 - 1⅜ - P1

SERIES DESIGNATION

Series Letter identifies basic cylinder construction standards.

CYLINDER BORE SIZE

Diameter of bore in inches. Available in sizes 1 1/2" thru 14".

MOUNTING STYLE CODE

Mounting style designated by use of assigned Code Letter. List of available models shown below.

PORT POSITION

Variable positions available to suit customer preference. Port position indicated by use of assigned location number with prefix "P". See below.

PISTON ROD DIAMETER

Size of cylinder rod in inches. Available sizes limited to those offered with Bore size selected.

STROKE LENGTH

Length of cylinder stroke in inches. If Stop Tube is included, indicate "Design" stroke, "Effective" stroke, and "Stop Tube" length required.

CUSHION OPTION CODE NUMBER

Code Number identifies choice of available construction options.

ROD END STYLE NUMBER

Assigned Code Number designates style of available Rod End option.

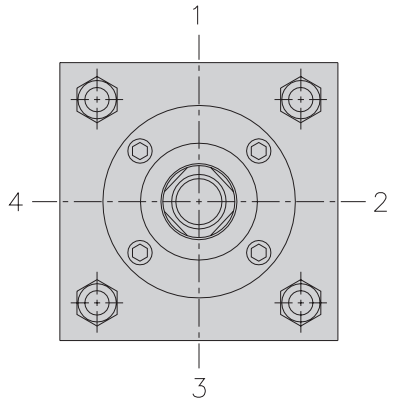
MOUNTING STYLE CODE LETTERS

CODE LETTER	DESCRIPTION
A	Foot Mount NFPA style MS2
B	Clevis Mount NFPA style MP1
BX	Single Lug Pivot Mount NFPA style MP3
C	Rect. Front Flange Mount NFPA style MF1
D	Rect. Rear Flange Mount NFPA style MF2
E	Front Trunnion Mount NFPA style MT1
F	Rear Trunnion Mount NFPA style MT2
G	Side Mount NFPA style MS4
J	End Lug Mount NFPA style MS7
K	Centerline Lug Mount NFPA style MS3
L	Extended Tie Rod Mount NFPA style MX1, MX2, & MX3
N	Intermediate Trunnion Mount NFPA style MT4
P	Square Front Flange Mount NFPA style MF5
R	Square Rear Flange Mount NFPA style MF6
T	Rect. Rear Head Mount NFPA style ME6
X	Rect. Front Head Mount NFPA style ME5
UB	Spherical Bushing Mount NFPA style MPU3

CUSHION CODE NUMBERS

CODE NUMBER	DESCRIPTION
0	Non-cushioned (No cushion at either end)
2	Adjustable Cushion on Rod End (Cushion at Front Head End only)
3	Adjustable Cushion on Blind End (Cushion at Rear Head End only)
4	Adjustable Cushion on Both Ends

PORT LOCATION POSITION NUMBERS



ROD END STYLE CODE NUMBERS

CODE NUMBER	DESCRIPTION
	STANDARD
2	Small Male Thread NFPA type SM
4	Short Style Female Thread NFPA type SF
	OPTIONAL
1	Full Diameter Male Thread NFPA type FM
3	Long Style Female Thread NFPA type LF
5	Studded Male Thread Dimensions equal to Style 2 Rod End
6	Special Rod End Made per custom specifications
8	Intermediate Male Thread NFPA type IM
0	Plain Rod End NFPA type PL

Cylinder side positions are numbered in a clockwise direction when viewing the unit from the rod end with location #1 being at the top as shown in the reference view.

Double rod end models are numbered in a similar manner with the primary mounting end being considered as the "rod end" for side numbering purposes. If the cylinder ports are in line at both ends of the unit, use only one number to designate the required position. When the cylinder is to be provided with multiple ports, specify the side position numbers which correspond to the desired locations.

M .....Double Rod End Model
Insert "M" in front of Mtg. Style Code Letter to designate Double Rod End construction. Mounting styles available are: MA, MC, ME, MG, MJ, MK, ML, MN, MP, and MX.

NON-STANDARD MODIFICATIONS AVAILABLE

Variations in construction involving use of non-standard dimensions, materials, or cylinder feature modifications are available upon request. Clearly describe any such requirement that is not identifiable by coded Model Number.

AVAILABLE OPTIONS

Optional construction features may be ordered for Series "H" cylinders to satisfy specific application requirements.

When such options are desired, a callout describing feature details must be provided in addition to the basic cylinder specifications as noted on the preceding page.

Many of these optional features are explained in detail on pages 8 thru 11. Among the options that may be ordered are:

- **Rod end modifications**
  See descriptive information on this page.
- **Modified mounting dimensions**
- **Custom mounting style**
- **Alternate Piston Seals**
  See information given on this page.
- **Optional seal materials**
  Viton, Buna-N, Carboxylated Nitrile
- **Optional seal styles**
  Other alternate piston seal designs
  V-Ring rod seals
- **Extended Thrust Key**
  Refer to information on page 72.
- **Stop Tube stroke limitation**
  Refer to information on pages 7 and 8.
- **Protective Rod Boot**
  Refer to information on page 8.
  Requires additional rod extension ("LA" dim)
- **Stainless steel Piston Rod**
  Refer to information on page 9.
- **Metallic Rod Scraper**
- **Hardened Piston Rod material**
- **Bearing Drainback port**
- **SAE straight thread o-ring style ports**
- **Alternate port sizes**
- **Proximity switch option**
- **Custom exterior finish**
- **Special construction modifications**
  Refer to information on page 11.

MODEL NUMBER MODIFICATION

Letter code "S" will be added to the normal cylinder model number when the use of an optional feature results in significant changes in construction details or alters standard mounting dimensions.

When a requested option changes basic cylinder construction, the code letter "S" will be placed in front of the "series designation" letter.

It is not necessary to include this "code letter" in the model number information submitted at the time of order entry. Lynair, Inc. will determine when this code letter should be used based on the optional features included and their effect on cylinder construction.

ROD END MODIFICATIONS

Standard cylinder rod end styles may be altered to include specific dimensional requirements upon request.

Variations in the length of rod extension ("LA" dim.), thread length ("A" dim.), or thread details may be ordered to suit application purposes.

When such variations are desired, the order information should be expressed in standard letter code terms.

An example of this callout form is:
"LA" dim. =6$^1/_2$"
(length of rod extension)
"A" dim. = 3"
(non-standard thread length)
"KK" dim. = $^3/_4$ - 10 UNC
(non-standard thread form)

Changes involving these dimensions do not necessitate the use of a "Style 6" rod end code number. That designation is assigned only to those rod ends having special design features rather than those with minor variations in length dimensions or thread details.

Thread sizes other than those furnished as standard are available upon request and usually are provided without additional cost.

ALTERNATE PISTON SEALS

Series "H" cylinders are equipped with cast iron piston rings and an energized, filled teflon seal unless otherwise specified. While suitable for general service conditions, they do allow a low level of fluid bypass which may make their use undesirable.

Block Vee piston seals with back up washers to provide leak-free sealing may be ordered as an alternate with no additional charge.

Self-energizing seals of high strength polyurethane are available as an extra cost option.

STROKE LENGTH TOLERANCE

The cylinder stroke is subject to a normal length variation of $\pm$ $^1/_{32}$".

Tolerance limits on mating machined surfaces and the elastic nature of cylinder tube and tie rod components makes a closer limit impractical without the custom fitting of parts.

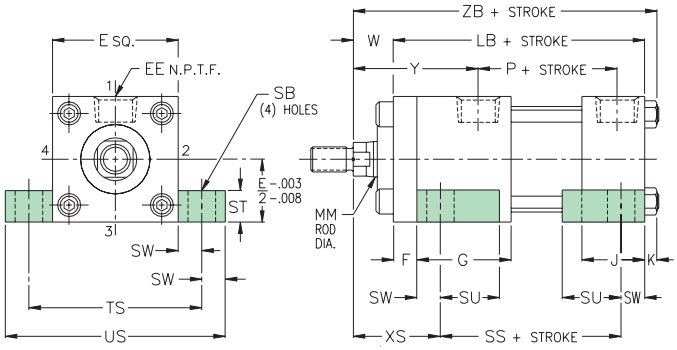
Cylinders with "close stroke tolerance" that are within .015 of specified length are available on a special order basis.

MOUNTING STYLE COMBINATIONS

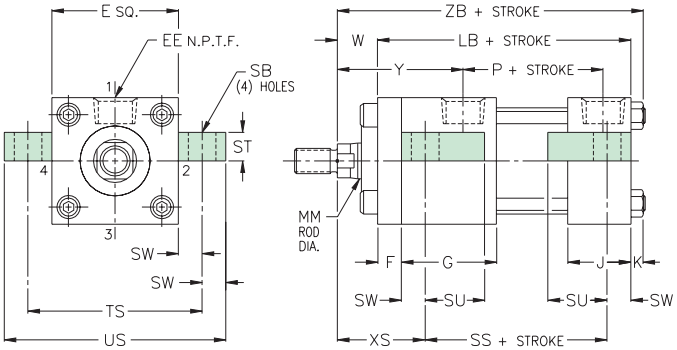
Two or more standard mounting styles may be combined for use on the same cylinder is so desired. The styles selected, however, must be compatible for use with each other based on construction limitations.

When multiple mountings are to be provided, the code letter applicable to each mounting style should be included in the cylinder model number.

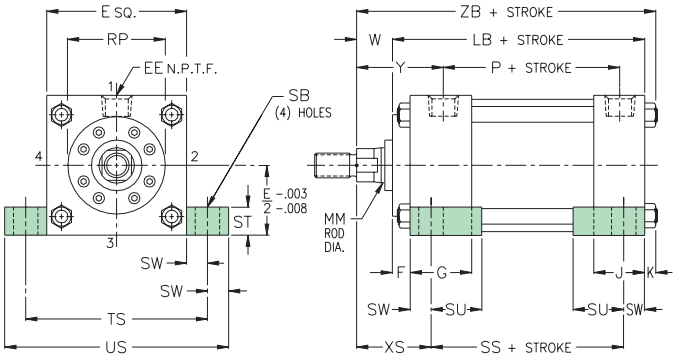
FOOT MOUNT MODEL "A" NFPA STYLE MS2

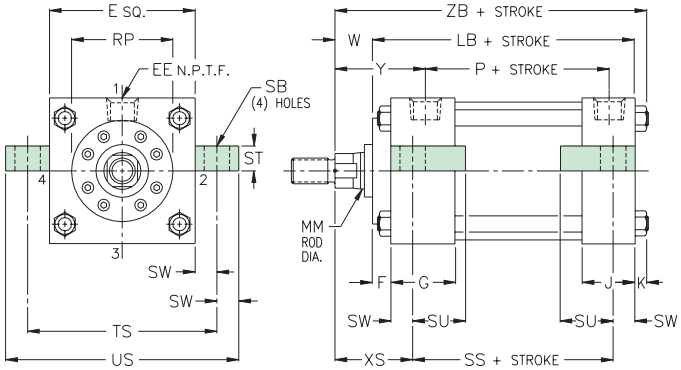


CENTERLINE LUG MOUNT MODEL "K" NFPA STYLE MS3

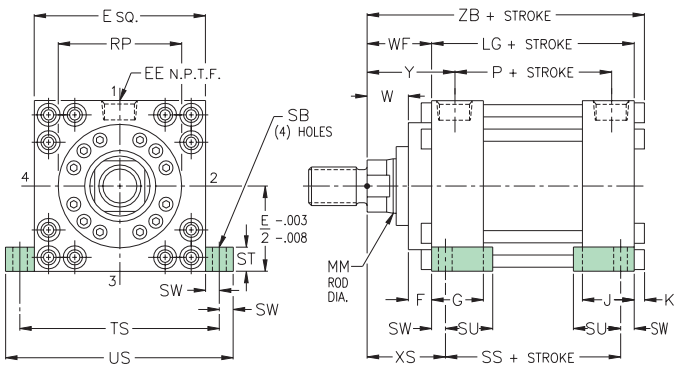


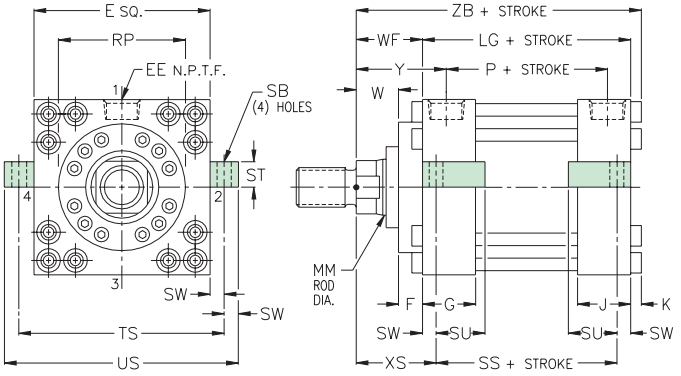
BORE	E	EE	E_1	F	G	J	K	P	LB	SB▪	SS	ST	SU	SW	TS	US
1 1/2	2 1/2	1/2	#8	3/8	1 3/4	1 1/2	1/2	3	5	3/8	3 7/8	1/2	15/16	3/8	3 1/4	4
2	3	1/2	#8	5/8	1 3/4	1 1/2	5/8	3	5 1/4	1/2	3 5/8	3/4	1 1/4	1/2	4	5
2 1/2	3 1/2	1/2	#8	5/8	1 3/4	1 1/2	5/8	3 1/8	5 3/8	3/4	3 3/8	1	1 9/16	11/16	4 7/8	6 1/4





BORE	E	EE	EE_1	F	G	J	K	P	LB	SB▪	SS	ST	SU	SW	TS	US
3 1/4	4 1/2	3/4	#12	3/4	2	1 3/4	3/4	3 5/8	6 1/4	3/4	4 1/8	1	1 9/16	11/16	5 7/8	7 1/4
4	5	3/4	#12	7/8	2	1 3/4	3/4	3 7/8	6 5/8	1	4	1 1/4	2	7/8	6 3/4	8 1/2
5	6 1/2	3/4	#12	7/8	2	1 3/4	1	4 3/8	7 1/8	1	4 1/2	1 1/4	2	7/8	8 1/4	10
6	7 1/2	1	#16	1	2 1/4	2 1/4	1 1/8	5	8 3/8	1 1/4	5 1/8	1 1/2	2 1/2	1 1/8	9 3/4	12
7	8 1/2	1 1/4	#20	1	2 3/4	2 3/4	1 1/4	5 3/4	9 1/2	1 1/2	5 3/4	1 3/4	2 7/8	1 3/8	11 1/4	14
8	9 1/2	1 1/2	#24	1	3	3	1 7/16	6 1/2	10 1/2	1 1/2	6 3/4	1 3/4	2 7/8	1 3/8	12 1/4	15





BORE	E	EE	EE_1	F	G	J	K	P	LG	SB▪	SS	ST	SU	SW	TS	US
10	12 5/8	2	#24	1 11/16	3 11/16	3 11/16	1/2	8 7/16	12 1/8	1 1/2	8 7/8	2 1/4	3 1/2	1 5/8	15 7/8	19 1/8
12	14 7/8	2	#32	1 15/16	4 7/16	4 7/16	1/2	10 3/8	14 1/2	1 1/2	10 1/2	3	4 1/4	2	18 7/8	22 7/8
14	17 1/4	2	#32	2 3/16	4 7/8	4 7/8	1/2	11 1/8	15 5/8	2 1/4	10 5/8	4	5	2 1/2	22 1/4	27 1/4

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	XS	ZB	WF	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 15/16	1 3/8	6 1/8	––	––
	*1	1/2	1	2 1/8	2 5/16	1 3/4	6 1/2	––	––
2	1	1/4	3/4	1 7/8	2 5/16	1 7/8	6 5/8	––	––
	*1 3/8	3/8	1	2 5/8	2 9/16	2 1/8	6 7/8	––	––
2 1/2	1	1/4	3/4	1 7/8	2 5/16	2 1/16	6 3/4	––	––
	1 3/8	3/8	1	2 5/8	2 9/16	2 5/16	7	––	––
	*1 3/4	1/2	1 1/4	3 1/4	2 13/16	2 9/16	7 1/4	––	––
3 1/4	1 3/8	1/4	7/8	2 1/2	2 11/16	2 5/16	7 7/8	––	3 1/2
	1 3/4	3/8	1 1/8	3 1/8	2 15/16	2 9/16	8 1/8	––	☐
	2	3/8	1 1/4	3 1/2	3 1/16	2 11/16	8 1/4	––	☐
4	1 3/4	1/4	1	3	2 15/16	2 3/4	8 3/8	––	3 7/8
	2	1/4	1 1/8	3 3/8	3 1/16	2 7/8	8 1/2	––	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	3 1/8	8 3/4	––	☐
5	2	1/4	1 1/8	3 3/8	3 1/16	2 7/8	9 1/4	––	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	3 1/8	9 1/2	––	4 3/4
	3	3/8	1 3/8	4 7/8	3 5/16	3 1/8	9 1/2	––	☐
	3 1/2	3/8	1 3/8	4 7/8	3 5/16	3 1/8	9 1/2	––	☐
6	2 1/2	1/4	1 1/4	4 1/4	3 7/16	3 3/8	10 3/4	––	4 3/4
	3	1/4	1 1/4	4 3/4	3 7/16	3 3/8	10 3/4	––	6
	3 1/2	1/4	1 1/4	4 3/4	3 7/16	3 3/8	10 3/4	––	☐
	4	1/4	1 1/4	5 1/4	3 7/16	3 3/8	10 3/4	––	☐
7	3	1/4	1 1/4	4 3/4	3 3/4	3 5/8	12	––	6
	3 1/2	1/4	1 1/4	4 3/4	3 3/4	3 5/8	12	––	6 1/2
	4	1/4	1 1/4	5 1/4	3 3/4	3 5/8	12	––	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 3/4	3 5/8	12	––	☐
	5	1/4	1 1/4	6 1/4	3 3/4	3 5/8	12	––	☐
8	3 1/2	1/4	1 1/4	4 3/4	3 7/8	3 5/8	13 3/16	––	6 1/2
	4	1/4	1 1/4	5 1/4	3 7/8	3 5/8	13 3/16	––	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 7/8	3 5/8	13 3/16	––	8 3/8
	5	1/4	1 1/4	6 1/4	3 7/8	3 5/8	13 3/16	––	☐
	5 1/2	1/4	1 1/4	6 3/4	3 7/8	3 5/8	13 3/16	––	☐
10	4 1/2	1/4	1 1/4	5 3/4	4 15/16	4 9/16	15 9/16	2 15/16	7 3/4
	5	1/2	1 1/2	6 1/2	5 3/16	4 13/16	15 13/16	3 3/16	8 1/2
	5 1/2	1/2	1 1/2	7	5 3/16	4 13/16	15 13/16	3 3/16	9 3/4
	7	1/2	1 1/2	8 1/2	5 3/16	4 13/16	15 13/16	3 3/16	11
12	5 1/2	1/4	1 1/4	6 3/4	5 7/16	5 3/16	18 3/16	3 3/16	10
	7	1/4	1 1/4	8 1/4	5 7/16	5 3/16	18 3/16	3 3/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 11/16	6 7/16	19 7/16	4 7/16	13 3/8
14	7	1/4	1 1/4	8 1/4	5 11/16	5 15/16	19 9/16	3 7/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 15/16	7 3/16	20 13/16	4 11/16	13 3/8
	9	1/2	2 1/2	11 1/2	6 15/16	7 3/16	20 13/16	4 11/16	14 1/4

*Cushion at rod end is non-adjustable in these size combinations.
☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12
A	3/4	1 1/8	1 5/8	2	2 1/4
B	1.124	1.499	1.999	2.374	2.624
C	3/8	1/2	5/8	3/4	7/8
D	1/2	7/8	1 3/16	1 17/32	1 3/4
NA	9/16	15/16	1 5/16	1 23/32	1 15/16

LETTER DIM.	2 1/2	3	3 1/2	4	4 1/2
KK	1 7/8-12	2 1/4-12	2 1/2-12	3-12	3 1/4-12
CC	2 1/4-12	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12
GG	2 1/2-12	3-12	3 1/2-12	4-12	4 1/2-12
A	3	3 1/2	3 1/2	4	4 1/2
B	3.124	3.749	4.249	4.749	5.249
C	1	1	1	1	1
D	2 1/8	2 5/8	3	3 1/2	3 7/8
NA	2 7/16	2 15/16	3 7/16	3 15/16	4 7/16

LETTER DIM.	5	5 1/2	7	8	9
KK	3 1/2-12	4-12	5 1/2-12	5 3/4-12	6 1/2-12
CC	4 3/4-12	5 1/4-12	6 1/2-12	7 1/2-12	8 1/2-12
GG	5-12	5 1/2-12	7-12	8-12	9-12
A	5	5 1/2	7	8	9
B	5.749	6.249	7.999	8.999	9.999
C	1	1	1	2	2
D	4 1/4	4 5/8	––	––	––
NA	4 15/16	5 7/16	6 15/16	7 15/16	8 15/16

Model "A" cylinders 1 1/2 thru 4 bore with ports at position #2 or #4 have lugs counterbored to recess mounting bolt allowing clearance for port connection.

- **"SB" is diameter of mounting bolt.**

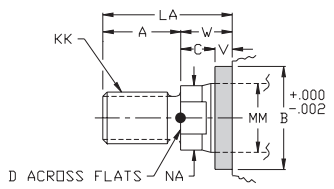
Extended Thrust Key suggested for Model "A" cylinders subject to severe load conditions. Dimensional information located on page 72.

EE_1 denotes size of alternate SAE straight thread O-ring style port furnished upon request.

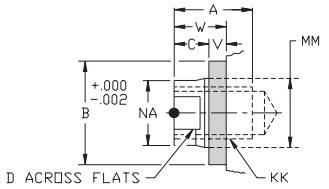
Rods larger than 5 1/2 diameter furnished with (4) 1/2" dia. spanner holes rather than wrench flats.

STANDARD ROD END STYLES

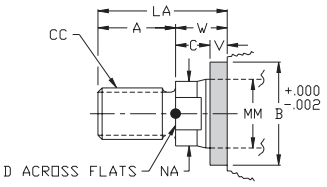
STYLE 2: Small Male Thread NFPA Type SM



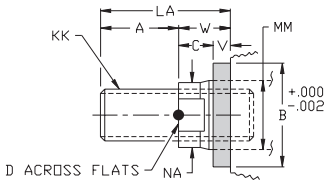
STYLE 4: Short Female Thread NFPA Type SF



STYLE 8: Intermediate Male Thread - NFPA Type IM

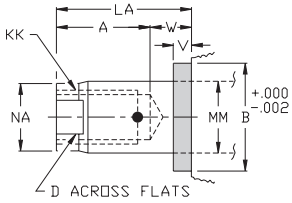


STYLE 5: Studded Small Male Thread - NFPA Type SM

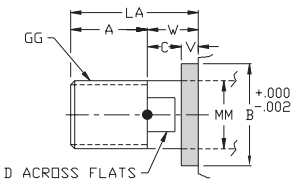


Male #5 additional cost

STYLE 3: Long Female Thread NFPA Type LF

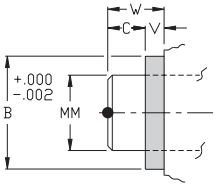


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



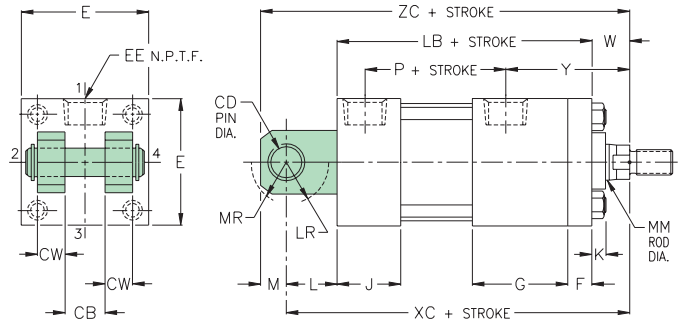
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

CLEVIS MOUNT MODEL "B" NFPA STYLE MP1



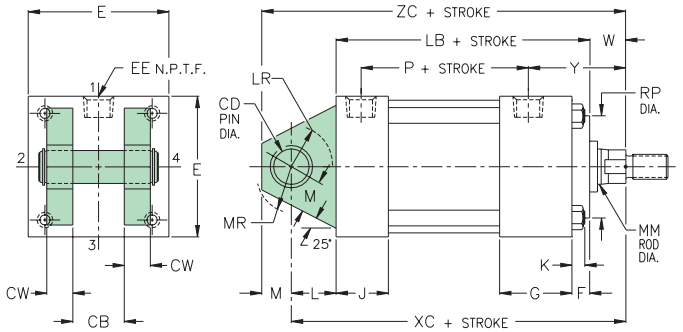
SINGLE LUG PIVOT MOUNT AVAILABLE MODELS.

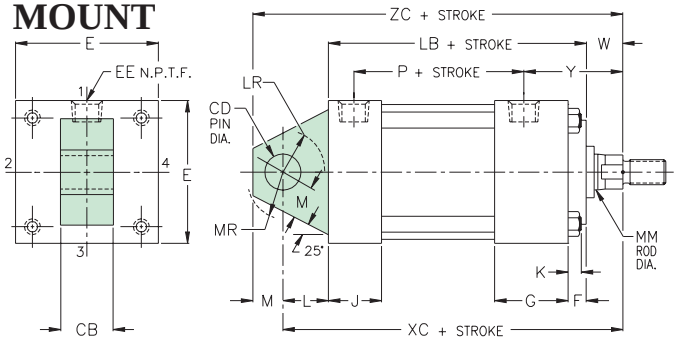
MODEL "BX" SINGLE LUG PIVOT NFPA STYLE MP3
Standard models are available in bore sizes 1½" thru 14". Dimensional data is shown in view below. Bearing retainer construction details are same as shown for Model "B" units. Pivot pin is not included with this mounting style.

MODEL "UB" SPHERICAL BUSHING MT.
NFPA STYLE MPU3
Model with spherical bushing in mounting pin hole available in bore sizes 1½" thru 14". See Model "UB" bulletin for dimensional information of desired model. Rod end attachments fitted with spherical bushings are also shown in bulletin.

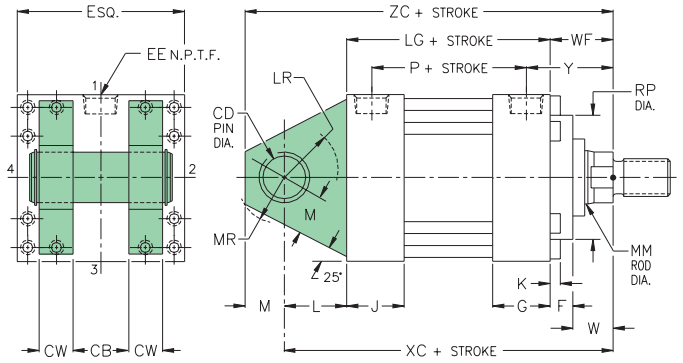
BORE	E	EE	EE1	F	G	J	K	L	M	P	CB	CD +.000 −.002	CW	LB	LR	MR
1 1/2	2 1/2	1/2	#8	3/8	1 3/4	1 1/2	1/2	3/4	1/2	3	3/4	.500	1/2	5	5/8	9/16
2	3	1/2	#8	5/8	1 3/4	1 1/2	5/8	1 1/4	3/4	3	1 1/4	.750	5/8	5 1/4	1	7/8
2 1/2	3 1/2	1/2	#8	5/8	1 3/4	1 1/2	5/8	1 1/4	3/4	3 1/8	1 1/4	.750	5/8	5 3/8	1	7/8

MODEL "BX" SINGLE LUG PIVOT MOUNT

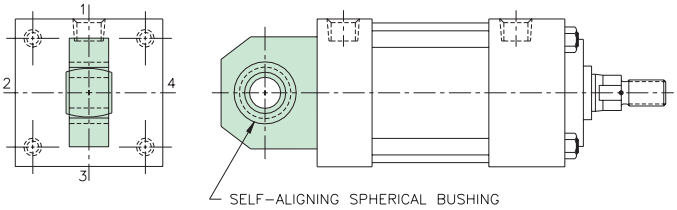




BORE	E	EE	EE1	F	G	J	K	L	M	P	CB	CD +.000 −.002	CW	LB	LR	MR
3 1/4	4 1/2	3/4	#12	3/4	2	1 3/4	3/4	1 1/2	1	3 5/8	1 1/2	1.000	3/4	6 1/4	1 1/4	1 1/8
4	5	3/4	#12	7/8	2	1 3/4	3/4	2 1/8	1 3/8	3 7/8	2	1.375	1	6 5/8	1 3/4	1 5/8
5	6 1/2	3/4	#12	7/8	2	1 3/4	1	2 1/4	1 3/4	4 3/8	2 1/2	1.750	1 1/4	7 1/8	2	1 7/8
6	7 1/2	1	#16	1	2 1/4	2 1/4	1 1/8	2 1/2	2	5	2 1/2	2.000	1 1/4	8 3/8	2 1/4	2 1/8
7	8 1/2	1 1/4	#20	1	2 3/4	2 3/4	1 1/4	3	2 1/2	5 3/4	3	2.500	1 1/2	9 1/2	2 3/4	2 5/8
8	9 1/2	1 1/2	#24	1	3	3	1 7/16	3 1/4	2 3/4	6 1/2	3	3.000	1 1/2	10 1/2	3	2 7/8



MODEL "UB" SPHERICAL BUSHING MOUNT



SEE MODEL "UB" BULLETIN

BORE	E	EE	EE1	F	G	J	K	L	M	P	CB	CD +.000 −.002	CW	LG	LR	MR
10	12 5/8	2	#24	1 11/16	3 11/16	3 11/16	1/2	4	3 1/2	8 7/16	4	3.500	2	12 1/8	3 3/4	3 5/8
12	14 7/8	2	#32	1 15/16	4 7/16	4 7/16	1/2	4 1/2	4	10 3/8	4 1/2	4.000	2 1/4	14 1/2	4 1/8	4
14	17 1/4	2	#32	2 3/16	4 7/8	4 7/8	1/2	5 3/4	5	11 1/8	6	5.000	3	15 5/8	5 1/4	5 1/8

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	XC	ZC	WF	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 15/16	6 3/8	6 7/8	––	––
	*1	1/2	1	2 1/8	2 5/16	6 3/4	7 1/4	––	––
2	1	1/4	3/4	1 7/8	2 5/16	7 1/4	8	––	––
	*1 3/8	3/8	1	2 5/8	2 9/16	7 1/2	8 1/4	––	––
2 1/2	1	1/4	3/4	1 7/8	2 5/16	7 3/8	8 1/8	––	––
	1 3/8	3/8	1	2 5/8	2 9/16	7 5/8	8 3/8	––	––
	*1 3/4	1/2	1 1/4	3 1/4	2 13/16	7 7/8	8 5/8	––	––
3 1/4	1 3/8	1/4	7/8	2 1/2	2 11/16	8 5/8	9 5/8	––	3 1/2
	1 3/4	3/8	1 1/8	3 1/8	2 15/16	8 7/8	9 7/8	––	☐
	2	3/8	1 1/4	3 1/2	3 1/16	9	10	––	☐
4	1 3/4	1/4	1	3	2 15/16	9 3/4	11 1/8	––	3 7/8
	2	1/4	1 1/8	3 3/8	3 1/16	9 7/8	11 1/4	––	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	10 1/8	11 1/2	––	☐
5	2	1/4	1 1/8	3 3/8	3 1/16	10 1/2	12 1/4	––	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	10 3/4	12 1/2	––	4 3/4
	3	3/8	1 3/8	4 7/8	3 5/16	10 3/4	12 1/2	––	☐
	3 1/2	3/8	1 3/8	4 7/8	3 5/16	10 3/4	12 1/2	––	☐
6	2 1/2	1/4	1 1/4	4 1/4	3 7/16	12 1/8	14 1/8	––	4 3/4
	3	1/4	1 1/4	4 3/4	3 7/16	12 1/8	14 1/8	––	6
	3 1/2	1/4	1 1/4	4 3/4	3 7/16	12 1/8	14 1/8	––	☐
	4	1/4	1 1/4	5 1/4	3 7/16	12 1/8	14 1/8	––	☐
7	3	1/4	1 1/4	4 3/4	3 3/4	13 3/4	16 1/4	––	6
	3 1/2	1/4	1 1/4	4 3/4	3 3/4	13 3/4	16 1/4	––	6 1/2
	4	1/4	1 1/4	5 1/4	3 3/4	13 3/4	16 1/4	––	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 3/4	13 3/4	16 1/4	––	☐
	5	1/4	1 1/4	6 1/4	3 3/4	13 3/4	16 1/4	––	☐
8	3 1/2	1/4	1 1/4	4 3/4	3 7/8	15	17 3/4	––	6 1/2
	4	1/4	1 1/4	5 1/4	3 7/8	15	17 3/4	––	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 7/8	15	17 3/4	––	8 3/8
	5	1/4	1 1/4	6 1/4	3 7/8	15	17 3/4	––	☐
	5 1/2	1/4	1 1/4	6 3/4	3 7/8	15	17 3/4	––	☐
10	4 1/2	1/4	1 1/4	5 3/4	4 15/16	19 1/16	22 9/16	2 15/16	7 3/4
	5	1/2	1 1/2	6 1/2	5 3/16	19 5/16	22 13/16	3 3/16	8 1/2
	5 1/2	1/2	1 1/2	7	5 3/16	19 5/16	22 13/16	3 3/16	9 3/4
	7	1/2	1 1/2	8 1/2	5 3/16	19 5/16	22 13/16	3 3/16	11
12	5 1/2	1/4	1 1/4	6 3/4	5 7/16	22 3/16	26 3/16	3 3/16	10
	7	1/4	1 1/4	8 1/4	5 7/16	22 3/16	26 3/16	3 3/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 11/16	23 7/16	27 7/16	4 7/16	13 3/8
14	7	1/4	1 1/4	8 1/4	5 11/16	24 13/16	29 13/16	3 7/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 15/16	26 1/16	31 1/16	4 11/16	13 3/8
	9	1/2	2 1/2	11 1/2	6 15/16	26 1/16	31 1/16	4 11/16	14 1/4

*Cushion at rod end is non-adjustable in these size combinations.
☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12
A	3/4	1 1/8	1 5/8	2	2 1/4
B	1.124	1.499	1.999	2.374	2.624
C	3/8	1/2	5/8	3/4	7/8
D	1/2	7/8	1 3/16	1 17/32	1 3/4
NA	9/16	15/16	1 5/16	1 23/32	1 15/16

LETTER DIM.	2 1/2	3	3 1/2	4	4 1/2
KK	1 7/8-12	2 1/4-12	2 1/2-12	3-12	3 1/4-12
CC	2 1/4-12	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12
GG	2 1/2-12	3-12	3 1/2-12	4-12	4 1/2-12
A	3	3 1/2	3 1/2	4	4 1/2
B	3.124	3.749	4.249	4.749	5.249
C	1	1	1	1	1
D	2 1/8	2 5/8	3	3 1/2	3 7/8
NA	2 7/16	2 15/16	3 7/16	3 15/16	4 7/16

LETTER DIM.	5	5 1/2	7	8	9
KK	3 1/2-12	4-12	5 1/2-12	5 3/4-12	6 1/2-12
CC	4 3/4-12	5 1/4-12	6 1/2-12	7 1/2-12	8 1/2-12
GG	5-12	5 1/2-12	7-12	8-12	9-12
A	5	5 1/2	7	8	9
B	5.749	6.249	7.999	8.999	9.999
C	1	1	1	2	2
D	4 1/4	4 5/8	––	––	––
NA	4 15/16	5 7/16	6 15/16	7 15/16	8 15/16

B, BX, and UB models are "pin" type mounting styles that must be fitted with suitable rod end attachment that allows pivoting at both ends. Rod end accessories for this purpose are shown on page 78.

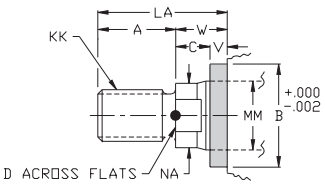
Chrome plated Clevis Pin with snap ring retainers furnished with all Model "B" cylinders.

EE_1 denotes size of alternate SAE straight thread O-ring style port furnished upon request.

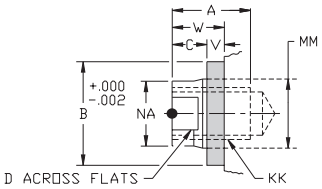
Rods larger than 5 1/2 diameter furnished with (4) 1/2" dia. spanner holes rather than wrench flats.

STANDARD ROD END STYLES

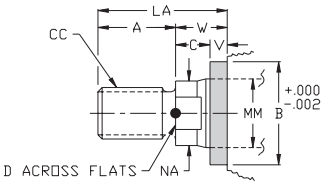
STYLE 2: Small Male Thread NFPA Type SM



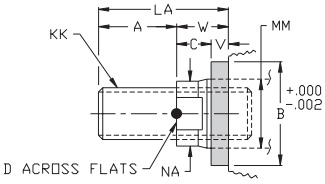
STYLE 4: Short Female Thread NFPA Type SF



STYLE 8: Intermediate Male Thread -NFPA Type IM

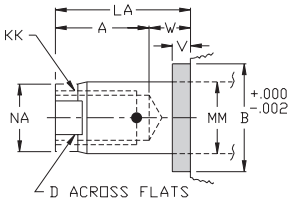


STYLE 5: Studded Small Male Thread -NFPA Type SM

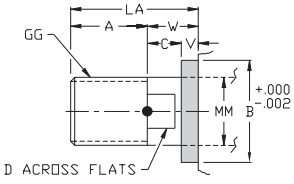


Male #5 additional cost

STYLE 3: Long Female Thread NFPA Type LF

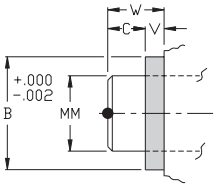


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



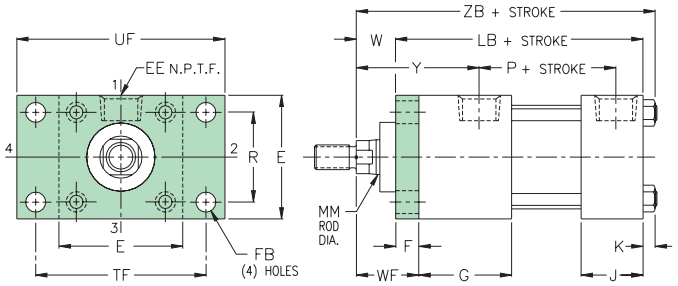
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

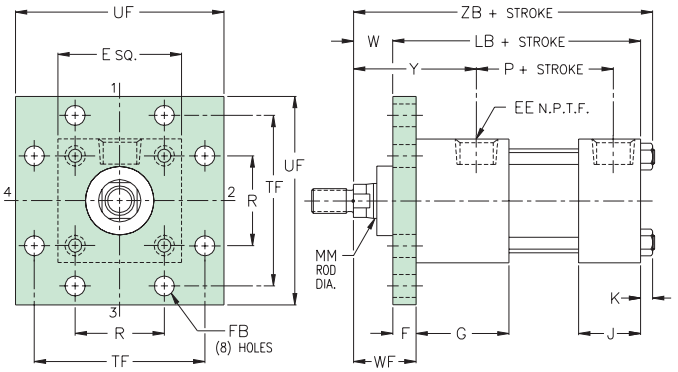
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

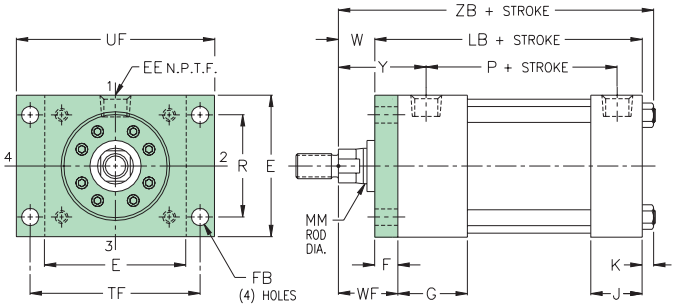
RECTANGULAR FRONT FLANGE

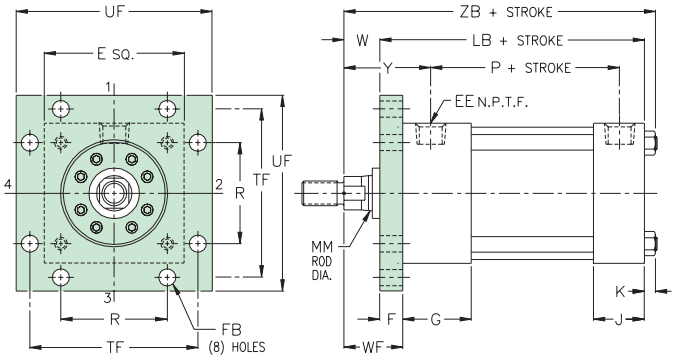


SQUARE FRONT FLANGE MT. MODEL "P" NFPA STYLE MF5

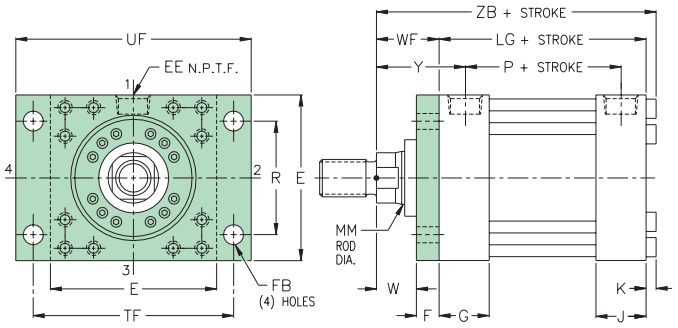


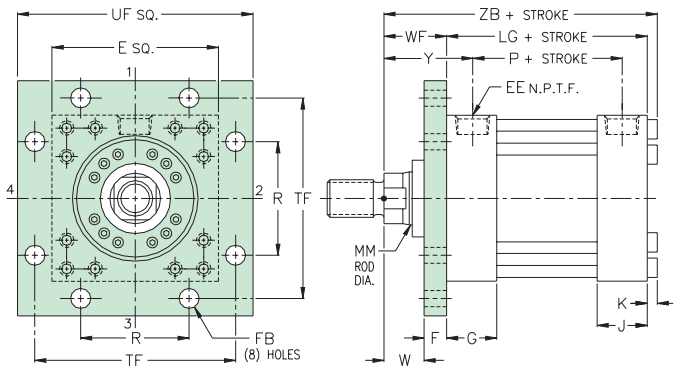
BORE	E	EE	EE1	F	G	J	K	P	R	LB	FB■	TF	UF
1 1/2	2 1/2	1/2	#8	3/8	1 3/4	1 1/2	1/2	3	1.63	5	3/8	3 7/16	4 1/4
2	3	1/2	#8	5/8	1 3/4	1 1/2	5/8	3	2.05	5 1/4	1/2	4 1/8	5 1/8
2 1/2	3 1/2	1/2	#8	5/8	1 3/4	1 1/2	5/8	3 1/8	2.55	5 3/8	1/2	4 5/8	5 5/8





BORE	E	EE	EE1	F	G	J	K	P	R	LB	FB■	TF	UF
3 1/4	4 1/2	3/4	#12	3/4	2	1 3/4	3/4	3 5/8	3.25	6 1/4	5/8	5 7/8	7 1/8
4	5	3/4	#12	7/8	2	1 3/4	3/4	3 7/8	3.82	6 5/8	5/8	6 3/8	7 5/8
5	6 1/2	3/4	#12	7/8	2	1 3/4	1	4 3/8	4.95	7 1/8	7/8	8 3/16	9 3/4
6	7 1/2	1	#16	1	2 1/4	2 1/4	1 1/8	5	5.73	8 3/8	1	9 7/16	11 1/4
7	8 1/2	1 1/4	#20	1	2 3/4	2 3/4	1 1/4	5 3/4	6.58	9 1/2	1 1/8	10 5/8	12 5/8
8	9 1/2	1 1/2	#24	1	3	3	1 7/16	6 1/2	7.50	10 1/2	1 1/4	11 13/16	14





BORE	E	EE	EE1	F	G	J	K	P	R	LG	FB■	TF	UF
10	12 5/8	2	#24	1 11/16	3 11/16	3 11/16	1/2	8 7/16	9.62	12 1/8	1 3/4	15 7/8	19
12	14 7/8	2	#32	1 15/16	4 7/16	4 7/16	1/2	10 3/8	11.45	14 1/2	2	18 1/2	22
14	17 1/4	2	#32	2 3/16	4 7/8	4 7/8	1/2	11 1/8	13.22	15 5/8	2 1/4	21 3/8	25 1/4

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	ZB	WF	RP	PSI RATING MD. "C"	PSI RATING MDL. "P"
1 1/2	5/8	1/4	5/8	1 3/8	1 15/16	6 1/8	1	––	3000	3000
	*1	1/2	1	2 1/8	2 5/16	6 1/2	1 3/8	––	2000	3000
2	1	1/4	3/4	1 7/8	2 5/16	6 5/8	1 3/8	––	3000	3000
	*1 3/8	3/8	1	2 5/8	2 9/16	6 7/8	1 5/8	––	2000	3000
2 1/2	1	1/4	3/4	1 7/8	2 5/16	6 3/4	1 3/8	––	3000	3000
	1 3/8	3/8	1	2 5/8	2 9/16	7	1 5/8	––	2250	3000
	*1 3/4	1/2	1 1/4	3 1/4	2 13/16	7 1/4	1 7/8	––	1750	3000
3 1/4	1 3/8	1/4	7/8	2 1/2	2 11/16	7 7/8	1 5/8	□	3000	3000
	1 3/4	3/8	1 1/8	3 1/8	2 15/16	8 1/8	1 7/8	□	2500	3000
	2	3/8	1 1/4	3 1/2	3 1/16	8 1/4	2	□	2000	3000
4	1 3/4	1/4	1	3	2 15/16	8 3/8	1 7/8	□	3000	3000
	2	1/4	1 1/8	3 3/8	3 1/16	8 1/2	2	□	2500	3000
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	8 3/4	2 1/4	□	2000	3000
5	2	1/4	1 1/8	3 3/8	3 1/16	9 1/4	2	4 1/4	1800	2500
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	9 1/2	2 1/4	4 3/4	1400	2000
	3	3/8	1 3/8	4 7/8	3 5/16	9 1/2	2 1/4	□	1200	1750
	3 1/2	3/8	1 3/8	4 7/8	3 5/16	9 1/2	2 1/4	□	1000	1500
6	2 1/2	1/4	1 1/4	4 1/4	3 7/16	10 3/4	2 1/4	4 3/4	1800	2500
	3	1/4	1 1/4	4 3/4	3 7/16	10 3/4	2 1/4	□	1800	2500
	3 1/2	1/4	1 1/4	4 3/4	3 7/16	10 3/4	2 1/4	□	1400	2000
	4	1/4	1 1/4	5 1/4	3 7/16	10 3/4	2 1/4	□	1000	1500
7	3	1/4	1 1/4	4 3/4	3 3/4	12	2 1/4	6	1300	2000
	3 1/2	1/4	1 1/4	4 3/4	3 3/4	12	2 1/4	□	1300	2000
	4	1/4	1 1/4	5 1/4	3 3/4	12	2 1/4	□	1200	1800
	4 1/2	1/4	1 1/4	5 3/4	3 3/4	12	2 1/4	□	1000	1500
	5	1/4	1 1/4	6 1/4	3 3/4	12	2 1/4	□	800	1200
8	3 1/2	1/4	1 1/4	4 3/4	3 7/8	13 3/16	2 1/4	6 1/2	1000	1500
	4	1/4	1 1/4	5 1/4	3 7/8	13 3/16	2 1/4	□	1000	1500
	4 1/2	1/4	1 1/4	5 3/4	3 7/8	13 3/16	2 1/4	□	900	1400
	5	1/4	1 1/4	6 1/4	3 7/8	13 3/16	2 1/4	□	800	1200
	5 1/2	1/4	1 1/4	6 3/4	3 7/8	13 3/16	2 1/4	□	700	1000
10	4 1/2	1/4	1 1/4	5 3/4	4 15/16	15 9/16	2 15/16	7 3/4	1200	2000
	5	1/2	1 1/2	6 1/2	5 3/16	15 13/16	3 3/16	8 1/2	1000	1750
	5 1/2	1/2	1 1/2	7	5 3/16	15 13/16	3 3/16	9 3/4	1000	1500
	7	1/2	1 1/2	8 1/2	5 3/16	15 13/16	3 3/16	□	800	1200
12	5 1/2	1/4	1 1/4	6 3/4	5 7/16	18 3/16	3 3/16	10	1000	1500
	7	1/4	1 1/4	8 1/4	5 7/16	18 3/16	3 3/16	11 3/4	800	1200
	8	1/2	2 1/2	10 1/2	6 11/16	19 7/16	4 7/16	□	700	1000
14	7	1/4	1 1/4	8 1/4	5 11/16	19 9/16	3 7/16	11 3/4	1000	1500
	8	1/2	2 1/2	10 1/2	6 15/16	20 13/16	4 11/16	13 3/8	800	1200
	9	1/2	2 1/2	11 1/2	6 15/16	20 13/16	4 11/16	□	700	1000

*Cushion at rod end is non-adjustable in these size combinations.
□ Recessed circular bearing retainer is not used in these size combinations. Bearing is retained by flange plate.

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12
A	3/4	1 1/8	1 5/8	2	2 1/4
B	1.124	1.499	1.999	2.374	2.624
C	3/8	1/2	5/8	3/4	7/8
D	1/2	7/8	1 3/16	1 17/32	1 3/4
NA	9/16	15/16	1 5/16	1 23/32	1 15/16

LETTER DIM.	2 1/2	3	3 1/2	4	4 1/2
KK	1 7/8-12	2 1/4-12	2 1/2-12	3-12	3 1/4-12
CC	2 1/4-12	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12
GG	2 1/2-12	3-12	3 1/2-12	4-12	4 1/2-12
A	3	3 1/2	3 1/2	4	4 1/2
B	3.124	3.749	4.249	4.749	5.249
C	1	1	1	1	1
D	2 1/8	2 5/8	3	3 1/2	3 7/8
NA	2 7/16	2 15/16	3 7/16	3 15/16	4 7/16

LETTER DIM.	5	5 1/2	7	8	9
KK	3 1/2-12	4-12	5 1/2-12	5 3/4-12	6 1/2-12
CC	4 3/4-12	5 1/4-12	6 1/2-12	7 1/2-12	8 1/2-12
GG	5-12	5 1/2-12	7-12	8-12	9-12
A	5	5 1/2	7	8	9
B	5.749	6.249	7.999	8.999	9.999
C	1	1	1	2	2
D	4 1/4	4 5/8	––	––	––
NA	4 15/16	5 7/16	6 15/16	7 15/16	8 15/16

"PSI Ratings" shown are recommended maximum operating pressure limits based on strength of cylinder mounting. Stroke length and resultant column strength factors may reduce recommended operating pressure. Refer to page 6 for data to determine effects of stroke length on this value.

Refer to page 2 for reference information on Flange Type mounting styles.

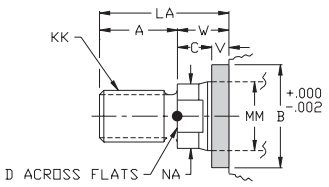
- **"FB" is diameter of mounting bolt.**

EE_1 denotes size of alternate SAE straight thread O-ring style port furnished upon request.

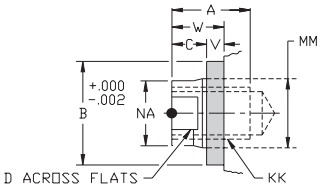
Rods larger than 5 1/2 diameter furnished with (4) 1/2" dia. spanner holes rather than wrench flats.

STANDARD ROD END STYLES

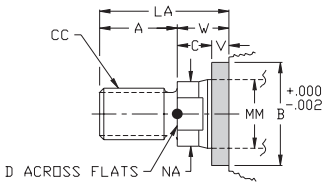
STYLE 2: Small Male Thread NFPA Type SM



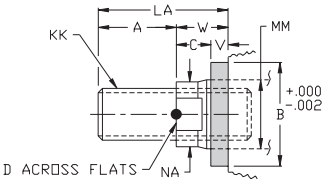
STYLE 4: Short Female Thread NFPA Type SF



STYLE 8: Intermediate Male Thread - NFPA Type IM

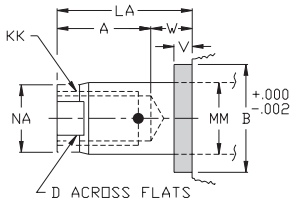


STYLE 5: Studded Small Male Thread - NFPA Type SM

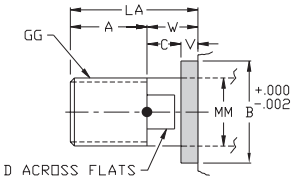


Male #5 additional cost

STYLE 3: Long Female Thread NFPA Type LF

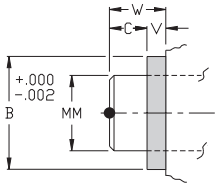


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



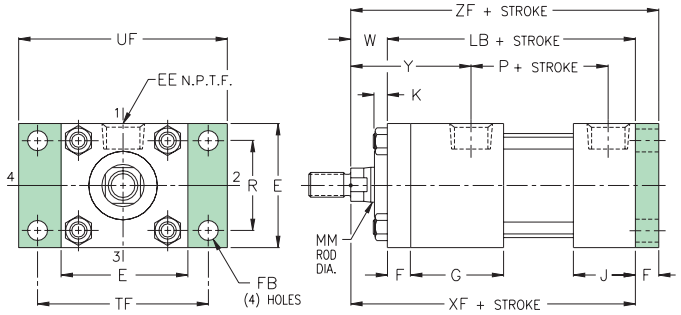
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

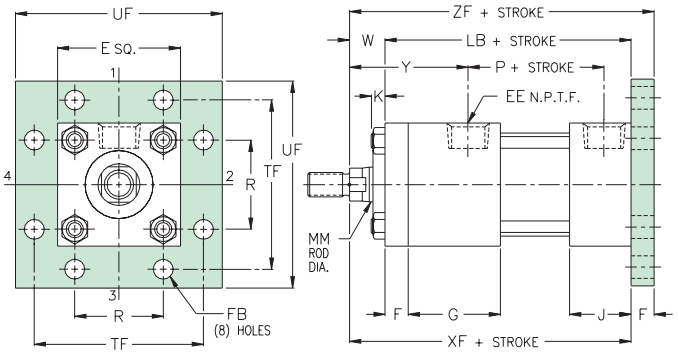
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

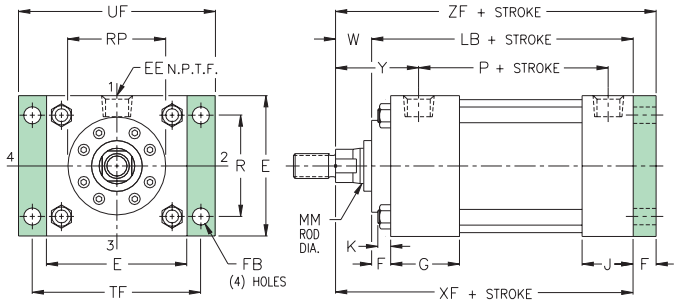
RECTANGULAR REAR FLANGE

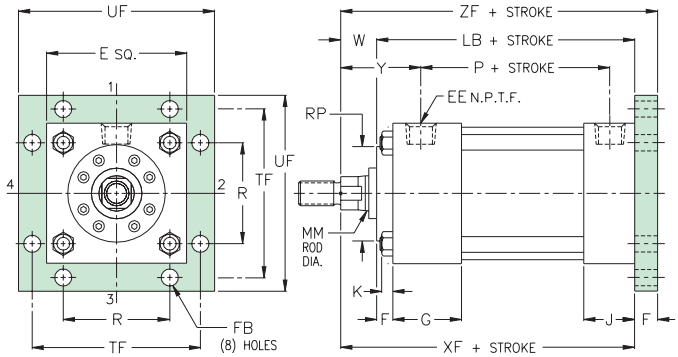


SQUARE REAR FLANGE MOUNT

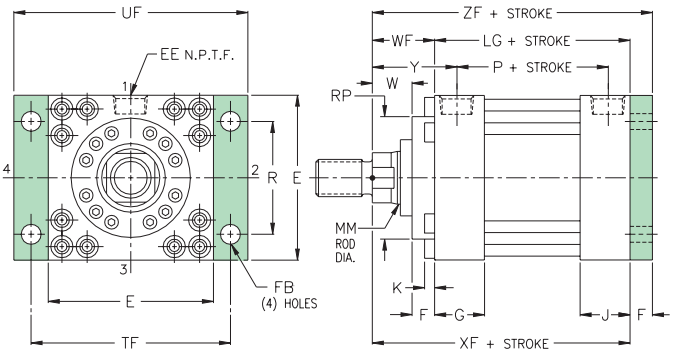


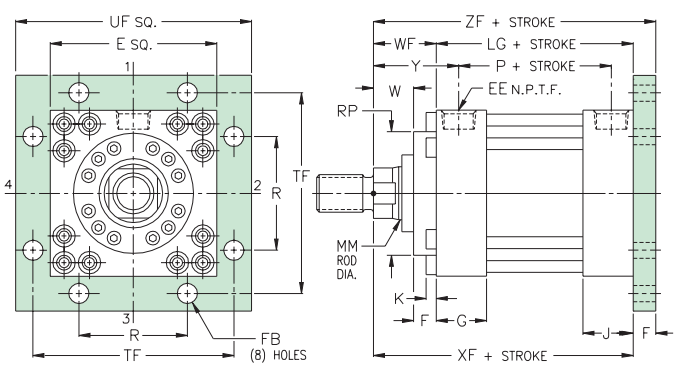
BORE	E	EE	EE1	F	G	J	K	P	R	LB	FB■	TF	UF
1 1/2	2 1/2	1/2	#8	3/8	1 3/4	1 1/2	1/2	3	1.63	5	3/8	3 7/16	4 1/4
2	3	1/2	#8	5/8	1 3/4	1 1/2	5/8	3	2.05	5 1/4	1/2	4 1/8	5 1/8
2 1/2	3 1/2	1/2	#8	5/8	1 3/4	1 1/2	5/8	3 1/8	2.55	5 3/8	1/2	4 5/8	5 5/8





BORE	E	EE	EE1	F	G	J	K	P	R	LB	FB■	TF	UF
3 1/4	4 1/2	3/4	#12	3/4	2	1 3/4	3/4	3 5/8	3.25	6 1/4	5/8	5 7/8	7 1/8
4	5	3/4	#12	7/8	2	1 3/4	3/4	3 7/8	3.82	6 5/8	5/8	6 3/8	7 5/8
5	6 1/2	3/4	#12	7/8	2	1 3/4	1	4 3/8	4.95	7 1/8	7/8	8 3/16	9 3/4
6	7 1/2	1	#16	1	2 1/4	2 1/4	1 1/8	5	5.73	8 3/8	1	9 7/16	11 1/4
7	8 1/2	1 1/4	#20	1	2 3/4	2 3/4	1 1/4	5 3/4	6.58	9 1/2	1 1/8	10 5/8	12 5/8
8	9 1/2	1 1/2	#24	1	3	3	1 7/16	6 1/2	7.50	10 1/2	1 1/4	11 13/16	14





BORE	E	EE	EE1	F	G	J	K	P	R	LG	FB■	TF	UF
10	12 5/8	2	#24	1 11/16	3 11/16	3 11/16	1/2	8 7/16	9.62	12 1/8	1 3/4	15 7/8	19
12	14 7/8	2	#32	1 15/16	4 7/16	4 7/16	1/2	10 3/8	11.45	14 1/2	2	18 1/2	22
14	17 1/4	2	#32	2 3/16	4 7/8	4 7/8	1/2	11 1/8	13.22	15 5/8	2 1/4	21 3/8	25 1/4

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	XF	ZF	WF	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 15/16	5 5/8	6	––	––
	*1	1/2	1	2 1/8	2 5/16	6	6 3/8	––	––
2	1	1/4	3/4	1 7/8	2 5/16	6	6 5/8	––	––
	*1 3/8	3/8	1	2 5/8	2 9/16	6 1/4	6 7/8	––	––
2 1/2	1	1/4	3/4	1 7/8	2 5/16	6 1/8	6 3/4	––	––
	1 3/8	3/8	1	2 5/8	2 9/16	6 3/8	7	––	––
	*1 3/4	1/2	1 1/4	3 1/4	2 13/16	6 5/8	7 1/4	––	––
3 1/4	1 3/8	1/4	7/8	2 1/2	2 11/16	7 1/8	7 7/8	––	3 1/2
	1 3/4	3/8	1 1/8	3 1/8	2 15/16	7 3/8	8 1/8	––	☐
	2	3/8	1 1/4	3 1/2	3 1/16	7 1/2	8 1/4	––	☐
4	1 3/4	1/4	1	3	2 15/16	7 5/8	8 1/2	––	3 7/8
	2	1/4	1 1/8	3 3/8	3 1/16	7 3/4	8 5/8	––	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	8	8 7/8	––	☐
5	2	1/4	1 1/8	3 3/8	3 1/16	8 1/4	9 1/8	––	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	8 1/2	9 3/8	––	4 3/4
	3	3/8	1 3/8	4 7/8	3 5/16	8 1/2	9 3/8	––	☐
	3 1/2	3/8	1 3/8	4 7/8	3 5/16	8 1/2	9 3/8	––	☐
6	2 1/2	1/4	1 1/4	4 1/4	3 7/16	9 5/8	10 5/8	––	4 3/4
	3	1/4	1 1/4	4 3/4	3 7/16	9 5/8	10 5/8	––	6
	3 1/2	1/4	1 1/4	4 3/4	3 7/16	9 5/8	10 5/8	––	☐
	4	1/4	1 1/4	5 1/4	3 7/16	9 5/8	10 5/8	––	☐
7	3	1/4	1 1/4	4 3/4	3 3/4	10 3/4	11 3/4	––	6
	3 1/2	1/4	1 1/4	4 3/4	3 3/4	10 3/4	11 3/4	––	6 1/2
	4	1/4	1 1/4	5 1/4	3 3/4	10 3/4	11 3/4	––	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 3/4	10 3/4	11 3/4	––	☐
	5	1/4	1 1/4	6 1/4	3 3/4	10 3/4	11 3/4	––	☐
8	3 1/2	1/4	1 1/4	4 3/4	3 7/8	11 3/4	12 3/4	––	6 1/2
	4	1/4	1 1/4	5 1/4	3 7/8	11 3/4	12 3/4	––	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 7/8	11 3/4	12 3/4	––	8 3/8
	5	1/4	1 1/4	6 1/4	3 7/8	11 3/4	12 3/4	––	☐
	5 1/2	1/4	1 1/4	6 3/4	3 7/8	11 3/4	12 3/4	––	☐
10	4 1/2	1/4	1 1/4	5 3/4	4 15/16	15 1/16	16 3/4	2 15/16	7 3/4
	5	1/2	1 1/2	6 1/2	5 3/16	15 5/16	17	3 3/16	8 1/2
	5 1/2	1/2	1 1/2	7	5 3/16	15 5/16	17	3 3/16	9 3/4
	7	1/2	1 1/2	8 1/2	5 3/16	15 5/16	17	3 3/16	11
12	5 1/2	1/4	1 1/4	6 3/4	5 7/16	17 11/16	19 5/8	3 3/16	10
	7	1/4	1 1/4	8 1/4	5 7/16	17 11/16	19 5/8	3 3/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 11/16	18 15/16	20 7/8	4 7/16	13 3/8
14	7	1/4	1 1/4	8 1/4	5 11/16	19 1/16	21 1/4	3 7/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 15/16	20 5/16	22 1/2	4 11/16	13 3/8
	9	1/2	2 1/2	11 1/2	6 15/16	20 5/16	22 1/2	4 11/16	14 1/4

*Cushion at rod end is non-adjustable in these size combinations.
☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12
A	3/4	1 1/8	1 5/8	2	2 1/4
B	1.124	1.499	1.999	2.374	2.624
C	3/8	1/2	5/8	3/4	7/8
D	1/2	7/8	1 3/16	1 17/32	1 3/4
NA	9/16	15/16	1 5/16	1 23/32	1 15/16

LETTER DIM.	2 1/2	3	3 1/2	4	4 1/2
KK	1 7/8-12	2 1/4-12	2 1/2-12	3-12	3 1/4-12
CC	2 1/4-12	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12
GG	2 1/2-12	3-12	3 1/2-12	4-12	4 1/2-12
A	3	3 1/2	3 1/2	4	4 1/2
B	3.124	3.749	4.249	4.749	5.249
C	1	1	1	1	1
D	2 1/8	2 5/8	3	3 1/2	3 7/8
NA	2 7/16	2 15/16	3 7/16	3 15/16	4 7/16

LETTER DIM.	5	5 1/2	7	8	9
KK	3 1/2-12	4-12	5 1/2-12	5 3/4-12	6 1/2-12
CC	4 3/4-12	5 1/4-12	6 1/2-12	7 1/2-12	8 1/2-12
GG	5-12	5 1/2-12	7-12	8-12	9-12
A	5	5 1/2	7	8	9
B	5.749	6.249	7.999	8.999	9.999
C	1	1	1	2	2
D	4 1/4	4 5/8	––	––	––
NA	4 15/16	5 7/16	6 15/16	7 15/16	8 15/16

Refer to "PSI Rating" values given for Models "C" and "P" in this section. The figure shown for the smallest rod offered in each Bore size represents the "PSI Rating" for Models "D" and "R" respectively regardless of rod diameter. Stroke length and resultant column strength factors may reduce recommended operating pressure. Refer to page 6 for data to determine stroke length effects on this value.

Refer to page 2 for reference information on Flange Type mounting styles.

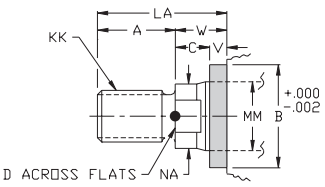
▪ "FB" is diameter of mounting bolt.

EE_1 denotes size of alternate SAE straight thread O-ring style port furnished upon request.

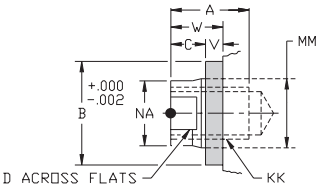
Rods larger than 5 1/2 diameter furnished with (4) 1/2" dia. spanner holes rather than wrench flats.

STANDARD ROD END STYLES

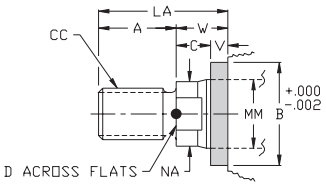
STYLE 2: Small Male Thread NFPA Type SM



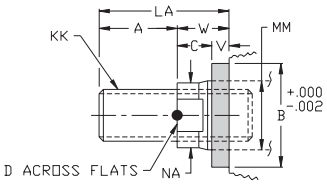
STYLE 4: Short Female Thread NFPA Type SF



STYLE 8: Intermediate Male Thread -NFPA Type IM

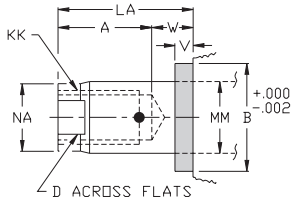


STYLE 5: Studded Small Male Thread -NFPA Type SM

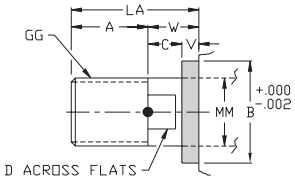


Male #5 additional cost

STYLE 3: Long Female Thread NFPA Type LF

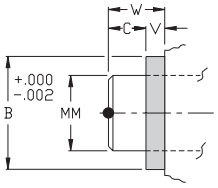


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



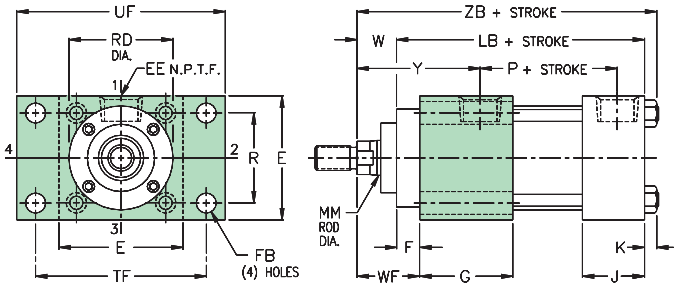
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

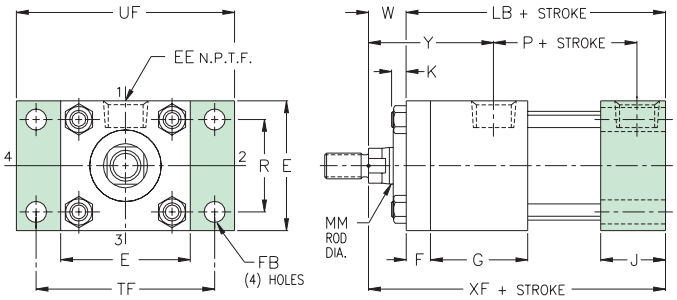
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

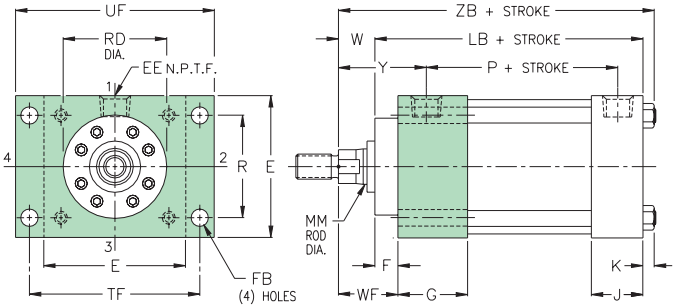
RECTANGULAR FRONT HEAD MT.

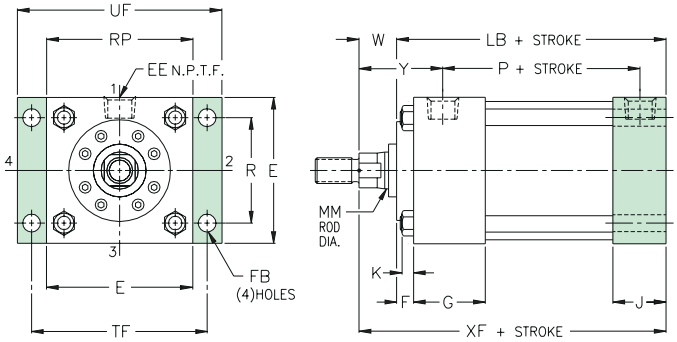


RECTANGULAR REAR HEAD MT.

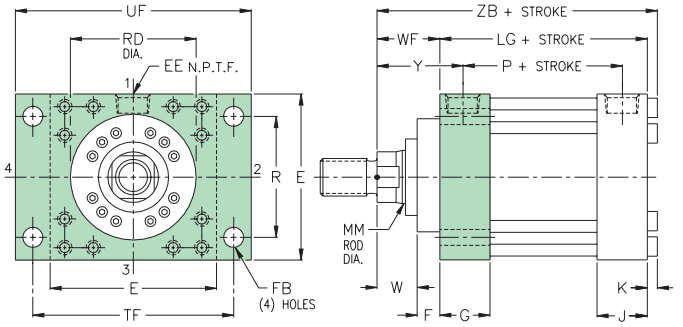


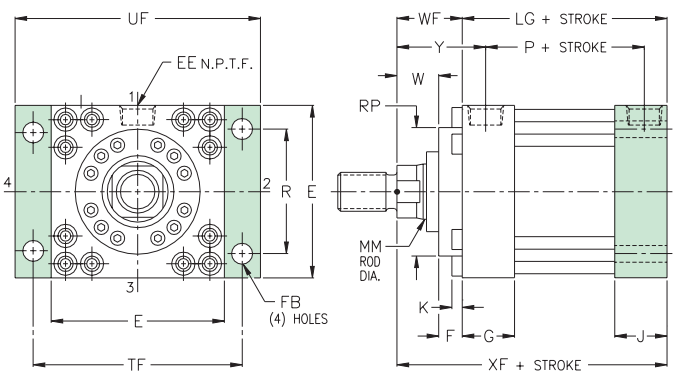
BORE	E	EE	EE1	F	G	J	K	P	R	LB	FB■	TF	UF
1 1/2	2 1/2	1/2	#8	3/8	1 3/4	1 1/2	1/2	3	1.63	5	3/8	3 7/16	4 1/4
2	3	1/2	#8	5/8	1 3/4	1 1/2	5/8	3	2.05	5 1/4	1/2	4 1/8	5 1/8
2 1/2	3 1/2	1/2	#8	5/8	1 3/4	1 1/2	5/8	3 1/8	2.55	5 3/8	1/2	4 5/8	5 5/8





BORE	E	EE	EE1	F	G	J	K	P	R	LB	FB■	TF	UF
3 1/4	4 1/2	3/4	#12	3/4	2	1 3/4	3/4	3 5/8	3.25	6 1/4	5/8	5 7/8	7 1/8
4	5	3/4	#12	7/8	2	1 3/4	3/4	3 7/8	3.82	6 5/8	5/8	6 3/8	7 5/8
5	6 1/2	3/4	#12	7/8	2	1 3/4	1	4 3/8	4.95	7 1/8	7/8	8 3/16	9 3/4
6	7 1/2	1	#16	1	2 1/4	2 1/4	1 1/8	5	5.73	8 3/8	1	9 7/16	11 1/4
7	8 1/2	1 1/4	#20	1	2 3/4	2 3/4	1 1/4	5 3/4	6.58	9 1/2	1 1/8	10 5/8	12 5/8
8	9 1/2	1 1/2	#24	1	3	3	1 7/16	6 1/2	7.50	10 1/2	1 1/4	11 13/16	14





BORE	E	EE	EE1	F	G	J	K	P	R	LG	FB■	TF	UF
10	12 5/8	2	#24	1 11/16	3 11/16	3 11/16	1/2	8 7/16	9.62	12 1/8	1 3/4	15 7/8	19
12	14 7/8	2 1/2	#32	1 15/16	4 7/16	4 7/16	1/2	10 3/8	11.45	14 1/2	2	18 1/2	22
14	17 1/4	3	#32	2 3/16	4 7/8	4 7/8	1/2	11 1/8	13.22	15 5/8	2 1/4	21 3/8	25 1/4

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	ZB	XF	WF	RD	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 15/16	6 1/8	5 5/8	1	2.124	--
	*1	1/2	1	2 1/8	2 5/16	6 1/2	6	1 3/8	2.499	--
2	1	1/4	3/4	1 7/8	2 5/16	6 5/8	6	1 3/8	2.499	--
	*1 3/8	3/8	1	2 5/8	2 9/16	6 7/8	6 1/4	1 5/8	2.999	--
2 1/2	1	1/4	3/4	1 7/8	2 5/16	6 3/4	6 1/8	1 3/8	2.499	--
	1 3/8	3/8	1	2 5/8	2 9/16	7	6 3/8	1 5/8	2.999	--
	*1 3/4	1/2	1 1/4	3 1/4	2 13/16	7 1/4	6 5/8	1 7/8	3.499	--
3 1/4	1 3/8	1/4	7/8	2 1/2	2 11/16	7 7/8	7 1/8	1 5/8	2.999	3 1/2
	1 3/4	3/8	1 1/8	3 1/8	2 15/16	8 1/8	7 3/8	1 7/8	3.499	--
	2	3/8	1 1/4	3 1/2	3 1/16	8 1/4	7 1/2	2	3.999	--
4	1 3/4	1/4	1	3	2 15/16	8 3/8	7 5/8	1 7/8	3.499	3 7/8
	2	1/4	1 1/8	3 3/8	3 1/16	8 1/2	7 3/4	2	3.999	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	8 3/4	8	2 1/4	4.499	☐
5	2	1/4	1 1/8	3 3/8	3 1/16	9 1/4	8 1/4	2	3.999	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	9 1/2	8 1/2	2 1/4	4.499	4 3/4
	3	3/8	1 3/8	4 7/8	3 5/16	9 1/2	8 1/2	2 1/4	5.249	☐
	3 1/2	3/8	1 3/8	4 7/8	3 5/16	9 1/2	8 1/2	2 1/4	5.749	☐
6	2 1/2	1/4	1 1/4	4 1/4	3 7/16	10 3/4	9 5/8	2 1/4	4.499	4 3/4
	3	1/4	1 1/4	4 3/4	3 7/16	10 3/4	9 5/8	2 1/4	5.249	6
	3 1/2	1/4	1 1/4	4 3/4	3 7/16	10 3/4	9 5/8	2 1/4	5.749	☐
	4	1/4	1 1/4	5 1/4	3 7/16	10 3/4	9 5/8	2 1/4	6.499	☐
7	3	1/4	1 1/4	4 3/4	3 3/4	12	10 3/4	2 1/4	5.249	6
	3 1/2	1/4	1 1/4	4 3/4	3 3/4	12	10 3/4	2 1/4	5.749	6 1/2
	4	1/4	1 1/4	5 1/4	3 3/4	12	10 3/4	2 1/4	6.499	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 3/4	12	10 3/4	2 1/4	6.999	☐
	5	1/4	1 1/4	6 1/4	3 3/4	12	10 3/4	2 1/4	7.499	☐
8	3 1/2	1/4	1 1/4	4 3/4	3 7/8	13 3/16	11 3/4	2 1/4	5.749	6 1/2
	4	1/4	1 1/4	5 1/4	3 7/8	13 3/16	11 3/4	2 1/4	6.499	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 7/8	13 3/16	11 3/4	2 1/4	6.999	8 3/8
	5	1/4	1 1/4	6 1/4	3 7/8	13 3/16	11 3/4	2 1/4	7.499	☐
	5 1/2	1/4	1 1/4	6 3/4	3 7/8	13 3/16	11 3/4	2 1/4	8.249	☐
10	4 1/2	1/4	1 1/4	5 3/4	4 15/16	15 9/16	15 1/16	2 15/16	6.999	7 3/4
	5	1/2	1 1/2	6 1/2	5 3/16	15 13/16	15 5/16	3 3/16	7.499	8 1/2
	5 1/2	1/2	1 1/2	7	5 3/16	15 13/16	15 5/16	3 3/16	8.249	9 3/4
	7	1/2	1 1/2	8 1/2	5 3/16	15 13/16	15 5/16	3 3/16	10.749	11
12	5 1/2	1/4	1 1/4	6 3/4	5 7/16	18 3/16	17 11/16	3 3/16	8.249	10
	7	1/4	1 1/4	8 1/4	5 7/16	18 3/16	17 11/16	3 3/16	10.749	11 3/4
	8	1/2	2 1/2	10 1/2	6 11/16	19 7/16	18 15/16	4 7/16	12.374	13 3/8
14	7	1/4	1 1/4	8 1/4	5 11/16	19 9/16	19 1/16	3 7/16	10.749	11 3/4
	8	1/2	2 1/2	10 1/2	6 15/16	20 13/16	20 5/16	4 11/16	12.374	13 3/8
	9	1/2	2 1/2	11 1/2	6 15/16	20 13/16	20 5/16	4 11/16	13.124	14 1/4

*Cushion at rod end is non-adjustable in these size combinations.
Cushion Adjusting Screw and Ball Check not available at position #2 or #4 on mounting end of unit.
☐ Circular retainer not used in these size combinations. Plate furnished is "E" square (applies to Model "T" only).

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12
A	3/4	1 1/8	1 5/8	2	2 1/4
B	1.124	1.499	1.999	2.374	2.624
C	3/8	1/2	5/8	3/4	7/8
D	1/2	7/8	1 3/16	1 17/32	1 3/4
NA	9/16	15/16	1 5/16	1 23/32	1 15/16

LETTER DIM.	2 1/2	3	3 1/2	4	4 1/2
KK	1 7/8-12	2 1/4-12	2 1/2-12	3-12	3 1/4-12
CC	2 1/4-12	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12
GG	2 1/2-12	3-12	3 1/2-12	4-12	4 1/2-12
A	3	3 1/2	3 1/2	4	4 1/2
B	3.124	3.749	4.249	4.749	5.249
C	1	1	1	1	1
D	2 1/8	2 5/8	3	3 1/2	3 7/8
NA	2 7/16	2 15/16	3 7/16	3 15/16	4 7/16

LETTER DIM.	5	5 1/2	7	8	9
KK	3 1/2-12	4-12	5 1/2-12	5 3/4-12	6 1/2-12
CC	4 3/4-12	5 1/4-12	6 1/2-12	7 1/2-12	8 1/2-12
GG	5-12	5 1/2-12	7-12	8-12	9-12
A	5	5 1/2	7	8	9
B	5.749	6.249	7.999	8.999	9.999
C	1	1	1	2	2
D	4 1/4	4 5/8	--	--	--
NA	4 15/16	5 7/16	6 15/16	7 15/16	8 15/16

Rectangular Head mounting styles are rated for 3000 psi service. Stroke length and resultant column strength factors may reduce recommended operating pressure. Refer to page 6 for data to determine effect of stroke length on this value.

Refer to page 2 for reference information on Flange Type mounting styles.

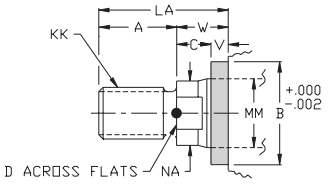
- **"FB" is diameter of mounting bolt.**

EE_1 denotes size of alternate SAE straight thread O-ring style port furnished upon request.

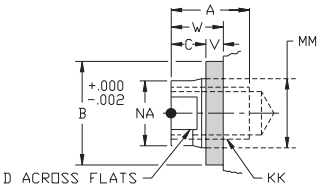
Rods larger than 5 1/2 diameter furnished with (4) 1/2" dia. spanner holes rather than wrench flats.

STANDARD ROD END STYLES

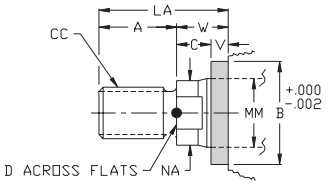
STYLE 2: Small Male Thread NFPA Type SM



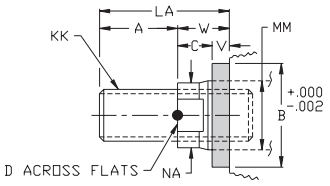
STYLE 4: Short Female Thread NFPA Type SF



STYLE 8: Intermediate Male Thread - NFPA Type IM

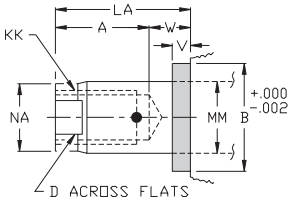


STYLE 5: Studded Small Male Thread - NFPA Type SM

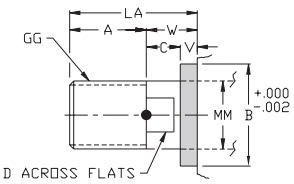


Male #5 additional cost

STYLE 3: Long Female Thread NFPA Type LF

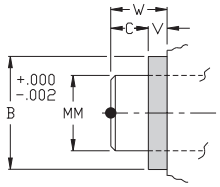


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



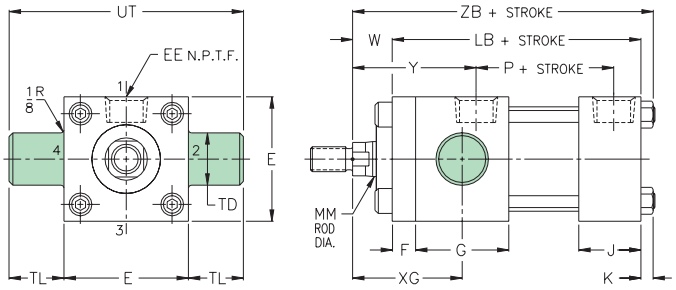
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

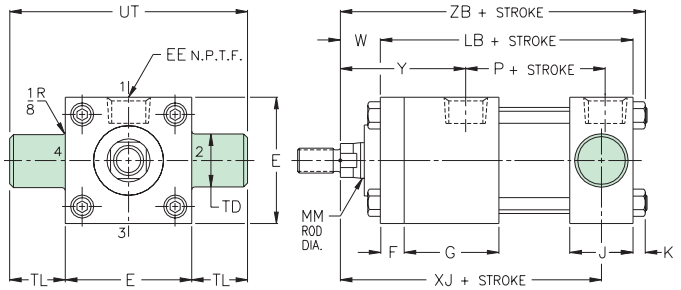
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

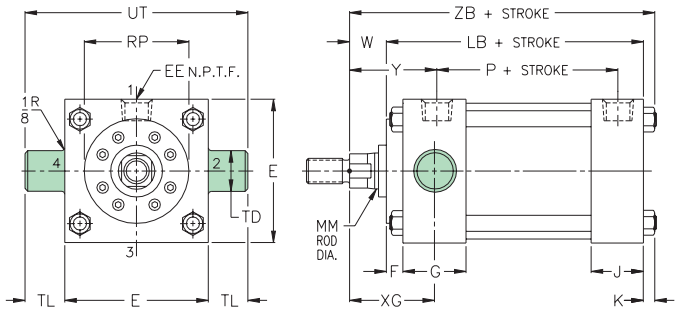
FRONT TRUNNION MOUNT MODEL "E" NFPA STYLE MT1

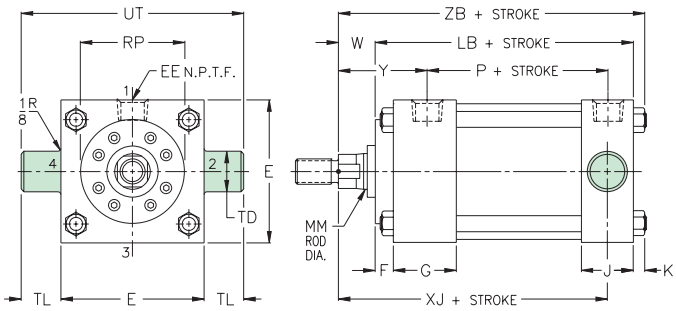


REAR TRUNNION MOUNT MODEL "F" NFPA STYLE MT2

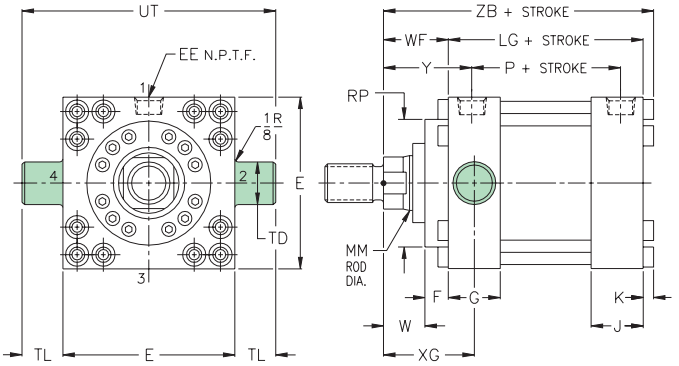


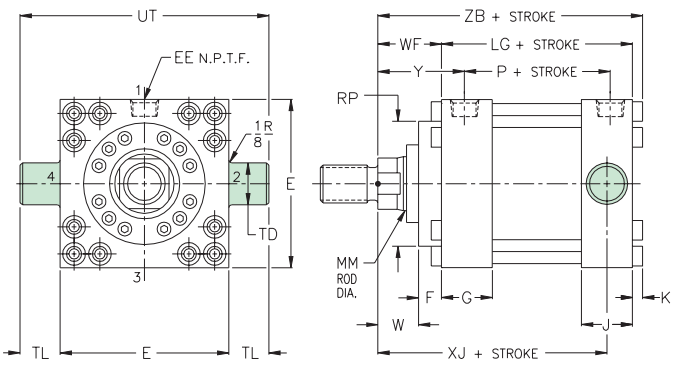
BORE	E	EE	EE_1	F	G	J	K	P	LB	$TD^{+.000}_{-.002}$	TL	UT
1 1/2	2 1/2	1/2	#8	3/8	1 3/4	1 1/2	1/2	3	5	1.000	1	4 1/2
2	3	1/2	#8	5/8	1 3/4	1 1/2	5/8	3	5 1/4	1.375	1 3/8	5 3/4
2 1/2	3 1/2	1/2	#8	5/8	1 3/4	1 1/2	5/8	3 1/8	5 3/8	1.375	1 3/8	6 1/4





BORE	E	EE	EE_1	F	G	J	K	P	LB	$TD^{+.000}_{-.002}$	TL	UT
3 1/4	4 1/2	3/4	#12	3/4	2	1 3/4	3/4	3 5/8	6 1/4	1.750	1 3/4	8
4	5	3/4	#12	7/8	2	1 3/4	3/4	3 7/8	6 5/8	1.750	1 3/4	8 1/2
5	6 1/2	3/4	#12	7/8	2	1 3/4	1	4 3/8	7 1/8	1.750	1 3/4	10
6	7 1/2	1	#16	1	2 1/4	2 1/4	1 1/8	5	8 3/8	2.000	2	11 1/2
7	8 1/2	1 1/4	#20	1	2 3/4	2 3/4	1 1/4	5 3/4	9 1/2	2.500	2 1/2	13 1/2
8	9 1/2	1 1/2	#24	1	3	3	1 7/16	6 1/2	10 1/2	3.000	3	15 1/2





BORE	E	EE	EE_1	F	G	J	K	P	LG	$TD^{+.000}_{-.002}$	TL	UT
10	12 5/8	2	#24	1 11/16	3 11/16	3 11/16	1/2	8 7/16	12 1/8	3.500	3 1/2	19 5/8
12	14 7/8	2	#32	1 15/16	4 7/16	4 7/16	1/2	10 3/8	14 1/2	4.000	4	22 7/8
14	17 1/4	2	#32	2 3/16	4 7/8	4 7/8	1/2	11 1/8	15 5/8	5.000	5	27 1/4

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	XG	XJ	ZB	WF	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 15/16	1 7/8	4 7/8	6 1/8	--	--
	*1	1/2	1	2 1/8	2 5/16	2 1/4	5 1/4	6 1/2	--	--
2	1	1/4	3/4	1 7/8	2 5/16	2 1/4	5 1/4	6 5/8	--	--
	*1 3/8	3/8	1	2 5/8	2 9/16	2 1/2	5 1/2	6 7/8	--	--
2 1/2	1	1/4	3/4	1 7/8	2 5/16	2 1/4	5 3/8	6 3/4	--	--
	1 3/8	3/8	1	2 5/8	2 9/16	2 1/2	5 5/8	7	--	--
	*1 3/4	1/2	1 1/4	3 1/4	2 13/16	2 3/4	5 7/8	7 1/4	--	--
3 1/4	1 3/8	1/4	7/8	2 1/2	2 11/16	2 5/8	6 1/4	7 7/8	--	3 1/2
	1 3/4	3/8	1 1/8	3 1/8	2 15/16	2 7/8	6 1/2	8 1/8	--	☐
	2	3/8	1 1/4	3 1/2	3 1/16	3	6 5/8	8 1/4	--	☐
4	1 3/4	1/4	1	3	2 15/16	2 7/8	6 3/4	8 3/8	--	3 7/8
	2	1/4	1 1/8	3 3/8	3 1/16	3	6 7/8	8 1/2	--	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	3 1/4	7 1/8	8 3/4	--	☐
5	2	1/4	1 1/8	3 3/8	3 1/16	3	7 3/8	9 1/4	--	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	3 1/4	7 5/8	9 1/2	--	4 3/4
	3	3/8	1 3/8	4 7/8	3 5/16	3 1/4	7 5/8	9 1/2	--	☐
	3 1/2	3/8	1 3/8	4 7/8	3 5/16	3 1/4	7 5/8	9 1/2	--	☐
6	2 1/2	1/4	1 1/4	4 1/4	3 7/16	3 3/8	8 3/8	10 3/4	--	4 3/4
	3	1/4	1 1/4	4 3/4	3 7/16	3 3/8	8 3/8	10 3/4	--	6
	3 1/2	1/4	1 1/4	4 3/4	3 7/16	3 3/8	8 3/8	10 3/4	--	☐
	4	1/4	1 1/4	5 1/4	3 7/16	3 3/8	8 3/8	10 3/4	--	☐
7	3	1/4	1 1/4	4 3/4	3 3/4	3 5/8	9 3/8	12	--	6
	3 1/2	1/4	1 1/4	4 3/4	3 3/4	3 5/8	9 3/8	12	--	6 1/2
	4	1/4	1 1/4	5 1/4	3 3/4	3 5/8	9 3/8	12	--	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 3/4	3 5/8	9 3/8	12	--	☐
	5	1/4	1 1/4	6 1/4	3 3/4	3 5/8	9 3/8	12	--	☐
8	3 1/2	1/4	1 1/4	4 3/4	3 7/8	3 3/4	10 1/4	13 3/16	--	6 1/2
	4	1/4	1 1/4	5 1/4	3 7/8	3 3/4	10 1/4	13 3/16	--	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 7/8	3 3/4	10 1/4	13 3/16	--	8 3/8
	5	1/4	1 1/4	6 1/4	3 7/8	3 3/4	10 1/4	13 3/16	--	☐
	5 1/2	1/4	1 1/4	6 3/4	3 7/8	3 3/4	10 1/4	13 3/16	--	☐
10	4 1/2	1/4	1 1/4	5 3/4	4 15/16	4 3/4	13 1/4	15 9/16	2 15/16	7 3/4
	5	1/2	1 1/2	6 1/2	5 3/16	5	13 1/2	15 13/16	3 3/16	8 1/2
	5 1/2	1/2	1 1/2	7	5 3/16	5	13 1/2	15 13/16	3 3/16	9 3/4
	7	1/2	1 1/2	8 1/2	5 3/16	5	13 1/2	15 13/16	3 3/16	11
12	5 1/2	1/4	1 1/4	6 3/4	5 7/16	5 3/8	15 1/2	18 3/16	3 3/16	10
	7	1/4	1 1/4	8 1/4	5 7/16	5 3/8	15 1/2	18 3/16	3 3/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 11/16	6 5/8	16 3/4	19 7/16	4 7/16	13 3/8
14	7	1/4	1 1/4	8 1/4	5 11/16	5 13/16	16 11/16	19 9/16	3 7/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 15/16	7 1/16	17 15/16	20 13/16	4 11/16	13 3/8
	9	1/2	2 1/2	11 1/2	6 15/16	7 1/16	17 15/16	20 13/16	4 11/16	14 1/4

*Cushion at rod end is non-adjustable in these size combinations.
☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12
A	3/4	1 1/8	1 5/8	2	2 1/4
B	1.124	1.499	1.999	2.374	2.624
C	3/8	1/2	5/8	3/4	7/8
D	1/2	7/8	1 3/16	1 17/32	1 3/4
NA	9/16	15/16	1 5/16	1 23/32	1 15/16

LETTER DIM.	2 1/2	3	3 1/2	4	4 1/2
KK	1 7/8-12	2 1/4-12	2 1/2-12	3-12	3 1/4-12
CC	2 1/4-12	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12
GG	2 1/2-12	3-12	3 1/2-12	4-12	4 1/2-12
A	3	3 1/2	3 1/2	4	4 1/2
B	3.124	3.749	4.249	4.749	5.249
C	1	1	1	1	1
D	2 1/8	2 5/8	3	3 1/2	3 7/8
NA	2 7/16	2 15/16	3 7/16	3 15/16	4 7/16

LETTER DIM.	5	5 1/2	7	8	9
KK	3 1/2-12	4-12	5 1/2-12	5 3/4-12	6 1/2-12
CC	4 3/4-12	5 1/4-12	6 1/2-12	7 1/2-12	8 1/2-12
GG	5-12	5 1/2-12	7-12	8-12	9-12
A	5	5 1/2	7	8	9
B	5.749	6.249	7.999	8.999	9.999
C	1	1	1	2	2
D	4 1/4	4 5/8	--	--	--
NA	4 15/16	5 7/16	6 15/16	7 15/16	8 15/16

NFPA Standards allow two sets of acceptable dimensions for "XG" which designates the trunnion pin location on Front Trunnion models in bore sizes 1 1/2" thru 6". If given dimension does not satisfy location requirements, the alternate NFPA location (given "XG" plus 1/8") is available upon request.

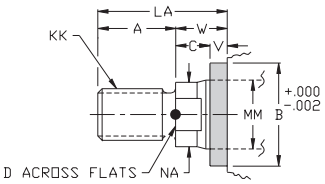
Trunnion mounted cylinders should be installed with suitable rod end attachment that allows pivoting at both points. Rod end accessories for this purpose are shown on page 78.

EE1 denotes size of alternate SAE straight thread O-ring style port furnished upon request.

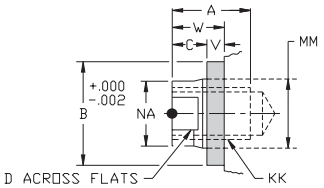
Rods larger than 5 1/2 diameter furnished with (4) 1/2" dia. spanner holes rather than wrench flats.

STANDARD ROD END STYLES

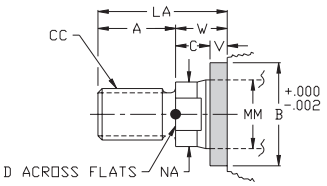
STYLE 2: Small Male Thread NFPA Type SM



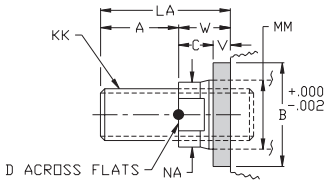
STYLE 4: Short Female Thread NFPA Type SF



STYLE 8: Intermediate Male Thread -NFPA Type IM

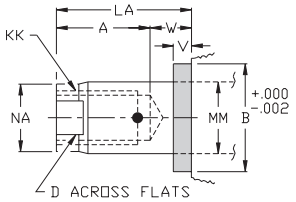


STYLE 5: Studded Small Male Thread -NFPA Type SM

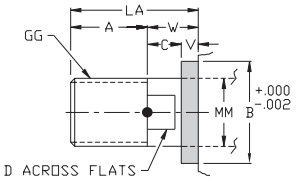


Male #5 additional cost

STYLE 3: Long Female Thread NFPA Type LF

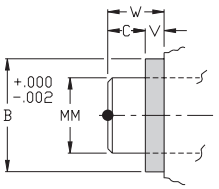


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



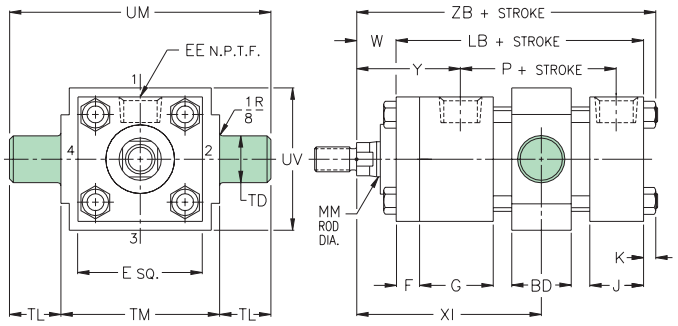
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

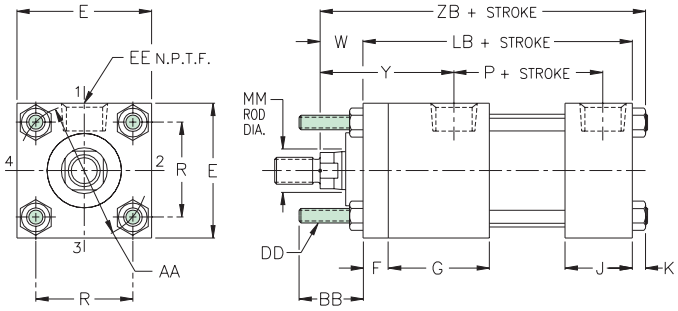
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

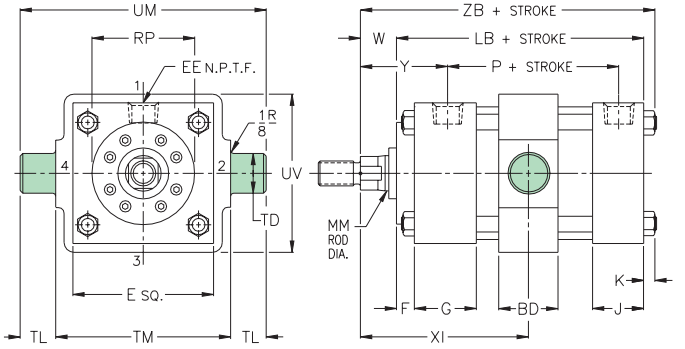
INTERMEDIATE TRUNNION MT. MODEL "N" NFPA STYLE MT4

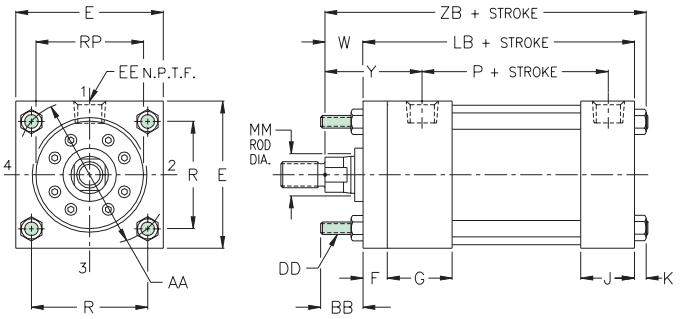


EXTENDED TIE ROD MOUNT MODEL "L" NFPA STYLE MX1, MX2 & MX3

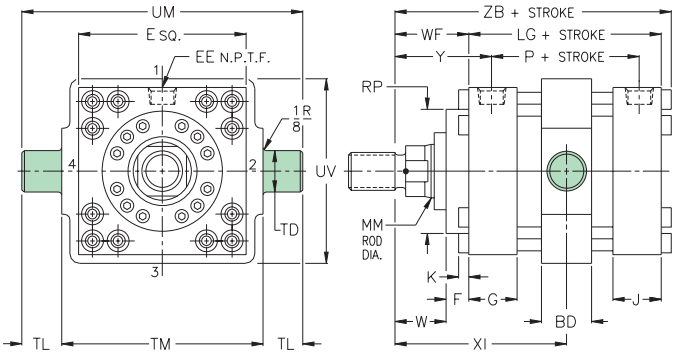


BORE	E	EE	EE1	F	G	J	K	P	R	LB	AA	BB	DD	TD +.000 −.002	TL	TM	UM	UV	BD
1 1/2	2 1/2	1/2	#8	3/8	1 3/4	1 1/2	1/2	3	1.63	5	2.30	1 3/8	3/8-24	1.000	1	3	5	2 3/4	1 1/4
2	3	1/2	#8	5/8	1 3/4	1 1/2	5/8	3	2.05	5 1/4	2.90	1 13/16	1/2-20	1.375	1 3/8	3 1/2	6 1/4	3 1/4	1 1/2
2 1/2	3 1/2	1/2	#8	5/8	1 3/4	1 1/2	5/8	3 1/8	2.55	5 3/8	3.61	1 13/16	1/2-20	1.375	1 3/8	4	6 3/4	3 3/4	1 3/4





BORE	E	EE	EE1	F	G	J	K	P	R	LB	AA	BB	DD	TD +.000 −.002	TL	TM	UM	UV	BD
3 1/4	4 1/2	3/4	#12	3/4	2	1 3/4	3/4	3 5/8	3.25	6 1/4	4.60	2 5/16	5/8-18	1.750	1 3/4	5	8 1/2	4 3/4	2
4	5	3/4	#12	7/8	2	1 3/4	3/4	3 7/8	3.82	6 5/8	5.40	2 5/16	5/8-18	1.750	1 3/4	5 1/2	9	5 1/4	2 1/4
5	6 1/2	3/4	#12	7/8	2	1 3/4	1	4 3/8	4.95	7 1/8	7.00	3 3/16	7/8-14	1.750	1 3/4	7	10 1/2	6 3/4	2 1/4
6	7 1/2	1	#16	1	2 1/4	2 1/4	1 1/8	5	5.73	8 3/8	8.10	3 5/8	1-14	2.000	2	8 1/2	12 1/2	7 3/4	3
7	8 1/2	1 1/4	#20	1	2 3/4	2 3/4	1 1/4	5 3/4	6.58	9 1/2	9.30	4 1/8	1 1/8-12	2.500	2 1/2	9 3/4	14 3/4	8 3/4	3
8	9 1/2	1 1/2	#24	1	3	3	1 7/16	6 1/2	7.50	10 1/2	10.61	4 1/2	1 1/4-12	3.000	3	11	17	9 3/4	4



MODEL "L" Extended Tie Rod mount cylinders are available in bore sizes 1 1/2" thru 8".

The tie rod extensions may be located on either one or both ends of the cylinder as needed to suit mounting requirements. The position of the desired extension must be provided to complete ordering information.

The following NFPA codes may be used to express this variable:

STYLE MX1 — **TIE RODS EXTENDED ON BOTH ENDS.**
STYLE MX2 — **TIE RODS EXTENDED ON REAR HEAD END ONLY.**
STYLE MX3 — **TIE RODS EXTENDED ON FRONT HEAD END ONLY.**

BORE	E	EE	EE1	F	G	J	K	P	LG	TD +.000 −.002	TL	TM	UM	UV	BD
10	12 5/8	2	#24	1 11/16	3 11/16	3 11/16	1/2	8 7/16	12 1/8	3.500	3 1/2	14	21	13	4
12	14 7/8	2	#32	1 15/16	4 7/16	4 7/16	1/2	10 3/8	14 1/2	4.000	4	16 1/2	24 1/2	15 1/2	4 1/2
14	17 1/4	2	#32	2 3/16	4 7/8	4 7/8	1/2	11 1/8	15 5/8	5.000	5	19 5/8	29 5/8	19 1/2	5 1/4

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	ZB	WF	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 15/16	6 1/8	--	--
	*1	1/2	1	2 1/8	2 5/16	6 1/2	--	--
2	1	1/4	3/4	1 7/8	2 5/16	6 5/8	--	--
	*1 3/8	3/8	1	2 5/8	2 9/16	6 7/8	--	--
2 1/2	1	1/4	3/4	1 7/8	2 5/16	6 3/4	--	--
	1 3/8	3/8	1	2 5/8	2 9/16	7	--	--
	*1 3/4	1/2	1 1/4	3 1/4	2 13/16	7 1/4	--	--
3 1/4	1 3/8	1/4	7/8	2 1/2	2 11/16	7 7/8	--	3 1/2
	1 3/4	3/8	1 1/8	3 1/8	2 15/16	8 1/8	--	☐
	2	3/8	1 1/4	3 1/2	3 1/16	8 1/4	--	☐
4	1 3/4	1/4	1	3	2 15/16	8 3/8	--	3 7/8
	2	1/4	1 1/8	3 3/8	3 1/16	8 1/2	--	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	8 3/4	--	☐
5	2	1/4	1 1/8	3 3/8	3 1/16	9 1/4	--	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	9 1/2	--	4 3/4
	3	3/8	1 3/8	4 7/8	3 5/16	9 1/2	--	☐
	3 1/2	3/8	1 3/8	4 7/8	3 5/16	9 1/2	--	☐
6	2 1/2	1/4	1 1/4	4 1/4	3 7/16	10 3/4	--	4 3/4
	3	1/4	1 1/4	4 3/4	3 7/16	10 3/4	--	6
	3 1/2	1/4	1 1/4	4 3/4	3 7/16	10 3/4	--	☐
	4	1/4	1 1/4	5 1/4	3 7/16	10 3/4	--	☐
7	3	1/4	1 1/4	4 3/4	3 3/4	12	--	6
	3 1/2	1/4	1 1/4	4 3/4	3 3/4	12	--	6 1/2
	4	1/4	1 1/4	5 1/4	3 3/4	12	--	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 3/4	12	--	☐
	5	1/4	1 1/4	6 1/4	3 3/4	12	--	☐
8	3 1/2	1/4	1 1/4	4 3/4	3 7/8	13 3/16	--	6 1/2
	4	1/4	1 1/4	5 1/4	3 7/8	13 3/16	--	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 7/8	13 3/16	--	8 3/8
	5	1/4	1 1/4	6 1/4	3 7/8	13 3/16	--	☐
	5 1/2	1/4	1 1/4	6 3/4	3 7/8	13 3/16	--	☐
10	4 1/2	1/4	1 1/4	5 3/4	4 15/16	15 9/16	2 15/16	7 3/4
	5	1/2	1 1/2	6 1/2	5 3/16	15 13/16	3 3/16	8 1/2
	5 1/2	1/2	1 1/2	7	5 3/16	15 13/16	3 3/16	9 3/4
	7	1/2	1 1/2	8 1/2	5 3/16	15 13/16	3 3/16	11
12	5 1/2	1/4	1 1/4	6 3/4	5 7/16	18 3/16	3 3/16	10
	7	1/4	1 1/4	8 1/4	5 7/16	18 3/16	3 3/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 11/16	19 7/16	4 7/16	13 3/8
14	7	1/4	1 1/4	8 1/4	5 11/16	19 9/16	3 7/16	11 3/4
	8	1/2	2 1/2	10 1/2	6 15/16	20 13/16	4 11/16	13 3/8
	9	1/2	2 1/2	11 1/2	6 15/16	20 13/16	4 11/16	14 1/4

*Cushion at rod end is non-adjustable in these size combinations.
☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4	2
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12	1 3/4-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12	2-12
A	3/4	1 1/8	1 5/8	2	2 1/4
B	1.124	1.499	1.999	2.374	2.624
C	3/8	1/2	5/8	3/4	7/8
D	1/2	7/8	1 3/16	1 17/32	1 3/4
NA	9/16	15/16	1 5/16	1 23/32	1 15/16

LETTER DIM.	2 1/2	3	3 1/2	4	4 1/2
KK	1 7/8-12	2 1/4-12	2 1/2-12	3-12	3 1/4-12
CC	2 1/4-12	2 3/4-12	3 1/4-12	3 3/4-12	4 1/4-12
GG	2 1/2-12	3-12	3 1/2-12	4-12	4 1/2-12
A	3	3 1/2	3 1/2	4	4 1/2
B	3.124	3.749	4.249	4.749	5.249
C	1	1	1	1	1
D	2 1/8	2 5/8	3	3 1/2	3 7/8
NA	2 7/16	2 15/16	3 7/16	3 15/16	4 7/16

LETTER DIM.	5	5 1/2	7	8	9
KK	3 1/2-12	4-12	5 1/2-12	5 3/4-12	6 1/2-12
CC	4 3/4-12	5 1/4-12	6 1/2-12	7 1/2-12	8 1/2-12
GG	5-12	5 1/2-12	7-12	8-12	9-12
A	5	5 1/2	7	8	9
B	5.749	6.249	7.999	8.999	9.999
C	1	1	1	2	2
D	4 1/4	4 5/8	--	--	--
NA	4 15/16	5 7/16	6 15/16	7 15/16	8 15/16

"XI" DIMENSION (Model "N" only)
The distance from the rod shoulder to centerline of trunnion pin is designated the "XI" dimension and is made to suit customer requirements. This dimension must be specified to complete the cylinder description. The trunnion location is not adjustable on the cylinder after manufacture.

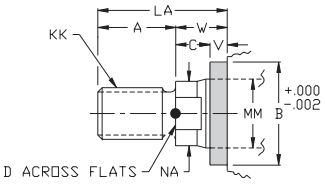
"BB" DIMENSION (Model "L" only)
"BB" value given is "standard" length of threaded tie rod extension. Modified "BB" lengths are available to suit design requirements. Specify the desired "BB" dimension and indicate at which end of the cylinder it is to be located.

Circular bearing retainer is covered by "E" square Filler Plate only when tie rods are extended at rod end of Model "L" cylinders.

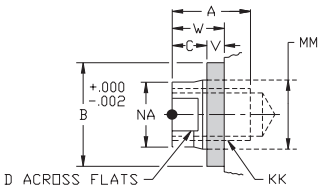
All notes on preceding page pertaining to Model "E" and "F" also apply to models shown.

STANDARD ROD END STYLES

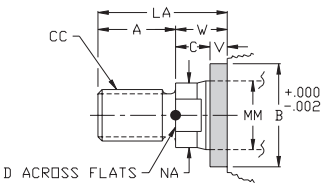
STYLE 2: Small Male Thread NFPA Type SM



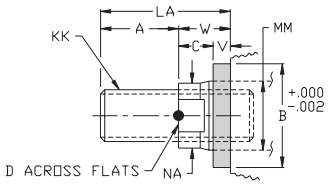
STYLE 4: Short Female Thread NFPA Type SF



STYLE 8: Intermediate Male Thread - NFPA Type IM

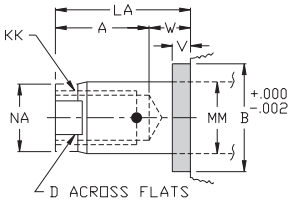


STYLE 5: Studded Small Male Thread - NFPA Type SM

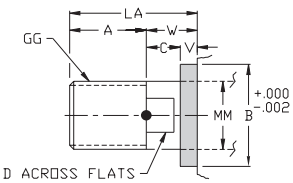


Male #5 additional cost

STYLE 3: Long Female Thread NFPA Type LF

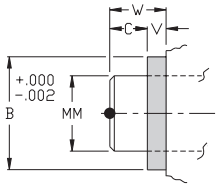


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



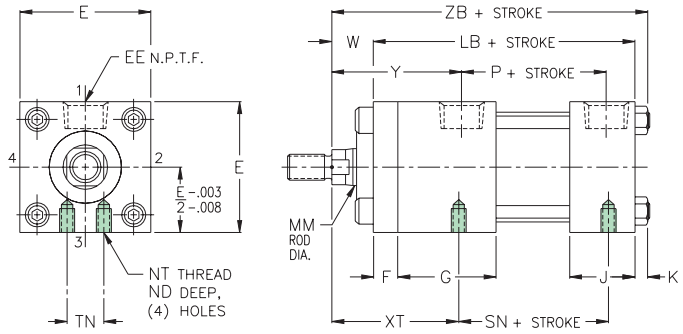
STYLE 6: Special Rod End

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

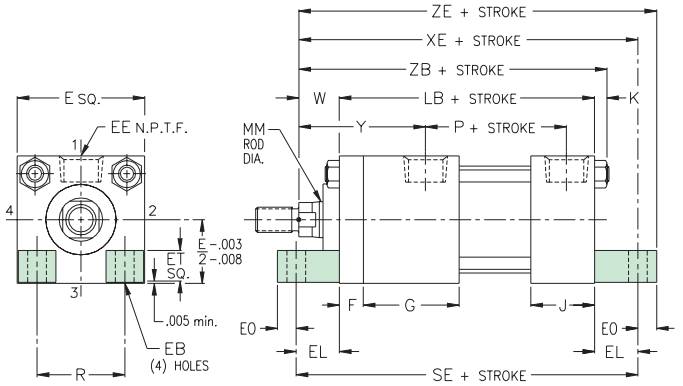
"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

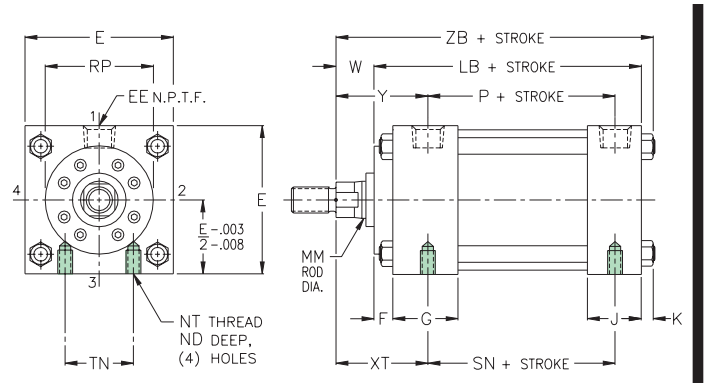
SIDE MOUNT MODEL "G" NFPA STYLE MS4

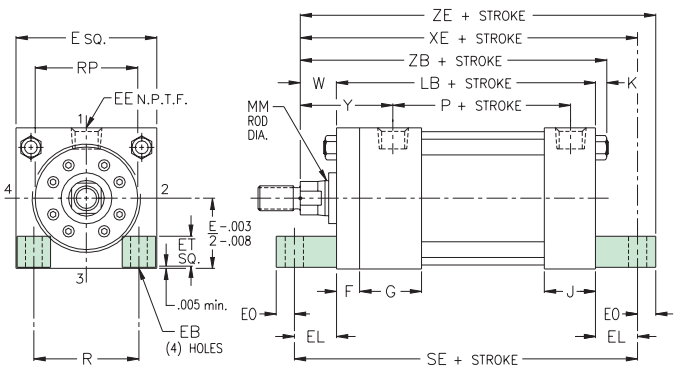


END LUG MOUNT MODEL "J" NFPA STYLE MS7



BORE	E	EE	EE1	F	G	J	K	P	R	LB	EB■	EL	EO	ET	NT	ND	SE	SN	TN
1 1/2	2 1/2	1/2	#8	3/8	1 3/4	1 1/2	1/2	3	1.63	5	3/8	7/8	3/8	7/8	3/8-16	1/2	6 3/4	2 7/8	3/4
2	3	1/2	#8	5/8	1 3/4	1 1/2	5/8	3	2.05	5 1/4	1/2	15/16	1/2	15/16	1/2-13	7/16	7 1/8	2 7/8	15/16
2 1/2	3 1/2	1/2	#8	5/8	1 3/4	1 1/2	5/8	3 1/8	2.55	5 3/8	1/2	15/16	1/2	15/16	5/8-11	9/16	7 1/4	3	1 5/16





BORE	E	EE	EE1	F	G	J	K	P	R	LB	EB■	EL	EO	ET	NT	ND	SE	SN	TN
3 1/4	4 1/2	3/4	#12	3/4	2	1 3/4	3/4	3 5/8	3.25	6 1/4	5/8	1 1/8	5/8	1 1/4	3/4-10	3/4	8 1/2	3 1/2	1 1/2
4	5	3/4	#12	7/8	2	1 3/4	3/4	3 7/8	3.82	6 5/8	5/8	1 1/8	5/8	1 3/16	1-8	3/4	8 7/8	3 3/4	2 1/16
5	6 1/2	3/4	#12	7/8	2	1 3/4	1	4 3/8	4.95	7 1/8	7/8	1 1/2	3/4	1 9/16	1-8	1 1/8	10 1/8	4 1/4	2 15/16
6	7 1/2	1	#16	1	2 1/4	2 1/4	1 1/8	5	5.73	8 3/8	1	1 11/16	7/8	1 3/4	1 1/4-7	1 1/4	11 3/4	5 1/8	3 5/16
7	8 1/2	1 1/4	#20	1	2 3/4	2 3/4	1 1/4	5 3/4	6.58	9 1/2	1 1/8	1 13/16	1	1 15/16	1 1/2-6	1 1/8	13 1/8	5 7/8	3 3/4
8	9 1/2	1 1/2	#24	1	3	3	1 7/16	6 1/2	7.50	10 1/2	1 1/4	2	1 1/8	2	1 1/2-6	1 1/2	14 1/2	6 5/8	4 1/4

OPTIONAL CONSTRUCTION FEATURE

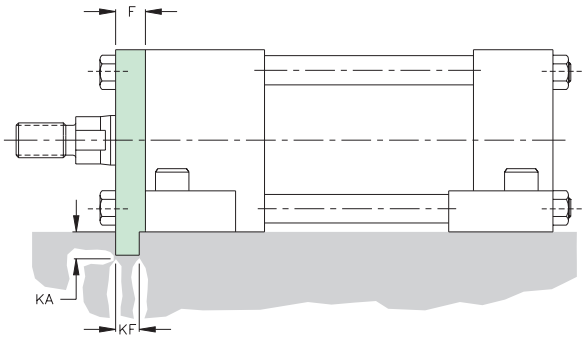
EXTENDED THRUST KEY

(KEY RETAINER PLATE)

Cylinders with fixed non-centerline class mountings (Models "A", "G", and "J") may be ordered to include an extended thrust key suitable for mating with a keyway milled into the mounting surface.

This feature, when used in conjunction with the standard cylinder mounting, provides a rigid assembly that will not shift under severe load conditions and eliminates the need for fitted bolts, pins, or welded external keys.

The table below contains dimensional data for thrust key provided when this optional feature is specified.



LETTER DIM.	CYLINDER BORE											
	1 1/2	2	2 1/2	3 1/4	4	5	6	7	8	10	12	14
F	3/8	5/8	5/8	3/4	7/8	7/8	1	1	1	1 11/16	1 15/16	2 3/16
KF +.000 -.002	.312	.562	.562	.687	.812	.812	.937	.937	.937	1.625	1.875	2.125
KA	3/16	5/16	5/16	3/8	7/16	7/16	1/2	1/2	1/2	13/16	15/16	1 1/16

ROD SELECTION/VARIABLE DIMENSIONS

BORE	Rod Dia. MM	V	W	LA	Y	XE	ZE	XT	ZB	RP
1 1/2	5/8	1/4	5/8	1 3/8	1 15/16	6 1/2	6 7/8	2	6 1/8	––
	*1	1/2	1	2 1/8	2 5/16	6 7/8	7 1/4	2 3/8	6 1/2	––
2	1	1/4	3/4	1 7/8	2 5/16	6 15/16	7 7/16	2 3/8	6 5/8	––
	*1 3/8	3/8	1	2 5/8	2 9/16	7 3/16	7 11/16	2 5/8	6 7/8	––
2 1/2	1	1/4	3/4	1 7/8	2 5/16	7 1/16	7 9/16	2 3/8	6 3/4	––
	1 3/8	3/8	1	2 5/8	2 9/16	7 5/16	7 13/16	2 5/8	7	––
	*1 3/4	1/2	1 1/4	3 1/4	2 13/16	7 9/16	8 1/16	2 7/8	7 1/4	––
3 1/4	1 3/8	1/4	7/8	2 1/2	2 11/16	8 1/4	8 7/8	2 3/4	7 7/8	3 1/2 ◆
	1 3/4	3/8	1 1/8	3 1/8	2 15/16	8 1/2	9 1/8	3	8 1/8	☐
	2	3/8	1 1/4	3 1/2	3 1/16	8 5/8	9 1/4	3 1/8	8 1/4	☐
4	1 3/4	1/4	1	3	2 15/16	8 3/4	9 3/8	3	8 3/8	3 7/8 ◆
	2	1/4	1 1/8	3 3/8	3 1/16	8 7/8	9 1/2	3 1/8	8 1/2	4 1/4 ◆
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	9 1/8	9 3/4	3 3/8	8 3/4	☐
5	2	1/4	1 1/8	3 3/8	3 1/16	9 3/4	10 1/2	3 1/8	9 1/4	4 1/4
	2 1/2	3/8	1 3/8	4 3/8	3 5/16	10	10 3/4	3 3/8	9 1/2	4 3/4
	3	3/8	1 3/8	4 7/8	3 5/16	10	10 3/4	3 3/8	9 1/2	☐
	3 1/2	3/8	1 3/8	4 7/8	3 5/16	10	10 3/4	3 3/8	9 1/2	☐
6	2 1/2	1/4	1 1/4	4 1/4	3 7/16	11 5/16	12 3/16	3 1/2	10 3/4	4 3/4
	3	1/4	1 1/4	4 3/4	3 7/16	11 5/16	12 3/16	3 1/2	10 3/4	6 ◆
	3 1/2	1/4	1 1/4	4 3/4	3 7/16	11 5/16	12 3/16	3 1/2	10 3/4	☐
	4	1/4	1 1/4	5 1/4	3 7/16	11 5/16	12 3/16	3 1/2	10 3/4	☐
7	3	1/4	1 1/4	4 3/4	3 3/4	12 9/16	13 9/16	3 13/16	12	6
	3 1/2	1/4	1 1/4	4 3/4	3 3/4	12 9/16	13 9/16	3 13/16	12	6 1/2
	4	1/4	1 1/4	5 1/4	3 3/4	12 9/16	13 9/16	3 13/16	12	7 1/4 ◆
	4 1/2	1/4	1 1/4	5 3/4	3 3/4	12 9/16	13 9/16	3 13/16	12	☐
	5	1/4	1 1/4	6 1/4	3 3/4	12 9/16	13 9/16	3 13/16	12	☐
8	3 1/2	1/4	1 1/4	4 3/4	3 7/8	13 3/4	14 7/8	3 15/16	13 3/16	6 1/2
	4	1/4	1 1/4	5 1/4	3 7/8	13 3/4	14 7/8	3 15/16	13 3/16	7 1/4
	4 1/2	1/4	1 1/4	5 3/4	3 7/8	13 3/4	14 7/8	3 15/16	13 3/16	8 3/8 ◆
	5	1/4	1 1/4	6 1/4	3 7/8	13 3/4	14 7/8	3 15/16	13 3/16	☐
	5 1/2	1/4	1 1/4	6 3/4	3 7/8	13 3/4	14 7/8	3 15/16	13 3/16	☐

*Cushion at rod end is non-adjustable in these size combinations.
☐ Circular retainer not used in these size combinations. Plate furnished is "E" square.
◆ "RP" diameter applies to Model "G" only in these sizes. Model "J" furnished with "E" square plate. Circular retainer, when used, is covered by "E" square Filler Plate on Model "J" units.

STANDARD ROD DIMENSIONS

LETTER DIM.	5/8	1	1 3/8	1 3/4
KK	7/16-20	3/4-16	1-14	1 1/4-12
CC	1/2-20	7/8-14	1 1/4-12	1 1/2-12
GG	5/8-18	1-14	1 3/8-12	1 3/4-12
A	3/4	1 1/8	1 5/8	2
B	1.124	1.499	1.999	2.374
C	3/8	1/2	5/8	3/4
D	1/2	7/8	1 3/16	1 17/32
NA	9/16	15/16	1 5/16	1 23/32

LETTER DIM.	2	2 1/2	3	3 1/2
KK	1 1/2-12	1 7/8-12	2 1/4-12	2 1/2-12
CC	1 3/4-12	2 1/4-12	2 3/4-12	3 1/4-12
GG	2-12	2 1/2-12	3-12	3 1/2-12
A	2 1/4	3	3 1/2	3 1/2
B	2.624	3.124	3.749	4.249
C	7/8	1	1	1
D	1 3/4	2 1/8	2 5/8	3
NA	1 15/16	2 7/16	2 15/16	3 7/16

LETTER DIM.	4	4 1/2	5	5 1/2
KK	3-12	3 1/4-12	3 1/2-12	4-12
CC	3 3/4-12	4 1/4-12	4 3/4-12	5 1/4-12
GG	4-12	4 1/2-12	5-12	5 1/2-12
A	4	4 1/2	5	5 1/2
B	4.749	5.249	5.749	6.249
C	1	1	1	1
D	3 1/2	3 7/8	4 1/4	4 5/8
NA	3 15/16	4 7/16	4 15/16	5 7/16

Rod end accessories attached to Model "J" End Lug Mount style cylinders may interfere with mounting lugs when stroke is retracted. If this condition exists, additional rod extension should be specified to provide necessary clearance.

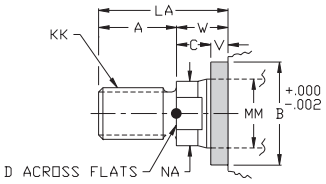
Extended Thrust Key suggested for Model "G" and Model "J" cylinders subject to severe load conditions. Dimensional information located on preceding page.

▪ "EB" is diameter of mounting bolt.

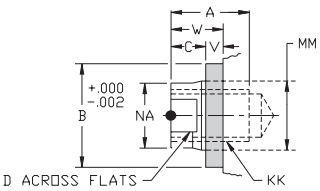
EE_1 denotes size of alternate SAE straight thread O-ring style port furnished upon request.

STANDARD ROD END STYLES

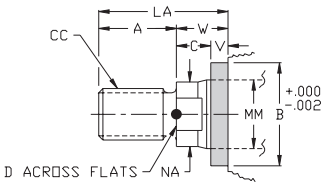
STYLE 2: Small Male Thread NFPA Type SM



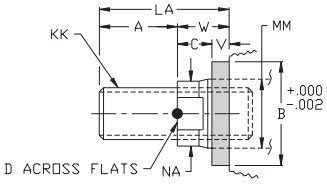
STYLE 4: Short Female Thread NFPA Type SF



STYLE 8: Intermediate Male Thread -NFPA Type IM

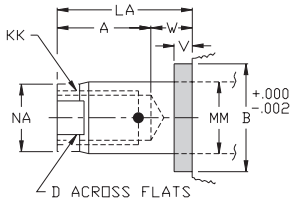


STYLE 5: Studded Small Male Thread -NFPA Type SM

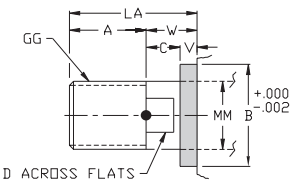


Male #5 additional cost

STYLE 3: Long Female Thread NFPA Type LF

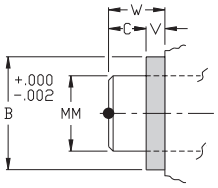


STYLE 1: Full Dia. Male Thread NFPA Type FM



Male #1 additional cost

STYLE 0: Plain Rod End NFPA Type



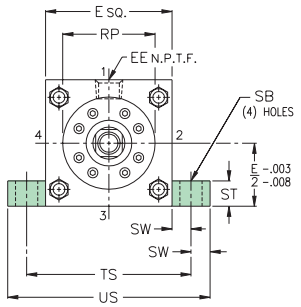
STYLE 6: Special Rod End

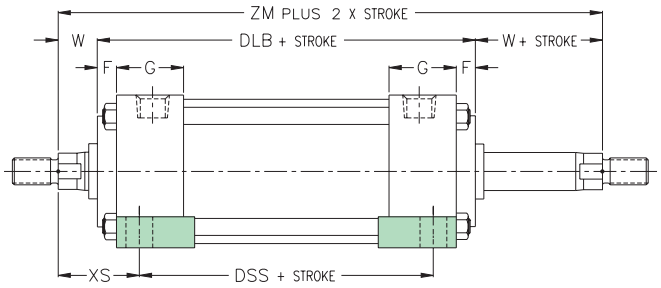
Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

"STYLE 6" designation not assigned to modified rod ends with altered "LA" or "A" lengths only.

"KK" male thread rod ends provide a shoulder surface against which the threaded connection or mounting accessory can be secured at assemble. Rod ends of this type are recommended for use when design permits.

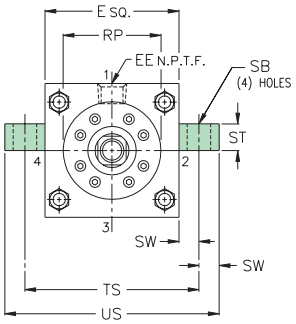
FOOT MOUNT--- MODEL "MA"



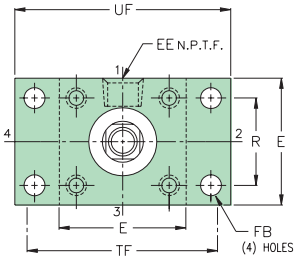


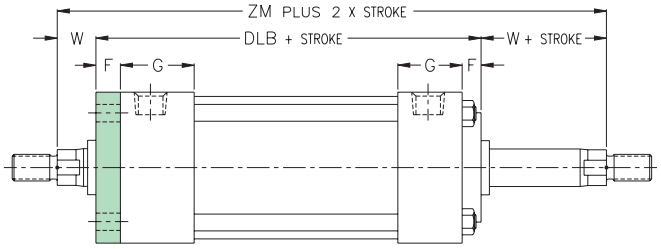
Side view of FOOT MT. Model "MA" above also represents dimensions applicable to CENTERLINE LUG MT. Model "MK". These models differ only in the position of mounting lugs relative to cylinder centerline.

FRONT VIEW--- MODEL



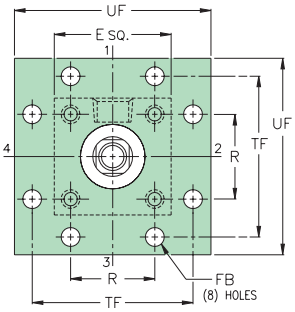
FRONT FLANGE MOUNT--- MODEL





Side view of RECT. FLANGE MT. Model "MC" also represents dimensions applicable to SQUARE FLANGE MT. Model "MP". RECTANGULAR FRONT HEAD MT. Model "MX" is also available. Refer to SINGLE ROD END Model "X" and substitute applicable dims.

FRONT VIEW--- MODEL

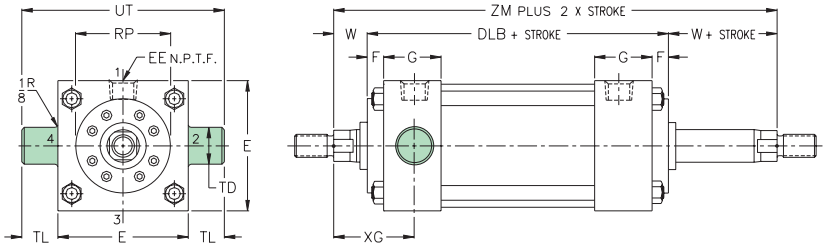


CYL. BORE	DIMS. COMMON TO ALL MODELS						MODEL "MA", "MK" MOUNTING DIMS.						"MC", "MP", "MX" MTG.			
	E	EE	EE_1	F	G	DLB	SB■	ST	SW	TS	US	DSS	FB■	R	TF	UF
1 1/2	2 1/2	1/2	#8	3/8	1 3/4	5 5/8	3/8	1/2	3/8	3 1/4	4	4 1/8	3/8	1.63	3 7/16	4 1/4
2	3	1/2	#8	5/8	1 3/4	6 1/8	1/2	3/4	1/2	4	5	3 7/8	1/2	2.05	4 1/8	5 1/8
2 1/2	3 1/2	1/2	#8	5/8	1 3/4	6 1/4	3/4	1	11/16	4 7/8	6 1/4	3 5/8	1/2	2.55	4 5/8	5 5/8
3 1/4	4 1/2	3/4	#12	3/4	2	7 1/4	3/4	1	11/16	5 7/8	7 1/4	4 3/8	5/8	3.25	5 7/8	7 1/8
4	5	3/4	#12	7/8	2	7 3/4	1	1 1/4	7/8	6 3/4	8 1/2	4 1/4	5/8	3.82	6 3/8	7 5/8
5	6 1/2	3/4	#12	7/8	2	8 1/4	1	1 1/4	7/8	8 1/4	10	4 3/4	7/8	4.95	8 3/16	9 3/4
6	7 1/2	1	#16	1	2 1/4	9 3/8	1 1/4	1 1/2	1 1/8	9 3/4	12	5 1/8	1	5.73	9 7/16	11 1/4
7	8 1/2	1 1/4	#20	1	2 3/4	10 1/2	1 1/2	1 3/4	1 3/8	11 1/4	14	5 3/4	1 1/8	6.58	10 5/8	12 5/8
8	9 1/2	1 1/2	#24	1	3	11 1/2	1 1/2	1 3/4	1 3/8	12 1/4	15	6 3/4	1 1/4	7.50	11 13/16	14
10	12 5/8	2	#24	1 11/16	3 11/16	15 1/2	1 1/2	2 1/4	1 5/8	15 7/8	19 1/8	8 7/8	1 3/4	9.62	15 7/8	19
12	14 7/8	2	#32	1 15/16	4 7/16	18 3/8	1 1/2	3	2	18 7/8	22 7/8	10 1/2	2	11.45	18 1/2	22
14	17 1/4	2	#32	2 3/16	4 7/8	20	2 1/4	4	2 1/2	22 1/4	27 1/4	10 5/8	2 1/4	13.22	21 3/8	25 1/4

CYL. BORE	MODEL "ME", "MN" MOUNTING DIMS.						MODEL "ML", "MG", "MJ" MOUNTING DIMENSIONS								
	TD +.000 -.002	TL	UT	TM	UM	UV	R	AA	TN	NT	SN	EB■	ET	EL	DSE
1 1/2	1.000	1	4 1/2	3	5	2 3/4	1.63	2.30	3/4	3/8-16	2 7/8	3/8	7/8	7/8	7 3/8
2	1.375	1 3/8	5 3/4	3 1/2	6 1/4	3 1/4	2.05	2.90	15/16	1/2-13	2 7/8	1/2	15/16	15/16	8
2 1/2	1.375	1 3/8	6 1/4	4	6 3/4	3 3/4	2.55	3.61	1 5/16	5/8-11	3	1/2	15/16	15/16	8 1/8
3 1/4	1.750	1 3/4	8	5	8 1/2	4 3/4	3.25	4.60	1 1/2	3/4-10	3 1/2	5/8	1 1/4	1 1/8	9 1/2
4	1.750	1 3/4	8 1/2	5 1/2	9	5 1/4	3.82	5.40	2 1/16	1-8	3 3/4	5/8	1 3/16	1 1/8	10
5	1.750	1 3/4	10	7	10 1/2	6 3/4	4.95	7.00	2 15/16	1-8	4 1/4	7/8	1 9/16	1 1/2	11 1/4
6	2.000	2	11 1/2	8 1/2	12 1/2	7 3/4	5.73	8.10	3 5/16	1 1/4-7	4 7/8	1	1 3/4	1 11/16	12 3/4
7	2.500	2 1/2	13 1/2	9 3/4	14 3/4	8 3/4	6.58	9.30	3 3/4	1 1/2-6	5 3/8	1 1/8	1 15/16	1 13/16	14 1/8
8	3.000	3	15 1/2	11	17	9 3/4	7.50	10.61	4 1/4	1 1/2-6	6 1/8	1 1/4	2	2	15 1/2
10	3.500	3 1/2	19 5/8	14	21	13									
12	4.000	4	22 7/8	16 1/2	24 1/2	15 1/2									
14	5.000	5	27 1/4	19 5/8	29 5/8	19 1/2									

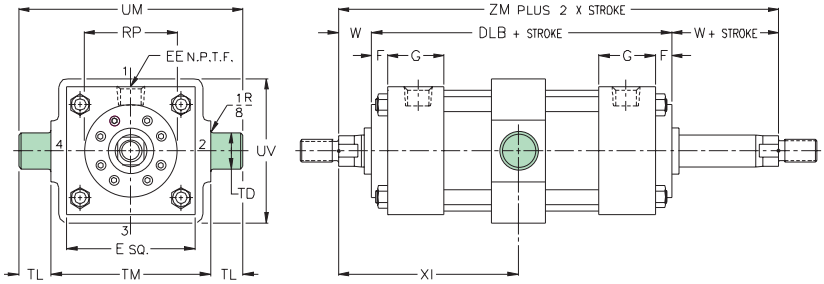
DOUBLE ROD END cylinders are furnished with solid, one piece piston rods in all standard models. Unique, proven construction permits piston removal while using no snap rings, pins, or threaded retainers for load retention. This exclusive LYNAIR feature minimizes end to end rod run out, improving alignment and smoothness of operation compared to cylinders with usual two piece rod construction.

FRONT TRUNNION MOUNT MODEL "ME"

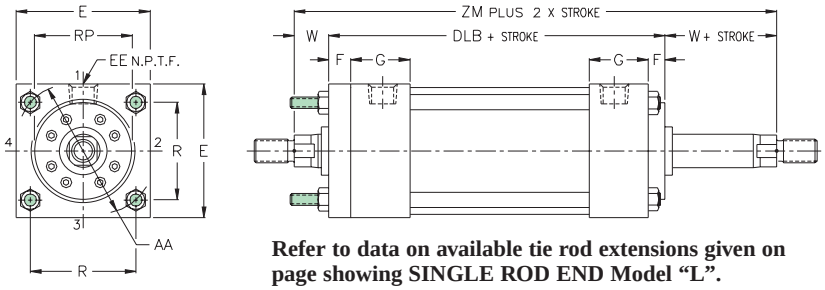


INTERMEDIATE TRUNNION MOUNT MODEL "MN"

CUSTOMER MUST SPECIFY "XI" DIMENSION

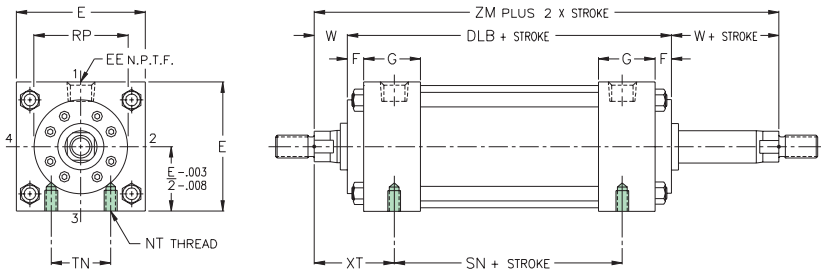


EXTENDED TIE ROD MOUNT --- MODEL "MN"

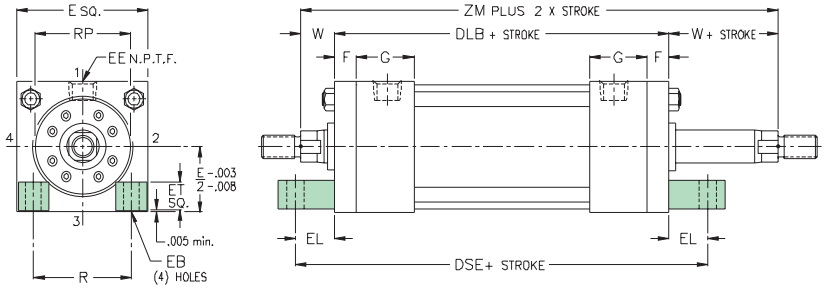


Refer to data on available tie rod extensions given on page showing SINGLE ROD END Model "L".

SIDE MOUNT --- MODEL "MG"



END LUG MOUNT --- MODEL "MJ"



DOUBLE ROD END cylinders are available with the same rod size and end style options as SINGLE ROD END cylinders having the same style mounting.

Dimensional information given provides basic envelope and mounting dimensions applicable to DOUBLE ROD END UNITS.

Data pertaining to variable rod end and bearing retainer details can be determined by referring to the SINGLE ROD END information located on preceding pages.

CYL. BORE	VARIABLE DIMENSIONS					
	Rod Dia. MM	W	ZM	XS	XG	XT
1 1/2	5/8	5/8	6 7/8	1 3/8	1 7/8	2
	1	1	7 5/8	1 3/4	2 1/4	2 3/8
2	1	3/4	7 5/8	1 7/8	2 1/4	2 3/8
	1 3/8	1	8 1/8	2 1/8	2 1/2	2 5/8
2 1/2	1	3/4	7 3/4	2 1/16	2 1/4	2 3/8
	1 3/8	1	8 1/4	2 5/16	2 1/2	2 5/8
	1 3/4	1 1/4	8 3/4	2 9/16	2 3/4	2 7/8
3 1/4	1 3/8	7/8	9	2 5/16	2 5/8	2 3/4
	1 3/4	1 1/8	9 1/2	2 9/16	2 7/8	3
	2	1 1/4	9 3/4	2 11/16	3	3 1/8
4	1 3/4	1	9 3/4	2 3/4	2 7/8	3
	2	1 1/8	10	2 7/8	3	3 1/8
	2 1/2	1 3/8	10 1/2	3 1/8	3 1/4	3 3/8
5	2	1 1/8	10 1/2	2 7/8	3	3 1/8
	2 1/2	1 3/8	11	3 1/8	3 1/4	3 3/8
	3	1 3/8	11	3 1/8	3 1/4	3 3/8
	3 1/2	1 3/8	11	3 1/8	3 1/4	3 3/8
6	2 1/2	1 1/4	11 7/8	3 3/8	3 3/8	3 1/2
	3	1 1/4	11 7/8	3 3/8	3 3/8	3 1/2
	3 1/2	1 1/4	11 7/8	3 3/8	3 3/8	3 1/2
	4	1 1/4	11 7/8	3 3/8	3 3/8	3 1/2
7	3	1 1/4	13	3 5/8	3 5/8	3 13/16
	3 1/2	1 1/4	13	3 5/8	3 5/8	3 13/16
	4	1 1/4	13	3 5/8	3 5/8	3 13/16
	4 1/2	1 1/4	13	3 5/8	3 5/8	3 13/16
	5	1 1/4	13	3 5/8	3 5/8	3 13/16
8	3 1/2	1 1/4	14	3 5/8	3 3/4	3 15/16
	4	1 1/4	14	3 5/8	3 3/4	3 15/16
	4 1/2	1 1/4	14	3 5/8	3 3/4	3 15/16
	5	1 1/4	14	3 5/8	3 3/4	3 15/16
	5 1/2	1 1/4	14	3 5/8	3 3/4	3 15/16
10	4 1/2	1 1/4	18	4 9/16	4 3/4	--
	5	1 1/2	18 1/2	4 13/16	5	--
	5 1/2	1 1/2	18 1/2	4 13/16	5	--
	7	1 1/2	18 1/2	4 13/16	5	--
12	5 1/2	1 1/4	20 7/8	5 3/16	5 3/8	--
	7	1 1/4	20 7/8	5 3/16	5 3/8	--
	8	2 1/2	23 3/8	6 7/16	6 5/8	--
14	7	1 1/4	22 1/2	5 15/16	5 13/16	--
	8	2 1/2	25	7 3/16	7 1/16	--
	9	2 1/2	25	7 3/16	7 1/16	--

Tie Rod Support Data

Cylinders with long stroke lengths, in addition to possible "Stop Tube" requirements, may need external support between the end caps to provide the stability needed to secure tie rod fasteners without causing the cylinder tube to buckle during assembly.
The table below indicates the stroke length limits at which "Tie Rod Supports" become necessary. The stroke length given represents the cylinder "design stroke." When a Stop Tube is included, this value is the length of "effective stroke" plus the "stop tube" length.
Tie Rod Support construction details may vary with stroke length, but part dimensions will not interfere with cylinder mountings. Cylinders in bore sizes 8" thru 14" do not require the use of "Tie Rod Supports." These units generally are available with a maximum "design stroke" limit of 233."

CYLINDER STROKE LIMITS (INCHES)

Cyl. Bore	Max. Stroke No Support	Max. Stroke 1 Support	Max. Stroke 2 Supports	Max. Design Stroke
1 1/2	46	94	135	166
2	60	123	166	166
2 1/2	75	153	213	213
3 1/4	99	201	237	237
4	121	246	285	285
5	152	284	284	284
6	180	284	284	284

Cylinder Maintenance

Suggested cylinder maintenance includes the replacement of seals subject to wear under normal operating conditions and the inspection of vital rod, bearing, and tube surfaces for abnormal wear or damage resulting from misalignment, particle contamination, or accidental abuse.
When maintenance is to be performed, the cylinder should be removed to a clean work area. The unit should be disassembled as described below to replace desired seal items. When seal replacement is necessary, it is recommended that static seals be replaced along with those subject to wear. Prior to reassembly, all cylinder surfaces and replacement parts should be thoroughly cleaned and well lubricated.

ROD SEAL REPLACEMENT

1. Extend cylinder rod several inches and provide adequate support to avoid cocking the piston inside tube.
2. Inspect rod wrench flat area and remove any burrs to prevent damage to rod bearing upon its removal.
3. Remove fasteners and detach bearing retainer plate.
4. Remove bearing and support ring from front head cavity and slide off over end of piston rod.
5. Remove rod wiper, rod seal, bearing to head o-ring and back up washer (items #5 and 6). Clean and inspect inner surface of rod bearing. If finish of bore is not uniform, measure for variations in size. If wear is apparent, replace bearing in addition to seal components.
6. Lubricate replacement seals and install in bearing using care to match original assembly.
7. Clean cylinder head surface, slide bearing assembly over rod carefully to avoid seal damage in area of wrench flats, and seat into front head cavity by tapping with soft face hammer. Use care not to shear outer o-ring during assembly.
8. Reattach bearing retainer using appropriate fasteners. Torque requirements for proper reassembly are included on this page.

PISTON AND TUBE END SEAL REPLACEMENT

Standard Series "H" models are equipped with cast iron piston rings and TFE seal which normally are maintenance free due to their extended service life.

The following instructions apply to cylinders equipped with optional cup type piston seals. These instructions can also be used as a general guide if replacement of cast iron rings & TFE seal is necessary.

1. Pull cylinder rod to its fully extended position and provide adequate support to avoid cocking the piston inside tube.
2. Remove tie rod fasteners from end of unit most convenient for service purposes.
3. Remove rear end cap and separate front head from cylinder tube. Tubing must be supported to prevent cocking against piston during assembly.
4. Slide piston out of cylinder tube to expose both seals Remove packing by inserting blunt screw driver under heel section and stretching seals over face of piston.
5. Clean piston and cylinder bore surfaces. Install new piston seals with cup form of each facing in opposite directions away from each other.
6. Remove tube end o-rings, clean groove and pilot surfaces, and install replacement o-ring seals.
7. Insert piston into tube by depressing lip of seal with a blunt edge tool around circumference using care not to nick or scratch seal surface.
8. Align tube ends squarely with end cap pilots and slide together carefully to avoid shearing o-ring seals. Reattach tie rod fasteners.
9. Hand tighten tie rod fasteners with piston rod in fully extended position. Torque gradually to recommended level by alternately tightening fasteners in a diagonal, corner crossing pattern.
10. If cylinder size permits, push piston rod to rear of unit to check alignment. If binding occurs, loosen tie rods and repeat torquing procedure.
    Cylinders with cushions should be assembled with the front cushion fully engaged. When assembled, proper alignment will allow full rotation of rod within the cushion at each end of cylinder.
11. After reassembly is complete, the cylinder should be pressure tested to inspect operating condition and checked for leakage before being placed back in service.

Torque Specifications

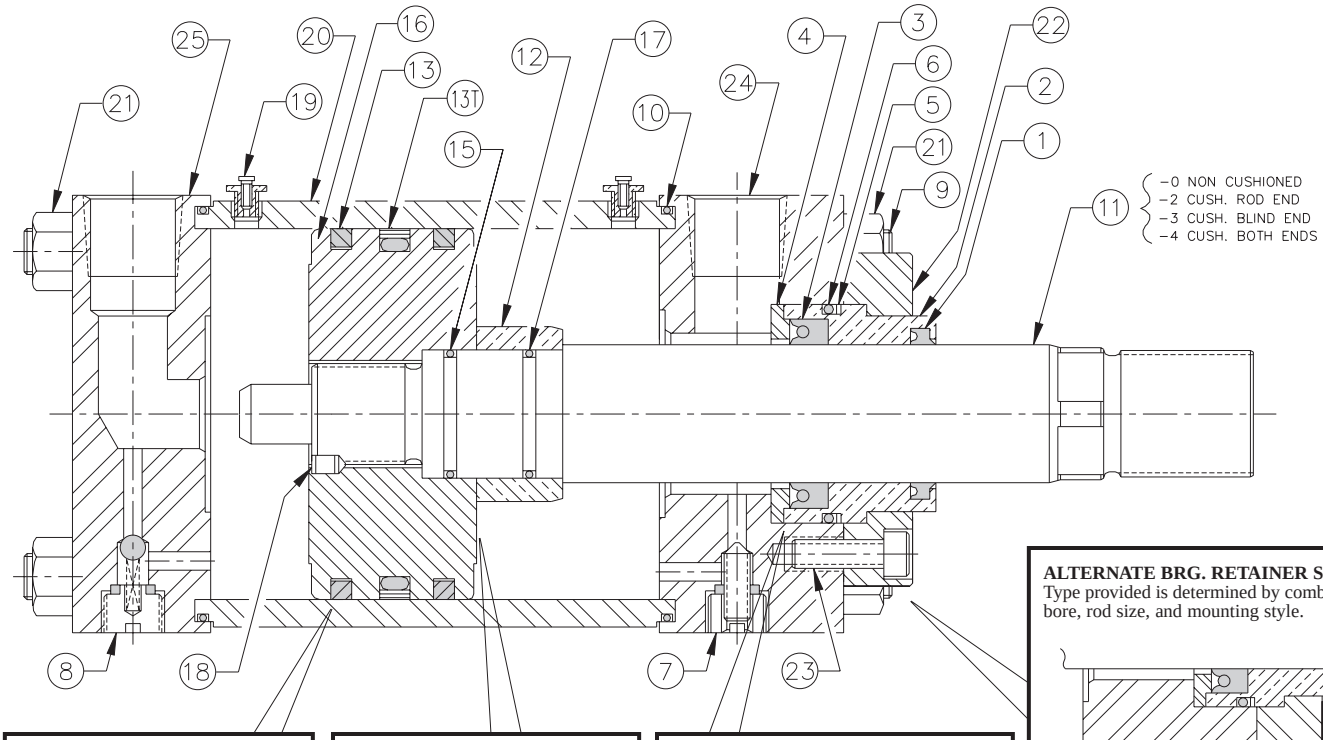
When tie rod nuts are removed to perform cylinder maintenance, they must be reassembled with proper torque to secure the assembly.
To prevent twisting, attach vice grip pliers or a locking clamp to tie rod near end of unit where torque will be applied. Recommended torque values apply to lubricated threads.

CYL. BORE	1 1/2	2	2 1/2	3 1/4	4	5
Tie Rod Dia.	3/8	1/2	1/2	5/8	5/8	7/8
Torque Ft. Lbs.	22	40	62	115	150	320
CYL. BORE	6	7	8	10	12	14
Tie Rod Dia.	1	1 1/8	1 1/4	1	1	1
Torque Ft. Lbs.	460	720	850	490	530	575

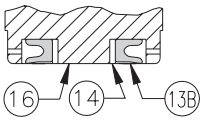
Bearing retainers are secured by socket head cap screws or tie rod fasteners in different model cylinders. The chart below shows torque value applicable to various screw sizes that are used.
Bearing retainer fasteners are secured with breakable bond adhesive to insure against self disassembly.

SCREW SIZE	#10-32	1/4-28	5/16-24	3/8-24	1/2-20	5/8-18
Torque Ft. Lbs.	6.3	14	27	48	114	222

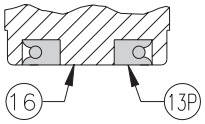
PART IDENTIFICATION NUMBERS FOR SERIES "H" HYDRAULIC CYLINDERS



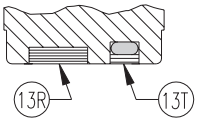
ALTERNATE PISTON SEALS
Cup type block vee seals with back up washers.



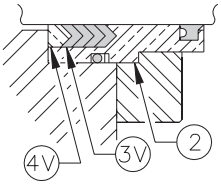
Heavy duty, self-energized polyurethane cup seals



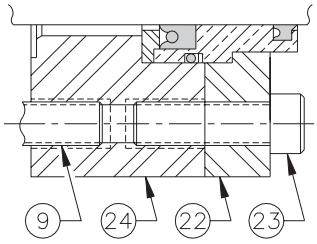
ALTERNATE PISTON SEAL
'O' Ring energized filled teflon seal with filled teflon wear ring.

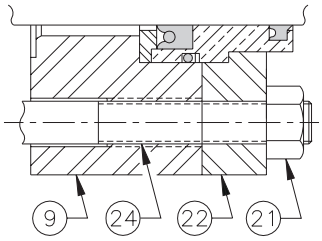


ALTERNATE V-RING ROD SEALS
V-Ring rod seal assembly is provided when Viton or other alternate seal material is required, or as an available order option with Buna seals.



ALTERNATE BRG. RETAINER STYLES
Type provided is determined by combination of bore, rod size, and mounting style.





ORDER INFORMATION REQUIREMENTS

When ordering replacement parts, clearly specify the item number, name, and quantity of the desired component. It is essential to provide the correct model and serial number of the cylinder in which the parts will be used. By providing both numbers, a cross check of reference data can be made to assure accurate fulfillment of order requirements.

BASIC PARTS LIST

ITEM NUMBER	PART NAME
1	Rod Wiper
2	Rod Bearing
3	Rod Seal (Std.)
3V	V-Ring Rod Seal Set (Opt.)
4	Seal Support Ring (Std.)
4V	Seal Support Ring (suits 3V only)
5	Back Up Washer - Brg. to Head
6	O-Ring - Bearing to Head
7	Cushion Adjusting Screw Assy.
8	Ball Check Assembly
9	Tie Rod
10	O-Ring - Tube End Seal
11	Piston Rod add dash number to indicate cushion style
12	Cushion Bushing
13	Cast Iron Piston Rings (Std.)
13T	Energized Teflon Piston Seal (Std.)
13B	Block Vee Piston Cup Seals (Opt.)
13P	Polyurethane Piston Cup Seals (Opt.)
13R	Filled Teflon Wear Ring (Opt.)
14	Back Up Washers (with 13B only)
15	O-Ring - Piston to Rod
16	Piston
17	O-Ring - Cush. Bush. to Rod
18	Locking Pin
19	Air Bleeder
20	Cylinder Tube
21	Tie Rod Fastener
22	Bearing Retainer
23	Bearing Retainer Cap Screw
24*	Front Head
25*	Rear Head

(*) Model number code letter used to indicate mounting style should be included with item number to describe part. Example: Item 24-A Front Head w/Foot Mounting.

MOUNTING COMPONENT PARTS LIST

ITEM NUMBER	MTG. STYLE	PART NAME
26	"C"	Rect. Front Flange Plate
27	"P"	Square Front Flange Plate
28	"D"	Rect. Rear Flange Plate
29	"R"	Square Rear Flange Plate
30	"N"	Intermediate Trunnion Ring
31	"J"	End Lug Mounting Blocks
32	"J"	Bearing Retainer Filler Plate
33	"L"	Bearing Retainer Filler Plate

SERVICE PARTS MAY BE ORDERED AS FOLLOWS:

SEAL KIT: Consists of item numbers 1, 3, 5, 6, 10, 13, & 13T. Piston seal items 13B and 14, or 13P, or 13T and 13R included in kit if used in original cylinder.

SEAL KIT w/BEARING: Consists of above items with addition of Rod Bearing and Support Ring, items 2 and 4.

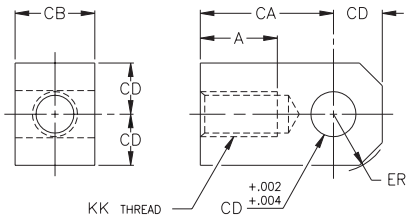
CARTRIDGE ASSEMBLY: Consists of item numbers 1, 2, 3, 4, 5, and 6.

PISTON AND ROD ASSEMBLY: Consists of item numbers 11, 12, 13, 13T, 13B, 13P, 13R, 14, 15, 16, 17, or 18 as required.

NOTE: Ordered parts will be supplied to suit construction details indicated by record data of original serial number.

LYNAIR, INC.
3515 Scheele Drive P.O. Box 720
Jackson, Michigan 49204
Phone (517)787-2240 FAX (517)787-4521

ROD EYE



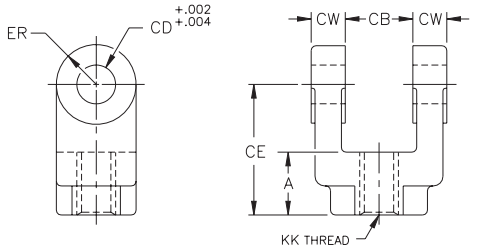
ORDER TO FIT ROD END THREAD SIZE.

MATERIAL: DUCTILE IRON CASTING OR CARBON STEEL

PIVOT PIN MUST BE ORDERED IF DESIRED FOR USE WITH THIS ACCESSORY.

PART NUMBER	ROD DIA.	Dimensions					
		KK	CD	CB	CA	A	ER
RE-0604	5/8	7/16-20	.500	3/4	1 1/2	3/4	9/16
RE-0605	5/8	1/2-20	.500	3/4	1 1/2	3/4	9/16
RE-0606	5/8	5/8-18	.500	3/4	1 1/2	3/4	9/16
RE-1007	1	3/4-16	.750	1 1/4	2 1/16	1 1/8	15/16
RE-1008	1	7/8-14	1.000	1 1/2	2 3/8	1 1/8	1 3/16
RE-1310	1 3/8	1-14	1.000	1 1/2	2 13/16	1 5/8	1 3/16
RE-1712	1 3/4	1 1/4-12	1.375	2	3 7/16	2	1 13/16
RE-2015	2	1 1/2-12	1.750	2 1/2	4	2 1/4	1 15/16
RE-2017	2	1 3/4-12	2.000	2 1/2	4 3/8	2 1/4	2 3/16
RE-2518	2 1/2	1 7/8-12	2.000	2 1/2	5	3	2 3/16
RE-3022	3	2 1/4-12	2.500	3	5 13/16	3 1/2	2 11/16
RE-3525	3 1/2	2 1/2-12	3.000	3	6 1/8	3 1/2	2 15/16
RE-4030	4	3-12	3.000	4	7 1/8	4	2 15/16
RE-4532	4 1/2	3 1/4-12	3.500	4	7 5/8	4 1/2	3 7/8
RE-5035M	5	3 1/2-12	3.500	4	7 5/8	5	3 7/8
RE-5540	5 1/2	4-12	4.000	4 1/2	9 1/8	5 1/2	4 1/16

ROD CLEVIS

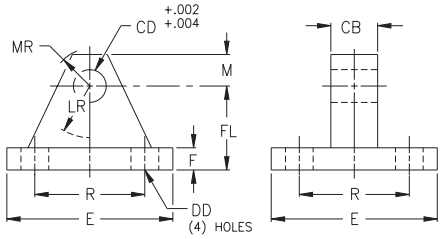


ORDER TO FIT ROD END THREAD SIZE.
MATERIAL: FORGED STEEL, DUCTILE IRON CASTING, OR CARBON STEEL.

PIVOT PIN IS PROVIDED WITH THIS WITH THIS ACCESSORY.

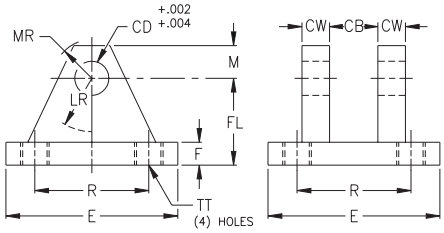
PART NUMBER	ROD DIA.	Dimensions						
		KK	CD	CB	CW	CE	A	ER
RC-0604	5/8	7/16-20	.500	.765	1/2	1 1/2	3/4	1/2
RC-0605	5/8	1/2-20	.500	.765	1/2	1 1/2	3/4	1/2
RC-0606	5/8	5/8-18	.500	.765	1/2	1 1/2	3/4	1/2
RC-1007	1	3/4-16	.750	1.265	5/8	2 3/8	1 1/8	3/4
RC-1008	1	7/8-14	1.000	1.515	3/4	2 15/16	1 5/8	1
RC-1310	1 3/8	1-14	1.000	1.515	3/4	3 1/8	1 5/8	1
RC-1712	1 3/4	1 1/4-12	1.375	2.015	1	4 1/8	2	1 3/8
RC-2015	2	1 1/2-12	1.750	2.515	1 1/4	4 1/2	2 1/4	1 3/4
RC-2017	2	1 3/4-12	2.000	2.515	1 1/4	5 1/2	3	2
RC-2518	2 1/2	1 7/8-12	2.000	2.515	1 1/4	5 1/2	3	2
RC-3022	3	2 1/4-12	2.500	3.015	1 1/2	6 1/2	3 1/2	2 1/4
RC-3525	3 1/2	2 1/2-12	3.000	3.015	1 1/2	6 3/4	3 1/2	3
RC-4030	4	3-12	3.000	3.015	1 1/2	7 1/2	4	3
RC-4532	4 1/2	3 1/4-12	3.500	4.015	2	8 1/2	4 1/2	3
RC-5035	5	3 1/2-12	3.500	4.015	2	9 1/2	5	3
RC-5540	5 1/2	4-12	4.000	4.515	2 1/4	10	5 1/2	4

EYE BRACKET



MATERIAL: FORGED STEEL, DUCTILE IRON CASTING, OR CARBON STEEL.
PIVOT PINS ARE INCLUDED WITH CLEVIS MOUNTED CYLINDERS AND ROD CLEVISES WHICH MATE WITH THIS ACCESSORY.

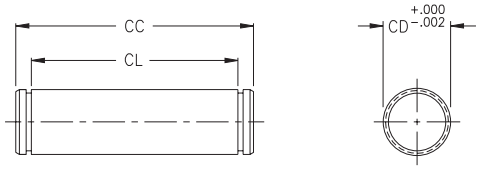
CLEVIS BRACK-



MATERIAL: FORGED STEEL, DUCTILE IRON CASTING, OR CARBON STEEL.
PIVOT PIN IS PROVIDED WITH THIS ACCESSORY.

EYE BRACKET	CLEVIS BRACKET	FITS CYL. SIZE	Dimensions											
			CD	CB	CW	E	R	FL	F	M	MR	LR	DD	TT
MB-0507	CB-0500	1 1/2	.500	3/4	1/2	2 1/2	1 5/8	1 1/8	3/8	1/2	9/16	5/8	13/32	3/8-24
MB-0712	CB-0750	2,2 1/2	.750	1 1/4	5/8	3 1/2	2 9/16	1 7/8	5/8	3/4	15/16	1	17/32	1/2-20
MB-1015	CB-1000	3 1/4	1.000	1 1/2	3/4	4 1/2	3 1/4	2 1/4	3/4	1	1 3/16	1 1/4	21/32	5/8-18
MB-1015H		3 1/4	1.000	1 1/2		4 1/2	3 1/4	2 3/8	7/8	1	1 3/16	1 1/4	21/32	
MB-1320	CB-1375	4	1.375	2	1	5	3 13/16	3	7/8	1 3/8	1 13/16	1 7/8	21/32	5/8-18
MB-1725	CB-1750	5	1.750	2 1/2	1 1/4	6 1/2	4 15/16	3 1/8	7/8	1 3/4	1 15/16	2	29/32	7/8-14
MB-1725H		5	1.750	2 1/2		6 1/2	4 15/16	3 3/8	1 1/8	1 3/4	1 15/16	2	29/32	
MB-2025	CB-2000	6	2.000	2 1/2	1 1/4	7 1/2	5 3/4	3 1/2	1	2	2 3/16	2 1/4	1 1/16	1-14
MB-2025H		6	2.000	2 1/2		7 1/2	5 3/4	4	1 1/2	2	2 3/16	2 1/4	1 1/16	
MB-2530	CB-2500	7	2.500	3	1 1/2	8 1/2	6 19/32	4	1	2 1/2	2 11/16	2 3/4	1 3/16	1 1/8-12
MB-2530H		7	2.500	3		8 1/2	6 19/32	4 3/4	1 3/4	2 1/2	2 11/16	2 3/4	1 3/16	
MB-3030	CB-3000	8	3.000	3	1 1/2	9 1/2	7 1/2	4 1/4	1	2 3/4	2 15/16	3	1 5/16	1 1/4-12
MB-3030H		8	3.000	3		9 1/2	7 1/2	5 1/4	2	2 3/4	2 15/16	3	1 5/16	
MB-3540	CB-3500	10	3.500	4	2	12 5/8	9 5/8	5 11/16	1 11/16	3 1/2	3 11/16	3 3/4	1 13/16	1 3/4-12
MB-4045	CB-4000	12	4.000	4 1/2	2 1/4	14 7/8	11 1/2	6 7/16	1 15/16	4	4 1/16	4 1/8	2 1/16	2-12

PIVOT PIN



PIVOT PINS ARE FURNISHED WITH (2) RETAINER RINGS.

MATERIAL: GROUND, CHROME PLATED HIGH STRENGTH STEEL

PIVOT PINS ARE INCLUDED WITH CLEVIS MOUNTED CYLIN-

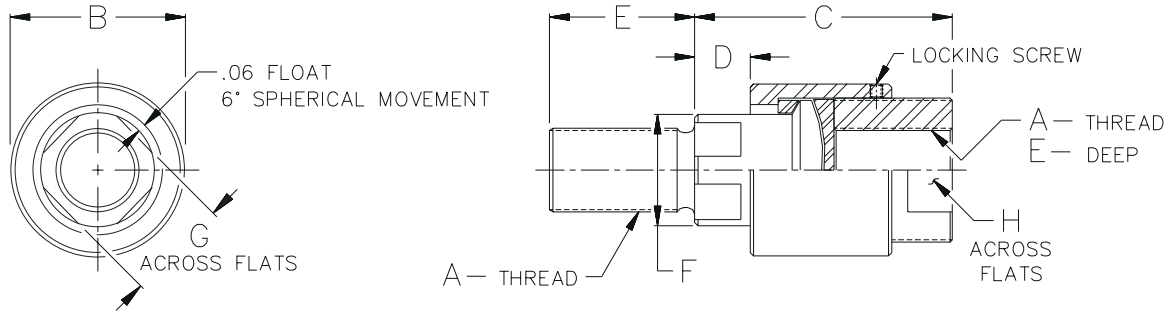
PART NUMBER	Order To. Fit Rod Eye	Dimensions		
		CD	CL	CC
CP-0522	RE-0604	.500	$1\frac{27}{32}$	$2\frac{7}{32}$
CP-0730	RE-1007	.750	$2\frac{5}{8}$	3
CP-1036	RE-1310	1.000	$3\frac{1}{8}$	$3\frac{9}{16}$
CP-1345	RE-1712	1.375	$4\frac{1}{8}$	$4\frac{1}{2}$
CP-1757	RE-2015	1.750	$5\frac{1}{8}$	$5\frac{3}{4}$
CP-2060	RE-2518	2.000	$5\frac{1}{8}$	6
CP-2570	RE-3022	2.500	$6\frac{1}{8}$	7
CP-3070	RE-3525	3.000	$6\frac{1}{8}$	7
CP-3590	RE-4532	3.500	$8\frac{1}{8}$	9
CP-40100	RE-5540	4.000	$9\frac{1}{8}$	10
CP-50130	RE-7055	5.000	$12\frac{1}{8}$	13

Rod end accessories shown on pg. 78 are recommended for use with style 2 or style 5 rod ends which include a shoulder surface against which the attachment can be secured.

If accessory is used with non-shouldered style thread, the thread length should be extended and the attachment secured with a locking nut.

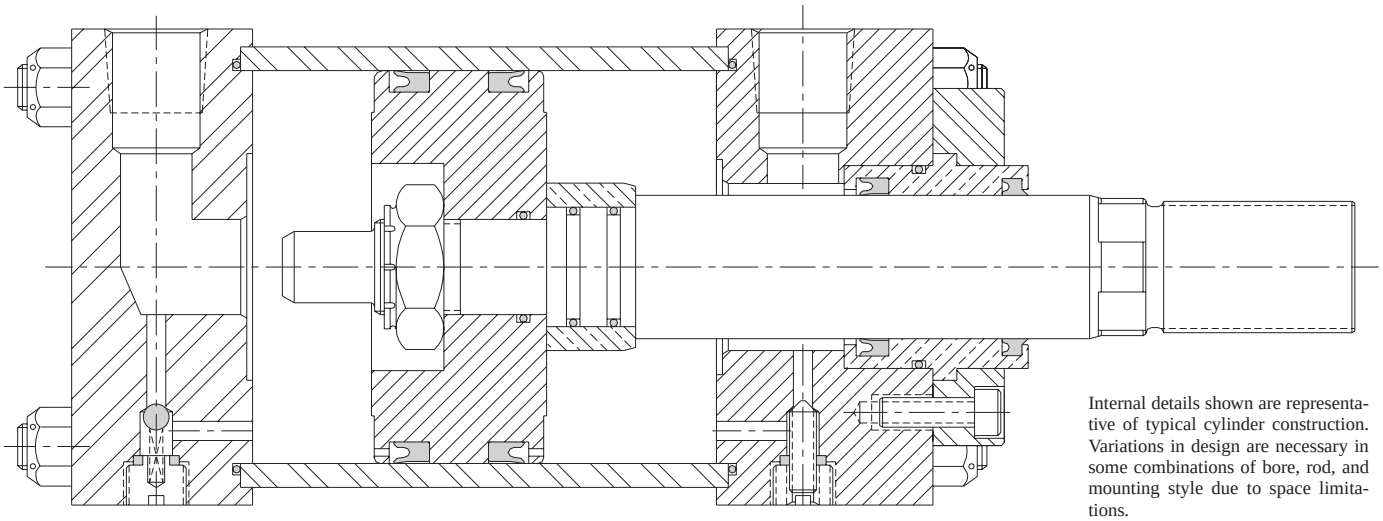
SELF ALIGNING ROD END COUPLER

- **PREVENTS BINDING AND ERRATIC MOVEMENT CAUSED BY MISALIGNMENT.**
- **PERMITS GREATER TOLERANCE BETWEEN CYLINDER CENTERLINE AND MATING MEMBER.**
- **REDUCES ROD SEAL AND BEARING WEAR.**
- **EQUALLY WELL SUITED FOR "PUSH" OR "PULL" APPLICATIONS.**



PART NUMBER	SUGGESTED ROD DIA.	ROD END COUPLER DIMENSIONS								
		A-THREAD	B	C	D	E	F	G	H	Max. Pull Force
LC-1-07A	$\frac{5}{8}$	$\frac{7}{16}$-20	$1\frac{3}{8}$	2	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{13}{16}$	2,535
LC-1-08A	$\frac{5}{8}$	$\frac{1}{2}$-20	$1\frac{3}{8}$	2	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{13}{16}$	3,500
LC-1-10A	$\frac{5}{8}$	$\frac{5}{8}$-18	$1\frac{3}{8}$	2	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{13}{16}$	4,750
LC-1-12A	1	$\frac{3}{4}$-16	2	$2\frac{5}{16}$	$\frac{1}{2}$	$1\frac{1}{8}$	$\frac{31}{32}$	$\frac{13}{16}$	$1\frac{1}{8}$	8,750
LC-1-14A	1	$\frac{7}{8}$-14	2	$2\frac{5}{16}$	$\frac{1}{2}$	$1\frac{1}{8}$	$\frac{31}{32}$	$\frac{13}{16}$	$1\frac{1}{8}$	9,750
LC-1-16A	$1\frac{3}{8}$	1-14	$3\frac{1}{8}$	$2\frac{15}{16}$	$\frac{17}{32}$	$1\frac{5}{8}$	$1\frac{11}{32}$	$1\frac{5}{32}$	$1\frac{5}{8}$	16,125
LC-1-20A	$1\frac{3}{4}$	$1\frac{1}{4}$-12	$3\frac{1}{8}$	$2\frac{15}{16}$	$\frac{17}{32}$	2	$1\frac{11}{32}$	$1\frac{5}{32}$	$1\frac{5}{8}$	19,600
LC-1-24A	2	$1\frac{1}{2}$-12	4	$4\frac{3}{8}$	$\frac{7}{8}$	$2\frac{1}{4}$	$1\frac{31}{32}$	$1\frac{3}{4}$	$2\frac{3}{8}$	34,000
LC-1-28A	2	$1\frac{3}{4}$-12	4	$4\frac{3}{8}$	1	$2\frac{1}{4}$	$1\frac{31}{32}$	$1\frac{3}{4}$	$2\frac{3}{8}$	34,000
LC-1-30A	$2\frac{1}{2}$	$1\frac{7}{8}$-12	5	$5\frac{5}{8}$	1	3	$2\frac{15}{32}$	$1\frac{15}{16}$	$2\frac{5}{8}$	41,250
LC-1-32A	$2\frac{1}{2}$	2-12	5	$5\frac{5}{8}$	1	3	$2\frac{15}{32}$	$1\frac{15}{16}$	$2\frac{5}{8}$	41,250
LC-1-36A	3	$2\frac{1}{4}$-12	$6\frac{3}{4}$	$6\frac{3}{8}$	1	$3\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{3}{8}$	$2\frac{7}{8}$	60,000
LC-1-40A	$3\frac{1}{2}$	$2\frac{1}{2}$-12	7	$6\frac{1}{2}$	1	$3\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{7}{8}$	$3\frac{3}{8}$	86,250
LC-1-44A	$3\frac{1}{2}$	$2\frac{3}{4}$-12	7	$6\frac{1}{2}$	1	$3\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{7}{8}$	$3\frac{3}{8}$	86,250
LC-1-48A	4	3-12	7	$6\frac{1}{2}$	1	$3\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{7}{8}$	$3\frac{3}{8}$	86,250
LC-1-52A	$4\frac{1}{2}$	$3\frac{1}{4}$-12	$9\frac{1}{4}$	$8\frac{1}{2}$	1	$4\frac{1}{2}$	4	$3\frac{3}{8}$	$4\frac{1}{2}$	134,250

Self aligning rod end couplers are suitable for use with cylinders having fixed mounting styles only. Rod end styles 2 and 5 having shouldered male threads are recommended when using an alignment coupler. When used with non-shouldered style rod ends (styles 1 or 8), jam nut should be used to lock the coupler in position. Maximum pull force values given allow a 4 to 1 safety factor.



Internal details shown are representative of typical cylinder construction. Variations in design are necessary in some combinations of bore, rod, and mounting style due to space limitations.

Typical Construction Features of Lynair Series "CS2" Cylinder and Equivalent Model Per Chrysler Series "MMAC-100" Specifications

PRESSURE RATING

Series "CS2" and "MMAC-100" cylinders are rated for 200 P.S.I. air or 1000 P.S.I. hydraulic service.

ADJUSTABLE CUSHION OPTION

Cushions are optional at either one or both ends of the cylinder. When provided, close fitting surfaces of mating components trap operating fluid to decelerate the piston before reaching the end of stroke position. Flush fitting Cushion Screw permits adjustment in deceleration rate while interchangeable Ball Check aids start up upon reversal of travel direction.

CYLINDER TUBE

Heavy wall steel tubing is honed to 15 micro inch finish and hard chrome plated on the bore surface to resist wear and promote optimum seal life.

O-RING TUBE END SEALS

Provides leak-free seal at maximum operating pressure levels.

CYLINDER PORTS

N.P.T.F. ports are standard and provided unless otherwise requested. Oversize ports are available upon request.

PISTON ROD

Precision ground, polished, and hard chrome plated piston rods made from high yield strength steel are offered with the choice of three end style options. Male rod threads thru 1½ diameter are rolled for maximum strength and uniformity. Four wrench flats are provided to aid in making the rod end connection. The rod surface is reduced in size in area of flats to eliminate contact with seals at assembly.

ROD BEARING/ REMOVABLE RETAINERS

Precision machined bronze bearing supports and centers rod to maintain concentricity with bore while housing rod seal and wiper. Retainer construction allows removal without tie rod disassembly in most size and mounting style combinations.

ROD SEAL

Pressure energized cup seal of abrasion resistant Buna-N assures positive sealing with minimal frictional drag. Flared lips seal at low pressure while deep base provides stability to resist "rollover" and "extrusion."

ROD WIPER

Double Lip Wiper cleans rod surface of contaminants and prevents entry of harmful particles into sensitive bearing and seal areas. Integral cup form on inboard side of wiper service as secondary seal to insure leak-free performance.

INTERIOR MATERIALS/ EXTERIOR FINISH

Front and Rear Heads are accurately machined from square steel blocks. Cylinder Tubes, Bearing Retainers, and mountings are constructed of steel for maximum strength and durability.

Cylinders have enamel finish on exterior with mounting and machined surfaces protected by anti-rust film lubricant at time of shipment.

PISTON/SECURELY LOCKED

One piece high tensile cast iron piston with wide surface area contacting cylinder bore stabilizes rod and reduces bearing loads. The piston is pilot fitted onto rod and secured by self-locking nut when sizes permit.

PISTON SEALS

Pressure energized cup seals of Buna-N material provide low friction, leak-free sealing with air or hydraulic service. Deep base design is self compensating to adjust for normal wear with stability needed to prevent premature failure from "rollover" or "extrusion".

TIE RODS WITH LOCKNUTS

Made from steel having 100,000 P.S.I. minimum yield strength (125,000 P.S.I. for diameters larger than ½") with rolled threads for maximum strength and uniformity are secured with self-locking nuts.

LYNAIR SERIES "CS2" CYLINDERS

A Model Numbering system for describing cylinder size and variable construction features that are available for use in "standard" cylinders is explained below.
This model number consists of Letter and Number Codes which represent the desired choices between available variables which make up the cylinder construction details.
Cylinders may be ordered to include non-standard features that cannot be identified in coded number terms. When special features are desired, clearly describe requirements with a supplemental callout of details.

GENERAL SPECIFICATIONS

RATED FOR 200 P.S.I. AIR/1000 P.S.I. HYD. SERVICE

Standard Series "CS2" cylinders are constructed to be suitable for use with either air or hydraulic fluid as the operating medium.

OPTIONAL "CUSHION" FEATURE

Cushions, which decelerate the rod travel speed before reaching the end of stroke position, are optional at either one or both ends of all cylinders.
Use of cushions is not recommended when stroke length is less than 3 inches.

PORT POSITION OPTIONS

Operating ports may be specified to be on any two of the four numbered side positions without added cost. The desired port positions should be included in the model number information submitted.
Standard port locations are as follows:
$1^1/_2$ thru $2^1/_2$ Bore - Port location #1.
$3^1/_4$ thru 10 Bore - Port location #2 and #4.
Cylinders will be provided with ports in these positions unless otherwise specified in order details.

MODEL NUMBER INFORMATION

SAMPLE MODEL NUMBER
NOTE: INCLUDE "DASH" MARKS ONLY AS SHOWN.

CS2	-	$3^1/_4$	B	4	1	-	10	-	$1^3/_8$	-	P2&4
1		2	3	4	5		6		7		8

DESCRIPTION OF LETTER AND NUMBER CODES

1. Cylinder "Series" designation.
2. Diameter of Cylinder Bore in inches.
   Available in sizes $1^1/_2$" thru 10".
3. Mounting Style Code Letter
   Available in Models A, B, C, D, G, L, and N.
4. Cushion Option Code Number
   0 ..... Non-cushioned
   2 ..... Adjustable Cushion on Rod End
   3 ..... Adjustable Cushion on Blind End
   4 ..... Adjustable Cushion on Both Ends
5. Rod End Style Number
   1 ..... Male Thread - Maximum Diameter
   2 ..... Small Male Thread
   4 ..... Female Thread
   6 ..... Special Rod End - per custom specifications
6. Stroke Length (inches)
7. Piston Rod Diameter
8. Port Position
   Desired position indicated by use of assigned location number with prefix "P".

CHRYSLER CORP. MMAC-100 SPECIFICATIONS

Cylinders manufactured to meet the requirements of this Chrysler Corporation Engineering Standard are identical to Series "CS2" models in design, but have certain dimensional differences affecting the mounting of some models. Charted dimensions pertaining exclusively to these cylinders are given on page 83.
The model number form used to identify cylinder construction details also conforms to Chrysler Standards. This model number, described below in detail, must be used when ordering cylinders that are to meet this specific standard.

REQUIREMENTS OF CHRYSLER STANDARD

RATED FOR 200 P.S.I. AIR/1000 P.S.I. HYD. SERVICE

Cylinders are constructed to be suitable for use with either air or hydraulic fluid as the operating medium.
Air operated cylinders are designated "MMAC" models, while those for hydraulic service are termed "MMHC" units.
Exterior dimensions of "MMAC" and "MMHC" cylinders are identical.

USE OF "CUSHION" OPTION

Cylinders are to be "non-cushioned" when the stroke length is 2 inches or less.
When the stroke length exceeds 2 inches, all cylinders are to include "adjustable cushions on both ends".

STROKE LENGTH RESTRICTION

Cylinder stroke lengths are to be ordered in full inch increments only.

ROD END THREAD SPECIFICATIONS

Cylinder piston rod is to have a male threaded rod end equal to Lynair standard Style 1.

STANDARD PORT LOCATIONS

All cylinders are to have two ports in each end with the preferred location being on sides #2 and #3.
If alternate port locations are desired, positions #1 and #4 may be specified.

MM	A	C	-	1	0	0	-	P2&3	4 Bore x 10 Stroke
1	2	3		4	5	6		7	8

DESCRIPTION OF LETTER AND NUMBER CODES

1. Chrysler Corp. code prefix letters.
2. A ..... indicates "air service"
   H ..... indicates "hydraulic service"
3. C ..... represents "cylinder"
4. Chrysler "Series" designation code
5. Mounting Style Code Number
   0 ..... Foot Mount
   1 ..... Rear Flange Mt. 3 ..... Pivot Mt.
   2 ..... Front Flange Mt. 4 ..... Trunnion Mt.
6. Seal Type Code Number
   0 ..... Standard seals for "air service" only.
   5 ..... Standard seals for "hydraulic service" only.
   6 ..... Seals suitable for use with Water Emulsion fluid. Buna-N rod seal, Cast Iron Ring piston seals.
   7 ..... Seals suitable for use with Phosphate Ester fluid. Viton rod and piston seals.
7. Port Position
   Desired position indicated by use of assigned location number with prefix "P".
8. Cylinder Bore Size and Stroke Length (inches)

SERIES "CS2" CYLINDER DIMENSIONS

BORE	BASIC DIMENSIONS -- ALL MODELS									
	MM	E	EE	F	G	J	K	W	Y	P
1 1/2	7/8	2 1/2	1/2	1/2	2 7/16	1 1/2	1/2	13/16	2 3/4	3 1/4
2	1 1/8	3	1/2	1/2	2 3/4	1 1/2	1/2	7/8	2 15/16	3 7/16
2 1/2	1 3/8	3 1/2	1/2	5/8	2 5/16	1 7/16	5/8	7/8	3 1/4	3 3/8
3 1/4	1 3/8	4 1/2	1/2	5/8	2 3/16	1 11/16	3/4	7/8	3	3 13/16
4	1 5/8	5	3/4	5/8	2 3/16	1 7/16	3/4	1	3 1/8	4
4 1/2	1 5/8	5 1/2	3/4	5/8	2 3/16	1 7/16	3/4	1	3 1/8	4
5	2 1/8	6	3/4	3/4	2 11/16	2 3/16	7/8	1 1/8	3 5/8	4 1/2
6	2 1/8	7	3/4	3/4	2 11/16	2 3/16	7/8	1 1/8	3 5/8	4 1/2
8	3	9 1/2	1	1 1/4	3 7/16	2 7/16	1 1/4	1 1/4	4 13/16	6 1/4
10	4	12	1 1/4	1 1/2	4 1/8	2 5/8	1 7/16	1 1/4	5 3/4	7 3/4

BORE	MODEL "A" MOUNTING DIMENSIONS									
	RP	LB	ZB	SB	ST	SX	SW	SU	S	XS
1 1/2	1 7/8	5 13/16	7 1/8	3/8	9/16	1/2	9/16	1 3/16	1 1/4	1 13/16
2	2 15/16	6 1/8	7 1/2	3/8	9/16	1/2	5/8	1 1/8	1 1/2	1 7/8
2 1/2	3 7/16	6 1/2	8	1/2	13/16	5/8	5/8	1 3/8	1 3/4	2 1/8
3 1/4	3 3/8	6 7/8	8 1/2	1/2	15/16	1/2	5/8	1 3/8	2 1/4	2 1/8
4	4	6 7/8	8 5/8	5/8	15/16	5/8	5/8	1 7/8	2 1/2	2 1/4
4 1/2	4	6 7/8	8 5/8	5/8	15/16	3/4	5/8	1 7/8	2 3/4	2 1/4
5	4 1/2	8 1/4	10 1/4	3/4	1 1/16	3/4	3/4	2 1/4	3 1/4	2 5/8
6	4 1/2	8 1/4	10 1/4	3/4	1 1/16	3/4	3/4	2 1/4	3 3/4	2 5/8
8	5 1/2	11 1/4	13 3/4	1	1 1/16	7/8	1	3	4 3/4	4 3/4
10	7	13 3/4	16 7/16	1 1/4	1 7/16	1 1/4	1 1/4	3	6 1/8	4

BORE	MODEL "B" MOUNTING DIMENSIONS								
	SS	TS	US	CD	CB	CE	L	M	MR
1 1/2	4 1/4	3 1/2	4 1/4	.626	1	1 1/2	1 5/16	3/4	7/8
2	4 1/2	4	4 3/4	.626	1	1 1/2	1 1/4	3/4	7/8
2 1/2	4 3/4	4 3/4	5 3/4	.752	1 1/2	1 3/4	1 3/8	7/8	1 1/16
3 1/4	5	5 1/2	6 1/2	.752	1 1/2	1 3/4	1 1/2	7/8	1 1/16
4	5	6 1/4	7 1/2	1.002	2	2 1/4	1 7/8	1 1/8	1 5/16
4 1/2	5	7	8 1/4	1.002	2	2 1/4	1 7/8	1 1/8	1 5/16
5	6	7 1/2	9	1.502	2 1/2	3	2 1/4	1 1/2	1 11/16
6	6	8 1/2	10	1.502	2 1/2	3	2 1/4	1 1/2	1 11/16
8	6 3/4	11 1/4	13 1/4	2.002	3	4	3 1/4	2	2 1/4
10	9 3/4	14 1/2	17	2.502	3 1/2	5	4	2 1/2	2 7/8

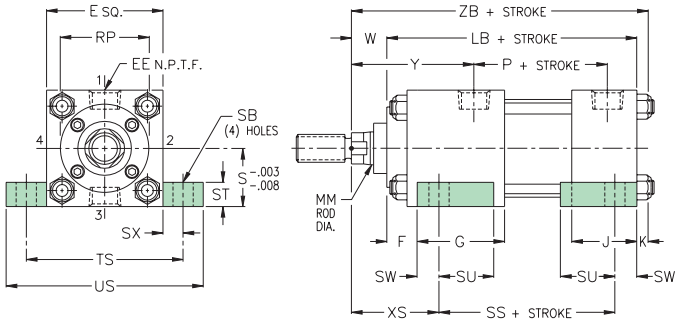
BORE	MODEL "N" MOUNTING DIMENSIONS								
	LR	XC	ZC	TD	TL	TM	UM	UV	BD
1 1/2	1 1/16	7 15/16	8 11/16	.999	1	2 1/2	4 1/2	2 1/2	1 1/2
2	1	8 1/4	9	.999	1	3	5	3	1 3/4
2 1/2	1 1/8	8 3/4	9 5/8	.999	1	3 1/2	5 1/2	3 1/2	1 3/4
3 1/4	1 1/4	9 1/4	10 1/8	.999	1	4 1/2	6 1/2	4 1/2	1 3/4
4	1 9/16	9 3/4	10 7/8	1.499	1 3/8	5 3/4	8 1/2	5 1/4	2
4 1/2	1 9/16	9 3/4	10 7/8	1.499	1 3/8	6 1/4	9	5 3/4	2
5	1 15/16	11 5/8	13 1/8	1.499	1 3/8	7 1/4	10	6 1/4	2
6	1 15/16	11 5/8	13 1/8	1.499	1 3/8	8 1/4	11	7 1/4	2
8	2 7/8	15 3/4	17 3/4	1.999	1 3/4	11 1/2	15	10	3
10	3 1/2	19	21 1/2	2.999	2 3/4	12	17 1/2	12	4

BORE	MODEL "C" AND "D" MOUNTING DIMENSIONS									
	U	H	TF	RF	UF	EB	ER	WF	XF	ZF
1 1/2	1 1/2	7/16	3 1/2	1 7/8	4 1/4	3/8	1/4	1 5/16	6 5/8	7 1/16
2	2	3/8	4	--	4 3/4	3/8	1/4	1 3/8	7	7 3/8
2 1/2	2 1/2	1/2	4 3/4	--	5 3/4	1/2	3/8	1 1/2	7 3/8	7 7/8
3 1/4	3	5/8	5 1/2	3 3/8	6 1/2	1/2	3/8	1 1/2	7 3/4	8 3/8
4	3 1/2	5/8	6 1/4	4	7 1/2	5/8	3/8	1 5/8	7 7/8	8 1/2
4 1/2	4	5/8	7	4	8 1/4	5/8	1/2	1 5/8	7 7/8	8 1/2
5	4 1/2	3/4	7 1/2	4 1/2	9	3/4	1/2	1 7/8	9 3/8	10 1/8
6	5 1/2	3/4	8 1/2	4 1/2	10	3/4	1/2	1 7/8	9 3/8	10 1/8
8	7	1 1/4	11 1/4	5 1/2	13 1/4	1	1/2	2 1/2	12 1/2	13 3/4
10	9 1/2	1 1/4	14 1/2	7	17	1 1/4	3/4	2 3/4	15	16 1/2

BORE	MODEL "G" AND "L" MOUNTING DIMENSIONS								
	NT	ND	TN	SN	XT	R	DD	BB	ZT
1 1/2	3/8-16	3/8	15/16	4 1/4	1 13/16	1.81	3/8-24	1	7 5/8
2	3/8-16	3/8	1 5/16	4 1/2	1 7/8	2.25	3/8-24	1 1/8	8 1/8
2 1/2	1/2-13	1/2	1 7/16	4 1/2	2 1/8	2.63	1/2-20	1 1/4	8 5/8
3 1/4	1/2-13	1/2	1 5/8	5	2 1/8	3.18	5/8-18	1 3/8	9 1/8
4	5/8-11	5/8	2 1/8	5	2 1/4	3.71	5/8-18	1 3/8	9 1/4
4 1/2	5/8-11	3/4	2 1/2	5	2 1/4	4.38	5/8-18	1 3/8	9 1/4
5	3/4-10	1 1/8	3	6	2 5/8	4.68	3/4-16	1 5/8	11
6	3/4-10	1 1/8	3 3/8	6	2 5/8	5.39	3/4-16	1 5/8	11
8	1-8	1 1/2	4	7 1/4	4 1/4	7.16	1 1/8-12	2 1/4	14 3/4
10	1 1/4-12	1 7/8	6 1/2	9 3/4	4	9.55	1 1/4-12	3	18

FOOT MOUNT

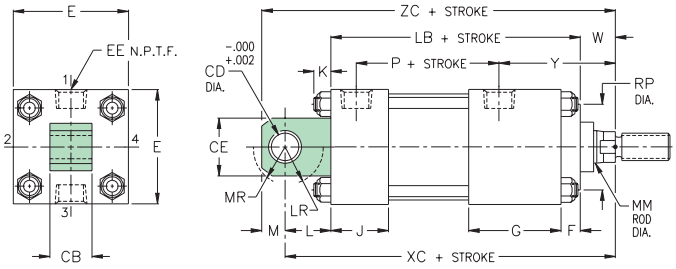
SERIES "CS2" MODEL "A"
CHRYSLER MODEL MMAC-



"SB" IS DIAMETER OF MOUNTING BOLT.

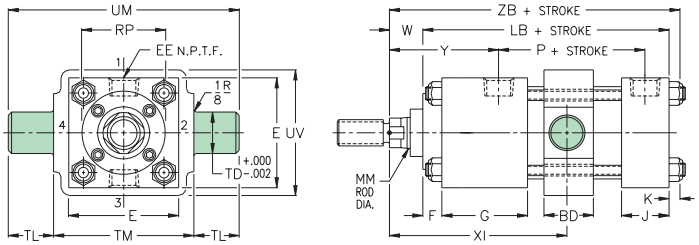
PIVOT MOUNT

SERIES "CS2" MODEL "B"
CHRYSLER MODEL MMAC-



TRUNNION MOUNT

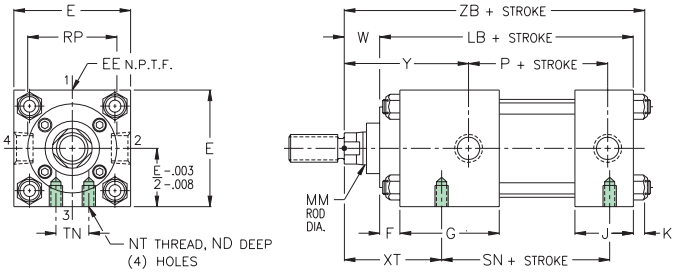
SERIES "CS2" MODEL "N"
CHRYSLER MODEL MMAC-



"XI" DIM. TO BE SPECIFIED BY CUSTOMER.
TRUNNION LOCATION IS ADJUSTABLE BETWEEN CYLINDER END

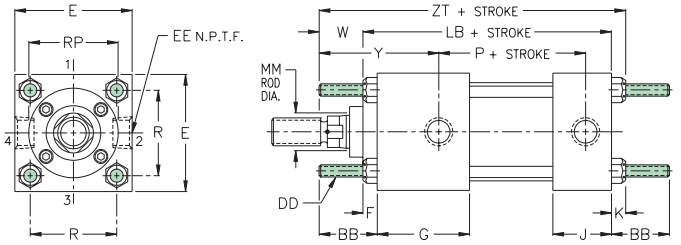
SIDE MOUNT

SERIES "CS2" MODEL



EXTENDED TIE ROD MOUNT

SERIES "CS2" MODEL

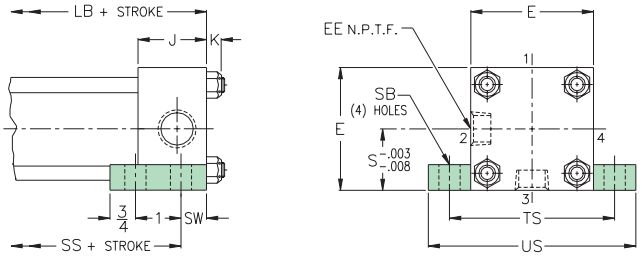


SPECIFY ON ORDER WHICH TIE RODS ARE TO BE EXTENDED.

CHRYSLER MODEL MMAC-100

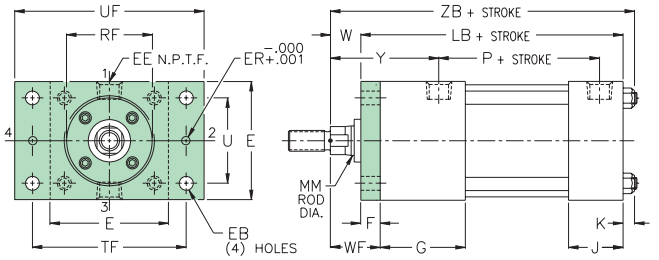
APPLIES TO 1½ AND 2 BORE CYLINDERS ONLY.

Lugs at rear of cylinder include multiple mounting holes as shown. Front head mounting is not altered.



FRONT FLANGE MT.

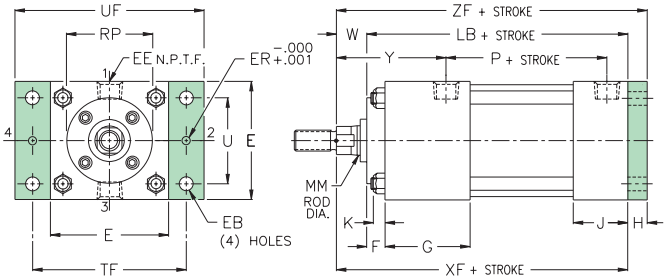
SERIES "CS2" MODEL "C"
CHRYSLER MODEL MMAC-



"EB" IS DIAMETER OF MOUNTING

REAR FLANGE MT.

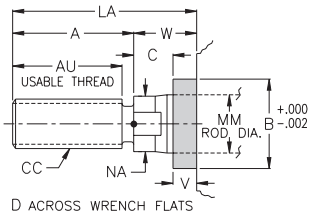
SERIES "CS2" MODEL "D"
CHRYSLER MODEL MMAC-



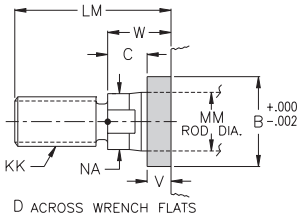
"EB" IS DIAMETER OF MOUNTING BOLT

OPTIONAL ROD END STYLES

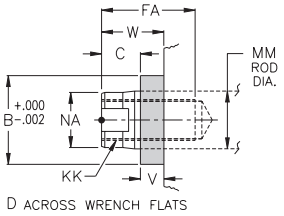
STYLE 1 (MMAC-100 STD.)
MALE THREAD - MAX.



STYLE 2
SMALL MALE



STYLE
FEMALE



STYLE
SPECIAL ROD

Special rod ends made to suit customer requirements are available. Submit dimensional sketch or accurate description when desired.

"STYLE 6" designation not assigned to modified rod ends with altered "LA" length.

STANDARD ROD END DIMENSIONS

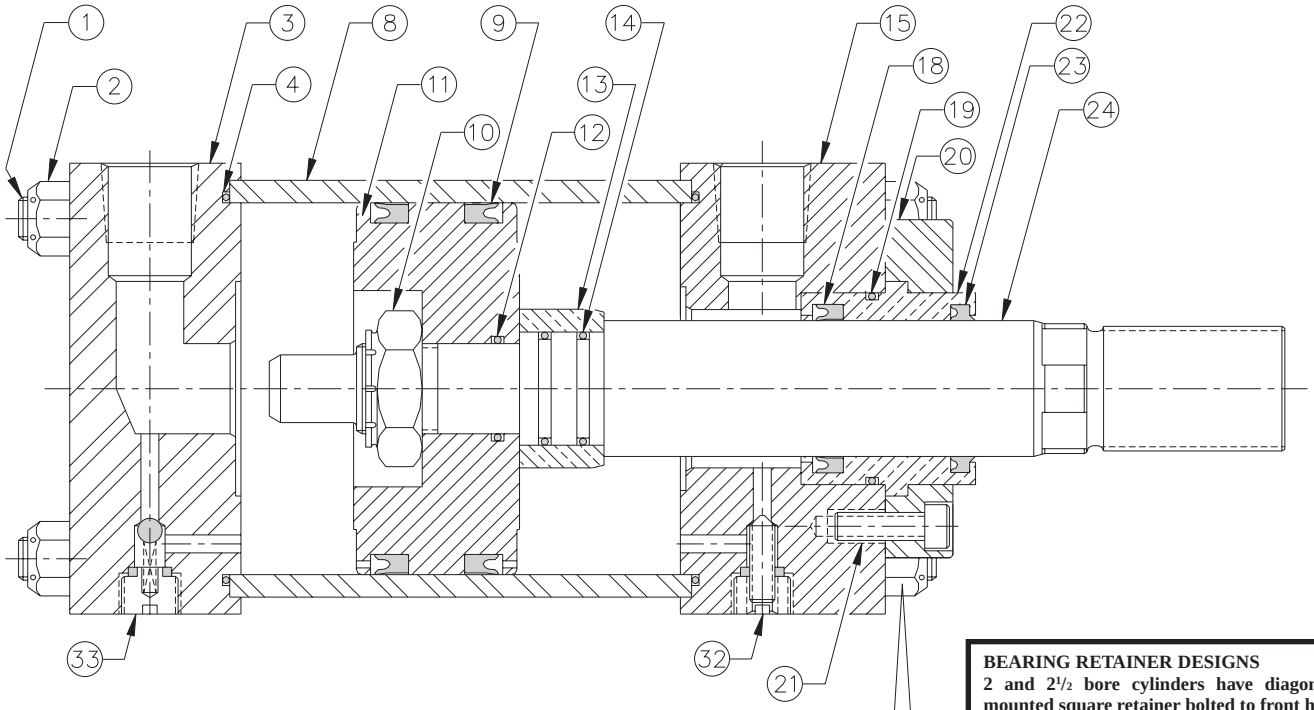
LET. DIM.	ROD DIAMETER						
	7/8	1 1/8	1 3/8	1 5/8	2 1/8	3	4
CC	3/4-10	1-8	1 1/4-12	1 1/2-12	2-12	2 3/4-12	3 3/4-12
KK	7/16-20	3/4-16	1-14	1 1/4-12	1 1/2-12	2 1/4-12	3-12
A	1 7/8	2 3/8	2 7/8	3 1/2	4 5/8	6 1/8	6 1/2
B	1.374	1.749	2.124	2.499	2.999	3.999	4.999
C	7/16	1/2	1/2	5/8	3/4	7/8	7/8
D	3/4	1	1 1/4	1 1/2	2	2 3/4	3 5/8
V	3/8	3/8	3/8	3/8	3/8	3/8	3/8
W	13/16	7/8	7/8	1	1 1/8	1 1/4	1 1/4
AU	1 5/8	2 1/8	2 5/8	3 1/8	4 1/8	5 5/8	6
FA	7/8	1 1/2	2	2 1/2	3	4	4 1/2
LA	2 11/16	3 1/4	3 3/4	4 1/2	5 3/4	7 3/8	7 3/4
LM	1 11/16	2 3/8	2 7/8	3 1/2	4 1/8	5 1/4	5 3/4
NA	27/32	1 3/32	1 11/32	1 19/32	2 3/32	2 15/16	3 15/16

CHRYSLER SERIES MMAC-100 HEAVY DUTY CYLINDER DIMENSIONS

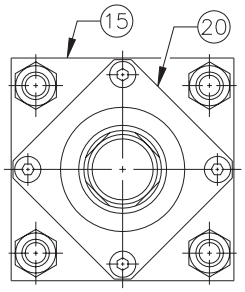
	LET. DIM.	CYLINDER BORE SIZE								
		1 1/2	2	2 1/2	3 1/4	4	4 1/2	5	6	8
BASIC DIMS - ALL MODELS	MM	7/8	1 1/8	1 3/8	1 3/8	1 5/8	1 5/8	2 1/8	2 1/8	3
	E	2 1/2	3	3 1/2	4 1/2	5	5 1/2	6	7	9 1/2
	EE	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	1
	F	1/2	1/2	5/8	5/8	5/8	5/8	3/4	3/4	1 1/4
	G	2 7/16	2 3/4	2 5/16	2 3/16	2 3/16	2 3/16	2 11/16	2 11/16	3 7/16
	J	1 1/2	1 1/2	1 7/16	1 11/16	1 7/16	1 7/16	2 3/16	2 3/16	2 7/16
	K	1/2	1/2	5/8	3/4	3/4	3/4	7/8	7/8	1 1/4
	W	13/16	7/8	7/8	7/8	1	1	1 1/8	1 1/8	1 1/4
	Y	2 3/4	2 15/16	3 1/4	3	3 1/8	3 1/8	3 5/8	3 5/8	4 13/16
	P	3 1/4	3 7/16	3 3/8	3 13/16	4	4	4 1/2	4 1/2	6 1/4
	RP	1 7/8	2 15/16	3 7/16	3 3/8	4	4	4 1/2	4 1/2	5 1/2
	LB	5 13/16	6 1/8	6 1/2	6 7/8	6 7/8	6 7/8	8 1/4	8 1/4	11 1/4
	ZB	7 1/8	7 1/2	8	8 1/2	8 5/8	8 5/8	10 1/4	10 1/4	13 3/4
FOOT MT. MODEL	SB	3/8	3/8	1/2	1/2	5/8	5/8	3/4	3/4	1
	ST	9/16	9/16	13/16	15/16	15/16	15/16	1 1/16	1 1/16	1 1/16
	SX	1/2	1/2	5/8	1/2	5/8	3/4	3/4	3/4	7/8
	SW	9/16	5/8	5/8	5/8	5/8	5/8	3/4	3/4	1
	SU	1 3/16	1 1/8	1 3/8	1 3/8	1 7/8	1 7/8	2 1/4	2 1/4	3
	S	1 1/4	1 1/2	1 3/4	2 1/4	2 1/2	2 3/4	3	3 1/2	4 3/4
	XS	1 13/16	1 7/8	2 1/8	2 1/8	2 1/4	2 1/4	2 5/8	2 5/8	4 3/4
	SS	4 1/4	4 1/2	4 3/4	5	5	5	6	6	6 3/4
	TS	3 1/2	4	4 3/4	5 1/2	6 1/4	7	7 1/2	8 1/2	11 1/4
	US	4 1/4	4 3/4	5 3/4	6 1/2	7 1/2	8 1/4	9	10	13 1/4
	CD	.626	.626	.752	.752	1.002	1.002	1.502	1.502	2.002

	LET. DIM.	CYLINDER BORE SIZE								
		1 1/2	2	2 1/2	3 1/4	4	4 1/2	5	6	8
PIVOT MT. MODEL	CB	1	1	1 1/2	1 1/2	2	2	2 1/2	2 1/2	3
	CE	1 1/2	1 1/2	1 3/4	1 3/4	2 1/4	2 1/4	3	3	4
	L	1 5/16	1 1/4	1 3/8	1 1/2	1 7/8	1 7/8	2 1/4	2 1/4	3 1/4
	M	3/4	3/4	7/8	7/8	1 1/8	1 1/8	1 1/2	1 1/2	2
	MR	7/8	7/8	1 1/16	1 1/16	1 5/16	1 5/16	1 11/16	1 11/16	2 1/4
	LR	1 1/16	1	1 1/8	1 1/4	1 9/16	1 9/16	1 15/16	1 15/16	2 7/8
	XC	7 15/16	8 1/4	8 3/4	9 1/4	9 3/4	9 3/4	11 5/8	11 5/8	15 3/4
	ZC	8 11/16	9	9 5/8	10 1/8	10 7/8	10 7/8	13 1/8	13 1/8	17 3/4
FLANGE MT. MODELS	U	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5 1/2	7
	H	7/16	3/8	1/2	5/8	5/8	5/8	3/4	3/4	1 1/4
	TF	3 1/2	4	4 3/4	5 1/2	6 1/4	7	7 1/2	8 1/2	11 1/4
	RF	1 7/8	--	--	3 3/8	4	4	4 1/2	4 1/2	5 1/2
	UF	4 1/4	4 3/4	5 3/4	6 1/2	7 1/2	8 1/4	9	10	13 1/4
	EB	3/8	3/8	1/2	1/2	5/8	5/8	3/4	3/4	1
	ER	1/4	1/4	3/8	3/8	3/8	1/2	1/2	1/2	1/2
	WF	1 5/16	1 3/8	1 1/2	1 1/2	1 5/8	1 5/8	1 7/8	1 7/8	2 1/2
	XF	6 5/8	7	7 3/8	7 3/4	7 7/8	7 7/8	9 3/8	9 3/8	12 1/2
	ZF	7 1/16	7 3/8	7 7/8	8 3/8	8 1/2	8 1/2	10 1/8	10 1/8	13 3/4
TRUNN. MT. MOD.	TD	.999	.999	.999	.999	1.499	1.499	1.499	1.499	1.999
	TL	1	1	1	1	1 3/8	1 3/8	1 3/8	1 3/8	1 3/4
	TM	2 1/2	3	3 1/2	4 1/2	5 3/4	6 1/4	7 1/4	8 1/4	11 1/2
	UM	4 1/2	5	5 1/2	6 1/2	8 1/2	9	10	11	15
	UV	2 1/2	3	3 1/2	4 1/2	5 1/4	5 3/4	6 1/4	7 1/4	10
	BD	1 1/2	1 3/4	1 3/4	1 3/4	2	2	2	2	3

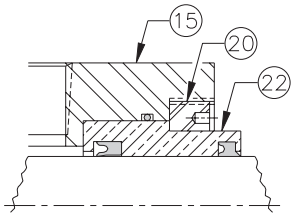
PART IDENTIFICATION NUMBERS FOR LYNAIR SERIES "CS2" AND "MMAC-100" CYLINDERS



BEARING RETAINER DESIGNS
2 and 2½ bore cylinders have diagonally mounted square retainer bolted to front head. (Not used on Model "C".)



1½ bore cylinders are constructed with a threaded retainer recessed into front head or flange.



BORE	1 1/2	2	2 1/2	3 1/4	4
Tie Rod Dia.	3/8	3/8	1/2	5/8	5/8
Torque Ft. Lbs.	18	22	40	70	105
BORE	4 1/2	5	6	8	10
Tie Rod Dia.	5/8	3/4	3/4	1 1/8	1 1/4
Torque	115	185	250	500	820

TIE ROD TORQUE SPECIFICATIONS

When tie rod nuts are removed to perform cylinder maintenance, they must be reassembled with proper torque to secure the assembly.

To prevent twisting, attach vice grip pliers or a locking clamp to tie rod near end of unit where torque will be applied. Recommended torque values apply to lubricated threads.

BASIC PARTS LIST

ITEM NUMBER	PART NAME
1	Tie Rod
2	Tie Rod Fastener
3*	Rear Head
4	Tube End O-Ring
8	Cylinder Tube
9	Piston Packing
10	Piston Nut
11	Piston
12	O-Ring - Piston to Rod
13	Cushion Bushing
14	O-Ring - Cushion to Rod
15*	Front Head
18	Rod Seal
19	O-Ring - Bearing to Head
20	Bearing Retainer
21	Bearing Retainer Cap Screws
22	Rod Bearing
23	Rod Wiper
24	Piston Rod
32	Cushion Adj. Screw Assembly
33	Ball Check Assembly

(*) Model number code letter used to indicate mounting style should be included with item number to describe part.
Example: Item 15-A Front Head

MOUNTING COMPONENT PARTS LIST

ITEM NUMBER	MTG. STYLE	PART NAME
35	"C"	Rect. Front Flange Plate
36	"D"	Rect Rear Flange Plate
37	"N"	Intermediate Trunnion Ring

ORDER INFORMATION REQUIREMENTS
When ordering replacement parts, clearly specify the item number, name, and quantity of the desired component. It is essential to provide the correct model and serial number of the cylinder in which the parts will be used. By providing both numbers, a cross check of reference data can be made to assure accurate fulfillment of order requirements.

SERVICE PARTS MAY BE ORDERED AS FOLLOWS:

SEAL KIT: Consists of item numbers 4, 9, 18, 19, and 23.

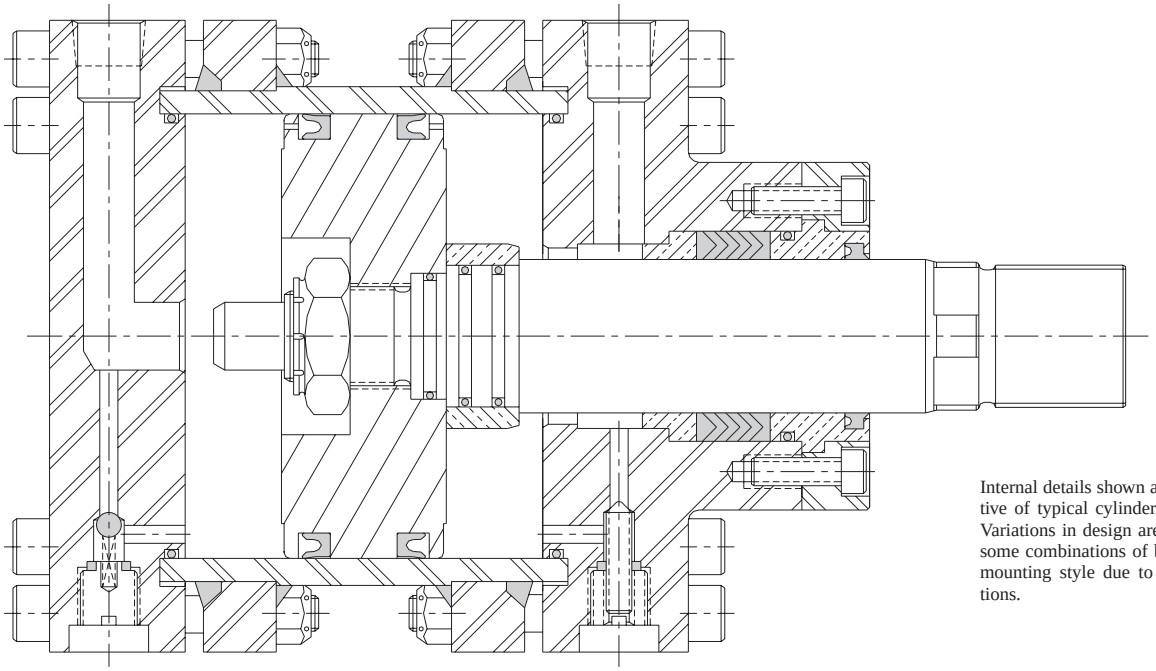
SEAL KIT w/BEARING: Consists of above items with addition of Rod Bearing, item 22.

CARTRIDGE ASSEMBLY: Consists of item numbers 18, 19, 22, and 23.

PISTON AND ROD ASSEMBLY: Consists of item numbers 9, 10, 11, 12, 13, 14, and 24 as required.

NOTE: Ordered parts will be supplied to suit construction details indicated by record data of original serial number.

LYNAIR, INC.
3515 Scheele Drive P.O. Box 720
Jackson, Michigan 49204
Phone (517)787-2240 FAX (517)787-4521



Internal details shown are representative of typical cylinder construction. Variations in design are necessary in some combinations of bore, rod, and mounting style due to space limitations.

Typical Construction Features of Lynair Heavy Duty Mill Type Cylinders. Series "MTA" Air and "MTH" Hydraulic Models

PRESSURE RATING

Series "MTA" Mill Type air cylinders are rated for 250 P.S.I. service. "MTH" models are rated for hydraulic service pressures of 1000 P.S.I. for 2 thru 10 bores, and 500 P.S.I. for 12 thru 20 bores.

ADJUSTABLE CUSHION OPTION

Cushions are optional at either one or both ends of the cylinder. When provided, close fitting surfaces of mating components trap operating fluid to decelerate the piston before it reaches the "end of stroke" position. Rod end cushions are self-compensating to adjust for minor alignment variations. Flush fitting Cushion Screw permits adjustment in deceleration rate while interchangeable Ball Check aids start up upon reversal of travel direction.

CYLINDER TUBE WITH WELDED FLANGE RINGS

Heavy wall steel tubing is honed to 15 micro inch finish after welded flange rings are attached. Surface of bore is hard chrome plated to resist wear and promote optimum seal life.

O-RING TUBE END SEALS

Seal located on pilot diameter between tube and head provides leak-free seal at maximum operating pressure levels.

CYLINDER PORTS

N.P.T.F. Ports are unobstructed permitting use of maximum flow area.

PISTON ROD

Precision ground, polished, and hard chrome plated piston rods made from high yield strength steel are offered with the choice of standard male or female thread options. Male rod threads thru $1^1/_2$ diameter are rolled for maximum strength and uniformity. Four wrench flats are provided to aid in making the rod end connection. The rod surface is reduced in size in area of flats to eliminate contact with seals at assembly.

ROD BEARING/ REMOVABLE RETAINERS

Precision machined bronze bearing supports and centers rod to maintain concentricity with bore while providing support for V-ring seal set.

Two-piece bearing with inner section that provides rod support during seal replacement is used when design permits.

Retainer construction allows bearing removal without disassembly of head retaining bolts.

ROD SEAL

Pressure energized multiple lip packing set consists of four fabric reinforced Buna-N V-ring seals plus male and female adapter rings. Seal set is self compensating to adjust for normal wear while providing long lasting, trouble free service.

ROD WIPER

Double Lip Wiper cleans rod surface of contaminants and prevents entry of harmful particles into sensitive bearing and seal areas. Integral cup form on inboard side of wiper serves as secondary seal to insure leak-free performance.

INTERIOR MATERIALS/ EXTERNAL FINISH

Front Head, Rear Head, and Flange Rings are accurately machined from carbon steel plate. Cylinder Tubes, Bearing Retainers, and mountings are constructed of steel for maximum strength and durability.

Cylinders have enamel finish on exterior with mounting and machined surfaces protected by anti-rust film lubricant at time of shipment.

PISTON/SECURELY LOCKED

One piece high tensile cast iron piston with wide surface area contacting cylinder bore stabilizes rod and reduces bearing loads. The piston is pilot fitted onto rod and secured by self-locking nut when sizes permit.

PISTON SEALS

Low friction, self compensating cup type seals provide long, trouble free service. Cylinder sizes thru 6" Bore have seals of lubricated (silicone) urethane material. Other bore sizes are equipped with seals of Buna-N. Piston seals are elastic and snap into piston grooves for easy installation.

RUGGED RETAINING BOLTS

High tensile alloy bolts with self-locking hex nuts are used to secure the cylinder assembly.

SPECIAL CYLINDERS

Variations in construction involving the use of non-standard dimensions, materials, or cylinder feature modifications are available upon request. Full engineering and manufacturing facilities are available to produce the exact cylinder to meet design requirements.

SEAL MATERIAL **--- Standard cylinders are equipped with Polyurethane or Buna-N piston seals and Buna-N/Fabric reinforced rod seals. If the operating conditions or system fluid are not suitable for this seal material, alternate compounds are available. Viton-A material seals are recommended for high temperatures from +180° F to +450° F and may be used with some phosphate ester type fluids. Carboxylated nitrile material seals are available for use with water based fluids to +250° F. Polyurethane seals are well suited for heavy duty air and hydraulic service with petroleum based fluids when system temperatures do not exceed +180° F. Other seal compounds are available for unusual operating conditions. Consult our Engineering Department for seal recommendations if seal compatibility with operating media is not known.**

ROD BOOTS **--- Rod boots offer protection to the piston rod against harmful elements of severe operating environments and are available for all cylinders. When used, it is necessary to provide additional piston rod extension to allow space for the compressed boot length and end connections. The extra required length varies with the rod diameter, stroke, and boot material. Cover materials suitable for a wide range of operating conditions are available. Consult our Engineering Department for information on required rod extensions and recommended boot material.**

METALLIC ROD SCRAPERS **--- Metallic rod scrapers are available for all cylinders and offer greater protection in extreme operating environments where foreign particles are present that may adhere to the rod creating more abrasive conditions than encountered under normal conditions. It is desirable to use a hardened rod when a metallic wiper is necessary.**

CHROME PLATING **--- Standard chrome plating thickness is .0005 thick on both piston rod and bores. Thicker than standard chrome plating is available when increased protection is required for steel surfaces.**

CASE HARDENED PISTON RODS **--- Piston rod material case hardened to Rc-54 is available for all cylinders if desired. This feature provides greater resistance to damage from foreign material contacting the rod surface.**

BRONZE/BRONZE CLAD STEEL PISTONS **--- This feature is available to protect against scoring of cylinder tube, i.e. when "side load" conditions are present. With this option, pistons are solid bronze 4" bore & down; pistons are bronze clad steel in 5" bore & up.**

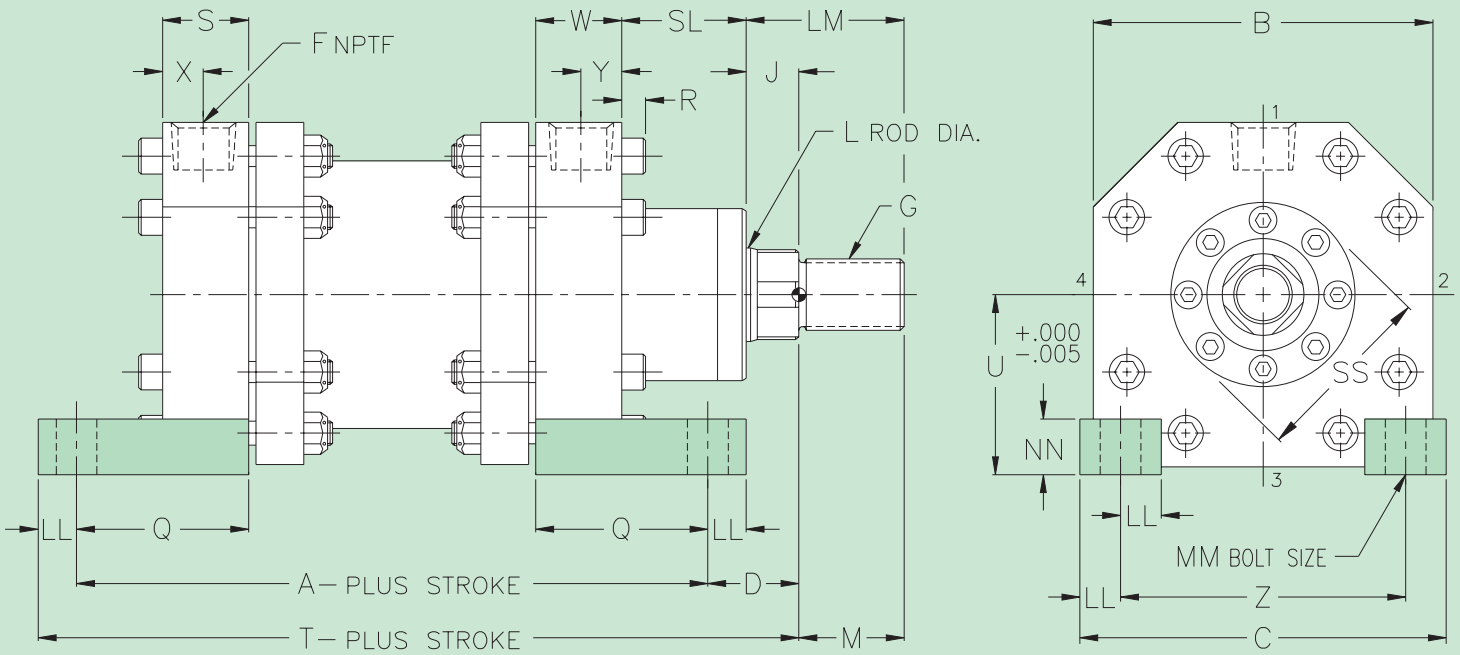
ENGINEERING INFORMATION **--- Refer to pages 4 and 5 of this catalog for information on "Push and Pull" cylinder forces at variable operating pressures. Information pertaining to recommended Rod Diameter and Stop Tube lengths can be found on page 6.**

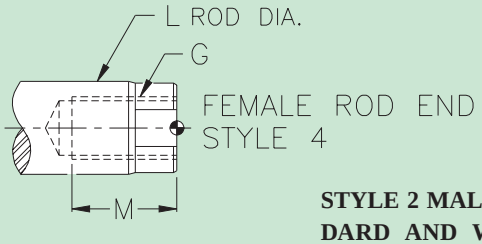
CUSTOM CYLINDERS **--- Mill Type cylinders shown in this catalog are our "standard models" only and do not represent the full range of available designs. Cylinders may be ordered with special features ranging anywhere from minor dimensional changes to total construction modification to suit your particular application requirements. Some common special design features include: Double rod end construction, special mounting dimensions, non-standard porting, special plating requirements, single-acting Ram type units, cylinders with hollow piston rods, Tandem cylinders, modified designs to meet specific "Mill Cylinder" user specifications, and numerous other variations. If a special cylinder is required, submit complete specification to our Engineering Department for information on availability.**

SPECIAL CYLINDER ACCESSORIES **--- The optional rod eyes, clevises, mounting brackets, and pins shown on the last page of this section are the "standard" items only and do not represent the full range of available cylinder attachments. Special accessories can be supplied to meet most application requirements. Submit dimension specifications to our Engineering Department for information on availability.**

CYLINDERS FOR WATER SERVICE **--- Cylinders for water service are provided upon request by making modifications to standard type units. We recommend that these modifications include the use of a stainless steel piston rod, .002 thick chrome plating on the cylinder bore, corrosion resistant plating to all other internal surfaces, a bronze coated steel piston, and carboxylated nitrile cup-type piston seals.**

DRAWING POLICY **--- Certified drawings showing external dimensions of standard or special Mill Type cylinders will be furnished upon request after receipt of a purchase order. A general drawing showing typical internal construction details with replacement part information will also be provided upon request. If a custom cylinder is involved, and construction is such that a general parts drawing is not suitable, Lynair, Inc. reserves the right to charge for Engineering Services involved in producing an internal view drawing with part identification. No drawings will be provided for cylinder quotations.**

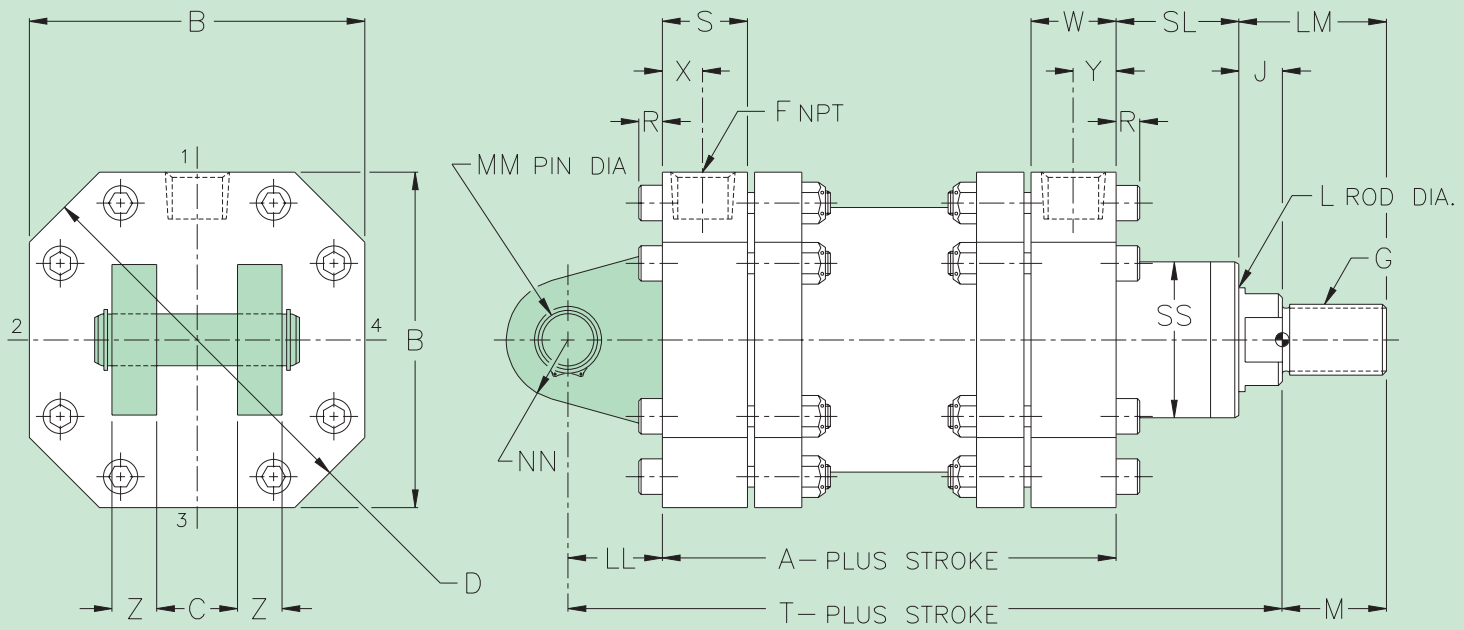


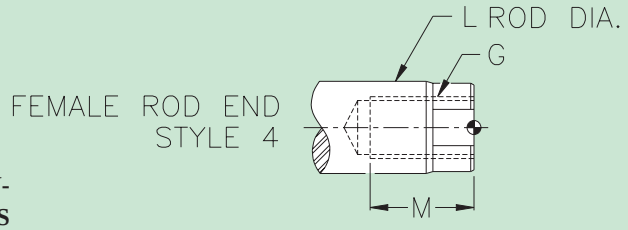


STYLE 2 MALE THREAD ROD END IS STANDARD AND WILL BE SUPPLIED UNLESS OTHERWISE SPECIFIED ON ORDER.

BORE	A	B	C	D	F	G	K	L ROD DIA.	J	LM	M	SL	Q	R	S	T	U	W	X	Y	Z	LL	MM	NN	SS
2	6 3/4	3 1/4	5	1 5/16	1/2	3/4-16	7/8	1	1	2	1	1 1/2	2 11/16	1/4	1 1/2	8 9/16	1 7/8	1 1/2	11/16	11/16	4	1/2	3/8	5/8	2 3/4
3 1/4	7 3/4	4 3/4	5 7/8	1 3/4	1/2	1-14	1 1/8	1 3/8	1	2 3/8	1 3/8	2	3	1/4	1 3/4	10 1/8	2 3/4	1 3/4	13/16	15/16	4 5/8	5/8	5/8	3/4	3 3/8
4	8 3/8	6 3/8	7 1/8	1 13/16	1/2	1 1/4-12	1 1/2	1 3/4	1	2 3/4	1 3/4	2 1/4	3 3/16	3/8	1 3/4	10 13/16	3 3/8	1 3/4	13/16	15/16	5 7/8	5/8	3/4	7/8	3 3/4
5	9 1/2	7 3/8	7 3/8	2 1/8	3/4	1 1/2-12	1 11/16	2	1	3	2	2 5/8	3 1/2	3/8	2	12 3/8	4	2	15/16	15/16	5 3/4	3/4	7/8	1	4 1/4
6	11 1/2	8 7/8	8 7/8	2	3/4	1 7/8-12	2 1/16	2 1/2	1	3 1/2	2 1/2	3 1/4	4 1/2	3/8	2 1/4	14 1/2	4 1/2	2 1/4	15/16	15/16	6 5/8	1	1	1 1/4	4 1/2
8	11 3/8	11 1/4	11 1/4	2 11/16	1	2 1/4-12	2 5/8	3	1	4	3	3 5/8	3 15/16	1/2	2	15 1/8	5 13/16	2	15/16	15/16	8 7/8	1 1/8	1 1/8	1 1/4	7
10	11 7/8	13	13	1 3/4	1 1/4	2 1/4-12	2 5/8	3	1	4	3	2	3 3/4	7/16	2 1/2	14 7/8	6 5/8	2 1/2	1 1/4	1 1/4	10	1 1/4	1 1/4	1 3/8	7
12	12 5/8	15 1/2	15 1/2	1 3/8	1 1/4	2 1/4-12	2 5/8	3	1	4	3	2	4 1/8	1/2	2 1/2	15 3/8	7 7/8	2 1/2	1 1/4	1 1/4	12 3/4	1 3/8	1 1/2	1 3/8	7
14	13 3/8	18	18	1 5/8	1 1/4	2 1/2-12	3	3 1/2	1	4 1/2	3 1/2	2 1/2	4 3/8	1/2	2 1/2	16 3/4	9 1/8	2 1/2	1 1/4	1 1/4	14 1/2	1 7/8	1 3/4	1 3/4	7
16	13 5/8	20 3/4	20 3/4	1 5/8	1 1/4	2 1/2-12	3	3 1/2	1	4 1/2	3 1/2	2 3/4	4 5/8	1/2	2 1/2	17 1/8	10 1/4	2 1/2	1 1/4	1 1/4	17	1 7/8	1 3/4	1 7/8	7
18	14 3/8	23 1/4	23 1/4	2	1 1/2	3-12	3 5/8	4 1/4	1	5 1/4	4 1/4	3 1/8	5 1/8	9/16	3	18 1/4	11 3/4	3	1 1/2	1 1/2	19 1/2	1 7/8	2	2 1/4	7
20	14 3/4	25 1/2	25 1/2	2	1 1/2	3-12	3 5/8	4 1/4	1	5 1/4	4 1/4	3 1/8	5 1/8	9/16	3	18 3/4	12 3/4	3	1 1/2	1 1/2	21 1/2	2	2	2 1/4	7

KEY TO MODEL NUM-	SERIES —	BORE SIZE	MOUNTING STYLE	TYPE OF CUSHIONING	ROD END STYLE	— STROKE	— ROD DIA.	— PORT LOC.
	MTA-AIR OR MTH-HYD	SPECIFY BORE DIA.	A	0-Non Cushioned 2-Cushion Rod End 3-Cushion Blind End 4-Cushioned Both Ends	2-Std. Male Thread 4-Std. Female Thread 6-Special Rod End	Specify Length In Inches	Specify Rod Dia.	Specify Port Loc.





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BORE	A	B	C	D	F	G	K	L ROD DIA.	J	LM	M	SL	R	S	T	W	X	Y	Z	LL	MM ---.000 ---.002	NN	SS
2	4 3/8	3 1/4	1	4 5/8	1/2	3/4-16	7/8	1	1	2	1	1 1/2	1/4	1 1/2	8 1/8	1 1/2	11/16	11/16	3/4	1 1/4	3/4	3/4	2 15/16
3 1/4	5 1/4	4 3/4	1 1/4	5 5/16	1/2	1-14	1 1/8	1 3/8	1	2 3/8	1 3/8	2	1/4	1 3/4	9 3/4	1 3/4	13/16	15/16	7/8	1 1/2	1 1/4	1 1/8	3 7/8
4	5 1/2	6 3/8	1 1/4	7 1/16	1/2	1 1/4-12	1 1/2	1 3/4	1	2 3/4	1 3/4	2 1/4	3/8	1 3/4	10 1/2	1 3/4	13/16	15/16	1	1 3/4	1 3/8	1 1/4	4 3/4
5	6 1/2	7 3/8	1 1/4	8 1/8	3/4	1 1/2-12	1 11/16	2	1	3	2	2 5/8	3/8	2	12 1/8	2	15/16	15/16	1 1/4	2	1 1/2	1 3/8	6
6	7	8 7/8	1 1/2	9	3/4	1 7/8-12	2 1/16	2 1/2	1	3 1/2	2 1/2	3 1/4	3/8	2 1/4	13 3/4	2 1/4	15/16	15/16	1 1/2	2 1/2	1 3/4	1 5/8	7
8	7 1/2	11 1/4	2	12	1	2 1/4-12	2 5/8	3	1	4	3	3 5/8	1/2	2	15 3/16	2	15/16	15/16	1 1/2	3 1/16	2	1 7/8	7
10	9 3/8	13	2 1/2	13 3/4	1 1/4	2 1/4-12	2 5/8	3	1	4	3	2	7/16	2 1/2	15 1/2	2 1/2	1 1/4	1 1/4	1 3/4	3 1/8	2 1/2	2 3/8	7
12	9 3/8	15 1/2	2 1/2	16 1/4	1 1/4	2 1/4-12	2 5/8	3	1	4	3	2	1/2	2 1/2	15 1/2	2 1/2	1 1/4	1 1/4	1 3/4	3 1/8	2 1/2	2 3/8	7
14	9 5/8	18	3	18 1/2	1 1/4	2 1/2-12	3	3 1/2	1	4 1/2	3 1/2	2 1/2	1/2	2 1/2	16 3/4	2 1/2	1 1/4	1 1/4	2	3 5/8	3	2 7/8	7
16	9 3/8	20 3/4	3	21 1/2	1 1/4	2 1/2-12	3	3 1/2	1	4 1/2	3 1/2	2 3/4	1/2	2 1/2	16 3/4	2 1/2	1 1/4	1 1/4	2	3 5/8	3	2 7/8	7
18	10 1/8	23 1/4	3 1/2	23 7/8	1 1/2	3-12	3 5/8	4 1/4	1	5 1/4	4 1/4	3 1/8	9/16	3	18 1/4	3	1 1/2	1 1/2	2 1/2	4	3 1/2	3 3/8	7
20	10 1/2	25 1/2	3 1/2	26	1 1/2	3-12	3 5/8	4 1/4	1	5 1/4	4 1/4	3 1/8	9/16	3	18 5/8	3	1 1/2	1 1/2	2 1/2	4	3 1/2	3 3/8	7

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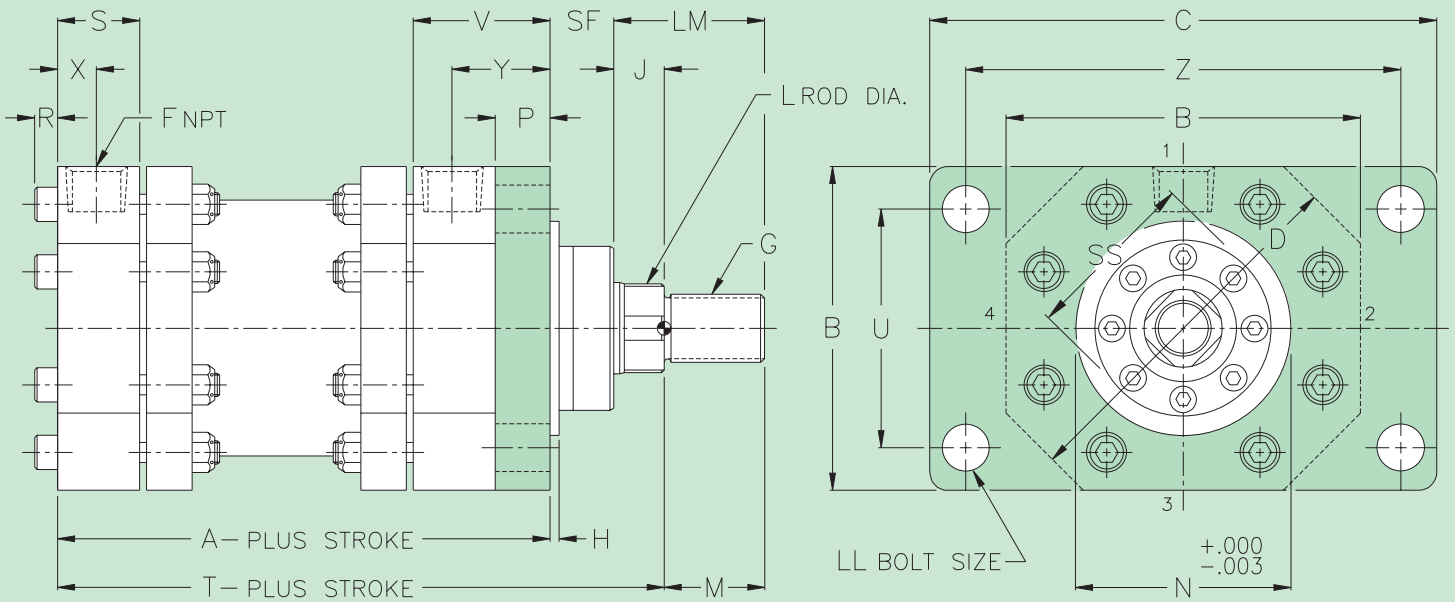
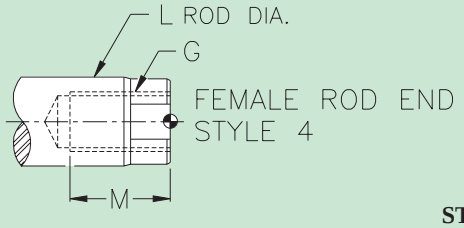
	MTA-AIR OR MTH-HYD	SPECIFY BORE DIA.	**B**	0-Non Cushioned 2-Cushion Rod End 3-Cushion Blind End 4-Cushioned Both Ends	2-Std. Male Thread 4-Std. Female Thread 6-Special Rod End	Specify Length In Inches	Specify Rod Dia.	Specify Port Loc.





STYLE 2 MALE THREAD ROD END IS STANDARD AND WILL BE SUPPLIED UNLESS OTHERWISE SPECIFIED ON ORDER.

BORE	A	B	C	D	F	G	H	K	L ROD DIA.	J	LM	M	SF	N	P	R	T	U	S	V	X	Y	Z	LL	SS
2	5	3 1/4	5 1/8	4 5/8	1/2	3/4-16	1/8	7/8	1	1	2	1	7/8	2 7/8	5/8	1/4	6 7/8	2 1/2	1 1/2	2 1/8	11/16	1 7/16	4 1/4	3/8	2 3/4
3 1/4	5 7/8	4 3/4	7 1/8	5 5/16	1/2	1-14	1/8	1 1/8	1 3/8	1	2 3/8	1 3/8	1 3/8	3 5/8	5/8	1/4	8 1/4	3 3/8	1 3/4	2 3/8	13/16	1 7/16	5 3/4	5/8	3 3/8
4	6 1/8	6 3/8	8 7/8	7 1/16	1/2	1 1/4-12	1/8	1 1/2	1 3/4	1	2 3/4	1 3/4	1 5/8	4 3/8	3/4	3/8	8 3/4	4 3/4	1 3/4	2 3/8	13/16	1 9/16	7 1/4	3/4	3 3/4
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6	8 1/2	8 7/8	13 1/4	9	3/4	1 7/8-12	1/4	2 1/16	2 1/2	1	3 1/2	2 1/2	1 3/4	5	1 1/2	3/8	11 1/4	5 7/8	2 1/4	3 3/4	15/16	2 7/16	10 1/4	1 1/4	4 1/2
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10	9 1/8	13	16	13 3/4	1 1/4	2 1/4-12	1/4	2 5/8	3	1	4	3	2 1/4	10	2 1/4	7/16	12 3/8	10	2 1/2	2 1/4	1 1/4	1	13	1 1/2	7
12	9 1/8	15 1/2	17 1/4	16 1/4	1 1/4	2 1/4-12	1/4	2 5/8	3	1	4	3	2 1/4	12	2 1/4	1/2	12 3/8	12 3/4	2 1/2	2 1/4	1 1/4	1	14 1/2	1 1/2	7
14	9 3/8	18	20 1/2	18 1/2	1 1/4	2 1/2-12	1/4	3	3 1/2	1	4 1/2	3 1/2	2 3/4	13	2 1/4	1/2	13 1/8	14 1/2	2 1/2	2 1/4	1 1/4	1	17	1 3/4	7
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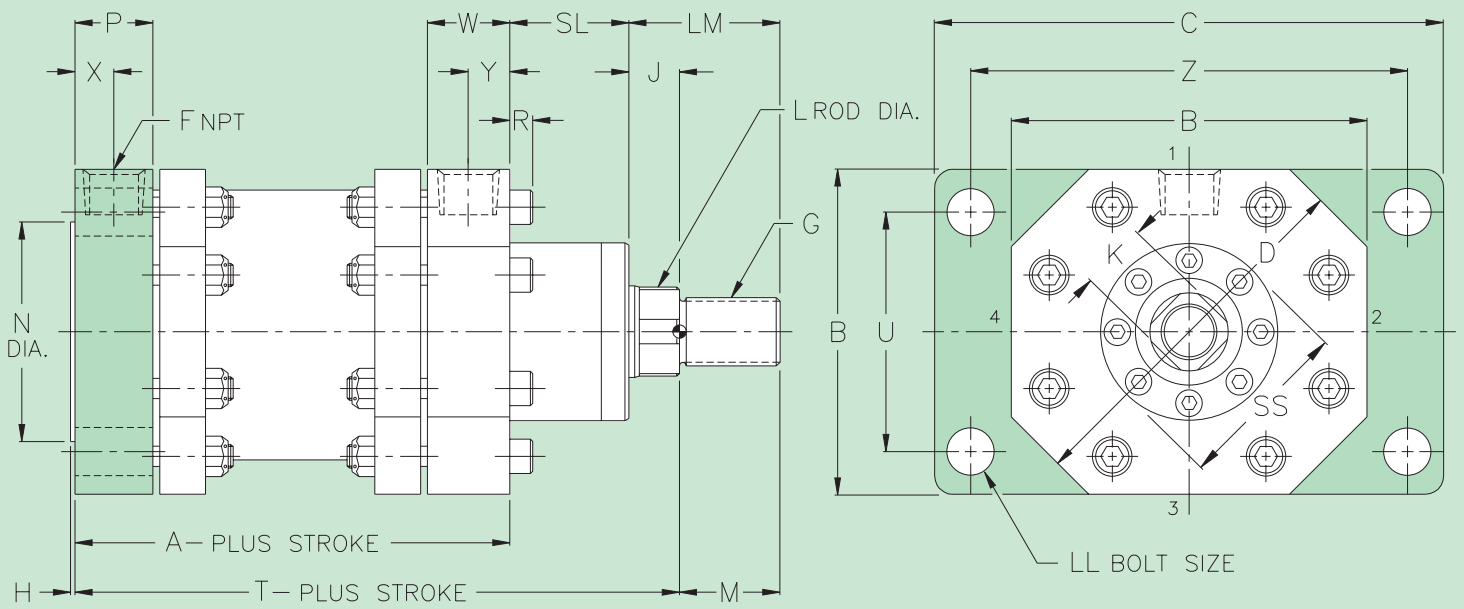
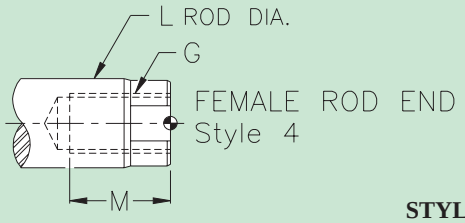
18	9 7/8	23 1/4	24 3/4	23 7/8	1 1/2	3-12	1/4	3 5/8	4 1/4	1	5 1/4	4 1/4	3 3/8	14 1/4	2 3/4	9/16	14 1/4	19 1/2	3	2 3/4	1 1/2	1 1/4	21	2	7
20	10 1/4	25 1/2	25 1/2	26	1 1/2	3-12	1/4	3 5/8	4 1/4	1	5 1/4	4 1/4	3 3/8	14 1/4	2 3/4	9/16	14 5/8	22	3	2 3/4	1 1/2	1 1/4	22	2	7

KEY TO MODEL NUM-	SERIES — BORE SIZE		MOUNTING STYLE	TYPE OF CUSHIONING	ROD END STYLE	— STROKE	— ROD DIA.	— PORT LOC.
	MTA-AIR OR MTH-HYD	SPECIFY BORE DIA.	C	0-Non Cushioned 2-Cushion Rod End 3-Cushion Blind End 4-Cushioned Both Ends	2-Std. Male Thread 4-Std. Female Thread 6-Special Rod End	Specify Length In Inches	Specify Rod Dia.	Specify Port Loc.

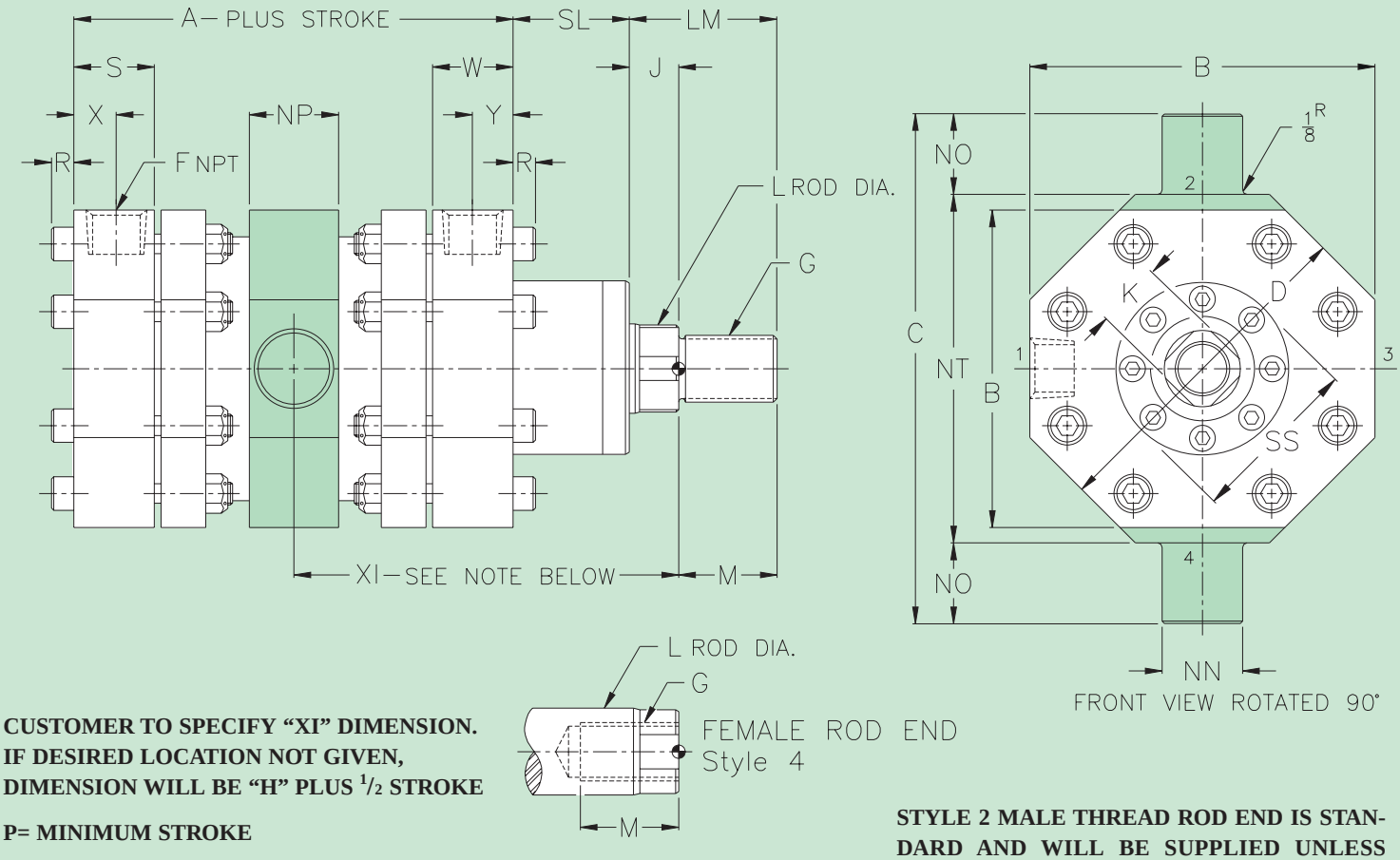




STYLE 2 MALE THREAD ROD END IS STANDARD AND WILL BE SUPPLIED UNLESS OTHERWISE SPECIFIED ON ORDER.

BORE	A	B	C	D	F	G	H	K	L ROD DIA.	J	LM	M	SL	N +.000 ---.003	P	R	T	U	W	X	Y	Z	LL	SS
2	4 1/4	3 1/4	5 1/8	4 5/8	1/2	3/4-16	1/8	7/8	1	1	2	1	1 1/2	2	1 3/8	1/4	6 3/4	2 1/2	1 1/2	9/16	11/16	4 1/4	3/8	2 15/16
3 1/4	5 1/8	4 3/4	7 1/8	5 5/16	1/2	1-14	1/8	1 1/8	1 3/8	1	2 3/8	1 3/8	2	3 5/8	1 5/8	1/4	8 1/8	3 3/8	1 3/4	11/16	15/16	5 3/4	5/8	3 7/8
4	5 3/8	6 3/8	8 7/8	7 1/16	1/2	1 1/4-12	1/8	1 1/2	1 3/4	1	2 3/4	1 3/4	2 1/4	4 3/8	1 5/8	3/8	8 5/8	4 3/4	1 3/4	11/16	15/16	7 1/4	3/4	4 3/4
5	6 3/8	7 3/8	10 1/4	8 1/8	3/4	1 1/2-12	1/8	1 11/16	2	1	3	2	2 5/8	5	1 7/8	3/8	10	5 5/8	2	13/16	15/16	8 1/2	1	6
6	6 7/8	8 7/8	13 1/4	9	3/4	1 7/8-12	1/8	2 1/16	2 1/2	1	3 1/2	2 1/2	3 1/4	6	2 1/8	3/8	11 1/8	5 7/8	2 1/4	13/16	15/16	10 1/4	1 1/4	7
8	7 3/8	11 1/4	15 1/4	12	1	2 1/4-12	1/8	2 5/8	3	1	4	3	3 5/8	8	1 7/8	1/2	12	8 1/2	2	13/16	15/16	12 1/2	1 1/2	7
10	9 1/8	13	16	13 3/4	1 1/4	2 1/4-12	1/4	2 5/8	3	1	4	3	2	10	2 1/4	7/16	12 1/8	10	2 1/2	1	1 1/4	13	1 1/2	7
12	9 1/8	15 1/2	17 1/4	16 1/4	1 1/4	2 1/4-12	1/4	2 5/8	3	1	4	3	2	12	2 1/4	1/2	12 1/8	12 3/4	2 1/2	1	1 1/4	14 1/2	1 1/2	7
14	9 3/8	18	20 1/2	18 1/2	1 1/4	2 1/2-12	1/4	3	3 1/2	1	4 1/2	3 1/2	2 1/2	13	2 1/4	1/2	12 7/8	14 1/2	2 1/2	1	1 1/4	17	1 3/4	7
16	9 1/8	20 3/4	21 3/4	21 1/2	1 1/4	2 1/2-12	1/4	3	3 1/2	1	4 1/2	3 1/2	2 3/4	14 1/4	2 1/4	1/2	12 7/8	17 1/2	2 1/2	1	1 1/4	18 1/2	1 3/4	7
18	9 7/8	23 1/4	24 3/4	23 7/8	1 1/2	3-12	1/4	3 5/8	4 1/4	1	5 1/4	4 1/4	3 1/8	14 1/4	2 3/4	9/16	14	19 1/2	3	1 1/4	1 1/2	21	2	7
20	10 1/4	25 1/2	25 1/2	26	1 1/2	3-12	1/4	3 5/8	4 1/4	1	5 1/4	4 1/4	3 1/8	14 1/4	2 3/4	9/16	14 3/8	22	3	1 1/4	1 1/2	22	2	7

KEY TO MODEL NUM-	SERIES —	BORE SIZE	MOUNTING STYLE	TYPE OF CUSHIONING	ROD END STYLE	— STROKE	— ROD DIA.	— PORT LOC.
	MTA-AIR OR MTH-HYD	SPECIFY BORE DIA.	D	0-Non Cushioned 2-Cushion Rod End 3-Cushion Blind End 4-Cushioned Both Ends	2-Std. Male Thread 4-Std. Female Thread 6-Special Rod End	Specify Length In Inches	Specify Rod Dia.	Specify Port Loc.



CUSTOMER TO SPECIFY "XI" DIMENSION. IF DESIRED LOCATION NOT GIVEN, DIMENSION WILL BE "H" PLUS 1/2 STROKE

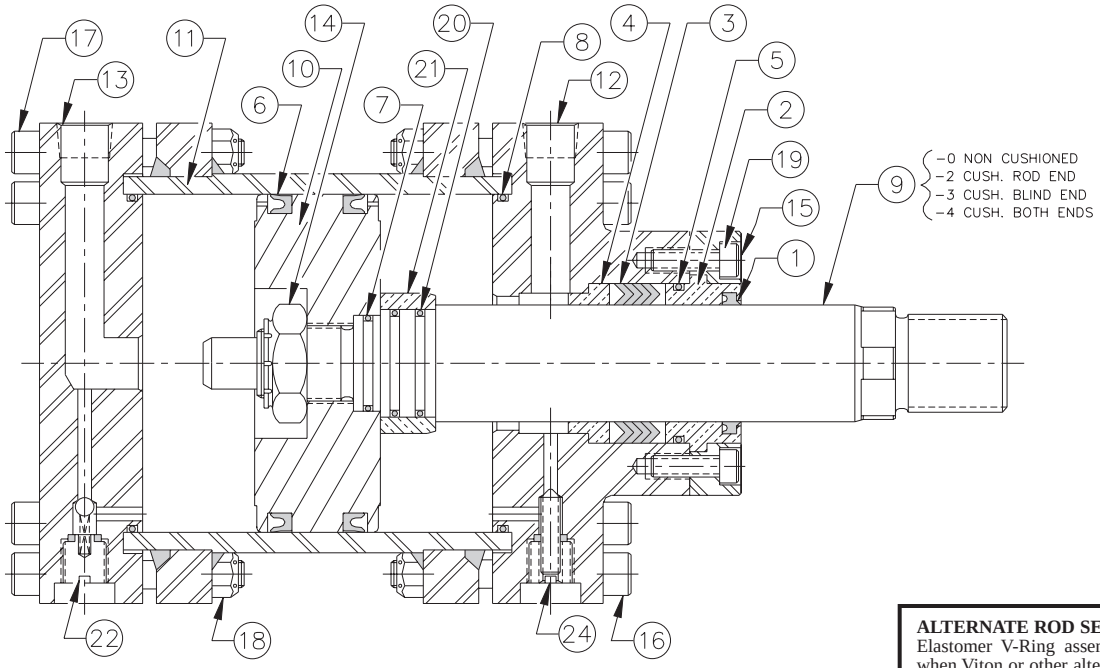
P= MINIMUM STROKE

STYLE 2 MALE THREAD ROD END IS STANDARD AND WILL BE SUPPLIED UNLESS OTHERWISE SPECIFIED ON ORDER.

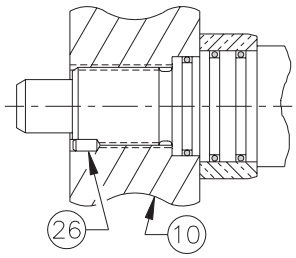
BORE	A	B	C	D	F	G	H	K	L ROD DIA.	J	LM	M	SL	P	R	S	W	X	Y	NN ---.001 ---.003	NO	NP	NT	SS
2	4 3/8	3 1/4	6 1/4	4 5/8	1/2	3/4-16	4 5/16	7/8	1	1	2	1	1 1/2	2 1/2	1/4	1 1/2	1 1/2	11/16	11/16	1 1/4	1 1/4	1 1/2	3 3/4	2 15/16
3 1/4	5 1/4	4 3/4	7 7/8	5 5/16	1/2	1-14	5 1/4	1 1/8	1 3/8	1	2 3/8	1 3/8	2	2 3/4	1/4	1 3/4	1 3/4	13/16	15/16	1 3/8	1 3/8	1 3/4	5 1/8	3 7/8
4	5 1/2	6 3/8	10 1/8	7 1/16	1/2	1 1/4-12	5 5/8	1 1/2	1 3/4	1	2 3/4	1 3/4	2 1/4	3 1/2	3/8	1 3/4	1 3/4	13/16	15/16	1 3/4	1 3/4	2	6 5/8	4 3/4
5	6 1/2	7 3/8	11 9/16	8 1/8	3/4	1 1/2-12	6 3/8	1 11/16	2	1	3	2	2 5/8	3 3/4	3/8	2	2	15/16	15/16	2	2	2 1/4	7 9/16	6
6	7	8 7/8	13 5/8	9	3/4	1 7/8-12	6 15/16	2 1/16	2 1/2	1	3 1/2	2 1/2	3 1/4	4 3/4	3/8	2 1/4	2 1/4	15/16	15/16	2 1/4	2 1/4	2 1/2	9 1/8	7
8	7 1/2	11 1/4	16 7/16	12	1	2 1/4-12	7 11/16	2 5/8	3	1	4	3	3 5/8	4 1/2	1/2	2	2	15/16	15/16	2 1/2	2 1/2	3	11 7/16	7
10	9 3/8	13	22 1/4	13 3/4	1 1/4	2 1/4-12	7 11/16	2 5/8	3	1	4	3	2	3 1/2	7/16	2 1/2	2 1/2	1 1/4	1 1/4	2 3/4	3	3	16 1/4	7
12	9 3/8	15 1/2	24 3/4	16 1/4	1 1/4	2 1/4-12	7 11/16	2 5/8	3	1	4	3	2	3 1/2	1/2	2 1/2	2 1/2	1 1/4	1 1/4	3	3	3 1/4	18 3/4	7
14	9 5/8	18	27 1/4	18 1/2	1 1/4	2 1/2-12	8 5/16	3	3 1/2	1	4 1/2	3 1/2	2 1/2	3 1/4	1/2	2 1/2	2 1/2	1 1/4	1 1/4	3 1/4	3 1/4	3 1/2	20 3/4	7
16	9 3/8	20 3/4	30	21 1/2	1 1/4	2 1/2-12	8 5/16	3	3 1/2	1	4 1/2	3 1/2	2 3/4	4	1/2	2 1/2	2 1/2	1 1/4	1 1/4	3 1/2	3 1/2	3 3/4	23	7
18	10 1/8	23 1/4	32 1/2	23 7/8	1 1/2	3-12	9 3/16	3 5/8	4 1/4	1	5 1/4	4 1/4	3 1/8	4 3/4	9/16	3	3	1 1/2	1 1/2	3 1/2	3 1/2	3 3/4	25 1/2	7
20	10 1/2	25 1/2	35 1/2	26	1 1/2	3-12	9 3/8	3 5/8	4 1/4	1	5 1/4	4 1/4	3 1/8	5	9/16	3	3	1 1/2	1 1/2	4 1/4	4 1/4	4 1/2	27	7

KEY TO MODEL NUM-	SERIES —	BORE SIZE	MOUNTING STYLE	TYPE OF CUSHIONING	ROD END STYLE	— STROKE —	ROD DIA.	— PORT LOC.
	MTA-AIR OR MTH-HYD	SPECIFY BORE DIA.	N	0-Non Cushioned 2-Cushion Rod End 3-Cushion Blind End 4-Cushioned Both Ends	2-Std. Male Thread 4-Std. Female Thread 6-Special Rod End	Specify Length In Inches	Specify Rod Dia.	Specify Port Loc.

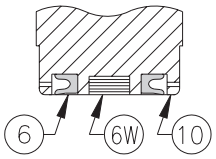
PART IDENTIFICATION NUMBERS FOR SERIES "MTA" AIR AND SERIES "MTH" HYDRAULIC CYLINDERS



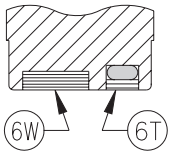
ALTERNATE PISTON CONSTRUCTION
Construction method used to secure Piston is determined by space available



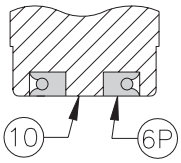
ALTERNATE PISTON DESIGN
Filled teflon wear ring available



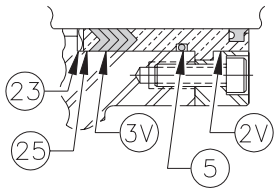
ALTERNATE PISTON SEALS
'O' Ring energized filled teflon seal with filled teflon wear ring.



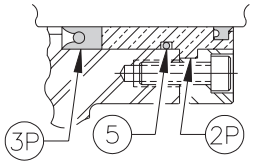
Heavy duty, self-energized polyurethane cup seals.



ALTERNATE ROD SEALS
Elastomer V-Ring assembly is provided when Viton or other alternate seal material is required.



Self-energizing polyurethane cup seal.



ORDER INFORMATION REQUIREMENTS
When ordering replacement parts, clearly specify the item number, name, and quantity of the desired component. It is essential to provide the correct model and serial number of the cylinder in which the parts will be used. By providing both numbers, a cross check of reference data can be made to assure accurate fulfillment of order requirements.

BASIC PARTS LIST

ITEM NUMBER	PART NAME
1	Rod Wiper
2	Rod Bearing - Outer
2P	Rod Bearing (Opt.)
2V	Rod Bearing (Opt.)
3	Rod Packing Set (Std.)
3P	Polyurethane Rod Seal (Opt.)
3V	Elastomer V-Ring Rod Pkg. Set (Opt.)
4	Rod Bearing - Inner
5	O-Ring, Brg. To Head
6	Block Vee Piston Seals (Std.)
6P	Polyurethane Piston Seals (Opt.)
6T	Energized Teflon piston Seal (Opt.)
6W	Filled Teflon Wear Ring (Opt.)
7	O-Ring, Rod To Piston
8	O-Ring, Tube Seal
9	Piston Rod
10	Piston
11	Tube Assembly
12	Front Head
13	Rear Head
14	Piston Nut
15	Bearing Cap
16	Front Head Bolt
17	Rear Head Bolt
18	Locking Hex Nuts
19	Bearing Cap Screws
20	O-Ring, Rod To Bushing
21	Cushion Bushing
22	Cushion Screw Assembly
23	Wave Spring
24	Ball Check Assembly
25	Support Ring (Opt.)
26	Locking Pin
27	"C" Rect. Front Flange Plate (For Front Flange Mount Cylinder Only)

(*) Model number code letter used to indicate mounting style should be included with item number to describe part. Example: Item 12-A Front Head w/Foot Mounting.

SERVICE PARTS MAY BE ORDERED AS FOLLOWS:

SEAL KIT: Series "MTA" & "MTH" - Consists of item numbers 1, 3, 5, 6, and 8.

SEAL KIT w/BEARING: Series "MTA" & "MTH" - Consists of item numbers 1, 2, 3, 5, 4, 6, and 8.

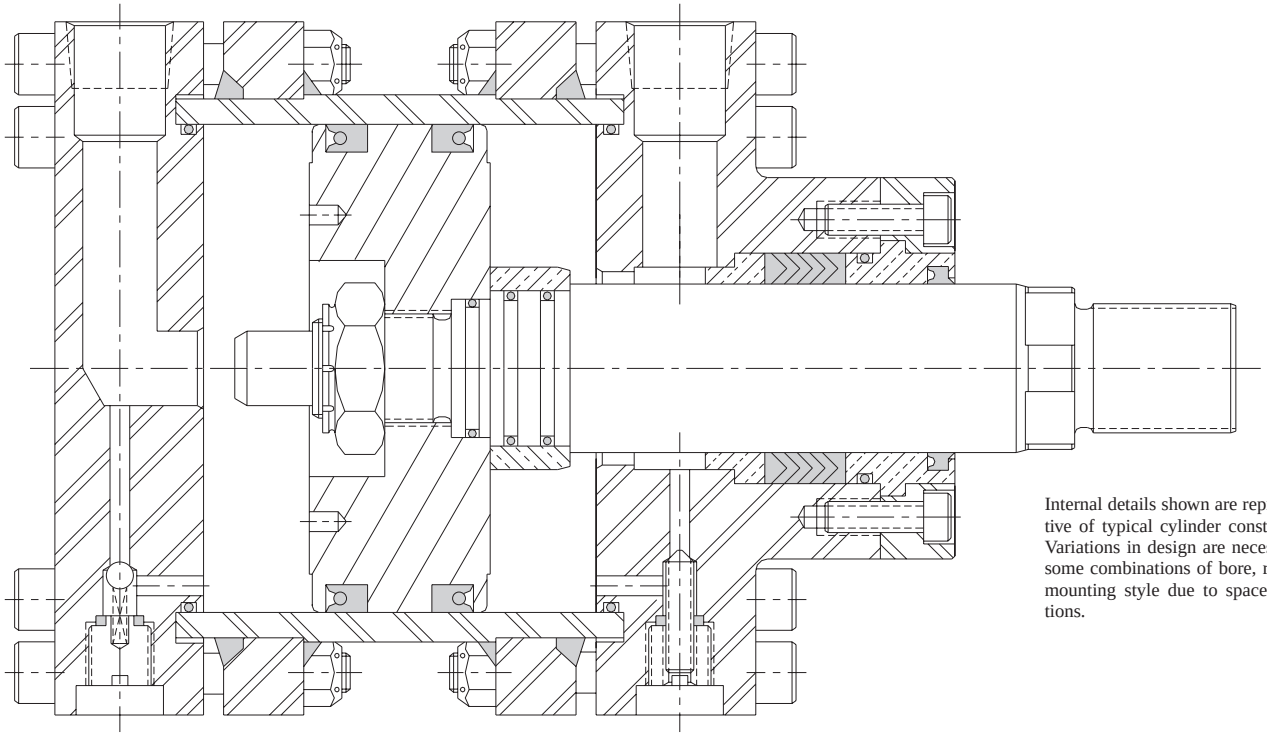
CARTRIDGE ASSEMBLY: Series "MTA" & "MTH" Consists of item numbers 1, 2, 3, 4 and 5.

NOTE: LYNAIR will substitute alternate rod or piston seals per our record of original construction.

PISTON AND ROD ASSEMBLY: Consists of item numbers 6, 7, 9, 10, 14, 20, and 21 as required.

NOTE: Ordered parts will be supplied to suit construction details indicated by record data of orig-

LYNAIR, INC.
3515 Scheele Drive P.O. Box 720
Jackson, Michigan 49204
Phone (517)787-2240 FAX (517)787-4521



Internal details shown are representative of typical cylinder construction. Variations in design are necessary in some combinations of bore, rod, and mounting style due to space limitations.

Typical Construction Features of Lynair Series "MHH" 2000 P.S.I. Heavy Duty Hydraulic Mill Type Cylinders

PRESSURE RATING

Series "MHH" Mill Type hydraulic cylinders are rated for maximum service to 2000 P.S.I.

ADJUSTABLE CUSHION OPTION

Cushions are optional at either one or both ends of the cylinder. When provided, close fitting surfaces of mating components trap operating fluid to decelerate the piston before it reaches the "end of stroke" position. Rod end cushions are self-compensating to adjust for minor alignment variations. Flush fitting Cushion Screw permits adjustment in deceleration rate while interchangeable Ball Check aids start up upon reversal of travel direction.

CYLINDER TUBE WITH WELDED FLANGE RINGS

Heavy wall steel tubing is honed to 15 micro inch finish after welded flange rings are attached. Surface of bore is hard chrome plated to resist wear and promote optimum seal life.

O-RING TUBE END SEALS

Seal located on pilot diameter between tube and head provides leak-free seal at maximum operating pressure levels.

CYLINDER PORTS

N.P.T.F. Ports are unobstructed permitting use of maximum flow area.

PISTON ROD

Precision ground, polished, and hard chrome plated piston rods made from high yield strength steel are offered with the choice of standard male or female thread options. Male rod threads thru $1^1/_2$ diameter are rolled for maximum strength and uniformity. Four wrench flats are provided to aid in making the rod end connection. The rod surface is reduced in size in area of flats to eliminate contact with seals at assembly.

ROD BEARING/ REMOVABLE RETAINERS

Precision machined bronze bearing supports and centers rod to maintain concentricity with bore while providing support for V-ring seal set.

Two-piece bearing with inner section that provides rod support during seal replacement is used when design permits.

Retainer construction allows bearing removal without disassembly of head retaining bolts.

ROD SEAL

Pressure energized multiple lip packing set consists of four fabric reinforced Buna-N V-ring seals plus male and female adapter rings. Seal set is self compensating to adjust for normal wear while providing long lasting, trouble free service.

ROD WIPER

Double Lip Wiper cleans rod surface of contaminants and prevents entry of harmful particles into sensitive bearing and seal areas. Integral cup form on inboard side of wiper serves as secondary seal to insure leak-free performance.

INTERIOR MATERIALS/ EXTERNAL FINISH

Front Head, Rear Head, and Flange Rings are accurately machined from carbon steel plate. Cylinder Tubes, Bearing Retainers, and mountings are constructed of steel for maximum strength and durability.

Cylinders have enamel finish on exterior with mounting and machined surfaces protected by anti-rust film lubricant at time of shipment.

PISTON/SECURELY LOCKED

One piece high tensile cast iron piston with wide surface area contacting cylinder bore stabilizes rod and reduces bearing loads. The piston is pilot fitted onto rod and secured by self-locking nut when sizes permit.

PISTON SEALS

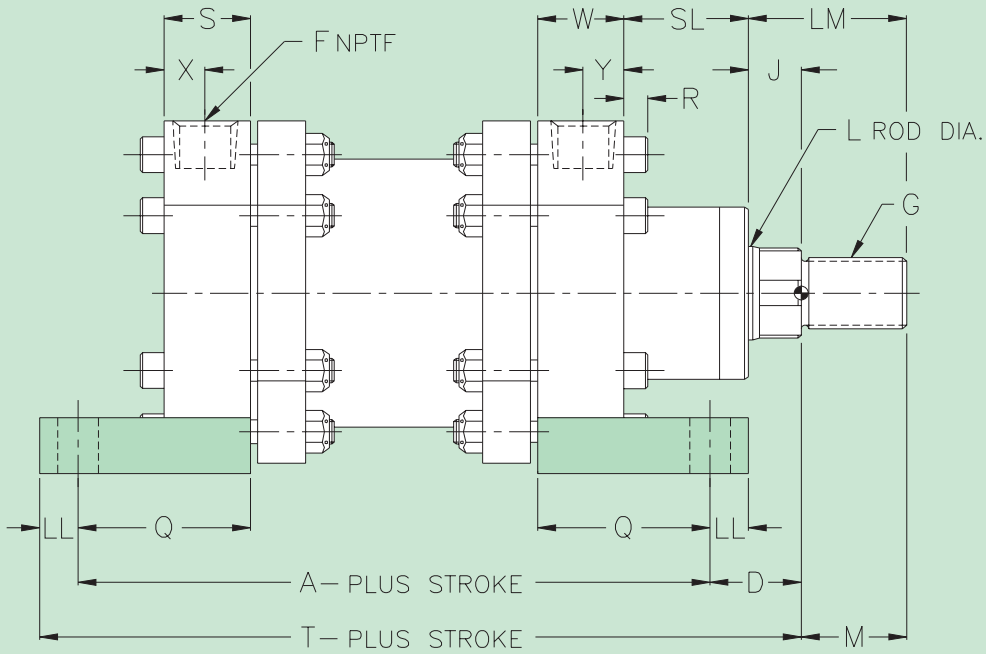
Durable, self energizing, polyurethane seals provide long lasting, leak-free sealing. Seals are elastic and snap into piston grooves for easy installation.

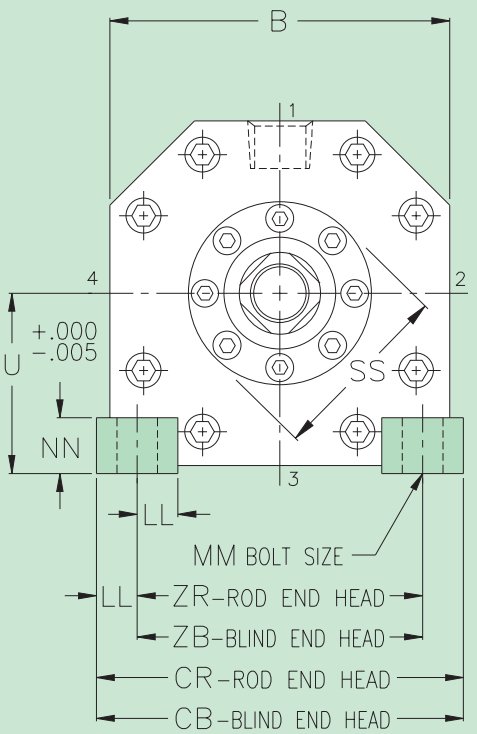
RUGGED RETAINING BOLTS

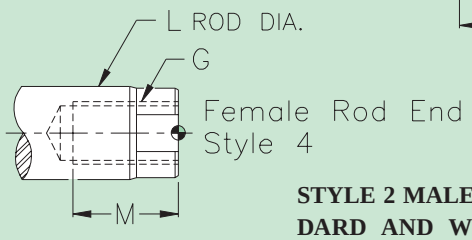
High tensile alloy bolts with self-locking hex nuts are used to secure the cylinder assembly.

SPECIAL CYLINDERS

Variations in construction involving the use of non-standard dimensions, materials, or cylinder feature modifications are available upon request. Full engineering and manufacturing facilities are available to produce the exact cylinder to meet design requirements.







STYLE 2 MALE THREAD ROD END IS STANDARD AND WILL BE SUPPLIED UNLESS OTHERWISE SPECIFIED ON ORDER.

DIMENSIONS NOT AFFECTED BY ROD DIAMETER

BORE	A	B	F	J	R	S	W	X	Y	U	MM	LL	Q	NN
2	6 3/4	3 1/4	1/2	1	3/8	1 1/2	1 1/2	11/16	11/16	1.875	1/2	1/2	2 11/16	5/8
3 1/4	7 3/4	4 3/4	3/4	1	3/8	1 3/4	1 3/4	3/4	3/4	2.750	5/8	5/8	3	3/4
4	8 3/8	6 3/8	3/4	1	1/2	1 3/4	1 3/4	3/4	3/4	3.375	3/4	3/4	3 3/16	7/8
5	9 1/2	7 3/8	1	1	5/8	2	2	13/16	7/8	4.000	7/8	7/8	3 1/2	1
6	11 1/2	8 7/8	1 1/4	1	5/8	2 1/4	2 1/4	15/16	1 1/16	4.500	1	1	4 1/2	1 1/4
8	11 7/8	11 1/4	1 1/4	1	7/8	2 7/16	2 7/16	1 1/8	1 3/16	5.812	1 1/8	1 1/8	4 3/16	1 1/4
10	14 1/2	14	1 1/2	1	7/8	2 11/16	2 11/16	1 3/16	1 3/16	7.625	1 1/4	1 1/4	5 1/16	1 1/2
12	16 1/4	17	1 1/2	1	7/8	2 11/16	2 11/16	1 3/16	1 3/16	9.125	1 1/2	1 1/2	5 5/8	1 3/4
14	19 7/8	19 1/2	2	1	1	3 11/16	3 11/16	1 1/2	2	10.500	1 3/4	1 3/4	6 1/2	2

VARIABLE DIMENSIONS FOR "STANDARD" ROD

BORE	L	LM	M	G	SS	T	ZR	CR	ZB	CB	D	SL
2	1	2	1	3/4-16	2 3/4	8 9/16	4	5	4	5	1 5/16	1 1/2
3 1/4	1 3/8	2 3/8	1 3/8	1-14	3 3/8	10 1/8	4 5/8	5 7/8	4 5/8	5 7/8	1 3/4	2
4	1 3/4	2 3/4	1 3/4	1 1/4-12	3 3/4	10 15/16	5 7/8	7 3/8	5 7/8	7 3/8	1 13/16	2 1/4
5	2	3	2	1 1/2-12	4 1/4	12 1/2	5 3/4	7 1/2	5 3/4	7 1/2	2 1/8	2 5/8
6	2 1/2	3 1/2	2 1/2	1 7/8-12	4 1/2	13 1/2	6 5/8	8 5/8	6 5/8	8 5/8	2	3 1/4
8	3	4	3	2 1/4-12	7	15 5/8	8 7/8	11 1/4	8 7/8	11 1/4	2 11/16	3 7/16
10	3 1/2	4 1/2	3 1/2	2 1/2-12	7	18 3/4	11	13 1/2	11	13 1/2	3	4 3/8
12	4 1/4	5 1/4	4 1/4	3-12	7	21 13/16	13	16	13	16	3 7/16	5 3/8
14	5 3/4	6 3/4	5 3/4	4-12	10	23 15/16	16 1/2	19 1/2	16 1/2	19 1/2	2 3/8	4 3/16

VARIABLE DIMENSIONS FOR ALTERNATE ROD

BORE	L	LM	M	G	SS	T	ZR	CR	ZB	CB	D	SL
2	1 3/8	2 3/8	1 3/8	1-14	3 1/8	8 15/16	4	5	4	5	1 11/16	1 7/8
3 1/4	2	3	2	1 1/2-12	3 7/8	10 1/2	5 5/8	6 7/8	4 5/8	5 7/8	2 1/8	2 3/8
4	2 1/2	3 1/2	2 1/2	1 7/8-12	4 3/4	10 11/16	6 3/8	7 7/8	5 7/8	7 3/8	2 5/16	2 3/4
5	3 1/2	4 1/2	3 1/2	2 1/2-12	6	13 5/8	7 5/8	9 3/8	5 3/4	7 1/2	3 1/4	3 3/4
6	4 1/4	5 1/4	4 1/4	3-12	7	15	8 3/4	10 3/4	6 5/8	8 5/8	3 1/2	4 3/4
8	5 3/4	6 3/4	5 3/4	4-12	8 5/8	17 3/4	10 3/8	13	8 7/8	11 1/4	4 13/16	5 9/16
10	5 3/4	6 3/4	5 3/4	4-12	8 5/8	20 1/2	11	13 1/2	11	13 1/2	4 3/4	6 1/8
12	5 3/4	6 3/4	5 3/4	4-12	8 5/8	22 3/16	13	16	13	16	4 7/16	6 3/8
14	7	8	7	5-12	10	24 11/16	16 1/2	19 1/2	16 1/2	19 1/2	3 1/8	4 15/16

ORDERING INFORMATION

Lynair model numbers contain information that designates the series, bore size, and optional cylinder details. To insure proper interpretation of order requirements, complete the model number described below and specify the desired features as indicated.

MHH - BORE SIZE ·A· TYPE OF CUSHIONING · ROD END STYLE -- STROKE LENGTH

SERIES CODE

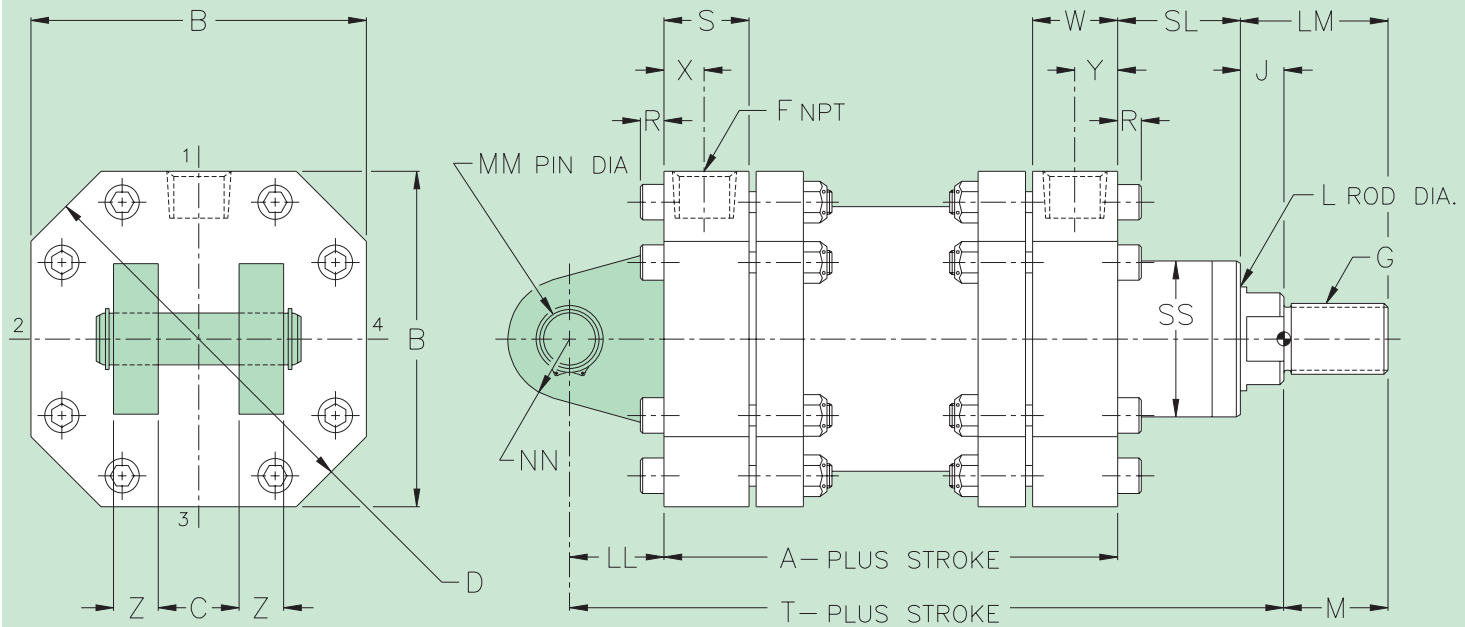
MOUNTING STYLE

INDICATE BY CODE NUMBER
0 · NON CUSHIONED
2 · CUSHION ON ROD END
3 · CUSHION ON BLIND END

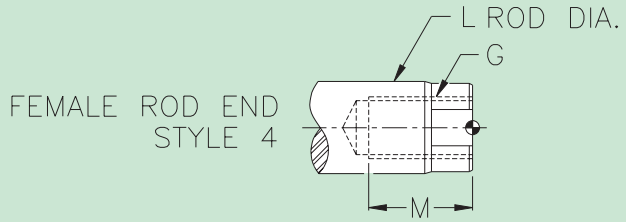
SPECIFY IN INCHES

INDICATE STYLE BY
2 · MALE THREAD

Piston rod diameter and port position should also be specified. If not, we will assume a "standard" rod is desired and the ports will be located on side no. 1. If non-standard modifications are necessary, fully describe requirements.



STYLE 2 MALE THREAD ROD END IS STANDARD AND WILL BE SUPPLIED UNLESS OTHERWISE SPECIFIED ON



DIMENSIONS NOT AFFECTED BY ROD DIAMETER

BORE	A	B	C	D	J	F	R	S	W	X	Y	Z	MM	LL	NN
2	4 3/8	3 1/4	1	4 5/8	1	1/2	3/8	1 1/2	1 1/2	11/16	11/16	3/4	.750	1 1/4	3/4
3 1/4	5 1/4	4 3/4	1 1/4	5 5/16	1	3/4	3/8	1 3/4	1 3/4	3/4	3/4	7/8	1.250	1 1/2	1 1/8
4	5 1/2	6 3/8	1 1/4	7 1/16	1	3/4	1/2	1 3/4	1 3/4	3/4	3/4	1	1.375	1 3/4	1 1/4
5	6 1/2	7 3/8	1 1/4	8 1/8	1	1	5/8	2	2	13/16	7/8	1 1/4	1.500	2	1 3/8
6	7	8 7/8	1 1/2	9	1	1 1/4	5/8	2 1/4	2 1/4	15/16	1 1/16	1 1/2	1.750	2 1/2	1 5/8
8	8 3/8	11 1/4	3	12	1	1 1/4	7/8	2 7/16	2 7/16	1 1/8	1 3/16	1 1/2	2.000	3	1 7/8
10	9 3/4	14	3 1/2	15 1/4	1	1 1/2	7/8	2 11/16	2 11/16	1 3/16	1 3/16	1 3/4	2.500	3 1/2	2 3/8
12	10 3/8	17	4 1/2	18	1	1 1/2	7/8	2 11/16	2 11/16	1 3/16	1 3/16	2	3.000	4	2 7/8
14	14 1/4	19 1/2	5	21	1	2	1	3 11/16	3 11/16	1 1/2	2	2 1/2	3.500	4 3/4	3 3/8

VARIABLE DIMS. FOR "STANDARD" ROD

BORE	L	LM	M	G	SS	T	SL
2	1	2	1	3/4-16	3 1/8	8 1/8	1 1/2
3 1/4	1 3/8	2 3/8	1 3/8	1-14	3 7/8	9 3/4	2
4	1 3/4	2 3/4	1 3/4	1 1/4-12	4 3/4	10 1/2	2 1/4
5	2	3	2	1 1/2-12	6	12 1/8	2 5/8
6	2 1/2	3 1/2	2 1/2	1 7/8-12	7	13 3/4	3 1/4
8	3	4	3	2 1/4-12	7	15 13/16	3 7/16
10	3 1/2	4 1/2	3 1/2	2 1/2-12	7	18 5/8	4 3/8
12	4 1/4	5 1/4	4 1/4	3-12	7	20 3/4	5 3/8
14	5 3/4	6 3/4	5 3/4	4-12	10	24 3/16	4 3/16

VARIABLE DIMENSIONS FOR ALTERNATE ROD

BORE	L	LM	M	G	SS	T	SL
2	1 3/8	2 3/8	1 3/8	1-14	3 1/8	8 1/2	1 7/8
3 1/4	2	3	2	1 1/2-12	3 7/8	10 1/8	2 3/8
4	2 1/2	3 1/2	2 1/2	1 7/8-12	4 3/4	11	2 3/4
5	3 1/2	4 1/2	3 1/2	2 1/2-12	6	13 1/4	3 3/4
6	4 1/4	5 1/4	4 1/4	3-12	7	15 1/4	4 3/4
8	5 3/4	6 3/4	5 3/4	4-12	8 5/8	17 15/16	5 9/16
10	5 3/4	6 3/4	5 3/4	4-12	8 5/8	20 3/8	6 1/8
12	5 3/4	6 3/4	5 3/4	4-12	8 5/8	21 3/4	6 3/8
14	7	8	7	5-12	10	24 15/16	4 15/16

ORDERING INFORMATION

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MHH - BORE SIZE ·B· TYPE OF CUSHIONING · ROD END STYLE -- STROKE LENGTH

SERIES CODE

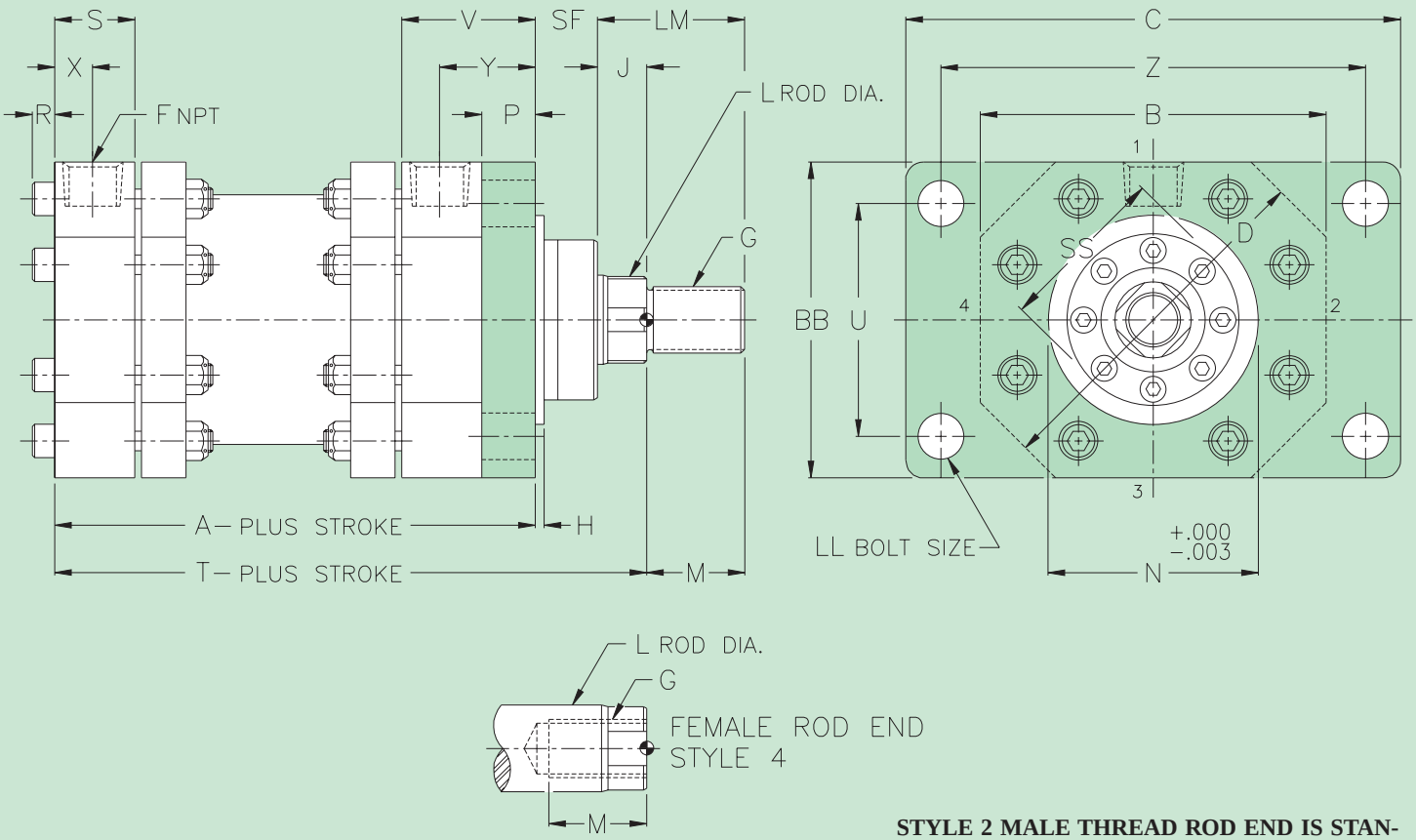
MOUNTING STYLE

INDICATE BY CODE NUMBER
0 - NON CUSHIONED
2 - CUSHION ON ROD END
3 - CUSHION ON BLIND END

SPECIFY IN INCHES

INDICATE STYLE BY
2 - MALE THREAD

Piston rod diameter and port position should also be specified. If not, we will assume a "standard" rod is desired and the ports will be located on side no. 1. If non-standard modifications are necessary, fully describe requirements.



STYLE 2 MALE THREAD ROD END IS STANDARD AND WILL BE SUPPLIED UNLESS OTHERWISE SPECIFIED ON ORDER.

DIMENSIONS NOT AFFECTED BY ROD DIAMETER

BORE	A	B	C	F	J	R	S	V	X	Y	Z	U	LL	H	P	D	BB
2	5	3 1/4	5 1/8	1/2	1	3/8	1 1/2	2 1/8	11/16	1 7/16	4 1/4	2 1/2	3/8	1/8	5/8	4 5/8	3 1/4
3 1/4	5 7/8	4 3/4	7 1/8	3/4	1	3/8	1 3/4	2 3/8	3/4	1 3/8	5 3/4	3 3/8	5/8	1/8	5/8	5 5/16	4 3/4
4	6 1/8	6 3/8	8 7/8	3/4	1	1/2	1 3/4	2 3/8	3/4	1 7/16	7 1/4	4 3/4	3/4	1/8	3/4	7 1/16	6 3/8
5	7 3/8	7 3/8	10 1/4	1	1	5/8	2	2 7/8	13/16	1 3/4	8 1/2	5 5/8	1	1/8	7/8	8 1/8	7 3/8
6	8 1/2	8 7/8	13 1/4	1 1/4	1	5/8	2 1/4	3 3/4	15/16	2 9/16	10 1/4	5 7/8	1 1/4	1/4	1 1/2	9	8 7/8
8	10 1/8	11 1/4	15 1/4	1 1/4	1 7/16	7/8	2 7/16	4 3/16	1 1/8	2 15/16	12 1/2	8 1/2	1 1/2	3/16	1 3/4	12	11 1/4
10	9 3/4	14	19	1 1/2	1	7/8	2 11/16	2 11/16	1 3/16	1 3/16	15 1/2	11 1/2	1 3/4	3/16	2 11/16	15 1/4	15
12	10 3/8	17	21	1 1/2	1	7/8	2 11/16	2 11/16	1 3/16	1 3/16	17 1/2	14 1/2	2	3/16	2 11/16	18	18
14	14	19 1/2	24	2	1	1	3 11/16	3 7/16	1 1/2	1 1/2	20	16	2	1/4	3 7/16	21	20

VARIABLE DIMS. FOR "STANDARD" ROD

BORE	L	LM	M	G	SS	T	N	SF
2	1	2	1	3/4-16	2 1/2	6 7/8	2.875	7/8
3 1/4	1 3/8	2 3/8	1 3/8	1-14	3 3/8	8 1/4	3.625	1 3/8
4	1 3/4	2 3/4	1 3/4	1 1/4-12	3 3/4	8 3/4	4.375	1 5/8
5	2	3	2	1 1/2-12	4 1/4	10 1/8	5.000	1 3/4
6	2 1/2	3 1/2	2 1/2	1 7/8-12	4 1/2	11 1/4	5.000	1 3/4
8	3	4 7/16	3	2 1/4-12	7	13 1/4	8.000	1 11/16
10	3 1/2	4 1/2	3 1/2	2 1/2-12	7	13 7/16	10.000	2 11/16
12	4 1/4	5 1/4	4 1/4	3-12	7	14 13/16	12.000	3 7/16
14	5 3/4	6 3/4	5 3/4	4-12	10	19 7/16	13.000	4 3/16

VARIABLE DIMENSIONS FOR ALTERNATE ROD

BORE	L	LM	M	G	SS	T	N	SF
2	1 3/8	2 3/8	1 3/8	1-14	2 7/8	7 1/4	3.125	1 1/4
3 1/4	2	3	2	1 1/2-12	3 7/8	8 5/8	4.625	1 3/4
4	2 1/2	3 1/2	2 1/2	1 7/8-12	4 3/4	9 1/4	5.625	2 1/8
5	3 1/2	4 1/2	3 1/2	2 1/2-12	6	11 1/4	6.375	2 7/8
6	4 1/4	5 1/4	4 1/4	3-12	7	12 3/4	7.500	3 1/4
8	5 3/4	7 3/16	5 3/4	4-12	8 5/8	14 15/16	9.500	3 3/8
10	5 3/4	6 3/4	5 3/4	4-12	8 5/8	15 3/16	10.000	4 7/16
12	5 3/4	6 3/4	5 3/4	4-12	8 5/8	15 13/16	12.000	4 7/16
14	7	8	7	5-12	10	20 3/16	13.000	4 15/16

ORDERING INFORMATION

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MHH - BORE SIZE ·C· TYPE OF CUSHIONING · ROD END STYLE – STROKE LENGTH

SERIES CODE

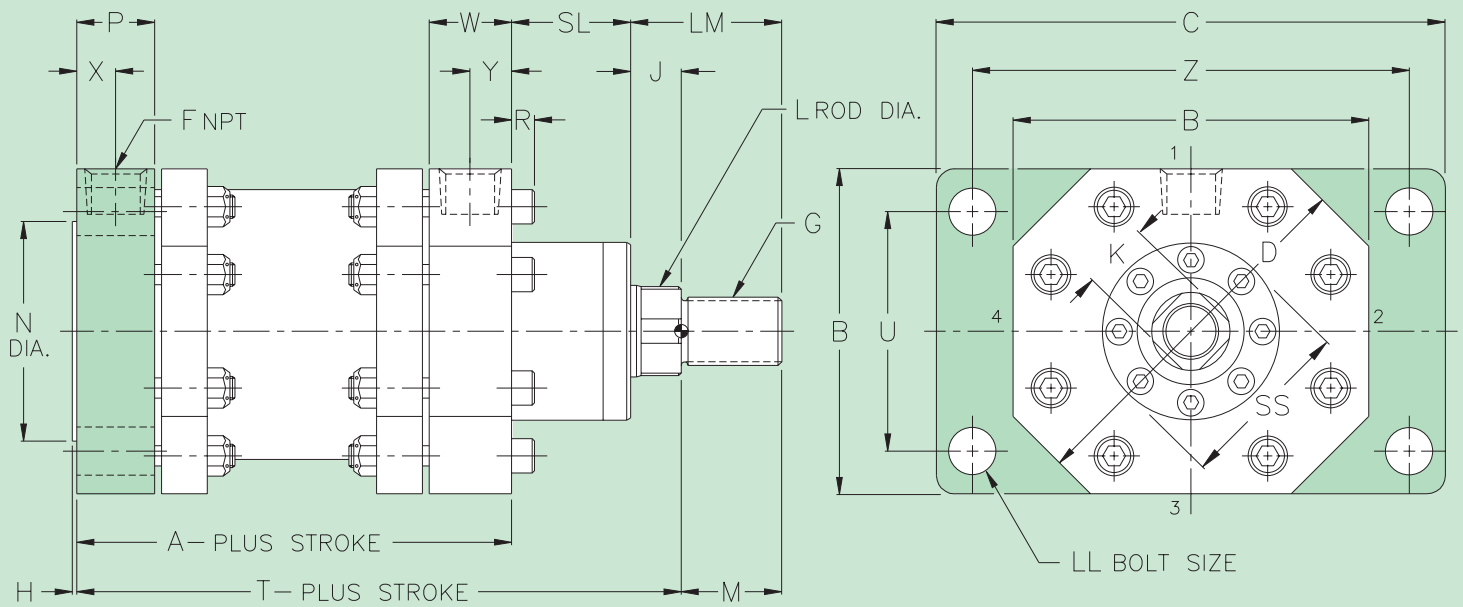
MOUNTING STYLE

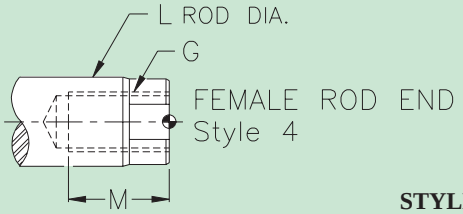
INDICATE BY CODE NUMBER
0 · NON CUSHIONED
2 · CUSHION ON ROD END
3 · CUSHION ON BLIND END

SPECIFY IN INCHES

INDICATE STYLE BY
2 · MALE THREAD

Piston rod diameter and port position should also be specified. If not, we will assume a "standard" rod is desired and the ports will be located on side no. 1. If non-standard modifications are necessary, fully describe requirements.





STYLE 2 MALE THREAD ROD END IS STANDARD AND WILL BE SUPPLIED UNLESS OTHERWISE SPECIFIED ON ORDER.

DIMENSIONS NOT AFFECTED BY ROD DIAMETER

BORE	A	B	C	F	J	R	W	X	Y	P	H	N	Z	U	LL	D	BB
2	4 1/4	3 1/4	5 1/8	1/2	1	3/8	1 1/2	9/16	13/16	1 3/8	1/8	2.000	4 1/4	2 1/2	3/8	4 5/8	3 1/4
3 1/4	5 1/8	4 3/4	7 1/8	3/4	1	3/8	1 3/4	11/16	3/4	1 5/8	1/8	3.625	5 3/4	3 3/8	5/8	5 5/16	4 3/4
4	5 3/8	6 3/8	8 7/8	3/4	1	1/2	1 3/4	11/16	3/4	1 5/8	1/8	4.375	7 1/4	4 3/4	3/4	7 1/16	6 3/8
5	6 3/8	7 3/8	10 1/4	1	1	5/8	2	13/16	7/8	1 7/8	1/8	5.000	8 1/2	5 5/8	1	8 1/8	7 3/8
6	6 7/8	8 7/8	13 1/4	1 1/4	1	5/8	2 1/4	15/16	1 1/16	2 1/8	1/8	6.000	10 1/4	5 7/8	1 1/4	9	8 7/8
8	8 3/16	11 1/4	15 1/4	1 1/4	1	7/8	2 7/16	1 1/8	15/16	2 1/4	3/16	8.000	12 1/2	8 1/2	1 1/2	12	11 1/4
10	9 9/16	14	19	1 1/2	1	7/8	2 11/16	1 1/16	1 3/16	2 1/2	3/16	10.000	15 1/2	11 1/2	1 3/4	15 1/4	15
12	10 3/16	17	21	1 1/2	1	7/8	2 11/16	1 1/16	1 3/16	2 1/2	3/16	12.000	17 1/2	14 1/2	2	18	18
14	14	19 1/2	24	2	1	1	3 11/16	1 1/2	2	3 7/16	1/4	13.000	20	16	2	21	20

VARIABLE DIMS. FOR "STANDARD" ROD

BORE	L	LM	M	G	SS	T	SL
2	1	2	1	3/4-16	3 1/8	6 3/4	1 1/2
3 1/4	1 3/8	2 3/8	1 3/8	1-14	3 7/8	8 1/8	2
4	1 3/4	2 3/4	1 3/4	1 1/4-12	4 3/4	8 5/8	2 1/4
5	2	3	2	1 1/2-12	6	10	2 5/8
6	2 1/2	3 1/2	2 1/2	1 7/8-12	7	11 1/8	3 1/4
8	3	4	3	2 1/4-12	7	12 5/8	3 7/16
10	3 1/2	4 1/2	3 1/2	2 1/2-12	7	14 15/16	4 3/8
12	4 1/4	5 1/4	4 1/4	3-12	7	16 9/16	5 3/8
14	5 3/4	6 3/4	5 3/4	4-12	10	19 3/16	4 3/16

VARIABLE DIMENSIONS FOR ALTERNATE ROD

BORE	L	LM	M	G	SS	T	SL
2	1 3/8	2 3/8	1 3/8	1-14	3 1/8	7 1/8	1 7/8
3 1/4	2	3	2	1 1/2-12	3 7/8	8 1/2	2 3/8
4	2 1/2	3 1/2	2 1/2	1 7/8-12	4 3/4	9 1/8	2 3/4
5	3 1/2	4 1/2	3 1/2	2 1/2-12	6	11 1/8	3 3/4
6	4 1/4	5 1/4	4 1/4	3-12	7	12 5/8	4 3/4
8	5 3/4	6 3/4	5 3/4	4-12	8 5/8	14 3/4	5 9/16
10	5 3/4	6 3/4	5 3/4	4-12	8 5/8	16 11/16	6 1/8
12	5 3/4	6 3/4	5 3/4	4-12	8 5/8	17 9/16	6 3/8
14	7	8	7	5-12	10	19 15/16	4 15/16

ORDERING INFORMATION

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MHH - BORE SIZE ·D· TYPE OF CUSHIONING · ROD END STYLE -- STROKE LENGTH

SERIES CODE

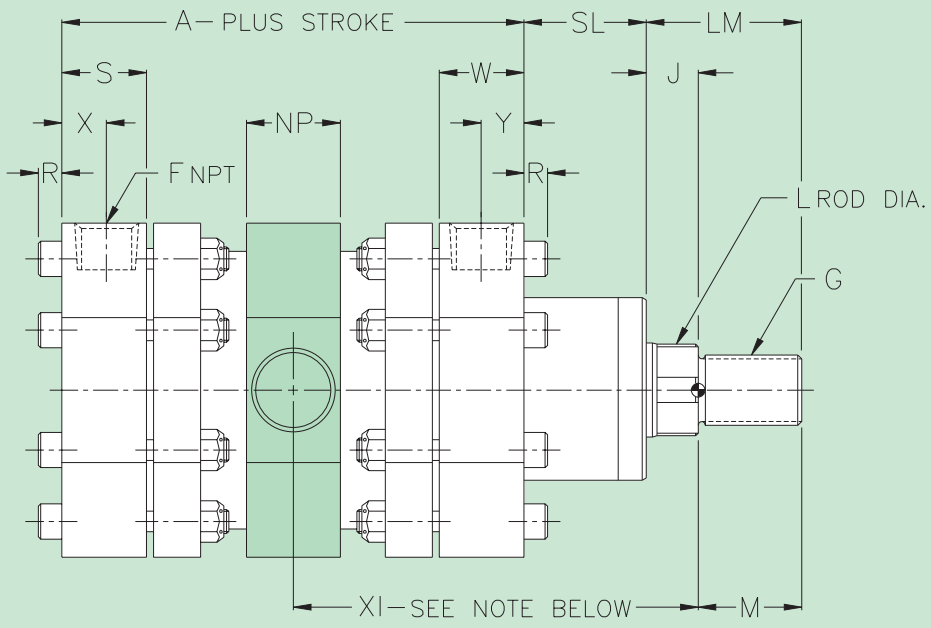
MOUNTING STYLE

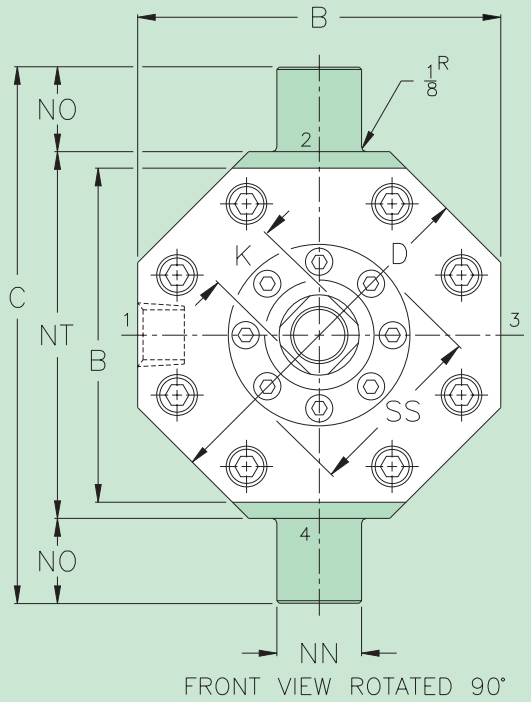
INDICATE BY CODE NUMBER
0 · NON CUSHIONED
2 · CUSHION ON ROD END
3 · CUSHION ON BLIND END

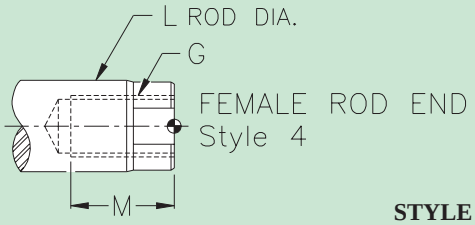
SPECIFY IN INCHES

INDICATE STYLE BY
2 · MALE THREAD

Piston rod diameter and port position should also be specified. If not, we will assume a "standard" rod is desired and the ports will be located on side no. 1. If non-standard modifications are necessary, fully describe requirements.







CUSTOMER TO SPECIFY **"XI"** DIMENSION.
IF DESIRED LOCATION NOT GIVEN,
DIMENSION WILL BE **"H"** PLUS 1/2 STROKE.
MINIMUM **XI = XH**
MAXIMUM **XI = XH** PLUS STROKE MINUS **P.**
P = MINIMUM STROKE

STYLE 2 MALE THREAD ROD END IS STANDARD AND WILL BE SUPPLIED UNLESS OTHERWISE SPECIFIED ON ORDER.

DIMENSIONS NOT AFFECTED BY ROD DIAMETER

BORE	A	B	C	F	J	R	S	W	X	Y	NT	NO	D	NN	NP	P
2	4 3/8	3 1/4	6 1/4	1/2	1	3/8	1 1/2	1 1/2	11/16	11/16	3 3/4	1 1/4	4 5/8	1.250	1 1/2	2 1/8
3 1/4	5 1/4	4 3/4	7 7/8	3/4	1	3/8	1 3/4	1 3/4	3/4	3/4	5 1/8	1 3/8	5 5/16	1.375	1 3/4	2 5/8
4	5 1/2	6 3/8	10 1/8	3/4	1	1/2	1 3/4	1 3/4	3/4	3/4	6 5/8	1 3/4	7 1/16	1.750	2	3 5/8
5	6 1/2	7 3/8	11 9/16	1	1	5/8	2	2	13/16	7/8	7 9/16	2	8 1/8	2.000	2 1/4	3 5/8
6	7	8 7/8	13 5/8	1 1/4	1	5/8	2 1/4	2 1/4	15/16	1 1/16	9 1/8	2 1/4	9	2.250	2 1/2	3 3/4
8	8 3/8	11 1/4	16 7/16	1 1/4	1	7/8	2 7/16	2 7/16	1 1/8	1 3/16	11 7/16	2 1/2	12	2.500	3	4 1/8
10	9 3/4	14	22 1/2	1 1/2	1	7/8	2 11/16	2 11/16	1 3/16	1 3/16	16 1/2	3	15 1/4	3.000	3 1/2	4 1/8
12	10 3/8	17	26	1 1/2	1	7/8	2 11/16	2 11/16	1 3/16	1 3/16	19	3 1/2	18	3.500	4	4 1/2
14	14 1/4	19 1/2	30 1/2	2	1	1	3 11/16	3 11/16	1 1/2	2	21 1/2	4 1/2	21	4.500	5	4 7/8

VARIABLE DIMS. FOR "STANDARD" ROD

BORE	L	LM	M	G	SS	H	SL	XH
2	1	2	1	3/4-16	3 1/8	4 5/16	1 1/2	5 3/4
3 1/4	1 3/8	2 3/8	1 3/8	1-14	3 7/8	5 1/4	2	6 7/8
4	1 3/4	2 3/4	1 3/4	1 1/4-12	4 3/4	5 5/8	2 1/4	7 3/4
5	2	3	2	1 1/2-12	6	6 3/8	2 5/8	8 5/8
6	2 1/2	3 1/2	2 1/2	1 7/8-12	7	6 15/16	3 1/4	9 5/8
8	3	4	3	2 1/4-12	7	8	3 7/16	10 5/8
10	3 1/2	4 1/2	3 1/2	2 1/2-12	7	9 5/16	4 3/8	12 1/4
12	4 1/4	5 1/4	4 1/4	3-12	7	10 1/2	5 3/8	13 3/4
14	5 3/4	6 3/4	5 3/4	4-12	10	12 5/16	4 3/16	14 3/4

VARIABLE DIMENSIONS FOR ALTERNATE ROD

BORE	L	LM	M	G	SS	H	SL	XH
2	1 3/8	2 3/8	1 3/8	1-14	3 1/8	4 11/16	1 7/8	6 1/8
3 1/4	2	3	2	1 1/2-12	3 7/8	5 5/8	2 3/8	7 1/4
4	2 1/2	3 1/2	2 1/2	1 7/8-12	4 3/4	6 1/8	2 3/4	8 1/4
5	3 1/2	4 1/2	3 1/2	2 1/2-12	6	7 1/2	3 3/4	9 3/4
6	4 1/4	5 1/4	4 1/4	3-12	7	8 7/16	4 3/4	11 1/8
8	5 3/4	6 3/4	5 3/4	4-12	8 5/8	10 1/8	5 9/16	12 3/4
10	5 3/4	6 3/4	5 3/4	4-12	8 5/8	11 1/16	6 1/8	14
12	5 3/4	6 3/4	5 3/4	4-12	8 5/8	11 1/2	6 3/8	14 3/4
14	7	8	7	5-12	10	13 1/16	4 15/16	15 1/2

ORDERING INFORMATION

Lynair model numbers contain information that designates the series, bore size, and optional cylinder details. To insure proper interpretation of order requirements, complete the model number described below and specify the desired features as indicated.

MHH – BORE SIZE · N · TYPE OF CUSHIONING · ROD END STYLE – STROKE LENGTH

SERIES CODE

MOUNTING STYLE

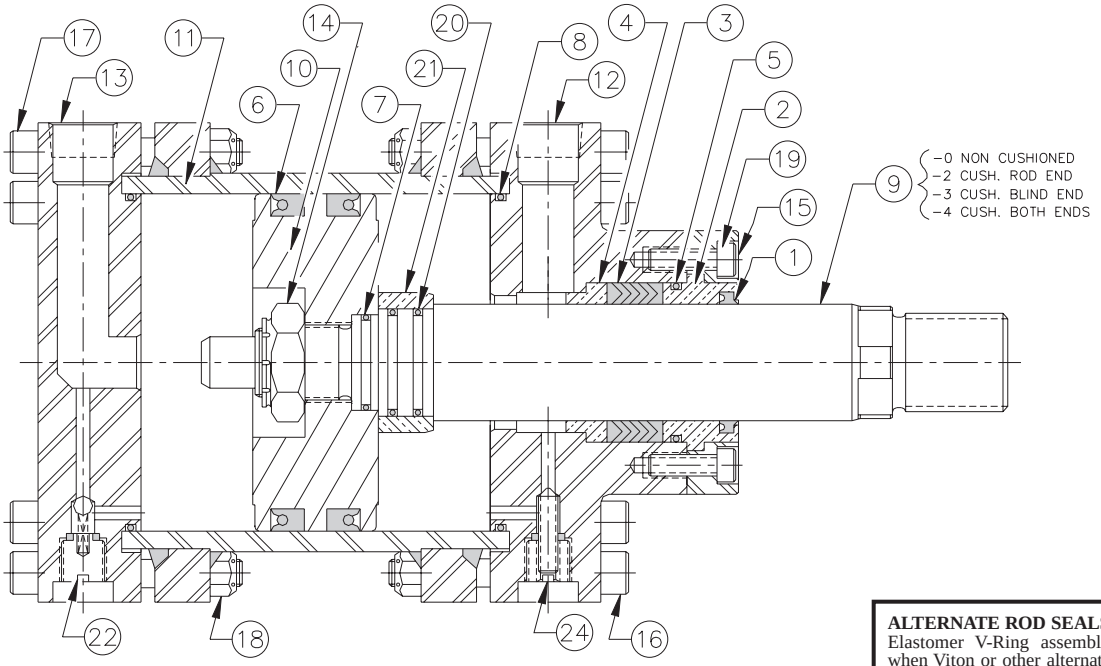
INDICATE BY CODE NUMBER
0 · NON CUSHIONED
2 · CUSHION ON ROD END
3 · CUSHION ON BLIND END

SPECIFY IN INCHES

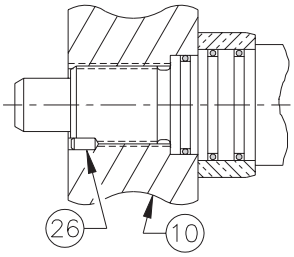
INDICATE STYLE BY
2 · MALE THREAD

Piston rod diameter and port position should also be specified. If not, we will assume a "standard" rod is desired and the ports will be located on side no. 1. If non-standard modifications are necessary, fully describe requirements.

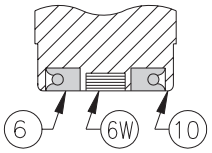
PART IDENTIFICATION NUMBERS FOR SERIES "MHH" HYDRAULIC CYLINDERS



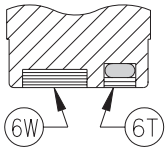
ALTERNATE PISTON CONSTRUCTION
Construction method used to secure Piston is determined by space available



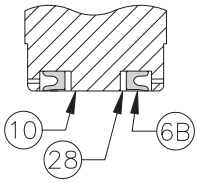
ALTERNATE PISTON DESIGN
Filled teflon wear ring available



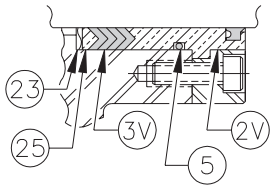
ALTERNATE PISTON SEALS
'O' Ring energized filled teflon seal with filled teflon wear ring.



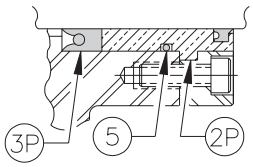
Elastomer block vee cup seals with back-up washers are provided when Viton or other alternate seal material is required.



ALTERNATE ROD SEALS
Elastomer V-Ring assembly is provided when Viton or other alternate seal material is required.



Self-energizing polyurethane cup seal.



ORDER INFORMATION REQUIREMENTS
When ordering replacement parts, clearly specify the item number, name, and quantity of the desired component. It is essential to provide the correct model and serial number of the cylinder in which the parts will be used. By providing both numbers, a cross check of reference data can be made to assure accurate fulfillment of order requirements.

BASIC PARTS LIST

ITEM NUMBER	PART NAME
1	Rod Wiper
2	Rod Bearing - Outer
2P	Rod Bearing (Opt.)
2V	Rod Bearing (Opt.)
3	Rod Packing Set (Std.)
3P	Polyurethane Rod Seal (Opt.)
3V	Elastomer V-Ring Rod Pkg. Set (Opt.)
4	Rod Bearing - Inner
5	O-Ring, Brg. To Head
6	Polyurethane Piston Seals (Std.)
6B	Block Vee Piston Seals (Opt.)
6T	Energized Teflon piston Seal (Opt.)
6W	Filled Teflon Wear Ring (Opt.)
7	O-Ring, Rod To Piston
8	O-Ring, Tube Seal
9	Piston Rod
10	Piston
11	Tube Assembly
12	Front Head
13	Rear Head
14	Piston Nut
15	Bearing Cap
16	Front Head Bolt
17	Rear Head Bolt
18	Locking Hex Nuts
19	Bearing Cap Screws
20	O-Ring, Rod To Bushing
21	Cushion Bushing
22	Cushion Screw Assembly
23	Wave Spring
24	Ball Check Assembly
25	Support Ring (Opt.)
26	Locking Pin
27	"C" Rect. Front Flange Plate (For Front Flange Mount Cylinder Only)
28	Back-up Washers (For 6B)

(*) Model number code letter used to indicate mounting style should be included with item number to describe part. Example: Item 12-A Front Head w/Foot Mounting.

SERVICE PARTS MAY BE ORDERED AS FOLLOWS:

SEAL KIT: Series "MHH" - Consists of item numbers 1, 3, 6, and 8.

SEAL KIT w/BEARING: Series "MHH" - Consists of item numbers 1, 2, 3, 4, 6, and 8.

CARTRIDGE ASSEMBLY: Series "MHH" - Consists of item numbers 1, 2, 3, and 4.

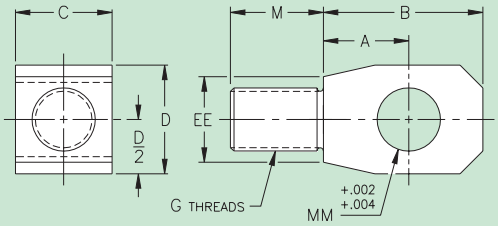
NOTE: LYNAIR will substitute alternate rod or piston seals per our record of original construction.

PISTON AND ROD ASSEMBLY: Consists of item numbers 6, 7, 9, 10, 14, 20, and 21 as required.

NOTE: Ordered parts will be supplied to suit construction details indicated by record data of original serial number.

LYNAIR, INC.
3515 Scheele Drive P.O. Box 720
Jackson, Michigan 49204
Phone (517)787-2240 FAX (517)787-4521

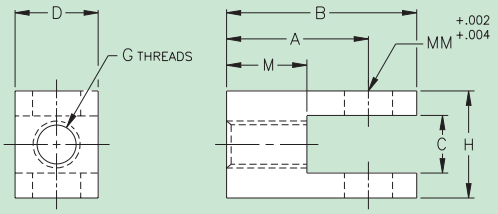
MALE THREAD ROD



Material — CRS
Pin Furnished Upon Request
At Additional Charge

PART NO.	FOR ROD DIAMETER	Dimensions							
		G	MM	A	B	C	D	M	EE
REM-1007	1	3/4-16	3/4	7/8	1 1/2	1 1/4	1 1/4	7/8	1 1/4
REM-1310	1 3/8	1-14	1 1/4	1 3/8	2 1/2	1 1/2	2 1/4	1 1/4	1 1/2
REM-1712	1 3/4	1 1/4-12	1 3/8	1 1/2	2 3/4	2	2 1/2	1 5/8	2
REM-2015	2	1 1/2-12	1 1/2	1 5/8	3	2 1/4	2 3/4	1 7/8	2 1/4
REM-2518	2 1/2	1 7/8-12	1 3/4	1 7/8	3 1/2	2 3/4	3 1/4	2 3/8	2 3/4
REM-3022	3	2 1/4-12	2	2 1/8	4	3 1/4	3 3/4	2 7/8	3 1/4
REM-3525	3 1/2	2 1/2-12	2 1/2	2 5/8	5	3 3/4	4 3/4	3 3/8	3 3/4
REM-4230	4 1/4	3-12	3	3 1/8	6	4 1/2	5 3/4	4	4 1/2
REM-5740	5 3/4	4-12	3 1/2	3 5/8	7	6	6 3/4	5 1/2	6
REM-7050	7	5-12	4 1/4	4 1/4	8 1/4	7 1/2	8	6 1/2	7 1/2

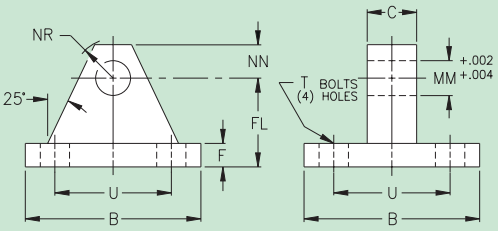
DOUBLE TONGUE CLEVIS



Material — CRS
Clevis pin is included with all double tongue clevises.

PART NO.	FOR ROD DIAMETER	Dimensions							
		G	MM	M	A	B	C	H	D
RCM-1007-10	1	3/4-16	3/4	1 1/8	2	2 5/8	1	2 1/2	1 1/4
RCM-1310-12	1 3/8	1-14	1 1/4	1 1/2	2 7/8	4	1 1/4	3	2 1/4
RCM-1712-12	1 3/4	1 1/4-12	1 3/8	1 7/8	3 3/8	4 5/8	1 1/4	3 1/4	2 1/2
RCM-2015-12	2	1 1/2-12	1 1/2	2 1/8	3 3/4	5 1/8	1 1/4	3 3/4	2 3/4
RCM-2518-15	2 1/2	1 7/8-12	1 3/4	2 5/8	4 1/2	6 1/8	1 1/2	4 1/2	3 1/4
RCM-3022-30	3	2 1/4-12	2	3 1/8	5 1/4	7 1/8	3	6	3 3/4
RCM-3525-25	3 1/2	2 1/2-12	2 1/2	3 5/8	6 1/4	8 5/8	2 1/2	6	4 3/4
RCM-3525-35	3 1/2	2 1/2-12	2 1/2	3 5/8	6 1/4	8 5/8	3 1/2	7	4 3/4
RCM-4230-30	4 1/4	3-12	3	4 3/8	7 1/2	10 3/8	3	7	5 3/4
RCM-4230-45	4 1/4	3-12	3	4 3/8	7 1/2	10 3/8	4 1/2	9	5 3/4
RCM-5740-50	5 3/4	4-12	3 1/2	5 7/8	9 1/2	12 7/8	5	10	6 3/4

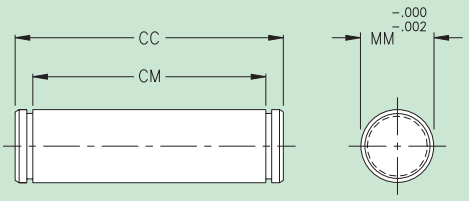
EYE BRACKET



Material — CRS
Welded Construction

PART NO.	FOR SERIES		Dimensions								
	"MT"	"MHH"	MM	C	B	U	FL	F	NN	NR	T
MBM-0710	2	2	3/4	1	3	2.25	1 7/8	5/8	5/8	1	3/8
MBM-1212	3 1/4	3 1/4	1 1/4	1 1/4	5	3.75	3	7/8	1 1/8	1 1/4	5/8
MBM-1312	4	4	1 3/8	1 1/4	6	4.50	3 7/8	1 3/16	1 1/4	1 1/2	3/4
MBM-1512	5	5	1 1/2	1 1/4	7	5.00	4 5/8	1 7/16	1 3/8	1 3/4	1
MBM-1715	6	6	1 3/4	1 1/2	8 1/4	6.00	5 5/8	1 11/16	1 1/2	2 1/4	1 1/4
MBM-2020	8		2	2	10	7.25	6 7/8	1 15/16	1 5/8	2 3/4	1 1/2
MBM-2030		8	2	3	10	7.25	6 7/8	1 15/16	1 5/8	2 3/4	1 1/2
MBM-2525	10/12		2 1/2	2 1/2	13 1/4	10.00	8 3/4	1 15/16	2 1/8	2 7/8	1 1/2
MBM-2535		10	2 1/2	3 1/2	13 1/4	10.00	8 3/4	2 3/16	2 1/8	2 7/8	1 3/4
MBM-3030	14/16		3	3	15 3/4	12.00	10 1/4	2 3/16	2 5/8	3 1/4	1 3/4
MBM-3045		12	3	4 1/2	15 3/4	12.00	10 1/4	2 7/16	2 5/8	3 1/4	2
MBM-3535	18/20		3 1/2	3 1/2	18	14.25	11 1/4	2 7/16	3	3 3/4	2
MBM-3550		14	3 1/2	5	18	14.25	11 1/4	2 7/16	3	3 3/4	2

CLEVIS PIN



PINS FURNISHED WITH SNAP RINGS ON BOTH ENDS

MATERIAL:
GROUND & POLISHED STEEL
CHROME PLATED

PART NO.	PIN TO SUIT			Dimensions		
	MT	MHH	CLEVIS	MM	CC	CM
CPM-0732	2	2	X	3/4	3 1/4	2 1/2
CPM-1237	3 1/4	3 1/4	X	1 1/4	3 3/4	3
CPM-1340	4	4	X	1 3/8	4	3 1/4
CPM-1547	5	5	X	1 1/2	4 3/4	3 3/4
CPM-1755	6	6	X	1 3/4	5 1/2	4 1/2
CPM-2060	8			2	6	5
CPM-2070		8	X	2	7	6
CPM-2570	10/12		X	2 1/2	7	6
CPM-2580		10	X	2 1/2	8	7
CPM-3085	14/16		X	3	8 1/2	7
CPM-30105	18/20	12	X	3	10 1/2	9
CPM-35115		14	X	3 1/2	11 1/2	10

SPECIFY DESIRED ACCESSORY PART NUMBER ON PURCHASE ORDER.

CONSULT "LYNAIR" FOR PRICE INFORMATION.

ALL ACCESSORIES ARE SUBJECT TO NORMAL QUANTITY DISCOUNTS.

CONSULT "LYNAIR" IF NON-STANDARD ITEM IS REQUIRED.

National
FLUID POWER
Association

Limited Warranty

Our products are fully warranted to be free from defects in workmanship and material for a period of one year from the time of shipment from our plant. We will replace any part which proves to be defective upon our inspection free of charge and correct any consequential damage to our unit resulting from a failure subject to the conditions of this limited warranty.

Approval must be obtained directly from an authorized official of Lynair, Inc. before a product is returned for inspection. If the failure proves to be the result of conditions within our area of responsibility, we will absorb shipping costs for the most economical mode of transportation.

Our products are not warranted for any specific measure of service, application suitability, or for any specific purpose unless we are fully informed of all factors related to the operating conditions prior to submitting design recommendations.

This warranty does not apply to deterioration resulting from storage, damage sustained in areas beyond our realm of control, and is void if the product is altered by anyone without our written authorization.

It is understood by the purchaser as a condition of the sale that we do not assume and are not liable for subsequent losses to equipment or material, loss of production, or handling costs resulting from a product failure covered by the terms of this guarantee.

Portions of this warranty are inapplicable in those states which have specific laws pertaining to certain product warranty obligations. Some states do not allow a time limitation on effective implied warranty responsibilities or allow for the exclusion of claims for incidental or consequential damages resulting from failure.

The warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

LYNAIR, INC.

3515 Scheele Drive P.O. Box 720
Jackson, Michigan 49204-0720
Phone (517)787-2240 FAX (517)787-4521
www.Lynair.com

Order Policy

An order, once placed and entered into production can only be cancelled with the consent of Lynair, Inc. under terms which indemnify the seller against loss. Due to the variety of variable construction options subject to buyer selection, many components of "Standard" models are in fact "Custom Made" to suit specific order requirements. The probability of future use of any completed part is a factor in determining applicable cancellation charges.

Customer acceptance of those charges is required before order cancellation becomes final.

Shipping dates assigned at time of order entry are approximate and based upon production schedules and availability of material. The seller shall not be liable for failure to meet estimated delivery date or for unforeseen delays caused by circumstances beyond our control.

No penalty clause of any description, in order specification or detail terms, will apply unless written acceptance is obtained from a principal official of Lynair, Inc. prior to formal order entry.

The seller assumes no responsibility, and is not liable for any cost arising from the installation, use, maintenance, or repair of any product of its manufacture beyond the conditions stated in the Limited Warranty.

Catalog Information

This material has been prepared to serve as an information source for use by skilled persons to assist them in making design decisions involving the use of our manufactured products for which they assume full responsibility. The information provided is intended to serve as a guide in developing design parameters and does not obligate the seller to assure application suitability of any end product.

All technical data and recommendations are offered by the seller free of charge for discretionary use by the buyer. While ample factors of safety are incorporated into product designs, unforeseen circumstances beyond our realm of control can compromise those values resulting in unsatisfactory performance or failure.

Warranty protection is extended exclusively to the quality of workmanship and materials which comprise our manufactured products. It does not apply to construction specifications developed on the basis of design considerations explained within the contents of this catalog.

In order to continue our commitment to produce products of the highest quality, LYNAIR, INC. reserves the right to make design improvements and modifications, exclusive of those which affect mounting dimensions, at our discretion without issuance of change notice.

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