

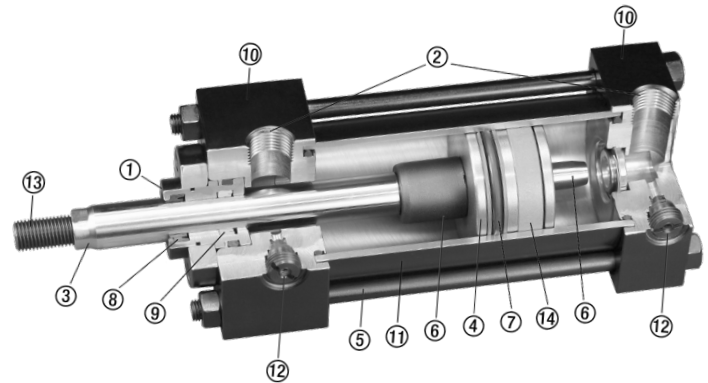
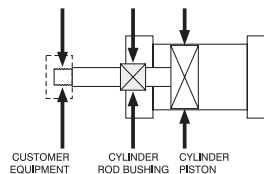
MH Series Medium Pressure Hydraulics

Features & Benefits

Floating Rod Bushing

Self Alignment Feature: Rod bushing is designed to float .002" to improve bearing surface alignment.

- Reduces cylinder drag and erratic operation
- Reduces cylinder wear
- Provides a minimum of 25% longer life than fixed rod bushing designs.



- 1. Floating Rod Bushing** – Precision machined from 150,000 PSI rated graphite filled ductile iron and PTFE coated to reduce friction and extend cycle life. Bushing design traps lubrication in effective bearing area. Bronze bushings also available.
- 2. Ports** – NPTF and SAE ports available standard. Non-standard locations, sizes and other port styles can be made-to-order to fit any application needs.
- 3. Piston Rod** – Steel piston rod provides high strength and damage resistance. Induction hardened and chrome plated for maximum wear resistance and long life (100K min. yield up to 5" rod; 75K min. yield for 5 1/2" rod).
- 4. Piston** – Precision machined ductile iron provides high strength and an excellent bearing surface for extended cylinder life.
Piston Lock Screw (PLS) – Former option but now standard on all hydraulic cylinders. 100% securely fastened to piston rod by thread lock, Dutch (Skotch) key and staking.
- 5. Tie Rods** – Pre-stressed, high carbon steel tie rod construction eliminates axial loading of cylinder tube and maintains compression on tube (100K min. yield).
- 6. Cushion** – Precision machined cushions are available at either end and provide smooth deceleration, which helps reduce end of stroke shock.
- 7. Piston Seals** – Heavy-duty, bi-directional Carboxylated Nitrile T-Seal with double back-up. Rated for shock loads and incorporates anti-extrusion technology. EP, PTFE and fluorocarbon designs available.
- 8. Rod Wiper** – Flocked nitrile wiper removes contaminants on retract stroke, helping ensure long life for all internal components.
- 9. Rod Seals** – Polyurethane seals offer high abrasion resistance and strength. Pressure activated double lip and wear compensating for extended life.
- 10. Head & Cap** – Precision machined steel head and cap are held to tight tolerances and ensure accurate alignment for a truly square cylinder.
- 11. Tube** – Precision machined steel tube with hard chrome I.D. is honed and micro finished for extended seal life and improved cycle rates.
- 12. Cushion Adjustment Needle** – Adjustable steel needle design has fine thread metering and is positively captured to prevent needle ejection during adjustment.
- 13. Piston Rod Stud** – Standard on KK1 and KK2 threads for .625" - 2" rods (125K min. yield). Available up to two times standard "A" thread length.
- 14. Wear Band** – Wear Guard; Glass Reinforced Nylon (standard). PTFE for E and V seal option.
Finish – Black urethane paint.

Operating Pressure

1500 PSI HYD (103 BAR)

Refer to mount section for specific PSI rating by bore size and mount.

Performance Options

ST – Stop tubes are used to reduce rod bearing and piston stress for cylinder design guidance).

CS – Center supports are recommended for cylinders with long strokes in horizontal applications to prevent buckling of the cylinder and extend cylinder life.

Operating Temperature

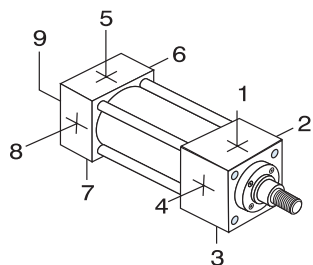
Standard Seals:	-20°F to 200°F (-29°C to 93°C)
Fluorocarbon Seals:	0°F to 400°F (-18°C to 204°C)
Ethylene Propylene Seals:	-50°F to 300°F (-45°C to 149°C)

SSR – 17-4 Chrome Plated Stainless Steel Piston Rod provide corrosion resistance in outdoor applications and wet environments (100K min. yield up to 5" rod; 75K min. yield 5 1/2" rod).

HP – High-impact pistons use a high strength steel nut retained piston for fatigue resistance and additional strength in demanding applications.

Technical Data

Port Locations



Note: Location 9 is center of cap face.

For complex port designs, multiple port locations & sizes can be ordered.
Call out locations and sizes for all sets using the following format.

Example: -P15=N375 -P26=N500

(3/8" NPTF Ports at 1 & 5 and 1/2" NPTF Ports at 2 & 6)

BSPP & BSPT ports also available.

Maximum Stroke Recommendations

Bore	No Center Support	With Center Supports (CS Options)	
		One Support	Two Supports
1.50", 2.00" & 2.50"	48 inches	Strokes over 48 inches	Strokes over 72 inches
3.25", 4.00" & 5.00"	65 inches	Strokes over 65 inches	Strokes over 92 inches
6.00"	72 inches	Strokes over 72 inches	not required

Force Chart

Bore	Rod Dia. (MM)	Effective Piston Area	Pounds of Force at PSI													Displacement per Inches of Stroke (gallons)
			250	350	440	500	550	630	675	750	830	980	1000	1300	1500	
1.50	Extend	1.767	442	618	777	884	972	1113	1193	1325	1467	1732	1767	2297	2651	0.00765
	0.625	1.460	365	511	642	730	803	920	986	1095	1212	1431	1460	1898	2190	0.00635
	1.000	0.982	246	344	432	491	540	619	663	737	815	962	982	1277	1473	0.00425
2.00	Extend	3.142	786	1100	1382	1571	1728	1979	2121	2357	2608	3079	3142	4085	4713	0.0136
	0.625	2.835	709	992	1247	1418	1559	1786	1914	2126	2353	2778	2835	3686	4253	0.0123
	1.000	2.357	589	825	1037	1179	1296	1485	1591	1768	1956	2310	2357	3064	3536	0.0102
	1.375	1.657	414	580	729	829	911	1044	1118	1243	1375	1624	1657	2154	2486	0.0071
2.50	Extend	4.909	1227	1718	2160	2455	2700	3093	3314	3682	4074	4811	4909	6382	7364	0.0213
	0.625	4.602	1151	1611	2025	2301	2531	2899	3106	3452	3820	4510	4602	5983	6903	0.0200
	1.000	4.124	1031	1443	1815	2062	2268	2598	2784	3093	3423	4042	4124	5361	6186	0.0179
	1.375	3.424	856	1198	1507	1712	1883	2157	2311	2568	2842	3356	3424	4451	5136	0.0148
	1.750	2.504	626	876	1102	1252	1377	1578	1690	1878	2078	2454	2504	3255	3756	0.0109
3.25	Extend	8.296	2074	2904	3650	4148	4563	5226	5600	6222	6886	8130	8296	10785	12444	0.0359
	1.000	7.511	1878	2629	3305	3756	4131	4732	5070	5633	6234	7361	7511	9764	11267	0.0325
	1.375	6.811	1703	2384	2997	3406	3746	4291	4597	5108	5653	6675	6811	8854	10217	0.0294
	1.750	5.891	1473	2062	2592	2946	3240	3711	3976	4418	4890	5773	5891	7658	8837	0.0255
	2.000	5.154	1289	1804	2268	2577	2835	3247	3479	3866	4278	5051	5154	6700	7731	0.0223
4.00	Extend	12.566	3142	4398	5529	6283	6911	7917	8482	9425	10430	12315	12566	16336	18849	0.0544
	1.000	11.781	2945	4123	5184	5891	6480	7422	7952	8836	9778	11545	11781	15315	17672	0.0510
	1.375	11.081	2770	3878	4876	5541	6095	6981	7480	8311	9197	10859	11081	14405	16622	0.0479
	1.750	10.161	2540	3556	4471	5081	5589	6401	6859	7621	8434	9958	10161	13209	15242	0.0440
	2.000	9.424	2356	3298	4147	4712	5183	5937	6361	7068	7822	9236	9424	12251	14136	0.0408
	2.500	7.657	1914	2680	3369	3829	4211	4824	5168	5743	6355	7504	7657	9954	11486	0.0331
5.00	Extend	19.635	4909	6872	8639	9818	10799	12370	13254	14726	16297	19242	19635	25526	29453	0.0850
	1.000	18.850	4713	6598	8294	9425	10368	11876	12724	14138	15646	18473	18850	24505	28275	0.0816
	1.375	18.150	4538	6353	7986	9075	9983	11435	12251	13613	15065	17787	18150	23595	27225	0.0785
	1.750	17.230	4308	6031	7581	8615	9477	10855	11630	12923	14301	16885	17230	22399	25845	0.0746
	2.000	16.493	4123	5773	7257	8247	9071	10391	11133	12370	13689	16163	16493	21441	24740	0.0714
	2.500	14.726	3682	5154	6479	7363	8099	9277	9940	11045	12223	14431	14726	19144	22089	0.0637
	3.000	12.566	3142	4398	5529	6283	6911	7917	8482	9425	10430	12315	12566	16336	18849	0.0544
	3.500	10.014	2504	3505	4406	5007	5508	6309	6759	7511	8312	9814	10014	13018	15021	0.0434
6.00	Extend	28.274	7069	9896	12441	14137	15551	17813	19085	21206	23467	27709	28274	36756	42411	0.1224
	1.375	26.789	6697	9376	11787	13395	14734	16877	18083	20092	22235	26253	26789	34826	40184	0.1159
	1.750	25.869	6467	9054	11382	12935	14228	16297	17462	19402	21471	25352	25869	33630	38804	0.1112
	2.000	25.132	6283	8796	11058	12566	13823	15833	16964	18849	20860	24629	25132	32672	37698	0.1088
	2.500	23.365	5841	8178	10281	11683	12851	14720	15771	17524	19393	22898	23365	30375	35048	0.1011
	3.000	21.205	5301	7422	9330	10603	11663	13359	14313	15904	17600	20781	21205	27567	31808	0.0918
	3.500	18.653	4663	6529	8207	9327	10259	11751	12591	13990	15482	18280	18653	24249	27980	0.0808
	4.000	15.708	3927	5498	6912	7854	8639	9896	10603	11781	13038	15394	15708	20420	23562	0.0680
8.00	Extend	50.265	12566	17593	22117	25133	27646	31667	33929	37699	41720	49260	50265	65345	75398	0.2176
	1.375	48.780	12195	17073	21463	24390	26829	30731	32927	36585	40487	47804	48780	63414	73170	0.2111
	1.750	47.860	11965	16751	21058	23930	26323	30152	32306	35895	39724	46903	47860	62218	71790	0.2072
	2.000	47.123	11781	16493	20734	23562	25918	29687	31808	35342	39112	46181	47123	61260	70685	0.2040
	2.500	45.356	11339	15875	19957	22678	24946	28574	30615	34017	37645	44449	45356	58963	68034	0.1963
	3.000	43.196	10799	15119	19006	21598	23758	27213	29157	32397	35853	42332	43196	56155	64794	0.1870
	3.500	40.644	10161	14225	17883	20322	22354	25606	27435	30483	33735	39831	40644	52837	60966	0.1760
	4.000	37.699	9425	13195	16588	18850	20734	23750	25447	28274	31290	36945	37699	49009	56549	0.1632
	4.500	34.361	8590	12026	15119	17181	18899	21647	23194	25771	28520	33674	34361	44669	51542	0.1488
	5.000	30.630	7658	10721	13477	15315	16847	19297	20675	22973	25423	30017	30630	39819	45945	0.1326
	5.500	26.507	6627	9277	11663	13254	14579	16699	17892	19880	22001	25977	26507	34459	39761	0.1148

Note: Theoretical force. Actual force will be reduced by friction.

Cylinder Torque Charts

Tie Rod Torque Specs	
Bore	Torque (ft-lbs)
1.50	8 ft-lbs
2.00	15 ft-lbs
2.50	15 ft-lbs
3.25	30 ft-lbs
4.00	30 ft-lbs
5.00	55 ft-lbs
6.00	60 ft-lbs
8.00	140 ft-lbs

Square Retainer Plate Torque Specs	
Hex Head Screw Size	Torque (ft-lbs)
1/4-28	7 ft-lbs
5/16-24	12 ft-lbs
3/8-24	30 ft-lbs
1/2-20	50 ft-lbs
5/8-18	50 ft-lbs

Round Retainer Plate Torque Specs	
SHCS Size	Torque (ft-lbs)
#10-32	5 ft-lbs
1/4-28	15 ft-lbs
5/16-24	20 ft-lbs

All torque specs are based upon using anti-seize thread lubricant.
Tighten cylinders using an "X" tightening pattern on tie rods.

IMI Bimba Spec: LPS Premium Copper Anti-Seize

Temperature Rating: -65°F to 1800°F

Military Spec: MIL-PRF-907-E

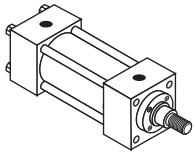
Torque Tolerance: -0% to +5%

Basic Cylinder Weight Chart (in lbs.)

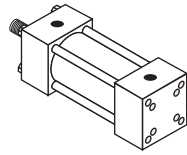
Bore	Rod Dia. (MM)	Mount												Add per Inch of Stroke
		MX0 MS4 ME3 ME4	MF1	MF2	MF5	MF6	MP1	MP2	MS2 MS3 MS7	MT1 MT2	MT4	MX1 MX2 MX3	SB	
1.50	0.625	3.8	4.2	4.5	4.7	5.0	4.2	4.6	4.1	4.3	5.6	3.9	4.1	0.31
	1.000	4.0	4.4	4.7	4.9	5.2	4.3	4.7	4.3	4.4	5.8	4.0	4.2	0.45
2.00	0.625	5.9	6.7	6.9	7.4	7.7	6.2	6.8	6.2	6.3	8.4	5.9	6.1	0.39
	1.000	6.3	6.9	7.4	7.7	8.1	6.7	7.3	6.6	6.8	8.9	6.4	6.6	0.53
	1.375	6.6	7.4	7.7	8.1	8.4	7.0	7.6	7.0	7.1	9.2	6.7	6.9	0.73
2.50	0.625	8.6	9.9	10.1	10.7	10.9	9.0	9.9	9.0	9.1	11.8	8.7	8.9	0.45
	1.000	9.4	10.1	10.9	10.9	11.7	9.7	10.7	9.7	9.9	12.5	9.5	9.7	0.59
	1.375	9.7	10.6	11.2	11.4	12.0	10.0	11.0	10.0	10.2	12.8	9.8	10.0	0.78
	1.750	10.5	11.5	12.0	12.3	12.8	10.8	11.8	10.8	10.9	13.6	10.6	10.7	1.04
3.25	1.000	15.5	19.1	19.2	20.8	20.9	16.6	19.1	16.3	16.0	21.4	15.7	16.4	0.70
	1.375	17.7	19.4	21.4	21.1	23.1	18.8	21.3	18.5	18.2	23.5	17.9	18.6	0.90
	1.750	18.3	20.3	22.0	22.0	23.7	19.4	21.9	19.1	18.8	24.2	18.5	19.2	1.16
	2.000	19.0	21.1	22.6	22.8	24.3	20.1	22.6	19.7	19.4	24.8	19.1	19.8	1.37
4.00	1.000	23.0	27.3	28.0	29.2	29.9	24.1	27.7	23.8	23.5	30.3	23.2	23.9	0.79
	1.375	23.8	27.6	28.8	29.6	30.7	24.9	28.5	24.5	24.2	31.1	23.9	24.6	0.99
	1.750	24.4	28.5	29.4	30.4	31.3	25.5	29.1	25.2	24.9	31.7	24.6	25.3	1.25
	2.000	26.9	29.3	31.9	31.2	33.9	28.0	31.6	27.7	27.4	34.2	27.1	27.8	1.45
	2.500	29.2	32.0	34.2	33.9	36.2	30.3	33.9	30.0	29.7	36.5	29.4	30.1	1.95
5.00	1.000	35.8	42.5	43.3	45.4	46.1	36.9	42.3	37.2	36.3	45.3	36.2	36.7	0.98
	1.375	36.6	42.9	44.0	45.7	46.9	37.7	43.1	38.0	37.1	46.0	37.0	37.5	1.18
	1.750	37.2	43.7	44.7	46.6	47.5	38.3	43.7	38.6	37.7	46.6	37.6	38.1	1.44
	2.000	38.7	44.6	46.1	47.4	49.0	39.8	45.1	40.0	39.1	48.1	39.0	39.5	1.65
	2.500	43.8	47.3	51.2	50.1	54.1	44.9	50.3	45.2	44.3	53.2	44.2	44.7	2.15
	3.000	46.3	50.3	53.7	53.2	56.6	47.4	52.7	47.7	46.7	55.7	46.6	47.1	2.76
	3.500	48.8	53.4	56.2	56.2	59.1	49.9	55.3	50.2	49.2	58.2	49.1	49.7	3.48
6.00	1.375	56.7	67.2	68.6	71.1	72.4	58.6	67.6	58.2	57.8	70.7	57.0	58.3	1.29
	1.750	57.7	68.0	69.6	71.9	73.5	59.6	68.6	59.2	58.8	71.7	58.0	59.3	1.55
	2.000	58.8	68.8	70.7	72.7	74.5	60.7	69.7	60.3	59.9	72.8	59.1	60.4	1.76
	2.500	61.5	71.4	73.4	75.3	77.3	63.5	72.4	63.0	62.6	75.5	61.8	63.2	2.26
	3.000	64.7	74.4	76.6	78.3	80.5	66.7	75.7	66.3	65.9	78.7	65.1	66.4	2.87
	3.500	68.0	77.4	79.9	81.3	83.8	70.0	78.9	69.5	69.1	82.0	68.3	69.7	3.59
	4.000	76.0	82.7	87.9	86.5	91.7	77.9	86.9	77.5	77.1	90.0	76.3	77.6	4.43
8.00	1.375	98.9	—	—	—	—	100.9	—	100.5	100.0	126.6	99.6	100.6	2.09
	1.750	99.9	—	—	—	—	101.9	—	101.5	101.1	127.6	100.6	101.6	2.35
	2.000	101.0	—	—	—	—	103.0	—	102.5	102.1	128.7	101.7	102.7	2.56
	2.500	103.7	—	—	—	—	105.7	—	105.3	104.9	131.4	104.4	105.4	3.06
	3.000	107.0	—	—	—	—	108.9	—	108.5	108.1	134.7	107.7	108.6	3.67
	3.500	110.2	—	—	—	—	112.2	—	111.8	111.4	137.9	110.9	111.9	4.39
	4.000	116.3	—	—	—	—	118.3	—	117.8	117.4	144.0	117.0	117.9	5.23
	4.500	123.9	—	—	—	—	125.9	—	125.4	125.0	151.6	124.6	125.6	6.17
	5.000	131.9	—	—	—	—	133.9	—	133.5	133.1	159.6	132.6	133.6	7.23
	5.500	141.0	—	—	—	—	143.0	—	142.6	142.2	168.7	141.7	142.7	8.39

Note: Add 20% to mount and stroke weight for double rod end cylinders. Add 1% for cushions.

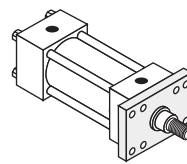
NFPA Mounting Styles



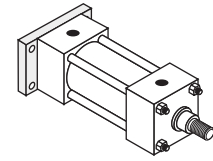
ME3
8.00" Bore



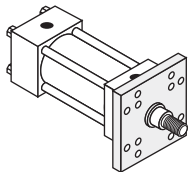
ME4
8.00" Bore



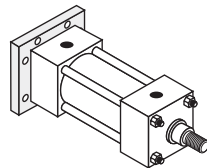
MF1
1.50"-6.00" Bores



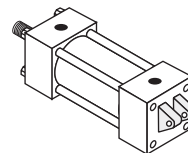
MF2
1.50"-6.00" Bores



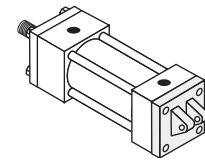
MF5
1.50"-6.00" Bores



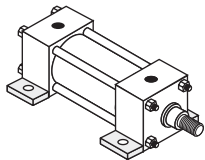
MF6
1.50"-6.00" Bores



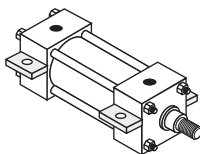
MP1
1.50"-8.00" Bores



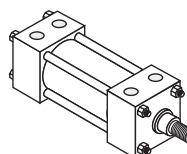
MP2
1.50"-6.00" Bores



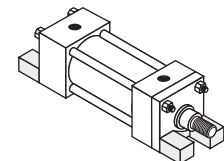
MS2
1.50"-8.00" Bores



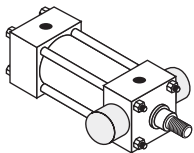
MS3
1.50"-8.00" Bores



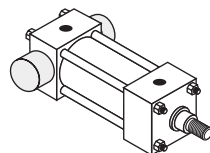
MS4
1.50"-8.00" Bores



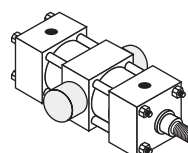
MS7
1.50"-8.00" Bores



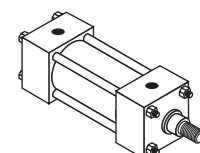
MT1
1.50"-8.00" Bores



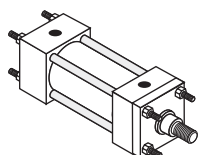
MT2
1.50"-8.00" Bores



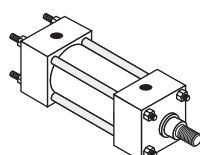
MT4
1.50"-8.00" Bores



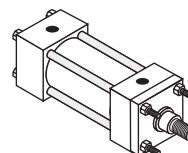
MX0
1.50"-8.00" Bores



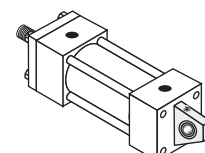
MX1
1.50"-8.00" Bores



MX2
1.50"-8.00" Bores

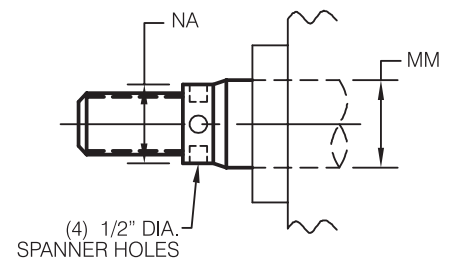
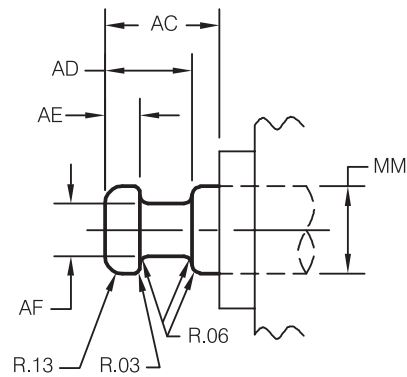
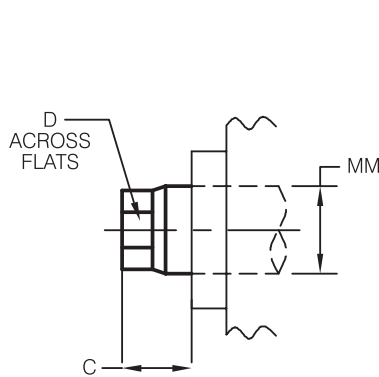
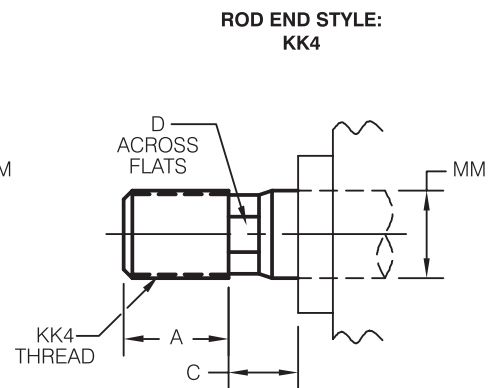
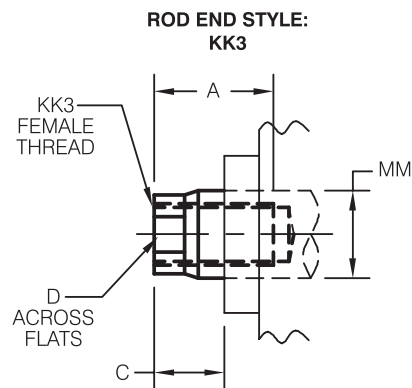
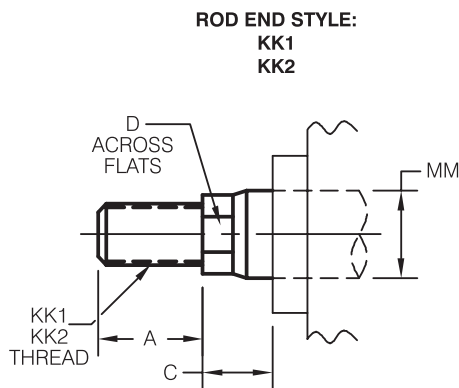


MX3
1.50"-8.00" Bores



SB
1.50"-8.00" Bores

Dimensions – Threads



Rod Dia. (MM)	A	C	D	AC	AD	AE	AF	KK1	KK2	KK3	KK4	NA ±.002
0.625	0.750	0.375	0.500	1.125	0.625	0.250	0.375	7/16 - 20*	1/2 - 20*	7/16 - 20	5/8 - 18	—
1.000	1.125	0.500	0.875	1.625	0.938	0.375	0.688	3/4 - 16*	7/8 - 14*	3/4 - 16	1 - 14	—
1.375	1.625	0.625	1.125	1.750	1.062	0.375	0.875	1 - 14*	1 1/4 - 12*	1 - 14	1 3/8 - 12	—
1.750	2.000	0.750	1.500	2.000	1.313	0.500	1.125	1 1/4 - 12*	1 1/2 - 12*	1 1/4 - 12	1 3/4 - 12	—
2.000	2.250	0.875	1.750	2.625	1.688	0.625	1.375	1 1/2 - 12*	1 3/4 - 12*	1 1/2 - 12	2 - 12	—
2.500	3.000	1.000	2.125	3.250	1.938	0.750	1.750	1 7/8 - 12	2 1/4 - 12	1 7/8 - 12	2 1/2 - 12	—
3.000	3.500	1.000	2.625	3.625	2.438	0.875	2.250	2 1/4 - 12	2 3/4 - 12	2 1/4 - 12	3 - 12	—
3.500	3.500	1.000	3.000	4.375	2.688	1.000	2.500	2 1/2 - 12	3 1/4 - 12	2 1/2 - 12	3 1/2 - 12	—
4.000	4.000	1.000	—	4.500	2.688	1.000	3.000	3 - 12	3 3/4 - 12	3 - 12	4 - 12	3.875
4.500	4.500	1.000	—	5.250	3.188	1.500	3.500	3 1/4 - 12	4 1/4 - 12	3 1/4 - 12	4 1/2 - 12	4.375
5.000	5.000	1.000	—	5.375	3.188	1.500	3.875	3 1/2 - 12	4 3/4 - 12	3 1/2 - 12	5 - 12	4.875
5.500	5.500	1.000	—	6.250	3.938	1.875	4.375	4 - 12	5 1/4 - 12	4 - 12	5 1/2 - 12	5.375

*Studded rod end.

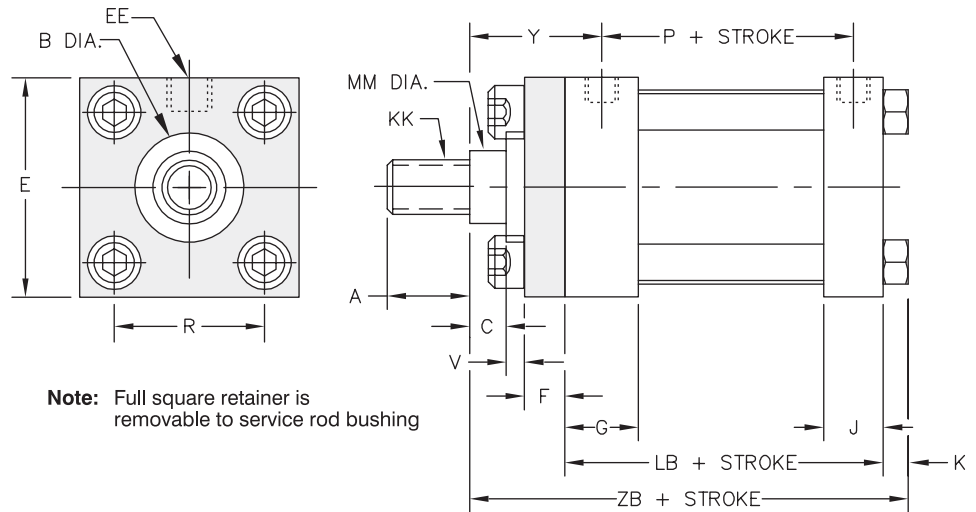
(4) wrench flats are an option.

Note: Rods larger than 3.50" dia. utilize (4) 0.500" dia. spanner holes 0.500" deep.

Dimensions – Basic Cylinder (MX0 Mount)

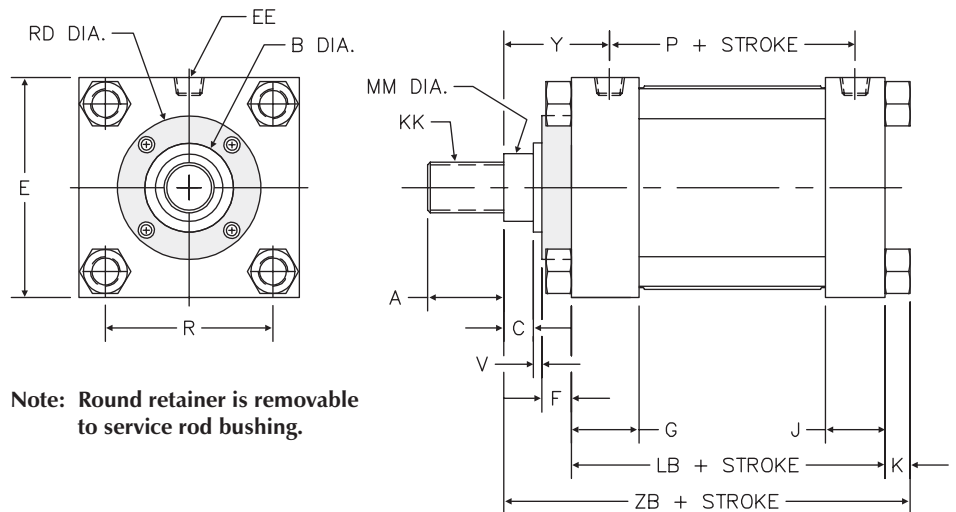
Square Retainer Construction

Full Square Retainer Used On	
Bore	Rod Diameter
1.50	0.625
	1.000
2.00	1.000
	1.375
2.50	1.000
	1.375
	1.750
3.25	1.375
	1.750
	2.000
4.00	2.000
	2.500
5.00	2.500
	3.000
	3.500
6.00	4.000

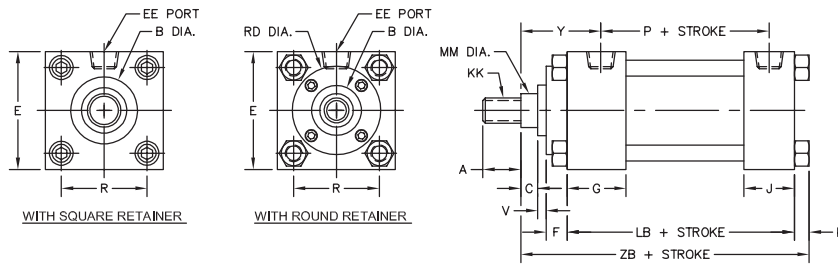


Round Retainer Construction

Round Retainer Used On	
Bore	Rod Diameter
2.00	0.625
2.50	0.625
3.25	1.000
4.00	1.000
	1.375
5.00	1.375
	1.750
	2.000
6.00	1.375
	1.750
	2.000
	2.500
	3.000
8.00	3.500
	1.375
	1.750
	2.000
	2.500
	3.000
	3.500
	4.000
	4.500
	5.000
	5.500



Dimensions – Basic Cylinder (MX0 Mount)



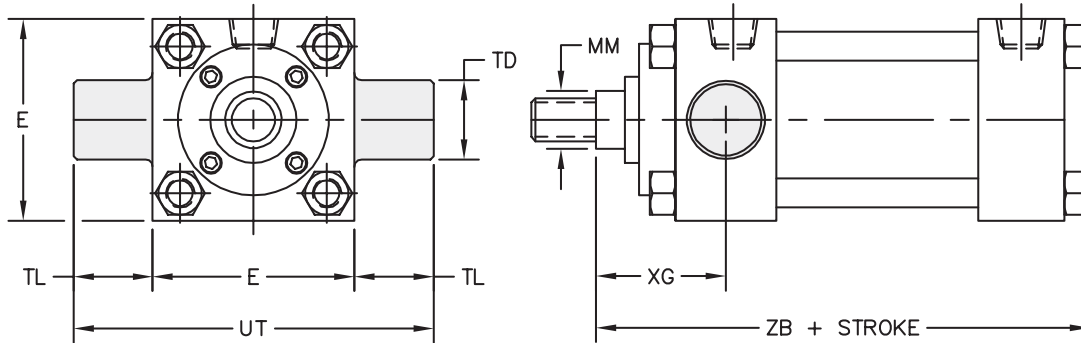
Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	A	B ²	C	EE		F	G	J	K	KK	R	RD ³	V	Y	Add to Stroke		
							NPTF	SAE										LB	P	ZB
1.50	0.625	1500	2.000	0.750	1.124	0.375	3/8	#6	0.375	1.500	1.000	0.250		1.430	SQ	0.250	1.875	3.625	2.375	4.875
	1.000	1500		1.125	1.499	0.500									SQ	0.500	2.250			
2.00	0.625	1500	2.500	0.750	1.124	0.375	3/8	#6	0.375	1.500	1.000	0.313		1.840	2.000	0.250	1.875	3.625	2.375	4.938
	1.000	1500		1.125	1.499	0.500									SQ	0.500	2.250			
2.50	1.375	1500	3.000	1.625	1.999	0.625	3/8	#6	0.375	1.500	1.000	0.313		2.190	SQ	0.625	2.500	3.750	2.500	5.688
	0.625	1000		0.750	1.124	0.375									2.000	0.250	1.875			
3.25	1.000	1500	3.750	1.125	1.499	0.500	1/2	#10	0.625	1.750	1.250	0.375		2.760	SQ	0.500	2.250	4.250	2.750	5.438
	1.375	1500		1.625	1.999	0.625									SQ	0.375	2.625			
4.00	1.750	1500	4.500	2.000	2.374	0.750	1/2	#10	0.625	1.750	1.250	0.375		3.320	SQ	0.500	3.000	4.250	2.750	6.500
	2.000	1500		2.250	2.624	0.875									SQ	0.750	2.750			
5.00	1.000	1000	5.500	1.125	1.499	0.500	1/2	#10	0.625	1.750	1.250	0.438		4.100	2.750	0.250	2.375	4.500	3.000	6.983
	1.375	1000		1.625	1.999	0.625									3.500	0.375	2.625			
6.00	1.750	1000	6.500	2.000	2.374	0.750	3/4	#12	0.750	2.000	1.500	0.438		4.880	3.500	0.500	2.875	5.000	3.250	7.688
	2.000	1000		2.250	2.624	0.875									SQ	0.500	3.000			
8.00	2.500	1000	8.500	3.000	3.124	1.000	3/4	#12	0.750	2.000	1.500	0.563		6.440	4.625	0.500	3.375	5.125	3.375	7.938
	3.000	1000		3.500	3.749	1.000									SQ	0.625	3.250			
	3.500	1000		3.500	4.249	1.000									4.250	0.375	3.125			
	4.000	750		4.000	4.749	1.000									4.625	0.500	3.375			
	1.375	500		1.625	1.999	0.625									5.250	0.500	3.375			
	1.750	500		2.000	2.374	0.750									5.750	0.500	3.375			
	2.000	675		2.250	2.624	0.875									6.500	0.500	3.375			
	2.500	675		3.000	3.124	1.000									7.250	0.500	3.375			
	3.000	675		3.500	3.749	1.000									7.500	0.500	3.375			
	3.500	675		3.500	4.249	1.000									7.500	0.500	3.375			
	4.000	675		4.000	4.749	1.000									7.500	0.500	3.375			
	4.500	675		4.500	5.249	1.000									7.500	0.500	3.375			
	5.000	675		5.000	5.749	1.000									7.500	0.500	3.375			
	5.500	675		5.500	6.249	1.000									7.500	0.500	3.375			

See rod end detail chart on page 21

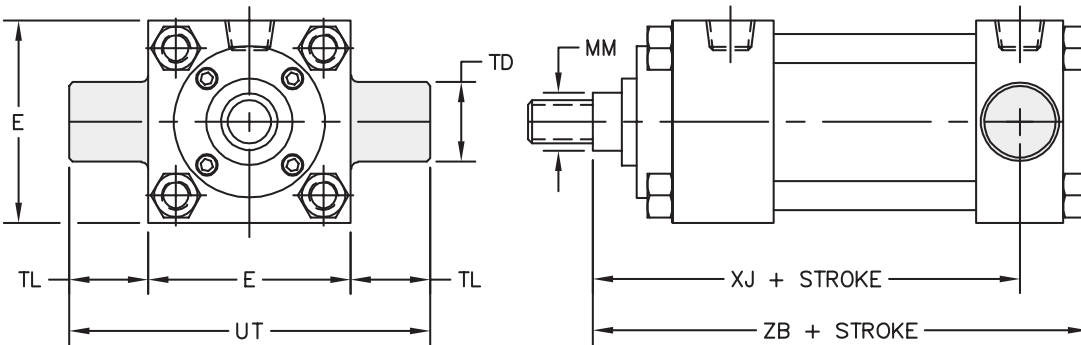
1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).
2. B dimension tolerance is +.000 / -.002
3. Where SQ is shown in chart, cylinder utilizes a full square retainer.

Dimensions – Trunnion Mounts

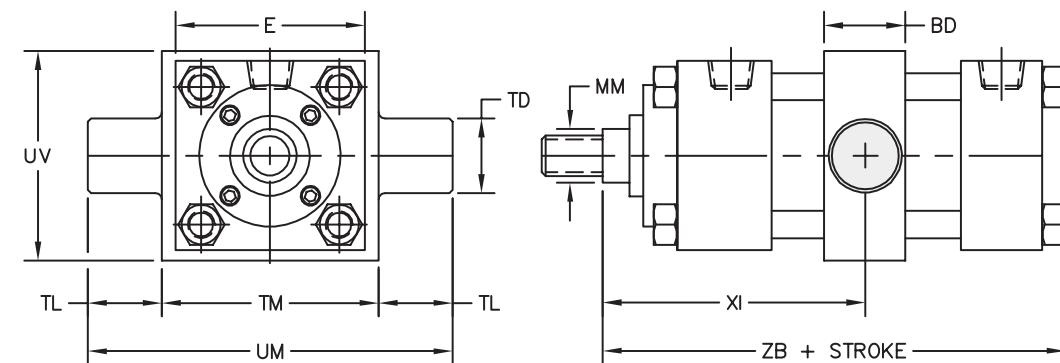
MT1: Head Trunnion



MT2: Cap Trunnion



MT4: Intermediate Trunnion



NOTE:
'XI' DIMENSION TO BE SPECIFIED BY CUSTOMER

Dimensions – Trunnion Mounts

Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	BD	TD ²	TL	TM	UM	UT	UV	XG	XI ³	MT4 Min Stroke	Add to Stroke	
														XJ	ZB
1.50	0.625	1500	2.000	1.250	1.000	1.000	2.500	4.500	4.000	2.500	1.750	3.250	0.375	4.125	4.875
	1.000	1500									2.125	3.625		4.500	5.250
2.00	0.625	1500	2.500	1.500	1.000	1.000	3.000	5.000	4.500	3.000	1.750	3.375	0.625	4.125	4.938
	1.000	1500									2.125	3.750		4.500	5.313
	1.375	1500									2.375	4.000		4.750	5.563
2.50	0.625	1000	3.000	1.500	1.000	1.000	3.500	5.500	5.000	3.500	1.750	3.375	0.500	4.250	5.063
	1.000	1500									2.125	3.750		4.625	5.438
	1.375	1500									2.375	4.000		4.875	5.688
	1.750	1500									2.625	4.250		5.125	5.938
3.25	1.000	1500	3.750	2.000	1.000	1.000	4.500	6.500	5.750	4.250	2.250	4.250	1.000	5.000	6.000
	1.375	1500									2.500	4.500		5.250	6.250
	1.750	1500									2.750	4.750		5.500	6.500
	2.000	1500									2.875	4.875		5.625	6.625
4.00	1.000	1000	4.500	2.000	1.000	1.000	5.250	7.250	6.500	5.000	2.250	4.250	1.000	5.000	6.000
	1.375	1000									2.500	4.500		5.250	6.250
	1.750	1000									2.750	4.750		5.500	6.500
	2.000	1000									2.875	4.875		5.625	6.625
	2.500	1000									3.125	5.125		5.875	6.875
5.00	1.000	750	5.500	2.000	1.000	1.000	6.250	8.250	7.500	6.000	2.250	4.250	0.750	5.250	6.313
	1.375	1000									2.500	4.500		5.500	6.563
	1.750	1000									2.750	4.750		5.750	6.813
	2.000	1000									2.875	4.875		5.875	6.938
	2.500	1000									3.125	5.125		6.125	7.188
	3.000	1000									3.125	5.125		6.125	7.188
	3.500	1000									3.125	5.125		6.125	7.188
6.00	1.375	750	6.500	2.000	1.375	1.375	7.625	10.375	9.250	7.000	2.625	4.750	0.750	5.875	7.063
	1.750	750									2.875	5.000		6.125	7.313
	2.000	750									3.000	5.125		6.250	7.438
	2.500	750									3.250	5.375		6.500	7.688
	3.000	750									3.250	5.375		6.500	7.688
	3.500	750									3.250	5.375		6.500	7.688
	4.000	750									3.250	5.375		6.500	7.688
8.00	1.375	500	8.500	2.500	1.375	1.375	9.750	12.500	11.250	9.500	2.625	5.000	1.125	6.000	7.313
	1.750	500									2.875	5.250		6.250	7.563
	2.000	675									3.000	5.375		6.375	7.688
	2.500	675									3.250	5.625		6.625	7.938
	3.000	675									3.250	5.625		6.625	7.938
	3.500	675									3.250	5.625		6.625	7.938
	4.000	675									3.250	5.625		6.625	7.938
	4.500	675									3.250	5.625		6.625	7.938
	5.000	675									3.250	5.625		6.625	7.938
	5.500	675									3.250	5.625		6.625	7.938
											3.250	5.625		6.625	7.938

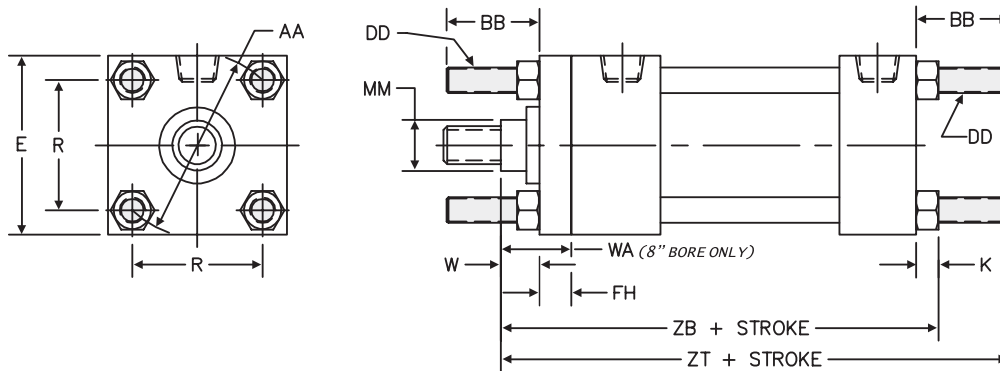
1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

2. TD dimension tolerance is + .000 / - .001

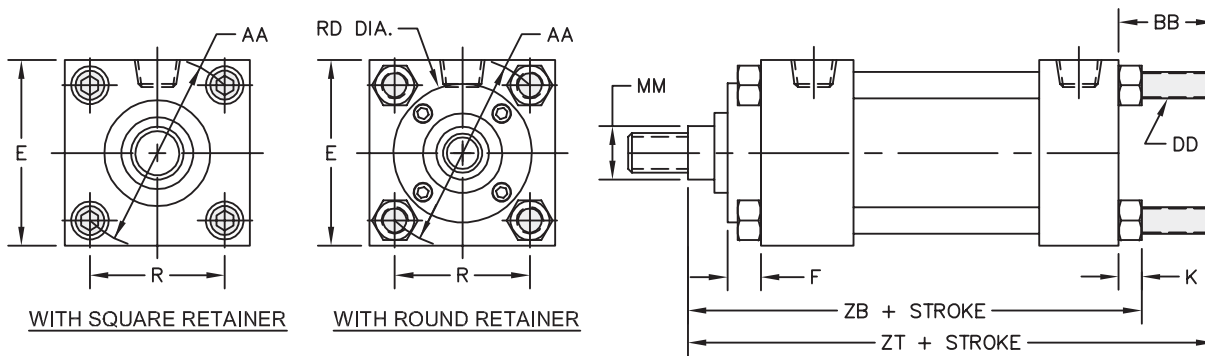
3. XI dimension is the minimum that can be supplied and leaves 1/4" gap between head & trunnion block (customer to specify XI dimension).

Dimensions – Extended Tie Rod Mounts

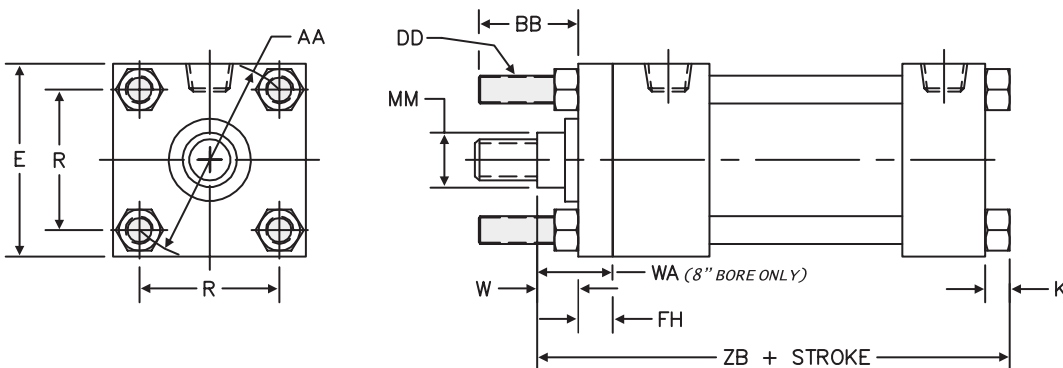
MX1: Head & Cap



MX2: Cap End



MX3: Head End



Dimensions – Extended Tie Rod Mounts

Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	FH	AA	BB	DD	F	K	R	RD ²	W or WA (8")	Add to Stroke	
													ZB	ZJ
1.50	0.625	1500	2.000	0.375	2.020	1.000	1/4 - 28	0.375	0.250	1.430	SQ	0.625	4.875	5.625
	1.000	1500									SQ	1.000	5.250	6.000
2.00	0.625	1500	2.500	0.375	2.600	1.125	5/16 - 24	0.375	0.313	1.840	2.000	0.625	4.938	5.750
	1.000	1500									SQ	1.000	5.313	6.125
	1.375	1500									SQ	1.250	5.563	6.375
2.50	0.625	1000	3.000	0.375	3.100	1.125	5/16 - 24	0.375	0.313	2.190	2.000	0.625	5.063	5.875
	1.000	1500									SQ	1.000	5.438	6.250
	1.375	1500									SQ	1.250	5.688	6.500
	1.750	1500									SQ	1.500	5.938	6.750
3.25	1.000	1500	3.750	0.625	3.900	1.375	3/8 - 24	0.625	0.375	2.760	2.750	0.750	6.000	7.000
	1.375	1500									SQ	1.000	6.250	7.250
	1.750	1500									SQ	1.250	6.500	7.500
	2.000	1500									SQ	1.375	6.625	7.625
4.00	1.000	1000	4.500	0.625	4.700	1.375	3/8 - 24	0.625	0.375	3.320	2.750	0.750	6.000	7.000
	1.375	1000									3.500	1.000	6.250	7.250
	1.750	1000									3.500	1.250	6.500	7.500
	2.000	1000									SQ	1.375	6.625	7.625
	2.500	1000									SQ	1.625	6.875	7.875
5.00	1.000	750	5.500	0.625	5.800	1.813	1/2 - 20	0.625	0.438	4.100	2.750	0.750	6.313	7.688
	1.375	1000									3.500	1.000	6.563	7.938
	1.750	1000									3.500	1.250	6.813	8.188
	2.000	1000									4.250	1.375	6.938	8.313
	2.500	1000									SQ	1.625	7.188	8.563
	3.000	1000									SQ	1.625	7.188	8.563
	3.500	1000									SQ	1.625	7.188	8.563
6.00	1.375	750	6.500	0.750	6.900	1.813	1/2 - 20	0.750	0.438	4.880	3.500	0.875	7.063	8.438
	1.750	750									3.875	1.125	7.313	8.688
	2.000	750									4.250	1.250	7.438	8.813
	2.500	750									4.625	1.500	7.688	9.063
	3.000	750									5.250	1.500	7.688	9.063
	3.500	750									5.750	1.500	7.688	9.063
	4.000	750									SQ	1.500	7.688	9.063
8.00	1.375	500	8.500	0.6253	9.100	2.3133	5/8 - 18	0.750	0.563	6.440	3.500	1.625	7.313	9.063
	1.750	500									3.875	1.875	7.563	9.313
	2.000	675									4.250	2.000	7.688	9.438
	2.500	675									4.625	2.250	7.938	9.688
	3.000	675									5.250	2.250	7.938	9.688
	3.500	675									5.750	2.250	7.938	9.688
	4.000	675									6.500	2.250	7.938	9.688
	4.500	675									7.250	2.250	7.938	9.688
	5.000	675									7.500	2.250	7.938	9.688
	5.500	675									7.500	2.250	7.938	9.688

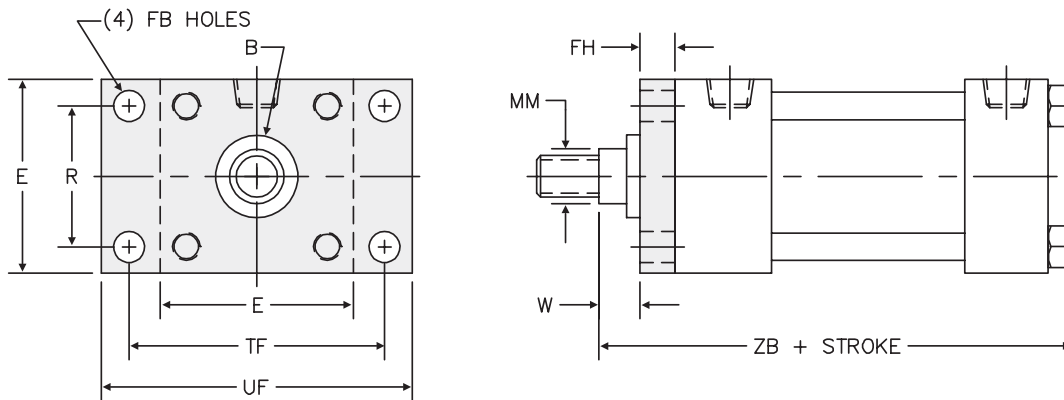
1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

2. Where SQ is shown in chart, cylinder utilizes a full square retainer. All MX1 & MX3 Mounts use full square retainer.

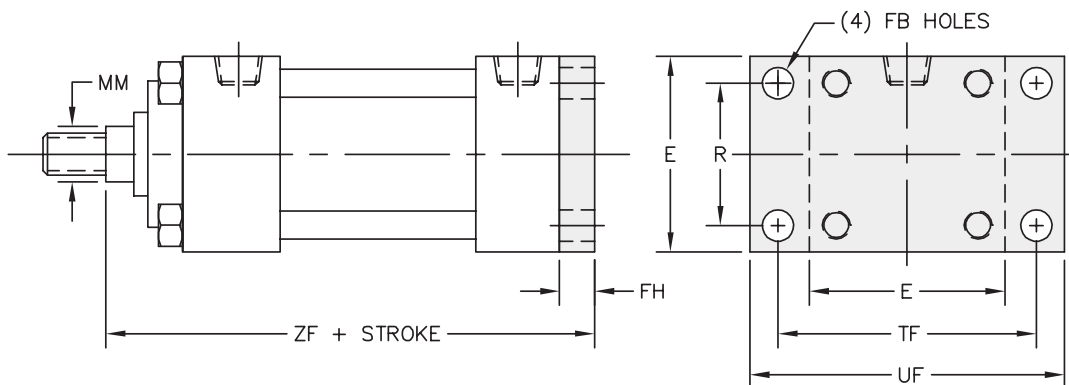
3. Round retainer used to retain bushing, not a full front plate as other bores. 'BB' is dimension from head on the 8.00" bore.

Dimensions – Flange Mounts

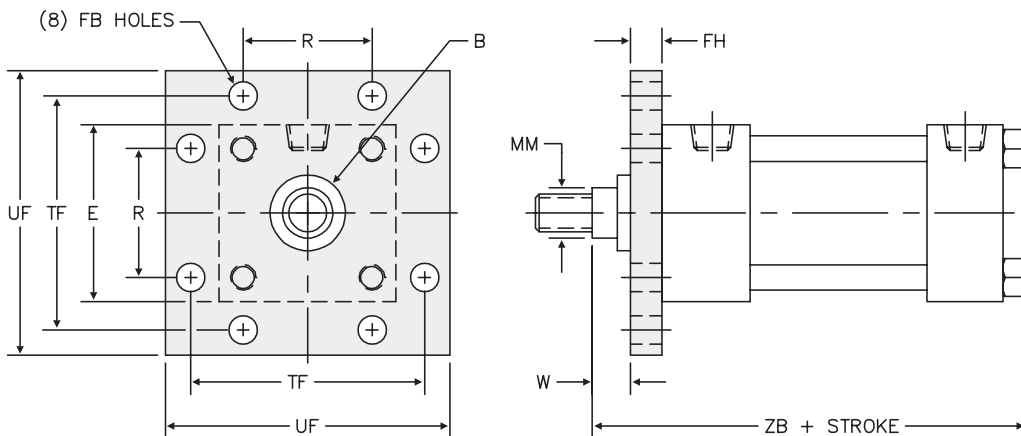
MF1: Head Flange



MF2: Cap Flange

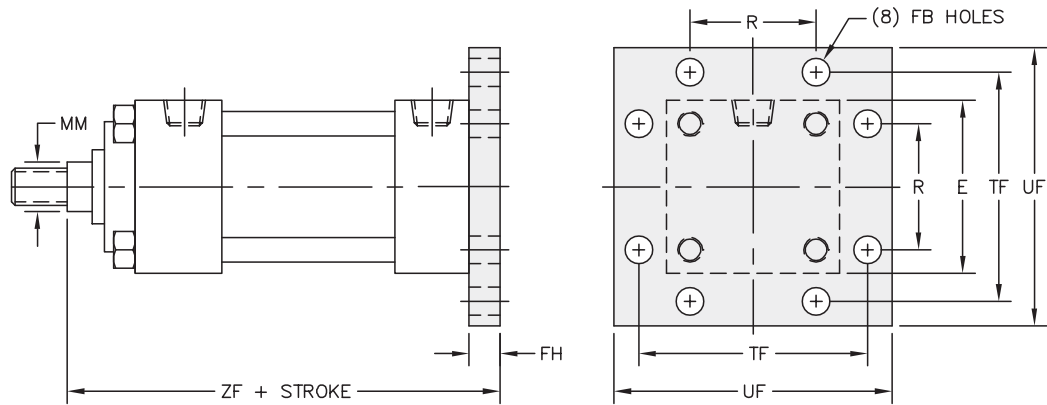


MF5: Head Square Flange



Dimensions – Flange Mounts

MF6: Cap Square Flange



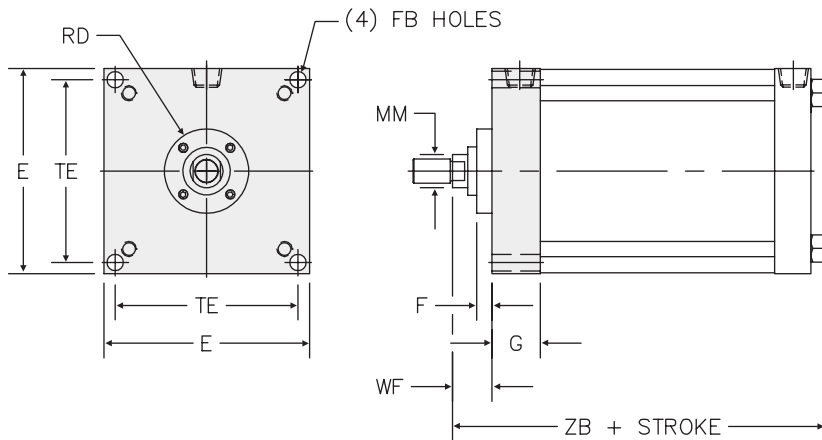
Bore	Rod Dia. (MM)	Max PSI Rating ¹	B ²	E	FB	FH	R	TF	UF	W	Add to Stroke	
											ZB	ZF
1.50	0.625	1500	1.124	2.000	0.313	0.375	1.438	2.750	3.375	0.625	4.875	5.000
	1.000	1500	1.499							1.000	5.250	5.375
2.00	0.625	1500	1.124	2.500	0.375	0.375	1.844	3.375	4.125	0.625	4.938	5.000
	1.000	1500	1.499							1.000	5.313	5.375
	1.375	1500	1.999							1.250	5.563	5.625
2.50	0.625	1000	1.124	3.000	0.375	0.375	2.188	3.875	4.625	0.625	5.063	5.125
	1.000	1500	1.499							1.000	5.438	5.500
	1.375	1500	1.999							1.250	5.688	5.750
	1.750	1500	2.374							1.500	5.938	6.000
3.25	1.000	1500	1.499	3.750	0.438	0.625	2.766	4.688	5.500	0.750	6.000	6.250
	1.375	1500	1.999							1.000	6.250	6.500
	1.750	1500	2.374							1.250	6.500	6.750
	2.000	1500	2.624							1.375	6.625	6.875
4.00	1.000	1000	1.499	4.500	0.438	0.625	3.328	5.438	6.250	0.750	6.000	6.250
	1.375	1000	1.999							1.000	6.250	6.500
	1.750	1000	2.374							1.250	6.500	6.750
	2.000	1000	2.624							1.375	6.625	6.875
	2.500	1000	3.124							1.625	6.875	7.125
5.00	1.000	750	1.499	5.500	0.563	0.625	4.109	6.625	7.625	0.750	6.313	6.500
	1.375	1000	1.999							1.000	6.563	6.750
	1.750	1000	2.374							1.250	6.813	7.000
	2.000	1000	2.624							1.375	6.938	7.125
	2.500	1000	3.124							1.625	7.188	7.375
	3.000	1000	3.749							1.625	7.188	7.375
	3.500	1000	4.249							1.625	7.188	7.375
6.00	1.375	750	1.999	6.500	0.563	0.750	4.875	7.625	8.625	0.875	7.063	7.375
	1.750	750	2.374							1.125	7.313	7.625
	2.000	750	2.624							1.250	7.438	7.750
	2.500	750	3.124							1.500	7.688	8.000
	3.000	750	3.749							1.500	7.688	8.000
	3.500	750	4.249							1.500	7.688	8.000
	4.000	750	4.749							1.500	7.688	8.000

1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

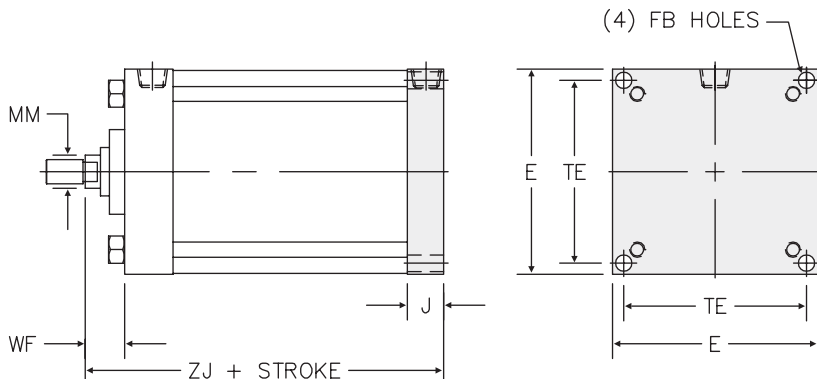
2. B dimension tolerance is +.000 / -.002

Dimensions – Flange Mounts

ME3: Head Square Mounting Holes



ME4: Cap Square Mounting Holes

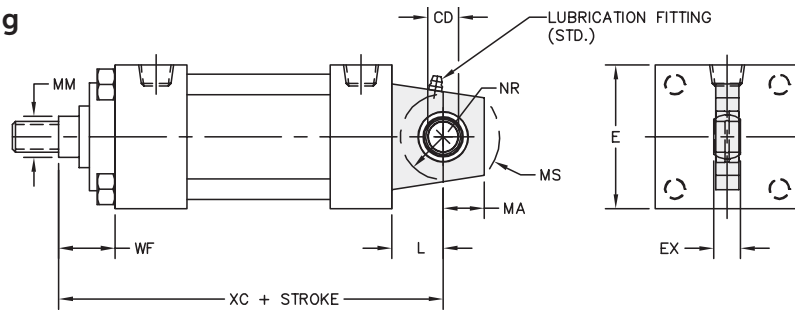


Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	F	FB	G	J	TE	RD	WF	Add to Stroke	
											ZB	ZJ
8.00	1.375	500	8.500	0.750	0.688	2.000	1.500	7.570	3.500	1.625	7.313	6.750
	1.750	500									7.563	7.000
	2.000	675									7.688	7.125
	2.500	675									7.938	7.375
	3.000	675									7.938	7.375
	3.500	675									7.938	7.375
	4.000	675									7.938	7.375
	4.500	675									7.938	7.375
	5.000	675									7.938	7.375
	5.500	675									7.938	7.375

1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

Dimensions – Spherical Bearing Mount

SB: Spherical Bearing



Bore	Rod Dia. (MM)	Max PSI Rating ¹	CD	E	EX	L	MA	MS	NR	WF	Add to Stroke XC
1.50	0.625	1500	0.500	2.000	0.437	0.750	0.750	0.938	0.625	1.000	5.375
	1.000	1500								1.375	5.750
2.00	0.625	980	0.500	2.500	0.437	0.750	0.750	0.938	0.625	1.000	5.375
	1.000	980								1.375	5.750
	1.375	980								1.625	6.000
2.50	0.625	630	0.500	3.000	0.437	0.750	0.750	0.938	0.625	1.000	5.500
	1.000	630								1.375	5.875
	1.375	630								1.625	6.125
	1.750	630								1.875	6.375
3.25	1.000	830	0.750	3.750	0.656	1.250	1.000	1.375	1.000	1.375	6.875
	1.375	830								1.625	7.125
	1.750	830								1.875	7.375
	2.000	830								2.000	7.500
4.00	1.000	550	0.750	4.500	0.656	1.250	1.000	1.375	1.000	1.375	6.875
	1.375	550								1.625	7.125
	1.750	550								1.875	7.375
	2.000	550								2.000	7.500
	2.500	550								2.250	7.750
5.00	1.000	350	0.750	5.500	0.656	1.250	1.000	1.375	1.000	1.375	7.125
	1.375	350								1.625	7.375
	1.750	350								1.875	7.625
	2.000	350								2.000	7.750
	2.500	350								2.250	8.000
	3.000	350								2.250	8.000
	3.500	350								2.250	8.000
6.00	1.375	440	1.000	6.500	0.875	1.500	1.250	1.688	1.250	1.625	8.125
	1.750	440								1.875	8.375
	2.000	440								2.000	8.500
	2.500	440								2.250	8.750
	3.000	440								2.250	8.750
	3.500	440								2.250	8.750
	4.000	440								2.250	8.750
8.00	1.375	250	1.000	8.500	0.875	1.500	1.250	1.688	1.250	1.625	8.250
	1.750	250								1.875	8.500
	2.000	250								2.000	8.625
	2.500	250								2.250	8.875
	3.000	250								2.250	8.875
	3.500	250								2.250	8.875
	4.000	250								2.250	8.875
	4.500	250								2.250	8.875
	5.000	250								2.250	8.875
	5.500	250								2.250	8.875

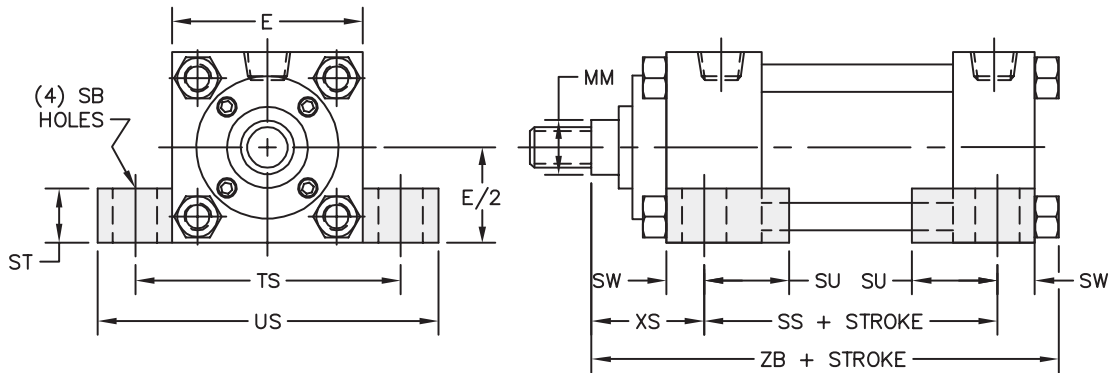
1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

Note 1: Spherical bearing pivot pin included with cylinder cap end only; 5.00", 6.00" & 8.00" bores have tie rod nuts exposed on cap end.

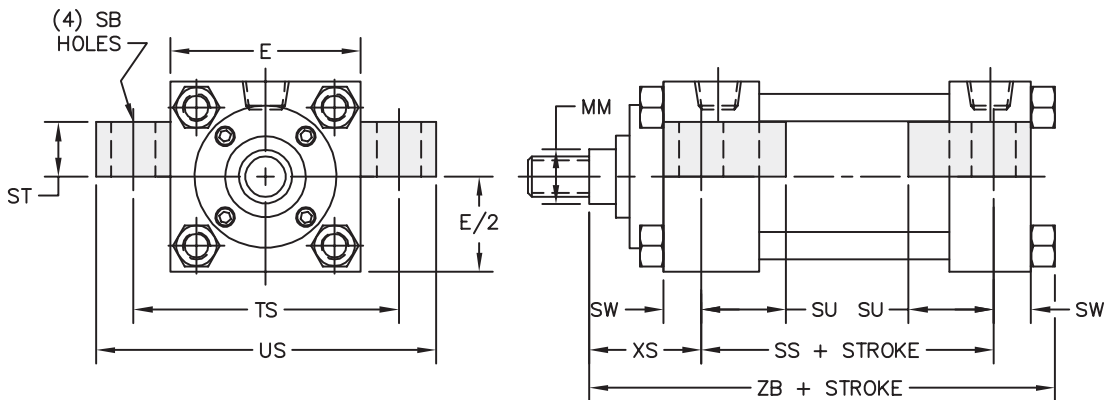
Note 2: Must specify KK3 rod end if to be used with HH-MSRE Series rod eye.

Dimensions – Lug Mounts

MS2: Side Lugs



MS3: Center Line Lugs



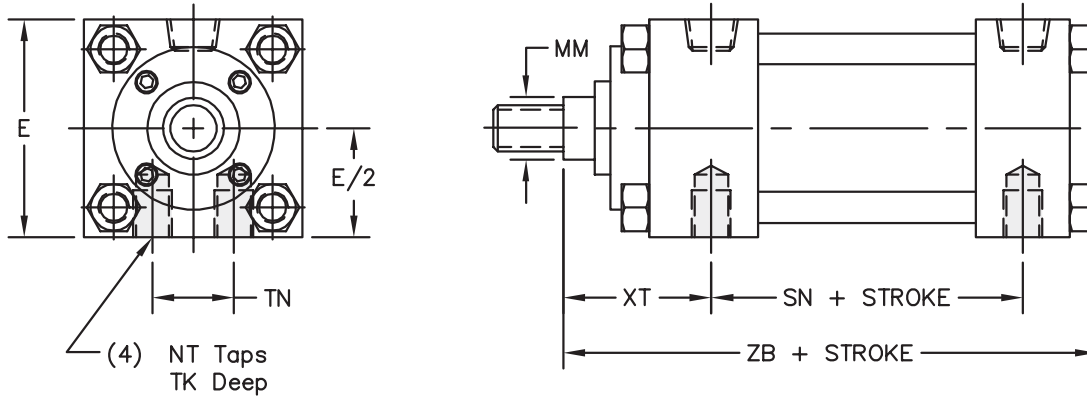
Dimensions – Lug Mounts

Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	SB	ST	SU	SW	TS	US	XS	Add to Stroke	
											SS	ZB
1.50	0.625	1500	2.000	0.438	0.500	1.125	0.375	2.750	3.500	1.375	2.875	4.875
	1.000	1500								1.750		5.250
2.00	0.625	1500	2.500	0.438	0.500	1.125	0.375	3.250	4.000	1.375	2.875	4.938
	1.000	1500								1.750		5.313
	1.375	1500								2.000		5.563
2.50	0.625	1000	3.000	0.438	0.500	1.125	0.375	3.750	4.500	1.375	3.000	5.063
	1.000	1500								1.750		5.438
	1.375	1500								2.000		5.688
	1.750	1500								2.250		5.938
3.25	1.000	1500	3.750	0.563	0.750	1.250	0.500	4.750	5.750	1.875	3.250	6.000
	1.375	1500								2.125		6.250
	1.750	1500								2.375		6.500
	2.000	1500								2.500		6.625
4.00	1.000	1000	4.500	0.563	0.750	1.250	0.500	5.500	6.500	1.875	3.250	6.000
	1.375	1000								2.125		6.250
	1.750	1000								2.375		6.500
	2.000	1000								2.500		6.625
	2.500	1000								2.750		6.875
5.00	1.000	750	5.500	0.813	1.000	1.063	0.688	6.875	8.250	2.063	3.125	6.313
	1.375	1000								2.313		6.563
	1.750	1000								2.563		6.813
	2.000	1000								2.688		6.938
	2.500	1000								2.938		7.188
	3.000	1000								2.938		7.188
	3.500	1000								2.938		7.188
6.00	1.375	750	6.500	0.813	1.000	1.313	0.688	7.875	9.250	2.313	3.625	7.063
	1.750	750								2.563		7.313
	2.000	750								2.688		7.438
	2.500	750								2.938		7.688
	3.000	750								2.938		7.688
	3.500	750								2.938		7.688
	4.000	750								2.938		7.688
8.00	1.375	500	8.500	0.813	1.000	1.313	0.688	9.875	11.250	2.313	3.750	7.313
	1.750	500								2.563		7.563
	2.000	675								2.688		7.688
	2.500	675								2.938		7.938
	3.000	675								2.938		7.938
	3.500	675								2.938		7.938
	4.000	675								2.938		7.938
	4.500	675								2.938		7.938
	5.000	675								2.938		7.938
	5.500	675								2.938		7.938

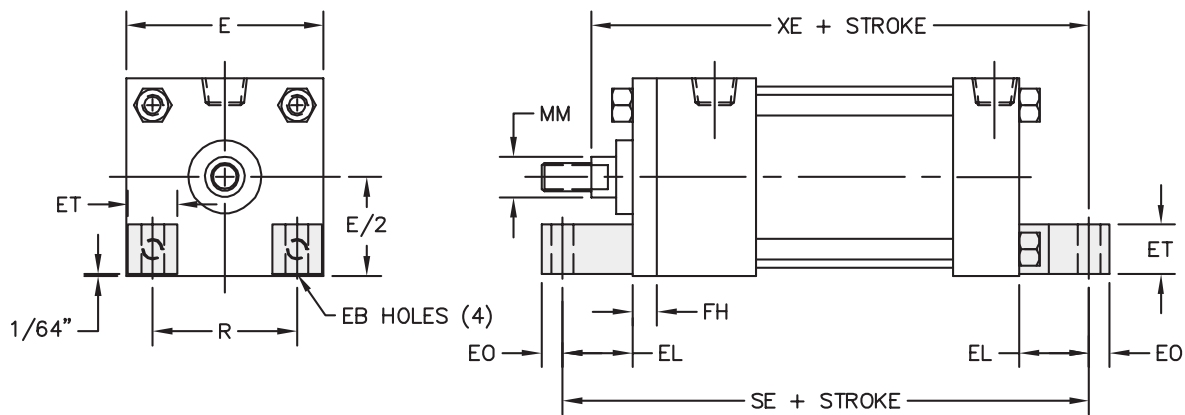
1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

Dimensions – Bottom Mounts

MS4: Bottom Tapped Holes



MS7: End Lugs



Dimensions – Bottom Mounts

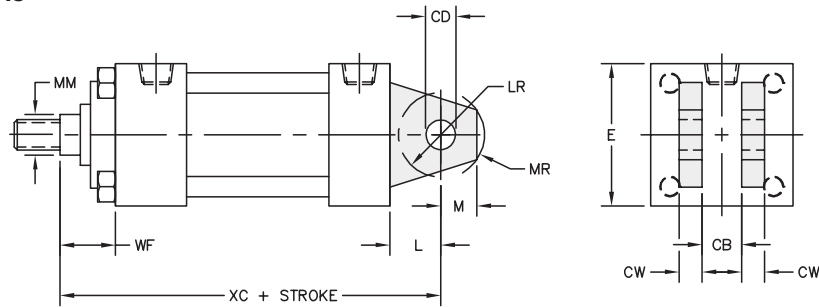
Bore	Rod Dia. (MM)	Max PSI Rating ¹												Add to Stroke			
			E	EB	EL	EO	ET	FH	NT	R	TN	TK	XT	SN	ZB	SE	XE
1.50	0.625	1500	2.000	0.281	0.750	0.250	0.563	0.375	1/4 - 20	1.438	0.625	0.375	1.938	2.250	4.875	5.500	5.375
	1.000	1500											2.313		5.250		5.750
2.00	0.625	1500	2.500	0.344	0.938	0.313	0.625	0.375	5/16 - 18	1.844	0.875	0.406	1.938	2.250	4.938	5.875	5.563
	1.000	1500											2.313		5.313		5.938
	1.375	1500											2.563		5.563		6.188
2.50	0.625	1000	3.000	0.344	1.063	0.313	0.750	0.375	3/8 - 16	2.188	1.250	0.438	1.938	2.375	5.063	6.250	5.813
	1.000	1500											2.313		5.438		6.188
	1.375	1500											2.563		5.688		6.438
	1.750	1500											2.813		5.938		6.688
3.25	1.000	1500	3.750	0.406	0.875	0.375	0.938	0.625	1/2 - 13	2.766	1.500	0.500	2.438	2.625	6.000	6.625	6.500
	1.375	1500											2.688		6.250		6.750
	1.750	1500											2.938		6.500		7.000
	2.000	1500											3.063		6.625		7.125
4.00	1.000	1000	4.500	0.406	1.000	0.375	1.125	0.625	1/2 - 13	3.328	2.063	0.625	2.438	2.625	6.000	6.875	6.625
	1.375	1000											2.688		6.250		6.875
	1.750	1000											2.938		6.500		7.125
	2.000	1000											3.063		6.625		7.250
	2.500	1000											3.313		6.875		7.500
5.00	1.000	750	5.500	0.531	1.063	0.500	1.375	0.625	5/8 - 11	4.109	2.688	0.750	2.438	2.875	6.313	7.250	6.938
	1.375	1000											2.688		6.563		7.188
	1.750	1000											2.938		6.813		7.438
	2.000	1000											3.063		6.938		7.563
	2.500	1000											3.313		7.188		7.813
	3.000	1000											3.313		7.188		7.813
	3.500	1000											3.313		7.188		7.813
6.00	1.375	750	6.500	0.531	1.000	0.500	1.563	0.750	3/4 - 10	4.875	3.250	1.000	2.813	3.125	7.063	7.750	7.625
	1.750	750											3.063		7.313		7.875
	2.000	750											3.188		7.438		8.000
	2.500	750											3.438		7.688		8.250
	3.000	750											3.438		7.688		8.250
	3.500	750											3.438		7.688		8.250
	4.000	750											3.438		7.688		8.250
8.00	1.375	500	8.500	0.688	1.125	0.625	2.000	2	3/4 - 10	6.438	4.500	1.250	2.813	3.250	7.313	7.375	7.875
	1.750	500											3.063		7.563		8.125
	2.000	675											3.188		7.688		8.250
	2.500	675											3.438		7.938		8.500
	3.000	675											3.438		7.938		8.500
	3.500	675											3.438		7.938		8.500
	4.000	675											3.438		7.938	N/A	N/A
	4.500	675											3.438		7.938	N/A	N/A
	5.000	675											3.438		7.938	N/A	N/A
	5.500	675											3.438		7.938	N/A	N/A

1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

2. Uses round retainer. MS7 Bracket bolted directly to head & cap.

Dimensions – Pivot Mounts

MP1: Rear Pivot Clevis



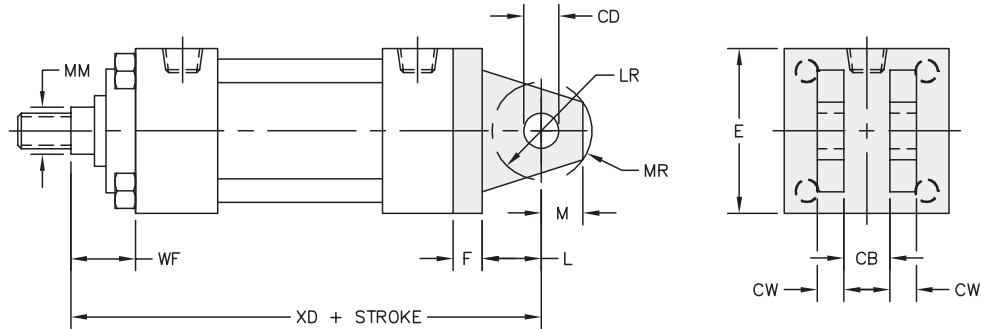
Bore	Rod Dia. (MM)	Max PSI Rating ¹	CB	CD	CW	E	L	LR	M	MR	WF	Add to Stroke	
												XC	
1.50	0.625	1500	0.750	0.500	0.500	2.000	0.750	0.563	0.500	0.625	1.000	5.375	
	1.000	1500									1.375	5.750	
2.00	0.625	1500	0.750	0.500	0.500	2.500	0.750	0.563	0.500	0.625	1.000	5.375	
	1.000	1500									1.375	5.750	
	1.375	1500									1.625	6.000	
2.50	0.625	1000	0.750	0.500	0.500	3.000	0.750	0.563	0.500	0.625	1.000	5.500	
	1.000	1500									1.375	5.875	
	1.375	1500									1.625	6.125	
	1.750	1500									1.875	6.375	
3.25	1.000	1500	1.250	0.750	0.625	3.750	1.250	1.000	0.750	0.938	1.375	6.875	
	1.375	1500									1.625	7.125	
	1.750	1500									1.875	7.375	
	2.000	1500									2.000	7.500	
4.00	1.000	1000	1.250	0.750	0.625	4.500	1.250	1.000	0.750	0.938	1.375	6.875	
	1.375	1000									1.625	7.125	
	1.750	1000									1.875	7.375	
	2.000	1000									2.000	7.500	
	2.500	1000									2.250	7.750	
5.00	1.000	750	1.250	0.750	0.625	5.500	1.250	1.000	0.750	0.938	1.375	7.125	
	1.375	1000									1.625	7.375	
	1.750	1000									1.875	7.625	
	2.000	1000									2.000	7.750	
	2.500	1000									2.250	8.000	
	3.000	1000									2.250	8.000	
6.00	1.375	750	1.500	1.000	0.750	6.500	1.500	1.250	1.000	1.188	1.625	8.125	
	1.750	750									1.875	8.375	
	2.000	750									2.000	8.500	
	2.500	750									2.250	8.750	
	3.000	750									2.250	8.750	
	3.500	750									2.250	8.750	
8.00	4.000	750	1.500	1.000	0.750	8.500	1.500	1.250	1.000	1.188	2.250	8.750	
	1.375	500									1.625	8.250	
	1.750	500									1.875	8.500	
	2.000	675									2.000	8.625	
	2.500	675									2.250	8.875	
	3.000	675									2.250	8.875	
	3.500	675									2.250	8.875	
	4.000	675									2.250	8.875	
	4.500	675									2.250	8.875	
	5.000	675									2.250	8.875	
	5.500	675									2.250	8.875	

1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

Note: Pivot pin included with cylinder cap end only.

Dimensions – Pivot Mounts

MP2: Rear Pivot Detachable Clevis



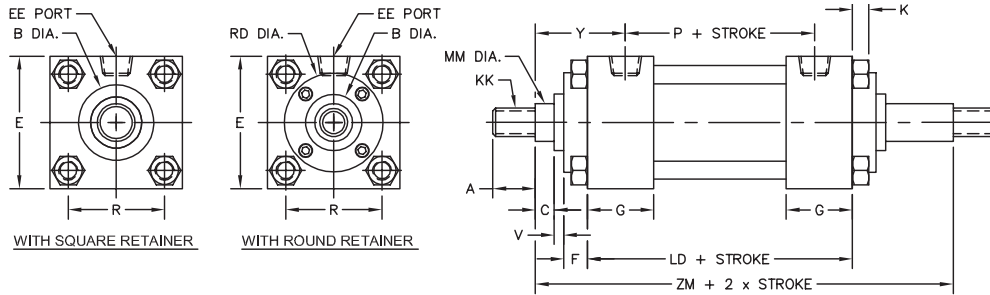
Bore	Rod Dia. (MM)	Max PSI Rating ¹	CB	CD	CW	E	F	L	LR	M	MR	WF	Add to Stroke	
													XD	
1.50	0.625	1500	0.750	0.500	0.500	2.000	0.375	0.750	0.563	0.500	0.625	1.000	5.750	
	1.000	1500										1.375	6.125	
2.00	0.625	1500	0.750	0.500	0.500	2.500	0.375	0.750	0.563	0.500	0.625	1.000	5.750	
	1.000	1500										1.375	6.125	
	1.375	1500										1.625	6.375	
2.50	0.625	1000	0.750	0.500	0.500	3.000	0.375	0.750	0.563	0.500	0.625	1.000	5.875	
	1.000	1500										1.375	6.250	
	1.375	1500										1.625	6.500	
	1.750	1500										1.875	6.750	
3.25	1.000	1500	1.250	0.750	0.625	3.750	0.625	1.250	1.000	0.750	0.938	1.375	7.500	
	1.375	1500										1.625	7.750	
	1.750	1500										1.875	8.000	
	2.000	1500										2.000	8.125	
4.00	1.000	1000	1.250	0.750	0.625	4.500	0.625	1.250	1.000	0.750	0.938	1.375	7.500	
	1.375	1000										1.625	7.750	
	1.750	1000										1.875	8.000	
	2.000	1000										2.000	8.125	
	2.500	1000										2.250	8.375	
5.00	1.000	750	1.250	0.750	0.625	5.500	0.625	1.250	1.000	0.750	0.938	1.375	7.750	
	1.375	1000										1.625	8.000	
	1.750	1000										1.875	8.250	
	2.000	1000										2.000	8.375	
	2.500	1000										2.250	8.625	
	3.000	1000										2.250	8.625	
6.00	3.500	1000										2.250	8.625	
	1.375	750	1.500	1.000	0.750	6.500	0.750	1.500	1.250	1.000	1.188	1.625	8.875	
	1.750	750										1.875	9.125	
	2.000	750										2.000	9.250	
	2.500	750										2.250	9.500	
	3.000	750										2.250	9.500	
	3.500	750										2.250	9.500	
	4.000	750										2.250	9.500	

1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

Note: Pivot pin included with cylinder cap end only.

Dimensions – Basic Double End (MX0 Mount)

MX0D: No Mount



Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	A	B ²	C	EE		F	G	K	KK	R	RD ³	V	Y	Add to Stroke		Add 2x Stroke
							NPTF	SAE									LD	P	ZM
1.50	0.625	1500	2.000	0.750	1.124	0.375	3/8	#6	0.375	1.500	0.250		1.438	SQ	0.250	1.875	4.125	2.375	6.125
	1.000	1500		1.125	1.499	0.500								SQ	0.500	2.250			
2.00	0.625	1500	2.500	0.750	1.124	0.375	3/8	#6	0.375	1.500	0.313		1.844	2.000	0.250	1.875	4.125	2.375	6.125
	1.000	1500		1.125	1.499	0.500								SQ	0.500	2.250			
	1.375	1500		1.625	1.999	0.625								SQ	0.625	2.500			
2.50	0.625	1000	3.000	0.750	1.124	0.375	3/8	#6	0.375	1.500	0.313		2.188	2.000	0.250	1.875	4.250	2.500	6.250
	1.000	1500		1.125	1.499	0.500								SQ	0.500	2.250			
	1.375	1500		1.625	1.999	0.625								SQ	0.625	2.500			
	1.750	1500		2.000	2.374	0.750								SQ	0.750	2.750			
3.25	1.000	1500	3.750	1.125	1.499	0.500	1/2	#10	0.625	1.750	0.375		2.766	2.750	0.250	2.375	4.750	2.750	7.500
	1.375	1500		1.625	1.999	0.625								SQ	0.375	2.625			
	1.750	1500		2.000	2.374	0.750								SQ	0.500	2.875			
	2.000	1500		2.250	2.624	0.875								SQ	0.500	3.000			
4.00	1.000	1000	4.500	1.125	1.499	0.500	1/2	#10	0.625	1.750	0.375		3.328	2.750	0.250	2.375	4.750	2.750	7.500
	1.375	1000		1.625	1.999	0.625								3.500	0.375	2.625			
	1.750	1000		2.000	2.374	0.750								3.500	0.500	2.875			
	2.000	1000		2.250	2.624	0.875								SQ	0.500	3.000			
	2.500	1000		3.000	3.124	1.000								SQ	0.625	3.250			
5.00	1.000	750	5.500	1.125	1.499	0.500	1/2	#10	0.625	1.750	0.438		4.109	2.750	0.250	2.375	5.000	3.000	9.000
	1.375	1000		1.625	1.999	0.625								3.500	0.375	2.625			
	1.750	1000		2.000	2.374	0.750								3.500	0.500	2.875			
	2.000	1000		2.250	2.624	0.875								4.250	0.500	3.000			
	2.500	1000		3.000	3.124	1.000								SQ	0.625	3.250			
	3.000	1000		3.500	3.749	1.000								SQ	0.625	3.250			
	3.500	1000		3.500	4.249	1.000								SQ	0.625	3.250			
6.00	1.375	750	6.500	1.625	1.999	0.625	3/4	#12	0.750	2.000	0.438		4.875	3.500	0.250	2.750	5.500	3.250	10.000
	1.750	750		2.000	2.374	0.750								3.875	0.375	3.000			
	2.000	750		2.250	2.624	0.875								4.250	0.375	3.125			
	2.500	750		3.000	3.124	1.000								4.625	0.500	3.375			
	3.000	750		3.500	3.749	1.000								5.250	0.500	3.375			
	3.500	750		3.500	4.249	1.000								5.750	0.500	3.375			
	4.000	750		4.000	4.749	1.000								SQ	0.500	3.375			
	1.375	500		1.625	1.999	0.625								3.500	0.250	2.750			
8.00	1.750	500	8.500	2.000	2.374	0.750	3/4	#12	0.750	2.000	0.563		6.438	3.875	0.375	3.000	5.625	3.375	10.125
	2.000	675		2.250	2.624	0.875								4.250	0.375	3.125			
	2.500	675		3.000	3.124	1.000								4.625	0.500	3.375			
	3.000	675		3.500	3.749	1.000								5.250	0.500	3.375			
	3.500	675		3.500	4.249	1.000								5.750	0.500	3.375			
	4.000	675		4.000	4.749	1.000								6.500	0.500	3.375			
	4.500	675		4.500	5.249	1.000								7.250	0.500	3.375			
	5.000	675		5.000	5.749	1.000								7.500	0.500	3.375			
	5.500	675		5.500	6.249	1.000								7.500	0.500	3.375			

See rod end detail chart on page 21

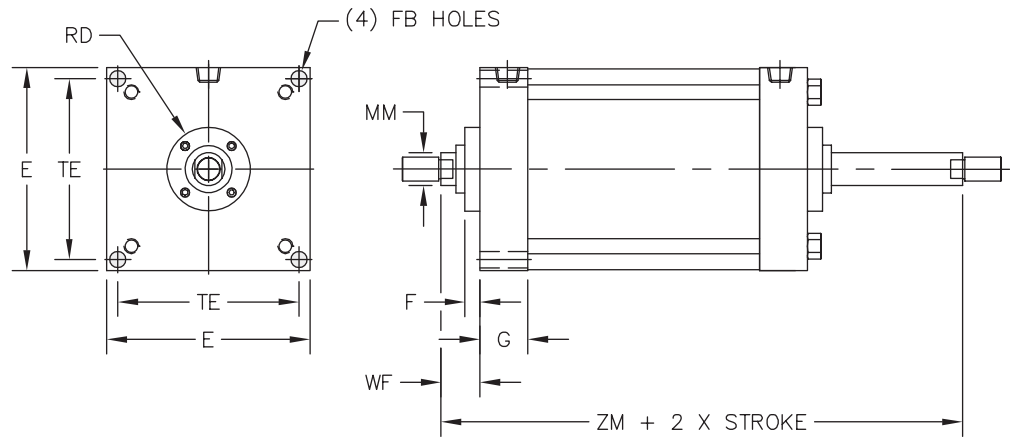
1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

2. B dimension tolerance is +.000 / -.002

3. Where SQ is shown in chart, cylinder utilizes a full square retainer.

Dimensions – Double End Mounts

ME3D: Head Square Mounting Holes

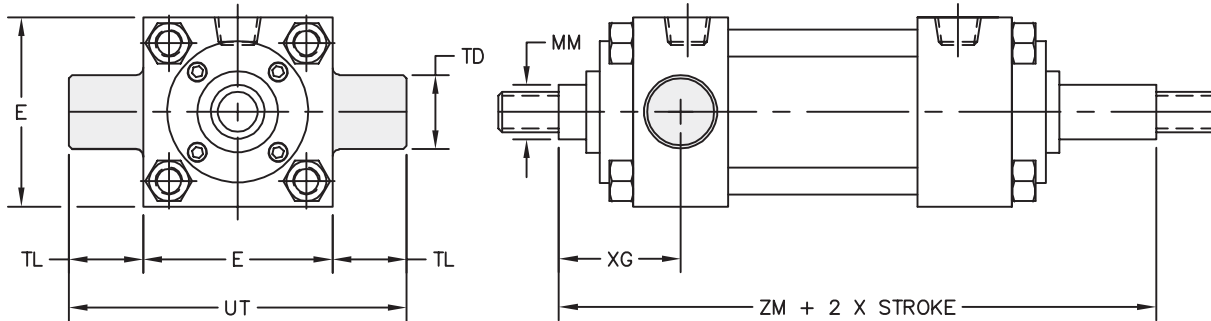


Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	F	FB	G	TE	RD	WF	Add to Stroke ZM
8.00	1.375	500	8.500	0.750	0.688	2.000	7.570	3.500	1.625	8.875
	1.750	500						3.875	1.875	9.375
	2.000	675						4.250	2.000	9.625
	2.500	675						4.625	2.250	10.125
	3.000	675						5.250	2.250	10.125
	3.500	675						5.750	2.250	10.125
	4.000	675						6.500	2.250	10.125
	4.500	675						7.250	2.250	10.125
	5.000	675						7.500	2.250	10.125
	5.500	675						7.500	2.250	10.125

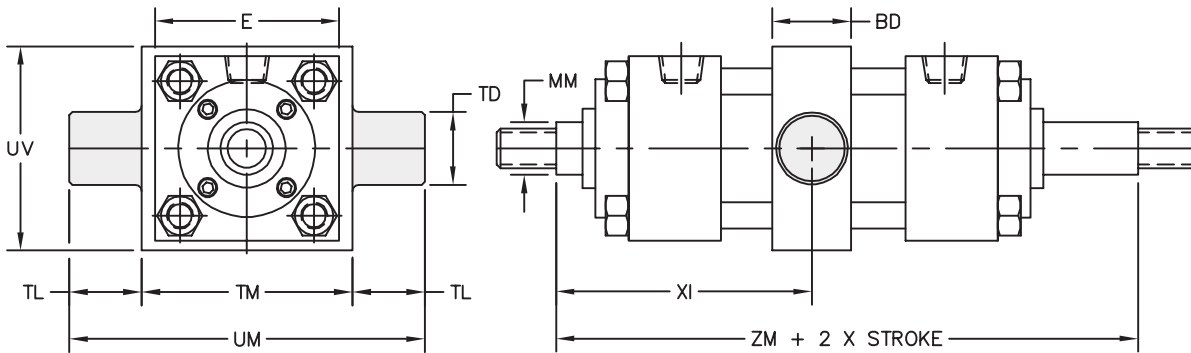
1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

Dimensions – Double End Mounts

MT1D: Head Trunnion



MT4D: Intermediate Trunnion



NOTE:
'XI' DIMENSION TO BE SPECIFIED BY CUSTOMER

Dimensions – Double End Mounts

Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	BD	TD ²	TL	TM	UM	UT	UV	XG	XI ³	MT4 Min Stroke	Add 2x Stroke ZM
1.50	0.625	1500	2.000	1.250	1.000	1.000	2.500	4.500	4.000	2.500	1.750	3.250	0.375	6.125
	1.000	1500									2.125	3.625		6.875
2.00	0.625	1500	2.500	1.500	1.000	1.000	3.000	5.000	4.500	3.000	1.750	3.375	0.625	6.125
	1.000	1500									2.125	3.750		6.875
	1.375	1500									2.375	4.000		7.375
2.50	0.625	1000	3.000	1.500	1.000	1.000	3.500	5.500	5.000	3.500	1.750	3.375	0.500	6.250
	1.000	1500									2.125	3.750		7.000
	1.375	1500									2.375	4.000		7.500
	1.750	1500									2.625	4.250		8.000
3.25	1.000	1500	3.750	2.000	1.000	1.000	4.500	6.500	5.750	4.250	2.250	4.250	1.000	7.500
	1.375	1500									2.500	4.500		8.000
	1.750	1500									2.750	4.750		8.500
	2.000	1500									2.875	4.875		8.750
4.00	1.000	1000	4.500	2.000	1.000	1.000	5.250	7.250	6.500	5.000	2.250	4.250	1.000	7.500
	1.375	1000									2.500	4.500		8.000
	1.750	1000									2.750	4.750		8.500
	2.000	1000									2.875	4.875		8.750
	2.500	1000									3.125	5.125		9.250
5.00	1.000	750	5.500	2.000	1.000	1.000	6.250	8.250	7.500	6.000	2.250	4.250	0.750	7.750
	1.375	1000									2.500	4.500		8.250
	1.750	1000									2.750	4.750		8.750
	2.000	1000									2.875	4.875		9.000
	2.500	1000									3.125	5.125		9.500
	3.000	1000									3.125	5.125		9.500
	3.500	1000									3.125	5.125		9.500
6.00	1.375	750	6.500	2.000	1.375	1.375	7.625	10.375	9.250	7.000	2.625	4.750	0.750	8.750
	1.750	750									2.875	5.000		9.250
	2.000	750									3.000	5.125		9.500
	2.500	750									3.250	5.375		10.000
	3.000	750									3.250	5.375		10.000
	3.500	750									3.250	5.375		10.000
	4.000	750									3.250	5.375		10.000
8.00	1.375	500	8.500	2.500	1.375	1.375	9.750	12.500	11.250	9.500	2.625	5.000	1.125	8.875
	1.750	500									2.875	5.250		9.375
	2.000	675									3.000	5.375		9.625
	2.500	675									3.250	5.625		10.125
	3.000	675									3.250	5.625		10.125
	3.500	675									3.250	5.625		10.125
	4.000	675									3.250	5.625		10.125
	4.500	675									3.250	5.625		10.125
	5.000	675									3.250	5.625		10.125
	5.500	675									3.250	5.625		10.125

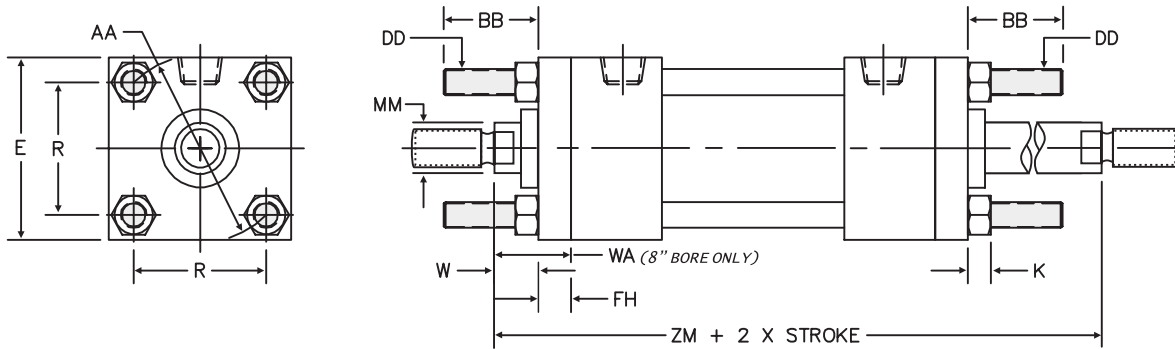
1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

2. TD dimension tolerance is + .000 / - .001

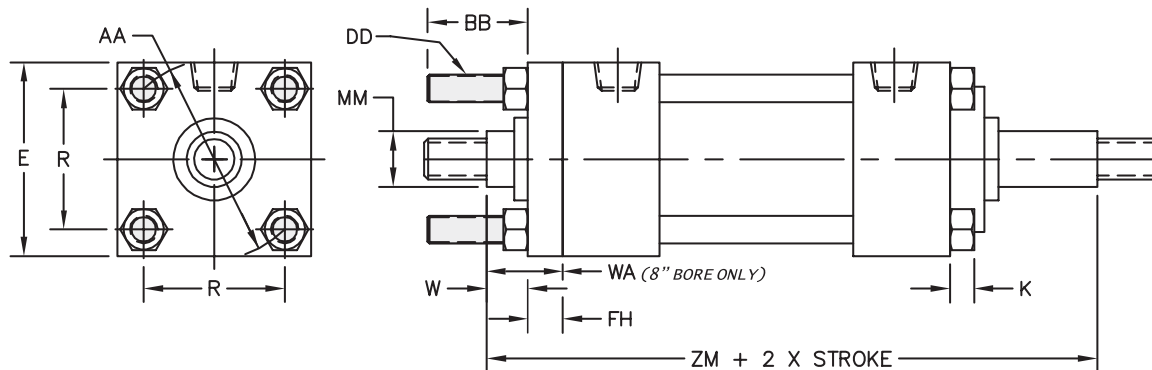
3. XI dimension is the minimum that can be supplied and leaves 1/4" gap between head & trunnion block (customer to specify XI dimension).

Dimensions – Double End Mounts

MX1D: Extended Tie Rods - Head & Cap



MX3D: Extended Tie Rods - Head End



Dimensions – Double End Mounts

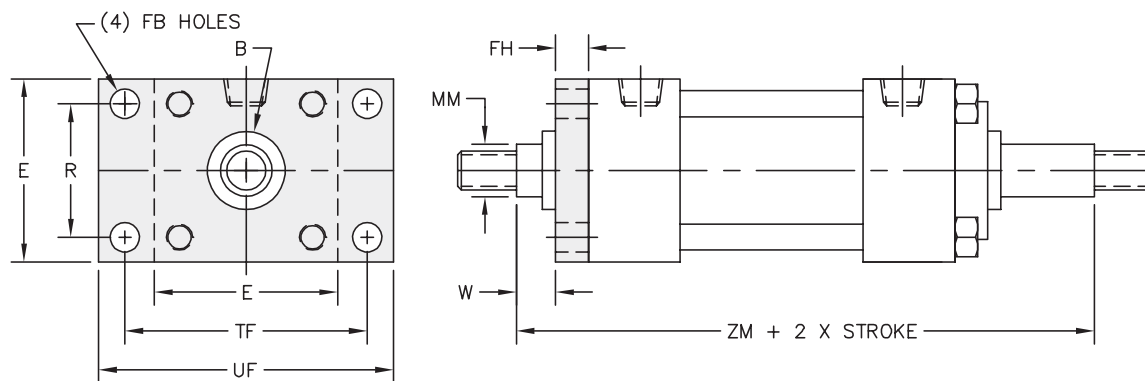
Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	FH	AA	BB ²	DD	K	R	W or WA (8")	Add 2x Stroke ZM
1.50	0.625	1500	2.000	0.375	2.020	1.000	1/4 - 28	0.250	1.430	0.625	6.125
	1.000	1500								1.000	6.875
2.00	0.625	1500	2.500	0.375	2.600	1.125	5/16 - 24	0.313	1.840	0.625	6.125
	1.000	1500								1.000	6.875
	1.375	1500								1.250	7.375
2.50	0.625	1000	3.000	0.375	3.100	1.125	5/16 - 24	0.313	2.190	0.625	6.250
	1.000	1500								1.000	7.000
	1.375	1500								1.250	7.500
	1.750	1500								1.500	8.000
3.25	1.000	1500	3.750	0.625	3.900	1.375	3/8 - 24	0.375	2.760	0.750	7.500
	1.375	1500								1.000	8.000
	1.750	1500								1.250	8.500
	2.000	1500								1.375	8.750
4.00	1.000	1000	4.500	0.625	4.700	1.375	3/8 - 24	0.375	3.320	0.750	7.500
	1.375	1000								1.000	8.000
	1.750	1000								1.250	8.500
	2.000	1000								1.375	8.750
	2.500	1000								1.625	9.250
5.00	1.000	750	5.500	0.625	5.800	1.813	1/2 - 20	0.438	4.100	0.750	7.750
	1.375	1000								1.000	8.250
	1.750	1000								1.250	8.750
	2.000	1000								1.375	9.000
	2.500	1000								1.625	9.500
	3.000	1000								1.625	9.500
	3.500	1000								1.625	9.500
6.00	1.375	750	6.500	0.750	6.900	1.813	1/2 - 20	0.438	4.880	0.875	8.750
	1.750	750								1.125	9.250
	2.000	750								1.250	9.500
	2.500	750								1.500	10.000
	3.000	750								1.500	10.000
	3.500	750								1.500	10.000
	4.000	750								1.500	10.000
8.00	1.375	500	8.500	0.625	9.100	2.313	5/8 - 18	0.563	6.440	1.500	8.875
	1.750	500								1.750	9.375
	2.000	675								1.875	9.625
	2.500	675								2.125	10.125
	3.000	675								2.125	10.125
	3.500	675								2.125	10.125
	4.000	675								2.125	10.125
	4.500	675								2.125	10.125
	5.000	675								2.125	10.125
	5.500	675								2.125	10.125

1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

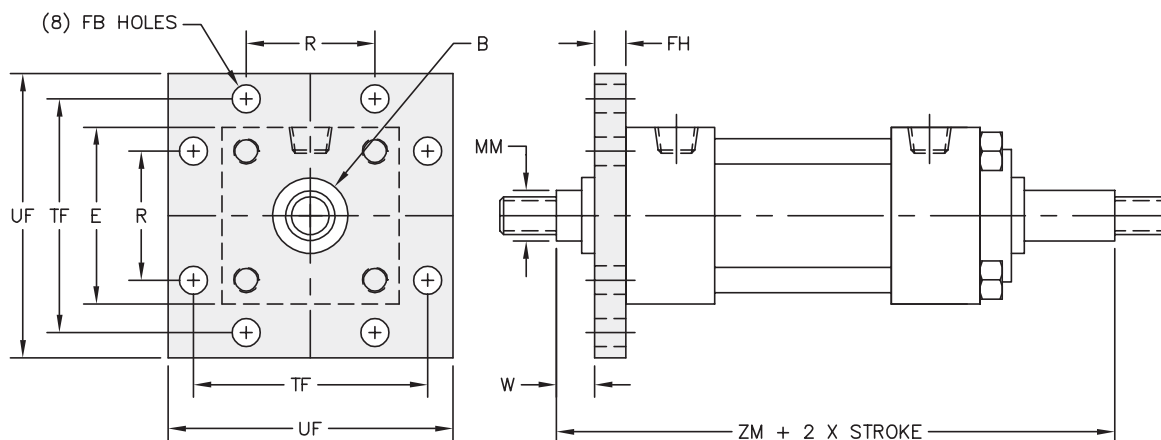
2. Round retainer used to retain bushing, not a full front plate as other bores. 'BB' is dimension from head on the 8.00" bore.

Dimensions – Double End Mounts

MF1D: Head Flange



MF5D: Head Square Flange



Dimensions – Double End Mounts

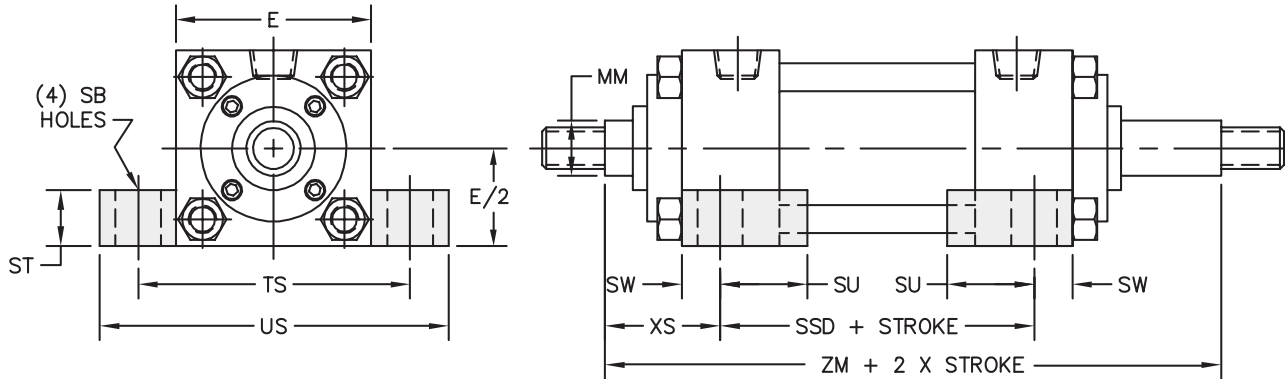
Bore	Rod Dia. (MM)	Max PSI Rating ¹	B ²	E	FB	FH	R	TF	UF	W	Add 2x Stroke ZM
1.50	0.625	1500	1.124	2.000	0.313	0.375	1.430	2.750	3.375	0.625	6.125
	1.000	1500	1.499							1.000	6.875
2.00	0.625	1500	1.124	2.500	0.375	0.375	1.840	3.375	4.125	0.625	6.125
	1.000	1500	1.499							1.000	6.875
	1.375	1500	1.999							1.250	7.375
2.50	0.625	1000	1.124	3.000	0.375	0.375	2.190	3.875	4.625	0.625	6.250
	1.000	1500	1.499							1.000	7.000
	1.375	1500	1.999							1.250	7.500
	1.750	1500	2.374							1.500	8.000
3.25	1.000	1500	1.499	3.750	0.438	0.625	2.760	4.688	5.500	0.750	7.500
	1.375	1500	1.999							1.000	8.000
	1.750	1500	2.374							1.250	8.500
	2.000	1500	2.624							1.375	8.750
4.00	1.000	1000	1.499	4.500	0.438	0.625	3.320	5.438	6.250	0.750	7.500
	1.375	1000	1.999							1.000	8.000
	1.750	1000	2.374							1.250	8.500
	2.000	1000	2.624							1.375	8.750
	2.500	1000	3.124							1.625	9.250
5.00	1.000	750	1.499	5.500	0.563	0.625	4.100	6.625	7.625	0.750	7.750
	1.375	1000	1.999							1.000	8.250
	1.750	1000	2.374							1.250	8.750
	2.000	1000	2.624							1.375	9.000
	2.500	1000	3.124							1.625	9.500
	3.000	1000	3.749							1.625	9.500
	3.500	1000	4.249							1.625	9.500
6.00	1.375	750	1.999	6.500	0.563	0.750	4.880	7.625	8.625	0.875	8.750
	1.750	750	2.374							1.125	9.250
	2.000	750	2.624							1.250	9.500
	2.500	750	3.124							1.500	10.000
	3.000	750	3.749							1.500	10.000
	3.500	750	4.249							1.500	10.000
	4.000	750	4.749							1.500	10.000

1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

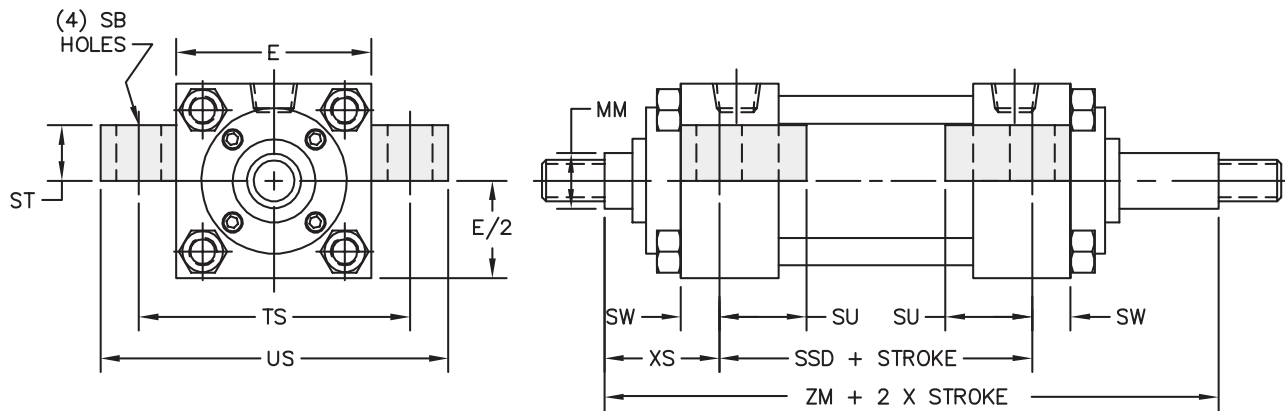
2. B dimension tolerance is +.000 / -.002

Dimensions – Double End Mounts

MS2D: Side Lugs



MS3D: Center Line Lugs



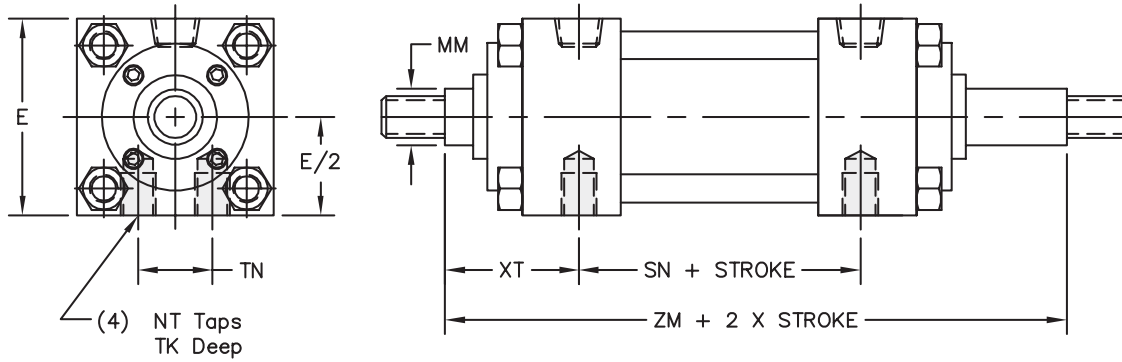
Dimensions – Double End Mounts

Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	SB	ST	SU	SW	TS	US	XS	Add to Stroke SSD	Add 2x Stroke ZM
1.50	0.625	1500	2.000	0.438	0.500	1.125	0.375	2.750	3.500	1.375	3.375	6.125
	1.000	1500								1.750		6.875
2.00	0.625	1500	2.500	0.438	0.500	1.125	0.375	3.250	4.000	1.375	3.375	6.125
	1.000	1500								1.750		6.875
	1.375	1500								2.000		7.375
2.50	0.625	1000	3.000	0.438	0.500	1.125	0.375	3.750	4.500	1.375	3.500	6.250
	1.000	1500								1.750		7.000
	1.375	1500								2.000		7.500
	1.750	1500								2.250		8.000
3.25	1.000	1500	3.750	0.563	0.750	1.250	0.500	4.750	5.750	1.875	3.750	7.500
	1.375	1500								2.125		8.000
	1.750	1500								2.375		8.500
	2.000	1500								2.500		8.750
4.00	1.000	1000	4.500	0.563	0.750	1.250	0.500	5.500	6.500	1.875	3.750	7.500
	1.375	1000								2.125		8.000
	1.750	1000								2.375		8.500
	2.000	1000								2.500		8.750
	2.500	1000								2.750		9.250
5.00	1.000	750	5.500	0.813	1.000	1.063	0.688	6.875	8.250	2.063	3.625	7.750
	1.375	1000								2.313		8.250
	1.750	1000								2.563		8.750
	2.000	1000								2.688		9.000
	2.500	1000								2.938		9.500
	3.000	1000								2.938		9.500
	3.500	1000								2.938		9.500
6.00	1.375	750	6.500	0.813	1.000	1.313	0.688	7.875	9.250	2.313	4.125	8.750
	1.750	750								2.563		9.250
	2.000	750								2.688		9.500
	2.500	750								2.938		10.000
	3.000	750								2.938		10.000
	3.500	750								2.938		10.000
8.00	4.000	750								2.938		10.000
	1.375	500	8.500	0.813	1.000	1.313	0.688	9.875	11.250	2.313	4.250	8.875
	1.750	500								2.563		9.375
	2.000	675								2.688		9.625
	2.500	675								2.938		10.125
	3.000	675								2.938		10.125
	3.500	675								2.938		10.125
	4.000	675								2.938		10.125
	4.500	675								2.938		10.125
	5.000	675								2.938		10.125
	5.500	675								2.938		10.125

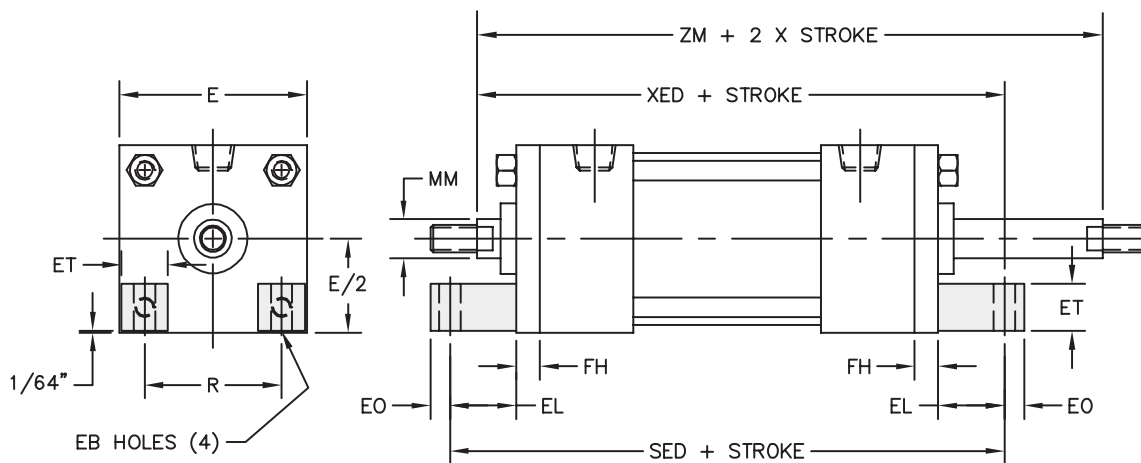
1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

Dimensions – Double End Mounts

MS4D: Bottom Tapped Holes



MS7D: End Lugs



Dimensions – Double End Mounts

Bore	Rod Dia. (MM)	Max PSI Rating ¹	E	EB	EL	EO	ET	FH	NT	R	TN	TK	XT	Add to Stroke			Add 2x Stroke
														SN	ZB	SE	XE
1.50	0.625	1500	2.000	N/A	N/A	N/A	N/A	N/A	1/4 - 20	N/A	0.625	0.375	1.938	2.250	N/A	N/A	6.125
	1.000	1500											2.313				6.875
2.00	0.625	1500	2.500	0.344	0.938	0.313	0.375	0.375	5/16 - 18	1.844	0.875	0.406	1.938	2.250	6.750	6.438	6.125
	1.000	1500		N/A	N/A	N/A	N/A	N/A		N/A			2.313		N/A	N/A	6.875
	1.375	1500		N/A	N/A	N/A	N/A	N/A		N/A			2.563		N/A	N/A	7.375
2.50	0.625	1000	3.000	0.344	1.063	0.313	0.750	0.375	3/8 - 16	2.188	1.250	0.438	1.938	2.375	7.125	6.688	6.250
	1.000	1500		N/A	N/A	N/A	N/A	N/A		N/A			2.313		N/A	N/A	7.000
	1.375	1500		N/A	N/A	N/A	N/A	N/A		N/A			2.563		N/A	N/A	7.500
	1.750	1500		N/A	N/A	N/A	N/A	N/A		N/A			2.813		N/A	N/A	8.000
3.25	1.000	1500	3.750	0.406	0.875	0.375	0.938	0.625	1/2 - 13	2.766	1.500	0.500	2.438	2.625	7.750	7.625	7.500
	1.375	1500		N/A	N/A	N/A	N/A	N/A		N/A			2.688		N/A	N/A	8.000
	1.750	1500		N/A	N/A	N/A	N/A	N/A		N/A			2.938		N/A	N/A	8.500
	2.000	1500		N/A	N/A	N/A	N/A	N/A		N/A			3.063		N/A	N/A	8.750
4.00	1.000	1000	4.500	0.406	1.000	0.375	1.125	0.625	1/2 - 13	3.328	2.063	0.625	2.438	2.625	8.000	7.750	7.500
	1.375	1000		0.406	1.000	0.375	1.125	0.625		3.328			2.688		8.000	8.000	8.000
	1.750	1000		N/A	N/A	N/A	N/A	N/A		N/A			2.938		N/A	N/A	8.500
	2.000	1000		N/A	N/A	N/A	N/A	N/A		N/A			3.063		N/A	N/A	8.750
	2.500	1000		N/A	N/A	N/A	N/A	N/A		N/A			3.313		N/A	N/A	9.250
5.00	1.000	750	5.500	0.531	1.063	0.500	1.375	0.625	5/8 - 11	4.109	2.688	0.750	2.438	2.875	8.375	8.063	7.750
	1.375	1000		0.531	1.063	0.500	1.375	0.625		4.109			2.688		8.375	8.313	8.250
	1.750	1000		0.531	1.063	0.500	1.375	0.625		4.109			2.938		8.375	8.563	8.750
	2.000	1000		N/A	N/A	N/A	N/A	N/A		N/A			3.063		N/A	N/A	9.000
	2.500	1000		N/A	N/A	N/A	N/A	N/A		N/A			3.313		N/A	N/A	9.500
	3.000	1000		N/A	N/A	N/A	N/A	N/A		N/A			3.313		N/A	N/A	9.500
	3.500	1000		N/A	N/A	N/A	N/A	N/A		N/A			3.313		N/A	N/A	9.500
6.00	1.375	750	6.500	0.531	1.000	0.500	1.563	0.750	3/4 - 10	4.875	3.250	1.000	2.813	3.125	9.000	8.875	8.750
	1.750	750		0.531	1.000	0.500	1.563	0.750		4.875			3.063		9.000	9.125	9.250
	2.000	750		0.531	1.000	0.500	1.563	0.750		4.875			3.188		9.000	9.250	9.500
	2.500	750		0.531	1.000	0.500	1.563	0.750		4.875			3.438		9.000	9.500	10.000
	3.000	750		N/A	N/A	N/A	N/A	N/A		N/A			3.438		N/A	N/A	10.000
	3.500	750		N/A	N/A	N/A	N/A	N/A		N/A			3.438		N/A	N/A	10.000
	4.000	750		N/A	N/A	N/A	N/A	N/A		N/A			3.438		N/A	N/A	10.000
8.00	1.375	500	8.500	0.688	1.125	0.625	2.000	2	3/4 - 10	6.438	4.500	1.250	2.813	3.250	7.875	8.375	8.875
	1.750	500		0.688	1.125	0.625	2.000	2		6.438			3.063		7.875	8.625	9.375
	2.000	675		0.688	1.125	0.625	2.000	2		6.438			3.188		7.875	8.750	9.625
	2.500	675		0.688	1.125	0.625	2.000	2		6.438			3.438		7.875	9.000	10.125
	3.000	675		0.688	1.125	0.625	2.000	2		6.438			3.438		7.875	9.000	10.125
	3.500	675		0.688	1.125	0.625	2.000	2		6.438			3.438		7.875	9.000	10.125
	4.000	675		N/A	N/A	N/A	N/A	N/A		N/A			3.438		N/A	N/A	10.125
	4.500	675		N/A	N/A	N/A	N/A	N/A		N/A			3.438		N/A	N/A	10.125
	5.000	675		N/A	N/A	N/A	N/A	N/A		N/A			3.438		N/A	N/A	10.125
	5.500	675		N/A	N/A	N/A	N/A	N/A		N/A			3.438		N/A	N/A	10.125

1. Max single acting pressure rating (non-shock). Any additional opposed intensified pressure related to varying impact area within the cylinder is not taken into consideration (ram cylinders).

2. Uses round retainer. MS7 Bracket bolted directly to head & cap.



MH Cylinders

MH-MF1 -250 x 10-H2C6-100-KK1-P15 = N375-SSSS-

Product Series
MH Medium Pressure Hydraulic

Style
Single Rod
D Double Rod

Stroke
0" to 120"
Made to Order.
(Use decimals for fractional strokes)

NFPA Mounts
MX0 No Mount (1.50" to 8.00" Bore)
MF1 Head Rectangular Flange (1.50" to 6.00" Bore)
MF2 Cap Rectangular Flange (1.50" to 6.00" Bore)
MF5 Head Square Flange (1.50" to 6.00" Bore)
MF6 Cap Square Flange (1.50" to 6.00" Bore)
ME3 Head Mounting Holes (8.00" Bore)
ME4 Cap Mounting Holes (8.00" Bore)
MP1 Fixed Cap Pivot Clevis (1.50" to 8.00" Bore)
MP2 Detachable Cap Pivot Clevis (1.50" to 6.00" Bore)
MS2 Side Lugs (1.50" to 8.00" Bore)
MS3 Center Line Lugs (1.50" to 8.00" Bore)
MS4 Bottom Tapped Holes (1.50" to 8.00" Bore)
MS7 End Lugs (1.50" to 8.00" Bore)
MT1 Head Trunnion (1.50" to 8.00" Bore)
MT2 Cap Trunnion (1.50" to 8.00" Bore)
MT4 Intermediate (Center) Trunnion (1.50" to 8.00" Bore)
MX1 Extended Tie Rods - Head & Cap (1.50" to 8.00" Bore)
MX2 Extended Tie Rods - Cap (1.50" to 8.00" Bore)
MX3 Extended Tie Rods - Head (1.50" to 8.00" Bore)
SB Spherical Bearing Cap Pivot (1.50" to 8.00" Bore)

Bore
150 1.50"
200 2.00"
250 2.50"
325 3.25"
400 4.00"
500 5.00"
600 6.00"
800 8.00"

Cushions¹
H 1
2
3
4
C 5
6
7
8

Rod End²
KK1 Small Male Thread
KK2 Large Male Thread
KK3 Female Thread
KK3M Female Metric Rod Thread
KK3X Female Special Thread
KK4 Full Diameter Male Thread
KK5 Plain End
KK10 Rod Coupler End
KKM Metric Thread
KKX Male Special Thread

Port Loc³
P 1
2
3
4
5
6
7
8
9

Rod Size
062 0.625" Rod Dia.
100 1.000" Rod Dia.
137 1.375" Rod Dia.
175 1.750" Rod Dia.
200 2.000" Rod Dia.
250 2.500" Rod Dia.
300 3.000" Rod Dia.
350 3.500" Rod Dia.
400 4.000" Rod Dia.
450 4.500" Rod Dia.
500 5.000" Rod Dia.
550 5.500" Rod Dia.

Port Size
N062 1/16" NPTF
N125 1/8" NPTF
N250 1/4" NPTF
N375 3/8" NPTF
N500 1/2" NPTF
N750 3/4" NPTF
S6 #6 SAE
S8 #8 SAE
S10 #10 SAE
S12 #12 SAE

Piston Seal
S Standard (Carboxylated)
C Cast-Ring
E EP
T PTFE⁴
V Fluorocarbon

Rod Seal
S Standard (Polyurethane)
E EP
V Fluorocarbon

Tube Seal
S Standard (Buna)
E EP
V Fluorocarbon

Rod Wiper⁴
S Standard (Flocked Nitrile)
M Metallic Scraper
T PTFE
V Fluorocarbon

Options
A= Extended Piston Rod Thread (Example: A = 2")
(Max = 2 Times ST'D "A" Dim.)
ABP= Air Bleed Ports (Example: ABP=15)
AS= Adjustable Stroke - Retract (Specify Length, Example: AS = 4")
C= Extended Piston Rod (Example: if C = 0.50", Then 1" Rod Extension is C = 1.50")
CS Center Support
DBB= Drain Back Bushing (Example: DBB=1)
EK Extended Key Plate
HLP High Load Piston
HSS High Shock Seals
LRB Lift Ring Boss
NR Non-Rotating
PLS Piston Lock Screw (Standard)
RBB Rod Bushing Material: Bronze
SSR Stainless Steel Piston Rod
ST=⁵ Stop Tube
Note: Specify Stop Tube Length (in inches)
Specify Stroke as ES (effective stroke)
Example: MH-MS2-250x48 ES-H2C6-ST=36
4WF Four Wrench Flats (Rod Sizes: .625"-3.50")
XX= Special Variation (Specify)

1. Call out 'H' for head cushion, 'C' for cap cushion, followed by the desired location(s).

2. When additional thread details are required, use format: Rod End = Modification Example: KKM=M12 x 1.75

3. Call out 'P' followed by all desired locations.

4. When cylinder design calls for all EP seals, use PTFE rod wiper.

5. The desired stop tube length adds directly to the overall cylinder length.
Note: Refer to MH Options for specifications.

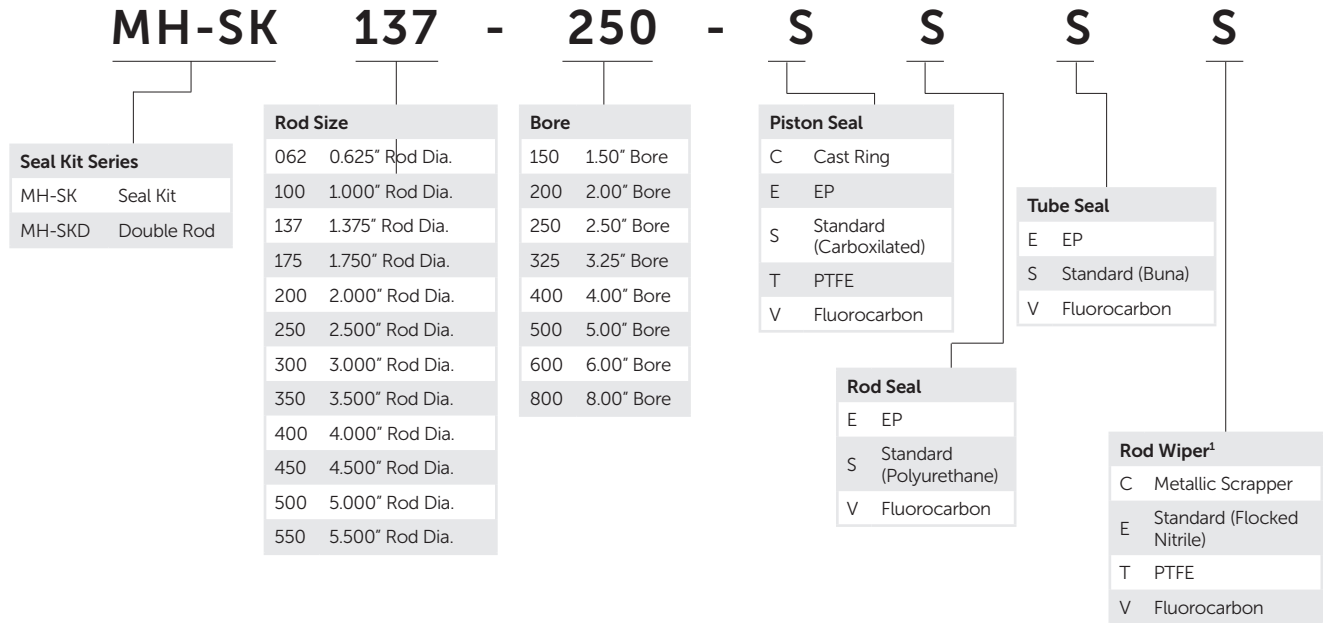
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Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (2017 - 9217c) © 2020 IMI International s.r.o.

02/21

MH Seal Kits

To ensure proper seals are supplied for all models, ALWAYS supply IMI Bimba serial number.



Examples:

MH-SK175-400-SSSS

MH-SK100-250-VVVT

All seal kits come with proper backup rings when required. To order replacement seal kits, call out the rod size, bore size and the seal selection from the original order.

¹ When cylinder design calls for all EP seals, use PTFE rod wiper.

Index to Options

- 53** A = Extended Piston Rod Thread
- 53** AS = Adjustable Stroke (Retract)
- 53** ABP = Air Bleed Ports
- 53** C = Extended Piston Rod
- 54** CS = Center Support
- 54** C or H = Cushions
- 54** DBB = Drain Back Bushing
- 55** EK = Extended Key Plate
- 55** T = PTFE Piston Seal
- 56** HSS = High Shock Seals
- 56** KKK = Non-Standard Rod Threads

- 56** KKM = Male Metric Rod Threads
- 56** KK3M = Female Metric Rod Threads
- 56** KK3X = Female Special Rod Threads
- 56** LRB = Lift Ring Boss
- 57** NR = Non-Rotating
- 57** Multiple Mounts
- 58** Port Options (BSPP, BSPT, NPTF)
- 58** RBB = Rod Bushing - Bronze (Ductile Iron is standard)

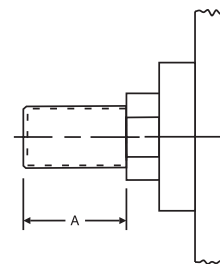
- 58** SSR = Stainless Steel Piston Rod
- 59** Seals (Piston, Rod, Tube, Wiper)
- 60** ST = Stop Tube & Rod Size Selection
- 61** Piston Rod Size Selection
- 62** 3P = Three-Position Cylinders
- 62** BTB = Back-To-Back Cylinders
- 62** TM = Tandem Cylinders
- 62** Special Finishes

A Extended Piston Rod Thread

A = refers to the length of piston rod thread.

Shorter than standard lengths can be furnished at no charge. Longer than standard lengths can be furnished at a nominal price adder. Special length threads do not delay orders!

Note: Maximum thread length is double the standard "A" length.



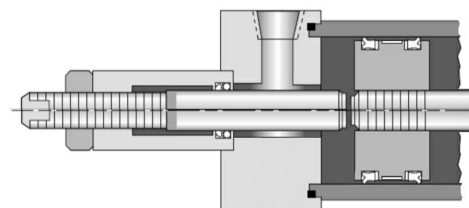
AS Adjustable Stroke (Retract)

AS = Consists of a threaded rod in the cylinder cap, non-removable. Provides an adjustable positive stop on the cylinder retract.

To order, specify "AS" and length of adjustment (Example: AS=3").

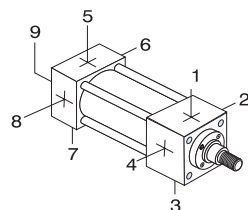
Adjustable Stroke	
Bore	Max "AS"
1.50	Up to 8 inch
2.00-3.25	Up to 6 inch
4.00-6.00	Up to 5 inch
8.00	Up to 4 inch

Consult factory for additional adjustable strokes offerings.



ABP Air Bleed Ports

ABP = Air bleeds can be provided at either or both ends of the cylinder. Air bleeds should be located at the highest point in the cylinder for maximum effectiveness. The location needs to be specified, similar to port locations.

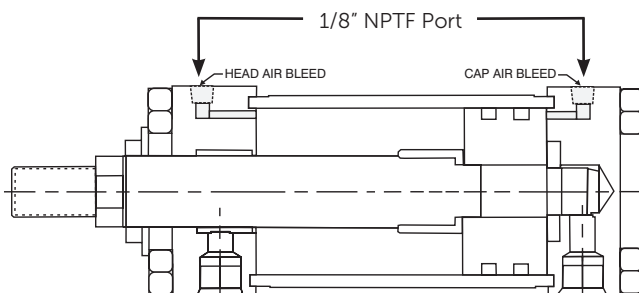


Bore & Rod Size Limits: Consult factory

Example: ABP=15
(Air Bleed ports at position 1 & 5)

Plugged from factory.

Location 9 is center
of cap face.

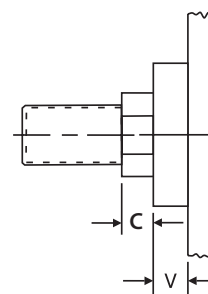


C Extended Piston Rod

C = is commonly referred to as piston rod extension. Piston rods can be extended to any length up to 120" total piston rod length, including stroke portion. Cylinders with long "C" lengths can be mounted away from obstacles or outside hazardous environments.

Example: If C=0.50", then 1" rod extension is C=1.50"

Be sure to check piston rod column strength charts to properly size the rod and prevent buckling. Extended piston rods do not delay delivery.

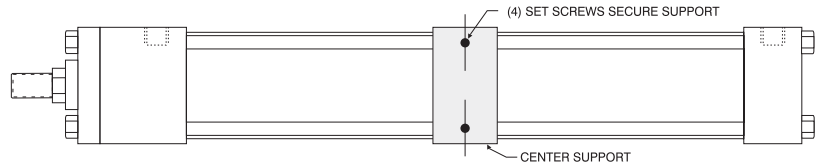


CS Center Supports

CS = Center supports are recommended for long stroke cylinders to support tube and prevent the tie rods from sagging. Properly supported cylinders will eliminate premature cylinder wear and eliminate tie rod vibration.

Center supports can include MS2 mounts.

Contact IMI Bimba for more information.

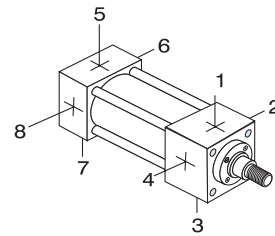


Maximum Stroke Recommendations			
Bore	No Center Support	With Center Supports (CS Option)	
		One Support	Two Supports
1.50", 2.00" & 2.50"	48 inches	Strokes over 48 inches	Strokes over 72 inches
3.25", 4.00" & 5.00"	65 inches	Strokes over 65 inches	Strokes over 92 inches
6.00"	72 inches	Strokes over 72 inches	Not Required

H/C Head & Cap Cushions

C or H = IMI Bimba's cushion design features industry proven technology and ultra fine adjustment needles for perfect deceleration and long life. Cushion adjustment needle positions need to be specified.

Example: H2C6



Cushion Locations		Standard Cushion Locations	
Head Cushion	Cap Cushion	Most Mounts	H2 C6
H1	C5	MS3 Mount	H3 C7
H2	C6	MT1 Mount	H3 C6
H3	C7	MT2 Mount	H2 C7
H4	C8		

Note: Cylinders with a short stroke (value varies with bore/rod diameter and cushion combinations) may result in improper cylinder operation. Consult factory for availability.

Unavailable Cushion Locations by Mount		
Mount	Head Cushion	Cap Cushion
ME5	H2, H4	–
ME6	–	C6, C8
MS3	H2, H4	C6, C8
MT1	H2, H4	–
MT2	–	C6, C8

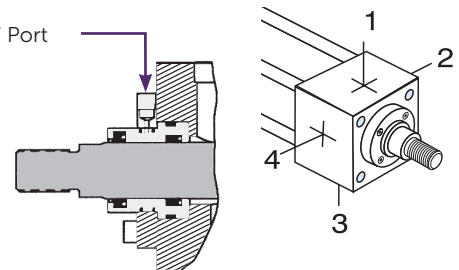
DBB Drain Back Bushing

DBB = When oil leakage cannot be tolerated, a rod bushing drain port can be provided. Since there isn't any pressure in the drain line, clear tubing can offer a visual inspection of any leakage. A constant leak indicates that the rod seal is worn and needs to be replaced.

Note: Some bore and rod sizes are not available or may require special thickness retainers.

Example: DBB=1 (drain port at position 1)

1/16" or 1/8" NPTF Port



EK Extended Key Plate

EK = Extended key plate or thrust key is made from a full square bushing retainer plate.

The key is designed to fit in a milled slot on the equipment to prevent the cylinder from shifting.

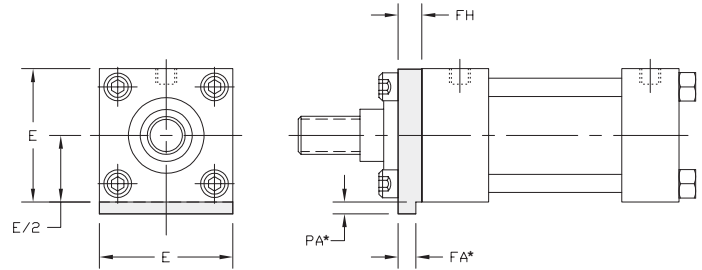
An additional mount needs to be specified to secure cylinder.

Available Bore Sizes: 1.50" to 6.00"

MH Dimensions Extended Key Plate

Bore	E	FA*	FH	PA*
1.50	2.000	0.312 / 0.310	0.375	0.188
2.00	2.500	0.312 / 0.310	0.375	0.188
2.50	3.000	0.312 / 0.310	0.375	0.188
3.25	3.750	0.562 / 0.560	0.625	0.313
4.00	4.500	0.562 / 0.560	0.625	0.313
5.00	5.500	0.562 / 0.560	0.625	0.313
6.00	6.500	0.687 / 0.685	0.750	0.375

* FA & PA dimensions will have a black oxide finish and will not be painted.



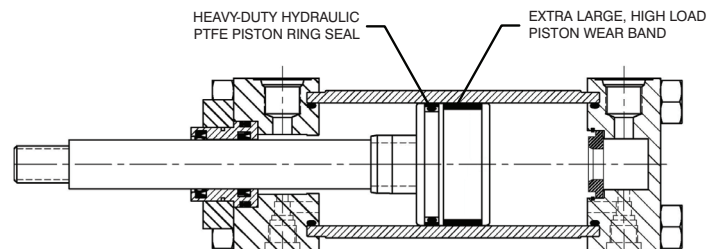
Option T (PTFE) Piston Seal - Recommended for High Load & Low Friction Applications

Long stroke cylinders and pivot type mounting can create severe cylinder piston-to-tube side loads. The PTFE piston seal provides increased side load capacity and low friction without increasing the cylinder base dimensions.

– Design Benefits

- Bi-direction piston seal offers low leakage rating
- Piston seal design offers lower friction than cast iron rings or lip seals, which eliminate stick/slip breakaway issues
- Glass filled PTFE piston seal is 20% stronger than bronze filled seals
- High contamination tolerant; offers the longest life of any seal type
- Temperature Rating (PTFE):
-100°F to 400°F (-73°C to 204°C)
- Temperature Rating (Nitrile):
-20°F to 200°F (-29°C to 93°C)
- Temperature Rating (FKM):
0°F to 400°F (-18°C to 204°C)
- High Load Piston Wear Band - Our superior design is 35% to 80% wider than competitive models and we locate the wear band at the furthest point from the rod bearing to increase overall effectiveness
- Piston Ring Seal - Glass filled PTFE with Nitrile* expander.

* Other materials are available, consult factory.



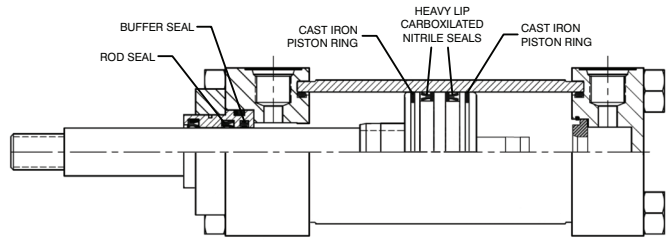
HSS High Shock Seals

HSS = High shock seal option provides shock protection to the rod and piston seal.

Piston Seal - Consists of two (2) bidirectional sealing, step-cut, cast iron piston rings to buffer the shock and two (2) heavy-lip design Carboxilated Nitrile seals (with back-up rings), to provide near leak-free operation.

Rod Seals - Consists of a buffer seal to handle the shock and a double lip polyurethane block vee seal for leak free operation.

Note: Some bore and rod sizes are not available.



KKX Non-Standard Rod Threads

KKX = Cylinders piston rods can be furnished with non-standard rod threads.

Ordering Example: MH - MF1 - 150 X 24 - 100 - KKX = 3/4-10 - P15 = N375 - SSSS

Add special thread to part number

KK3M Female Metric Rod Threads

KK3M = Equipment that is imported to the United States will typically contain metric tie-rod cylinders. In general, ISO tie rod cylinders are not as robust as NFPA cylinder designs and some customers prefer to replace the metric cylinders with NFPA designs to provide longer life.

IMI Bimba can provide cylinders with metric piston rod end threads to assist customers in mating replacement cylinders to existing equipment.

Ordering Example: MH - MF1 - 150 X 24 - 100 - KK3M = M18 x 1.5 - P15 = N375 - SSSS

KKM Male Metric Rod Threads

KKM = Equipment that is imported to the United States will typically contain metric tie-rod cylinders. In general, ISO tie rod cylinders are not as robust as NFPA cylinder designs and some customers prefer to replace the metric cylinders with NFPA designs to provide longer life.

IMI Bimba can provide cylinders with metric piston rod end threads to assist customers in mating replacement cylinders to existing equipment.

Ordering Example: MH - MF1 - 150 X 24 - 100 - KKM = M18 x 1.5 - P15 = N375 - SSSS

KK3X Female Special Rod Threads

KK3X = IMI Bimba can machine a wide range of female rod threads. Standard NFPA rod threads are UNF (fine), class 2 threads. Common alternative choices are UNC (coarse) threads. Note: unless otherwise specified, the rod thread will be standard catalog "A" dimension lengths.

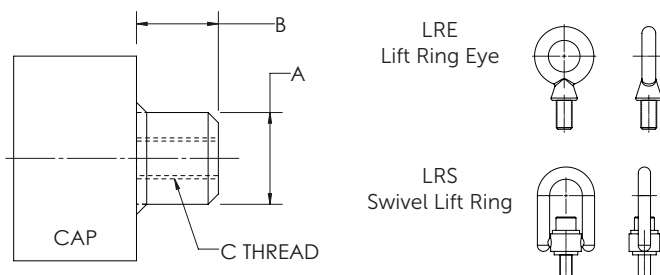
Ordering Example: MH - MF1 - 150 X 24 - 100 - KK3X = 3/4-10 - P15 = N375 - SSSS

LRB Lift Ring Boss

LRB = A steel, tapped lug is welded to the center of the cylinder cap.

UNC coarse threads are provided to accept high load type lifting eyes (lift eyes are available with the options to the right).

Also available in additional locations and styles.



Lift Lug Dimensions

Bore	A	B	C	Straight Pull Lifting Capacity *
1.50	1.120	1.000	1/2-13	2500
2.00	1.500	1.250	5/8-11	4000
2.50	1.500	1.250	5/8-11	4000
3.25	2.000	1.500	3/4-10	6000
4.00	2.000	1.500	3/4-10	6000
5.00	2.000	1.500	3/4-10	6000
6.00	2.500	2.000	1-8	9000
8.00	2.500	2.000	1-8	9000

* Lifting capacity is the maximum capacity for intermittent lifting and placement of cylinder only. It is NOT intended to be used as the primary cylinder mount.

Note: Not available on MF2, MF6, ME6, MP1 and SB mounts.

NR Non-Rotating Cylinders - NFPA

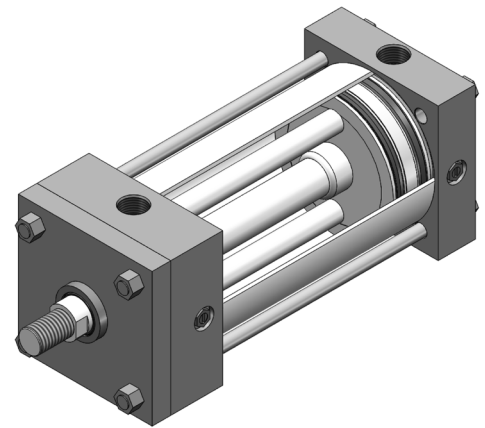
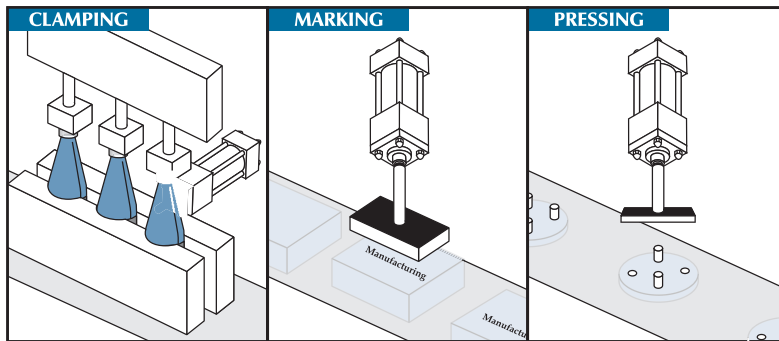
– Benefits

- Two integral guide rods throughout stroke torqued with hex nuts on cap end
- High repeatability at each end of stroke (+/- 1 degree)
- All external dimensions are the same as standard cylinder (no additional length or width required)
- Standard diameter guide rod seals & bronze Bearings for long life and reliable operation
- Steel, hard chrome plated guide rods offer an abrasive resistant surface

– Advantages

- Eliminates the need for external guide shafts in many positioning applications
- Guide rods are self-cleaning and not subjected to harsh cleaners
- Compact design saves space; no larger than standard NFPA cylinders
- Durable, self-contained construction

– Application Possibilities



Available Bore Sizes with 'NR' Guide Rod Sizes and Max. Stroke

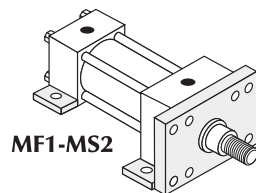
Bore	Rod Dia. (MM)	Cushions
4.00	1.000 & 1.375	No Cushions
5.00	1.000, 1.375, 1.750 & 2.000	Cap Cushions Only
6.00	1.375 - 3.000	Both Cushioned (3.000" Rod - Cap Only)
8.00	1.375 - 3.500	Both Cushioned (3.500" Rod - Cap Only)

Note: External guide rod models are available with rectangular head and cap. Contact factory for additional information.

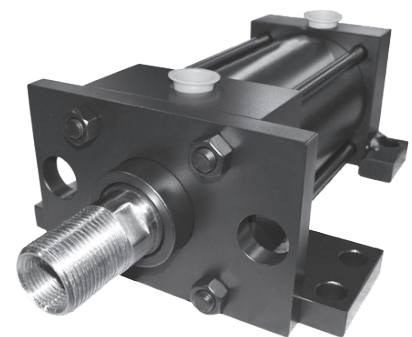
Multiple Mounts

Cylinders can be furnished with a wide selection of multiple mounts.

Ordering Example: MH - MF1 - MS2 - 250 X 12 - 100 - KK1 - P15 = N375 - SSSS



↑
Add additional mount to part number



Port Options

Cylinders can be furnished with NPTF or SAE O-Ring Boss (SAEJ514) ports at no-charge.

Cylinders can be furnished with BSPP or BSPT for additional cost.

BSPT = British Standard Pipe Taper

British Standard Pipe Taper (BSPT) threads have the same taper as American NPT tapered threads, but use a 55° Whitworth thread form and different diameters.

(Not interchangeable with NPT)

BSPP = British Standard Pipe Parallel

British Standard Pipe Parallel (BSPP), also referred to as BSP "Straight" Thread.

(Not interchangeable with NPT)

RBB Solid Bronze Rod Bushing

RBB = Our standard floating rod bushing design is used in conjunction with solid SAE 660 bronze material. Material specifications: 20,000 PSI compressive strength.

Some customers prefer to use bronze rod bushings. Most common uses are in water hydraulic applications.

Specials: IMI Bimba can provide special length rod bushings; contact your local distributor for details.

Note: Since the mechanical properties of bronze is much lower than cast iron, bronze rod bushings typically do not provide the same long life that our standard PTFE coated cast iron rod bushings provide.

SSR 17-4 Stainless Steel Hard Chrome Plated Piston Rod

SSR = Cylinders can be furnished with hard chrome plated stainless steel piston rods.

100,000 min. yield (rods up to 5.00)

75,000 min. yield (5.500 rod)

Seals

The MH Series allows for the use of different types of seal design and material compounds in every area, for maximum flexibility and performance.

S Standard Seals

Piston:	Carboxilated Nitrile
Rod Seal:	Polyurethane
Tube Seals:	Buna
Rod Wiper:	Flocked Nitrile
Temperature Rating:	-20°F to 200°F (-29°C to 93°C)
Compatible with:	Mineral based hydraulic fluids

Piston Seal		Tube Seal	
S	Standard (Carboxilated)	S	Standard (Buna)
C	Cast-Ring	E	EP
E	EP	V	Fluorocarbon
T	PTFE		
V	Fluorocarbon		

Rod Seal		Rod Wiper	
S	Standard (Polyurethane)	S	Standard (Flocked Nitrile)
E	EP	M	Metallic Scraper
V	Fluorocarbon	T	PTFE
		V	Fluorocarbon

E Ethylene Propylene

Temperature Range:	-50°F to 300°F (-45°C to 149°C)
Compatible with:	Most Phosphate Ester (Skydrol 500 and 7000, type 2) fluids

Note: Requires a PTFE rod wiper and L011 lubricant option for EP compatible seal grease.

T Glassed Filled PTFE

Temperature Rating (PTFE):	-100°F to 400°F (-73°C to 204°C)
Temperature Rating (Nitrile):	-20°F to 200°F (-29°C to 93°C)
Temperature Rating (FKM):	0°F to 400°F (-18°C to 204°C)
Compatible with:	All hydraulic fluids and almost any fluid
Use:	Low friction and high side load

C Cast Iron Piston Rings

Temperature Range:	-20°F to 400°F* (-29°C to 204°C)
Compatible with:	Virtually all fluids
Uses:	Hydraulic shock protection

* When cylinder is equipped with FKM seals.

V Fluorocarbon

Temperature Range:	0°F to 400°F (-18°C to 204°C) (Up to 400°F with reduced service life)
Compatible with:	Some Phosphate Ester (Houghto-Safe 1000, 1120; Pyrogard 42, 43, 53, 55) fluids; mineral based petroleum, halogenated hydrocarbons, silicate ester and diester fluids

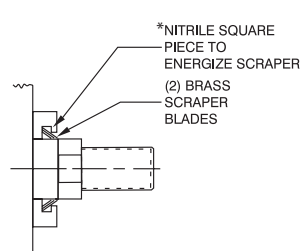
XX Special

Non-standard seals can be furnished.

Contact IMI Bimba for more information.

M Metallic Rod Scraper

M = Aggressively scrapes the piston rod, removing foreign material such as spatter, sprays and powders (brass construction).



* Standard energizer will match cylinder seals.

ST Stop Tube and Rod Size Selection

ST = Stop tubes are designed to reduce the piston rod bushing stress to within the designed range of the bearing material. This will ensure proper cylinder performance in any given application. Stop tubes lower the cylinder bearing stress by adding length to the piston, which increases the overall length of the cylinder

Note: IMI Birmba uses a double piston design when possible.

Stop Tube Selection - To determine the proper amount of stop tube for your application, you must first find the value of "D", which represents the stroke (adjusted for mounting condition). Each mounting condition creates different levels of bushing stress, which has direct impact on the amount of stop tube required (see Chart 1).

Once the value of "D" is known, refer to Chart 2 for the recommended amount of stop tube.

To Order Stop Tube

- Add the stop tube prefix "ST=" and the stop tube length to the cylinder model number.
- Add "ES" after the cylinder stroke to indicate that the stroke is the effective stroke.

Example: MH-MS2-250X42 ES-100-KK2-P15=N375-SSSS-ST=2

Chart 1

Find the value of "D" for your application

D = Stroke, adjusted for mounting condition

S = Actual cylinder stroke

T = Axial thrust (refer to Chart 3 on page 61)

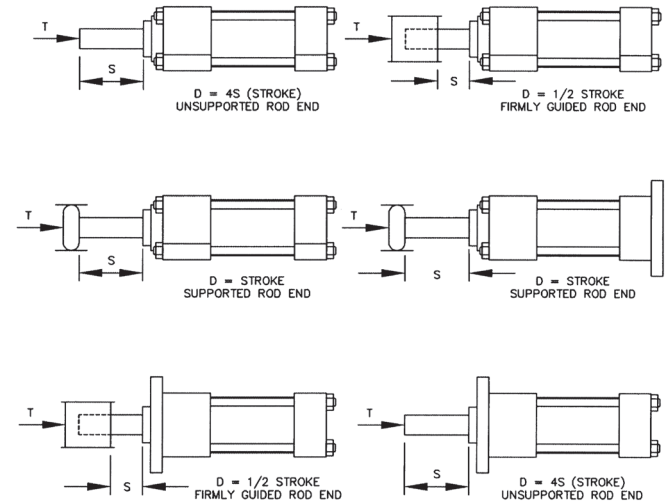
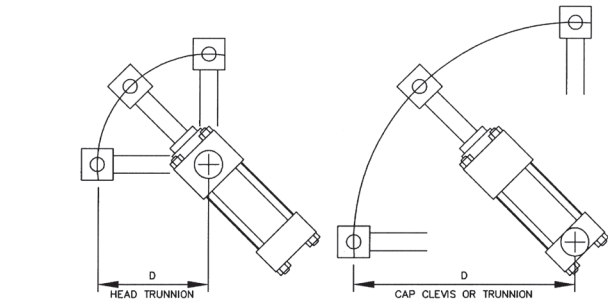
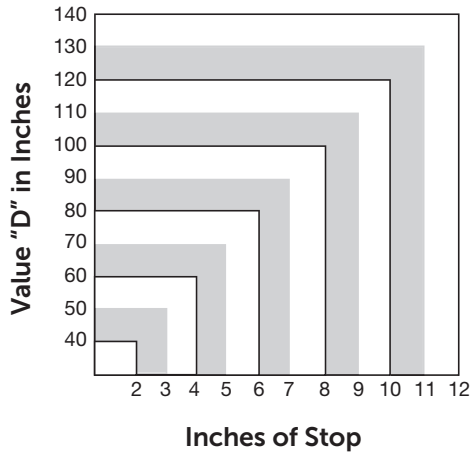


Chart 2

Using the value of "D", find the recommended amount of stop tube



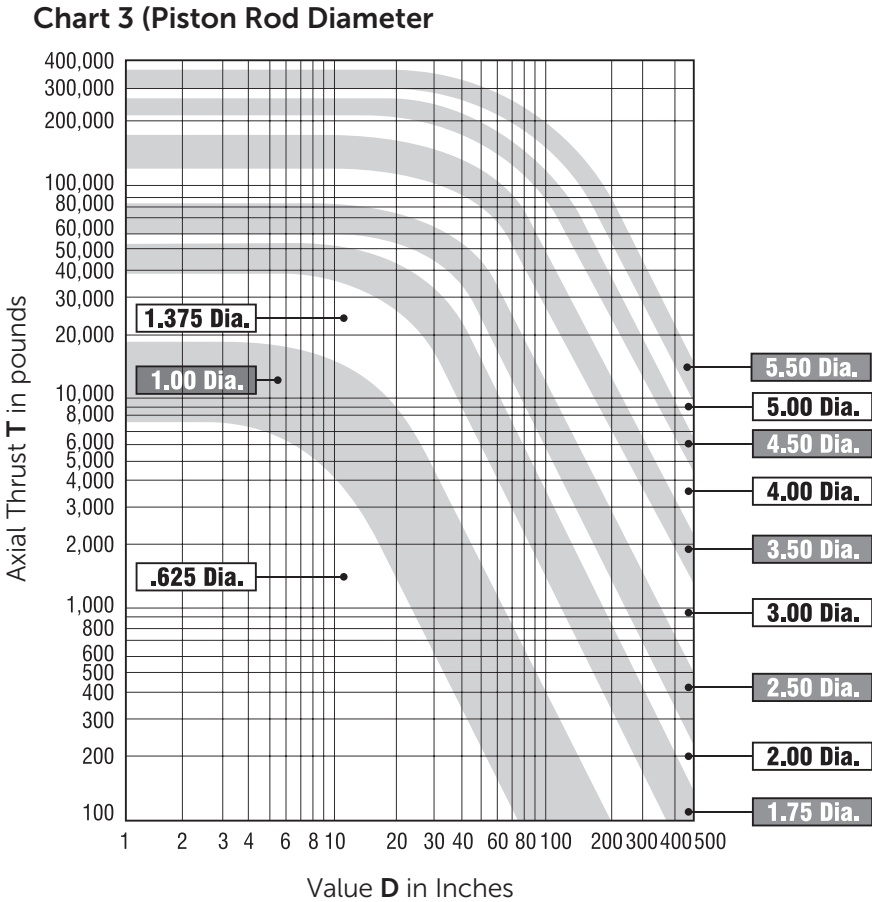
Note: Measure "D" when cylinder is fully extended.

Refer to page 61 for Rod Size Selection Chart.

Piston Rod Size Selection

Standard rod sizes are usually suitable for shorter stroke applications at lower hydraulic pressures. With high thrust force or long stroke applications, you must check the column strength of the rod in the mounting style to determine the proper rod diameter size.

- 1. Determine the total axial thrust by multiplying the bore area size (in inches) by the operating pressure (in PSI).
- 2. From page 60, determine the value of "D" for the application.
- 3. Find the value of "D" in the chart to the right. Follow the value of "D" vertically on the graph until it intersects with the axial thrust value of the cylinder. The intersection of these two values will fall within one of the shaded areas representing the piston rod diameter size required for the application.



3P Three-Position Cylinders

3P = You can create a 3-Position cylinder from two of the same bore size cylinders.

3-Position cylinders consist of multiple cylinders built as one unit having one exposed working rod end, capable of delivering three rod positions.

– 3-Position Benefits

- 3-Positions in one cylinder — One cylinder produces three different rod end positions. By varying stroke lengths, a multitude of positions can be created
- Simplifies machine design — Eliminates the need for an additional cylinder to create a third position. 3-Position cylinders reduce space and the cost to mount multiple cylinders

Note: Piston rods are not connected.

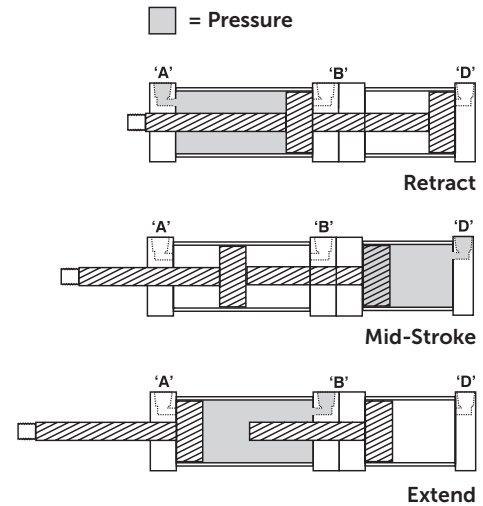
Contact IMI Bimba for more information.

How They Work

Position 1 (retract): Pressure to port "A" fully retracts cylinder

Position 2 (mid-stroke): Pressure to port "D" advances cylinder to mid-stroke position

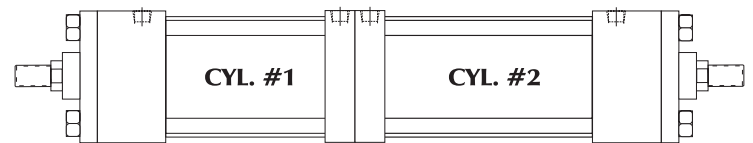
Position 3 (extend): Pressure to port "B" fully extends cylinder



BTB Back-To-Back Cylinders

BTB = Back-to-Back cylinders consist of two individual cylinders built as one unit. These cylinders can act as a four position cylinder.

Contact IMI Bimba for more information.

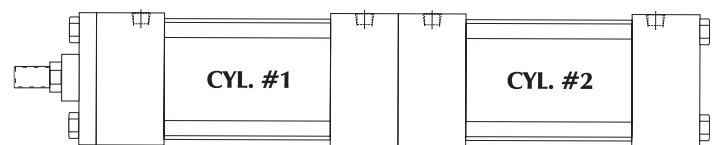


TM Tandem Cylinders

TM = You can tandem different cylinders together to create unlimited design possibilities.

Note: Piston rods are connected.

Contact IMI Bimba for more information.



Special Finishes

Standard Finish: Black Urethane Paint (suitable for indoor or outdoor use)

Optional Paint: Black Epoxy Paint (suitable for indoor use only)

Additional Paint Choices: IMI Bimba can provide paint in any color or type with customer supplied paint specification and color code.

Additional Finishes: IMI Bimba can provide special finishes, i.e. Nutride Plate Heavy Chrome Plated Piston Rods.

Contact IMI Bimba with your specifications – we would be pleased to provide a quote!

