

Hydraulic Motors, Rol-Seal® Units RSA, RSB, RSC, & MRS Series – TECHNICAL DATA

ENGLISH. (For Metric data, see www.vonruden.com/engr_library/rolseal/RSAAllModels_metric.pdf)



12.27.04



Introduction:

This document contains the specifics we publish for all five models in the Rol-Seal® hydraulic motor family. This includes the three size/mounting variations of our original design (RSA, RSB and RSC models) plus our two MRS models (MRSA and MRSAA).

The MRS design is a modified configuration that yields units intended for small space applications that require the combination higher speeds and lower torques.

If you need information beyond what we've included here, please contact our factory engineers so we can provide you with whatever else you need.

CONTENTS

Product Line Overview	
Features & Benefits – RSA, RSB, RSC	2
Features & Benefits – MRS	3
Performance Comparisons (complete line)	4
RSA & RSB Series Specifics	
Torque Ranges/Displacements	5
Dimensional Drawings, Configurations, Options	7
RSC Series Specifics	
Torque Ranges/Displacements	10
Dimensional Drawings, Configurations, Options	11
RSA, RSB & RSC	
General Maintenance	13
Brakes	13
Planetary Gearboxes	14
Model/Order Nomenclature	15
MRS Series Specifics	
MRSA – Dimensional Drawings and Configurations with Seal & Foot Mount Options	16
MRSAA – Dimensional Drawings and Configurations with Seal & Foot Mount Options	18
Output Shaft Options for MRSA & MRSAA	20
General Maintenance & Model/Order Nomenclature	22

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A FEW WORDS ABOUT OUR ROL-SEAL® RSA, RSB & RSC MOTOR DESIGN

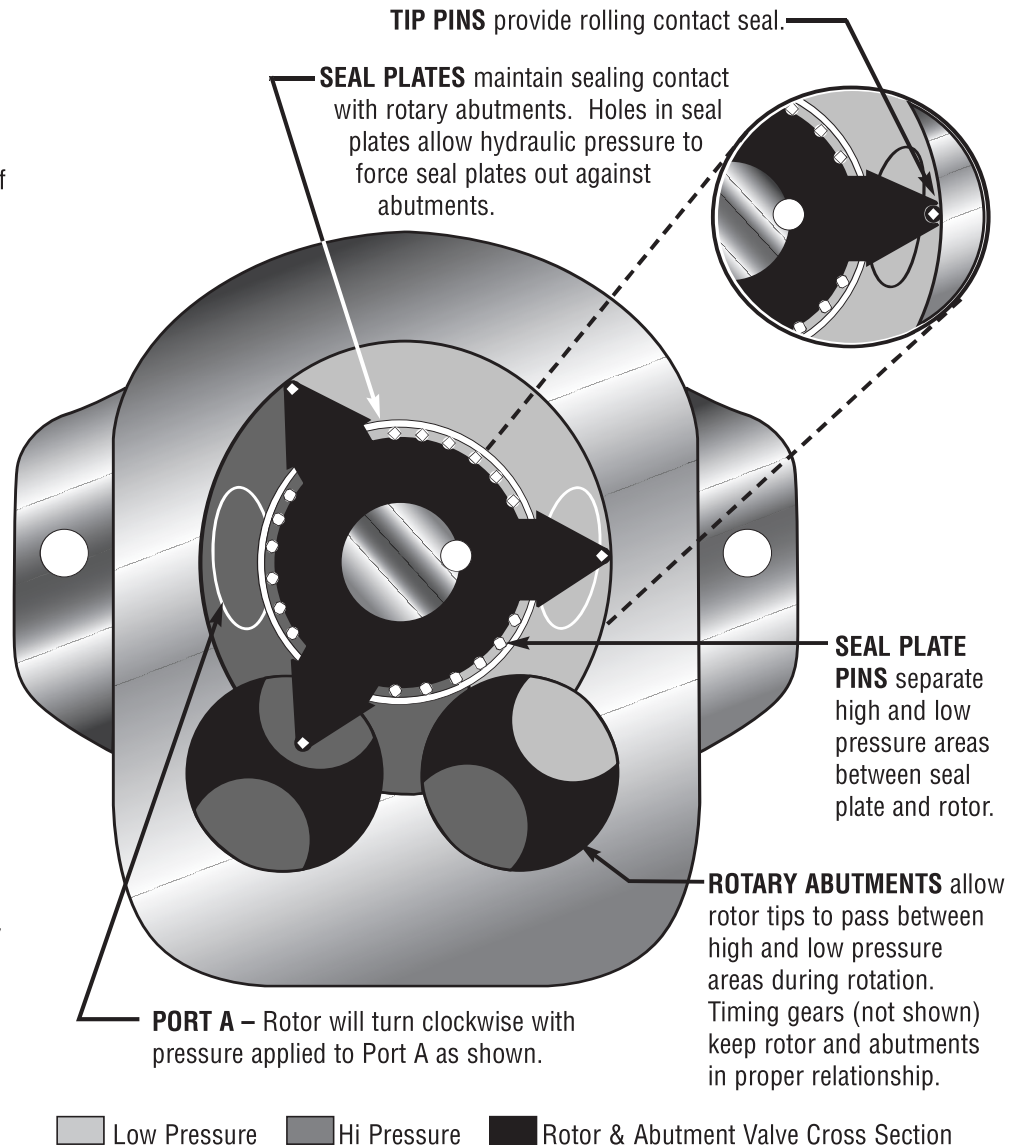
When Von Ruden introduced the first hydraulic motors built on our Rotary Abutment principle, their performance and durability advantages were obvious. Today, that same set of benefits are just as valid. Regardless of size, each model delivers:

1. High Starting Torque: Typically this is in the 92-94% range. That means overall hydraulic systems savings because designers can use smaller motors. Higher starting torque also means increased vehicle gradeability and more drawbar pull.

2. High Running Torque: Friction loss and viscous drag at high speed are both lower due to the internal rolling contact seal elements. Large flow passages reduce internal pressure drop. Typical breakaway pressure at a no load condition is less than 10 PSI.

3. More Useable Speed: Smooth running at low speed (less than 10 RPM) with minimal performance loss at high speeds (up to 3,500 RPM). Smooth performance over an unusually wide speed range. Low speed characteristics often eliminate the need for additional speed reduction.

4. Long Life: Performance stays relatively constant over the motor's working life. The internal rolling seal elements are essentially frictionless and wear compensating. The rolling seal element design also tolerates a high degree of contamination so the motors perform well in free-wheeling applications.



The Rol-Seal's Rotary Abutment Advantage:

The positive contact provided by rolling seals between rotor and housing and between abutments and seal plates creates relatively frictionless operation

that makes these motors relatively insensitive to wear over their exceedingly long working life.

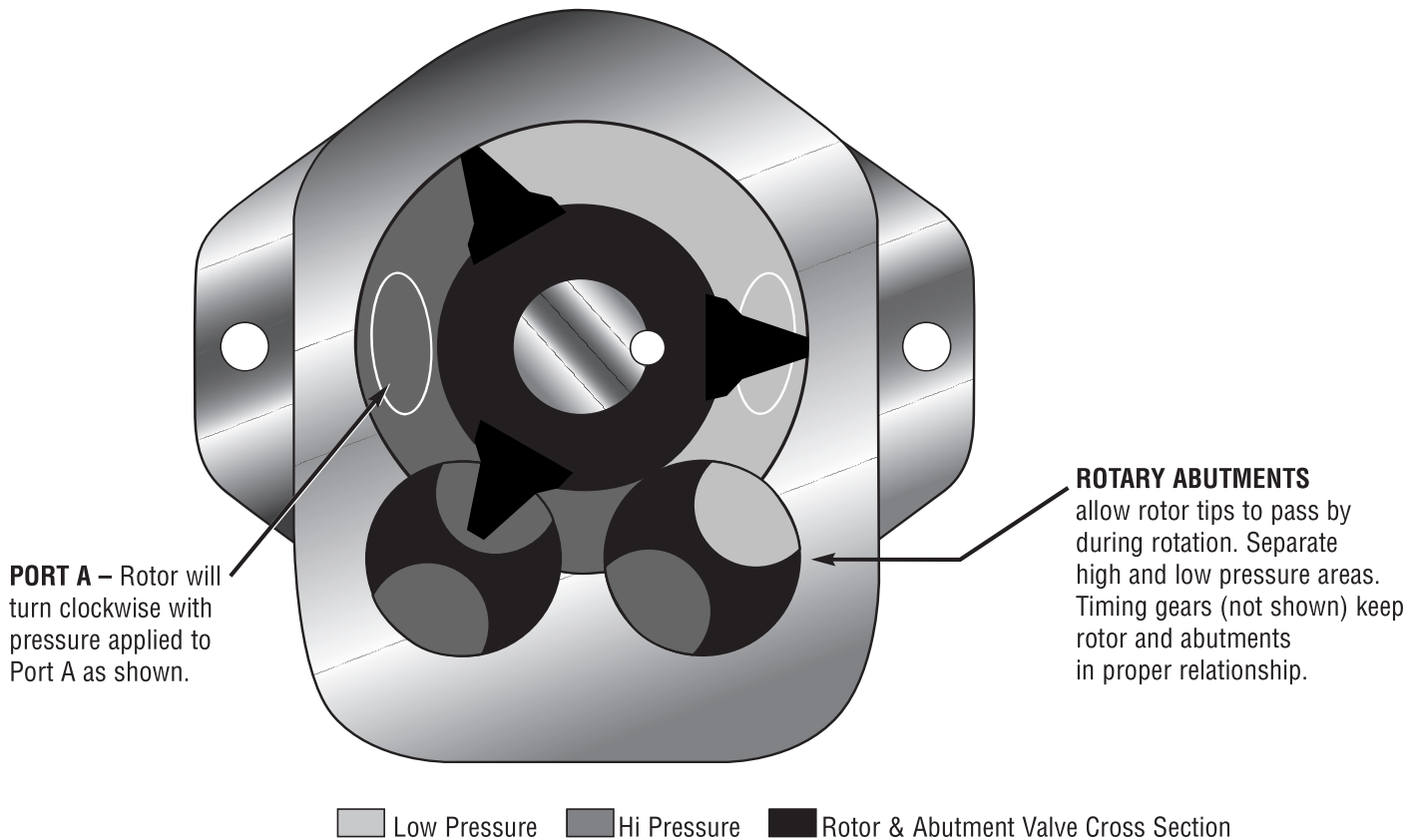
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11.17.04

A FEW WORDS ABOUT OUR ROL-SEAL® MRS SERIES DESIGN



For decades, Von Ruden's Rol-Seal® Rotary Abutment hydraulic motors have been the preferred choice for designers working on applications where normal motors produce marginal or unsatisfactory results. Our MRS series units have been specially modified to deliver much higher speeds than their larger RSA, RSB, & RSC Rol-Seal counterparts while maintaining many of the other advantages of those larger units.

1. **More Useable Speed:** These motors run smoothly with minimal performance loss at continuous speeds up to 6000 RPM. Their low speed characteristics often eliminate the need for additional speed reduction. Typical breakaway pressure at a no load condition is less than 10 PSI.

2. **Higher Starting Torque:** Typically this is in the 80-84%

range. That means overall hydraulic systems savings because designers often can get the start-up characteristics then need with these smaller-displacement MRS motors.

3. **Higher Running Torque and Radial Load Capacities:** Though MRS units are relatively low displacement motors, they are surprisingly robust. Radial loads up to 300 lbs are standard and continuous torques from 105 to 478 lb. in. can be produced. Large flow passages reduce internal pressure drop.

4. **Long Life:** Performance stays relatively constant over the motor's working life. A Double Seal configuration that provides extra protection in dirt or dust-laden environments without increasing their overall space requirements is available.

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11.17.04

PERFORMANCE SPECIFICATIONS (ALL ROL-SEAL® MODELS)

		DISPLACEMENT (in ³ /rev.)													
		Models MRSA & MRSAA							Models RSA & RSB				Model RSC		
		.22	.38	.45	.60	.70	.85	1.00	2.0	3.0	4.0	5.0	6.0	8.0	10.0
Flow (GPM)	Continuous	5.0	8.0	10	13.0	15.0	17.0	22.0	18	20	18	17	39	42	39
	Intermittent	7.0	12.0	14.0	18.0	21.0	26.0	30.0	31	39	44	39	52	59	61
Max. Speed (RPM)	Continuous	6000	6000	6000	6000	6000	6000	6000	2000	1500	1000	750	1500	1200	900
	Intermittent	7000	7000	7000	7000	7000	7000	7000	3500	3000	2500	1800	2000	1700	1400
ΔPressure (PSI)	Continuous	3000	3000	3000	3000	2500	2500	2500	2500	2250	2000	2000	2000	2000	2000
	Intermittent	4000	4000	4000	4000	3500	3500	3500	3000	3000	3000	3000	3000	3000	3000
	Peak	5000	5000	5000	5000	4500	4500	4500	3750	3750	3500	3500	3500	3500	3500
Max. Theoretical Torque (lb. in.)	Continuous	105	182	215	287	278	338	398	796	1075	1273	1592	1910	2547	3184
	Intermittent	140	242	287	382	390	473	557	955	1433	1910	2388	2866	3821	4777
Weight (lb.)		12.0	12.0	12.0	12.0	13.0	13.0	13.0	13	14	15	16	36	39	42

Notes: 1. Intermittent conditions must be less than 10% of every minute.
2. Inlet and return pressures are not to exceed ratings listed above.

3. Peak conditions are to be less than 1% of every minute.
4. Intermittent speed and peak pressure must not occur simultaneously.

ROTATIONAL MOMENT OF INERTIA (WK²)

Model	Displacement (in ³ /rev)	lb-in ²
MRSA/MRSAA	.22 – 1.00	Contact Factory
RSA/RSB	2.0	1.23
RSA/RSB	3.0	1.42
RSA/RSB	4.0	1.61
RSA/RSB	5.0	1.80
RSC	6.0	7.25
RSC	8.0	8.15
RSC	10.0	9.04

SHAFT RADIAL AND THRUST LOAD CAPACITY

Model	Radial	Thrust
MRSA/MRSAA	300 lbs ¹	250 lbs.
RSA/RSB	600 lbs. ²	600 lbs.
RSC	1000 lbs. ³	1000 lbs.

Notes: 1. Based on load located .5" from mounting flange.
2. Based on load located 1" from mounting flange.
3. Based on load located 1.5" from mounting flange.

OTHER MOTOR DESIGNS FOR OTHER APPLICATIONS

When accuracy and precise repeatability are your application's primary concern, you should consider our line of **Axial Vane hydraulic motors**.

Contact your Von Ruden representative or download complete data on any of these other motors from our web site.

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11.17.04

RSA & RSB units: Torque Ranges Shown as “lb. in. @ RPM” for 2.0 in³/revolution displacement

		Continuous Operation				Intermittent Operation – Less than Six Sec. / Min.				
		250 PSI	500 PSI	1000 PSI	1500 PSI	2000 PSI	2500 PSI	3000 PSI		
FLOW RATE	.25 GPM	67 @ 9								
	.5 GPM	67 @ 38	146 @ 23							
	1 GPM	66 @ 95	146 @ 81	293 @ 57		440 @ 28				
	2 GPM	66 @ 210	144 @ 196	290 @ 156	438 @ 140	585 @ 99	735 @ 56		885 @ 6	
	4 GPM	64 @ 440	138 @ 431	285 @ 389	434 @ 376	581 @ 330	731 @ 289		880 @ 237	
	8 GPM	59 @ 902	133 @ 869	280 @ 857	429 @ 830	576 @ 785	726 @ 742		876 @ 694	
	12 GPM	55 @ 1360	129 @ 1320	276 @ 1299	425 @ 1282	572 @ 1227	722 @ 1182		872 @ 1133	
	16 GPM	51 @ 1812	125 @ 1772	272 @ 1750	421 @ 1734	568 @ 1679	718 @ 1634		868 @ 1585	
	20 GPM	47 @ 2264	121 @ 2224	268 @ 2202	417 @ 2186	564 @ 2130	714 @ 2085		864 @ 2035	
	25 GPM	42 @ 2829	116 @ 2789	263 @ 2767	412 @ 2750	559 @ 2694	709 @ 2650		859 @ 2599	
	30 GPM	37 @ 3393	111 @ 3353	258 @ 3331	407 @ 3314	554 @ 3258	704 @ 3213		854 @ 3165	
	35 GPM									
40 GPM										

RSA & RSB units: Torque Ranges Shown as “lb. in. @ RPM” for 3.0 in³/revolution displacement

		Continuous Operation				Intermittent Operation – Less than Six Sec. / Min.				
		250 PSI	500 PSI	1000 PSI	1500 PSI	2000 PSI	2500 PSI	3000 PSI		
FLOW RATE	.25 GPM	108 @ 4								
	.5 GPM	108 @ 23	226 @ 10							
	1 GPM	107 @ 61	225 @ 48	451 @ 29						
	2 GPM	104 @ 137	222 @ 125	448 @ 96	674 @ 67	898 @ 39	1120 @ 10			
	4 GPM	99 @ 291	217 @ 279	443 @ 250	669 @ 220	893 @ 192	1115 @ 163	1338 @ 134		
	8 GPM	89 @ 598	207 @ 587	433 @ 558	659 @ 528	883 @ 500	1105 @ 470	1328 @ 442		
	12 GPM	79 @ 907	197 @ 895	423 @ 865	649 @ 835	873 @ 808	1095 @ 778	1318 @ 750		
	16 GPM	69 @ 1217	187 @ 1203	413 @ 1172	639 @ 1140	863 @ 1114	1085 @ 1085	1308 @ 1055		
	20 GPM	59 @ 1523	177 @ 1510	403 @ 1481	629 @ 1450	853 @ 1422	1075 @ 1394	1298 @ 1361		
	25 GPM	46 @ 1907	164 @ 1895	390 @ 1864	616 @ 1832	840 @ 1800	1062 @ 1775	1285 @ 1745		
	30 GPM	33 @ 2290	151 @ 2279	377 @ 2245	603 @ 2216	827 @ 2182	1049 @ 2155	1272 @ 2128		
	35 GPM	20 @ 2675	138 @ 2664	364 @ 2627	590 @ 2595	814 @ 2565	1036 @ 2538	1259 @ 2509		
40 GPM	7 @ 3061	125 @ 3048	351 @ 3010	577 @ 2978	801 @ 2946	1023 @ 2919	1246 @ 2890			

Notes: 1. Performance data shown above is typical at 156 SSU fluid viscosity. Actual data may vary slightly from unit to unit in production.
2. All numbers subject to change without notice. Always confirm with us that you are working with the most current data.

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11.17.04

RSA & RSB units: Torque Ranges Shown as “lb. in. @ RPM” for 4.0 in³/revolution displacement

		Continuous Operation					Intermittent Operation – Less than Six Sec. / Min.	
		250 PSI	500 PSI	1000 PSI	1500 PSI	2000 PSI	2500 PSI	3000 PSI
FLOW RATE	.25 GPM	148 @ 2						
	.5 GPM	148 @ 17	313 @ 8					
	1 GPM	146 @ 45	311 @ 37	612 @ 16				
	2 GPM	143 @ 102	308 @ 94	609 @ 80	910 @ 61	1211 @ 42	1512 @ 29	
	4 GPM	136 @ 216	301 @ 207	602 @ 195	904 @ 179	1205 @ 157	1506 @ 139	1807 @ 105
	8 GPM	123 @ 442	288 @ 433	589 @ 418	890 @ 399	1191 @ 380	1492 @ 360	1793 @ 325
	12 GPM	110 @ 669	275 @ 660	576 @ 639	877 @ 620	1178 @ 601	1479 @ 581	1780 @ 546
	16 GPM	97 @ 891	262 @ 881	563 @ 860	864 @ 840	1165 @ 821	1466 @ 802	1767 @ 766
	20 GPM	84 @ 1113	249 @ 1104	550 @ 1081	851 @ 1060	1152 @ 1042	1453 @ 1023	1754 @ 987
	25 GPM	68 @ 1392	233 @ 1382	534 @ 1357	835 @ 1337	1136 @ 1318	1437 @ 1299	1738 @ 1263
	30 GPM	52 @ 1668	217 @ 1657	518 @ 1633	819 @ 1613	1120 @ 1594	1421 @ 1575	1722 @ 1539
	35 GPM	36 @ 1944	201 @ 1934	502 @ 1909	803 @ 1889	1104 @ 1870	1405 @ 1850	1706 @ 1815
40 GPM	20 @ 2220	185 @ 2209	486 @ 2184	787 @ 2165	1088 @ 2164	1389 @ 2126	1690 @ 2091	

RSA & RSB units: Torque Ranges Shown as “lb. in. @ RPM” for 5.0 in³/revolution displacement

		Continuous Operation					Intermittent Operation – Less than Six Sec. / Min.	
		250 PSI	500 PSI	1000 PSI	1500 PSI	2000 PSI	2500 PSI	3000 PSI
FLOW GPM	.25 GPM							
	.5 GPM	180 @ 11	368 @ 6					
	1 GPM	180 @ 34	370 @ 29	755 @ 2				
	2 GPM	178 @ 79	366 @ 74	756 @ 49	1123 @ 30	1500 @ 9		
	4 GPM	175 @ 169	358 @ 165	750 @ 144	1115 @ 123	1496 @ 102	1860 @ 83	2220 @ 59
	8 GPM	159 @ 350	342 @ 344	734 @ 324	1099 @ 303	1480 @ 283	1844 @ 261	2204 @ 239
	12 GPM	143 @ 530	326 @ 522	718 @ 507	1083 @ 486	1464 @ 465	1832 @ 444	2188 @ 422
	16 GPM	127 @ 712	310 @ 705	702 @ 688	1067 @ 667	1448 @ 646	1816 @ 625	2172 @ 602
	20 GPM	111 @ 895	295 @ 885	686 @ 867	1051 @ 848	1432 @ 827	1800 @ 806	2156 @ 784
	25 GPM	91 @ 1120	275 @ 1110	666 @ 1094	1031 @ 1073	1412 @ 1053	1780 @ 1033	2135 @ 1009
	30 GPM	70 @ 1345	255 @ 1334	646 @ 1321	1011 @ 1301	1392 @ 1279	1760 @ 1258	2116 @ 1235
	35 GPM	51 @ 1570	235 @ 1558	626 @ 1546	991 @ 1526	1372 @ 1505	1740 @ 1484	2095 @ 1462
40 GPM	30 @ 1795	215 @ 1785	606 @ 1773	971 @ 1751	1352 @ 1731	1719 @ 1710	2076 @ 1687	

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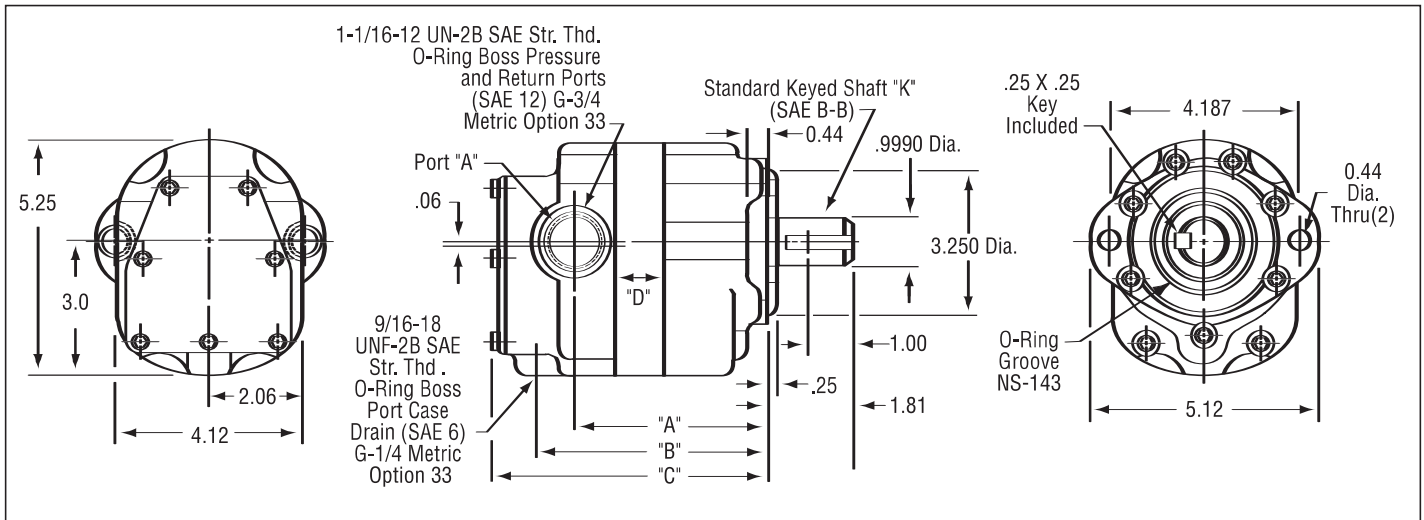
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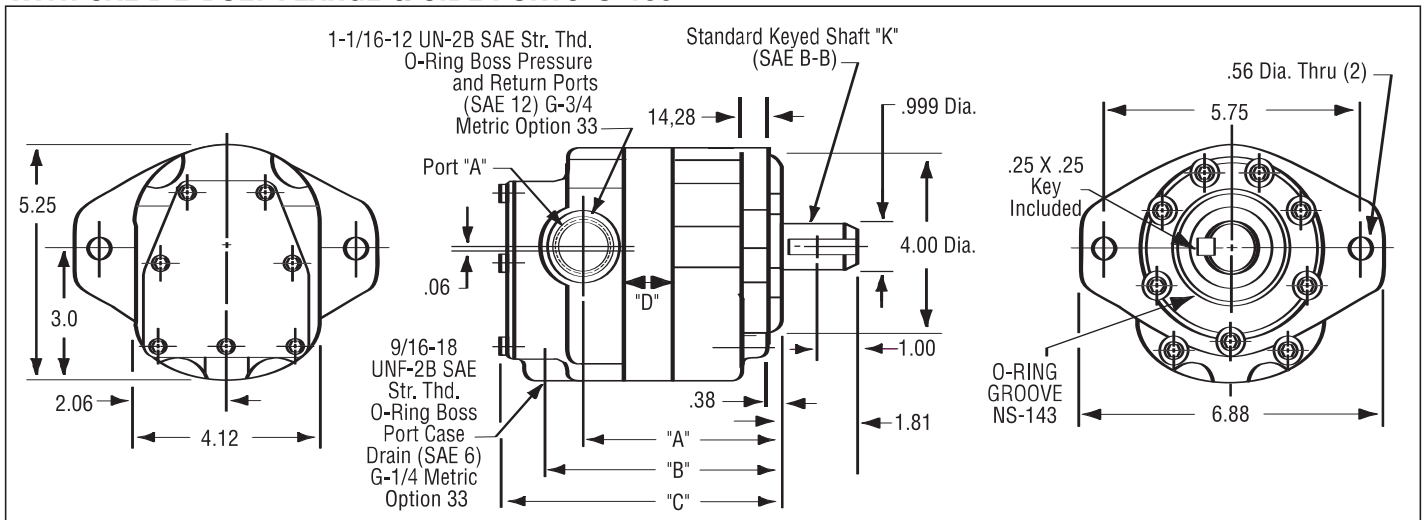
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RSA: WITH SAE A 2-BOLT FLANGE & SIDE PORTS @ 180°



Displacement in ³ /Rev.	A	B	C	D
2.0	3.68	4.53	6.12	.65
3.0	4.02	4.87	6.46	.99
4.0	4.34	5.19	6.78	1.31
5.0	4.67	5.52	7.11	1.64

RSB: WITH SAE B 2-BOLT FLANGE & SIDE PORTS @ 180°



Note: 1. All dimensions in inches and subject to change without notice. Always confirm with us that you are working with the most current data.
2. Consult factory for specific machining tolerances.

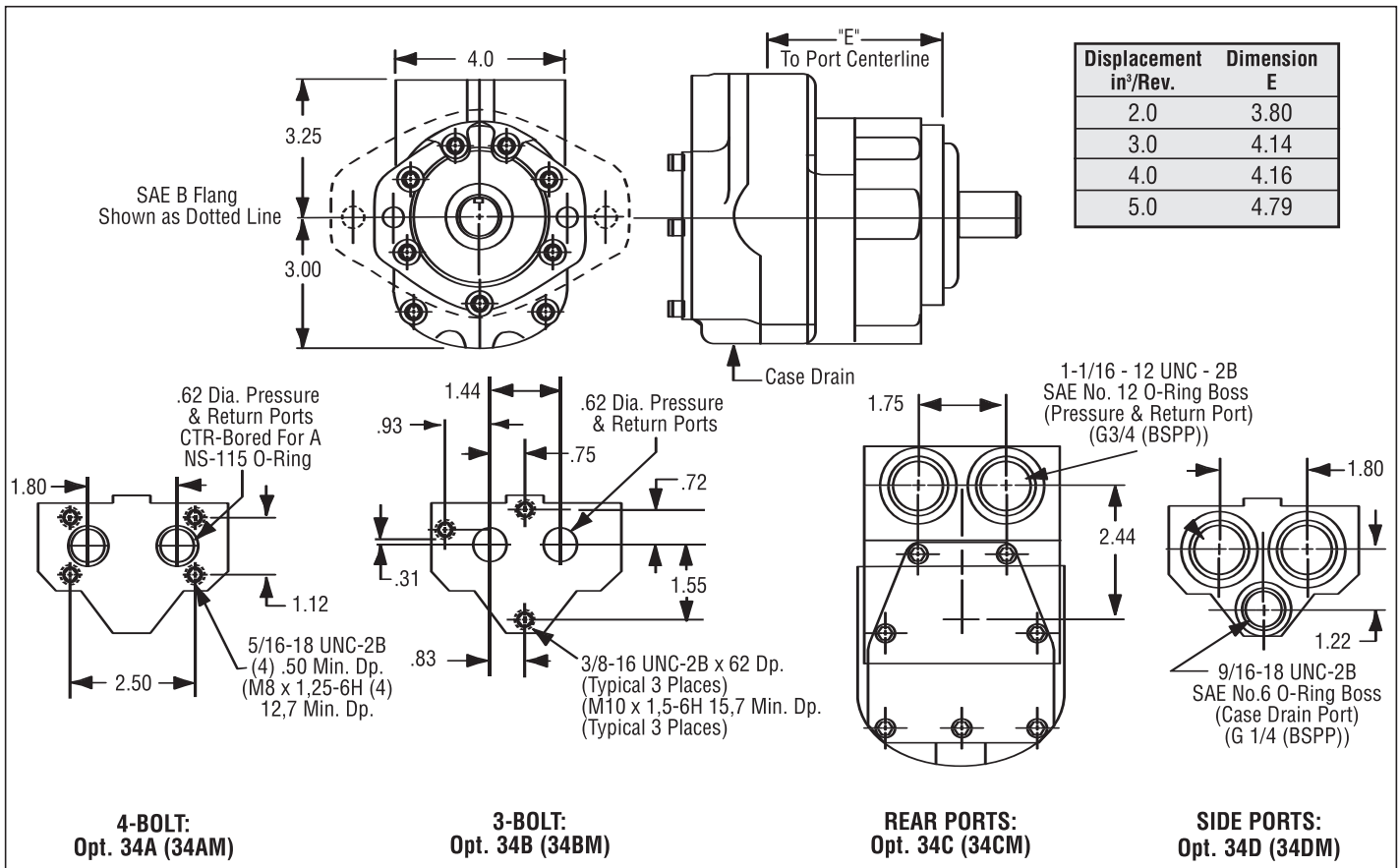
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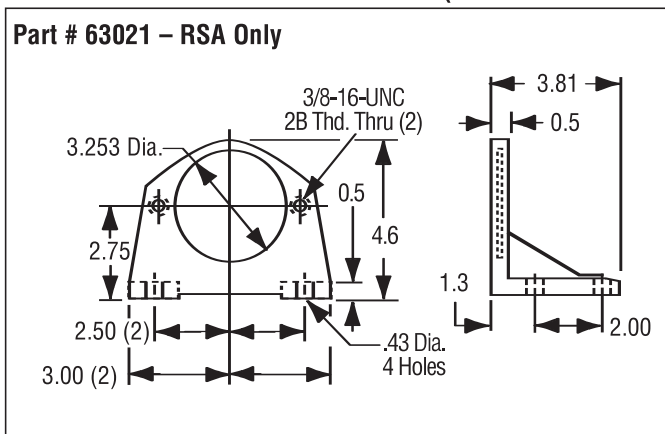


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RSA & RSB WITH MANIFOLD MOUNT and END OR SIDE PORTS



RSA FOOT MOUNTING BRACKET (Not Available on RSB)



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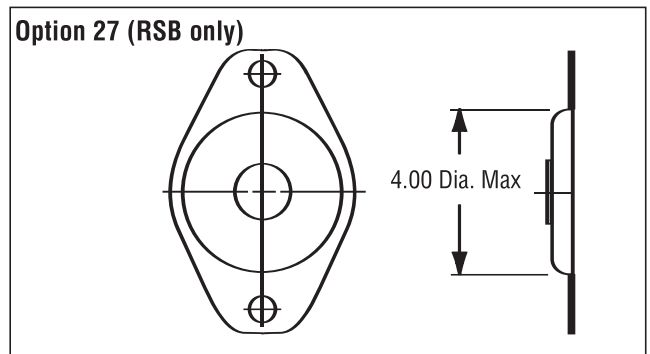
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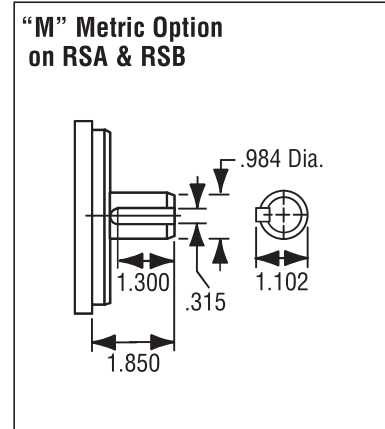
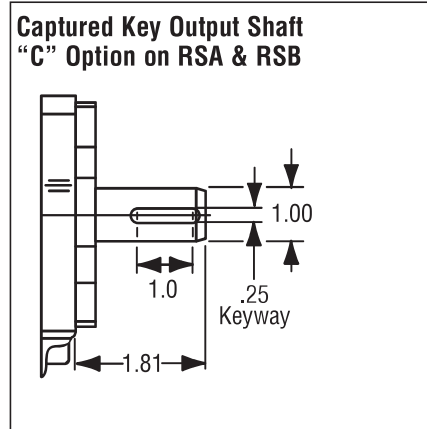
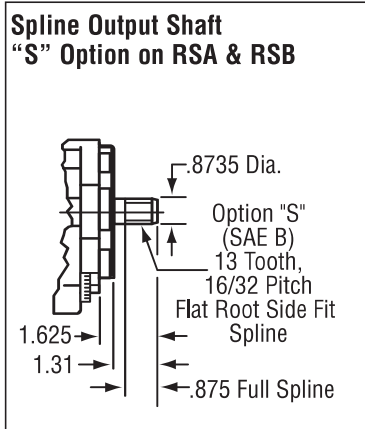
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RSB FRONT SEALING CAP OPTION

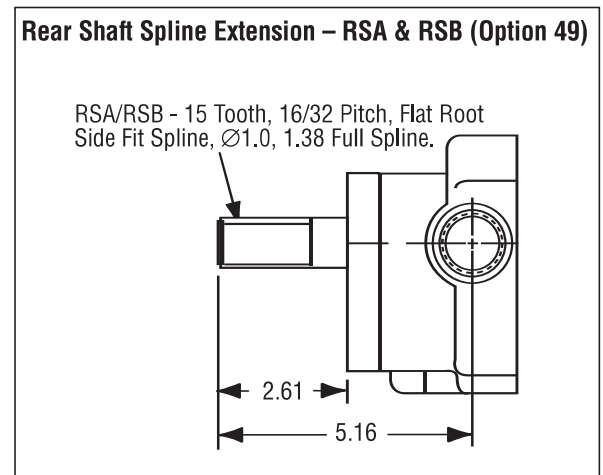
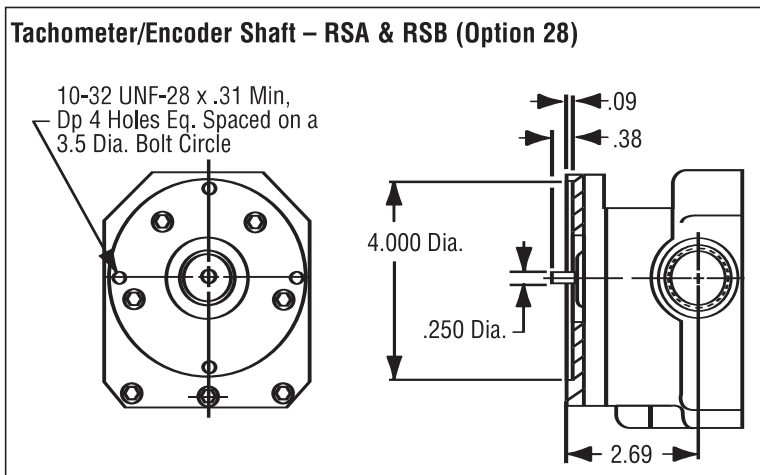
RSB motors have mounting flange pilot diameters that are interrupted by bolt holes. If another device (for example, a gearbox) is going to be mounted, an O-ring gasket on the pilot diameter will not produce a seal between the two. If the gear box or other such device does not have its own dynamic seal on its input shaft, then this motor option (#27) should be specified. Your motors then will have turned-down pilot diameters and this front sealing cap (with O-rings between the sealing cap and motor).



RSA & RSB OUTPUT SHAFT OPTIONS



RSA & RSB REAR SHAFT EXTENSION OPTIONS



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11.17.04

RSC units: Torque Ranges Shown as “lb. in. @ RPM” for 6.0 in³/revolution displacement

		Continuous Operation				Intermittent Operation – Less than Six Sec. / Min.		
		250 PSI	500 PSI	1000 PSI	1500 PSI	2000 PSI	2500 PSI	3000 PSI
FLOW GPM	1 GPM	218 @ 27	442 @ 17					
	2 GPM	219 @ 64	442 @ 55	898 @ 23	1368 @ 10			
	4 GPM	219 @ 138	440 @ 128	894 @ 100	1365 @ 87	1825 @ 68	2257 @ 42	
	8 GPM	209 @ 283	431 @ 272	884 @ 243	1355 @ 232	1815 @ 213	2248 @ 186	2709 @ 147
	12 GPM	200 @ 434	422 @ 424	875 @ 394	1346 @ 381	1806 @ 362	2238 @ 335	2699 @ 297
	16 GPM	190 @ 581	412 @ 572	865 @ 544	1336 @ 534	1796 @ 512	2227 @ 486	2690 @ 445
	20 GPM	181 @ 732	402 @ 722	854 @ 694	1326 @ 682	1785 @ 663	2218 @ 636	2681 @ 445
	25 GPM	169 @ 921	390 @ 910	842 @ 881	1313 @ 870	1772 @ 851	2207 @ 824	2670 @ 784
	30 GPM	157 @ 1111	377 @ 1102	829 @ 1070	1302 @ 1059	1761 @ 1038	2194 @ 1012	2657 @ 973
	35 GPM	145 @ 1298	366 @ 1289	818 @ 1258	1291 @ 1244	1750 @ 1226	2182 @ 1200	2645 @ 1162
	40 GPM	131 @ 1481	354 @ 1472	805 @ 1444	1278 @ 1432	1737 @ 1413	2168 @ 1386	2633 @ 1348
	50 GPM	107 @ 1857	331 @ 1847	782 @ 1818	1255 @ 1805	1713 @ 1788	2146 @ 1760	2608 @ 1723
60 GPM	84 @ 2233	306 @ 2222	758 @ 2194	1230 @ 2182	1690 @ 2163	2122 @ 2135	2586 @ 2097	

RSC units: Torque Ranges Shown as “lb. in. @ RPM” for 8.0 in³/revolution displacement

		Continuous Operation				Intermittent Operation – Less than Six Sec. / Min.		
		250 PSI	500 PSI	1000 PSI	1500 PSI	2000 PSI	2500 PSI	3000 PSI
FLOW GPM	1 GPM	298 @ 12	609 @ 5					
	2 GPM	294 @ 41	606 @ 34	1218 @ 17				
	4 GPM	292 @ 99	600 @ 91	1217 @ 74	1840 @ 59	2450 @ 40	3030 @ 19	
	8 GPM	279 @ 212	587 @ 205	1204 @ 186	1827 @ 173	2444 @ 153	3025 @ 131	3560 @ 103
	12 GPM	266 @ 310	574 @ 302	1191 @ 285	1814 @ 270	2431 @ 250	3012 @ 227	3547 @ 199
	16 GPM	253 @ 440	562 @ 432	1179 @ 416	1802 @ 401	2418 @ 382	2999 @ 360	3534 @ 330
	20 GPM	241 @ 554	549 @ 546	1166 @ 530	1789 @ 513	2405 @ 495	2986 @ 474	3520 @ 444
	25 GPM	225 @ 696	533 @ 690	1150 @ 670	1772 @ 657	2389 @ 638	2970 @ 615	3504 @ 587
	30 GPM	209 @ 838	517 @ 831	1133 @ 814	1756 @ 798	2373 @ 779	2954 @ 756	3488 @ 728
	35 GPM	193 @ 980	500 @ 972	1117 @ 956	1740 @ 942	2356 @ 922	2938 @ 900	3472 @ 872
	40 GPM	177 @ 1122	485 @ 1115	1102 @ 1097	1725 @ 1083	2340 @ 1064	2922 @ 1040	3456 @ 1012
	50 GPM	145 @ 1406	453 @ 1400	1069 @ 1380	1692 @ 1367	2308 @ 1348	2890 @ 1326	3424 @ 1295
60 GPM	113 @ 1691	421 @ 1682	1037 @ 1665	1660 @ 1650	2276 @ 1632	2858 @ 1610	3392 @ 1556	

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**RSC units: Torque Ranges Shown as “lb. in. @ RPM”
for 10.0 in³/revolution displacement**

Continuous Operation Intermittent Operation – Less than Six Sec. / Min.

	250 PSI	500 PSI	1000 PSI	1500 PSI	2000 PSI	2500 PSI	3000 PSI	
FLOW RATE	1 GPM	370 @ 16	760 @ 7					
	2 GPM	372 @ 38	768 @ 31	1545 @ 22				
	4 GPM	370 @ 84	765 @ 78	1540 @ 69	2340 @ 42	3098 @ 28	3824 @ 16	
	8 GPM	354 @ 169	749 @ 163	1525 @ 148	2320 @ 135	3100 @ 122	3820 @ 111	4535 @ 81
	12 GPM	338 @ 258	733 @ 252	1507 @ 238	2308 @ 226	3084 @ 212	3804 @ 200	4519 @ 182
	16 GPM	323 @ 353	717 @ 344	1492 @ 332	2290 @ 318	3068 @ 305	3785 @ 292	4500 @ 274
	20 GPM	306 @ 443	700 @ 436	1475 @ 424	2275 @ 412	3050 @ 398	3770 @ 386	4483 @ 367
	25 GPM	285 @ 556	682 @ 550	1453 @ 536	2254 @ 522	3032 @ 510	3752 @ 498	4465 @ 480
	30 GPM	266 @ 671	662 @ 666	1435 @ 652	2235 @ 639	3010 @ 625	3730 @ 612	4446 @ 594
	35 GPM	245 @ 784	640 @ 780	1415 @ 765	2216 @ 752	2991 @ 739	3711 @ 727	4427 @ 707
	40 GPM	226 @ 902	619 @ 894	1396 @ 882	2192 @ 868	2970 @ 855	3692 @ 844	4405 @ 825
50 GPM	185 @ 1125	581 @ 1119	1356 @ 1105	2152 @ 1093	2931 @ 1080	3650 @ 1068	4365 @ 1049	
60 GPM	146 @ 1350	540 @ 1346	1312 @ 1331	2112 @ 1322	2890 @ 1308	3608 @ 1296	4323 @ 1276	

Notes: Performance data shown above is typical at 156 SSU fluid viscosity. Actual data may vary slightly from unit to unit in production.

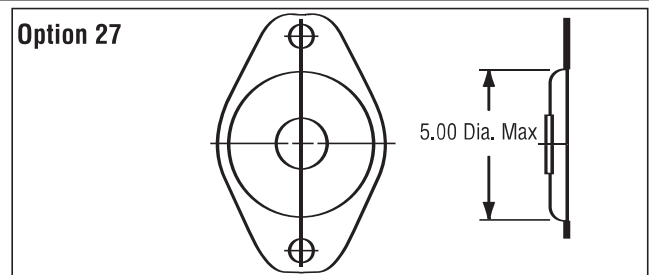
RSC WITH SAE C 2-BOLT FLANGE & SIDE PORTS @ 180°

Displacement in ³ /Rev.	A	B	C	D
6.0	4.18	5.15	6.46	.89
8.0	4.46	5.43	6.75	1.18
10.0	4.75	5.75	7.06	1.54

Notes: 1. All dimensions in mm and subject to change without notice. Always confirm with us that you are working with the most current data. 2. Consult factory for specific machining tolerances.

RSC FRONT SEALING CAP OPTION

RSC motors have mounting flange pilot diameters that are interrupted by bolt holes. If another device (for example, a gearbox) is going to be mounted, an O-ring gasket on the pilot diameter will not produce a seal between the two. If the gear box or other such device does not have its own dynamic seal on its input shaft, then this motor option (#27) should be specified. Your motors then will have turned-down pilot diameters and this front sealing cap (with O-rings between the sealing cap and motor).



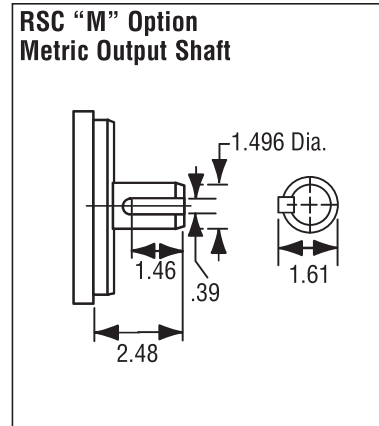
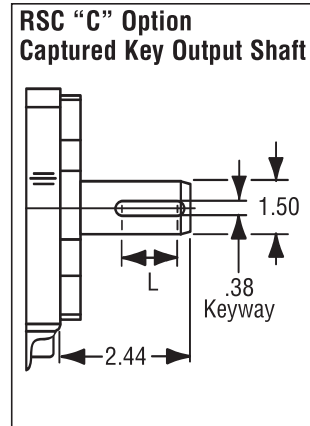
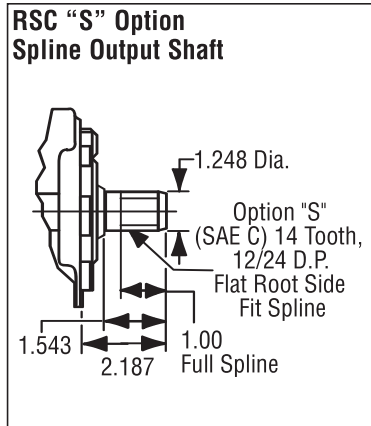
Hydraulic Motors, Rol-Seal® Units RSA, RSB, RSC, & MRS Series - TECHNICAL DATA

ENGLISH. (For Metric data, see www.vonruden.com/engr_library/rolseal/RSallModels_metric.pdf)

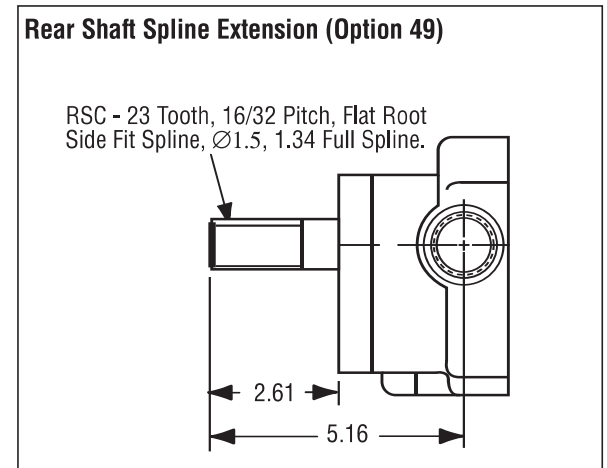
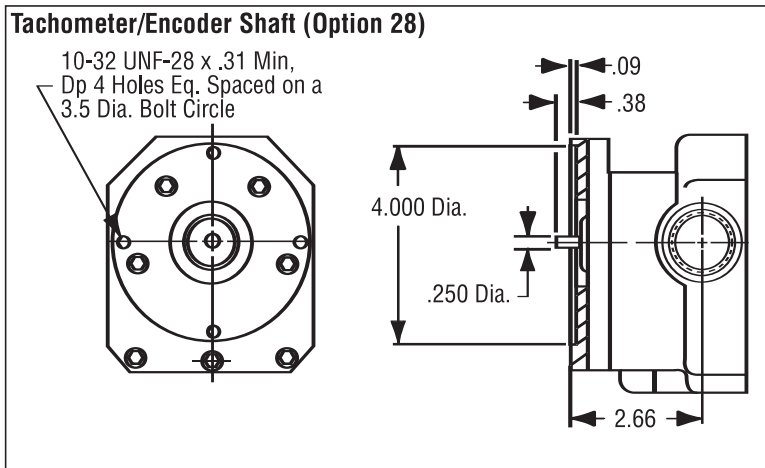


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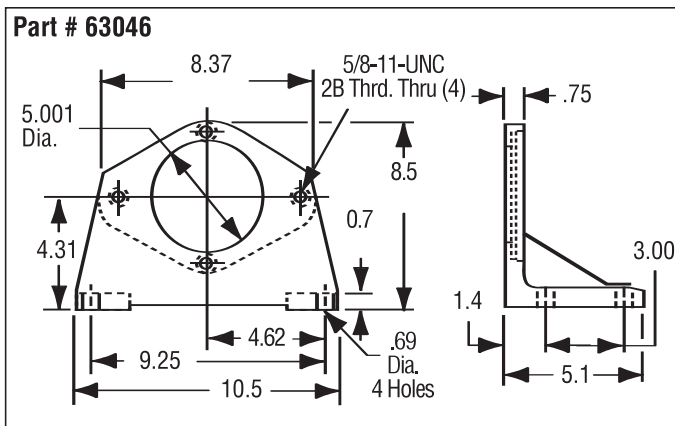
RSC OUTPUT SHAFT OPTIONS



RSC REAR SHAFT EXTENSION OPTIONS



RSC AVAILABLE FOOT MOUNTING BRACKET



Notes:

1. All dimensions in inches and subject to change without notice. Always confirm with us that you are working with the most current data.
2. Consult factory for specific machining tolerances.

Hydraulic Motors, Rol-Seal® Units RSA, RSB, RSC, & MRS Series – TECHNICAL DATA

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GENERAL MAINTENANCE ISSUES ON RSA, RSB & RSC

Fluids:

We recommend a premium quality, anti-wear type mineral based hydraulic fluid with a minimum oil viscosity of 70 ssu. Maximum operating temperature is 180° F.

Filtration:

A fluid cleanliness level of ISO 17/14 should be maintained at all times. Nominal filtration must be 25 micron or better.

Case Drain:

These motors are provided with a case drain port that must be connected to the reservoir with no more than 250 PSI surge pressure. Internal cross port check valves (option-24) can be provided when motors are not subject to instantaneous shock pressures (such as with dynamic braking).

POWER TRAIN ACCESSORIES – RSA, RSB & RSC

Motor Brakes



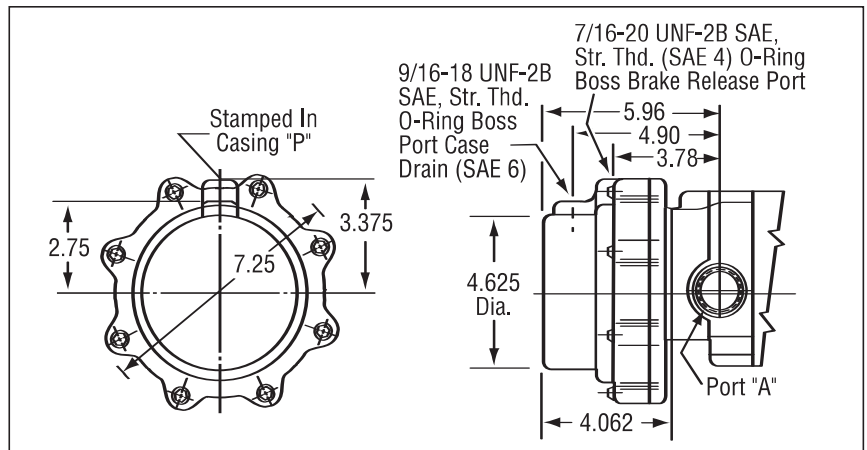
All Rol-Seal® motors can be equipped with a rear-mounted, normally on, wet friction disc type brakes. They will prevent creep under high static loads which might result from system leakage. They also should be used where positive locking of the motor shaft is required.

Maximum Release Pressure: 3000 PSI

Oil Volume: .6 in.³ for full release

Minimum Holding Capacity: See chart. Note that chart data assumes the use of mineral-based oil with no back pressure in release line .

In applications where excessive holding torque is a concern, please consult factory.



Brake Model	Minimum Holding Capacity at 250 PSI Release Pressure	Brake Model	Minimum Holding Capacity at 125 PSI Release Pressure
222	940 lb. in.	232	470 lb. in.
223	1410 lb. in.	233	705 lb. in.
224	1885 lb. in.	234	940 lb. in.
226	2820 lb. in.	236	1410 lb. in.
228	3760 lb. in.	238	1885 lb. in.
220	5170 lb. in.	230	2585 lb. in.

Notes: 1. Dimensions shown are in inches. Always confirm with us that you are working with the most current data.

2. All numbers are subject to change without notice.

Hydraulic Motors, Rol-Seal® Units RSA, RSB, RSC, & MRS Series – TECHNICAL DATA



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Planetary Gear Boxes for RSA, RSB & RSC

In addition to brakes, Von Ruden also can equip any of our Rol-Seal motors with a wide variety of Planetary Gearboxes. As you can see from the chart below, RSA Series units can be configured to meet virtually any application.

For those where space is a primary consideration, please take special note of our Series 200 offering. By incorporating the available Gear Reduction option, a 2, 3, 4, or 5 in³ displacement RSA motor and Series 200 gearbox can produce amazing torques from a surprisingly small overall package.

Complete dimensional and performance data for all our planetary gearboxes is available in either English or Metric on our web site.

If you prefer, your Von Ruden representative or our factory engineers will also provide whatever you request.



Gearbox Series	Maximum Output Torque lb. inches		Maximum Input Speed at No Load RPM	Maximum Shaft Radial Load/Inward Thrust Load Pounds (reference only)	Reduction Stages	Available Gear Reduction Ratios				
	Continuous/Intermittent									
200	12,500/21,000		2,000	6,500/4,000	SINGLE	5.19	5.86			
	14,500/24,000		2,500			7.07				
	15,000/25,000		2,000			8.06	9.95			
220	10,000/20,000		3,000	14,000/10,000	SINGLE	4.08	5.05			
			3,000		DOUBLE	16.65	20.62	25.53		
			3,000		TRIPLE	67.91	84.1	104.51	128.98	
						(Other ratios available up to 3284:1)				
280	14,000/28,000		3,000	14,000/10,000	SINGLE	4.08	5.05			
			3,000		DOUBLE	16.65	20.62	25.53		
			3,000		TRIPLE	67.91	84.1	104.51	128.98	
						(Other ratios available up to 3284:1)				
500	25,000/50,000		3,000	22,000/15,000	SINGLE	4.08	5.05			
			3,000		DOUBLE	16.65	20.62	25.53		
			3,000		TRIPLE	67.91	84.1	104.51	128.98	
						(Other ratios available up to 3284:1)				
616	27,500/33,000		1,800	18,000/7,800	SINGLE	5.2				
1300	65,000/130,000		3,000	45,000/30,000	SINGLE	4.42	6.00			
			3,000		DOUBLE	19.54	26.32	33.15	36	45
			3,000		TRIPLE	86.35	47.21	159.12	216	
						(Other ratios available up to 2276:1)				
2500	125,000/250,000		3,000	36,000/39,000	DOUBLE	20.25	25.88	29.58		
						37.80	40.25	51.43		
						(Other ratios available up to 6630:1)				
2520	125,000/250,000		3,000	51,000/44,000	DOUBLE	20.25	25.88	29.58		
						37.80	40.25	51.43		
						(Other ratios available up to 6630:1)				
6000	300,000/600,000		4,000	57,000/90,000	DOUBLE	24.66	38.56	60.29		
			4,000			70.39	89.38			
			4,000			110.08	139.76			
						(Other ratios available up to 90,000:1)				
10000	500,000/1,000,000		4,000	57,000/90,000	DOUBLE	26.48	41.41			
			4,000			75.60	96.00			
						(Other ratios available up to 62,000:1)				

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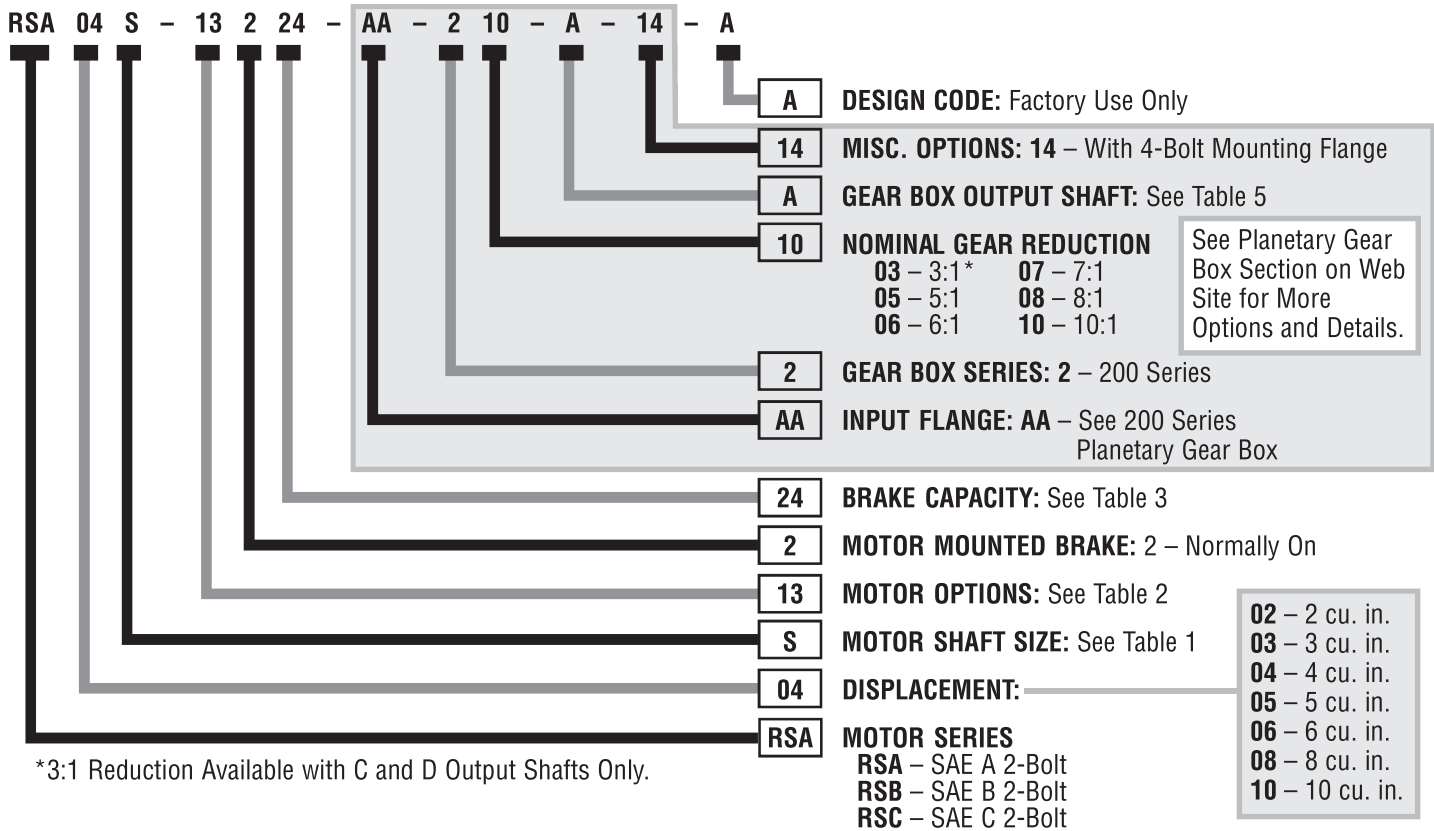
Hydraulic Motors, Rol-Seal Units RSA, RSB, RSC, & MRS Series – TECHNICAL DATA

ENGLISH. (For Metric data, see www.vonruden.com/engr_library/rolseal/RSAAllModels_metric.pdf)



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ROL-SEAL MOTORS/BRAKES/SAE GEAR BOXES (Models RSA, RSB & RSC Only)



<p>Table 1: MOTOR SHAFT SIZES</p> <p>RSA C – ø1" Keyed (.25" captured key) K – ø1" Keyed (.25" key) M – 25mm Keyed (8x7x32) S – 13 Tooth 16/32 Pitch Spline ø .875"*</p> <p>RSB C – ø1" Keyed (.25" captured key) K – ø1" Keyed (.25" key) M – 25mm Keyed (8x7x32) S – 13 Tooth 16/32 Pitch Spline ø .875"*</p> <p>RSC C – ø1" Keyed (.38" captured key) K – ø 1.5" Keyed (.375" key) M – 38mm Keyed (10x8x36) S – 14 Tooth 12/24 Pitch Spline ø 1.25"*</p> <p>KEYS INCLUDED *S Shafts are for 200 Series Box</p>	<p>Table 2: MOTOR OPTIONS</p> <p>13 – Viton Seals 24 – Internal Drain 27 – Front Sealing Cap (RSB & RSC Only) 28 – Tach. Adapter 33 – Side Ports 180° Metric (BSPP) RSA/B Work Ports G 3/4 Drain Port G 1/4 RSC Work Ports G 1 Drain Port G 1/2</p> <p>34A – Manifold, .62" Ports, 4 Bolt 34B – Manifold, .62" Ports, 3 Bolt 34C – Rear Ports, SAE 12 34D – Side Ports, SAE 12 34AM – Manifold, Metric 15,7 Ports, 4 Bolt 34BM – Manifold, Metric 15,7 Ports, 3 Bolt 34CM – Metric Rear Ports G 3/4 34DM – Metric Side Ports Ports G 3/4 49 – Splined Rear Shaft Extension 52 – For 95/5 Fluids</p>	<p>Table 3: BRAKE CAPACITY</p> <table border="1"> <thead> <tr> <th>250 PSI Release</th> <th>125 PSI Release</th> </tr> </thead> <tbody> <tr> <td>22 940 lb. in.</td> <td>32 470 lb. in.</td> </tr> <tr> <td>23 1410 lb. in.</td> <td>33 705 lb. in.</td> </tr> <tr> <td>24 1885 lb. in.</td> <td>34 940 lb. in.</td> </tr> <tr> <td>26 2820 lb. in.</td> <td>36 1410 lb. in.</td> </tr> <tr> <td>28 3760 lb. in.</td> <td>38 1885 lb. in.</td> </tr> <tr> <td>20 1570 lb. in.</td> <td>30 2585 lb. in.</td> </tr> </tbody> </table> <p>Table 5: GEAR BOX OUTPUT SHAFTS</p> <p>A – ø 2.125" Straight Keyed (.5" key) B – 16 Tooth 8/16 Pitch Spline ø 2.125" C – ø 1.875" Straight Keyed (.5" key) D – 13 Tooth 8/16 Pitch Spline ø 1.75"</p>	250 PSI Release	125 PSI Release	22 940 lb. in.	32 470 lb. in.	23 1410 lb. in.	33 705 lb. in.	24 1885 lb. in.	34 940 lb. in.	26 2820 lb. in.	36 1410 lb. in.	28 3760 lb. in.	38 1885 lb. in.	20 1570 lb. in.	30 2585 lb. in.
250 PSI Release	125 PSI Release															
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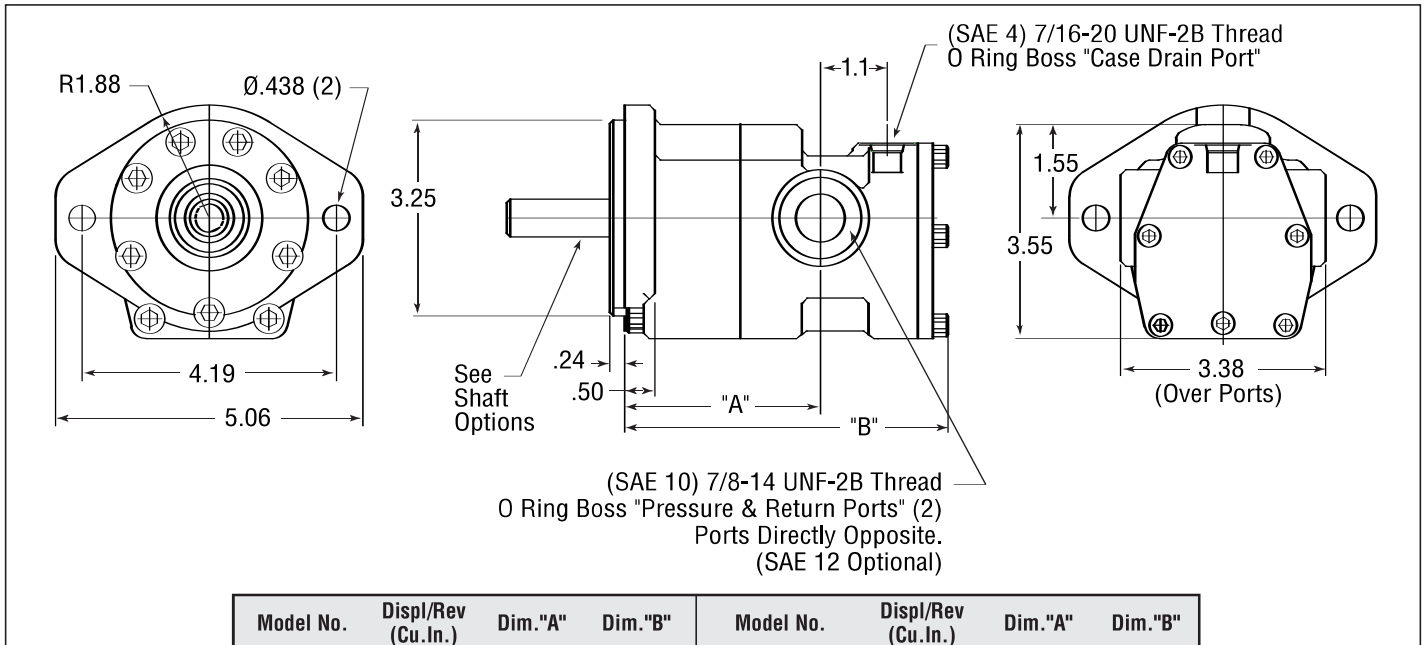
Hydraulic Motors, Rol-Seal® Units RSA, RSB, RSC, & MRS Series - TECHNICAL DATA

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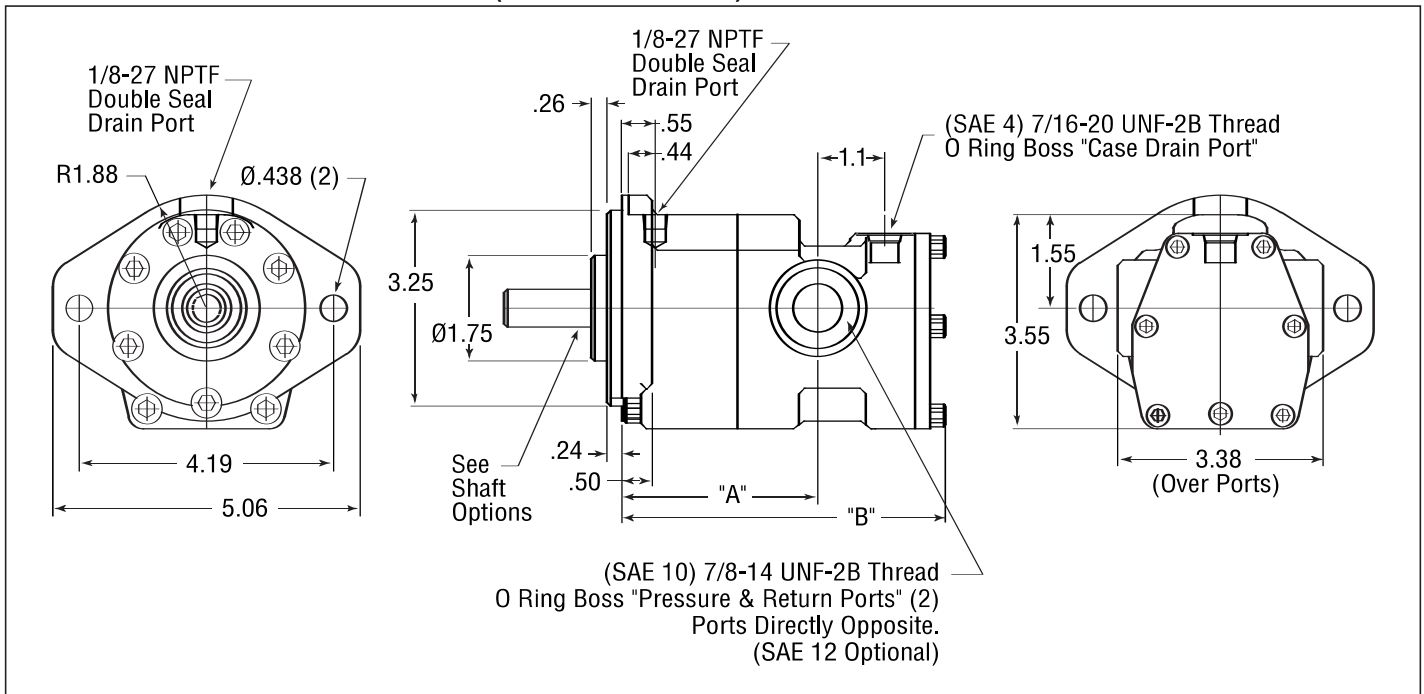
11.17.04

MODEL MRSA WITH STANDARD SAE A MOUNT



Model No.	Displ/Rev (Cu.In.)	Dim."A"	Dim."B"	Model No.	Displ/Rev (Cu.In.)	Dim."A"	Dim."B"
MRSA0022	.22	2.98	5.08	MRSA0070	.70	3.22	5.32
MRSA0038	.38	2.98	5.08	MRSA0085	.85	3.22	5.32
MRSA0045	.45	2.98	5.08	MRSA0100	1.00	3.22	5.32
MRSA0060	.60	2.98	5.08				

MODEL MRSA WITH DOUBLE SEALS (OPTIONS 17 & 36)



Notes: 1. All dimensions in inches and subject to change without notice. Always confirm with us that you are working with the most current data.
2. Consult factory for specific machining tolerances.

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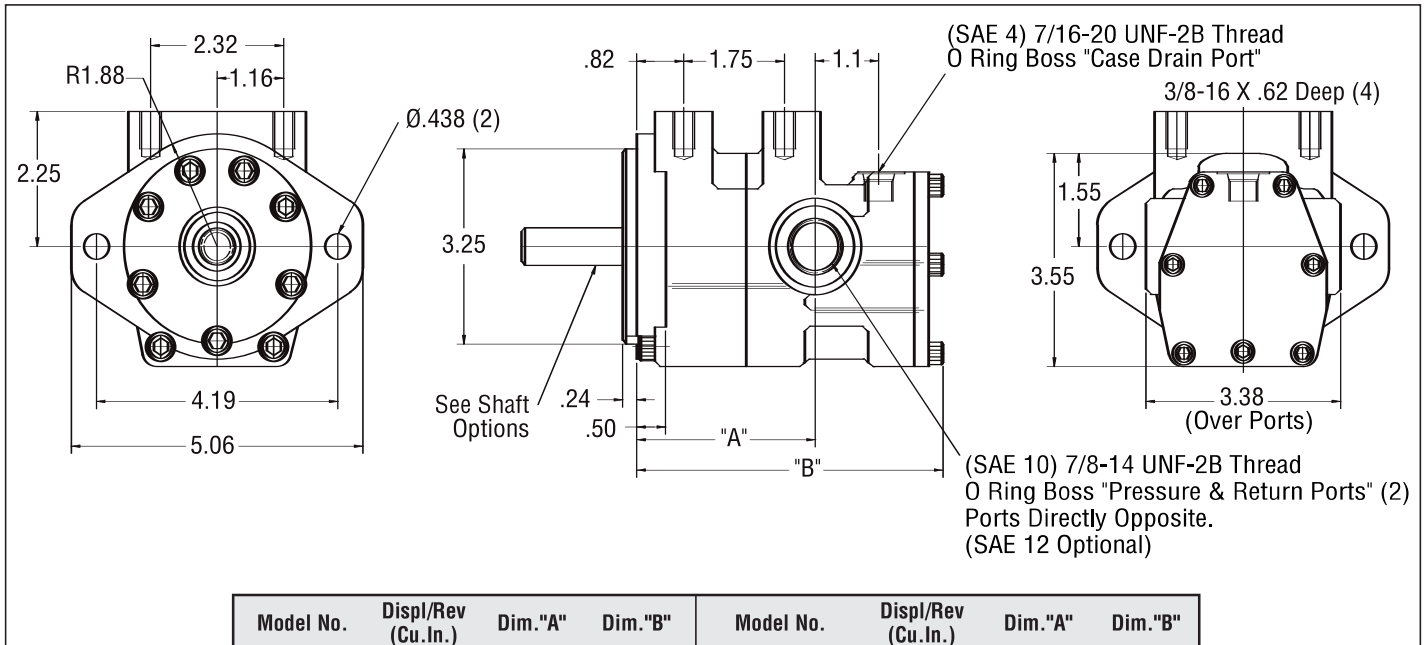
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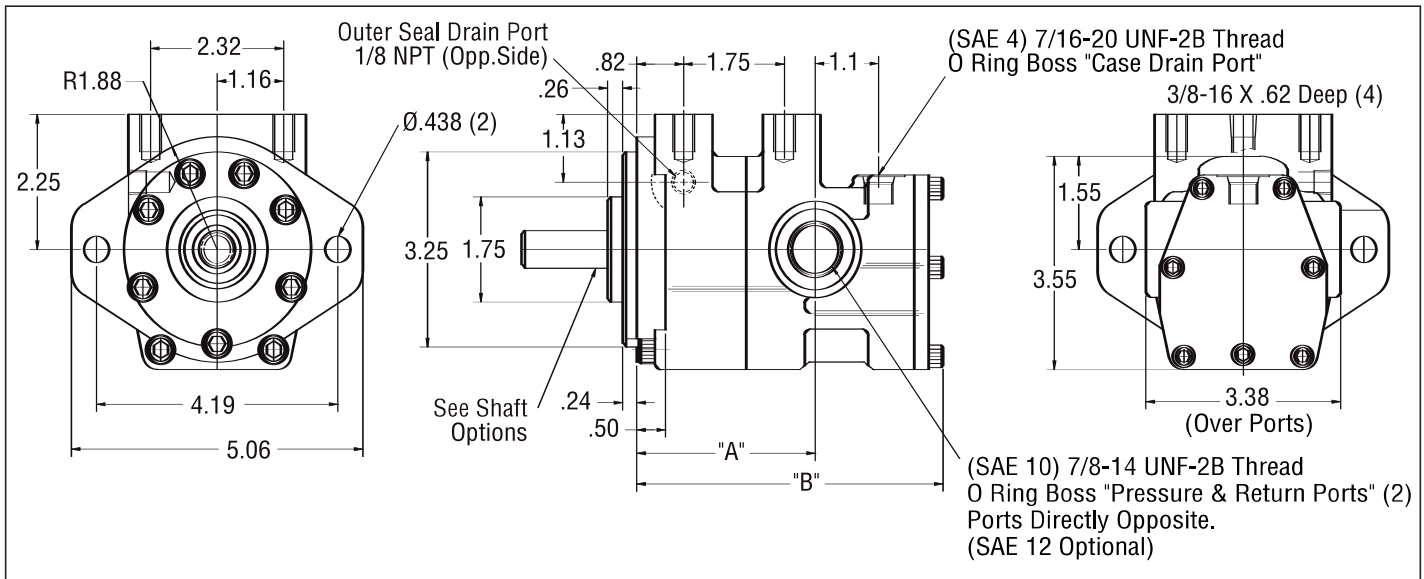
11.17.04

MODEL MRSA WITH FOOT MOUNT (OPTION-15)



Model No.	Displ/Rev (Cu.In.)	Dim."A"	Dim."B"	Model No.	Displ/Rev (Cu.In.)	Dim."A"	Dim."B"
MRSA0022	.22	2.98	5.08	MRSA0070	.70	3.22	5.32
MRSA0038	.38	2.98	5.08	MRSA0085	.85	3.22	5.32
MRSA0045	.45	2.98	5.08	MRSA0100	1.00	3.22	5.32
MRSA0060	.60	2.98	5.08				

MODEL MRSA WITH DOUBLE SEAL (OPTIONS 17 & 36) & FOOT MOUNT (OPTION 15)



Notes: 1. All dimensions in inches and subject to change without notice. Always confirm with us that you are working with the most current data.
2. Consult factory for specific machining tolerances.

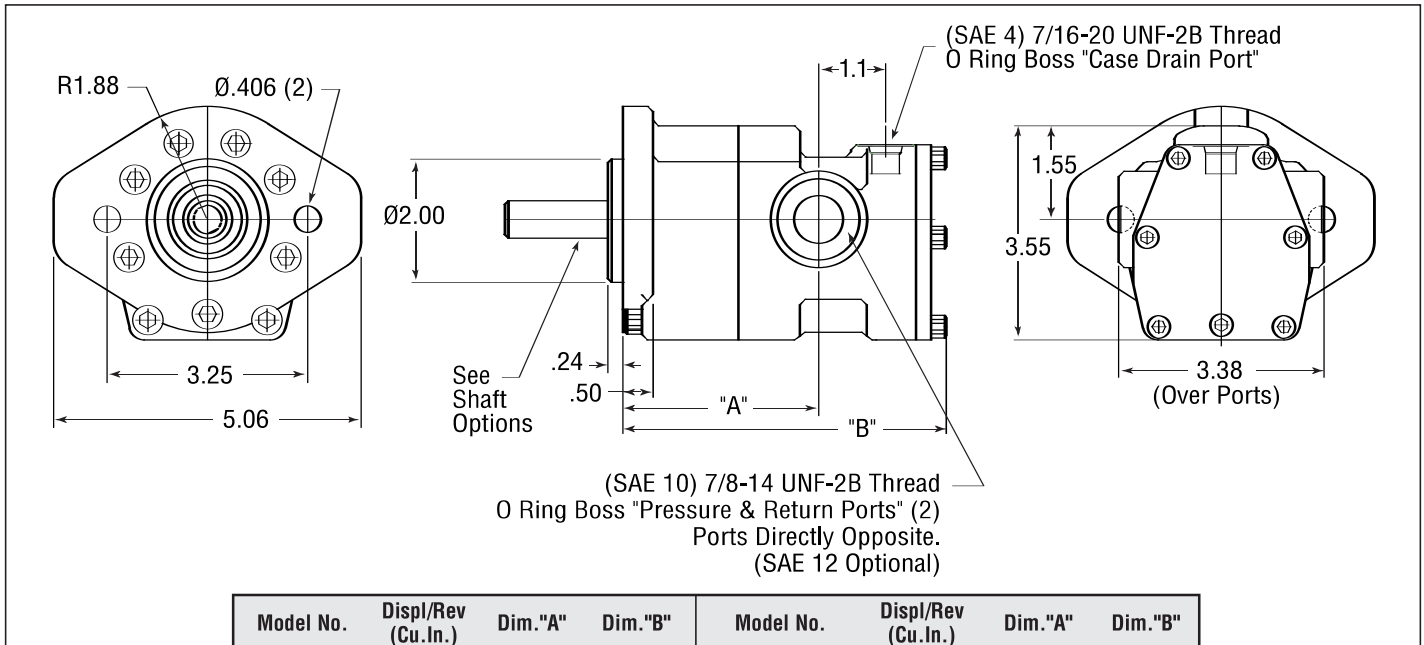
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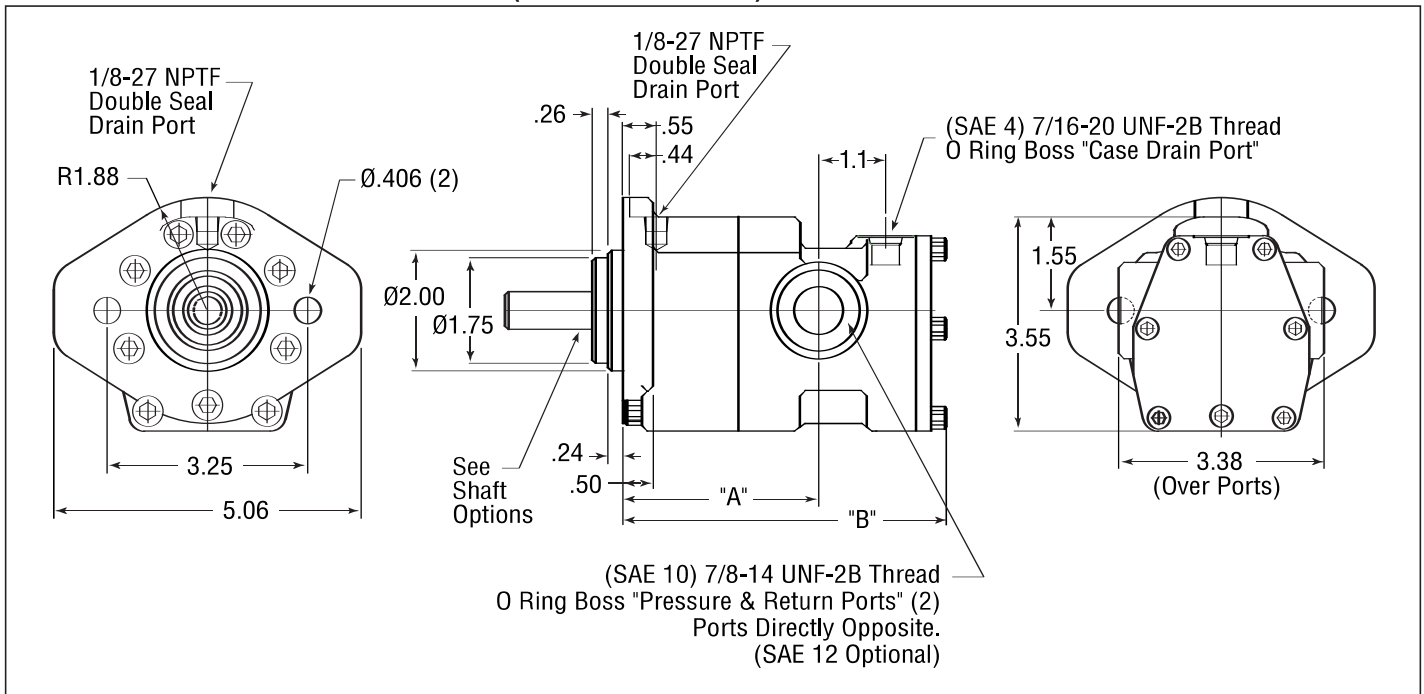
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WITH STANDARD SAE AA MOUNT (ORDER MODEL MRSAA)



Model No.	Displ/Rev (Cu.In.)	Dim. "A"	Dim. "B"	Model No.	Displ/Rev (Cu.In.)	Dim. "A"	Dim. "B"
MRSAA0022	.22	2.98	5.08	MRSAA0070	.70	3.22	5.32
MRSAA0038	.38	2.98	5.08	MRSAA0085	.85	3.22	5.32
MRSAA0045	.45	2.98	5.08	MRSAA0100	1.00	3.22	5.32
MRSAA0060	.60	2.98	5.08				

MODEL MRSAA WITH DOUBLE SEALS (OPTIONS 17 & 36)



Notes: 1. All dimensions in inches and subject to change without notice. Always confirm with us that you are working with the most current data.
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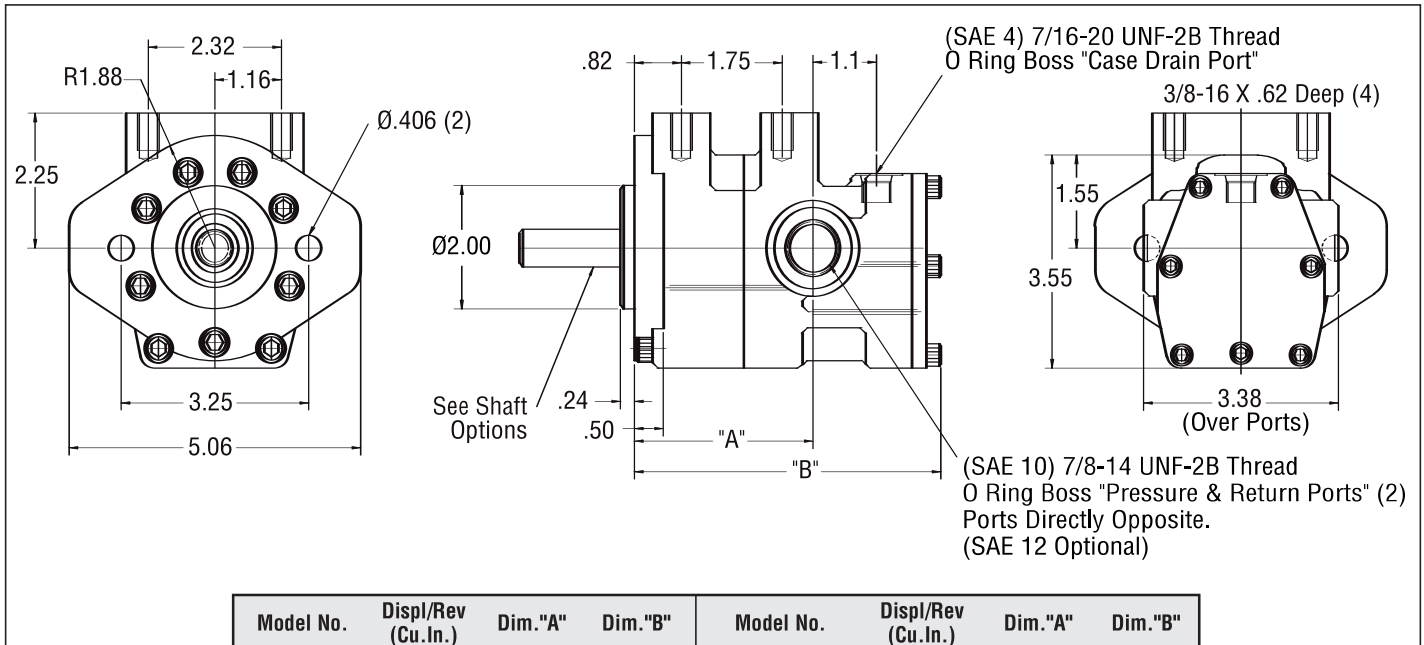
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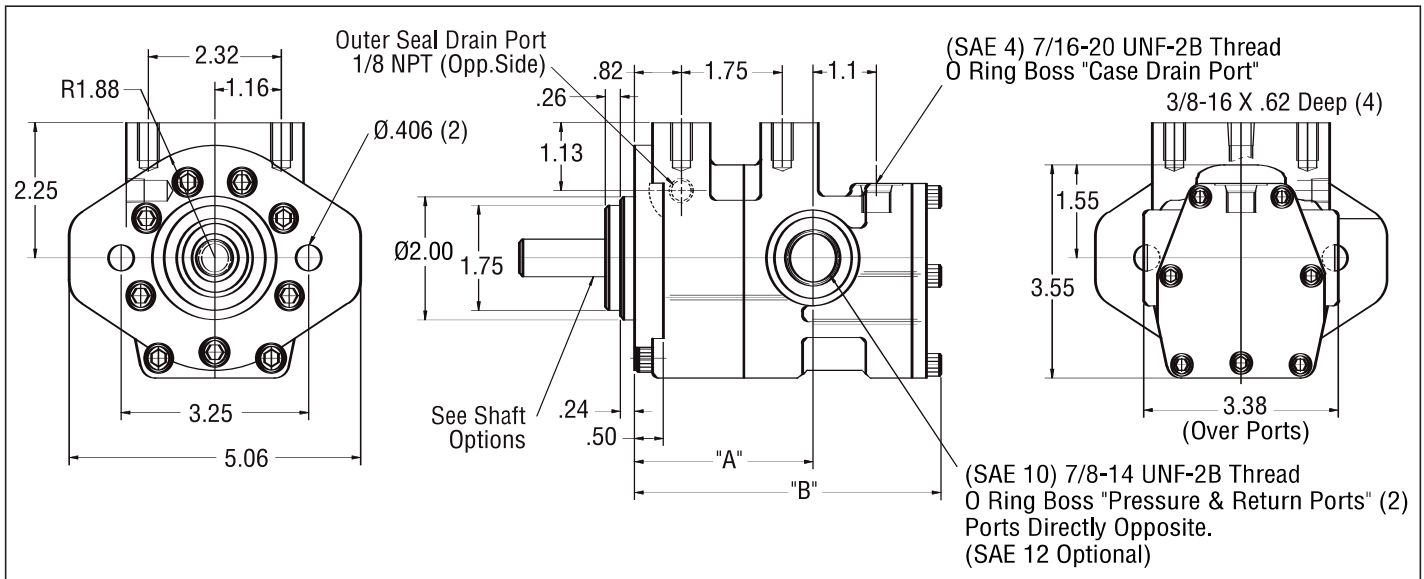
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MODEL MRSAA WITH FOOT MOUNT (OPTION-15)



Model No.	Displ/Rev (Cu.In.)	Dim."A"	Dim."B"	Model No.	Displ/Rev (Cu.In.)	Dim."A"	Dim."B"
MRSAA0022	.22	2.98	5.08	MRSAA0070	.70	3.22	5.32
MRSAA0038	.38	2.98	5.08	MRSAA0085	.85	3.22	5.32
MRSAA0045	.45	2.98	5.08	MRSAA0100	1.00	3.22	5.32
MRSAA0060	.60	2.98	5.08				

MODEL MRSAA WITH DOUBLE SEAL (OPTIONS 17 & 36) & FOOT MOUNT (OPTION 15)



Notes: 1. All dimensions in inches and subject to change without notice. Always confirm with us that you are working with the most current data.
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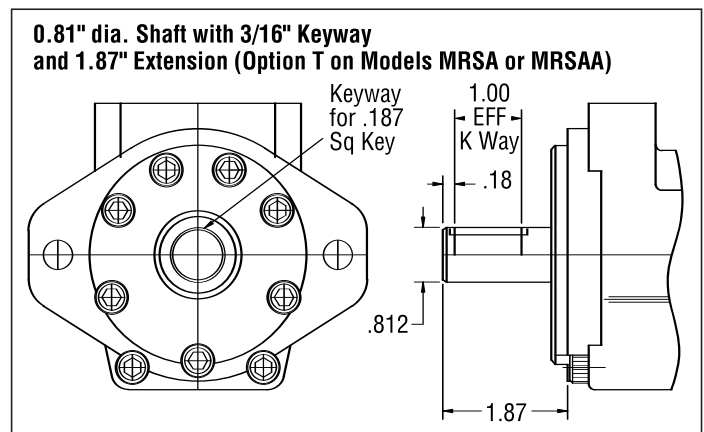
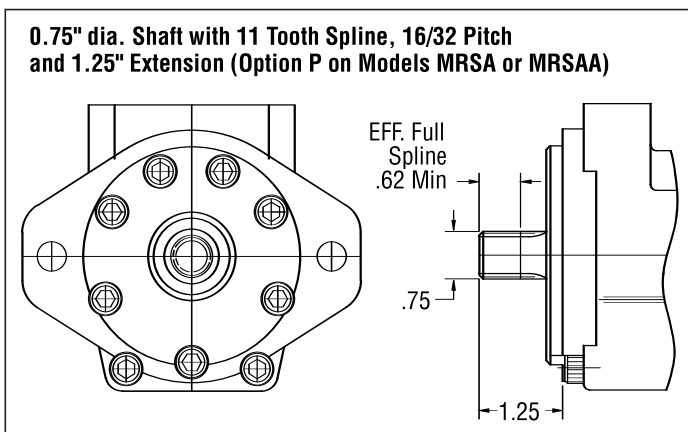
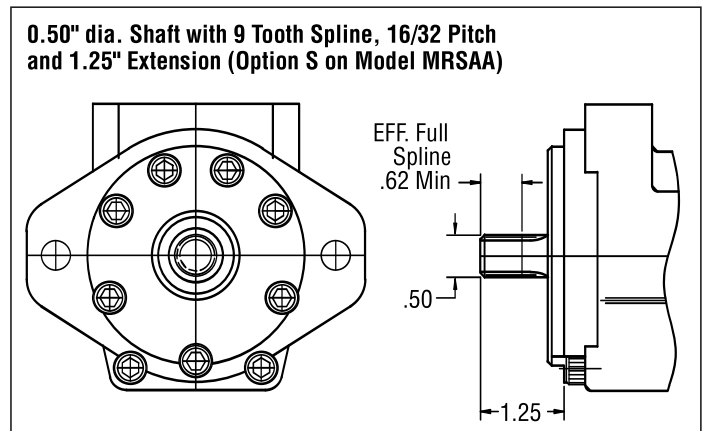
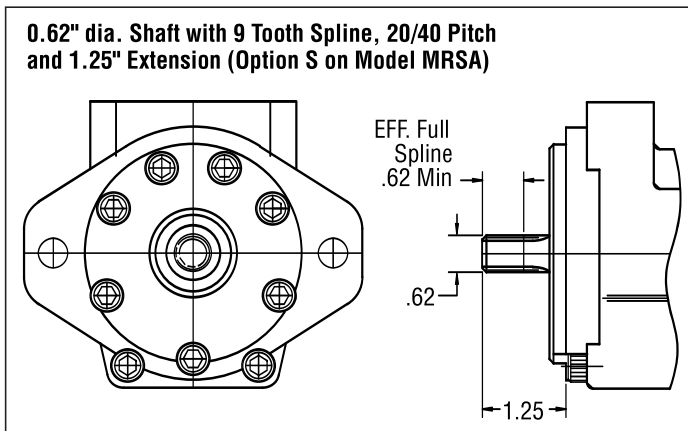
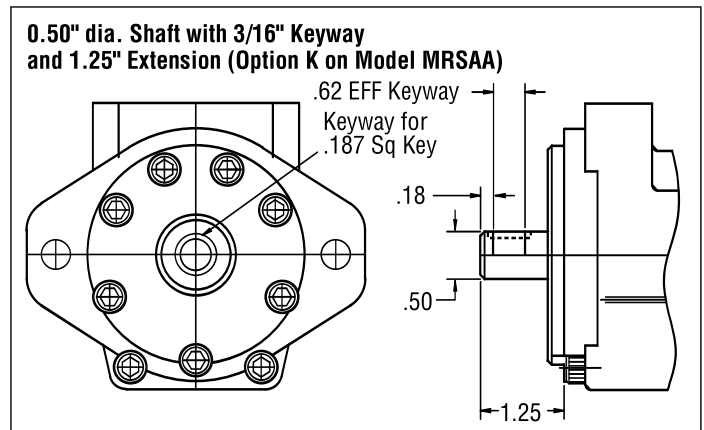
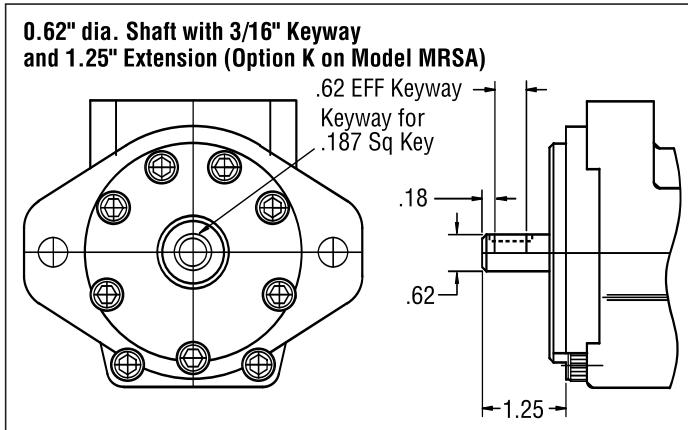
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MRS OUTPUT SHAFT OPTIONS



See Next Page for More Output Shaft Options

- Notes: 1. All dimensions in inches and subject to change without notice. Always confirm with us that you are working with the most current data.
2. Consult factory for specific machining tolerances.

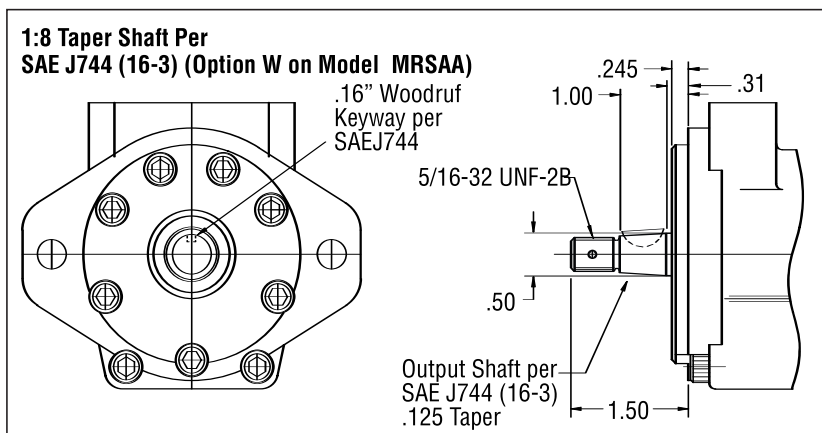
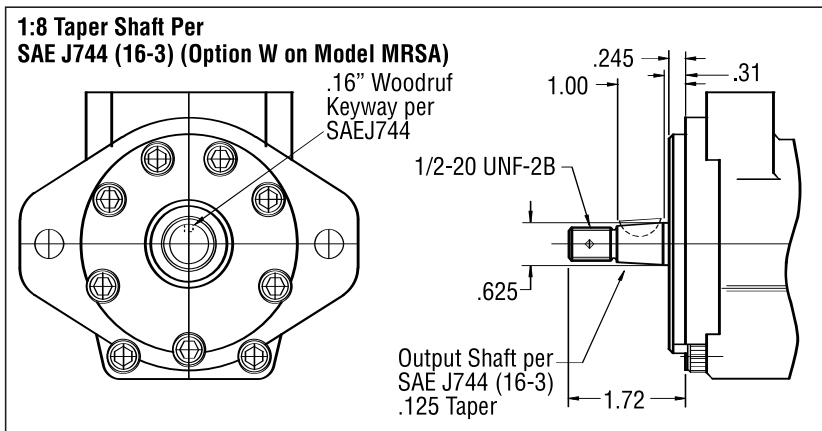
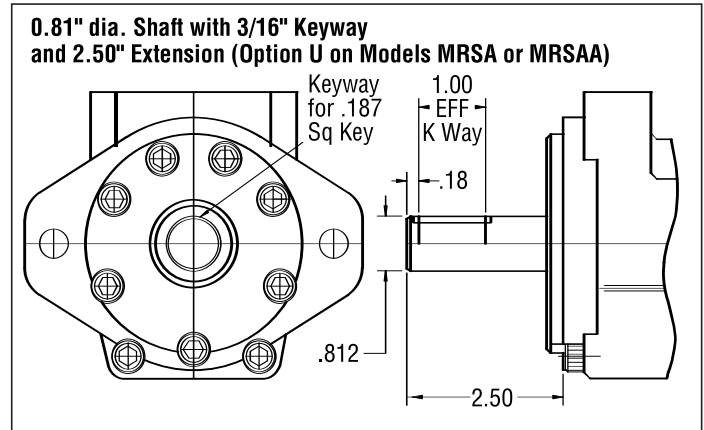
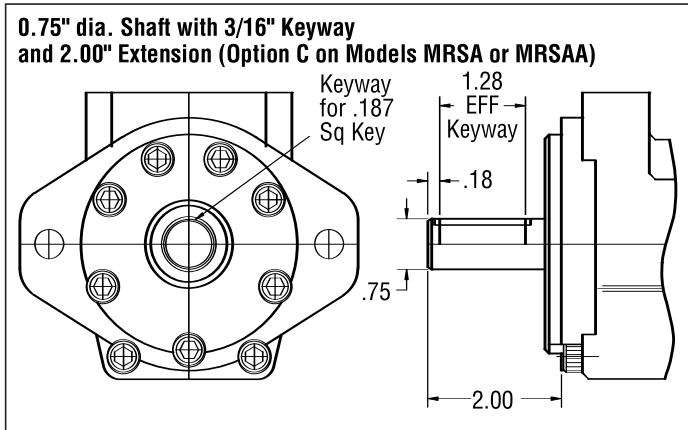
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MRS OUTPUT SHAFT OPTIONS (continued)



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2. Consult factory for specific machining tolerances.

Hydraulic Motors, Rol-Seal® Units RSA, RSB, RSC, & MRS Series – TECHNICAL DATA

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OPERATION & MAINTENANCE DATA ON MRS UNITS

Fluids:

We recommend a premium quality, anti-wear type mineral based hydraulic fluid with a minimum oil viscosity of 70 ssu. Maximum operating temperature is 180° F.

Filtration:

A fluid cleanliness level of ISO 17/14 should be maintained at all times. Nominal filtration must be 25 micron or better.

Case Drain:

These motors are provided with a case drain port that must be connected to the reservoir with no more than 250 PSI surge pressure. Internal cross port check valves (option-24) can be provided when motors are not subject to instantaneous shock pressures (such as with dynamic braking).

MRS MOTOR MODEL/ORDER NOMENCLATURE

MRSA – 0060 – K – 15 – A

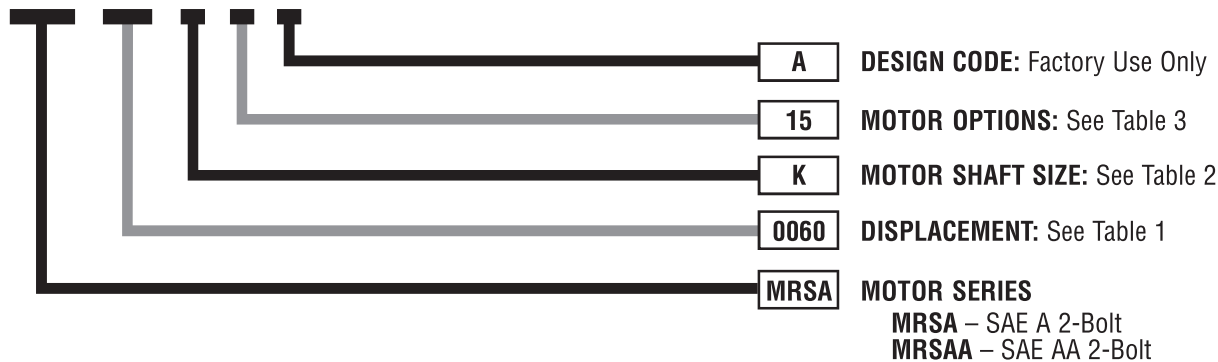


Table 1 MOTOR DISPLACEMENTS	Table 2 MOTOR SHAFT SIZES	Table 3 MOTOR OPTIONS
0022 – 0.22 cu. in. 0038 – 0.38 cu. in. 0045 – 0.45 cu. in. 0060 – 0.60 cu. in. 0070 – 0.70 cu. in. 0085 – 0.85 cu. in. 0100 – 1.00 cu. in. Note: Maximum Displacement 1.138 cu. in.	MRSA K – 0.62" Keyed, (0.187" key) 1.25" Ext. S – 0.62" 9T Spline, 20/40, 1.25" Ext. C – 0.75" Keyed, (0.187" key) 2.00" Ext. P – 0.75" 11T Spline, 16/32, 1.25" Ext. T – 0.812" Keyed (0.187" key) 1.875" Ext. U – 0.812" Keyed (0.187" key) 2.50" Ext. W – 0.625" 1:8 Taper, SAE J744 MRSAA K – 0.50" Keyed, (0.187" key) 1.25" Ext. S – 0.50" 9T Spline, 16/32, 1.25" Ext. C – Same as MRSA above P – Same as MRSA above T – Same as MRSA above U – Same as MRSA above W – 0.50" 1:8 Taper, SAE J744 KEYS INCLUDED	15 – Foot Mount 17 – High Pressure Mechanical Seal 24 – Internal Drain 28 – Tach. Adapter 34 – SAE #12 Ports 36 – Secondary Seal (Required with Option 17.) Threaded Drain Hole Between Seals – 0.125" NPT. Adds 0.25" to Snout. 49 – Rear Shaft Extension (Not Available with Option 17)

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ROL-SEAL® Hydraulic Motors OVERVIEW DOCUMENT



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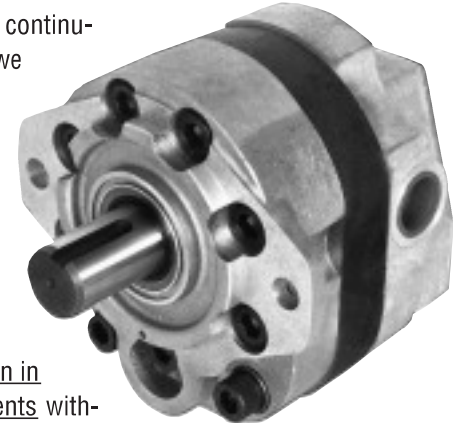
ENGLISH. (For Metric data, see www.vonruden.com/hydraulic_motors/rolseal/rol-seal_oview_met.html)

For almost 40 years, Von Ruden's Rol-Seal® Rotary Abutment hydraulic motors have been the preferred choice for designers working on applications where normal motors produce marginal or unsatisfactory results. Essentially Rol-Seal motors deliver four advantages:

- 1. Higher Starting Torque:** Typically this is in the 92-94% range. That means overall hydraulic systems savings because designers can use smaller motors. Higher starting torque also means increased vehicle gradeability and more drawbar pull.
- 2. Higher Running Torque:** Friction loss and viscous drag at high speed on larger displacement Rol-Seal motors are lower due to the internal rolling contact seal elements. Large flow passages reduce internal pressure drop. Typical breakaway pressure at a no load condition is less than 10 psi.
- 3. More Useable Speed:** These motors run smoothly at low speed (less than 10 RPM) with minimal performance loss at high speeds. (See chart below.) Their low speed characteristics often eliminate the need for additional speed reduction.
- 4. Long Life:** Performance stays relatively constant over the motor's working life. Internal rolling seal elements are essentially frictionless and wear compensating. The rolling seal element design also tolerates a high degree of contamination so the motors perform well in free-wheeling applications.

High Speed Modifications for the MRS Series:

For applications that require continuous speeds over 2000 rpm we have modified the basic Rol-Seal design to produce small-displacement, 6000 rpm units with surprisingly robust, 300 lb. radial load capacities. These also are available in a Double Seal configuration that provides extra protection in dirt or dust-laden environments without increasing their overall space requirements!



Rol-Seal's Rotary Abutment Advantage: Especially on the larger models where the positive contact provided by rolling seals between rotor and housing and between abutments and seal plates creates virtually frictionless operation – these motors are relatively insensitive to wear over their exceedingly long working life.

To simplify your design project, we also build Motor Brakes and Planetary Gear Boxes that are compatible with most models.

Complete technical data for all these is on our web site. However, we and our global network of representatives always welcome the opportunity to answer any questions you might have and make recommendations that could help simplify your task. Consider us to be always at your service.

Note: For applications where concerns for precision and repeatability are paramount, our line of Axial Vane hydraulic motors is also available.

ROL-SEAL GENERAL PERFORMANCE SPECIFICATIONS

		DISPLACEMENT (in ³ /rev.)													
		Models MRSA & MRSAA							Models RSA & RSB				Model RSC		
		.22	.38	.45	.60	.70	.85	1.00	2.0	3.0	4.0	5.0	6.0	8.0	10.0
Flow (gpm)	Continuous	4.8	8.3	9.8	13.0	15.2	17.4	21.7	18	20	18	17	39	42	39
	Intermittent	6.7	11.5	13.6	18.2	21.2	25.8	30.3	31	39	44	39	52	59	61
Max. Speed ^{1,4} (rpm)	Continuous	6000	6000	6000	6000	6000	6000	6000	2000	1500	1000	750	1500	1200	900
	Intermittent	7000	7000	7000	7000	7000	7000	7000	3500	3000	2500	1800	2000	1700	1400
ΔPressure ^{2,3,4} (psi)	Continuous	3000	3000	3000	3000	2500	2500	2500	2500	2250	2000	2000	2000	2000	2000
	Intermittent	4000	4000	4000	4000	3500	3500	3500	3000	3000	3000	3000	3000	3000	3000
	Peak	5000	5000	5000	5000	4500	4500	4500	3750	3750	3500	3500	3500	3500	3500
Max. Theoretical Torque (lb. in.)	Continuous	105	182	215	287	334	406	478	796	1075	1273	1592	1910	2547	3184
	Intermittent	140	242	287	382	446	541	637	955	1433	1910	2388	2866	3821	4777
Weight (lb.)		11.5	11.6	11.7	11.8	12.3	12.4	12.6	13	14	15	16	36	39	42

Notes: 1. Intermittent conditions must be less than 10% of every minute.
2. Inlet and return pressures are not to exceed ratings listed above.

3. Peak conditions are to be less than 1% of every minute.
4. Intermittent speed and peak pressure must not occur simultaneously.

ROL-SEAL Hydraulic Motors OVERVIEW DOCUMENT



ENGLISH. (For Metric data, see www.vonruden.com/hydraulic_motors/rolseal/rol-seal_oview_met.html)

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ROTATIONAL MOMENT OF INERTIA (WK²)

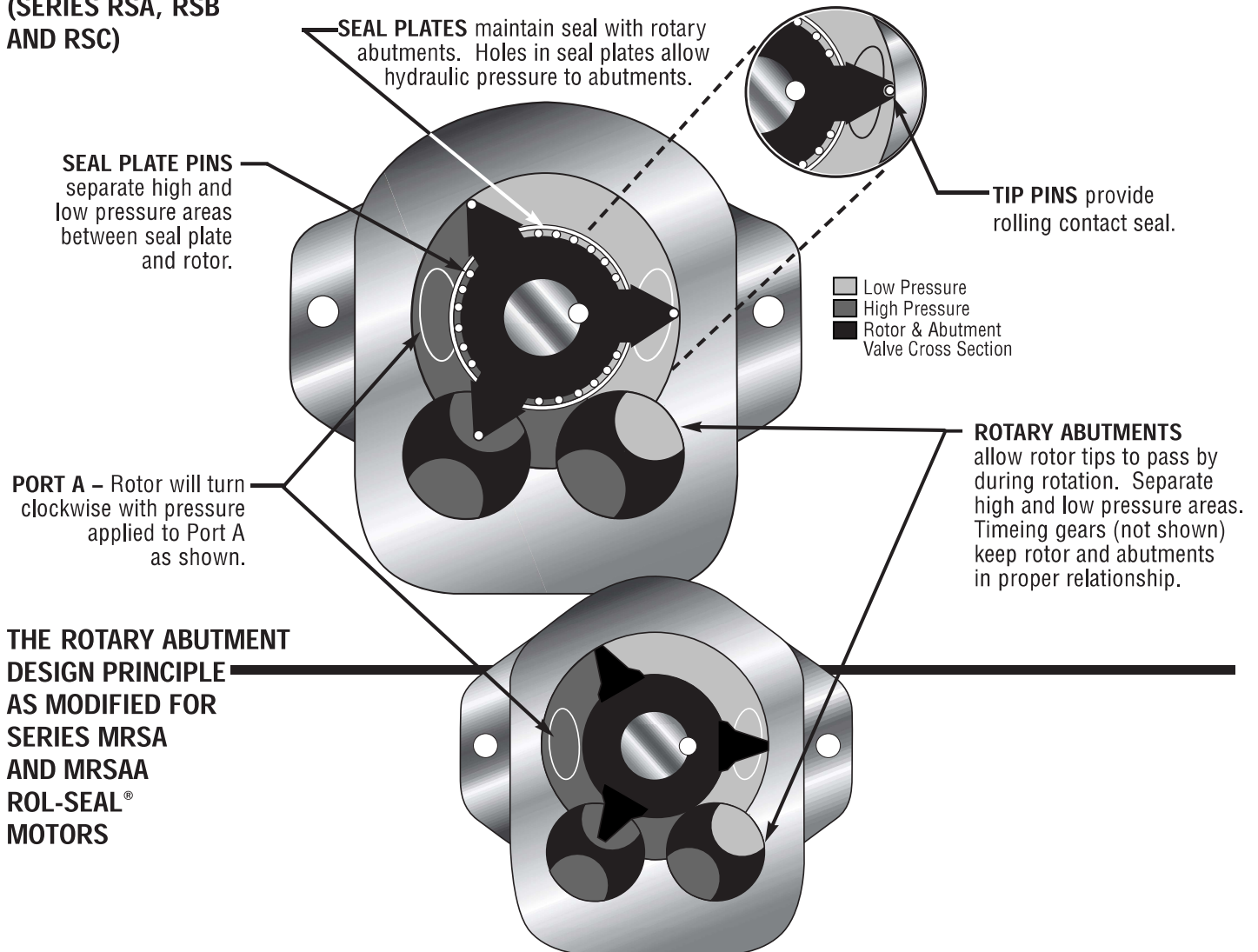
Model	Displacement (in ³ /rev)	lb-in ²
MRSA/MRSAA	.22 – 1.00	Contact Factory
RSA/RSB	2.0	1.23
RSA/RSB	3.0	1.42
RSA/RSB	4.0	1.61
RSA/RSB	5.0	1.80
RSC	6.0	7.25
RSC	8.0	8.15
RSC	10.0	9.04

SHAFT RADIAL AND THRUST LOAD CAPACITY

Model	Radial	Thrust
MRSA/MRSAA	300 lbs. ¹	250 lbs.
RSA/RSB	600 lbs. ²	600 lbs.
RSC	1000 lbs. ³	1000 lbs.

Notes: 1. Based on load located .5" from mounting flange.
2. Based on load located 1" from mounting flange.
3. Based on load located 1.5" from mounting flange.

THE ROTARY ABUTMENT DESIGN PRINCIPLE AND THE FEATURES BUILT INTO THE ROL-SEAL® MOTOR (SERIES RSA, RSB AND RSC)



THE ROTARY ABUTMENT DESIGN PRINCIPLE AS MODIFIED FOR SERIES MRSA AND MRSAA ROL-SEAL® MOTORS

ROL-SEAL Hydraulic Motors OVERVIEW DOCUMENT



ENGLISH. (For Metric data, see www.vonruden.com/hydraulic_motors/rolseal/rol-seal_oview_met.html)

COMPLETE, OFF-THE-SHELF OR CUSTOM ENGINEERED DRIVE PACKAGES

For customers whose applications require a subassembly of pre-engineered hydraulic drive components, Von Ruden Manufacturing offers a full line of compatible products. By combining a Rol-Seal motor with either (or both) the brake and gear box components referenced earlier on these pages, we can deliver a single unit that simplifies your inventory and lowers your assembly costs.

If the Rol-Seal motors described here do not meet the requirements of your application, we suggest you also review the specifications of our Axial Vane motors. Often, these are the ideal solution when highly accurate and repeatable positioning is paramount. They too can be mated to our brakes and gear boxes when subassemblies are preferred.

We also have a complete line of Overhung Load Adaptors for applications that include high radial and thrust loads on the motor. In many situations they also provide a maintenance advantage by simplifying motor removal and protecting the motor shaft seal from contamination.

When required, you'll also find that our extensive line of right angle and speed reduction gearboxes meet the same high performance and quality standards as all of Von Ruden Manufacturing's products.

Finally, if yours is an application that requires a custom built component of the type we manufacture, our engineers always welcome the opportunity to discuss those needs. Von Ruden's new manufacturing facilities are fully equipped to handle a wide variety of that type work.

Complete engineering data on all our products is available on our web site, through your local Von Ruden representative, or by contacting our factory directly at the number below.



ROL-SEAL GENERAL MAINTENANCE ISSUES

Fluids:

We recommend a premium quality, anti-wear type mineral based hydraulic fluid with a minimum oil viscosity of 70 ssu. Maximum operating temperature is 180 degrees F.

Filtration:

A fluid cleanliness level of ISO 17/14 should be maintained at all times. Nominal filtration must be 25 micron or better.

Case Drain:

These motors are provided with a case drain port that must be connected to the reservoir with no more than 250 psi surge pressure. Internal cross port check valves (option-24) can be provided when motors are not subject to instantaneous shock pressures (such as with dynamic braking).

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