

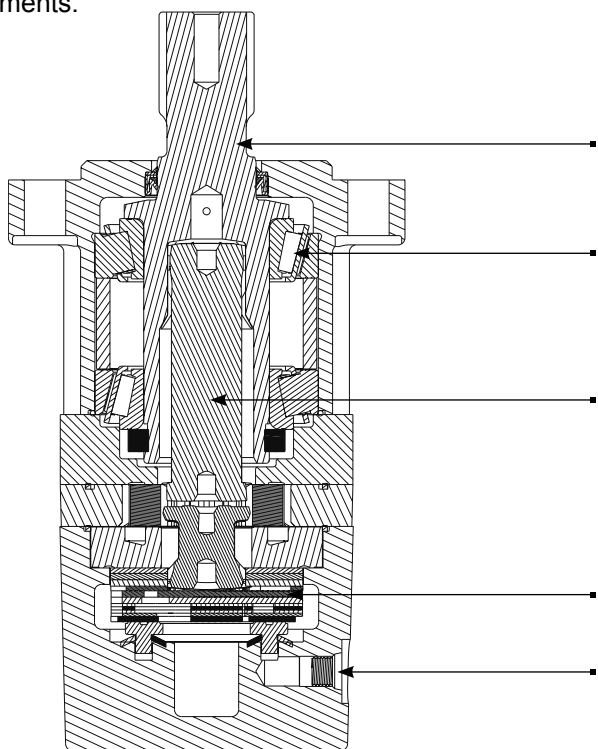


whitedriveproducts

WS SERIES HYDRAULIC MOTORS



The WS product family features flow rates up to 76 LPM [20 GPM], torque up to 824 Nm [7,295 lb-in], and pressures up to 207 bar [3000 PSI] at continuous ratings. The WS targets agricultural equipment, skid steer attachments, and other applications that require greater torque under demanding conditions. A distinguishing feature of the WS in relation to competitive products is its heavy duty drive link with a larger pitch diameter. This enables the WS to better withstand pressure and torque spikes and is reflected in its intermittent and peak performance ratings. Additional product features include a three zone commutator valve, heavy-duty tapered roller bearings, and case drain with integral internal drain*. The WS offers displacements from 100cc [6.1in³] to 496cc [30.3in³]. Nine (9) shaft and seven (7) mounting options are available to meet the most common SAE and European requirements.



KEY FEATURES

- **Nine shaft and seven mounting options** to meet the most common SAE and European requirements.
- **Heavy-duty tapered roller bearings** for extra side load capacity.
- **Heavy-duty drive link** with larger pitch diameter than competitors for greater resistance to pressure and torque spikes.
- **Three zone commutator valve** for high flow capacity.
- **Standard case drain** with integral internal drain* for extended shaft seal life.

*See page 18 for allowable back pressure when utilizing the internal drain.

SPECIFICATIONS

Intermittent Ratings - 10% of Operation Peak Ratings - 1% of Operation

CODE	Displacement cc [in ³ /rev]	Max. Speed rpm		Max. Flow lpm [gpm]		Max. Torque Nm [lb-in]		Max. Pressure bar [psi]		
		cont.	inter.	cont.	inter.	cont.	inter.	cont.	inter.	peak
100	100 [6.10]	745	880	76 [20]	95 [25]	280 [2475]	416 [3680]	207 [3000]	310 [4500]	310 [4500]
110	112 [6.85]	675	840	76 [20]	95 [25]	307 [2715]	468 [4145]	207 [3000]	310 [4500]	310 [4500]
130	129 [7.86]	580	730	76 [20]	95 [25]	370 [3275]	550 [4865]	207 [3000]	310 [4500]	310 [4500]
160	162 [9.90]	465	700	76 [20]	114 [30]	462 [4090]	618 [5465]	207 [3000]	276 [4000]	310 [4500]
200	202 [12.31]	375	560	76 [20]	114 [30]	576 [5100]	768 [6795]	207 [3000]	276 [4000]	310 [4500]
230	228 [13.92]	325	490	76 [20]	114 [30]	642 [5685]	806 [7135]	207 [3000]	276 [4000]	310 [4500]
320	325 [19.81]	235	350	76 [20]	114 [30]	789 [6980]	1029 [9105]	190 [2750]	224 [3250]	259 [3750]
400	399 [24.36]	190	280	76 [20]	114 [30]	816 [7225]	1034 [9150]	155 [2250]	190 [2750]	224 [3250]
500	496 [30.29]	155	230	76 [20]	114 [30]	824 [7295]	1041 [9210]	121 [1750]	155 [2250]	172 [2500]



100

Pressure - bars [psi]

Max.
Cont.

Max.
Inter.

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	172 [2500]	207 [3000]	242 [3500]	276 [4000]	310 [4500]
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100 cc [6.10 in³/rev.]

Intermittent Ratings are below and to the right of the BOLD line.

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	2 [0.5]	4 [1]	8 [2]	15 [4]	23 [6]	30 [8]	38 [10]	45 [12]	53 [14]	61 [16]	68 [18]	76 [20]	83 [22]	91 [24]	95 [25]
Max. Cont.															
Max. Inter.															

14 [120] 11	35 [313] 8	77 [681] 6	116 [1025] 4												
15 [129] 37	38 [337] 35	80 [710] 10	122 [1079] 7	162 [1436] 5											
16 [138] 75	40 [354] 74	88 [781] 71	136 [1205] 68	181 [1602] 58	227 [2007] 44	267 [2364] 43	315 [2791] 42	352 [3119] 41	383 [3386] 33						
16 [138] 151	40 [354] 149	89 [790] 146	138 [1222] 143	187 [1654] 137	235 [2079] 129	282 [2495] 119	324 [2871] 110	370 [3277] 101	411 [3636] 87						
14 [127] 226	39 [344] 225	88 [779] 221	137 [1214] 217	186 [1647] 210	234 [2071] 200	282 [2494] 188	324 [2869] 174	371 [3279] 162	415 [3676] 147						
12 [109] 302	37 [326] 300	86 [765] 297	136 [1200] 292	184 [1625] 284	232 [2049] 273	280 [2474] 258	323 [2859] 240	369 [3268] 224	416 [3682] 206						
10 [88] 378	34 [305] 376	83 [738] 372	133 [1174] 366	181 [1601] 357	229 [2026] 343	276 [2446] 326	318 [2810] 300	366 [3235] 281	415 [3672] 261						
7 [65] 453	32 [282] 447	81 [713] 441	129 [1145] 441	178 [1574] 430	226 [2002] 415	274 [2423] 396	316 [2793] 367	364 [3220] 345	413 [3653] 324						
4 [39] 528	29 [254] 527	77 [686] 515	126 [1116] 515	175 [1546] 504	222 [1968] 486	266 [2351] 455	315 [2791] 433	362 [3203] 407	411 [3637] 384						
2 [15] 604	25 [221] 602	74 [652] 597	122 [1084] 590	171 [1513] 578	219 [1941] 559	264 [2340] 527	312 [2760] 502	360 [3182] 475	409 [3616] 447						
	21 [186] 678	69 [614] 672	118 [1047] 664	167 [1481] 651	216 [1910] 632	260 [2300] 596	309 [2735] 570	356 [3152] 541	407 [3601] 513						
	16 [144] 754	65 [573] 747	114 [1009] 739	163 [1441] 725	211 [1872] 704	257 [2278] 677	307 [2712] 652	353 [3121] 624	403 [3568] 595						
				156 [1379] 801	205 [1814] 782	253 [2239] 758	300 [2653] 730	347 [3075] 698	398 [3526] 668						
					199 [1762] 850	246 [2179] 826	294 [2604] 799	343 [3037] 768	395 [3495] 733						
					196 [1737] 883	246 [2176] 863	294 [2605] 835	342 [3028] 800	392 [3472] 770						

Torque - Nm [lb-in], Speed rpm

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

27 [243]	55 [485]	110 [971]	165 [1456]	219 [1942]	274 [2427]	329 [2913]	384 [3398]	439 [3883]	494 [4369]
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Theoretical Torque - Nm [lb-in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

Pressure - bars [psi]

Max.
Cont.

Max.
Inter.

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	172 [2500]	207 [3000]	242 [3500]	276 [4000]	310 [4500]
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112 cc [6.85 in³/rev.]

Intermittent Ratings are below and to the right of the BOLD line.

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	2 [0.5]	4 [1]	8 [2]	15 [4]	23 [6]	30 [8]	38 [10]	45 [12]	53 [14]	61 [16]	68 [18]	76 [20]	83 [22]	91 [24]	95 [25]
Max. Cont.															
Max. Inter.															

12 [106] 9	38 [334] 8	86 [757] 6	132 [1166] 4												
12 [110] 17	38 [334] 10	89 [788] 8	137 [1213] 6	184 [1624] 5											
15 [129] 67	42 [373] 67	98 [863] 65	152 [1341] 62	206 [1823] 58	255 [2257] 45	297 [2629] 40	341 [3015] 36	377 [3334] 22	396 [3502] 9						
15 [134] 135	43 [378] 135	97 [863] 133	152 [1350] 130	208 [1838] 125	261 [2314] 118	314 [2776] 107	357 [3158] 88	402 [3558] 71	438 [3879] 49						
15 [128] 203	42 [373] 203	97 [856] 190	151 [1337] 196	206 [1826] 182	260 [2302] 170	313 [2770] 143	359 [3179] 124	411 [3633] 103	458 [4054] 124						
12 [108] 271	40 [351] 270	94 [833] 268	148 [1313] 264	203 [1798] 258	258 [2281] 248	311 [2753] 234	359 [3177] 201	413 [3656] 178	466 [4122] 155						
9 [80] 339	36 [322] 338	91 [803] 335	145 [1280] 331	199 [1761] 325	253 [2236] 313	307 [2715] 296	358 [3165] 255	413 [3652] 232	468 [4144] 206						
8 [69] 404	33 [293] 406	87 [770] 403	141 [1247] 399	194 [1716] 391	249 [2205] 378	303 [2684] 360	353 [3124] 313	408 [3613] 289	467 [4133] 259						
4 [38] 471	29 [254] 473	82 [728] 470	136 [1202] 465	189 [1676] 457	243 [2152] 442	294 [2605] 403	351 [3108] 376	407 [3601] 347	464 [4109] 316						
	24 [210] 541	78 [687] 538	131 [1162] 532	185 [1635] 523	239 [2114] 508	290 [2564] 467	346 [3058] 438	402 [3553] 406	462 [4092] 372						
	18 [163] 609	72 [639] 605	126 [1116] 599	180 [1594] 589	234 [2068] 573	286 [2534] 530	341 [3016] 502	397 [3515] 467	458 [4051] 432						
	13 [117] 677	68 [598] 673	121 [1068] 667	174 [1541] 656	228 [2017] 639	282 [2494] 594	336 [2977] 565	393 [3481] 528	454 [4017] 492						
		67 [596] 742	115 [1015] 735	169 [1500] 722	221 [1960] 699	276 [2445] 672	332 [2942] 637	388 [3436] 598	447 [3953] 557						
		62 [549] 808	109 [967] 801	164 [1452] 787	218 [1926] 767	272 [2403] 737	326 [2885] 702	383 [3385] 659	441 [3906] 620						
		60 [528] 841	105 [939] 834	161 [1425] 818	215 [1901] 800	270 [2389] 771	323 [2861] 736	380 [3361] 693	439 [3886] 648						

Torque - Nm [lb-in], Speed rpm

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

31 [273]	62 [545]	123 [1090]	185 [1635]	246 [2180]	308 [2726]	370 [3271]	431 [3816]	493 [4361]	554 [4906]
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Theoretical Torque - Nm [lb-in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

Theoretical rpm	19	38	76	152	228	303	379	455	531	606	682	758	834	909	947
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Theoretical rpm	17	34	68	135	203	270	338	405	473	540	608	675	742	810	844
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130	Pressure - bars [psi]								Max. Cont.	Max. Inter.
	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	172 [2500]	207 [3000]	242 [3500]	276 [4000]	310 [4500]

129 cc [7.86 in³/rev.]

Intermittent Ratings are below and to the right of the BOLD line.

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	2 [0.5]	4 [1]	8 [2]	15 [4]	23 [6]	30 [8]	38 [10]	45 [12]	53 [14]	61 [16]	68 [18]	76 [20]	83 [22]	91 [24]	95 [25]	Theoretical rpm
Max. Cont.	13 [114] 8	41 [367] 6	94 [830] 3													15
	16 [144] 17	45 [400] 9	101 [890] 6	151 [1334] 4	201 [1780] 3	256 [2264] 3	306 [2706] 2									30
	19 [172] 58	52 [456] 57	115 [1022] 55	180 [1592] 52	235 [2081] 50	294 [2600] 38	348 [3084] 35	402 [3560] 31	448 [3962] 22	477 [4219] 9						59
	21 [182] 117	53 [469] 116	117 [1037] 114	182 [1609] 111	246 [2175] 107	309 [2735] 101	369 [3265] 92	424 [3749] 80	480 [4249] 68	528 [4671] 53						118
	20 [174] 175	52 [460] 174	116 [1026] 172	180 [1591] 169	244 [2163] 165	308 [2730] 158	371 [3285] 148	427 [3783] 132	489 [4330] 117	547 [4837] 99						177
	17 [150] 234	49 [436] 233	113 [1004] 230	178 [1571] 227	242 [2143] 223	307 [2714] 215	370 [3276] 202	426 [3767] 186	488 [4322] 168	550 [4866] 147						236
	14 [120] 293	46 [403] 291	110 [974] 289	174 [1537] 285	238 [2109] 280	303 [2677] 272	367 [3246] 260	423 [3741] 240	486 [4305] 220	549 [4860] 197						294
	10 [86] 351	42 [367] 350	106 [935] 347	169 [1499] 343	234 [2069] 337	298 [2633] 329	362 [3204] 315	417 [3688] 289	482 [4264] 266	547 [4837] 243						353
	6 [53] 410	37 [329] 408	101 [891] 405	165 [1458] 401	229 [2027] 395	294 [2600] 385	349 [3092] 361	414 [3661] 341	478 [4230] 317	544 [4818] 289						412
		33 [289] 467	96 [853] 464	160 [1415] 460	224 [1979] 453	287 [2543] 442	344 [3048] 415	409 [3620] 392	474 [4195] 367	539 [4773] 338						471
Max. Inter.			91 [803] 522	155 [1369] 518	219 [1934] 510	282 [2498] 499	340 [3007] 471	404 [3571] 448	469 [4147] 421	536 [4744] 389						530
			85 [753] 580	148 [1314] 575	212 [1879] 568	277 [2447] 556	335 [2960] 526	399 [3528] 503	464 [4108] 474	533 [4714] 441						588
			77 [681] 641	140 [1242] 637	204 [1805] 627	267 [2362] 613	332 [2938] 592	397 [3510] 567	461 [4076] 536	526 [4651] 504						647
			71 [625] 701	134 [1185] 696	198 [1751] 686	261 [2307] 672	325 [2872] 651	389 [3442] 625	453 [4011] 594	520 [4599] 563						706
			68 [601] 730	131 [1158] 726	195 [1722] 717	258 [2285] 703	322 [2849] 683	384 [3399] 657	450 [3986] 625	519 [4594] 589						735

Torque - Nm [lb-in], Speed rpm

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

35 [313]	71 [625]	141 [1251]	212 [1876]	283 [2502]	353 [3127]	424 [3753]	495 [4378]	565 [5004]	636 [5629]
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Theoretical Torque - Nm [lb-in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

160	Pressure - bars [psi]								Max. Cont.	Max. Inter.
	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	172 [2500]	207 [3000]	242 [3500]	259 [3750]	276 [4000]

162 cc [9.90 in³/rev.]

Intermittent Ratings are below and to the right of the BOLD line.

Intermittent Ratings - 10% of Operation

Flow - lpm (gpm)	Max. Cont.															Theoretical rpm	
	2 [0.5]	4 [1]	8 [2]	15 [4]	23 [6]	30 [8]	38 [10]	45 [12]	53 [14]	61 [16]	68 [18]	76 [20]	83 [22]	91 [24]	95 [25]		114 [30]
	20 [173] 11	55 [485] 10	125 [1102] 8	190 [1679] 6	255 [2258] 5												12
	22 [199] 23	59 [523] 22	135 [1194] 20	207 [1831] 18	274 [2425] 15	338 [2989] 13	397 [3511] 9										24
	32 [283] 47	63 [554] 45	144 [1273] 43	223 [1974] 41	298 [2635] 37	368 [3255] 34	433 [3830] 29	480 [4251] 21	504 [4459] 16	527 [4664] 10							47
	31 [278] 94	69 [609] 94	145 [1287] 91	228 [2014] 88	308 [2728] 84	388 [3416] 79	460 [4071] 71	526 [4654] 59	557 [4931] 53	583 [5163] 45							94
	29 [257] 141	69 [615] 141	143 [1265] 138	225 [1990] 135	306 [2711] 130	386 [3412] 124	464 [4108] 116	535 [4737] 100	573 [5074] 93	607 [5370] 83							140
	26 [226] 188	66 [583] 188	138 [1225] 186	221 [1958] 182	303 [2678] 177	383 [3387] 170	462 [4088] 160	538 [4761] 144	578 [5116] 135	617 [5463] 125							187
	21 [188] 235	62 [547] 234	133 [1180] 234	216 [1914] 230	298 [2633] 224	379 [3353] 217	458 [4055] 206	534 [4730] 189	575 [5085] 180	616 [5451] 168							234
	16 [145] 282	57 [509] 281	135 [1192] 280	210 [1861] 276	292 [2581] 270	372 [3289] 261	452 [4000] 250	530 [4688] 234	570 [5046] 224	613 [5423] 212							280
	11 [97] 329	51 [455] 328	133 [1178] 327	205 [1817] 323	286 [2530] 316	365 [3231] 307	441 [3905] 293	523 [4627] 274	563 [4986] 264	606 [5363] 251							327
	5 [44] 376	45 [402] 375	125 [1110] 374	199 [1761] 370	280 [2474] 363	359 [3173] 353	436 [3857] 338	517 [4572] 319	557 [4934] 308	599 [5301] 295							374
		37 [331] 422	118 [1048] 421	192 [1697] 417	272 [2408] 410	351 [3104] 400	427 [3779] 383	508 [4498] 363	548 [4853] 353	592 [5240] 339							420
		30 [265] 469	111 [980] 467	183 [1616] 465	264 [2337] 457	343 [3036] 446	419 [3712] 428	500 [4424] 408	540 [4777] 396	584 [5167] 382							467
		22 [193] 516	103 [913] 514	176 [1557] 510	256 [2264] 503	335 [2965] 491	413 [3658] 476	492 [4358] 454	533 [4721] 441	575 [5093] 427							514
				175 [1553] 558	246 [2180] 550	327 [2890] 538	405 [3587] 522	484 [4286] 500	524 [4639] 484	568 [5027] 473							560
				163 [1443] 581	241 [2134] 573	321 [2843] 561	400 [3543] 545	481 [4253] 522	521 [4611] 511	561 [4968] 496							584
				138 [1222] 699	217 [1917] 691	296 [2618] 679	376 [3324] 661	456 [4034] 645	495 [4383] 625	534 [4729] 609							700

Torque - Nm [lb-in], Speed rpm

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

45 [394]	89 [788]	178 [1576]	267 [2363]	356 [3151]	445 [3939]	534 [4727]	623 [5515]	668 [5909]	712 [6303]
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Theoretical Torque - Nm [lb-in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]



	Pressure - bars [psi]							Max. Cont.	Max. Inter.	
200	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	172 [2500]	190 [2750]	207 [3000]	242 [3500]	276 [4000]

Intermittent Ratings - 10% of Operation

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Theoretical Torque - Nm [lb-in] Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

Max.
ContMax.
Inter

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	172 [2500]	190 [2750]	207 [3000]	242 [3500]	276 [4000]
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Intermittent Ratings - 10% of Operation

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

Theoretical Torque - Nm [lb-in] Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]



320	Pressure - bars [psi]									Max. Cont.	Max. Inter.
	17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	155 [2250]	172 [2500]	190 [2750]	207 [3000]	224 [3250]	

325 cc [19.81 in³/rev.]

Intermittent Ratings are below and to the right of the BOLD line.

Intermittent Ratings - 10% of Operation

Max. Cont.	Flow - lpm [gpm]	2 [0.5]	65 [571] 5	135 [1196] 4	272 [2406] 3	398 [3524] 1												
		4 [1]	67 [595] 11	146 [1291] 10	290 [2568] 9	425 [3764] 7	558 [4937] 6	623 [5514] 4	689 [6101] 3	746 [6599] 1								
		8 [2]	67 [597] 22	150 [1328] 22	311 [2751] 20	461 [4083] 18	596 [5277] 16	659 [5834] 14	723 [6396] 12	788 [6977] 11	849 [7510] 9							
		15 [4]	64 [565] 46	147 [1299] 46	312 [2761] 44	474 [4197] 41	627 [5547] 36	698 [6173] 33	762 [6747] 30	821 [7261] 26	880 [7785] 20	942 [8337] 19						
		23 [6]	77 [677] 70	154 [1367] 69	320 [2834] 67	484 [4283] 64	642 [5679] 57	717 [6347] 52	791 [7004] 48	853 [7548] 42	917 [8116] 37	977 [8646] 32						
		30 [8]	72 [641] 93	147 [1299] 93	313 [2766] 91	477 [4221] 87	637 [5640] 80	715 [6329] 75	786 [6959] 65	861 [7617] 59	937 [8236] 53	996 [8816] 49						
		38 [10]	64 [566] 117	137 [1217] 117	303 [2683] 114	468 [4142] 110	629 [5568] 103	705 [6241] 94	784 [6935] 87	859 [7603] 80	934 [8265] 74	1005 [8895] 68						
		45 [12]	53 [473] 141	131 [1155] 141	292 [2587] 138	458 [4049] 134	619 [5479] 125	695 [6151] 116	774 [6850] 109	850 [7523] 103	926 [8197] 96	1001 [8861] 89						
		53 [14]	30 [262] 164	122 [1076] 164	281 [2483] 161	446 [3943] 157	606 [5367] 146	687 [6078] 139	764 [6764] 132	840 [7434] 124	915 [8099] 116	990 [8761] 109						
		61 [16]	18 [161] 188	112 [994] 187	267 [2359] 185	431 [3818] 181	594 [5253] 169	674 [5966] 163	753 [6660] 155	824 [7290] 149								
Max. Inter.	68 [18]	18 [160] 211	113 [997] 211	265 [2344] 209	430 [3805] 204	593 [5244] 192	673 [5953] 185	751 [6649] 178	811 [7178] 174									
	76 [20]	3 [25] 235	97 [863] 234	248 [2198] 233	415 [3673] 227	578 [5114] 216	658 [5821] 210	736 [6515] 202	797 [7052] 197									
	83 [22]		84 [747] 258	236 [2091] 255	400 [3540] 249	562 [4973] 240	641 [5676] 234	720 [6368] 227	781 [6913] 222									
	91 [24]		75 [667] 282	215 [1900] 279	380 [3365] 273	543 [4804] 264	623 [5510] 258	701 [6202] 251	763 [6756] 246									
	95 [25]		70 [616] 293	207 [1828] 290	370 [3272] 285	533 [4716] 276	613 [5423] 270	698 [6175] 261	758 [6711] 257									
	114 [30]			153 [1353] 350	315 [2789] 344	478 [4230] 335	559 [4943] 329	639 [5653] 322	704 [6233] 318									

Torque - Nm [lb-in], Speed rpm

Overall Efficiency -

70 - 100%

40 - 69%

0 - 39%

89 [788]	178 [1576]	356 [3153]	534 [4729]	713 [6306]	802 [7094]	891 [7882]	980 [8670]	1069 [9459]	1158 [10247]
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Theoretical Torque - Nm [lb-in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

400	Pressure - bars [psi]									Max. Cont.	Max. Inter.
	17 [250]	35 [500]	69 [1000]	86 [1250]	104 [1500]	121 [1750]	138 [2000]	155 [2250]	172 [2500]	190 [2750]	

399 cc [24.36 in³/rev.]

Intermittent Ratings are below and to the right of the BOLD line.

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	2 [0.5]	4 [1]	8 [2]	15 [4]	23 [6]	30 [8]	38 [10]	45 [12]	53 [14]	61 [16]	68 [18]	76 [20]	83 [22]	91 [24]	99 [26]	114 [30]	Max. Cont.	Max. Inter.
	81 [717] 4	173 [1534] 4	356 [3148] 2															
	85 [752] 9	181 [1605] 8	369 [3263] 7	460 [4074] 6	550 [4865] 5	638 [5648] 4	724 [6404] 3	816 [7222] 2										
	86 [762] 18	187 [1654] 18	387 [3422] 16	483 [4274] 15	575 [5090] 13	662 [5861] 11	747 [6613] 10	826 [7310] 7										
	82 [724] 38	185 [1635] 37	391 [3460] 35	493 [4361] 34	592 [5240] 31	688 [6086] 27	776 [6871] 23	866 [7667] 17	942 [8337] 12									
	75 [663] 57	178 [1573] 56	383 [3393] 54	486 [4301] 52	588 [5201] 50	686 [6074] 46	783 [6926] 40	876 [7750] 33	963 [8524] 27	1056 [9345] 24								
	66 [585] 76	168 [1490] 75	374 [3306] 73	476 [4216] 72	578 [5119] 69	679 [6007] 65	776 [6868] 57	872 [7716] 50	966 [8545] 43	1055 [9341] 36								
		154 [1365] 95	361 [3197] 93	464 [4110] 91	567 [5015] 88	664 [5880] 82	764 [6764] 76	862 [7626] 69	956 [8463] 61	1050 [9289] 52								
		140 [1237] 114	346 [3066] 112	450 [3978] 110	551 [4880] 107	649 [5744] 101	750 [6638] 95	848 [7503] 88	945 [8361] 80	1039 [9195] 71								
		125 [1104] 133	330 [2924] 131	434 [3838] 129	536 [4745] 126	634 [5609] 119	735 [6504] 112	833 [7369] 102	929 [8217] 97	1024 [9058] 88								
		106 [934] 151	311 [2755] 150	415 [3672] 148	518 [4580] 145	617 [5456] 131	718 [6357] 123	817 [7228] 113	913 [8079] 114	1007 [8913] 104								
			291 [2578] 169	395 [3493] 167	498 [4405] 165	597 [5279] 158	699 [6185] 151	798 [7065] 143	896 [7931] 134	991 [8774] 122								
			269 [2379] 189	371 [3286] 187	475 [4205] 184	575 [5084] 177	678 [5997] 171	777 [6879] 163	876 [7754] 154	972 [8606] 143								
			246 [2174] 207	348 [3076] 205	451 [3987] 202	555 [4911] 198	654 [5789] 192	754 [6671] 184	852 [7543] 175	951 [8413] 165								
			226 [2000] 226	322 [2850] 224	424 [3756] 221	528 [4668] 217	629 [5571] 211	728 [6446] 204	828 [7332] 195	926 [8197] 184								
			197 [1739] 246	294 [2600] 244	397 [3515] 241	500 [4421] 236	602 [5323] 231	702 [6214] 224	801 [7093] 215	900 [7963] 205								
			131 [1162] 284	237 [2100] 282	338 [2991] 279	441 [3901] 275	542 [4798] 269	643 [5687] 263	743 [6574] 254	843 [7458] 245								

Torque - Nm [lb-in], Speed rpm

Overall Efficiency -

70 - 100%

40 - 69%

0 - 39%

110 [969]	219 [1939]	438 [3877]	548 [4846]	657 [5816]	767 [6785]	876 [7754]	986 [8723]	1095 [9693]	1205 [10662]
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Theoretical Torque - Nm [lb-in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

**500**

Pressure - bars [psi]

Max.
Cont.Max.
Inter.

17 [250]	35 [500]	52 [750]	69 [1000]	86 [1250]	104 [1500]	121 [1750]	138 [2000]	155 [2250]
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496 cc [30.29 in³/rev.]

Intermittent Ratings are below and to the right of the BOLD line.

Intermittent Ratings - 10% of Operation

Flow - lpm [gpm]	Max. Cont.	Max. Inter.	Theoretical rpm									
			4	8	16	31	46	62	77	92	107	123
2 [0.5]			94 [832] 3	210 [1861] 3	323 [2859] 3	435 [3853] 3						
4 [1]			98 [868] 7	197 [1743] 7	314 [2781] 7	430 [3802] 6	542 [4797] 6	652 [5766] 5	777 [6876] 4			
8 [2]			100 [882] 15	205 [1812] 15	328 [2905] 14	447 [3959] 14	565 [5001] 13	677 [5990] 11	780 [6900] 9	879 [7779] 7		
15 [4]			95 [843] 31	204 [1803] 30	332 [2938] 30	460 [4070] 29	584 [5170] 28	703 [6225] 25	815 [7212] 21	917 [8118] 16	1012 [8956] 13	
23 [6]			89 [783] 46	196 [1737] 46	324 [2869] 45	453 [4009] 44	580 [5133] 43	705 [6237] 41	824 [7296] 36	930 [8234] 28	1033 [9141] 22	
30 [8]			79 [696] 62	185 [1639] 61	314 [2778] 61	443 [3918] 60	570 [5047] 58	696 [6161] 56	814 [7205] 50	930 [8231] 43	1041 [9210] 34	
38 [10]			68 [600] 77	172 [1523] 77	300 [2652] 76	429 [3800] 75	557 [4929] 74	684 [6052] 71	805 [7123] 66	924 [8175] 59	1037 [9175] 50	
45 [12]				177 [1568] 92	262 [2318] 92	410 [3624] 91	519 [4593] 89	644 [5696] 86	770 [6811] 82	891 [7885] 75	1008 [8916] 68	
53 [14]				157 [1389] 108	286 [2533] 107	415 [3673] 106	544 [4810] 104	669 [5918] 101	794 [7027] 96	914 [8092] 89	1031 [9122] 80	
61 [16]				138 [1219] 123	265 [2347] 122	394 [3486] 121	523 [4630] 120	649 [5740] 116	775 [6861] 111	897 [7936] 104	1013 [8968] 95	
68 [18]				114 [1004] 139	243 [2147] 138	370 [3277] 137	500 [4424] 135	626 [5536] 132	752 [6659] 127	876 [7753] 120	995 [8806] 111	
76 [20]				96 [849] 154	217 [1919] 153	344 [3047] 152	473 [4190] 151	600 [5311] 147	728 [6446] 143	852 [7537] 136	972 [8606] 127	
83 [22]				78 [688] 169	154 [1360] 169	276 [2439] 168	406 [3595] 167	534 [4724] 164	660 [5839] 161	784 [6938] 155	907 [8028] 148	
91 [24]					160 [1416] 184	268 [2371] 184	397 [3512] 182	524 [4633] 179	650 [5755] 175	776 [6863] 170	898 [7950] 162	
99 [26]					129 [1138] 200	231 [2048] 199	321 [2844] 198	451 [3988] 196	576 [5097] 193	703 [6218] 188	827 [7320] 181	
114 [30]						186 [1647] 230	292 [2581] 229	383 [3387] 227	508 [4494] 224	636 [5631] 219	761 [6738] 213	

Torque - Nm [lb-in], Speed rpm

Overall Efficiency - 70 - 100% ☐ 40 - 69% ☐ 0 - 39% ☐

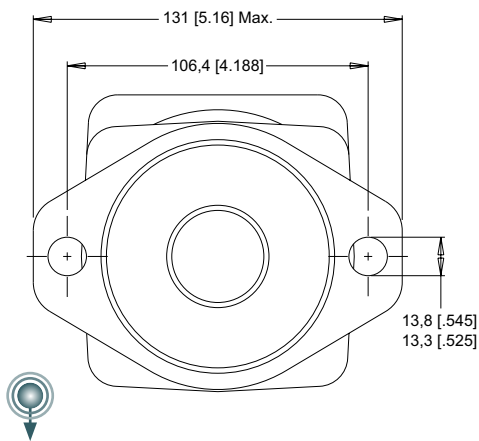
136 [1205]	272 [2410]	409 [3616]	545 [4821]	681 [6026]	817 [7231]	953 [8436]	1090 [9642]	1226 [10847]
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Theoretical Torque - Nm [lb-in]

Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

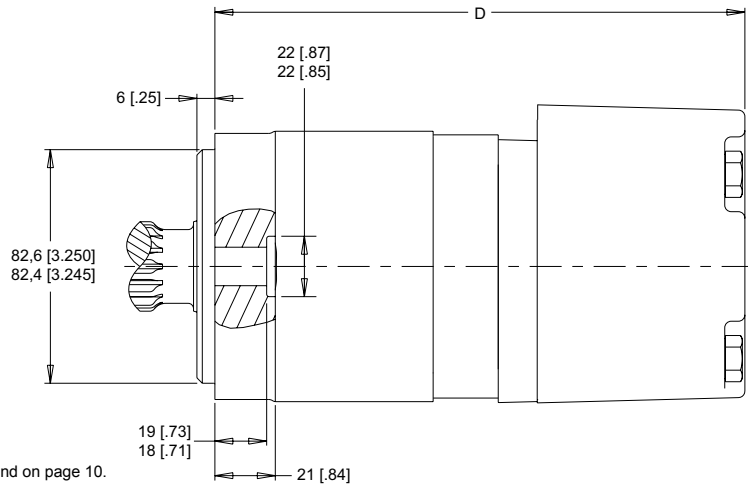
355 & 356 SERIES HOUSINGS

A0 2-Hole SAE A Mount with End Ports

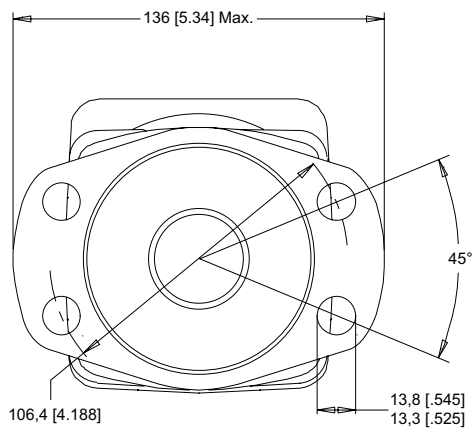


NOTE: Overall motor length varies depending on the displacement. Dimension D is found on page 10.

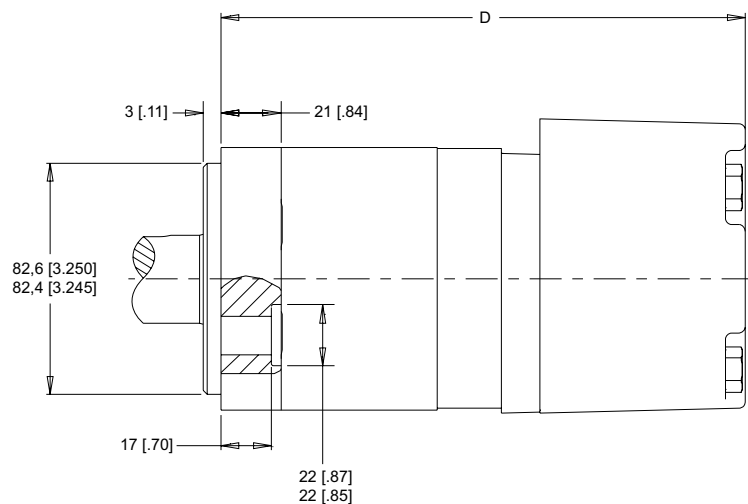
A7 2-Hole SAE A Mount with Side Ports



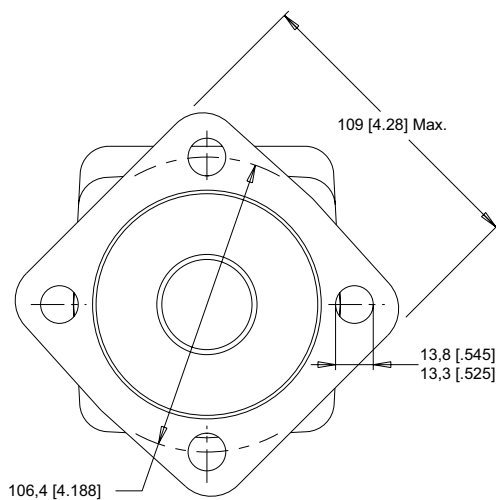
A2 4-Hole Magneto with End Ports



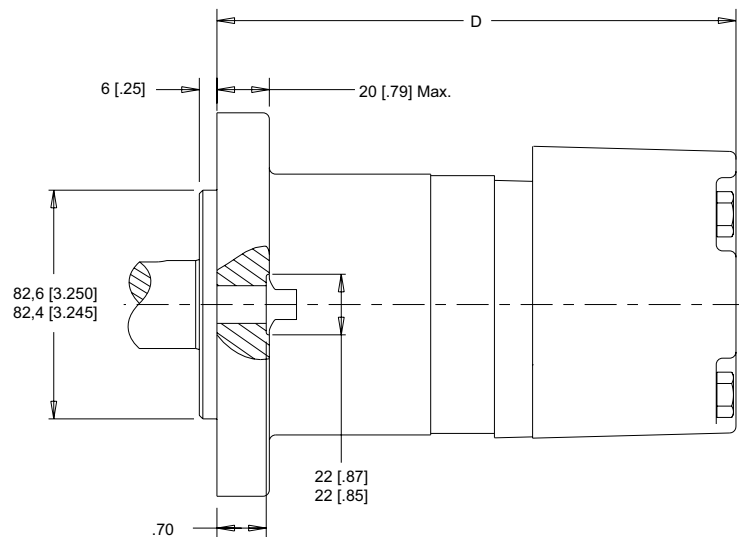
A8 4-Hole Magneto with Side Ports



AG 4-Hole Square SAE A Mount with End Ports



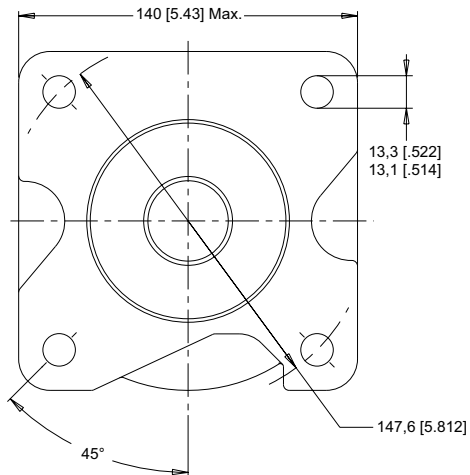
AH 4-Hole Square SAE A Mount with Side Ports



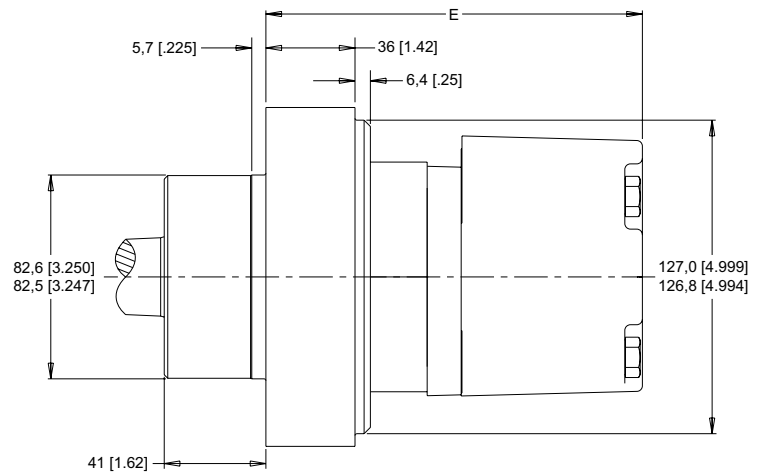


355 & 356 SERIES HOUSINGS

W2 4-Hole 3.25" Pilot Wheel Mount with End Ports

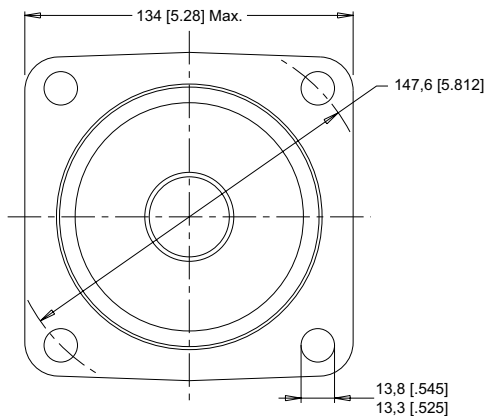


W8 4-Hole 3.25" Wheel Mount with Side Ports

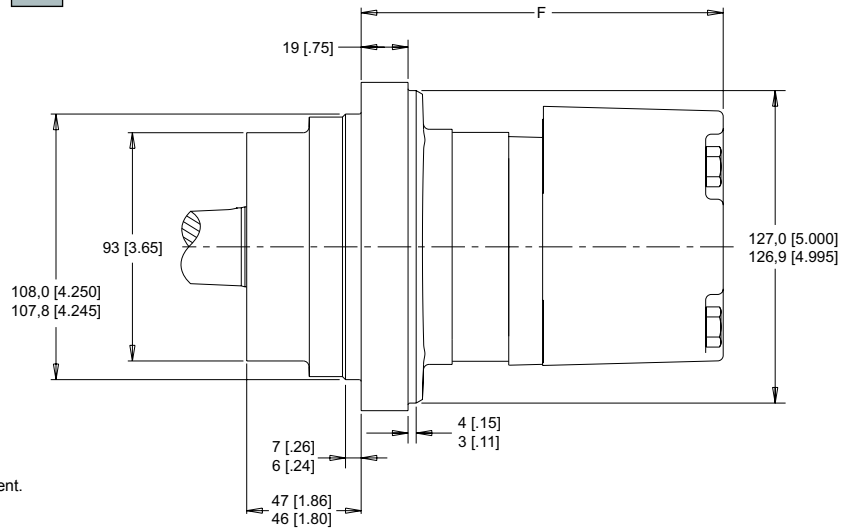


NOTE: Overall motor length varies depending on the displacement. Dimension E is found on page 10.

Y2 4-Hole 4.25" Pilot Wheel Mount with End Ports

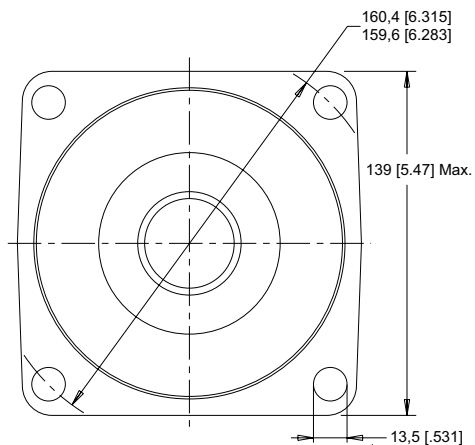


Y8 4-Hole 4.25" Wheel Mount with Side Ports

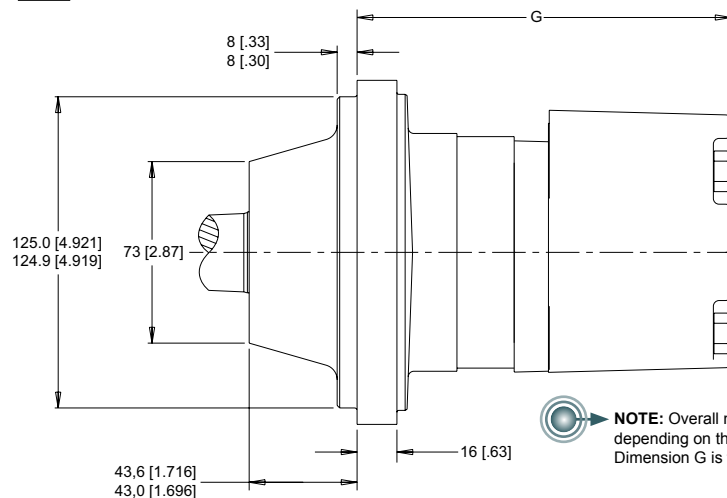


NOTE: Overall motor length varies depending on the displacement. Dimension F is found on page 11.

Z2 4-Hole Euro Wheel Mount with End Ports



Z8 4-Hole Euro Wheel Mount with Side Ports



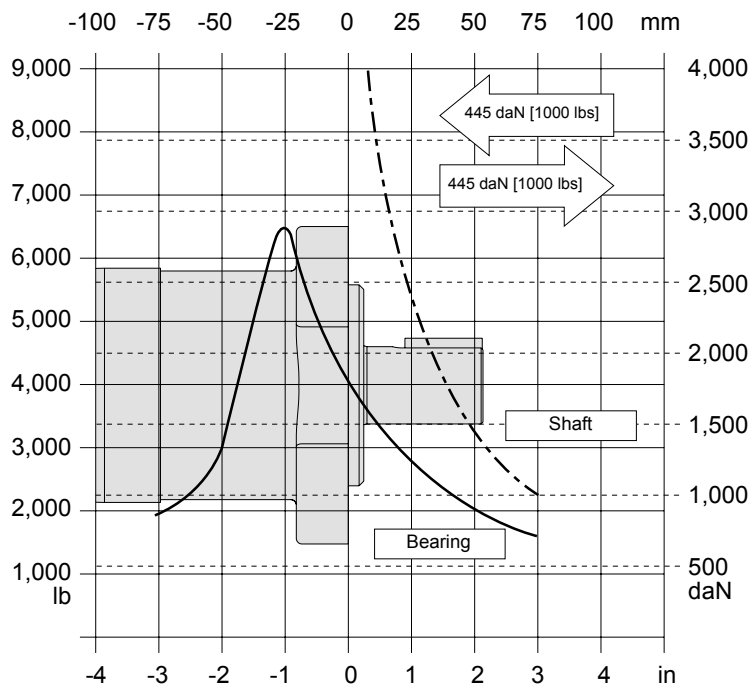
NOTE: Overall motor length varies depending on the displacement. Dimension G is found on page 11.



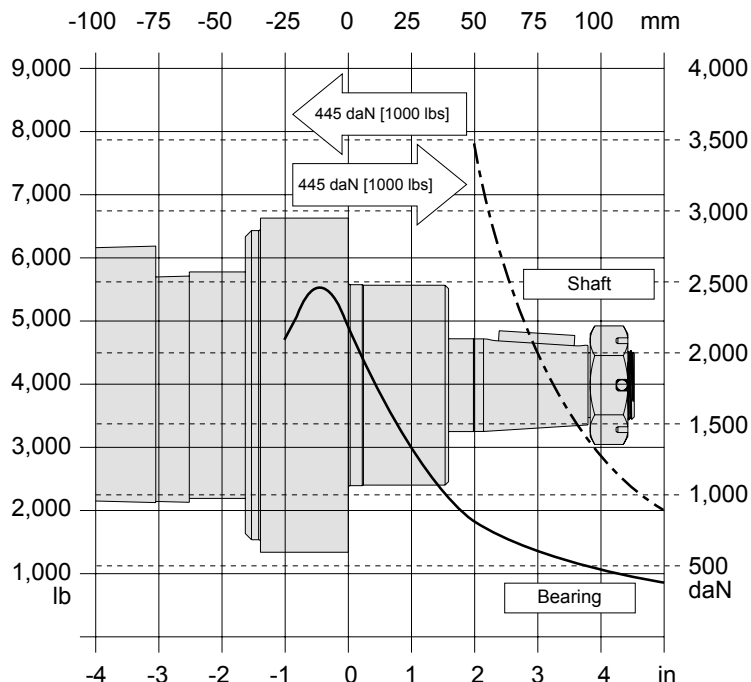
355 & 356 SERIES TECHNICAL INFORMATION

Bearing Curve: The bearing curve represents allowable bearing loads for a B10 life of 2,000 hours at 100 rpm. The curve includes effects of 1,000 lbs inward/outward net thrust* (see note on page 11). Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table located below.

SAE "A" MOUNT



3.25" PILOT WHEEL MOUNT



LENGTH / WEIGHT CHART SAE A Mount - Dimension D		
Code	mm [in]	kg [lb]
100	193 [7.60]	10,8 [23.8]
110	196 [7.70]	11,0 [24.1]
130	199 [7.83]	11,1 [24.5]
160	205 [8.08]	11,5 [25.4]
200	213 [8.38]	11,9 [26.2]
230	219 [8.62]	12,3 [27.1]
320	237 [9.33]	13,3 [29.2]
400	237 [9.33]	13,3 [29.2]
500	252 [9.93]	14,0 [30.9]

NOTE:

WS motor weights vary $\pm 0,5$ kg [1 lbs] depending upon motor configuration. Add 3,8 mm [.15 in] to dimension D for Magneto mount.

LENGTH / WEIGHT CHART 3.25" Wheel Mount - Dimension E		
Code	mm [in]	kg [lb]
100	158 [6.23]	12,5 [27.5]
110	161 [6.33]	12,6 [27.8]
130	164 [6.46]	12,8 [28.2]
160	170 [6.71]	13,3 [29.2]
200	178 [7.01]	13,6 [29.9]
230	184 [7.25]	14,0 [30.8]
320	202 [7.96]	15,0 [32.9]
400	202 [7.96]	15,0 [32.9]
500	217 [8.56]	15,8 [34.7]

NOTE:

WS motor weights vary $\pm 0,5$ kg [1 lbs] depending upon motor configuration.

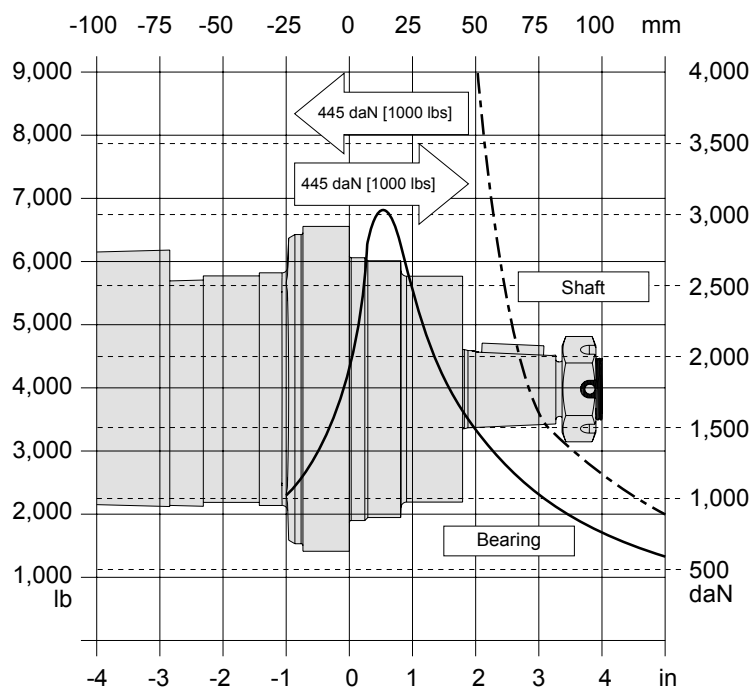
BEARING LOAD Multiplication Factor Table	
RPM	Factor
050	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.50



355 & 356 SERIES TECHNICAL INFORMATION

Bearing Curve: The bearing curve represents allowable bearing loads for a B10 life of 2,000 hours at 100 rpm. The curve includes effects of 1,000 lbs inward/outward net thrust*. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 10.

4.25" PILOT & EURO WHEEL MOUNTS



* Case pressure will push outward on the shaft. If case drain line is attached and routed directly to tank, case pressure should be negligible. If case drain line is not attached, case pressure will be nearly the same as motor return pressure. When case pressure is acting, the allowable inward axial load can be increased and the allowable outward axial load must be decreased at a rate of 59 kg / 7 bar [130 lb / 100 psi] for shaft codes 02, 10, 12, 20, 21, 22 & 23. The rate for shaft codes 28 & 31 is 78 kg / 7 bar [175 lb / 100 psi].

LENGTH / WEIGHT CHART 4.25" Wheel Mount - Dimension F		
Code	mm [in]	kg [lb]
100	153 [6.02]	12,0 [26.5]
110	155 [6.12]	12,2 [26.8]
130	159 [6.25]	12,4 [27.2]
160	165 [6.50]	12,8 [28.1]
200	173 [6.80]	13,1 [28.9]
230	179 [7.04]	13,5 [29.8]
320	197 [7.75]	14,5 [31.9]
400	197 [7.75]	14,5 [31.9]
500	212 [8.35]	15,3 [33.6]

NOTE:

WS motor weights vary $\pm 0,5$ kg [1 lbs] depending upon motor configuration.

LENGTH / WEIGHT CHART Euro Wheel Mount - Dimension G		
Code	mm [in]	kg [lb]
100	156 [6.14]	11,8 [26.0]
110	158 [6.24]	12,2 [26.3]
130	162 [6.37]	12,0 [26.7]
160	168 [6.62]	12,5 [27.6]
200	176 [6.92]	12,9 [28.4]
230	182 [7.16]	13,3 [29.3]
320	200 [7.87]	14,3 [31.4]
400	200 [7.87]	14,3 [31.4]
500	215 [8.47]	15,0 [33.1]

NOTE:

WS motor weights vary $\pm 0,5$ kg [1 lbs] depending upon motor configuration.

LENGTH / WEIGHT CHART Short Motor - Dimension H		
Code	mm [in]	kg [lb]
100	142 [5.60]	9,6 [21.2]
110	145 [5.70]	9,8 [21.5]
130	148 [5.83]	9,9 [21.8]
160	154 [6.08]	10,4 [22.8]
200	162 [6.38]	10,7 [23.6]
230	168 [6.62]	11,1 [24.5]
320	186 [7.33]	12,0 [26.5]
400	186 [7.33]	12,0 [26.5]
500	201 [7.93]	12,9 [28.3]

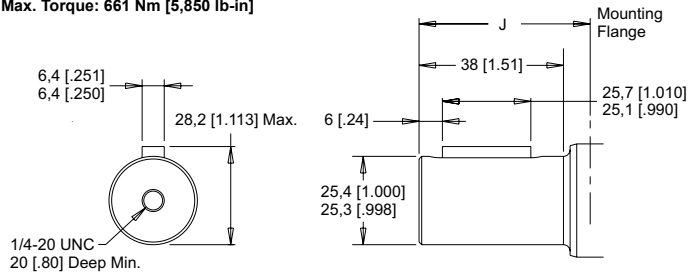
NOTE:

WS motor weights vary $\pm 0,5$ kg [1 lbs] depending upon motor configuration.



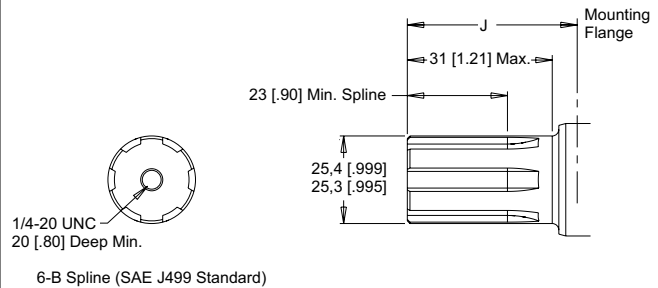
10 1" Straight

Max. Torque: 661 Nm [5,850 lb-in]



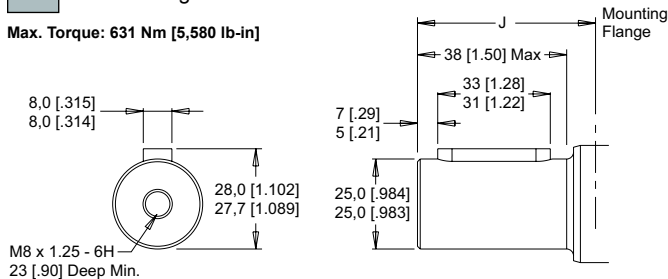
02 6-B Spline

Max. Torque: 429 Nm [3,800 lb-in]



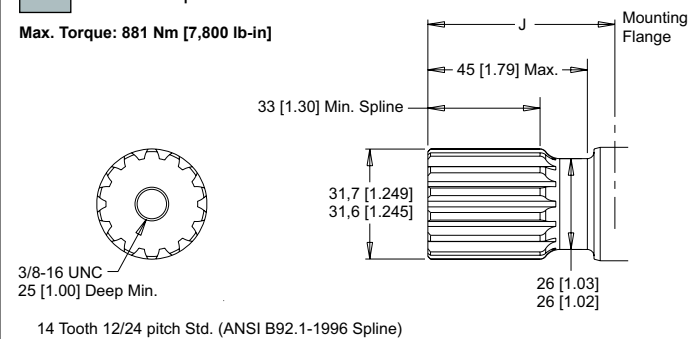
12 25mm Straight

Max. Torque: 631 Nm [5,580 lb-in]



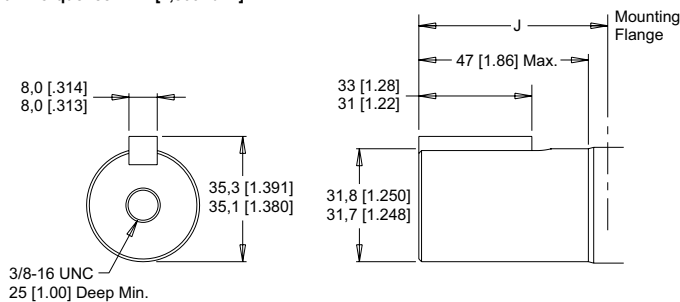
23 14 Tooth Spline

Max. Torque: 881 Nm [7,800 lb-in]



20 1-1/4" Straight

Max. Torque: 881 Nm [7,800 lb-in]



MOUNTING FLANGE TO SHAFT END - Dimension J

Code	A0, A7, AG, & AH	A2 & A8	W2 & W8	Y2 & Y8	Z2 & Z8
02	51 [2.00]	47 [1.85]	85 [3.34]	91 [3.58]	88 [3.45]
10	51 [2.00]	47 [1.85]	85 [3.34]	91 [3.58]	88 [3.45]
12	51 [2.00]	56 [1.86]	85 [3.34]	91 [3.58]	88 [3.46]
20	55 [2.18]	52 [2.03]	89 [3.52]	96 [3.76]	92 [3.63]
21	65 [2.54]	61 [2.39]	99 [3.88]	105 [4.12]	101 [3.99]
22	64 [2.51]	60 [2.36]	103 [4.04]	104 [4.09]	101 [3.96]
23	55 [2.17]	52 [2.03]	89 [3.51]	95 [3.75]	92 [3.63]
28	N/A	N/A	102 [4.02]	107 [4.20]	104 [4.08]
31	N/A	N/A	117 [4.62]	123 [4.86]	120 [4.73]



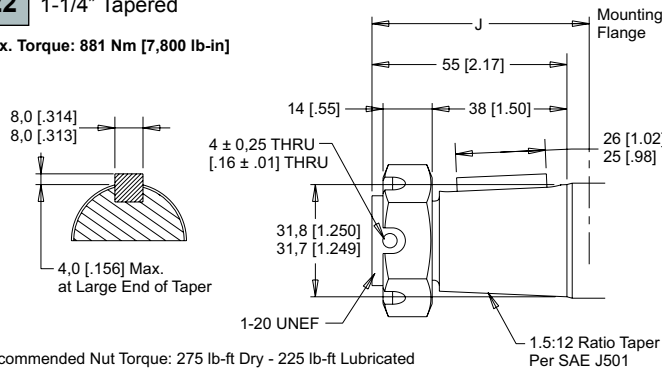
NOTE: Shaft lengths vary $\pm 0,8$ mm [.030 in.]



355 & 356 SERIES SHAFTS

22 1-1/4" Tapered

Max. Torque: 881 Nm [7,800 lb-in]

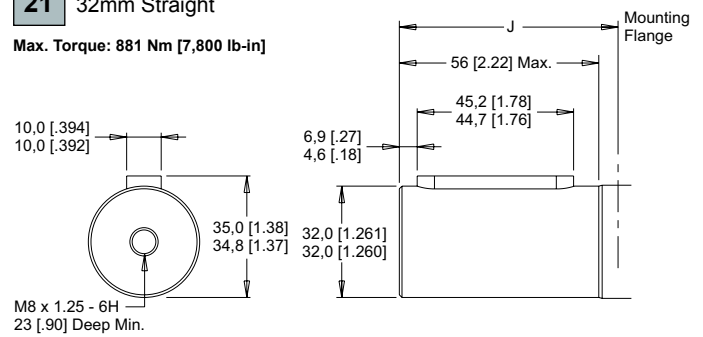


Recommended Nut Torque: 275 lb-ft Dry - 225 lb-ft Lubricated
Plus Torque Required to Align the Slotted Nut with the Shaft Crosshole.

1.5:12 Ratio Taper
Per SAE J501

21 32mm Straight

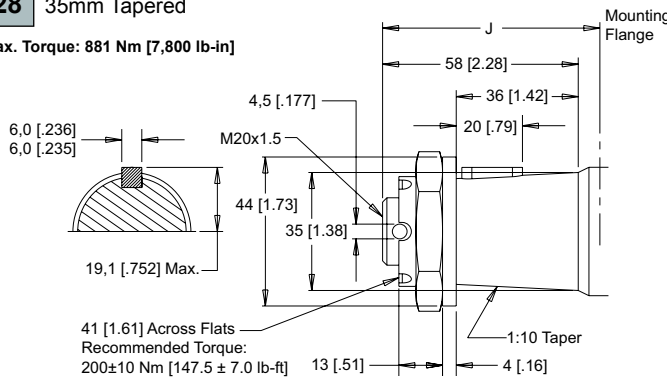
Max. Torque: 881 Nm [7,800 lb-in]



M8 x 1.25 - 6H
23 [.90] Deep Min.

28 35mm Tapered

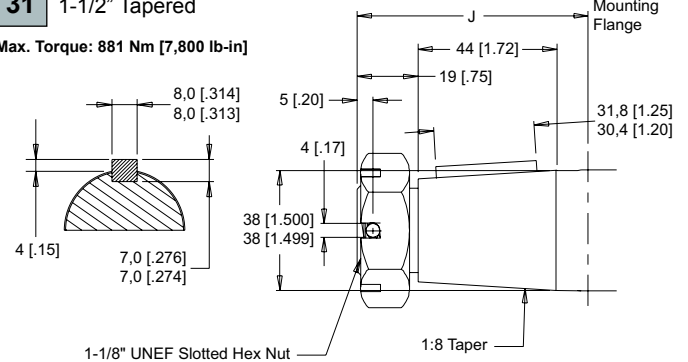
Max. Torque: 881 Nm [7,800 lb-in]



41 [1.61] Across Flats
Recommended Torque:
200±10 Nm [147.5 ± 7.0 lb-ft]

31 1-1/2" Tapered

Max. Torque: 881 Nm [7,800 lb-in]



1-1/8" UNEF Slotted Hex Nut

1:8 Taper



NOTE: Dimension J is found on page 12.

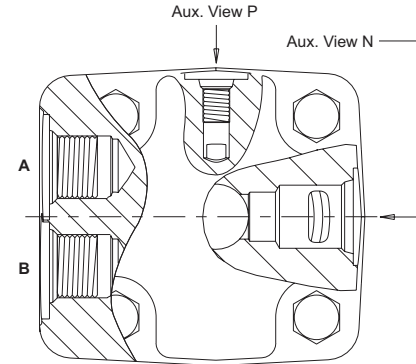
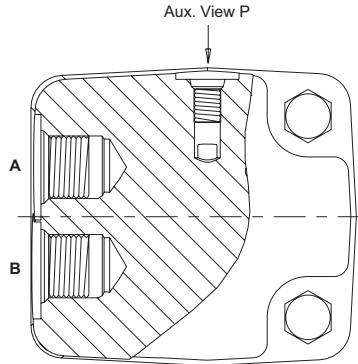
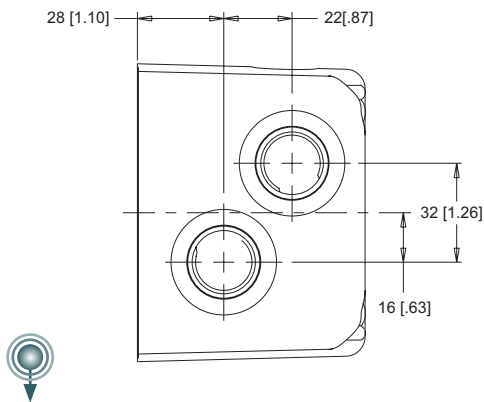


355 & 356 SERIES PORTING OPTIONS

SIDE PORTS

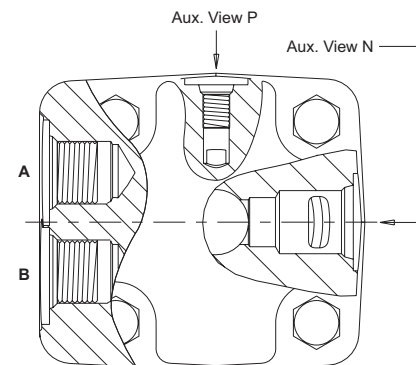
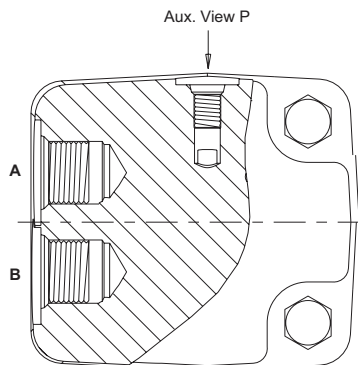
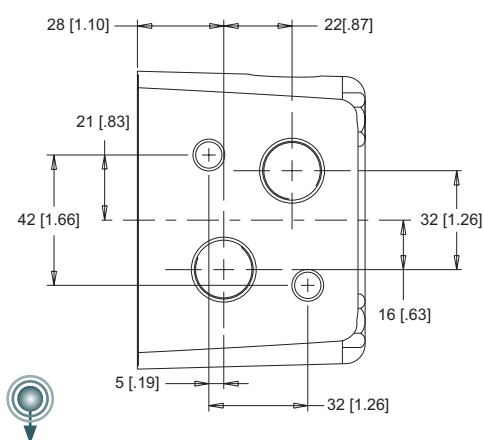
1 7/8" O-Ring with 7/16" Drain Port

2 1/2" BSP.F with 1/4" Drain Port



NOTE: The #1 and #2 WS side ported options can be ordered with a relief valve cavity (10 Series / 2 Way Valve Cavity 7/8" - 14 UNF-2B). See page 15 for Auxillary views N and P.

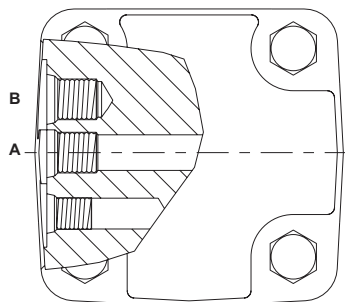
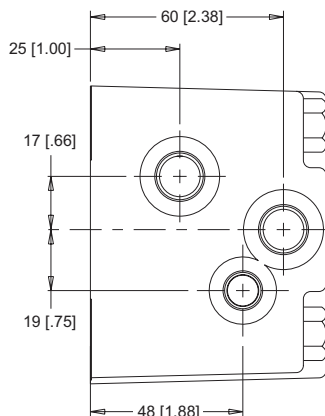
3 1/2" BSP.F Offset Manifold with 1/4" Drain Port



NOTE: The #3 WS side ported option can be ordered with a relief valve cavity (10 Series / 2 Way Valve Cavity 7/8" - 14 UNF-2B). See page 15 for Auxillary views N and P.

5 9/16" O-Ring with 7/16" Drain Port

9 3/8" BSP.F with 1/4" Drain Port

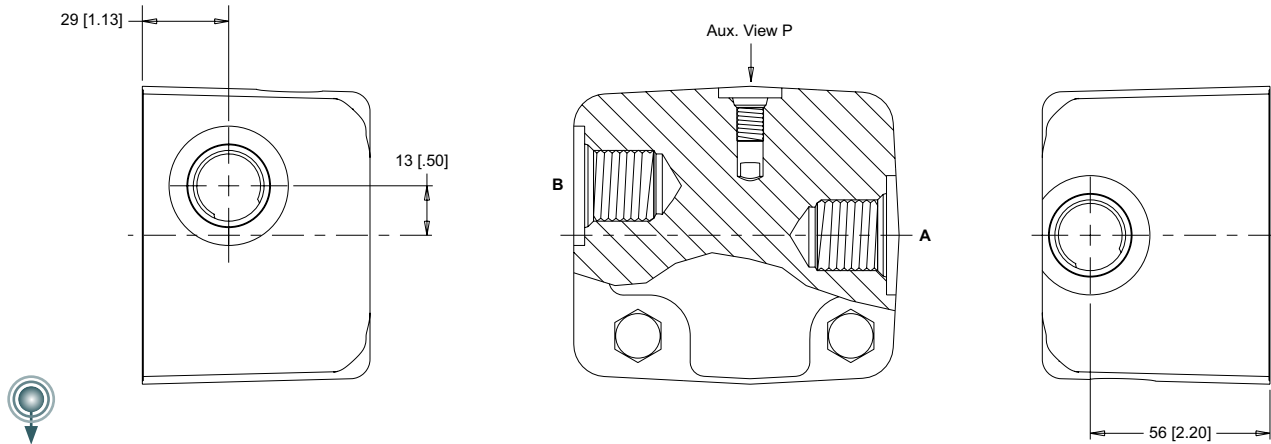




355 & 356 SERIES PORTING OPTIONS

SIDE PORTS

- 6** 1-1/16" O-Ring with 7/16" Drain Port

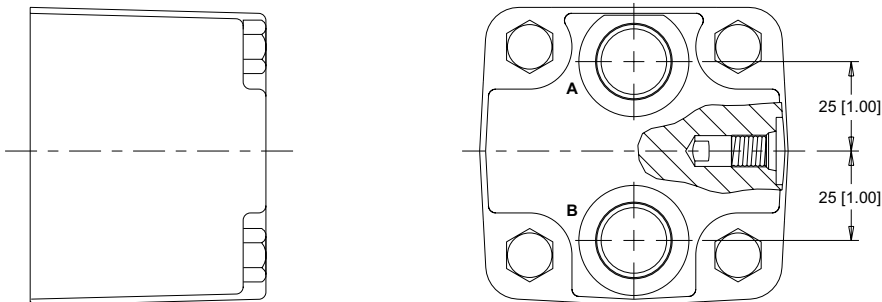


NOTE: See below for Auxillary view P.

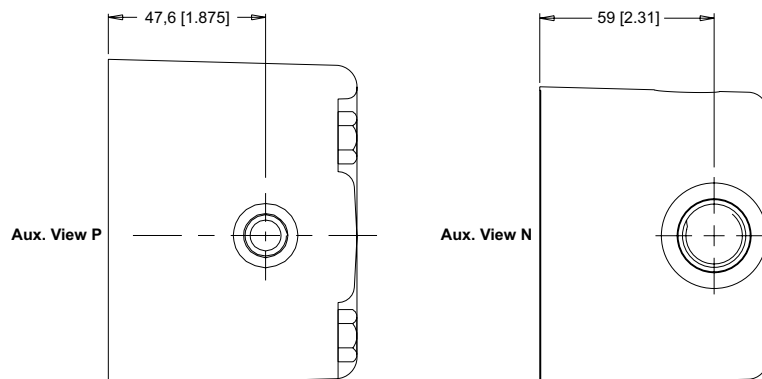
END PORTS

- 1** 7/8" O-Ring with 7/16" Drain Port

- 2** 1/2" BSP.F with 1/4" Drain Port



AUXILLARY VIEWS





355 & 356 SERIES SHORT MOTOR

SHORT MOTOR TECHNICAL INFORMATION

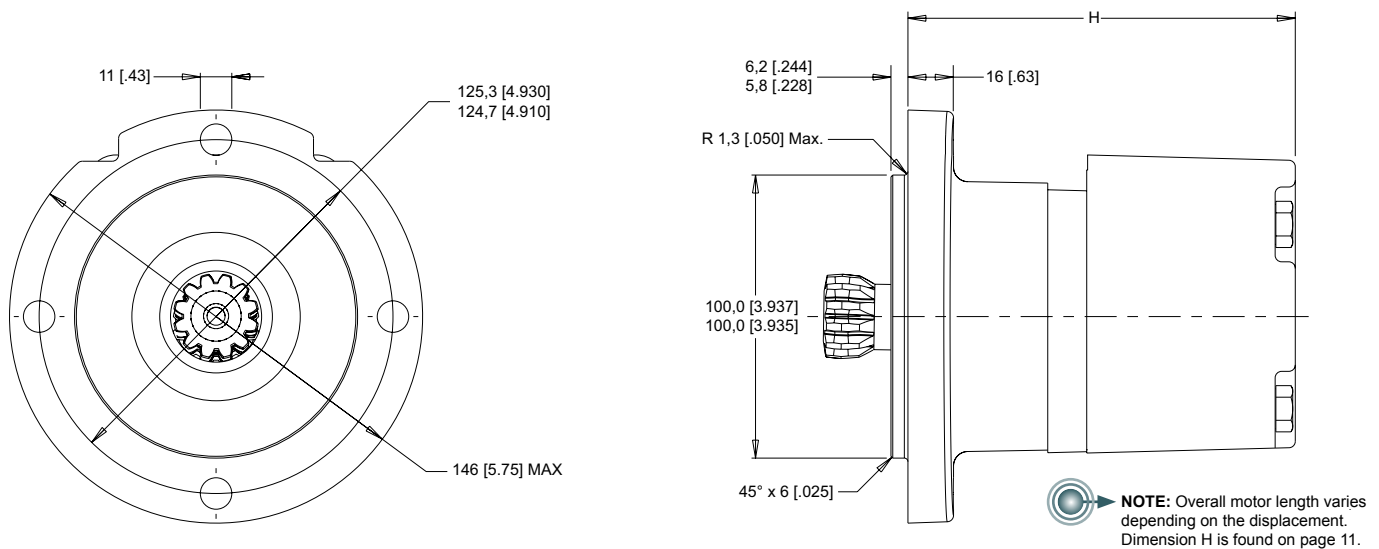
The WS short motor comes without bearings or an output shaft. It is designed for direct mounting onto a gearbox or similar add-on component that provides the internal splined input shaft and bearings. Spline specifications provided below.

The add-on component must be fitted with a shaft seal on its input shaft if it is desired to prevent the motor leakage oil from flowing into the add-on component. In addition, the recommended 4mm diameter hole in the bottom of the add-on component input shaft should be omitted or plugged. If a shaft seal is used, make sure the motor back pressure or case pressure will never exceed the pressure rating of the shaft seal. A case drain line is recommended to keep pressure on the shaft seal low.

HOUSINGS

SG Short Motor with End Ports

SH Short Motor with Side Ports



SHORT MOTOR SPECIFICATIONS

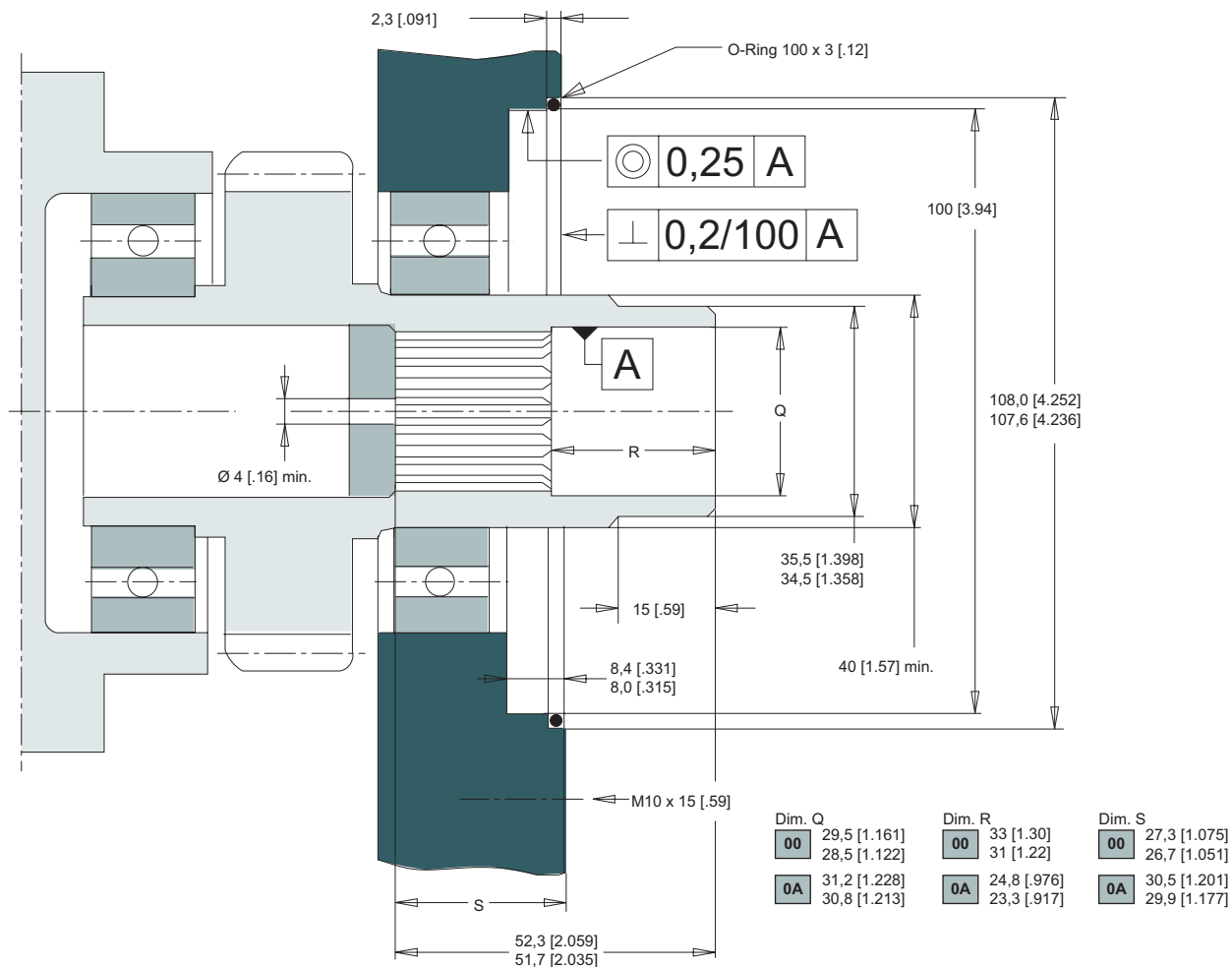
Intermittent Ratings - 10% of Operation Peak Ratings - 1% of Operation

CODE	Displacement cc [in ³ /rev]	Max. Torque Nm [lb-in]	Max. Pressure bar [psi]		
		Inter.	Cont.	Inter.	Peak
100	100 [6.10]	416 [3680]	207 [3000]	310 [4500]	310 [4500]
110	112 [6.85]	468 [4145]	207 [3000]	310 [4500]	310 [4500]
130	129 [7.86]	550 [4865]	207 [3000]	310 [4500]	310 [4500]
160	162 [9.90]	618 [5465]	207 [3000]	276 [4000]	310 [4500]
200	202 [12.31]	768 [6795]	207 [3000]	276 [4000]	310 [4500]
230	228 [13.92]	806 [7135]	207 [3000]	276 [4000]	310 [4500]
320	325 [19.81]	1029 [9105]	190 [2750]	224 [3250]	259 [3750]
400	399 [24.36]	1034 [9150]	155 [2250]	190 [2750]	224 [3250]
500	496 [30.29]	1041 [9210]	121 [1750]	155 [2250]	172 [2500]

NOTE: The above specifications chart references a torque reduction in Short Motor operation when the WS 00 Cardan Shaft listed on page 17 is used. When using the WS 0A Cardan shaft please refer to the specifications listed on page 2.



355 & 356 SERIES SHORT MOTOR



SHAFTS

The recommended shaft material is SAE 8620 or similar case hardening steel such as 20 MoCr4 (900 N/mm²) hardened to 59 - 62 HRC to a depth of 0,762 - 1,016 [.030 - .040]

00 Cardan

Fillet Root Side Fit

Number of teeth.....	12	Pitch.....	12/24
Pressure Angle.....	30°	Pitch Dia.	25,4 [1.0]
Major Diameter D_{fi}	28,0 [1.10] - 27,9 [1.096]		
Form Diameter (Min.) D_{fi}	27,6 [1.09]		
Minor Diameter D_i	23,033 [.9068] - 23,0 [.9055]		
Space Width (Circular) L_o	4,328 [1.704] - 4,288 [1.688]		
Tooth Thickness (Circular) S_o	2,341 [.09217]		
Fillet Radius R_{min}	0,2 [.008]		
*Max Distance Between Pins I	17,77 [1.700] - 17,62 [1.694]		
Pin Diameter d	4,836 [1.9034] - 4,834 [1.9026]		

Internal involute spline data per ANSI B92.1-1970, class 5 (corrected $m \cdot X = 0.8$; $m = 2.1166$)

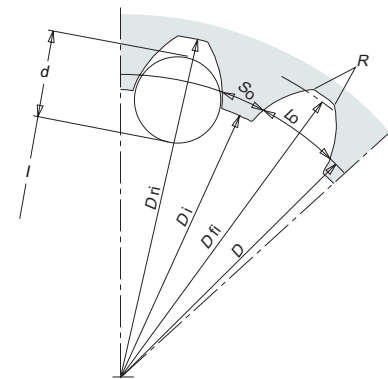
* Dimensions apply after heat treatment.

0A Cardan

Fillet Root Side Fit

Number of teeth.....	12	Pitch.....	10.9091
Pressure Angle.....	30°	Pitch Dia. D	27,94 [1.1]
Base Diameter.....	24,199 [.9527]		
Major Diameter D_{fi}	30,7 [1.210] - 30,5 [1.200]		
Form Diameter (Min.) D_{fi}	29,97 [1.180]		
Minor Diameter D_i	25,578 [1.007] - 25,705 [1.012]		
*Space Width (Circular) L_o			
Max. Actual.....	4,232 [1.666]		
Min. Effective.....	4,155 [1.636]		
Fillet Radius R_{max}	0,38 [.015]		
Max Distance Between Pins I	21,51 [1.8469]		
Pin Diameter d	4,5085 [1.775]		
with 3,175 [.125] Flat for root clearance			

* Dimensions apply after heat treatment.



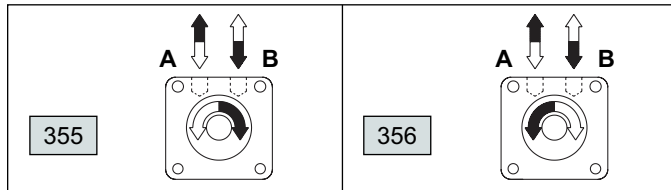


355 & 356 SERIES MODEL CODE BUILDER

SERIES	DISPLACEMENT	HOUSING	SHAFT	PAINT	CAVITY	ADD ON	MISCELLANEOUS
STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7	STEP 8

STEP 1 - Select a series

- 355 Clockwise Rotation
356 Counterclockwise Rotation



STEP 2 - Select a displacement option

100	100 cc	[6.1 in ³ /rev]	230	228 cc	[13.9 in ³ /rev]
110	112 cc	[6.9 in ³ /rev]	320	325 cc	[19.8 in ³ /rev]
130	129 cc	[7.9 in ³ /rev]	400	399 cc	[24.4 in ³ /rev]
160	162 cc	[9.9 in ³ /rev]	500	496 cc	[30.3 in ³ /rev]
200	202 cc	[12.3 in ³ /rev]			

STEP 3 - Select a mounting option

NOTE: To complete the three (3) digit WS Series housing code a two (2) digit mounting option must be followed with the single (1) digit porting option found in STEP 3 part II. Side port mounting options need side port porting options and end port mounting options need end port porting options.

A0	2-Hole SAE A Mount With End Ports
A2	4-Hole Magneto With End Ports
A7	2-Hole SAE A Mount With Side Ports
A8	4-Hole Magneto With Side Ports
AG	4-Hole Square SAE A Mount With End Ports
AH	4-Hole Square SAE A Mount With Side Ports
SG	Short Motor With End Ports
SH	Short Motor With Side Ports
W2	4-Hole 3.25" Pilot Wheel Mount With End Ports
W8	4-Hole 3.25" Pilot Wheel Mount With Side Ports
Y2	4-Hole 4.25" Pilot Wheel Mount With End Ports
Y8	4-Hole 4.25" Pilot Wheel Mount With Side Ports
Z2	4-Hole Euro Wheel Mount with End Ports
Z8	4-Hole Euro Wheel Mount with Side Ports

WS series motors have been tested per NFPA/T2.6.1-1974 in order to establish ratings for infinite housing life. These ratings are based on pressure cycles with the case drain connected. The ratings for each housing are listed below:

Mounting Option	Rated Fatigue Pressure
4-Hole Square SAE A and 4-Hole Euro Wheel Mounts	34 bar [500 psi]
2-Hole SAE A and 4-Hole Magneto Mounts	48 bar [700 psi]
3.25" and 4.25" Wheel Mounts	117 bar [1700 psi]

STEP 3 (part II) - Select a porting option

END PORTS

- 1 7/8" O-Ring With 7/16" Drain
2 1/2" BSP.F With 1/4" Drain

SIDE PORTS

- 1 7/8" O-Ring With 7/16" Drain
2 1/2" BSP.F With 1/4" Drain
3 1/2" BSP.F Offset Manifold With 1/4" Drain
5 9/16" O-Ring With 7/16" Drain
6 1-1/16" O-Ring With 7/16" Drain
9 3/8" BSP.F With 1/4" Drain

STEP 4 - Select a shaft option

02	6B Spline	23	14 Tooth Spline
10	1" Straight	28	35mm Tapered
12	25mm Straight	31	1-1/2" Tapered
20	1-1/4" Straight	00	Cardan (Drive Link Only)
21	32mm Straight	0A	Cardan (Drive Link Only)
22	1-1/4" Tapered		

NOTE: The 00 & 0A shafts must be used on the Short Motor and only the Short Motor. The 28 and 31 shafts are not available on the SAE A mounts or the Magneto mounts.

STEP 5 - Select a paint option

- A Black
B Black (unpainted flange face)
Z No Paint

STEP 6 - Select a valve cavity option and installed valve

A	None	F	121 bar [1750 psi]
B	Relief Valve Cavity	G	138 bar [2000 psi]
C	69 bar [1000 psi]	J	173 bar [2500 psi]
D	86 bar [1250 psi]	L	207 bar [3000 psi]
E	104 bar [1500 psi]		

NOTE: Valve cavity is only available on Side Ports 1, 2, and 3. The B option will not have a valve cartridge listed above installed.

STEP 7 - Select an add on option

- A Standard
B Lock Nut
C Solid Hex Nut

STEP 8 - Select a miscellaneous option

- AA None

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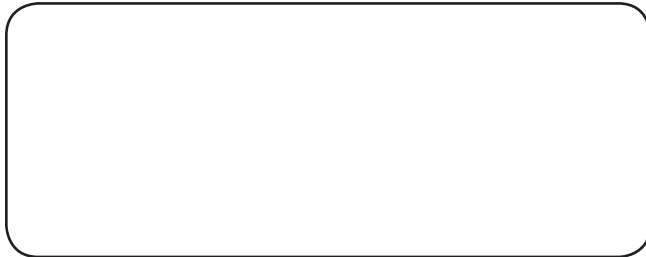
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