



HB

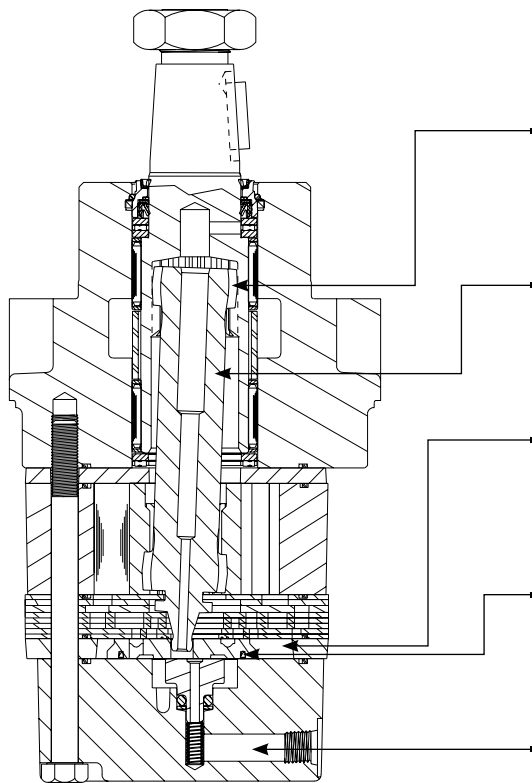
SERIES HYDRAULIC MOTORS

苏州帕凯德自动化有限公司

HB

OVERVIEW

The HB Series motor is the leader in its class, offering high efficiency and durability. The three-zone orbiting valve, laminated manifold and Roller Stator® motor work harmoniously to produce high overall efficiencies over a wide range of operating conditions. The standard case drain increases shaft seal life by reducing internal pressures experienced by the seal. Case oil leakage is also directed across all driveline components, increasing motor life. An internal drain option is also available. At the heart of the motor is a heavy-duty driveline, offering 30% more torque capacity than competitive designs. These features make the HB Series motor the preferred choice for applications requiring peak efficiency for continuous operation.



KEY FEATURES

- Forced Drive Link Lubrication** reduces wear and promotes longer life from motor.
- Heavy-Duty Drive Link** is up to 30% stronger than competitive designs for longer life.
- Three-Zone Orbiting Valve** precisely meters oil to produce exceptional volumetric efficiency.
- Rubber Energized Steel Face Seal** does not extrude or melt under high pressure or high temperature.
- Standard Case Drain** increases shaft seal life by reducing pressure on seal.

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 |
| 050 | 52 [3.2] | 680 | 830 | 38 [10] | 45 [12] | 135 [1200] | 158 [1400] | 207 [3000] | 242 [3500] | 276 [4000] |
| 080 | 76 [4.6] | 800 | 950 | 53 [14] | 64 [17] | 191 [1700] | 222 [1975] | 207 [3000] | 242 [3500] | 276 [4000] |
| 090 | 89 [5.4] | 680 | 840 | 61 [16] | 76 [20] | 225 [2000] | 270 [2400] | 207 [3000] | 242 [3500] | 276 [4000] |
| 110 | 111 [6.8] | 680 | 850 | 76 [20] | 95 [25] | 298 [2650] | 349 [3100] | 207 [3000] | 242 [3500] | 276 [4000] |
| 125 | 127 [7.7] | 580 | 740 | 76 [20] | 95 [25] | 338 [3000] | 394 [3500] | 207 [3000] | 242 [3500] | 276 [4000] |
| 160 | 164 [10.0] | 460 | 580 | 76 [20] | 95 [25] | 448 [3975] | 512 [4550] | 207 [3000] | 242 [3500] | 276 [4000] |
| 200 | 205 [12.5] | 370 | 460 | 76 [20] | 95 [25] | 569 [5050] | 653 [5800] | 207 [3000] | 242 [3500] | 276 [4000] |
| 250 | 254 [15.5] | 290 | 370 | 76 [20] | 95 [25] | 704 [6250] | 799 [7100] | 207 [3000] | 242 [3500] | 276 [4000] |
| 300 | 293 [17.9] | 250 | 320 | 76 [20] | 95 [25] | 811 [7200] | 929 [8250] | 207 [3000] | 242 [3500] | 276 [4000] |
| 400 | 409 [24.9] | 180 | 230 | 76 [20] | 95 [25] | 946 [8400] | 1019 [9050] | 173 [2500] | 189 [2750] | 207 [3000] |



050

| | | | | | | | | |
|-----------------------|----------|-----------|------------|------------|------------|------------|------------|-------------|
| Pressure - bars [psi] | | | | | | | Max. Cont. | Max. Inter. |
| 17 [250] | 35 [500] | 69 [1000] | 104 [1500] | 138 [2000] | 173 [2500] | 207 [3000] | 242 [3500] | |

52 cc [3.2 in³/rev.]

| | | | | | | | | | |
|------------------------|------------------|---------|-------|-------|--------|--------|--------|---------|---------|
| Max. Max. Inter. Cont. | Flow - lpm [gpm] | 2 [0.5] | 4 [1] | 8 [2] | 15 [4] | 23 [6] | 30 [8] | 38 [10] | 45 [12] |
|------------------------|------------------|---------|-------|-------|--------|--------|--------|---------|---------|

| | | | | | | | | | | |
|--------------------------------|--------|----------|----------|----------|----------|----------|------------|------------|---|-----|
| Torque - Nm [lb-in], Speed rpm | | | | | | | | | Intermittent Ratings - 10% of Operation | |
| | 7 [66] | 18 [158] | 38 [314] | 51 [447] | 66 [587] | | | | | 37 |
| | 36 | 31 | 26 | 21 | 9 | | | | | 73 |
| | 9 [77] | 19 [164] | 38 [335] | 57 [505] | 71 [631] | 87 [772] | 98 [866] | | | 145 |
| | 72 | 69 | 65 | 63 | 33 | 32 | 9 | | | 289 |
| | 9 [75] | 19 [164] | 39 [342] | 59 [521] | 78 [690] | 95 [840] | 109 [964] | 123 [1086] | | 434 |
| | 142 | 140 | 135 | 133 | 122 | 102 | 77 | 57 | | 578 |
| | 8 [68] | 19 [164] | 38 [340] | 57 [507] | 78 [688] | 99 [872] | 112 [993] | 129 [1145] | | 722 |
| | 288 | 286 | 285 | 284 | 265 | 245 | 211 | 189 | | 867 |
| | | | 36 [319] | 56 [492] | 76 [669] | 97 [859] | 114 [1009] | 134 [1182] | | |
| | | | 431 | 427 | 416 | 396 | 347 | 321 | | |
| | | | 34 [304] | 53 [467] | 73 [646] | 95 [841] | 113 [1001] | 134 [1183] | | |
| | | | 577 | 572 | 568 | 543 | 488 | 463 | | |
| | | | | 51 [451] | 71 [628] | 92 [810] | 111 [978] | 133 [1174] | | |
| | | | | 699 | 683 | 665 | 634 | 604 | | |
| | | | | 48 [427] | 68 [606] | 88 [781] | 111 [980] | | | |
| | | | | 847 | 825 | 798 | | | | |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | | |
|----------|----------|----------|----------|------------|------------|------------|------------|
| 14 [127] | 29 [255] | 58 [510] | 86 [764] | 115 [1019] | 144 [1274] | 173 [1529] | 202 [1783] |
|----------|----------|----------|----------|------------|------------|------------|------------|

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

080

| | | | | | | | | |
|-----------------------|----------|-----------|------------|------------|------------|------------|------------|-------------|
| Pressure - bars [psi] | | | | | | | Max. Cont. | Max. Inter. |
| 17 [250] | 35 [500] | 69 [1000] | 104 [1500] | 138 [2000] | 173 [2500] | 207 [3000] | 242 [3500] | |

76 cc [4.6 in³/rev.]

| | | | | | | | | | | | | |
|------------------------|------------------|---------|-------|-------|--------|--------|--------|---------|---------|---------|---------|---------|
| Max. Max. Inter. Cont. | Flow - lpm [gpm] | 2 [0.5] | 4 [1] | 8 [2] | 15 [4] | 23 [6] | 30 [8] | 38 [10] | 45 [12] | 53 [14] | 61 [16] | 64 [17] |
|------------------------|------------------|---------|-------|-------|--------|--------|--------|---------|---------|---------|---------|---------|

| | | | | | | | | | | | | |
|--------------------------------|----------|----------|----------|----------|------------|------------|------------|------------|-----|--|---|-----|
| Torque - Nm [lb-in], Speed rpm | | | | | | | | | | | Intermittent Ratings - 10% of Operation | |
| | 14 [127] | 30 [262] | 61 [543] | 91 [806] | 120 [1062] | 145 [1285] | 169 [1496] | 191 [1693] | | | | 26 |
| | 25 | 24 | 21 | 18 | 17 | 11 | 11 | 9 | | | | 51 |
| | 16 [140] | 32 [286] | 63 [559] | 95 [839] | 124 [1099] | 151 [1340] | 178 [1579] | 203 [1796] | | | | 101 |
| | 50 | 50 | 43 | 43 | 34 | 32 | 32 | 31 | | | | 201 |
| | 16 [139] | 32 [280] | 64 [563] | 97 [857] | 129 [1139] | 157 [1390] | 187 [1652] | 211 [1865] | | | | 302 |
| | 100 | 100 | 99 | 92 | 87 | 79 | 78 | 77 | | | | 402 |
| | 14 [127] | 31 [275] | 65 [572] | 99 [872] | 131 [1155] | 160 [1420] | 186 [1643] | 216 [1911] | | | | 503 |
| | 200 | 200 | 199 | 191 | 181 | 174 | 160 | 154 | | | | 603 |
| | 13 [113] | 30 [262] | 63 [557] | 96 [853] | 130 [1149] | 160 [1420] | 186 [1646] | 218 [1930] | | | | 704 |
| | 301 | 300 | 297 | 295 | 284 | 271 | 253 | 245 | | | | 804 |
| | 10 [91] | 27 [243] | 61 [536] | 93 [826] | 127 [1125] | 159 [1409] | 187 [1654] | 220 [1945] | | | | 904 |
| | 401 | 400 | 398 | 390 | 384 | 372 | 346 | 339 | | | | |
| | | 24 [212] | 58 [511] | 89 [790] | 123 [1087] | 156 [1379] | 185 [1638] | 213 [1883] | | | | |
| | | 502 | 500 | 499 | 498 | 485 | 443 | 433 | | | | |
| | | 20 [177] | 54 [482] | 87 [767] | 120 [1060] | 164 [1451] | 193 [1711] | 228 [2021] | | | | |
| | | 602 | 601 | 600 | 597 | 540 | 526 | 510 | | | | |
| | | 14 [127] | 50 [445] | 84 [741] | 124 [1098] | 155 [1369] | 185 [1640] | 217 [1918] | | | | |
| | | | 690 | 689 | 688 | 658 | 644 | 631 | 613 | | | |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | | |
|----------|----------|----------|------------|------------|------------|------------|------------|
| 21 [183] | 41 [366] | 83 [732] | 124 [1099] | 166 [1465] | 207 [1831] | 248 [2197] | 290 [2564] |
|----------|----------|----------|------------|------------|------------|------------|------------|

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



090

| Pressure - bars [psi] | | | | | | Max. Cont. | Max. Inter. |
|-----------------------|----------|-----------|------------|------------|------------|------------|-------------|
| 17 [250] | 35 [500] | 69 [1000] | 104 [1500] | 138 [2000] | 173 [2500] | 207 [3000] | 242 [3500] |

89 cc [5.4 in³/rev.]

| Flow - lpm [gpm] | Torque - Nm [lb-in], Speed rpm | | | | | | | | Theoretical rpm |
|------------------|--------------------------------|----------|----------|------------|------------|------------|------------|------------|-----------------|
| | 12 [106] | 26 [231] | 69 [609] | 100 [889] | 142 [1259] | 174 [1537] | 206 [1826] | 232 [2049] | |
| 2 [0.5] | 21 | 19 | 17 | 15 | 13 | 10 | 7 | 5 | 22 |
| 4 [1] | | 30 [264] | 68 [605] | 107 [947] | 146 [1296] | 180 [1596] | 212 [1875] | 242 [2142] | 43 |
| 8 [2] | | 33 [291] | 71 [629] | 108 [958] | 149 [1323] | 183 [1620] | 221 [1956] | 251 [2223] | 86 |
| | | 84 | 79 | 73 | 67 | 66 | 60 | 59 | |
| 15 [4] | | | 72 [636] | 113 [1003] | 153 [1351] | 188 [1664] | 225 [1990] | 260 [2300] | 172 |
| | | | 167 | 158 | 149 | 143 | 141 | 135 | |
| 23 [6] | | | 72 [633] | 112 [995] | 151 [1340] | 187 [1654] | 226 [1996] | 260 [2304] | 257 |
| | | | 252 | 243 | 233 | 227 | 222 | 218 | |
| 30 [8] | | | 68 [598] | 109 [960] | 151 [1340] | 188 [1660] | 227 [2012] | 263 [2326] | 343 |
| | | | 339 | 331 | 317 | 309 | 301 | 300 | |
| 38 [10] | | | | 108 [959] | 150 [1328] | 188 [1667] | 229 [2024] | 270 [2393] | 428 |
| | | | | 416 | 403 | 391 | 381 | 370 | |
| 45 [12] | | | | 109 [961] | 153 [1356] | 195 [1728] | 232 [2049] | 271 [2398] | 514 |
| | | | | 505 | 490 | 475 | 462 | 448 | |
| 53 [14] | | | | 145 [1287] | 190 [1678] | 213 [1886] | 241 [2135] | 282 [2495] | 599 |
| | | | | 590 | 578 | 558 | 544 | 530 | |
| 61 [16] | | | | 134 [1190] | 187 [1654] | 192 [1701] | 227 [2007] | 269 [2384] | 685 |
| | | | | 677 | 660 | 644 | 629 | 610 | |
| 68 [18] | | | | | 136 [1201] | 189 [1675] | 240 [2122] | | 770 |
| | | | | | 748 | 729 | 719 | | |
| 76 [20] | | | | | 136 [1205] | 174 [1536] | 216 [1916] | | 856 |
| | | | | | 835 | 819 | 806 | | |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | | |
|----------|----------|----------|------------|------------|------------|------------|------------|
| 24 [215] | 49 [430] | 97 [860] | 146 [1290] | 194 [1720] | 243 [2150] | 291 [2580] | 340 [3010] |
|----------|----------|----------|------------|------------|------------|------------|------------|

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

110

| Pressure - bars [psi] | | | | | | Max. Cont. | Max. Inter. |
|-----------------------|----------|-----------|------------|------------|------------|------------|-------------|
| 17 [250] | 35 [500] | 69 [1000] | 104 [1500] | 138 [2000] | 173 [2500] | 207 [3000] | 242 [3500] |

111 cc [6.8 in³/rev.]

| Flow - lpm [gpm] | Torque - Nm [lb-in], Speed rpm | | | | | | | | Theoretical rpm |
|------------------|--------------------------------|----------|----------|------------|------------|------------|------------|------------|-----------------|
| | 12 [106] | 39 [347] | 88 [777] | 135 [1199] | 182 [1609] | 223 [1977] | 273 [2420] | 304 [2690] | |
| 2 [0.5] | 16 | 16 | 14 | 11 | 9 | 8 | 6 | 5 | 17 |
| 4 [1] | 16 [142] | 42 [374] | 97 [857] | 146 [1290] | 199 [1763] | 246 [2179] | 293 [2592] | 329 [2916] | 34 |
| | 33 | 33 | 31 | 27 | 21 | 19 | 18 | 16 | |
| 8 [2] | | 42 [372] | 98 [866] | 148 [1313] | 201 [1782] | 249 [2204] | 297 [2629] | 345 [3050] | 68 |
| | | 67 | 64 | 59 | 49 | 46 | 44 | 43 | |
| 15 [4] | | | 94 [835] | 149 [1320] | 201 [1777] | 251 [2223] | 302 [2674] | 348 [3083] | 136 |
| | | | 134 | 126 | 117 | 110 | 104 | 104 | |
| 23 [6] | | | 93 [819] | 148 [1312] | 201 [1775] | 250 [2215] | 302 [2671] | 348 [3078] | 204 |
| | | | 202 | 196 | 186 | 177 | 167 | 163 | |
| 30 [8] | | | 89 [785] | 145 [1287] | 199 [1760] | 249 [2204] | 299 [2648] | 352 [3114] | 272 |
| | | | 269 | 267 | 258 | 247 | 267 | 229 | |
| 38 [10] | | | 83 [738] | 139 [1232] | 194 [1718] | 244 [2163] | 296 [2617] | 349 [3086] | 340 |
| | | | 339 | 336 | 327 | 315 | 304 | 292 | |
| 45 [12] | | | 82 [723] | 145 [1281] | 209 [1853] | 291 [2578] | 315 [2786] | 343 [3031] | 408 |
| | | | 407 | 406 | 397 | 386 | 368 | 360 | |
| 53 [14] | | | 74 [654] | 129 [1143] | 183 [1621] | 238 [2103] | 287 [2539] | 349 [3085] | 476 |
| | | | 475 | 473 | 466 | 451 | 441 | 426 | |
| 61 [16] | | | | 143 [1261] | 199 [1763] | 251 [2224] | 301 [2666] | 363 [3213] | 544 |
| | | | | 542 | 536 | 523 | 510 | 492 | |
| 68 [18] | | | | 120 [1059] | 179 [1586] | 233 [2058] | 284 [2510] | 347 [3071] | 612 |
| | | | | 609 | 603 | 593 | 580 | 561 | |
| 76 [20] | | | | 107 [944] | 160 [1419] | 217 [1918] | 268 [2374] | 327 [2896] | 680 |
| | | | | 678 | 677 | 661 | 645 | 627 | |
| 83 [22] | | | | 93 [824] | 157 [1393] | 206 [1823] | 257 [2271] | | 748 |
| | | | | 746 | 743 | 735 | 714 | | |
| 91 [24] | | | | 86 [762] | 139 [1234] | 197 [1744] | 250 [2214] | | 816 |
| | | | | 813 | 810 | 803 | 783 | | |
| 95 [25] | | | | 77 [678] | 132 [1171] | 191 [1694] | 243 [2154] | | 850 |
| | | | | 847 | 844 | 835 | 828 | | |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | | |
|----------|----------|------------|------------|------------|------------|------------|------------|
| 31 [271] | 61 [541] | 122 [1083] | 184 [1624] | 245 [2166] | 306 [2707] | 367 [3248] | 428 [3790] |
|----------|----------|------------|------------|------------|------------|------------|------------|

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



125

| | | | | | | | |
|-----------------------|----------|-----------|------------|------------|------------|------------|-------------|
| Pressure - bars [psi] | | | | | | Max. Cont. | Max. Inter. |
| 17 [250] | 35 [500] | 69 [1000] | 104 [1500] | 138 [2000] | 173 [2500] | 207 [3000] | 242 [3500] |

127 cc [7.7 in³/rev.]

Intermittent Ratings - 10% of Operation

| | | | | | | | | | | |
|------------------|---------|----------|----------|-----------|------------|------------|------------|------------|------------|-----------------|
| Flow - lpm [gpm] | 2 [0.5] | 14 [127] | 44 [394] | 109 [961] | 159 [1408] | 217 [1922] | 267 [2364] | 313 [2766] | 355 [3146] | Theoretical rpm |
| | 4 [1] | 16 [138] | 45 [401] | 108 [952] | 167 [1475] | 226 [2004] | 278 [2459] | 332 [2936] | 367 [3245] | |
| | 8 [2] | | 49 [432] | 108 [953] | 165 [1462] | 231 [2046] | 286 [2528] | 332 [2941] | 387 [3421] | |
| | 15 [4] | | 59 [519] | 107 [949] | 167 [1479] | 229 [2024] | 284 [2513] | 342 [3023] | 392 [3467] | |
| | 23 [6] | | | 102 [902] | 166 [1473] | 223 [1973] | 279 [2473] | 337 [2985] | 393 [3477] | |
| | 30 [8] | | | 179 [157] | 160 [1420] | 222 [1968] | 287 [2541] | 337 [2987] | 391 [3459] | |
| | 38 [10] | | | 239 [209] | 160 [1420] | 222 [1968] | 287 [2541] | 337 [2987] | 391 [3459] | |
| | 45 [12] | | | 239 [209] | 154 [1359] | 217 [1919] | 273 [2413] | 332 [2940] | 387 [3428] | |
| | 53 [14] | | | 299 [259] | 147 [1304] | 207 [1831] | 267 [2361] | 329 [2914] | 406 [3590] | |
| | 61 [16] | | | 359 [309] | 146 [1293] | 204 [1801] | 268 [2375] | 332 [2935] | 419 [3704] | |
| | 68 [18] | | | 419 [369] | 168 [1484] | 198 [1756] | 258 [2287] | 327 [2895] | 386 [3419] | |
| | 76 [20] | | | 473 [413] | 193 [1704] | 214 [1894] | 278 [2460] | 360 [3188] | 386 [3412] | |
| | 83 [22] | | | | 205 [1815] | 245 [2164] | 290 [2567] | 344 [3040] | 408 [3606] | |
| | 91 [24] | | | | 577 [507] | 561 [491] | 537 [467] | 505 [445] | 453 [393] | |
| | 95 [25] | | | | 151 [1336] | 201 [1781] | 260 [2298] | 320 [2832] | | |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | | |
|----------|----------|------------|------------|------------|------------|------------|------------|
| 35 [307] | 69 [613] | 139 [1226] | 208 [1839] | 277 [2452] | 346 [3065] | 416 [3678] | 485 [4291] |
|----------|----------|------------|------------|------------|------------|------------|------------|

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] | 173 [2500] | 207 [3000] | 242 [3500] |

164 cc [10.0 in³/rev.]

Intermittent Ratings - 10% of Operation

| | | | | | | | | | | |
|------------------|---------|----------|-----------|------------|------------|------------|------------|------------|------------|-----------------|
| Flow - lpm [gpm] | 2 [0.5] | 24 [216] | 61 [538] | 143 [1267] | 213 [1881] | 287 [2536] | 351 [3106] | 411 [3640] | 470 [4159] | Theoretical rpm |
| | 4 [1] | 28 [244] | 67 [596] | 145 [1287] | 215 [1899] | 291 [2578] | 355 [3145] | 425 [3758] | 493 [4366] | |
| | 8 [2] | | 66 [588] | 148 [1306] | 224 [1983] | 301 [2666] | 366 [3241] | 441 [3904] | 508 [4493] | |
| | 15 [4] | | 46 [404] | 146 [1291] | 226 [2002] | 313 [2769] | 375 [3318] | 451 [3990] | 516 [4569] | |
| | 23 [6] | | 92 [80] | 146 [1295] | 224 [1986] | 307 [2718] | 379 [3358] | 449 [3975] | 515 [4553] | |
| | 30 [8] | | 137 [119] | 142 [1258] | 221 [1954] | 299 [2644] | 376 [3329] | 447 [3952] | 520 [4603] | |
| | 38 [10] | | | 184 [161] | 216 [1909] | 289 [2558] | 371 [3282] | 448 [3961] | 520 [4598] | |
| | 45 [12] | | | 230 [202] | 208 [1842] | 284 [2510] | 357 [3161] | 436 [3862] | 512 [4529] | |
| | 53 [14] | | | 277 [241] | 202 [1788] | 275 [2438] | 353 [3124] | 427 [3781] | 509 [4508] | |
| | 61 [16] | | | 323 [283] | 187 [1659] | 275 [2431] | 338 [2994] | 418 [3698] | 496 [4392] | |
| | 68 [18] | | | 369 [324] | 175 [1553] | 257 [2278] | 325 [2874] | 405 [3587] | 480 [4246] | |
| | 76 [20] | | | 415 [365] | 169 [1499] | 246 [2176] | 328 [2906] | 397 [3514] | 477 [4223] | |
| | 83 [22] | | | 461 [401] | 147 [1297] | 232 [2049] | 315 [2792] | 385 [3411] | | |
| | 91 [24] | | | | 507 [447] | 504 [447] | 498 [438] | 487 [427] | | |
| | 95 [25] | | | | 131 [1157] | 218 [1928] | 300 [2655] | 378 [3344] | | |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | | |
|----------|----------|------------|------------|------------|------------|------------|------------|
| 45 [398] | 90 [796] | 180 [1592] | 270 [2389] | 360 [3185] | 450 [3981] | 540 [4777] | 630 [5573] |
|----------|----------|------------|------------|------------|------------|------------|------------|

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



200

| Pressure - bars [psi] | | | | | | | Max. Cont. | Max. Inter. |
|-----------------------|----------|-----------|------------|------------|------------|------------|------------|-------------|
| 17 [250] | 35 [500] | 69 [1000] | 104 [1500] | 138 [2000] | 173 [2500] | 207 [3000] | 242 [3500] | |

205 cc [12.5 in³/rev.]

| Flow - lpm [gpm] | Torque - Nm [lb-in], Speed rpm | | | | | | | | Intermittent Ratings - 10% of Operation | |
|------------------|--------------------------------|----------|------------|------------|------------|------------|------------|------------|---|-----------------|
| | 35 [314] | 83 [734] | 179 [1581] | 267 [2365] | 353 [3121] | 443 [3921] | 505 [4469] | 579 [5120] | 10 | Theoretical rpm |
| 2 [0.5] | 9 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | | |
| 4 [1] | 18 | 18 | 17 | 14 | 13 | 11 | 9 | 8 | | 19 |
| 8 [2] | 36 | 36 | 35 | 31 | 27 | 24 | 21 | 20 | | 37 |
| 15 [4] | 73 | 73 | 72 | 68 | 61 | 53 | 49 | 46 | | 74 |
| 23 [6] | | 110 | 109 | 106 | 98 | 89 | 81 | 74 | | 111 |
| 30 [8] | | | 147 | 144 | 136 | 123 | 112 | 104 | | 148 |
| 38 [10] | | | 184 | 182 | 173 | 162 | 151 | 141 | | 185 |
| 45 [12] | | | 221 | 219 | 214 | 200 | 187 | 176 | | 222 |
| 53 [14] | | | 258 | 256 | 250 | 238 | 224 | 213 | | 259 |
| 61 [16] | | | 295 | 290 | 286 | 277 | 264 | 242 | | 296 |
| 68 [18] | | | 331 | 327 | 323 | 319 | 303 | 289 | | 333 |
| 76 [20] | | | | 369 | 365 | 360 | 343 | 331 | | 370 |
| 83 [22] | | | | 405 | 401 | 395 | 382 | | | 407 |
| 91 [24] | | | | 442 | 441 | 438 | 425 | | | 444 |
| 95 [25] | | | | 460 | 458 | 456 | 444 | | | 462 |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | | |
|----------|-----------|------------|------------|------------|------------|------------|------------|
| 56 [498] | 112 [995] | 225 [1990] | 337 [2986] | 450 [3981] | 562 [4976] | 675 [5971] | 787 [6967] |
|----------|-----------|------------|------------|------------|------------|------------|------------|

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

250

| Pressure - bars [psi] | | | | | | | Max. Cont. | Max. Inter. |
|-----------------------|----------|-----------|------------|------------|------------|------------|------------|-------------|
| 17 [250] | 35 [500] | 69 [1000] | 104 [1500] | 138 [2000] | 173 [2500] | 207 [3000] | 242 [3500] | |

254 cc [15.5 in³/rev.]

| Flow - lpm [gpm] | Torque - Nm [lb-in], Speed rpm | | | | | | | | Intermittent Ratings - 10% of Operation | |
|------------------|--------------------------------|-----------|------------|------------|------------|------------|-----|-----|---|-----------------|
| | 43 [381] | 104 [924] | 221 [1955] | 339 [3001] | 449 [3974] | 551 [4872] | | | 8 | Theoretical rpm |
| 2 [0.5] | 7 | 6 | 6 | 5 | 3 | 1 | | | | |
| 4 [1] | 14 | 14 | 13 | 11 | 9 | 7 | 4 | | | 15 |
| 8 [2] | 29 | 29 | 28 | 26 | 22 | 17 | 13 | 9 | | 30 |
| 15 [4] | 59 | 58 | 57 | 56 | 51 | 41 | 33 | 25 | | 60 |
| 23 [6] | 89 | 88 | 88 | 87 | 82 | 69 | 58 | 48 | | 90 |
| 30 [8] | | 119 | 118 | 117 | 115 | 101 | 87 | 76 | | 120 |
| 38 [10] | | 149 | 148 | 147 | 141 | 129 | 114 | 104 | | 150 |
| 45 [12] | | | 178 | 176 | 174 | 165 | 147 | 127 | | 179 |
| 53 [14] | | | 208 | 206 | 205 | 197 | 176 | 158 | | 209 |
| 61 [16] | | | 238 | 235 | 233 | 227 | 205 | 191 | | 239 |
| 68 [18] | | | 268 | 266 | 263 | 259 | 245 | 222 | | 269 |
| 76 [20] | | | 298 | 295 | 292 | 289 | 277 | 252 | | 299 |
| 83 [22] | | | | 326 | 323 | 319 | 307 | | | 328 |
| 91 [24] | | | | 357 | 355 | 353 | 342 | | | 358 |
| 95 [25] | | | | 371 | 368 | 365 | 360 | | | 373 |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | | |
|----------|------------|------------|------------|------------|------------|------------|------------|
| 70 [617] | 139 [1234] | 279 [2468] | 418 [3702] | 558 [4936] | 697 [6170] | 837 [7404] | 976 [8639] |
|----------|------------|------------|------------|------------|------------|------------|------------|

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



300

| Pressure - bars [psi] | | | | | | Max. Cont. | Max. Inter. |
|-----------------------|----------|-----------|------------|------------|------------|------------|-------------|
| 17 [250] | 35 [500] | 69 [1000] | 104 [1500] | 138 [2000] | 173 [2500] | 207 [3000] | 242 [3500] |

293 cc [17.9 in³/rev.]

Torque - Nm [lb-in], Speed rpm Intermittent Ratings - 10% of Operation

| | | | | | | | | | | | |
|------------------|---------|----------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------|-----|
| Flow - lpm [gpm] | 2 [0.5] | 61 [543] 6 | 118 [1044] 5 | 261 [2311] 5 | 388 [3433] 4 | | | | | Theoretical rpm | |
| | 4 [1] | 59 [521] 12 | 140 [1237] 12 | 271 [2397] 11 | 414 [3666] 11 | 546 [4833] 8 | 681 [6025] 5 | | | | 7 |
| | 8 [2] | 61 [541] 25 | 128 [1134] 25 | 281 [2490] 24 | 425 [3761] 23 | 562 [4970] 19 | 693 [6128] 14 | 820 [7259] 10 | 915 [8095] 4 | | 13 |
| | 15 [4] | 52 [461] 51 | 128 [1130] 51 | 275 [2436] 50 | 427 [3782] 50 | 578 [5119] 44 | 715 [6327] 32 | 827 [7317] 25 | 956 [8457] 19 | | 26 |
| | 23 [6] | | 115 [1017] 77 | 266 [2351] 76 | 406 [3592] 75 | 557 [4931] 70 | 706 [6250] 55 | 840 [7435] 43 | 945 [8361] 37 | | 52 |
| | 30 [8] | | 107 [951] 103 | 251 [2223] 102 | 407 [3598] 101 | 538 [4759] 96 | 691 [6117] 82 | 832 [7359] 66 | 948 [8393] 52 | | 78 |
| | 38 [10] | | 88 [779] 129 | 229 [2026] 127 | 393 [3475] 126 | 528 [4672] 122 | 672 [5950] 109 | 826 [7307] 90 | 959 [8487] 74 | | 104 |
| | 45 [12] | | | 217 [1923] 154 | 368 [3256] 153 | 504 [4457] 150 | 663 [5864] 133 | 800 [7076] 112 | 931 [8239] 97 | | 130 |
| | 53 [14] | | | 201 [1782] 180 | 347 [3067] 178 | 510 [4513] 173 | 646 [5713] 161 | 798 [7060] 140 | 921 [8149] 114 | | 155 |
| | 61 [16] | | | 168 [1491] 206 | 324 [2865] 204 | 472 [4180] 201 | 621 [5492] 188 | 764 [6765] 171 | 917 [8112] 142 | | 181 |
| | 68 [18] | | | 143 [1266] 232 | 298 [2638] 230 | 427 [3783] 227 | 591 [5234] 220 | 745 [6591] 198 | 878 [7773] 176 | | 207 |
| | 76 [20] | | | 114 [1013] 258 | 283 [2501] 256 | 443 [3916] 254 | 597 [5284] 247 | 717 [6344] 227 | 849 [7512] 206 | | 233 |
| | 83 [22] | | | | 246 [2179] 282 | 397 [3512] 280 | 559 [4943] 274 | 681 [6023] 257 | | | 259 |
| | 91 [24] | | | | 181 [1601] 309 | 357 [3159] 306 | 502 [4442] 304 | 642 [5684] 294 | | | 284 |
| | 95 [25] | | | | 166 [1466] 321 | 323 [2858] 319 | 491 [4347] 318 | 630 [5577] 300 | | | 310 |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | | |
|----------|------------|------------|------------|------------|------------|------------|-------------|
| 81 [713] | 161 [1425] | 322 [2850] | 483 [4275] | 644 [5701] | 805 [7126] | 966 [8551] | 1127 [9976] |
|----------|------------|------------|------------|------------|------------|------------|-------------|

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

400

| Pressure - bars [psi] | | | | | | Max. Cont. | Peak |
|-----------------------|----------|-----------|------------|------------|------------|------------|------|
| 17 [250] | 35 [500] | 69 [1000] | 104 [1500] | 138 [2000] | 173 [2500] | 207 [3000] | |

409 cc [24.9 in³/rev.]

Torque - Nm [lb-in], Speed rpm Intermittent Ratings - 10% of Operation

| | | | | | | | | | | | |
|------------------|---------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|--|-----------------|-----|
| Flow - lpm [gpm] | 2 [0.5] | 85 [757] 4 | 193 [1710] 4 | 367 [3248] 3 | 534 [4721] 2 | | | | | Theoretical rpm | |
| | 4 [1] | 88 [776] 9 | 185 [1640] 8 | 383 [3386] 8 | 580 [5129] 6 | 745 [6590] 4 | 899 [7954] 1 | | | | 5 |
| | 8 [2] | 86 [762] 18 | 196 [1734] 18 | 394 [3487] 17 | 586 [5184] 15 | 764 [6763] 11 | 927 [8204] 5 | | | | 10 |
| | 15 [4] | 85 [749] 37 | 188 [1661] 36 | 404 [3571] 35 | 602 [5325] 32 | 796 [7047] 24 | 962 [8517] 18 | 1108 [9804] 9 | | | 19 |
| | 23 [6] | 71 [629] 55 | 180 [1593] 55 | 387 [3428] 54 | 596 [5274] 49 | 787 [6969] 39 | 978 [8653] 28 | 1141 [10094] 20 | | | 38 |
| | 30 [8] | | 165 [1462] 74 | 373 [3299] 73 | 595 [5264] 69 | 792 [7010] 58 | 966 [8552] 44 | 1149 [10167] 31 | | | 56 |
| | 38 [10] | | 143 [1269] 92 | 356 [3150] 90 | 581 [5144] 88 | 782 [6923] 79 | 974 [8617] 62 | 1156 [10231] 45 | | | 75 |
| | 45 [12] | | 122 [1076] 111 | 333 [2950] 109 | 545 [4823] 107 | 749 [6624] 98 | 957 [8470] 83 | 1143 [10116] 61 | | | 93 |
| | 53 [14] | | 95 [842] 129 | 313 [2774] 128 | 521 [4607] 126 | 717 [6344] 117 | 931 [8235] 103 | 1131 [10007] 78 | | | 112 |
| | 61 [16] | | | 282 [2493] 147 | 496 [4385] 145 | 685 [6063] 141 | 919 [8131] 121 | 1100 [9733] 100 | | | 130 |
| | 68 [18] | | | 244 [2156] 166 | 453 [4009] 165 | 681 [6023] 158 | 871 [7708] 142 | 1071 [9478] 121 | | | 149 |
| | 76 [20] | | | 197 [1741] 185 | 420 [3713] 183 | 650 [5756] 179 | 838 [7417] 166 | 1051 [9302] 145 | | | 167 |
| | 83 [22] | | | 164 [1448] 203 | 378 [3344] 201 | 588 [5200] 198 | 810 [7171] 186 | | | | 186 |
| | 91 [24] | | | | 333 [2947] 222 | 559 [4945] 220 | 750 [6640] 211 | | | | 205 |
| | 95 [25] | | | | 303 [2682] 231 | 539 [4773] 228 | 764 [6760] 221 | | | | 223 |

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

Theoretical Torque - Nm [lb-in]

| | | | | | | |
|-----------|------------|------------|------------|------------|-------------|--------------|
| 112 [991] | 224 [1982] | 448 [3965] | 672 [5947] | 896 [7930] | 1120 [9912] | 1344 [11895] |
|-----------|------------|------------|------------|------------|-------------|--------------|

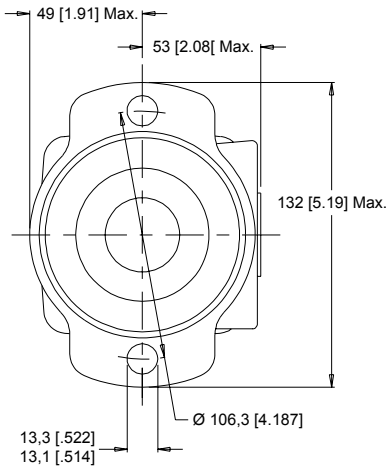
Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]

HB

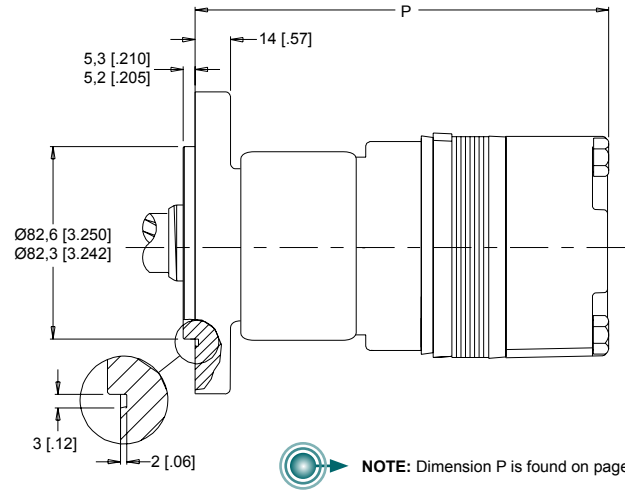
300 SERIES HOUSINGS (MAGNETO MOUNTS)



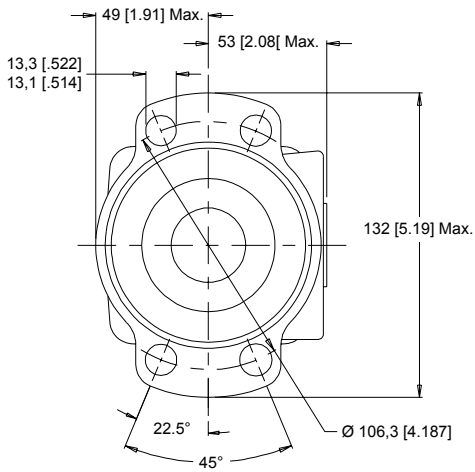
A0 2-Hole with End Ports



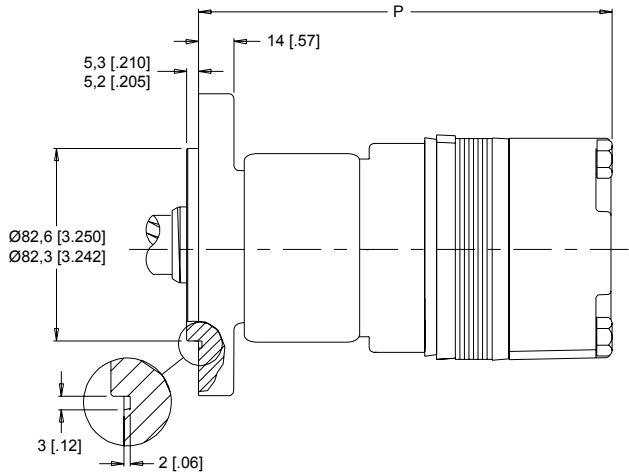
A7 2-Hole with Side Ports



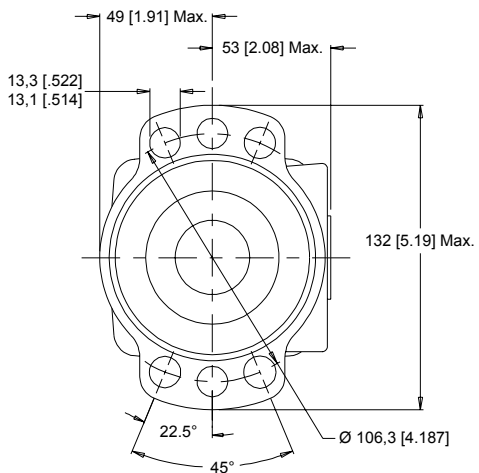
A2 4-Hole with End Ports



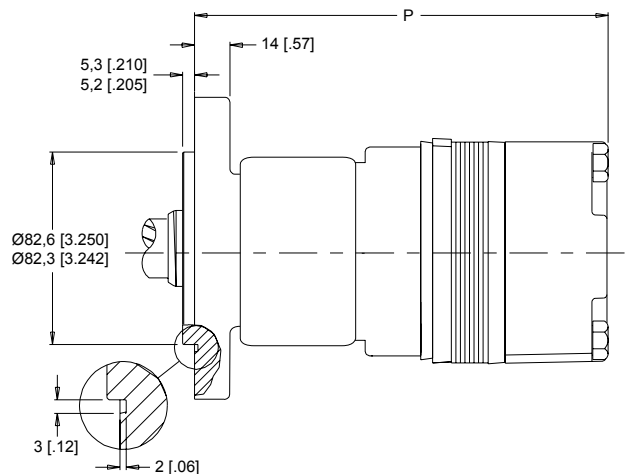
A8 4-Hole with Side Ports



A4 6-Hole with End Ports



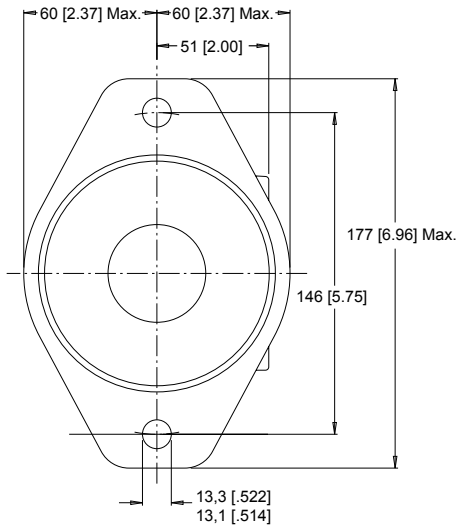
A9 6-Hole with Side Ports



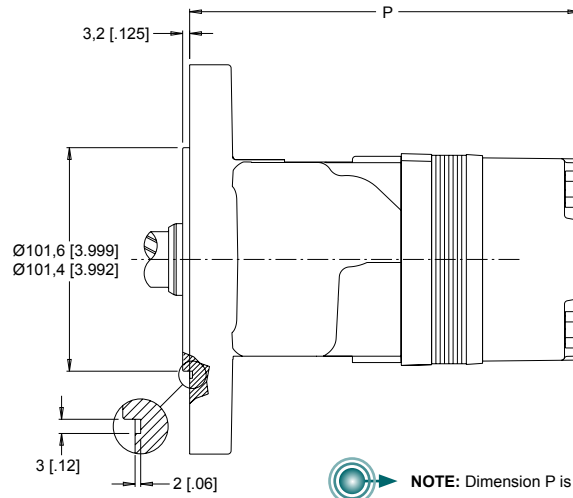


300 SERIES HOUSINGS (SAE B, WHEEL, & 4-HOLE SQUARE MOUNTS)

B0 2-Hole with End Ports

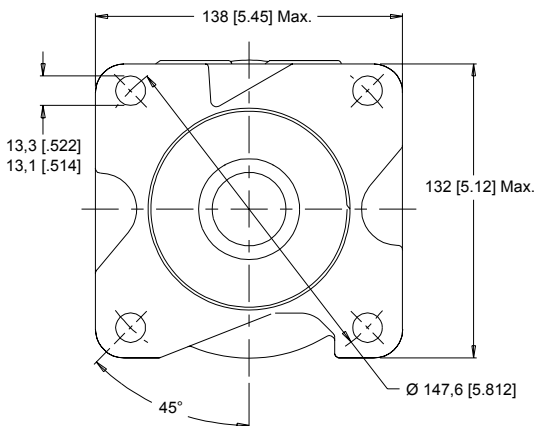


B7 2-Hole with Side Ports

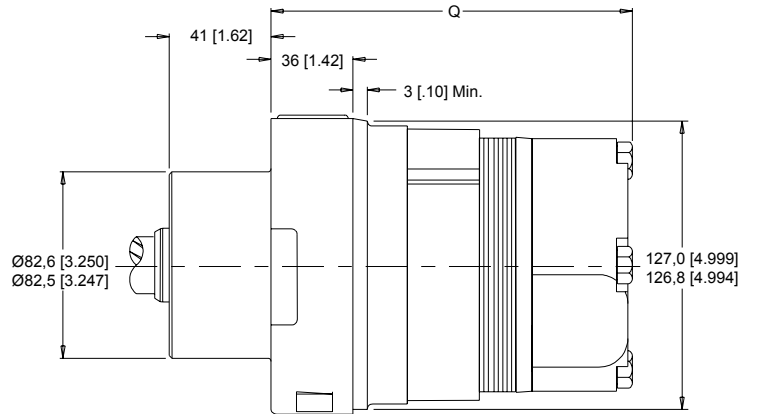


NOTE: Dimension P is found on page 10.

W2 4-Hole with End Ports

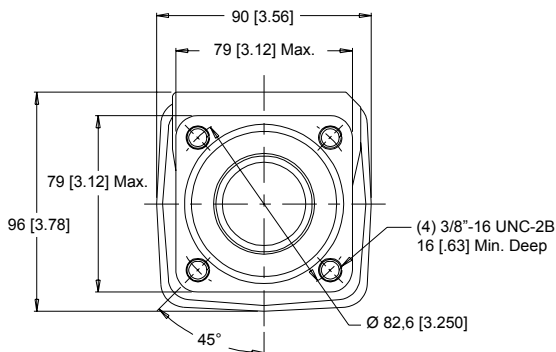


W8 4-Hole with Side Ports

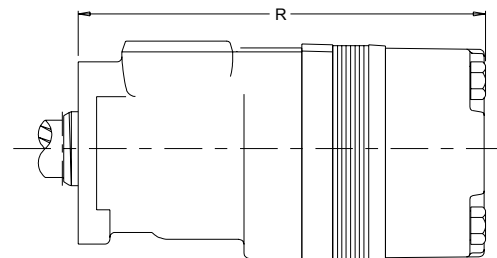


NOTE: Dimension Q is found on page 10.

F2 4-Hole with End Ports



F8 4-Hole with Side Ports



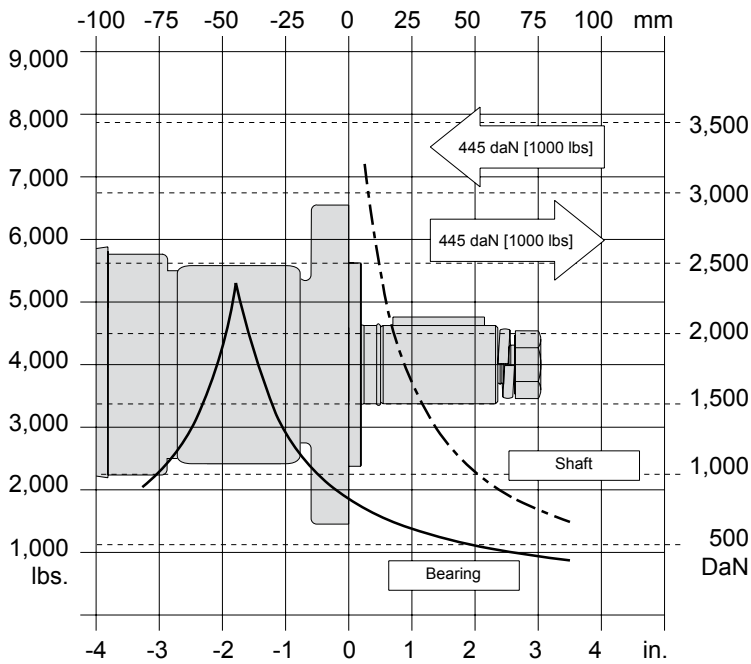
NOTE: Dimension R is found on page 11.



300 SERIES TECHNICAL INFORMATION

Bearing Curve: The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table located below.

SAE A & B MOUNTS



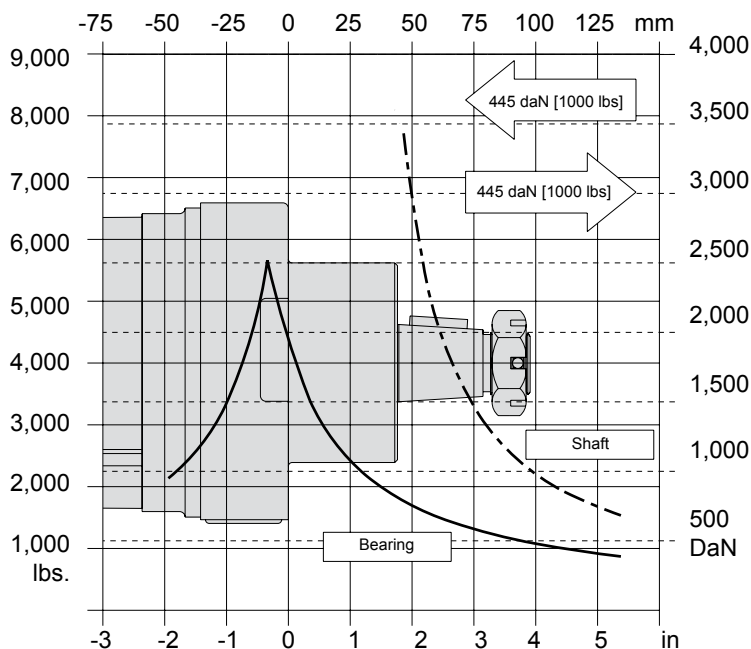
| LENGTH / WEIGHT CHART SAE A & B Mounts - Dimension P | | |
|---|------------|-------------|
| Code | mm [in] | kg [lb] |
| 050 | 195 [7.68] | 8,8 [19.5] |
| 080 | 199 [7.82] | 9,1 [20.0] |
| 090 | 201 [7.90] | 9,2 [20.2] |
| 110 | 204 [8.04] | 9,4 [20.7] |
| 125 | 207 [8.14] | 9,5 [21.0] |
| 160 | 212 [8.36] | 9,8 [21.7] |
| 200 | 219 [8.61] | 10,2 [22.5] |
| 250 | 226 [8.91] | 10,6 [23.4] |
| 300 | 232 [9.15] | 11,0 [24.3] |
| 400 | 251 [9.86] | 12,0 [26.4] |

NOTE:
HB motor weights vary ± 1.0 kg [2 lbs] depending upon motor configuration. Add 1,2 kg [2.7 lb] to motor weight for the SAE B mount. Subtract 18 [7.1] from Dimension P if side ports 5, 6, or 7 and end ports 1 or 2 are used.

| LENGTH / WEIGHT CHART Wheel Mount - Dimension Q | | |
|--|------------|-------------|
| Code | mm [in] | kg [lb] |
| 050 | 158 [6.22] | 11,5 [25.3] |
| 080 | 162 [6.36] | 11,7 [25.7] |
| 090 | 163 [6.41] | 11,8 [25.9] |
| 110 | 166 [6.55] | 12,0 [26.5] |
| 125 | 169 [6.64] | 12,1 [26.7] |
| 160 | 174 [6.87] | 12,4 [27.4] |
| 200 | 181 [7.12] | 12,8 [28.3] |
| 250 | 188 [7.42] | 13,2 [29.7] |
| 300 | 195 [7.66] | 13,6 [30.0] |
| 400 | 213 [8.37] | 14,6 [32.1] |

NOTE:
HB motor weights vary ± 1.0 kg [2 lbs] depending upon motor configuration. Subtract 18 [7.1] from Dimension Q if side ports 5, 6, or 7 and end ports 1 or 2 are used.

WHEEL MOUNT



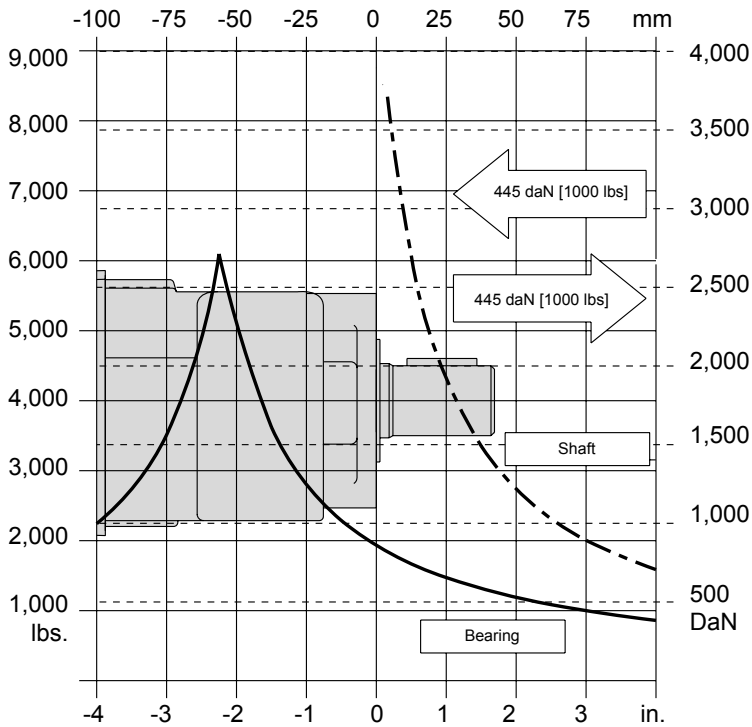
| BEARING LOAD MULTIPLICATION FACTOR TABLE | |
|--|--------|
| RPM | FACTOR |
| 50 | 1.23 |
| 100 | 1.00 |
| 200 | 0.81 |
| 300 | 0.72 |
| 400 | 0.66 |
| 500 | 0.62 |
| 600 | 0.58 |
| 700 | 0.56 |
| 800 | 0.50 |



300 SERIES TECHNICAL INFORMATION

Bearing Curve: The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table located on page 10.

4-HOLE SQUARE MOUNT



| LENGTH / WEIGHT CHART 4-Hole Sq. Mount - Dimension R | | |
|---|------------|-------------|
| Code | mm [in] | kg [lb] |
| 050 | 198 [7.80] | 8,3 [18.4] |
| 080 | 202 [7.94] | 8,6 [18.9] |
| 090 | 204 [8.02] | 8,7 [19.1] |
| 110 | 207 [8.16] | 8,9 [19.6] |
| 125 | 210 [8.26] | 9,0 [19.9] |
| 160 | 215 [8.48] | 9,3 [20.6] |
| 200 | 222 [8.73] | 9,7 [21.4] |
| 250 | 229 [9.03] | 10,1 [22.3] |
| 300 | 236 [9.27] | 10,5 [23.2] |
| 400 | 254 [9.98] | 11,5 [25.3] |

NOTE:
HB motor weights vary ± 1.0 kg [2 lbs] depending upon motor configuration. Subtract 18 [7.1] from Dimension R if side ports 5, 6, or 7 and end ports 1 or 2 are used.

MOUNTING FLANGE TO SHAFT END - Dimension S

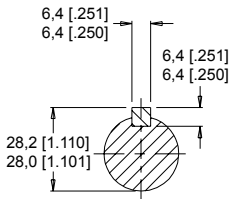
| Code | SAE A & B Mounts mm [in] | Wheel Mounts mm [in] | 4-Hole Sq. Mounts mm [in] |
|------|-----------------------------|-------------------------|------------------------------|
| 01 | 44 [1.75] | 82 [3.21] | 41 [1.63] |
| 02 | 49 [1.93] | 86 [3.39] | 46 [1.81] |
| 07 | 62 [2.46] | 100 [3.93] | 60 [2.35] |
| 08 | 62 [2.46] | 100 [3.93] | 60 [2.35] |
| 10 | 49 [1.93] | 86 [3.39] | 46 [1.81] |
| 12 | 55 [2.17] | 92 [3.63] | 52 [2.05] |
| 15 | 51 [1.99] | 88 [3.45] | 47 [1.87] |
| 20 | 61 [2.40] | 99 [3.87] | 58 [2.29] |
| 21 | 61 [2.40] | 98 [3.87] | 58 [2.29] |
| 22 | 66 [2.58] | 103 [4.04] | 63 [2.46] |
| 23 | 57 [2.23] | 94 [3.69] | 54 [2.11] |

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

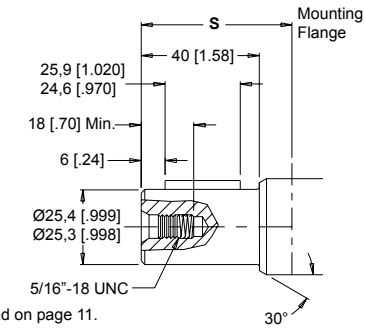


10 1" Straight

Max. Torque: 661 Nm [5850 lb-in]

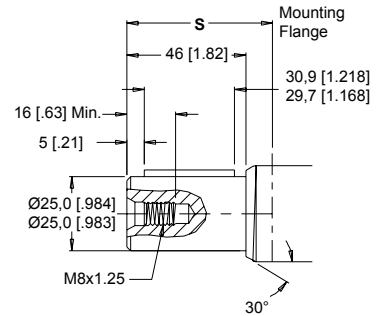
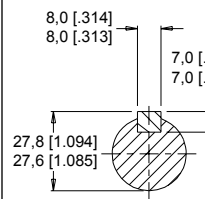


*15 1" Straight Extended



12 25mm Straight

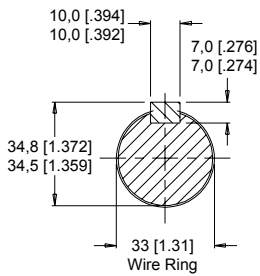
Max. Torque: 631 Nm [5580 lb-in]



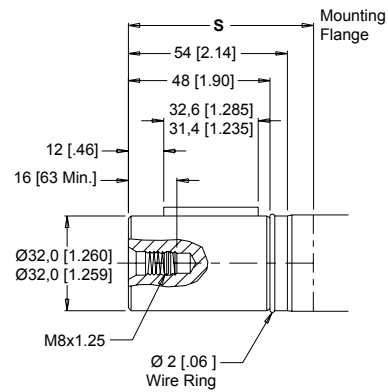
NOTE: Dimension S is found on page 11.

21 32mm Straight

Max. Torque: 882 Nm [7804 lb-in]

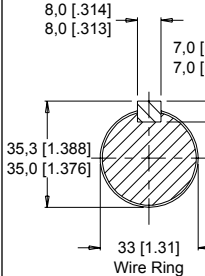


*08 32mm Straight Extended

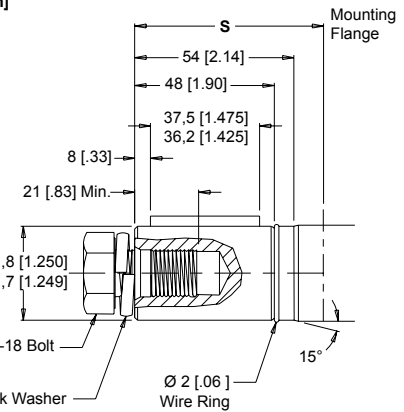


20 1-1/4" Straight

Max. Torque: 882 Nm [7804 lb-in]

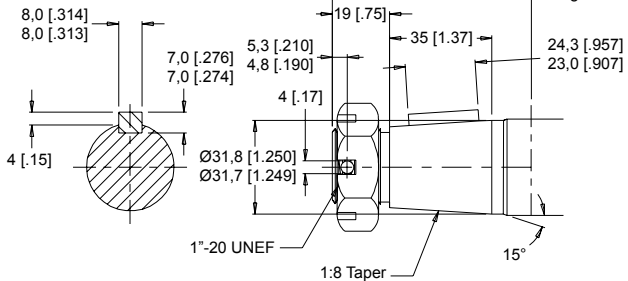


*07 1-1/4" Straight Extended



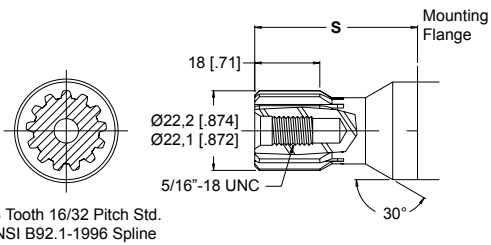
22 1-1/4" Tapered

Max. Torque: 882 Nm [7804 lb-in]



01 13 Tooth Spline

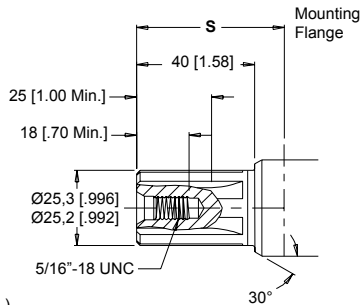
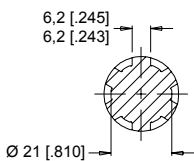
Max. Torque: 170 Nm [1500 lb-in]



NOTE: A slotted nut is standard on this shaft.

02 6-B Spline

Max. Torque: 429 Nm [3800 lb-in]

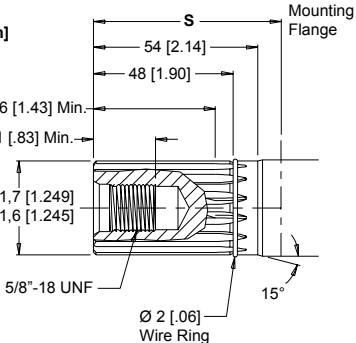
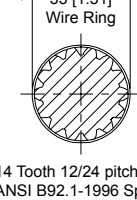


1.00-6-B Spline (SAE J499 Std.)

NOTE: *Shafts for speed sensor use only.

23 14 Tooth Spline

Max. Torque: 882 Nm [7804 lb-in]

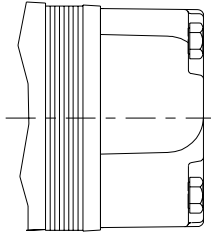


14 Tooth 12/24 pitch Std. ANSI B92.1-1996 Spline

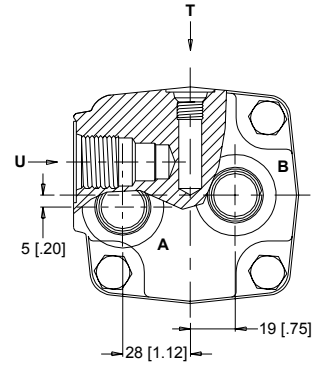
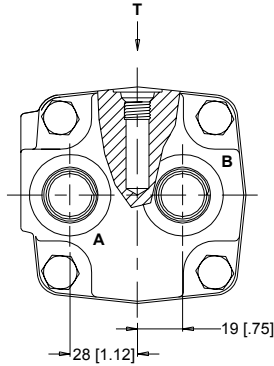


END PORTS

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



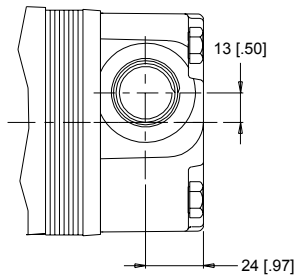
2 1/2" BSP.F with 1/4" Drain



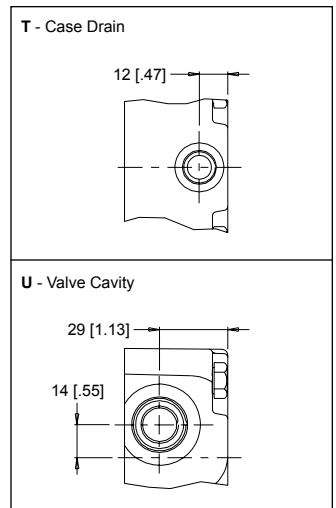
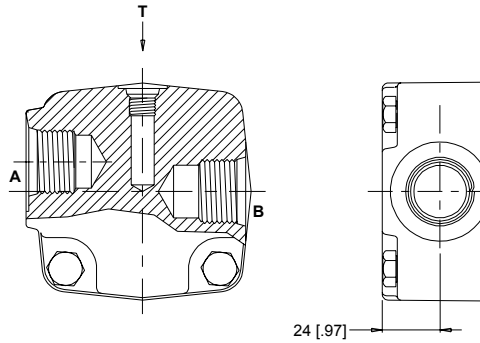
NOTE: The 1 & 2 porting options can be ordered with an internal drain and/or a relief valve cavity. U - 10 Series/2-way Valve Cavity (7/8-14 UNF-2B)

SIDE PORTS

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

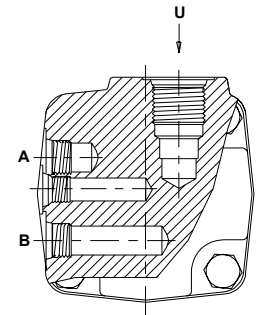
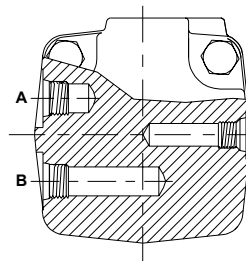
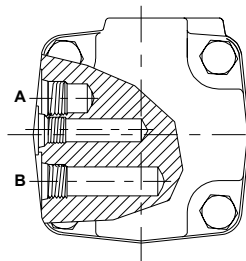
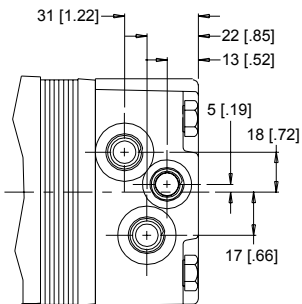


7 1/2" BSP.F with 1/4" Drain



NOTE: The 6 & 7 porting options can be ordered with an internal drain.

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



NOTE: The 5 porting option can be ordered with an internal drain or a relief valve cavity. U - 10 Series/2-way Valve Cavity (7/8-14 UNF-2B)

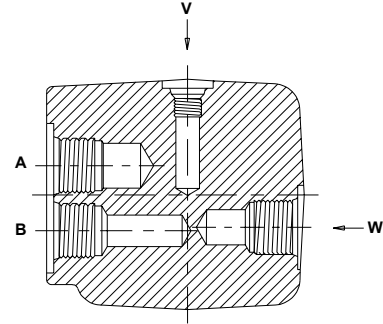
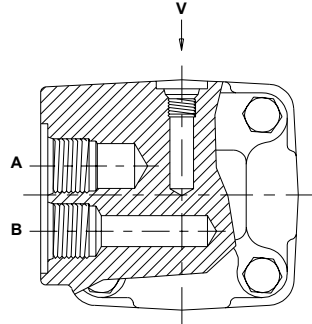
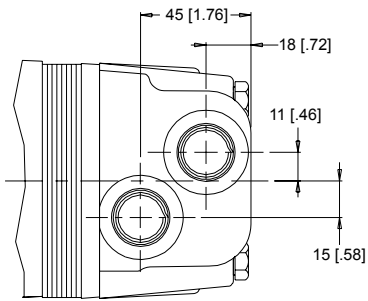
HB

300 SERIES PORTING OPTIONS

SIDE PORTS

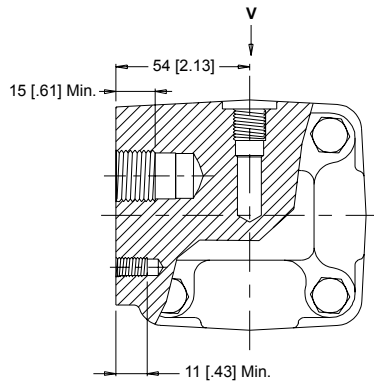
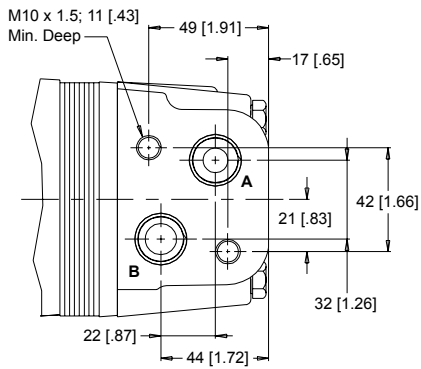
1 7/8" O-Ring with 7/16" Drain

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

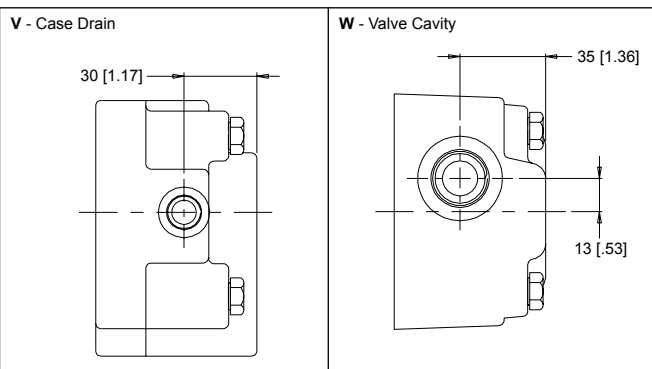


NOTE: The 1 & 2 porting options can be ordered with an internal drain and/or a relief valve cavity. **W** - 10 Series/2-way Valve Cavity (7/8-14 UNF-2B)

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



NOTE: The 3 porting option can be ordered with an internal drain.





300 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

300 High Pressure HB Series

STEP 2 - Select a displacement option

| | | | | | |
|-----|--------|----------------------------|-----|--------|-----------------------------|
| 050 | 52 cc | [3.2 in ³ /rev] | 160 | 164 cc | [10.0 in ³ /rev] |
| 080 | 76 cc | [4.6 in ³ /rev] | 200 | 205 cc | [12.5 in ³ /rev] |
| 090 | 89 cc | [5.4 in ³ /rev] | 250 | 254 cc | [15.5 in ³ /rev] |
| 110 | 111 cc | [6.8 in ³ /rev] | 300 | 293 cc | [17.9 in ³ /rev] |
| 125 | 127 cc | [7.7 in ³ /rev] | 400 | 409 cc | [24.9 in ³ /rev] |

STEP 3 - Select a mounting option

NOTE: To complete the three (3) digit HB 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 End Port Magneto Mount (S) |
| A7 | 2-Hole Side Port Magneto Mount (S) |
| A2 | 4-Hole End Port Magneto Mount (S) |
| A8 | 4-Hole Side Port Magneto Mount (S) |
| A4 | 6-Hole End Port Magneto Mount (S) |
| A9 | 6-Hole Side Port Magneto Mount (S) |
| B0 | 2-Hole End Port SAE B Mount |
| B7 | 2-Hole Side Port SAE B Mount |
| W2 | 4-Hole End Port Wheel Mount |
| W8 | 4-Hole Side Port Wheel Mount |
| F2 | 4-Hole End Port Square Mount (S) |
| F8 | 4-Hole Side Port Square Mount (S) |

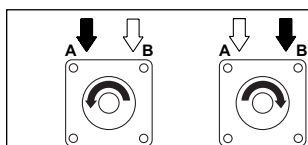
STEP 3 (part II) - Select a porting option

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 |
| 7 | 1/2" BSP.F With 1/4" Drain |



NOTE: HB Series motors do not have internal components that allow the motor to turn in either direction. Refer to the diagram to the left to determine which way the motor will turn when either port A or port B is pressurized.

STEP 4 - Select a shaft option

| | | | |
|----|--------------------------|----|------------------------|
| 01 | 7/8" 13 Tooth Spline | 15 | 1" Straight Ext. (S) |
| 02 | 1" 6-B Spline | 20 | 1-1/4" Straight |
| 07 | 1-1/4" Straight Ext. (S) | 21 | 32mm Straight |
| 08 | 32mm Straight Ext. (S) | 22 | 1-1/4" Tapered |
| 10 | 1" Straight | 23 | 1-1/4" 14 Tooth Spline |
| 12 | 25mm Straight | | |

STEP 5 - Select a paint option

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

STEP 6 - Select a valve cavity option

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

NOTE: Valve cavity option is only available on side ports 1, 2, & 5 and end ports 1 & 2.

STEP 7 - Select an add on option

| | |
|---|---|
| A | Standard |
| B | Lock Nut |
| C | Solid Hex Nut |
| W | 4-Pin Dual Male Weatherpack Connector (S) |
| X | 4-Pin M12 Dual Male Connector (S) |
| Y | 3-Pin Single Male Weatherpack Connector (S) |
| Z | 4-Pin M12 Single Male Connector (S) |

NOTE: (S) - STEP 3 Mountings available for use with speed sensors. STEP 4 Shafts available for use with speed sensors. STEP 7 Speed sensor options.

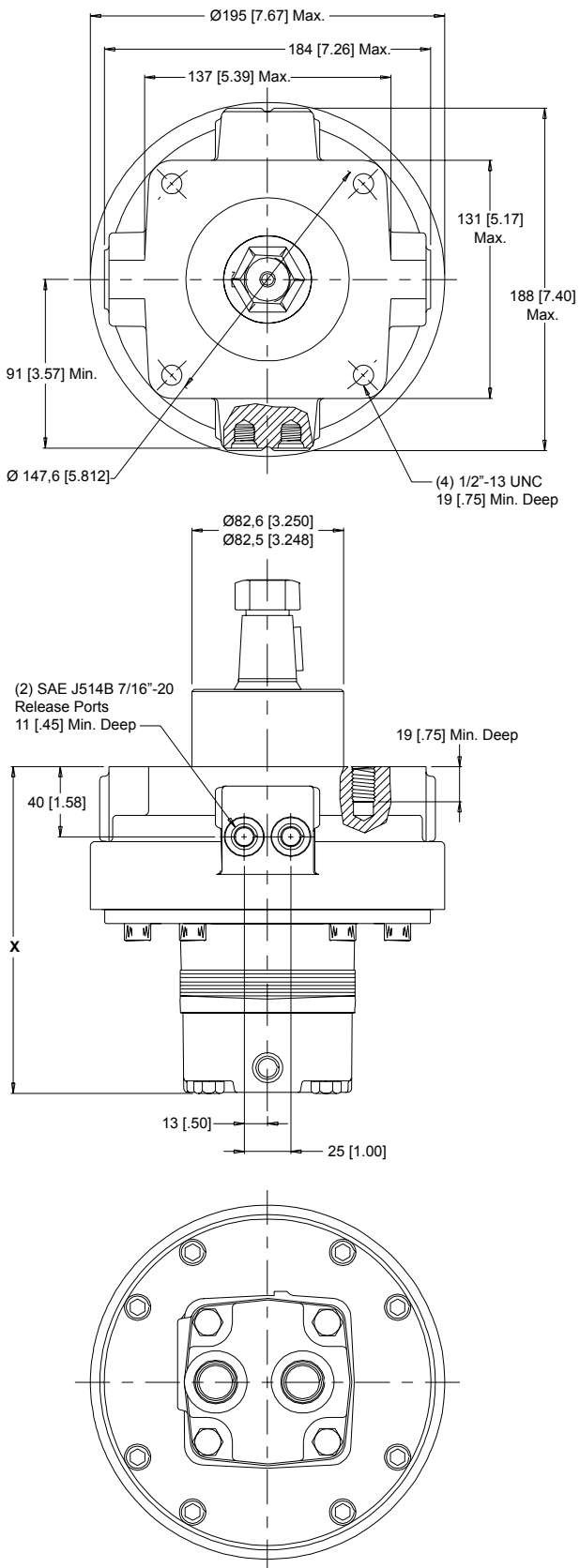
STEP 8 - Select a miscellaneous option

| | |
|----|---------------------------------------|
| AA | None |
| AB | Internal Drain |
| AC | Freeturning Rotor |
| AD | Internal Drain with Freeturning Rotor |

HB

310 SERIES (HB MOTOR/BRAKE)

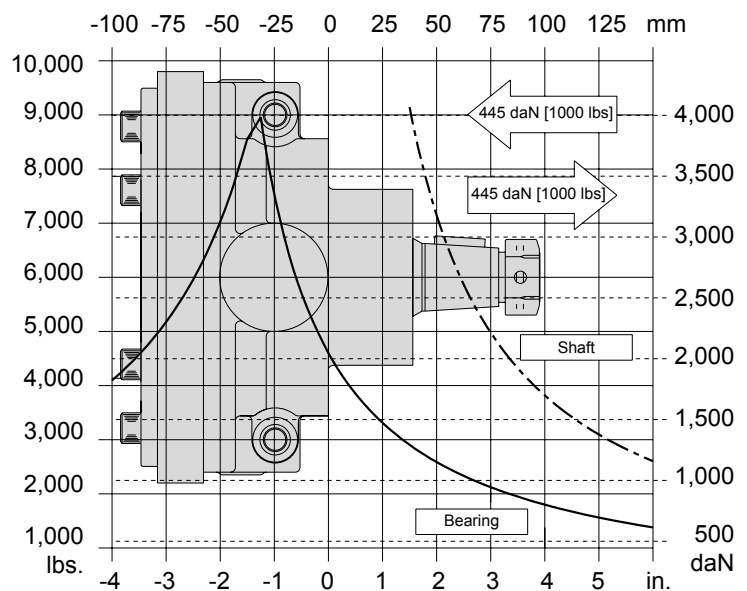
W2 4-Hole with End Ports **W8** 4-Hole with Side Ports



Rated brake torque 904 Nm [8000 lb-in]
 Initial release pressure 21 bar [300 psi]
 Full release pressure 31 bar [450 psi]
 Maximum release pressure 207 bar [3000 psi]
 Release volume 13-16 cc [0.8 - 1.0 cu in]

NOTE: See page 19 for important motor/brake operating recommendations.

Bearing Curve: The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an L_{10} life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table located on page 10.



LENGTH / WEIGHT CHART
 310 Wheel Mount - Dimension X

| Code | mm [in] | kg [lb] |
|------|------------|-------------|
| 050 | 173 [6.80] | 19,1 [42.2] |
| 080 | 175 [6.88] | 19,4 [42.7] |
| 090 | 178 [7.02] | 19,5 [42.9] |
| 110 | 182 [7.16] | 19,7 [43.4] |
| 125 | 184 [7.26] | 19,8 [43.7] |
| 160 | 190 [7.48] | 20,1 [44.4] |
| 200 | 196 [7.73] | 20,5 [45.3] |
| 250 | 204 [8.03] | 20,9 [46.1] |
| 300 | 210 [8.27] | 21,3 [47.0] |
| 400 | 228 [8.98] | 22,3 [49.1] |

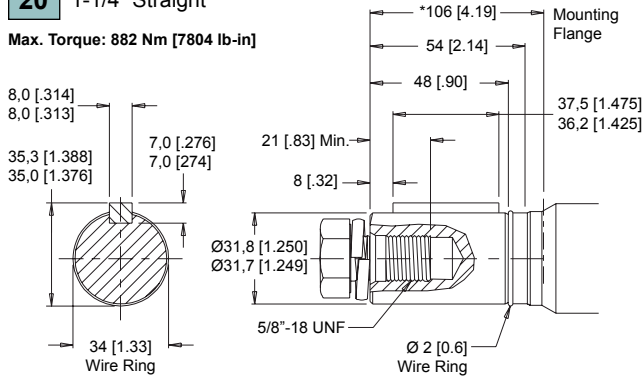
NOTE:
 HB motor weights vary $\pm 1,0$ kg [2 lbs] depending upon motor configuration. Subtract 18 [7.1] from Dimension X if side ports 5, 6, or 7 and end ports 1 or 2 are used.



310 SERIES (HB MOTOR/BRAKE SHAFTS)

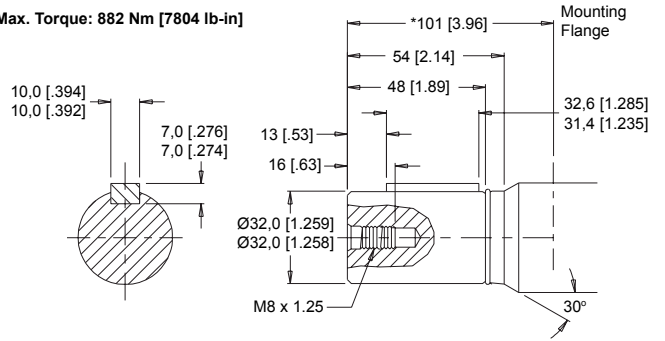
20 1-1/4" Straight

Max. Torque: 882 Nm [7804 lb-in]



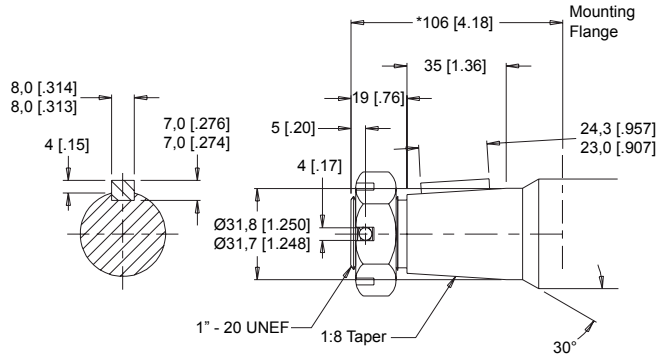
21 32mm Straight

Max. Torque: 882 Nm [7804 lb-in]



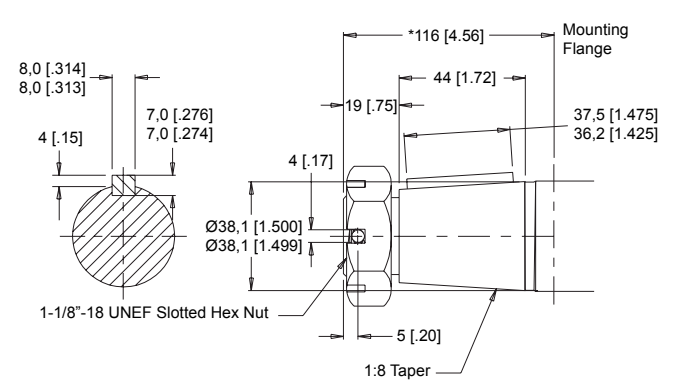
22 1-1/4" Tapered

Max. Torque: 882 Nm [7804 lb-in]



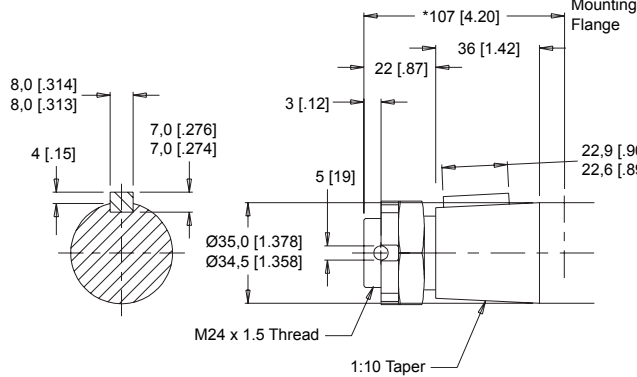
31 1-1/2" Tapered

Max. Torque: 882 Nm [7804 lb-in]



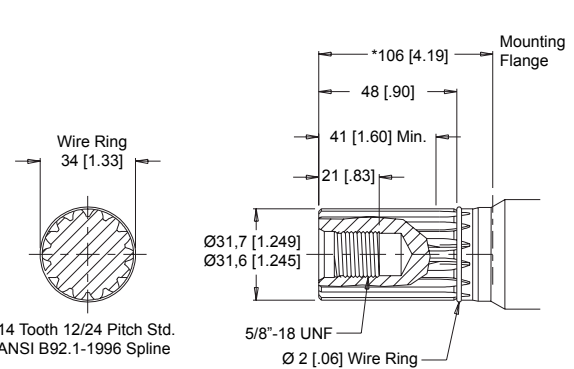
28 35mm Tapered

Max. Torque: 882 Nm [7804 lb-in]



23 1-1/4" 14 Tooth Spline

Max. Torque: 882 Nm [7804 lb-in]



NOTE: A slotted hex nut is standard on all tapered shafts. * Shaft lengths may vary ± 0,8mm [0.030 in]



310 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

310 HB Series Motor/Brake

STEP 2 - Select a displacement option

| | | | | | |
|------------|--------|----------------------------|------------|--------|-----------------------------|
| 050 | 52 cc | [3.2 in ³ /rev] | 160 | 164 cc | [10.0 in ³ /rev] |
| 080 | 76 cc | [4.6 in ³ /rev] | 200 | 205 cc | [12.5 in ³ /rev] |
| 090 | 89 cc | [5.4 in ³ /rev] | 250 | 254 cc | [15.5 in ³ /rev] |
| 110 | 111 cc | [6.8 in ³ /rev] | 300 | 293 cc | [17.9 in ³ /rev] |
| 125 | 127 cc | [7.7 in ³ /rev] | 400 | 409 cc | [24.9 in ³ /rev] |

STEP 3 - Select a mounting option

NOTE: To complete the three (3) digit HB 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.

| | |
|-----------|------------------------------|
| W2 | 4-Hole End Port Wheel Mount |
| W8 | 4-Hole Side Port Wheel Mount |

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 |
| 7 | 1/2" BSP.F With 1/4" Drain |

NOTE: HB Series motors do not have internal components that allow the motor to turn in either direction. Refer to the diagram to the left to determine which way the motor will turn when either port A or port B is pressurized.

STEP 4 - Select a shaft option

| | | | |
|-----------|-----------------|-----------|------------------------|
| 20 | 1-1/4" Straight | 23 | 1-1/4" 14 Tooth Spline |
| 21 | 32mm Straight | 28 | 35mm Tapered |
| 22 | 1-1/4" Tapered | 31 | 1-1/2" Tapered |

STEP 5 - Select a paint option

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

STEP 6 - Select a valve cavity option

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

NOTE: Valve cavity option is only available on side ports 1, 2, & 5 and end ports 1 & 2.

STEP 7 - Select an add on option

| | |
|----------|---------------|
| A | Standard |
| B | Lock Nut |
| C | Solid Hex Nut |

STEP 8 - Select a miscellaneous option

| | |
|-----------|-------------------|
| AA | None |
| AC | Freeturning Rotor |



NOTE: The HB 310 series motor/brakes are available with different holding torque specifications. For additional information please contact White Drive Products Customer Service & Technical Support or your local White Drive Products' distributor.

OPERATING AND TECHNICAL INFORMATION

WHITE DRIVE PRODUCT MOTOR/BRAKE PRECAUTION

CAUTION! - White Drive Products' motors/brakes are intended to operate as static or parking brakes. System circuitry must be designed to bring the load to a stop before applying the brake.

CAUTION! - Because it is possible for some large displacement motors to overpower the brake, it is critical that the maximum system pressure be limited for these applications. Failure to do so could cause serious injury or death. When choosing a motor/brake for an application, consult the performance chart for the series and displacement chosen for the application to verify that the maximum operating pressure of the system will not allow the motor to produce more torque than the maximum rating of the brake. Also, it is vital that the system relief be set low enough to insure that the motor is not able to overpower the brake.

To ensure proper operation of the brake, case drain back pressure must be maintained at 34 bar [500 psi] or less. Case drain back pressure above 34 bar [500 psi] can result in erratic operation of the brake. To avoid potential problems with the operation of the brake, a separate case drain line is recommended. Use of the internal drain option is not recommended due to the possibility of return line pressure spikes. A simple schematic of a system utilizing a motor/brake is shown in Figure A below. Although maximum brake release pressure may be used for an application, a 34 bar [500 psi] pressure reducing valve is recommended to promote maximum life for the brake release piston seals. However, if a pressure reducing valve is used in a system which has case drain back pressure, the pressure reducing valve should be set to 34 bar [500 psi] over the expected case pressure to ensure full brake release. To achieve proper brake release operation, it is necessary to bleed out any trapped air and fill brake release cavity and hoses before all connections are tightened. To facilitate this operation, all motor/brakes feature two release ports. One or both of these ports may be used to release the brake in the unit. Motor/brakes should be configured so that the release ports are near the top of the unit in the installed position. Once all system connections are made, one release port must be opened to atmosphere and the brake release line carefully charged with fluid until all air is removed from the line and motor/brake release cavity. When this has been accomplished the port plug or secondary release line must be reinstalled. In the event of a pump or battery failure, an external pressure source may be connected to the brake release port to release the brake, allowing the machine to be moved.

Typical motor/brake schematic

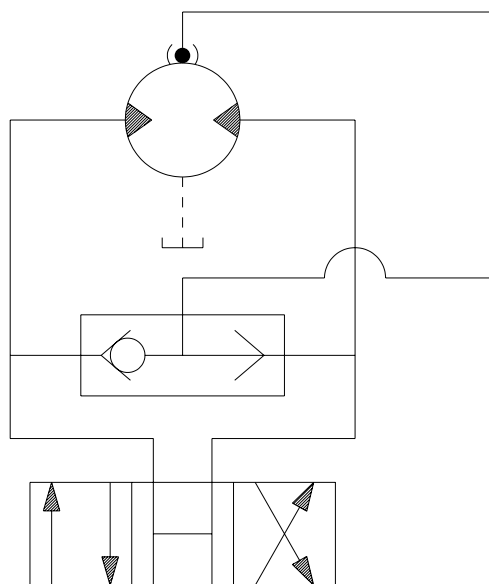


Figure A



NOTE: It is vital that all operating recommendations be followed. Failure to do so could result in injury or death.

Delivering The Power To Get Work Done.



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