

**OVERVIEW**

The combination of compact size, light weight and low speed efficiency make the CE motor the best wheel drive motor available. To reduce overall motor length and weight, all unnecessary material was removed from the housing and the valve was placed in the face of the rotor. The pressure-compensated balance plate allows the motor to maintain high volumetric efficiencies at startup and high mechanical efficiencies during running conditions. All of these features unite to make the CE Series motor 10-25% lighter and more compact than competitive designs, making it perfect for applications with strict weight and size requirements.

**FEATURES / BENEFITS**

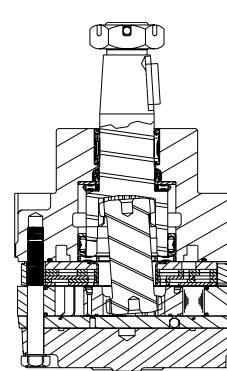
- Needle Roller Bearing is in optimum location to allow load to be placed as close to center line of bearing as possible.
- Three Bearing Options allow load carrying capability of motor to be matched to application.
- Valve-In-Rotor Design provides cost effective, efficient distribution of oil and reduces overall motor length.
- Pressure-Compensated Balance Plate improves volumetric efficiency at low flows and high pressure.

**TYPICAL APPLICATIONS**

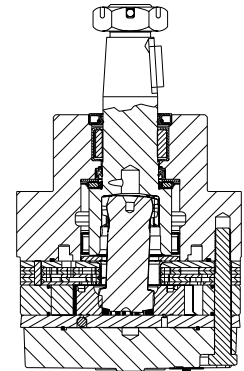
Medium-duty wheel drives, grapple heads, feed rollers, broom drives and more

**SERIES DESCRIPTIONS**

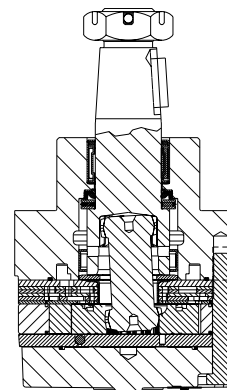
**400/401 - Hydraulic Motor**  
*Standard*



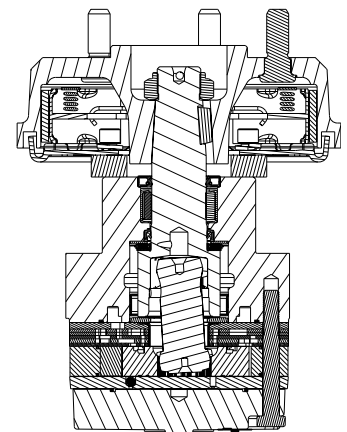
**420/421 - Hydraulic Motor**  
*With Medium Duty Bearing*



**430/431 - Hydraulic Motor**  
*With Heavy Duty Bearing*



**410/411 - Hydraulic Motor**  
*With Integral Drum Brake*



**SPECIFICATIONS**

CODE	Displacement cm <sup>3</sup> [in <sup>3</sup> /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
120	121 [7.4]	360	490	45 [12]	61 [16]	322 [2850]	356 [3150]	207 [3000]	224 [3250]	241 [3500]
160	162 [9.9]	370	470	61 [16]	76 [20]	424 [3750]	501 [4430]	207 [3000]	224 [3250]	241 [3500]
200	204 [12.4]	300	370	61 [16]	76 [20]	525 [4650]	593 [5250]	207 [3000]	224 [3250]	241 [3500]
230	232 [14.2]	260	320	61 [16]	76 [20]	559 [4950]	646 [5720]	207 [3000]	224 [3250]	241 [3500]
260	261 [15.9]	260	350	68 [18]	91 [24]	706 [6250]	760 [6730]	207 [3000]	224 [3250]	241 [3500]
300	300 [18.3]	250	320	76 [20]	95 [25]	802 [7100]	862 [7630]	207 [3000]	224 [3250]	241 [3500]
350	348 [21.2]	220	270	76 [20]	95 [25]	904 [8000]	1017 [9000]	207 [3000]	224 [3250]	241 [3500]
375	375 [22.8]	200	250	76 [20]	95 [25]	972 [8600]	1040 [9200]	207 [3000]	224 [3250]	241 [3500]
470	465 [28.3]	160	200	76 [20]	95 [25]	1040 [9200]	1153 [10200]	172 [2500]	189 [2750]	207 [3000]
540	536 [32.7]	140	170	76 [20]	95 [25]	1003 [8875]	1209 [10700]	138 [2000]	172 [2500]	207 [3000]
750	748 [45.6]	100	130	76 [20]	95 [25]	1082 [9575]	1237 [10950]	103 [1500]	121 [1750]	138 [2000]

► Performance data is typical. Performance of production units varies slightly from one motor to another. See page 9 for additional information on product testing. Running at intermittent ratings should not exceed 10% of every minute of operation.



**DISPLACEMENT PERFORMANCE**

<b>120</b>		Pressure - bar [psi]						Max. Cont.	Peak		
		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]		
		121 cm <sup>3</sup> [7.4 in <sup>3</sup> ] / rev						Intermittent Ratings - 10% of Operation			
		Torque - Nm [lb-in], <b>Speed rpm</b>									
Flow - lpm [gpm]	2 [0.5]	21 [184] 14	47 [418] 13	84 [745] 10	114 [1008] 7					16	Theoretical rpm
	4 [1]	26 [226] 26	52 [459] 26	109 [969] 23	157 [1387] 21	203 [1793] 18	260 [2305] 13	290 [2566] 10	281 [2490] 7	32	
	8 [2]		52 [456] 58	110 [977] 56	161 [1424] 51	208 [1845] 47	269 [2382] 33	310 [2746] 29	347 [3066] 25	63	
	15 [4]		48 [422] 119	110 [975] 112	169 [1497] 103	225 [1992] 95	271 [2399] 91	327 [2896] 83	369 [3269] 82	125	
	23 [6]		46 [409] 187	106 [934] 182	158 [1402] 177	204 [1803] 173	248 [2199] 168	297 [2630] 160	372 [3290] 143	188	
	30 [8]			99 [876] 248	157 [1389] 244	207 [1829] 240	253 [2241] 233	323 [2857] 205	371 [3282] 201	250	
	38 [10]			96 [853] 306	156 [1379] 298	207 [1834] 293	257 [2278] 286	297 [2633] 279	359 [3178] 269	313	
	45 [12]			85 [749] 371	151 [1337] 360	206 [1823] 352	256 [2267] 345	305 [2695] 341	344 [3042] 335	375	
	53 [14]			77 [684] 437	137 [1215] 428	197 [1745] 418	251 [2222] 409	296 [2618] 404		438	
	61 [16]			71 [633] 499	135 [1191] 490	194 [1717] 482	244 [2163] 467	304 [2687] 454		500	
<b>Rotor Width</b>		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>									
13.8 [542] mm [in]		Theoretical Torque - Nm [lb-in]									
		33 [295]	67 [589]	133 [1178]	200 [1768]	266 [2357]	333 [2946]	399 [3535]	466 [4124]		
Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]											

<b>160</b>		Pressure - bar [psi]						Max. Cont.	Peak		
		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]		
		162 cm <sup>3</sup> [9.9 in <sup>3</sup> ] / rev						Intermittent Ratings - 10% of Operation			
		Torque - Nm [lb-in], <b>Speed rpm</b>									
Flow - lpm [gpm]	2 [0.5]	32 [287] 11	72 [634] 11	152 [1341] 10	215 [1906] 9	282 [2493] 8	326 [2888] 6	366 [3238] 4	412 [3643] 1	12	Theoretical rpm
	4 [1]	36 [318] 22	78 [690] 21	145 [1287] 20	225 [1991] 19	290 [2567] 16	346 [3060] 14	366 [3236] 8	416 [3680] 7	24	
	8 [2]	33 [296] 45	73 [649] 44	145 [1287] 43	227 [2010] 40	292 [2586] 36	357 [3156] 33	413 [3654] 31	464 [4108] 28	47	
	15 [4]	44 [386] 92	71 [630] 91	146 [1296] 88	226 [2000] 86	299 [2646] 79	364 [3226] 74	426 [3768] 71	485 [4289] 66	94	
	23 [6]		70 [623] 133	146 [1294] 131	225 [1991] 128	296 [2617] 122	365 [3232] 117	428 [3786] 115	492 [4352] 111	140	
	30 [8]		66 [583] 181	141 [1251] 177	216 [1916] 175	286 [2533] 171	350 [3102] 165	414 [3663] 159	476 [4210] 152	187	
	38 [10]		61 [537] 224	138 [1224] 223	212 [1873] 219	282 [2497] 213	347 [3072] 211	411 [3641] 204	473 [4183] 196	234	
	45 [12]		56 [495] 272	130 [1150] 265	207 [1829] 264	279 [2465] 262	344 [3046] 256	407 [3603] 249	470 [4157] 242	280	
	53 [14]			123 [1088] 318	196 [1737] 313	269 [2384] 306	332 [2939] 297	400 [3540] 295	464 [4111] 284	327	
	61 [16]			114 [1010] 362	187 [1659] 356	263 [2327] 351	329 [2910] 344	395 [3499] 334	458 [4053] 330	374	
68 [18]			102 [903] 410	180 [1593] 407	250 [2209] 401	319 [2822] 385	389 [3438] 382		420		
76 [20]			96 [846] 455	174 [1536] 448	248 [2193] 438	316 [2798] 430	379 [3353] 423		467		
<b>Rotor Width</b>		Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input type="checkbox"/>									
13.8 [542] mm [in]		Theoretical Torque - Nm [lb-in]									
		45 [394]	89 [788]	178 [1576]	267 [2365]	356 [3153]	445 [3941]	534 [4729]	623 [5518]		
Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]											

► Performance data is typical. Performance of production units varies slightly from one motor to another. See page 9 for additional information on product testing.

**DISPLACEMENT PERFORMANCE**

<b>200</b>		Pressure - bar [psi]						Max. Cont.	Peak	
		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	
204 cm <sup>3</sup> [12.4 in <sup>3</sup> ] / rev										
Flow - lpm [gpm]		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
		40 [358] 8	92 [817] 8	180 [1596] 8	269 [2378] 7	348 [3083] 6				10
Max. Cont.	4 [1]	46 [409] 17	89 [787] 15	180 [1597] 15	276 [2440] 12	359 [3177] 11	427 [3782] 9	489 [4328] 8		19
	8 [2]	45 [395] 36	91 [807] 34	190 [1684] 32	284 [2509] 31	369 [3268] 28	451 [3989] 25	523 [4630] 23	586 [5189] 19	38
	15 [4]	40 [358] 73	92 [817] 72	188 [1662] 69	284 [2492] 67	373 [3303] 63	453 [4006] 60	530 [4693] 56	607 [5371] 51	75
	23 [6]		86 [760] 111	181 [1600] 107	278 [2457] 104	365 [3228] 100	451 [3989] 95	524 [4636] 90	605 [5353] 85	112
	30 [8]		75 [663] 148	174 [1539] 145	267 [2363] 142	359 [3176] 137	441 [3905] 132	518 [4584] 125	597 [5286] 120	150
	38 [10]		62 [549] 185	162 [1430] 184	257 [2272] 181	347 [3072] 177	429 [3798] 171	507 [4488] 164	587 [5198] 157	187
	45 [12]			146 [1290] 222	244 [2159] 217	339 [2996] 213	429 [3798] 204	506 [4476] 198	583 [5161] 193	224
	53 [14]			129 [1145] 259	227 [2005] 256	328 [2905] 250	410 [3628] 244	492 [4354] 236	571 [5049] 226	261
	61 [16]			112 [994] 298	208 [1842] 297	316 [2795] 284	399 [3534] 281	484 [4285] 273	562 [4971] 266	299
	68 [18]			90 [799] 334	207 [1833] 330	304 [2689] 327	395 [3493] 320	481 [4260] 316		336
76 [20]			75 [665] 366	178 [1576] 365	282 [2495] 361	372 [3288] 361	465 [4115] 351		373	
Rotor Width	Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input checked="" type="checkbox"/>									
	Theoretical Torque - Nm [lb-in]									
		56 [494]	112 [987]	223 [1975]	335 [2962]	446 [3949]	558 [4936]	669 [5924]	781 [6911]	
mm [in]		Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]								

<b>230</b>		Pressure - bar [psi]						Max. Cont.	Peak	
		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	
233 cm <sup>3</sup> [14.2 in <sup>3</sup> ] / rev										
Flow - lpm [gpm]		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
		46 [406] 7	98 [866] 7	209 [1849] 6	300 [2659] 5	380 [3367] 2				9
Max. Cont.	4 [1]	49 [435] 14	105 [925] 13	215 [1903] 12	321 [2839] 11	413 [3651] 8	488 [4315] 6	543 [4808] 3		17
	8 [2]	50 [438] 30	107 [945] 28	221 [1954] 26	329 [2909] 26	430 [3803] 22	520 [4599] 18	594 [5260] 13	662 [5856] 9	33
	15 [4]	45 [401] 62	102 [900] 61	214 [1895] 59	325 [2872] 57	426 [3773] 53	522 [4623] 47	610 [5395] 41	683 [6045] 34	66
	23 [6]	39 [342] 96	92 [812] 96	203 [1801] 93	317 [2808] 91	412 [3645] 87	486 [4304] 80	560 [4953] 72	642 [5678] 66	98
	30 [8]		84 [743] 128	197 [1739] 125	304 [2691] 122	410 [3627] 119	506 [4479] 112	600 [5313] 103	647 [5728] 95	131
	38 [10]		72 [634] 162	186 [1650] 159	292 [2585] 156	402 [3556] 153	493 [4363] 146	584 [5169] 136	634 [5613] 126	163
	45 [12]			167 [1477] 192	282 [2494] 191	393 [3479] 185	491 [4349] 178	576 [5094] 167	658 [5822] 155	196
	53 [14]			152 [1343] 225	260 [2301] 225	374 [3310] 220	470 [4160] 208	555 [4910] 201	657 [5818] 186	228
	61 [16]			135 [1198] 259	250 [2209] 259	362 [3207] 253	464 [4110] 244	553 [4895] 232	637 [5637] 220	261
	68 [18]			115 [1021] 291	231 [2044] 289	344 [3042] 286	447 [3956] 279	540 [4777] 266		293
76 [20]			93 [822] 325	210 [1859] 323	327 [2898] 319	432 [3825] 311	529 [4677] 299		326	
Rotor Width	Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input checked="" type="checkbox"/>									
	Theoretical Torque - Nm [lb-in]									
		64 [565]	128 [1131]	256 [2261]	383 [3392]	511 [4522]	639 [5653]	767 [6783]	894 [7914]	
mm [in]		Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]								

► Performance data is typical. Performance of production units varies slightly from one motor to another. See page 9 for additional information on product testing.



DISPLACEMENT PERFORMANCE

Table for 260 series showing displacement performance metrics including pressure, torque, speed, and efficiency. Includes a color-coded efficiency scale and theoretical torque data.

Table for 300 series showing displacement performance metrics including pressure, torque, speed, and efficiency. Includes a color-coded efficiency scale and theoretical torque data.

► Performance data is typical. Performance of production units varies slightly from one motor to another. See page 9 for additional information on product testing.

**DISPLACEMENT PERFORMANCE**

		Pressure - bar [psi]						Max. Cont.	Peak	
<b>350</b>		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	
348 cm <sup>3</sup> [21.2 in <sup>3</sup> ] / rev										
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	2 [0.5]	70 [617] 5	147 [1297] 5	269 [2383] 4					6	Theoretical rpm
	4 [1]	73 [649] 10	149 [1318] 10	291 [2580] 10	412 [3647] 9				11	
	8 [2]	76 [670] 21	159 [1403] 21	313 [2767] 21	453 [4007] 20	557 [4927] 18	668 [5915] 16	782 [6919] 13	22	
	15 [4]	69 [609] 43	159 [1409] 42	324 [2868] 42	463 [4101] 40	596 [5273] 37	714 [6316] 36	820 [7261] 32	44	
	23 [6]	62 [544] 65	149 [1319] 65	321 [2837] 64	478 [4228] 31	606 [5363] 57	736 [6514] 53	845 [7475] 52	66	
	30 [8]	45 [395] 87	128 [1134] 86	304 [2693] 85	467 [4134] 84	622 [5502] 80	776 [6870] 75	906 [8022] 67	88	
	38 [10]		109 [962] 108	288 [2550] 107	455 [4027] 106	621 [5500] 100	754 [6670] 94	907 [8028] 85	109	
	45 [12]		94 [833] 130	268 [2376] 129	439 [3889] 128	588 [5205] 124	758 [6712] 115	901 [7970] 104	131	
	53 [14]		65 [575] 152	244 [2162] 151	409 [3619] 150	572 [5059] 148	727 [6433] 137	879 [7777] 127	153	
	61 [16]			220 [1947] 174	385 [3406] 173	549 [4855] 171	697 [6172] 163	855 [7570] 152	175	
	68 [18]			186 [1644] 196	361 [3195] 194	520 [4599] 192	685 [6062] 187	825 [7297] 177	197	
	76 [20]			147 [1301] 216	324 [2863] 213	483 [4275] 212	637 [5634] 209	790 [6993] 194	218	
	83 [22]			109 [960] 239	289 [2560] 237	443 [3921] 234	605 [5357] 232	770 [6814] 223	240	
	91 [24]			77 [684] 261	251 [2225] 258	431 [3814] 257	588 [5207] 256	733 [6488] 248	262	
	95 [25]			56 [493] 272	226 [2004] 270	409 [3621] 264	570 [5048] 261	727 [6435] 259	273	
Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input checked="" type="checkbox"/>										
<b>Rotor Width</b>		Theoretical Torque - Nm [lb-in]								
39.4 [1.553]		95 [844]	191 [1688]	381 [3376]	572 [5064]	763 [6752]	954 [8439]	1144 [10127]	1335 [11815]	
mm [in]		Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]								

		Pressure - bar [psi]						Max. Cont.	Peak	
<b>375</b>		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]	241 [3500]	
375 cm <sup>3</sup> [22.8 in <sup>3</sup> ] / rev										
		Torque - Nm [lb-in], Speed rpm						Intermittent Ratings - 10% of Operation		
Flow - lpm [gpm]	2 [0.5]	78 [687] 4	162 [1438] 4	321 [2840] 4	447 [3958] 3	592 [5237] 2			6	Theoretical rpm
	4 [1]	78 [694] 9	163 [1443] 8	333 [2951] 8	474 [4193] 7	606 [5366] 6	730 [6457] 4		11	
	8 [2]	81 [721] 19	169 [1495] 18	339 [3001] 17	485 [4288] 16	625 [5533] 15	756 [6692] 13	851 [7532] 9	21	
	15 [4]	74 [651] 39	166 [1470] 38	321 [2837] 36	465 [4117] 36	611 [5404] 33	748 [6624] 29	876 [7754] 26	41	
	23 [6]	62 [547] 60	155 [1372] 59	341 [3015] 58	515 [4557] 56	670 [5931] 51	785 [6946] 44	884 [7825] 40	61	
	30 [8]	47 [412] 81	138 [1223] 80	320 [2836] 77	503 [4453] 76	664 [5880] 71	834 [7385] 63	976 [8633] 55	82	
	38 [10]		118 [1048] 101	303 [2684] 99	495 [4382] 97	647 [5726] 92	801 [7090] 83	922 [8161] 74	102	
	45 [12]		98 [870] 121	288 [2547] 119	469 [4147] 117	635 [5620] 112	804 [7115] 107	972 [8605] 93	122	
	53 [14]		71 [625] 141	261 [2308] 140	435 [3849] 139	603 [5337] 135	786 [6953] 126	938 [8298] 114	142	
	61 [16]		55 [487] 162	241 [2134] 161	423 [3744] 160	593 [5248] 155	758 [6706] 147	922 [8160] 135	163	
	68 [18]			204 [1805] 182	391 [3461] 181	564 [4988] 177	723 [6402] 168	893 [7899] 164	183	
	76 [20]			219 [1942] 201	365 [3231] 200	533 [4714] 198	662 [5860] 193	864 [7643] 178	203	
	83 [22]			132 [1173] 222	316 [2795] 220	514 [4552] 219	675 [5970] 210	807 [7141] 203	223	
	91 [24]			100 [881] 243	290 [2567] 242	475 [4202] 241	640 [5667] 232	792 [7012] 220	244	
	95 [25]			80 [711] 253	261 [2313] 251	465 [4113] 250	616 [5454] 242	779 [6891] 235	254	
Overall Efficiency - 70 - 100% <input type="checkbox"/> 40 - 69% <input type="checkbox"/> 0 - 39% <input checked="" type="checkbox"/>										
<b>Rotor Width</b>		Theoretical Torque - Nm [lb-in]								
31.8 [1.252]		103 [908]	205 [1815]	410 [3631]	615 [5446]	821 [7261]	1026 [9076]	1231 [10892]	1436 [12707]	
mm [in]		Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]								

▶ Performance data is typical. Performance of production units varies slightly from one motor to another. See page 9 for additional information on product testing.



DISPLACEMENT PERFORMANCE

**470**

Pressure - bar [psi] Max. Cont. Peak

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	173 [2500]	207 [3000]
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465 cm<sup>3</sup> [28.3 in<sup>3</sup>] / rev

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

Flow - lpm [gpm]	2 [0.5]	99 [878] 4	210 [1862] 3	420 [3713] 3				5	Theoretical rpm
	4 [1]	102 [899] 8	210 [1856] 7	424 [3748] 7	597 [5285] 7	774 [6847] 6		9	
	8 [2]	102 [906] 16	222 [1968] 15	438 [3875] 15	620 [5488] 14	782 [6922] 13	957 [8470] 11	1106 [9788] 9	
	15 [4]	95 [836] 32	208 [1837] 31	407 [3600] 30	605 [5351] 28	782 [6922] 25	961 [8504] 23	1143 [10118] 20	
	23 [6]	79 [700] 48	196 [1736] 48	426 [3772] 46	620 [5483] 44	814 [7204] 41	969 [8580] 36	1149 [10172] 31	
	30 [8]	61 [544] 65	179 [1588] 65	411 [3638] 63	630 [5578] 61	847 [7498] 57	1046 [9253] 48	1191 [10541] 44	
	38 [10]	40 [352] 81	159 [1405] 80	387 [3429] 80	618 [5471] 77	825 [7301] 73	1036 [9167] 67	1245 [11019] 55	
	45 [12]		125 [1105] 97	367 [3245] 96	587 [5197] 94	800 [7076] 90	1005 [8891] 82	1232 [10898] 72	
	53 [14]		103 [912] 113	340 [3007] 113	572 [5066] 111	767 [6787] 106	985 [8720] 100	1208 [10688] 91	
	61 [16]		63 [557] 130	306 [2712] 129	527 [4662] 128	744 [6581] 124	955 [8451] 116	1162 [10285] 105	
	68 [18]			260 [2298] 146	494 [4370] 145	708 [6262] 142	921 [8148] 135	1149 [10169] 126	
	76 [20]			219 [1941] 163	456 [4035] 163	673 [5954] 158	883 [7815] 151	1090 [9647] 140	
	83 [22]			174 [1542] 179	417 [3687] 178	634 [5612] 176	847 [7496] 168		
	91 [24]			138 [1225] 195	373 [3302] 194	605 [5354] 193	808 [7147] 186		
	95 [25]				348 [3079] 204	552 [4885] 203	769 [6808] 197		

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

Rotor Width

39.4 [1.553]	127 [1127]	255 [2253]	509 [4506]	764 [6760]	1018 [9013]	1273 [11266]	1528 [13519]
--------------	------------	------------	------------	------------	-------------	--------------	--------------

mm [in]

Theoretical Torque - Nm [lb-in]

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

**540**

Pressure - bar [psi] Max. Cont. Max. Inter

17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]	172 [2500]
----------	----------	-----------	------------	------------	------------

536 cm<sup>3</sup> [32.7 in<sup>3</sup>] / rev

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

Flow - lpm [gpm]	2 [0.5]	106 [940] 3	230 [2035] 2				4	Theoretical rpm	
	4 [1]	105 [927] 6	223 [1975] 6	455 [4023] 6	655 [5797] 5	868 [7684] 3	8		
	8 [2]	112 [991] 13	237 [2100] 13	488 [4321] 12	719 [6358] 10	911 [8065] 8	1087 [9617] 3		15
	15 [4]	107 [944] 27	246 [2174] 26	503 [4455] 25	745 [6593] 24	952 [8426] 21	1131 [10005] 16		29
	23 [6]	96 [854] 42	230 [2033] 41	516 [4571] 40	756 [6686] 40	1007 [8911] 36	1233 [10911] 30		43
	30 [8]	69 [613] 56	208 [1843] 56	476 [4214] 54	760 [6724] 54	993 [8787] 49	1206 [10676] 42		57
	38 [10]	59 [521] 70	184 [1631] 70	456 [4035] 69	720 [6367] 67	968 [8568] 64	1223 [10821] 56		71
	45 [12]	30 [264] 84	155 [1376] 83	418 [3702] 83	688 [6089] 83	926 [8195] 78	1205 [10668] 69		85
	53 [14]		123 [1089] 98	391 [3456] 98	630 [5576] 97	892 [7896] 95	1149 [10165] 88		99
	61 [16]		90 [793] 113	361 [3197] 113	635 [5622] 112	896 [7925] 109	1137 [10061] 106		114
	68 [18]		51 [452] 127	328 [2901] 126	592 [5238] 125	862 [7632] 124	1116 [9873] 118		128
	76 [20]			278 [2460] 141	550 [4869] 140	816 [7222] 140	1076 [9526] 132		142
	83 [22]			224 [1980] 154	447 [3954] 153	720 [6369] 151			156
	91 [24]			180 [1590] 169	449 [3971] 168	754 [6673] 167			170
	95 [25]			153 [1358] 176	426 [3768] 174	689 [6095] 173			177

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

Rotor Width

45.5 [1.791]	147 [1302]	294 [2604]	588 [5207]	883 [7811]	1177 [10414]	1471 [13018]
--------------	------------	------------	------------	------------	--------------	--------------

mm [in]

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

► Performance data is typical. Performance of production units varies slightly from one motor to another. See page 9 for additional information on product testing.

**DISPLACEMENT PERFORMANCE**

		Pressure - bar [psi]			Max. Cont.	Peak		
<b>750</b>		17 [250]	35 [500]	69 [1000]	104 [1500]	138 [2000]		
748 cm <sup>3</sup> [45.6 in <sup>3</sup> ] / rev		Intermittent Ratings - 10% of Operation						
		Torque - Nm [lb-in], Speed rpm						
Flow - lpm [gpm]	2 [0.5]	108 [957] 2	231 [2041] 1					3
	4 [1]	174 [1540] 4	340 [3010] 4	651 [5760] 4	950 [8408] 4	1233 [10916] 3		6
	8 [2]	166 [1467] 9	367 [3246] 9	695 [6154] 9	1020 [9024] 9	1302 [11518] 7		11
	15 [4]	170 [1501] 19	359 [3181] 19	719 [6366] 19	1086 [9607] 18	1325 [11729] 16		21
	23 [6]	167 [1477] 29	344 [3048] 29	699 [6190] 28	1015 [8979] 27	1346 [11916] 25		31
	30 [8]	129 [1142] 40	324 [2866] 39	700 [6191] 38	1053 [9316] 37	1345 [11898] 35		41
	38 [10]	111 [979] 50	295 [2606] 49	656 [5809] 48	1039 [9191] 47	1390 [12305] 44		51
	45 [12]	69 [614] 60	254 [2246] 59	631 [5586] 58	987 [8736] 57	1365 [12079] 56		61
	53 [14]	47 [413] 69	227 [2009] 68	591 [5232] 66	957 [8469] 65	1346 [11913] 64		71
	61 [16]		198 [1756] 80	555 [4909] 79	931 [8243] 77	1294 [11455] 74		82
	68 [18]		136 [1203] 91	517 [4571] 90	879 [7778] 90	1230 [10884] 87		92
	76 [20]		93 [827] 100	453 [4010] 99	820 [7257] 98	1191 [10540] 97		102
	83 [22]			409 [3620] 109	786 [6958] 108			112
	91 [24]			340 [3010] 120	747 [6609] 119			122
95 [25]			318 [2810] 126	693 [6130] 125			127	
Max. Cont.								
Max. Inter.								
		Overall Efficiency - 70 - 100% <input type="checkbox"/>		40 - 69% <input type="checkbox"/>		0 - 39% <input type="checkbox"/>		
<b>Rotor Width</b>		Theoretical Torque - Nm [lb-in]						
63.5 [2.501]		205 [1815]	410 [3631]	821 [7261]	1231 [10892]	1641 [14522]		
mm [in]		Displacement tested at 54°C [129°F] with an oil viscosity of 46cSt [213 SUS]						

► Performance data is typical. Performance of production units varies slightly from one motor to another. See page 9 for additional information on product testing.



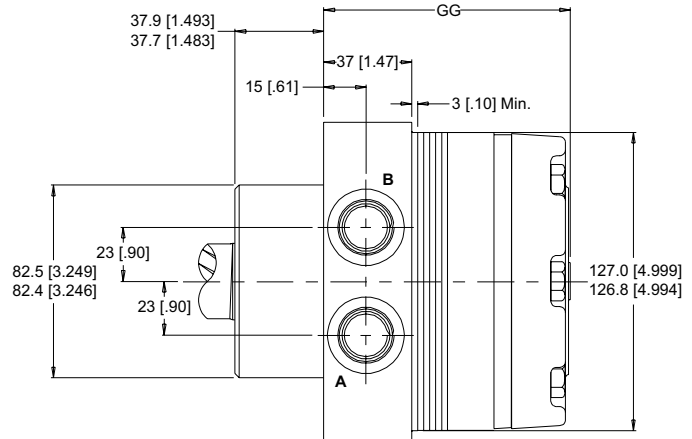
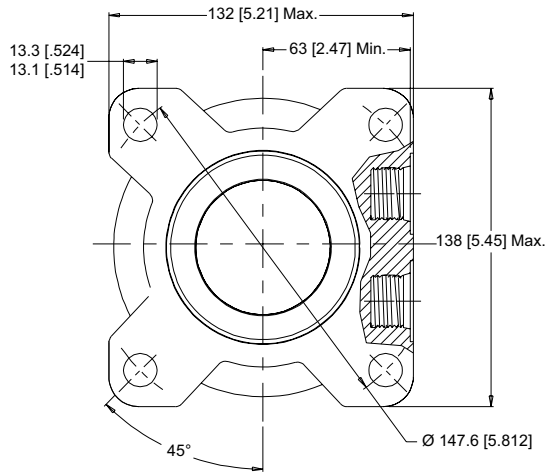
**HOUSINGS**

► Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

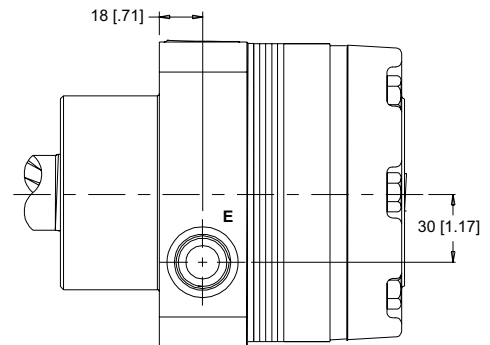
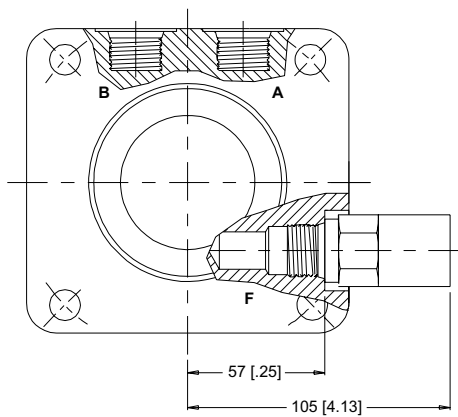
**4-HOLE, WHEEL MOUNT, ALIGNED PORTS**

**W31** 7/8-14 UNF **W38** G 1/2

**STANDARD**



**OPTIONAL VALVE CAVITY**



E: 10 Series/2-Way Valve Cavity 7/8-14 UNF F: Valve Cartridge Installed

► Dimension GG is charted on page 154.

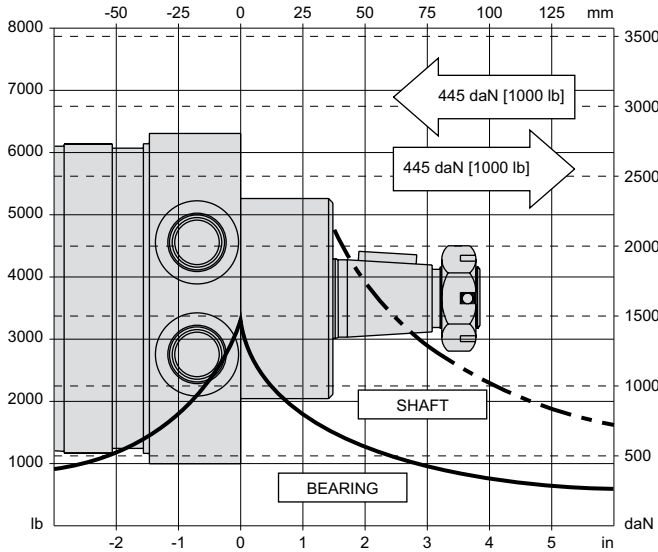


**TECHNICAL INFORMATION**

**ALLOWABLE SHAFT LOAD / 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 on page 10.

**WHEEL MOUNTS**



**LENGTH & WEIGHT CHART**

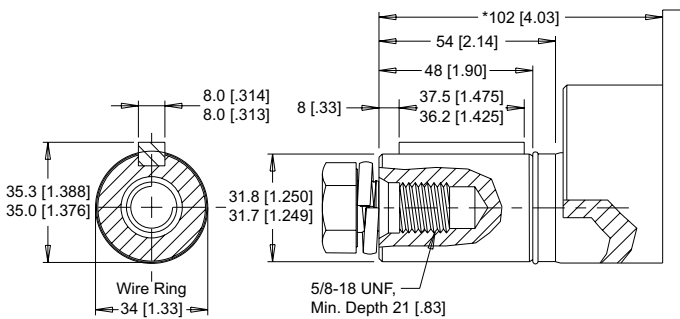
Dimension GG is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on pages 153, 156 & 159.

GG #	Length mm [in]	Weight kg [lb]
120	99 [3.91]	10.9 [24.1]
160	99 [3.91]	10.9 [24.1]
200	103 [4.05]	11.3 [24.8]
230	105 [4.15]	11.4 [25.2]
260	108 [4.24]	11.6 [25.6]
300	111 [4.37]	11.9 [26.3]
350	125 [4.92]	13.1 [28.8]
375	117 [4.62]	12.4 [27.4]
470	125 [4.92]	13.1 [28.8]
540	131 [5.16]	13.6 [30.0]
750	149 [5.87]	15.0 [33.1]

► All CE series motor weights can vary  $\pm 0.5$  kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

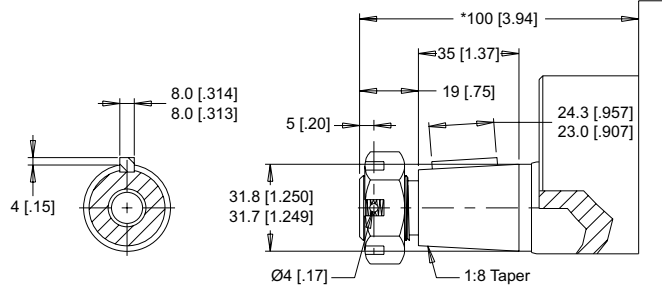
**SHAFTS**

**20** 1-1/4" Straight



Max. Torque: 1200 Nm [10600 lb-in]

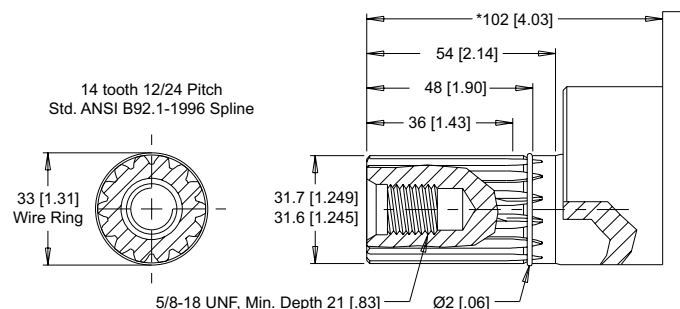
**22** 1-1/4" Tapered



Max. Torque: 1200 Nm [10600 lb-in]

► A slotted hex nut is standard on this shaft. Dimensional details & additional options are listed on page 14.

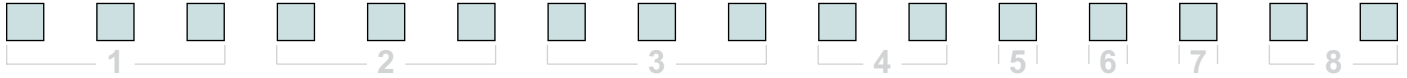
**23** 14 Tooth Spline



Max. Torque: 1200 Nm [10600 lb-in]

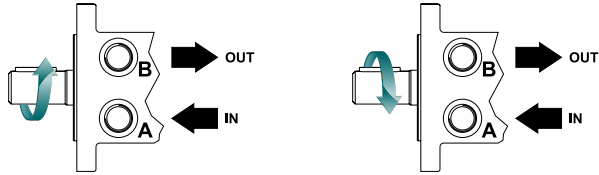


ORDERING INFORMATION



1. CHOOSE SERIES DESIGNATION

- 400** Counterclockwise Rotation
- 401** Clockwise Rotation



► The 400 & 401 series are bi-directional. Reversing the inlet hose will reverse shaft rotation. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

2. SELECT A DISPLACEMENT OPTION

- |   |   |
|---|---|
| <b>120</b> 121 cm <sup>3</sup> /rev [7.4 in <sup>3</sup> /rev]  | <b>350</b> 348 cm <sup>3</sup> /rev [21.2 in <sup>3</sup> /rev] |
| <b>160</b> 162 cm <sup>3</sup> /rev [9.9 in <sup>3</sup> /rev]  | <b>375</b> 375 cm <sup>3</sup> /rev [22.8 in <sup>3</sup> /rev] |
| <b>200</b> 204 cm <sup>3</sup> /rev [12.4 in <sup>3</sup> /rev] | <b>470</b> 465 cm <sup>3</sup> /rev [28.3 in <sup>3</sup> /rev] |
| <b>230</b> 232 cm <sup>3</sup> /rev [14.2 in <sup>3</sup> /rev] | <b>540</b> 536 cm <sup>3</sup> /rev [32.7 in <sup>3</sup> /rev] |
| <b>260</b> 261 cm <sup>3</sup> /rev [15.9 in <sup>3</sup> /rev] | <b>750</b> 748 cm <sup>3</sup> /rev [45.6 in <sup>3</sup> /rev] |
| <b>300</b> 300 cm <sup>3</sup> /rev [18.3 in <sup>3</sup> /rev] |   |

3. SELECT A MOUNT & PORT OPTION

- W31** 4-Hole, Wheel Mount, Aligned Ports, 7/8-14 UNF
- W38** 4-Hole, Wheel Mount, Aligned Ports, G 1/2

4. SELECT A SHAFT OPTION

- 20** 1-1/4" Straight
- 22** 1-1/4" Tapered
- 23** 14 Tooth Spline

5. SELECT A PAINT OPTION

- A** Black
- B** Black, Unpainted Mounting Surface
- Z** No Paint

6. SELECT A VALVE CAVITY / CARTRIDGE OPTION

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| <b>A</b> None                     | <b>E</b> 104 bar [1500 psi] Relief |
| <b>B</b> Valve Cavity Only        | <b>F</b> 121 bar [1750 psi] Relief |
| <b>C</b> 69 bar [1000 psi] Relief | <b>G</b> 138 bar [2000 psi] Relief |
| <b>D</b> 86 bar [1250 psi] Relief |                                    |

7. SELECT AN ADD-ON OPTION

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

8. SELECT A MISCELLANEOUS OPTION

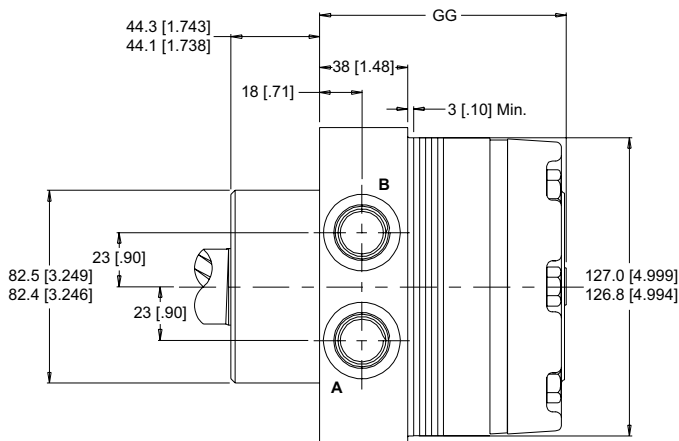
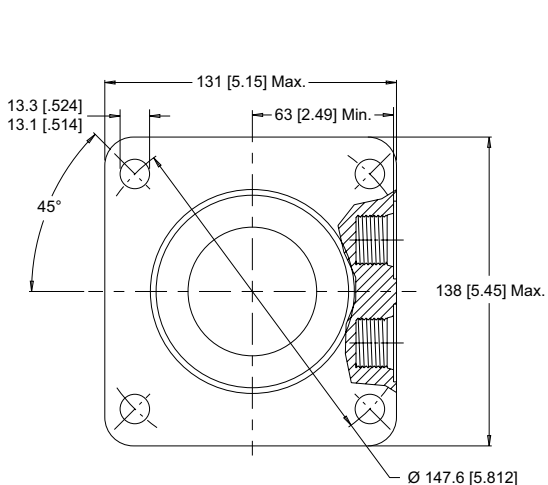
- AA** None
- AC** Freeturning Rotor
- AE** Hydraulic Declutch With Freeturning Rotor

**HOUSINGS**

► Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

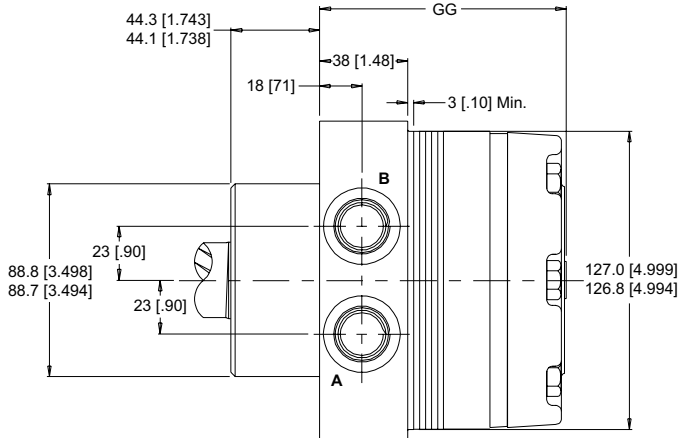
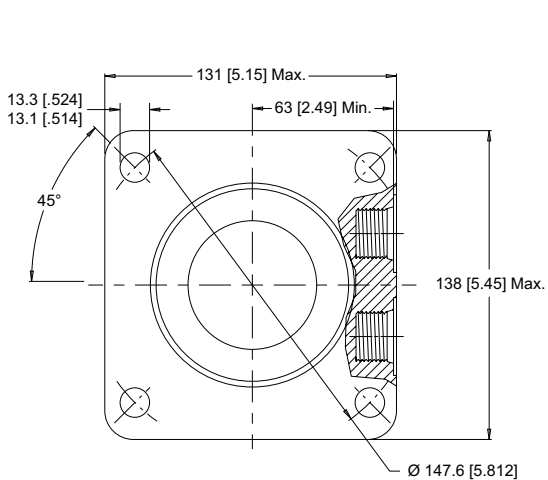
**4-HOLE, 3.5" PILOT WHEEL MOUNT, ALIGNED PORTS**

**P31** 7/8-14 UNF **P38** G 1/2



**4-HOLE, 3.25" PILOT WHEEL MOUNT, ALIGNED PORTS**

**W31** 7/8-14 UNF **W35** 9/16-18 UNF **W38** G 1/2



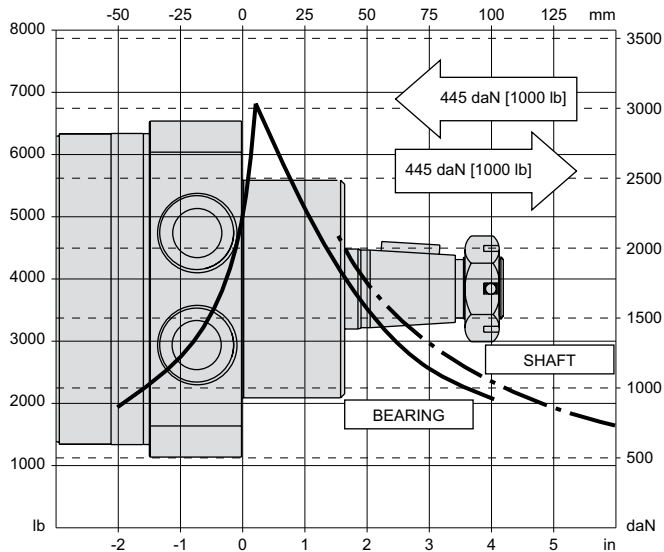
► Dimension GG is charted on page 154.

**TECHNICAL INFORMATION**

**ALLOWABLE SHAFT LOAD / BEARING CURVE**

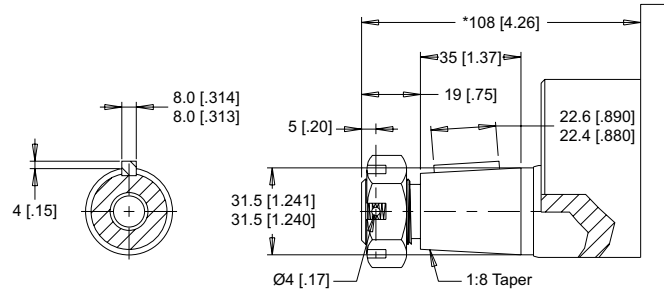
The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an  $L_{10}$  life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 10.

**WHEEL MOUNTS**



**SHAFTS**

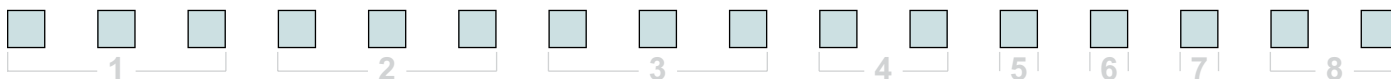
**22** 1-1/4" Tapered



Max. Torque: 1200 Nm [10600 lb-in]

► A slotted hex nut is standard on this shaft. Dimensional details & additional options are listed on page 14.

**ORDERING INFORMATION**



**1. CHOOSE SERIES DESIGNATION**

**420** Counterclockwise Rotation    **421** Clockwise Rotation

► The 420 & 421 series are bi-directional. Reversing the inlet hose will reverse shaft rotation. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

**2. SELECT A DISPLACEMENT OPTION**

<b>120</b>	121 cm <sup>3</sup> /rev [7.4 in <sup>3</sup> /rev]	<b>350</b>	348 cm <sup>3</sup> /rev [21.2 in <sup>3</sup> /rev]
<b>160</b>	162 cm <sup>3</sup> /rev [9.9 in <sup>3</sup> /rev]	<b>375</b>	375 cm <sup>3</sup> /rev [22.8 in <sup>3</sup> /rev]
<b>200</b>	204 cm <sup>3</sup> /rev [12.4 in <sup>3</sup> /rev]	<b>470</b>	465 cm <sup>3</sup> /rev [28.3 in <sup>3</sup> /rev]
<b>230</b>	232 cm <sup>3</sup> /rev [14.2 in <sup>3</sup> /rev]	<b>540</b>	536 cm <sup>3</sup> /rev [32.7 in <sup>3</sup> /rev]
<b>260</b>	261 cm <sup>3</sup> /rev [15.9 in <sup>3</sup> /rev]	<b>750</b>	748 cm <sup>3</sup> /rev [45.6 in <sup>3</sup> /rev]
<b>300</b>	300 cm <sup>3</sup> /rev [18.3 in <sup>3</sup> /rev]		

**3. SELECT A MOUNT & PORT OPTION**

<b>P31</b>	4-Hole, 3.25" Pilot Wheel Mount, Aligned Ports, 7/8-14 UNF
<b>P38</b>	4-Hole, 3.25" Pilot Wheel Mount, Aligned Ports, G 1/2
<b>W31</b>	4-Hole, 3.50" Pilot Wheel Mount, Aligned Ports, 7/8-14 UNF
<b>W35</b>	4-Hole, 3.50" Pilot Wheel Mount, Aligned Ports, 9/16-18 UNF
<b>W38</b>	4-Hole, 3.50" Pilot Wheel Mount, Aligned Ports, G 1/2

**4. SELECT A SHAFT OPTION**

<b>22</b>	1-1/4" Tapered
-----------	----------------

**5. SELECT A PAINT OPTION**

<b>A</b>	Black
<b>B</b>	Black, Unpainted Mounting Surface
<b>Z</b>	No Paint

**6. SELECT A VALVE CAVITY / CARTRIDGE OPTION**

<b>A</b>	None
----------	------

**7. SELECT AN ADD-ON OPTION**

<b>A</b>	Standard
<b>B</b>	Lock Nut
<b>C</b>	Solid Hex Nut

**8. SELECT A MISCELLANEOUS OPTION**

<b>AA</b>	None
<b>AC</b>	Freeturning Rotor
<b>AE</b>	Hydraulic Dec clutch With Freeturning Rotor

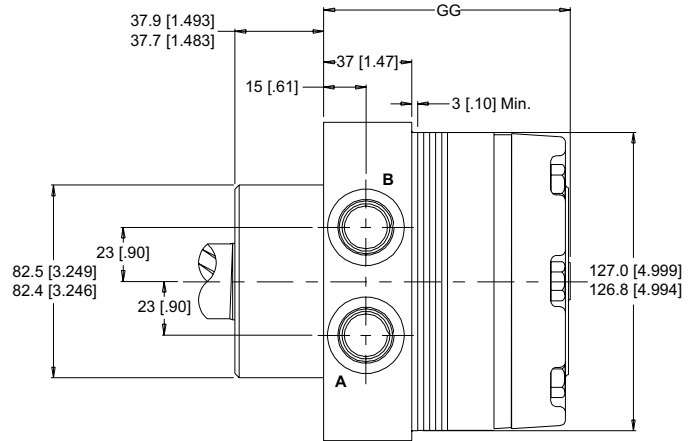
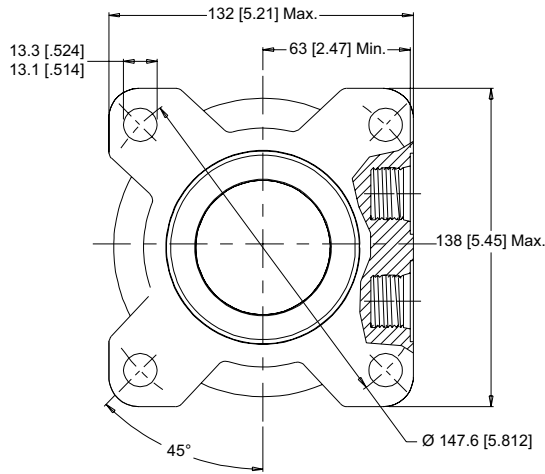
**HOUSINGS**

► Dimensions shown are without paint. Paint thickness can be up to 0.13 [.005].

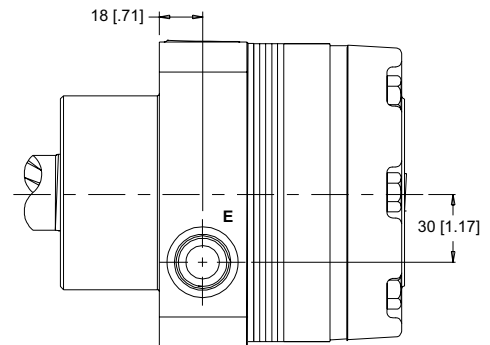
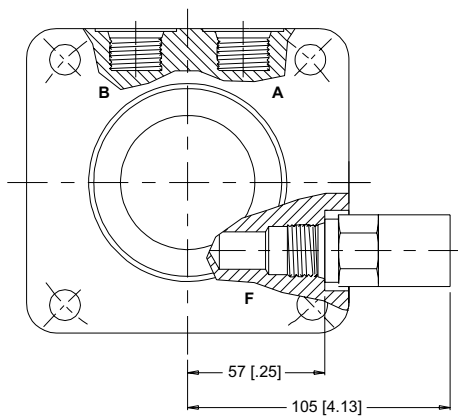
**4-HOLE, WHEEL MOUNT, ALIGNED PORTS**

**W31** 7/8-14 UNF **W38** G 1/2

**STANDARD**



**OPTIONAL VALVE CAVITY**



E: 10 Series/2-Way Valve Cavity 7/8-14 UNF F: Valve Cartridge Installed

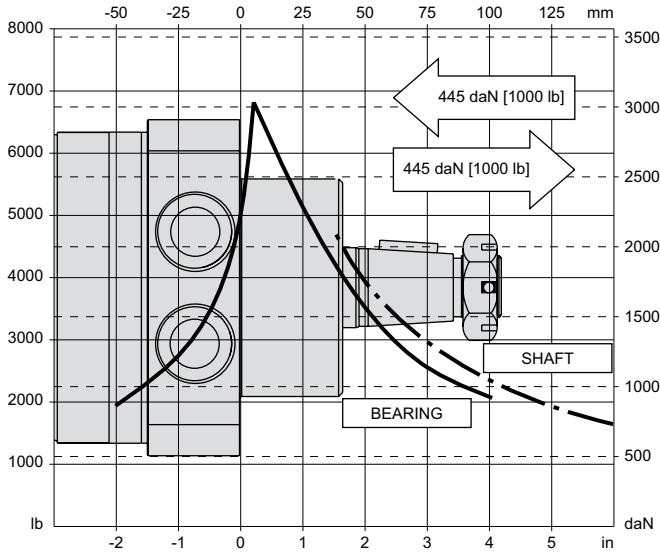
► Dimension GG is charted on page 154.

**TECHNICAL INFORMATION**

**ALLOWABLE SHAFT LOAD / BEARING CURVE**

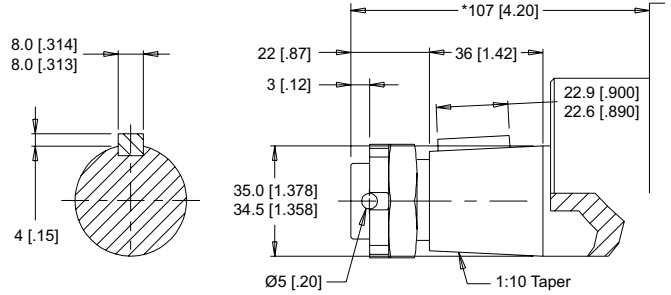
The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an  $L_{10}$  life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 10.

**WHEEL MOUNTS**



**SHAFTS**

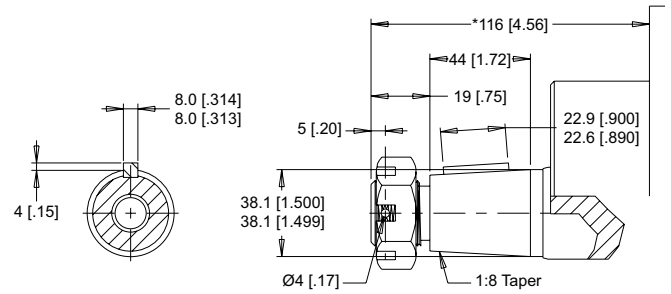
**28** 35mm Tapered



▶ A slotted hex nut is standard on this shaft. Dimensional details & additional options are listed on page 14.

**Max. Torque: 1200 Nm [10600 lb-in]**

**31** 1-1/2" Tapered



▶ A slotted hex nut is standard on this shaft. Dimensional details & additional options are listed on page 14.

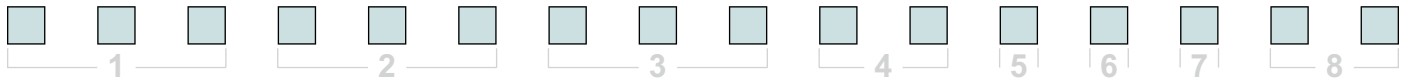
**Max. Torque: 1200 Nm [10600 lb-in]**

\* Mounting flange length may vary by  $\pm .8$  [.030].



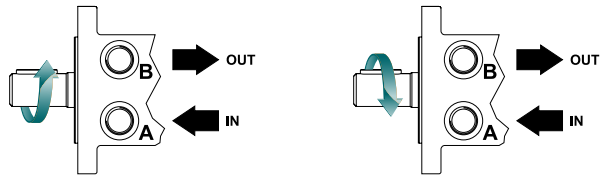


**ORDERING INFORMATION**



**1. CHOOSE SERIES DESIGNATION**

- 430** Counterclockwise Rotation
- 431** Clockwise Rotation



► The 430 & 431 series are bi-directional. Reversing the inlet hose will reverse shaft rotation. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

**2. SELECT A DISPLACEMENT OPTION**

<b>120</b>	121 cm <sup>3</sup> /rev [7.4 in <sup>3</sup> /rev]	<b>350</b>	348 cm <sup>3</sup> /rev [21.2 in <sup>3</sup> /rev]
<b>160</b>	162 cm <sup>3</sup> /rev [9.9 in <sup>3</sup> /rev]	<b>375</b>	375 cm <sup>3</sup> /rev [22.8 in <sup>3</sup> /rev]
<b>200</b>	204 cm <sup>3</sup> /rev [12.4 in <sup>3</sup> /rev]	<b>470</b>	465 cm <sup>3</sup> /rev [28.3 in <sup>3</sup> /rev]
<b>230</b>	232 cm <sup>3</sup> /rev [14.2 in <sup>3</sup> /rev]	<b>540</b>	536 cm <sup>3</sup> /rev [32.7 in <sup>3</sup> /rev]
<b>260</b>	261 cm <sup>3</sup> /rev [15.9 in <sup>3</sup> /rev]	<b>750</b>	748 cm <sup>3</sup> /rev [45.6 in <sup>3</sup> /rev]
<b>300</b>	300 cm <sup>3</sup> /rev [18.3 in <sup>3</sup> /rev]		

**3. SELECT A MOUNT & PORT OPTION**

- W31** 4-Hole, Wheel Mount, Aligned Ports, 7/8-14 UNF
- W38** 4-Hole, Wheel Mount, Aligned Ports, G 1/2

**4. SELECT A SHAFT OPTION**

- 28** 35mm Tapered
- 31** 1-1/2" Tapered

**5. SELECT A PAINT OPTION**

- A** Black
- B** Black, Unpainted Mounting Surface
- Z** No Paint

**6. SELECT A VALVE CAVITY / CARTRIDGE OPTION**

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| <b>A</b> None                     | <b>E</b> 104 bar [1500 psi] Relief |
| <b>B</b> Valve Cavity Only        | <b>F</b> 121 bar [1750 psi] Relief |
| <b>C</b> 69 bar [1000 psi] Relief | <b>G</b> 138 bar [2000 psi] Relief |
| <b>D</b> 86 bar [1250 psi] Relief |                                    |

**7. SELECT AN ADD-ON OPTION**

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

**8. SELECT A MISCELLANEOUS OPTION**

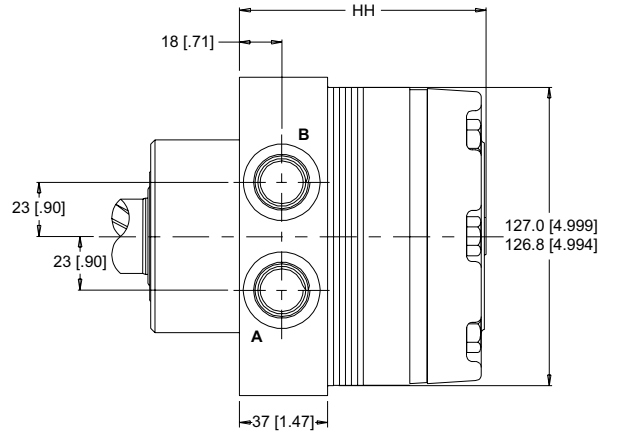
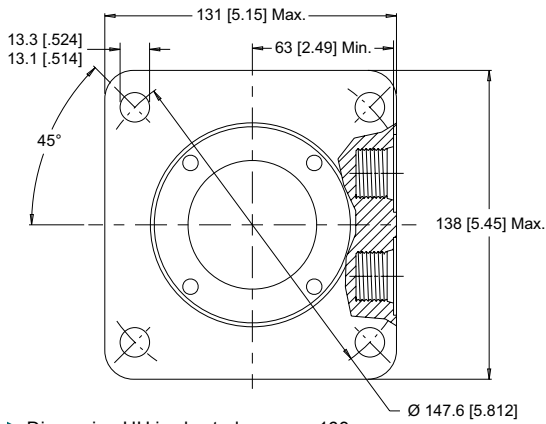
- AA** None
- AC** Freeturning Rotor
- AE** Hydraulic Declutch With Freeturning Rotor

**HOUSINGS**

► Dimensions shown are without paint. Paint thickness can be up to 0.13 [0.005].

**4-HOLE, WHEEL BRAKE MOUNT, ALIGNED PORTS**

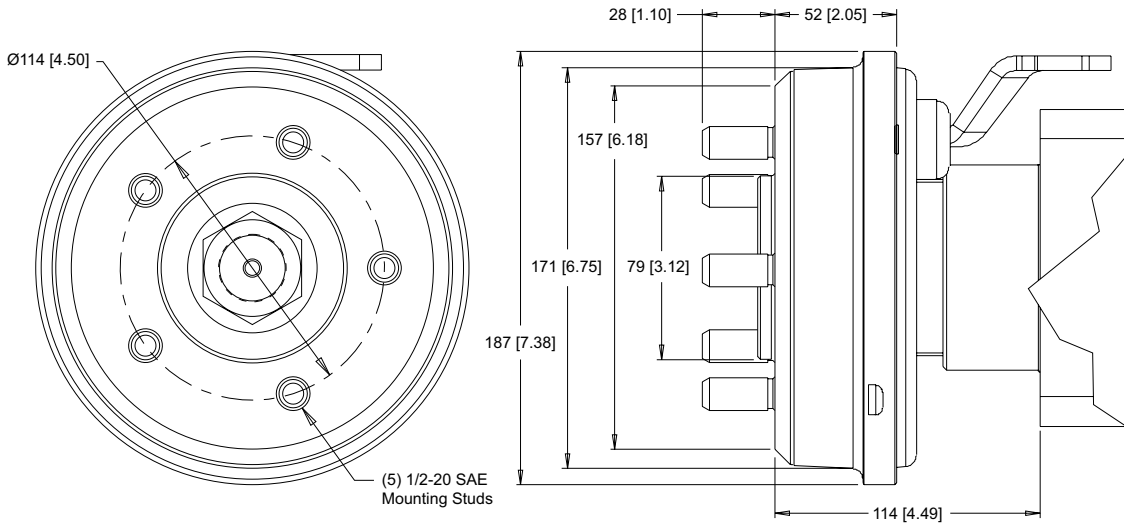
**K31** 7/8-14 UNF    **K35** 9/16-18 UNF    **K38** G 1/2



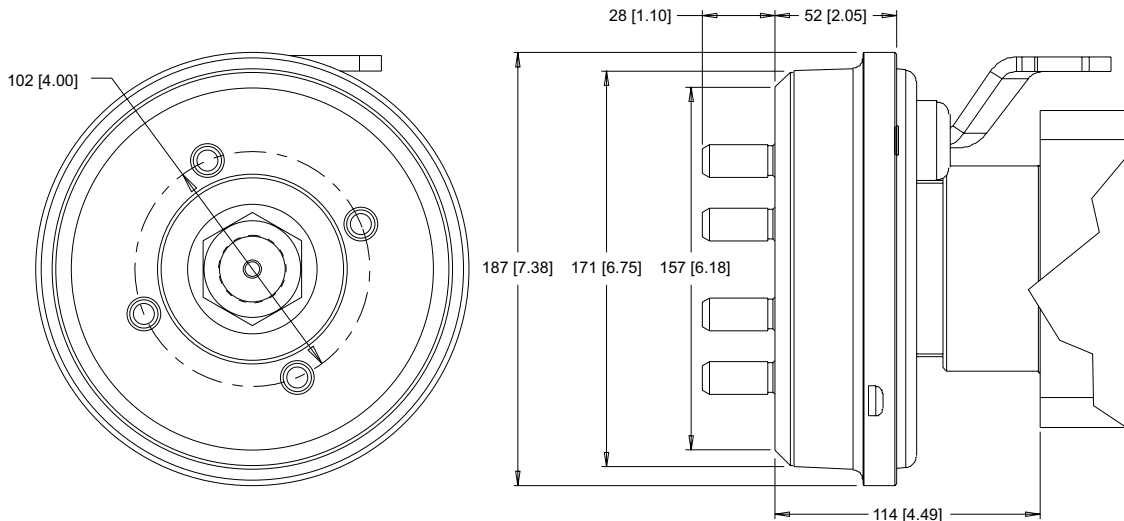
► Dimension HH is charted on page 163.

**HUB OPTION DETAILS**

**5-BOLT, WHEEL HUB**

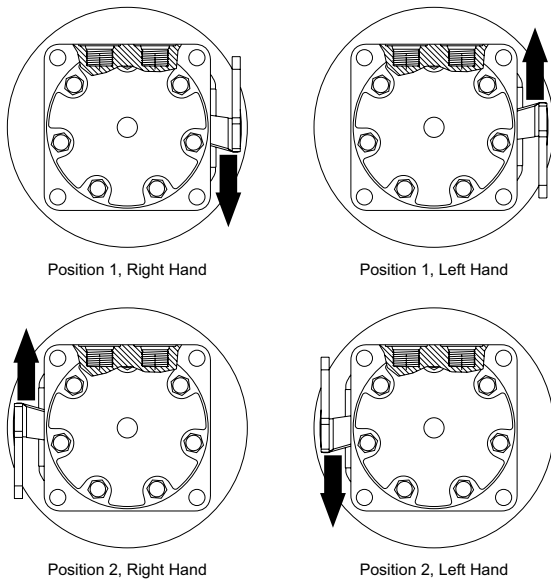


**4-BOLT, WHEEL HUB**

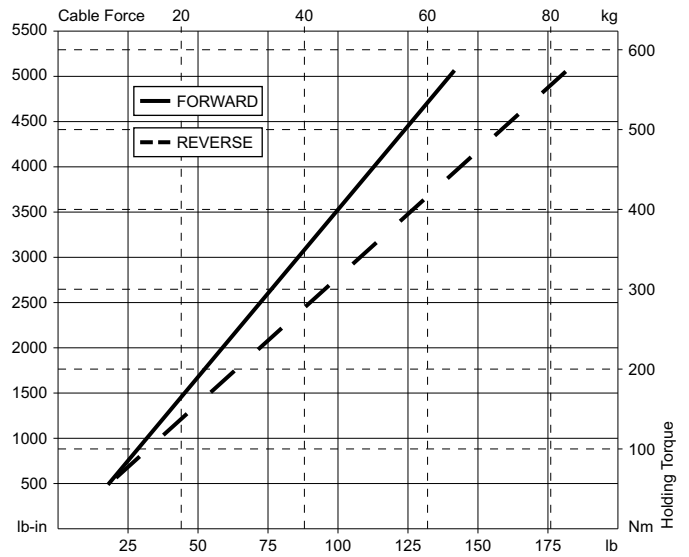


**TECHNICAL INFORMATION**

**BRAKE LEVER POSITION & PULL DIRECTION**



**BRAKE HOLDING TORQUE**



**ALLOWABLE SHAFT LOAD / BEARING CURVE**

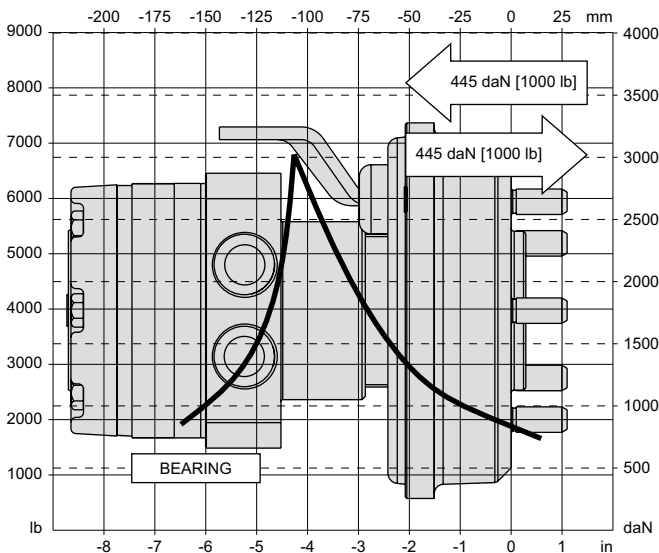
The bearing curve represents allowable bearing loads based on ISO 281 bearing capacity for an  $L_{10}$  life of 2,000 hours at 100 rpm. Radial loads for speeds other than 100 rpm may be calculated using the multiplication factor table on page 10.

**LENGTH & WEIGHT CHART**

Dimension HH is the overall motor length from the rear of the motor to the mounting flange surface and is referenced on detailed housing drawings listed on page 162.

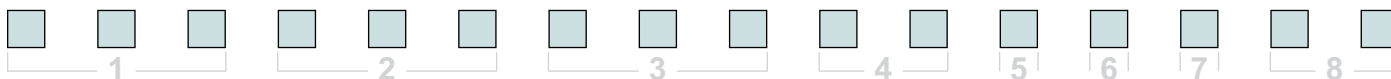
HH #	Length mm [in]	Weight kg [lb]
120	99 [3.91]	16.0 [35.2]
160	99 [3.91]	16.0 [35.2]
200	103 [4.05]	16.3 [35.9]
230	105 [4.15]	16.5 [36.3]
260	108 [4.24]	16.7 [36.7]
300	111 [4.37]	17.0 [37.4]
350	125 [4.92]	18.1 [39.9]
375	117 [4.62]	17.5 [38.5]
470	125 [4.92]	18.1 [39.9]
540	131 [5.16]	18.7 [41.1]
750	149 [5.87]	20.1 [44.2]

**MOTOR BRAKE**



► 410/411 motor/brake weights can vary  $\pm 0.5$  kg [1 lb] depending on model configurations such as housing, shaft, endcover, options etc.

**ORDERING INFORMATION**



**1. CHOOSE SERIES DESIGNATION**

**410** Counterclockwise Rotation    **411** Clockwise Rotation

► The 410 & 411 series are bi-directional. Reversing the inlet hose will reverse shaft rotation. For applications requiring the motor to rotate in only one direction, shaft seal life may be prolonged by pressurizing the A port of the motor.

**2. SELECT A DISPLACEMENT OPTION**

<b>120</b>	121 cm <sup>3</sup> /rev [7.4 in <sup>3</sup> /rev]	<b>350</b>	348 cm <sup>3</sup> /rev [21.2 in <sup>3</sup> /rev]
<b>160</b>	162 cm <sup>3</sup> /rev [9.9 in <sup>3</sup> /rev]	<b>375</b>	375 cm <sup>3</sup> /rev [22.8 in <sup>3</sup> /rev]
<b>200</b>	204 cm <sup>3</sup> /rev [12.4 in <sup>3</sup> /rev]	<b>470</b>	465 cm <sup>3</sup> /rev [28.3 in <sup>3</sup> /rev]
<b>230</b>	232 cm <sup>3</sup> /rev [14.2 in <sup>3</sup> /rev]	<b>540</b>	536 cm <sup>3</sup> /rev [32.7 in <sup>3</sup> /rev]
<b>260</b>	261 cm <sup>3</sup> /rev [15.9 in <sup>3</sup> /rev]	<b>750</b>	748 cm <sup>3</sup> /rev [45.6 in <sup>3</sup> /rev]
<b>300</b>	300 cm <sup>3</sup> /rev [18.3 in <sup>3</sup> /rev]		

**3. SELECT A MOUNT & PORT OPTION**

<b>K31</b>	4-Hole, Wheel Brake Mount, Aligned Ports, 7/8-14 UNF
<b>K35</b>	4-Hole, Wheel Brake Mount, Aligned Ports, 9/16-18 UNF
<b>K38</b>	4-Hole, Wheel Brake Mount, Aligned Ports, G 1/2

**4. SELECT A SHAFT OPTION**

<b>22</b>	1-1/4" Tapered
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**5. SELECT A PAINT OPTION**

<b>A</b>	Black
<b>Z</b>	No Paint

**6. SELECT A VALVE CAVITY / CARTRIDGE OPTION**

<b>A</b>	None
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**7. SELECT AN ADD-ON OPTION**

<b>A</b>	Standard
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**8. SELECT A MISCELLANEOUS OPTION**

<b>YA</b>	5 Bolt Hub, Position 2, Right Hand
<b>YB</b>	5 Bolt Hub, Position 2, Left Hand
<b>YE</b>	4 Bolt Hub, Position 2, Right Hand
<b>YF</b>	4 Bolt Hub, Position 2, Left Hand
<b>ZA</b>	5 Bolt Hub, Position 1, Left Hand
<b>ZB</b>	5 Bolt Hub, Position 1, Right Hand
<b>ZE</b>	4 Bolt Hub, Position 1, Left Hand
<b>ZF</b>	4 Bolt Hub, Position 1, Right Hand