MOTORS

Technical Information

VIS 40, 45

WHITE

together in motion

Contents

Chapter 1
General Information

Topics:

General Overview

The VIS (Valve-in-Star) Motors are the next step in the evolution of the low speed high torque (LSHT) hydraulic motors. The VIS design provides design advantages over other types of LSHT hydraulic motor valving resulting in a more compact package with better efficiency and higher pressure capability. These improvements have shown significant packaging and performance advantages in applications such as skid steer loaders, mini excavators, trenchers and logging equipment.
VIS motors are primarily intended for use in closed loop circuit applications. Consult your White representative for assistance on open loop circuit applications

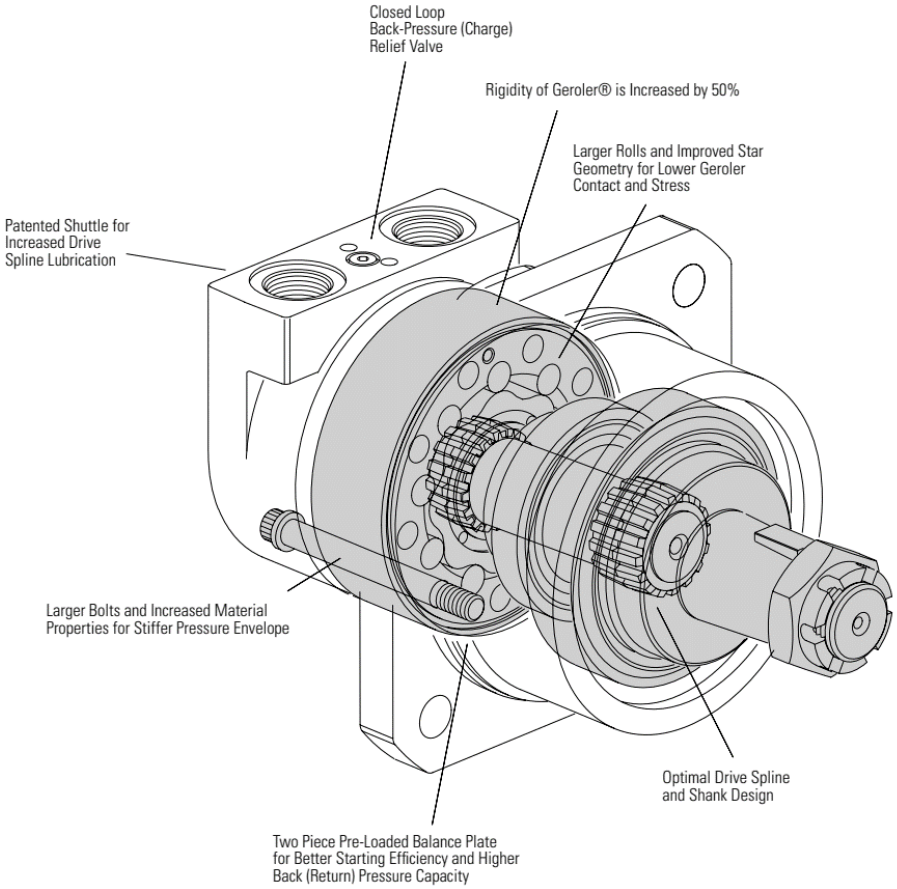


Figure 1 General view

Features

- Patented VIS Geroler technology
- Simplified design - only three moving components:
  - geroler star
  - drive
  - output shaft
- Pressure-balance Geroler - improves efficiency
- Shuttle valve option for reliable internal drive lubrication
- Variety of optional features

Benefits

- Extremely compact powerful package
- Highest output torque in its class
- High efficiency
- Reduced system temperatures
- High horsepower density
- Design flexibility
- Reliable and dependable performance

Applications

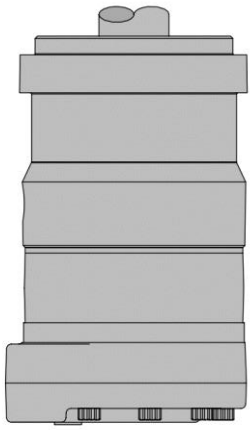
- Skid steer loaders
- Sprayers
- Underground boring equipment
- Forestry equipment
- Irrigation reels
- Grinders/Mixers
- Material handling equipment
- Augers and skid steer attachments
- Large turf care equipment

Design Features

White hydraulic motors provide design flexibility. All VIS motors are available with various configurations consisting of:

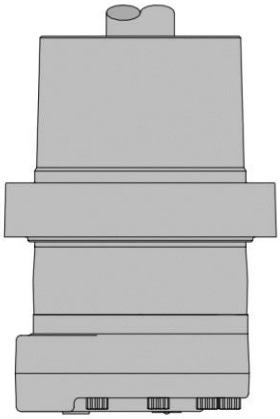
- Displacement (Geroler)
- Output Shaft
- No Shaft (Bearingless Motor)
- Port Configuration
- Mounting Flange
- Park brake
- Other Special Features

Standard Motor



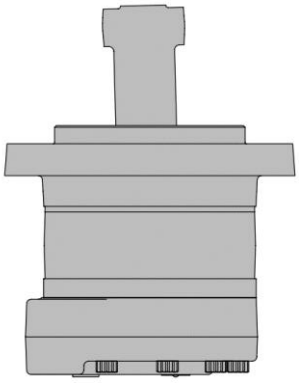
The standard motor mounting flange is located as close to the output shaft as possible. This type of mounting supports the motor close to the shaft load. This mounting flange is also compatible with many standard gear boxes.

Wheel Motor



The wheel motor mounting flange is located near the center of the motor which permits part or all of the motor to be located inside the wheel or roller hub. In traction drive applications, loads can be positioned over the motor bearings for best bearing life. This wheel motor mounting flange provides design flexibility in many applications.

Bearingless Motor



The bearingless motor has the same drive components as the standard and wheel motors with the exception that the motor is assembled without the output shaft, bearings and bearing housing. The bearingless motor is especially suited for applications such as gear boxes, winch drives, reel and roll drives. Bearingless motor applications must be designed with a bearing supported internal spline to mate with the bearingless motor drive. Product designs using these hydraulic motors provide considerable cost savings.

Typical Hydraulic Circuit

Shuttle valve , Two Way (Closed Center)

Schematic diagram

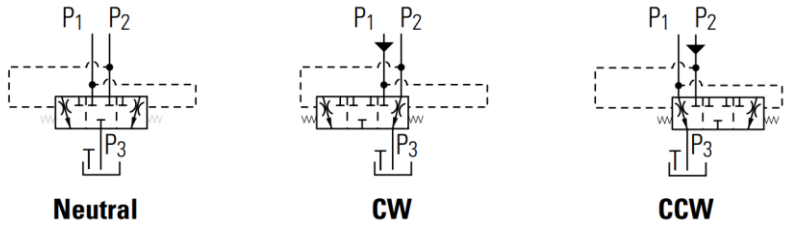
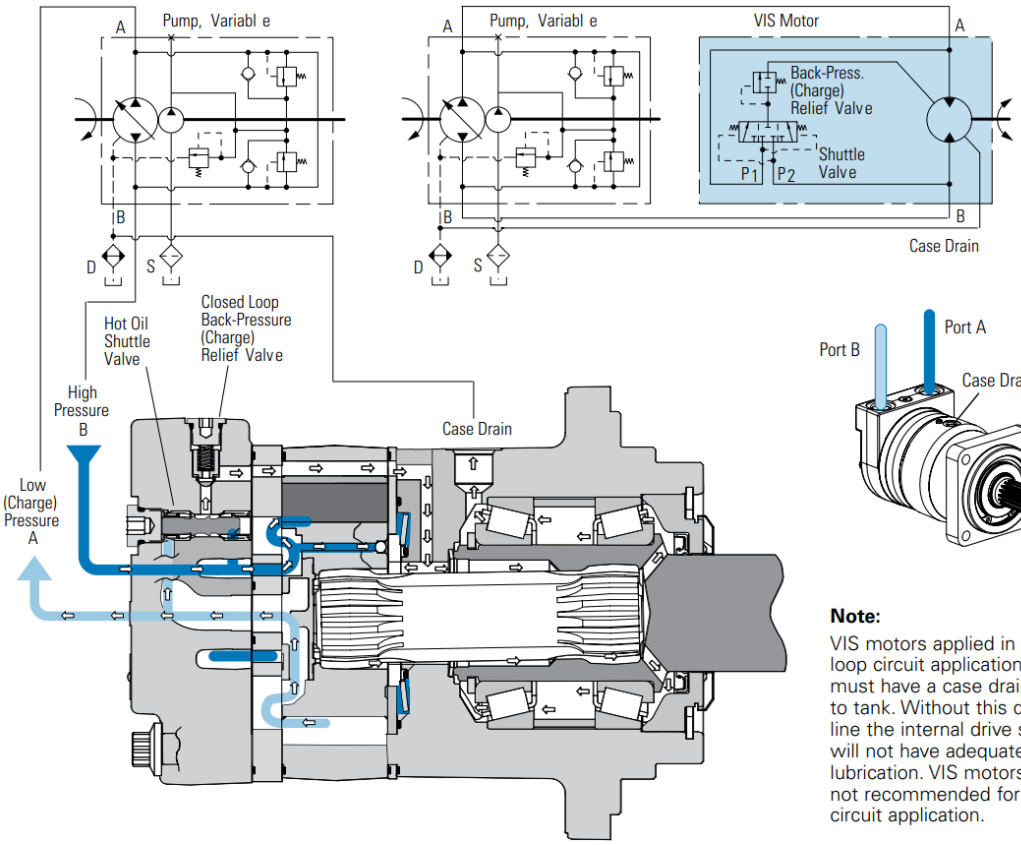


Figure 2 Shuttle valve

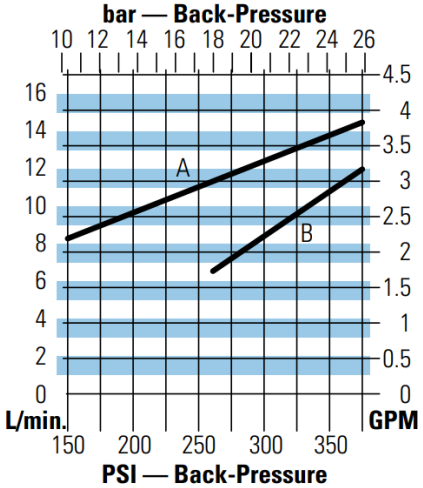
Closed loop circuit



Note:
VIS motors applied in closed loop circuit applications must have a case drain line to tank. Without this drain line the internal drive spline will not have adequate lubrication. VIS motors are not recommended for series circuit application.

Figure 3 Open loop circuit

Shuttle Flow Charts



A

4,5 bar [65 PSI] @ 60° C [140° F]

Δ Between Back-Pressure and Case Pressure (Typical Data)

B

15,2 bar [220 PSI] @ 60° C [140° F]

Δ Between Back-Pressure and Case Pressure (Typical Data)

Due to Machining Tolerances, Flow May be More or Less

Figure 4 Shuttle Flow Charts

Open loop circuit

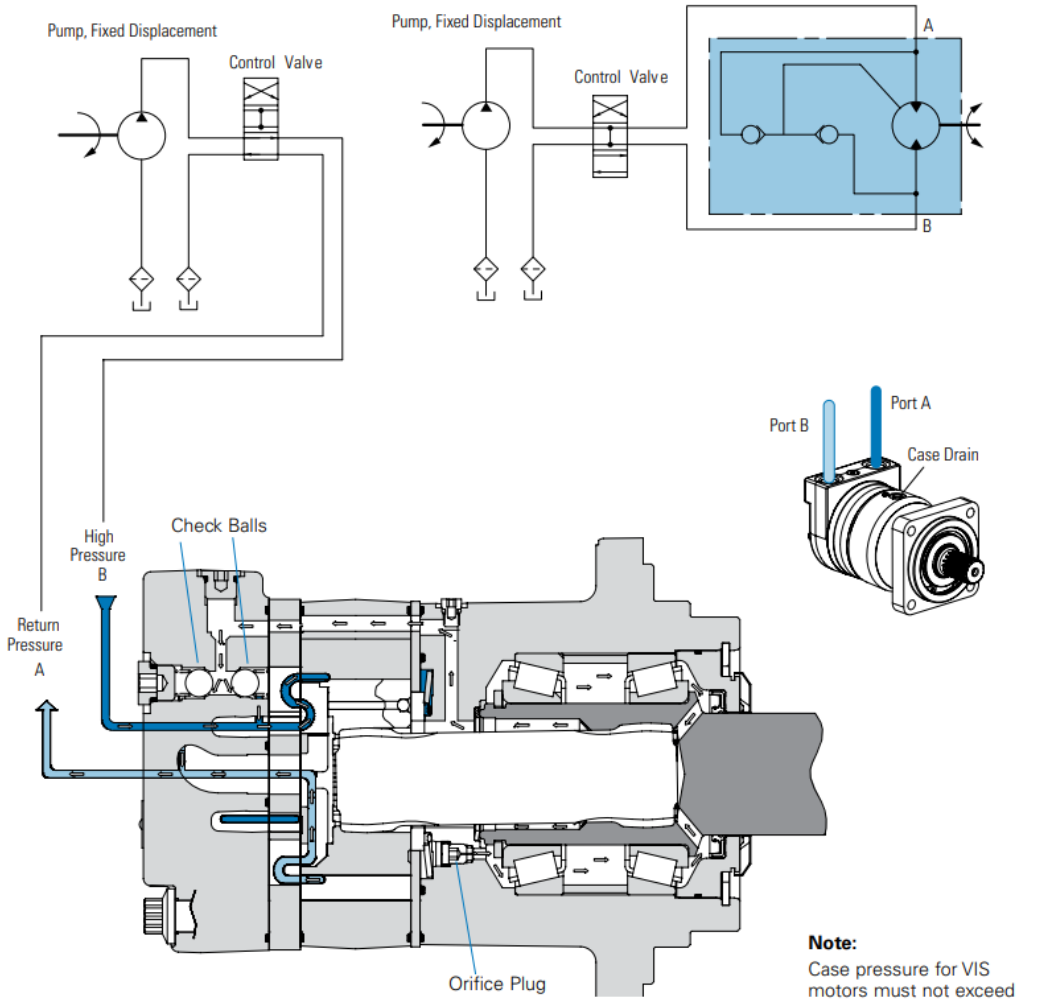


Figure 5 Open loop circuit

Two Speed Circuit

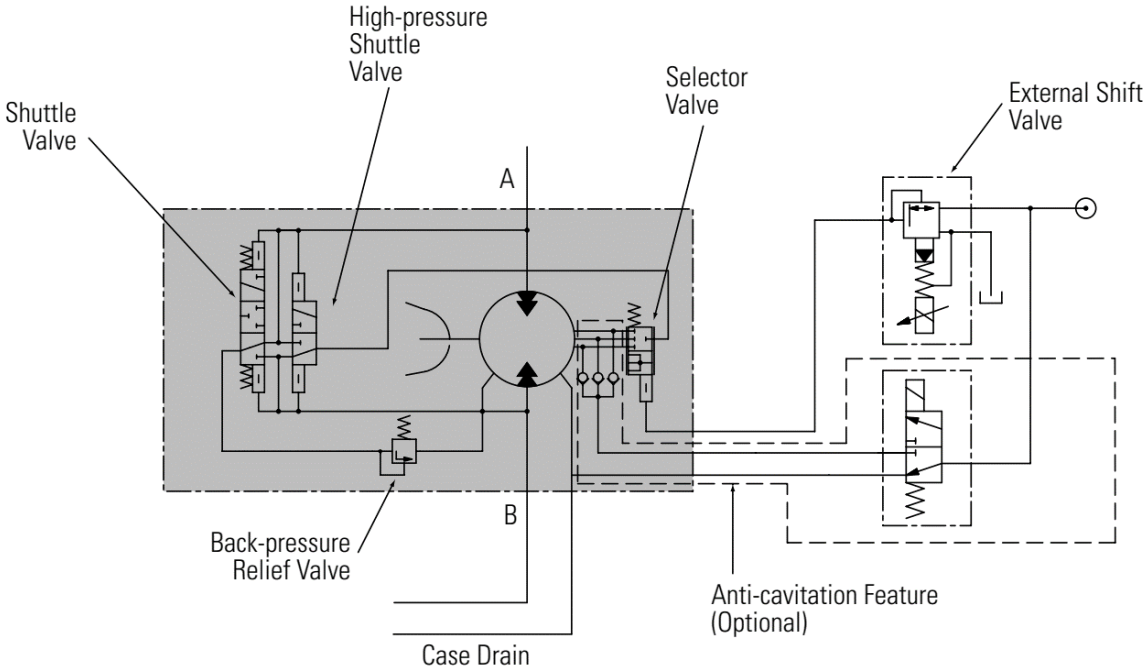


Figure 6 Two-speed Circuit

Two-speed brake motor circuit

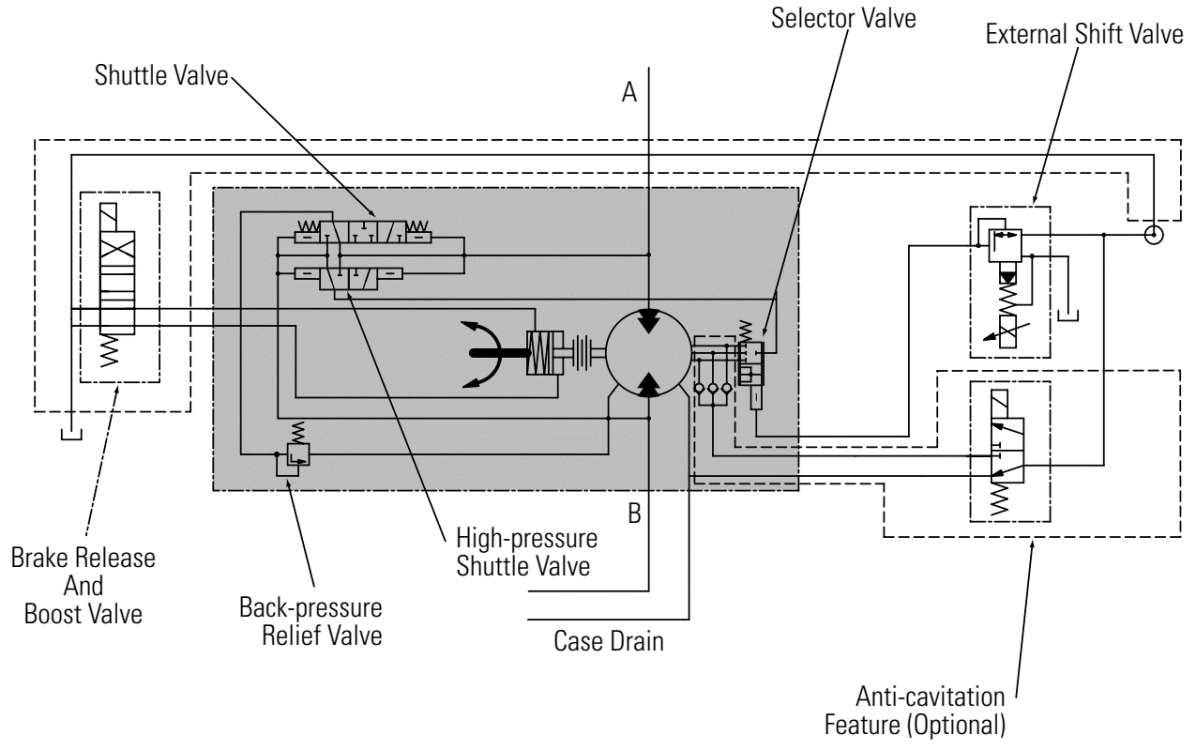


Figure 7 Two-speed brake motor circuit

Chapter 2
VIS 40 series

Topics:

- *Description*
- *Features*
- *Benefits*
- *Applications*
- *Specifications*
- *Technical Data*
- *Performance Data*
- *Dimensions*
- *Dimensions shafts*
- *Side Load Capacity*
- *Product numbers*
- *Model Code*

Description

The VIS 40 Series is the newest addition to the VIS product line. The VIS 40 is very close in size to the VIS 30, but with increased drive train strength, it has even greater torque capability. Maximum continuous output torque capability is rated to 2531 Nm [22,400 lb-in] with a displacement range from 505cc to 940cc per revolution. VIS 40 motors can be run up to 151 LPM [40 GPM] with pressure capability up to 310 bar (4500 PSI]. The motor utilizes patented VIS technology with improved high-strength Geroler, optimized drive geometry, and two-piece pre-loaded balance plate for increased starting efficiency, reduced leakage and higher back pressure capacity. A wide variety of options are available including two-speed option, brake options and case flow options for both closed-loop and open loop applications.

Features

- Patented VIS Geroler technology
- Three moving components: (Geroler, star, drive, and output shaft)
- Maximized drive strength in compact package size
- Compact package size similar to VIS 30 Series.
- Two-piece pre-loaded pressure balance plate
- Variety of optional features including two-speed option, brake packages, and case flow solutions for both closed-loop and open-loop applications.

Benefits

- Extremely compact powerful package
- Increased torque capability
- Greatest horsepower density in the VIS motor line
- High efficiency
- Quiet, smooth operation
- Reliable, trouble-free performance
- Design Flexibility

Applications

- Skid Steer Loaders and Attachments
- Snow Removal Equipment
- Trenchers
- Grapples
- Rough Terrain Forklifts
- Wood Processing – Saw Mills & Chippers
- Metal Forming
- Entertainment / Amusement Rides
- Industrial Processing
- Harvesters

Specifications

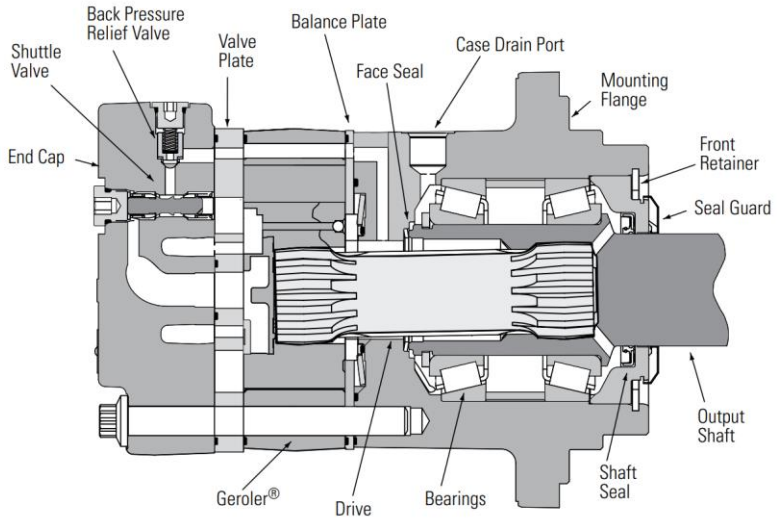


Figure 8 VIS 40 overview

Technical Data

Type				VIS 40							
Geometric displacement	cm^3			325	400	505	570	630	685	785	940
	$[in^3]$			[19.8]	[24.4]	[30.7]	[34.9]	[38.5]	[41.7]	[48.0]	[57.4]
Maximum speed	min^{-1}	cont.		440	357	279	244	221	204	177	148
	[rpm]	int.[1)]		[454]	[368]	[293]	[257]	[233]	[215]	[187]	[148]
Maximum torque	N•m	cont.		1445	1781	2240	2531	2531	2531	2531	2531
	[lbf•in]			[12789]	[15760]	[19829]	[22400]	[22400]	[22400]	[22400]	[22400]
		int. [1)]		1986	1597	2746	2815	3165	3165	3165	3165
				[17421]	[14137]	[21919]	[24918]	[28000]	[28000]	[28000]	[28000]
Pressure	bar	cont.		310	310	310	279	254	235	208	171
	[psi]			[4500]	[4500]	[4500]	[4040]	[3686]	[3389]	[3012]	[2489]
		int.[1)]		345	345	345	309	315	290	254	214
				[5000]	[5000]	[5000]	[4486]	[4574]	[4212]	[3682]	[3100]
		peak[2)]		380	380	380	380	380	380	300	250
				[5500]	[5500]	[5500]	[5500]	[5500]	[5500]	[4355]	[3621]
Maximum flow	l/min [US gal/ min]	cont.		151	151	151	151	151	151	151	151
				[40]	[40]	[40]	[40]	[40]	[40]	[40]	[40]
		int.[1)]		170	170	170	170	170	170	170	170
				[45]	[45]	[45]	[45]	[45]	[45]	[45]	[45]
Weight	kg [lb]	Standard		28.5	29.1	29.9]	30.5	31.4	31.4	32.2	33.4
				[62.9]	[64.2]	[66.0	[67.2]	[68.2]	[69.2]	[71.0]	[73.6]
		Wheel Mount Bearingless		16.3	16.9	17.7]	18.3	18.7	19.2	20.0	21.2
				[36.0]	[37.3]	[39.1	[40.3]	[41.3]	[42.3]	[44.1]	[42.7]
		Two-Speed Standard		32.1	32.7	33.5	34.1	34.5	35.0	35.8	37.0
				[70.8]	[72.1]	[73.9]	[75.1]	[76.1]	[77.1]	[78.9]	[81.5]
		Wheel Mount Two- Speed Bearingless		19.9	20.5	21.3	21.9	22.3	22.8	23.6	24.8
				[43.9]	[45.2]	[47.0]	[48.2]	[49.2]	[50.2]	[52.0]	[54.6]

Table 1 VIS 40 Technical Data

*A simultaneous maximum torque and maximum speed **NOT** recommended*

To assure best motor life, run motor for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

Maximum Inlet Pressure: 400 bar [5800 PSI]
Do Not Exceed A Pressure Rating (for displacement size see chart above).

Return Pressure (Back-Pressure): Minimum – 3,5 bar [50 PSI]
Maximum – 21 bar [300 PSI]

Note

Return (back-pressure) must be 3,5 bar [50 PSI] greater than the case pressure, except with open loop circuit.

Δ Pressure: The true Δ bar [ΔPSI] between inlet port and outlet port

Case Pressure: Minimum – No Pressure
Maximum – 3,5 bar [50 PSI]

Note:
The case must be full when the motor is operating. A case drain is recommended

Continuous Rating: Motor may be run continuously at these ratings

Intermittent operation: 10% of every minute

Peak operation: 1% of every minute

Recommended fluids:	Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 70 SUS at operating temperature.
Recommended maximum system operating temp.:	-34°C to 82°C [-30°F to 180°F]
Recommended filtration:	Per ISO Cleanliness Code, 4406: 20/18/13
Shuttle:	Standard
Back-Pressure Relief Valve:	Required for closed loop circuit.

Performance Data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area. Performance data is typical at 120 SUS. Actual data may vary slightly from unit to unit in production.

325 cm³/r [19.8 in³/r]

Flow LPM [GPM]	250 15	500 35	1000 70	1500 105	2000 140	2500 170	3000 205	3500 240	4000 275	4500 310	5000 345	5500 380
4	668	1399	2834	4251	5583	6924	8258	9528	10387	11637	12659	
	75	158	320	480	631	782	933	1076	1174	1315	1430	
15	46	46	46	44	43	43	42	42	39	37	36	
8	680	1419	2867	4303	5711	7126	8530	9876	11269	12460	13782	14840
	77	160	324	486	645	805	964	1116	1273	1408	1557	1677
30	93	91	90	87	85	84	83	81	78	74	70	66
12	647	1412	2879	4340	5768	7195	8619	10010	11360	12672	14029	15246
	73	160	325	490	652	813	974	1131	1284	1432	1585	1723
45	139	137	133	132	129	129	129	127	126	124	113	109
16	690	1420	2852	4316	5741	7191	8621	10014	11412	12736	14081	15435
	78	160	322	488	649	812	974	1131	1289	1439	1591	1744
61	186	184	181	179	174	170	168	168	166	161	154	151
20	657	1250	2774	4407	5695	7170	8741	9952	11392	12789	14137	15339
	74	141	313	498	643	810	988	1124	1287	1445	1597	1733
76	233	229	226	223	217	214	211	209	208	203	200	197
25	544	1266	2814	4154	5858	7220	8518	9936	11269	12654	14037	15334
	61	143	318	469	662	816	962	1123	1273	1430	1586	1732
95	291	287	283	280	277	269	266	264	260	256	254	248
30	146	1177	2605	3968	5401	6882	8315	9678	11092	12536	13960	15321
	16	133	294	448	610	778	939	1094	1253	1416	1577	1731
114	341	345	340	336	333	325	323	320	316	312	307	303
35	114	1144	2532	3960	5322	6768	8232	9589	11019	12228	13298	15023
	13	129	286	447	601	765	930	1083	1245	1382	1503	1697
132	396	402	396	392	387	378	377	372	369	363	353	354
40	92	557	2047	3574	5032	6507	7944	9282	10687	12112	13439	14938
	10	63	231	404	569	735	898	1049	1207	1368	1518	1688
151	454	452	440	433	430	429	430	428	425	420	413	408

Continuous
Intermittent
Will Operate at Reduced Life

Figure 9 Performance Data 325 cm³/r

400 cm³/r [24.4 in³/r]

Flow LPM [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	35	70	105	140	170	205	240	275	310	345	380
4	823	1724	3493	5239	6880	8532	10177	11741	12800	14340	15600	
	93	195	395	592	777	964	1150	1327	1446	1620	1763	
15	37	37	37	36	35	35	34	34	32	30	29	
8	838	1749	3533	5302	7038	8781	10511	12171	13887	15354	16983	18288
	95	198	399	599	795	992	1188	1375	1569	1735	1919	2066
30	75	74	73	71	69	68	67	66	63	60	57	53
12	797	1740	3548	5349	7108	8866	10622	12335	13999	15616	17289	18788
	90	197	401	604	803	1002	1200	1394	1582	1764	1953	2123
45	113	111	108	107	105	105	105	103	102	101	92	88
16	850	1750	3515	5319	7074	8862	10624	12341	14063	15695	17353	19021
	96	198	397	601	799	1001	1200	1394	1589	1773	1961	2149
61	151	149	147	145	141	138	136	136	135	131	125	123
20	810	1540	3419	5431	7018	8836	10771	12264	14039	15760	17421	18902
	92	174	386	614	793	998	1217	1386	1586	1781	1968	2136
76	189	186	183	181	176	174	171	170	169	165	163	160
25	670	1560	3467	5118	7219	8897	10497	12244	13887	15594	17299	18896
	76	176	392	578	816	1005	1186	1383	1569	1762	1954	2135
95	236	233	230	227	225	218	216	215	211	208	206	202
30	180	1450	3210	4890	6656	8480	10246	11927	13669	15448	17203	18881
	20	164	363	552	752	958	1158	1348	1544	1745	1944	2133
114	277	280	276	273	270	264	262	259	256	253	250	246
35	140	1410	3120	4880	6559	8341	10144	11817	13579	15068	16388	18514
	16	159	353	551	741	942	1146	1335	1534	1702	1852	2092
132	321	326	321	318	314	307	306	302	299	295	287	287
40	113	687	2522	4405	6201	8019	9789	11438	13170	14926	16561	18409
	13	78	285	498	701	906	1106	1292	1488	1686	1871	2080
151	368	367	357	352	349	348	349	347	345	341	335	331

Continuous
Intermittent
Will Operate at Reduced Life

6201 Torque [lb-in]
701 Nm
349 Speed RPM

Figure 10 Performance Data 400 cm³/r

505 cm³/r [30.7in³/r]

Flow LPM [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	35	70	105	140	170	205	240	275	310	345	380
4	1035	2169	4395	6592	8656	10735	12804	14773	16105	18043	19628	
	117	245	497	745	978	1213	1447	1669	1820	2039	2218	
15	29	29	29	29	28	28	27	27	25	24	23	
8	1055	2200	4445	6671	8855	11049	13225	15313	17473	19319	21368	23010
	119	249	502	754	1000	1248	1494	1730	1974	2183	2414	2600
30	60	59	58	56	55	54	53	52	50	48	45	42
12	1003	2190	4464	6730	8944	11155	13364	15520	17614	19648	21753	23640
	113	247	504	760	1011	1260	1510	1754	1990	2220	2458	2671
45	90	88	86	85	83	83	83	82	81	80	73	70
16	1069	2202	4422	6692	8901	11150	13367	15527	17694	19747	21833	23932
	121	249	500	756	1006	1260	1510	1754	1999	2231	2467	2704
61	120	118	117	115	112	110	108	108	107	104	100	98
20	1019	1938	4301	6833	8830	11117	13552	15431	17663	19829	21919	23783
	115	219	486	772	998	1256	1531	1743	1996	2240	2476	2687
76	150	148	145	144	140	138	136	135	134	131	129	127
25	843	1963	4363	6440	9083	11194	13207	15406	17473	19620	21765	23775
	95	222	493	728	1026	1265	1492	1741	1974	2217	2459	2686
95	188	185	183	180	179	173	172	171	168	165	164	160
30	226	1824	4039	6153	8375	10670	12892	15006	17199	19437	21645	23756
	26	206	456	695	946	1206	1457	1695	1943	2196	2446	2684
114	220	223	219	217	215	210	208	206	204	201	198	195
35	176	1774	3926	6140	8252	10494	12763	14868	17086	18959	20619	23294
	20	200	444	694	932	1186	1442	1680	1930	2142	2330	2632
132	255	259	255	253	250	244	243	240	238	234	228	228
40	142	864	3174	5542	7803	10089	12317	14391	16570	18779	20837	23162
	16	98	359	626	882	1140	1392	1626	1872	2122	2354	2617
151	293	292	284	279	277	277	277	276	274	271	267	263

Continuous
Intermittent
Will Operate at Reduced Life

Figure 11 Performance Data 505 cm³/r

570 cm³/r [34.9 in³/r]

Flow LPM [GPM]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	35	70	105	140	170	205	240	275	310	345	380
4	1177	2466	4996	7494	9841	12204	14556	16794	18308	20511	22313	
	133	279	564	847	1112	1379	1645	1897	2069	2317	2521	
15	26	26	26	25	24	24	24	24	22	21	20	
8	1199	2501	5053	7584	10067	12560	15034	17408	19864	21962	24292	26158
	135	283	571	857	1137	1419	1699	1967	2244	2481	2745	2955
30	52	52	51	50	48	48	47	46	44	42	40	37
12	1140	2489	5074	7650	10167	12681	15193	17644	20024	22336	24729	26874
	129	281	573	864	1149	1433	1717	1993	2262	2524	2794	3036
45	79	78	76	75	73	73	73	72	71	71	64	62
16	1216	2503	5027	7608	10119	12675	15195	17652	20115	22449	24820	27206
	137	283	568	860	1143	1432	1717	1994	2273	2536	2804	3074
61	106	104	103	101	99	96	95	95	94	92	88	86
20	1159	2203	4890	7768	10038	12638	15407	17542	20080	22542	24918	27037
	131	249	552	878	1134	1428	1741	1982	2269	2547	2815	3055
76	132	130	128	127	123	121	120	119	118	115	114	112
25	958	2231	4960	7321	10325	12725	15014	17513	19863	22305	24743	27027
	108	252	560	827	1167	1438	1696	1979	2244	2520	2796	3054
95	165	163	161	159	157	152	151	150	148	145	144	141
30	257	2074	4591	6994	9520	12130	14656	17059	19552	22096	24606	27006
	29	234	519	790	1076	1370	1656	1927	2209	2496	2780	3051
114	193	196	193	191	189	184	183	181	179	177	174	172
35	200	2017	4463	6980	9381	11930	14509	16902	19423	21553	23440	26481
	23	228	504	789	1060	1348	1639	1910	2195	2435	2648	2992
132	225	228	224	222	220	214	214	211	209	206	201	201
40	162	983	3608	6300	8870	11469	14002	16360	18837	21348	23688	2633
	18	111	408	712	1002	1296	1582	1848	2128	2412	2676	2975
151	257	257	249	246	244	243	244	243	241	238	234	232

8870 Torque [lb-in]
1002 Nm
244 Speed RPM

Continuous
Intermittent
Will Operate at Reduced Life

Figure 12 Performance Data 570 cm³/r

630 cm³/r [38.5in³/r]

Flow LPM [GPM]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	35	70	105	140	170	205	240	275	310	345	380
4	1298	2720	5511	8267	10856	13463	16058	18526	20197	22627	24615	
	147	307	623	934	1227	1521	1814	2093	2282	2556	2781	
15	23	23	23	23	22	22	22	22	20	19	18	
8	1323	2759	5575	8366	11105	13856	16585	19204	21913	24227	26797	28856
	149	312	630	945	1255	1565	1874	2170	2476	2737	3028	3260
30	48	47	46	45	44	43	42	42	40	38	36	34
12	1257	2746	5598	8439	11216	13990	16760	19464	22089	24640	27279	29646
	142	310	632	954	1267	1581	1894	2199	2496	2784	3082	3350
45	72	70	68	68	67	67	67	65	65	64	58	56
16	1341	2761	5546	8393	11163	13982	16763	19472	22190	24765	27381	30012
	152	312	627	948	1261	1580	1894	2200	2507	2798	3094	3391
61	96	94	93	92	89	87	86	86	86	83	79	78
20	1278	2430	5394	8569	11073	13942	16996	19352	22151	24867	27488	29825
	144	275	609	968	1251	1575	1920	2186	2503	2810	3106	3370
76	120	118	116	115	112	110	108	108	107	104	103	102
25	1057	2461	5471	8076	11390	14038	16563	19320	21912	24605	27295	29815
	119	278	618	912	1287	1586	1871	2183	2476	2780	3084	3369
95	150	148	146	144	143	138	137	136	134	132	130	128
30	283	2288	5065	7716	10502	13381	16167	18819	21569	24375	27145	29792
	32	258	572	872	1187	1512	1827	2126	2437	2754	3067	3366
114	175	177	175	173	171	167	166	164	163	160	158	156
35	221	2225	4923	7700	10349	13160	16006	18646	21427	23776	25858	29212
	25	251	556	870	1169	1487	1808	2107	2421	2686	2922	3301
132	204	207	203	202	199	194	194	191	190	187	182	182
40	178	1084	3980	6950	9785	12652	15446	18048	20780	23551	26132	29047
	20	122	450	785	1106	1430	1745	2039	2348	2661	2952	3282
151	233	233	226	223	221	221	221	220	219	216	213	210

Continuous
Intermittent
Will Operate at Reduced Life

Figure 13 Performance Data 630 cm³/r

685 cm³/r [41.7 in³/r]

Flow LPM [GPM]

	250 15	500 35	1000 70	1500 105	2000 140	2500 170	3000 205	3500 240	4000 275	4500 310	5000 345	5500 380
4	1406	2947	5969	8954	11758	14582	17392	20066	21875	24507	26661	
	159	333	674	1012	1328	1647	1965	2267	2472	2769	3012	
15	22	22	22	21	20	20	20	20	19	18	17	
8	1433	2989	6038	9062	12028	15007	17964	20800	23734	26241	29025	31254
	162	338	682	1024	1359	1696	2030	2350	2682	2965	3279	3531
30	44	43	43	42	40	40	39	39	37	35	33	31
12	1362	2974	6063	9141	12148	15152	18153	21082	23925	26688	29547	32110
	154	336	685	1033	1373	1712	2051	2382	2703	3015	3338	3628
45	66	65	63	63	61	61	61	60	60	59	54	52
16	1453	2991	6007	9090	12090	15145	18156	21091	24034	26823	29656	32506
	164	338	679	1027	1366	1711	2051	2383	2715	3031	3351	3673
61	88	87	86	85	83	81	80	80	79	77	73	72
20	1384	2632	5842	9281	11994	15100	18408	20960	23992	26934	29773	32304
	156	297	660	1049	1355	1706	2080	2368	2711	3043	3364	3650
76	111	109	107	106	103	102	100	99	99	96	95	94
25	1145	2666	5926	8748	12337	15205	17939	20926	23733	26650	29563	32293
	129	301	670	988	1394	1718	2027	2364	2681	3011	3340	3649
95	138	136	135	133	132	128	126	126	124	122	120	118
30	307	2478	5486	8357	11375	14493	17511	20383	23361	26401	29401	32268
	35	280	620	944	1285	1637	1978	2303	2639	2983	3322	3646
114	162	164	161	160	158	154	153	152	150	148	146	144
35	239	2410	5332	8340	11209	14254	17337	20196	23207	25752	28007	31640
	27	272	602	942	1266	1610	1959	2282	2622	2910	3164	3575
132	188	191	188	186	184	179	179	177	175	172	168	168
40	193	1174	4311	7527	10598	13704	16730	19548	22507	25508	28304	31461
	22	133	487	850	1197	1548	1890	2209	2543	2882	3198	3555
151	215	215	209	206	204	204	204	203	202	199	196	194

10598 / 1197 / 204 } Torque [lb-in] / Nm / Speed RPM

Continuous
Intermittent
Will Operate at Reduced Life

Figure 14 Performance Data 685 cm³/r

785 cm³/r [48.0 in³/r]

Flow LPM [GPM]

	250 15	500 35	1000 70	1500 105	2000 140	2500 170	3000 205	3500 240	4000 275	4500 310	5000 345
4	1618	3392	6871	10306	13535	16784	20020	23097	25180	28210	30689
	183	383	776	1164	1529	1896	2262	2610	2845	3187	3467
15	19	19	19	18	18	18	17	17	16	15	15
8	1649	3440	6950	10431	13845	17275	20678	23942	27320	30205	33410
	186	389	785	1178	1564	1952	2336	2705	3087	3413	3775
30	38	38	37	36	35	35	34	34	32	31	29
12	1568	3423	6979	10522	13984	17441	20895	24267	27540	30720	34011
	177	387	789	1189	1580	1971	2361	2742	3112	3471	3843
45	57	56	55	54	53	53	53	52	52	51	47
16	1672	3443	6914	10464	13917	17433	20899	24277	27665	30876	34137
	189	389	781	1182	1572	1970	2361	2743	3126	3488	3857
61	77	76	75	74	72	70	69	69	69	67	64
20	1593	3030	6725	10683	13805	17382	21190	24127	27617	31003	34271
	180	342	760	1207	1560	1964	2394	2726	3120	3503	3872
76	96	95	93	92	89	88	87	86	86	84	83
25	1318	3069	6821	10069	14201	17502	20649	24087	27319	30677	34030
	149	347	771	1138	1604	1977	2333	2721	3087	3466	3845
95	120	118	117	115	114	111	110	109	107	106	105
30	353	2852	6315	9620	13094	16683	20157	23463	26891	30390	33843
	40	322	713	1087	1479	1885	2277	2651	3038	3434	3824
114	141	142	140	139	137	134	133	132	130	129	127
35	275	2774	6138	9600	12903	16408	19956	23247	26714	29643	32238
	31	313	693	1085	1458	1854	2255	2627	3018	3349	3642
132	163	166	163	162	160	156	155	154	152	150	146
40	222	1351	4962	8665	12200	15774	19257	22501	25908	29362	32580
	25	153	561	979	1378	1782	2176	2542	2927	3317	3681
151	187	187	181	179	177	177	177	177	175	173	170

Continuous
Intermittent
Will Operate at Reduced Life

Figure 15 Performance Data 785 cm³/r

940 cm³/r [57.4 in³/r]

Flow LPM [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000
	15	35	70	105	140	170	205	240	275
4	1935	4056	8216	12325	16185	20071	23940	27620	30111
	219	458	928	1393	1829	2268	2705	3121	3402
15	16	16	16	15	15	15	14	14	14
8	1972	4114	8311	12473	16557	20658	24727	28631	32670
	223	465	939	1409	1871	2334	2794	3235	3691
30	32	31	31	30	29	29	28	28	27
12	1875	4094	8346	12582	16722	20857	24987	29019	32933
	212	463	943	1422	1889	2357	2823	3279	3721
45	48	47	46	45	45	45	45	44	43
16	2000	4117	8268	12513	16642	20846	24992	29032	33083
	226	465	934	1414	1880	2355	2824	3280	3738
61	64	63	62	62	60	59	58	58	57
20	1905	3623	8042	12776	16509	20786	25339	28851	33025
	215	409	909	1443	1865	2348	2863	3260	3731
76	80	79	78	77	75	74	73	72	72
25	1576	3670	8157	12041	16982	20929	24693	28804	32669
	178	415	922	1360	1919	2365	2790	3254	3691
95	100	99	98	96	96	93	92	91	90
30	423	3411	7551	11504	15658	19950	24104	28057	32157
	48	385	853	1300	1769	2254	2723	3170	3633
114	118	119	117	116	115	112	111	110	109
35	329	3317	7340	11480	15429	19621	23864	27799	31945
	37	375	829	1297	1743	2217	2696	3141	3609
132	137	139	136	135	133	130	130	128	127
40	266	1616	5934	10361	14589	18863	23029	26907	30982
	30	183	670	1171	1648	2131	2602	3040	3500
151	156	156	152	149	148	148	148	148	147

5934 670 152 } Torque [lb-in] Nm Speed RPM

Continuous

Intermittent

Will Operate at Reduced Life

Figure 16 Performance Data 940 cm³/r

Dimensions

1–1/16-12 UN-2B SAE O-ring Ports (2)

9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

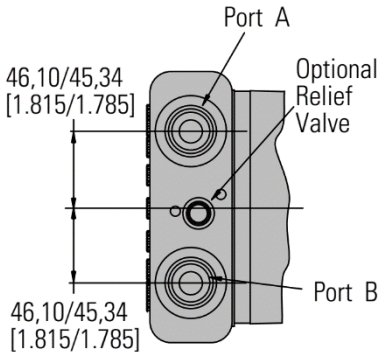


Figure 17 Ports

Standard Motors (SAE)

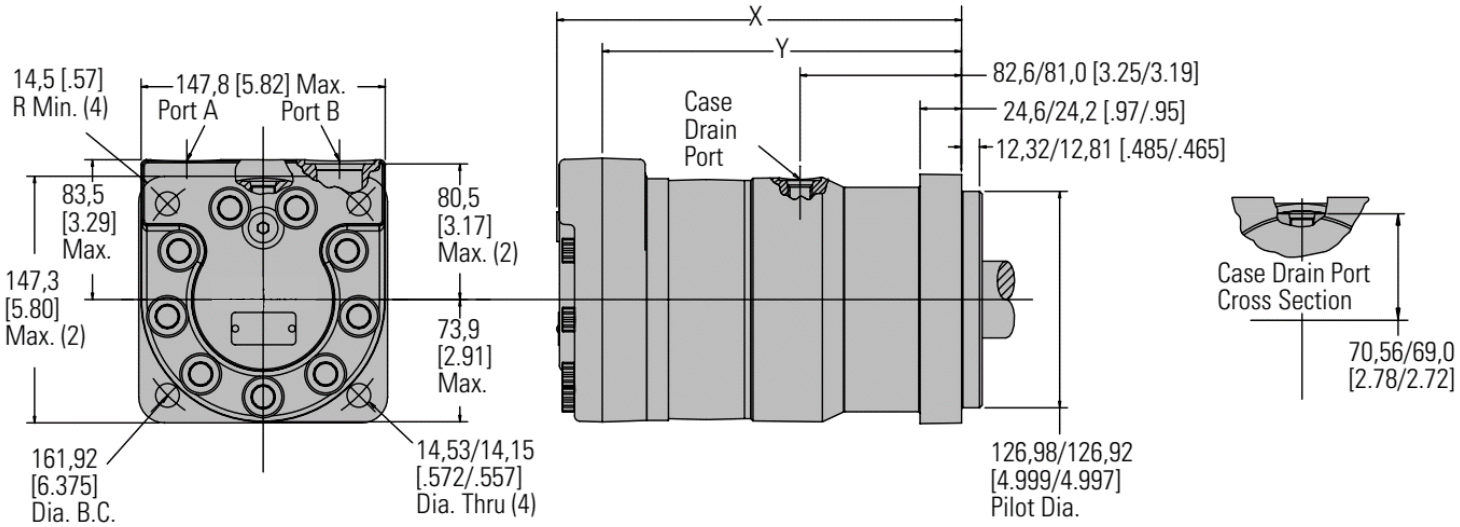


Figure 18 Standard Motors (SAE)

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X	223.5	230.4	239.3	245.4	250.7	255.3	264.7	278.4
mm [in]	*8.80*	*9.07*	*9.42*	*9.66*	*9.87*	*10.05*	*10.42*	*10.96*
Y	195.3	201.9	211.1	217.2	222.5	227.1	263.2	249.9
mm [in]	*7.69*	*7.95*	*8.31*	*8.55*	*8.76*	*8.94*	*9.30*	*9.84*

Table 2 Standard Motors (SAE) dimensions

Wheel Motors (SAE)

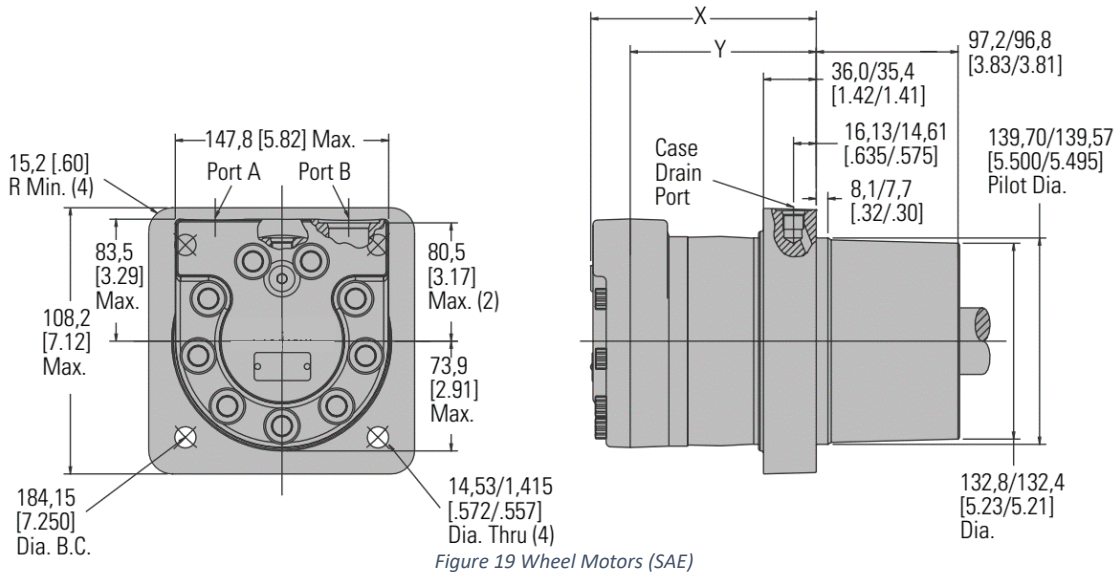


Figure 19 Wheel Motors (SAE)

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X	138.7	145.5	154.4	160.5	165.9	170.4	179.8	193.5
mm [in]	*5.46*	*5.73*	*6.08*	*6.32*	*6.53*	*6.71*	*7.08*	*7.62*
Y	110.5	117.1	126.2	132.3	137.7	142.2	151.4	165.1
mm [in]	*4.35*	*4.61*	*4.97*	*5.21*	*5.42*	*5.60*	*5.96*	*6.50*

Table 3 Wheel Motors (SAE) dimensions

Oversize motor

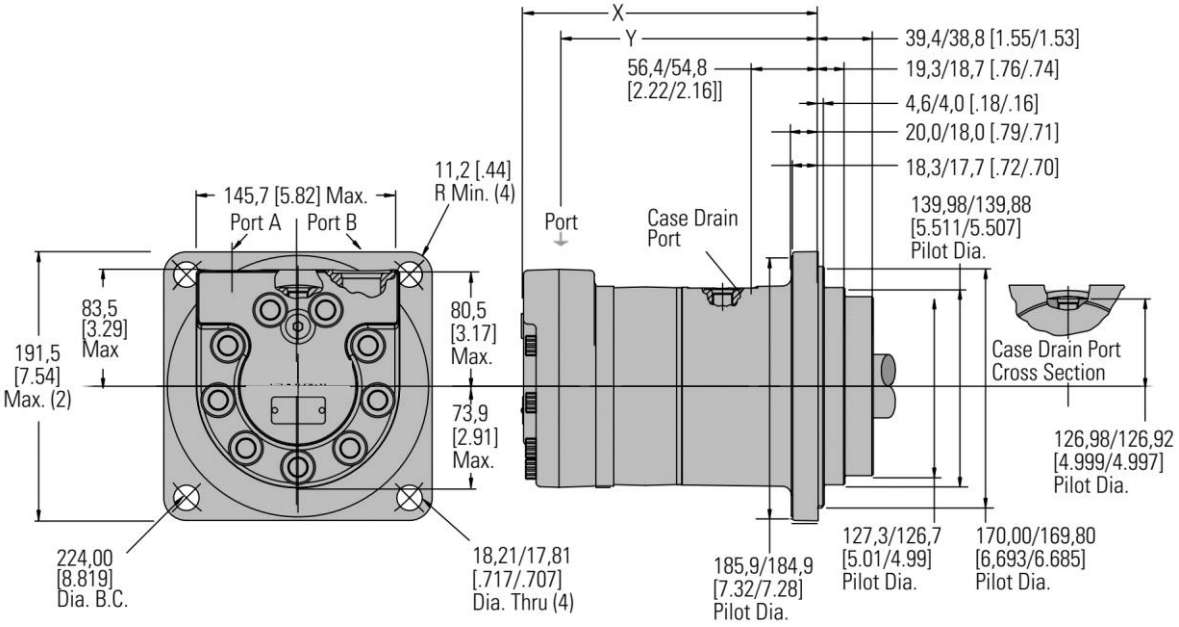


Figure 20 Standard Motors (Oversize)

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	196.6 *[7.74]*	203. *[8.00]*	181.4 *[8.36]*	187.4 *[8.60]*	192.5 *[8.81]*	197.6 *[8.99]*	206.8 *[9.35]*	220.5 *[9.89]*
Y *mm [in]*	168.1 *[6.62]*	175.0 *[6.89]*	183.9 *[7.24]*	190.2 *[7.49]*	195.3 *[7.69]*	199.9 *[7.87]*	209.3 *[8.24]*	223.0 *[8.78]*

Table 4 Standard Motors Oversize (SAE) dimensions

Standard and Wheel Mount – ISO

Ports

G 3/4 (BSP) O-ring Ports (2)

G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW Port

B Pressurized — CCW

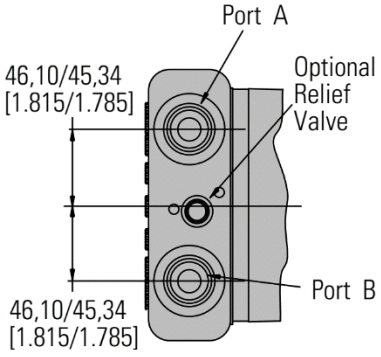


Figure 21 Ports

Standard Motors – ISO

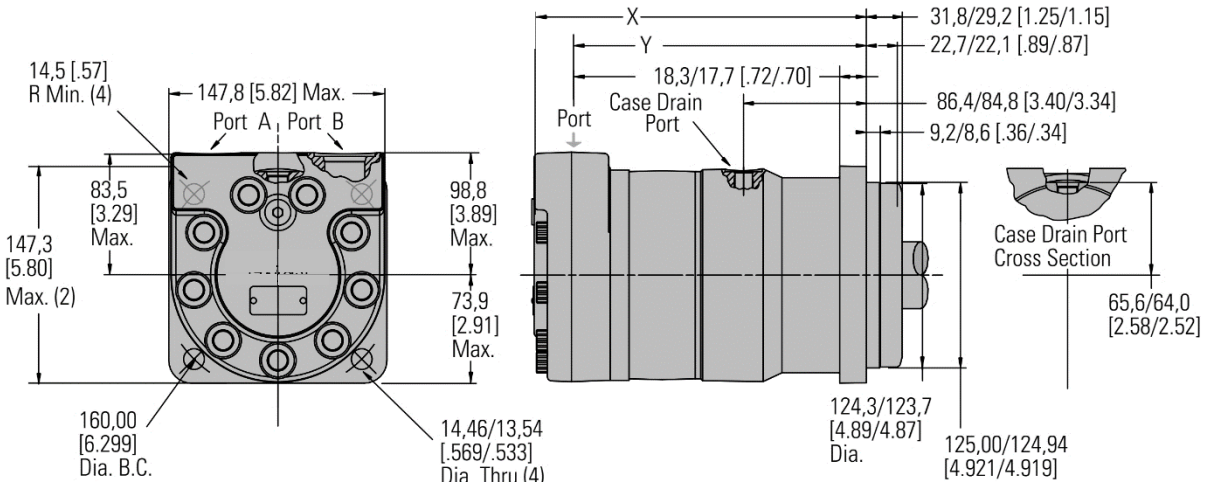


Figure 22 Standard Motors – ISO

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	211.6 *[8.33]*	218.2 *[8.59]*	227.3 *[8.95]*	233.4 *[9.19]*	238.8 *[9.40]*	243.3 *[9.58]*	252.5 *[9.94]*	266.2 *[10.48]*
Y *mm [in]*	183.1 *[7.21]*	190.0 *[7.48]*	198.9 *[7.83]*	205.2 *[8.08]*	210.3 *[8.28]*	214.9 *[8.46]*	224.3 *[8.83]*	238.0 *[9.37]*

Table 5 Standard Motors- ISO dimensions

Wheel Motors – ISO

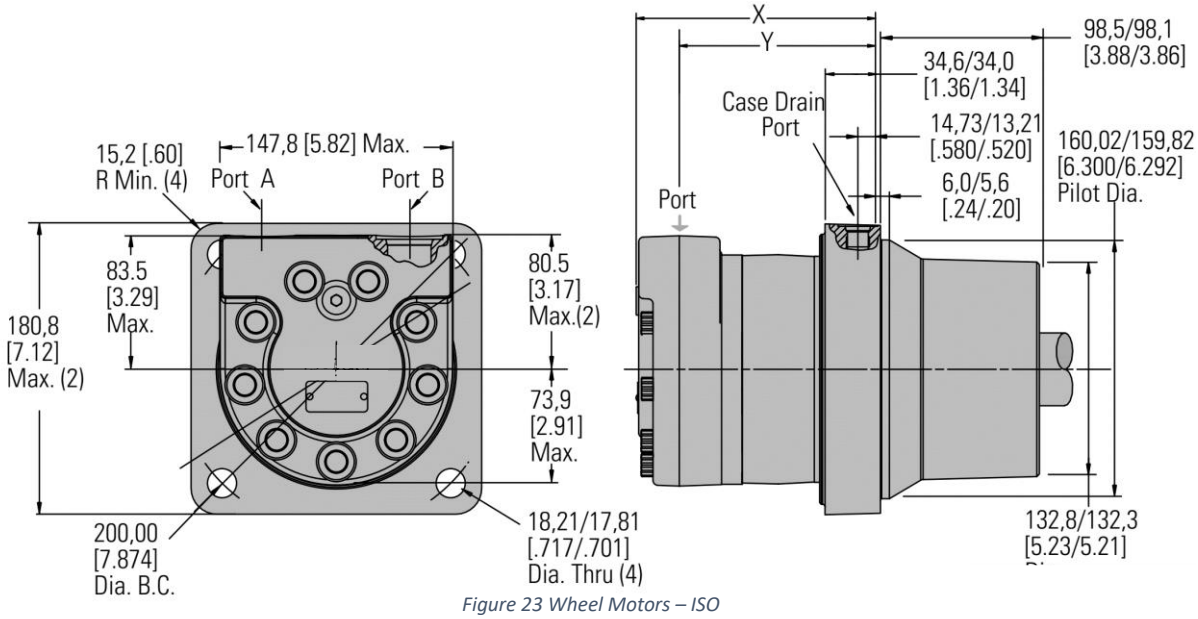


Figure 23 Wheel Motors – ISO

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	137.4 *5.41*	144.0 *5.67*	153.2 *6.03*	159.3 *6.27*	164.6 *6.48*	169.2 *6.66*	178.3 *7.02*	192.0 *7.56*
Y *mm [in]*	109.0 *4.29*	115.8 *4.56*	124.7 *4.91*	131.1 *5.16*	136.1 *5.36*	140.7 *5.54*	150.1 *5.91*	163.8 *6.45*

Table 6 Wheel Motors- ISO dimensions

Bearingless

Ports

1-1/16-12 UN-2B SAE O-ring Ports (2)

9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

Or

G 3/4 (BSP) O-ring Ports (2)

G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Drive End

Port A Pressurized — CW

Port B Pressurized — CCW

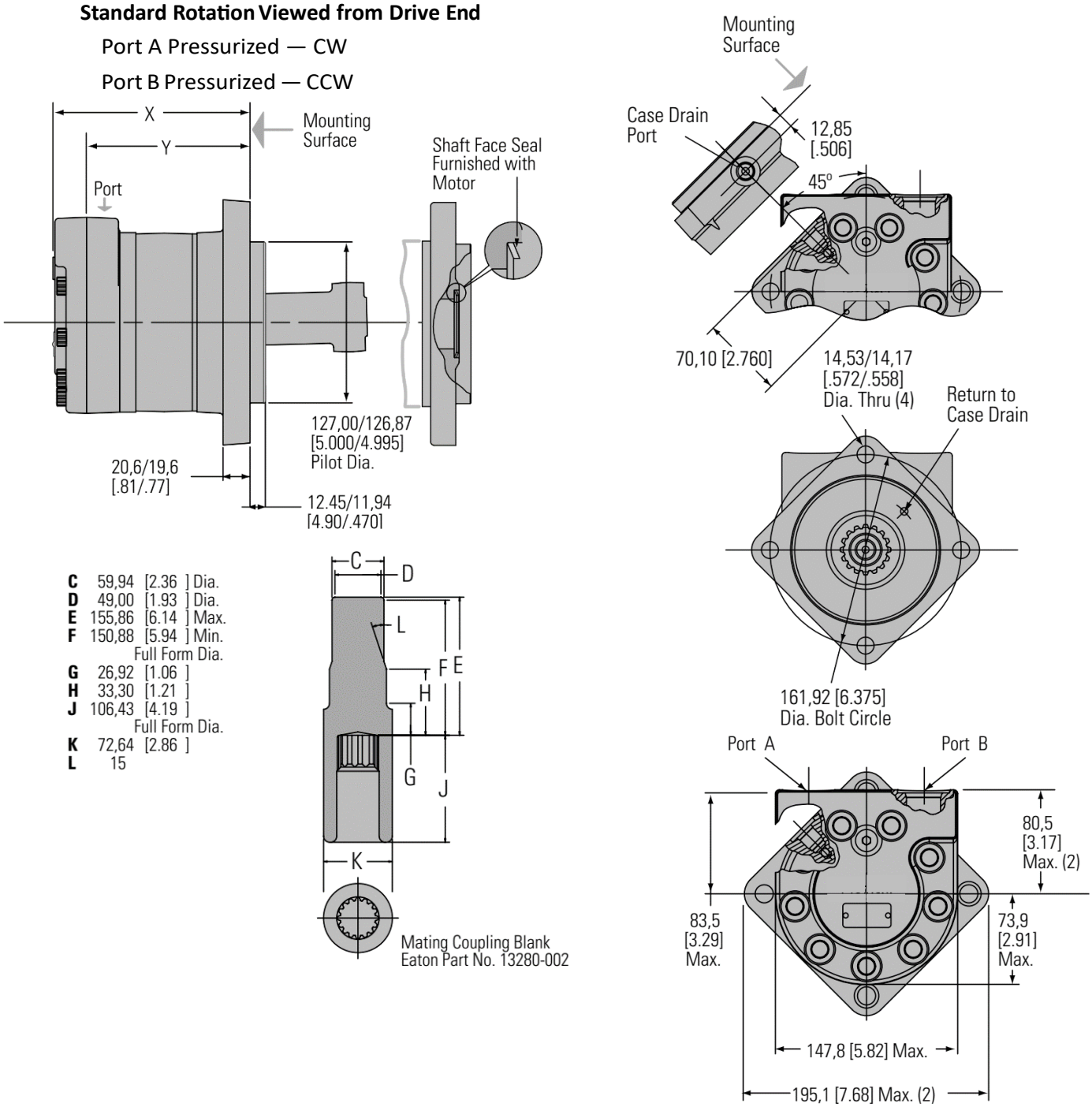


Figure 24 Bearingless Motors -ISO

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	141.2 *[5.56]*	148.1 *[5.83]*	157.2 *[6.19]*	163.3 *[6.43]*	168.4 *[6.63]*	173.2 *[6.82]*	182.2 *[7.18]*	196.1 *[7.72]*
Y *mm [in]*	113.3 *[4.46]*	120.1 *[4.73]*	129.0 *[5.08]*	135.1 *[5.32]*	140.5 *[5.53]*	145.3 *[5.72]*	154.4 *[6.08]*	168.1 *[6.62]*

Table 7 Bearingless Motors- ISO dimensions

Installation Information

1. Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 -1,27 [.030 -.050]. Dimensions apply **after heat treat.**
2. Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
3. Seal to be furnished with motor for proper oil circulation thru splines.
4. Similar to SAE “C” Four Bolt Flange.

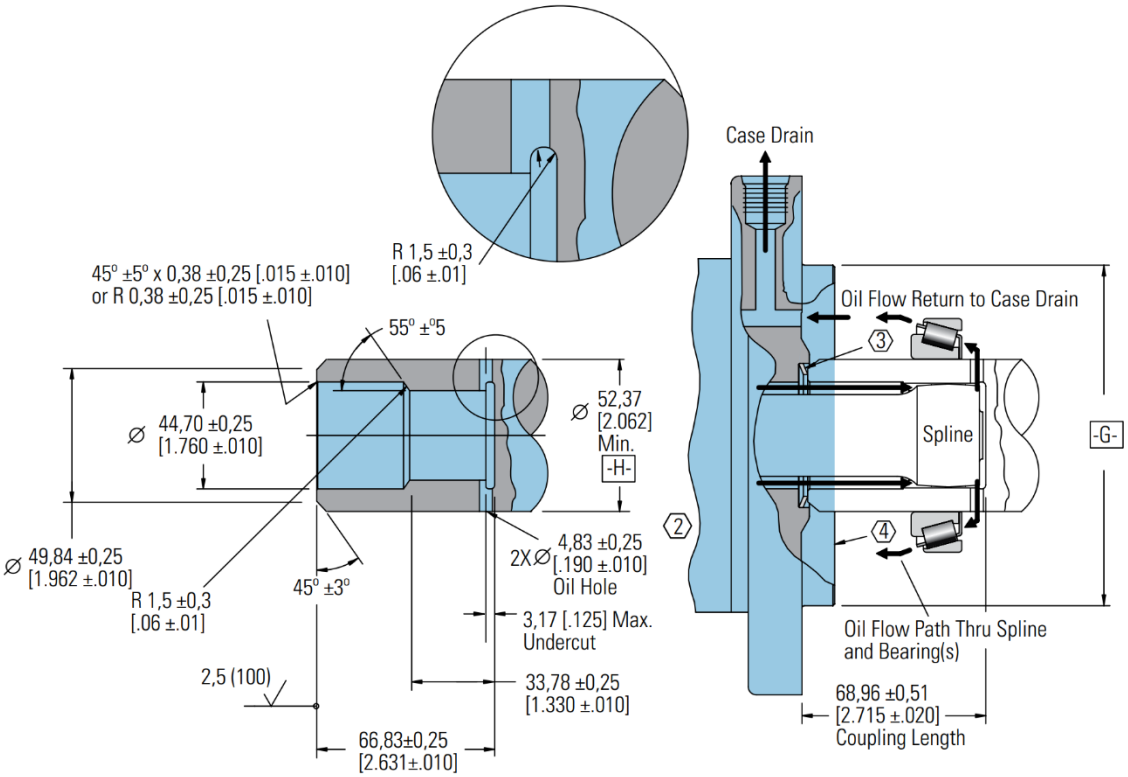
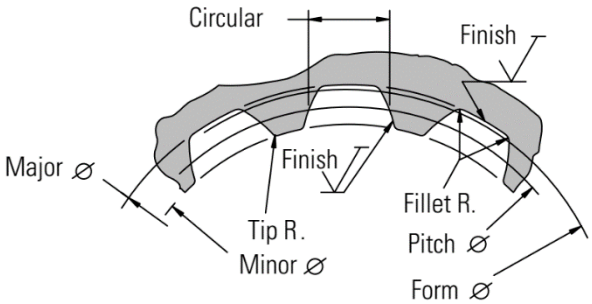


Figure 25 Bearingless motor installation

Spline Pitch 10/20
Pressure Angle ..... 30°
Number of teeth 16
Class of Fit ..... Ref. 5
Type of Fit ..... Side
Pitch Diameter ..... Ref. 40,640000 [1.6000000] ⌀0,20 [.008] | H
Base Diameter ..... Ref. 35,195272 [1.3856406]
Major Diameter ..... 43,56 [1.715] Max. 43,18 [1.700]
Min. Minor Diameter ..... 36,83 -37,08 [1.450 -1.460]
Form Diameter, Min. ..... 42.47 [1.672]
Fillet Radius ..... 0,64 -0,76 [.025 -.030]
Tip Radius ..... 0,25 -0,51 [.010 -.020]
Finish 1,6 (63)
Involute Profile Variation ..... +0,000 -0,025 [+.0000 -.0010]
Total Index Variation ..... 0,040 [.0016]
Lead Variation ..... 0,013 [.0005]
Circular Space Width:
- Maximum Actual ..... 4.105 [.1616]
- Minimum Effective ..... 3,995 [.1573]
- Maximum Effective ..... Ref. 4,056 [.1597]
- Minimum Actual ..... Ref. 4,081 [.1582]

Dimension Between Two Pins ..... Ref. 34,272 -34,450 [1.3493 -1.3563]
Pin Diameter ..... 4,389 [.1728]



Dimensions shafts

SAE

40 mm Straight

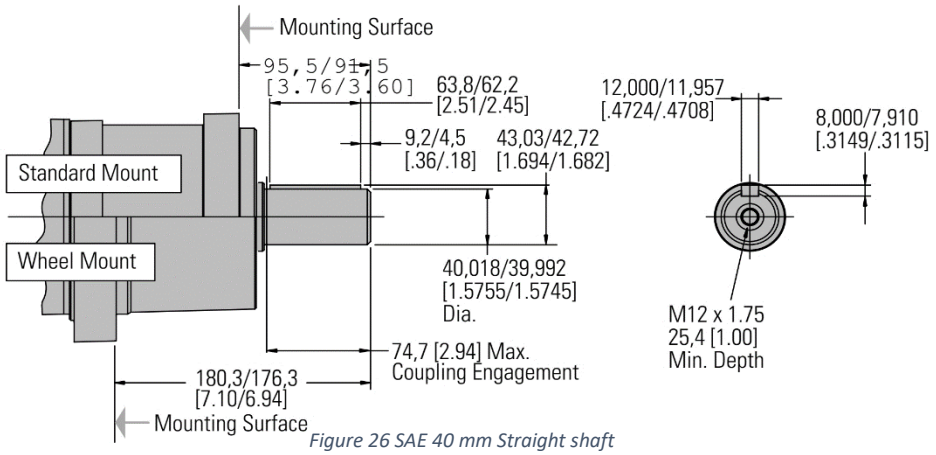


Figure 26 SAE 40 mm Straight shaft

Note:

For motor torque ratings above 875 Nm [7750 lb - in] use split coupler.

1-1/2 Inch
17 Tooth Splined

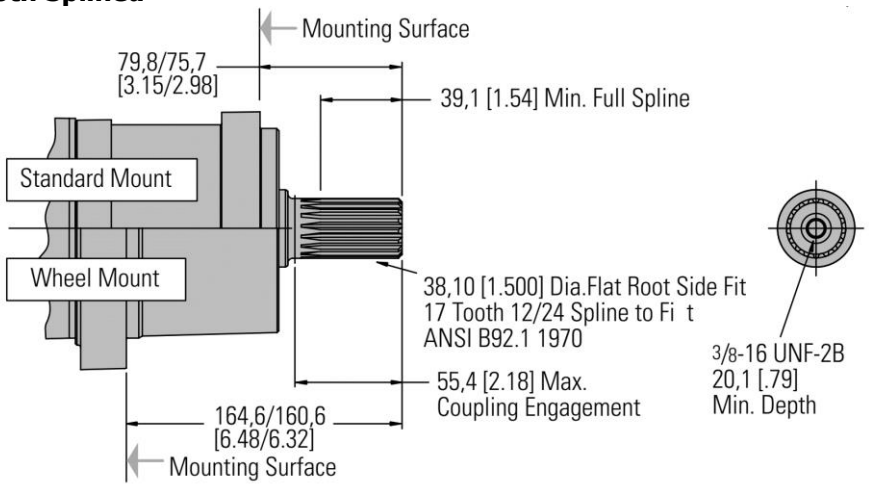


Figure 27 SAE 1-1/2 Inch shaft

1-3/4 Inch Tapered

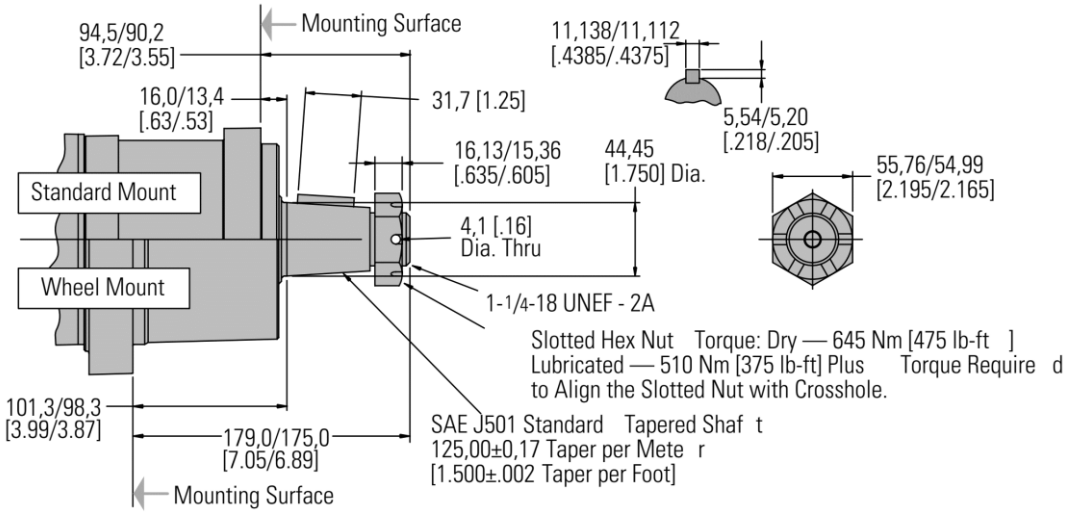


Figure 28 1-3/4 Inch Tapered

Oversize flange

40mm Straight

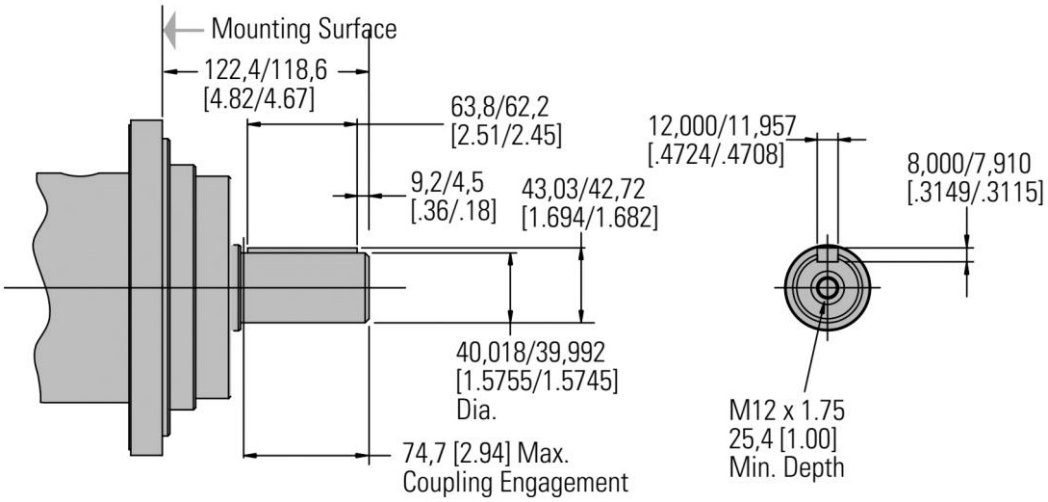


Figure 29 Oversize flange Straight 40 mm shaft

Note:

For motor torque ratings above 875 Nm [7750 lb - in] use split coupler.

46mm
28 Tooth Splined

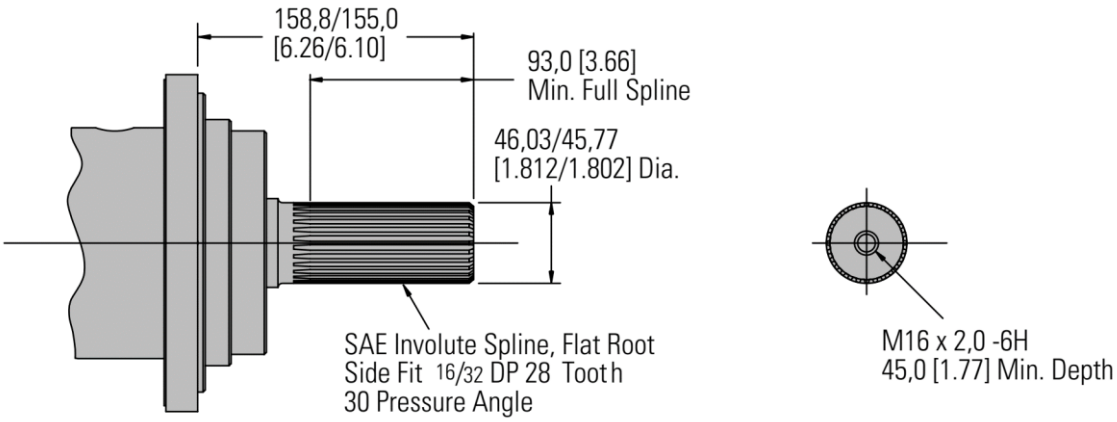


Figure 30 Oversize flange 46mm

1-3/4 Inch Tapered

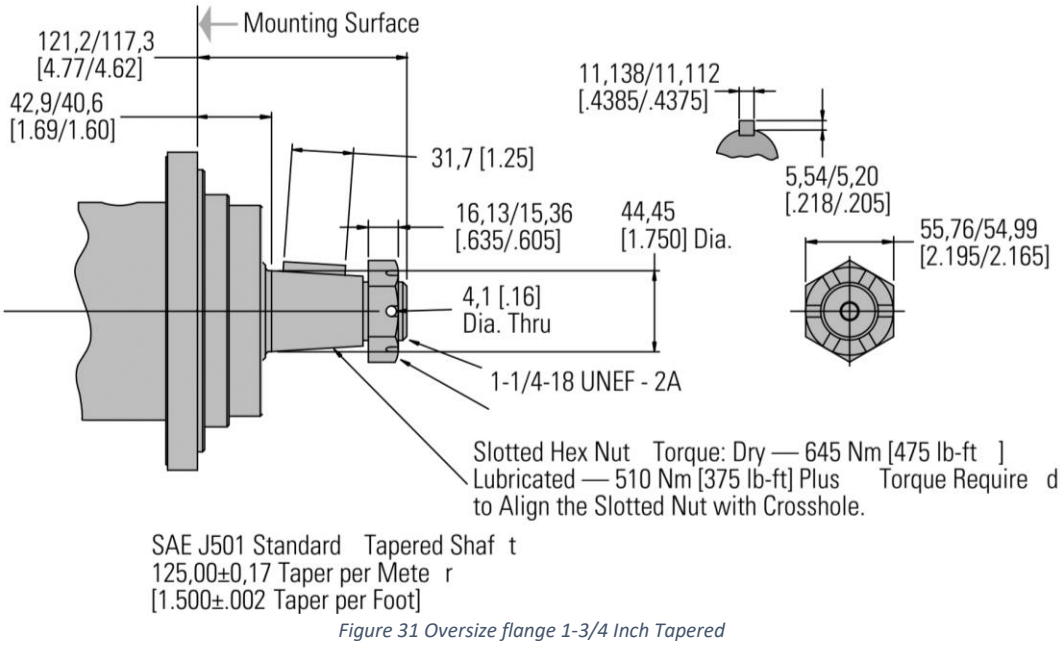


Figure 31 Oversize flange 1-3/4 Inch Tapered

ISO

40mm Straight

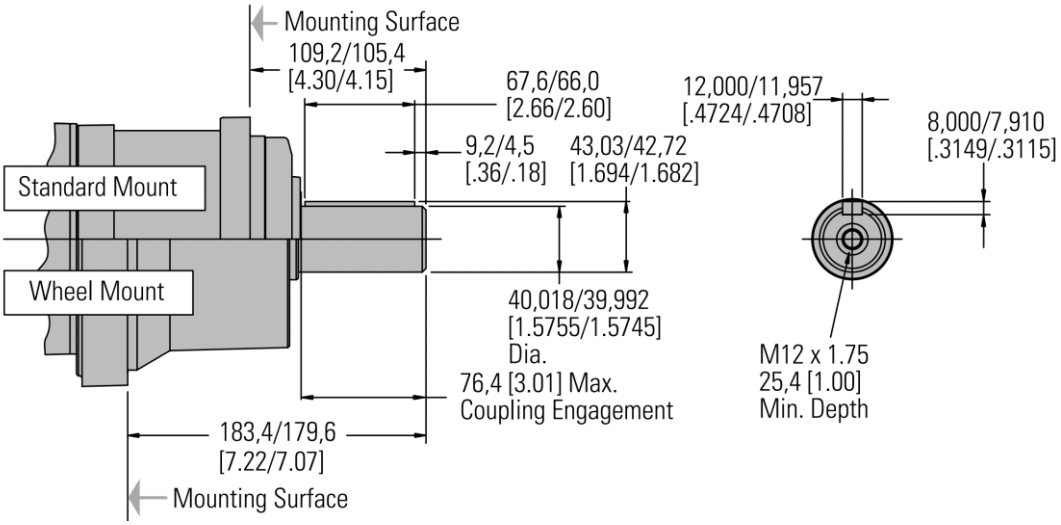


Figure 32 ISO 40mm Straight

38.1 mm [1-1/2 inch]
17 Tooth Splined

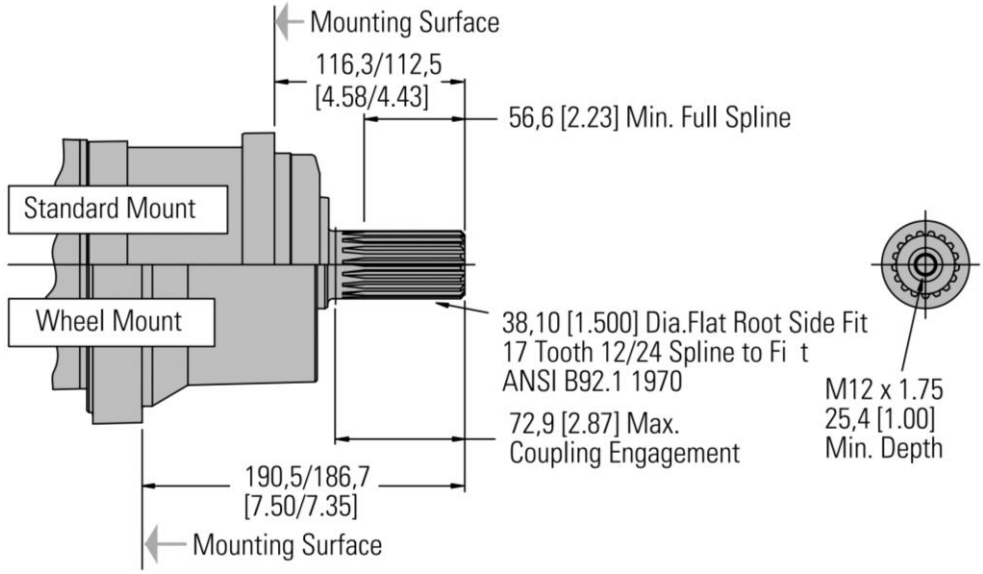


Figure 33 ISO 38.1 mm [1-1/2 inch] shaft

45mm Tapered

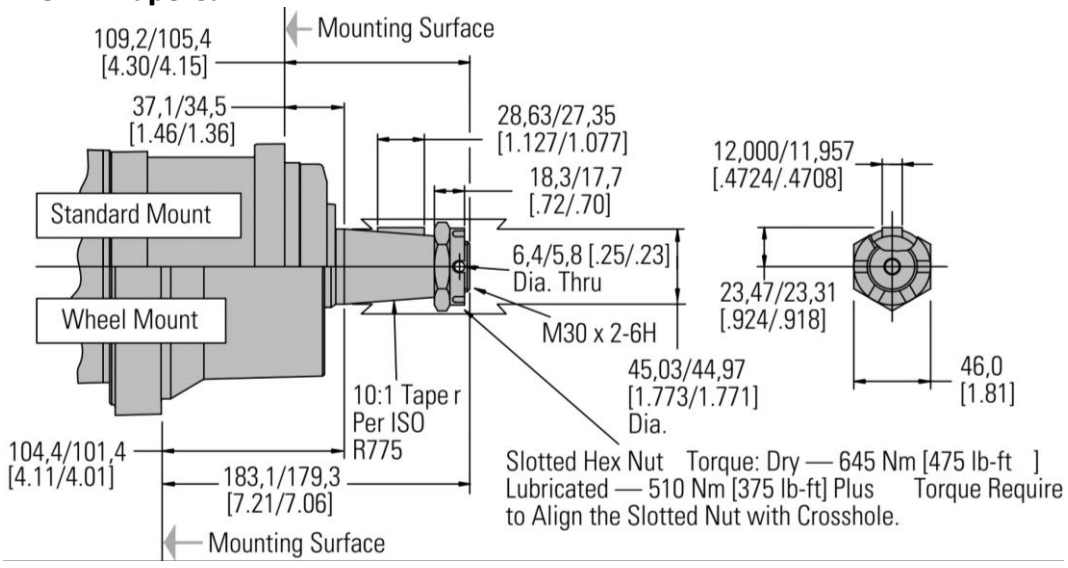


Figure 34 ISO 45mm Tapered shaft

Side Load Capacity

These curves indicate the radial load capacity on the motor shaft(s) at various locations.
The curve is based on B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.
To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

Standard Mount

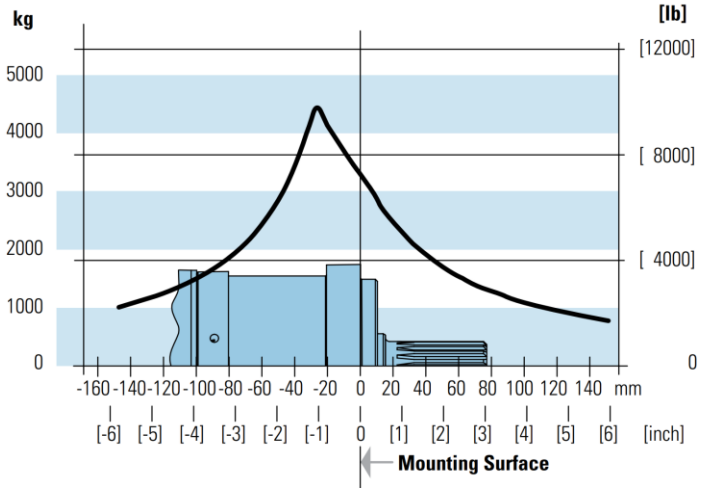


Figure 35 Side Load Capacity Standard Mount

Wheel Mount

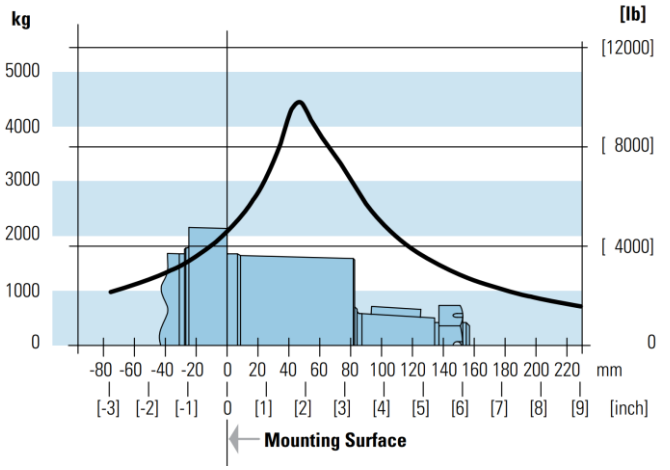


Figure 36 Side Load Capacity Wheel Mount

Oversize Flange

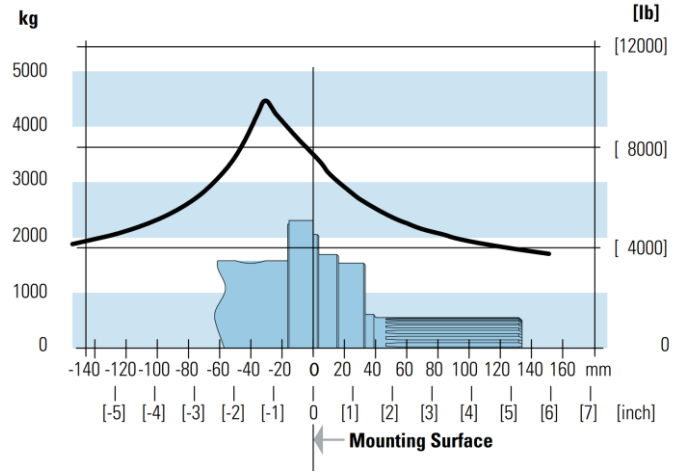


Figure 37 Side Load Capacity Oversize flange

ISO

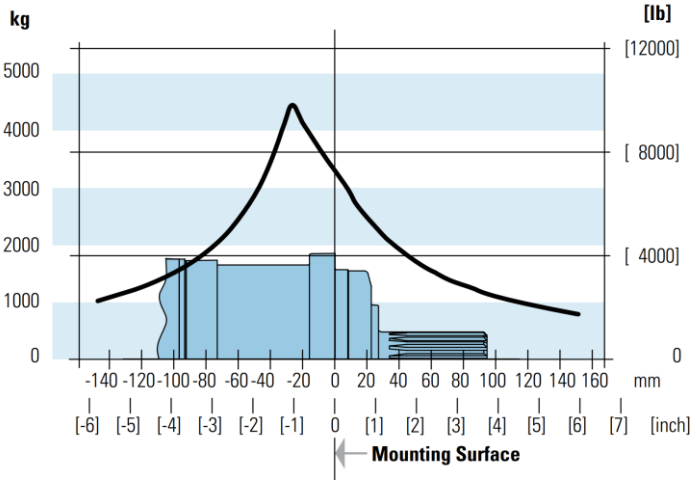


Figure 38 Side Load Capacity ISO Mount

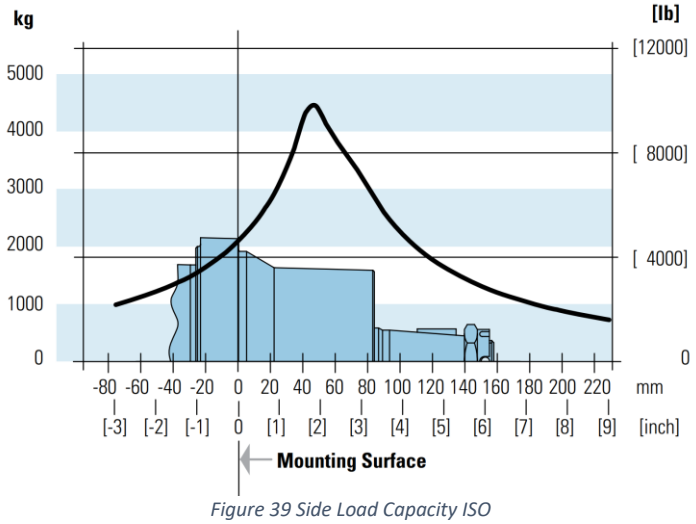


Figure 39 Side Load Capacity ISO

RPM	Multiplication 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	0.54

Table 8 Multiplication factor

For 3,000,000 shaft revolutions or 500 hours — Increase these shaft loads 52%.

Product numbers

Use digit prefix —168-, 177-, or 180- plus four digit number from charts for complete product number— Example: 168-0018.
Orders will not be accepted without three digit prefix.

Closed loop

Product Number									
Mounting	Shaft	Port Size	Displacement						
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
SAE										
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0220	-0218	-0032	-0022	-0033	-0034	-0035	-0036
	1 1/2 inch 17 Tooth Splined		177-0221	-	-0024	-0026	-0037	-0038	-0039	-0040
	1 3/4 inch Tapered		-	-	-0041	-0042	-0043	-0044	-0045	-0046
Wheel	40 mm Straight		-	-	-0007	-0008	-0009	-0010	-0011	-0012
	1 1/2 inch 17 Tooth Splined		-	-	-0013	-0014	-0015	-0016	-0017	-0018
	1 ¾ inch Tapered		-	180-0088	-0019	-0020	-0021	-0022	-0023	-0024
Bearingless			-	-	-0015	-0016	-0017	-0018	-0019	-0020
Oversize										
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	-	-	177-0047	-0048	-	-	-	-
	45mm Tapered		-	-	177-0053	-0054	-	-	-	-
	1 ½ inch 17 Tooth Splined		-	-	177-0059	-0060	-	-	-	-
ISO										
Standard	40 mm Straight	G ¾ (BSP) (2) G ¼ (BSP) Drain Port (1)	-	-	-0065	-0066	-0067	-0068	-0069	-0070
	45mm Tapered		177-0223	-0224	-0071	-0072	-0073	-0074	-0075	-0076
	1 ½ inch 17 Tooth Splined		-	-	-0077	-0078	-0079	-0080	-0081	-0082
Wheel	40 mm Straight		-	-	-0025	-0026	-0027	-0028	-0029	-0030
	45mm Tapered		-	-	-0031	-0032	-0033	-0034	-0035	-0036
	1 ½ inch 17 Tooth Splined		-	-	-0037	-0038	-0039	-0040	-0041	-0042
Bearingless				-	-0021	-0022	-0023	-0024	-0025	-0026

Figure 40 Closed loop product numbers

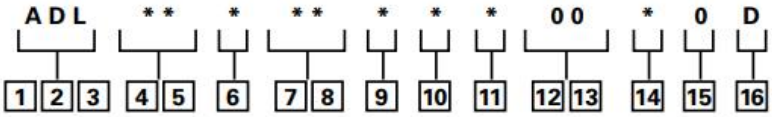
Note:

The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

- *A case drain is required for all closed loop VIS motor applications.*
- *The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].*

Model Code

The following 16 - digit coding system has been developed to identify all of the configuration options for the VIS 40 motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1, 2, 3 Product Series
ADL – VIS 40 Motor

4, 5 Displacement cm³/r [in³/r]
20 – 325 [19.8]
24 – 400 [24.4]
31 – 505 [30.7]
35 – 570 [34.9]
38 – 630 [38.5]
42 – 685 [41.7]
48 – 785 [48.0]
57 – 940 [57.4]

6 Mounting Type
A – 4 Bolt Bearingless 127,00 [5.000] Pilot Dia. with 12,19 [.480] Pilot Length and 14,35 [.565] Dia holes on 161,92 [6.375] Dia. Bolt Circle

B – 4 Bolt Wheel Mount 160,00 [6.3] Pilot Dia. With 5,8 [.23] Pilot Length and 18,00 [.709] Dia. Holes on 200,00 [7.874] Dia. Bolt Circle (ISO Compatible)

C – 4 Bolt Oversize Flange 185,4 [7.30] Rear Pilot Dia., 169,90 [6.689], 139,93 [5.509], 127,0 [5.00] Dia (Front Pilots) and 18,01 [.709] Dia. Holes on 224,00 [8.819] Dia. Bolt Circle

F – 4 Bolt Standard Mount (SAE CC) 127,00 [5.000] Pilot Dia. With 12,2 [.48] Pilot Length and 14,32 [.564] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle

G – 4 Bolt Wheel Mount 139,7 [5.50] Pilot Dia. with 7,9 [.31] Pilot Length and 14,32 [.564] Dia. Holes on 184,15 [7.250] Dia. Bolt Circle (SAE Compatible)

H – 4 Bolt Standard Mount 125,00 [4.92] Pilot Dia. with 8,9 [.35] Pilot Length and 14,00 [.551] Dia. Holes on 160,00 [6.299] Dia. Bolt Circle (ISO Compatible)

M – Standard, 4 Bolt: 169,75 [6.683] Pilot Dia. with 4,3 [.17] Pilot Length and M16 X 2 -6H Threaded Holes on 224,00 [8.819] Dia. Bolt Circle (To be selected for Brake Option)

7, 8 Output Shaft
00 – None (Bearingless)

01 – 45 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M30 x 2- 6H Threaded Shaft End, 12W x 8H X 28L [.472W x .313H x 1.102L] Key

02 – 1-3/4 inch Dia. .125:1 Tapered Shaft Per SAE J 501 with 1 1/4 - 18 UNEF - 2A Threaded Shaft End, 11,11 [.4375] Square x 31,8 [1.25] Straight Key

04 – 46 mm Dia. Flat Root Side Fit, 28 Tooth, 16/32 DP 30 Degree Involute Spline, 93,0 [3.66] Minimum Full Spline with M16 X 2,0-6H Thread in End

07 – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 63L [.472W x .313H x 2.480L] Key (SAE Compatible)

08 – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 39,1 [1.54] Minimum Full Spline with 3/8-16 UNC - 2B Thread in End (SAE Compatible)

09 – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 56,6 [2.23] Minimum Full Spline with M12 x 1.75 - 6H Thread in End (ISO Compatible)

10 – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 67L [.472W x .313H x 2.630L] Key (ISO Compatible)

9 Ports
A – 1-1/16-12 UN-2B Size 12 O-ring Port, Accepts Fittings for SAE J1926

B – G 3/4 (BSP) Straight Thread Port

10 Case Flow Options
A – Shuttle Valve with 9/16-18 UNF-2B, Size 6 O-ring Port Case Drain, Accepts Fittings for SAE J1926

B – Shuttle Valve with G 1/4 (BSP) Straight Thread Port Case Drain

C – Check valve with leakage orifice, no case drain (for Open Loop only)

11 Back-Pressure Relief
0 – None (for Open Loop Only)

1 – Set at 4,5 bar [65 PSI] (for Manual Pumps)

2 – Set at 15,2 bar [220 PSI] (for Servo Pumps)

4 – Set at 15,2 bar [300 PSI] (for high charge Servo Pumps)

12, 13 Special Features
00 – None

08 – Spring Applied Hydraulic Release Wet Brake with Brake Capacity of 20,000 lbf-in Static and 150 lbf/in² release pressure

14 Paint/ Special Packaging
0 – Primer, Individual Box

A – Low Gloss Black Primer, Individual Box

B – No Paint, Bulk Box Option

C – Low Gloss Black Primer, Bulk Box Option

15 Assigned Code when Applicable
0 – Assigned Code

16 Assigned Design Code
D – Assigned Design Code

Chapter 3
VIS 40 Series Two-speed

Topics:

- *Specifications*
- *Performance Data*
- *Dimensions*
- *Product numbers*
- *Model Code*

Specifications

VIS 40 Series motors are available with an integral two-speed feature that allows the operator to shift the motor between low speed high torque (LSHT) mode and high speed low torque (HSLT) mode.

In the LSHT mode, output torque and rotation speed values are equal to those of the conventional VIS 40 motor. In the HSLT mode motor displacement is reduced by one third, resulting in a fifty percent increase in rotation speed and a torque output reduction of one third.

The VIS 40 two-speed motor is bidirectional. It will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes. Shift on the fly technology allows full-power operation throughout the full duration of the shift.

Changing between modes is accomplished by changing the displacement in a ratio of 1 to 1.5. An external two-position three-way control valve is required for shifting pressure to the pilot port between low pressure (LSHT mode) and pilot signal pressure (HSLT mode).

An integral selector valve shifts the motor from LSHT mode to HSLT mode. Initially, low pressure is supplied to the pilot port. The selector valve is biased to LSHT mode by a return spring. When pilot signal pressure is supplied to the pilot port and 3,5 Δbar [50 PSI] is reached, the selector valve overcomes return spring force and the shifts the spool to select HSLT mode.

Oil on the opposite side of the spool is drained to tank via the drain port. The pressure difference between the pilot port and drain port must be maintained to keep the motor in the high speed mode. When pilot pressure is removed from the pilot port, the pressure in the pilot end of the spool valve is relieved and drained back through the control valve and the return spring forces the spool valve to LSHT position.

Pilot pressure may come from any source that will provide uninterrupted pressure during the high-speed mode operation. Allowable pilot pressure must be at least 3,5 Δbar [50 PSI] and may be as high as full operating pressure of the motor.

All VIS 40 Series two-speed motors are equipped with a return line shuttle for closed circuit applications as standard equipment. All options available on the conventional VIS 40 are also available on VIS 40 two-speed motors.

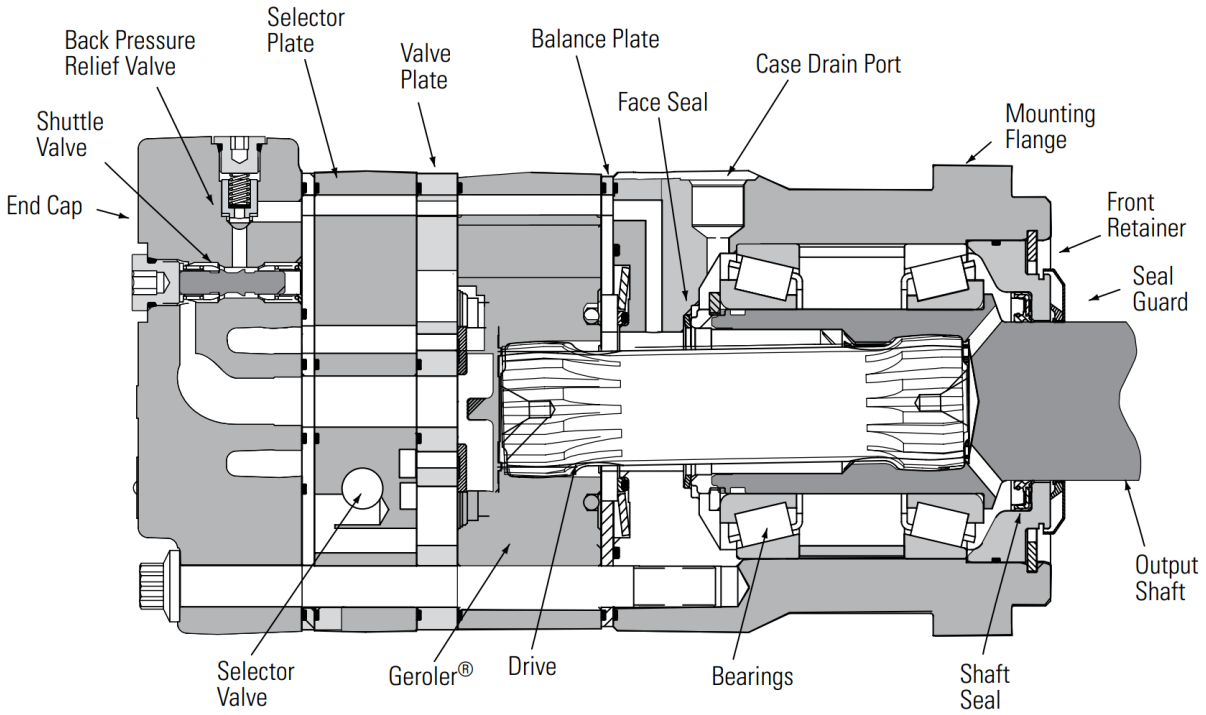


Figure 41 VIS 40 Two-speed

Performance Data

In the LSHT mode, torque and speed values are equal to those of the conventional VIS 40 motor. In the HSLT mode, rotation speed is increased by fifty percent and torque output is reduced by one third. The VIS 40 two-speed motor will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes.

Dimensions

Ports

1–1/16-12 UN-2B SAE O-ring Ports (2)

9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

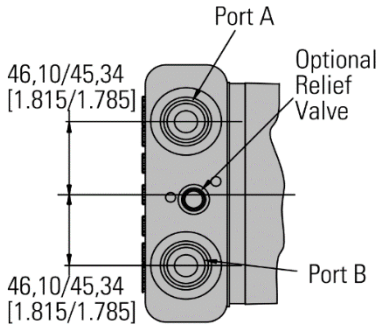


Figure 42 Two-speed Ports

Standard Motors (SAE)

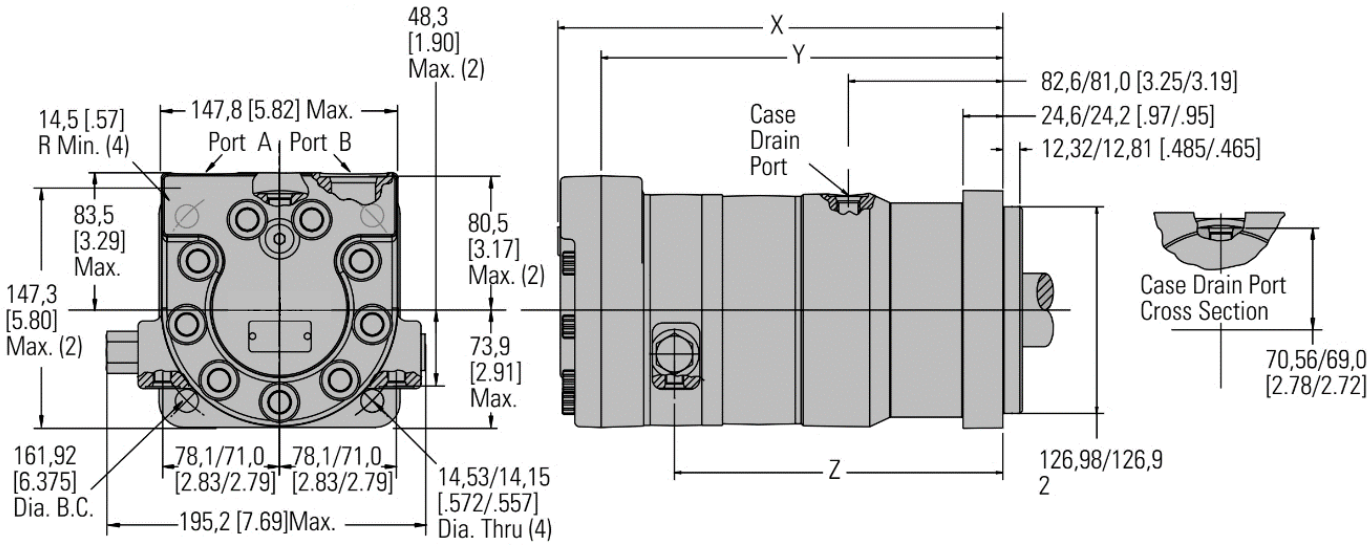


Figure 43 Two-speed Standard Motors (SAE)

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	259.3 *[10.21]*	265.9 *[10.47]*	275.1 *[10.83]*	281.2 *[11.07]*	286.3 *[11.27]*	290.8 *[11.45]*	300.2 *[11.82]*	313.9 *[12.36]*
Y *mm [in]*	231.4 *[9.11]*	238.0 *[9.37]*	246.9 *[9.72]*	253.0 *[9.96]*	258.3 *[10.17]*	262.9 *[10.35]*	272.3 *[10.72]*	286.0 *[11.26]*
Z *mm [in]*	186.2 *[7.33]*	193.0 *[7.60]*	201.7 *[7.94]*	208.0 *[8.19]*	213.4 *[8.40]*	217.7 *[8.57]*	227.3 *[8.95]*	241.0 *[9.49]*

Table 9 Two – speed Motors (SAE) dimensions

Wheel Motors (SAE)

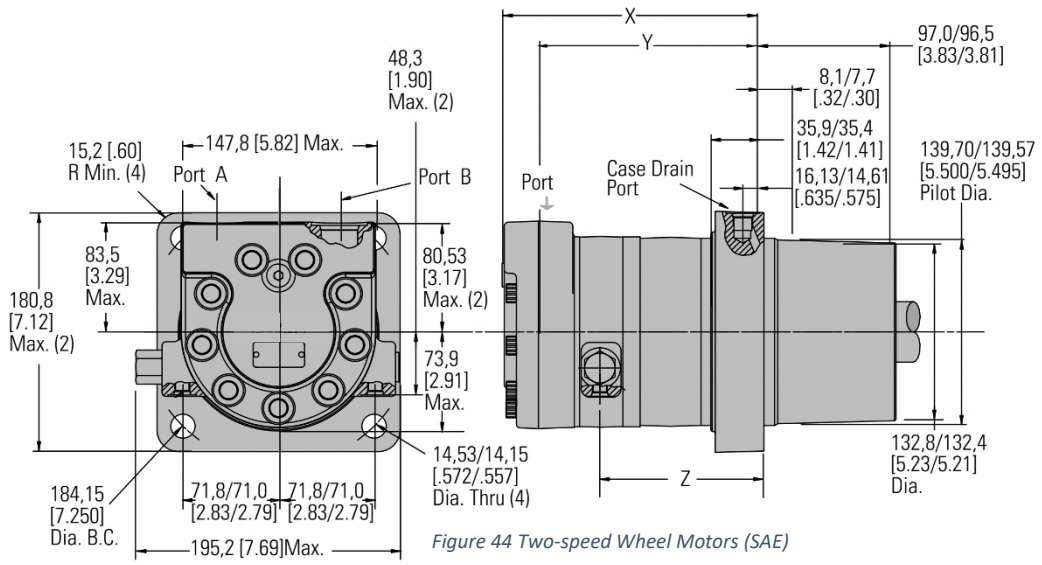


Figure 44 Two-speed Wheel Motors (SAE)

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	174.5 *[6.87]*	181.1 *[7.13]*	190.2 *[7.49]*	196.3 *[7.73]*	201.4 *[7.93]*	206.0 *[8.11]*	215.4 *[8.48]*	229.1 *[9.02]*
Y *mm [in]*	146.6 *[5.77]*	153.2 *[6.03]*	162.1 *[6.38]*	168.1 *[6.62]*	173.5 *[6.83]*	178.1 *[7.01]*	187.5 *[7.38]*	201.2 *[7.92]*
Z *mm [in]*	101.3 *[3.99]*	108.2 *[4.26]*	116.8 *[4.60]*	123.2 *[4.85]*	128.5 *[5.06]*	132.8 *[5.23]*	142.5 *[5.61]*	156.2 *[6.15]*

Table 10 Two – speed Wheel Motors (SAE) dimensions

Oversize flange

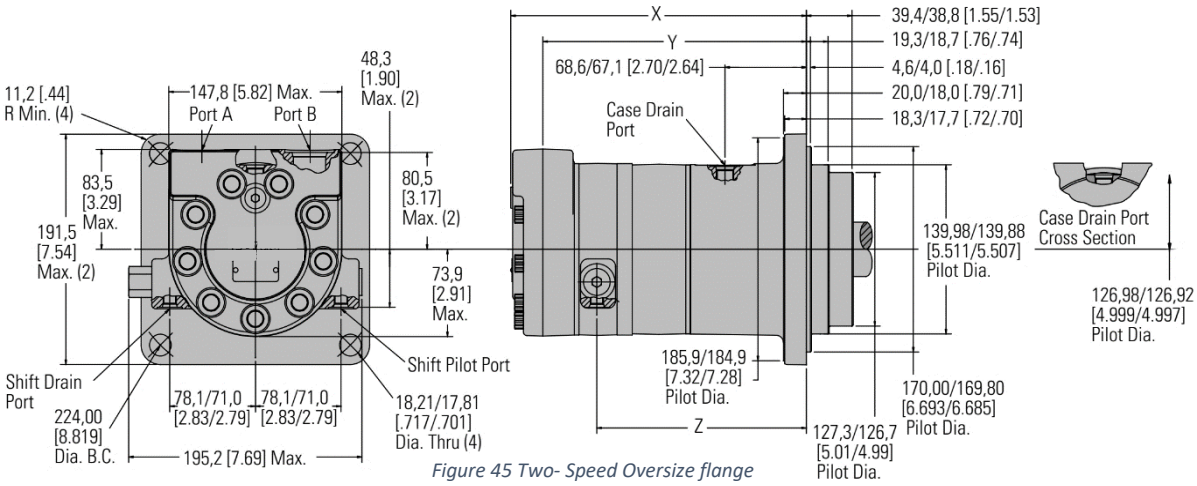


Figure 45 Two- Speed Oversize flange

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	232.4 *[9.15]*	239.3 *[9.42]*	248.2 *[9.77]*	254.3 *[10.01]*	259.3 *[10.21]*	263.9 *[10.39]*	273.1 *[10.75]*	286.8 *[11.29]*
Y *mm [in]*	204.0 *[8.03]*	210.6 *[8.29]*	220.0 *[8.66]*	226.1 *[8.90]*	231.4 *[9.11]*	236.0 *[9.29]*	245.1 *[9.65]*	258.8 *[10.19]*
Z *mm [in]*	159.0 *[6.26]*	165.6 *[6.52]*	174.8 *[6.88]*	181.1 *[7.13]*	186.4 *[7.34]*	190.8 *[7.51]*	200.2 *[7.88]*	213.9 *[8.42]*

Table 11 Two – speed Oversize flange Motors (SAE) dimensions

Ports

G 3/4 (BSP) O-ring Ports (2)

G 1/4 (BSP) O-ring Case Drain Port (1)

7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

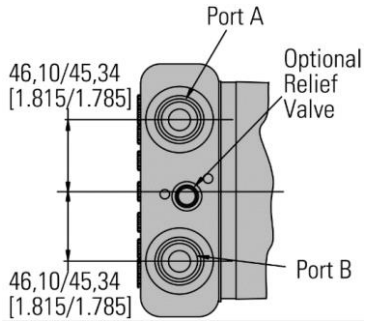


Figure 46 Ports

Standard Motors (ISO)

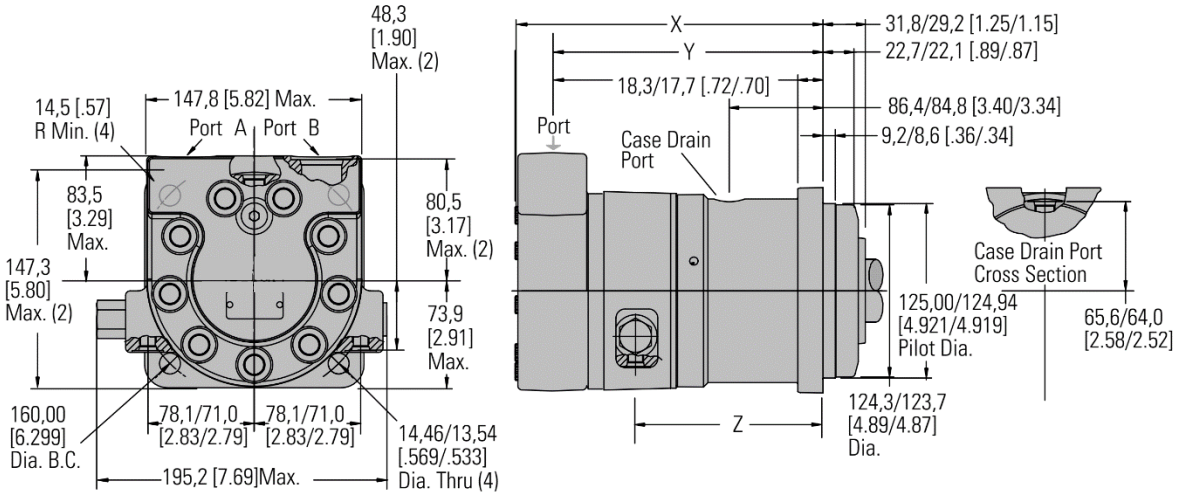


Figure 47 Two-speed Standard Motor (ISO)

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	247.4 *[9.74]*	253.7 *[9.99]*	263.1 *[10.36]*	269.2 *[10.60]*	274.3 *[10.80]*	278.9 *[10.98]*	288.0 *[11.34]*	301.8 *[11.88]*
Y *mm [in]*	219.5 *[8.64]*	225.8 *[8.89]*	235.0 *[9.25]*	241.0 *[9.49]*	246.4 *[9.70]*	251.0 *[9.88]*	260.1 *[10.24]*	273.8 *[10.78]*
Z *mm [in]*	174.2 *[6.86]*	180.8 *[7.12]*	189.7 *[7.47]*	196.1 *[7.72]*	201.4 *[7.93]*	205.7 *[8.10]*	215.1 *[8.47]*	228.9 *[9.01]*

Table 12 Two – speed Standard Motors (ISO) dimensions

Wheel Motor (ISO)

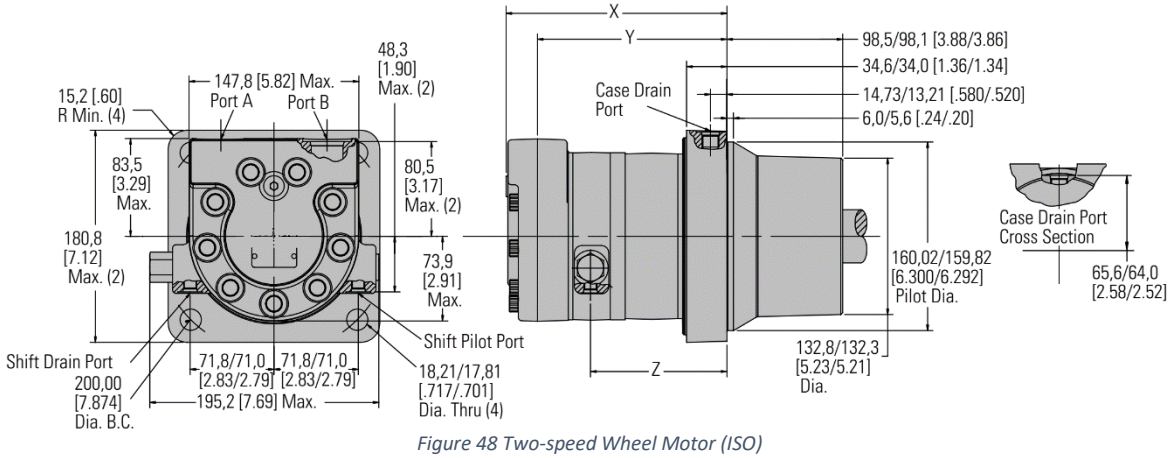


Figure 48 Two-speed Wheel Motor (ISO)

Dimensions	Displacement *cm³/r [in³/r]*							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	173.2 *[6.82]*	179.6 *[7.07]*	189.0 *[7.44]*	195.1 *[7.68]*	200.2 *[7.88]*	204.7 *[8.06]*	213.9 *[8.42]*	227.6 *[8.96]*
Y *mm [in]*	145.3 *[5.72]*	151.6 *[5.97]*	160.8 *[6.33]*	166.9 *[6.57]*	172.2 *[6.78]*	176.8 *[6.96]*	185.9 *[7.32]*	199.6 *[7.86]*
Z *mm [in]*	100.1 *[3.94]*	106.7 *[4.20]*	115.6 *[4.55]*	121.9 *[4.80]*	127.3 *[5.01]*	131.6 *[5.18]*	141.0 *[5.55]*	154.7 *[6.09]*

Table 13 Two – speed Wheel Motors (ISO) dimensions

Ports

1–1/16-12 UN-2B SAE O-ring Ports (2)

9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

or

G 3/4 (BSP) O-ring Ports (2)

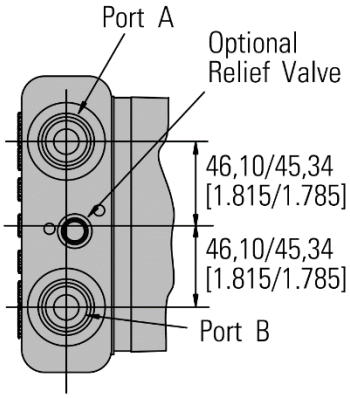
G 1/4 (BSP) O-ring Case Drain Port (1)

7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Drive End

Port A Pressurized — CW

Port B Pressurized — CCW



Bearingless

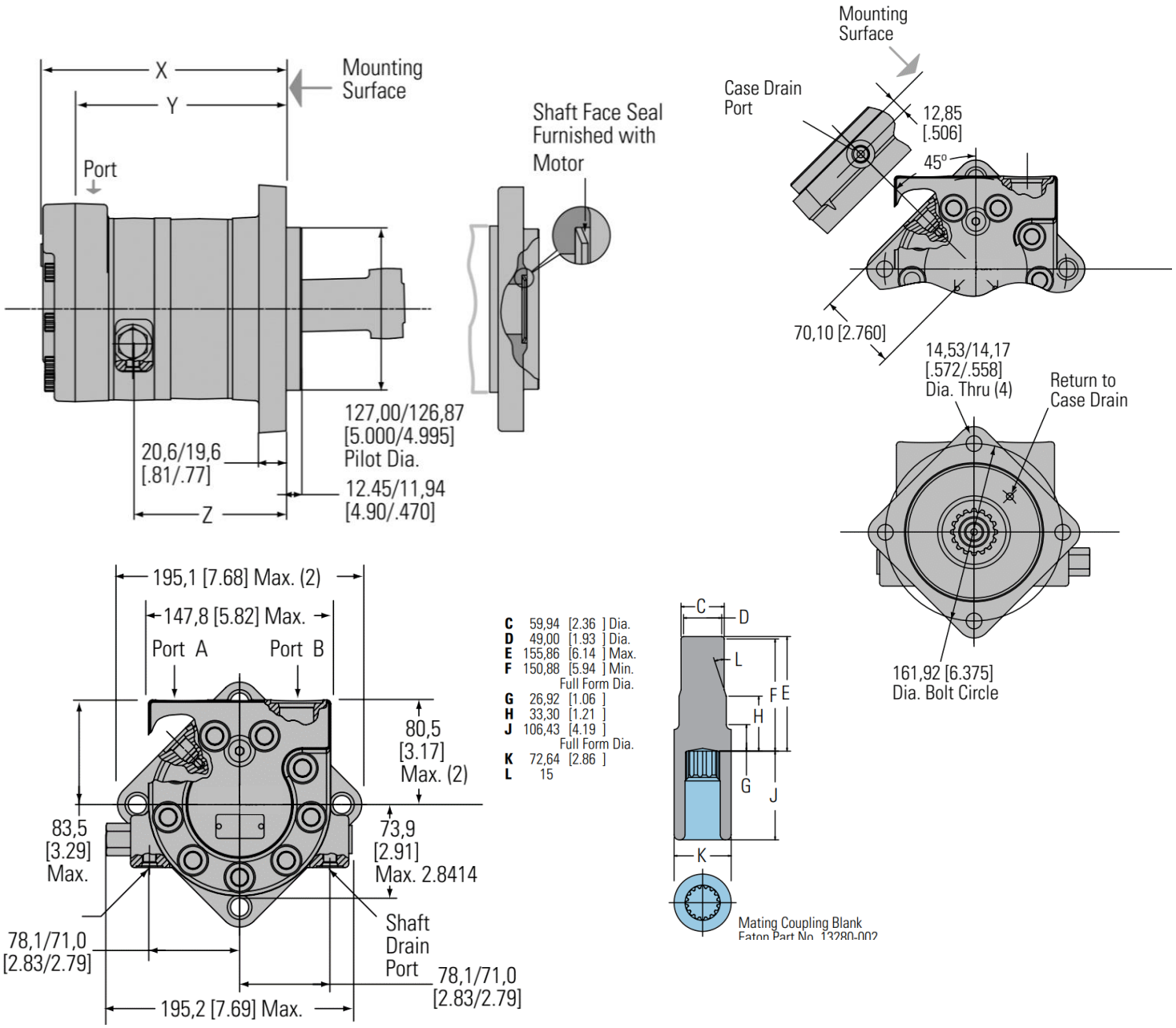


Figure 49 Two speed - Bearingless motor

Note

After machining blank, part must be hardened per specification.

Dimensions	Displacement cm^3/r [in^3/r]							
	325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
X *mm [in]*	177.0 *[6.97]*	183.6 *[7.23]*	193.0 *[7.60]*	199.1 *[7.84]*	204.0 *[8.03]*	208.8 *[8.22]*	217.9 *[8.58]*	231.6 *[9.12]*
Y *mm [in]*	149.1 *[5.87]*	155.7 *[6.13]*	164.8 *[6.49]*	170.9 *[6.73]*	176.0 *[6.93]*	180.8 *[7.12]*	190.0 *[7.48]*	203.7 *[8.02]*
Z *mm [in]*	103.9 *[4.09]*	110.7 *[4.36]*	119.6 *[4.71]*	126.0 *[4.96]*	131.1 *[5.16]*	135.6 *[5.34]*	145.0 *[5.71]*	158.8 *[6.25]*

Table 14 Two – speed Bearingless Motors (ISO) dimensions

Installation Information

1. Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 -1,27 [.030 -.050]. Dimensions apply after heat treat.
2. Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
3. Seal to be furnished with motor for proper oil circulation thru splines.
4. Similar to SAE “C” Four Bolt Flange.

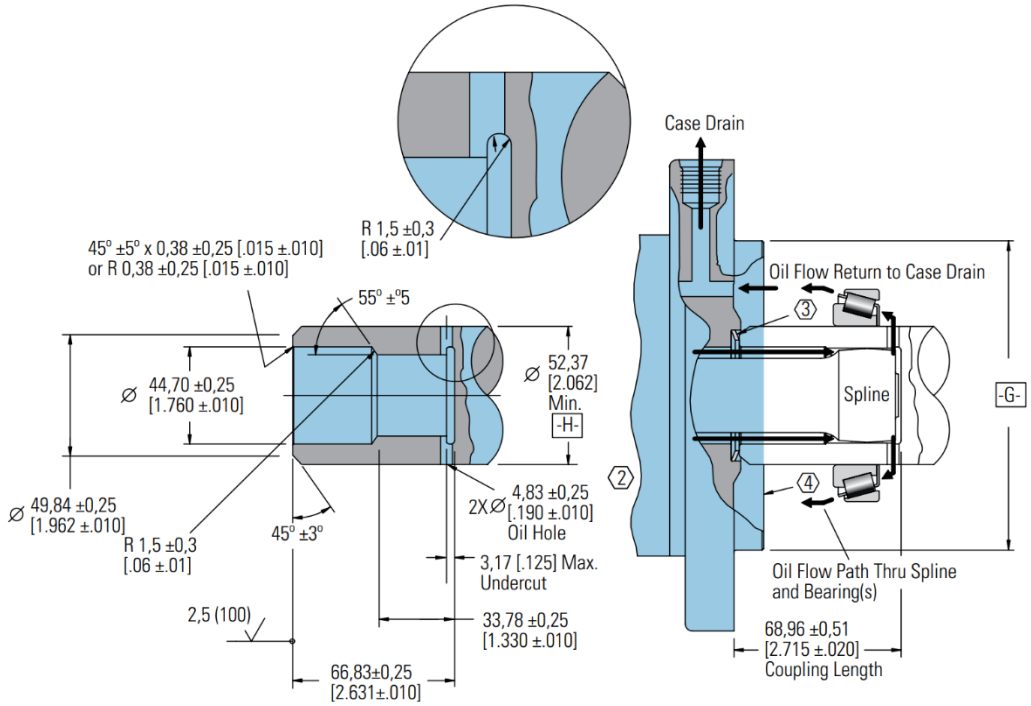
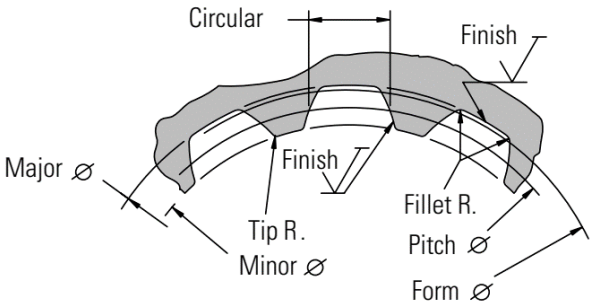


Figure 50 Two-speed Bearingless Installation Information

Spline Pitch 10/20
Pressure Angle ..... 30°
Number of teeth 16
Class of Fit ..... Ref. 5
Type of Fit ..... Side
Pitch Diameter..... Ref. 40,640000 [1.6000000] ◎ 0,20 [.008] | H
Base Diameter ..... Ref. 35,195272 [1.3856406]
Major Diameter ..... 43,56 [1.715] Max. 43,18 [1.700]
Min. Minor Diameter ..... 36,83 -37,08 [1.450 -1.460]
Form Diameter, Min. ..... 42.47 [1.672]
Fillet Radius ..... 0,64 -0,76 [.025 -.030]
Tip Radius ..... 0,25 -0,51 [.010 -.020]
Finish 1,6 (63)
Involute Profile Variation ..... +0,000 -0,025 [+.0000 -.0010]
Total Index Variation ..... 0,040 [.0016]
Lead Variation ..... 0,013 [.0005]
Circular Space Width:
- Maximum Actual ..... 4.105 [.1616]
- Minimum Effective ..... 3,995 [.1573]
- Maximum Effective ..... Ref. 4,056 [.1597]
- Minimum Actual ..... Ref. 4,081 [.1582]

Dimension Between Two Pins..... Ref. 34,272 -34,450 [1.3493 -1.3563]
Pin Diameter ..... 4,389 [.1728]



Product numbers

Closed loop

Product Number									
Mounting	Shaft	Port Size	Displacement						
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
SAE										
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	-	-0106	-0021	-0022	-0023	-0024	-0025	-0026
	1 1/2 inch 17 Tooth Splined		178-0108	-0109	-0027	-0028	-0029	-0030	-0031	-0032
	1 3/4 inch Tapered		-	-0128	-0033	-0034	-0035	-0036	-0037	-0038
Wheel	40 mm Straight		-	-	-0002	-0003	-0004	-0005	-0006	-0007
	1 1/2 inch 17 Tooth Splined		-	-	-0008	-0009	-0010	-0011	-0012	-0013
	1 ¾ inch Tapered		-	182-0041	-0014	-0015	-0016	-0017	-0018	-0019
Bearingless			176-0037	-	-0019	-0020	-0021	-0022	-0023	-0024
Oversize										
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	-	-	178-0039	-0040	-	-	-	-
	46mm 28 Tooth Splined		-	-	178-0045	-0046	-	-	-	-
	1 ¾ inch Tapered		-	-	178-0051	-0052	-	-	-	-
ISO										
Standard	40 mm Straight	G ¾ (BSP) (2) G ¼ (BSP) Drain Port (1)	178-0110	-0111	-0057	-0058	-0059	-0060	-0061	-0062
	45mm Tapered		178-0095	-	-0069	-0070	-0071	-0072	-0073	-0074
	1 ½ inch 17 Tooth Splined		-	-	-0063	-0064	-0065	-0066	-0067	-0068
Wheel	40 mm Straight		182-0042	-	-0020	-0021	-0022	-0023	-0024	-0025
	45mm Tapered		-	-	-0026	-0027	-0028	-0029	-0030	-0031
	1 ½ inch 17 Tooth Splined		-	-	-0032	-0033	-0034	-0035	-0036	-0037
Bearingless			-	-	-0025	-0026	-0027	-0028	-0029	-0030

Figure 51 Closed loop two – speed product numbers

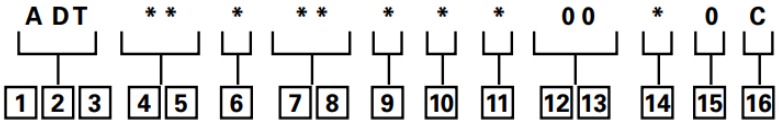
Note:

The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

- *A case drain is required for all closed loop VIS motor applications.*
- *The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].*

Model Code

The following 16 - digit coding system has been developed to identify all of the configuration options for the VIS 40 motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1, 2, 3 Product Series

ADT – VIS 40- Two-speed Motor

4, 5 Displacement – cm³/r [in³/r]

20 – 325 [19.8]

24 – 400 [24.4]

31 – 505 [30.7]

35 – 570 [34.9]

38 – 630 [38.5]

42 – 685 [41.7]

48 – 785 [48.0]

57 – 940 [57.4]

6 Mounting Type

A – 4 Bolt Bearingless 127,00 [5.000] Pilot Dia. with 12,19 [.480] Pilot Length and 14,35 [.565] Dia holes on 161,92 [6.375] Dia. Bolt Circle

B – 4 Bolt Wheel Mount 160,00 [6.3] Pilot Dia. With 5,8 [.23] Pilot Length and 18,00 [.709] Dia. Holes on 200,00 [7.874] Dia. Bolt Circle (ISO Compatible)

C – 4 Bolt Oversize Flange 185,4 [7.30] Rear Pilot Dia., 169,90 [6.689], 139,93 [5.509], 127,0 [5.00] Dia (Front Pilots) and 18,01 [.709] Dia. Holes on 224,00 [8.819] Dia. Bolt Circle

F – 4 Bolt Standard Mount (SAE CC) 127,00 [5.000] Pilot Dia. With 12,2 [.48] Pilot Length and 14,32 [.564] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle

G – 4 Bolt Wheel Mount 139,7 [5.50] Pilot Dia. with 7,9 [.31] Pilot Length and 14,32 [.564] Dia. Holes on 184,15 [7.250] Dia. Bolt Circle (SAE Compatible)

H – 4 Bolt Standard Mount 125,00 [4.92] Pilot Dia. With 8,9 [.35] Pilot Length and 14,00 [.551] Dia. Holes on 160,00 [6.299] Dia. Holes on 160,00 [6.299] Dia. Bolt Circle (ISO Compatible)

M – Standard, 4 Bolt: 169,75 [6.683] Pilot Dia. With 4.3 [.17] Pilot Length and M16 X 2 -6H Threaded Holes on 224,00 [8.819] Dia. Bolt Circle (To be selected for Brake Option)

7, 8 Output Shaft

00 – None (Bearingless)

01 – 45 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M30X2-6H Threaded Shaft End, 12W X 8H X 28L [.472W X .313H X 1.102L] Key

02 – 1-3/4 inch Dia. .125:1 Tapered Shaft Per SAE J501 with 1-1/4 - 18 UNEF-2A Threaded Shaft End, 11,11 [.4375] Square X 31,8 [1.25] Straight Key

04 – 46 mm Dia. Flat Root Side Fit, 28 Tooth, 16/32 DP 30 Degree Involute Spline, 93,0 [3.66] Minimum Ful Spline with M16 X 2,0-6H Thread in End

07 – 40 mm Dia. Straight Shaft with M12 X 1,75-6H Thread in End, 12W X 8H X 63L [.472W X .313H X 2.480L] Key (SAE Compatible)

08 – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 39,1 [1.54] Minimum Full Spline with 3/8-16 UNC-2B Thread in End (SAE Compatible)

09 – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 56,6 [2.23] Minimum Full Spline with M12 X 1.75-6H Thread in End (ISO Compatible)

10 – 40 mm Dia. Straight Shaft with M12 X 1,75-6H Thread in End, 12W X 8H X 67L [.472W X .313H X 2.630L] Key (ISO Compatible)

9 Ports

A – 1–1/16-12 UN-2B Size 12 O-ring Port, Accepts Fittings for SAE J1926

B – G 3/4 (BSP) Straight Thread Port

10 Case Flow Options

A – Shuttle Valve with 9/16-18 UNF-2B, Size 6 O-ring Port Case Drain, Accepts Fittings for SAE J1926

B – Shuttle Valve with G 1/4 (BSP) Straight Thread Port Case Drain

11 Back-Pressure Relief

1 – Set at 4,5 bar [65 PSI] (for Manual Pumps)

2 – Set at 15,2 bar [220 PSI] (for Servo Pumps)

4 – Set at 15,2 bar [300 PSI] (for high charge Servo Pumps)

12, 13 Special Features

00 – None

08 – Spring Applied Hydraulic Release Wet Brake With Brake Capacity of 20,000 lbf-in Static and 150 lbf/in² release pressure

14 Paint/ Special Packaging

0 – Primer, Individual Box

A – Low Gloss Black Primer, Individual Box

B – No Paint, Bulk Box Option

C – Low Gloss Black Primer, Bulk Box Option

15 Assigned Code when Applicable

0 – Assigned Code

16 Assigned Design Code

C – Assigned Design Code

Chapter 4
VIS 40 Series Brake

Topics:

- *Description*
- *Features*
- *Applications*
- *Specifications*
- *Brake dimension*

Description

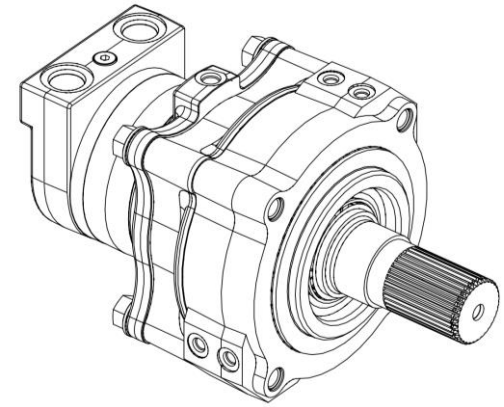


Figure 52 Brake motor

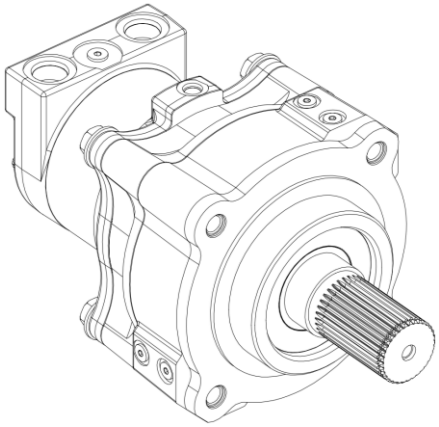


Figure 53 Brake Motor WITH Outer Grease Seal

Features

- Spring-Applied/ Hydraulically Released Multi-Disc Brake
- Spring automatically applies brake when hydro- static pressure is absent
- Environmentally Protected
- Integral Design –Motor and brake as a single package to minimize length and cost.
- Infinite Braking – Eliminates machine creep associated with park pawl mechanisms
- Boost Feature – Increases holding capacity to match full motor output torque
- No adjustments needed
- Two Sets of Release and Boost Ports – Allows for multiple plumbing options and facilitates bleeding
- Outer Grease Seal - optional feature that encloses the front bearing protecting it from external contamination

Applications

- Skid Steer Loaders
- Mini Excavators
- Trenchers
- Road Rollers
- Anywhere load-holding is needed on a Low- Speed High-Torque drive system

Specifications

Static Holding Torque	780 N-m [6900 lb-in] minimum (spring only - no boost) 2621 N-m [23200 lb-in] minimum (@ 10,3 bar [150 PSI] boost) 3570 N-m [31600 lb-in] minimum (@ 15,2 bar [220 PSI] boost)
Release Pressure	10,3 bar [150 PSI] minimum for full release 68,9 bar [1000 PSI] maximum allowed at release port
Case Pressure	1,4 bar [20 PSI] continuous 3,5 bar [50 PSI] maximum
Boost Pressure	15,2 bar [220 PSI] continuous 34,5 bar [500 PSI] maximum
Speed	360 RPM maximum
Emergency	After 3 consecutive stops, brake to still meet parking requirement

Model Code Selection:

To add a brake to the motor, select Mounting Option 'M' from Mounting Options and select Brake Option from Special Features.

Brake dimension

Ports

7/16-20 UNF-2B SAE O-Ring Release Port (2) G 1/4 (BSP) Release Port (2)

7/16-20 UNF-2B SAE O-ring Boost Port (2) G 1/4 (BSP) Release Port (2)

9/16-18 UNF-2B SAE O-ring Case Drain Port (1) G 1/4 (BSP) O-ring Case Drain Port

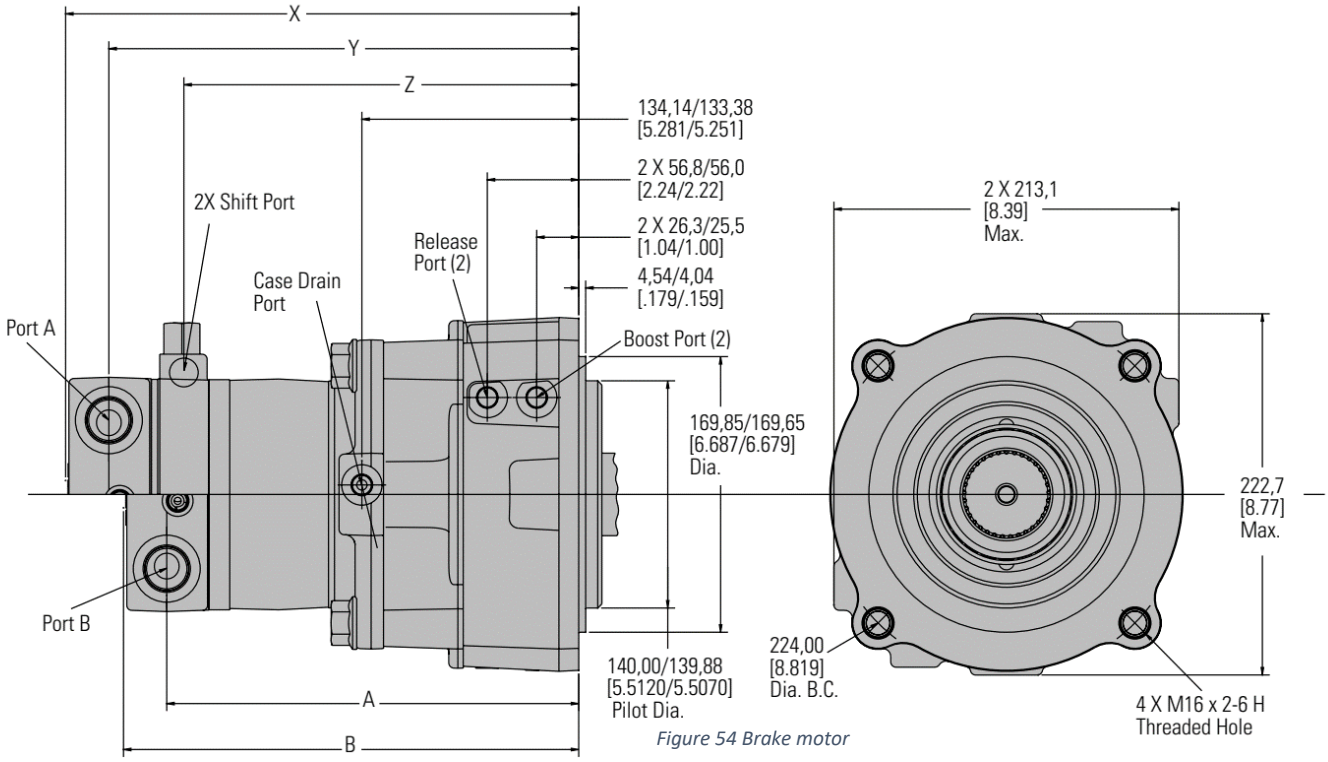


Figure 54 Brake motor

Dimensions		Displacement cm^3/r [in^3/r]							
		325 ***19.8***	**400** ***24.4***	**505** ***30.7***	**570** ***34.9***	**630** ***38.5***	**685** ***41.7***	**785** ***48.0***	**940** ***57.4***
Single - Speed	**A**	220.9	229.7	238.7	244.9	250.1	254.7	264.0	277.7
	mm [in]	*8.78*	*9.05*	*[9.40]*	*[9.64]*	*[9.85]*	*[10.04]*	*[10.40]*	*[10.94]*
	B	250.2	256.9	265.9	272.1	277.3	281.9	291.2	304.9
	mm [in]	*9.85*	*10.11*	*[10.47]*	*[10.71]*	*[10.92]*	*[11.10]*	*[11.46]*	*[12.00]*
Two - Speed	**X**	286.1	292.7	301.9	308.0	313.1	317.9	327.0	340.7
	mm [in]	*11.26*	*11.52*	*[11.88]*	*[12.12]*	*[12.32]*	*[12.52]*	*[12.88]*	*[13.42]*
	Y	258.9	265.7	274.7	280.9	285.9	290.7	300.0	313.7
	mm [in]	*10.20*	*10.46*	*[10.82]*	*[11.06]*	*[11.27]*	*[11.45]*	*[11.80]*	*[12.35]*
	Z	213.5	220.3	229.3	235.5	238.5	245.3	254.6	268.3
	mm [in]	*8.41*	*8.67*	*[9.03]*	*[9.27]*	*[9.39]*	*[9.66]*	*[10.02]*	*[10.56]*

Table 15 Brake Motors dimensions

Brake Shaft Dimensions/ Sideload Curves

Standard Brake

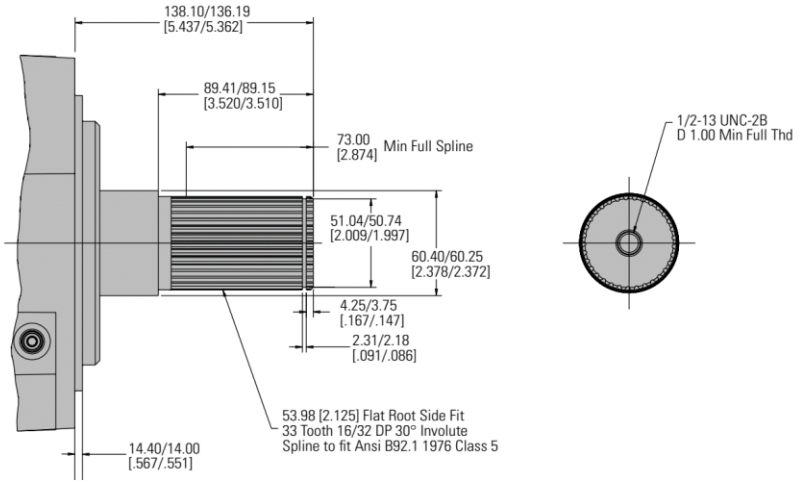


Figure 55 Standard Brake Shaft Dimensions

Brake with Outer Grease Seal

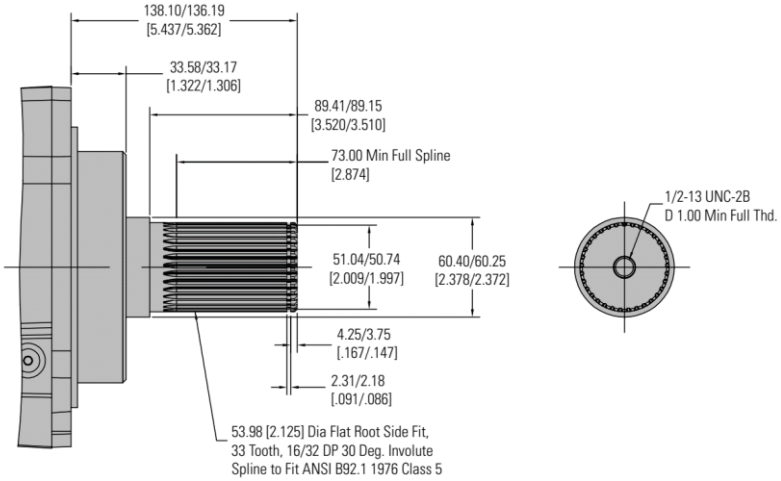


Figure 56 Brake with Outer Grease Seal

Standard mounts

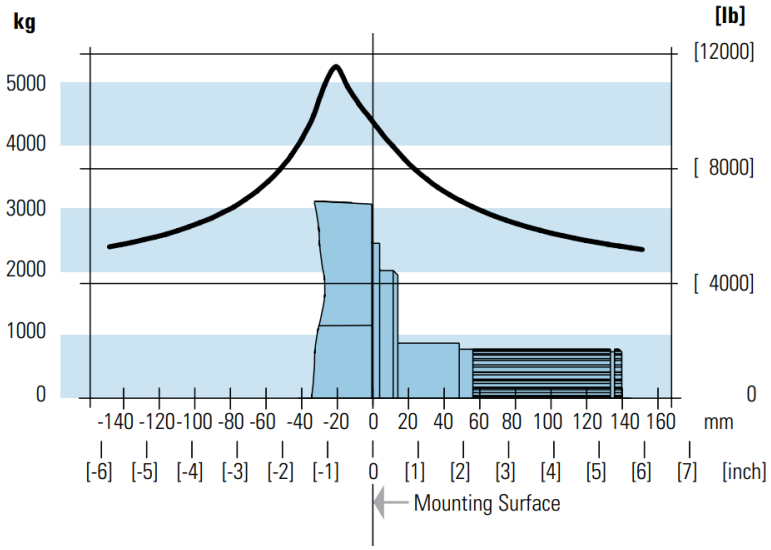


Figure 57 Standard Mounts

Chapter 5
VIS 45

Topics:

- *Highlights*
- *Description*
- *Features*
- *Benefits*
- *Applications*
- *Specification*
- *Technical Data*
- *Performance Data*
- *Ports*
- *Shafts*
- *Side Load Capacity*
- *Product numbers*
- *Model code*

Highlights

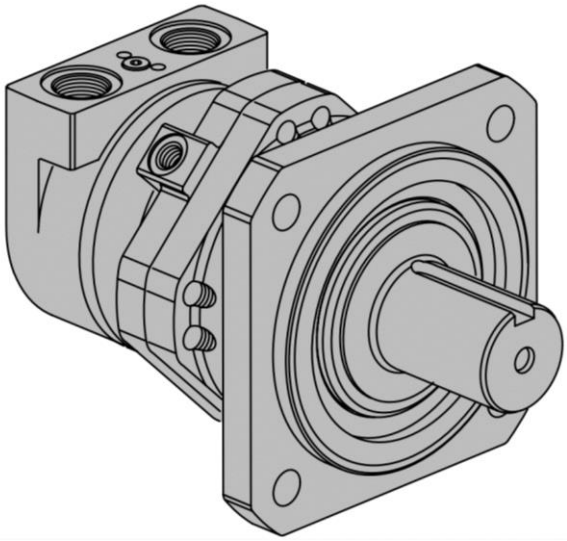


Figure 58 VIS 45

Description

The VIS 45 is the most powerful motor in the VIS Series product line. Maximum continuous output torque capability is rated to 4520 Nm [40,000 lb-in.] with a displacement range from 630cc to 1560cc per revolution. VIS 45 motors can be run up to 170 LPM [45 GPM] with pressure capability up to 310 bar [4500 PSI]. The motor utilizes patented VIS technology with improved high-strength Geroler, optimized drive geometry, and two-piece pre-loaded balance plate for increased starting efficiency, reduced leakage and higher back pressure capacity.

Features

- Patented VIS Geroler technology
- Three moving components: (Geroler, star, drive, and output shaft)
- Two-piece pre-loaded pressure balance plate
- Variety of optional features including two-speed option, and case flow solutions for both closed- loop and open-loop applications.

Benefits

- Extremely compact powerful package
- Increased torque capability
- Greatest horsepower density in the VIS motor line
- High efficiency
- Quiet, smooth operation
- Reliable performance
- Design Flexibility

Applications

- Traction Drives
- Skid Steer loaders
- Grapples
- Excavator Swing Drives
- Marine & Military Winches
- Utility Reels
- Harvesters
- Snow Grooming Equipment
- Trenchers
- Piggy-back Forklifts
- Industrial Machine Tools
- Truck Grapples
- Wood Processing – Saw Mills
- Augers

Specification

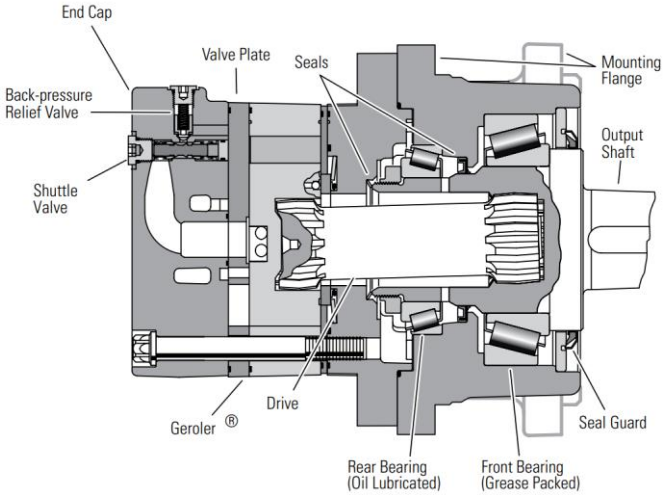


Figure 59 VIS 45

Technical Data

Type				VIS 45				
Geometric displacement		cm^3		630	805	990	1245	1560
		$[in^3]$		38.6	48.6	60.5	76.0	95.0
Maximum speed		min^{-1}	cont.	256	198	164	129	104
		[rpm]	int.[1)]	284	220	183	143	115
Maximum torque		N•m	cont.	2963	3555	4052	4520	4520
		[lbf•in]		26080	31460	35860	40000	40000
			int.[1)]	3111	3722	4549	5376	5650
				27530	32940	40269	47592	50000
Pressure		bar	cont.	310	310	258	205	164
		[psi]		[4500]	[4500]	3740	2975	2380
			int.[1)]	345	345	322	256	205
				[5000]	[5000]	4675	3720	2975
			peak[2)]	379	379	379	308	246
				[5500]	[5500]	5500	4465	3570
Maximum flow		l/min [US gal/ min]	cont.	170	170	170	170	170
				[45]	[45]	[45]	[45]	[45]
			int.[1)]	189	189	189	189	189
				[50]	[50]	[50]	[50]	[50]
Weight	kg [lb]	Standard or Wheel Mount		53.8	55.2	56.7	58.7	61.2
				118.7	121.6	125.0	129.4	134.9
		Bearingless		28.3	29.6	31.1	33.1	35.6
				62.3	65.2	68.6	73.0	78.5
		Two-Speed Standard or Wheel Mount		58.5	59.8	61.3	63.3	65.8
				128.9	131.8	135.2	139.6	145.1
		Two- Speed Bearingless		32.9	34.2	35.7	37.7	40.2
				72.5	75.4	78.8	83.2	88.7

Table 16 VIS 40 Technical Data

*A simultaneous maximum torque and maximum speed **NOT** recommended*

To assure best motor life, run motor for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

Maximum Inlet Pressure: 400 bar [5800 PSI]
Do Not Exceed A Pressure Rating (for displacement size see chart above).

Return Pressure (Back-Pressure): Minimum – 3,5 bar [50 PSI]
Maximum – 21 bar [300 PSI]

Note

Return (back-pressure) must be 3,5 bar [50 PSI] greater than the case pressure, except with open loop circuit.

Δ Pressure: The true Δ bar [ΔPSI] between inlet port and outlet port

Case Pressure: Minimum – No Pressure
Maximum – 3,5 bar [50 PSI]

Note:
The case must be full when the motor is operating. A case drain is recommended

Continuous Rating: Motor may be run continuously at these ratings

Intermittent operation: 10% of every minute

Peak operation: 1% of every minute

Recommended fluids: Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 70 SUS at operating temperature.

Recommended maximum system operating temp.: -34°C to 82°C [-30°F to 180°F]

Recommended filtration: Per ISO Cleanliness Code, 4406: 20/18/13

Shuttle: Standard

Back-Pressure Relief Valve: Required for closed loop circuit.

Performance Data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area. Performance data is typical at 120 SUS. Actual data may vary slightly from unit to unit in production.

630 cm³/r [38.6 in³/r]

Flow LPM [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
	15	35	70	105	140	170	205	240	275	310	345
4	1270	2710	5530	8250	10300	12900	15540	17720	20820	23640	25740
	144	306	625	932	1164	1458	1756	2002	2353	2671	2909
15	23	23	23	22	22	21	20	19	18	17	15
8	1290	2720	5580	8290	10490	13110	15760	18070	21000	24100	26070
	146	307	631	937	1185	1481	1781	2042	2373	2723	2946
30	47	45	45	45	45	44	43	41	38	36	34
12	1310	2670	5440	8320	10820	13400	16370	18970	21230	24540	26840
	148	302	615	940	1223	1514	1850	2144	2399	2773	3033
45	71	68	68	67	67	66	64	62	61	58	54
16	1320	2600	5400	8250	10910	13730	16780	19710	21970	24870	27530
	149	294	610	932	1233	1551	1896	2227	2483	2810	3111
61	95	91	91	89	89	88	85	83	81	77	72
20	1290	2500	5270	8020	10690	13400	16730	20020	22320	25420	
	146	283	596	906	1208	1514	1890	2262	2522	2872	
76	119	114	114	113	113	111	108	104	103	97	
24	1240	2440	5200	7920	10560	13430	16700	19970	22610	25730	
	140	276	588	895	1193	1518	1887	2257	2555	2907	
91	143	137	137	135	135	133	129	125	123	117	
28		2190	5050	7870	10520	13480	16660	19860	22450	26080	
		247	571	889	1189	1523	1883	2244	2537	2963	
106		160	160	157	157	155	150	146	143	136	
32		2110	4870	7720	10300	13230	16370	19720	22320	25986	
		238	550	872	1164	1495	1850	2228	2522	2936	
121		182	182	180	180	177	172	166	164	156	
36		2090	4550	7330	10030	12890	15960	19220	22040	25655	
		236	514	828	1133	1457	1803	2172	2491	2898	
136		205	205	202	202	199	193	187	184	175	
40			4150	7120	9760	12490	15560	18820	21600	25185	
			469	805	1103	1411	1758	2127	2441	2845	
151			228	224	224	221	214	208	204	194	
45			3970	6930	9500	12230	15340	18470	21207	24742	
			449	783	1074	1382	1733	2087	2396	2795	
170			256	252	252	249	241	234	229	218	
50			3680	6660	9270	11920	15150	18300			
			416	753	1048	1347	1712	2068			
189			284	280	280	276	268	259			

Continuous

Intermittent

[9270] Torque [lb-in]
1048 Nm
280 Speed RPM

Figure 60 VIS 45 - 630 cm³/r [38.6 in³/r] Performance data

805 cm³/r [48.6 in³/r]

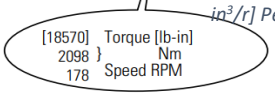
Flow LPM [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
	15	35	70	105	140	170	205	240	275	310	345
4	1600	3350	7180	10670	13480	16640	19680	21740	25860	28500	31720
	181	379	811	1206	1523	1880	2224	2457	2922	3221	3584
15	19	18	17	17	17	17	16	15	14	13	12
8	1620	3380	7240	10730	13740	16920	19950	22160	25920	28970	32200
	183	382	818	1212	1553	1912	2254	2504	2929	3274	3639
30	38	36	35	34	34	34	34	34	32	31	29
12	1640	3310	7180	10770	14170	17290	20730	23270	26340	29420	32470
	185	374	811	1217	1601	1954	2342	2630	2976	3324	3669
45	56	55	52	52	51	51	50	50	49	47	45
16	1660	3220	7010	10680	14290	17710	21240	24170	26830	30340	32940
	188	364	792	1207	1615	2001	2400	2731	3032	3428	3722
61	76	74	71	70	69	69	68	68	67	64	60
20	1600	3110	6840	10380	14000	17290	20990	24490	27270	31390	
	181	351	773	1173	1582	1954	2372	2767	3082	3547	
76	95	92	88	87	86	86	85	85	84	80	
24	1560	3030	6750	10250	13830	17340	21110	24450	27620	31460	
	176	342	763	1158	1563	1959	2385	2763	3121	3555	
91	114	110	105	104	103	103	102	102	101	96	
28		2720	6560	10190	13780	17390	21090	24360	27420	31238	
		307	741	1151	1557	1965	2383	2753	3098	3529	
106		128	123	121	120	120	119	119	117	111	
32		2620	6330	10000	13480	17070	20730	24180	27270	31064	
		296	715	1130	1523	1929	2342	2732	3082	3509	
121		147	140	139	137	137	135	135	134	127	
36		2620	5910	9480	13140	16640	20200	23570	26910	30646	
		296	668	1071	1485	1880	2283	2663	3041	3462	
136		165	158	156	154	154	152	152	150	143	
40			5390	9220	12790	16120	19700	23080	26343	30019	
			609	1042	1445	1822	2226	2608	2976	3391	
151			175	173	171	171	169	169	167	159	
45			5150	8970	12450	15780	19420	22650	25848	29462	
			582	1014	1407	1783	2194	2559	2920	3328	
170			198	196	193	193	191	191	189	179	
50			4770	8610	12140	15380	19180	22440			
			539	973	1372	1738	2167	2536			
189			220	217	215	215	212	212			

Figure 61 VIS 45 - 805 cm³/r [48.6 in³/r] Performance data

990 cm³/r [60.5 in³/r]

Flow LPM [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000	4500	4750
	15	35	70	105	140	170	205	240	275	310	330
4	2000	4100	8630	12620	16050	20080	24150	28320	32590	35150	37040
	226	463	975	1426	1814	2269	2729	3200	3683	3972	4186
15	15	15	15	15	14	14	14	13	12	11	10
8	2020	4130	8700	12740	16350	20420	24480	28400	32850	35670	37250
	228	467	983	1440	1848	2307	2766	3209	3712	4031	4209
30	30	30	29	29	29	28	28	27	25	25	24
12	2050	4050	8630	12780	16870	20860	25440	28550	32920	35860	37630
	232	458	975	1444	1906	2357	2875	3226	3720	4052	4252
45	45	45	44	44	43	43	41	41	41	40	39
16	2070	3940	8420	12680	17010	21380	26070	29660	33020	36620	38439
	234	445	951	1433	1922	2416	2946	3352	3731	4138	4342
61	61	60	58	58	58	57	55	55	54	53	52
20	2000	3800	8220	12330	16660	20860	25760	30060	33550	37880	39766
	226	429	929	1393	1883	2357	2911	3397	3791	4280	4492
76	76	75	73	73	72	71	69	69	68	66	64
24	1950	3700	8120	12180	16460	20890	25820	30090	33990	38366	40269
	220	418	918	1376	1860	2361	2918	3400	3841	4334	4549
91	91	90	88	88	86	85	83	83	82	80	78
28		3320	7880	12100	16400	20990	25890	29900	33750	39106	39995
		375	890	1367	1853	2372	2926	3379	3814	4280	4518
106		105	102	102	101	99	97	97	95	92	90
32		3210	7610	11870	16050	20600	25440	29680	33550	37890	39766
		363	860	1341	1814	2328	2875	3354	3791	4280	4492
121		120	117	117	115	114	110	110	109	106	103
36		3200	7100	11260	15640	20080	24800	28930	32716	36936	38759
		362	802	1272	1767	2269	2802	3269	3696	4173	4379
136		135	131	131	130	128	124	124	123	119	116
40			6480	10950	15220	19460	24170	28330	32023	36155	37935
			732	1237	1720	2199	2731	3201	3618	4084	4286
151			146	146	144	142	138	138	137	133	130
45			6190	10650	14810	19040	23830	27952	31599	35679	37432
			699	1203	1674	2152	2693	3158	3570	4031	4229
170			164	164	162	160	155	155	154	149	145
50			5740	10230	14450	18570	23540				
			649	1156	1633	2098	2660				
189			183	183	180	178	173				

Figure 62 VIS 45 - 990 cm³/r [60.5 in³/r] Performance data



1245 cm³/r [76.0 in³/r]

Flow LPM [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000	4250
	15	35	70	105	140	170	205	240	275	295
4	2160	4800	9960	15150	20200	26450	30670	39180	42800	43220
	244	542	1125	1712	2283	2989	3466	4427	4836	4884
15	12	11	11	11	11	10	10	9	9	9
8	2250	4830	10370	15760	22010	27180	33330	39840	43660	44400
	254	546	1172	1781	2487	3071	3766	4502	4934	5017
30	24	23	22	22	21	20	20	19	19	19
12	2400	5390	10910	17290	22780	28470	34170	40140	44160	47220
	271	609	1233	1954	2574	3217	3861	4536	4990	5336
45	36	33	33	32	32	32	32	31	31	30
16	2410	5150	10930	16970	22880	28600	33900	39500	44510	47592
	272	582	1235	1918	2585	3232	3831	4464	5030	5376
61	48	46	45	44	43	43	43	42	41	40
20	2350	4890	10650	16470	21960	27450	33130	37710	43890	46933
	266	553	1203	1861	2481	3102	3744	4261	4960	5302
76	60	59	57	56	56	56	55	55	54	52
24	2190	4760	10460	15920	21230	26530	32320	37680	42670	45673
	247	538	1182	1799	2399	2998	3652	4258	4822	5156
91	72	70	68	67	67	67	66	66	65	63
28	1990	4260	10070	15860	21200	26420	32480	37500	42464	45418
	225	481	1138	1792	2396	2985	3670	4238	4797	5131
106	85	82	80	78	78	78	77	77	76	74
32		4100	9770	15410	20770	26300	31920	37240	42167	45103
		463	1104	1741	2347	2972	3607	4208	4764	5095
121		94	91	90	89	89	88	88	87	84
36		4090	9060	14650	20060	25670	31110	36295	41087	43955
		462	1024	1655	2267	2901	3515	4100	4642	4966
136		106	103	101	101	100	99	99	98	95
40			8300	14150	19570	24900	30320	35373	40034	42836
			938	1599	2211	2814	3426	3996	4523	4839
151			114	113	112	111	110	110	108	105
45			8100	13970	19310	24610	29972	34967	39570	42343
			915	1579	2182	2781	3686	3950	4470	4783
170			129	127	126	125	124	124	122	118
50			7900	13790	19050	24310				
			893	1558	2153	2747				
189			143	141	140	139				

Figure 63 VIS 45 - 1245 cm³/r [76.0 in³/r] Performance data

1560 cm³/r [95.0 in³/r]

Flow LPM [GPM]	250 15	500 35	1000 70	1500 105	2000 140	2500 170	3000 205	3500 240	4000 275
4 15	2700 305 9	5670 641 9	11910 1346 9	18520 2093 9	24910 2815 9	30860 3487 8	37610 4250 8	42320 4782 8	48366 5464 8
8 30	2810 318 19	5910 668 19	12400 1401 18	19260 2176 18	25590 2892 18	31740 3587 17	39310 4442 16	44150 4989 15	50457 5700 15
12 45	3010 340 29	6300 712 28	13040 1474 28	20490 2315 27	26600 3006 26	33070 3737 25	39880 4506 23	46670 5274 22	53337 6025 22
16 61	3020 341 38	6300 712 38	13360 1510 37	20740 2344 36	27270 3082 35	33950 3836 34	40450 4571 31	48630 5495 29	55577 6279 29
20 76	2930 331 48	6150 695 47	13200 1492 46	20490 2315 45	27110 3063 44	34830 3936 42	39820 4500 39	47662 5384 37	54470 6154 37
24 91	2780 314 58	5910 668 56	12880 1455 55	19750 2232 54	26930 3043 53	34390 3886 50	39310 4442 47	47300 5343 44	54057 6107 44
28 106		5310 600 66	12500 1413 64	19630 2218 63	26600 3006 62	33950 3836 59	38740 4378 55	46635 5268 52	53297 6021 52
32 121		5120 579 75	12070 1364 74	19260 2176 72	26260 2967 70	33510 3787 67	38180 4314 62	45982 5195 58	52550 5937 58
36 136		5100 576 85	11270 1274 83	18270 2065 81	25590 2892 79	33070 3737 76	37652 4254 70	45366 5125 66	
40 151			10280 1162 92	17760 2007 90	24910 2815 88	32630 3687 84	37124 4194 78	44750 5055 73	
45 170			9820 1110 104	17280 1953 101	24240 2739 99	31793 3592 95	36119 4080 87	43577 4923 82	
50 189			9100 1028 115	16600 1876 113	23650 2672 110				

16600 / 1876 / 113 } Torque [lb-in] / Nm / Speed RPM

Figure 64 VIS 45 - 1560 cm³/r [95.0 in³/r] Performance data

Ports

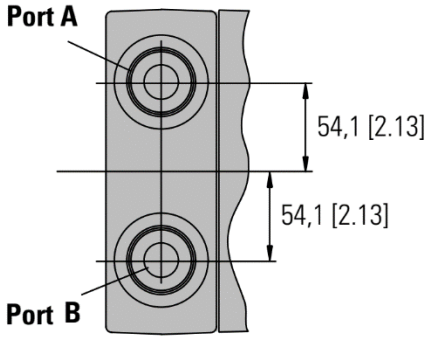
1-5/16 – 12 UN-2B SAE O-ring Ports (2)
9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

or

G 1 (BSP) O-ring Ports (2)
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW



Standard Mount

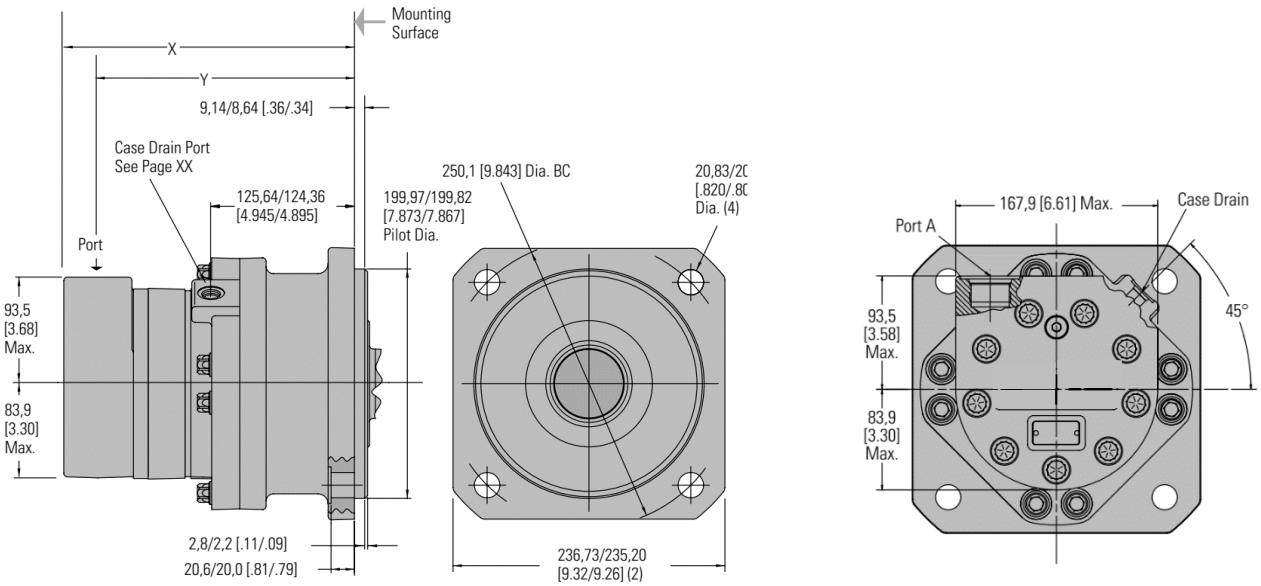


Figure 65 VIS 45 standard mount

Dimensions	Displacement cm^3/r [in^3/r]				
	630 [38.6]	**805 [48.6]**	**990 [60.5]**	**1245 [76.0]**	**1560 [95.0]**
X *mm [in]*	260.9 *[10.27]*	271.3 *[10.68]*	283.7 *[11.17]*	299.7 *[11.80]*	319.5 *[12.58]*
Y *mm [in]*	228.6 *[9.00]*	239.0 *[9.41]*	251.5 *[9.90]*	267.7 *[10.54]*	287.5 *[11.32]*

Table 17 Brake Motors dimensions

Wheel Mount

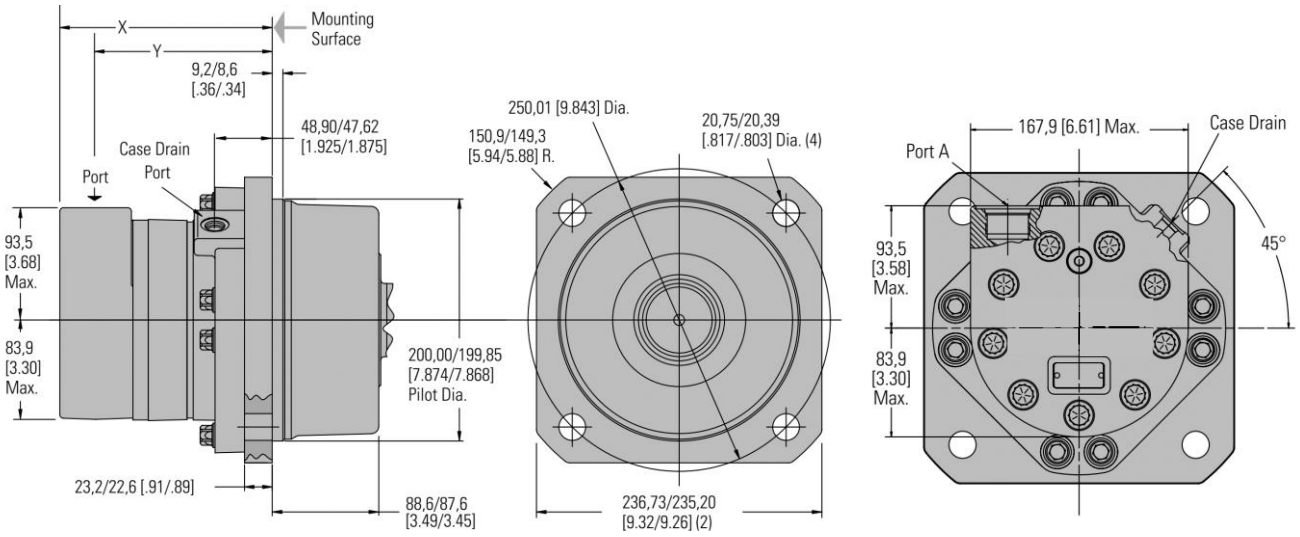


Figure 66 Wheel Mount

Dimensions	Displacement cm^3/r [in^3/r]				
	630 [38.6]	**805 [48.6]**	**990 [60.5]**	**1245 [76.0]**	**1560 [95.0]**
X *mm [in]*	184.2 *[7.25]*	194.6 *[7.66]*	207.0 *[8.15]*	223.0 *[8.78]*	242.8 *[9.56]*
Y *mm [in]*	151.9 *[5.98]*	162.3 *[6.39]*	174.8 *[6.88]*	191.0 *[7.52]*	210.8 *[8.30]*

Table 18 Wheel Motors dimensions

Bearingless

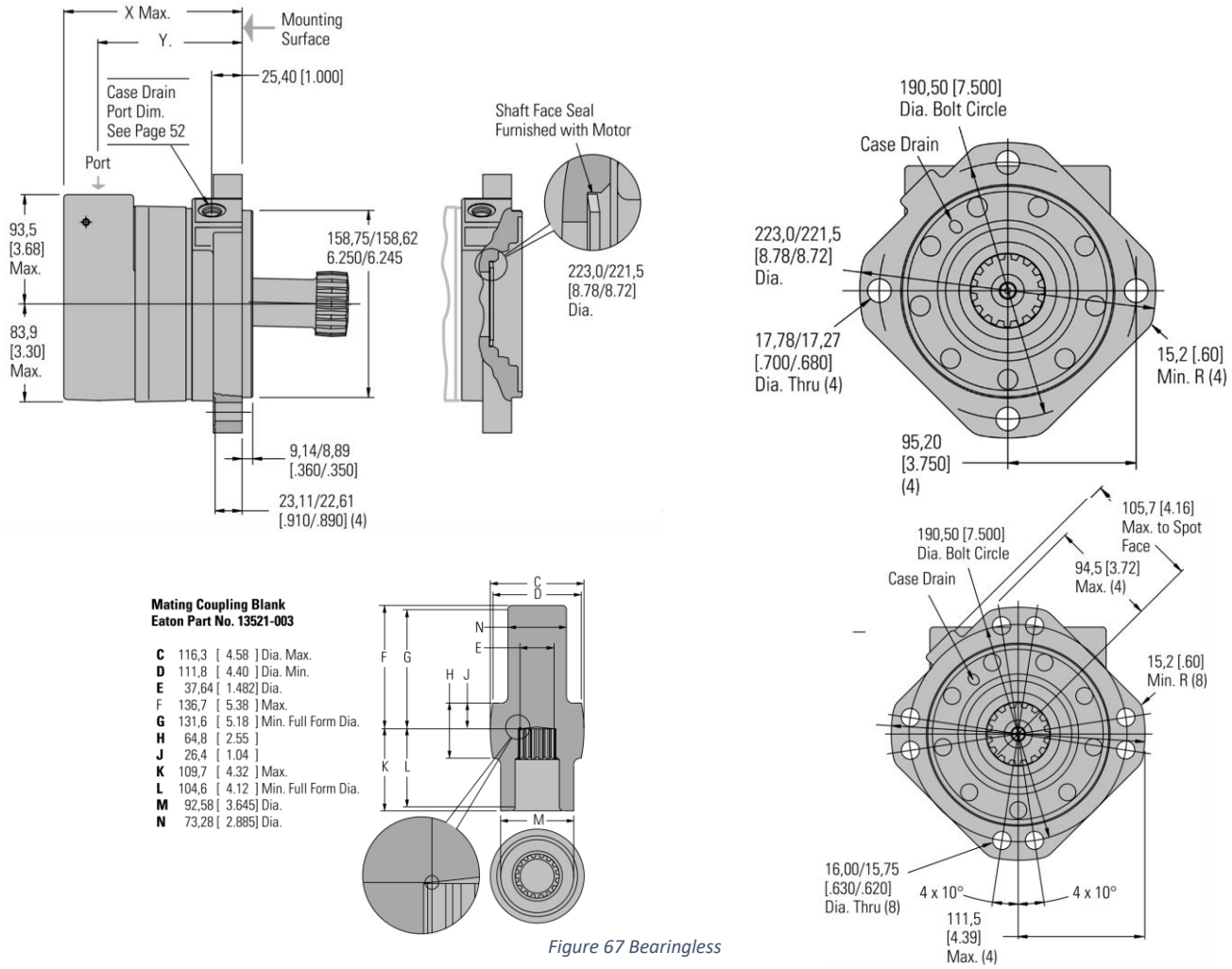


Figure 67 Bearingless

Dimensions	Displacement *cm³/r [in³/r]*				
	630 [38.6]	**805 [48.6]**	**990 [60.5]**	**1245 [76.0]**	**1560 [95.0]**
X	161.5	172.5	184.4	200.7	220.5
mm [in]	*6.36*	*6.79*	*7.26*	*7.90*	*8.68*
Y	130.3	141.2	153.4	169.7	189.5
mm [in]	*5.13*	*5.56*	*6.04*	*6.68*	*7.46*

Table 19 Bearingless Motors dimensions

Installation Guide

1. Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 59-62 HRc with case depth (to 50HRc) of 0,76 -1,27 [.030 -.050]. Dimensions apply after heat treat.
2. Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
3. Seal to be furnished with motor for proper oil circulation thru splines.
4. Dimension indicated applies within area shown.

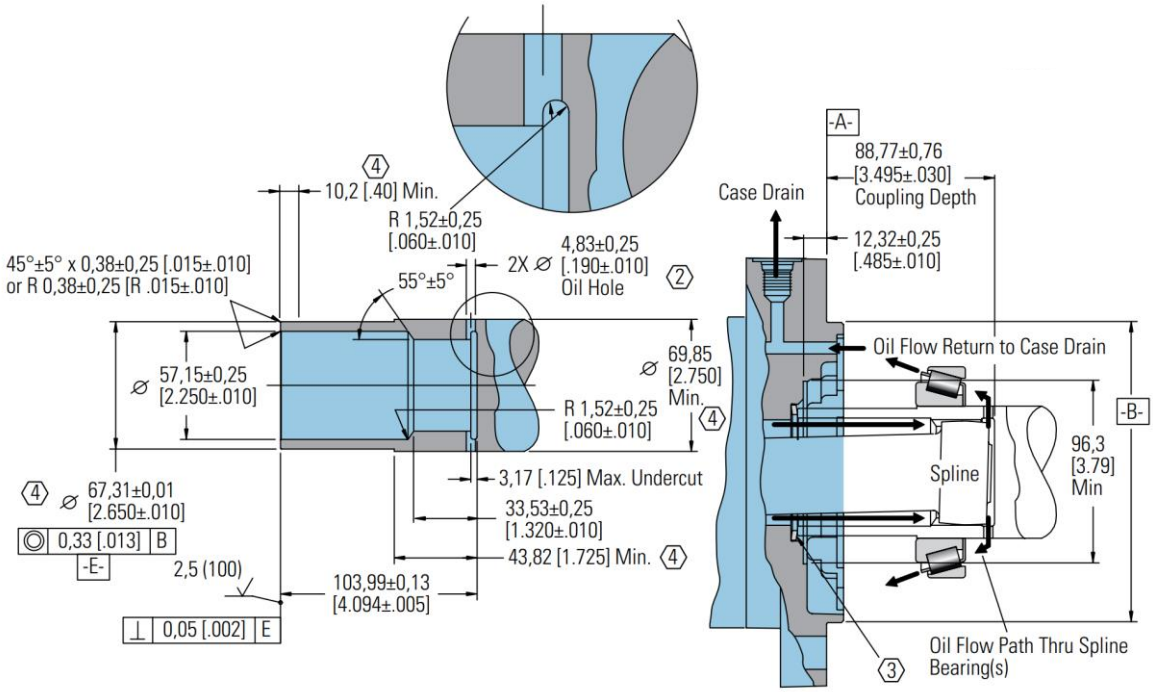
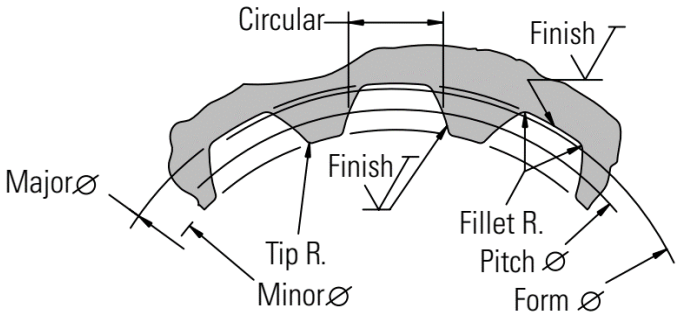


Figure 68 Bearingless Installation Guide

Spline Pitch 8/16
Pressure Angle .....30°
Number of teeth 16
Class of Fit ..... Ref. 5
Type of Fit .....Side
Pitch Diameter.....Ref. 50,80000 [2.0000000] ◎0,33 [.013] B
Base Diameter .....Ref. 43,994090032 [1.7320508]
Major Diameter..... 56,34±0,15 [2.218±.006]
Min. Minor Diameter..... 48,44±0,08 [1.907±.003]
Form Diameter, Min.....55,22 [2.174]
Fillet Radius .....1,02±0,25 [.040±.010]
Tip Radius .....0,38±0,13 [.015±.005]
Finish 1,6 (63)
Involute Profile Variation .....+0,000 -0,025 [+.0000 -.0010]
Total Index Variation .....0,041 [.0016]
Lead Variation .....0,015 [.0006]
Circular Space Width:
Maximum Actual .....6,180 [.2433]
Minimum Effective.....6,048 [.2381]
Maximum Effective.....Ref. 6,099 [.2401]
Minimum Actual.....Ref. 6,114 [.2407]
Dimension Between Two Pins.....Ref. 42,659 ±0,05 [1.6795±.0020]
Pin Diameter.....6,223 [.2450]



Shafts

Splined

70 mm 22 Tooth Splined

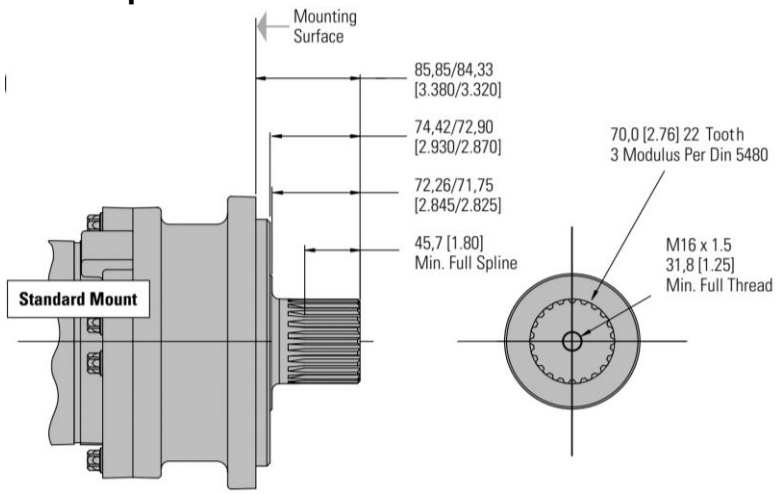


Figure 69 70 mm 22 Tooth Splined shaft

2–3/4 Inch 32 Tooth Splined

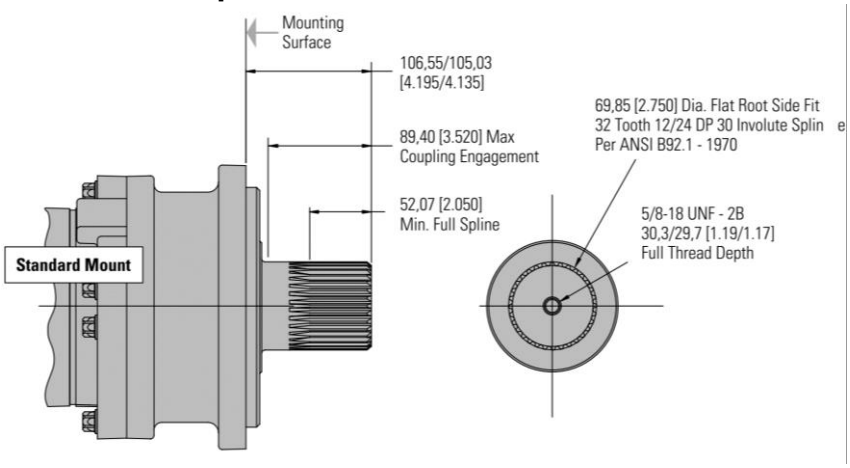


Figure 70 2–3/4 Inch 32 Tooth Splined shaft

Keyed

2–5/8 Inch Straight

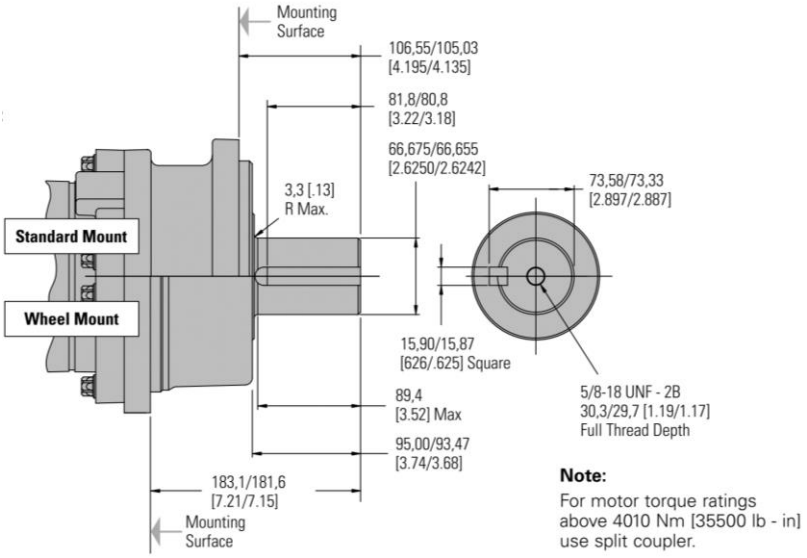


Figure 71 2–5/8 Inch Straight shaft

60 mm Tapered

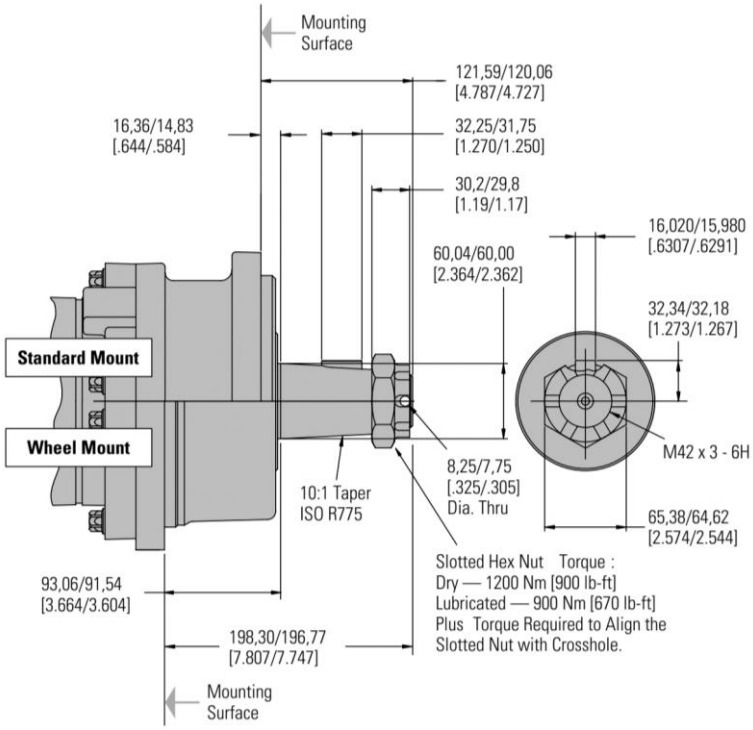


Figure 72 60 mm Tapered shaft

Side Load Capacity

These curves indicate the radial load capacity on the motor shaft(s) at various locations. The curve is based on B 10 bearing life (2000 hours or 12,000,000 shaft revolutions at 100 RPM) at rated output torque. To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

Standard Mount

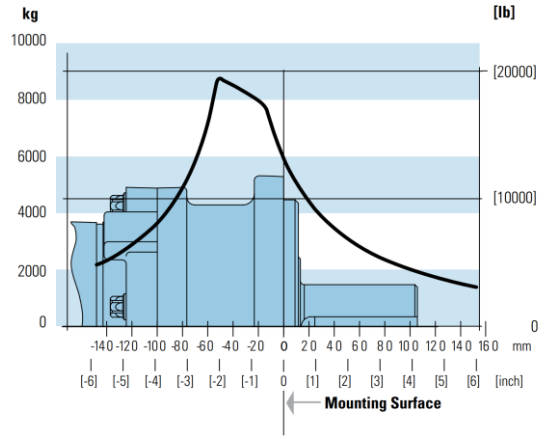


Figure 73 Standard Mount side load capacity

Wheel Mount

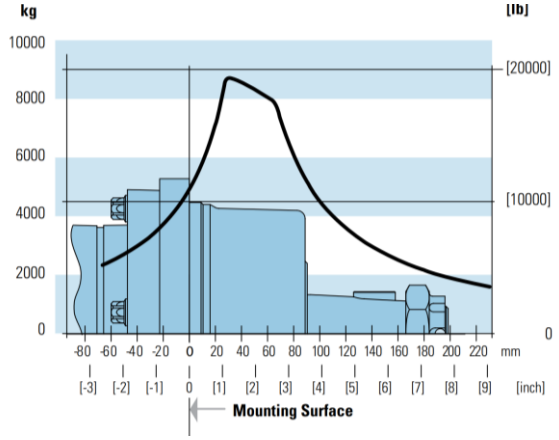


Figure 74 Wheel Mount side load capacity

RPM	Multiplication 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	0.54

Table 20 Multiplication factor

For 3,000,000 shaft revolutions or 500 hours — Increase these shaft loads 52%.

Product numbers

Use three-digit prefix (155-, 156-, or 157-) plus four-digit number from charts for complete product number (ex: 157-0034).

Orders will not be accepted without the three-digit prefix.

Product number							
Mounting	**Shaft**	**Port size**	**Displacement**				
			630 *38.6*	805 *48.6*	990 *60.5*	1245 *76.0*	1560 *95.0*
SAE							
Standard	2–5/8 inch Straight	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0107	-0108	-0109	-0110	-0111
	60 mm Tapered		155-0114	-0115	-0116	-0117	-0118
	70 mm 22 Tooth Splined		155-0121	-0122	-0123	-0124	-0125
	2–3/4 inch 32 Tooth Splined		155-0128	-0085	-0129	-0130	-0131
Wheel	2–5/8 inch Straight		156-0039	-0040	-0041	-0042	-0043
	60 mm Tapered		156-0046	-0047	-0048	-0049	-0050
Bearingless	(8 Bolt)		157-0066	-0067	-0068	-0069	-0070
	(4 Bolt)		157-0004	-	-	-	-
ISO							
Standard	2–5/8 inch Straight	G1 (BSP) (2) G ¼ (BSP) Drain Port (1)	155-0134	-0135	-0136	-0137	-0138
	60 mm Tapered		155-0141	-0142	-0143	-0144	-0145
	70 mm 22 Tooth Splined		155-0148	-0149	-0150	-0151	-0152
	2–3/4 inch 32 Tooth Splined		155-0155	-0156	-0157	-0158	-0159
Wheel	2–5/8 inch Straight		156-0053	-0054	-0055	-0056	-0057
	60 mm Tapered		156-0060	-0061	-0062	-0063	-0064
Bearingless	(8 Bolt)		157-0074	-0075	-0076	-0077	-0078
	(4 Bolt)		157-0081	-	-	-	-

Table 21 product numbers

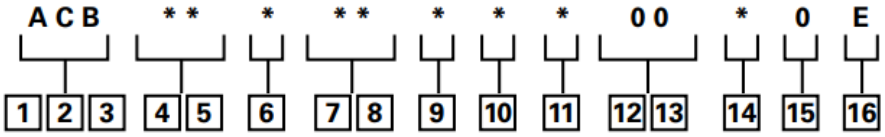
Note:

The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 15,2 bar [220 PSI].

- *A case drain is required for all closed loop VIS motor applications.*
- *The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].*

Model code

The following 16 - digit coding system has been developed to identify all of the configuration options for the VIS 45 motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1, 2, 3 Product Series
ACB – VIS 45 Motor

4, 5 Displacement cm³/r [in³/r]
39 – 630 [38.6]
49 – 805 [48.6]
60 – 990 [60.5]
76 – 1245 [76.0]
95 – 1500 [95.0]

6 Mounting Type
A – 4 Bolt Bearingless 158,70 [6.250] Pilot Dia. With 9,07 [.355] Pilot Length and 17,53 [.690] Dia holes on 190,50 [7.500] Dia. B. C. - Max. Torque Allowed 3615 Nm [32000 lb - in] (Displ. Code 32, 35, 39 Only)

C – 8 Bolt Bearingless 158,70 [6.250] Pilot Dia. With 9,07 [.355] Pilot Length and 17,53 [.690] Dia holes on 190,50 [7.500] Dia. Bolt Circle

D – 4 Bolt Wheel Mount 200,0 [7.87] Pilot Dia. With 9,0 [.35] Pilot Length and 20,57 [.810] Dia. Holes on 250,0 [9.84] Dia. Bolt Circle

H – 4 Bolt Standard Mount 200,0 [7.87] Pilot Dia. With 9,0 [.35] Pilot Length and 20,57 [.810] Dia. Holes on 250,00 [9.84] Dia. Bolt Circle

7, 8 Output Shaft
00 – None (Bearingless)

05 – 2-5/8 inch Dia. Straight Shaft with 5/8-18 UNF-2B Thread in End and 15,88 [.625] Sq. X 81,3 [3.20] Straight Key

06 – 70 mm Dia. 22 Tooth 3 Modulus Splined Shaft Per DIN 5480 with M16 X 1,5 Thread in End

08 – 2-3/4 inch Dia. Flat Root Side Fit 32 Tooth 12/24 DP 30°. Involute Spline with 5/8-18 UNF-2B Thread in End

09 – 60 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M42 x 3 - 6H Threaded Shaft End, 16W x 10H x 32L [.630W x .394H x 1.260L]

9 Ports
A – 1-5/16-12 UN-2B O-ring Port, Accepts Fittings for SAE J1926/1

B – G 1 (BSP) Ports, Accepts Fittings with Elastomeric or Deformable Metallic Sealing Member Per DIN 3852

10 Case Flow Options
B – Check valve with leakage orifice, no case drain (for Open Loop only)

D – Shuttle Valve with Side Facing 9/16-18 UNF-2B, O-ring Port Case Drain, Accepts Fittings for SAE J1926/1, Case Drain Required

H – Shuttle Valve with Side Facing G 1/4 (BSP) Port Case Drain, Case Drain Required

11 Back-Pressure Relief
0 – None (for Open Loop Only)

1 – Set at 15,2 bar [220 psi] (for Servo Pumps)

3 – Set at 4,5 bar [65 psi] (for Manual Pumps)

4 – Set at 20,7 bar [300 PSI] (for High Pressure Servo Pumps)

12, 13 Special Features
00 – None

14 Paint/ Special Packaging
0 – Primer, Individual Box

A – Low Gloss Black Primer, Individual Box

B – No Paint, Bulk Box Option

C – Low Gloss Black Primer, Bulk Box Option

15 Assigned Code when Applicable
0 – Assigned Code

16 Assigned Design Code
E – Assigned Design Code

Chapter 6
VIS 45 Series Two-speed

Topics:

Specification

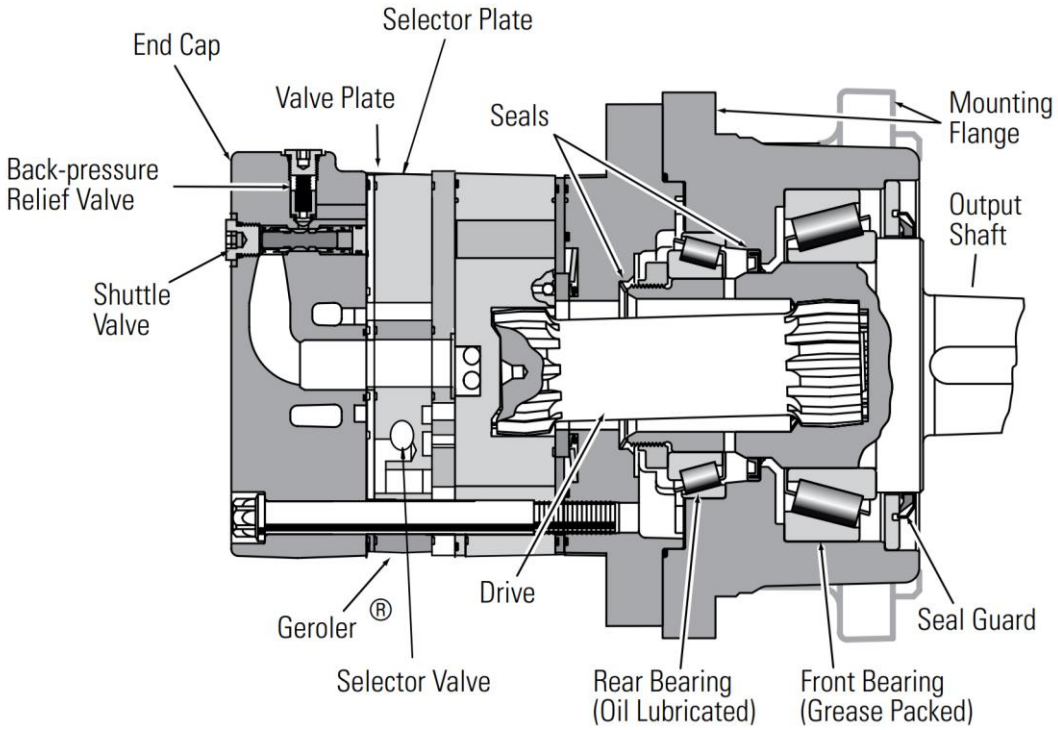


Figure 75 VIS 45 Two-speed

VIS 45 Series motors are available with an integral two-speed feature that allows the operator to shift the motor between low speed high torque (LSHT) mode and high speed low torque (HSLT) mode. In the LSHT mode, output torque and rotation speed values are equal to those of the conventional VIS 45 motor. In the HSLT mode motor displacement is reduced by one third, resulting in a fifty percent increase in rotation speed and a torque output reduction of one third. The VIS 45 two speed motor is bidirectional. It will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes. Shift on the fly technology allows full-power operation throughout the full duration of the shift.

Changing between modes is accomplished by changing the displacement in a ratio of 1 to 1.5. An external two-position three-way control valve is required for shifting pressure to the pilot port between low pressure (LSHT mode) and pilot signal pressure (HSLT mode). An integral selector valve shifts the motor from LSHT mode to HSLT mode. Initially, low pressure is supplied to the pilot port. The selector valve is biased to LSHT mode by a return spring. When pilot signal pressure is supplied to the pilot port and 3,5 Δbar [50 ΔPSI] is reached, the selector valve overcomes return spring force and the shifts the spool to select HSLT mode. Oil on the opposite side of the spool is drained to tank via the drain port. The pressure difference between the pilot port and drain port must be maintained to keep the motor in the high speed mode. When pilot pressure is removed from the pilot port, the pressure in the pilot end of the spool valve is relieved and drained back through the control valve and the return spring forces the spool valve to LSHT position.

Pilot pressure may come from any source that will provide uninterrupted pressure during the high-speed mode operation. Allowable pilot pressure must be at least 3,5 Δbar [50 ΔPSI] and may be as high as full operating pressure of the motor.

All VIS 45 Series two speed motors are equipped with a return line shuttle for closed circuit applications as standard equipment. All options available on the conventional VIS 45 are also available on VIS 45 two speed motors.

Performance Data

In the LSHT mode, torque and speed values are equal to those of the conventional VIS 45 motor. In the HSLT mode, rotation speed is increased by fifty percent and torque output is reduced by one third. The VIS 45 two speed motor will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes.

Dimensions

Ports

1-5/16 – 12 UN-2B SAE O-ring Ports (2)
9/16-18 UNF-2B SAE O-ring Case Drain Port (1) or
7/16-20 UNF-2B SAE O-ring Shift Ports (2)

G 1 (BSP) O-ring Ports (2)
G 1/4 (BSP) O-ring Case Drain Port (1)
7/16-20 UNF – 2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Shaft End
Port A Pressurized — CW
Port B Pressurized — CCW

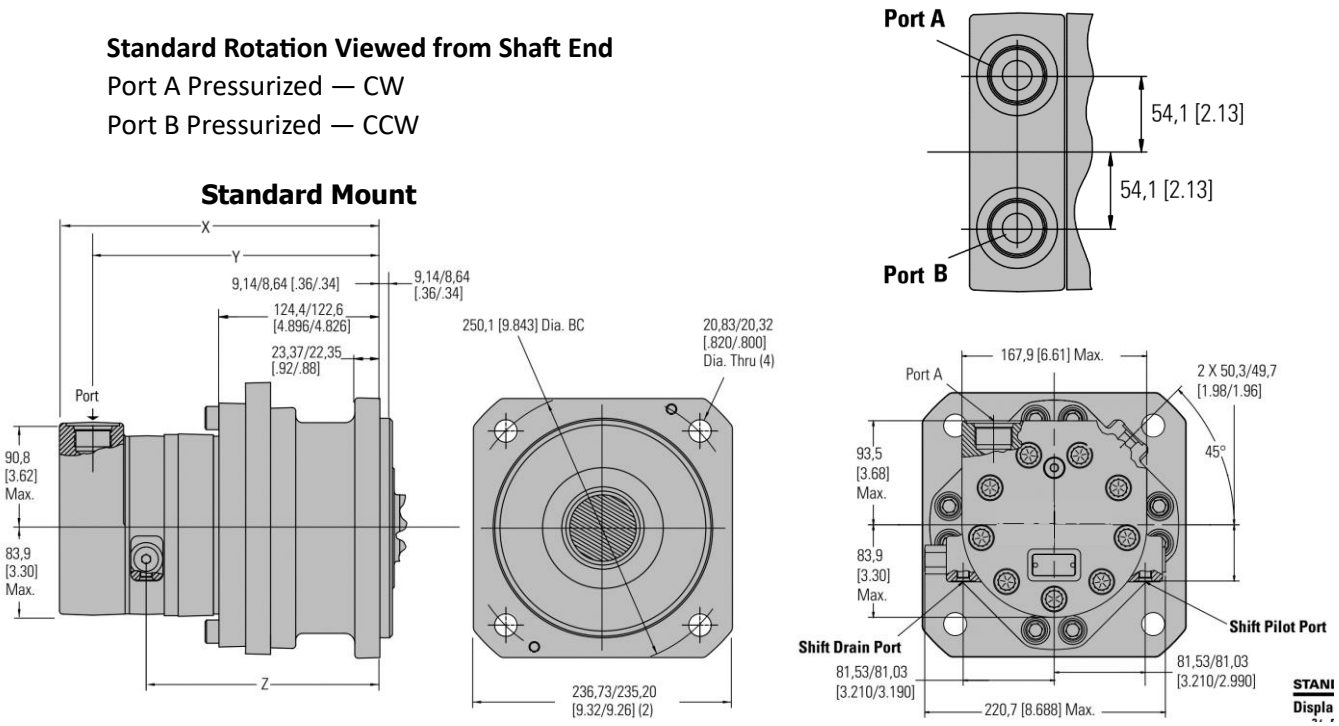


Figure 76 VIS 45 Two-Speed Standard Mount

Dimensions	Displacement cm^3/r [in^3/r]				
	630 [38.6]	**805 [48.6]**	**990 [60.5]**	**1245 [76.0]**	**1560 [95.0]**
X	295.5	305.9	318.3	334.3	353.3
mm [in]	*11.63*	*12.04*	*12.53*	*13.16*	*13.94*
Y	263.2	273.6	286.0	302.0	321.0
mm [in]	10.36	10.77	11.26	11.89	12.67
Z	216.3	226.7	239.1	255.1	274.1
mm [in]	*8.51*	*8.92*	*9.41*	*10.04*	*10.82*

Table 22 Two speed standard mount Motors dimensions

Wheel Mount

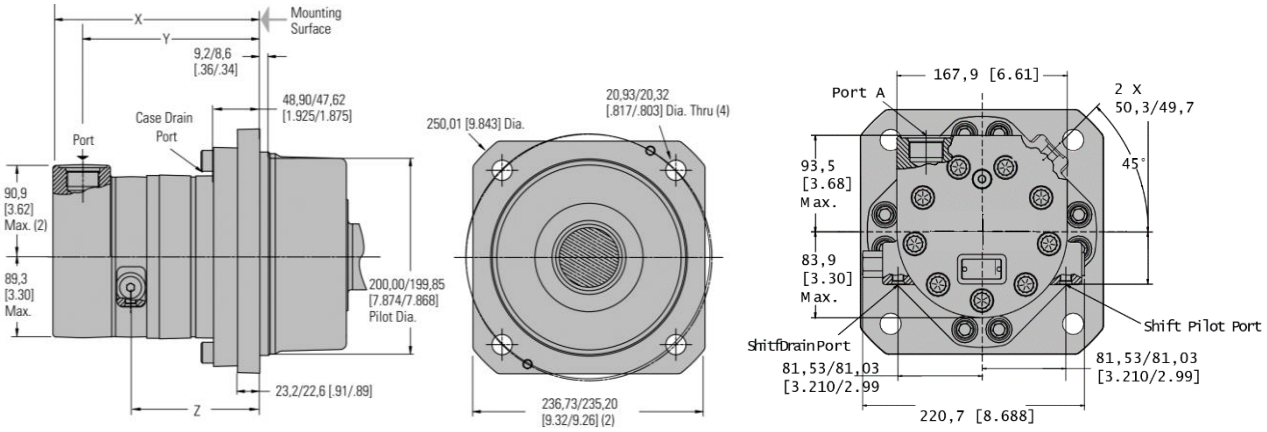
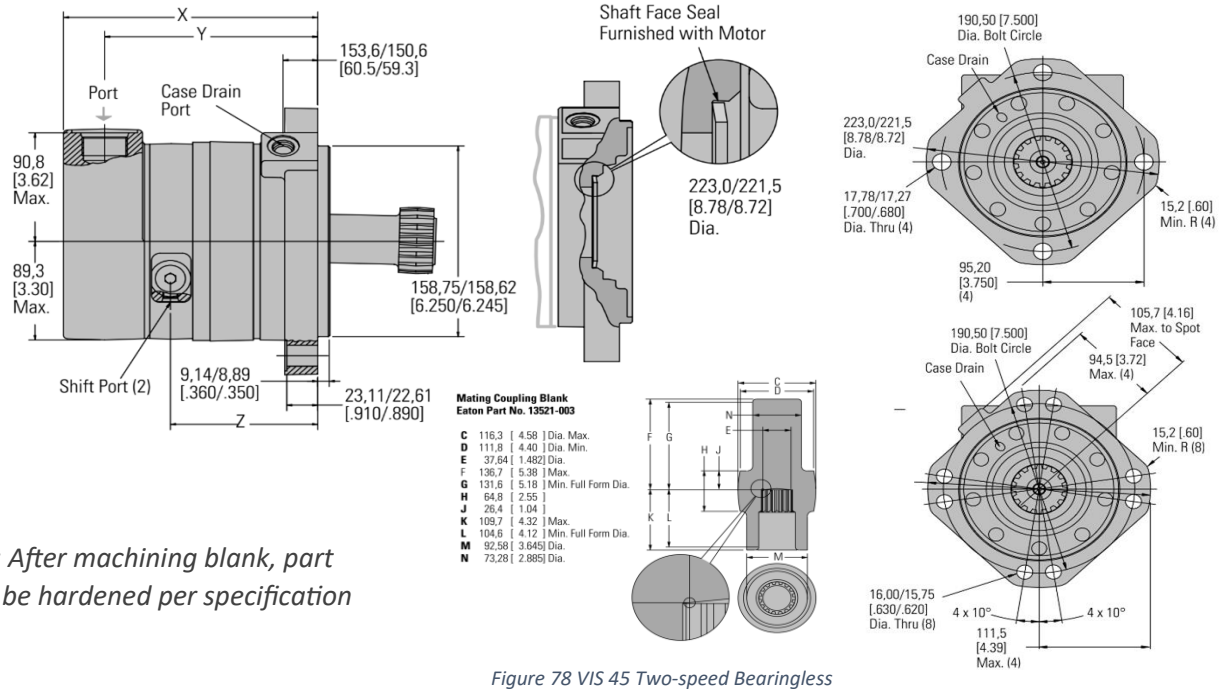


Figure 77 VIS 45 Two-speed Wheel Mount

Dimensions	Displacement cm^3/r [in^3/r]				
	630 [38.6]	**805 [48.6]**	**990 [60.5]**	**1245 [76.0]**	**1560 [95.0]**
X	218.8	229.2	241.6	257.6	276.6
mm [in]	*8.61*	*9.02*	*9.51*	*10.14*	*10.92*
Y	186.5	196.9	209.4	225.6	245.4
mm [in]	7.34	7.75	8.24	8.88	9.66
Z	139.6	150.0	162.4	178.4	197.4
mm [in]	*5.49*	*5.90*	*6.39*	*7.02*	*7.80*

Table 23 Two speed Wheel Mount Motors dimensions

Bearingless



Note: After machining blank, part must be hardened per specification

Figure 78 VIS 45 Two-speed Bearingless

Dimensions	Displacement cm^3/r [in^3/r]				
	630 [38.6]	**805 [48.6]**	**990 [60.5]**	**1245 [76.0]**	**1560 [95.0]**
X	196.1	206.5	218.9	235.2	255.0
mm [in]	*7.72*	*8.13*	*8.62*	*9.26*	*10.04*
Y	165.9	176.3	188.8	205.0	224.8
mm [in]	6.53	6.94	7.43	8.07	8.85
Z	116.9	127.3	139.7	156.0	175.8
mm [in]	*4.60*	*5.01*	*5.50*	*6.14*	*6.92*

Table 24 Two speed Bearingless Motors dimensions

Product numbers

Use digit prefix—173-,174- or 183- plus four digit number from charts for complete product number

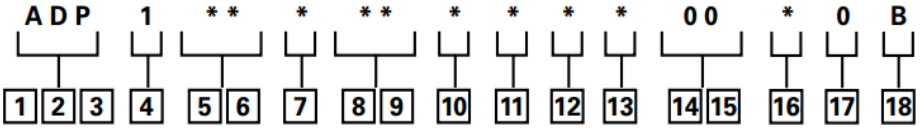
Example: 173-0013.

Orders will not be accepted without three digit prefix.

			Product number				
		Displacement	630	805	990	1245	1560
Mounting	**Shaft**	**Port size**	*38.6*	*48.6*	*60.5*	*76.0*	*95.0*
SAE							
Standard	2–5/8 inch Straight	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0006	-0007	-0008	-0009	-0010
	60 mm Tapered		174-0011	-0012	-0013	-0014	-0015
	70 mm 22 Tooth Splined		174-0016	-0017	-0018	-0019	-0020
Wheel	2–3/4 inch 32 Tooth Splined		174-0021	-0022	-0023	-0024	-0025
	2–5/8 inch Straight		183-0006	-0007	-0008	-0009	-0010
	60 mm Tapered		183-0011	-0012	-0013	-0014	-0015
Bearingless	(8 Bolt)		173-0008	-0009	-0010	-0011	-0012
	(4 Bolt)		173-0013	-	-	-	-
ISO							
Standard	2–5/8 inch Straight	G1 (BSP) (2) G ¼ (BSP) Drain Port (1)	174-0026	-0027	-0028	-0029	-0030
	60 mm Tapered		174-0031	-0032	-0033	-0034	-0035
	70 mm 22 Tooth Splined		174-0036	-0037	-0038	-0039	-0040
Wheel	2–3/4 inch 32 Tooth Splined		174-0041	-0042	-0043	-0044	-0045
	2–5/8 inch Straight		183-0016	-0017	-0018	-0019	-0020
	60 mm Tapered		183-0021	-0022	-0023	-0024	-0025
Bearingless	(8 Bolt)		173-0014	-0015	-0016	-0017	-0018
	(4 Bolt)		173-0019	-	-	-	-

Table 25 product numbers

Model Code



1, 2, 3 Product Series

ADP – VIS 45 Two-speed Motor

4 Assigned Code

1 – Assigned Code

5 6 Displacement cm³/r [in³/r]

49 – 805 [48.6]

60 – 990 [60.5]

76 – 1245 [76.0]

95 – 1560 [95.0]

7 Mounting Type

A – 4 Bolt Bearingless 158,70 [6.250] Pilot Dia. With 9,07 [.355] Pilot Length and 17,53 [.690] Dia holes on 190,50 [7.500] Dia. B. C. - Max. Torque Allowed 3615 Nm [32000 lb-in] (Displ. Code 32, 35, 39 Only)

C – 8 Bolt Bearingless 158,70 [6.250] Pilot Dia. With 9,07 [.355] Pilot Length and 17,53 [.690] Dia holes on 190,50 [7.500] Dia. Bolt Circle

D – 4 Bolt Wheel Mount 200,0 [7.87] Pilot Dea. With 9,0 [.35] Pilot Length and 20,57 [.810] Dia. Holes on 250,0 [9.84] Dia. Bolt Circle

H – 4 Bolt Standard Mount 200,0 [7.87] Pilot Dia. With 9,0 [.35] Pilot Length and 20,57 [.810] Dia. Holes on 250,00 [9.84] Dia. Bolt Circle

8, 9 Output Shaft

00 – None (Bearingless)

05 – 2-5/8 inch Dia. Straight Shaft with 5/8-18 UNF-2B Thread in End and 15,88 [.625] Sq. X 81,3 [3.20] Straight Key

06 – 70 mm Dia. 22 Tooth 3 Modulus Splined Shaft Per DIN 5480 with M16 X 1,5 Thread in End

08 – 2-3/4 inch Dia. Flat Root Side Fit 32 Tooth 12/24 DP 30°. Involute Spline with 5/8-18 UNF-2B Thread in End

09 – 60 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M42 x 3 - 6H Threaded Shaft End, 16W x 10H x 32L [.630W x .394H x 1.260L]

10 Ports

A – 1-5/16-12 UN-2B O-ring Port, Accepts Fittings for SAE J1926/1

B – G 1 (BSP) Straight Thread Ports

11 Case Flow Options

D – Shuttle Valve with Side Facing 9/16-18 UNF-2B, O-ring Port Case Drain, Accepts Fittings for SAE J1926/1, Case Drain Required

F – Shuttle Valve with Side Facing G 1/4 (BSP) Port Case Drain, Case Drain Required

12 Back-Pressure Relief

1 – Set at 15,2 bar [220 psi] (for Servo Pumps)

3 – Set at 4,5 bar [65 psi] (for Manual Pumps)

4 – Set at 20,7 bar [300 PSI] (for High Pressure Servo Pumps)

13 Assigned Code

0 – Assigned Code

14, 15 Special Features

00 – None

16 Paint/ Special Packaging

0 – Primer, Individual Box

A – Low Gloss Black Primer, Individual Box

B – No Paint, Bulk Box Option

C – Low Gloss Black Primer, Bulk Box Option

17 Assigned Code when Applicable

0 – Assigned Code

18 Assigned Design Code

B – Assigned Design Code

Figures

Tables

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