Design code -003

Displacements cm^3/r [in^3/r]
344 [21.0]
400 [24.4]
434 [26.5]
480 [29.3]
677 [41.3]

HP30 Motor

Powering Business Worldwide

Engineered for performance

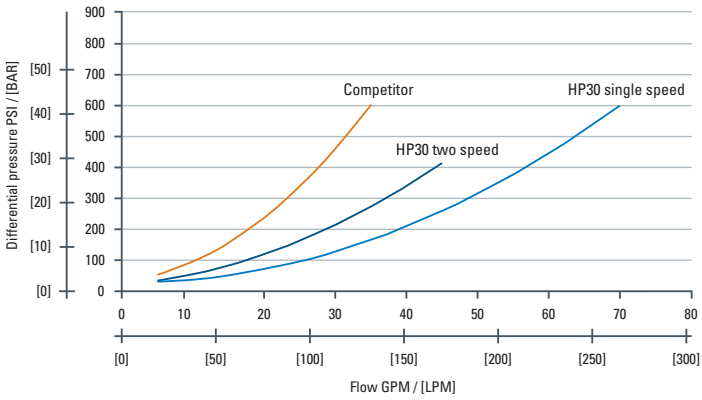
For the past 55 years, Char-Lynn has been recognized as the industry leader in low-speed, high-torque (LSHT) hydraulic motor technology. Today, Eaton continues in this tradition of performance and innovation with the release of the HP30, the latest in the Char-Lynn motor line up.

Featuring exceptional starting torque efficiency and two-speed capability, the HP30 offers significant advantages over competitive radial piston and designs. Also, by minimizing no load pressure drop to less than 20 bar [290 psi] at 133 lpm [35 gpm] in high speed mode – the best in the industry – the HP30 motor reduces parasitic heat build-up, thereby improving vehicle operating efficiency and reducing emissions.

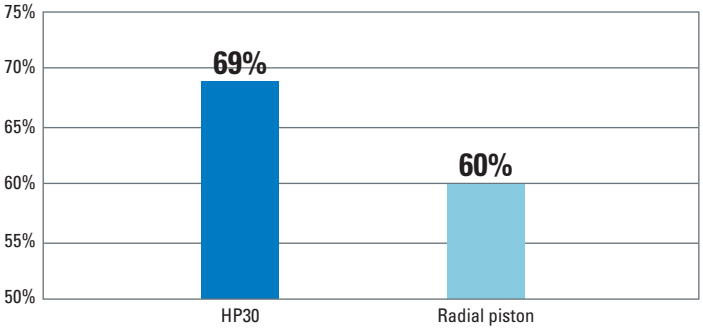
Options available for the HP30 motor include standard and wheel versions, and an enhanced Eaton front-mounted, spring-applied, pressure-released (SAPR) hydraulic brake. Additional series circuit compatibility makes the HP30 a very versatile motor.

More torque, less heat

HP30 NLPD - No Load Pressure Drop



Mechanical starting efficiency
5000 psid, 0.1 rpm, 220°F temp, 70 SUS, DTE 24



Many factors can dramatically affect the cost, and performance, of a hydraulic system. Heat generation and starting torque efficiency are two of the most significant. Eaton Char-Lynn HP30 motors provide industry leading performance in both areas, making them an ideal choice for both mobile and industrial hydraulic applications.

Heat generation and system cost

When a motor generates excess heat, this heat must be removed from the hydraulic system. Typically, this is done using oil coolers. The larger the cooler, the more expensive the system. The HP30 provides industry leading heat generation performance, minimizing system cooling costs and space requirements. This is achieved through a unique, patented valving design, which minimizes No Load Pressure Drop in both single and two-speed operating modes.

Starting torque efficiency and system performance

High starting torque efficiency means that the HP30 motor provides maximum power to the output shaft at start-up and lower pressure and flow requirements to initiate rotation. In both mobile and stationary machines, the HP30 motor provides the starting torque needed for the most demanding applications.

Table of contents

Features, benefits, and applications

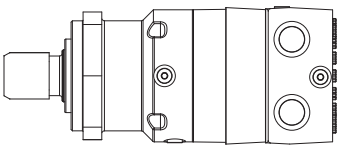
Features

Char-Lynn hydraulic motors provide design flexibility. All motors are available with various configurations consisting of:

- Displacement (Geroler size)
- Output shaft
- Port configuration
- Mounting flange

Benefits

- Lowest pressure drop motor in the industry
- The most experienced manufacturer of LSHT hydraulic motors
- High starting torque
- 2 speed capable
- Series circuit capable

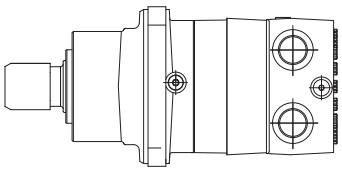


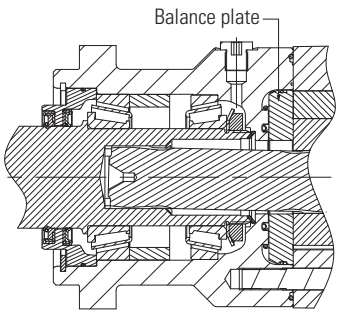
Standard motor

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 optimal bearing life. This wheel motor mounting flange provides design flexibility in many applications.





Balance plate

The HP30 uses a balance plate to reduce the leakage over the face of the rotating Geroler®. This Eaton patented device also protects the motor from high temperature differences between the fluid from the pump and the fluid communicated to the motor.

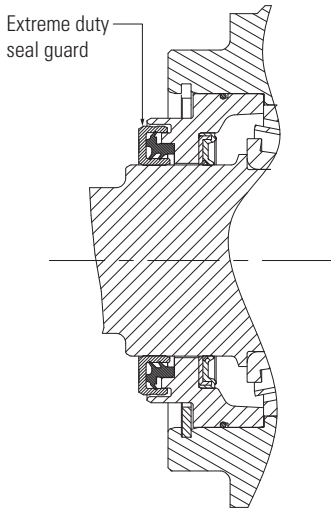
Applications for Eaton HP30 motors

- Harvesters
- Augers
- Forestry Equipment
- Grinders and Mixers
- Horizontal/Vertical Drilling
- Material Handling
- Metal Forming
- Sprayers
- Skid Steer Loaders

Extreme duty seal guard

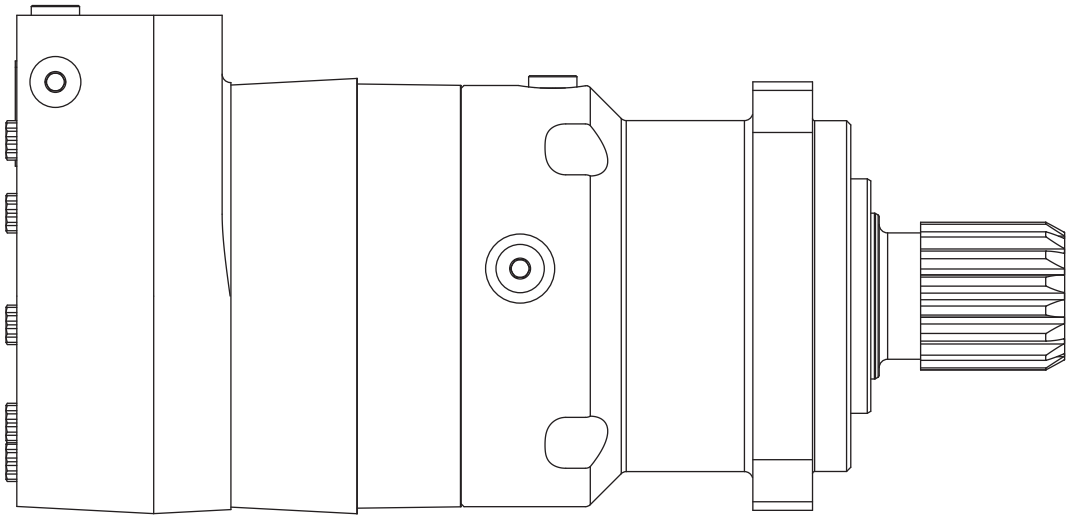
Extreme duty seals are engineered to equipment working in harsh conditions, such as cement augers, dredgers, fertilizer and salt spreaders, tillers and other machines that require power wash-downs.

The two piece seal features two channels, one stationary and one that rotates with the motor shaft. In between the channels is a greased cavity used to reduce friction and keep dirt out. Compared to the current industry standard slinger seal guard, the Extreme Duty Seal Guard adds three additional barriers to protect the motor from contamination.



Specifications

Single-speed



HP30 series motors, single-speed

Displ. cm³/r [in³/r]		344 [21.0]	400 [24.4]	434 [26.5]	480 [29.3]	677 [41.3]
Max. speed [rpm] @ flow	Continuous	495	426	392	355	252
	Intermittent	770	663	610	552	392
Flow l/min [gpm]	Continuous	170 [45]	170 [45]	170 [45]	170 [45]	170 [45]
	Intermittent	265 [70]	265 [70]	265 [70]	265 [70]	265 [70]
Torque Nm [lb-in]	Continuous	1,164 [14,288]	1,876 [16,601]	2,037 [18,030]	2,252 [19,935]	2,469 [21,852]
	Intermittent	1,764 [15,876]	2,084 [18,446]	2,263 [20,034]	2,503 [22,150]	2,893 [25,605]
Pressure Δ bar [Δ psi]	Continuous	310 [4,500]	310 [4,500]	310 [4,500]	310 [4,500]	241 [3,500]
	Intermittent	345 [5,000]	345 [5,000]	345 [5,000]	345 [5,000]	283 [4,100]
	Peak	379 [5,500]	379 [5,500]	379 [5,500]	379 [5,500]	310 [4,500]
Weight kg [lb]	Standard mount	36,9 [81.4]	37,6 [82.8]	38,0 [83.7]	38,4 [84.7]	40,4 [89.0]
	Wheel mount	39,7 [87.6]	40,4 [89.0]	40,7 [89.8]	41,2 [90.9]	43,2 [95.1]

Note: 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:

405 bar [5850 psi]

Do not exceed Δ pressure rating (see chart above).

Maximum return pressure:

405 bar [5850 psi] with case drain installed.

Do not exceed Δ pressure rating (see chart above).

Δ bar [Δ psi]:

The true pressure difference between inlet port and outlet port.

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 13 cSt [70 SUS] at operating temperature.

Recommended maximum system operating temp.:

82°C [180°F]

Recommended filtration:

Per ISO Cleanliness code, 4406: 20/18/13.

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 25.5 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No operation

344 cm³/r [21 in³/r]

Δ Pressure bar [psi]

Flow LPM [gpm]

	[500] **34**	[1000] **69**	[1500] **103**	[2000] **138**	[2500] **172**	[3000] **207**	[3500] **241**	[4000] **276**	[4500] **310**	[5000] **345**	[5500] **379**
19	[1472]	[3021]	[4579]	[5078]	[7624]	[9108]	[10720]	[12211]	[13768]	[15245]	[16676]
	166	*341*	*517*	*574*	*861*	*1029*	*1211*	*1380*	*1556*	*1722*	*1884*
[5]	**50**	**48**	**46**	**44**	**43**	**40**	**39**	**38**	**38**	**36**	**33**
30	[1491]	[3068]	[4604]	[6170]	[7762]	[9319]	[10876]	[12445]	[13984]	[15485]	[16891]
	169	*347*	*520*	*697*	*877*	*1053*	*1229*	*1406*	*1580*	*1750*	*1908*
[8]	**81**	**76**	**74**	**74**	**74**	**72**	**70**	**68**	**66**	**64**	**61**
45	[1462]	[3067]	[4613]	[6217]	[7779]	(9346)	[10948]	[12477]	[14015]	[15547]	[16951]
	165	*346*	*521*	*702*	*879*	*1056*	*1237*	*1410*	*1583*	*1757*	*1915*
[12]	**124**	**118**	**114**	**113**	**113**	**112**	**110**	**108**	**106**	**103**	**100**
61	[1436]	[3037]	[4608]	[6178]	[7753]	(9340)	[10914]	[12490]	[14040]	[15429]	[16866]
	162	*343*	*521*	*698*	*876*	*1055*	*1233*	*1411*	*1586*	*1743*	*1906*
[16]	**167**	**159**	**154**	**152**	**151**	**151**	**150**	**148**	**145**	**143**	**140**
76	[1408]	[3004]	[4576]	[6156]	[7744]	(9313)	[10902]	[12452]	[13830]	[15317]	[16809]
	159	*339*	*517*	*696*	*875*	*1052*	*1232*	*1407*	*1563*	*1731*	*1899*
[20]	**211**	**201**	**195**	**191**	**190**	**189**	**188**	**187**	**185**	**183**	**179**
91	[1351]	[2969]	[4556]	[6125]	[7724]	(9301)	[10897]	[12470]	[13972]	[15407]	[16679]
	153	*335*	*515*	*692*	*873*	*1051*	*1231*	*1409*	*1579*	*1741*	*1885*
[24]	**255**	**243**	**237**	**232**	**229**	**227**	**226**	**226**	**223**	**220**	**218**
106	[1340]	[2930]	[4501]	[6087]	[7665]	(9255)	[10835]	[12392]	[13792]	[15233]	[16704]
	151	*331*	*509*	*688*	*866*	*1046*	*1224*	*1400*	*1558*	*1721*	*1887*
[28]	**296**	**285**	**278**	**273**	**269**	**266**	**265**	**264**	**253**	**250**	**245**
121	[1303]	[2856]	[4443]	[6011]	[7604]	(9196)	[10779]	[12331]	[13679]	[15084]	[16600]
	147	*323*	*502*	*679*	*859*	*1039*	*1218*	*1393*	*1546*	*1704*	*1875*
[32]	**341**	**328**	**319**	**312**	**308**	**305**	**303**	**302**	**301**	**298**	**294**
136	[1287]	[2794]	[4378]	[5958]	[7522]	(9110)	[10688]	[12252]	[13568]	[15007]	[16569]
	145	*316*	*495*	*673*	*850*	*1029*	*1208*	*1384*	*1533*	*1696*	*1872*
[36]	**384**	**371**	**361**	**354**	**349**	**345**	**341**	**338**	**334**	**331**	**328**
151	[1253]	[2698]	[4317]	[5879]	[7443]	(9019)	[10586]	[12107]	[13451]	[14944]	[16505]
	142	*305*	*488*	*664*	*841*	*1019*	*1196*	*1368*	*1520*	*1688*	*1865*
[40]	**427**	**414**	**403**	**395**	**390**	**385**	**381**	**379**	**377**	**374**	**370**
170	[1237]	[2674]	[4203]	[5785]	[7331]	(8891)	[10472]	[11919]	[13429]	[14905]	[16474]
	140	*302*	*475*	*654*	*828*	*1005*	*1183*	*1347*	*1517*	*1684*	*1861*
[45]	**485**	**465**	**455**	**446**	**440**	**434**	**430**	**426**	**423**	**421**	**418**
227	[1100]	[2351]	[3669]	[5550]	[6724]	[8574]	[10040]	[11407]	[12771]	[14384]	[16124]
	124	*266*	*415*	*627*	*760*	*969*	*1134*	*1289*	*1443*	*1625*	*1822*
[60]	**645**	**622**	**609**	**599**	**587**	**580**	**542**	**572**	**567**	**564**	**593**
265		[2215]	[3487]	[5385]	[6537]	[8438]	[9883]	[11218]	[12548]	[14184]	[15988]
		250	*394*	*608*	*739*	*953*	*1117*	*1267*	*1418*	*1603*	*1806*
[70]		**727**	**712**	**701**	**686**	**678**	**633**	**669**	**664**	**660**	**696**

[5385] *608* **701** } Torque [lb-in] *Nm* **Speed RPM**

400 cm³/r [24.4 in³/r]

Δ Pressure bar [psi]

Flow LPM [gpm]

	[500] **34**	[1000] **69**	[1500] **103**	[2000] **138**	[2500] **172**	[3000] **207**	[3500] **241**	[4000] **276**	[4500] **310**	[5000] **345**	[5500] **379**
15	[1696]	[3461]	[5232]	[7051]	[8788]	[10516]	[12132]	[13884]	[15098]	[16504]	[18112]
	192	*391*	*591*	*797*	*993*	*1188*	*1371*	*1569*	*1706*	*1865*	*2046*
[4]	**35**	**33**	**32**	**29**	**27**	**24**	**22**	**19**	**18**	**17**	**16**
30	[1734]	[3556]	[5378]	[7198]	[9016]	[10801]	[12635]	[14376]	[16092]	[17786]	[19750]
	196	*402*	*608*	*813*	*1019*	*1220*	*1428*	*1624*	*1818*	*201*	*2231*
[8]	**73**	**70**	**67**	**66**	**63**	**61**	**58**	**55**	**52**	**48**	**46**
45	[1709]	[3560]	[5382]	[7225]	[9032]	[10837]	[12652]	[14448]	[16178]	[17912]	[19752]
	193	*4002*	*608*	*816*	*1020*	*1224*	*1429*	*1632*	*1828*	*2024*	*2232*
[12]	**111**	**107**	**102**	**99**	**97**	**96**	**93**	**90**	**88**	**84**	**83**
61	[1667]	[3514]	[5354]	[7194]	[9012]	[10840]	[12644]	[14421]	[16192]	[17953]	[19755]
	188	*397*	*605*	*813*	*1018*	*1225*	*1429*	*1629*	*1829*	*2028*	*2232*
[16]	**148**	**143**	**139**	**134**	**132**	**130**	**128**	**125**	**121**	**118**	**116**
76	[1650]	[3462]	[5306]	[7147]	[8966]	[10766]	[12586]	[14373]	[16139]	[17861]	[19745]
	186	*391*	*599*	*807*	*1013*	*1216*	*1422*	*1624*	*1824*	*20018*	*2231*
[20]	**184**	**179**	**174**	**169**	**166**	**164**	**161**	**159**	**156**	**152**	**150**
95	[1650]	[3351]	[5239]	[7074]	[8916]	[10685]	[12471]	[14257]	[15974]	[17715]	[19648]
	186	*379*	*592*	*799*	*1007*	*1207*	*1409*	*1611*	*18055*	*2002*	*2220*
[25]	**231**	**225**	**219**	**214**	**209**	**205**	**202**	**199**	**197**	**194**	**191**
114	[1631]	[3280]	[5112]	[6957]	[8765]	[10578]	[12402]	[14140]	[15908]	[17622]	[19528]
	184	*371*	*578*	*786*	*990*	*1195*	*1401*	*1598*	*1797*	*1991*	*2206*
[30]	**278**	**270**	**264**	**259**	**254**	**249**	**245**	**242**	**238**	**233**	**231**
132	[1553]	[3154]	[4986]	[6858]	[8658]	[10439]	[12268]	[14032]	[15792]	[17454]	[19350]
	175	*356*	*563*	*775*	*978*	*1179*	*1386*	*1585*	*1784*	*1972*	*2186*
[35]	**325**	**317**	**310**	**303**	**298**	**293**	**288**	**284**	**279**	**274**	**271**
151	[1514]	[3081]	[4881]	[6733]	[8532]	[10342]	[12116]	[13934]	[15659]	[17415]	[19301]
	171	*348*	*551*	*761*	*964*	*1168*	*1369*	*1574*	*1769*	*1968*	*2181*
[40]	**371**	**363**	**355**	**348**	**341**	**335**	**329**	**323**	**317**	**310**	**305**
170	[1492]	[2997]	[4731]	[6545]	[8342]	[10144]	[11950]	[13773]	[15512]	[17139]	[18965]
	169	*339*	*535*	*739*	*943*	*1146*	*1350*	*1556*	*1753*	*1936*	*2143*
[45]	**417**	**408**	**396**	**392**	**384**	**378**	**372**	**363**	**356**	**350**	**347**
227	[1402]	[2782]	[4420]	[6147]	[7951]	[9737]	[11541]	[13403]	[15134]	[16680]	[18438]
	158	*314*	*499*	*694*	*898*	*1100*	*1304*	*1514*	*1710*	*1885*	*2083*
[60]	**557**	**546**	**529**	**526**	**514**	**507**	**498**	**485**	**474**	**468**	**464**
265		[2639]	[4212]	[5882]	[7690]	[9465]	[11268]	[13157]	[14882]	[16374]	[18087]
		298	*476*	*665*	*869*	*1069*	*1273*	*1487*	*1681*	*1850*	*2044*
[70]		**637**	**617**	**615**	**601**	**593**	**583**	**566**	**553**	**546**	**542**

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 25.5 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No operation

434 cm³/r [26.5 in³/r]

Δ Pressure bar [psi]

Flow LPM [gpm]

	[500] **34**	[1000] **69**	[1500] **103**	[2000] **138**	[2500] **172**	[3000] **207**	[3500] **241**	[4000] **276**	[4500] **310**	[5000] **345**	[5500] **379**
19	[1859]	[3828]	[5846]	[7798]	[9707]	[11679]	[13580]	[15532]	[17715]	[19497]	[21425]
	210	*433*	*660*	*881*	*1097*	*1320*	*1534*	*1755*	*2002*	*2203*	*2421*
[5]	**40**	**38**	**37**	**35**	**33**	**32**	**30**	**28**	**29**	**26**	**27**
30	[1917]	[3890]	[5878]	[7878]	[9867]	[11834]	[13790]	[15797]	[17767]	[19788]	[21610]
	2174	*440*	*664*	*890*	*1115*	*1337*	*1558*	*1784*	*2007*	*2236*	*2442*
[8]	**66**	**64**	**62**	**60**	**58**	**56**	**54**	**52**	**51**	**49**	**47**
45	[1883]	[3885]	[5878]	[7881]	[9858]	[11839]	[13859]	[15853]	[17818]	[19785]	[21706]
	213	*439*	*664*	*890*	*1114*	*1338*	*1566*	*1791*	*2013*	*2235*	*2452*
[12]	**100**	**97**	**94**	**92**	**89**	**87**	**84**	**82**	**80**	**78**	**76**
61	[1838]	[3852]	[5847]	[7872]	[9853]	[11838]	[13862]	[15893]	[17850]	[19839]	[21761]
	208	*435*	*661*	*889*	*1113*	*1338*	*1566*	*1796*	*2017*	*2241*	*2459*
[16]	**135**	**130**	**127**	**125**	**122**	**119**	**116**	**113**	**111**	**109**	**106**
76	[1794]	[3819]	[5824]	[7845]	[9843]	[11848]	[13869]	[15884]	[17843]	[19799]	[21725]
	203	*431*	*658*	*886*	*1112*	*1339*	*1567*	*1798*	*2016*	*2237*	*2455*
[20]	**169**	**164**	**160**	**157**	**154**	**151**	**148**	**144**	**141**	**139**	**138**
91	[1753]	[3779]	[5791]	[7785]	[9763]	[11791]	[13846]	[15825]	[17817]	[19801]	[21734]
	198	*427*	*654*	*880*	*1103*	*1332*	*1564*	*1788*	*2013*	*2237*	*2456*
[24]	**203**	**197**	**193**	**189**	**186**	**183**	**180**	**177**	**174**	**171**	**169**
106	[1688]	[3715]	[5742]	[7733]	[9738]	[11768]	[13789]	[15806]	[17794]	[19751]	[21696]
	191	*420*	*649*	*874*	*1100*	*1330*	*1558*	*1786*	*2010*	*2232*	*2451*
[28]	**238**	**231**	**226**	**222**	**218**	**215**	**212**	**209**	**206**	**203**	**200**
121	[1588]	[3653]	[5657]	[7678]	[9657]	[11682]	[13713]	[15711]	[17695]	[19727]	[21634]
	179	*413*	*639*	*867*	*1091*	*1320*	*1549*	*1775*	*1999*	*2229*	*2444*
[32]	**273**	**264**	**258**	**254**	**250**	**246**	**243**	**240**	**237**	**235**	**232**
136	[1549]	[3581]	[5591]	[7600]	[9607]	[11613]	[13655]	[15643]	[17650]	[19613]	[21580]
	175	*405*	*632*	*859*	*1085*	*1312*	*1543*	*1767*	*1994*	*2216*	*2438*
[36]	**307**	**298**	**292**	**287**	**282**	**279**	**275**	**271**	**267**	**264**	**261**
151	[1559]	[3492]	[5489]	[7487]	[9504]	[11523]	[13515]	[15588]	[17555]	[19507]	[21518]
	176	*395*	*620*	*846*	*1074*	*1302*	*1527*	*1761*	*1983*	*2204*	*2431*
[40]	**341**	**333**	**325**	**319**	**314**	**310**	**306**	**302**	**299**	**295**	**292**
170	[1539]	[3367]	[5382]	[7376]	[9371]	[11378]	[13423]	[15413]	[17452]	[19379]	[21348]
	174	*380*	*608*	*833*	*1059*	*1286*	*1517*	*1741*	*1972*	*2189*	*2412*
[45]	**388**	**376**	**367**	**361**	**356**	**350**	**346**	**341**	**337**	**331**	**325**
227	[1283]	[3011]	[5023]	[6812]	[9069]	[10962]	[12917]	[14902]	[17045]	[18897]	[20911]
	145	*340*	*568*	*770*	*1025*	*1238*	*1459*	*1684*	*1926*	*2135*	*2363*
[60]	**515**	**501**	**490**	**483**	**475**	**469**	**464**	**456**	**453**	**448**	**442**
265		[2845]	[4842]	[6614]	[8922]	[10801]	[12756]	[14741]	[16904]	[18743]	[20780]
		321	*547*	*747*	*1008*	*1220*	*1441*	*1666*	*1910*	*2118*	*2348*
[70]		**585**	**573**	**565**	**556**	**549**	**544**	**533**	**531**	**525**	**518**

[6614] *747* **565** } Torque [lb-in] *Nm* **Speed RPM**

480 cm³/r [29.3 in³/r]

Δ Pressure bar [psi]

Flow LPM [gpm]

	[500] **34**	[1000] **69**	[1500] **103**	[2000] **138**	[2500] **172**	[3000] **207**	[3500] **241**	[4000] **276**	[4500] **310**	[5000] **345**	[5500] **379**
19	[2030]	[4156]	[6239]	[8401]	[10381]	[12499]	[14668]	[16741]	[19004]	[21234]	[23044]
	229	*470*	*705*	*949*	*1173*	*1412*	*1657*	*1892*	*2147*	*2399*	*2604*
[5]	**36**	**34**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**26**	**25**
30	[2059]	[4245]	[6393]	[8526]	[10726]	[12911]	[15052]	[17096]	[19250]	[21386]	[23509]
	233	*48*	*722*	*863*	*1212*	*1459*	*1701*	*1932*	*2175*	*2416*	*2656*
[8]	**59**	**56**	**54**	**53**	**52**	**51**	**50**	**49**	**47**	**45**	**44**
45	[2043]	[4261]	[6424]	[8633]	[10768]	[12918]	[15167]	[17274]	[19448]	[21527]	[23674]
	231	*481*	*726*	*975*	*1217*	*1460*	*1714*	*1952*	*2197*	*2432*	*2675*
[12]	**90**	**86**	**84**	**83**	**80**	**79**	**77**	**73**	**75**	**73**	**75**
61	[2014]	[4232]	[6417]	[8604]	[10800]	[12956]	[15181]	[17330]	[19482]	[21545]	[23605]
	228	*478*	*725*	*972*	*1220*	*1464*	*1715*	*1958*	*2201*	*2434*	*2667*
[16]	**121**	**116**	**113**	**111**	**109**	**108**	**106**	**104**	**103**	**102**	**101**
76	[1971]	[4184]	[6377]	[8586]	[10764]	[12916]	[15137]	[17295]	[19378]	[21434]	[23390]
	223	*473*	*720*	*970*	*1216*	*1459*	*1710*	*1954*	*2189*	*2422*	*2643*
[20]	**152**	**146**	**142**	**139**	**137**	**135**	**133**	**132**	**131**	**130**	**128**
91	[1918]	[4137]	[6325]	[8538]	[10715]	[12889]	[15073]	[17201]	[19396]	[21426]	[23357]
	217	*467*	*715*	*965*	*1210*	*1456*	*1703*	*1944*	*2191*	*2421*	*2639*
[24]	**183**	**176**	**172**	**169**	**166**	**164**	**163**	**161**	**159**	**159**	**158**
106	[1844]	[4088]	[6270]	[8474]	[10648]	[12859]	[14966]	[17131]	[19218]	[21166]	[23211]
	208	*462*	*708*	*957*	*1203*	*1453*	*1691*	*1936*	*2171*	*2391*	*2622*
[28]	**214**	**207**	**202**	**198**	**195**	**193**	**192**	**190**	**188**	**188**	**183**
121	[1785]	[3990]	[6204]	[8397]	[10600]	[12798]	[15029]	[17032]	[19073]	[21209]	[2328]
	202	*451*	*701*	*949*	*1198*	*1446*	*1698*	*1924*	*2155*	*2396*	*2630*
[32]	**246**	**237**	**232**	**228**	**224**	**221**	**220**	**218**	**215**	**212**	**205**
136	[1682]	[3906]	[6107]	[8318]	[10479]	[12680]	[14802]	[16928]	[19033]	[21022]	[23073]
	190	*441*	*690*	*940*	*1184*	*1433*	*1672*	*1913*	*2150*	*2375*	*2607*
[36]	**277**	**268**	**261**	**257**	**253**	**250**	**247**	**246**	**244**	**243**	**242**
151	[1623]	[3812]	[6014]	[8227]	[10423]	[12599]	[14712]	[16821]	[18978]	[20968]	[23004]
	183	*431*	*680*	*930*	*1178*	*1424*	*1662*	*1900*	*2144*	*2369*	*2599*
[40]	**308**	**298**	**291**	**286**	**282**	**279**	**277**	**276**	**273**	**272**	**269**
170	[1593]	[3733]	[5901]	[8107]	[10256]	[12453]	[14601]	[16702]	[18803]	[20837]	[23039]
	180	*422*	*667*	*916*	*1159*	*1407*	*1650*	*1887*	*2125*	*2354*	*2603*
[45]	**346**	**336**	**328**	**322**	**317**	**314**	**311**	**309**	**307**	**306**	**304**
227	[1273]	[3369]	[5528]	[7547]	[9826]	[11901]	[14131]	[15883]	[18224]	[20258]	[22393]
	144	*381*	*625*	*853*	*1110*	*1345*	*1597*	*1795*	*2059*	*2289*	*2530*
[60]	**463**	**449**	**439**	**432**	**425**	**423**	**418**	**417**	**413**	**412**	**408**
265		[3202]	[5365]	[7342]	[9666]	[11731]	[13928]	[15659]	[17991]	[20012]	[22199]
		362	*606*	*829*	*1092*	*1325*	*1574*	*1769*	*2033*	*2261*	*2508*
[70]		**525**	**513**	**505**	**497**	**495**	**489**	**488**	**484**	**482**	**478**

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 25.5 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No operation

677 cm³/r [41.3 in³/r]

Δ Pressure bar [psi]

Flow LPM [gpm]

	[500] **34**	[1000] **69**	[1500] **103**	[2000] **138**	[2500] **172**	[3000] **207**	[3500] **241**	[4000] **276**	[4500] **310**
19	[2891] *327*	[5874] *664*	[8849] *1000*	[11879] *1342*	[14733] *1665*	[18029] *2037*	[21058] *2379*	[24108] *2724*	[26345] *2977*
[5]	**25**	**23**	**22**	**20**	**19**	**19**	**18**	**18**	**17**
30	[2946] *333*	[5976] *675*	[9040] *1021*	[12173] *1375*	[15193] *1717*	[18209] *2057*	[21319] *2409*	[24331] *2749*	[27149] *3067*
[8]	**42**	**39**	**37**	**36**	**34**	**33**	**32**	**31**	**30**
45	[2949] *333*	[6045] *683*	[9153] *1034*	[12250] *1384*	[15322] *1731*	[18427] *2082*	[21576] *2438*	[24476] *2765*	[27610] *3119*
[12]	**65**	**59**	**56**	**55**	**56**	**54**	**53**	**52**	**50**
61	[2894] *327*	[6012] *679*	[9092] *1027*	[12148] *1373*	[15242] *1722*	[18400] *2079*	[21479] *2427*	[24558] *1958*	[27562] *3114*
[16]	**87**	**82**	**77**	**74**	**73**	**73**	**72**	**70**	**69**
76	[2819] *318*	[5936] *671*	[9011] *1018*	[12090] *1366*	[15221] *1720*	[18322] *2070*	[21481] *2427*	[24547] *2773*	[27517] *3109*
[20]	**110**	**104**	**99**	**95**	**94**	**94**	**93**	**91**	**90**
91	[2740] *310*	[5846] *661*	[8918] *1008*	[11991] *1355*	[15079] *1704*	[18242] *2061*	[21380] *2416*	[24421] *2759*	[27386] *3094*
[24]	**132**	**125**	**120**	**116**	**113**	**113**	**113**	**112**	**111**
106	[2640] *298*	[5757] *650*	[8843] *999*	[11896] *1344*	[14926] *1686*	[18030] *2037*	[21241] *2400*	[24273] *2742*	[27183] *3071*
[28]	**150**	**147**	**141**	**135**	**133**	**131**	**130**	**130**	**130**
121	[2511] *284*	[5621] *635*	[8715] *985*	[11761] *1329*	[14858] *1679*	[18015] *2035*	[21090] *2383*	[24209] *2735*	[27101] *3062*
[32]	**176**	**169**	**162**	**157**	**153**	**151**	**153**	**154**	**152**
136	[2364] *267*	[5508] *622*	[8581] *969*	[11666] *1318*	[14749] *1666*	[17898] *2022*	[20993] *2372*	[24048] *2717*	[26990] *3050*
[36]	**199**	**190**	**184**	**178**	**176**	**174**	**175**	**175**	**173**
151	[2257] *255*	[5398] *610*	[8498] *960*	[11591] *1310*	[14680] *1659*	[17844] *2016*	[20981] *2371*	[24035] *2716*	[26911] *3041*
[40]	**222**	**212**	**205**	**199**	**195**	**193**	**193**	**195**	**195**
170	[2134] *241*	[5193] *587*	[8294] *667*	[11413] *1290*	[14489] *1637*	[17596] *1988*	[20716] *2341*	[23818] *2691*	[26687] *3015*
[45]	**249**	**240**	**233**	**226**	**222**	**219**	**214**	**212**	**211**
227	[1608] *182*	[4641] *524*	[7692] *869*	[10865] *1228*	[13773] *1556*	[16854] *1904*	[20139] *2275*	[22970] *2595*	[25908] *2927*
[60]	**333**	**321**	**312**	**304**	**296**	**293**	**291**	**293**	**292**
265		[4381] *495*	[7434] *840*	[10596] *1197*	[13519] *1527*	[16589] *1874*	[19870] *2245*	[22709] *2566*	[25603] *2893*
[70]		**375**	**366**	**357**	**347**	**344**	**341**	**343**	**342**

[10596] *1197* **357** } Torque [lb-in] *Nm* **Speed RPM**

Dimensions

Standard mount

Main 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

G1 (BSP) O-ring ports (2)

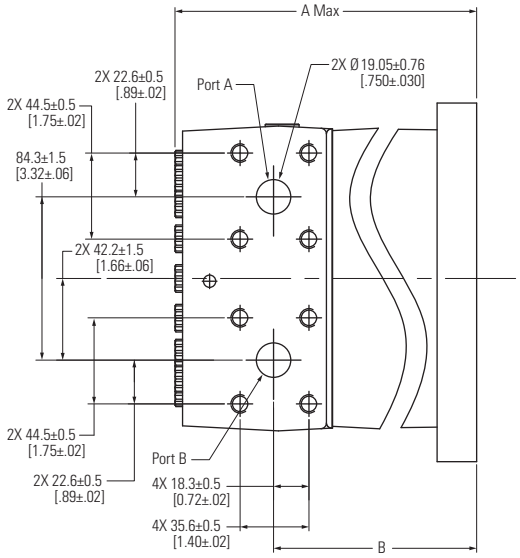
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

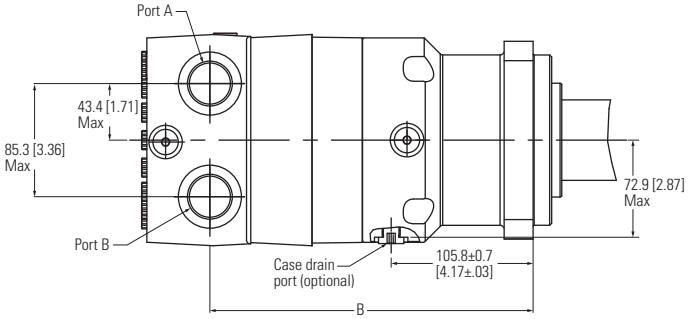
Port A pressurized – CW

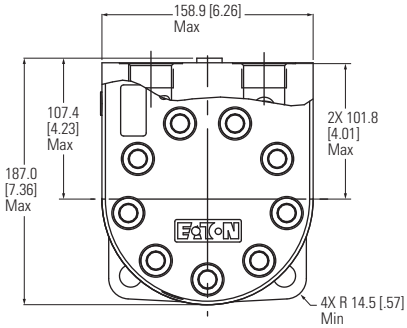
Port B pressurized – CCW

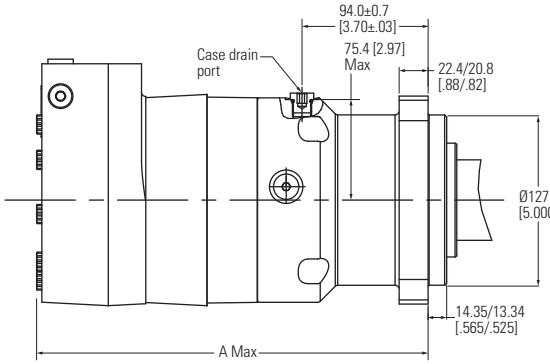
Manifold interface

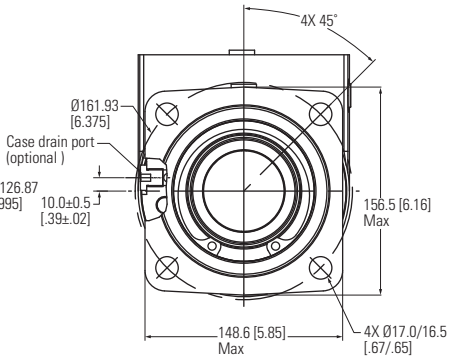


Closed loop









Motor dimensions – Standard mount

Displacement	A Max		B	
cm³/r [in³/r]	mm	[in]	mm	[in]
344 [21.0]	288.0	[11.34]	235.6	[9.28]
400 [24.4]	293.2	[11.55]	240.9	[9.49]
434 [26.5]	296.5	[11.67]	244.2	[9.61]
480 [29.3]	300.6	[11.84]	248.3	[9.78]
677 [41.3]	319.1	[12.56]	266.8	[10.50]

Dimensions

Standard mount

Main 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

G1 (BSP) O-ring ports (2)

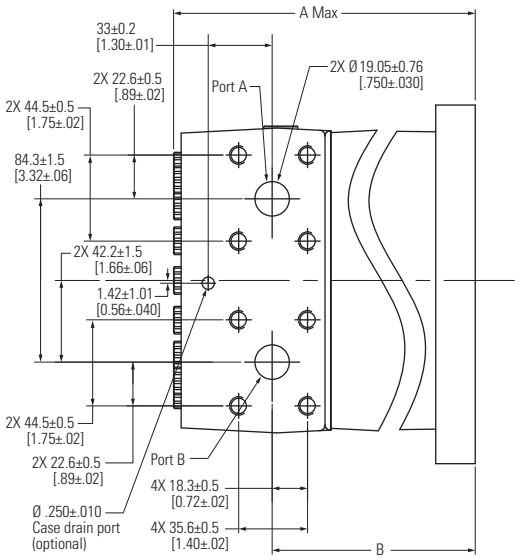
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

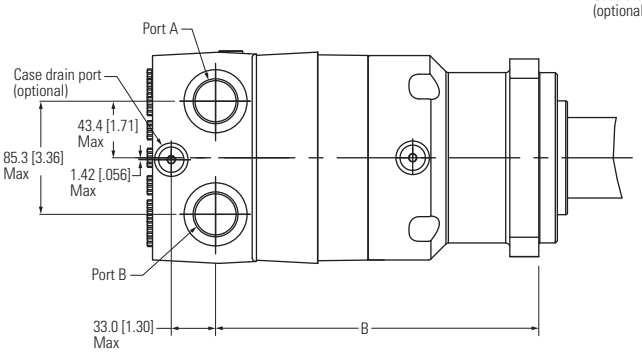
Port A pressurized – CW

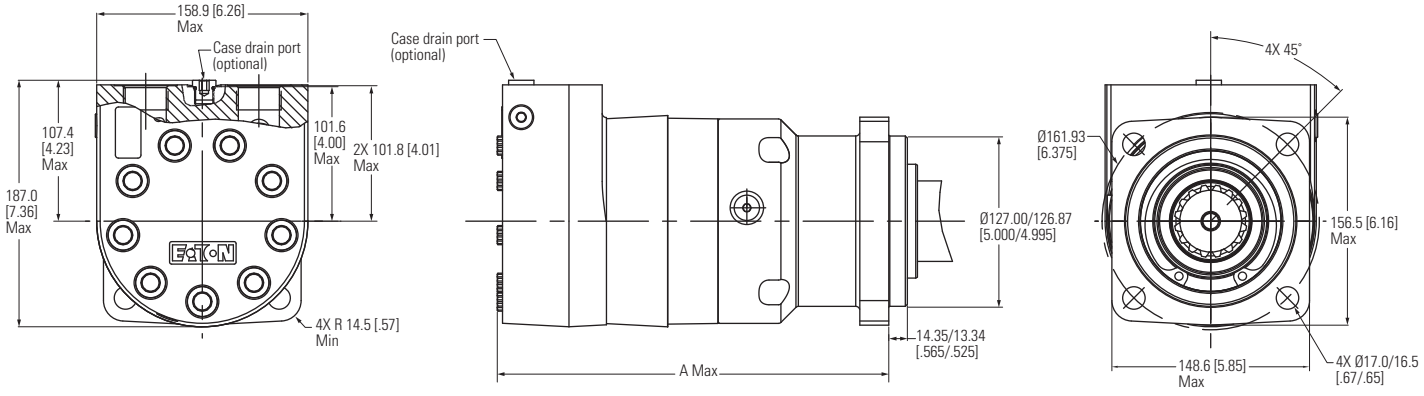
Port B pressurized – CCW

Manifold interface



Open loop





Motor dimensions – Standard mount

Displacement	A Max		B	
cm³/r [in³/r]	mm	[in]	mm	[in]
344 [21.0]	288.0	[11.34]	235.6	[9.28]
400 [24.4]	293.2	[11.55]	240.9	[9.49]
434 [26.5]	296.5	[11.67]	244.2	[9.61]
480 [29.3]	300.6	[11.84]	248.3	[9.78]
677 [41.3]	319.1	[12.56]	266.8	[10.50]

Note: Use of a case drain is optional in an open loop circuit if motor case pressure does not exceed 300 psi.

Dimensions

Wheel mount

Main 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

G1 (BSP) O-ring ports (2)

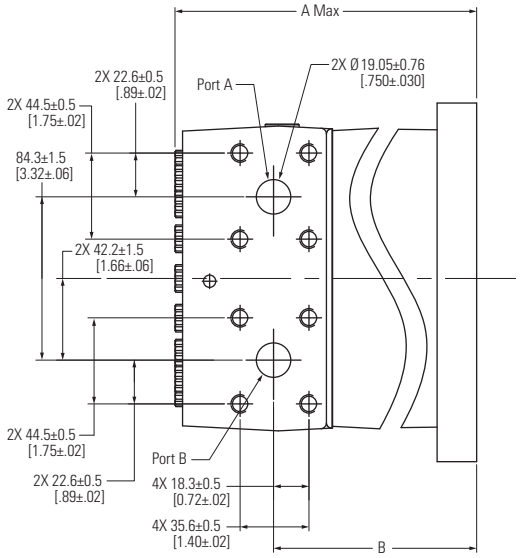
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

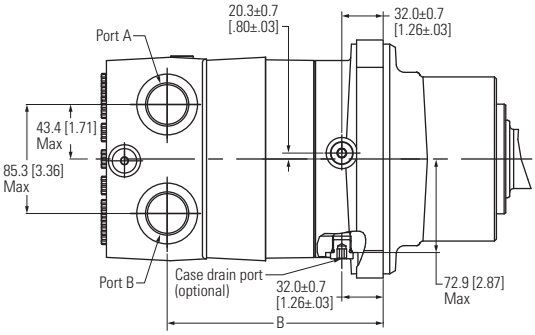
Port A pressurized – CW

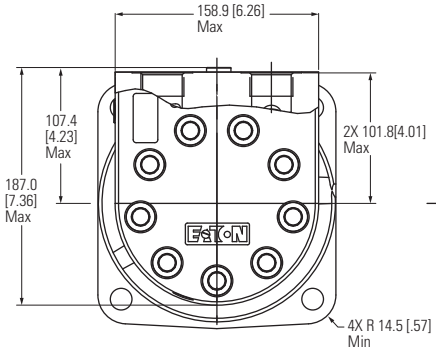
Port B pressurized – CCW

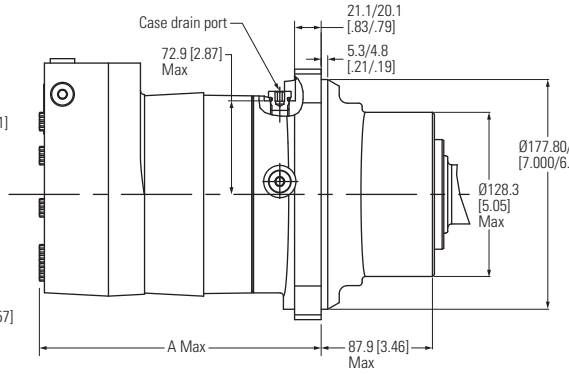
Manifold interface

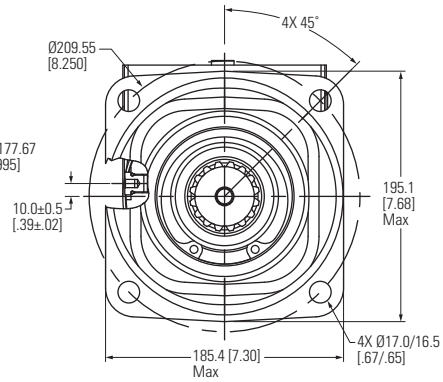


Closed loop









Motor dimensions – Wheel mount

Displacement	A Max		B	
cm³/r [in³/r]	mm	[in]	mm	[in]
344 [21.0]	214.2	[8.43]	161.8	[6.37]
400 [24.4]	219.5	[8.64]	167.1	[6.58]
434 [26.5]	222.7	[8.77]	170.4	[6.71]
480 [29.3]	226.8	[8.93]	174.5	[6.87]
677 [41.3]	245.3	[9.66]	193.0	[7.60]

Dimensions

Wheel mount

Main 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

G1 (BSP) O-ring ports (2)

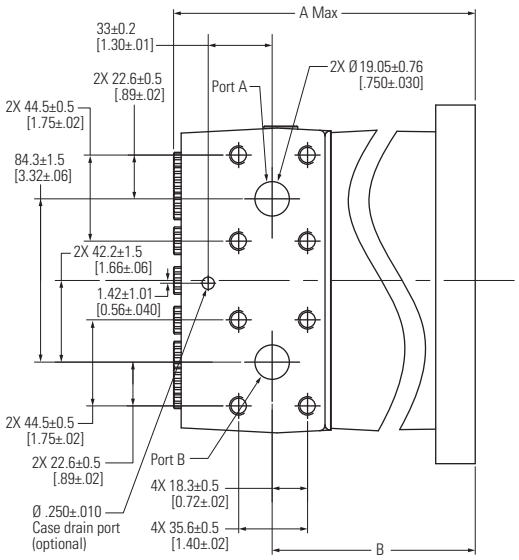
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

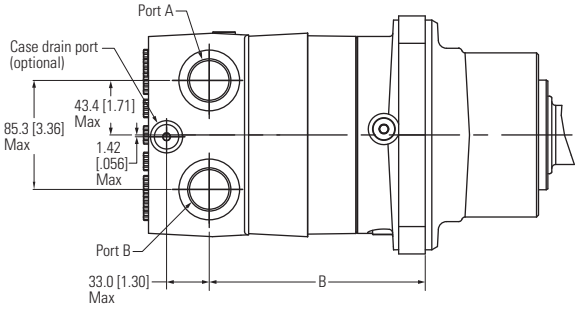
Port A pressurized – CW

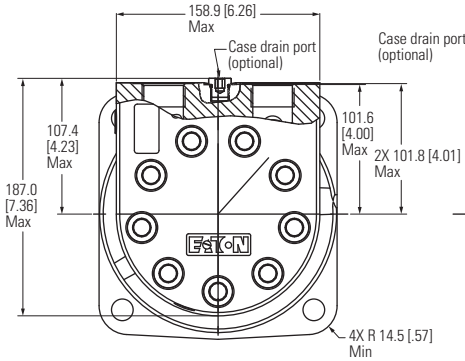
Port B pressurized – CCW

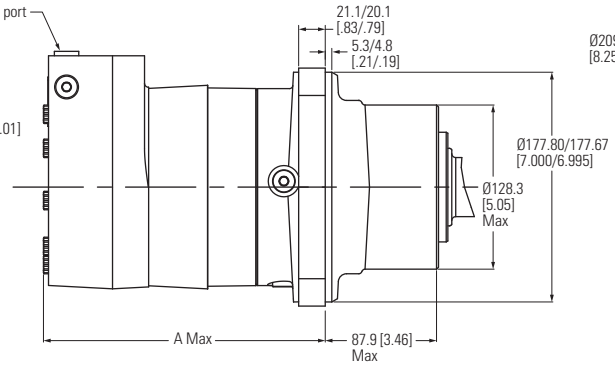
Manifold interface

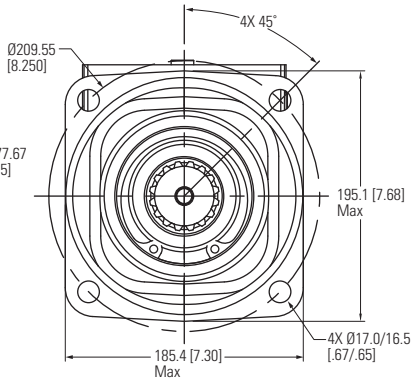


Open loop









Motor dimensions – Wheel mount

Displacement	A Max		B	
cm³/r [in³/r]	mm	[in]	mm	[in]
344 [21.0]	214.2	[8.43]	161.8	[6.37]
400 [24.4]	219.5	[8.64]	167.1	[6.58]
434 [26.5]	222.7	[8.77]	170.4	[6.71]
480 [29.3]	226.8	[8.93]	174.5	[6.87]
677 [41.3]	245.3	[9.66]	193.0	[7.60]

Note: Use of a case drain is optional in an open loop circuit if motor case pressure does not exceed 300 psi.

Dimensions

Bearlingless mount

For HP30 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Main 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

G1 (BSP) O-ring ports (2)

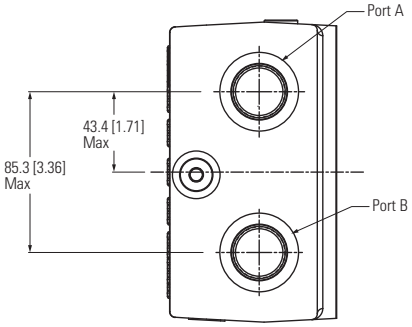
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from drive end

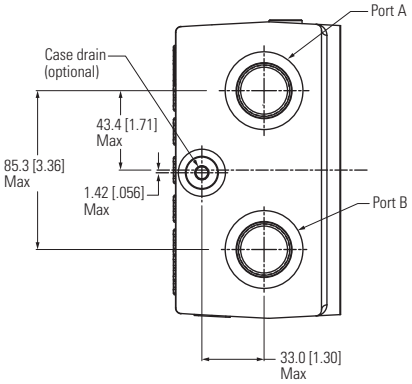
Port A pressurized — CW

Port B pressurized — CCW

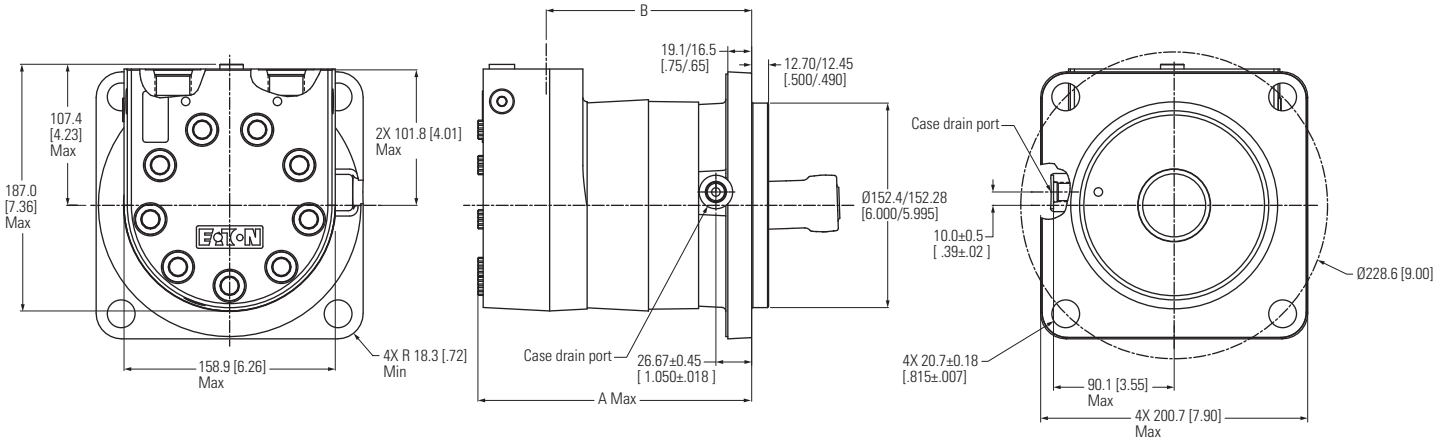
Closed loop configuration



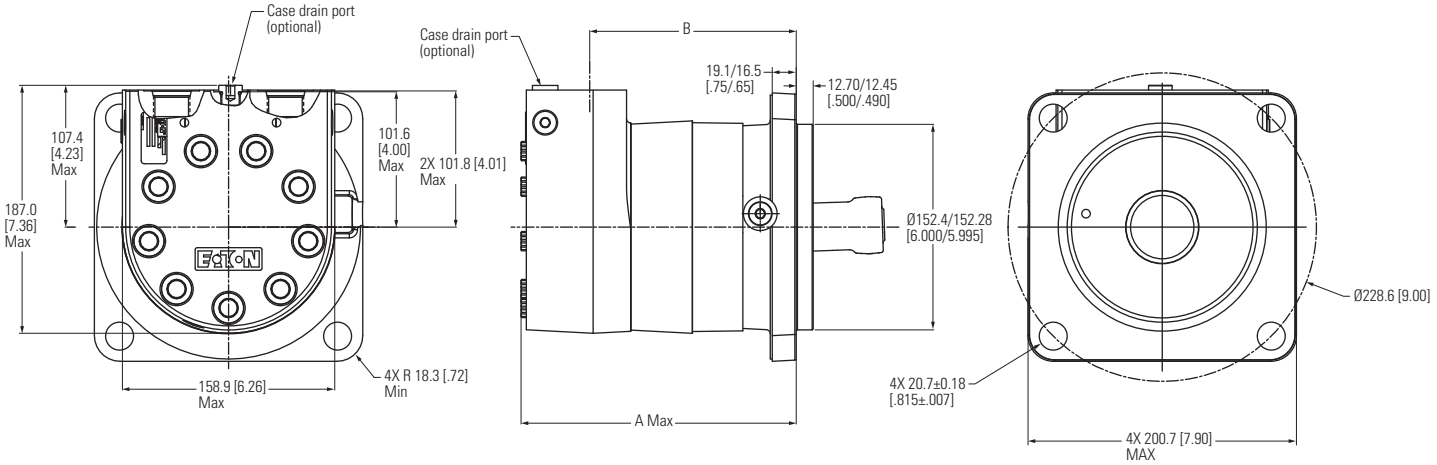
Open loop configuration



Closed loop



Open loop



Motor dimensions – Bearlingless mount

Displacement	A Max		B	
cm³/r [in³/r]	mm	[in]	mm	[in]
344 [21.0]	199.6	[7.86]	147.8	[5.82]
400 [24.4]	204.9	[8.07]	153.1	[6.03]
434 [26.5]	208.1	[8.19]	156.4	[6.16]
480 [29.3]	212.2	[8.36]	160.5	[6.32]
677 [41.3]	230.8	[9.09]	179.0	[7.05]

Note: Use of a case drain is optional in an open loop circuit if motor case pressure does not exceed 300 psi.

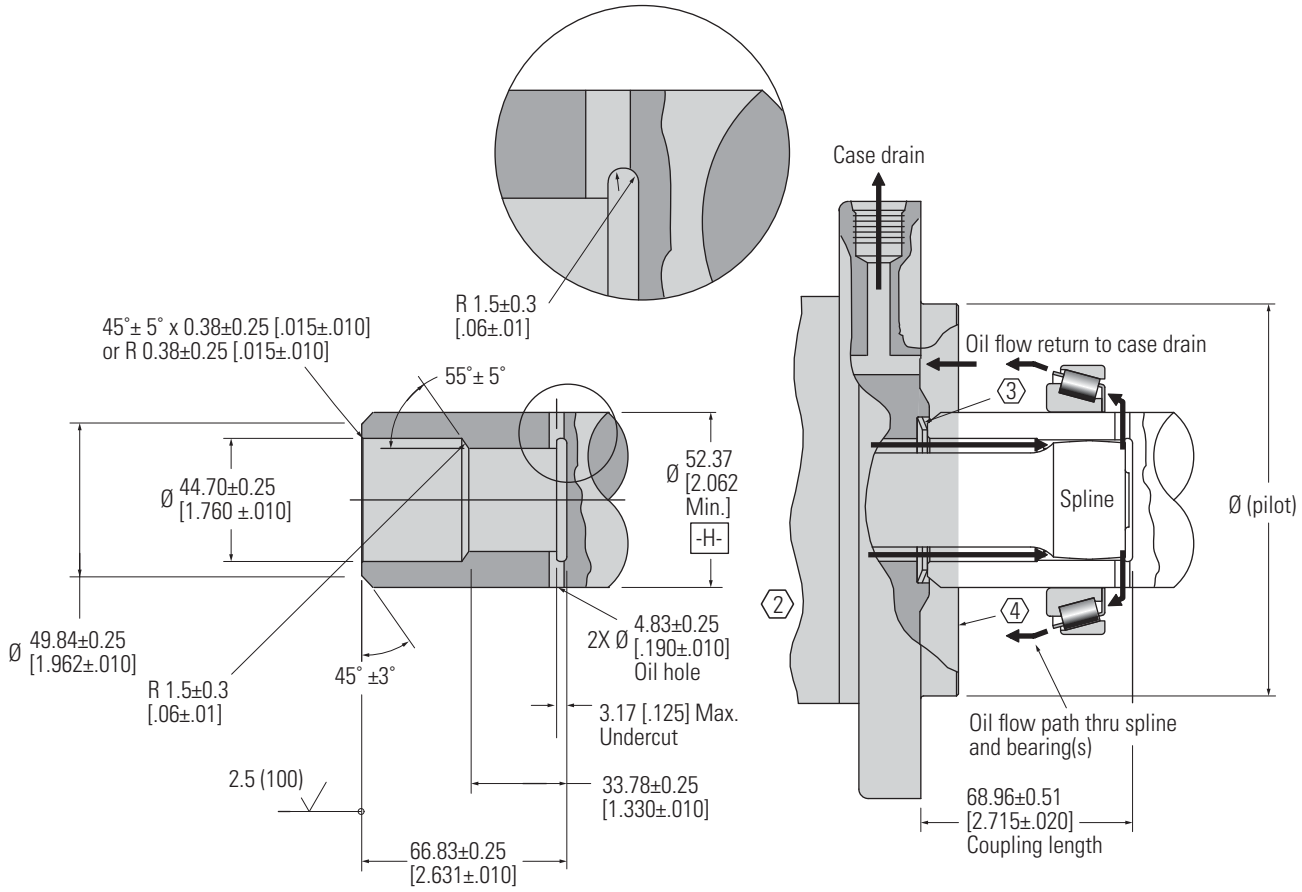
Install Instructions

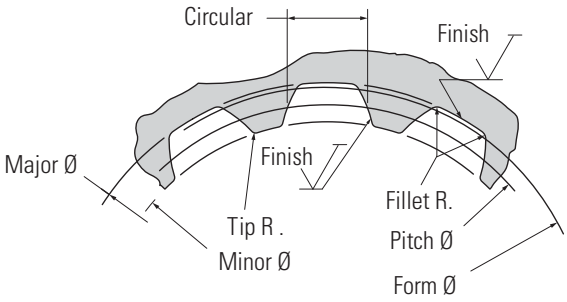
Bearlingless mount

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.





Note: Close loop shown - flow path reverses for open loop configuration.

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. 4.081 [.1582]
Minimum actual	Ref. 4.081 [.1582]
Dimension between two pins	Ref. 34.272-34.450 [1.3493-1.3563]
Pin diameter	4.389 [.1728]

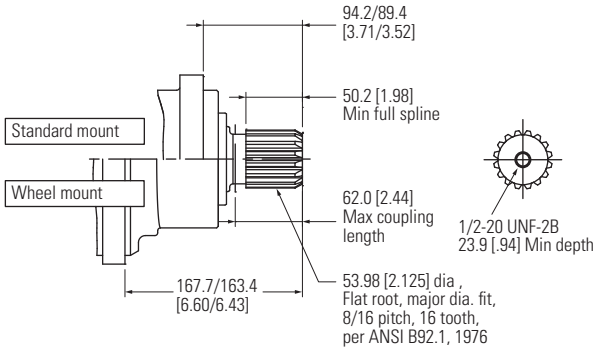
Dimensions

HP30 shaft installation

Code 01

2 1/8 Inch 16 tooth splined

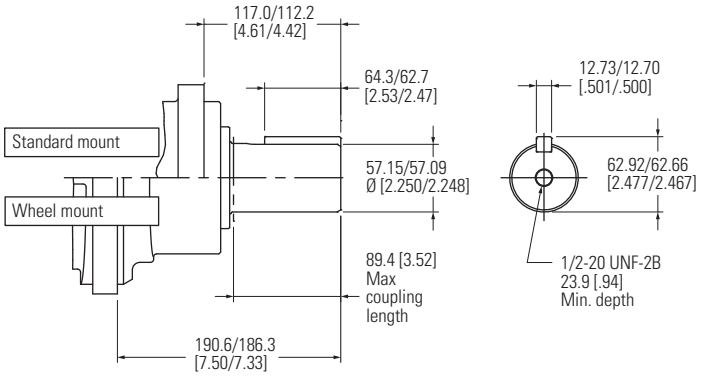
2712 [24000] Max. Torque Nm [lb-in]



Code 02

2 1/4 Inch straight

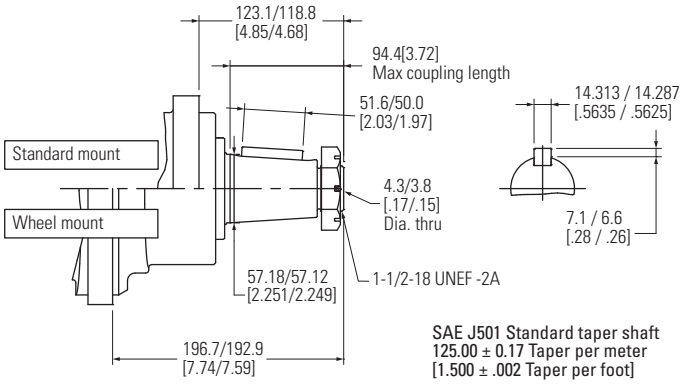
2712 [24000] Max. Torque Nm [lb-in]



Code 03

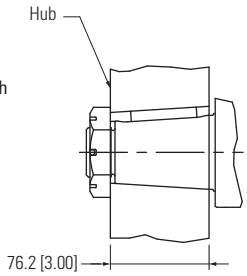
2 1/4 Inch tapered

2712 [24000] Max. Torque Nm [lb-in]

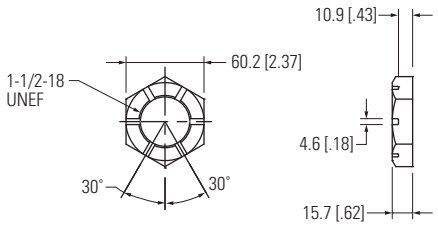


Tapered shaft hub data

Recommended torque:
(1150 Nm [850 lb-ft] dry)
(880 Nm [650 lb-ft] lub)
Plus torque required to
align the slotted nut with
the shaft crosshole.



Slotted hexagon nut



Dimensions

Shaft side load capacity

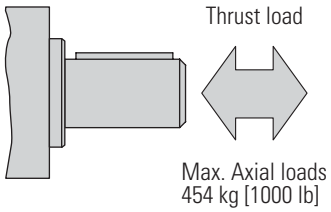
These curves indicate the radial load capacity on the motor shaft at various locations with an external thrust load of 454 kg [1,000 lb].

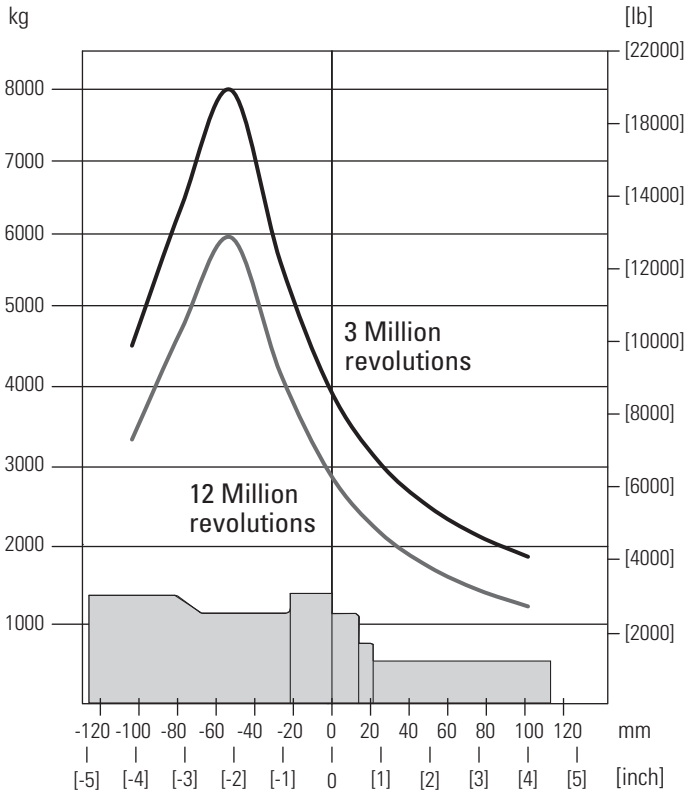
Note: Case pressure will increase the allowable inward thrust load and decrease the allowable outward thrust load. Case pressure will push outward on the shaft at 199 kg/7 Bar [438 lb/100 psi].

Each 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.

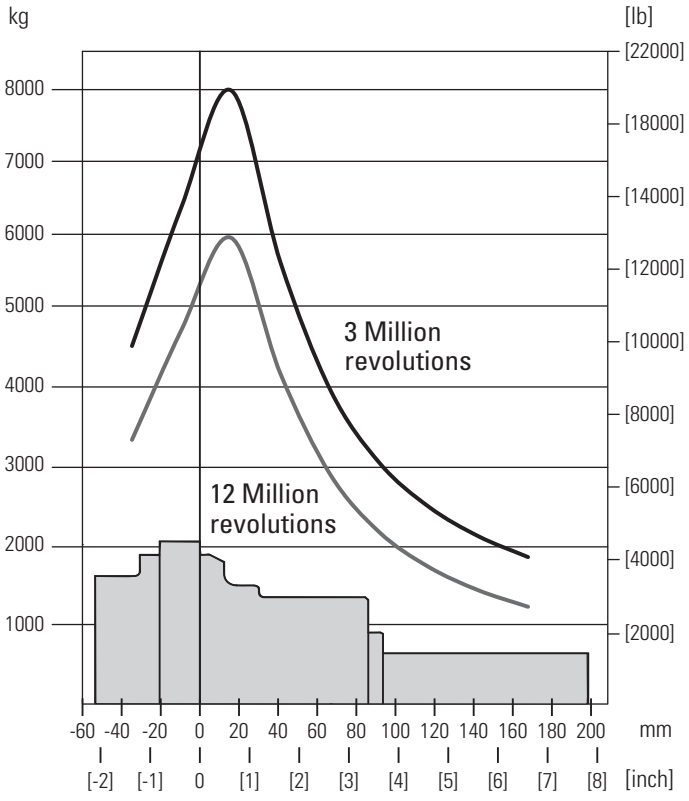
rpm	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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





HP 30 Standard mount curve



HP 30 Wheel mount curve

HP30 motor

Case pressure and case port

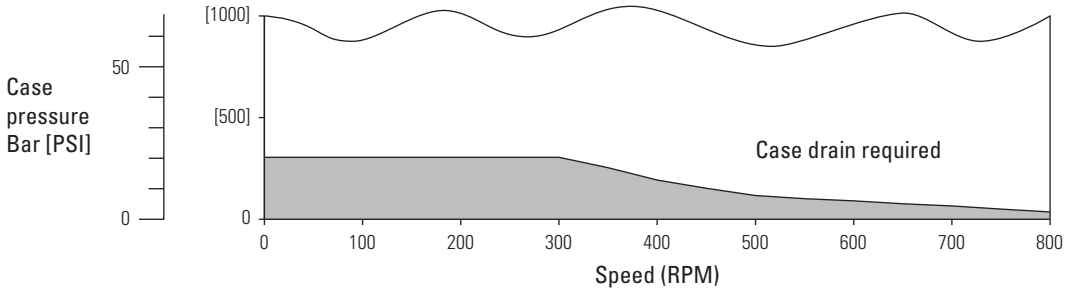
Char-Lynn HP30 series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine if an external case drain is required from the case pressure seal limitation chart.

Case porting advantage

Contamination control — flushing the motor case.

Cooler motor — exiting oil draws motor heat away.

Extend motor seal life — maintain low case pressure with a preset restriction in the case drain line.



Note: Use of a case drain is optional in an open loop circuit if motor case pressure does not exceed 300 psi.

Note: HP30 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.

Product numbers

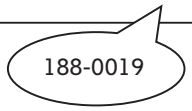
Single-speed

Note: For HP30 series motors with a configuration not shown in the chart below: Use model code number system on the next page to specify product in detail.

Use digit prefix — 187- or 188-, plus four digit number from charts for complete product number— Example 187-0029.

Orders will not be accepted without three digit prefix.

Mounting	Shaft	Port size	Displ. cm³/r [in³/r] / Product number				
			344 [21.0]	400 [24.4]	434 [26.5]	480 [29.3]	677 [41.3]
Standard motor	2 1/8 Inch 16 T splined	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	187-0029	-0030	-0031	-0032	-0033
	2 1/4 Inch straight	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	187-0034	-0035	-0036	-0037	-0038
	2 1/4 Inch tapered	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	187-0039	-0040	-0041	-0042	-0043
Wheel motor	2 1/8 Inch 16 T splined	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	188-0008	-0009	-0010	-0011	-0012
	2 1/4 Inch straight	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	188-0013	-0014	-0015	-0016	-0017
	2 1/4 Inch tapered	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	188-0018	-0019	-0020	-0021	-0022



Two-speed

Note: For HP30 series motors with a configuration not shown in the chart below: Use model code number system on the next page to specify product in detail.

Use digit prefix — 190- or 191- plus four digit number from charts for complete product number— Example 190-0097.

Orders will not be accepted without three digit prefix.

Mounting	Shaft	Port size	Displ. cm³/r [in³/r] / Product number				
			344 [21.0]	400 [24.4]	434 [26.5]	480 [29.3]	677 [41.3]
Standard motor	2 1/8 Inch 16 T splined	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	190-0097	-0098	-0099	-0100	-0101
	2 1/4 Inch straight	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	190-0102	-0103	-0104	-0105	-0106
	2 1/4 Inch tapered	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	190-0107	-0108	-0109	-0110	-0111
Wheel motor	2 1/8 Inch 16 T splined	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	191-0036	-0037	-0038	-0039	-0040
	2 1/4 Inch straight	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	191-0041	-0042	-0043	-0044	-0045
	2 1/4 Inch tapered	1-1/16-12 UN O-ring (2) 9/16-18 UNF O-ring (1)	191-0046	-0047	-0048	-0049	-0050

Model code

The following 30-digit coding system has been developed to identify all of the configuration options for the HP30 series motor. Use this model code to specify a motor with the desired features. All 30-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.

M	HP3	1A	21	AA	00	AA	01	0	0	0	0	0	00	00	00	00	C
1	2,3,4	5, 6	7, 8	9, 10	11, 12	13, 14	15, 16	17	18	19	20	21	22, 23	24, 25	26, 27	28, 29	30

1 Product

M – Motor

2,3,4 Product series

HP3 – HP30 series

5,6 Configuration

1A – Single-speed

1B – Single-speed w/spring applied hydraulic release wet brake

2A – Two-speed

2B – Two-speed w/spring applied hydraulic release wet brake

7,8 Displacement

21 – 343.8 cm³/r [20.98 in³/r]

24 – 400.0 cm³/r [24.40 in³/5]

26 – 434.2 cm³/r [26.50 in³/5]

29 – 479.5 cm³/r [29.26 in³/5]

41 – 677.3 cm³/r [41.33 in³/5]

9,10 Mounting type

AA – Brake, 4 bolts 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

BB – Bearingless, 4 bolt: 152.4[6.00] pilot dia. 20.70 [.815] dia. Holes on 228.6 [9.00] dia. bolt circle

SA – Standard, 4 bolt: 127.00 [5.000] pilot dia. 17.02 [.670] dia. holes on 161.92 [6.375] dia. bolt circle

SB – Standard, 4 bolt: 127.00 [5.000] pilot dia. 17.70 [.697] dia. holes on 162.3 [6.390] dia. bolt circle

SF – Standard, 4 bolt: 160.00 [6.299] pilot dia. 18.0 [.71] dia. holes on 200.0 [7.87] dia. bolt circle

SE – Standard, 4 bolt: 125.00 [4.921] pilot dia. 14.00 [.551] dia. holes on 160.00 [6.299] dia. bolt circle

WA – Wheel, 4 bolt: 177.80 [7.000] pilot dia. 17.02 [.670] dia. holes on 209.55 [8.250] dia. bolt circle

11,12 Output shaft

00 – None (bearingless)

01 – Splined 2⅛", 16t 8/16 dp with ½-20 threaded hole

02 – Straight keyed, 2¼" dia. with ½-20 threaded hole

03 – Tapered, 2¼" SAE J501 with 1½-18 thread and slotted nut

04 – Straight keyed, 50mm dia. with M12 metric threaded hole

07 – Straight keyed, 40mm dia. with M12 metric threaded hole

08 – Splined 1½", 17t 12/24 dp with M12 Metric threaded hole

10 – Tapered, 60mm ISO R775 with M42 thread and slotted nut

13,14 Port type

AA – #12 SAE O-ring ports

AC – #16 SAE O-ring ports

AE – G 1 BSP straight thread ports

AF – 17.78 [.700] dia. Manifold ports with 8x.375-16 UNC-2B port block mounting holes

15,16 Case flow option

01 – Shuttle valve with .5625-18 UNF-2B SAE O-ring case drain port in line with main ports, optional .5625-18 UNF-2B case drain port in mounting flange (closed loop circuits)

02 – Shuttle valve with .5625-18 UNF-2B SAE O-ring case drain port in mounting flange (for bearingless and brake) (closed loop circuits)

03 – Shuttle valve with G 1/4 BSP straight thread case drain port in mounting flange (for bearingless and brake) (closed loop circuits)

04 – Check valve with orifice plug, G 1/4 BSP straight thread case drain port in valve housing (open loop circuits)

05 – Shuttle valve with G ¼ BSP straight thread case drain port in line with main ports, optional G 1/4 BSP straight thread case drain port in mounting flange (closed loop circuits)

06 – Check valve with orifice plug, .5625-18 UNF-2B SAE O-ring case drain port in valve housing (open loop circuits)

09 – Check valve with orifice plug, dia. 250 manifold case drain port in valve housing (open loop circuits)

17 Low pressure relief

0 – None

A – Set @ 4.5 bar (65 psi)

B – Set @ 11.0 bar (160 psi)

C – Set @ 15.2 bar (220 psi)

D – Set @ 20.7 bar (300 psi)

18 Pressure/flow option

0 – None

18 Geroler option

0 – None

20 Seal option

0 – None

1 – Viton seals

2 – Outer grease seal (for brake only)

3 – Extreme duty seal guard

21 Accessories

0 – None

1 – M 12 threaded connector, digital speed pickup (30 pulse) (Pin 1 = power supply, Pin 3 = common, Pin 4 = output signal)

22,23 Special features (hardware)

00 – None

24,25 Special features (assembly)

00 – None

01 – Reverse rotation

26,27 Paint option

00 – No paint

AA – Painted low gloss black

AE – Painted charcoal gray

28,29 Customer identification

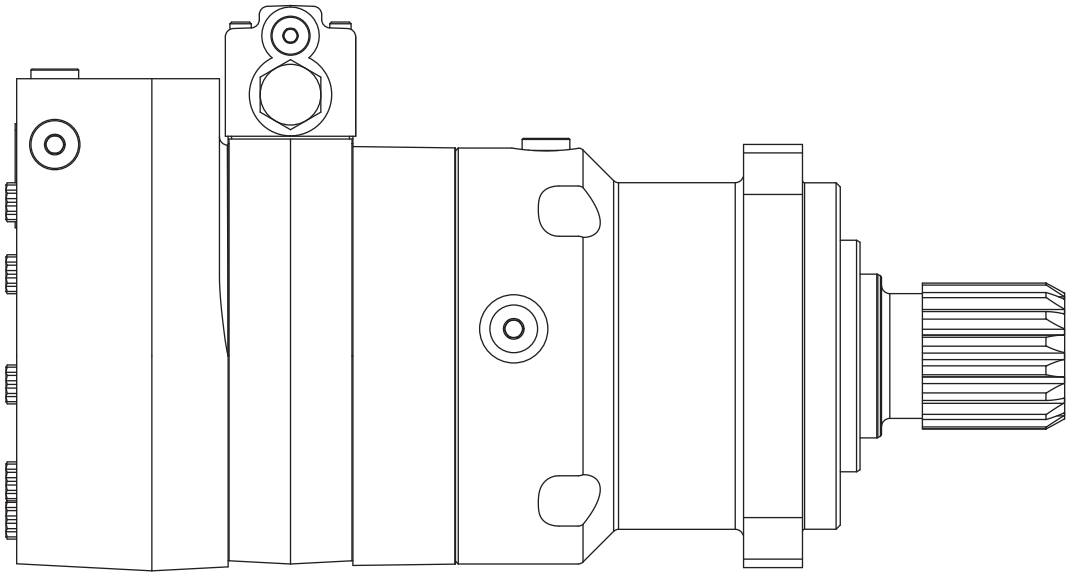
00 – None

30 Design code

C – Three

Description

Two-speed



HP30 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 HP30 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 HP30 two-speed motor is bidirectional. It will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT or 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 shift 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 10.3 Δbar [150 psi] over case pressure 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 internally to case. 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.

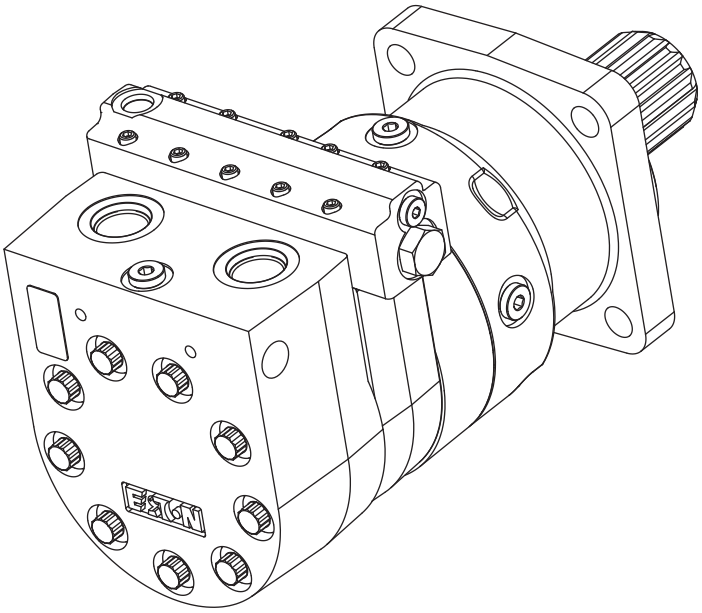
Pilot pressure may come from any source that will provide uninterrupted pressure during the high-speed mode operation. Allowable pilot pressure must be at least 3.5 Δbar [50 psi] and may be as high as full operating pressure of the motor.

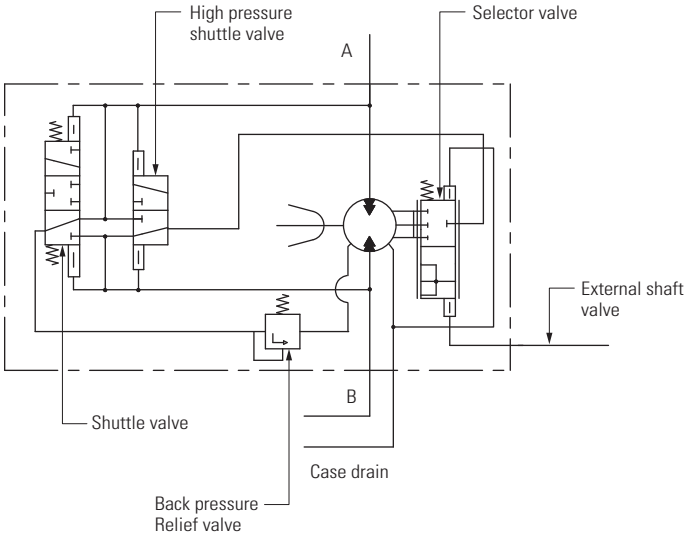
Performance data

In the LSHT mode, torque and speed values are equal to those of the conventional HP30 motor (refer to single-speed motor performance data). In the HSLT mode, rotation speed is increased by fifty percent and torque output is reduced by one third. The HP30 two-speed motor will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes.

Typical hydraulic circuit

Two-speed

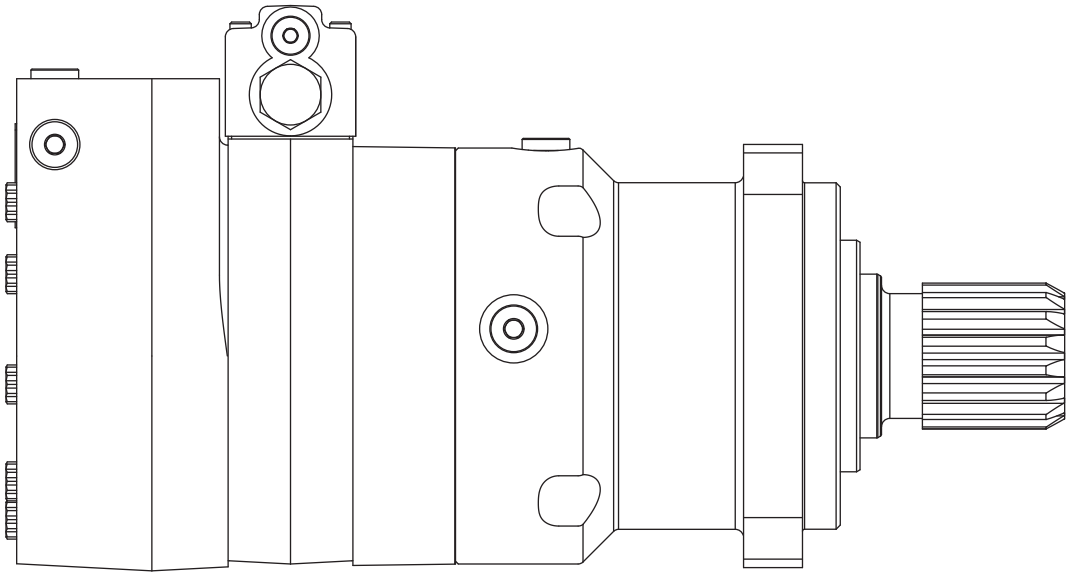




Note: The schematic diagram applies to HP30 series two-speed motors.

Specifications

Two-speed



HP30 Series motors, two-speed

Displ. cm³/r [in³/r]	High speed mode Low speed mode	229 [14.0] 344 [21.0]	267 [16.3] 400 [24.4]	289 [17.7] 434 [26.5]	320 [19.5] 480 [29.3]	477 [27.5] 677 [41.3]
Max. speed [rpm] @ continuous flow	High speed mode Low speed mode	743 495	639 426	588 392	532 355	378 252
Flow l/min [gpm]	High speed mode Low speed mode	170 [45] 170 [45]	170 [45] 170 [45]	170 [45] 170 [45]	170 [45] 170 [45]	170 [45] 170 [45]
Torque* Nm [lb-in]	High speed mode Continuous Intermittent	 1,076 [9,525] 1,196 [10,584]	 1,251 [11,067] 1,389 [12,297]	 1,358 [12,020] 1,509 [13,356]	 1,501 [13,290] 1,669 [14,767]	 1,646 [14,571] 1,929 [17,068]
Torque* Nm [lb-in]	Low speed mode Continuous Intermittent	 1,614 [14,288] 1,794 [15,876]	 1,876 [16,600] 2,084 [18,446]	 2,037 [18,030] 2,263 [20,034]	 2,252 [19,935] 2,503 [22,150]	 2,469 [21,856] 2,893 [25,602]
Pressure Δ bar [Δ psi]	Continuous Intermittent Peak	310 [4,500] 345 [5,000] 379 [5,500]	310 [4,500] 345 [5,000] 379 [5,500]	310 [4,500] 345 [5,000] 379 [5,500]	310 [4,500] 345 [5,000] 379 [5,500]	241 [3,500] 283 [4,100] 379 [5,500]
Weight kg [lb]	Standard mount Wheel mount	391 [86.2] 419 [92.4]	398 [87.6] 426 [93.8]	402 [88.5] 429 [94.6]	406 [89.5] 434 [95.7]	426 [93.8] 454 [99.9]

*See shaft torque ratings for limitations.

Note: 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:

405 bar [5850 psi]

Do not exceed Δ pressure rating (see chart above).

Maximum return pressure:

405 bar [5850 psi] with case drain installed.

Do not exceed Δ pressure rating (see chart above).

Maximum case pressure:

20 bar [300 psi]

Δ bar [Δ psi] :

The true pressure difference between inlet port and outlet port.

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 13 cSt [70 SUS] at operating temperature.

Recommended maximum system operating temp.:

82°C [180°F]

Recommended filtration:

Per ISO Cleanliness code, 4406: 20/18/13.

Dimensions

Two-speed standard mount

Main 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

G1 (BSP) O-ring ports (2)

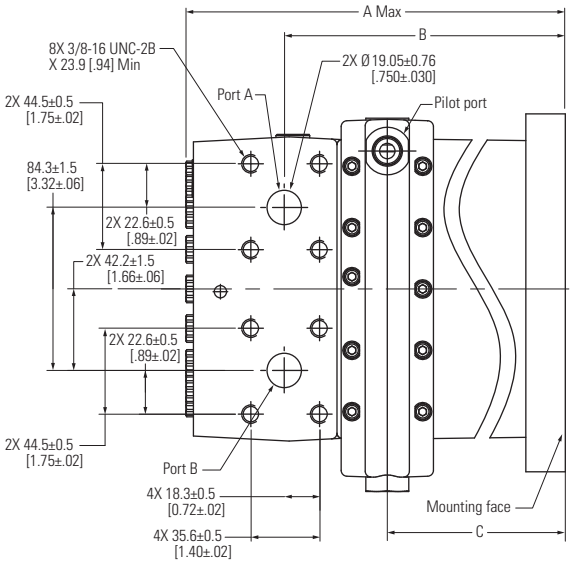
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

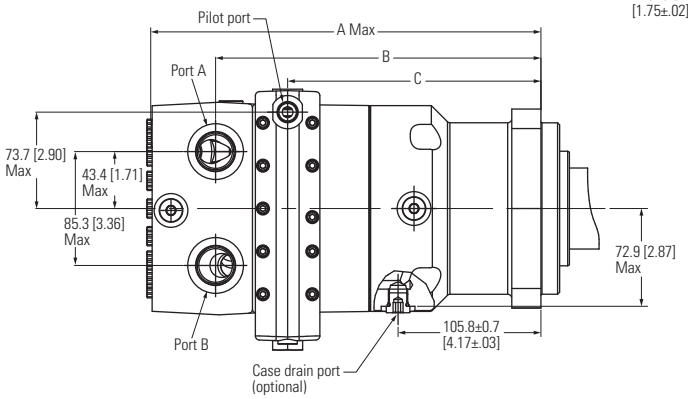
Port A pressurized – CW

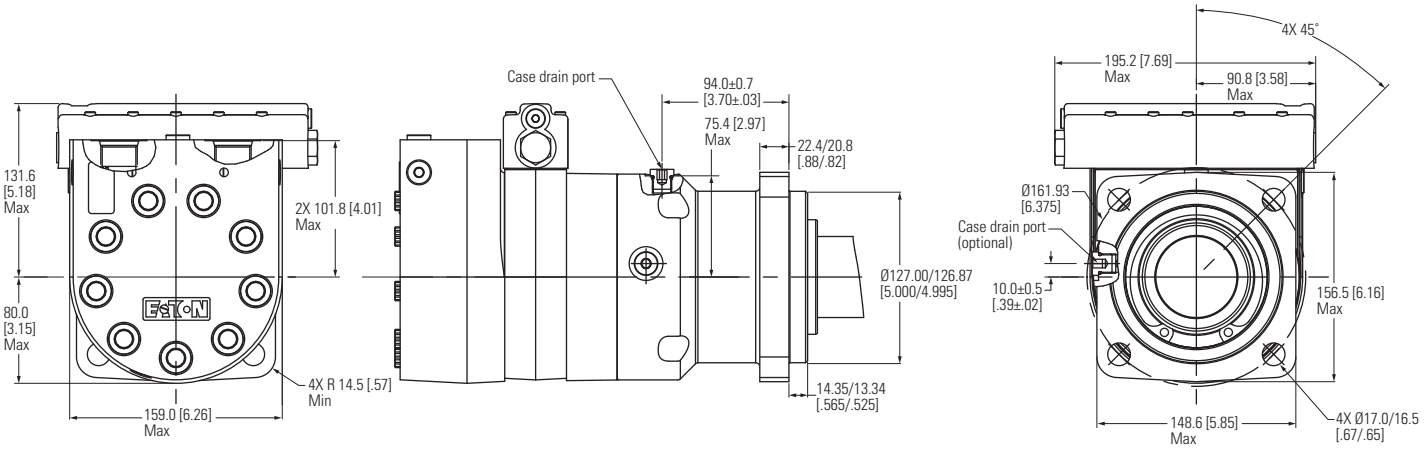
Port B pressurized – CCW

Manifold interface



Closed loop





Motor dimensions – Standard mount

Displacement	A Max		B		C	
cm³/r [in³/r]	mm	[in]	mm	[in]	mm	[in]
344 [21.0]	288.0	[11.34]	235.6	[9.28]	182.3	[7.18]
400 [24.4]	293.2	[11.55]	240.9	[9.49]	187.6	[7.39]
434 [26.5]	296.5	[11.67]	244.2	[9.61]	190.8	[7.51]
480 [29.3]	300.6	[11.84]	248.3	[9.78]	194.9	[7.68]
677 [41.3]	319.1	[12.56]	266.8	[10.50]	213.5	[8.40]

Dimensions

Two-speed standard mount

Main 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

G1 (BSP) O-ring ports (2)

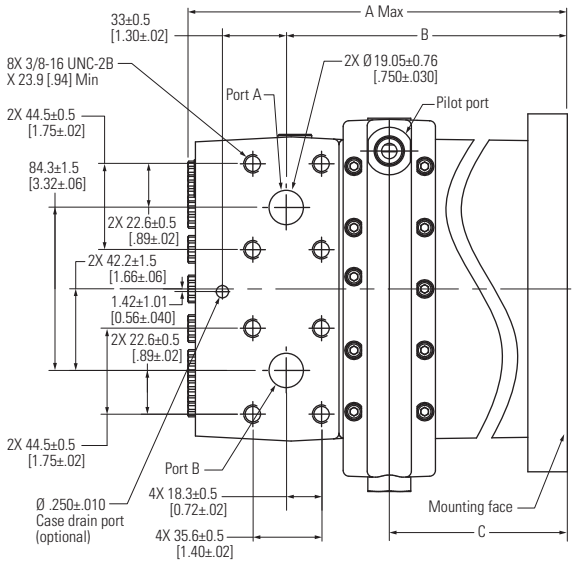
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

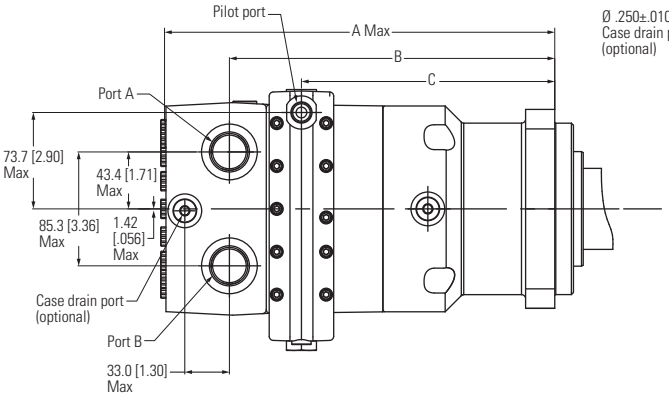
Port A pressurized – CW

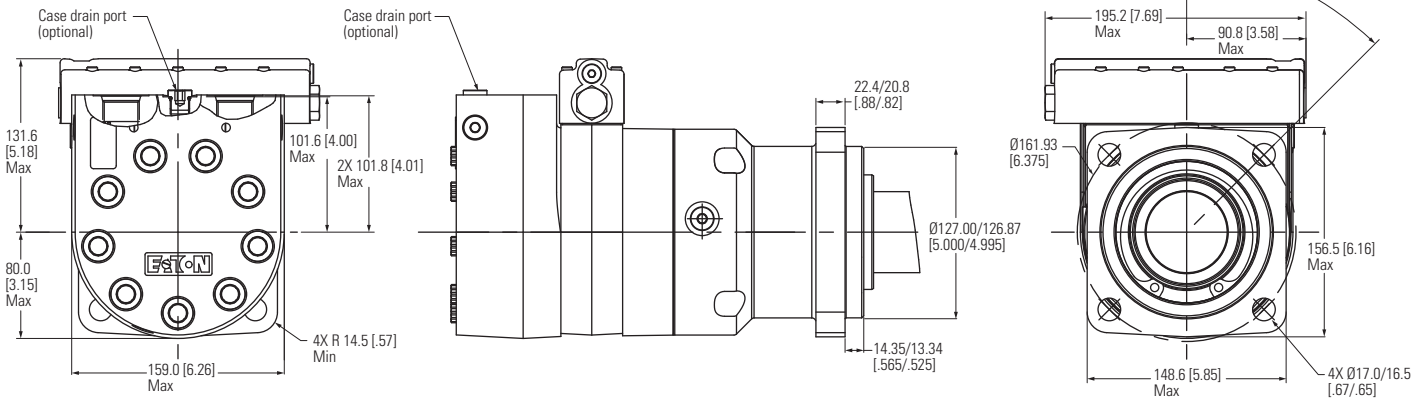
Port B pressurized – CCW

Manifold interface



Open loop





Motor dimensions – Standard mount

Displacement	A Max		B		C	
cm³/r [in³/r]	mm	[in]	mm	[in]	mm	[in]
344 [21.0]	288.0	[11.34]	235.6	[9.28]	182.3	[7.18]
400 [24.4]	293.2	[11.55]	240.9	[9.49]	187.6	[7.39]
434 [26.5]	296.5	[11.67]	244.2	[9.61]	190.8	[7.51]
480 [29.3]	300.6	[11.84]	248.3	[9.78]	194.9	[7.68]
677 [41.3]	319.1	[12.56]	266.8	[10.50]	213.5	[8.40]

Note: Use of a case drain is optional in an open loop circuit if motor case pressure does not exceed 300 psi.

Dimensions

Two-speed wheel mount

Main 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

G1 (BSP) O-ring ports (2)

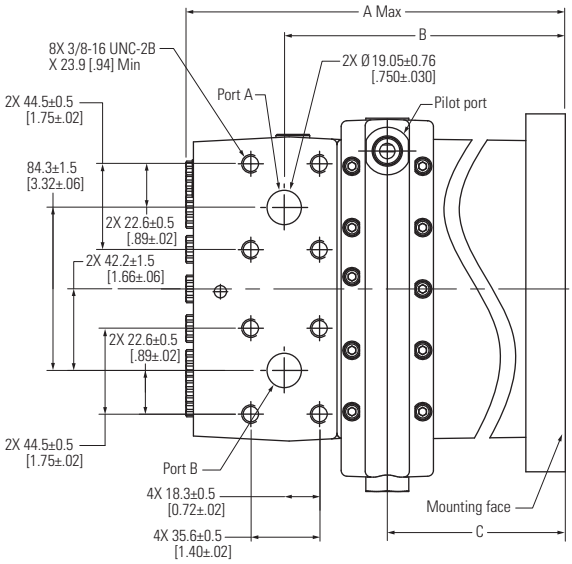
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

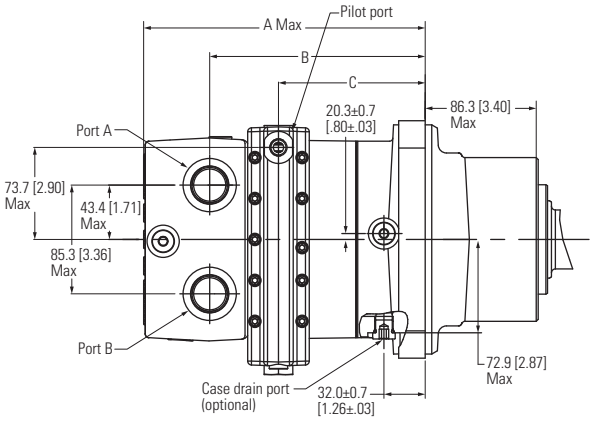
Port A pressurized – CW

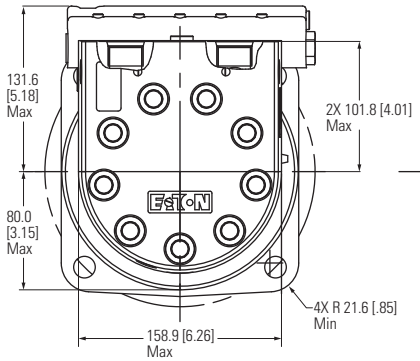
Port B pressurized – CCW

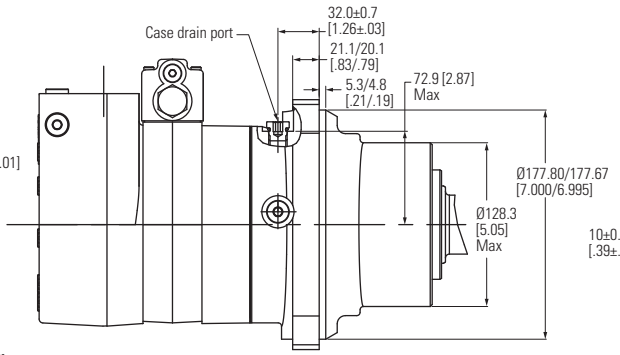
Manifold interface

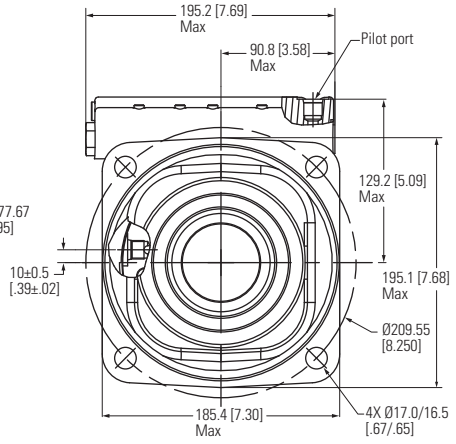


Closed loop









Motor dimensions – Wheel mount

Displacement	A Max		B		C	
cm³/r [in³/r]	mm	[in]	mm	[in]	mm	[in]
344 [21.0]	214.2	[8.43]	161.8	[6.37]	108.6	[4.28]
400 [24.4]	219.5	[8.64]	167.1	[6.58]	113.9	[4.49]
434 [26.5]	222.7	[8.77]	170.4	[6.71]	117.0	[4.61]
480 [29.3]	226.8	[8.93]	174.5	[6.87]	121.3	[4.78]
677 [41.3]	245.3	[9.66]	193.0	[7.60]	139.6	[5.50]

Dimensions

Two-speed wheel mount

Main 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

G1 (BSP) O-ring ports (2)

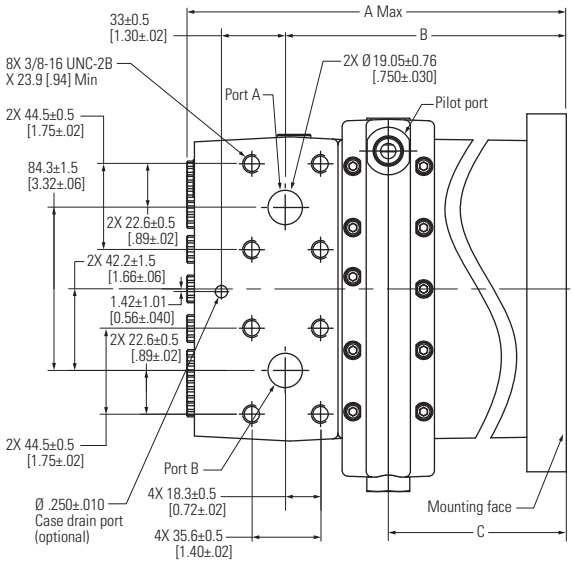
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

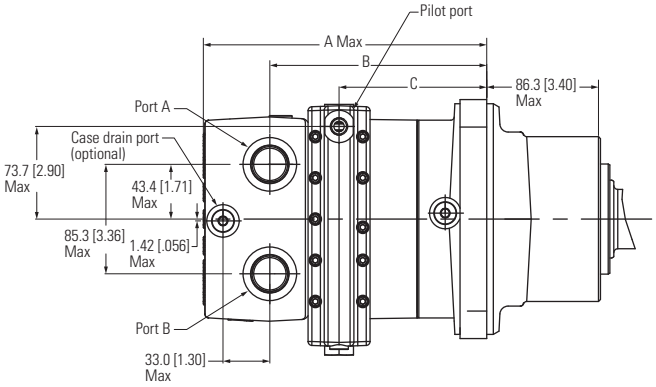
Port A pressurized – CW

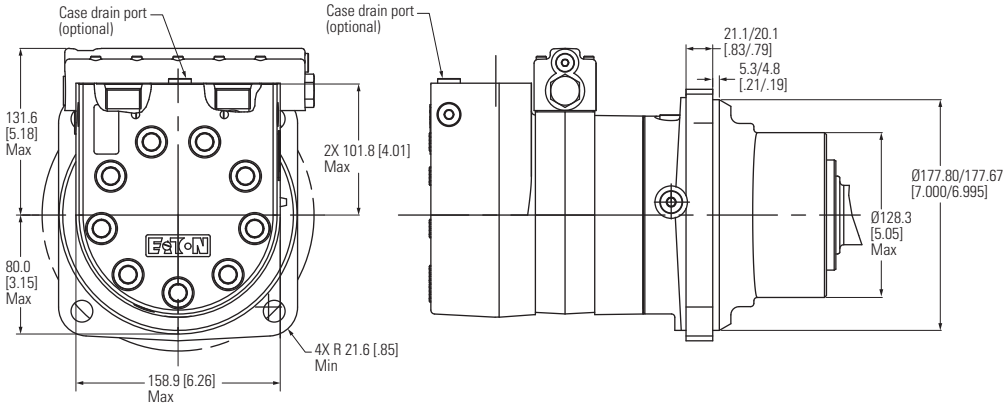
Port B pressurized – CCW

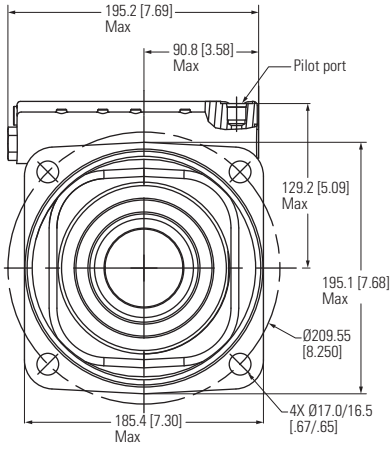
Manifold interface



Open loop







Motor dimensions – Wheel mount

Displacement	A Max		B		C	
cm³/r [in³/r]	mm	[in]	mm	[in]	mm	[in]
344 [21.0]	214.2	[8.43]	161.8	[6.37]	108.6	[4.28]
400 [24.4]	219.5	[8.64]	167.1	[6.58]	113.9	[4.49]
434 [26.5]	222.7	[8.77]	170.4	[6.71]	117.0	[4.61]
480 [29.3]	226.8	[8.93]	174.5	[6.87]	121.3	[4.78]
677 [41.3]	245.3	[9.66]	193.0	[7.60]	139.6	[5.50]

Note: Use of a case drain is optional in an open loop circuit if motor case pressure does not exceed 300 psi.

Dimensions

Two-speed bearlingless

Main 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

G1 (BSP) O-ring ports (2)

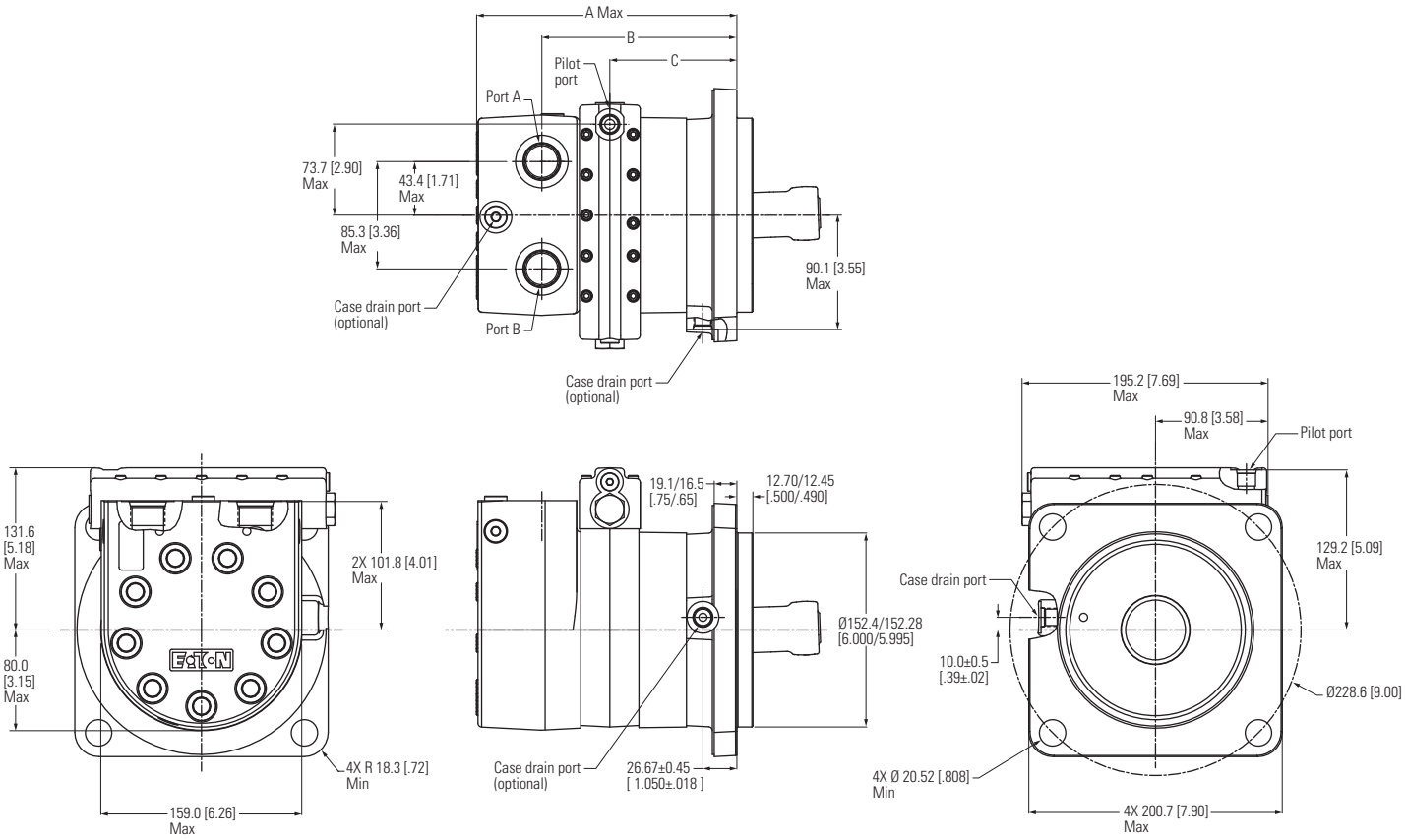
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from drive end

Port A pressurized — CW

Port B pressurized — CCW

Closed loop



Motor dimensions – Bearingless mount

Displacement	A Max		B		C	
cm³/r [in³/r]	mm	[in]	mm	[in]	mm	[in]
344 [21.0]	199.6	[7.86]	147.8	[5.82]	94.5	[3.72]
400 [24.4]	204.9	[8.07]	153.1	[6.03]	99.8	[3.93]
434 [26.5]	208.1	[8.19]	156.4	[6.16]	103.1	[4.06]
480 [29.3]	212.2	[8.36]	160.5	[6.32]	107.2	[4.22]
677 [41.3]	230.8	[9.09]	179.0	[7.05]	125.7	[4.95]

Dimensions

Two-speed bearlingless

Main 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

G1 (BSP) O-ring ports (2)

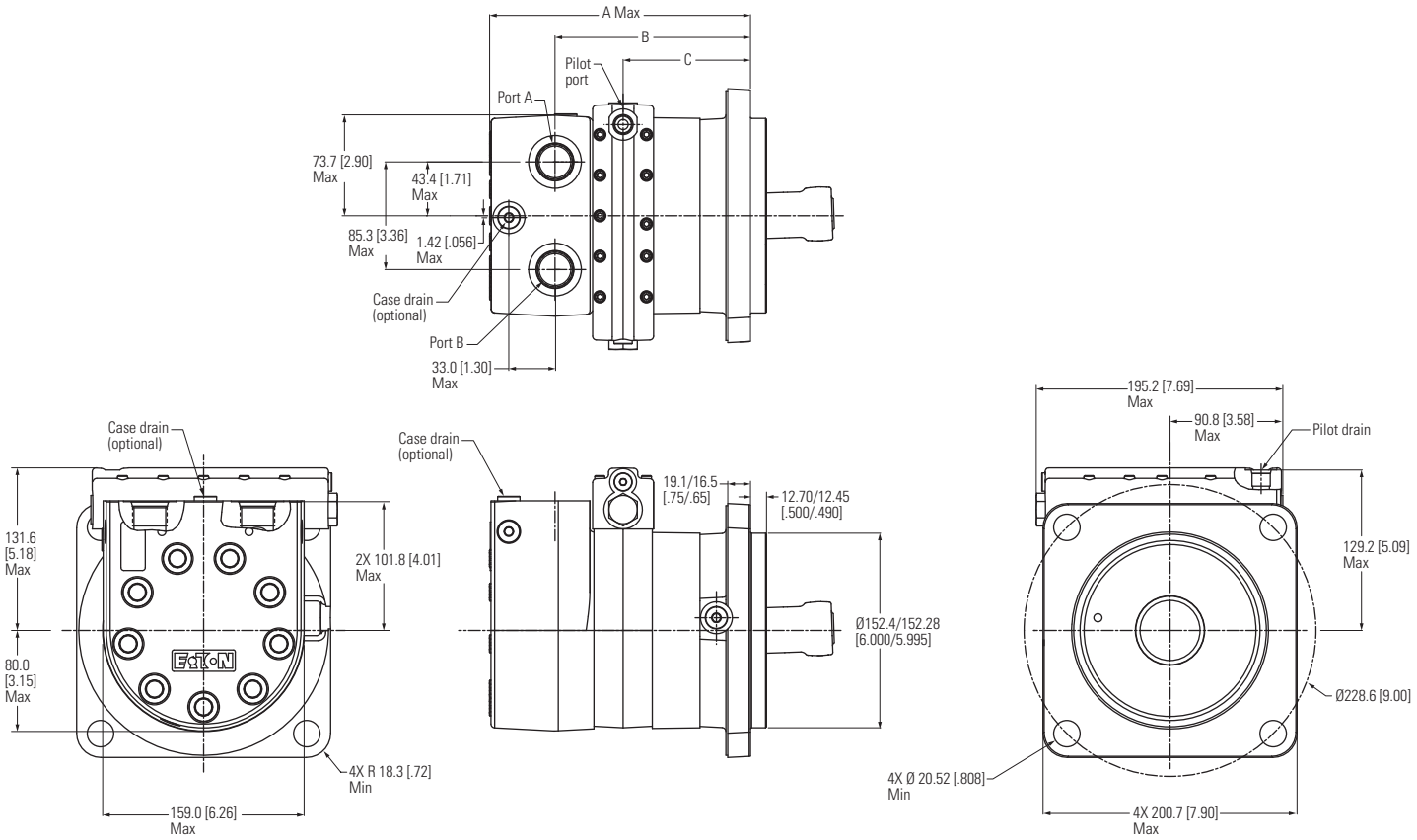
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from drive end

Port A pressurized — CW

Port B pressurized — CCW

Open loop



Motor dimensions – Bearingless mount

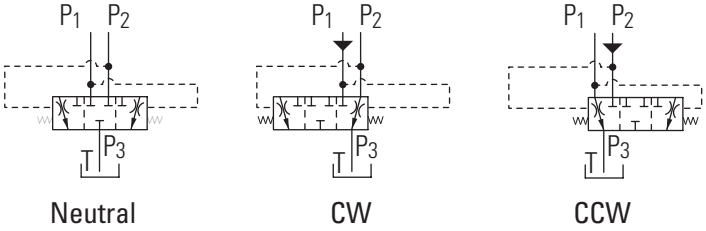
Displacement	A Max		B		C	
cm³/r [in³/r]	mm	[in]	mm	[in]	mm	[in]
344 [21.0]	199.6	[7.86]	147.8	[5.82]	94.5	[3.72]
400 [24.4]	204.9	[8.07]	153.1	[6.03]	99.8	[3.93]
434 [26.5]	208.1	[8.19]	156.4	[6.16]	103.1	[4.06]
480 [29.3]	212.2	[8.36]	160.5	[6.32]	107.2	[4.22]
677 [41.3]	230.8	[9.09]	179.0	[7.05]	125.7	[4.95]

Note: Use of a case drain is optional in an open loop circuit if motor case pressure does not exceed 300 psi.

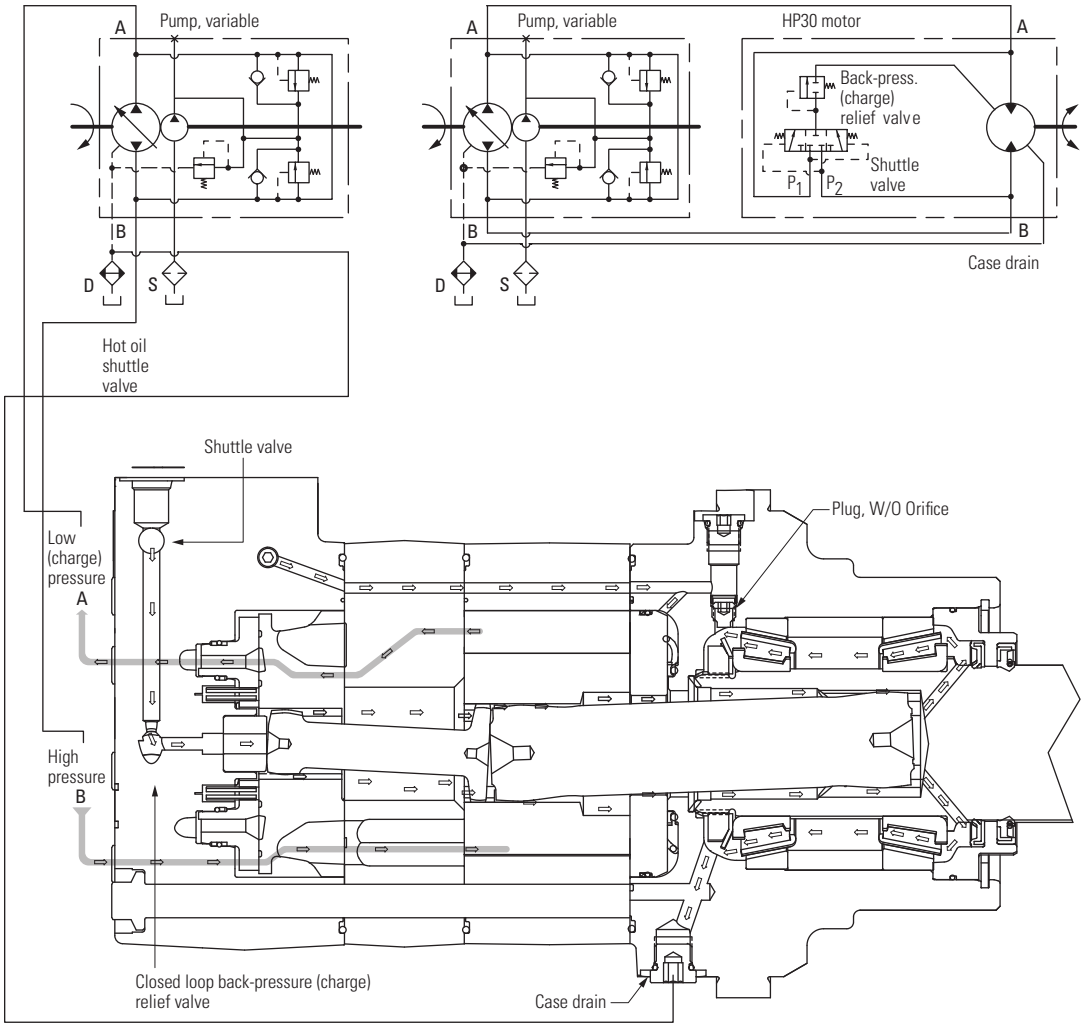
Typical hydraulic circuit

HP30

Shuttle valve, two way (closed center) —
Schematic diagrams



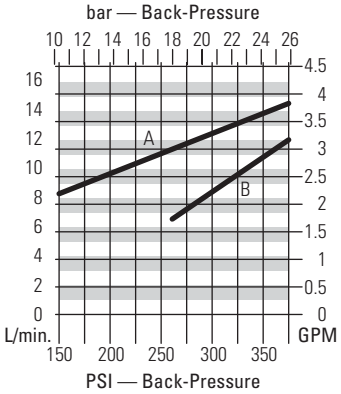
Closed loop circuit



Note: Conversion Kit Number 9901136-000 can be used to convert a -003 design code open loop motor into a -003 closed loop motor.

See HP30 parts and repair manual for more information.

HP30 motors 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

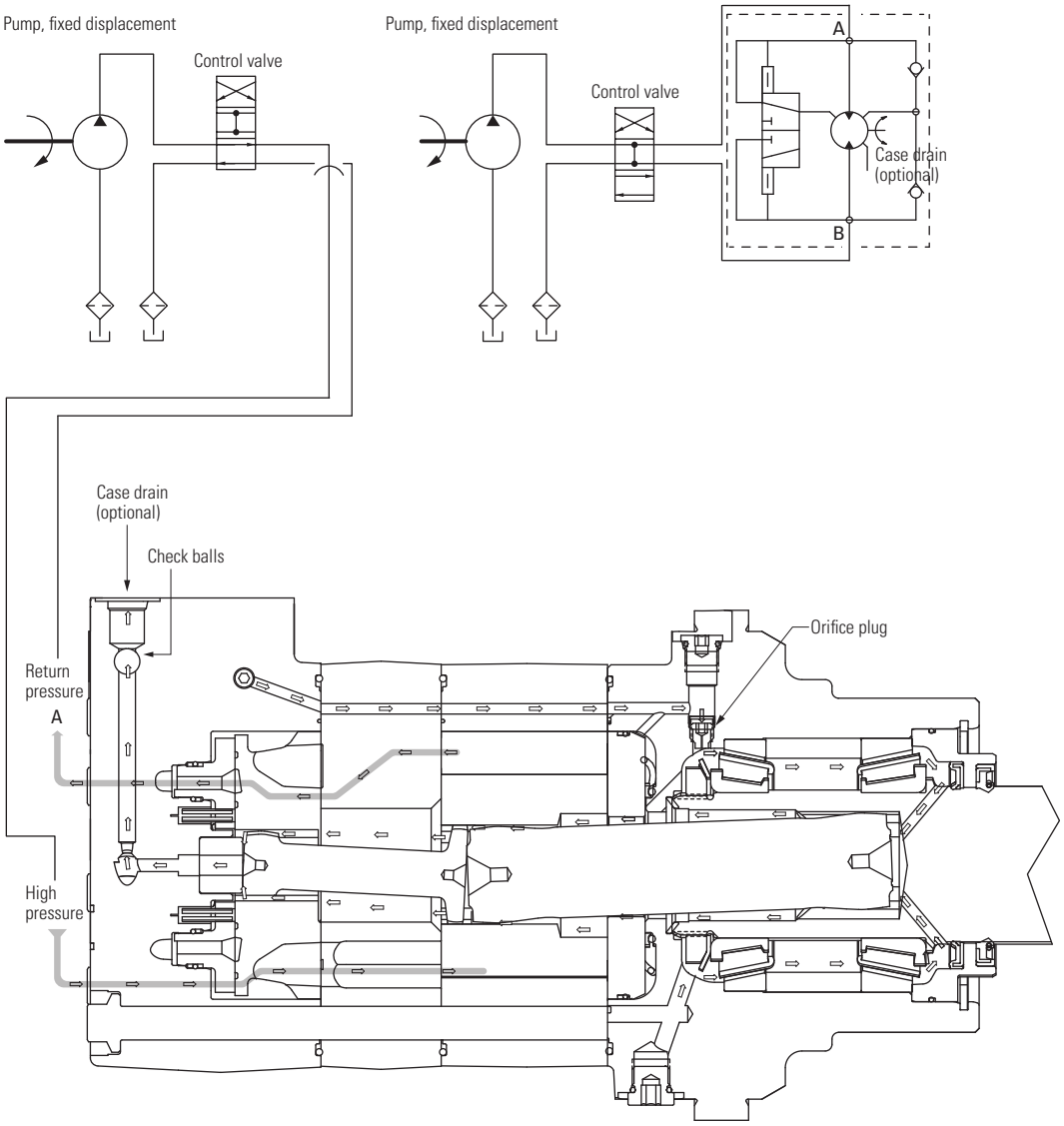
Note: Closed loop circuits must have a shuttle valve configuration. See model code position 15, 16 "Case Flow Option."

Note: HP30 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.

Typical hydraulic circuit

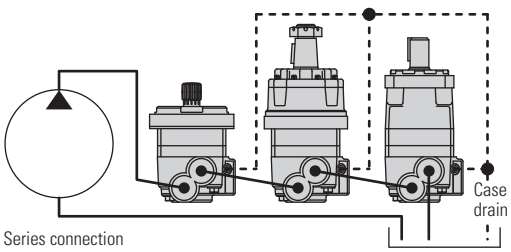
HP30

Open loop circuit



Note: Conversion Kit Number 9901135-000 can be used to convert a -003 design code closed loop motor into a -003 open loop motor. See HP30 parts and repair manual for more information.

HP30 motor is series circuit capable.



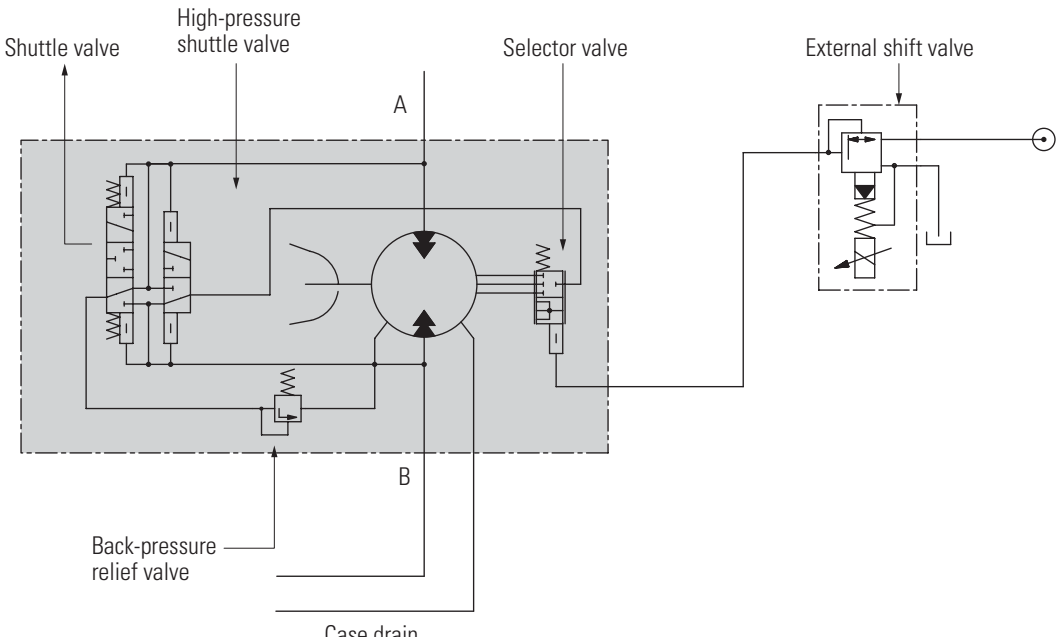
Note: Open loop circuits must have a check valve with orifice plug configuration. See model code position 15, 16 “Case flow option.”

Note: Use of a case drain is optional in an open loop circuit if motor case pressure does not exceed 300 psi.

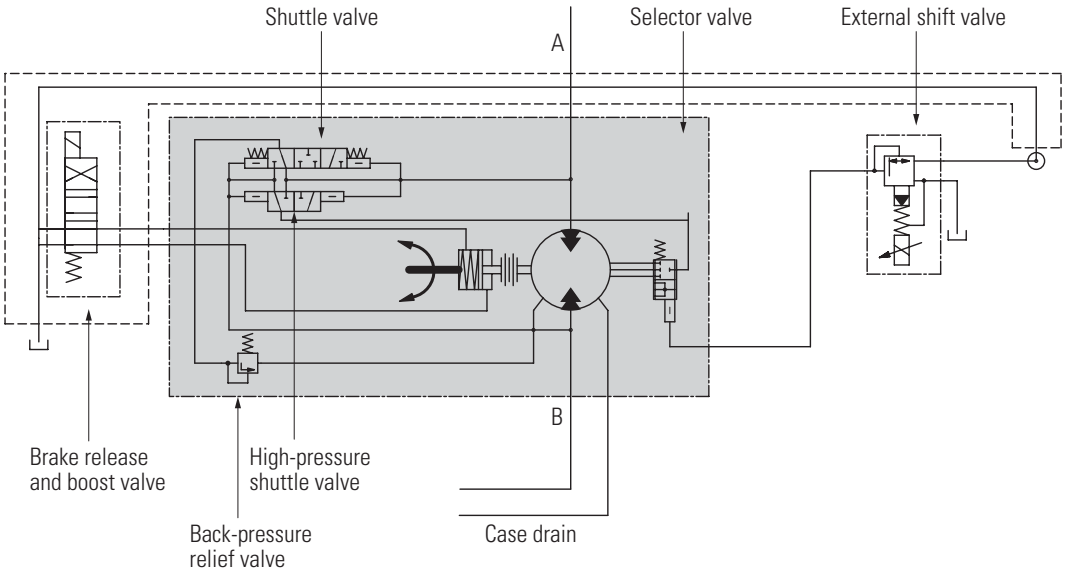
Typical hydraulic circuit

HP30

Two-speed circuit

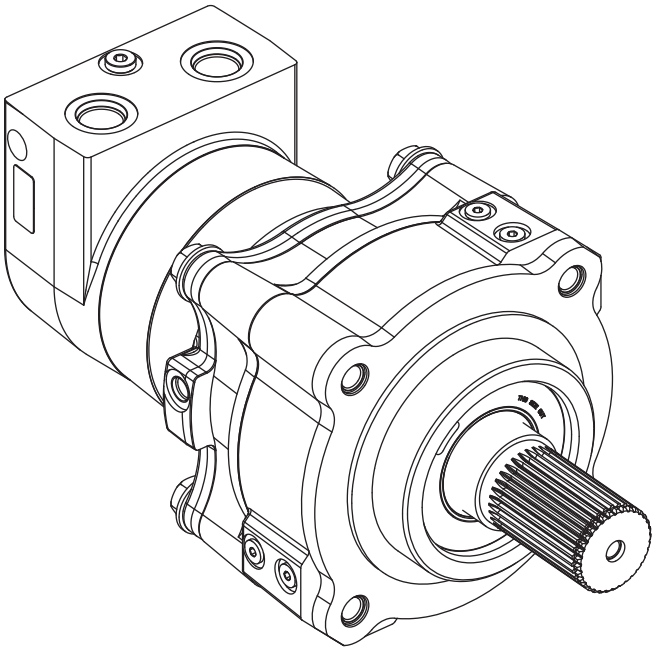


Two-speed brake motor circuit



Description

Brake motor



Features

- Spring-applied/hydraulically released multi-disc brake
- Spring automatically applies brake when hydrostatic 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
- Seal option: "with outer grease seal" & "without outer grease seal" both configurations are available in brake motors

Applications

- Skid steer loaders
- Trenchers
- Road rollers
- Anywhere load-holding is needed on a low-speed high-torque drive system

Specifications

• Static holding –	780 N-m [6900 lb-in] minimum torque (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] maximumallowed 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

Dimensions

Brake motor single-speed

Main ports

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

9/16-18 UNF-2B SAE O-ring cse drain port (1)

or

G1 (BSP) O-ring ports (2)

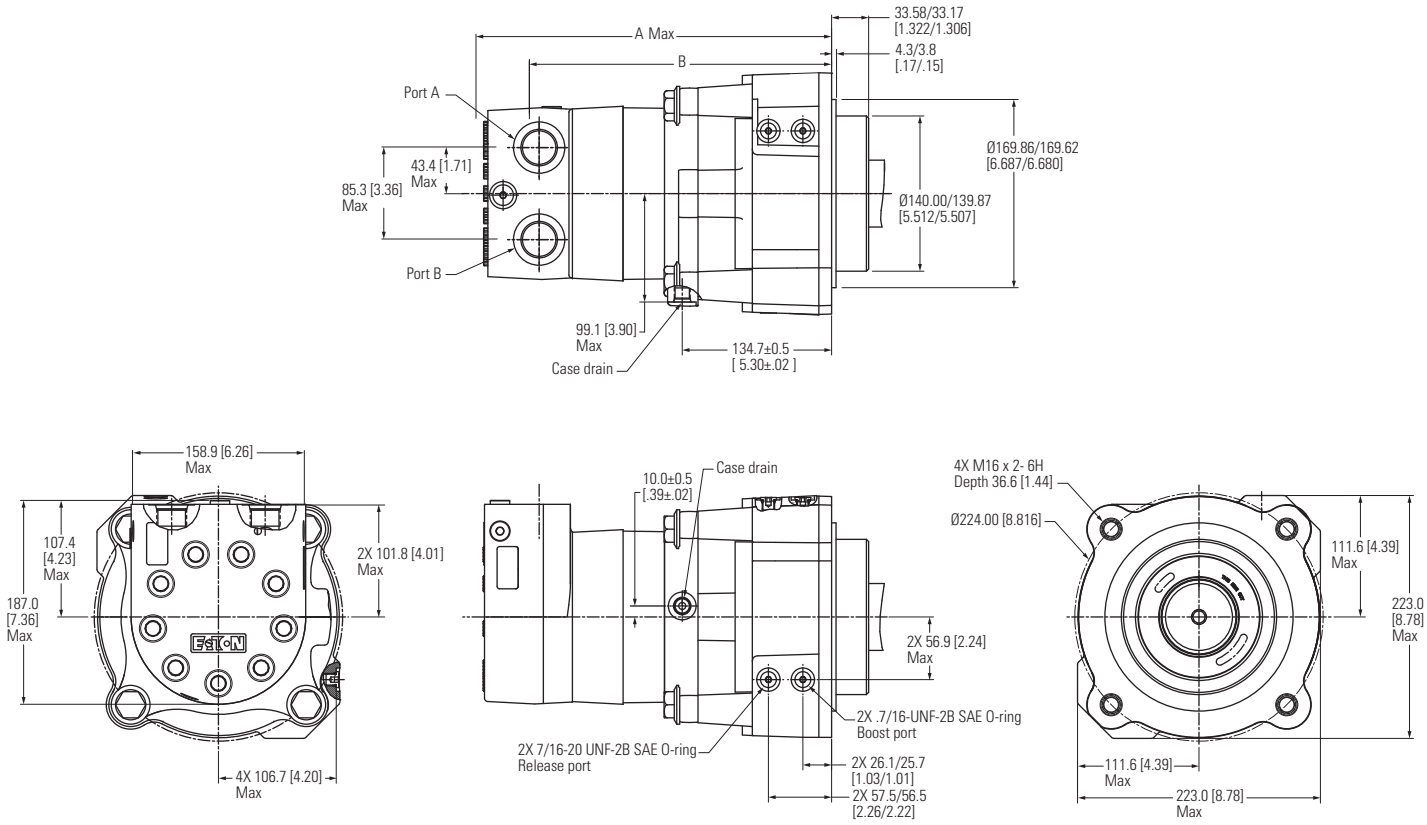
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

Port A pressurized – CW

Port B pressurized – CCW

Closed loop



Brake motor dimensions – Single-speed

Displacement	A Max		B	
cm³/r [in³/r]	mm	[in]	mm	[in]
344 [21.0]	311.0	[12.25]	259.0	[10.20]
400 [24.4]	316.3	[12.45]	264.3	[10.40]
434 [26.5]	319.6	[12.58]	267.5	[10.53]
480 [29.3]	323.7	[12.74]	271.6	[10.69]
677 [41.3]	342.2	[13.47]	290.1	[11.42]

Dimensions

Brake motor two-speed

Main ports

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

9/16-18 UNF-2B SAE O-ring cse drain port (1)

or

G1 (BSP) O-ring ports (2)

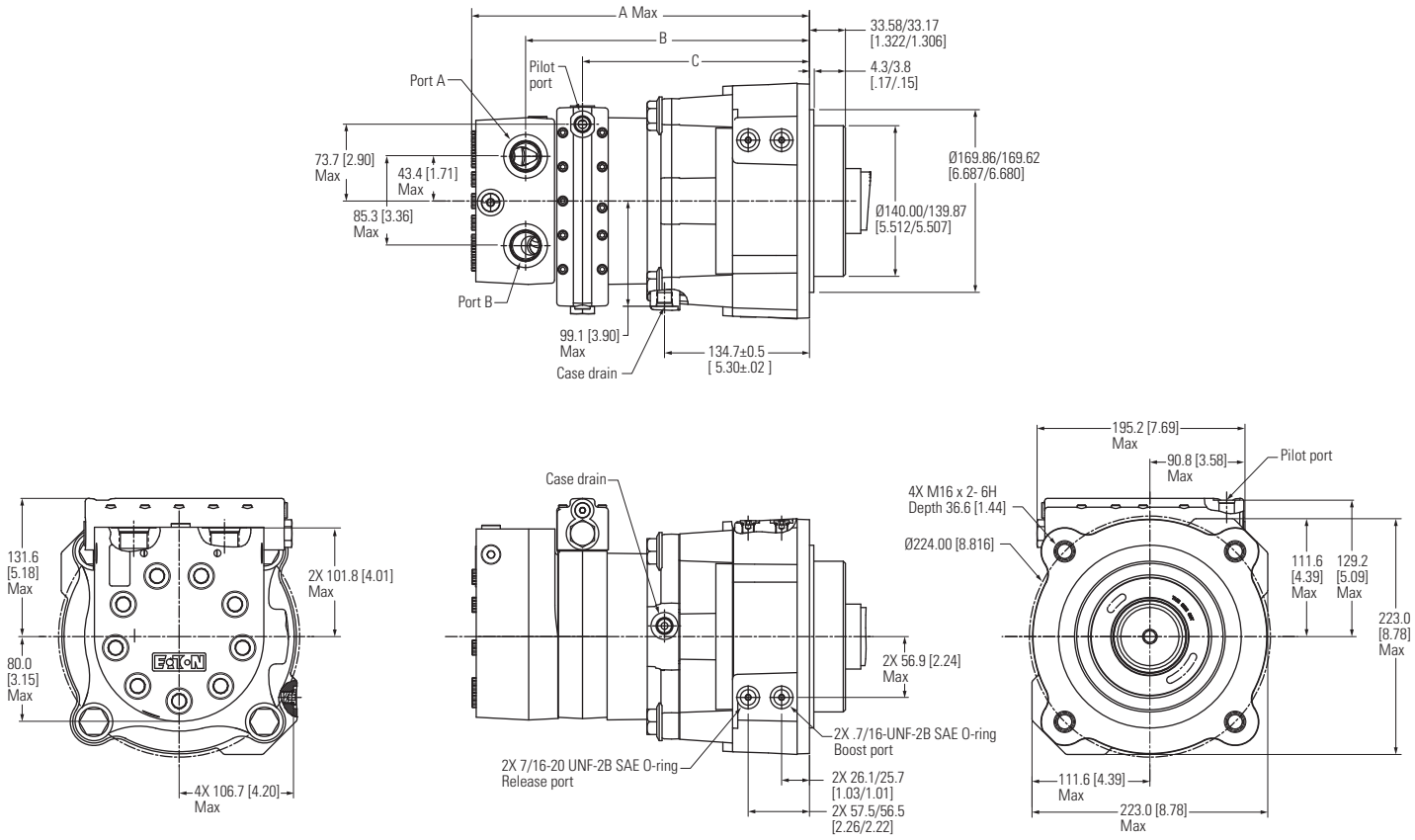
G1/4 (BSP) O-ring case drain port (1)

Standard rotation viewed from shaft end

Port A pressurized – CW

Port B pressurized – CCW

Closed loop



Brake motor dimensions – Two-speed

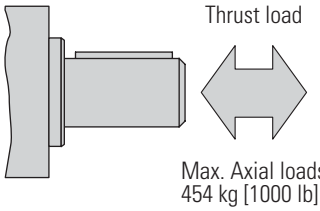
Displacement	A Max		B		C	
cm³/r [in³/r]	mm	[in]	mm	[in]	mm	[in]
344 [21.0]	311.0	[12.25]	259.0	[10.20]	205.6	[8.10]
400 [24.4]	316.3	[12.45]	264.3	[10.40]	210.9	[8.30]
434 [26.5]	319.6	[12.58]	267.5	[10.53]	214.2	[8.43]
480 [29.3]	323.7	[12.74]	271.6	[10.69]	218.3	[8.59]
677 [41.3]	342.2	[13.47]	290.1	[11.42]	236.8	[9.32]

Dimensions

Brake shaft side load capacity

These curves indicate the radial load capacity on the motor shaft at various locations with an allowable external thrust load of 454 kg [1,000 lb].

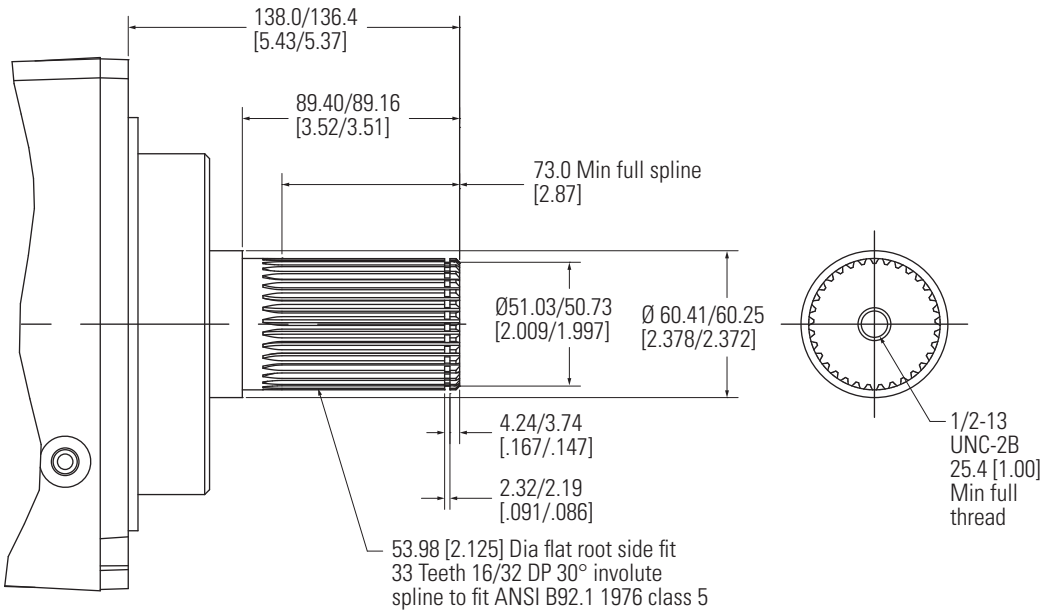
Note: Case pressure will increase the allowable inward thrust load and decrease the allowable outward thrust load. Case pressure will push outward on the shaft at 100 kg/3.5 bar [222 lb/50 psi].

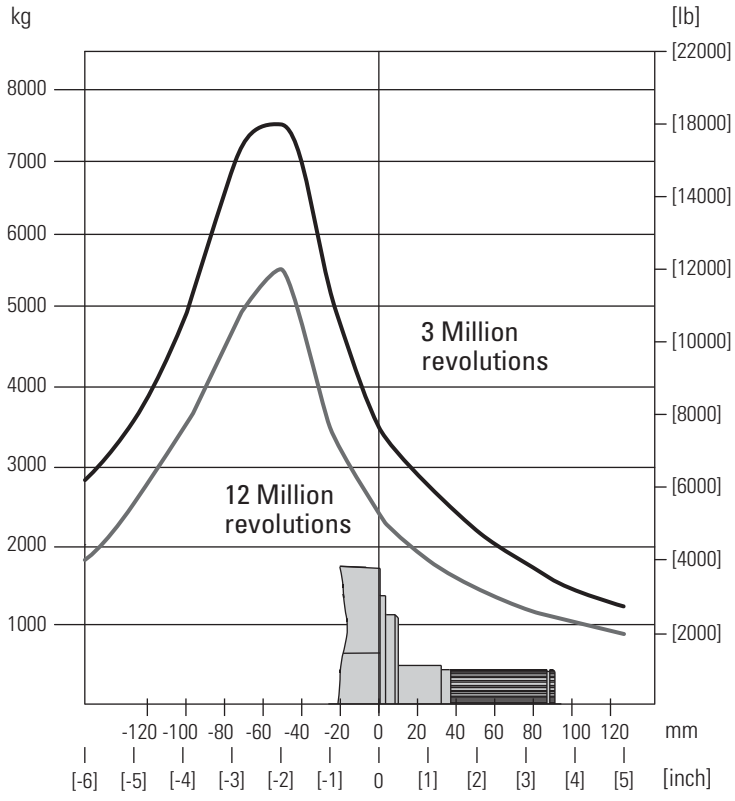


Each curve is based on B 10 bearing life [2000 hours or 12,000,000 shaft revolutions at 100 rpm] at rated output torque. To determine radial load at speeds other than 100 rpm, multiply the load values given on the bearing curve by the factors in the chart below.

rpm	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
360	0.69

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





HP30 / VIS Brake curve

Notes

Notes

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