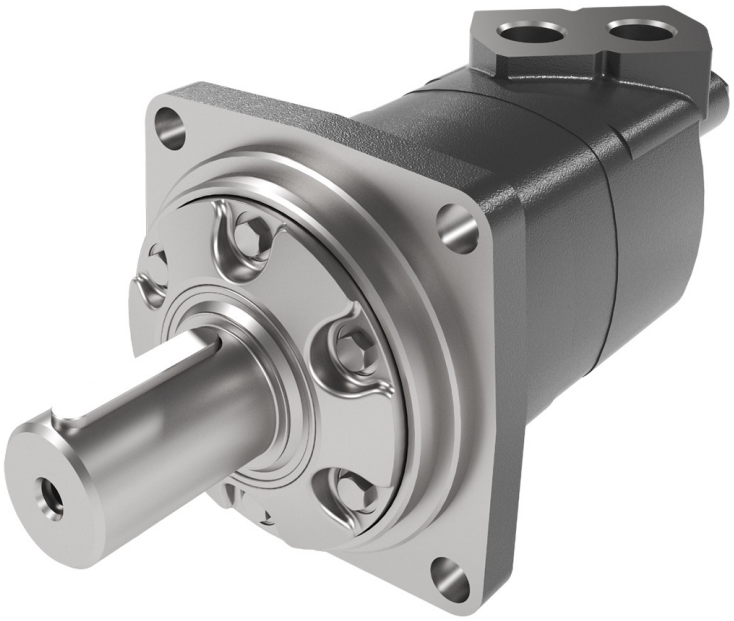
XL6 disc valve motor series

About the XL6 series

Danfoss' Xcel™ series low speed, high torque disc valve motors offer the most popular features and options from the parallel Danfoss Char-Lynn range and are optimized to bring the highest value in medium duty applications.



XL6 features, benefits, applications

Features

- 8 displacements, a variety of mounting flanges and output shafts
- Reliable, proven design
- High efficiency

Benefits

- Flexibility in designing this motor into a system
- Options that fit well into tough applications

Applications

- Mobile equipment
- Snow removal, mowing
- Sprayers
- Trenching machines
- Wood processing machines

XL6 disc valve motor series

XL6 specifications overview

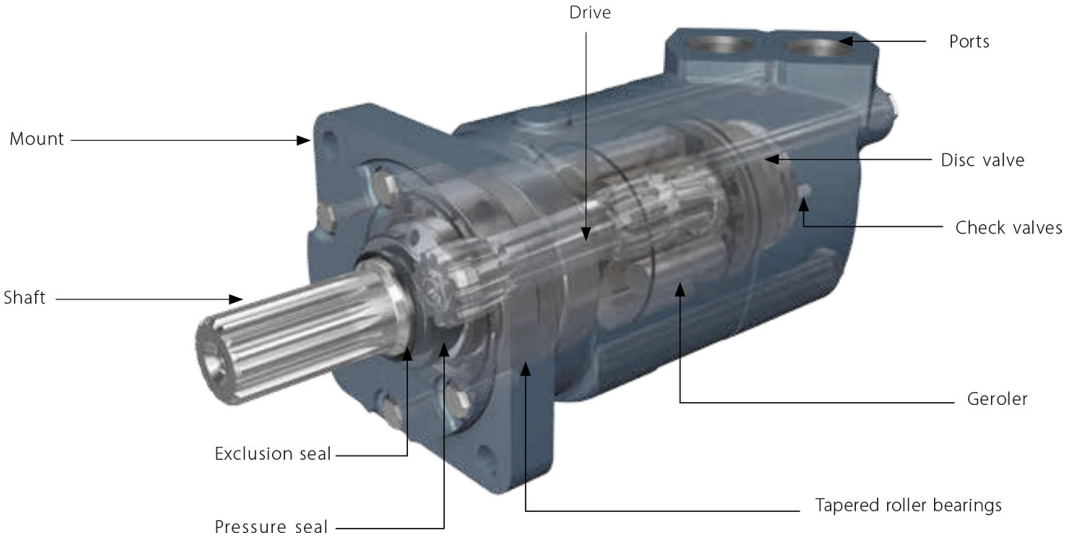
Specification	Data
Geroler element	8 displacements
Flow l/min [US gal/min]	150 [40] continuous 225 [60] intermittent
Speed RPM	775 continuous 866 intermittent
Pressure bar [psi]	205 [3000] continuous 310 [4500] intermittent
Torque N·m [lb·in]	1685 [14920] continuous 1875 [16580] intermittent

Continuous motor may run continuously at the listed ratings

Intermittent 10% of every minute

XL6 disc valve motor series

XL6 part identification



XL6 technical data

XL6 195cc-390cc technical data

Displacement cm³/r [in³]		**195 [11.9]**	**245 [15.0]**	**310 [19.0]**	**390 [23.9]**
Flow l/min [US gal/min]	Continuous	150 [40]	150 [40]	150 [40]	150 [40]
	Intermittent	170 [45]	210 [55]	225 [60]	225 [60]
Max. speed RPM	Continuous	775	615	485	387
	Intermittent	866	834	698	570
Pressure Δbar [Δpsi]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]
Torque* Nm [lb-in]	Continuous	575 [5100]	735 [6510]	930 [8230]	1155 [10230]
	Intermittent	860 [7620]	1100 [9740]	1355 [11990]	1635 [14490]
Weight	Standard or wheel mount	24.9 [55.0]	25.2 [55.5]	25.6 [56.5]	26.3 [58.0]
	Bearingless	20.2 [44.5]	20.4 [45.0]	20.9 [46.0]	21.5 [47.5]

* See shaft torque ratings for limitations.

XL6 490cc-985cc technical data

Displacement cm³/r [in³]		**490 [30.0]**	**625 [38.0]**	**805 [49.0]**	**985 [60.0]**
Flow l/min [US gal/min]	Continuous	150 [40]	150 [40]	150 [40]	150 [40]
	Intermittent	225 [60]	225 [60]	225 [60]	225 [60]
Max. speed RPM	Continuous	307	241	187	153
	Intermittent	454	355	289	230
Pressure Δbar [Δpsi]	Continuous	205 [3000]	170 [2500]	140 [2000]	140 [2000]
	Intermittent	275 [4000]	221 [3200]	170 [2500]	140 [2000]
Torque* Nm [lb-in]	Continuous	1445 [12800]	1480 [13100]	1582 [14004]	1685 [14920]
	Intermittent	1885 [16670]	1898 [16800]	1850 [16377]	1875 [16580]
Weight	Standard or wheel mount	27.0 [59.5]	27.9 [61.5]	29.0 [64.0]	30.4 [67.0]
	Bearingless	22.2 [49.0]	23.1 [51.0]	24.5 [53.5]	25.7 [56.5]

* See shaft torque ratings for limitations.

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For maximum case pressure, see case pressure seal limitation graph.

Δ bar [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.

To ensure best motor life, run motor for approximately 1 hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

Recommended operating parameters

Data	Recommended
Max. inlet pressure	310 bar [4500 psi] **Caution** Do not exceed Δ pressure rating
Max. return pressure	310 bar [4500 psi] with case drain line installed **Caution** Do not exceed Δ pressure rating
Fluids	Premium quality, anti-wear type hydraulic oil with a viscosity of no less than 13 cSt [70 SUS] at operating temperature.
Operating temperature	-34 to 82 °C [-30 to 180 °F]
Filtration	Per ISO cleanliness code 4406:20/18/13

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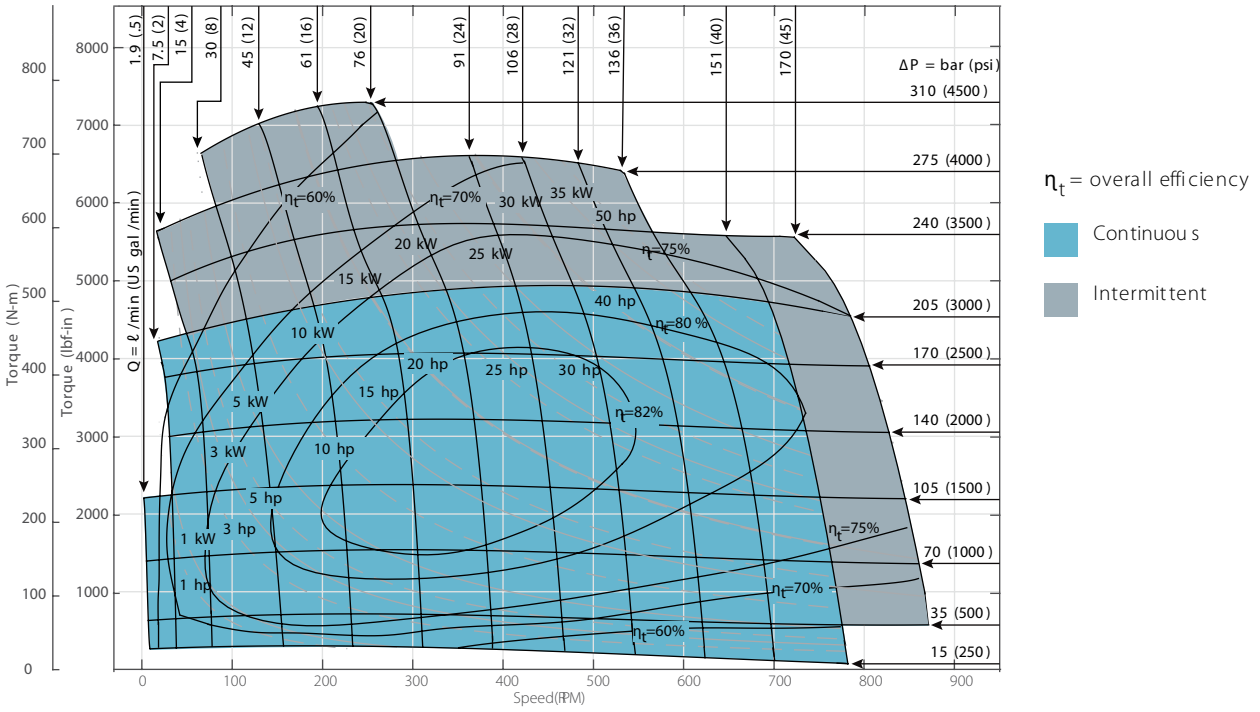
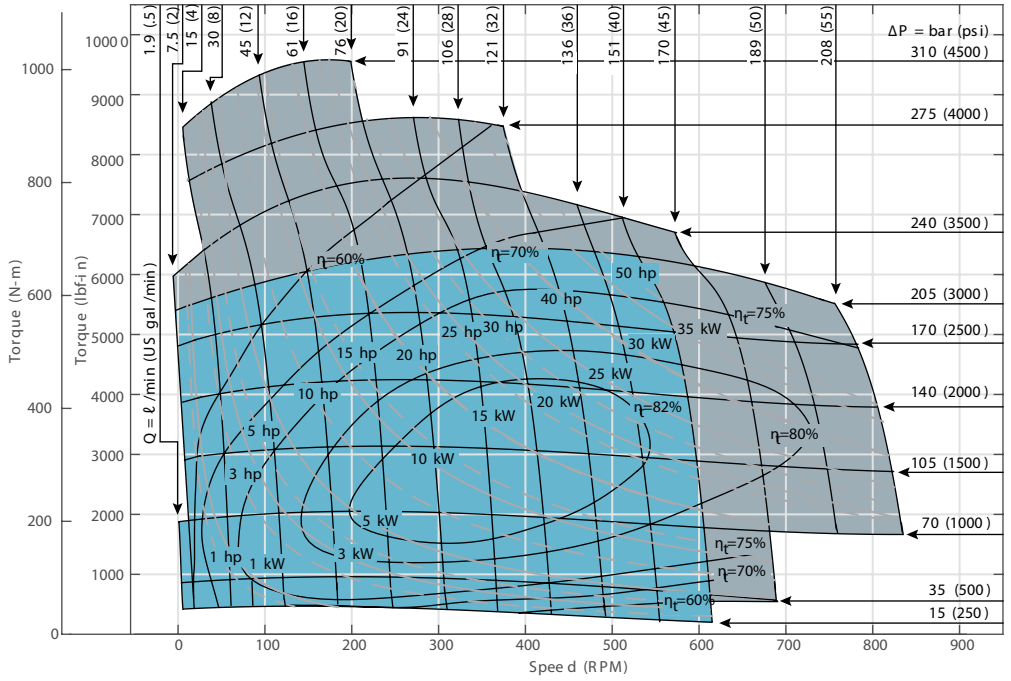
XL6 performance data

Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

XL6 195cc motor



XL6 245cc motor



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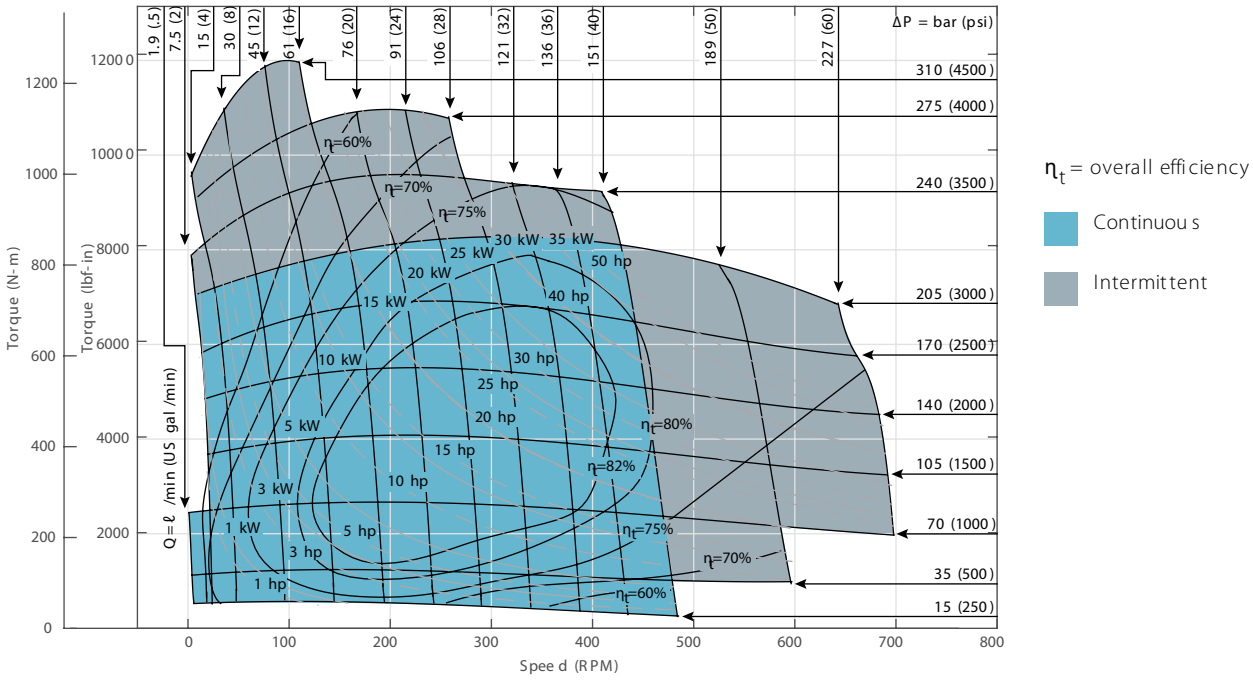
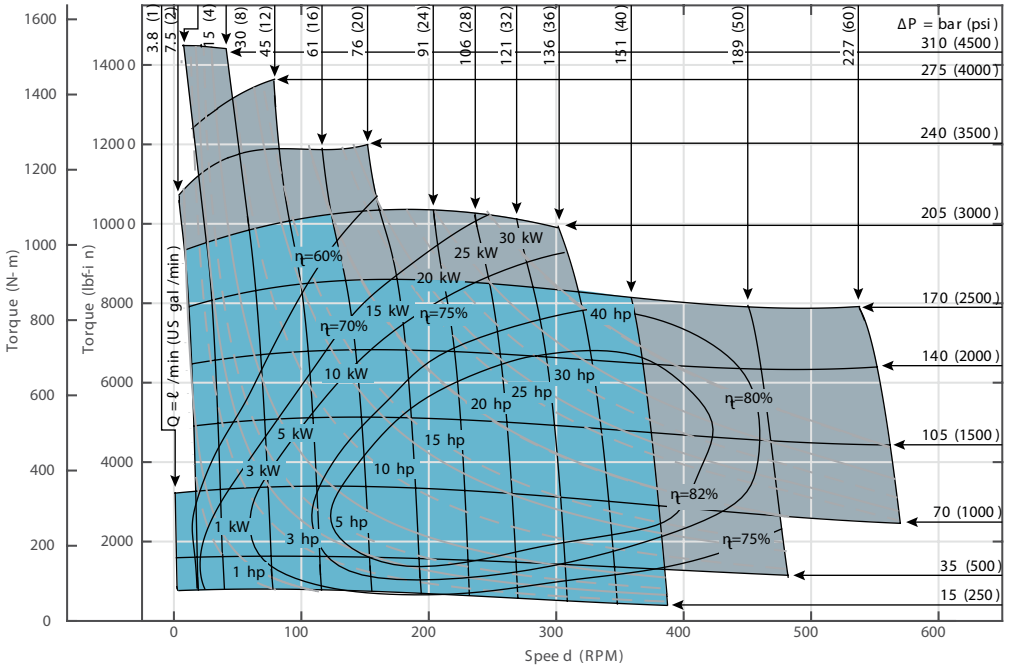
XL6 310cc motor

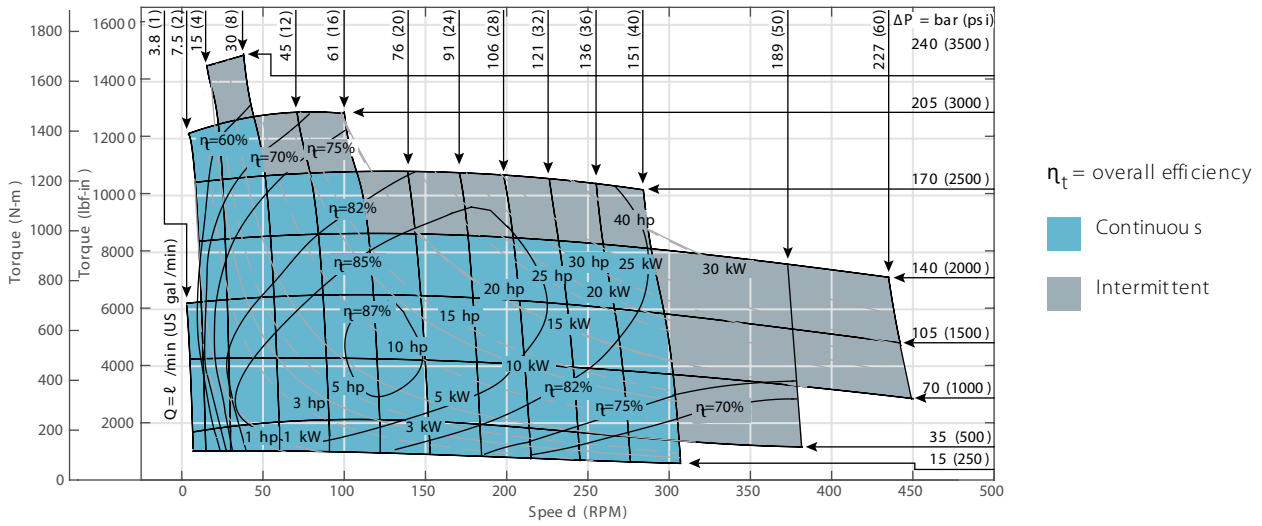


XL6 390cc motor



XL6 disc valve motor series

XL6 490cc motor

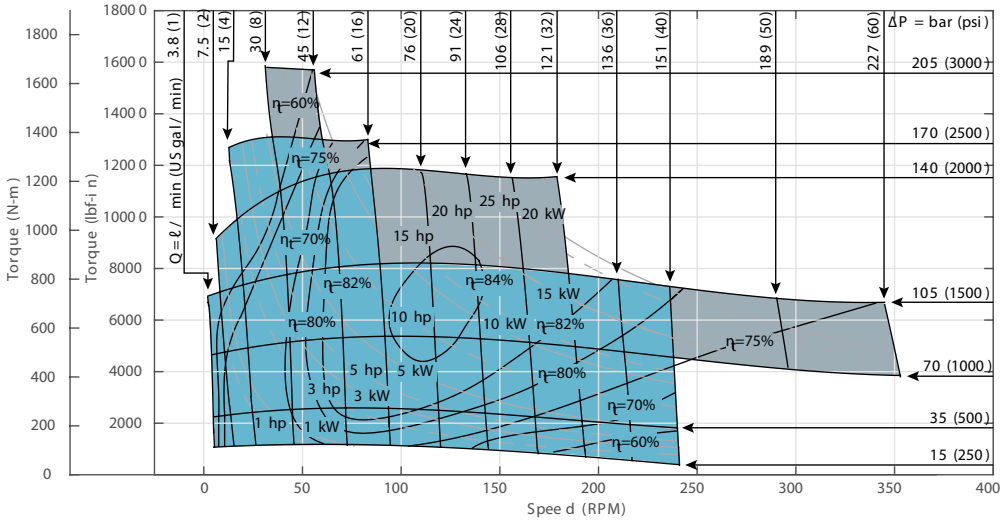


η_t = overall efficiency

Continuous

Intermittent

XL6 625cc motor



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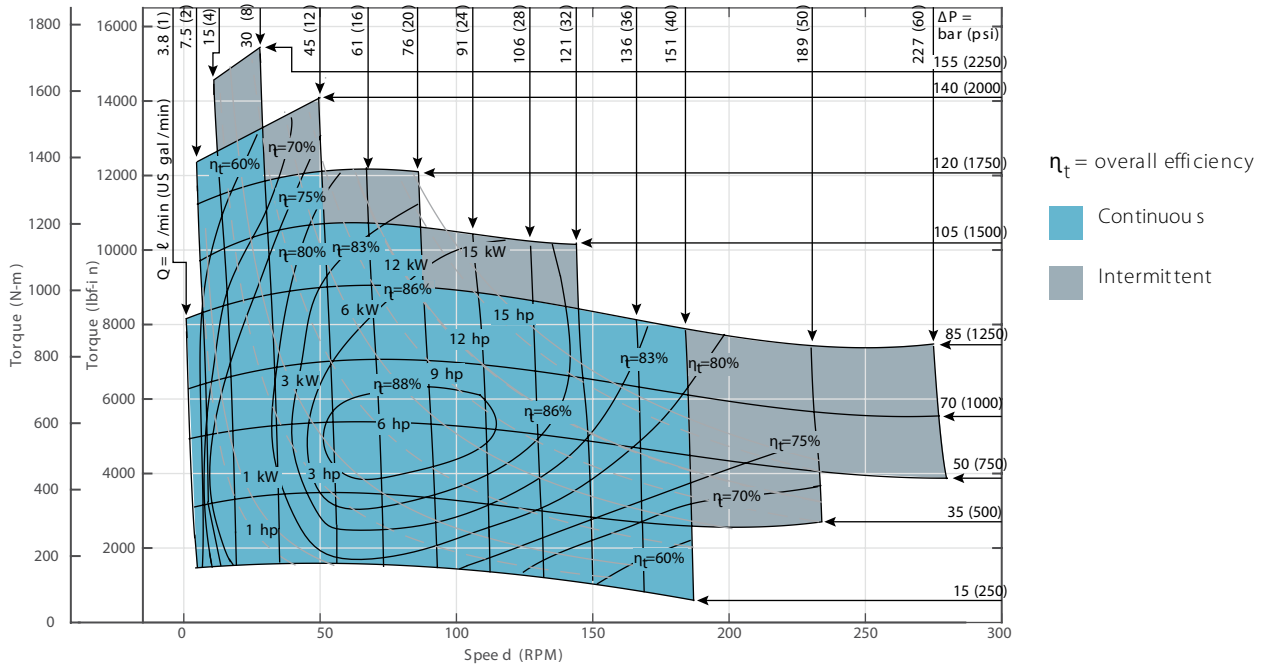
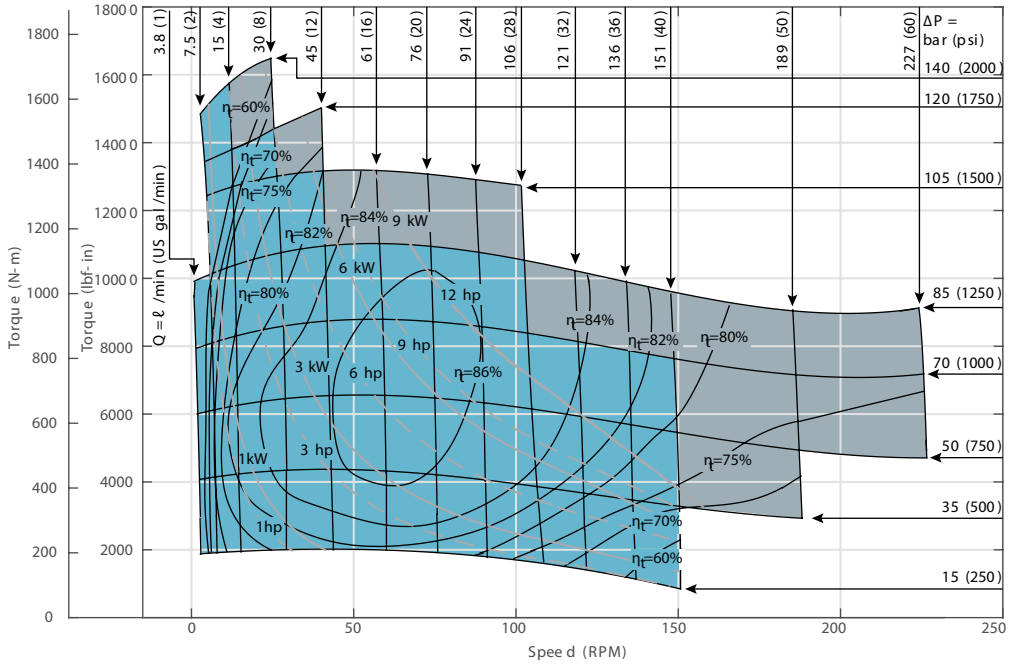
XL6 805cc motor



XL6 985cc motor



XL6 disc valve motor series

Mounting dimensions

XL6 standard mount dimensions

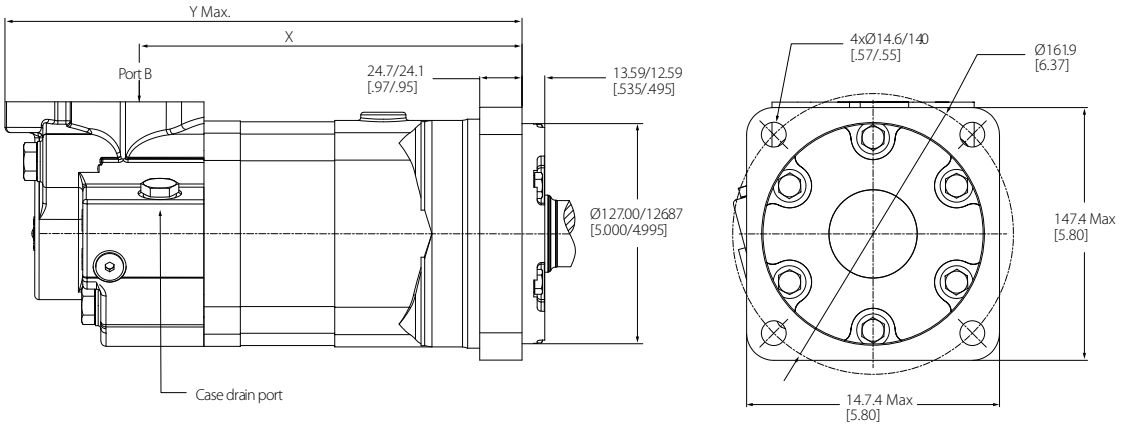
Ports

- 1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1) or
- G 1 (BSP) staggered ports (2)
- G 1/4 (B SP) case drain port (1)

Standard rotation viewed from shaft end

- Port A pressurized - CW
- Port B pressurized - CCW

Standard mount (AB)



Dimensions

Displacement cm^3/r [in^3/r]	Dimensions in mm [in]	
	X	Y
195 [11.9]	187.5 [7.38]	270.0 [10.63]
245 [15.0]	193.0 [7.60]	275.6 [10.85]
310 [19.0]	200.1 [7.89]	283.0 [11.14]
390 [23.9]	209.0 [8.23]	291.6 [11.48]
490 [30.0]	220.2 [8.67]	302.8 [11.93]
625 [38.0]	235.0 [9.25]	317.5 [12.50]
805 [49.0]	254.8 [10.03]	337.3 [13.28]
985 [60.0]	274.6 [10.81]	357.1 [14.06]

XL6 disc valve motor series

XL6 wheel mount dimensions

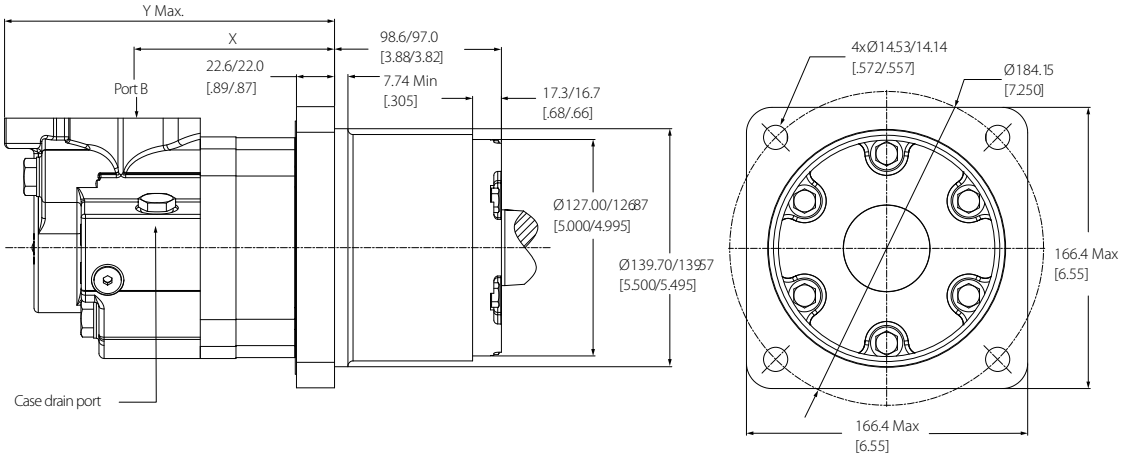
Ports

- 1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1) or
- G 1 (BSP) staggered ports (2)
- G 1/4 (B SP) case drain port (1)

Standard rotation viewed from shaft end

- Port A pressurized - CW
- Port B pressurized - CCW

Wheel mount (AC)



Dimensions

Displacement cm^3/r [in^3/r]	Dimensions in mm [in]	
	X	Y
195 [11.9]	102.6 [4.04]	185.2 [7.29]
245 [15.0]	108.2 [4.26]	190.8 [7.51]
310 [19.0]	115.6 [4.55]	198.1 [7.80]
390 [23.9]	124.5 [4.90]	207.1 [8.15]
490 [30.0]	135.4 [5.33]	217.9 [8.58]
625 [38.0]	150.1 [5.91]	232.7 [9.16]
805 [49.0]	169.9 [6.69]	252.7 [9.95]
985 [60.0]	189.7 [7.47]	272.5 [10.73]

XL6 disc valve motor series

XL6 global mount ISO dimensions

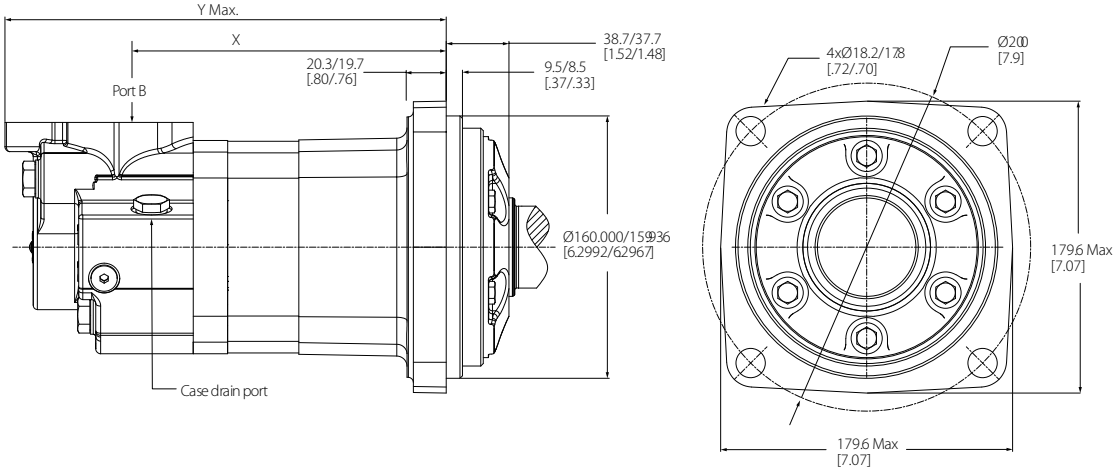
Ports

- 1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1) or
- G 1 (BSP) staggered ports (2)
- G 1/4 (B SP) case drain port (1)

Standard rotation viewed from shaft end

- Port A pressurized - CW
- Port B pressurized - CCW

Global mount ISO (AH)



Dimensions

Displacement cm^3/r [in^3/r]	Dimensions in mm [in]	
	X	Y
310 [19.0]	182.4 [7.18]	264.9 [10.43]
390 [23.9]	191.0 [7.52]	273.6 [10.77]
490 [30.0]	202.2 [7.96]	284.7 [11.12]
625 [38.0]	216.9 [8.54]	299.5 [11.79]
805 [49.0]	236.7 [9.32]	319.3 [12.57]
985 [60.0]	256.5 [10.10]	339.1 [13.35]

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XL6 bearingless mount dimensions

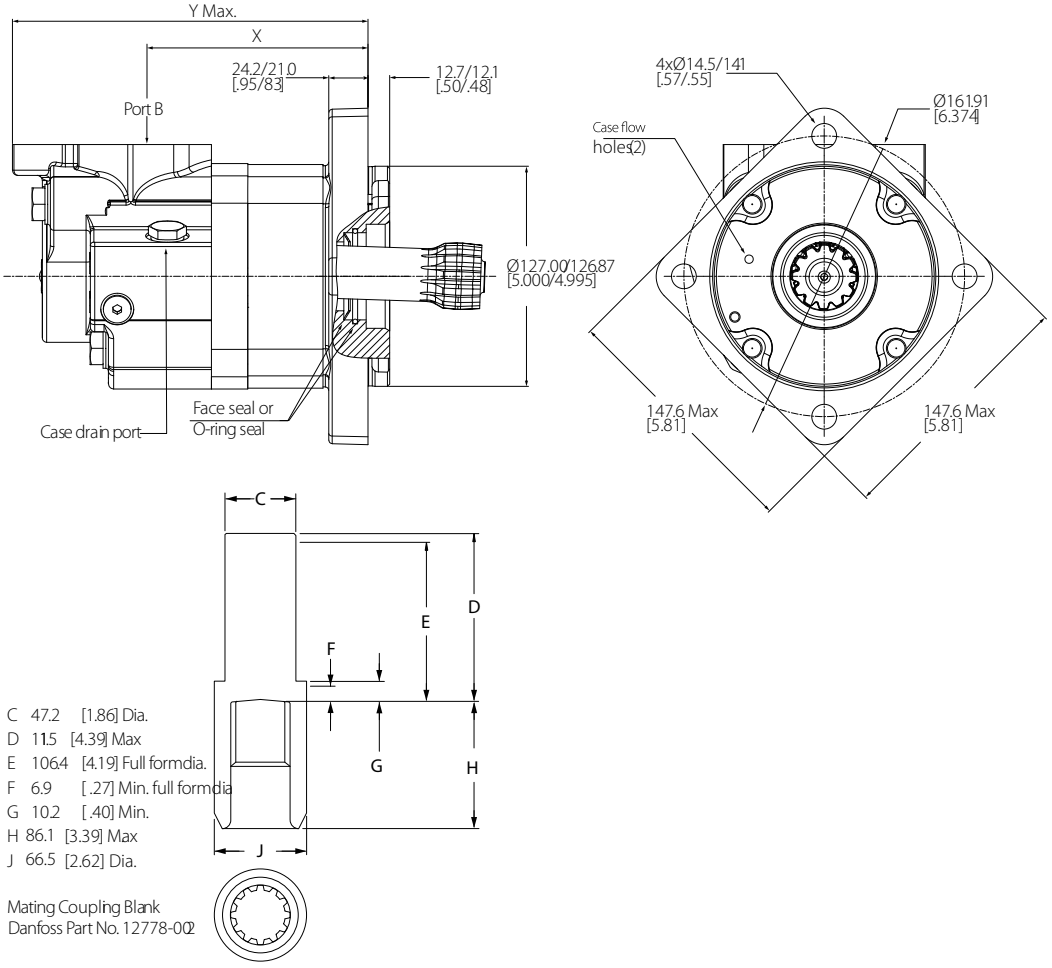
Ports

- 1 5/16-12 UN-2B SAE O-ring staggered ports (2)
- 7/16-20 UNF-2B SAE O-ring case drain port (1) or
- G 1 (BSP) staggered ports (2)
- G 1/4 (B SP) case drain port (1)

Standard rotation viewed form shaft end

- Port A pressurized - CW
- Port B pressurized - CCW

Bearingless mount (AA)



Dimensions

Displacement cm^3/r [in^3/r]	Dimensions in mm [in]	
	X	Y
195 [11.9]	105.4 [4.15]	188.0 [7.40]
245 [15.0]	111.0 [4.37]	193.5 [7.62]
310 [19.0]	118.4 [4.66]	200.9 [7.91]
390 [23.9]	127.3 [5.01]	209.6 [8.25]
490 [30.0]	138.2 [5.44]	220.7 [8.69]

XL6 disc valve motor series

Dimensions (continued)

Displacement cm^3/r [in^3/r]	Dimensions in mm [in]	
	X	Y
625 [38.0]	152.9 [6.02]	235.5 [9.27]
805 [49.0]	173.0 [6.81]	255.3 [10.05]
985 [60.0]	192.8 [7.59]	275.1 [10.83]

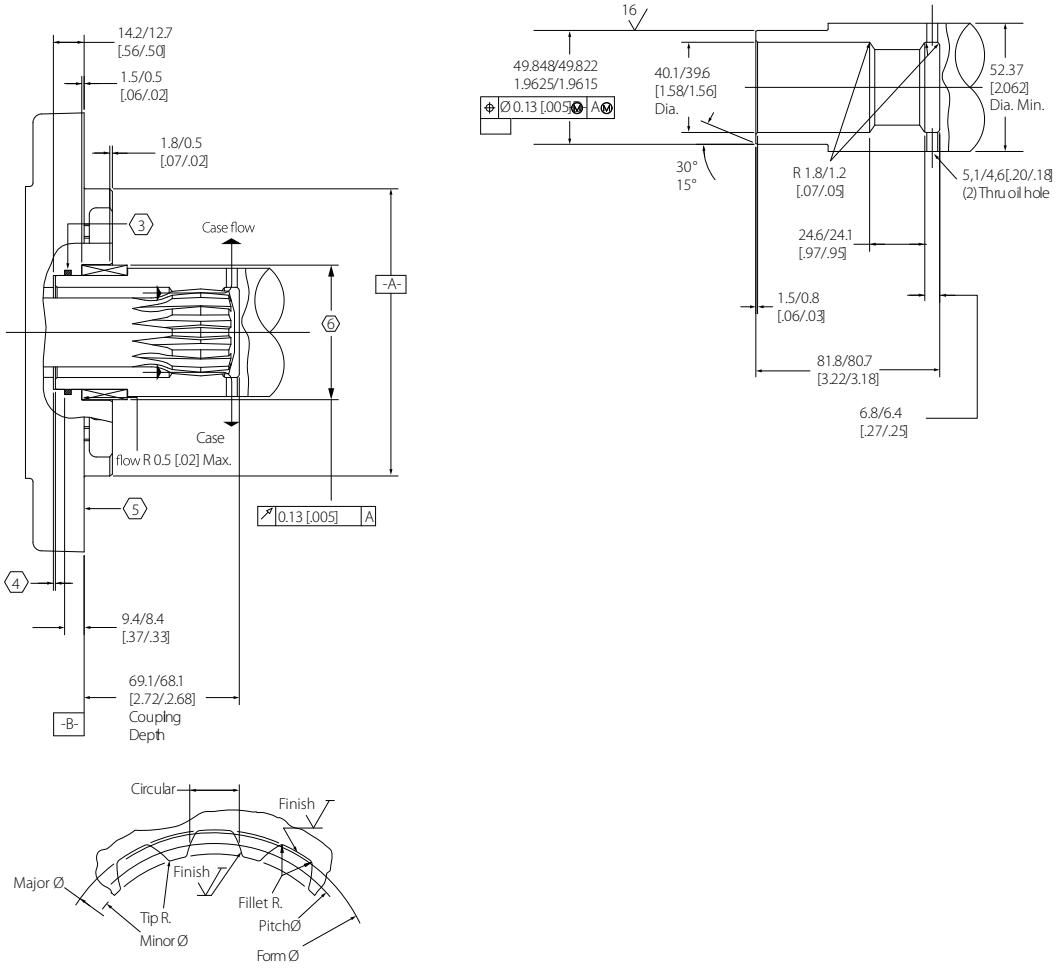
For Xcel XL6 Series bearingless motor application information, contact your Danfoss representative. Mating coupling blanks are available from Danfoss.

After machining blank, part must be hardened per Danfoss specification.

XL6 disc valve motor series

XL6 bearingless installation information

- Internal spline in mating part to be as follows: material to be ASTMA304, 8620H. Carbonize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0.076 - 1.02 [0.030 -0.040] (dimensions apply after heat treat).
- Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
- Seal to be furnished with motor for proper oil circulation.
- Some means of maintaining clearance between shaft and mounting flange must be provided.
- Similar to SAE “C“ four bolt flange.
- Counterbore designed to adapt to a standard sleeve beaning 50.010 - 50.038 [1.9689 - 1.9700] ID by 60.051 - 60.079 [2.3642 - 2 .3653] OD (Oilite bronze sleeve bearing).



Installation information

Specification	Data
Spline pitch	8.5/17
Pressure angle	30°
Number of teeth	12
Class of fit	Ref. 5
Type of fit	Side
Pitch diameter	Ref. 35.858823 [1.4117647] | 0.20 [0.008] D

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Installation information (continued)

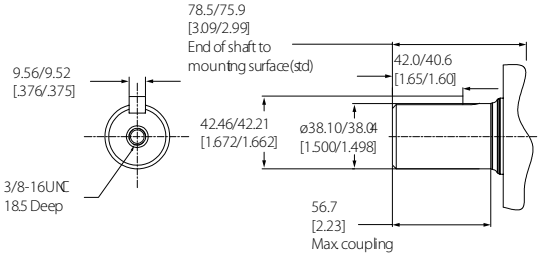
Specification	Data
Base diameter	Ref. 31.054652 [1.2226241]
Major diameter	39.17 [1.542] Max. 38,97 [1.534] min.
Minor diameter	33.30 - 33.48 [1.311 - 1.318]
Form diameter, min	38.33 [1.509]
Fillet radius	0.64 - 0.76 [0.025 - 0.030]
Tip radius	0.25 - 0.51 [0.010 - 0.020]
Finish	1.6 (63)
Involute profile variation	+0.000 -0.025 [+0.0000 -0.0010]
Total index variation	0.038 [0.0015]
Lead variation	0.013 [0.0005]
Circular space width	Maximum actual: 5.898 [0.2322]
	Minimum effective: 5.804 [0.2285]
	Maximum effective: Ref. 5.857 [0.2306]
	Minimum actual: Ref. 5.834 [0.2297]
Dimension between two pins	Ref. 26.929 - 27.084 [1.0602 - 1.0663]
Pin diameter	6.223 [0.2450] Pins to have 4.0 [0.160] Wide flat for root clearance

XL6 disc valve motor series

Shaft dimensions

XL6 straight (code 01) dimensions

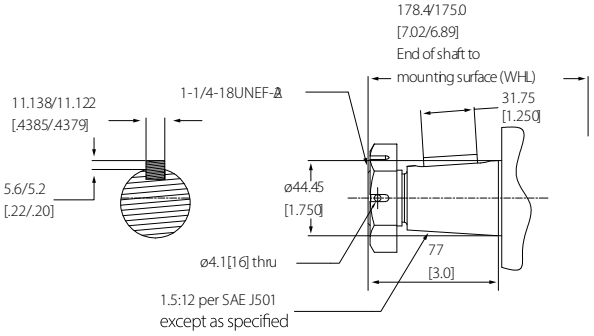
38.1 [1.50] straight (code 01)



1328 N·m [11750 lb·in] max. torque

XL6 tapered (code 02) dimensions

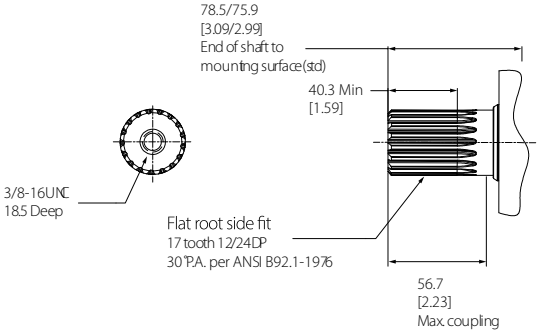
44.4 [1.75] tapered (code 02)



2107 N·m [18650 lb·in] max. torque

XL6 17 tooth splined (code 03) dimensions

38.1 [1.50] 17 tooth splined (03)

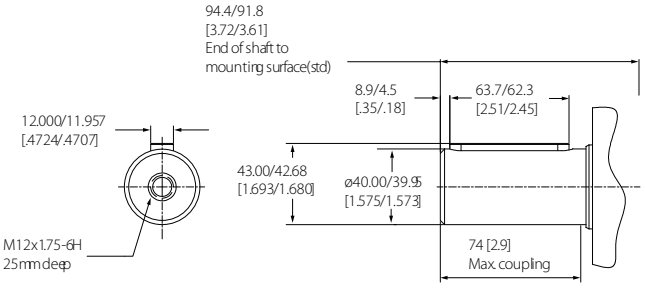


1328 N·m [11750 lb·in] max. torque

XL6 disc valve motor series

XL6 40mm straight (code 04) dimensions

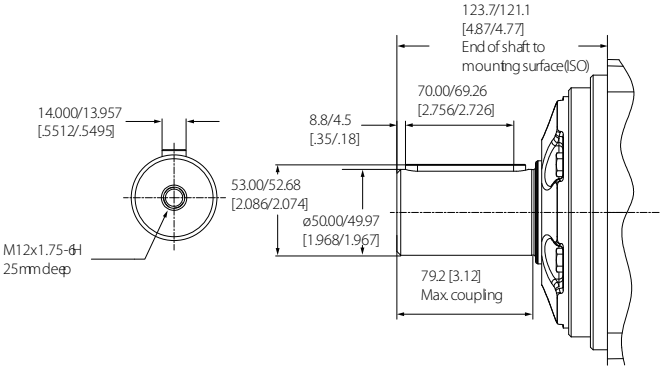
40mm straight (code 04)



1328 N·m [11750 lb·in] max. torque

XL6 50mm straight (code 05) dimensions

50mm straight (code 05)

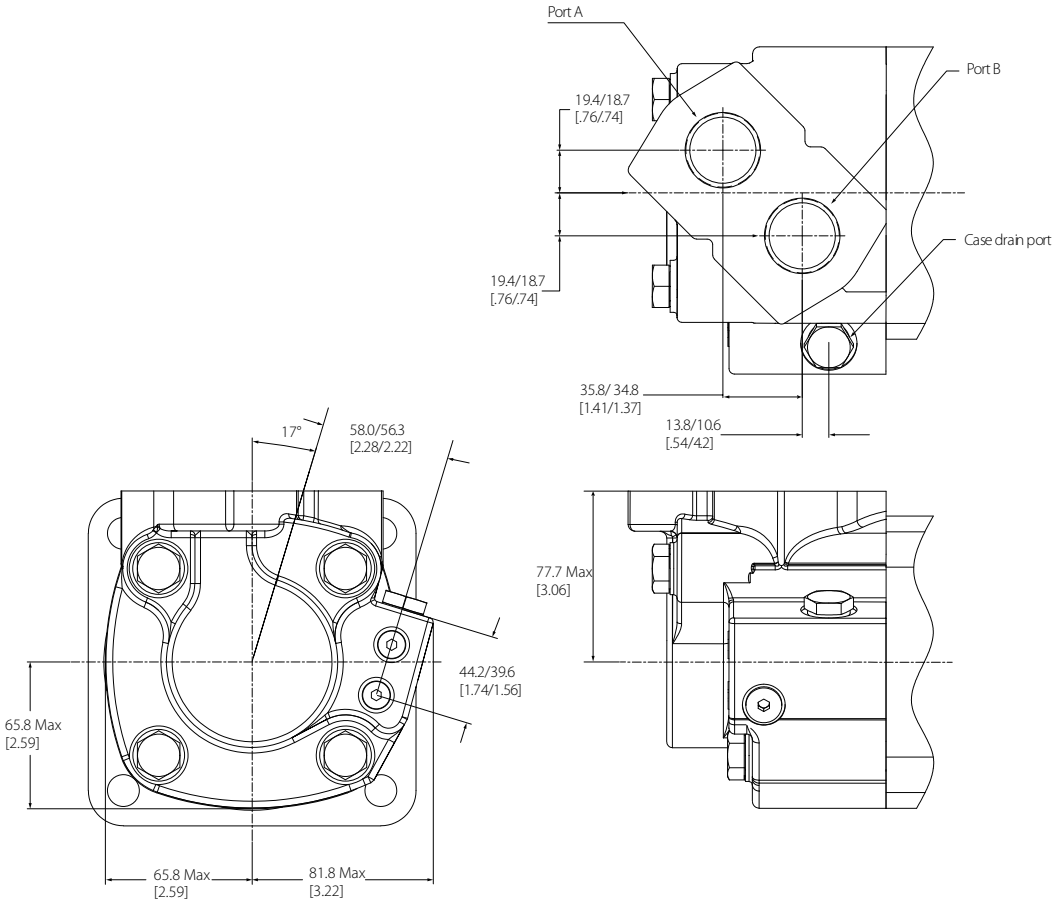


2107 N·m [18650 lb·in] max. torque

Only for use with mounting option AH.

XL6 disc valve motor series

XL6 ports dimensions



Ports

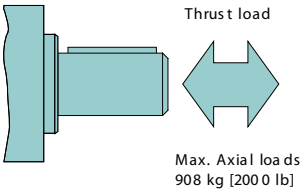
Option	Description
AA and 02	AA: 1 5/16-12 UN-2B SAE O-ring staggered ports (2) 02: 7/16-20 UNF-2B SAE O-ring case drain port (1)
AC and 03	AC: G 1 (BSP) staggered ports (2) 03: G 1/4 (BSP) case drain port (1)

XL6 disc valve motor series

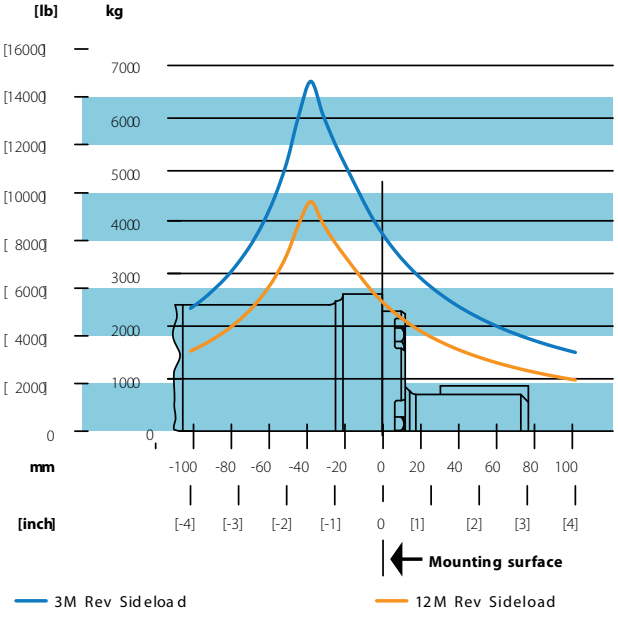
XL6 side load capacity

These curves indicate the radial load capacity on the motor shaft(s) at various locations with an external thrust load of 454 kg [1000 lb]. The maximum allowable thrust load is 908 kg [2000 lb].

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 109 kg/7 Bar [241 lb/100 PSI] .

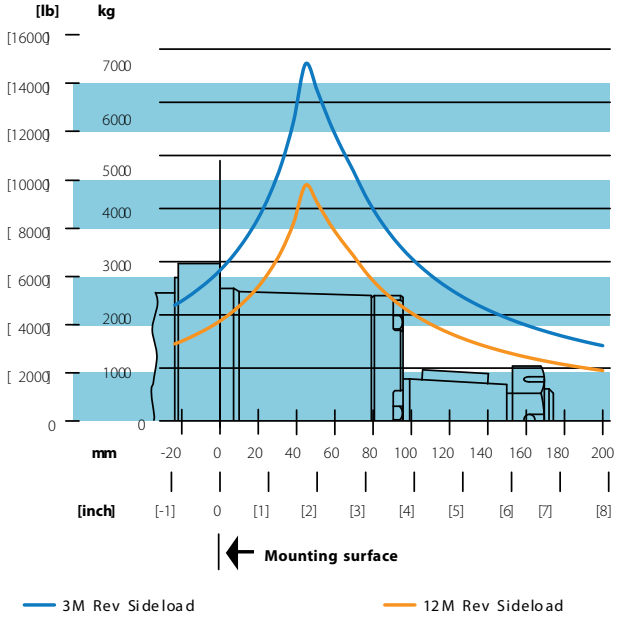


Standard motor with straight and splined shafts



XL6 disc valve motor series

Wheel motor with tapered shaft



Each 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 R PM, multiply the load values given on the bearing curve by the factors in the chart below.

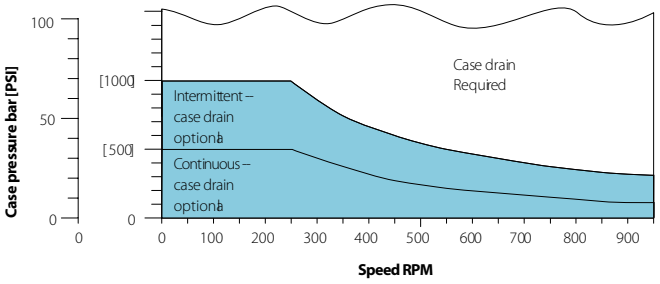
RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

XL6 disc valve motor series

XL6 case pressure seal limitation

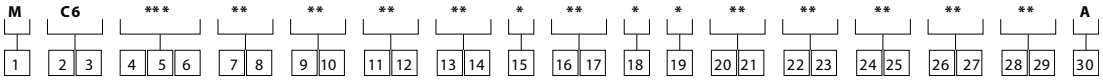
Xcel XL6 series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine if an external case drain is required from the case pressure seal limitation chart.

Case porting advantage contamination control	Flushing motor case
Cooler motor	Exiting oil draws motor heat away
Extended motor seal life	Maintain low case pressure with a preset restriction in the case drain line



XL6 disc valve motor series

XL6 model code



XL6 product, series, displacement options

1 - product

Code	Description
M	Motor

2, 3 - series

Code	Description
C6	Xcel XL6 series

4, 5, 6 - displacement

Code	Description
195	195 [11.9]
245	245 [15.0]
310	310 [19.0]
390	390 [23.9]
490	490 [30.0]
625	625 [38.0]
805	805 [49.0]
985	985 [60.0]

XL6 mounting flange and output shaft options

7, 8 - mounting

Code	Description
AA	Bearingless, 4 bolt: 127.0 [5.00] pilot dia. 14.35 [0.565] dia. holes on 162.0 [6.38] dia. bolt circle
AB	Standard, (SAE C), 4 bolt: 127.0 [5 .00] pilot dia. 14.35 [0.565] dia. holes on 162.0 [6 .38] dia. bolt circle
AC	Wheel, 4 bolt: 139.7 [5.50] pilot dia. 14.35 [0.565] dia. holes on 184.2 [7.25] dia. bolt circle
AH	Standard, 4 bolt: 160.0 [6.30] pilot dia. 18.01 [0.709] dia. holes on 200.0 [7.87] dia. bolt circle

9, 10 - output shaft

Code	Description
00	None (bearingless)
01	38.10 [1.500] dia. straight shaft with 0.375 - 16 UNC-2B thread in end, 9.52 [0.375] sq x 41.28 [1 .625] straight key
02	44.45 [1.750] dia. 0.125:1 tapered shaft per SAE J501 with 1.250-18 UNEF-2A threaded shaft end, 11.11 [0.4375] sq. x 31.8 [1.25] straight key
03	38.10 [1.500] dia. flat root side fit, 17 tooth, 12/24 DP 30° involute spline with 0.375-16 UNC-2B thread in end 40.4 [1.59] minimum full spline length