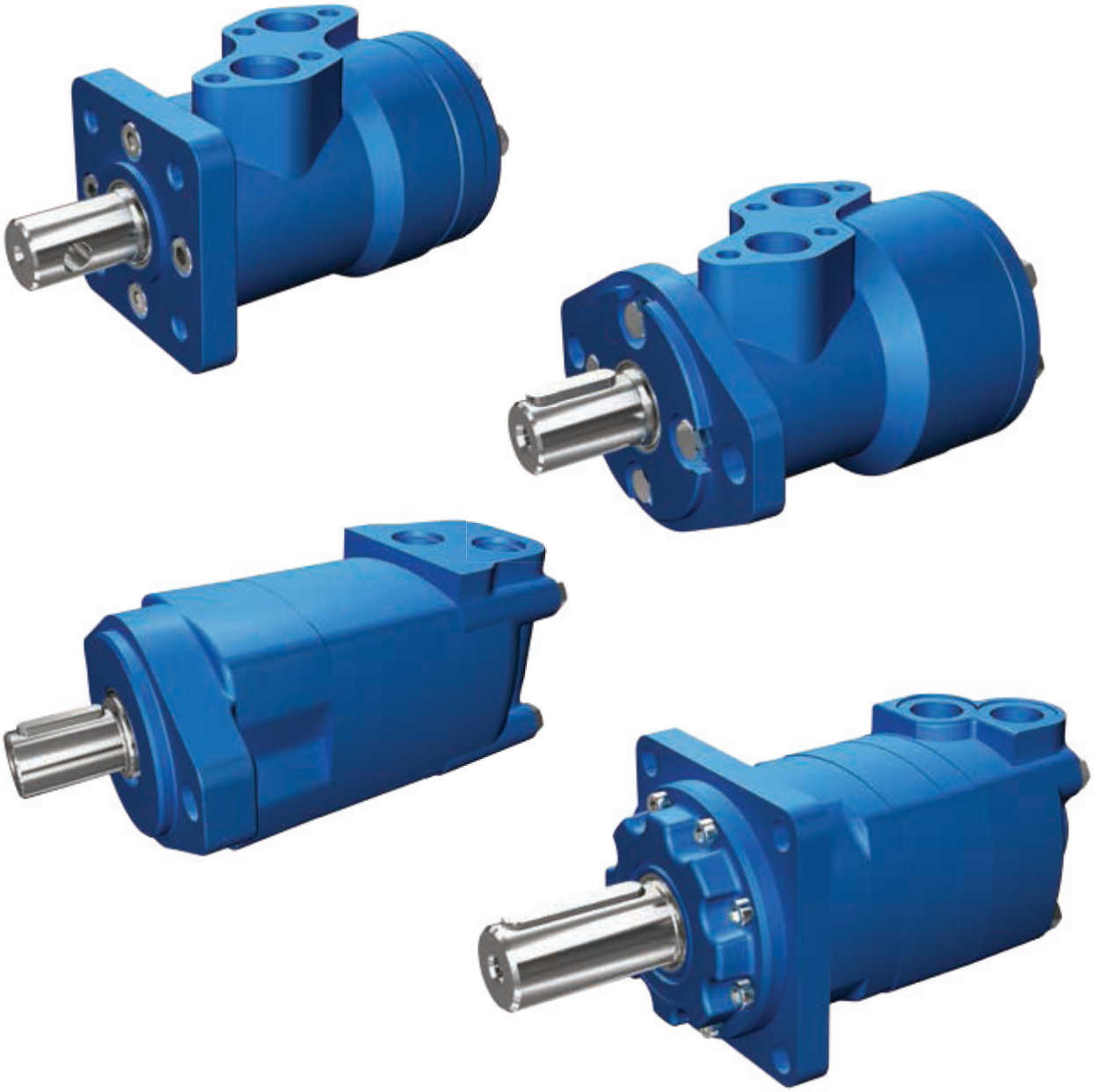
Low Speed High Torque Hydraulic Motors

Xcel XLH, XLS, XL2 and XL4 Series



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Contents

Xcel Spool Valve Motors 4
- Product Description, Features Benefits and Applications 4

Xcel XLH Series (016-) 5
- Specifications 5
- Performance Data 6
- Dimensions Xcel XLH Series (016-) - Outline 12
- Model Code 13

Xcel XLS Series (036-) 14
- Specifications 14
- Performance Data 15
- Dimensions Xcel XLS Series (036-) - Outline 20
- Model Code 21

Dimensions - Mounts 22

Dimensions - Shafts 23

Dimensions - Ports 24

Shaft Side Load Capacity and Case Pressure 25

Xcel XL2 Series 26
- Highlights 26
- Specifications 27
- Performance Data 28
- Dimensions - Standard/Wheel Mount 33
- Dimensions - Standard/Wheel Mount with Integral Valves 34
- Dimensions - Bearingless Mount 35
- Installation Information Bearingless 38
- Dimensions - Mounting Options 39
- Dimensions - Shafts 40
- Dimensions Ports 42
- Shaft Side Load Capacity 46
- Case Pressure and Case Porting 47
- Model Code 48

Xcel XL4 Series 50
- Highlights 50
- Specifications 51
- Performance Data 52
- Dimensions - Standard/Wheel Mount 55
- Dimensions - Bearingless 57
- Installation Information Bearingless 58
- Dimensions - Shafts 59
- Dimensions - Ports 60
- Shaft Side Load Capacity 61
- Case Pressure and Case Porting 62
- Model Code 63

Xcel Spool Valve Motors

Product Description, Features Benefits and Applications

Description

Eaton's Xcel™ Series Low Speed High Torque Spool Valve motors offer the most popular features and are optimized to bring the highest value in medium duty applications.

Xcel spool valve motors distribute pressurized fluid into and out of the orbit gear set via valve slots integrated into the output shaft. The spool valve motors incorporate both valving and hydrodynamic journal bearings into a common shaft design. These motors incorporate the proven orbit motor principle to provide high torque at low speeds. Motor shaft rotation can be instantly reversed by changing direction of input/output flow while generating equal torque in either direction.
The displacements available provide a wide variety of speeds and torque.

XLS motor feature Eaton's Geroler™ technology to minimize friction and increase operating efficiency, while internal check valves limit case pressure to that of the outlet port.

Features

- Proven orbit motor principle
- Hydrodynamic journal bearings
- Three moving components (Gerotor-star, drive, and shaft)
- Three –zone pressure design
- Optimized drive running angle
- Variety of displacements and shafts
- Designed for medium and low duty

Benefits

- Compact, powerful package
- High efficiency
- Design flexibility
- Economically tailored solutions
- Long bearing life (at rated loads)

Applications

- Aerial work platform
- Augers
- Conveyors
- Food processing
- Harvesters
- Machine tools
- Spreaders
- Turf care equipment
- Winches

Specifications XLH Motor

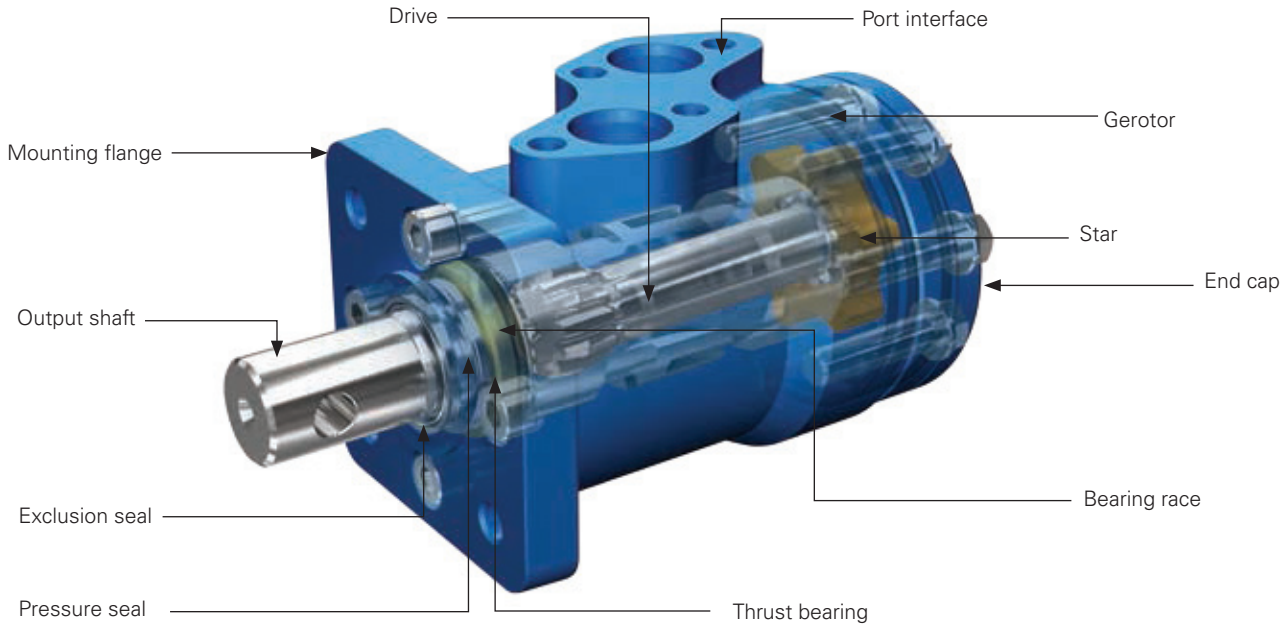
Geroler Element	11 Displacements
Flow L/min [GPM]	57 [15] Continuous***
	68 [18] Intermittent**
Speed rpm	Up to 800 rpm inter. **
ΔPressure bar [psi]	124 [1800] Cont.***
	138 [2000] Inter.**
Torque Nm [in-lbs]	426 [3770] Cont.***
	507 [4485] Inter.**

Specifications XLS Motor

Geroler Element	9 Displacements
Flow L/min [GPM]	57 [15] Continuous***
	68 [18] Intermittent**
Speed rpm	Up to 875 rpm inter. **
ΔPressure bar [psi]	138 [2000] Cont.***
	155 [2250] Inter.**
Torque Nm [in-lbs]	473 [4190] Cont.***
	512 [4540] Inter.**

***Continuous-(Cont.) Continuous rating, motor may be run continuously at these ratings.

**Intermittent-(Inter.) Intermittent operation, 10% of every minute.



Specification Data

Displacement cm^3/r [in^3/r]		53 [3.2]	63 [3.8]	80 [4.9]	100 [6.2]	125 [7.6]	160 [9.6]	200 [12.2]	245 [14.9]	315 [19.2]	390 [23.8]	485 [30.0]
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]
	Intermittent	45 [12]	53 [14]	68 [18]	68 [18]	68 [18]	68 [18]	68 [18]	68 [18]	68 [18]	68 [18]	68 [18]
Max. Speed RPM	Continuous	721	693	710	568	462	354	286	234	174	144	114
	Intermittent	864	806	848	678	551	421	341	282	209	171	138
Pressure ΔBar [Δpsi]	Continuous	124 [1800]	124 [1800]	124 [1800]	124 [1800]	124 [1800]	115 [1650]	110 [1600]	100 [1450]	90 [1300]	83 [1200]	69 [1000]
	Intermittent	138 [2000]	138 [2000]	138 [2000]	138 [2000]	138 [2000]	124 [1800]	124 [1800]	124 [1800]	124 [1800]	110 [1600]	90 [1300]
Torque* Nm [lb-in]	Continuous	83 [735]	104 [920]	130 [1150]	162 [1430]	200 [1770]	242 [2140]	287 [2540]	318 [2815]	377 [3340]	419 [3705]	426 [3770]
	Intermittent	93 [825]	116 [1025]	145 [1285]	181 [1600]	223 [1975]	260 [2300]	324 [2870]	391 [3460]	508 [4495]	547 [4840]	507 [4485]
Weight Kg [lbs]		5 [11.0]	5.3 [11.6]	5.5 [12.1]	6.1 [13.4]	6.2 [13.6]	6.4 [14.1]	6.7 [14.7]	7.1 [15.6]	7.4 [16.3]	7.7 [16.9]	8 [17.6]

Maximum Case Pressure: See case pressure seal limitation graph

*See shaft torque ratings for limitations.

Note: A simultaneous maximum torque and maximum speed NOT recommended.
To assure 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.

Max. inlet pressure:

150 bar [2175 psi]

Do not exceed Δ pressure rating (see chart above)

ΔBar[Δpsi]:

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

Recommended fluids:

Premium quality anti-wear type hydraulic oil with a viscosity of not less than 20-32 cSt at operating temperature.

Recommended system operating temp :

82°C [180 °F]

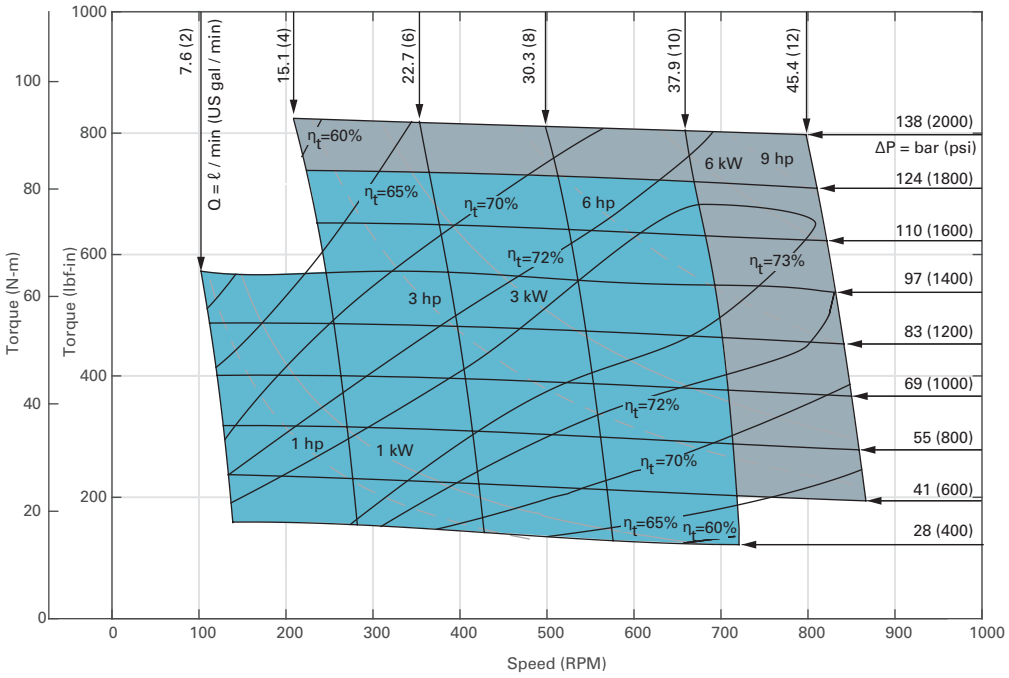
Recommended filtration

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

Xcel XLH Series (016-)

Performance Data

Function Diagram: XLH motor 53cc



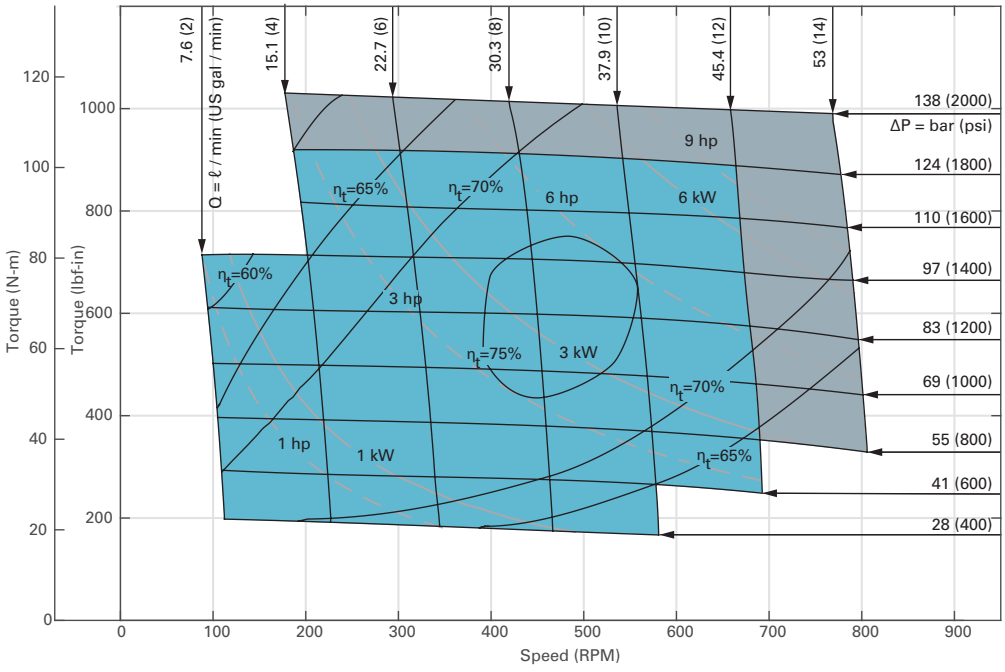
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

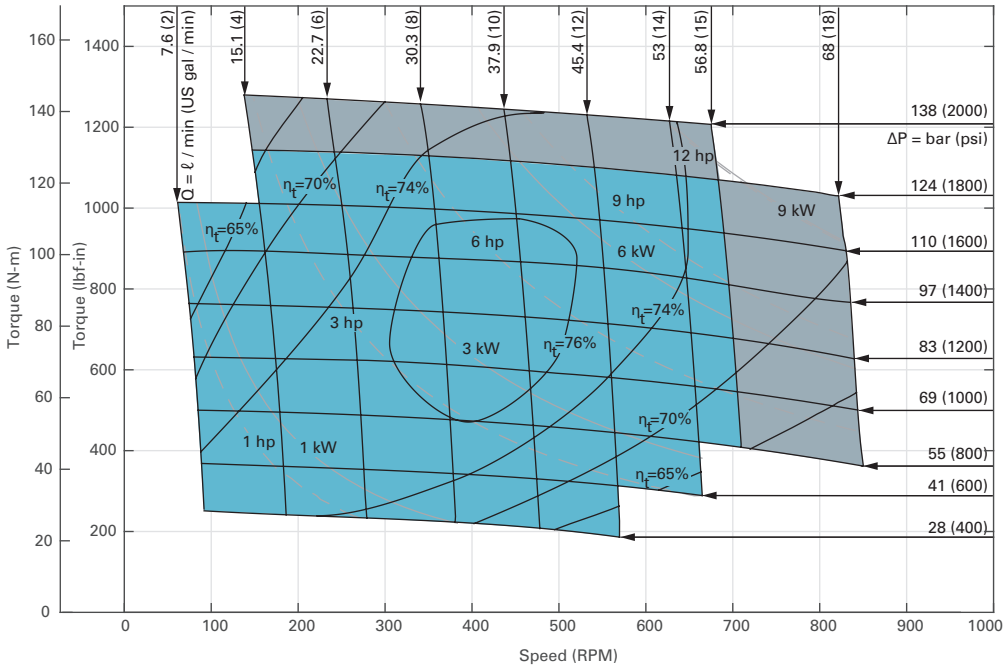
Continuous

Intermittent

Function Diagram: XLH motor 63cc



Function Diagram: XLH motor 80cc



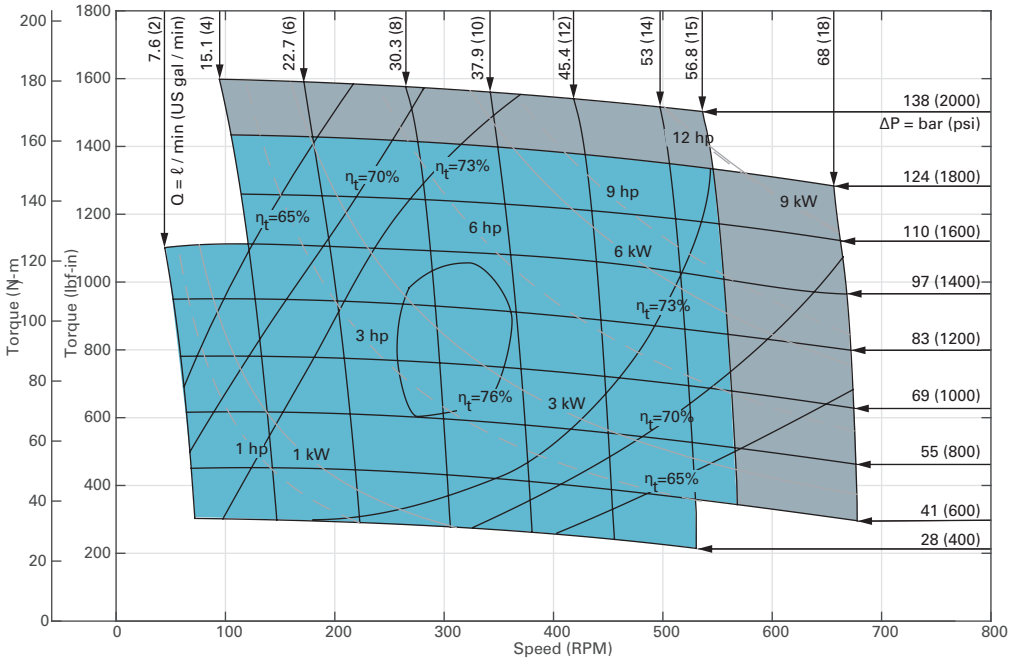
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

Continuous

Intermittent

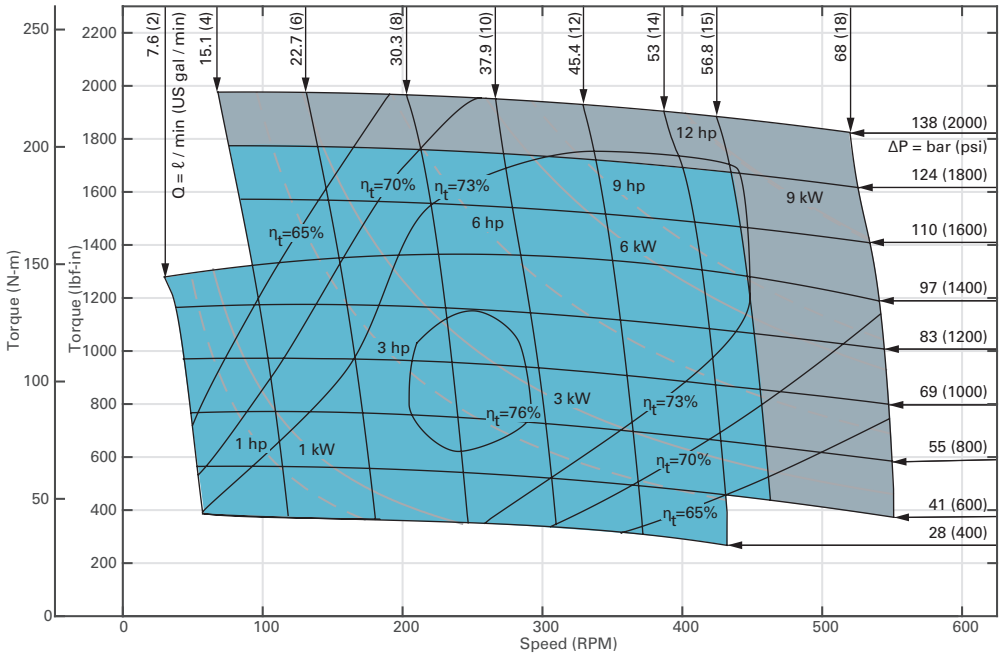
Function Diagram: XLH motor 100cc



Xcel XLH Series (016-)

Performance Data

Function Diagram: XLH motor 125cc



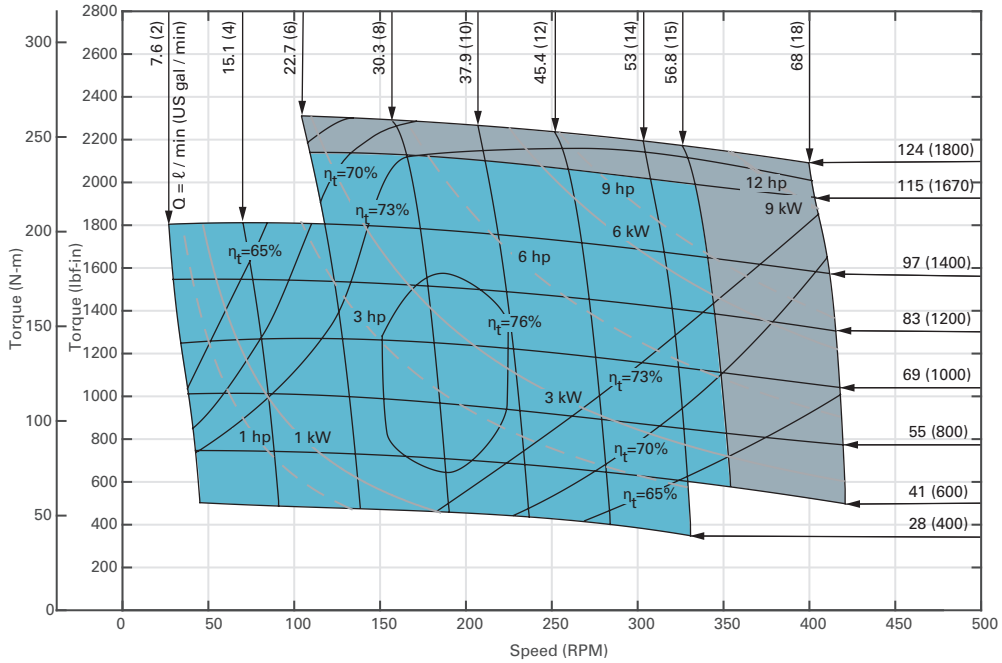
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

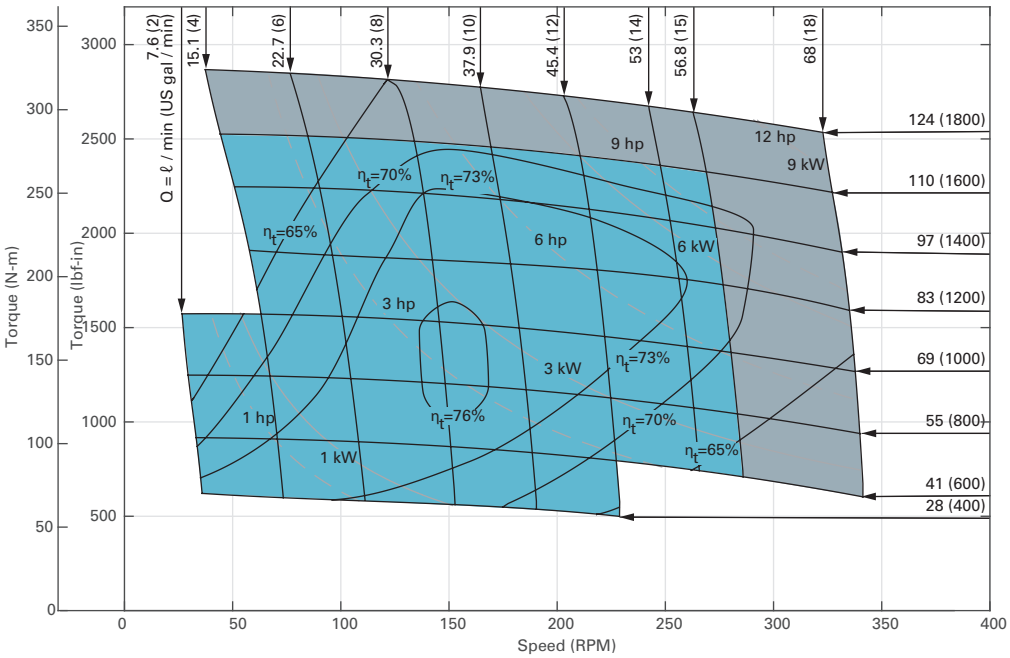
Continuous

Intermittent

Function Diagram: XLH motor 160cc



Function Diagram: XLH motor 200cc



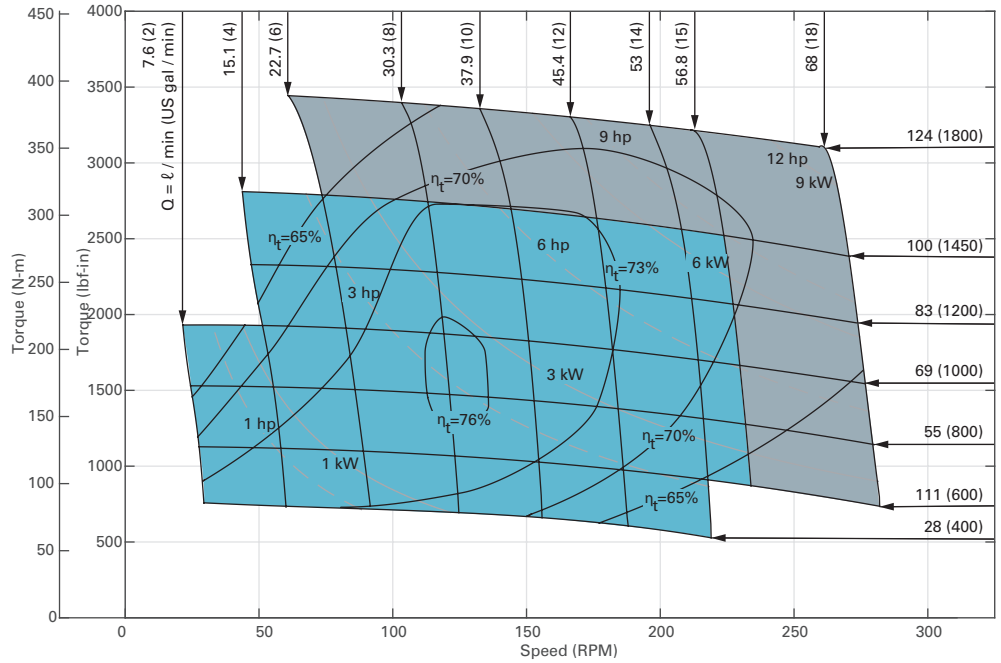
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

Continuous

Intermittent

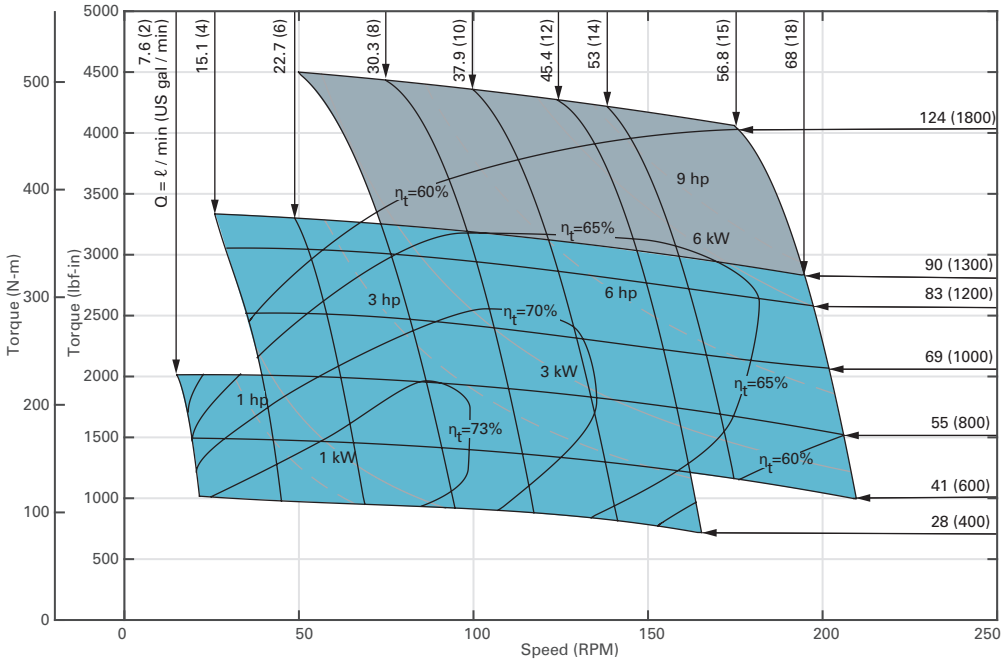
Function Diagram: XLH motor 245cc



Xcel XLH Series (016-)

Performance Data

Function Diagram: XLH motor 315cc



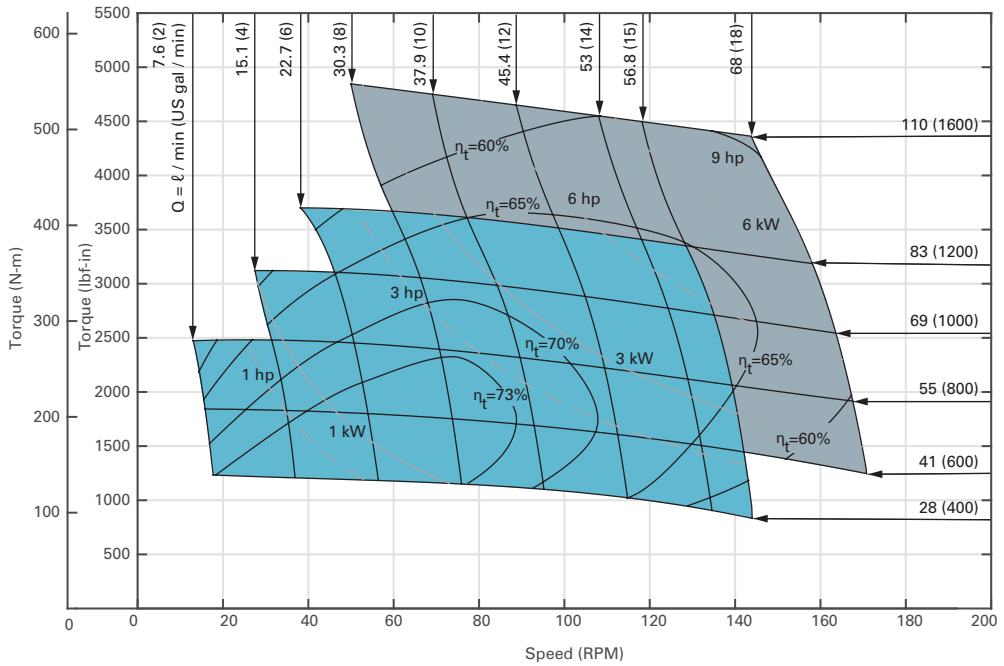
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

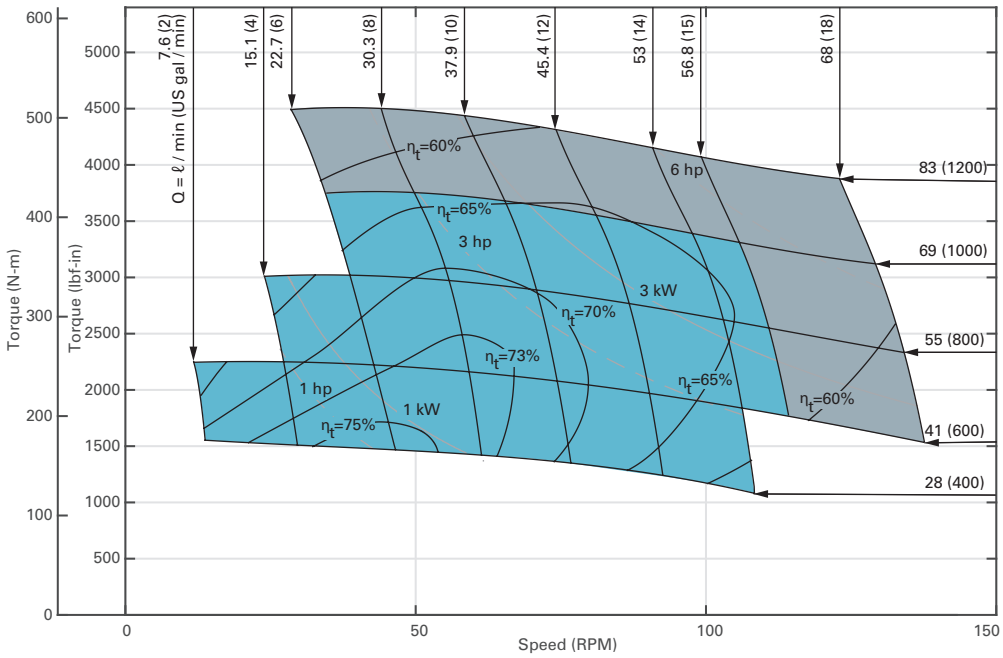
Continuous

Intermittent

Function Diagram: XLH motor 390cc



Function Diagram: XLH motor 485cc



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

η_t = overall efficiency

Continuous

Intermittent

Xcel XLH Series (016-)

Dimensions Xcel XLH Series - Outline

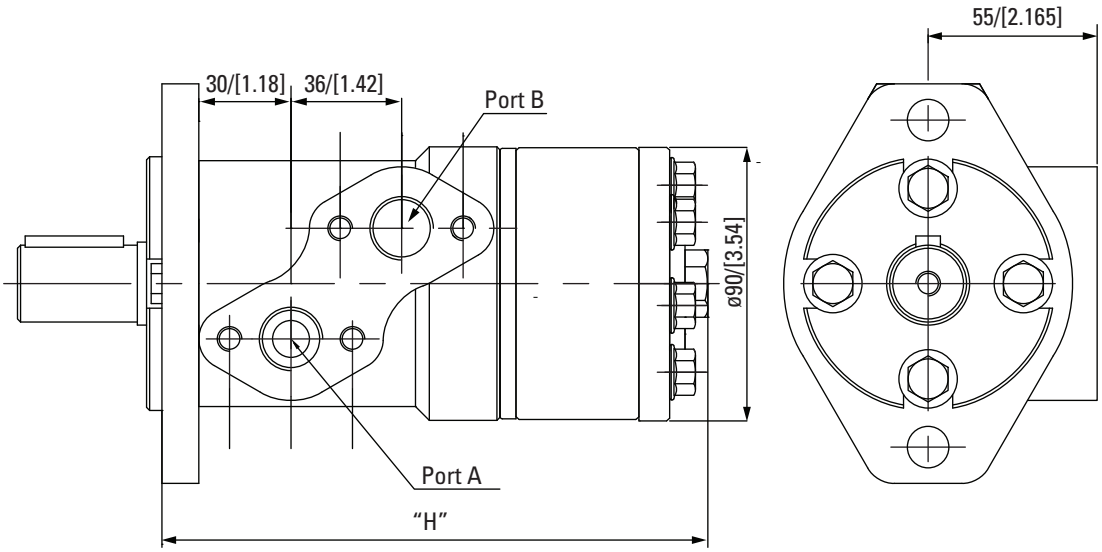
Standard Rotation Viewed from Shaft End

Port A pressurized – CW

Port B pressurized – CCW

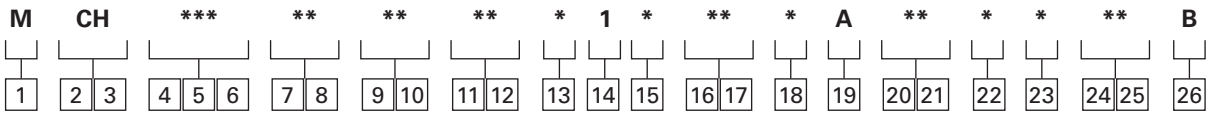
XLH Standard Shaft Seal and Section Seal Kit Number: **Z331-23**

XLH High Pressure Shaft Seal and Section Seal Kit Number: **Z331-41**



Disp. cc/r [in3/r]	53 [3.2]	63 [3.8]	80 [4.9]	100 [6.2]	125 [7.6]	160 [9.6]	200 [12.2]	245 [14.9]	315 [19.2]	390 [23.8]	485 [30.0]
H mm [in]	142 [5.59]	144 [5.67]	146 [5.75]	148 [5.83]	151 [5.95]	157 [6.18]	161 [6.34]	167 [6.57]	177 [6.96]	187 [7.36]	199 [7.83]

* Based on the mounting flange SAE A.



1 Product

M	Motor

2 3 Series

CH	XLH Series

4 5 6 Displacement cm³/r [in³/r]

053	53 [3.2]
063	63 [3.8]
080	80 [4.9]
100	100 [6.2]
125	125 [7.6]
160	160 [9.6]
200	200 [12.2]
245	245 [14.9]
315	315 [19.2]
390	390 [23.8]
485	485 [30.0]

7 8 Mounting flange

AA	2 bolt standard, SAE A. 82.55x5, pilot 2-13.5 Dia. Mounting holes on 106.4 Dia
AC	2 bolt standard, 82.55x2.8 pilot. 2-13.5 Dia. Mounting holes on 106.4 Dia.
AD	4 Bolt standard, 44.40 Dia. x 3.05 Pilot, 375-16 UNC-2B, Mounting Holes on 82.55 Dia. B.C.
AE	4 Bolt standard, 44.40 Dia. x 3.05 Pilot, M10x1.5-6H Mounting Holes on 82.55 Dia. B.C.

9 10 Output shaft

01	25 dia. Straight, parallel key A8x7x32, M8 hole in shaft end. DIN 6885
02	25 Dia. Straight, 5mm extra length. parallel key A8x7x32, M8 hole in shaft end, DIN 6885
03	25.4Dia. Straight, parallel key ¼x¼x1¼, M8 hole in shaft end, BS 46
04	25.4 Dia. Splined shaft, SAE 6B, 1/4-20UNC-2B hole in shaft end
05	25.4 Dia. Straight, woodruff key, 1/4-20 UNC-2B hole in shaft end
08	25.4 Dia. Straight, 10.3 [.405] Dia. Cross Hole 15.7 [.618] from Shaft End, 1/4-20UNC-2B hole in shaft end

11 12 Main ports

AA	Staggered port 2-G1/2 ISO228/1
AE	Staggered port 2-0.875-14UNF-2B O-ring or manifold ports (4-M8-6H mounting holes)

13 Case drain options

0	None
1	G1/4 ISO228/1
3	0.4375-20UNF-2B

14 Gerotor options

1	Standard Gerotor

15 Shaft options

0	Standard shaft

16 17 Seal options

00	Standard seals
01	Seal guard
02	High pressure seal shaft

18 Speed sensor options

0	None

19 Manifold block options

A	None

20 21 Special features (hardware)

00	None

22 Special assembly instructions

0	None
1	Reverse rotation

23 Paint

C	Black primer

24 25 Customer identification or name plate

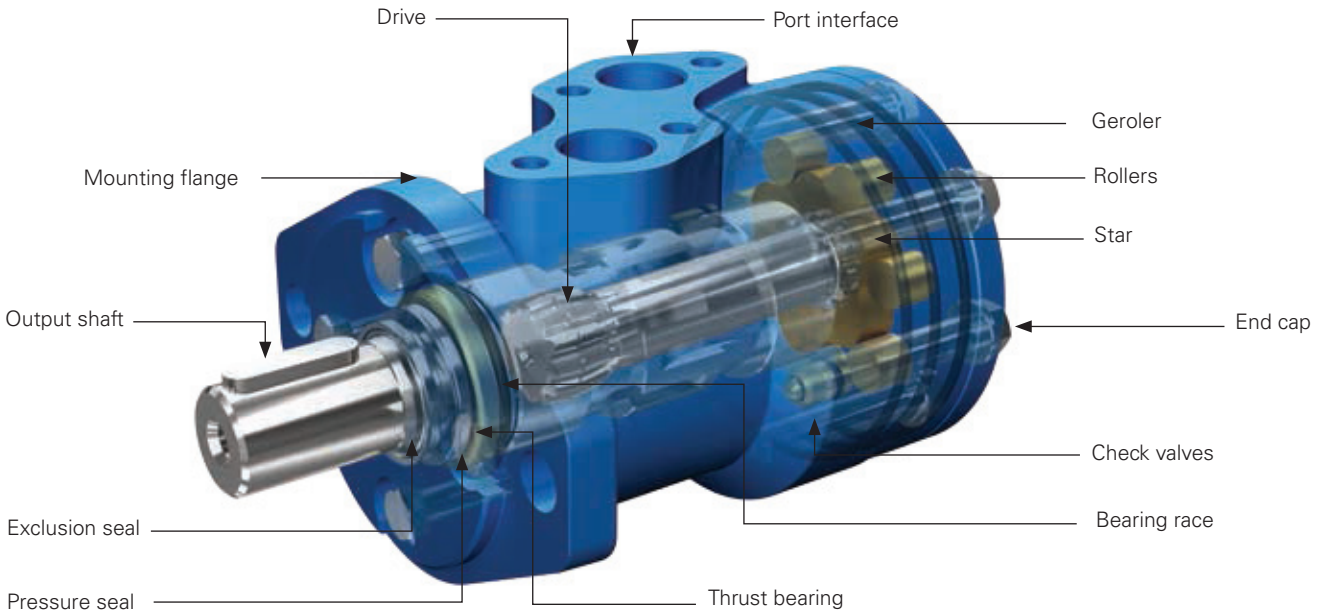
00	None

26 Design code

B	Second

Xcel XLS Series (036-)

Specifications



The XLS series features the same basic construction and layout as the XLH series. XLS uses Geroler technology to further reduce friction and increase volumetic efficiency. XLS also has check valves as standard that drain the case chamber to the motor outlet port. In many applications this enables the case drain to be omitted.

Specification Data

Displacement cm^3/r [in^3/r]		50 [3.1]	80 [4.9]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]
Flow LPM [GPM]	Continuous	38 [10]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]
	Intermittent	45 [12]	68 [18]	68 [18]	68 [18]	68 [18]	68 [18]	68 [18]	68 [18]	68 [18]
Max. Speed RPM	Continuous	741	701	554	430	353	286	230	180	141
	Intermittent	875	830	665	515	425	344	275	215	171
Pressure ΔBar [Δpsi]	Continuous	138 [2000]	138 [2000]	138 [2000]	124 [1800]	124 [1800]	124 [1800]	110 [1600]	97 [1405]	83 [1200]
	Intermittent	155 [2250]	155 [2250]	155 [2250]	138 [2000]	138 [2000]	138 [2000]	124 [1800]	110 [1600]	90 [1300]
Torque* Nm [lb-in]	Continuous	103 [920]	171 [1515]	216 [1310]	246 [2180]	298 [2640]	342 [3030]	391 [3465]	417 [3695]	473 [4190]
	Intermittent	116 [1030]	192 [1700]	241 [2135]	273 [2420]	328 [2905]	379 [3360]	437 [3870]	444 [3935]	512 [4540]
Weight Kg [lbs]		6.3 [13.8]	7.0 [15.4]	7.5 [16.5]	7.7 [16.9]	7.1 [15.6]	8.0 [17.6]	8.4 [18.5]	9.4 [20.6]	9.6 [21.1]

Maximum Case Pressure: See case pressure seal limitation graph

*See shaft torque ratings for limitations.

Note: A simultaneous maximum torque and maximum speed NOT recommended.
To assure 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.

Max. inlet pressure:

170 bar [2465 psi]

Do not exceed Δ pressure rating (see chart above)

ΔBar[Δpsi]:

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

Recommended fluids:

Premium quality anti-wear type hydraulic oil with a viscosity of not less than 20-32 cSt at operating temperature.

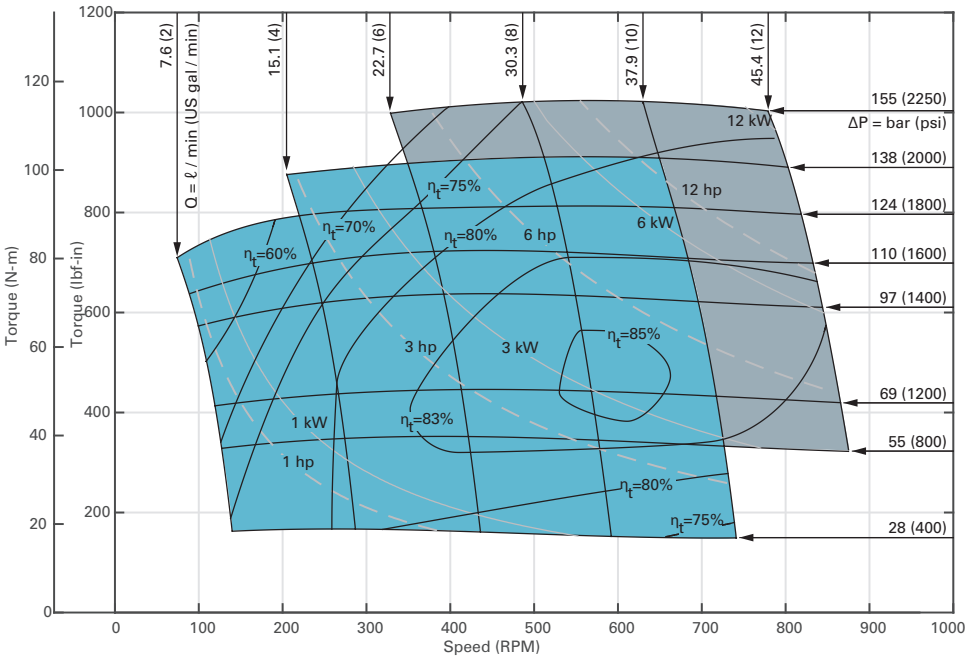
Recommended system operating temp:

82°C [180 °F]

Recommended filtration

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

Function Diagram: XLS motor 50 cc



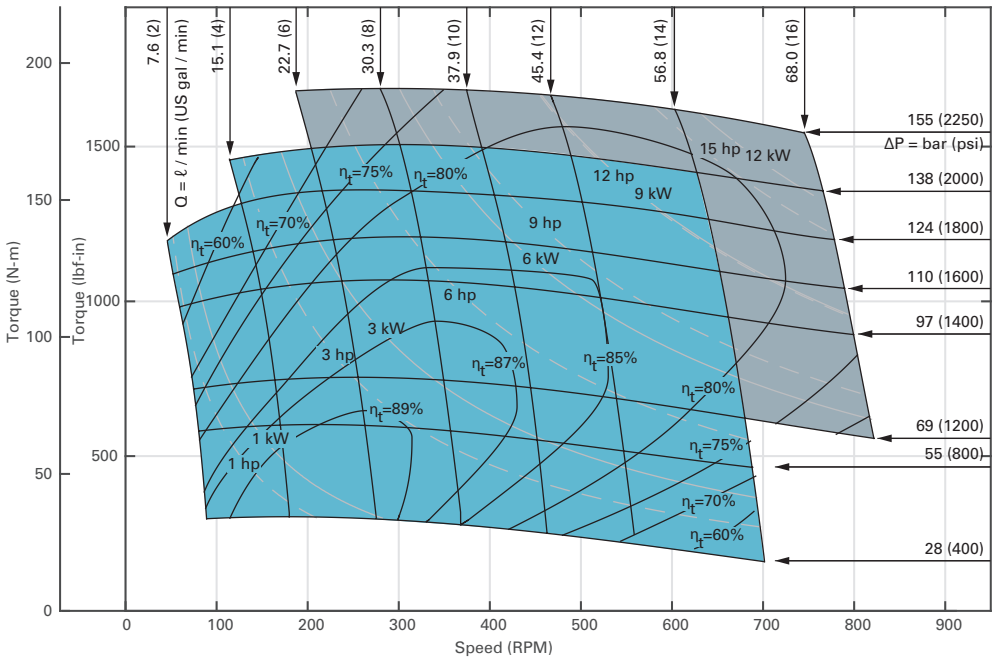
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

Continuous

Intermittent

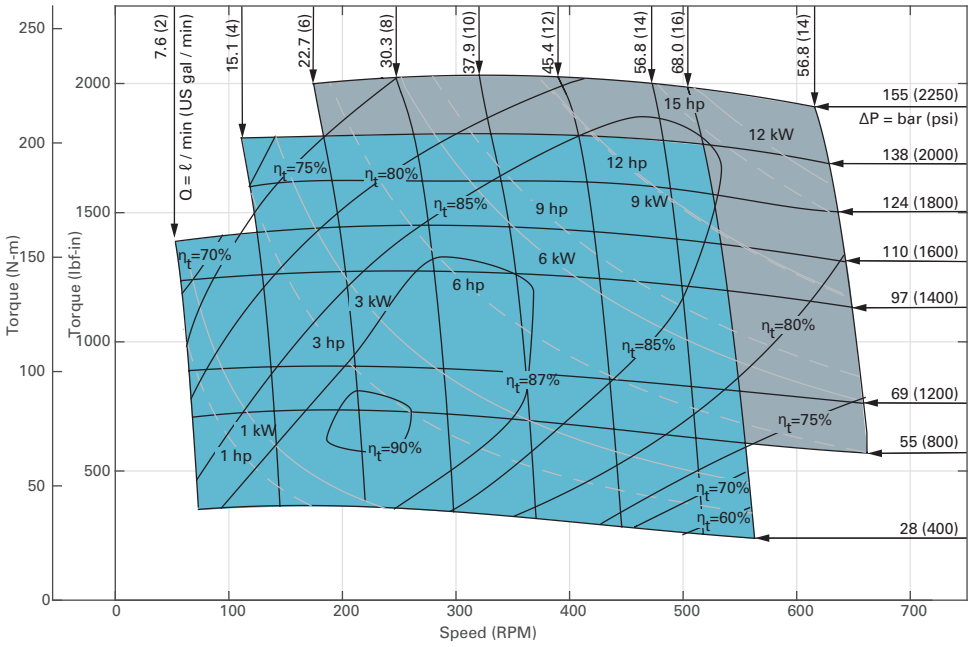
Function Diagram: XLS motor 80 cc



Xcel XLS Series (036-)

Performance Data

Function Diagram: XLS motor 100 cc



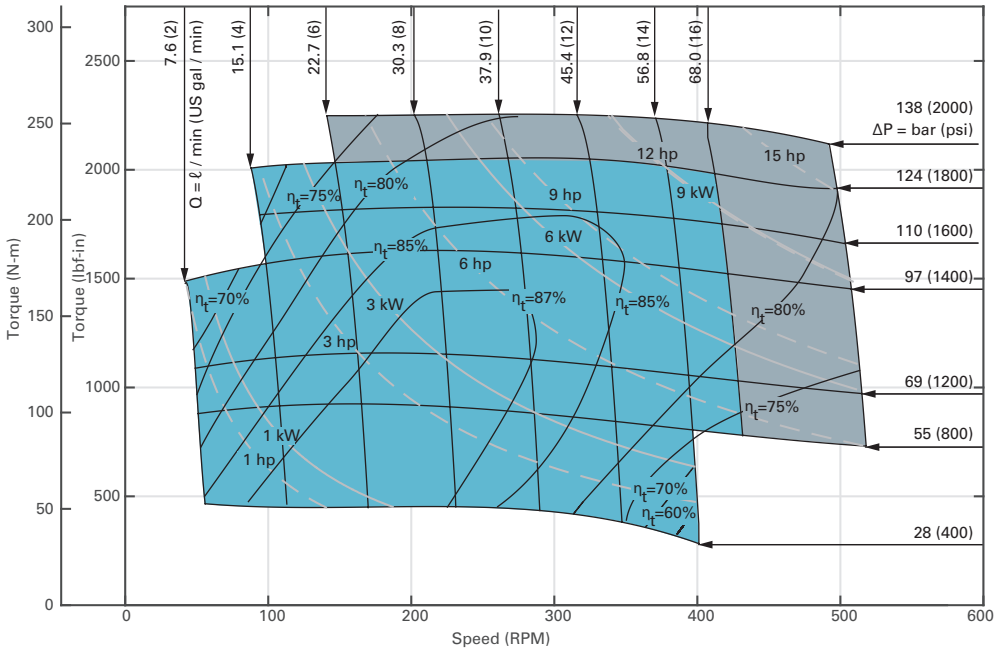
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

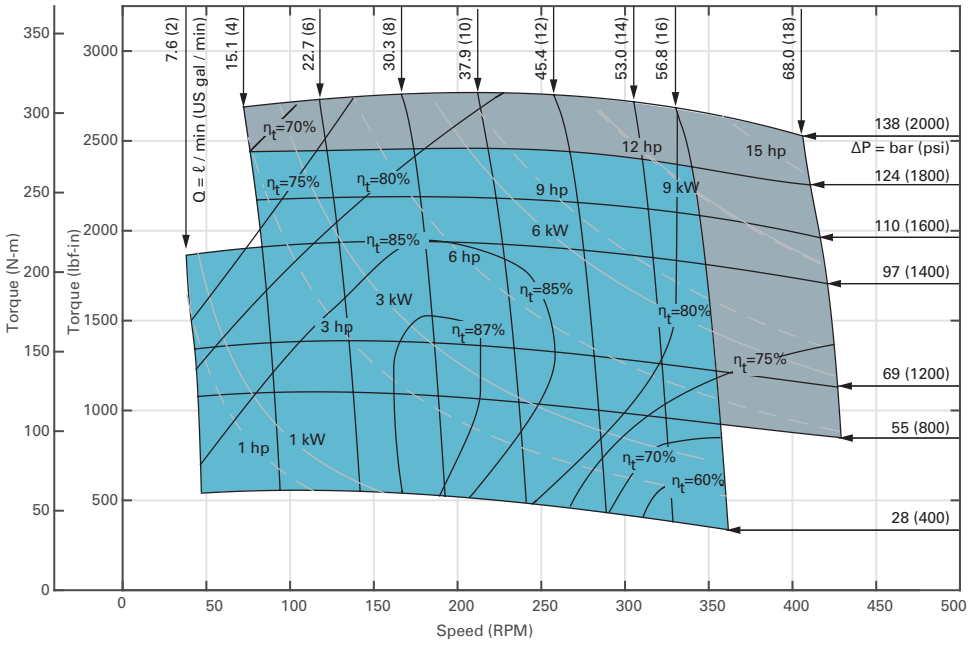
Continuous

Intermittent

Function Diagram: XLS motor 130 cc



Function Diagram: XLS motor 160 cc



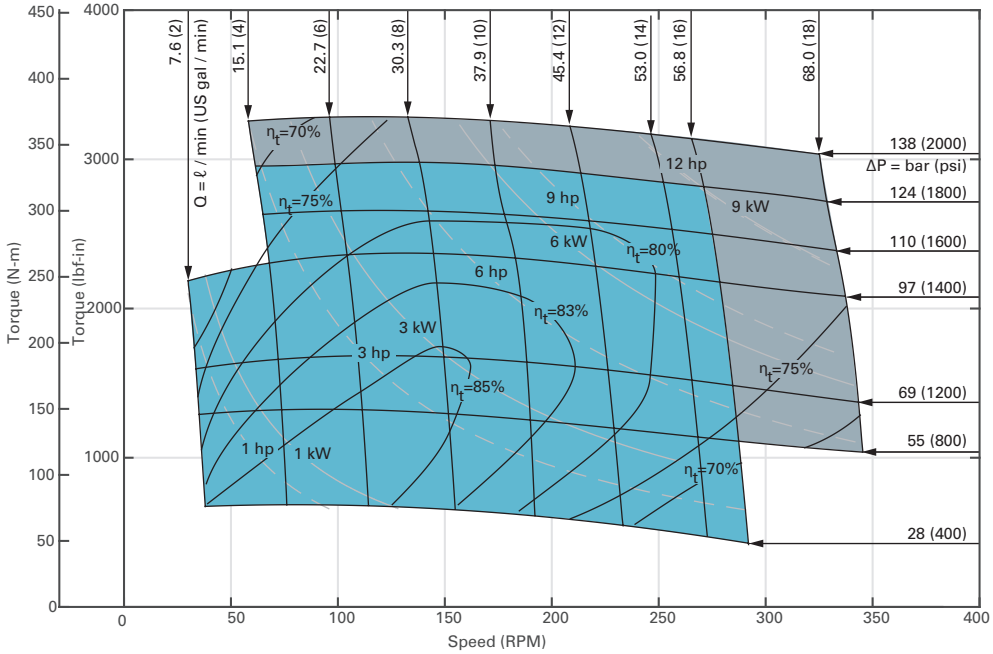
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

Continuous

Intermittent

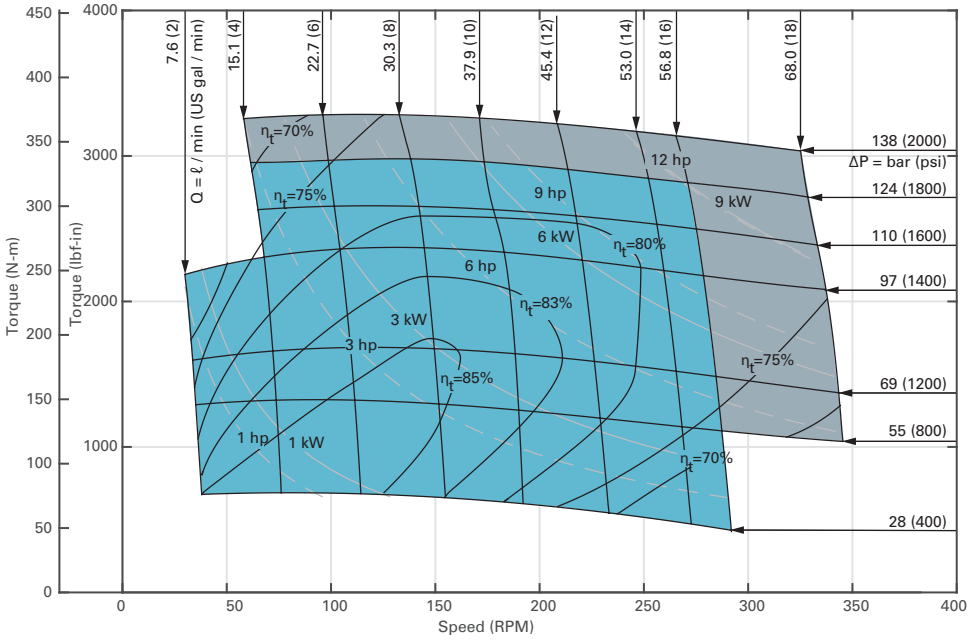
Function Diagram: XLS motor 195 cc



Xcel XLS Series (036-)

Performance Data

Function Diagram: XLS motor 245 cc



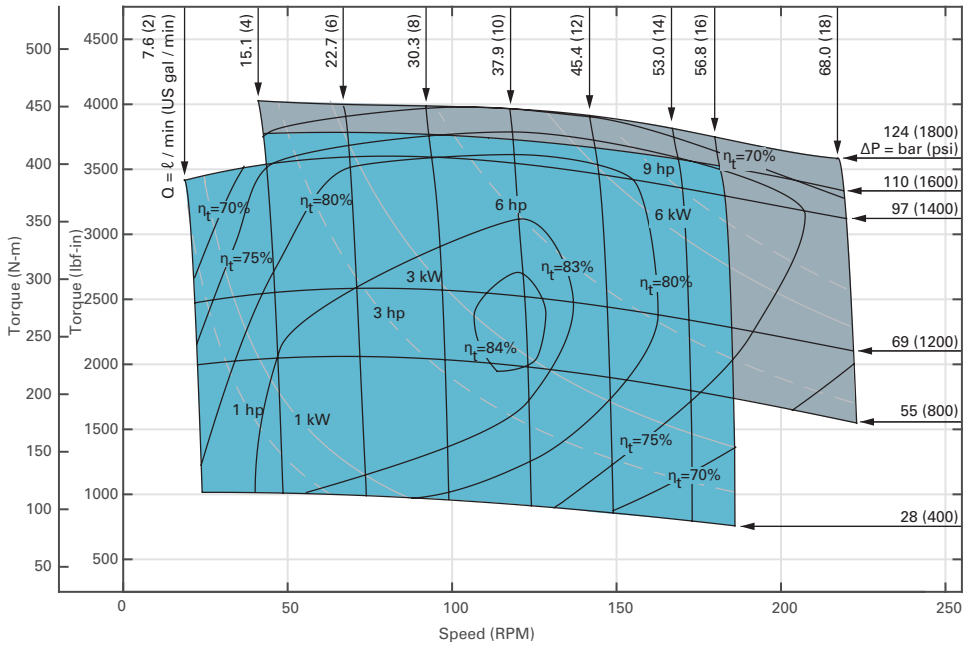
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

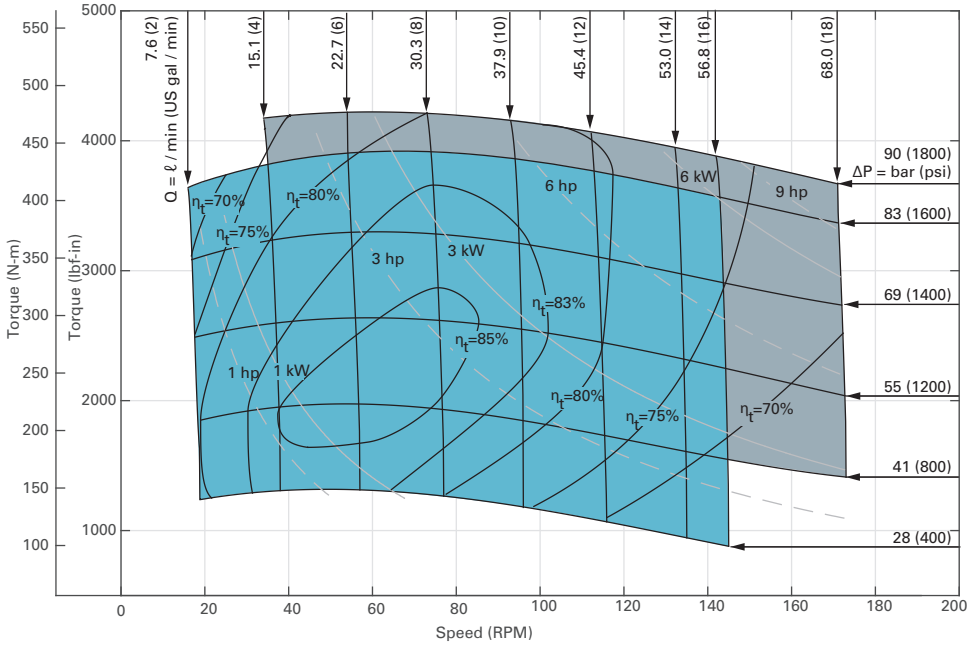
Continuous

Intermittent

Function Diagram: XLS motor 305 cc



Function Diagram: XLS motor 395 cc



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

η_t = overall efficiency

Continuous

Intermittent

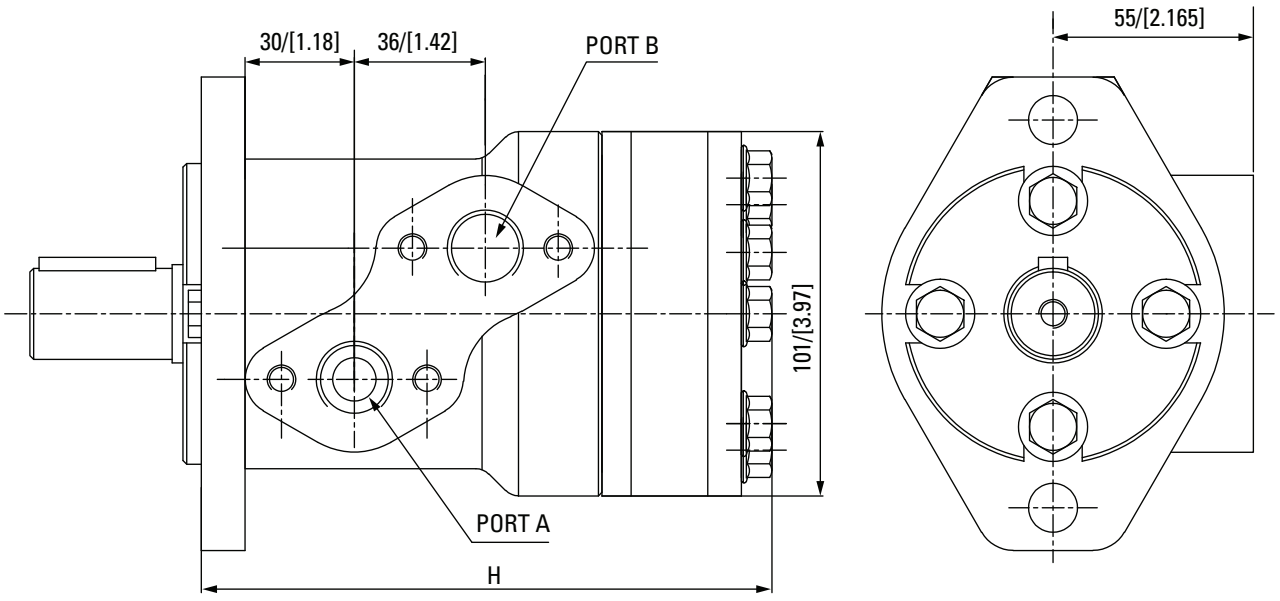
Xcel XLS Series (036-)

Dimensions Xcel XLS Series - Outline

Standard Rotation Viewed from Shaft End

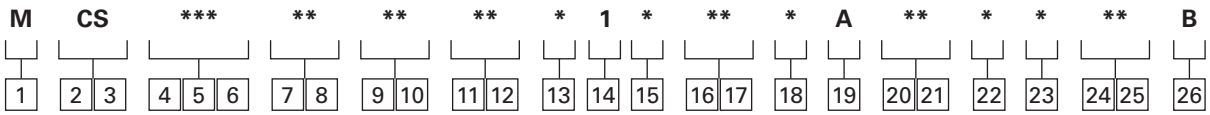
Port A pressurized – CW
Port B pressurized – CCW

XLS Standard Shaft Seal and Section Seal Kit Number: **Z331-25**
XLS High Pressure Shaft Seal and Section Seal Kit Number: **Z331-59**



Disp. cc/r [in3/r]	50 [3.1]	80 [4.9]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]
H mm [in]	149 [5.86]	156 [6.14]	160 [6.30]	167 [6.57]	167 [6.57]	177 [6.97]	183 [7.59]	194 [7.63]	210 [8.26]

* Based on the mounting flange SAE A.



1 Product

M	Motor

2 3 Series

CS	XLS series

4 5 6 Displacement cm³/r [in³/r]

050	50 [3.1]
080	80 [4.9]
100	100 [6.2]
130	130 [8.0]
160	160 [9.6]
195	195 [11.9]
245	245 [14.9]
305	305 [18.7]
395	395 [24.0]

7 8 Mounting flange

AA	2 bolt SAE A. 82.55x5, pilot 2-13.5 Dia. Mounting holes on 106.4 Dia.
AC	2 bolt standard, 82.55x2.8 pilot. 2-13.5 Dia. Mounting holes on 106.4 Dia.
AD	4 Bolt standard, 44.40 Dia. x 3.05 pilot. 375-16 UNC-2B. Mounting Holes on 82.55 Dia. B.C.
AE	4 Bolt standard. 44.40 Dia. x 3.05 pilot, M10x1.5-6H Mounting Holes on 82.55 Dia. B.C.

9 10 Output shaft

01	25 Dia. Standard straight, parallel key A8x7x32, M8 hole in shaft end. DIN 6885
02	25 Dia. Straight, 5mm extra length, parallel key A8x7x32, M8 hole in shaft end. DIN 6885
03	25.4 Dia. Standard raight, parallel key ¼x¼x1¼, M8 hole in shaft end. BS 46
04	25.4 Dia. Splined shaft, SAE 6B, ¼-20UNC-2B hole in shaft end.
05	25.4 Dia. Straight, woodruff key, 1/4-20 UNC-2B hole in shaft end
08	25.4 Dia. Straight, 10.3 [.405] Dia. Cross Hole 15.7 [.618] from Shaft End, 1/4-20UNC-2B hole in shaft end

11 12 Main ports

AA	Staggered port 2-G1/2 ISO228/1
AE	Staggered port 2-0.875-14UNF-2B O-ring or manifold ports (4-M8-6H mounting holes)

13 Case drain options

0	None
1	G1/4 ISO228/1
3	0.4375-20UNF-2B

14 Geroler options

1	Standard Geroler

15 Shaft options

0	Standard shaft

16 17 Seal options

00	Standard seals
01	Seal guard
02	High pressure seal shaft

18 Speed sensor options

00	None

19 Manifold block options

A	None

20 21 Special features (hardware)

00	None

22 Special assembly instructions

0	None
1	Reverse rotation

23 Paint

C	Black primer

24 25 Customer identification or name plate

00	None

26 Design code

B	Second

Xcel Spool Valve Motors

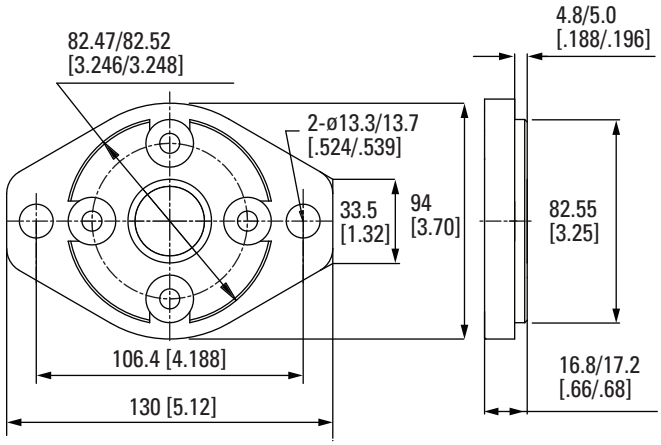
Dimensions - Mounts

Code AA

SAE A

2 bolt

82.55 x 5
[3.25]x[.196] pilot

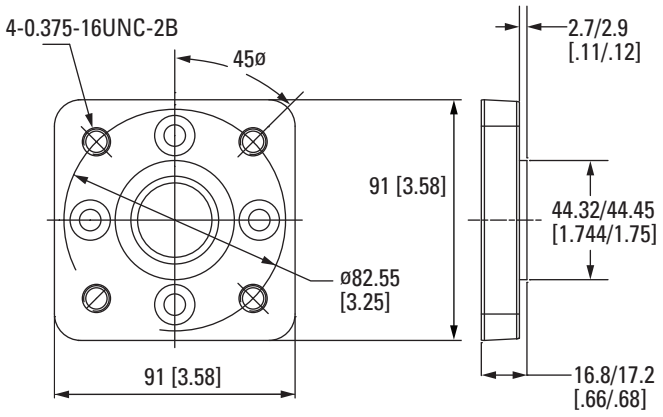


Code AD

SAE A

4 bolt

44.40 [1.748] pilot

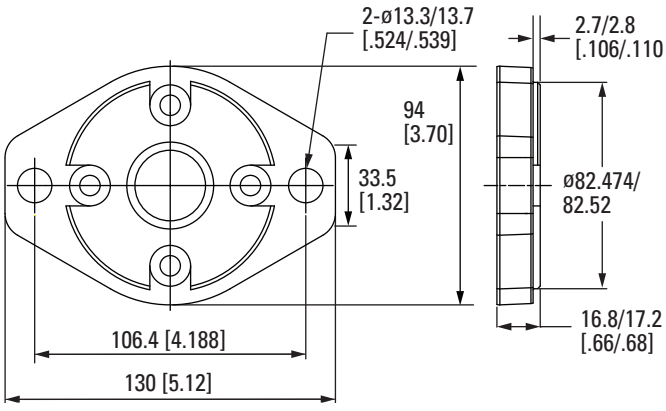


Code AC

SAE A

2 bolt

ø82.55 x 2.5
[3.25]x[.110]



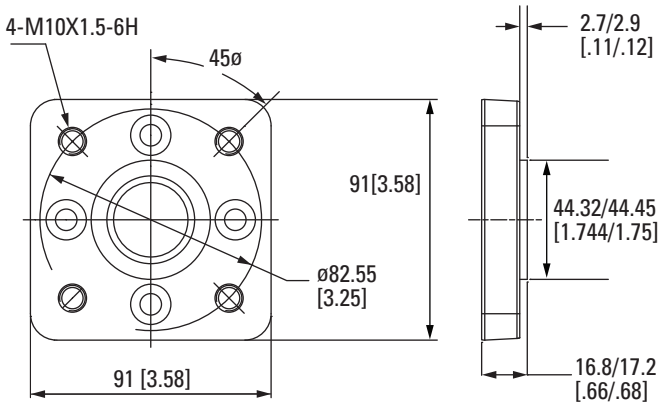
Code AE

SAE A

4 bolt

44.40 [1.748] pilot

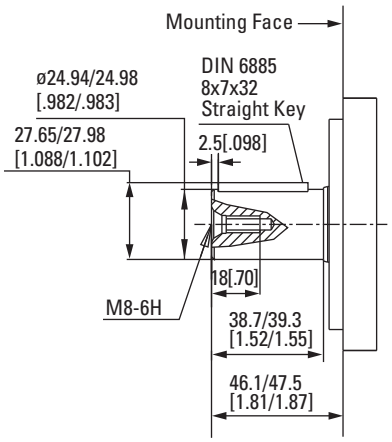
Metric



SAE 6B splined shaft (Code 04) recommended whenever operation above 260Nm [2300 in-lb] of torque, especially for those applications subject to frequent reversals.

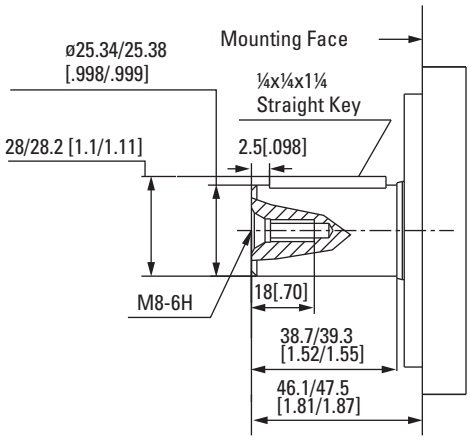
25mm Straight Shaft (01)

395Nm [3500 in-lb] Max. torque



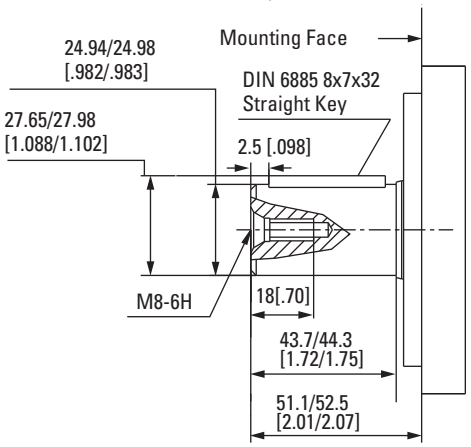
Straight Shaft (03)

395Nm [3500 in-lb] Max. torque



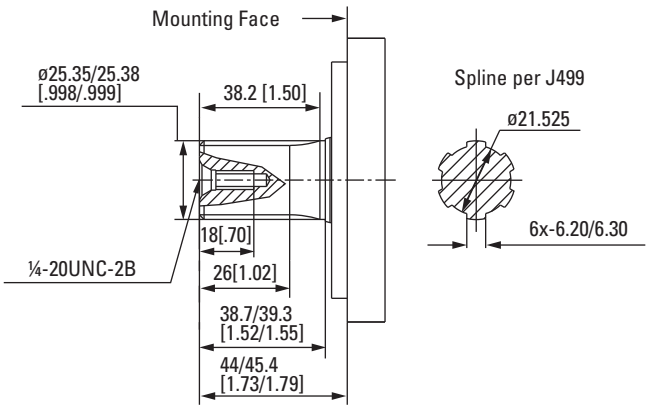
25 mm Straight Shaft w/ 5mm extra length (02)

395Nm [3500 in-lb] Max. torque



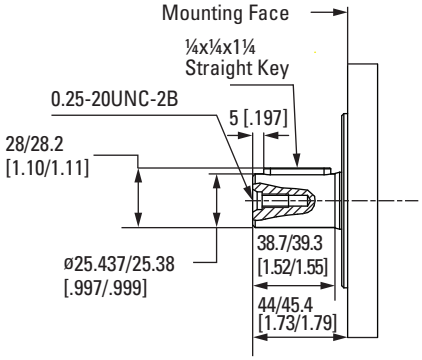
SAE 6B Spline (04)

395Nm [3500 in-lb] Max. torque



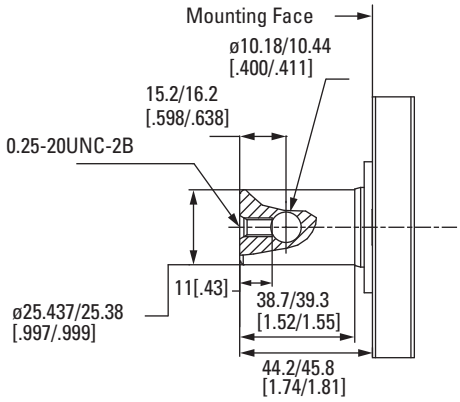
25.4 [1.00] Straight Shaft (05)

395Nm [3500 in-lb] Max. torque



25.4 [1.00] Straight Shaft w/ Crosshole (08)

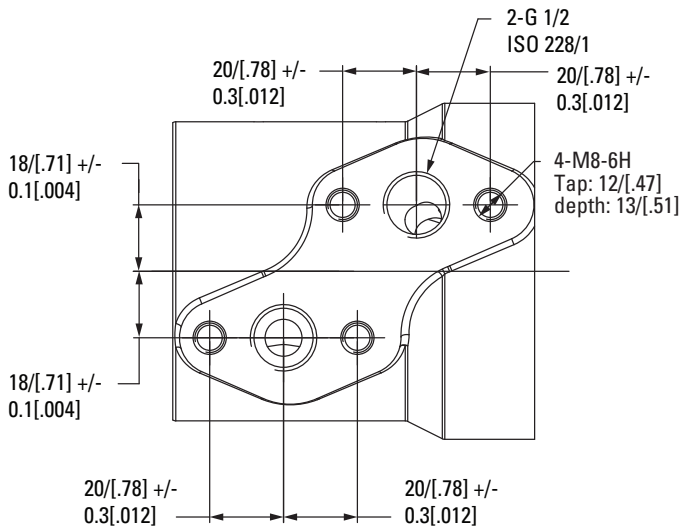
338Nm [3000 in-lb] Max. torque



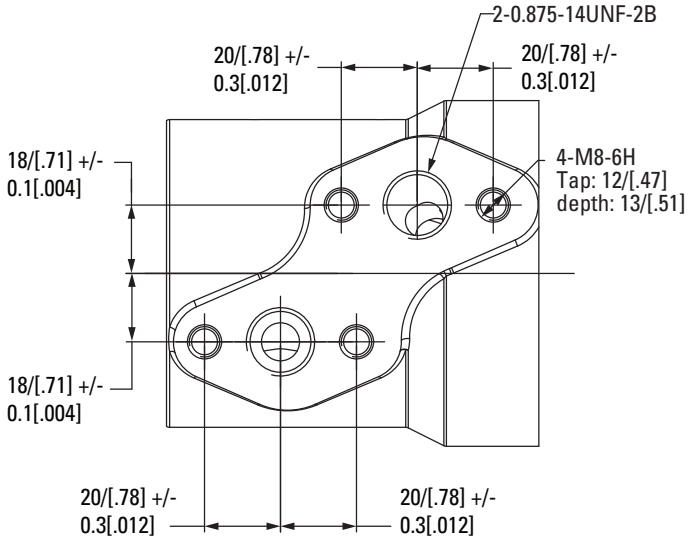
Xcel Spool Valve Motors

Dimensions - Ports

Code AA



Code AE

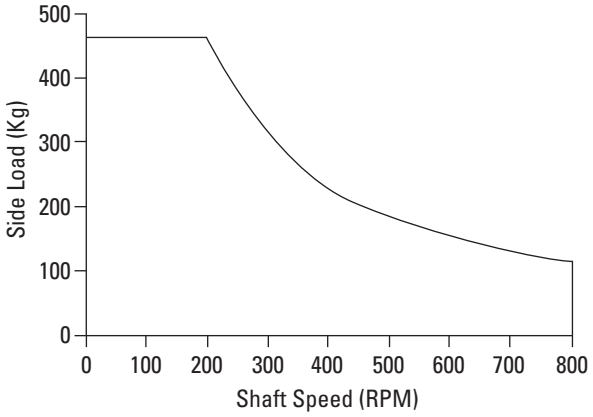


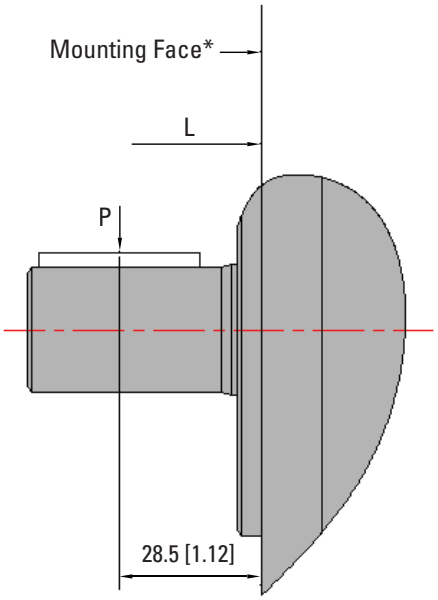
Side Load P (Kg) = $\frac{800}{N}\left(\frac{15000}{L+100}\right)$ from 200-800 RPM

Where N = Shaft Speed (RPM)

L = Distance from Mounting Surface (mm)

P = Side Load (Kg)





Case Pressure/Shaft Seal

Refer to the case pressure/shaft seal chart below. Allowable case pressure is highest at low shaft speeds. Motor life will be shortened if case pressure exceeds recommended ratings.

Case pressure is as follows:

Pc = 0.6ΔP+P2 ΔP = P1-P2

Pc = Case Pressure,

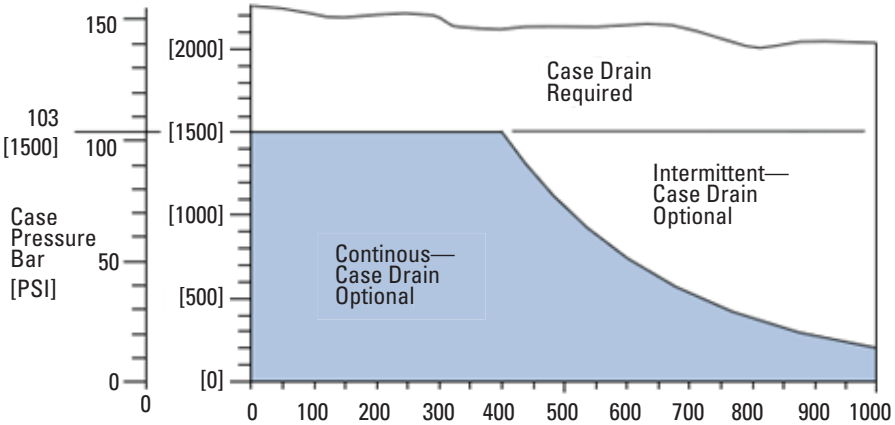
P1 = Inlet Line Pressure

P2 = Outlet Pressure

The motor life is improved from use of a case drain line.

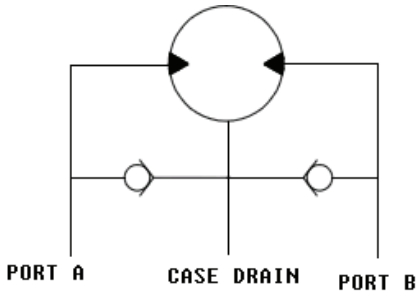
- Contamination control – flushing the motor case
- Motor cooler – exiting oil draws motor heat away.
- Extend motor seal life – maintain low case pressure with a preset restriction installed in the case drain line.

When case drain line is used, make sure the motor is always filled with oil.



Case Pressure Seal Limitation

XLS Series Only



Note: With check valves as standard on the XLS motor, case pressure can be considered the same as the outlet pressure/backpressure.

Note: Check Valves are not available on the XLH Series.

Xcel XL2 Series

Highlights

Description

Eaton's Xcel™ Series Low Speed High Torque Disc Valve motors offer the most popular features and options from the parallel Char-Lynn™ range and are optimized to bring the highest value in medium duty applications.

Features

- Three zone design for longer life and true bi-directionality
- Bearings that meet the highest standards of the industry
- Options to optimize performance in every application
- Integrated cross-over relief and counterbalance valve options

Benefits

- Easy to design in a system
- Reliability in multiple applications
- Integrated valve options to minimize installed size and weight

Applications

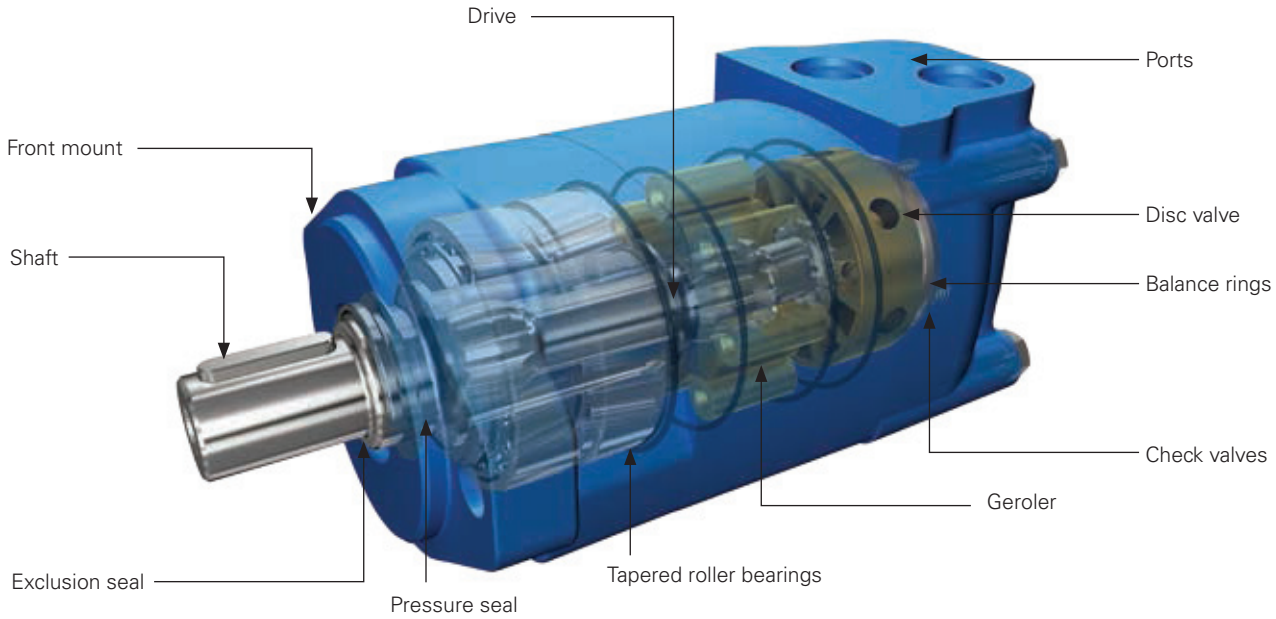
- Skid steer attachments
- Swing motor
- Brush Cutters & Mowers
- Augers
- Sweepers
- Snow blowers
- Conveyors

XL2 Series Motors

Geroler® element	9 displacements
Flow LPM[GPM]	75 [20] Continuous*
	115 [30] Intermittent **
Speed RPM	908 Cont.*
	924 Inter **
Pressure Bar [psi]	205[3000] Cont.*
	310 [4500] Inter **
Torque Nm [lb-in]	845 [7470] Cont.*
	930 [8225] Inter **

* Continuous-(Cont.) Continuous rating, motor may be run continuously at these ratings

** Intermittent-(Inter.) Intermittent operation, 10% of every minute



Specification Data

Displacement cm^3/r [in^3/r]		80 [4.9]	100 [6.1]	130 [7.9]	160 [9.8]	195 [11.9]	245 [15]	305 [18.6]	395 [24.1]	490 [29.9]
Flow LPM [GPM]	Continuous	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Intermittent	75 [20]	95 [25]	95 [25]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]
Speed RPM	Continuous	908	739	575	477	385	308	246 [2180]	191	153
	Intermittent	908	924	719	713	577	462	365	287	230
Pressure ΔBar [Δpsi]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	155 [2248]	120 [1740]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	260 [3771]	260 [3771]	260 [3771]	240 [3481]	170 [2466]	140 [2031]
Torque* Nm [lb-in]	Continuous	235 [2080]	295 [2611]	385 [3407]	455 [4027]	540 [4779]	660 [5841]	765 [6770]	775 [6859]	845 [7478]
	Intermittent	345 [3053]	445 [3938]	560 [4956]	570 [5045]	665 [5885]	820 [7257]	885 [7832]	925 [8186]	930 [8231]
Weight Kg [lbs]	Standard or wheel mont	9.3 [20.5]	9.5 [20.9]	9.8 [21.6]	10.0 [22]	10.4 [22.9]	10.9 [24]	11.3 [24.9]	11.8 [26]	12.2 [26.9]
	Bearingless	7.3 [16.1]	7.5 [16.5]	7.7 [17]	7.9 [17.4]	8.4 [18.5]	8.8 [19.4]	9.3 [20.5]	9.8 [21.6]	10.2 [22.5]

Maximum Case Pressure: See case pressure seal limitation graph

*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.

Max. inlet pressure:

310 bar [4500 psi]

Do not exceed Δ pressure rating (see chart above)

Max. return pressure:

310 bar [4500 psi] with case drain line installed

Do not exceed Δ pressure rating (see chart above)

ΔBar[Δpsi]:

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

Recommended fluids:

Premium quality anti-wear type hydraulic oil with a viscosity of not less than 13 cSt (70 SUS) at operating temperature.

Recommended system operating temp.:

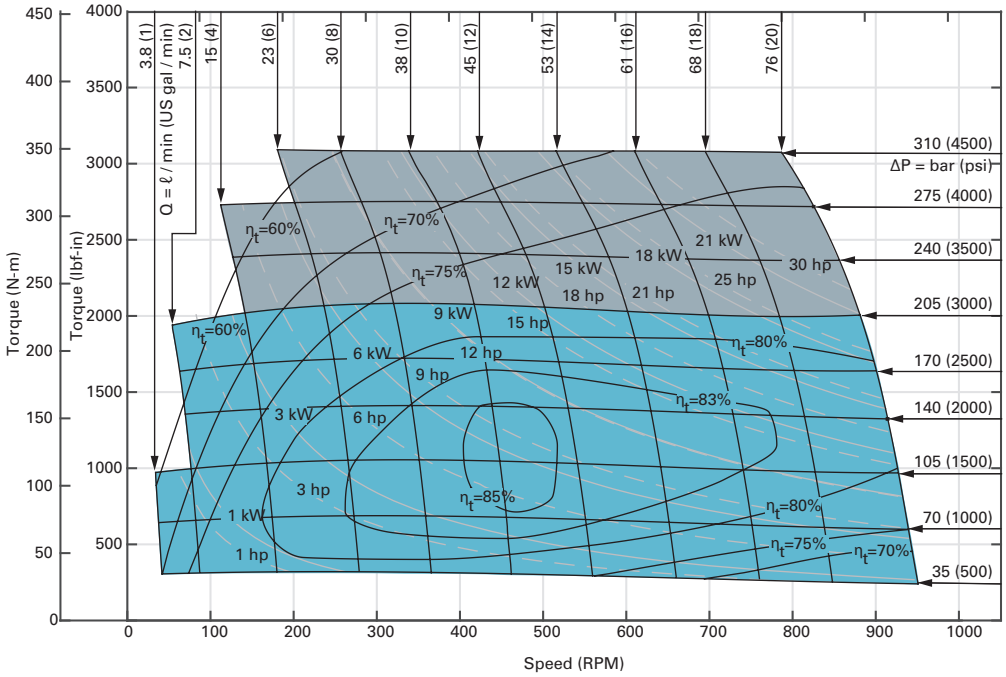
-34°C to 82°C [-30°F to 180°F]

Recommended filtration

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

Performance Data

Function Diagram: XL2 motor 80 cc



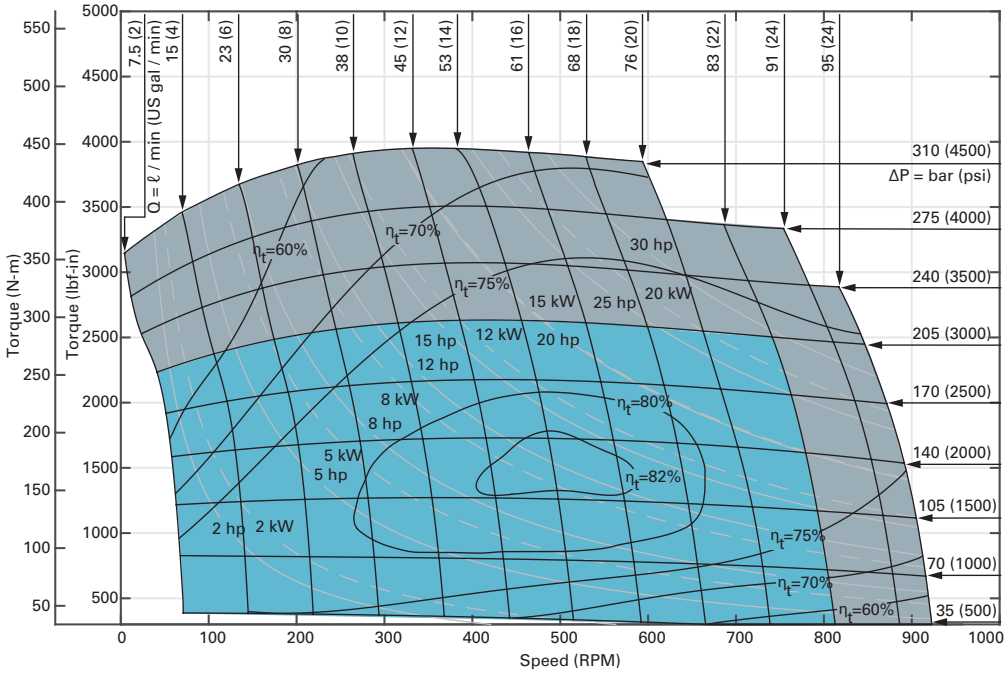
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

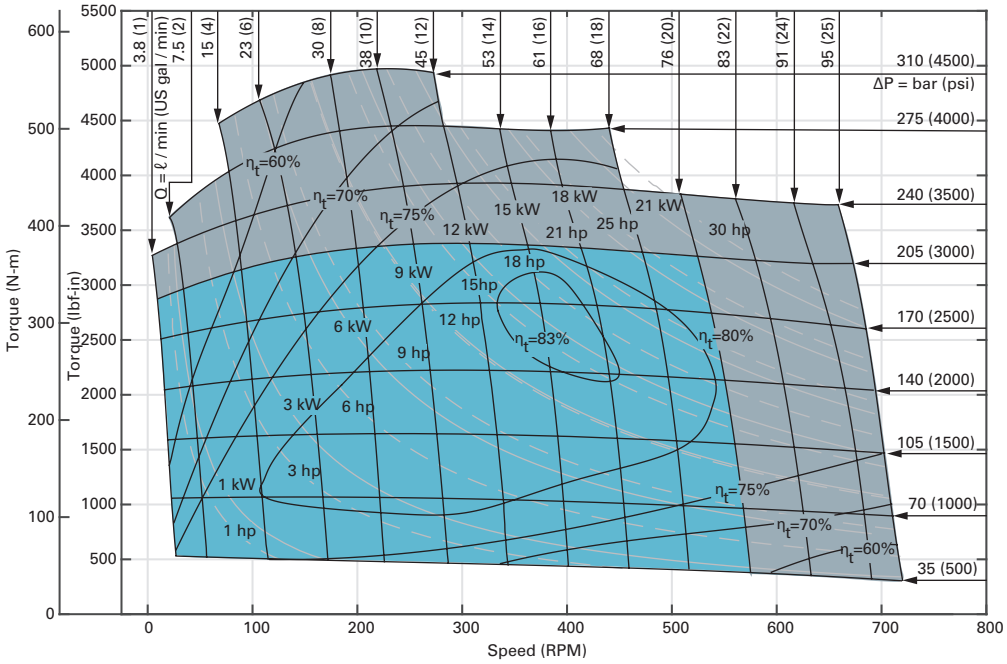
Continuous

Intermittent

Function Diagram: XL2 motor 100 cc



Function Diagram: XL2 motor 130 cc



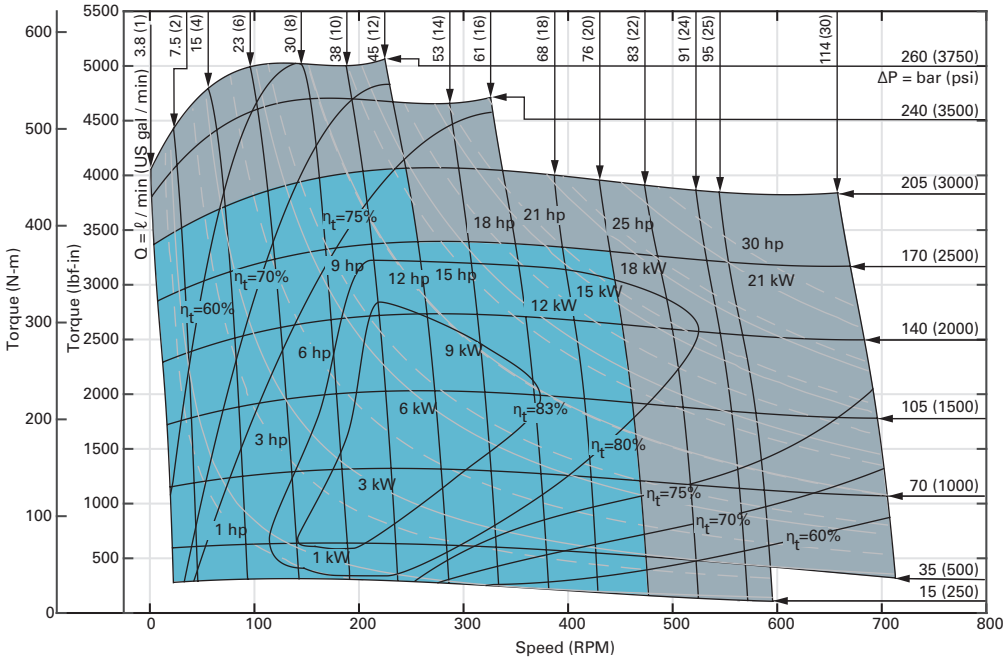
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

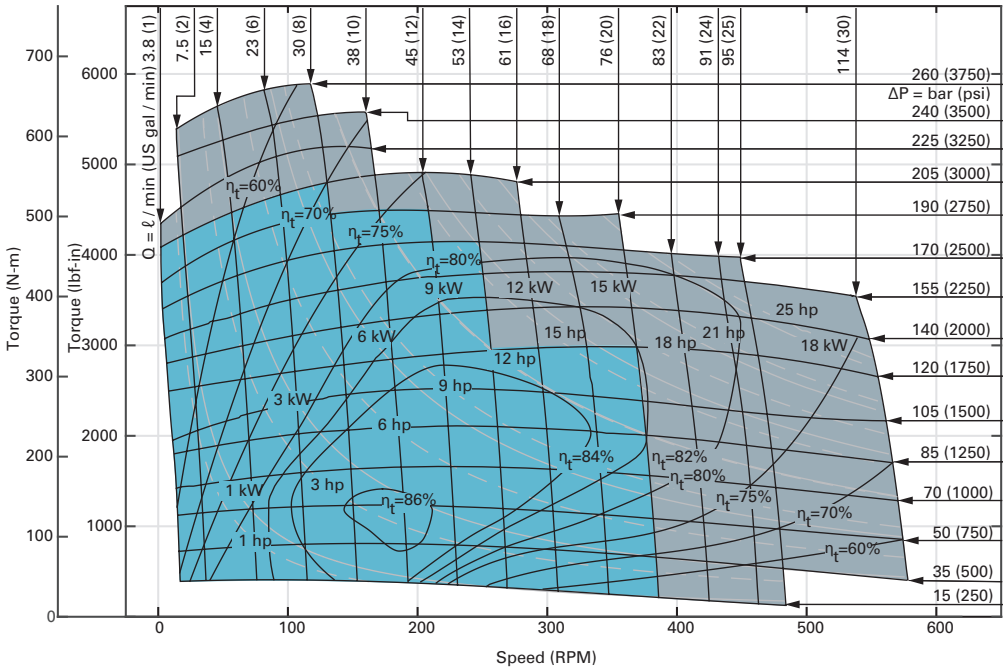
Continuous

Intermittent

Function Diagram: XL2 motor 160 cc



Function Diagram: XL2 motor 195 cc



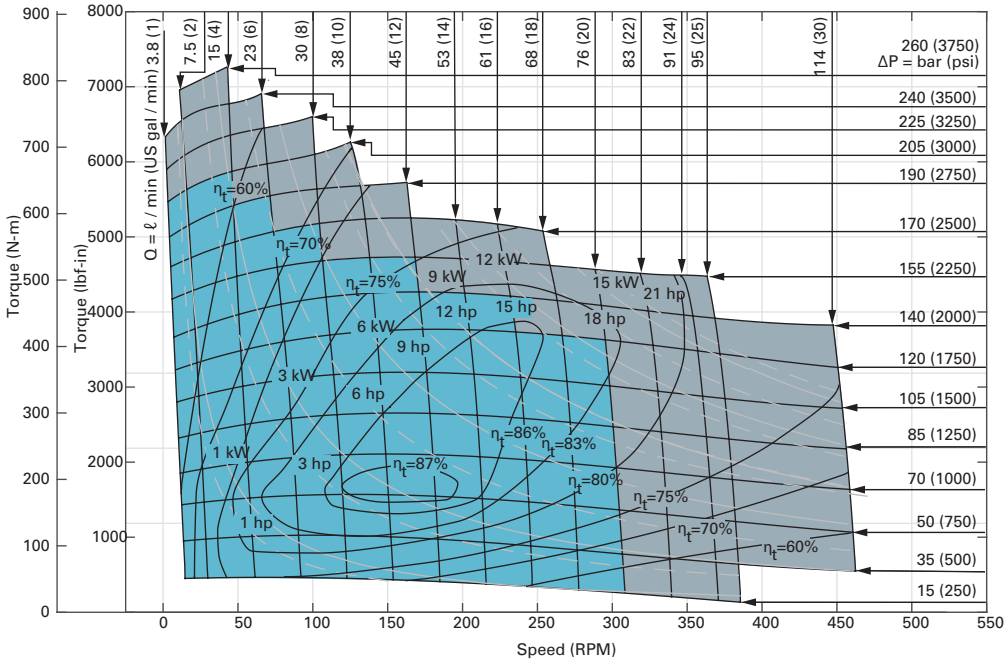
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

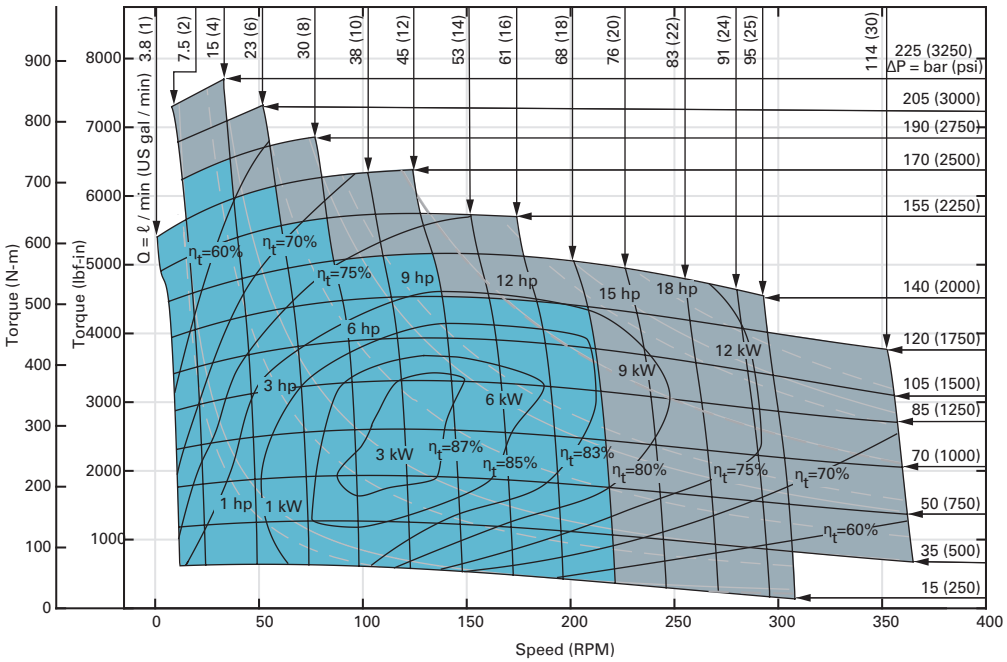
Continuous

Intermittent

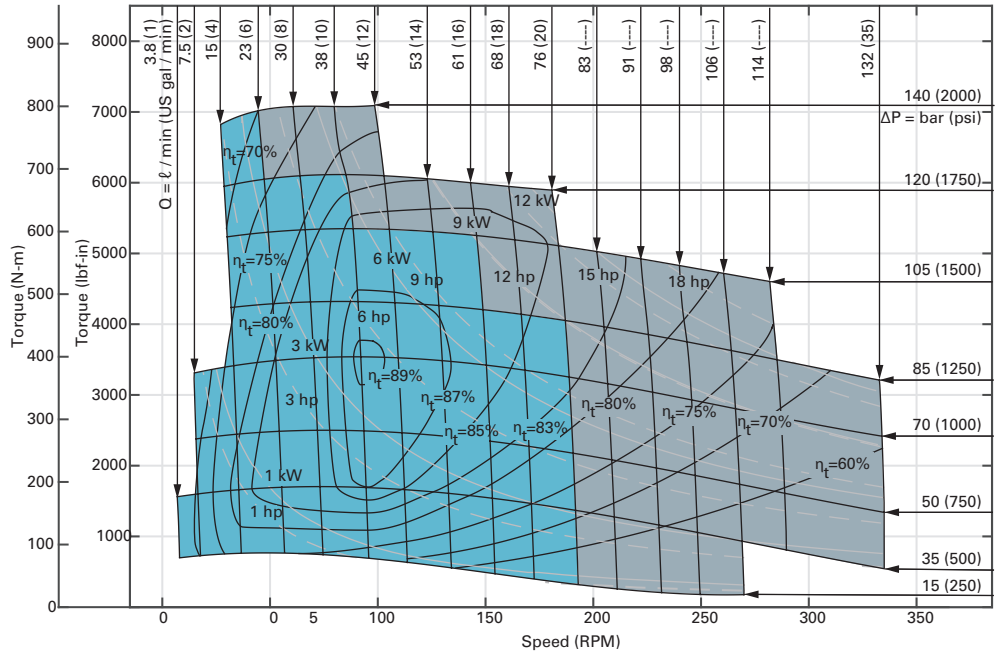
Function Diagram: XL2 motor 245 cc



Function Diagram: XL2 motor 305 cc



Function Diagram: XL2 motor 395 cc



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

η_t = overall efficiency

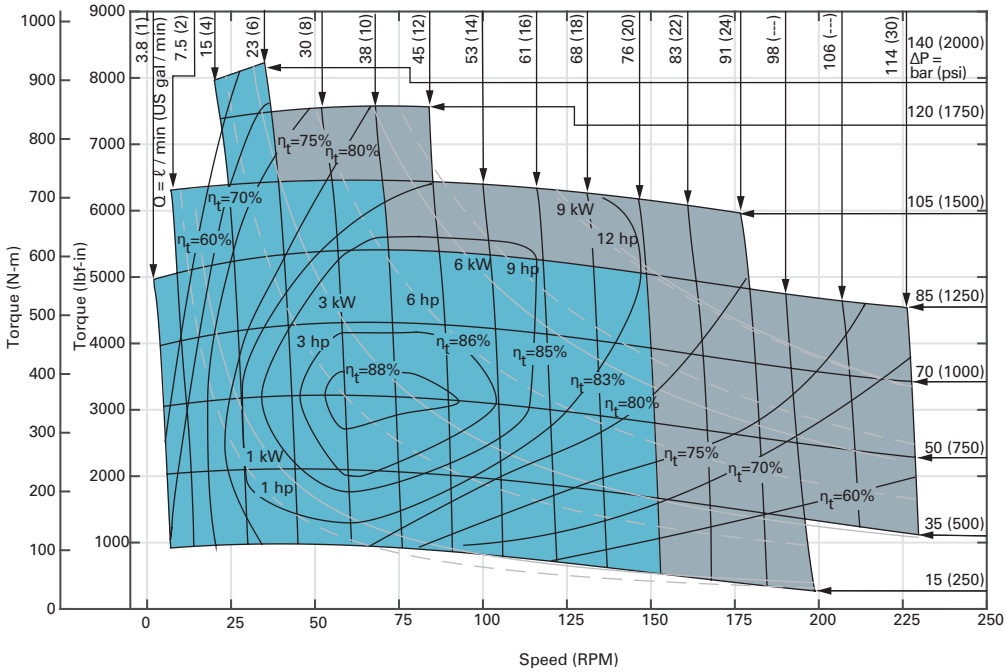
Continuous

Intermittent

Xcel XL2 Series

Performance Data

Function Diagram: XL2 motor 490 cc



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

η_t = overall efficiency

Continuous

Intermittent

Standard Rotation Viewed from Shaft End

Port A pressurized – CW

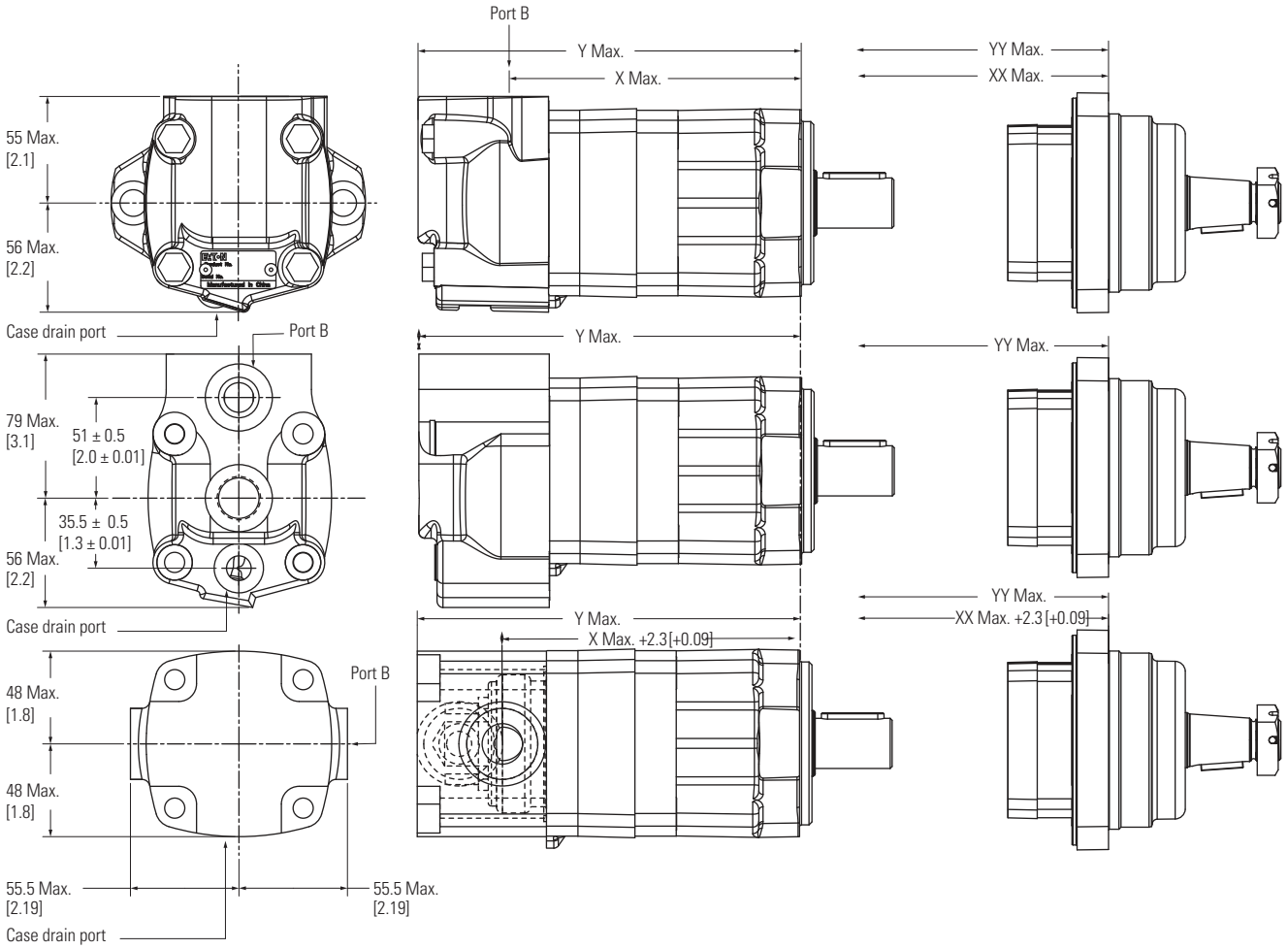
Port B pressurized – CCW

XL2 Standard and Wheel mount Shaft Seal and Section Seal Kit Number: **Z331-02**

XL2 Standard and Wheel mount High Pressure Shaft Seal and Section Seal Kit Number: **Z331-51**

XL2 Standard and Wheel mount High Pressure Shaft Seal, Seal Guard, and Section Seals Kit Number: **Z331-45**

Standard Mount & Wheel Mount



Standard/wheel mount motor dimensions

Displacement	X		Y		XX		YY	
cm³/r[in³/r]	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]
80 [4.9]	136.9	[5.39]	184.2	[7.25]	96.9	[3.81]	144.3	[5.68]
100 [6.1]	141.5	[5.57]	189	[7.44]	101.4	[3.99]	148.9	[5.86]
130 [7.9]	147.9	[5.82]	195.4	[7.69]	107.8	[4.24]	155.2	[6.11]
160 [9.8]	147.9	[5.82]	195.4	[7.69]	107.8	[4.24]	155.2	[6.11]
195 [11.9]	154.7	[6.09]	202.2	[7.96]	114.6	[4.51]	162.1	[6.38]
245 [15]	163.7	[6.44]	211.1	[8.31]	123.5	[4.86]	171	[6.73]
305 [18.6]	175.1	[6.89]	222.3	[8.75]	135	[5.31]	182.4	[7.18]
395 [24.1]	191	[7.52]	238.6	[9.39]	151.5	[5.96]	198.4	[7.81]
490 [29.9]	208.4	[8.2]	255.8	[10.07]	168.2	[6.62]	215.7	[8.49]

Xcel XL2 Series

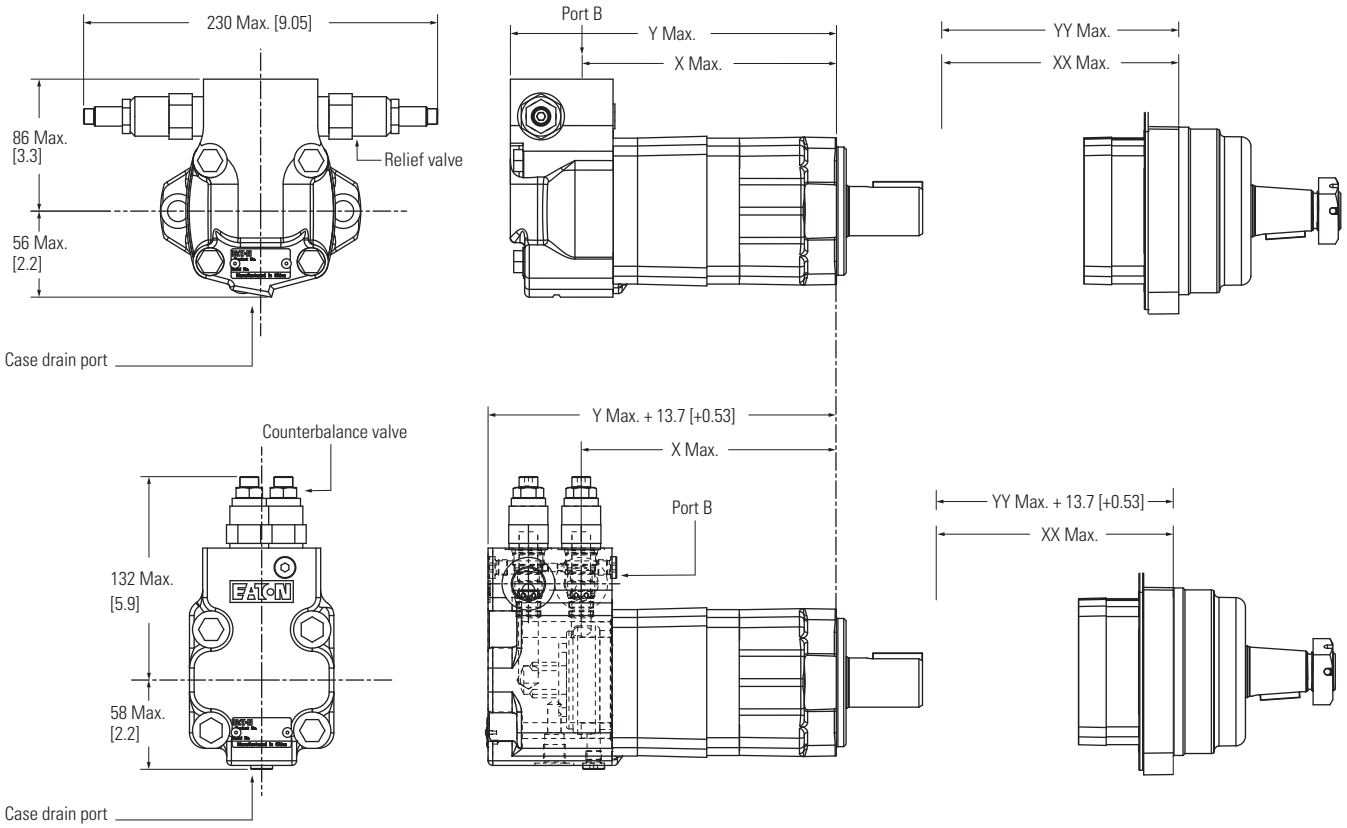
Dimensions Standard/Wheel Mount with Integral Valve

Standard Rotation Viewed from Shaft End

Port A pressurized – CW

Port B pressurized – CCW

Standard Mount with Integral Valve & Wheel Mount with Integral Valve

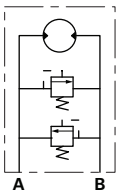


Functional symbol

Relief valve

RV3A-10-S-O-36 or

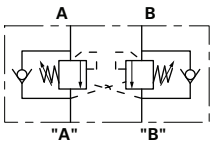
CRV2-10-C-0-0-30



Counterbalance valve

1CE30

(Rated Flow 30LPM)



Note: Please contact Eaton for more detailed information about relief valve and counterbalance valve

Standard/wheel mount motor dimensions

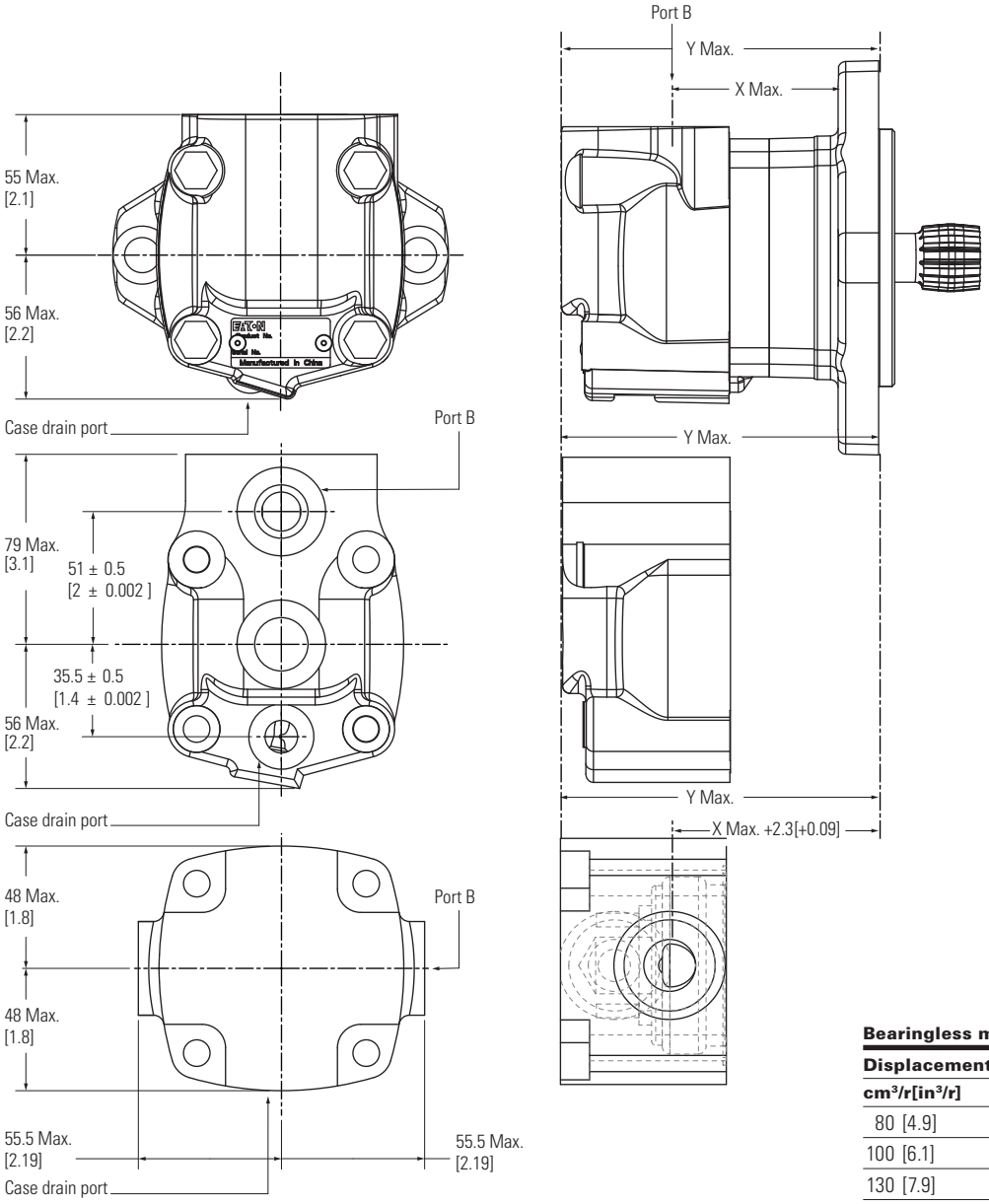
Displacement	X		Y		XX		YY	
cm³/r[in³/r]	mm	[inch]	mm	[inch]	mm	[inch]	mm	[inch]
80 [4.9]	136.9	[5.39]	184.2	[7.25]	96.9	[3.81]	144.3	[5.68]
100 [6.1]	141.5	[5.57]	189	[7.44]	101.4	[3.99]	148.9	[5.86]
130 [7.9]	147.9	[5.82]	195.4	[7.69]	107.8	[4.24]	155.2	[6.11]
160 [9.8]	147.9	[5.82]	195.4	[7.69]	107.8	[4.24]	155.2	[6.11]
195 [11.9]	154.7	[6.09]	202.2	[7.96]	114.6	[4.51]	162.1	[6.38]
245 [15]	163.7	[6.44]	211.1	[8.31]	123.5	[4.86]	171	[6.73]
305 [18.6]	175.1	[6.89]	222.3	[8.75]	135	[5.31]	182.4	[7.18]
395 [24.1]	191	[7.52]	238.6	[9.39]	151.5	[5.96]	198.4	[7.81]
490 [29.9]	208.4	[8.2]	255.8	[10.07]	168.2	[6.62]	215.7	[8.49]

Standard rotation viewed from shaft end

Port A pressurized – CW

Port B pressurized – CCW

Bearingless



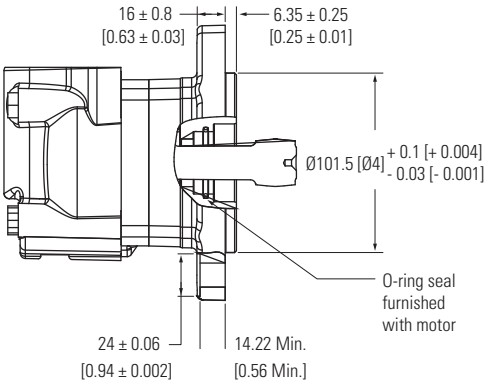
Bearingless mount motor dimensions

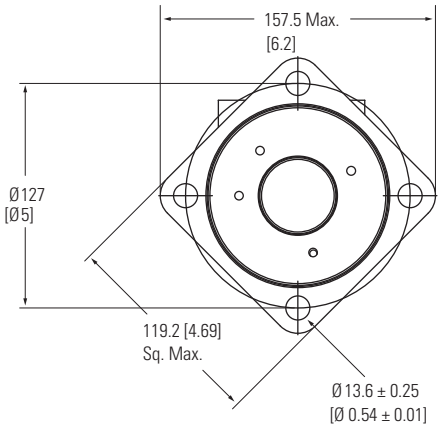
Displacement	X		Y	
cm³/r[in³/r]	mm	[inch]	mm	[inch]
80 [4.9]	79	[3.11]	126.5	[4.98]
100 [6.1]	83.5	[3.29]	131.4	[5.17]
130 [7.9]	89.9	[3.54]	137.7	[5.42]
160 [9.8]	89.9	[3.54]	137.7	[5.42]
195 [11.9]	96.8	[3.81]	144.3	[5.68]
245 [15]	105.6	[4.16]	153.5	[6.04]
305 [18.6]	117.1	[4.61]	164.6	[6.48]
395 [24.1]	133.1	[5.24]	180.9	[7.12]
490 [29.9]	150.3	[5.92]	198.2	[7.8]

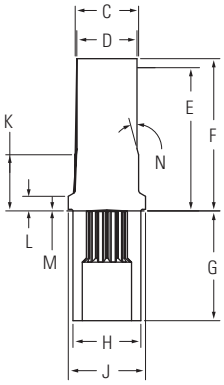
Xcel XL2 Series

Dimensions Bearingless

Bearingless Mount (AD)







C 35,86 [1.412] dia.
D 34,04 [1.340] dia.
E 81,0 [3.19] Min. full form dia.
F 86,1 [3.39] Max.
G 62,10 [2.445] full form dia.
H 38,40 [1.512] dia.
J 43,7 [1.72] dia.
K 25,91 [1.020]
L 8,25 [0.325]
M 0,89 [0.035]
N 15°

Mating coupling blank
Eaton part no. 6034897-803

For Xcel XL2 Series Bearingless Motor application information contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

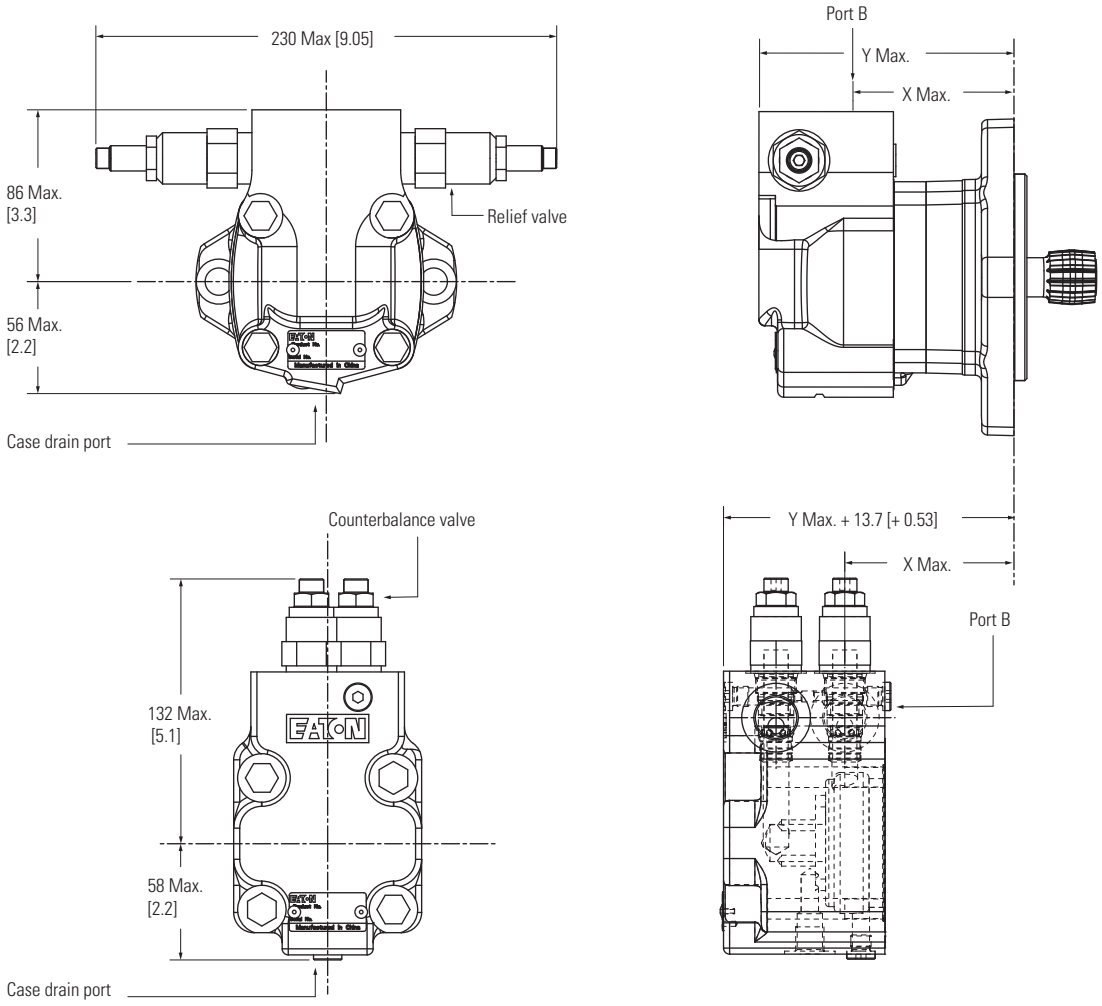
After machining blank, part must be hardened per Eaton specification

Standard rotation viewed from shaft end

Port A pressurized – CW

Port B pressurized – CCW

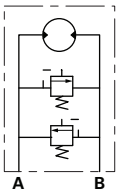
Bearingless with Integral Valve



Relief valve

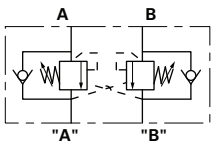
RV3A-10-S-O-36 or

CRV2-10-C-0-0-30



Counterbalance valve

1CE30



Bearingless mount motor dimensions

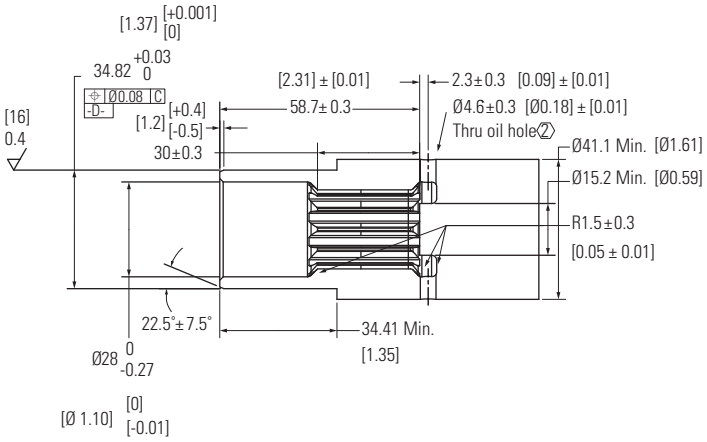
Displacement	X		Y	
cm³/r[in³/r]	mm	[inch]	mm	[inch]
80 [4.9]	79	[3.11]	126.5	[4.98]
100 [6.1]	83.5	[3.29]	131.4	[5.17]
130 [7.9]	89.9	[3.54]	137.7	[5.42]
160 [9.8]	89.9	[3.54]	137.7	[5.42]
195 [11.9]	96.8	[3.81]	144.3	[5.68]
245 [15]	105.6	[4.16]	153.5	[6.04]
305 [18.6]	117.1	[4.61]	164.6	[6.48]
395 [24.1]	133.1	[5.24]	180.9	[7.12]
490 [29.9]	150.3	[5.92]	198.2	[7.8]

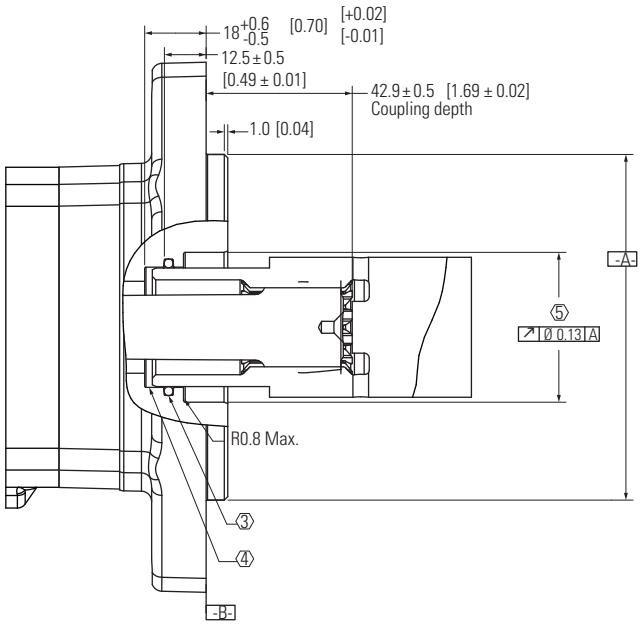
Xcel XL2 Series

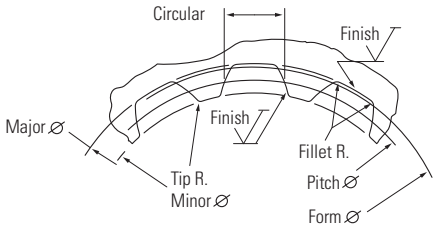
Installation Information Bearingless

1. Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H vacuum degassed alloy steel carbonize to a hardness of 59-62 HRc with case depth (to 50HRc) of 0,076 -1,02 [.030 -.040]. 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. Some means of maintaining clearance between shaft and mounting flange must be provided.
5. Counterbore designed to adapt a standard sleeve bearing 35,010 -35,040 [1.3784 -1.3795] I.D. by 44,040 -44,070 [1.7339 -1.7350] O.D. (Oilite Bronze Sleeve Bearing AAM3544-22).

Bearingless

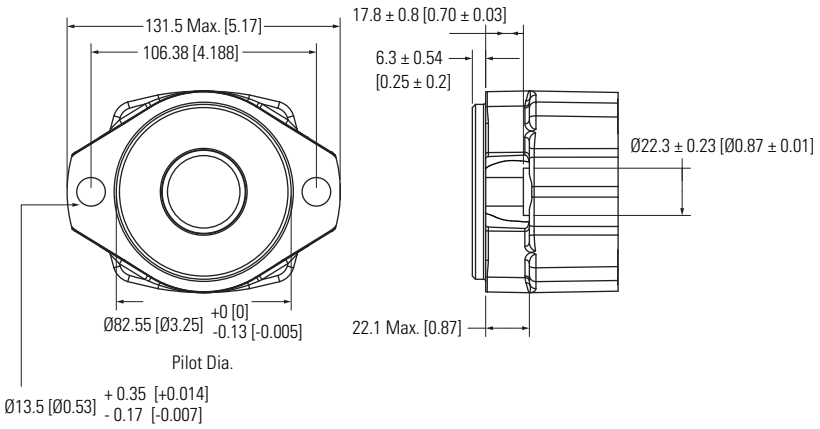




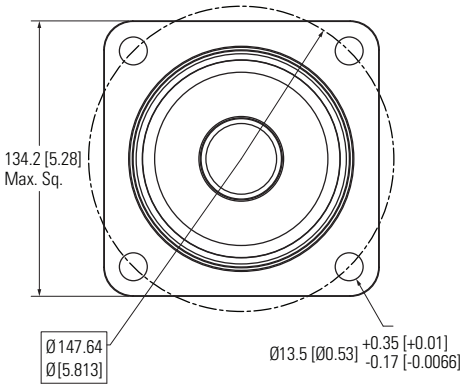


Spline pitch	12/24
Pressure angle	30°
Number of teeth	12
Class of fit	Ref 5
Type of fit	Side
Pitch diameter	Ref. 25,400000 [1.0000000]
Base diameter	Ref. 21,997045 [.8660254] ◎0,21 [.008] | D
Major diameter	(27,74 [1.092] Max. 27,59 [1.086] Min.)
Minor diameter	23,097 - 23,224 [.9093 - .9143]
Form diameter, min	29,93 [1.060]
Fillet radius	0,64 - 0,76 [.025 - .030]
Tip radius	0,25 - 0,38 [.010 - .015]
Finish	1,6 (63)
Involute profile variation	+0,000 -0,025 [+.0000 -.0010]
Total index variation	0,038 [.0015]
Lead variation	0,013 [.0005]
Circular space width:	
Maximum actual	4,318 [.1700]
Minimum effective	4,216 [.1660]
Maximum effective	Ref. 4,270 [.1681]
Minimum actual	Ref. 4,247 [.1672]
Dimension between two pins	Ref. 19,020 - 19,190 [.7488 - .7555]
Pin diameter	4,496 [.1770] Pins to Have 3,38 [.133] Wide flat for root clearance

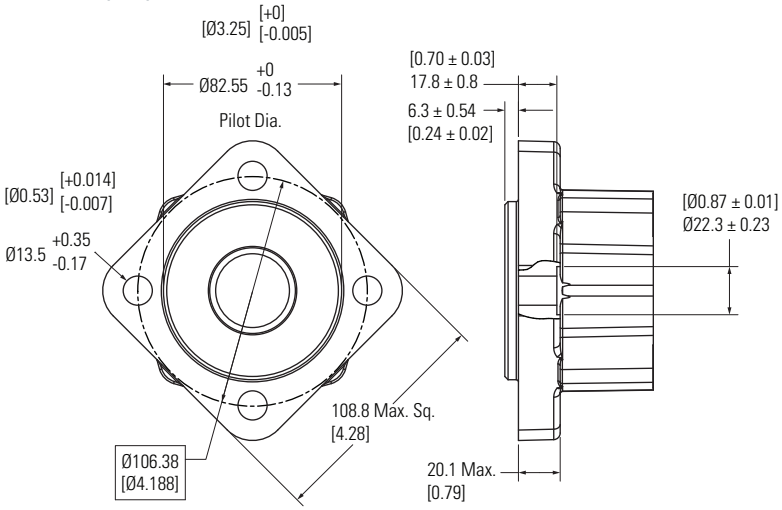
SAE A - Two Bolt (AC)

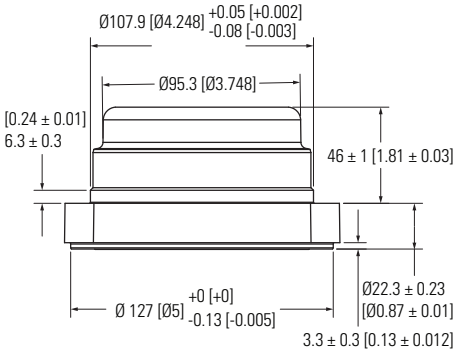


Four Bolt Wheel (AB)

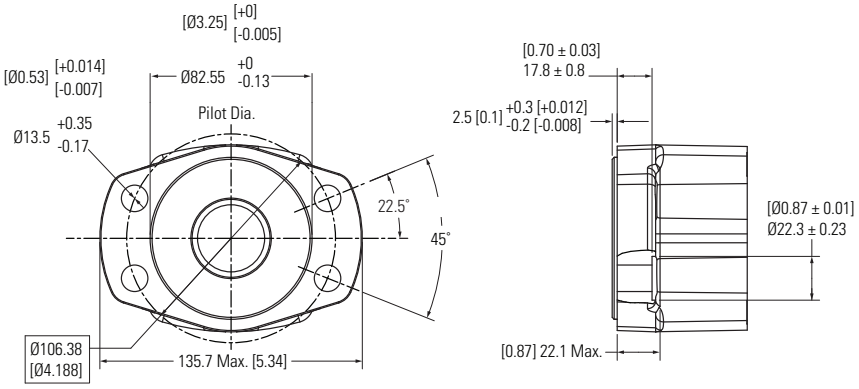


Four Bolt (AH)





Four Bolt Magneto (AJ)

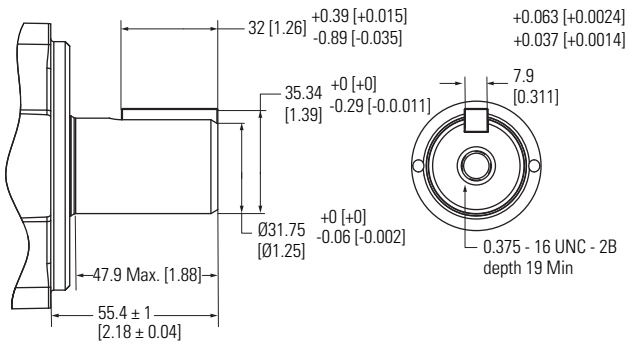


Xcel XL2 Series

Dimensions Shafts

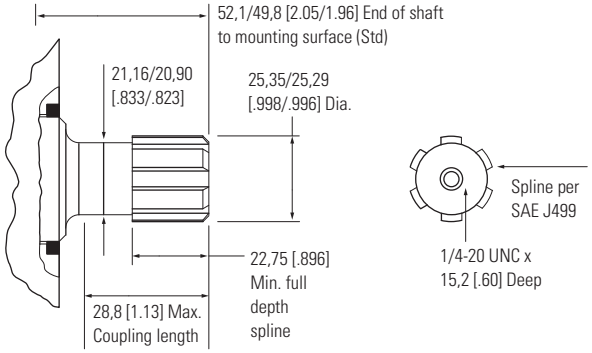
31.75 [1.25] Straight (02)

768Nm [6800 in-lb] Max. torque



SAE 6B Splined (05)

395Nm [3500 in-lb] Max. torque



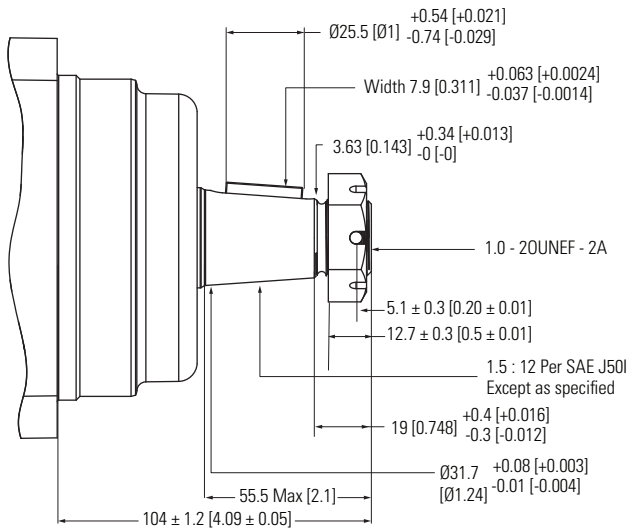
31.75 [1.25] Tapered (03)

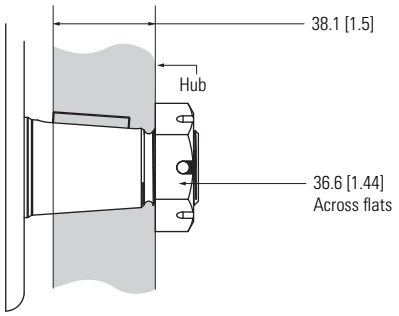
768Nm [6800 in-lb] Max. torque

Recommended torque on nut to align
the slotted nut with the shaft cross hole:

(373Nm [275 lb-ft] Dry)

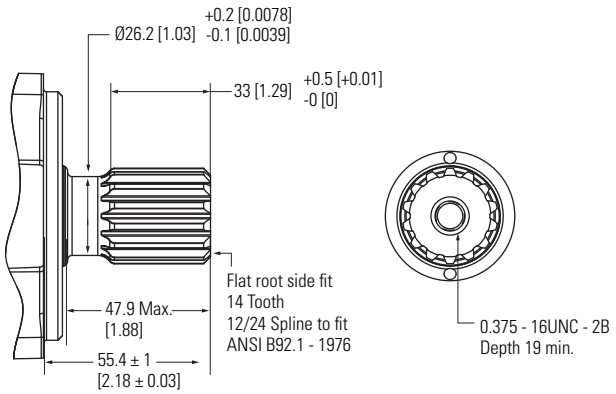
(305Nm [225 lb-ft] Lub)





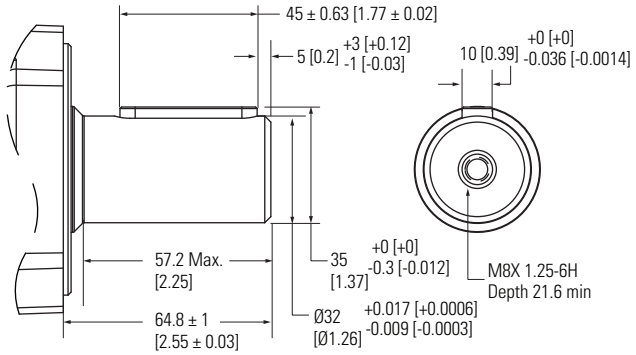
31.75 [1.25] 14 Tooth Splined (04)

768Nm [6800 in-lb] Max. torque



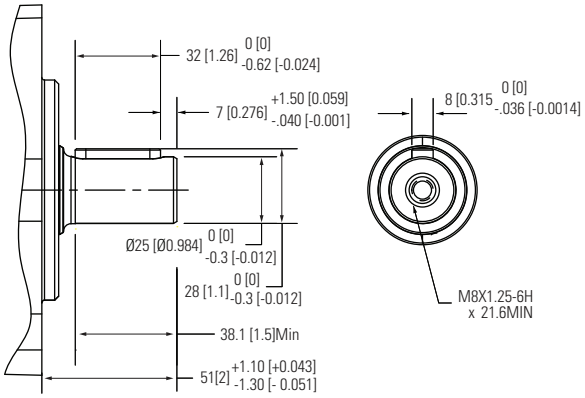
32mm Straight (16)

768Nm [6800 in-lb] Max. torque



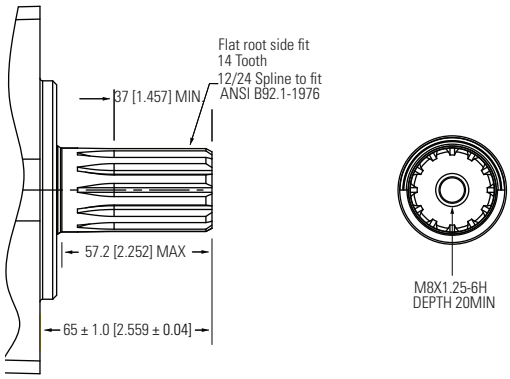
25mm Straight (98)

395Nm [3500 in-lb] Max. torque



31.75 [1.25] 14 Tooth Spline extra length (99)

768Nm [6800 in-lb] Max. torque



Xcel XL2 Series

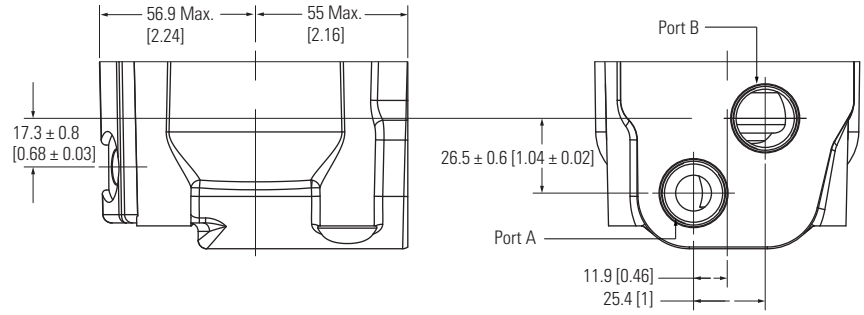
Dimensions Ports

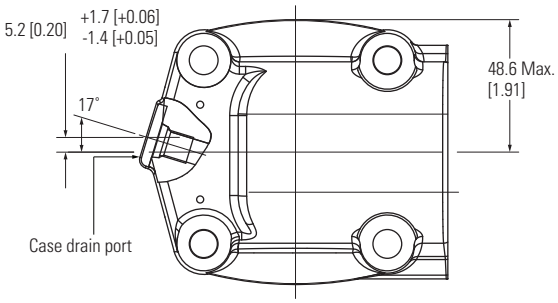
Staggered Ports

Main Ports (2): 7/8-14UNF-2B SAE O-ring Ports - **AA**
Case Drain Port (1): 7/16-20UNF-2B SAE O-ring Port - **01**

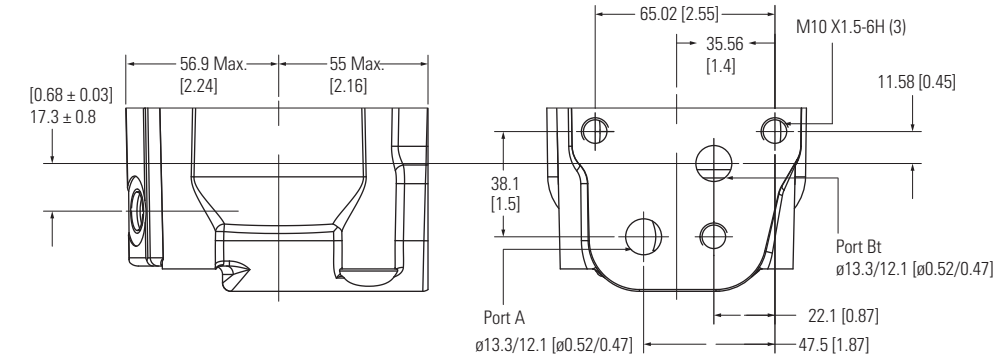
or

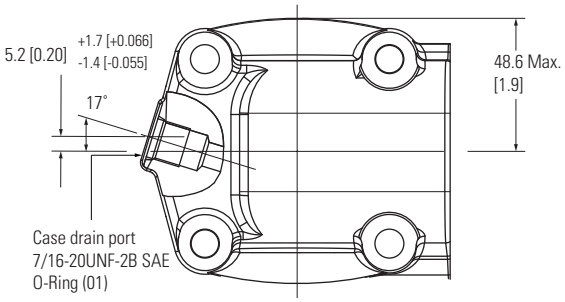
Main Ports (2): G1/2 O-ring Ports - **AG**
Case Drain Port (1): G1/4 O-ring Port - **02**





Manifold Ports (AE)

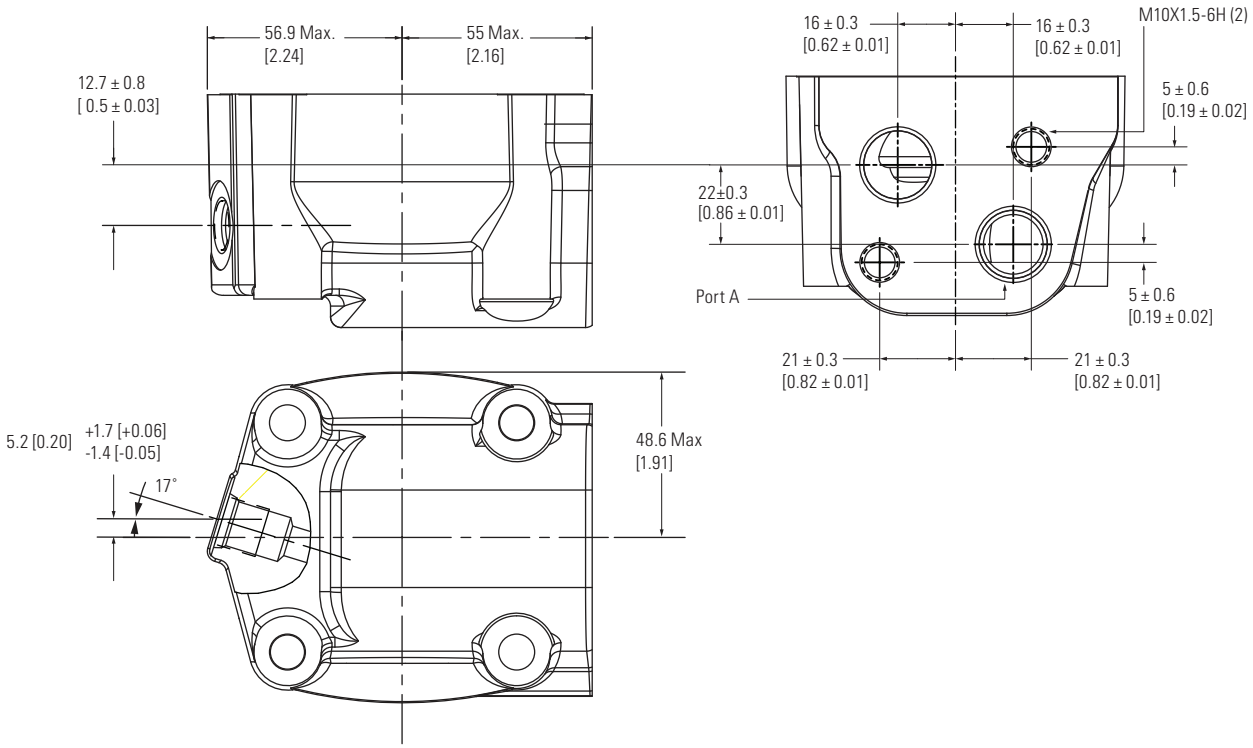




Manifold Ports

G1/2 Staggered port(2) - **AS**

G1/4 Case drain port(1) - **02**



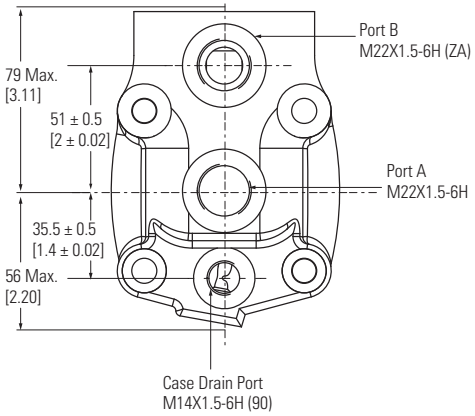
Xcel XL2 Series

Dimensions Ports

End Ports

Main Ports (2): M22X1.5-6H End Ports - **ZA**

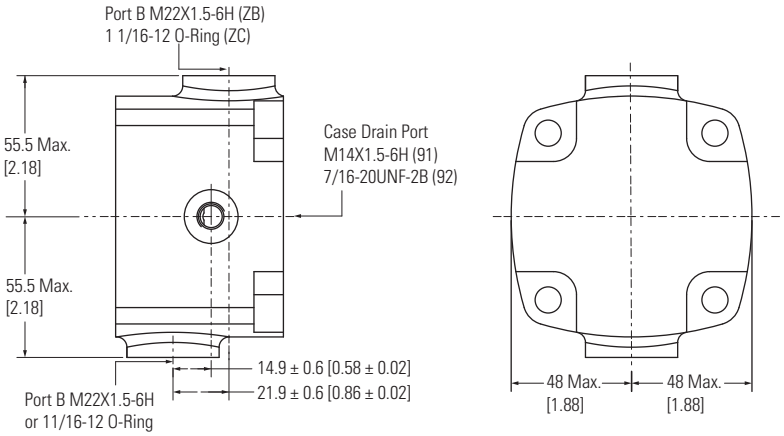
Case Drain Port (1): M14X1.5-6H O-ring Port - **90**



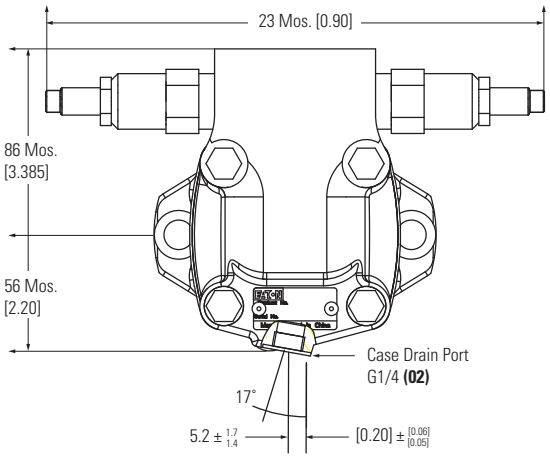
Side Ports

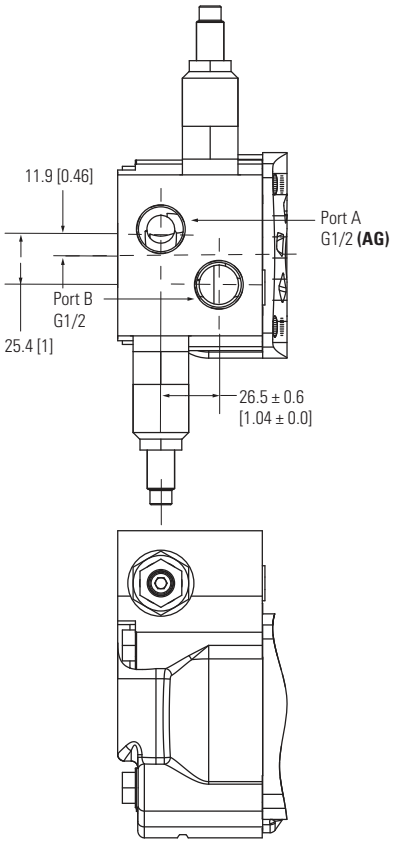
Main Ports (2): M22X1.5-6H Ports (Positioned 180o Apart) - **ZB**

M14X1.5-6H O-ring Port - **91**



Ports with Relief Valves





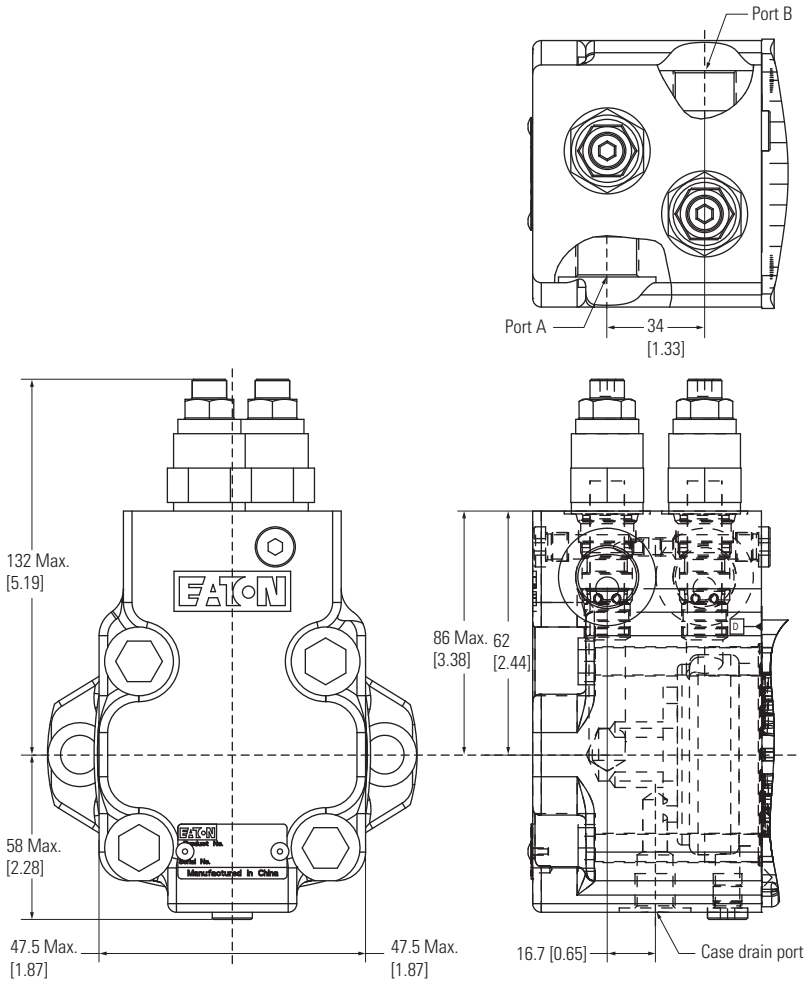
Ports with Counterbalance Valve

7/8-14UNF-2B SAE O-ring Staggered Ports(2) - **AA**

7/16-20UNF-2B SAE O-ring Case Drain Port(1) - **01**

G1/2 Staggered Ports(2) - **AG**

G1/4 Case Drain Port(1) - **02**

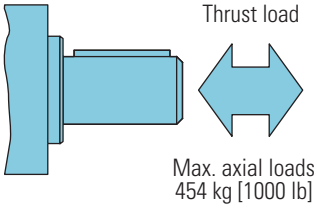


Xcel XL2 Series

Shaft Side Load Capacity

These curves indicate the radial load capacity on the motor shafts) at various locations with an allowable external thrust load of 454 kg. [1000 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 94 kg/7 Bar [208 lb/100 psi].



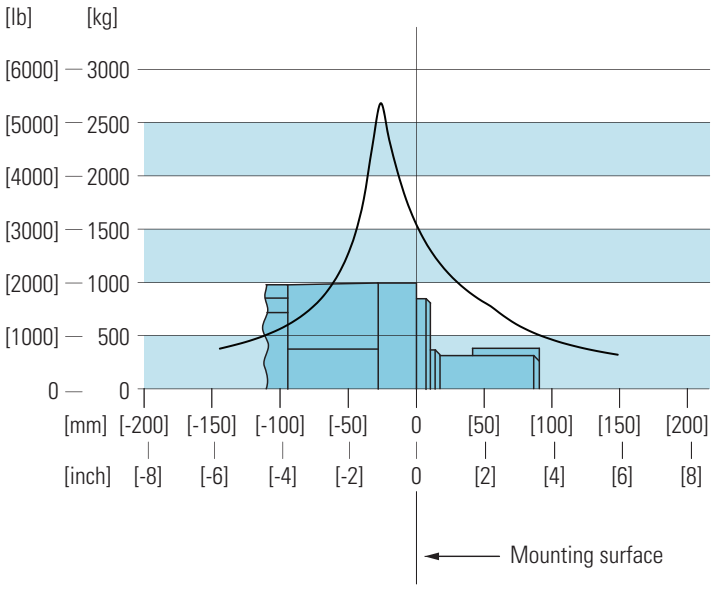
Each curve is based on B10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

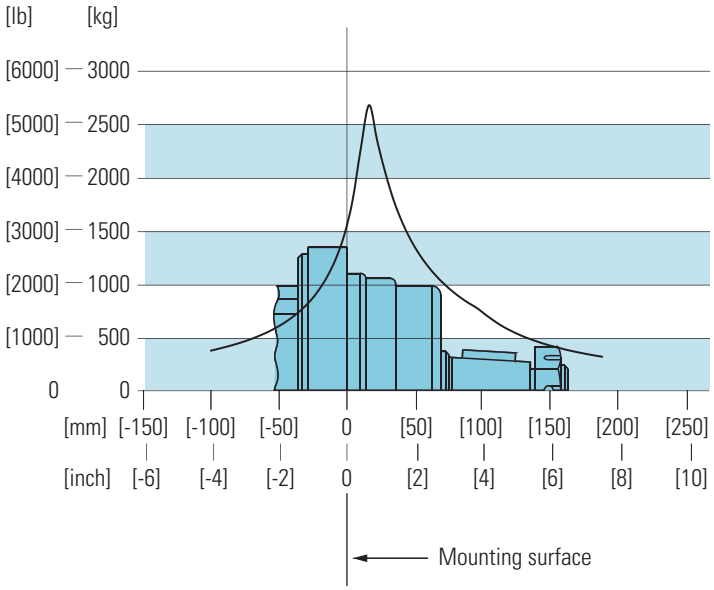
RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



Wheel Motor
Tapered Shaft



Xcel XL2 Series Case Pressure Seal Limitation 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.

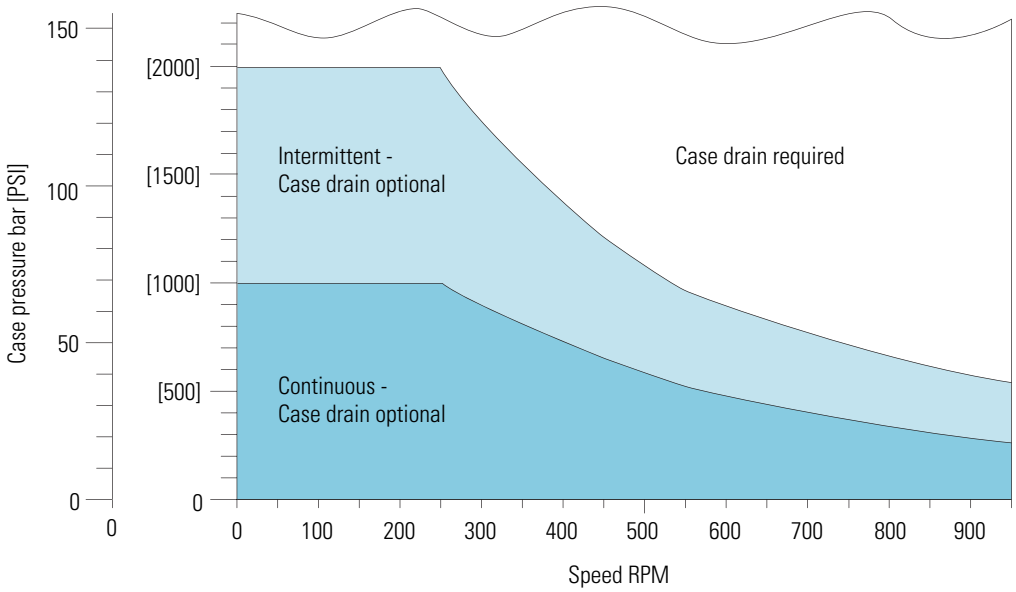
Case porting advantage

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.

Case Pressure Seal Limitation



Xcel XL2 Series

Model Code

M	C	2	***	**	**	**	**	*	**	*	*	**	**	**	**	**	B
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 Series

C 2	Xcel XL2 Series

4 5 6 Displacement cm³/r [in³/r]

080	80.6 [4.92]
100	101.6 [6.20]
130	130.6 [7.97]
160	158.1 [9.65]
195	194.8 [11.89]
245	244.3 [14.91]
305	306.6 [18.71]
395	393.8 [24.03]
490	489.0 [29.8]

7 8 Mounting description

AB	Wheel, 4 bolt: 108.0 [4.25] Pilot dia. 13.59 [.535] dia. Holes on 147.6 [5.81] dia. Bolt circle. 127.0 [5.00] dia. Rear mount pilot
AC	Standard, 2 bolt: 82.6 [3.25] Pilot dia. 13.59 [.535] dia. Holes on 106.4 [4.19] dia. Bolt circle. SAE A
AD	Bearingless (w/ leakage slots), 4 bolt: 101.6 [4.00] Pilot dia. 13.59 [.535] dia. Holes on 127.0 [5.00] dia. bolt circle
AH	Standard, 4 bolt: 82.6 [3.25] Pilot dia. 13.59 [.535] dia. Holes on 106.4 [4.19] dia. Bolt circle
AJ	Standard (magneto), 4 bolt: 82.6 [3.25] Pilot dia. 13.59 [.535] dia. Holes on 106.4 [4.19] dia. Bolt circle. 2.79 [.110] Pilot length

9 10 Output shaft description

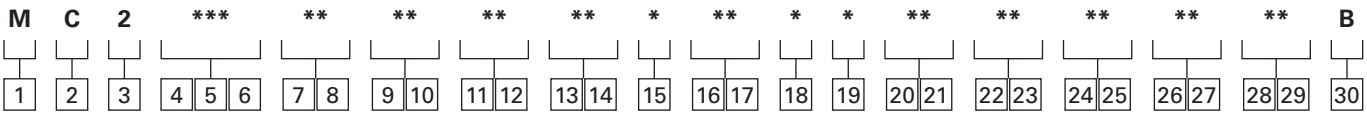
00	None (Bearingless)
02	31.75 [1.250] dia. straight shaft with .375 -16 UNC-2b thread in end, 7.938 [.3125] Sq. X 31.75 [1.250] straight key
03	31.75 [1.250] dia. .125:1 tapered shaft per SAE j501 with 1.000-20 UNEF-2A threaded shaft end and slotted hex nut, 7.938 [.3125] sq. X 25.40 [1.000] straight key
04	31.75 [1.250] Dia. flat root side fit, 14 tooth, 12/24 dp 30 deg. involute spline with .375-16UNC-2B thread in end, 33.0 [1.30] minimum full spline length
05	25.40 [1.000] dia. 6B spline per SAE J499 with .250-20UNC-2B thread in end, 22.76 [.896] minimum full spline length
16	32.00 [1.260] dia. straight shaft with M8 X 1.25-6H thread in end, 9.982 [.3930] W X 7.995 [.3132]H x 45.00 [1.772]L key
35	25.40 [1.000] dia. 6B spline per SAE J499 with .250-20 UNC-2B thread in end, 25.40 [1.000] minimum full spline length
98	25.00 [.984] dia. straight shaft with M8 X 1.25-6H thread in end, 7.982 .3142]W X 6.954 [.2738]H X 32[1.260]L key
99	31.75 [1.250] dia. Flat root side fit, 14 tooth, 12/24 DP 30 deg. Involute spline with M8X1. 25-6H thread in end, 37.0 [1.46] minimum full spline length, 139[5.471] oal shaft length

11 12 Port description

AA	7/8-14UNF-2B SAE O-ring ports - staggered ports
AE	13.0 [.512] dia. manifold ports with 3X M10 X 1.5-6H port block mounting holes
AG	G 1/2 BSP straight THD ports – staggered ports
AS	G 1/2 BSP straight THD ports – staggered port with 2X M10 X 1.5-6H port block mounting holes - European
BA	M22X 1.5-6H ports per ISO9974-1- staggered ports
ZA	M22X 1.5-6H ports per ISO9974-1- end ports
ZB	M22X 1.5-6H ports per ISO9974-1- side ports (Position 180° apart)
ZC	1 1/16-12 O-ring ports -side ports (Position 180° apart)

13 14 Case flow options

00	None
01	7/16-20UNF-2B SAE O-ring port
02	G 1/4 BSP straight THD port
10	G 1/4 BSP straight THD port with optional G 1/4 BSP straight THD port in mounting flange
90	M14X 1.5-6H ports per ISO9974-1- end ports
91	M14X 1.5-6H ports per ISO9974-1- side ports (Position 180° apart)
92	7/16-20 O-ring ports -side ports (Position 180° apart)



15 Low pressure relief

0	None

16 17 Pressure/flow option

00	None
01	Relief valve set @ 170.0 bar [2465 lbf/in^2]

18 Geroler option

1	Standard

19 Seal option

0	Standard
3	High pressure shaft seal
4	Seal guard
6	High pressure shaft seal, seal guard

20 21 Accessories

00	None
AE	M12 threaded connector, long body digital speed and direction pickup (two 30 pulse signals in quadrature per revolution pin 1=power supply, pin 2=output signal 1, pin 3=common, pin 4=output signal 2) Supply voltage: 8 to 28 V DC Output voltage low: 0.5 V DC Max at 10 mA

22 23 Special features (hardware)

00	None (Standard)

24 25 Special features (assembly)

00	None (Standard)
AA	Flange rotated 90^0 degrees
AB	Reverse rotation
AC	Flange rotated 90^0 degrees, reverse rotation

26 27 Paint/packaging

AA	Blue
AB	Black

28 29 Customer identification or name plate

AA	Standard

30 Design code

B	Second

* For more special features contact your Eaton representative.

Xcel XL4 Series

Highlights

Description

Eaton's Xcel™ Series Low Speed High Torque Disc Valve motors offer the most popular features and options from the parallel Char-Lynn™ range and are optimized to bring the highest value in medium duty applications.

Features

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

Benefits

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

Applications

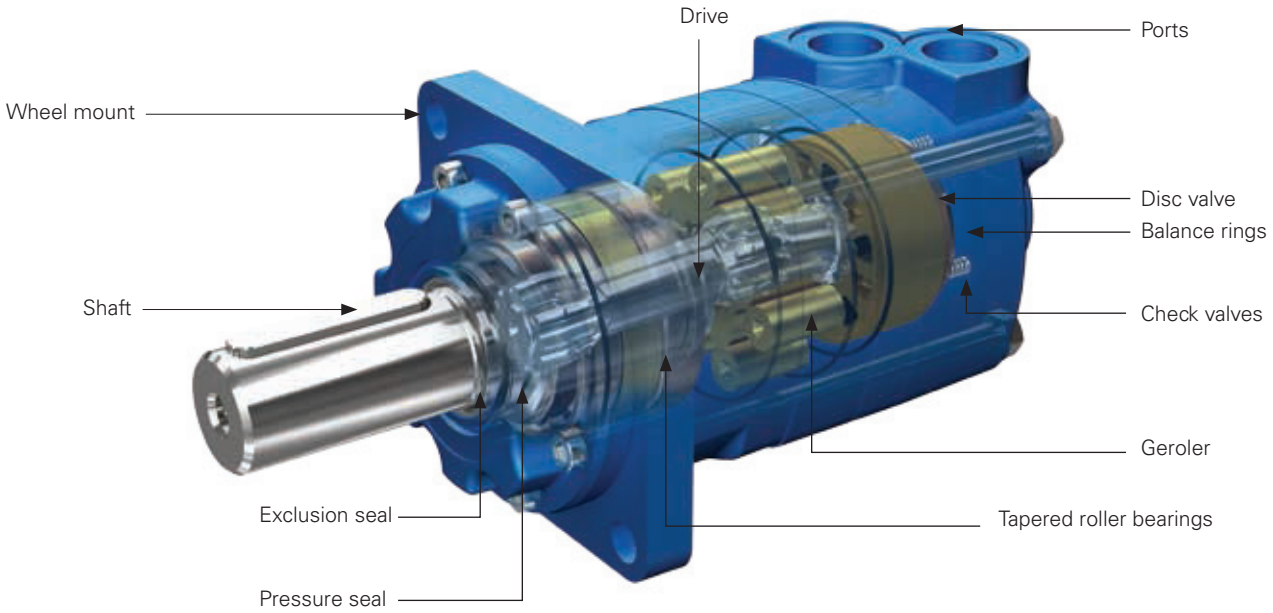
- Mowers
- Snow Removal
- Sprayers
- Trenching machines
- Wood Processing Machines

XL4 Series Motors

Geroler® Element	6 Displacements
Flow l/min [GPM]	95 [25] Continuous**
	150 [40] Intermittent*
Speed RPM	582 Cont.**
	693 Inter.*
Pressure bar [psi]	205 [3000] Cont.**
	310 [4500] Inter.*
Torque Nm [lb-in]	945 [8400] Cont.**
	1170 [10350] Inter.*

** Continuous— (Cont.) Continuous rating, motor may be run continuously at these ratings

* Intermittent— (Inter.) Intermittent operation, 10% of every minute.



Specification Data

Displacement cm^3/r [in^3/r]		160 [9.8]	205 [12.5]	245 [15.0]	310 [19.0]	395 [24.0]	495 [30]
Flow LPM [GPM]	Continuous	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]
	Intermittent	115 [30]	115 [30]	130 [35]	130 [35]	150 [40]	150 [40]
Max. Speed RPM	Continuous	582	459	383	303	239	191
	Intermittent	693	546	532	422	376	305
Pressure ΔBar [Δpsi]	Continuous	205 [2973]	205 [2973]	205 [2973]	205 [2973]	190 [2750]	140 [2000]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	260 [3750]	240 [3500]	170 [2500]
Torque* Nm [lb-in]	Continuous	485 [4292]	600 [5310]	705 [6239]	850 [7523]	930 [8240]	945 [8375]
	Intermittent	705 [6239]	800 [7080]	845 [7478]	1065 [9425]	1185 [10470]	1170 [10350]
Weight Kg [lbs]	Standard or wheel mount	18.1 [39.9]	18.4 [40.6]	18.6 [41]	19.5 [43]	20.4 [45]	21.8 [48.1]
	Bearingless	14.1 [31.1]	14.5 [32]	14.7 [32.4]	15.6 [34.4]	16.6 [36.6]	17.9 [39.5]

Maximum Case Pressure: See case pressure seal limitation graph

*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.

Max. inlet pressure:

310 bar [4500 psi]

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

Max. return pressure:

310 bar [4500 psi] with case drain line installed.

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

ΔBar [Δpsi]:

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.

Recommended fluids:

Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 13 cSt (70 SUS) at operating temperature.

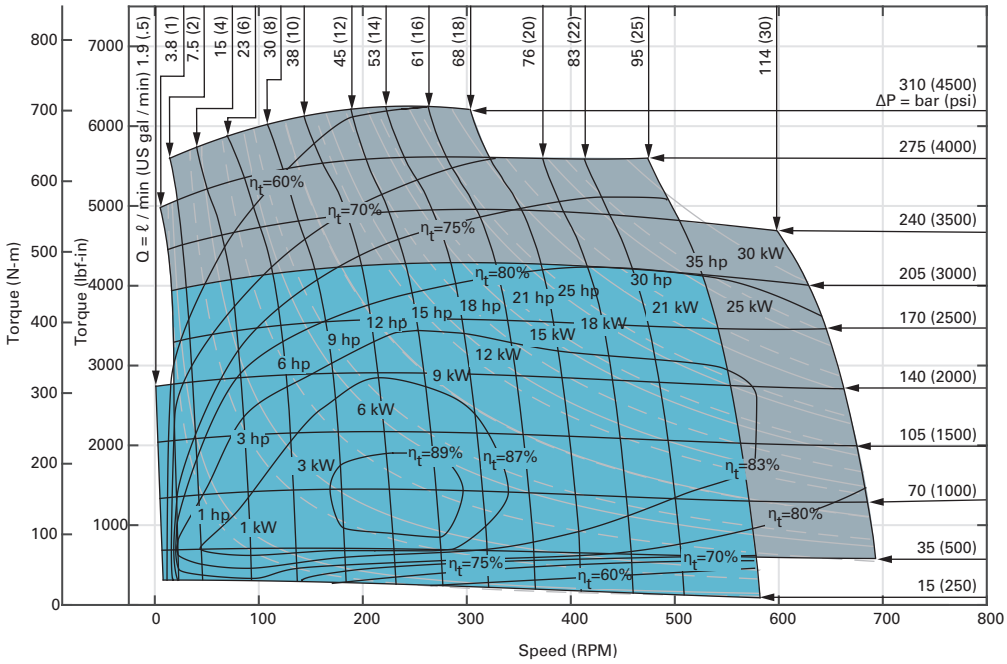
Recommended system operating temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended filtration

per ISO Cleanliness Code, 4406: 20/18/13

Function Diagram: XL4 motor 160 cc



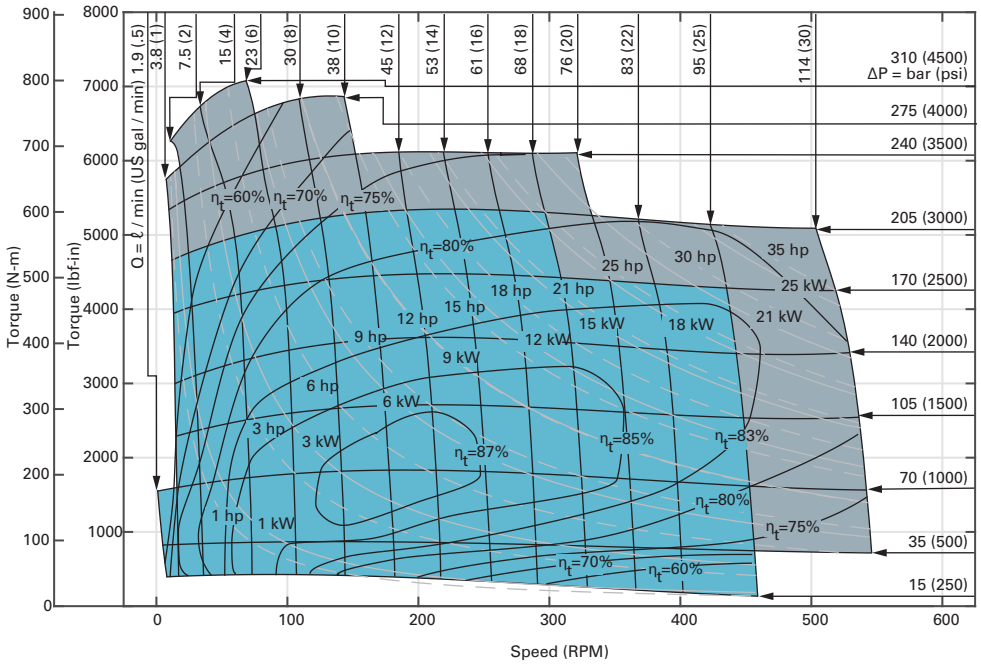
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

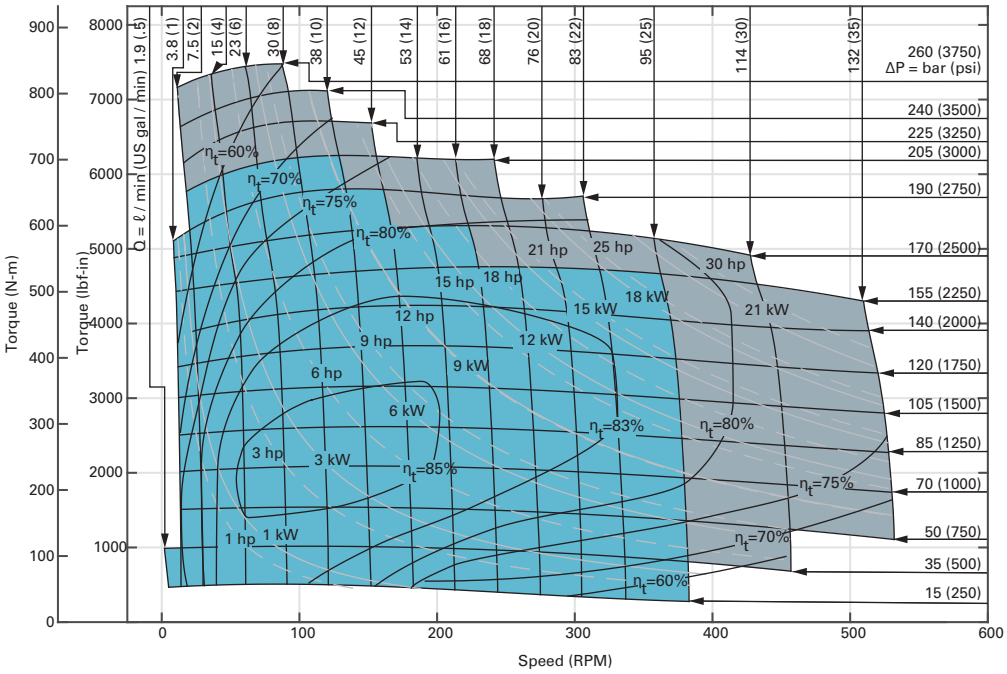
Continuous

Intermittent

Function Diagram: XL4 motor 205 cc



Function Diagram: XL4 motor 245 cc



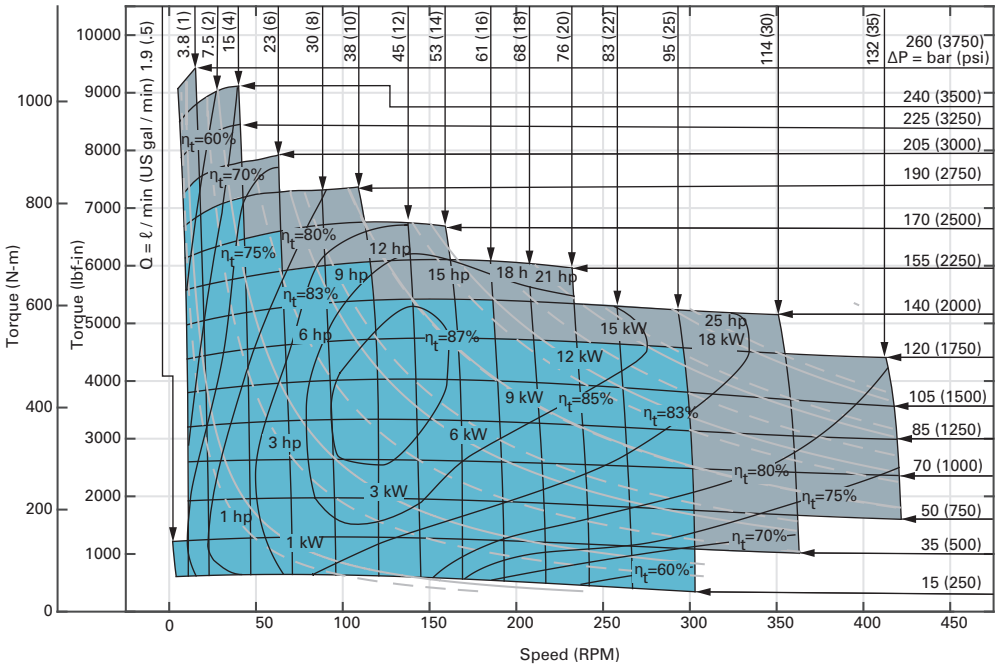
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

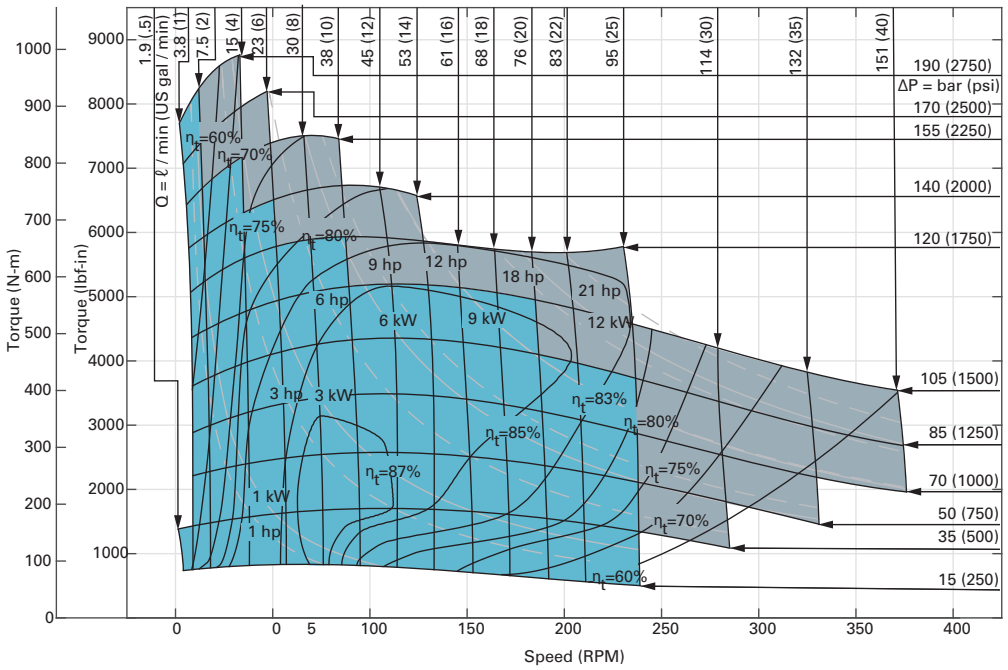
Continuous

Intermittent

Function Diagram: XL4 motor 310 cc



Function Diagram: XL4 motor 395 cc



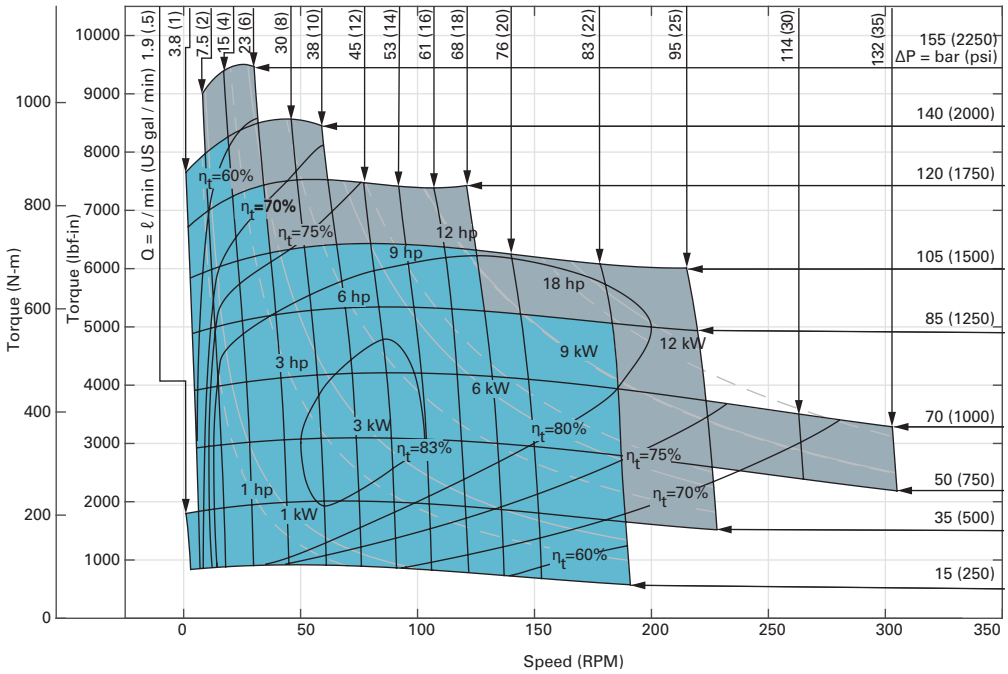
Performance data is typical at 25 cSt (120 SUS). Actual data may vary slightly from unit to unit in production.

η_t = overall efficiency

Continuous

Intermittent

Function Diagram: XL4 motor 495 cc



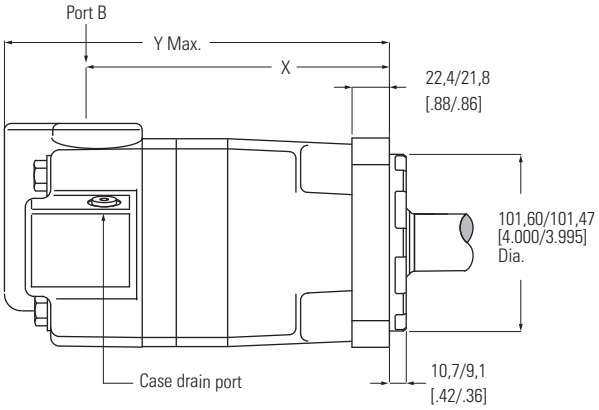
Standard Rotation Viewed from Shaft End

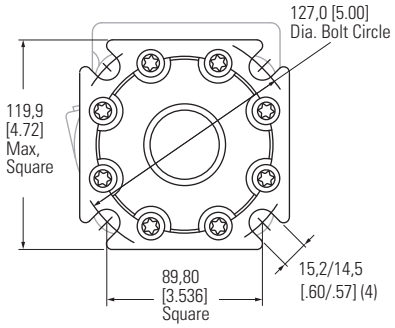
Port A Pressurized — CW

Port B Pressurized — CCW

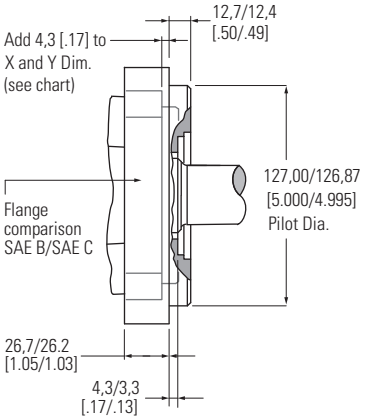
XL4 Standard Shaft Seal and Section Seal Kit Number: **Z331-32**

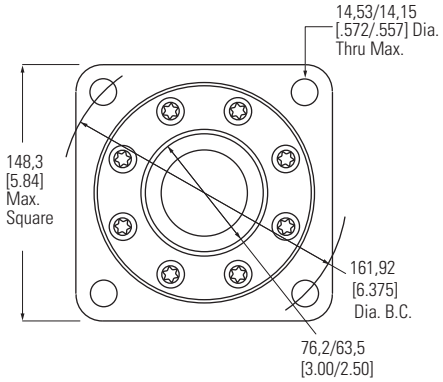
Standard Mount (AB)





SAE C Flange (AC)





Standard mount motor dimensions

Displacement		X		Y	
cm³/r[in³/r]		mm	[inch]	mm	[inch]
160	[9.9]	168,7	[6.64]	224,7	[8.85]
205	[12.5]	177,2	[6.98]	233,2	[9.18]
245	[15.0]	168,7	[6.64]	224,7	[8.85]
310	[19.0]	177,2	[6.98]	233,2	[9.18]
395	[24.0]	187,9	[7.40]	243,9	[9.60]
495	[30.0]	200,7	[7.90]	256,8	[10.11]

Xcel XL4 Series

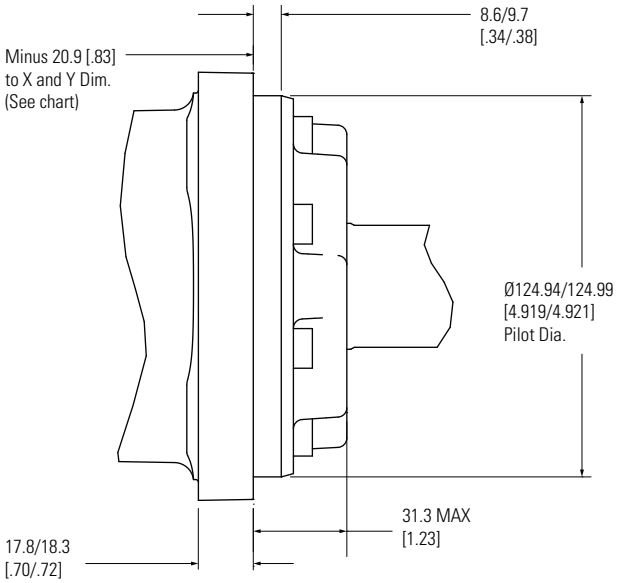
Dimensions - Standard/Wheel Mount

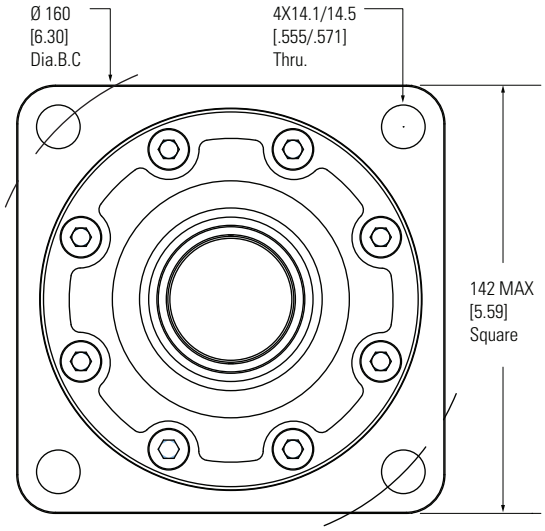
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

ISO 125 B4HW Flange (AD)





Standard mount motor dimensions

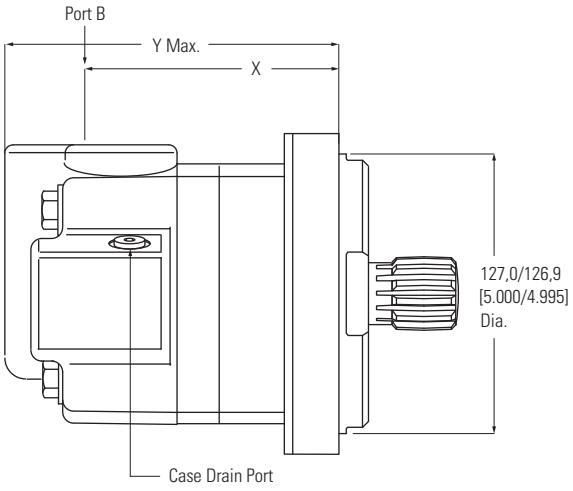
Displacement		X		Y	
cm³/r[in³/r]		mm	[inch]	mm	[inch]
160	[9.9]	168,7	[6.64]	224,7	[8.85]
205	[12.5]	177,2	[6.98]	233,2	[9.18]
245	[15.0]	168,7	[6.64]	224,7	[8.85]
310	[19.0]	177,2	[6.98]	233,2	[9.18]
395	[24.0]	187,9	[7.40]	243,9	[9.60]
495	[30.0]	200,7	[7.90]	256,8	[10.11]

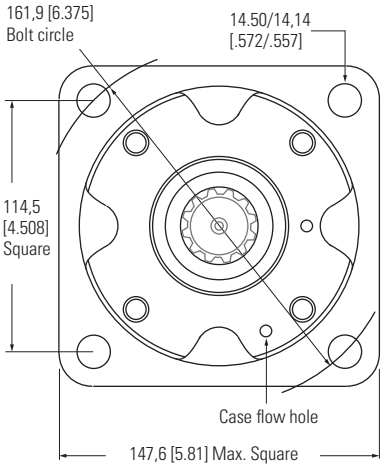
Standard Rotation Viewed from Shaft End

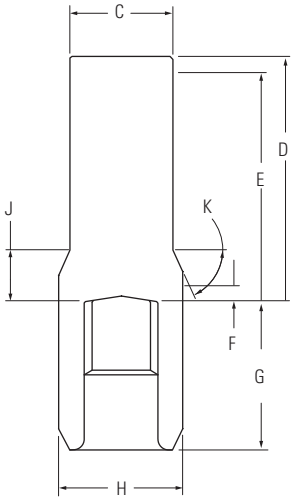
Port A Pressurized — CW

Port B Pressurized — CCW

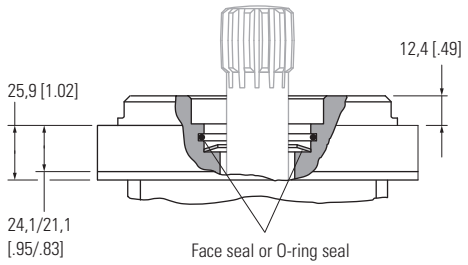
Bearingless Mount (AA)



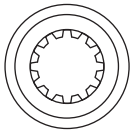




C 47,2 [1.86] Dia.
D 112,5 [4.43] Max.
E 107,4 [4.23] Full form Dia.
F 7,4 [.29] Min. Full form Dia.
G 68,8 [2.71] Max.
H 56,9 [2.24] Dia.
J 18,29 [.720]
K 38°



Mating Coupling Blank
Eaton Part No. 12745-003



For Xcel XL4 Series bearingless motor application information contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics.

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

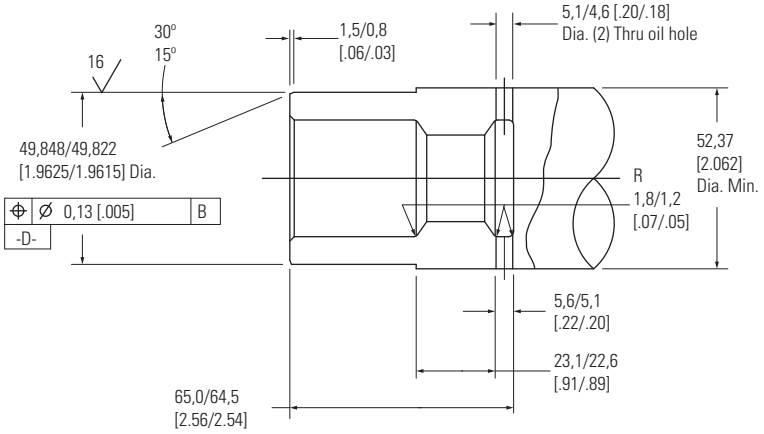
Bearingless motor dimensions

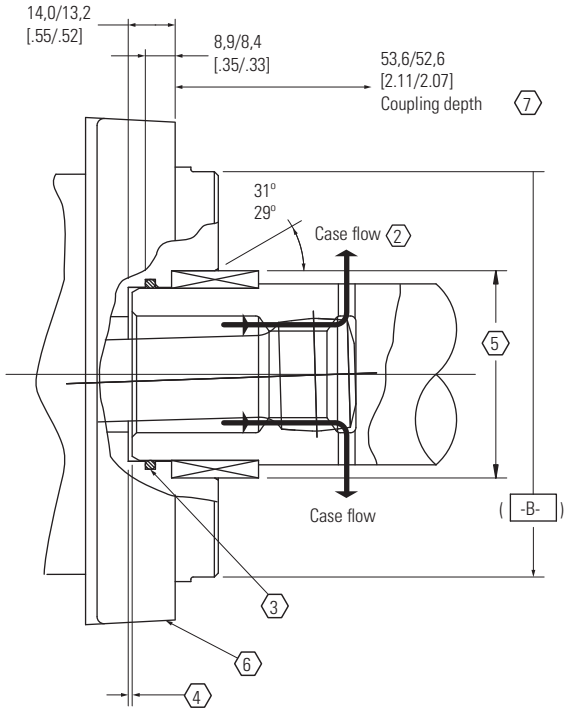
Displacement		X		Y	
cm³/r[in³/r]		mm	[inch]	mm	[inch]
160	[9.9]	101,4	[4.00]	157,1	[6.19]
205	[12.5]	109,9	[4.33]	165,7	[6.52]
245	[15.0]	101,4	[4.00]	157,1	[4.19]
310	[19.0]	109,9	[4.33]	165,7	[6.52]
395	[24.0]	120,6	[4.75]	176,3	[6.94]
495	[30.0]	133,5	[5.26]	189,2	[7.45]

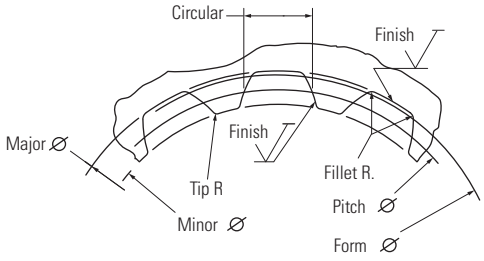
Xcel XL4 Series

Installation Information Bearingless

1. Internal spline in mating part to be as follows: Material to be ASTM A304, 8620H. Carbonize 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. Some means of maintaining clearance between shaft and mounting flange must be provided.
5. Counterbore designed to adapt to a standard sleeve bearing 50,010 - 50,040 [1.9689 - 1.9700] ID by 60,050 - 60,080 [2.3642 - 2.3653] (Oilite bronze sleeve bearing).
6. Similar to SAE "C" Four Bolt Flange.
7. 52,8 [2.08] Max. dimension to be maintained when assembling shipping and installing unit to insure valve drive engagement with valve



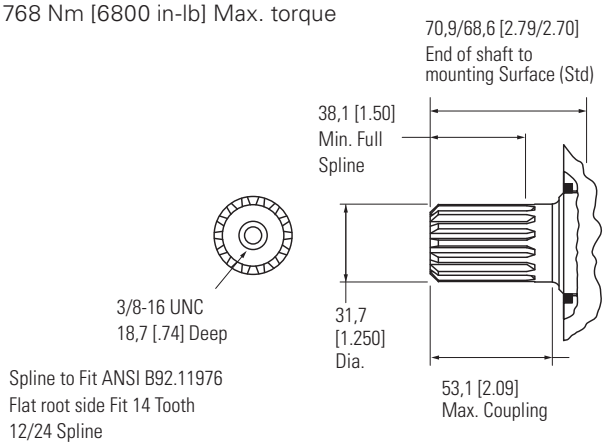




Spline Pitch	10/20
Pressure Angle	30°
Number of teeth	12
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 30,480000 [1.2000000] | 0,20 [.008] | D
Base Diameter	Ref. 26,396455 [1.0392305]
Major Diameter	33,43 [1.316] Max. 33,23 [1.308] Min.
Min. Minor Diameter	28,40 - 28,58 [1.118 - 1.125]
Form Diameter, Min	32,59 [1.283]
Fillet Radius	0,63 - 0,76 [.025 - .030]
Tip Radius	0,26 - 0,51 [.010 - .020]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+.0000 -.0010]
Total Index Variation	0,038 [.0015]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual	5,045 [.1986]
Minimum Effective	4,995 [.1951]
Maximum Effective	Ref. 5,009 [.1972]
Minimum Actual	Ref. 4,986 [.1963]
Dimension Between Two Pins	Ref. 22,783 - 22,929 [.8970 - .9027]
Pin Diameter	5,334 [.2100] Pins to Have 3,73 [.147] Wide Flat for Root Clearance

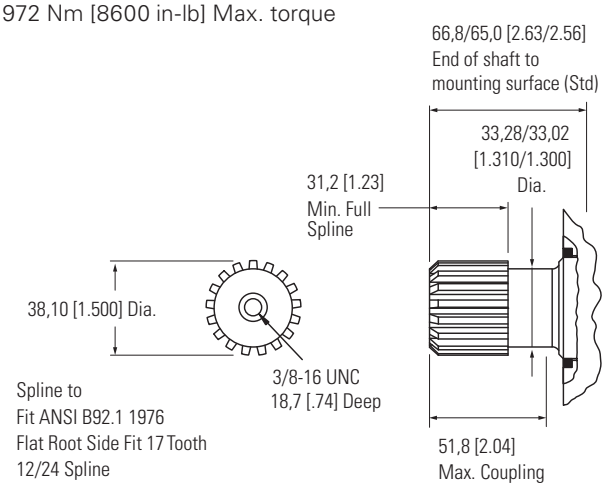
31.75 [1.25] 14 Tooth Splined (02)

768 Nm [6800 in-lb] Max. torque



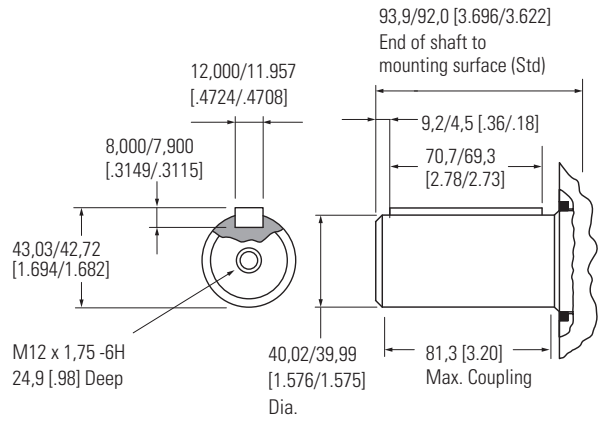
38.1 [1.50] 17 Tooth Splined (05)

972 Nm [8600 in-lb] Max. torque



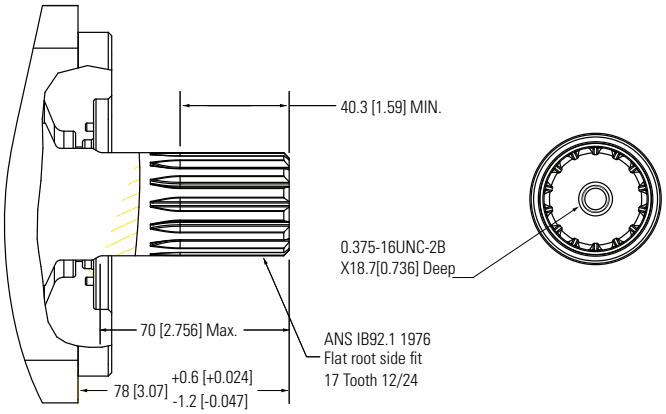
40mm Straight (04)

972 Nm [8600 in-lb] Max. torque



38.1 [1.50] 17 Tooth Splined (03)

972 Nm [8600 in-lb] Max. torque



Dimensions Ports

Ports (Preferred)

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

7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) - **03**

or

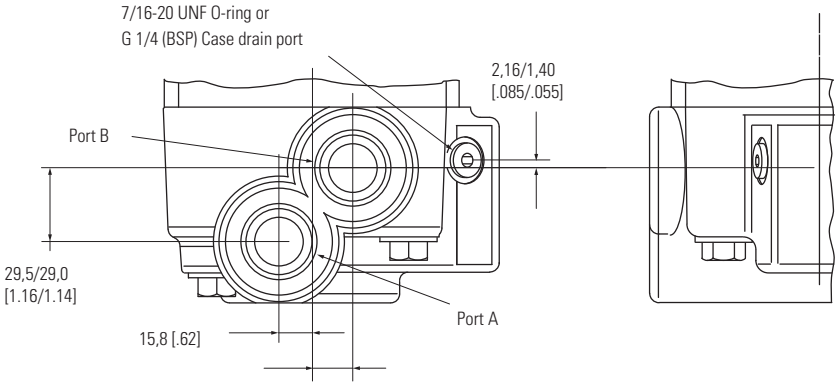
G3/4 (BSP) Staggered Ports (2) - **AB**

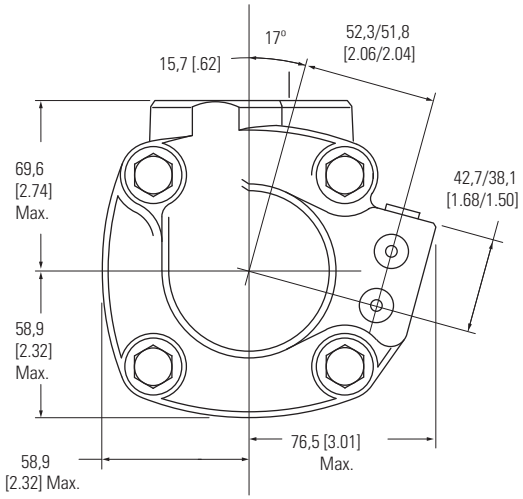
G1/4 (BSP) Case Drain Port (1) - **02**

or

M27X2 Staggered Ports(2) - **AA**

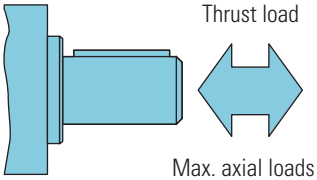
M14X1.5 Case Drain Port(1) - **01**





These curves indicate the radial load capacity on the motor shaft(s) at various locations with an allowable external thrust load of 454 kg [1000 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 94 kg/7 Bar [208 lb/100 psi].



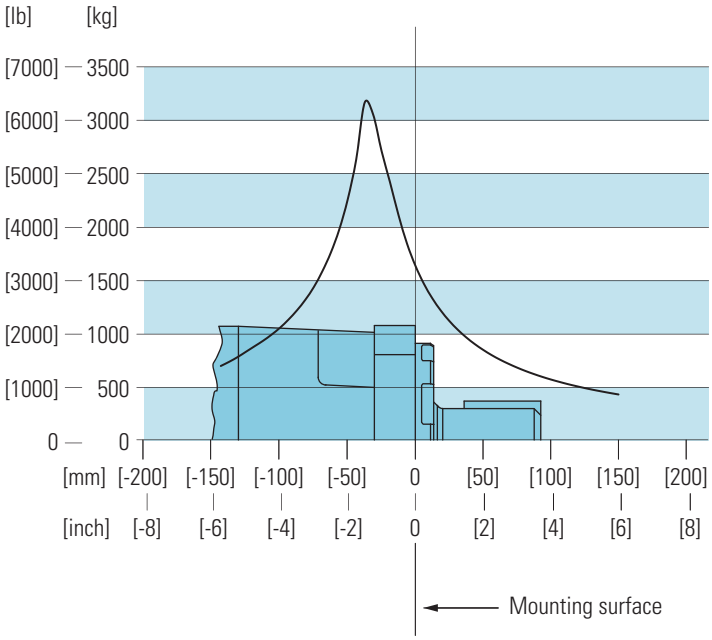
B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

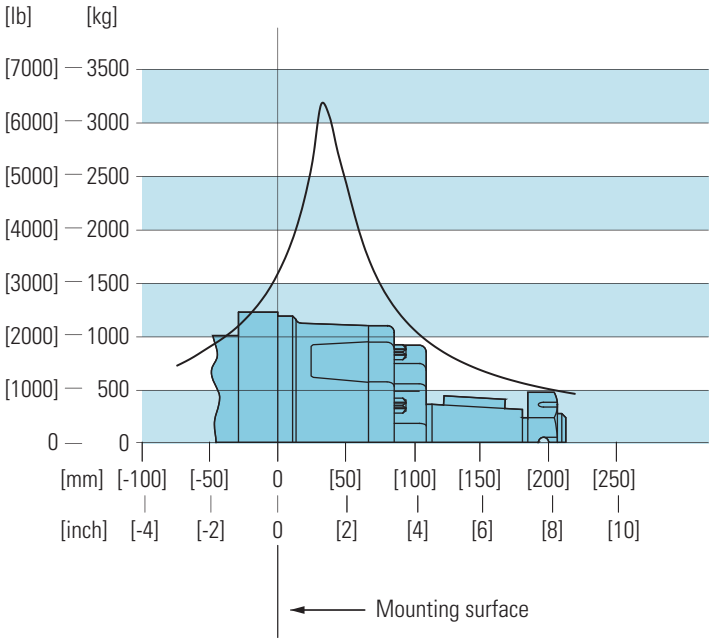
RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



Wheel Motor
Tapered Shaft



Xcel XL4 Series

Case Pressure and Case Porting

Xcel XL4 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.

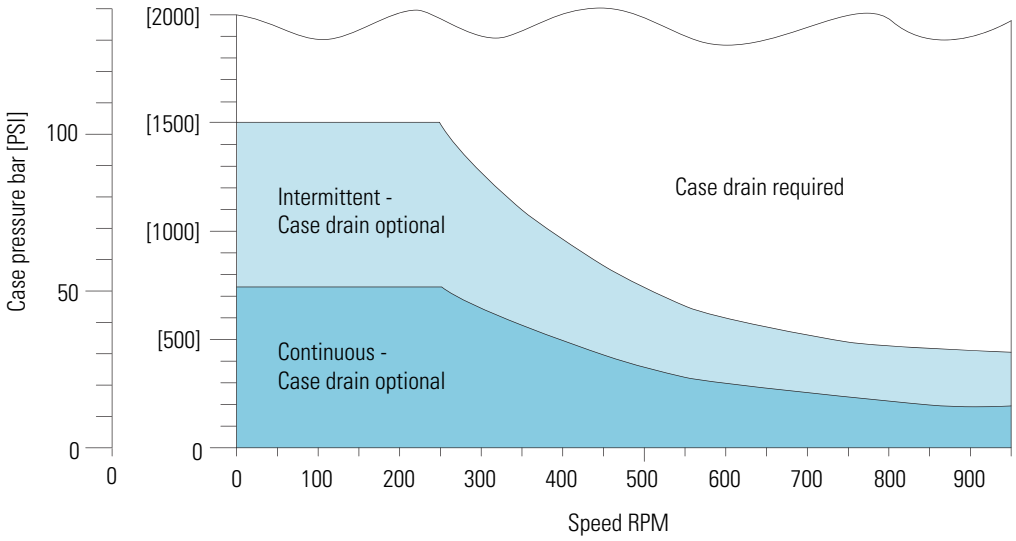
Case porting advantage

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.

Case Pressure Seal Limitation



M	C4	***	**	**	**	**	*	**	*	*	**	**	**	**	**	A
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 Series

C4	Xcel XL4 Series

4 5 6 Displacement cm³/rev [in³/r]

160	162.2 [9.90]
205	205.5 [12.54]
245	246.3 [15.03]
310	311.8 [19.03]
395	393.9 [24.04]
495	492.6 [30.06]

7 8 Mounting description

AA	Bearingless, 4 bolt: 127.00 [5.000] pilot DIA. 14.27 [.562] DIA. Holes on 161.92 [6.375] DIA. Bolt circle
AB	Standard, 4 bolt: 101.60 [4.000] pilot DIA. 14.7 [.58] slots on 127.00 [5.000] DIA. Bolt circle. (SAE B)
AC	Standard, 4 bolt: 127.00 [5.000] pilot DIA. 14.27 [.562] DIA. Holes on 161.92[6.375] DIA. Bolt circle. (SAE C)
AD	Standard: ISO flange 125 B4HW (ISO 3019/2) 124.97 [4.920] pilot DIA. 14.27 [.562] DIA. Holes on 160.00 [6.299] DIA. Bolt circle.

9 10 Output shaft description

00	None (bearingless)
02	31.75 [1.250] DIA. Flat root side fit, 14 tooth, 12/24 DP 30 deg. Involute spline, 38.1 [1.50] Minimum full spline length, with .375-16UNC-2B thread in end
03	38.10 [1.500] DIA. Flat root side fit, 17 TOOTH, 12/24 DP 30 deg. Involute spline, 40.3 [1.59] minimum full spline length, with 375-16 UNC-2B thread in end
04	40.00 [1.575] DIA. Straight with M12 x 1.75-6H thread, 7.955 [.3132] x 11.979 [.4716] wide x 69.98 [2.755]straight key
05	38.10 [1.500] DIA. Flat root side fit, 17 tooth, 12/24 DP 30 DEG. Involute spline, 31.2 [1.23] minimum full spline length, with .375-16 UNC-2B thread in end

11 12 Port description

AA	M 27x2- staggered ports
AB	G 3/4 ports -staggered ports
AC	1 1/16-12UN-2B SAE O-ring ports - staggered ports

13 14 Case flow options

01	M 14x1.5 straight thread with check valve
02	G 1/4 BSP straight thread with check valve
03	7/16-20UNF-2B SAE O-ring port with check valve

15 Low pressure relief

0	None

16 17 Pressure/flow option

00	None

18 Geroler option

0	Standard

19 Seal option

0	Standard

20 21 Accessories

00	None

22 23 Special features (hardware)

00	None

24 25 Special features (assembly)

00	None (Standard)

26 27 Paint/packaging

AA	Blue
AB	Black

28 29 Customer identification or name plate

00	None

30 Design code

A	First

* For more special features contact your Eaton representative.

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