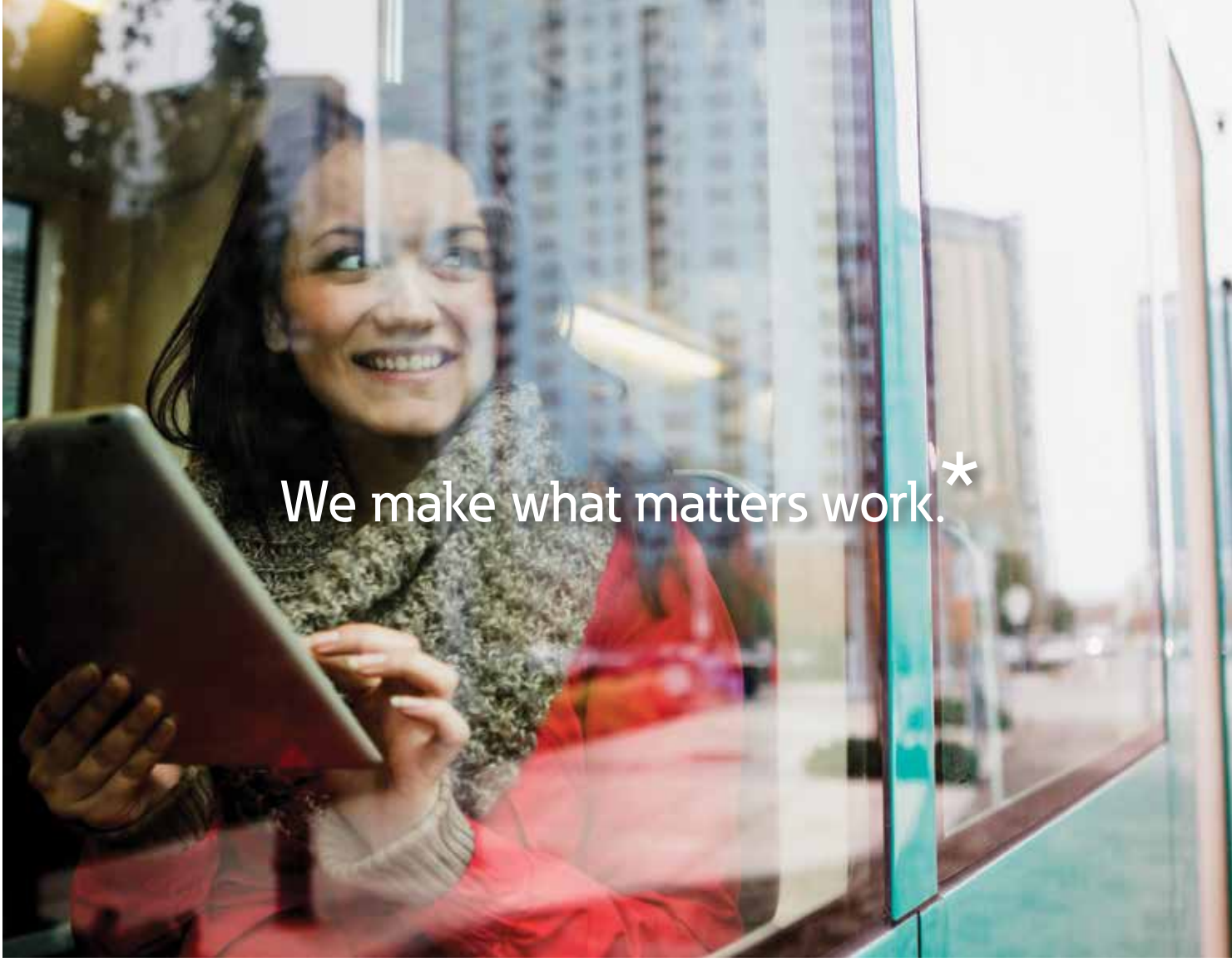
Low Speed, High Torque Motors

Spool Valve: J, H, S, T
Disc Valve: 2,000, 4,000 Compact, Delta, 4,000, 6,000, and 10,000 Series

EATON
Powering Business Worldwide



* At Eaton, we believe that power is a fundamental part of just about everything people do. Technology, transportation, energy and infrastructure-these are things the world relies on every day. That's why Eaton is dedicated to helping our customers find new ways to manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. To improve people's lives, the communities where we live and work, and the planet our future generations depend upon. Because that's what really matters. And we're here to make sure it works.

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EATON
Powering Business Worldwide

Serving eight key segments - sharing one focus

Alternative Energy

Making energy sources technically practical and economically sound requires the kind of control made possible by high-quality components. When Eaton is on the inside, you will experience the reliable, consistent performance to create and capture energy—making renewable energy an every-day energy.

Discrete Manufacturing

Produce at peak efficiency with the superior precision and repeatability of Eaton products. Eaton hydraulic components provide the precise control and consistent operation required for virtually every step in your manufacturing operation. With Eaton, we'll help you redefine the meaning of raw productivity.

Oil & Gas

As the oil & gas industry continues to face further globalization and consolidation, large-scale organizations that can meet your needs in every corner of the world are more difficult to find. At Eaton, our portfolio of products is only surpassed by our tremendous reach.

Processing

Whatever your industry, no matter which processes you manage, Eaton parts and systems help keep you up and running. Our components make equipment more efficient and easier to use, so you get optimal machine performance and maximum productivity.

Agriculture & Forestry

There's a reason farming and forestry are called "working the land." These segments involve some of the hardest work and longest hours of any sector in the economy. Your productivity and profitability depend on the way you manage time and tasks.

Commercial Vehicles

Eaton technologies can make your driving operation more successful. Greater comfort and productivity help increase driver retention, while reduced emissions, leaks, and noise improve environmental performance. Increased efficiencies overall mean lower costs and higher net revenue.

Material Handling

Eaton hydraulic systems provide the precise control and consistent operation required for material handling and utility work. With a broad selection of products and solutions built in, Eaton helps make you a master of your domain.

Construction & Mining

When you work on a large scale, even the details are big. You need to trust every part of the equipment that lets you handle construction and mining jobs. For reliable components that deliver consistent performance in extreme conditions, turn to Eaton.

Eaton is a leading diversified power management company

Eaton provides reliable, efficient and safe power management for a growing number of industries.

Understanding and helping our customers succeed

- Listening and understanding to requirements and business drivers
- Delivering solutions with value propositions to solve the critical business needs

Knowing what's important to our customers and integrating that knowledge into the fabric of our business

- to deliver innovative, quality products
- to respond fast
- to provide dedicated customer service and support around the globe

Our strength is global reach with local responsiveness and support

- Customers served in more than 150 countries
- Diverse channels ensure reliable availability and support
- Design and engineering teams provide support for standard products and custom solutions
- Eaton experts offer efficient product and application training

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Overview

Introduction to Eaton motors

Introduction:

For the past 65 years, the Char Lynn® brand has been recognized as the industry leader in low-speed, high-torque (LSHT) hydraulic motor technology. The name Char-Lynn was coined by one of the original pioneers in the hydraulic industry, the late Mr. Lynn Charlson. The hydraulic motor designs developed by Lynn Charlson and his team use what is termed as the Orbit principle. This principal is the center of the designs pioneered by the Char-Lynn team and is based on the fact that a gerotor or Geroler®, star orbits multiple times (typically 6 to 8 times depending on specific star and ring geometry) for each complete single revolution within the outer ring. This principle is what gives Char-Lynn motors their reliable high power density and extremely compact size. Only three primary moving components are needed to transmit torque through the motor: star, drive and output shaft. Shaft rotation can be instantly reversed by changing inlet / outlet flow while generating equal torque in either direction. A variety of displacement sizes are available in each motor family that provide a wide variety of speeds and torque ranges from any series of motors. The results are compact, modular, economical designs that can be easily customized to suit a wide variety of application needs.

Motor quick-guide (based on maximum continuous ratings)

Type	Output Torque Nm [lb-in]	Pressure bar [psi]	Flow lpm [gpm]	Side Load kg [lbs]
Spool valve	441	177	61	635
	[3905]	[2565]	[16]	[1400]
Disc valve	2700	205	170	4500
	[24000]	[3000]	[45]	[10000]

Motor options include:

- Displacement size (cubic inches or cc's per revolution)
- Output shaft size and type
- Mounting flange type
- Porting interface
- Special features such as integrated brakes, sensors, specialty seals, integrated crossover relief valves, 2-speed capability, manifold valve packages, and environmental protection suited for corrosive environments

Char-Lynn motors are extremely reliable, compact, and have tremendous power density. They provide a way to meet many needs for cost-effective power transmission requirements. Multiple motors can be driven by a single power source (pump) and controlled using a wide array of valves and variable displacement pump controls. Motors can even be configured with electronic sensors to provide digital feedback for sensing both motor direction and output speed.

The Char-Lynn motor range consists of three major types based on the type of valving used to distribute fluid through the Orbit gear set (Geroler or gerotor).

These three types are:

- Spool valve
- Disc valve

Migration from one valve technology to the next enhances motor performance in terms of efficiency, pressure rating, displacements, and motor output torque capability.

To help guide you to proper product selection, a quick guide is provided below. In addition, you will find product highlights, summaries of motor option features and benefits, application formulas, and detailed specifications for each motor family.

Hydraulic circuit:

Hydraulic drives can be divided into two basic types:

1. Traction Drives and
2. Non-Traction drives.

Traction drives (also referred to as propel drives) are used to propel a wheeled or track-driven vehicle. Non-traction drives (also referred to as work drives) are used for some other vehicle function such as a winch, auger, conveyor or rotate function for a boom or crane.

These rotary drive systems can also be classified as either open loop or closed-loop circuits.

Open loop circuit:

In an open loop circuit, oil is returned to a reservoir before returning to the motor. The motor/ pump circuit is open to atmosphere. In an open loop circuit, the drive speed of a motor may be controlled by, varying the flow with a valve, changing pump input speed (engine or pump input speed), or varying flow using a variable displacement pump. Often these circuits use counter-balance valves to accomplish dynamic braking functions, and provide a flow (pressure) source to release a springapplied, hydraulic release brake. It is common to use a shuttle valve for directing flow to release the springapplied pressure-release brake. A shuttle valve is basically a double check valve that directs flow from the A or B side of the loop and is often the source of flow to create the pressure to release a brake.

Typical applications using open loop circuits include:

- Truck-Mounted Booms and cranes (boom – rotate function)
- Aerial Work Platforms (boom – rotate function)
- Winches
- Conveyors
- Grapples
- Others

Closed loop circuit:

In a closed loop circuit, there is no reservoir between the inlet and outlet of the motor and pump. The pump outlet is connected directly to the motor inlet and the motor outlet is connected directly to the pump inlet. This circuit is, in theory, closed to atmosphere. Motor speed is typically controlled using a variable displacement pump. This pump can also control motor output shaft direction (CW or CCW rotation).

These systems provide dynamic control of flow through the closed loop of the motor/pump circuit. They are, however, subject to some inherent internal leakage that results in the inability of the loop to hold a load over time. This is why a static brake is typically found in such systems to mechanically hold the load. Brakes used include mechanical caliper, disc or ball-ramp type brakes. The T and Delta Series motors have options for a SAHR (spring-applied, hydraulic release) brake that meet this need.

Typical applications using closed loop circuits include:

- Vehicle traction drives (propel function)
- Conveyors
- Winches
- Others

Power density:

Char-Lynn motors are truly built for high torque low speed. A lot of power is derived from this small package. This power advantage provides the designer with a product that can be used for overall compactness in addition to taking full advantage of the high pressure ratings typical of present day hydraulic components. Char-Lynn hydraulic motors allow the designer to put the power where it is needed. Furthermore, the motors can be mounted directly on the driven device away from the original power source which eliminates the need for other mechanical linkages such as chains, sprockets, belts, pulleys, gears, rotating drive shafts, and universal joints. Several motors can be driven from the same power source and can be connected in series or parallel to each other.

Durability:

The design and method of manufacture of three critical drive train components: valve drive, shaft drive, and output shaft, give these motors durability. Consequently, the motors stand up against high hydraulic pressures.

Performance Rating Our method of rating these motors recognizes that at slower speeds and flow, higher pressures and torque are permitted. Hence, our performance data shows the complete flow range (down to 1 liter per minute or 1/4 gallon per minute) and speed range (down to one revolution per minute depending on application).

Controllable speeds:

Char-Lynn motors operate at low speeds that remain very near constant even when load varies. Shaft speed is varied smoothly, easily and economically using simple inexpensive controls. Also, these motors are reversible. Consequently, direction of shaft rotation can be changed instantly with equal output torque in either direction.

Dependable performance:

Highly precise manufacturing of parts provide consistent, dependable performance and long life even under varying conditions.

Reliability:

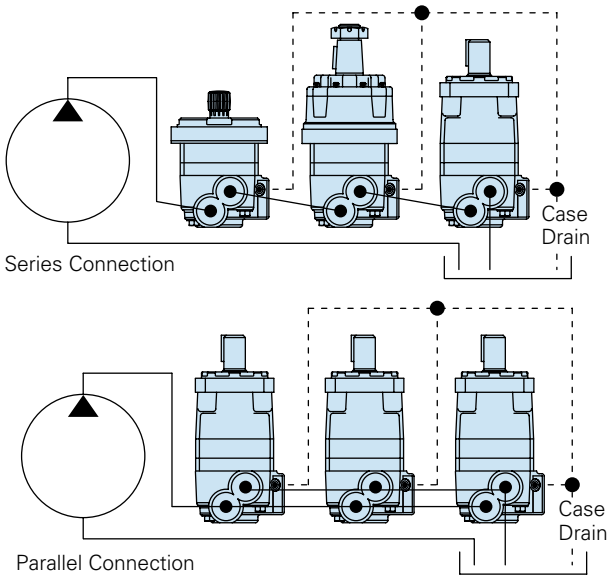
Char-Lynn motors are self contained, with hydraulic fluid providing lubrication. These motors are completely sealed so they can operate safely and reliably in hostile environments such as dust, dirt, steam, water, and heat and provide reliable performance.

High efficiencies:

Char-Lynn motors efficiently convert the supplied hydraulic fluid's pressure and flow into a low speed high torque rotational output. This efficiency minimizes the rate of hydraulic system heat generation and maximizes shaft horsepower.

Case drain and shuttle valve options:

Many hydraulic systems can benefit from the use of a system case drain. Char-Lynn motors provide this feature built in. One of the advantages for case drain flow is that contamination is flushed from the system. This flushing also aids in cooling the system and lowering the case pressure which will extend motor seal life. With a case drain line in place, oil pressure in the gear box (Bearing-less motor applications) can also be controlled. In applications where more system cooling and flushing is required, a shuttle valve option is available in 2000, 4000 Compact, 4000, 6000 series motors.



Step One – Calculate motor speed (RPM)

$$RPM = \frac{2.65 \times KPH \times G}{R_m}$$

$$RPM = \frac{168 \times MPH \times G}{R_I}$$

Where KPH = vehicle speed (kilometers per hour)

Where MPH = vehicle speed (miles per hour)

R_m = rolling radius of tires (meter)

R_I = rolling radius of tires (inch)

G = gear reduction ratio (if any) between motors and wheels. If no gear box or other gear reduction devices are used G = 1.

If vehicle speed is expressed in m/second, multiply by 3.6 to convert to KPH. If vehicle speed is expressed in ft./second, divide by 1.47 to convert to MPH.

Step Two – Determine rolling resistance

Rolling resistance (RR) is the force required to propel a vehicle over a particular surface. The values in Table 1 are typical of various surfaces per 1000 lb. of vehicle weight.

RR = GVW x ρ (kg) (lb)

where GVW = gross (loaded) vehicle weight lb/Kg

ρ = value from Table 1

Table 1 - Rolling resistance coefficients For rubber tires on various surfaces

Surface	r
Concrete, excellent	**.010**
Concrete, good	.015
Concrete, poor	.020
Asphalt, good	.012
Asphalt, fair	.017
Asphalt, poor	.022
Macadam, good	.015
Macadam, fair	.022
Macadam, poor	.037
Snow, 2 inch	.025
Snow, 4 inch	.037
Dirt, smooth	.025
Dirt, sandy	.040
Mud	.037 to .150
Sand, Gravel	.060 to .150
Sand, loose	.160 to .300

Step Three – Tractive effort to ascend grade

The largest grade a vehicle can ascend is called its "gradability." Grade is usually expressed as a percent rather than in degrees. A rise of one meter in ten meters or one footrise in ten feet of travel is a 1/10 or 10 percent grade.

$Gr = GVW (\sin \theta + \rho \cos \theta)$

Comparison grade (%)	Table slope (degrees)
1%	0° 35′
2%	1° 9′
5%	2° 51′
6%	3° 26′
8%	4° 35′
10%	5° 43′
12%	6° 5′
15%	8° 31′
20%	11° 19′
25%	14° 3′
32%	18°
60%	31°

Step Four – Determine acceleration force (FA)

The force (FA) required to accelerate from stop to maximum speed (KPH) or (MPH) in time (t) seconds can be obtained from the following equation:

$$FA = \frac{KPH \times GVW(kg)}{t\ 3.6}$$

FA = Acceleration Force (Newton)

t = Time (Seconds)

$$FA = \frac{MPH \times GVW\ (lb)}{22\ t}$$

FA = Acceleration Force (lb)

t = Time (Seconds)

Step Five – Determine drawbar pull

Drawbar Pull (DP) is total force available at the drawbar or "hitch" after the above forces have been subtracted from the total propelling force produced by the hydraulic motors. This value is established as either:

1. A goal or objective of the designer.
2. A force required to pull a trailer (Repeat steps two through four above using trailer weight and add the three forces together to obtain DP).

Step Six – Total Tractive Effort

The tractive effort (TE) is the total force required to propel the vehicle and is the sum of the forces determined in Steps 2 through 5.

TE = RR + GR + FA + DP (Kg. or lb.)

- DP — Drawbar pull desired
- FA — Force required to accelerate
- GR — Force required to climb a grade
- RR — Force required to overcome rolling resistance

Wind resistance forces can usually be neglected. However, it may be wise to add 10% to the above total to allow for starting resistances caused by friction in bearings and other mechanical components.

Step Seven – Calculate Hydraulic Motor Torque (T)

$$T = \frac{TE \times R_m}{N \times Gx \times Eg} \text{ (Nm / Motor)}$$

$$T = \frac{TE \times R_l}{N \times Gx \times Eg} \text{ (lb - in/Motor)}$$

Where: N = number of driving motors

Eg = gear box mechanical efficiency

Step Eight – Wheel Slip

If the torque required to slip the wheel (TS) is less than the torque calculated in Step 7, the performance objectives cannot be achieved.

$$TS = \frac{W \times f \times R_m}{G \times Eg} \text{ (Nm / Motor)}$$

$$TS = \frac{W \times f \times R_l}{G \times Eg} \text{ (lb - in/Motor)}$$

Where: f = coefficient of friction

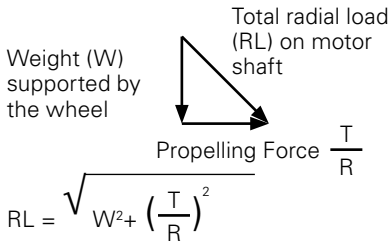
W = loaded vehicle weight over drive wheel

	Coefficient of friction (f)
Steel on steel	0.15 to 0.20
Rubber tire on dirt	0.5 to 0.7
Rubber tire on asphalt	0.8 to 1.0
Rubber tire on concrete	0.8 to 1.0
Rubber tire on grass	0.4

It may be desirable to allow the wheel to slip to prevent hydraulic system overheating when excessive loads are imposed should the vehicle stall. In this case TS should be just slightly larger than T.

Step Nine – Motor Radial Load Carrying Capacity

When a motor is used to drive a vehicle with the wheel mounted directly on the motor shaft or rotating hub, the Total Radial Load (RL) acting on the motor shaft is the vector summation of two forces acting at right angles to each other.



$$RL = \sqrt{W^2 + \left(\frac{T}{R}\right)^2}$$

Refer to radial load rating of each motor series.

Shaft Torque (T)

$$T = \frac{q \, D \, P}{2 \, p}$$

$$\frac{\text{bar} \times \text{cm /rev}}{62.8} = \text{Nm}$$

$$\frac{\text{PSI} \times \text{in}^3\text{/rev}}{6.28} = \text{lb – in}$$

Shaft Speed (N)

$$N = \frac{\text{Flow}}{\text{Displacement}}$$

$$\text{RPM} = \frac{1000 \times \text{l/min}}{\text{cm}^3\text{/rev}} \qquad \text{RPM} = \frac{231 \times \text{GPM}}{\text{in}^2\text{/rev}}$$

Power (into motor)

$$Kw = \frac{\text{bar} \times \text{l/min}}{600} \qquad \text{HP} = \frac{\text{PSI} \times \text{GPM}}{1714}$$

Power (out of motor)

$$Kw = \frac{\text{Nm} \times \text{RPM}}{9549} \qquad \text{HP} = \frac{\text{lb -in} \times \text{RPM}}{63{,}025}$$

where:

Kw = Kilowatt

HP = Horsepower

LPM = Liters per Minute

GPM = Gallons per Minute

Nm = Newton Meters

lb-in = Pound inch

Bar = 10 Newtons per Square Centimeter

PSI = Pounds per Square Inch

q = Displacement

Optional features

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Optional feature	Benefit
2 Speed motors	Allows motor to have two displacements (higher speed has lower torque)
Seal guard/Extreme duty seal guard	Prevents physical damage to shaft seal from foreign debris
High pressure Shaft Seal	More robust shaft seal that can withstand high case pressure spikes
Environmental protection	Epoxy coating for demanding application in harsh environments
Nickel Plating	For highly corrosive environment or food/sanitary applications
Integrated Parking Brake	Spring applied hydraulic release brake
Free running / reduced clearance option	Improved mechanical efficiency at high-speed/high-flow conditions and improved volumetric efficiency at low-speed/low-flow conditions
Speed sensors	To collect speed and/or direction information from a motor and provide electric signal
Shuttle valve	Redirect some low pressure oil for increased cooling in closed loop applications
Case port	To increase lubrication and flushing of the motor, reduce case pressure, and extend seal life
Internal check valves	Relieves the case pressure to the low pressure port
Low speed valving	For better efficiency and smooth running at low speed conditions (<200 RPM)
Viton seals	For higher temperature or chemical resistance applications
Integral cross over valving	Compact design that limits the differential pressure across the motor
Reverse rotation	Allows opposite shaft rotation for a given port pressure.
ATEX	Motor meets ATEX certification requirements for explosive environments

Typical applications*

Optional features	Winch	Swing drives	Sweeper brush drives	Auger	Industrial conveyor	Car wash	Turf propel	Irrigation reels	Mixers/grinders	Plastic injection molding	Traction drives	Trencher chain drives	Salt sand spreader	Marine winches
2 Speed motors	x			x				x			x			x
Seal guard			x				x		x			x		
Viton seals	x				x					x				
High pressure shaft seal									x					
Environmental protection					x	x							x	x
Nickel Plating					x	x							x	x
Integrated parking brake	x	x			x			x			x			x
Free running / reduced clearance option		x												
Speed sensors					x			x	x	x		x	x	
Shuttle valve							x		x		x	x		
Case port	x	x	x	x	x		x		x		x	x		
Internal check valves					x	x	x							
Low speed valving		x			x		x							
Integral cross over valving	x	x		x										x
Reverse rotation					x									
ATEX			x				x			x	x		x	

* These features are not limited to these applications. Final configuration depends on individual application needs.

Feature description	Spool valve motors				Disc valve motors					
	J Series	H Series	S Series	T Series	2000 Series	4000 Compact Series	Delta	4000 Series	6000 Series	10000 Series
2 Speed motors	—	—	—	—	O	—	—	—	—	O
Seal guard	—	O	O	O	O	O	O	O	O	O
Viton seals	O	O	O	O	O	O	O	O	O	O
High pressure shaft seal	—	O	O	O	O	O	—	O	—	—
Environmental protection	O	O	O	O	O	O	O	O	O	O
Nickel plating options	O	O	O	O	O	O	O	O	O	O
Integrated parking brake	—	—	—	O	—	—	O	—	—	—
Free running / reduced clearance option	O	O	O	O	O	O	—	O	O	O
Speed sensors	O	O	O	O	O	O	O	O	O	O
Shuttle valve					O	O	—	O	O	—
Case port	O	O	O	O	S	S	S	S	S	S
Internal check valves	S	O	S	O	—	—	—	—	—	—
Low speed valving	—	O	O	O	—	—	—	—	—	—
Integral cross over valving	—	—	—	—	O	O	—	—	—	O
Reverse rotation	O	O	O	O	O	O	O	O	O	O
ATEX Certification		O	O	O	O	O	O	O	O	O

O Optional

S Standard

— Not applicable

Two speed motors

This option is available on all 2000 series motors.

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Features:

This option gives the user the ability to switch the displacement of the motor thus providing a different speed at a different torque without changing the input flow. An external three way valve is required for shifting the pilot pressure port between signal pressure (HSLT) and low pressure (LSHT). Two speed motors are available. With a return line closed center shuttle for closed circuit applications. With full shift-on-the-fly ability, shift ratios of 2:1 (2000 series) provide greater circuit flexibility in a compact reliable package.

Benefits:

- Two operating speeds and torque levels with one motor
- Two selectable performance ranges in one motor package

Application:

- Conveyors
- Winches
- Traction drives
- Augers
- Irrigation/utility cable reels

This option is available on H, S, T, 2000, 4000 compact, Delta, 4000, 6000, and 10,000 series motors

Seal guard

Features:

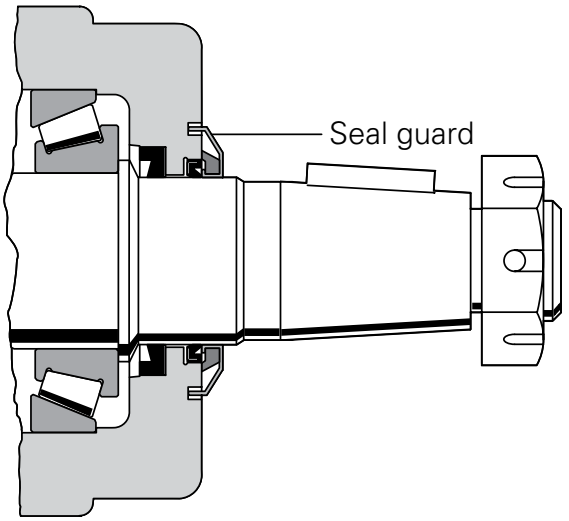
This option consists of a metal shield that protects an internal wiper seal. The shield is interference fit on the output shaft and moves with the output shaft. For added protection, the shield is recessed into a groove in the bearing housing face.

Benefits:

Centrifugal force causes foreign debris to be forced away from the high pressure shaft and dust seal area. The seal does not seal hydraulic fluid, instead it protects the standard seals from damage caused by foreign debris.

Applications:

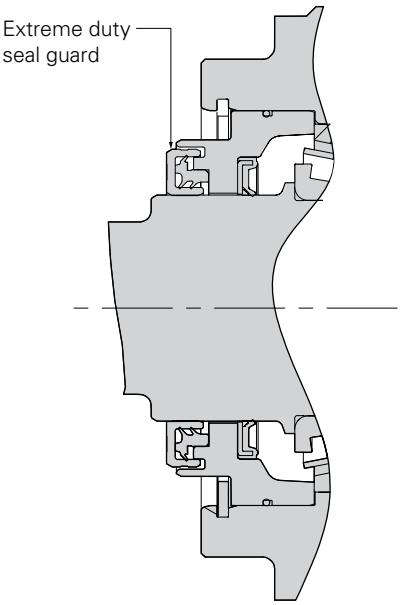
- Street sweepers
- Industrial sweepers
- Lawn and turf equipment
- Harvesting machinery
- Mining equipment



Extreme duty seal guard

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

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



Viton seals

This option is available on most Char-Lynn motors.

Features:

Higher chemical compatibility and temperature tolerance make Viton the material of choice for demanding application in extremely corrosive and harsh environments.

Benefits:

- Longer seal life in chemically aggressive environment
- Operating Temperature Range of -25°C to 200°C [-13°F to 392°F]

Applications:

- Industrial conveyors
- Plastic injection molding

Note: Minimum Viscosity Levels must still be maintained

High pressure seals

This option is available on H, S, T, 2000 and 4000 series motors.

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Features:

Eaton has introduced a high-pressure shaft seal option for its H, S, T, 2000 and 4000 series motors. The seal geometry is optimized for applications that operate under extreme conditions. The seal geometry optimizes the clamping force of the sealing lip against the output shaft to prevent seal leakage at extreme pressure conditions. The seal is designed to withstand case pressures up to 200 bar [2900 PSI] at 150 rpm.

For reference, the standard seal can withstand case pressure up to:

- 100 bars (1500 PSI) for H, S, T motors
- 140 bars (2000PSI) for 2000 Series
- 100 bars (1500 PSI) for 4000 Series
- 70 bars (1000 PSI) for 6000 Series
- 20 bars (300 PSI) for the 10,000 Series

Benefits:

- Increases ability to handle high-pressure spike conditions.
- Can be an effective alternative to additional case port plumbing
- Operating Temperature -40°C to 150°C [-40°F to 300°F]

Special notes:

1. Intermittent operation is defined as 10% of every minute.
2. The standard seal with case port option is preferred for maximum life – especially for continuous duty at high pressure conditions.
3. Seal kits are available to convert motors with the standard shaft seal to the high pressure shaft seal. (complete motor seal kits include high pressure shaft seal).
4. Minimum Viscosity Levels must be maintained.

Applications:

- Harvesters
- Sweepers
- Turf Equipment
- Wood Chippers
- Stump Grinders
- Skid steer loader attachments (often loaders have no case line available)
- Any application with extreme intermittent operating conditions or where no case return line is available

High pressure shaft seal part numbers:

H Series	–	Kit No. 60572-000
S Series	–	Kit No. 9900098-000
T Series	–	Kit No. 60579-000
Shaft Seal	–	Part No. 5995483-001
2000 Series	–	Kit No. 9901109-000
Shaft Seal	–	Part No. 5991881-001

Integrated brake options are available for T and Delta series motors

Features:

Eaton continues to develop and bring new brake solutions to market that are performance matched to each motor series. These include:

- T Series with Integrated Parking Brake
- 2000 Series (Kameoka), Delta Series

Parking brake

In addition, Eaton brake motors can be mated with bolt-on valve packages to provide dynamic braking hydraulically using state of the art counter-balance valve technology.

Benefits:

- Complete compact system package
- Performance-matched brake / motor solution
- Increases design flexibility
- Reduces assembly costs and simplifies service requirements
- Better fit for hydro electric vehicles over traditional mechanical actuated brakes
- Ability to direct port release pressure (eliminate brake release hose correction)
- Streamlines inventory and order processing

Applications:

- Aerial Work Platforms
- Boom Lifts
- Track Cranes
- Forestry Grapples
- Winches
- Traction Drives
- Anywhere load holding is a requirement in a LSHT motor application

Free running and reduced side clearance Gerotor/Geroler sets

This feature is available in all Char-Lynn motors.

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Free running Gerotor/Geroler sets

Features:

The free running option is accomplished using a specially precision-machined gerotor/geroler assembly. This feature increases the clearance between the star and mating ring, allowing the motor to turn more freely with less mechanical drag. The increased clearance also improves lubrication across the wear surfaces of the gerotor star and ring and provides a greater pressure-relieving flow path reducing pressure spikes. Flow is by-passed internally across the star tips, reducing shock loads to the main drive components. This feature provides an effective method for reducing shock loads to the main drive components.

Benefits:

- Suited for applications with rapid stop/start or rapid reversals.
- Reduces starting pressure and increases starting torque efficiency.
- Reduces pressure spikes through the orbit gear set.

Applications:

- Harvesters
- Stump Grinders
- Skid steer loader attachments
- Machine Tools
- Applications with continuous high speed/high flow applications
- Applications with high-pressure spikes from rapid reversals

Special Notes: Volumetric Efficiency will be reduced with the free-running option.

Reduced side clearance Gerotor/Geroler sets

Features:

The reduced side clearance option decreases the axial clearance between the star and the mating surfaces, allowing less flow between these parts. This improves volumetric efficiency, and is useful in very low flow applications.

Benefits:

- Increased volumetric efficiency

Applications:

- Conveyors, seeders, low speed industrial applications.

Special Notes: Reduced clearances affects the motors ability to withstand thermal shock conditions. See your Eaton representative for further information.

Gerotor or Geroler:

The H series motor uses a Gerotor while the rest of the Char-Lynn motors use a Geroler. The difference is shown in the picture below:

Essentially a Geroler, has rolls added to the lobes of the outer ring of the Orbit gear set. These rolls act as a roller bearing and reduce friction, increase mechanical efficiency and reduce wear in systems with low fluid viscosity. In addition, the Geroler type typically provides smoother performance at low speed conditions. The basic formula and guideline to determine whether a gerotor or Geroler should be used is as follows:

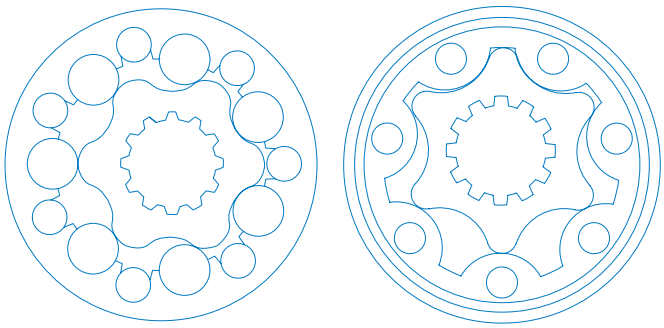
20 x psi / RPM = SUS (use this formula to determine minimum fluid viscosity)

RPM = speed of output shaft in revolutions per minute

SUS = minimum viscosity measured in SUS. The recommended viscosity limits are as follows:

1. A Gerotor Orbit gear set requires a minimum fluid viscosity of 100 SUS or the value calculated by the formula 20 psi/ RPM = SUS.
2. A Geroler Orbit gear set requires a minimum fluid viscosity of 70 SUS.

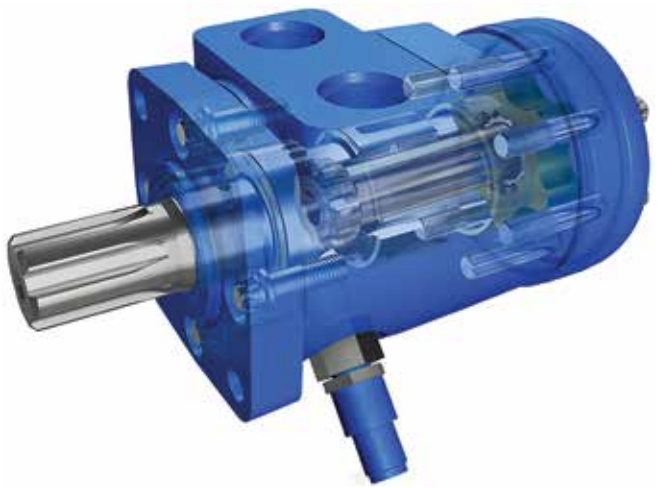
In addition, applications running at less than 100 rpm should consider using a Geroler motor.



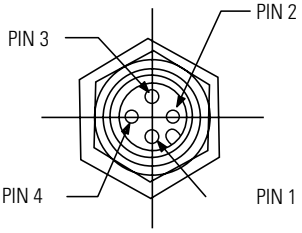
Geroler **Gerotor**

Thermal shock:

Eaton's Char-Lynn Geroler sets are precision-machined with clearances fitted for the mobile hydraulics market. A key consideration in all hydraulic components is the components resistance to thermal shock. Thermal shock is the seizure of a component due to thermal expansion. This is typically caused by hot oil quickly induced in an ambient hydraulic circuit. Side clearance between the Geroler Star and Ring is a major factor in overall motor efficiency, and is controlled very tightly. It is important that this clearance is able to withstand varying environmental changes. All Char-Lynn standard Gerolers/ Gerotor sets are designed to withstand a 70°FΔ (39°CΔ) oil temperature differential at rated flow in under 10 seconds. For motors with 2 speeds, this condition is designed in low speed mode operation.



Note: The speed sensor option does NOT include read-out display.

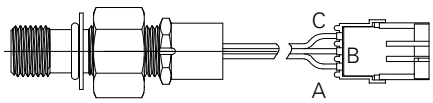


M12 Connector,
PIN Detail

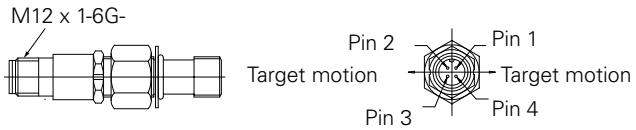
Connector Type

Output	Signal	Weather pack shroud	M12	Deutsch
Single	Digital on/off	6026077-001	6026077-22 (spool & disc) 5989814-001 (HP30)	
Dual	Version 1 2 Signals 90 degree out of phase		113003-001	5998790-001
	Version 2 Dual pulse with speed and direction		113003-002 (disc) 203266-001 (spool - no direction)	

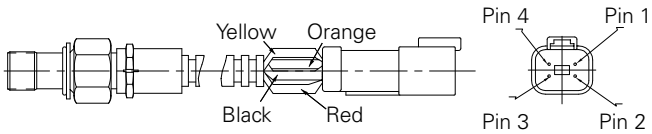
Weather pac shroud



M12 Connector



Deutsch Connector



Pin Details

PIN	Function
1	Power (RED)
2	Output 1 Orange
3	Common (Black)
4	Output 2 (Yellow)

The single output speed sensor:

This design is rugged and fully protected against accidental reverse polarity or short circuit hook up. A built in pull up resistor simplifies installation with control systems. This sensor is fully compatible with the mobile vehicle electrical systems and gives a reliable digital on/off signal over a wide speed range and temperature range. The sensor is field-serviceable; no factory setting or shimming is required.

The dual output speed sensor:

This sensor provides both speed and direction information. Its design is based on the field proven technology of our standard sensor and is designed for off road environments. The new sensor is based on the principle of quadrature.

- The first version speed sensor has two output signals 90° out of phase. Each output provides one pulse per target.
- The second version has a speed signal that is twice the output pulses per revolution and it also has a direction signal. (Direction not available on spool motors)

Single and two outputs:

Supply Voltage:

8 to 24 Vdc (compatible with 12V vehicle systems

Supply Current:

20 mA max. (Vs) (including internal pull-up resistor)

Output Voltage:

Low < .5 Vdc @ 10 mA; output is open collector with 10kW pull-up resistor

M12 Connector (version 1)

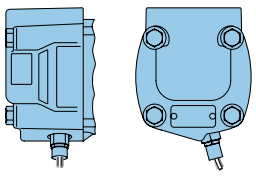
- Pin 1 = Power supply
- Pin 2 = Output one
- Pin 3 = Common
- Pin 4 = Output two

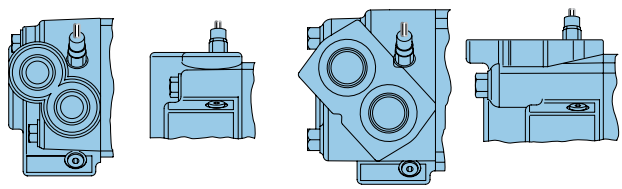
M12 Connector (version 2)

- Pin 1= Power Supply
- Pin 2 = Direction
- Pin 3 = Common
- Pin 4 = Speed signal

Technical information

Motors	Speed sensor pulses per rev	Quadrature pulses per rev
J,H,S,T,W	15	60
2000 series	30	60
4000 series	30	72
6000 series	30	80
10,000 series	30	60





Shuttle valve

Lubricating shuttle

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The shuttle valve option is available in 2000, 4000 and 6000 series motors.

Features:

Case Port allows for hydraulic oil to be flushed and cools the system. In applications where more system cooling and flushing is required.

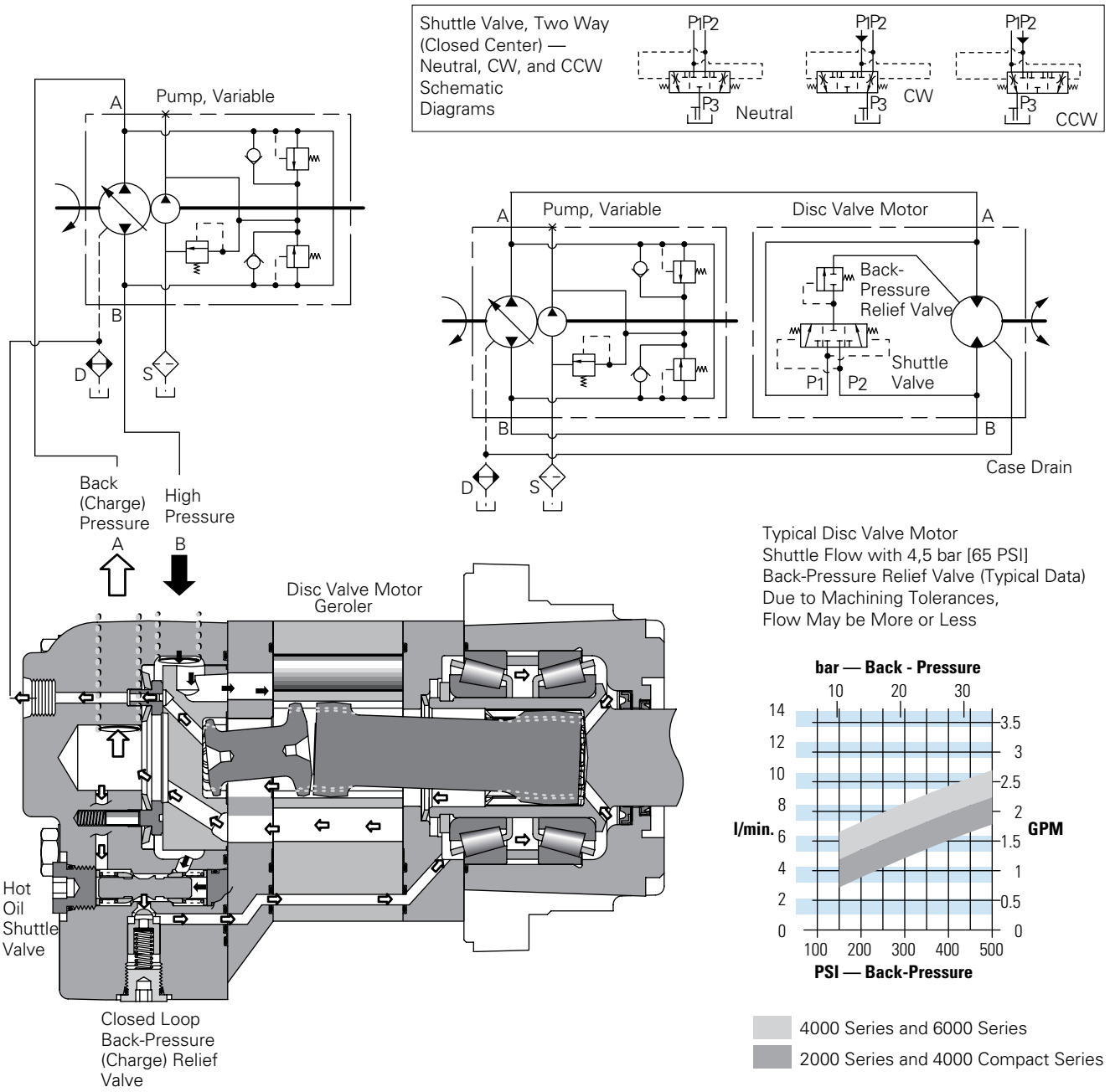
Applications:

- Turf Propel
- Mixers/Grinders
- Traction drives
- Trencher chain drives

Benefits:

- Flushing
- Cooling
- Longer system life

Closed Loop Circuit



Typical Disc Valve Motor
Shuttle Flow with 4,5 bar [65 PSI]
Back-Pressure Relief Valve (Typical Data)
Due to Machining Tolerances,
Flow May be More or Less

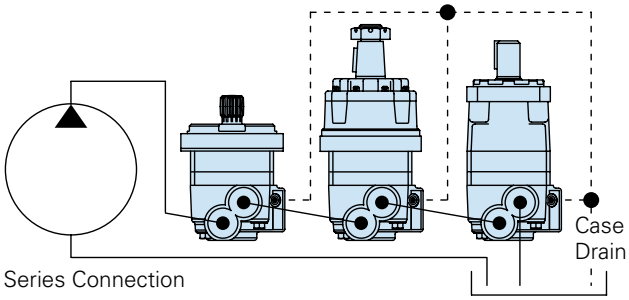
4000 Series and 6000 Series

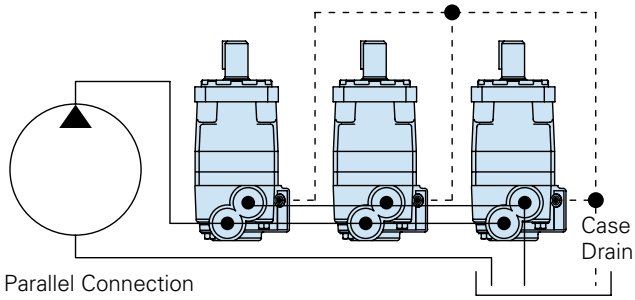
2000 Series and 4000 Compact Series

Motors with shuttle valve must have a case port to tank, without this port line the internal drive splines will not have adequate lubrication.

Case porting

This option is available on all Char-Lynn motors.





Features:

This feature provides for connection of a port line connected to the motor case. A port is located in the motor direct to motor case pressure that allows the case pressure to be returned directly to tank. Internal leakage to the motor case cavity can be drained directly which reduces case pressure and provides flushing of the system circuit.

Benefits:

- Extends shaft seal life
- Extends thrust bearing life
- Reduces shaft seal leakage problems
- Improves flushing of the circuit to reduce system contaminates and cooling the system.

Applications:

- Especially suited for continuous running industrial applications and where motors are operating under high back pressure conditions (e.g. series circuit applications).
- Conveyers
- Car wash
- Harvesters
- Recommended for applications running with high case pressure conditions

Internal check valves:

This option is available on H, S, and T Series motors.

Internal check valve reduces high case pressure on the shaft seal by venting excess pressure to the lowest pressure port, further extending shaft seal life, This option is not necessary when using case drain.

Internal check valves are available as an option in H and T Series motors, whereas S Series motors have this feature as standard.

Low speed valving / Low flow housing

This option is available on H, S and T series motors.

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Features:

This feature optimizes the motor for low-speed performance. It greatly improves smooth operation at speeds below 200 rpm. The valving is optimized with increased sealing and tighter clearances. Motors with this feature are designed to run continuously up to 200 rpm at standard rated pressures.

Benefits:

- Improves smoothness at low speed conditions (less than 200 rpm)
- Improves volumetric efficiency

Applications:

- Salt-sand spreaders
- Machine tools
- Irrigation drives
- Consider for applications running at low speed conditions below 200 rpm.

Note: Motors with this valving are not intended for low pressure applications (A minimum of 300 psi delta must be maintained between A port pressure and case pressure)

Low flow housing:

This feature is available on the H and T Series motor

Features:

This feature further optimizes the motor for low-speed performance. This option is used in combination with low speed valving to mate the housing geometry to the rotating valve to further increase sealing. Motors with this feature are designed to run continuously up to 200 rpm at the standard rated pressures.

Benefits:

- Further improves smoothness at low speeds (less than 200 rpm)
- Improves volumetric efficiency

Applications:

- Seed metering
- Steering motors
- Low speed conveyors

Full body Nickel plating:

This option is available on H, S, T, 2000, 4000, and 6000 motors.

Features:

Eaton is offering full body nickel plating for Char Lynn motors for protection against wash down environments. This does not offer protection against salt water environments and the recommended option is epoxy paint

Paint option	Description	Applications
Electroless Nickel Plating (AMS 2404D specification)	Premium process offering extremely high quality corrosion resistance	Where water contact is extremely high+

+ Washdown applications only – does not include salt water applications

Benefits:

- Protection in heavy and frequent washdown environments
- Single source plating
- Warranty from Eaton on nickel plating

Applications:

- Food processing
- Industrial conveyors

Environmental protection (epoxy paint):

This option is available on all Char-Lynn motors.

Features:

All motors are available with a corrosion resistant coating for use in hostile environments. This hard, extremely durable coating is the best protection against corrosion and rust. This paint option is commonly combined with a plated shaft option and the extreme duty seal option for a full body protection.

Benefits:

This coating protects the motor from salt water and various chemicals. Motor output shaft plating helps eliminate seal damage caused by caustic or acidic materials.

Applications:

- Marine
- Food processing
- Fishing and agricultural applications
- Fertilizer spreaders and conveyors

Nickel plated shafts:

This option is available on H, S, T, motors.

Features:

Eaton is offering Electroless nickel plating on the shafts alone for corrosion protection. This option is commonly used with full body nickel plating in wash down applications.

Benefits:

- Protection in heavy and frequent wash-down environments
- Single source plating
- Warranty from Eaton on nickel plating
- Protects shaft seals from shaft corrosion

Applications:

- Car washes
- Fishing winches / marine applications
- Fertilizer spreaders and conveyors

Chrome plated shafts:

This option is available on J, 2000, 4000 Compact, Delta, 4000, and 6000 Series motors.

Benefits:

- Protection in heavy and frequent wash-down environments
- Protects shaft seals from shaft corrosion
- Single source plating
- Warranty from Eaton on Chrome plating

Applications:

- Car washes
- Fishing winches / marine applications
- Fertilizer spreaders and conveyors

Integral valves for 2000 series

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Replacement cartridges can be obtained by ordering the Item part number as listed below.

Replacement cartridges

Item part #	Item desc.	Relief valve setting
02-199291	RV5A-10-F-0-35/15	1500 PSI
02-199292	RV5A-10-F-0-35/17.5	1750 PSI
02-199293	RV5A-10-F-0-35/20	2000 PSI
02-199295	RV5A-10-F-0-35/22.5	2250 PSI
02-198563	RV5A-10-F-0-35/25	2500 PSI
02-199294	RV5A-10-F-0-35/27.5	2750 PSI
02-199296	RV5A-10-F-0-35/30	3000 PSI

Features:

- Complete packaged system solution, single source for motors with relief valve capability
- Relief valves as close to Geroler as possible, providing added protection
- Eliminate leak points from in-line or bolt-on relief's
- Valves capable of full motor pressure
- Provides added flexibility to system design by allowing motors to have individual relief valve settings
- Simplifies assembly, purchasing and system design requirements

Benefits:

- This compact and efficient package offers increased value and cost effectiveness to designing Eaton into your applications.
- Minimizing the use of hoses, tubing and fittings reduces production and assembly.

Applications:

- Skid-steer attachments
- Swing motors
- Brush cutters & mowers
- Harvesting equipment
- Directional boring
- Winches
- Augers
- Any place where pressure relief is optimal for system or motor performance and life

Special housings bolt on solutions

Cartridge valves & manifolds are available for H, S, T and 2000 Series motors.

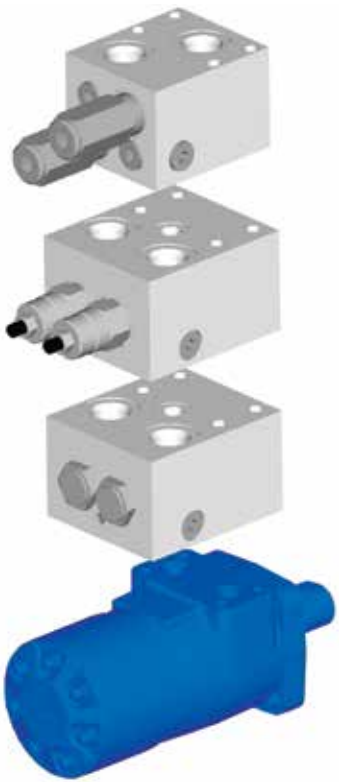
Features:

- Aluminum manifolds anodized black
- Pre-set cartridges to your specifications
- 100% production tested assembly
- Manifolds and motors can be supplied as a pre-assembled package
- Dual counterbalance valve (with integral shuttle valve), dual pilot operated check valve and dual cross port relief valve packages are available

Benefits:

- Minimize use of hoses, tubing and fittings for faster assembly
- Minimize leak points
- Compact solutions

Special T-brake release manifolds are available. Please contact your local Eaton representative for more information on manifold solutions for motors.



ATEX Certification

H, S, T, 2000, 4000 compact, Delta, 4000, 6000 and 10,000 series motors

What is ATEX Certification?

ATEX certification is a certification that allows our motors to be used in certain types of explosive environments. It derives its name from the French title of the European Union ATEX directive - ATmosphèresEXplosives.

Benefits

ATEX certification on Char-Lynn motors allows use in certain types of explosive environments. Ordering an ATEX certified motor, you receive:

- An ATEX certified motor that has the ATEX marking on the label
- An operating instructions manual
- EC Declaration of Conformity (ATEX Certificate)

Applications

- Oil and gas drills and conveyors
- Specialty mining vehicles

How to configure an ATEX certified Motor in the model code?

To specify an ATEX certified motor, you will need to select the 'EX' option from the Special features (Hardware) section of the model code for the above motors.

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Performance data

Product line	Viscosity minimum	Recommended Viscosity range	ISO Cleanliness requirements
H Series	100 SUS	100-200 SUS	20/18/13
	20 cst	20-43 cst	
J, S, T Series	70 SUS	100-200 SUS	20/18/13
	13 cst	20-43 cst	
Disc Valve Series	70 SUS	100-200 SUS	20/18/13
	13 cst	20-43 cst	

Introduction:

Hydraulic fluids are one of the vital components of hydraulic system. Proper selection of oil assures satisfactory life and operation of system components. The purpose of this section is to provide readers with the knowledge required to select the appropriate fluids for use in systems that employ Eaton hydraulic components.

Viscosity and temperature:

Viscosity is the measure of a fluid's resistance to flow. The most important characteristic to consider when choosing a fluid to be used in a hydraulic system is viscosity. The fluid must be thin enough to flow easily but thick enough to maintain adequate lubricating film between component and to maintain proper sealing at the operating temperatures of the hydraulic system. For viscosity requirements see table. Viscosity of any fluid is relative to temperature, as the fluid warms the viscosity decreases and vice versa. When choosing a fluid it is important to consider the start-up and operating temperatures of the hydraulic system. A high Viscosity Index (VI) fluid shows relatively small change of viscosity with temperature. Lubricants used for hydraulic applications may contain viscosity index improvers. They refer to these fluids as viscosity index improved, or multi-viscosity fluids. The viscosity of these fluids may drop down in use due to the shearing of VI improvers used in the formulations. Anti-wear hydraulic oils containing polymeric thickeners viscosity index improvers are generally used for wide band operating temperature applications. These fluids experience temporary and permanent viscosity loss during use in hydraulic system. Check the extent of viscosity loss (shear stability) to avoid hydraulic service below the recommended minimum viscosity. Oil with good shear stability is recommended for wide band temperature applications. Multi-grade engine oils, ATFs, UTTOs, etc., also contain VIIs, and viscosity loss will be encountered during use.

Cleanliness:

Cleanliness of the fluid in a hydraulic system is extremely important. More than 70% of all failures are caused by contamination. Eaton recommends that the fluids used in its hydraulic components be maintained per ISO 4406. Cleanliness level requirements varies with the hydraulic components. The cleanliness of a hydraulic system is dictated by the cleanliness requirement of the most stringent component in the system. Cleanliness requirements for specific products are given in the table. OEMs and distributors who use Eaton hydraulic components in their products should provide for these requirements in their design. A reputable filter supplier can supply filter information.

Fluid maintenance:

The condition of a fluid has a direct effect on the performance and reliability of the system. Maintaining proper fluid viscosity, cleanliness level, water content, and additive level is essential for excellent hydraulic system performance. Routine fluid condition monitoring is recommended.

Fluid selection:

Premium grade anti-wear (AW) petroleum based hydraulic fluids will provide the best performance in Eaton hydraulic components. Lubricants that pass Eaton Vickers® 35VQ25A high-pressure vane pump test (Eaton ATS-373 test procedure, ASTM Specification D-6973) are considered good quality, anti-wear hydraulic fluids. Automotive crankcase oils with American Petroleum Institute (API) letter designation SE, SF, SG, SH, or higher per SAE J183 classes of oils are recommended for applications using Eaton GG motors. Automotive crankcase oils generally exhibit less shear stability compared to industrial anti-wear hydraulic fluids, which can result in higher loss of viscosity during service life. Other mineral oil-based lubricants commonly used in hydraulic systems are automatic transmission fluids (ATFs) and universal tractor transmission oils (UTTOs). Synthetic hydrocarbon base stocks, such as polyalphaolefins (PAOs), are also used to formulate hydraulic fluids, engine oils, ATFs and UTTOs. Alternative fluids are recommended when specific properties, such as fire resistance, biodegradability, etc., are necessary for the application. Keep in mind that alternative fluids may differ from AW petroleum fluids in properties such as pressure viscosity coefficient, specific gravity, lubricity, etc. Hence, Geroler/Gerotor motors may need to be derated, some can be operated under full ratings, and other are not rated.

Additional notes:

When choosing a hydraulic fluid, all the components in the system must be considered. Viscosity limitations has to meet the most stringent components requirements. For any system where the fluid is non petroleum oil, set the target one ISO range code cleaner for each particle size, than that of petroleum fluids. Keep adequate fluid level in the reservoir. Take fluid level reading when the system is cold. For more details, refer to Eaton Fluid Recommendation Document # 03-401-2010 Contact your Eaton representative if you have specific questions about the fluid requirements of Eaton hydraulic components.

Spool Valve Hydraulic Motors

Spool Valve: J, H, S, T Series

Spool Valve motors incorporate the proven orbit motor principle to provide high torque at low speeds.

Spool valve motors

Highlights

B-1

Product description

Char-Lynn spool valve motors distribute pressurized fluid into and out of the orbit gear set (Gerotor or Geroler) via valve slots integrated into the output shaft. Spool valve motors incorporate both valving and hydrodynamic journal bearings into a common shaft design. The valve section (spool valve) can be optimized for low flow, low speed needs, using a low speed spool option to enhance smooth running performance. 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 torques from any spool valve motor series.

Features:

- Proven orbit motor principle
- Hydrodynamic journal bearings
- Constant clearance Geroler
- Three-zone pressure design
- Reduced drive running angle
- High pressure seals
- Modular design

Benefits:

- Compact, powerful package
- Infinite bearing life (at rated loads)
- High efficiency
- Increases shaft seal & bearing life
- Smooth operation, increases drive life
- Reduces leakage
- Design flexibility
- Economically tailored solutions

Applications:

- Harvesters
- Augers
- Spreaders
- Machine tools
- Conveyors
- Winches
- Turf care equipment
- Food processing
- Aerial work platforms
- Anywhere a compact drive with high output torque is needed

Design features

Spool valve technology is typically used where compact, economical solutions are most needed. Spool valve motors use a spool valve to precisely time and control flow through the orbit gear set (Gerotor or Geroler). Inlet flow is directed into and out of the orbit set via slots in the spool and passages through the motor housing. The result is a very cost effective compact package suited to many application requirements. The three primary components in the motor are the orbit star, drive and output shaft. H, S and T Series incorporate the spool valve and hydrodynamic bearings in the motor shaft. Due to its compact size and high speed capability, the J Series is unique and utilizes a separate dedicated spool and spool valve drive. All motors utilize Eaton's constant-clearance Geroler technology except the H Series, which continues to use the time-proven H motor gerotor set. These motors all use a three-zone pressure design consisting of three unique pressure areas: 1) inlet, 2) return, 3) case. This provides the capability to limit motor case pressure and allows the use of several case pressure options for extended shaft seal and thrust bearing life.

Below is a quick-guide to help select the proper motor for your application:

Motor quick-guide (based on maximum continuous ratings)

Series	Output torque Nm [lb-in]	Pressure bar [psi]	Flow lpm [gpm]	Side Load kg [lbs]
J Series	62	140	21	196
	[550]	[2030]	[5.5]	[430]
H Series	407	141	61	635
	[3607]	[2050]	[16]	[1400]
S Series	465	135	55	635
	[4112]	[2000]	[15]	[1400]
T Series	441	177	61	635
	[3905]	[2565]	[16]	[1400]

* The above are provided as guidelines only. Actual ratings vary depending on final motor configuration

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B-1

Description:

Char-Lynn J Series motors provide a lot of power from a very small package. Up to 5 kW [6 1/2 HP] of power. These motors are 61 mm [2.4 in] in diameter and 104 to 130 mm [4.1 to 5.1 in] in length. The J Series motor shaft and seal allows high case pressure up to 76 bar [1100 PSI] return line pressure without case drain line. When a case drain line is used a 220 bar [3190 PSI] peak pressure is allowed in the return line.

Specifications

Geroler Element	5 Displacements
Flow l/min [GPM]	21 [5.5] Continuous***
	25 [6.5] Intermittent**
Speed	Up to 1992 RPM Cont.
	Up to 2458 RPM Inter.
Pressure bar [PSI]	140 [2030] Cont.***
	165 [2400] Inter.**
Torque Nm [lb-in]	62 [549] Cont.***
	84 [743] Inter.**

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

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

Features:

- Constant clearance Geroler set
- Integrated check valves
- Self-lubricating shaft bushing
- High-strength rigid components
- Increased valve seal lands
- High pressure seals
- Variety of displacements, shafts, mounts and special options

Benefits:

- High efficiency
- Extended leak-free performance
- Powerful compact package
- Design flexibility

Applications:

- Agricultural augers, harvesters, seeders
- Car wash tire spray wands and brushes
- Marine bow thrusters
- Food processing
- Railroad maintenance equipment
- Machine tools
- Conveyors
- Snow blower chute rotator
- Industrial sweepers and floor polishers
- Saw mill works
- Turf equipment reel drives
- Paint stripper


Plastic Injection


Metal Forming

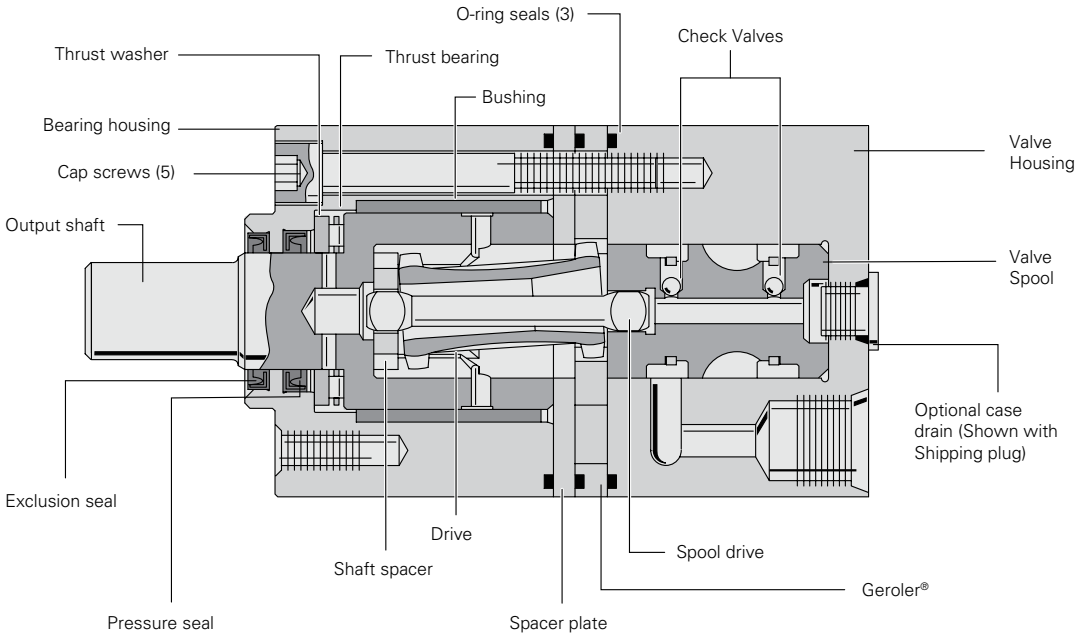

Food Processing


Agriculture

J Series (129-)

Specifications

B-1



Specification data — J motors

Displ. cm³/r [in³/r]		8.2 [.50]	12.9 [.79]	19.8 [1.21]	31.6 [1.93]	50.0 [3.00]
Max. Speed (RPM) @continuous flow		1992	1575	1043	650	393
Flow l/min [GPM]	Continuous	17 [4.5]	21 [5.5]	21 [5.5]	21 [5.5]	21 [5.5]
	Intermittent	21 [5.5]	25 [6.5]	25 [6.5]	25 [6.5]	25 [6.5]
Torque Nm [lb-in]	Continuous	16 [141]	25 [225]	38 [333]	50 [446]	62 [549]
	Intermittent	19 [164]	30 [263]	46 [405]	62 [546]	84 [743]
	Peak	22 [193]	36 [321]	48 [425]	83 [733]	86 [765]
Pressure Δ bar [Δ PSI]	Continuous	140 [2030]	140 [2030]	140 [2030]	121 [1750]	97 [1400]
	Intermittent	165 [2400]	165 [2400]	165 [2400]	150 [2175]	140 [2030]
	Peak	220 [3190]	220 [3190]	220 [3190]	190 [2756]	150 [2175]
Weight kg [lbs]		2 [4.4]	2.1 [4.6]	2.2 [4.8]	2.3 [5.0]	2.4 [5.4]

Maximum case pressure: See case pressure seal limitation graph.

A simultaneous maximum torque and maximum speed NOT recommended.

Note: To assure best motor life, run motor in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

Maximum Inlet Pressure
* Maximum pressure at motor inlet port is 220 Bar [3190 PSI] without regard to Δ bar [Δ PSI] and/ or back pressure ratings or combination thereof.

Δ Pressure:
The true Δ bar [Δ PSI] difference between inlet port and outlet port.

See individual shafts for maximum torque recommendation. Splined shafts are recommended for those applications subject to frequent reversals.

Continuous rating:
Motor may be run continuously at these ratings

Intermittent operation:
10% of every minute

*See shaft torque ratings for limitations.

Peak operation:
1% of every minute

Recommended fluids:
Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 13 cSt [70 SUS] at operating temperature.

Recommended system operating temp:
-34°C to 82°C

[-30°F to 180°F]

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

Thermal shock warning:

Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:

Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous

Intermittent

8.2 cm³/r [.50 in³/r]

Δ Pressure bar [PSI]

Flow LPM [GPM]	[200]	[400]	[500]	[600]	[700]	[800]	[1000]	[1400]	[1500]	[2000]	[2030] Max. Continuous	[2400] Max. Intermittent
	14	28	34	41	48	55	69	97	103	138	140	166
[1]	[11]	[25]	[33]	[40]	[47]	[55]	[69]	[96]	[102]	[130]	[132]	[146]
	1	3	4	5	5	6	8	11	12	15	15	16
4	456	444	437	429	422	412	394	347	332	250	239	170
[2]	[9]	[24]	[31]	[38]	[46]	[53]	[68]	[97]	[105]	[139]	[141]	[163]
	1	3	4	4	5	6	8	11	12	16	16	18
8	897	886	877	867	860	847	823	768	749	657	647	557
[3]	[6]	[20]	[28]	[35]	[44]	[51]	[65]	[94]	[102]	[137]	[139]	[164]
	1	2	3	4	5	6	7	11	12	15	16	19
11	1349	1331	1318	1309	1296	1285	1261	1198	1176	1070	1060	959
[4.25]		[16]	[23]	[30]	[36]	[44]	[60]	[90]	[97]	[133]	[135]	[160]
		2	3	3	4	5	7	10	11	15	15	18
16		1902	1885	1873	1858	1846	1817	1750	1721	1599	1585	1475
[4.5] Max. Continuous		[16]	[23]	[29]	[36]	[43]	[59]	[89]	[96]	[131]	[134]	[160]
		2	3	3	4	5	7	10	11	15	15	18
17		1992	1979	1964	1947	1929	1900	1833	1808	1684	1673	1553
[5.5] Max. Intermittent		[12]	[18]	[26]	[33]	[40]	[54]	[83]	[92]	[124]	[129]	[154]
		1	2	3	4	5	6	9	10	14	15	17
21		2458	2437	2420	2405	2387	2353	2272	2255	2134	2115	1994

12.9 cm³/r [0.79 in³/r]

Δ Pressure bar [PSI]

Flow LPM [GPM]	[200]	[400]	[500]	[600]	[700]	[800]	[1000]	[1400]	[1450]	[1500]	[2000]	2030 Max. Continuous	[2400] Max. Intermittent
	14	28	34	41	48	55	69	97	100	103	138	140	166
[1]	[19]	[43]	[54]	[65]	[76]	[88]	[109]	[154]	[159]	[164]	[214]	[217]	[250]
	2	5	6	7	9	10	12	17	18	19	24	25	28
4	290	285	281	277	273	268	260	237	234	230	194	189	151
[2]	[16]	[39]	[51]	[63]	[74]	[86]	[109]	[155]	[160]	[165]	[221]	[225]	[263]
	2	4	6	7	8	10	12	18	18	19	25	25	30
8	573	566	561	555	549	544	534	501	496	490	442	437	396
[3]	[11]	[35]	[47]	[58]	[70]	[82]	[105]	[152]	[157]	[163]	[219]	[223]	[263]
	1	4	5	7	8	9	12	17	18	18	25	25	30
11	859	849	843	838	832	825	810	777	771	763	708	701	652
[4]	[6]	[30]	[41]	[53]	[64]	[76]	[99]	[146]	[152]	[157]	[214]	[217]	[260]
	1	3	5	6	7	9	11	16	17	18	24	25	29
15	1153	1140	1135	1129	1124	1117	1101	1060	1051	1044	982	975	924
[5.5] Max. Continuous		[19]	[30]	[42]	[54]	[65]	[89]	[136]	[142]	[148]	[205]	[209]	[251]
		2	3	5	6	7	10	15	16	17	23	24	28
21		1575	1566	1556	1547	1539	1521	1473	1466	1457	1396	1387	1330
[6.5] Max. Intermittent		[11]	[23]	[35]	[46]	[56]	[81]	[130]	[135]	[140]	[198]	[202]	[243]
		1	3	4	5	6	9	15	15	16	22	23	27
25		1859	185	1842	1831	1820	1804	1755	1743	1734	1670	1663	1599

[42] Torque [lb-in]
5 Nm
1556 Speed RPM

J Series (129-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

19.8 cm³/r [1.21 in³/r]
Δ Pressure bar [PSI]

Flow LPM [GPM]		[200]	[400]	[500]	[600]	[700]	[800]	[1000]	[1400]	[1450]	[1500]	[2000]	[2030] Max. Continuous	[2400] Max. Intermittent
		14	28	34	41	48	55	69	97	100	103	138	140	166
	[1]	[32]	[67]	[85]	[102]	[119]	[136]	[170]	[236]	[244]	[253]	[321]	[325]	[374]
		4	8	10	12	13	15	19	27	28	29	36	37	42
4		189	187	186	185	183	182	179	172	170	169	141	138	114
	[2]	[30]	[65]	[83]	[101]	[119]	[136]	[172]	[223]	[248]	[257]	[328]	[333]	[388]
		3	7	9	11	13	15	19	25	28	29	37	38	44
8		379	375	373	370	368	366	361	351	349	347	312	309	285
	[3]	[21]	[57]	[75]	[93]	[111]	[128]	[163]	[231]	[240]	[248]	[325]	[330]	[405]
		2	6	8	11	13	14	18	26	27	28	37	37	46
11		569	565	563	560	558	556	551	529	526	523	487	484	459
	[4]	[12]	[47]	[65]	[83]	[101]	[119]	[154]	[221]	[230]	[239]	[316]	[320]	[382]
		1	5	7	9	11	13	17	25	26	27	36	36	43
15		761	758	754	751	749	746	741	717	711	707	660	656	628
Max. Continuous	[5.5]		[31]	[49]	[67]	[84]	[101]	[137]	[202]	[211]	[218]	[295]	[299]	[365]
			4	6	8	9	11	15	23	24	25	33	34	41
21			1043	1040	1035	1033	1028	1021	997	993	990	938	934	899
Max. Intermittent	[6.5]		[21]	[38]	[56]	[74]	[91]	[126]	[189]	[196]	[206]	[278]	[283]	[347]
			2	4	6	8	10	14	21	22	23	31	32	39
25			1226	1222	1219	1215	1211	1204	1179	1174	1169	1121	1117	1079

31.6 cm³/r [1.93 in³/r]
Δ Pressure bar [PSI]

Flow LPM [GPM]		[200]	[400]	[500]	[600]	[700]	[800]	[1000]	[1450]	[1450]	[1500]	[1750] Max. Continuous	[2175] Max. Intermittent
		14	28	34	41	48	55	69	97	100	103	121	150
	[1]	[51]	[106]	[133]	[160]	[187]	[213]	[265]	[362]	[372]	[383]	[439]	
		6	12	15	18	21	24	30	41	42	43	50	
4		118	116	115	113	112	111	107	91	85	81	70	
	[2]	[46]	[103]	[132]	[159]	[187]	[214]	[269]	[362]	[374]	[387]	[446]	[546]
		5	12	15	18	21	24	30	41	42	44	50	62
8		236	234	232	230	228	225	221	187	179	175	165	145
	[3]	[36]	[94]	[122]	[149]	[177]	[205]	[259]	[351]	[364]	[377]	[440]	[542]
		4	11	14	17	20	23	29	40	41	43	50	61
11		355	352	349	347	345	342	336	296	292	287	273	245
	[4]	[24]	[79]	[107]	[135]	[162]	[190]	[246]	[337]	[349]	[362]	[425]	[528]
		3	9	12	15	18	21	28	38	39	41	48	60
15		474	472	469	466	462	460	452	404	397	393	373	346
Max. Continuous	[5.5]		[55]	[83]	[111]	[139]	[167]	[221]	[307]	[320]	[334]	[400]	[505]
			6	9	13	16	19	25	35	36	38	45	57
21			650	647	645	640	636	629	584	580	575	550	513
Max. Intermittent	[6.5]		[35]	[64]	[93]	[121]	[150]	[204]	[279]	[294]	[308]	[378]	[485]
			4	7	11	14	17	23	32	33	35	43	55
25			767	764	760	755	751	742	712	707	701	675	637

B-1

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

50.0 cm³/r [3.00 in³/r]
Δ Pressure bar [PSI]

Flow LPM [GPM]	[200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1100] 76	[1200] 83	[1300] 90	[1400] 97	Max. Continuous [2030] 140	Max. Intermittent
[1] 4	[82] 9 75	[167] 19 72	[211] 24 72										
[2] 8	[70] 8 149	[156] 18 147	[201] 23 145	[243] 28 144	[286] 32 143	[327] 37 142							
[3] 11	[53] 6 221	[140] 16 220	[184] 21 218	[227] 26 217	[271] 31 215	[311] 35 213	[396] 45 209	[441] 50 205	[484] 55 201	[521] 59 200	[549] 62 191		
[4] 15	[30] 3 296	[120] 14 292	[162] 18 289	[204] 23 286	[250] 28 284	[292] 33 282	[374] 42 273	[419] 47 270	[460] 52 265	[501] 57 263	[541] 61 259	[743] 84 213	
[5.5] 21		[81] 9 393	[127] 14 392	[170] 19 389	[214] 24 387	[254] 29 383	[339] 38 377	[379] 43 372	[422] 48 369	[463] 52 364	[506] 57 358	[702] 79 302	
Max. Continuous													
[6.5] 25		[47] 5 465	[90] 10 462	[133] 15 460	[176] 20 458	[219] 25 455	[307] 35 448	[345] 39 445	[385] 43 440	[429] 48 435	[467] 53 430	[685] 77 364	
Max. Intermittent													

[81] Torque [lb-in]
9 Nm
393 Speed RPM

Dimensions

Ports

Code: A 9/16-18 UNF-2B SAE O-ring ports, End ported

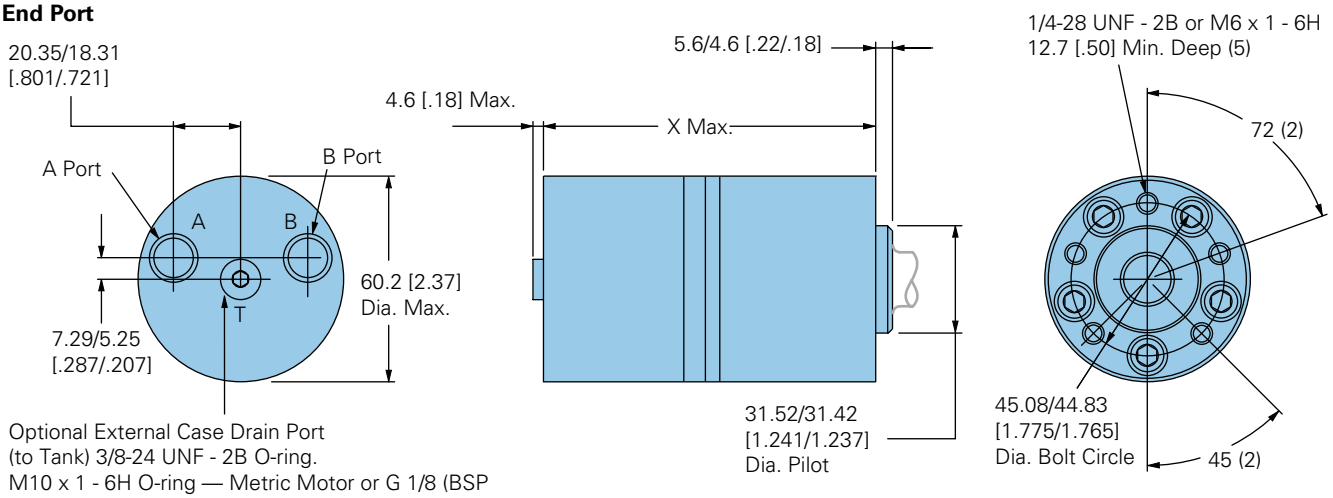
Code: C M14 x 1.5-6H O-ring, End ported

Standard rotation viewed from shaft end

Port A Pressurized — CW

Port B Pressurized — CCW

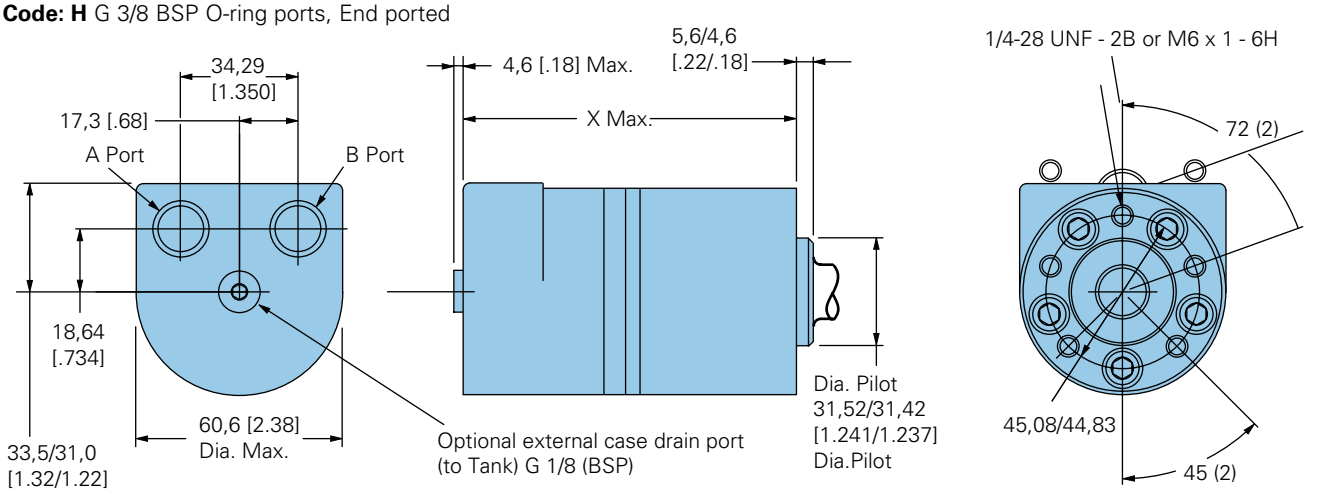
End Port



End port dimensions

Displacement cm³/r [in³/r]	X mm [inch]
8.2 [.50]	103.9 [4.09]
12.9 [.79]	106.9 [4.21]
19.8 [1.21]	112.5 [4.38]
31.6 [1.93]	118.9 [4.68]
50.0 [3.00]	130.3 [5.13]

Code: H G 3/8 BSP O-ring ports, End ported



End port dimensions

Displacement cm³/r [in³/r]	X mm [inch]
8.2 [.50]	103.9 [4.09]
12.9 [.79]	106.9 [4.21]
19.8 [1.21]	112.5 [4.38]
31.6 [1.93]	118.9 [4.68]
50.0 [3.00]	130.0 [5.12]
160.5 [6.32]	132.3 [5.21]

B-1

Ports

Code: D 9/16-18 UNF-2B SAE O-ring ports, Side ported

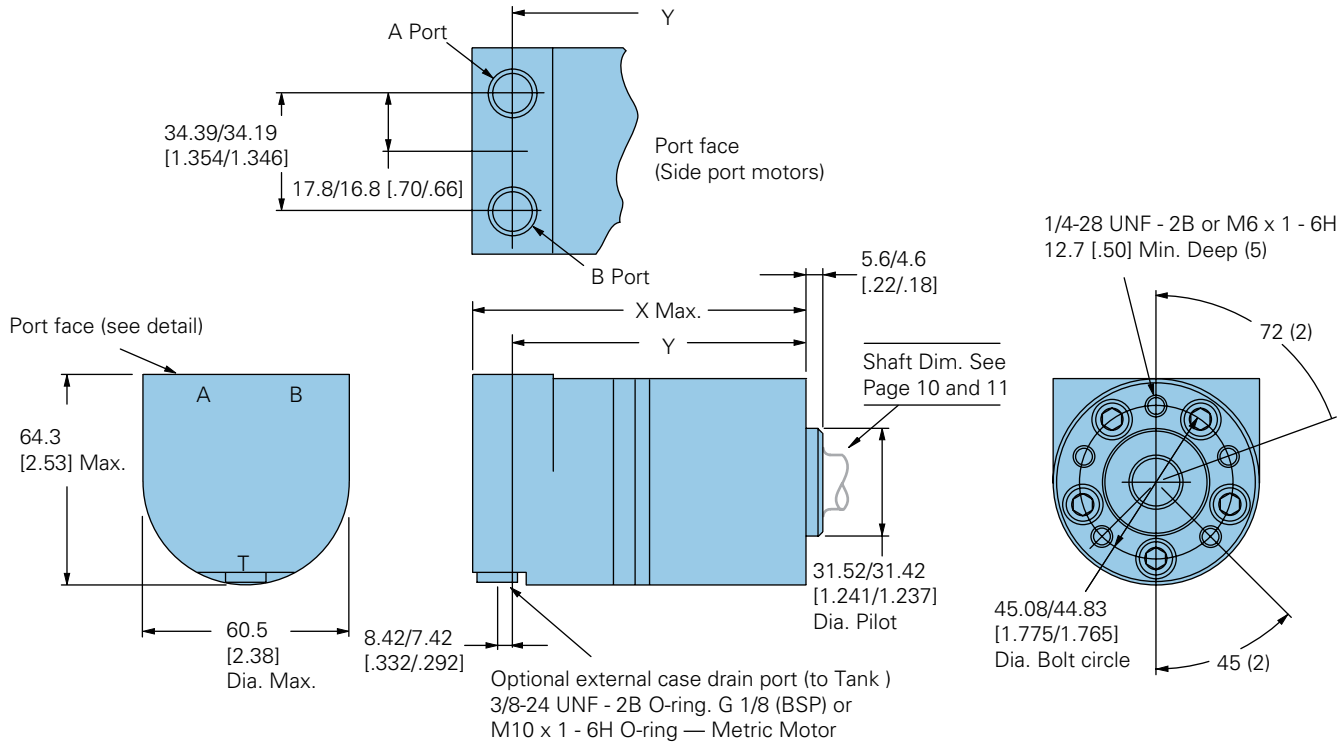
Code: E G 3/8 BSP O-ring ports, Side ported

Standard rotation viewed from shaft end

Port A Pressurized — CW

Port B Pressurized — CCW

Side port



Side port motors

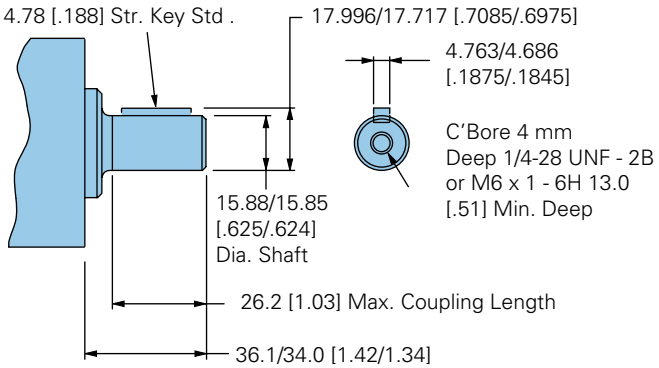
Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
8.2 [.50]	103.9 [4.09]	89.4/ 87.4 [3.52/3.44]
12.9 [.79]	106.9 [4.21]	92.5/ 90.4 [3.64/3.56]
19.8 [1.21]	112.5 [4.38]	96.8/ 94.7 [3.81/3.73]
31.6 [1.93]	118.9 [4.68]	104.4/102.4 [4.11/4.03]
50.0 [3.00]	130.0 [5.12]	115.7/113.9 [4.56/4.48]

Dimensions

Shafts

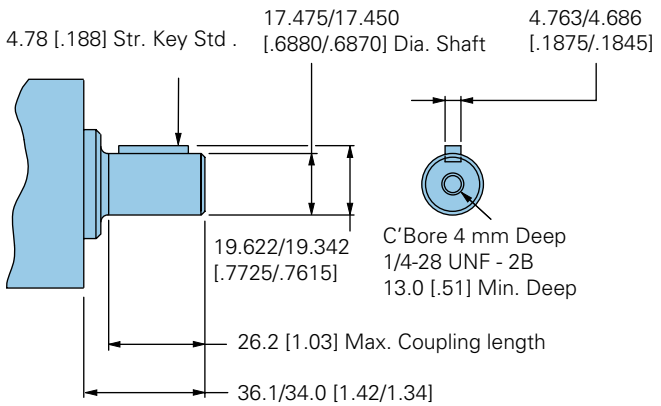
B-1

5/8 inch straight keyed



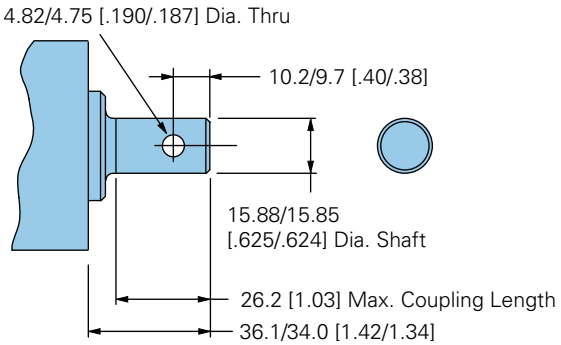
Max. Torque continuous Duty 39 Nm [350 lb-in]

11/16 inch straight keyed



Max. Torque continuous Duty 52 Nm [465 lb-in]

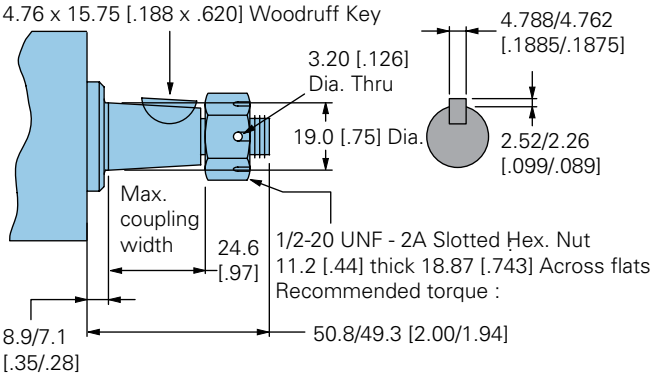
5/8 Inch straight keyed w/crosshole



Max. Torque Continuous
Duty 39 Nm [350 lb-in]

3/4 inch tapered

(Tapered shaft end per SAE J744 except as specified - 1.5 : 12 Ratio)

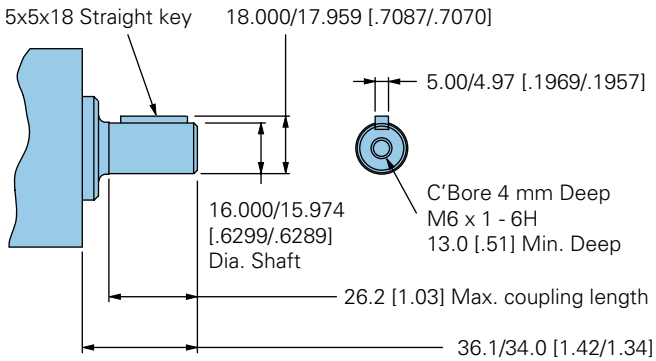


Max. Torque continuous
Duty 68 Nm [600 lb-in]

B-1

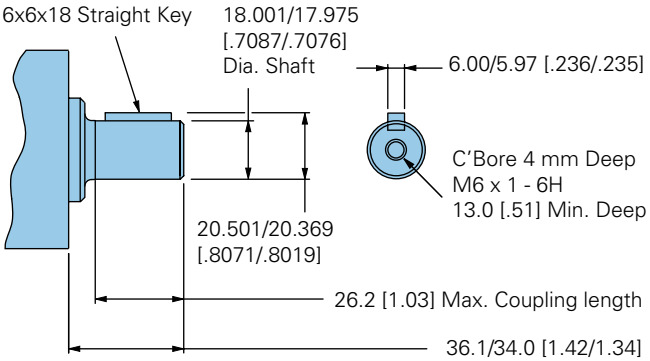
Shafts and flange kit

16 mm Straight keyed



Max. Torque continuous duty 39 Nm [350 lb-in]

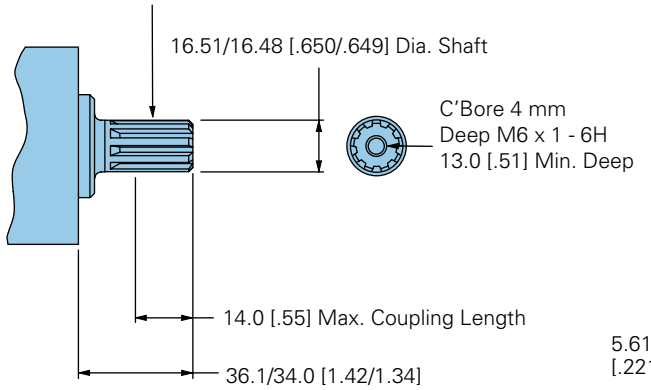
18 mm Straight keyed



Max. Torque continuous duty 58 Nm [510 lb-in]

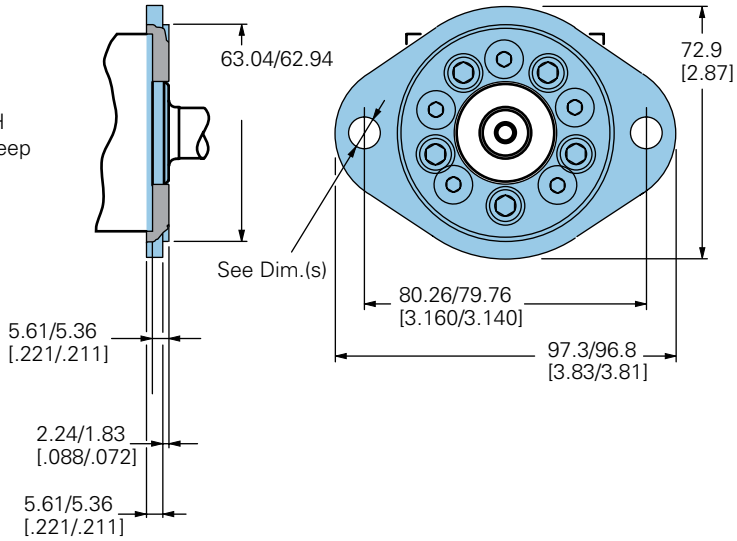
Involute 9T splined — metric

Involute splined shaft external B17x14 DIN 5482



Max. Torque Continuous Duty 44 Nm [390 lb-in]

2 Bolt flange kits (2)



Note: Kit 60552 for 3/8 Dia. Mounting Bolts (10.49/10.24 [.413/.403] Dia. Thru) 1/4-28 UNF screws for attaching flange to motor (5)
Kit 60553 for M8 Dia. Mounting Bolts (9.12/8.86 [.359/.349] Dia. Thru) M6 x 1 -6H screws for attaching flange to motor (5)

J Series (129-)

Product numbers

B-1

Use digit prefix —

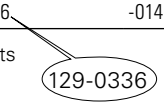
129- plus four digit number from charts for complete product number— Example 129-0479. Orders will not be accepted without three digit prefix.

Orders will not be accepted without three digit prefix.

End port

Mounting	Shaft	Port size	Displ. cm³/ r [in³/ r] / Product Number				
			8.2 [.50]	12.9 [.79]	19.8 [1.21]	31.6 [1.93]	50.0 [3.00]
1/4-28 UNF 2B	5/8 inch Straight		129-0291	-0292	-0293	-0294	-0458
	11/16 inch Straight	9/16 -18 UNF	129-0295	-0296	-0297	-0298	-0459
	Splined — Metric	2B O-Ring (2)	129-0009	-0010	–	-0302	-0460
	3/4 inch Tapered		–				
M6 x 1 - 6H	16 mm Straight	M14 x 1,5 -	129-0041	-0042	-0043	-0044	–
	18 mm Straight	6H O-Ring (2)	129-0045	-0046	-0047	-0048	–
	Splined — Metric		129-0045	-0050	-0313	-0052	–
	16 mm Straight		129-0315	-0316	-0317	-0318	-0464
	18 mm Straight	G 1/4 (BSP) (2)	129-0137	-0320	-0321	-0322	–
	Splined — Metric		129-0323	-0324	-0325	-0326	–
	16 mm Straight		129-0327	-0328	-0329	-0330	-0467
	18 mm Straight	G 3/8 (BSP) (2)*	129-0331	–	-0159 or -0649	-0160	–
	Splined — Metric		129-0141	-0336	-0143	–	-0469

Note: *The same casting used for side ports is required for G 3/8 (BSP) end ports



Side port

Mounting	Shaft	Port size	Displ. cm³/ r [in³/ r] / Product Number				
			8.2 [.50]	12.9 [.79]	19.8 [1.21]	31.6 [1.93]	50.0 [3.00]
1/4-28 UNF 2B	5/8 inch Straight		129-0339	-0340	-0341	-0342	-0470
	11/16 inch Straight	9/16 -18 UNF	129-0343	-0344	-0345	-0346	-0471
	Splined — Metric	2B O-Ring (2)	129-0347	-0348	-0031	-0350	-0472
	3/4 inch Tapered		129-0481				
M6 x 1 - 6H	16 mm Straight	M14 x 1,5 -	129-0053	-0054	-0055	-0056	-0650
	18 mm Straight	6H O-Ring (2)	–	-0058	-0059	-0060	–
	Splined — Metric		–	–	-0063	–	–
	16 mm Straight		129-0363	-0364	-0365	-0366	–
	18 mm Straight	G 1/4 (BSP) (2)					
	Splined — Metric		–	–	–	-0370	-0477
	16 mm Straight		129-0371	-0372	-0373	-0374	-0403
	18 mm Straight	G 3/8 (BSP) (2)	129-0375	-0376	-0377	-0378	-0478
	Splined — Metric		129-0379	-0034	-0381	-0036	-0479

Two bolt mounting flange kit (for 3/8 inch mounting bolts) — kit number 60552 (includes 5 screws — 1/4 -28 UNF-2B)

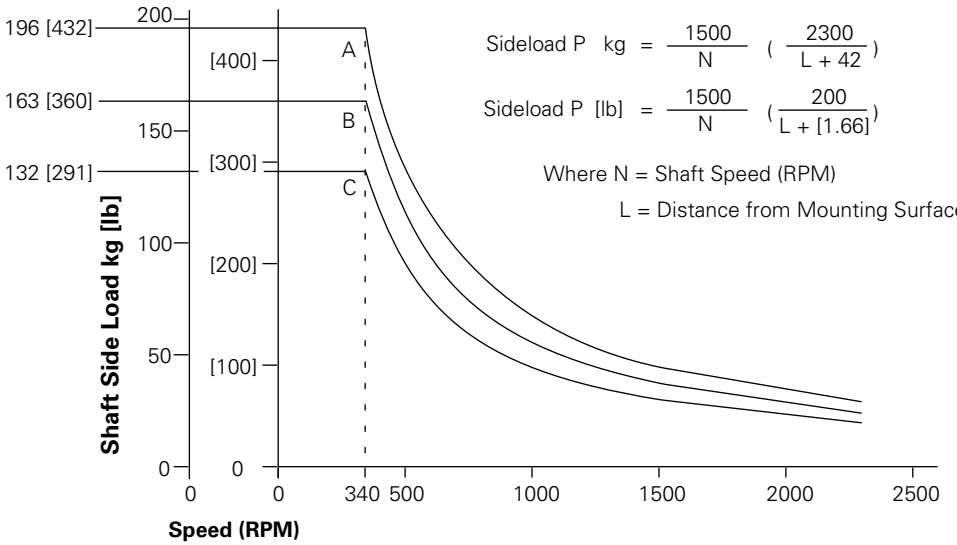
Two bolt mounting flange kit (for M8 mounting bolts) — kit number 60553 (includes 5 screws — M6 x 1-6H)

The hydrodynamic bearing has infinite life when shaft load ratings are not exceeded. Hence, the shaft side load capacity is more than adequate to handle most externally applied loads (such as belts, chains, etc.), providing the motor to shaft size is applied within its torque rating.

Allowable side load chart, shaft load location drawing (right) and load curves (below) are based on the side or radial loads being applied to shaft at locations A, B, and C, to determine the shaft side load capacity at locations other than those shown use the formula (shown below). For more information about shaft side loads on Char-Lynn motors contact your Eaton representative.

Allowable side load — kg [lb]

RPM	A	B	C
2300	29 [64]	24 [53]	20 [43]
1500	44 [98]	37 [82]	30 [66]
1250	54 [118]	44 [98]	36 [79]
1000	67 [147]	55 [122]	45 [99]
750	89 [196]	74 [163]	60 [132]
600	111 [245]	93 [204]	75 [165]
500	133 [294]	111 [245]	90 [198]
400	167 [368]	139 [306]	112 [248]
340	196 [432]	163 [360]	132 [291]

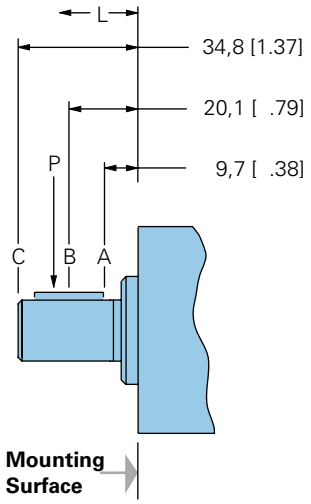


$$\text{Sideload P kg} = \frac{1500}{N}\left(\frac{2300}{L+42}\right)$$

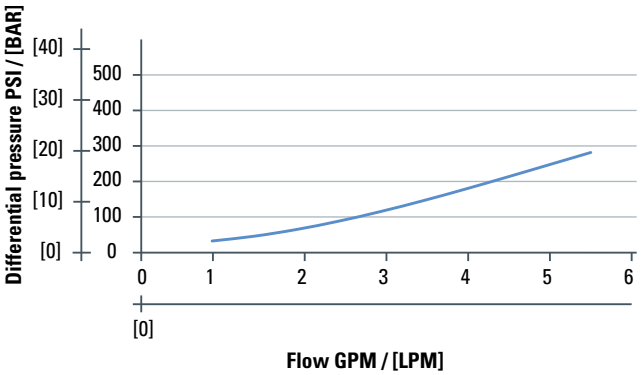
$$\text{Sideload P [lb]} = \frac{1500}{N}\left(\frac{200}{L+[1.66]}\right)$$

Where N = Shaft Speed (RPM)

L = Distance from Mounting Surface



J Series NLPD - no load pressure drop



B-1

The J Series offers check valves in the motor as a standard feature. This addition reduces the case pressure in the motor to the return pressure of the system when the case drain is not used. For return pressures higher than the rated pressures (see chart) the external case drain can be connected. If the case drain line is needed, connect drain line to assure that the motor will always remain full of fluid.

Case drain advantage

In addition to providing lower case pressures for motors connected in series, there are advantages for adding an external case drain line to motors with normal case pressures as well. These advantages are:

Contamination Control — flushing the motor case.

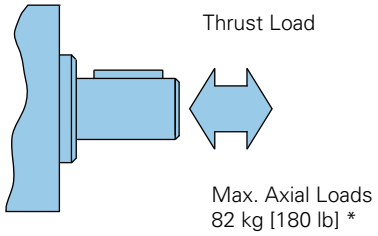
Motor Cooler — exiting oil draws motor heat away.

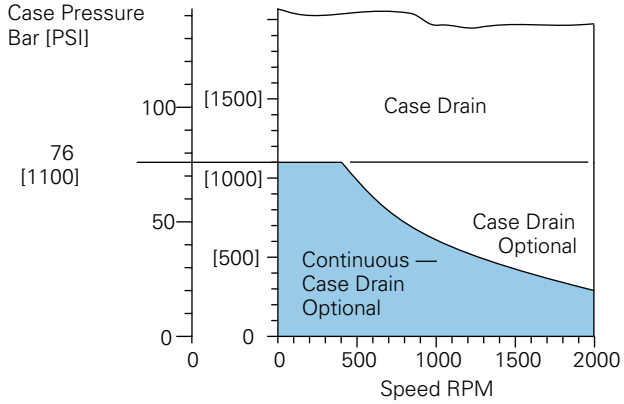
Extend Motor Seal Life — maintain low case pressure with a preset restriction installed in the case drain line

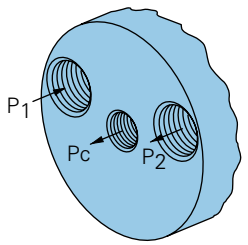
Example: A 14 Bar case pressure will cause a load of 40 kg, so the allowable thrust load will be 82 kg plus 40 = 120 kg kg pushing inward on shaft. Tension load is 82 kg under all case pressure conditions.

Example: A 200 PSI case pressure will cause a load of 88 lbs, so the allowable thrust load will be 180 lbs plus 88 = 268 lbs pushing inward on shaft. Tension load is 180 lb under all case pressure conditions

Note: J Series motors can be connected in parallel or in series. Case pressure will add to the allowable compressive thrust load. Case pressure will push outward on the shaft at 20 kg/7 Bar [44 lb/100 PSI].







Case Pressure Seal Limitation

B-1

The following 16-digit coding system has been developed to identify all of the configuration options for the J motor. Use this model code to specify a motor with the desired features. All 16-digits of the code must be present when ordering.

M	0 J	**	*	**	*	*	**	*	*	0	B
1	2 3	4 5	6	7 8	9	10	11 12	13	14	15	16

1 Product

M Motor

2 3 Series

0J J Series

4 5 Displacement cm³/r [in³/r]

05 8.2 [.50]
08 12.9 [.79]
12 19.8 [1.21]
19 31.6 [1.93]
30 50.0 [3.00]

6 Mounting type

A 5 Bolt: Dia. 31,47 [1.239] x 5,1 [.20] Pilot 1/4-28 UNF 2B Mounting Holes on 45 [1.77] Dia. Bolt Circle
B 5 Bolt: Dia. 31,47 [1.239] x 5,1 [.20] Pilot M6 x 1- 6H Mounting Holes on 45 [1.77] Dia. Bolt Circle
C 2 Bolt: Dia. 62,99 [2.480] x 2,0 [.08] Pilot 10,36[.408] Mounting Holes on 80,0 [3.150] Dia. Bolt Circle

7 8 Output shaft

01 5/8 inch Dia. straight with 4,72 [.186] square key and 1/4-28 UNF - 2B threaded hole
02 16 mm Dia. Straight with 5,00 [.197] square key with M6 x 1 - 6H threaded hole
04 11/16 inch Dia. straight with 4,72 [.186] square key and 1/4-28 UNF - 2B threaded hole
05 18 mm Dia. straight with 5,92 [.233] square key with M6 x 1 - 6H threaded hole
06 Involute splined 9T— metric 16,50 [.650] Dia. (B17 x 14 DIN 5482) M6 x 1 - 6H threaded hole
07 5/8 inch straight key w/ crosshole

9 Ports

A 9/16 -18 UNF - 2B O-Ring end ported
C M14 x 1,5 - 6H O-Ring port, end ported
D 9/16 -18 UNF - 2B O-Ring side ported
E G 3/8 (BSP) side ported
H G 3/8 (BSP) end ported

10 Case flow options

0 No case drain
1 3/8 -24 UNF - 2B O-Ring
2 G 1/8 (BSP)
3 M10 x 1 - 6H O-Ring

11 12 Special features (hardware)

00 None
08 Digital speed pickup (15 pulse), M12 connector (A=Power, B=Common, C=Signal)

13 Special features (assembly)

0 None
1 Reverse rotation

14 Paint/special packaging

0 No paint, individual box
A Low gloss black primer, individual box
B Environmental coated black
E Nickel plated motor (excluding shaft)

15 Eaton assigned code when applicable

0 None

16 Eaton assigned design code

B Two

See Eatonpowersource.com/ for more options and configurations.

H Series (101-)

Highlights

B-2

Description

Designed for medium duty applications, these motors use industry-proven spool valve technology combined with state-of-the-art gerotors. In addition, a wide variety of mounting flanges, shafts, Ports and valving options provide design flexibility. Direction of shaft rotation and shaft speed can be controlled easily and smoothly throughout the speed range of the motor, and equipment can be driven direct, eliminating costly mechanical components.

Specifications

Gerotor Element	13 Displacements
Flow l/min [GPM]	61[16]Continuous***
	76 [20] Intermittent**
Speed	Up to 1021 RPM
Pressure bar [PSI]	141[2050] Cont.***
	177[2565] Inter.**
Torque Nm [lb-in]	407 [3604] Cont.***
	520[4600] Inter.**

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

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

Features:

- Time-tested Char-Lynn drive set
- Three moving components (gerotor-star, drive, and shaft)
- Optimized drive running angle
- Three-zone pressure design (inlet, return and case)
- Variety of displacements, shafts and mounts
- Special options to meet customer needs

Benefits:

- High efficiency
- Powerful compact package
- Design flexibility
- Extended leak-free performance

Applications:

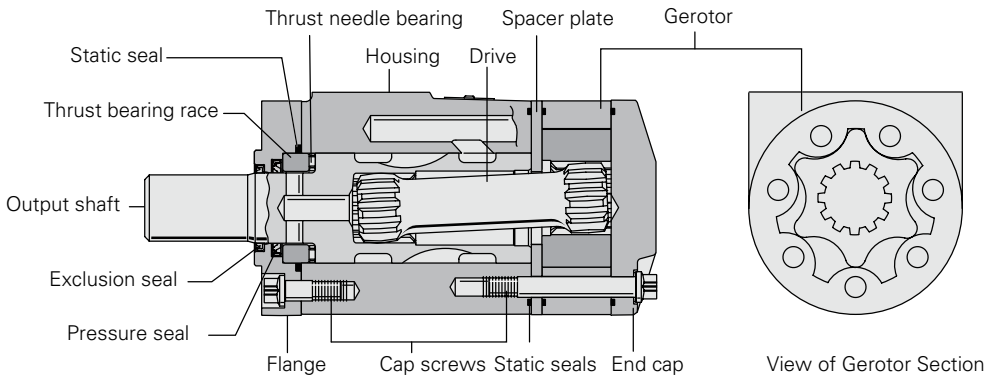
- Agricultural augers, harvesters, seeders
- Car wash brushes
- Food processing
- Railroad maintenance equipment
- Machine tools
- Conveyors
- Industrial sweepers and floor polishers
- Saw mill works
- Turf equipment
- Concrete and asphalt equipment
- Skid steer attachments

Conveyor

Combine

Sweeper

Salt and sand spreader



Specification data — H motors

Displ. cm³/r [in³/r]		36 [2.2]	46 [2.8]	59 [3.6]	74 [4.5]	97 [5.9]	120 [7.3]	146 [8.9]	159 [9.7]	185 [11.3]	231 [14.1]	293 [17.9]	370 [22.6]	739 [45.1]
Max. Speed (RPM) @ continuous flow		1021	969	993	796	620	501	411	377	324	259	205	162	79
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]
	Intermittent	38 [10]	53 [14]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	64 [566]	84 [745]	103 [913]	134 [1189]	176 [1559]	219 [1936]	268 [2370]	275 [2434]	339 [3004]	319 [2821]	351 [3110]	407 [3604]	389 [3440]
	Intermittent	81 [715]	106 [937]	130 [1153]	170 [1507]	222 [1962]	276 [2442]	353 [3126]	336 [2974]	426 [3773]	427 [3780]	466 [4121]	484 [4283]	520 [4600]
Min. Starting torque Nm [lb-in]	@ Cont. Pressure	53 [467]	67 [592]	86 [763]	108 [957]	142 [1253]	175 [1549]	213 [1881]	232 [2050]	271 [2396]	252 [2234]	282 [2500]	330 [2920]	316 [2800]
	@ Int. Pressure	68 [599]	87 [770]	111 [983]	139 [1229]	182 [1614]	225 [1988]	275 [2431]	299 [2645]	349 [3090]	347 [3075]	388 [3430]	408 [3610]	434 [3840]
Pressure Δ bar [Δ PSI]	Continuous	141 [2050]	141 [2050]	141 [2050]	141 [2050]	141 [2050]	141 [2050]	141 [2050]	141 [2050]	141 [2050]	106 [1535]	93 [1350]	86 [1250]	41 [600]
	Intermittent	177 [2565]	177 [2565]	177 [2565]	177 [2565]	177 [2565]	177 [2565]	177 [2565]	177 [2565]	177 [2565]	141 [2050]	124 [1800]	103 [1500]	55 [800]
End ported units only														
Δ Bar [Δ PSI]	Cont. Pressure	83 [1200]	83 [1200]	76 [1100]	76 [1100]	76 [1100]	69 [1000]	69 [1000]	69 [1000]	62 [900]	55 [800]	48 [700]	57 [825]	27 [396]
	Intermittent	117 [1700]	117 [1700]	110 [1600]	110 [1600]	110 [1600]	103 [1500]	103 [1500]	103 [1500]	91 [1400]	90 [1300]	83 [1200]	68 [990]	36 [528]
Weight kg [lb]		5.1 [11.2]	5.1 [11.2]	5.2 [11.5]	5.2 [11.5]	5.4 [11.8]	5.5 [12.1]	5.6 [12.4]	5.7 [12.5]	5.8 [12.8]	6.0 [13.3]	6.3 [14.0]	6.7 [14.7]	8.4 [18.6]

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

A simultaneous maximum torque and maximum speed NOT recommended.

Note: To assure best motor life, run motor in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

Maximum inlet pressure:

177 Bar [2565 PSI] without regard to Δ Bar [Δ PSI] and/ or back pressure ratings or combination thereof. 6B splined or Tapered shafts are recommended whenever operation above 282 NM [2500 lb-in] of torque, especially for those applications subject to frequent reversals.

Δ Pressure: The true Δ bar [Δ PSI] 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. Minimum oil viscosity (at operating temperature) should be the highest of the following: 20 cSt [100 SUS] or

$$\left[\frac{300 \times \text{Bar}}{\text{RPM}} = \text{SUS} \quad \frac{20 \times \text{PSI}}{\text{RPM}} = \text{SUS}\right]$$

Recommended system

Operating temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended filtration:

Per ISO cleanliness code 4406, level 20/18/13

Note: Δ pressure is derated for end ported units.

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

H Series (101-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

Continuous

Intermittent

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

Δ Pressure bar [PSI]
36 cm³/r [2.2 in³/r]

Flow LPM [GPM]												Max. Continuous	Max. Intermittent
	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2400]	[2565]
	14	28	41	55	69	83	97	110	124	141	166	177
[2]	[49]	[103]	[162]	[216]	[270]	[325]	[379]	[432]	[489]	[556]	[650]	[694]
	6	12	18	24	31	37	43	49	55	63	73	78
8	204	201	198	194	189	184	177	170	162	146	122	112
[4]	[47]	[106]	[160]	[217]	[274]	[327]	[384]	[439]	[495]	[561]	[654]	[698]
	5	12	18	25	31	37	43	50	56	63	74	79
15	408	407	402	399	394	387	381	373	365	348	323	312
[6]	[44]	[102]	[158]	[215]	[272]	[328]	[383]	[440]	[496]	[565]	[661]	[706]
	5	12	18	24	31	37	43	50	56	64	75	80
23	613	612	609	604	599	591	586	576	565	549	523	510
[8]	[40]	[97]	[153]	[212]	[270]	[326]	[383]	[440]	[497]	[566]	[668]	[715]
	5	11	17	24	31	37	43	50	56	64	75	81
30	817	817	814	807	799	793	785	776	762	747	721	707
Max. Continuous [10]	[36]	[90]	[148]	[207]	[265]	[322]	[380]	[438]	[495]	[565]	[664]	[713]
	4	10	17	23	30	36	43	49	56	64	75	81
38	1021	1021	1015	1008	1001	991	981	969	959	944	920	906

[90] Torque [lb-in]
10 Nm
1021 Speed RPM

Δ Pressure bar [PSI]
46 cm³/r [2.8 in³/r]

Flow LPM [GPM]												Max. Continuous	Max. Intermittent
	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2400]	[2565]
	14	28	41	55	69	83	97	110	124	141	166	177
[2]	[64]	[136]	[212]	[284]	[355]	[426]	[497]	[567]	[641]	[728]	[852]	[909]
	7	15	24	32	40	48	56	64	72	82	96	103
8	161	158	156	153	148	145	139	133	127	114	95	87
[4]	[61]	[139]	[209]	[286]	[359]	[429]	[503]	[576]	[649]	[735]	[857]	[915]
	7	16	24	32	41	48	57	65	73	83	97	103
15	323	320	316	314	310	304	300	293	287	273	253	245
[6]	[58]	[134]	[207]	[282]	[356]	[430]	[502]	[577]	[650]	[740]	[867]	[927]
	7	15	23	32	40	49	57	65	73	84	98	105
23	486	481	479	475	471	464	461	453	444	431	410	401
[8]	[52]	[128]	[200]	[276]	[354]	[428]	[502]	[577]	[651]	[745]	[876]	[937]
	6	14	23	31	40	48	57	65	74	84	99	106
30	648	643	640	635	628	623	617	610	599	586	566	556
[10]	[47]	[118]	[194]	[269]	[347]	[423]	[498]	[575]	[649]	[742]	[871]	[934]
	5	13	22	30	39	48	56	65	73	84	98	106
38	808	803	798	793	787	779	771	761	753	741	722	712
[12]	[36]	[109]	[188]	[260]	[340]	[417]	[492]	[567]	[643]	[735]	[864]	[926]
	4	12	21	29	38	47	56	64	73	83	98	105
Max. Continuous 45	969	964	960	952	946	938	931	922	914	899	877	867
Max. Intermitted [14]	[25]	[98]	[175]	[249]	[327]	[404]	[484]	[559]	[634]	[733]		
	3	11	20	28	37	46	55	63	72	83		
53	1127	1123	1115	1108	1100	1093	1086	1079	1068	1058		

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

B-2

Δ Pressure bar [PSI]
59 cm³/r [3.6 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050] Max. Continuous	[2400] Max. Intermittent	[2565]
	14	28	41	55	69	83	97	110	124	141	166	177
[2]	[79]	[169]	[260]	[349]	[437]	[526]	[616]	[704]	[796]	[903]	[1055]	[1128]
	9	19	29	39	49	59	70	80	90	102	119	127
8	127	125	123	121	117	114	109	103	96	84	65	56
[4]	[76]	[168]	[257]	[349]	[441]	[529]	[620]	[710]	[800]	[910]	[1065]	[1138]
	9	19	29	39	50	60	70	80	90	103	120	129
15	254	254	251	249	246	241	236	230	224	211	193	184
[6]	[73]	[161]	[252]	[346]	[439]	[529]	[618]	[709]	[802]	[913]	[1069]	[1143]
	8	18	28	39	50	60	70	80	91	103	121	129
23	381	381	380	377	373	368	364	358	349	338	319	309
[8]	[64]	[151]	[243]	[336]	[428]	[519]	[609]	[701]	[794]	[911]	[1076]	[1153]
	7	17	27	38	48	59	69	79	90	103	122	130
30	508	508	508	504	500	496	491	484	476	465	446	436
[10]	[57]	[141]	[234]	[327]	[419]	[512]	[602]	[693]	[786]	[905]	[1071]	[1149]
	6	16	26	37	47	58	68	78	89	102	121	130
38	635	635	634	630	626	621	614	608	601	589	571	561
[12]	[45]	[131]	[227]	[318]	[409]	[505]	[593]	[684]	[778]	[895]	[1058]	[1138]
	5	15	26	36	46	57	67	77	88	101	120	129
45	762	762	762	757	753	747	741	734	728	714	694	684
[14]	[33]	[118]	[213]	[305]	[396]	[492]	[583]	[676]	[770]	[889]	[1055]	[1135]
	4	13	24	34	45	56	66	76	87	100	119	128
53	889	889	887	882	877	872	866	860	851	836	813	803
[15]	[29]	[111]	[205]	[297]	[389]	[486]	[576]	[670]	[765]	[885]	[1055]	[1132]
	3	13	23	34	44	55	65	76	86	100	119	128
57	953	953	951	945	940	935	929	921	913	896	872	861
[16]	[25]	[108]	[201]	[293]	[384]	[482]	[573]	[666]	[762]	[881]	[1050]	[1129]
	3	12	23	33	43	54	65	75	86	100	119	128
Max. Continuous 61	993	992	991	991	984	978	972	965	957	944	918	905
[20]	[17]	[98]	[192]	[285]	[377]	[475]	[567]	[660]	[757]	[877]		
	2	11	22	32	43	54	64	75	86	99		
Max. Intermittent 76	1080	080	1077	1071	1067	1062	1055	1049	1040	1029		

[111] Torque [lb-in]
13 Nm
953 Speed RPM

H Series (101-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

Continuous

Intermittent

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

B-2

Δ Pressure bar [PSI]
74 cm³/r [4.5 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050] Max. Continuous	[2400]	[2565] Max. Intermittent
	14	28	41	55	69	83	97	110	124	141	166	177
[2]	[103]	[220]	[339]	[454]	[569]	[685]	[801]	[916]	[1036]	[1175]	[1373]	[1468]
	12	25	38	51	64	77	91	103	117	133	155	166
8	101	99	98	96	93	90	86	81	76	66	51	44
[4]	[99]	[219]	[335]	[457]	[574]	[689]	[808]	[925]	[1042]	[1185]	[1386]	[1481]
	11	25	38	52	65	78	91	105	118	134	157	167
15	203	201	199	197	194	191	187	182	177	167	153	147
[6]	[94]	[210]	[328]	[451]	[571]	[689]	[805]	[924]	[1044]	[1189]	[1392]	[1489]
	11	24	37	51	65	78	91	104	118	134	157	168
23	305	303	301	298	296	292	288	283	276	267	252	245
[8]	[86]	[196]	[319]	[438]	[558]	[676]	[793]	[913]	[1033]	[1186]	[1401]	[1507]
	10	22	36	49	63	76	90	103	117	134	158	170
30	406	404	402	399	396	393	388	383	377	367	352	345
[10]	[74]	[183]	[310]	[422]	[545]	[667]	[784]	[903]	[1024]	[1178]	[1394]	[1495]
	8	21	35	48	62	75	89	102	116	133	158	169
38	507	505	502	499	496	492	486	482	476	466	452	445
[12]	[58]	[171]	[295]	[408]	[533]	[657]	[773]	[891]	[1013]	[1165]	[1377]	[1477]
	7	19	33	46	60	74	87	101	114	132	156	167
45	608	606	603	600	596	591	587	581	576	565	549	542
[14]	[43]	[154]	[277]	[396]	[515]	[640]	[760]	[880]	[1002]	[1157]	[1374]	[1470]
	5	17	31	45	58	72	86	99	113	131	155	166
53	709	706	702	698	694	691	686	681	674	661	643	636
[15]	[36]	[145]	[268]	[387]	[506]	[632]	[750]	[873]	[996]	[115]3	[1373]	[1468]
	4	16	30	44	57	71	85	99	113	130	155	166
57	760	757	753	749	744	740	735	729	723	709	690	683
[16]	[31]	[138]	[261]	[382]	[500]	[627]	[744]	[869]	[991]	[1150]	[1371]	[1466]
	4	16	29	43	56	71	84	98	112	130	155	166
Max. Continuous 61	796	793	790	786	782	778	773	768	761	750	734	723
[20]	[14]	[121]	[233]	[351]	[482]	[609]	[725]	[856]	[981]	1140		
	2	14	26	40	54	69	82	97	111	129		
Max. Intermittent 76	904	902	898	895	891	887	882	877	869	861		

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

B-2

Δ Pressure bar [PSI]
97 cm³/r [5.9 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050] Max. Continuous	[2400] Max. Intermittent	[2565]
	14	28	41	55	69	83	97	110	124	141	166	177
[2]	[134]	[292]	[442]	[593]	[746]	[899]	[1054]	[1209]	[1365]	[1546]	[1806]	[1933]
	15	33	50	67	84	102	119	137	154	175	204	218
8	78	76	75	73	71	68	65	61	55	47	33	27
[4]	[131]	[281]	[436]	[596]	[750]	[903]	[1059]	[1212]	[1367]	[1559]	[1828]	[1955]
	15	32	49	67	85	102	120	137	154	176	207	221
15	156	155	153	151	149	147	143	139	134	126	113	107
[6]	[126]	[269]	[425]	[588]	[747]	[900]	[1054]	[1206]	[1368]	[1556]	[1823]	[1951]
	14	30	48	66	84	102	119	136	155	176	206	220
23	234	233	231	230	228	224	221	217	210	202	189	182
[8]	[110]	[246]	[408]	[566]	[718]	[873]	[1023]	[1177]	[1339]	[1542]	[1829]	[1962]
	12	28	46	64	81	99	116	133	151	174	207	222
30	312	311	310	308	305	303	300	295	291	282	269	263
[10]	[96]	[231]	[392]	[539]	[699]	[859]	[1005]	[1156]	[1318]	[1528]	[1821]	[1956]
	11	26	44	61	79	97	114	131	149	173	206	221
38	390	389	387	385	383	380	376	373	368	359	346	340
[12]	[77]	[218]	[378]	[522]	[681]	[844]	[990]	[1142]	[1301]	[1506]	[1792]	[1925]
	9	25	43	59	77	95	112	129	147	170	202	217
45	468	467	465	463	460	457	453	449	445	435	421	415
[14]	[60]	[197]	[358]	[513]	[662]	[828]	[973]	[1131]	[1293]	[1493]	[1776]	[1906]
	7	22	40	58	75	94	110	128	146	169	201	215
53	546	544	542	539	537	535	531	526	521	512	499	493
[15]	[52]	[189]	[346]	[495]	[651]	[819]	[963]	[1126]	[1286]	[1490]	[1778]	[1899]
	6	21	39	56	74	93	109	127	145	168	201	215
57	585	583	581	578	575	573	569	564	559	550	536	530
[16]	[46]	[181]	[339]	[489]	[643]	[813]	[960]	[1121]	[1283]	[1488]	[1773]	[1893]
	5	20	38	55	73	92	108	127	145	168	200	214
61	620	617	613	610	608	607	601	599	594	585	569	561
[20]	[25]	[157]	[311]	[455]	[625]	[790]	[941]	[1110]	[1272]	[1482]		
	3	18	35	51	71	89	106	125	144	167		
76	701	700	697	694	691	688	684	681	674	668		

Max. Continuous

Max. Intermittent

[189] 21 583 } Torque [lb-in] Nm Speed RPM

H Series (101-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

B-2

Δ Pressure bar [PSI]
120 cm³/r [7.3 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2050] 141	Max. Continuous [2400] 166	Max. Intermittent [2565] 177
[2]	[162]	[357]	[544]	[736]	[927]	[1116]	[1305]	[1498]	[1687]	[1913]	[2231]	[2385]
	18	40	61	83	105	126	147	169	191	216	252	269
8	62	61	61	59	58	55	53	49	45	38	26	21
[4]	[160]	[348]	[539]	[736]	[930]	[1119]	[1316]	[1506]	[1698]	[1936]	[2268]	[2426]
	18	39	61	83	105	126	149	170	192	219	256	274
15	125	124	123	121	120	119	116	114	110	102	90	86
[6]	[155]	[338]	[530]	[729]	[923]	[1116]	[1310]	[1500]	[1699]	[1936]	[2271]	[2432]
	18	38	60	82	104	126	148	169	192	219	257	275
23	188	187	186	185	183	180	178	175	170	163	152	147
[8]	[139]	[319]	[515]	[710]	[901]	[1094]	[1283]	[1476]	[1673]	[1925]	[2278]	[2442]
	16	36	58	80	102	124	145	167	189	217	257	276
30	250	250	249	247	245	243	241	237	233	226	216	211
[10]	[121]	[303]	[497]	[686]	[883]	[1081]	[1267]	[1460]	[1655]	[1911]	[2268]	[2433]
	14	34	56	78	100	122	143	165	187	216	256	275
38	313	312	311	309	308	306	302	300	296	289	278	273
[12]	[102]	[288]	[480]	[664]	[862]	[1060]	[1246]	[1440]	[1640]	[1885]	[2232]	[2397]
	12	33	54	75	97	120	141	163	185	213	252	271
45	375	374	373	371	370	367	365	361	358	350	338	333
[14]	[78]	[263]	[458]	[652]	[841]	[1041]	[1228]	[1420]	[1616]	[1865]	[2213]	[2375]
	9	30	52	74	95	118	139	160	183	211	250	268
53	438	437	435	433	431	430	427	423	419	412	401	396
[15]	[67]	[253]	[446]	[632]	[828]	[1030]	[1214]	[1411]	[1608]	[1856]	[2205]	[2370]
	8	29	50	71	94	116	137	159	182	210	249	268
57	469	468	466	464	462	460	458	454	450	442	430	425
[16]	[59]	[241]	[436]	[619]	[819]	[1020]	[1206]	[1402]	[1602]	[1847]	[2196]	[2363]
	7	27	49	70	93	115	136	158	181	209	248	267
Max. Continuous 61	501	499	497	495	493	491	488	485	482	476	465	460
[20]	[20]	[202]	[384]	[581]	[778]	[971]	[1169]	[1356]	[1559]	1810		
	2	23	43	66	88	110	132	153	176	205		
Max. Intermittent 76	626	624	621	618	617	614	611	609	606	603		

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
146 cm³/r [8.9 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1700] 117	[1800] 124	[2050] 141	Max. Continuous [2300] 159	Max. Intermittent [2565] 177
[2]	[198]	[435]	[664]	[897]	[1130]	[1361]	[1591]	[1827]	[1942]	[2050]	2333	[2611]	[2911]
	22	49	75	101	128	154	180	206	219	232	264	295	329
8	51	50	50	49	47	45	43	40	39	36	31	24	17
[4]	[196]	[424]	[657]	[898]	[1133]	[1365]	[1604]	[1836]	[1954]	[2068]	2359	[2648]	[2957]
	22	48	74	101	128	154	181	207	221	234	267	299	334
15	103	102	101	99	99	97	95	93	92	89	84	78	72
[6]	[189]	[412]	[646]	[889]	[1125]	[1361]	[1598]	[1829]	[1951]	[2066]	2360	[2653]	[2967]
	21	47	73	100	127	154	181	207	220	233	267	300	335
23	154	153	152	151	150	148	146	143	141	139	134	128	121
[8]	[169]	[389]	[628]	[866]	[1098]	[1333]	[1564]	[1799]	[1919]	[2043]	2343	[2649]	[2969]
	19	44	71	98	124	151	177	203	217	231	265	299	335
30	205	205	204	203	201	200	197	195	193	191	186	180	173
[10]	[148]	[369]	[605]	[836]	[1076]	[1318]	[1544]	[1780]	[1899]	[2030]	2370	[2789]	[3126]
	17	42	68	94	122	149	174	201	215	229	268	315	353
38	257	256	255	253	252	251	248	246	244	242	237	231	225
[12]	[125]	[351]	[586]	[810]	[1051]	[1293]	[1519]	[1756]	[1878]	[1999]	2301	[2606]	[2930]
	14	40	66	92	119	146	172	198	212	226	260	294	331
45	308	307	306	305	303	301	299	296	295	292	287	281	275
[14]	[95]	[321]	[558]	[795]	[1026]	[1290]	[1497]	[1731]	[1851]	[1978]	2276	[2580]	[2895]
	11	36	63	90	116	146	169	196	209	223	257	292	327
53	359	358	357	355	354	352	350	347	346	343	338	331	325
[15]	[82]	[308]	[544]	[771]	[1010]	[1256]	[1480]	[1720]	[1840]	[1962]	2264	[2569]	[2893]
	9	35	61	87	114	142	167	194	208	222	256	290	327
57	385	384	383	381	379	378	375	373	371	368	363	356	349
[16]	[76]	[299]	[532]	[765]	[1003]	[1249]	[1475]	[1710]	[1832]	[1955]	[2245]	[2547]	[2873]
	9	34	60	86	113	141	167	193	207	221	254	288	325
Max. Continuous 61	411	410	408	406	405	403	400	398	396	394	390	385	375
[20]	[24]	[246]	[468]	[708]	[948]	[1184]	[1425]	[1653]	[1780]	1902	2208		
	3	28	53	80	107	134	161	187	201	215	249		
Max. Intermittent 76	513	512	509	507	506	504	501	499	498	497	494		

H Series (101-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

Continuous Intermittent

B-2

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

Δ Pressure bar [PSI]
159 cm³/r [9.7 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050] Max. Continuous	[2400]	[2565] Max. Intermittent
	14	28	41	55	69	83	97	110	124	141	166	177
[2]	[209]	[465]	[715]	[973]	[1228]	[1478]	[1724]	[1981]	[2046]	[2401]	[2764]	[2903]
	24	53	81	110	139	167	195	224	231	271	312	328
8	47	46	46	45	44	42	40	38	37	31	23	20
[4]	[210]	[460]	[710]	[971]	[1229]	[1480]	[1745]	[1996]	[2059]	[2432]	[2813]	[2959]
	24	52	80	110	139	167	197	226	233	275	318	334
15	94	94	93	91	91	90	89	87	87	82	76	74
[6]	[205]	[454]	[704]	[965]	[1216]	[1477]	[1738]	[1991]	[2055]	[2434]	[2824]	[2974]
	23	51	80	109	137	167	196	225	232	275	319	336
23	141	141	140	139	138	136	134	132	132	126	119	116
[8]	[186]	[440]	[693]	[951]	[1205]	[1461]	[1716]	[1973]	[2038]	[2417]	[2808]	[2956]
	21	50	78	107	136	165	194	223	230	273	317	334
30	188	188	187	186	185	183	181	179	178	173	166	163
[10]	[164]	[422]	[671]	[930]	[1189]	[1451]	[1702]	[1965]	[2032]	[2404]	[2789]	[2938]
	19	48	76	105	134	164	192	222	230	272	315	332
38	235	234	234	232	232	230	228	226	225	220	213	210
[12]	[144]	[404]	[652]	[900]	[1163]	[1421]	[1674]	[1937]	[2004]	[2379]	[2770]	[2922]
	16	46	74	102	131	161	189	219	226	269	313	330
45	282	281	281	279	279	277	275	273	272	267	260	257
[14]	[109]	[374]	[623]	[883]	[1140]	[1396]	[1653]	[1900]	[1963]	[2342]	[2727]	[2873]
	12	42	70	100	129	158	187	215	222	265	308	325
53	330	329	328	327	325	323	322	319	319	313	306	304
[15]	[92]	[359]	[612]	[861]	[1123]	[1381]	[1633]	[1886]	[1950]	[2326]	[2712]	[2847]
	10	41	69	97	127	156	185	213	220	263	306	322
57	353	352	351	350	348	347	345	343	342	337	330	328
[16]	[87]	[344]	[591]	[848]	[1108]	[1366]	[1624]	[1877]	[1938]	[2299]	[2665]	[2808]
	10	39	67	96	125	154	183	212	219	260	301	317
Max. Continuous 61	377	376	374	373	372	370	368	366	365	361	356	354
[20]	[26]	[268]	[510]	[772]	[1034]	[1290]	[1553]	[1802]	[1865]	[2179]		
	3	30	58	87	117	146	175	204	211	246		
Max. Intermittent 76	471	470	467	465	464	462	460	458	458	456		

[359] Torque [lb-in]
41 Nm
352 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
185 cm³/r [11.3 in³/r]

Flow LPM [GPM]	Max. Continuous	Max. Intermittent
[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2050] 141	[2150] 148	[2565] 177
[2] 8	[257] 29 40	[554] 63 40	[847] 96 39	[1150] 130 38	[1447] 163 37	[1739] 196 36	[2035] 230 33	[2320] 262 29	[2607] 295 23	[2963] 335 16	[3103] 351 12	
[4] 15	[254] 29 81	[546] 62 81	[845] 95 80	[1145] 129 79	[1448] 164 78	[1744] 197 77	[2049] 232 76	[2343] 265 74	[2635] 298 70	[3003] 339 66	[3147] 356 63	[3758] 425 55
[6] 23	[246] 28 121	[540] 61 121	[834] 94 120	[1137] 128 120	[1434] 162 119	[1736] 196 117	[2036] 230 115	[2337] 264 112	[2631] 297 108	[3004] 339 103	[3151] 356 100	[3773] 426 89
[8] 30	[224] 25 162	[520] 59 162	[820] 93 161	[1117] 126 160	[1414] 160 159	[1716] 194 157	[2014] 228 155	[2315] 262 152	[2611] 295 148	[2985] 337 143	[3133] 354 140	[3754] 424 129
[10] 38	[202] 23 202	[499] 56 202	[793] 90 201	[1095] 124 201	[1394] 158 200	[1699] 192 198	[1997] 226 196	[2299] 260 193	[2593] 293 189	[2966] 335 184	[3112] 352 181	[3733] 422 170
[12] 45	[176] 20 243	[475] 54 242	[767] 87 242	[1063] 120 241	[1368] 155 240	[1664] 188 238	[1969] 222 236	[2268] 256 234	[2565] 290 230	[2940] 332 225	[3088] 349 222	[3715] 420 212
[14] 53	[140] 16 283	[443] 50 283	[735] 83 282	[1035] 117 281	[1340] 151 280	[1637] 185 279	[1936] 219 277	[2227] 252 274	[2529] 286 270	[2902] 328 265	[3051] 345 262	[3667] 414 252
[15] 57	[120] 14 304	[425] 48 303	[719] 81 302	[1014] 115 301	[1320] 149 300	[1618] 183 299	[1914] 216 297	[2205] 249 294	[2510] 284 290	[2885] 326 286	[3023] 342 283	[3648] 412 274
[16] 61	[108] 12 324	[407] 46 323	[700] 79 322	[998] 113 321	[1301] 147 320	[1598] 181 318	[1895] 214 316	[2185] 247 314	[2490] 281 312	[2863] 323 308	[3012] 340 306	[3630] 410 295
[20] 76	[27] 3 405	[321] 36 404	[612] 69 402	[911] 103 401	[1211] 137 400	[1504] 170 398	[1795] 203 397	[2070] 234 395	[2387] 270 394	[2756] 311 389		

H Series (101-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

Continuous

Intermittent

B-2

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

Δ Pressure bar [PSI]
231 cm³/r [14.1 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1450] 100	[1535] 106	Max. Continuous [2000] 138	Max. Intermittent [2050] 141
[2]	[338]	[707]	[1074]	[1456]	[1827]	[2192]	[2572]	[2657]	[2819]		
	38	80	121	165	206	248	291	300	319		
8	32	32	31	30	30	28	26	25	24		
[4]	[328]	[695]	[1076]	[1447]	[1827]	[2201]	[2577]	[2669]	[2821]	[3671]	[3780]
	37	79	122	163	206	249	291	302	319	415	427
15	65	65	64	63	62	62	60	60	58	50	49
[6]	[317]	[687]	[1057]	[1434]	[1811]	[2186]	[2555]	[2650]	[2806]	[3668]	[3766]
	36	78	119	162	205	247	289	299	317	414	426
23	97	97	97	96	95	94	92	91	89	80	78
[8]	[289]	[659]	[1038]	[1406]	[1777]	[2160]	[2531]	[2625]	[2781]	[3644]	[3742]
	33	74	117	159	201	244	286	297	314	412	423
30	130	130	130	129	128	127	124	124	122	112	112
[10]	[265]	[631]	[1004]	[1381]	[1751]	[2131]	[2510]	[2602]	[2753]	[3608]	[3713]
	30	71	113	156	198	241	284	294	311	408	420
38	162	162	162	162	160	158	156	156	154	145	144
[12]	[230]	[599]	[968]	[1345]	[1722]	[2088]	[2480]	[2571]	[2718]	[3571]	[3678]
	26	68	109	152	195	236	280	290	307	403	416
45	195	195	194	194	193	192	189	189	187	178	172
[14]	[191]	[563]	[927]	[1299]	[1686]	[2058]	[2428]	[2519]	[2675]	[3532]	[3633]
	22	64	105	147	190	233	274	285	302	399	410
53	227	227	227	226	226	224	222	221	220	212	210
[15]	[167]	[538]	[904]	[1279]	[1661]	[2030]	[2404]	[2493]	[2645]	[3488]	[3598]
	19	61	102	145	188	229	272	282	299	394	407
57	243	243	243	242	242	240	238	238	236	229	228
[16]	[143]	[517]	[887]	[1258]	[1634]	[2002]	[2369]	[2462]	[2611]	[3444]	[3557]
	16	58	100	142	185	226	268	278	295	389	402
Max. Continuous 61	259	259	259	258	258	256	254	253	252	245	244
[20]	[29]	[411]	[785]	[1152]	[1520]	[1877]	[2222]	[2318]	[2462]		
	3	46	89	130	172	212	251	262	278		
Max. Intermittent 76	324	324	323	322	322	320	319	318	318		

[538] Torque [lb-in]
61 Nm
243 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

B-2

Δ Pressure bar [PSI]
293 cm³/r [17.9 in³/r]

Flow LPM [GPM]		[200]	[400]	[600]	[800]	[1000]	[1200]	[1350]	[1800]
		14	28	41	55	69	83	93	124
	[2]	[427]	[893]	[1361]	[1829]	[2293]	[2672]	[2977]	
		48	101	154	207	259	302	336	
	8	26	25	25	24	22	16	13	
	[4]	[419]	[886]	[1362]	[1833]	[2305]	[2771]	[3110]	[4107]
		47	100	154	207	260	313	351	464
	15	51	51	51	50	49	47	44	22
	[6]	[402]	[872]	[1342]	[1819]	[2291]	[2757]	[3098]	[4121]
		45	99	152	206	259	312	350	466
	23	77	77	76	76	74	71	68	54
	[8]	[367]	[838]	[1316]	[1785]	[2252]	[2723]	[3070]	[4086]
		41	95	149	202	254	308	347	462
	30	102	102	102	101	100	98	95	84
	[10]	[332]	[803]	[1276]	[1749]	[2215]	[2684]	[3034]	[4061]
		38	91	144	198	250	303	343	459
	38	128	128	128	127	126	123	120	108
	[12]	[289]	[760]	[1230]	[1706]	[2177]	[2634]	[2989]	[4012]
		33	86	139	193	246	298	338	453
	45	153	153	153	153	151	149	146	135
	[14]	[241]	[712]	[1176]	[1650]	[2126]	[2592]	[2935]	[3963]
		27	80	133	186	240	293	332	448
	53	179	179	179	179	177	175	172	161
	[15]	[211]	[683]	[1149]	[1623]	[2096]	[2558]	[2905]	[3914]
		24	77	130	183	237	289	328	442
	57	192	192	192	191	190	188	185	174
	[16]	[182]	[657]	[1128]	[1598]	[2066]	[2534]	[2884]	[3886]
		21	74	127	181	233	286	326	439
Max. Continuous	61	205	205	204	204	203	201	198	189
	[20]	[43]	[527]	[1001]	[1463]	[1919]	[2375]	[2720]	
Max. Intermittent		5	60	113	165	217	268	307	
	76	256	256	255	255	254	252	249	

H Series (101-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
370 cm³/r [22.6 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1250] 86 (Max. Continuous)	[1500] 103 (Max. Intermittent)
[2]	[537] 61	[1121] 127	[1715] 194	[2285] 258	[2862] 323			
8	20	20	20	19	16			
[4]	[532] 60	[1123] 127	[1715] 194	[2308] 261	[2893] 327	[3467] 392	[3604] 407	[4274] 483
15	40	40	40	39	38	36	35	27
[6]	[508] 57	[1100] 124	[1693] 191	[2294] 259	[2884] 326	[3458] 391	[3598] 407	[4283] 484
23	61	61	61	60	58	55	53	47
[8]	[463] 52	[1060] 120	[1661] 188	[2255] 255	[2840] 321	[3414] 386	[3557] 402	[4254] 481
30	81	81	81	80	79	76	74	68
[10]	[414] 47	[1017] 115	[1613] 182	[2203] 249	[2788] 315	[3363] 380	[3506] 396	[4212] 476
38	101	101	101	101	99	96	94	88
[12]	[363] 41	[960] 108	[1553] 175	[2152] 243	[2737] 309	[3305] 373	[3446] 389	[4152] 469
45	121	121	121	121	119	116	115	109
[14]	[303] 34	[897] 101	[1484] 168	[2086] 236	[2667] 301	[3246] 367	[3386] 383	[4092] 462
53	142	142	142	142	140	137	136	130
[15]	[266] 30	[862] 97	[1452] 164	[2050] 232	[2630] 297	[3206] 362	[3347] 378	[4054] 458
57	152	152	152	152	150	148	147	140
[16]	[230] 26	[832] 94	[1426] 161	[2020] 228	[2597] 293	[3168] 358	[3307] 374	[4010] 453
Max. Continuous 61	162	162	162	162	161	158	157	151
[20]	[61] 7	[671] 76	[1269] 143	[1847] 209	[2410] 272	[2987] 337	[3119] 352	
Max. Intermittent 76	202	202	202	202	202	199	198	

[862] 97 152 } Torque [lb-in] Nm Speed RPM

Δ Pressure bar [PSI]
739 cm³/r [45.1 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55 (Max. Intermittent)
[2]	[1080] 122	[2250] 254	[3440] 389	[4570] 516
8	10	10	10	9
[4]	[1070] 121	[2250] 254	[3440] 389	[4600] 520
15	20	20	19	18
[6]	[1020] 115	[2200] 249	[3390] 383	[4590] 519
23	30	30	29	27
[8]	[945] 107	[2135] 241	[3330] 376	[4515] 510
30	40	40	39	37
[10]	[840] 95	[2050] 232	[3250] 367	[4430] 501
38	50	50	48	46
[12]	[740] 84	[1945] 220	[3130] 354	[4320] 488
45	60	59	58	55
[14]	[630] 71	[1820] 206	[3005] 340	[4195] 474
53	69	68	68	66
[15]	[540] 61	[1735] 196	[2905] 328	[4130] 467
57	74	74	73	72
[16]	[478] 54	[1681] 190	[2860] 323	[4060] 459
Max. Continuous 61	79	79	78	77
[20]	[143] 16	[1350] 153	[2565] 290	[3705] 419
Max. Intermittent 76	99	98	97	96

Standard rotation viewed from shaft end

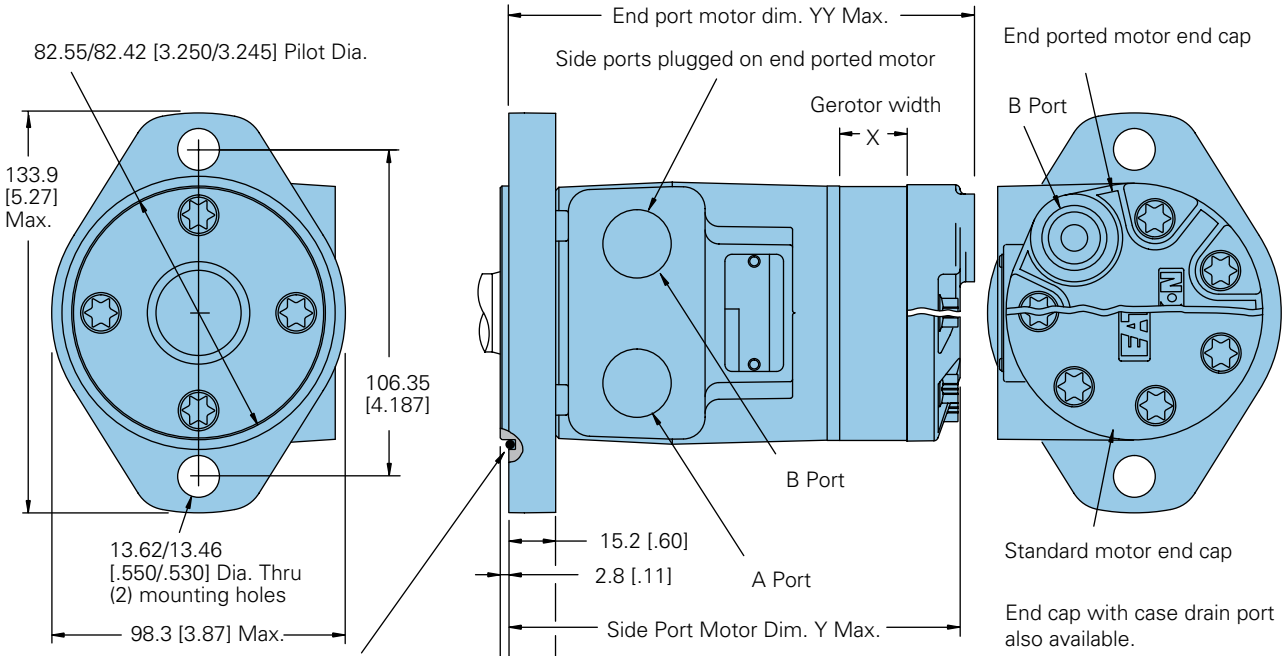
Port A pressurized — CW

Port B pressurized — CCW

Note: Mounting surface flatness requirement is 13 mm [.005 inch] Max.

Note: End ported motor pressure is derated. Reference page B-2-18 for ratings.

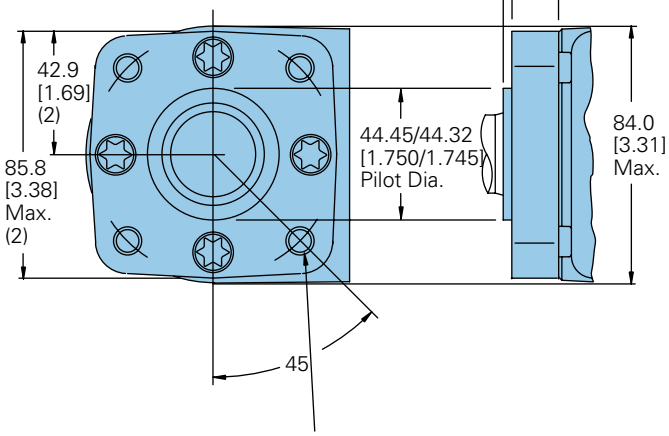
Code: AA 2 Bolt flange



Groove provided for 82.6 [3.25] I.D. x
2.62 [.103] cross section o-ring (Dash No. 152)

Mounting
surface

Code: BA 4 Bolt flange



3/8-16 UNC (15.2 [.60] Max. Bolt thread engagement)
mounting holes (4) equally spaced on 82.6 [3.25] dia. bolt circle
or
M10 x 1.5 (15.2 [.60] Max. Bolt Thread Engagement)
mounting holes (4) equally spaced on 82.6 [3.25] dia. bolt circle

2 and 4 bolt flange

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	YY mm [inch]
36 [2.2]	6.4 [.25]	132.1 [5.20]	138.5 [5.45]
46 [2.8]	6.4 [.25]	132.1 [5.20]	138.5 [5.45]
59 [3.6]	10.2 [.40]	135.9 [5.35]	142.3 [5.60]
74 [4.5]	10.2 [.40]	135.9 [5.35]	142.3 [5.60]
97 [5.9]	13.2 [.52]	139.0 [5.47]	145.3 [5.72]
120 [7.3]	16.5 [.65]	142.3 [5.60]	148.6 [5.85]
146 [8.9]	20.1 [.79]	145.8 [5.74]	152.2 [5.99]
159 [9.7]	21.9 [.86]	147.6 [5.81]	154.0 [6.06]
185 [11.3]	25.4 [1.00]	151.2 [5.95]	157.5 [6.20]
231 [14.1]	31.8 [1.25]	157.5 [6.20]	
293 [17.9]	40.4 [1.59]	166.2 [6.54]	
370 [22.6]	50.8 [2.00]	176.6 [6.95]	
739 [45.1]	101.6 [4.00]	227.4 [8.95]	

H Series (101-)

Product numbers

Use digit prefix —101- plus four digit number from charts for complete product number—Example 101-1001. Orders will not be accepted without three digit prefix.

2 Bolt flange

Shaft	Port size	Displ. cm³/ r [in³/ r] / product number												
		36 [2.2]	46 [2.8]	59 [3.6]	74 [4.5]	97 [5.9]	120 [7.3]	146 [8.9]	159 [9.7]	185 [11.3]	231 [14.1]	293 [17.9]	370 [22.6]	740 [45.0]
1 in. Straight w/ Woodruff key	7/8-14 O-Ring	101-1700	-1033	-1701	-1034	-1035	-1702	-1703	-1036	-1037	-1038	-1039	-1040	—
	1/2 NPTF	101-1704	-1025	-1705	-1026	-1027	-1706	-1707	-1028	-1029	-1030	-1031	-1032	—
	Manifold*	101-1708	-1041	-1709	-1042	-1043	-1710	-1711	-1044	-1045	-1046	-1047	-1048	—
1 in. SAE 6B Splined	7/8-14 O-Ring	101-1721	-1081	-1722	-1082	-1083	-1723	-1724	-1084	-1085	-1086	-1087	-1088	—
	1/2 NPTF	101-1725	-1073	-1726	-1074	-1075	-1727	-1728	-1076	-1077	-1078	-1079	-1080	—
	Manifold*	101-1729	-1089	-1730	-1090	-1091	-1731	-1732	-1092	-1093	-1094	-1095	-1096	—
1 in. Straight w/.31 Dia. Crosshole	7/8-14 O-Ring	101-1796	-1797	-1798	-1799	-1800	-1801	-1802	-1803	—	—	—	—	—
	1/2 NPTF	101-1804	-1805	-1806	-1807	-1808	-1870	—	—	—	—	—	—	—
	Manifold*	101-1811	-1812	-1813	-1814	-1815	-1816	—	-1818	—	—	—	—	—
1 in. Straight w/.40 Dia. Crosshole	7/8-14 O-Ring	101-1819	-1323	-1820	-1324	-1325	-1821	-1822	-1326	—	—	—	—	—
	1/2 NPTF	101-1823	-1319	-1824	-1320	-1825	-1826	-1827	-1828	—	—	—	—	—
	Manifold*	101-1829	-1463	-1830	-1831	-1832	-1833	-1834	-1871	—	—	—	—	—

101-1834

4 Bolt flange

Shaft	Port size	Displ. cm³/ r [in³/ r] / product number												
		36 [2.2]	46 [2.8]	59 [3.6]	74 [4.5]	97 [5.9]	120 [7.3]	146 [8.9]	159 [9.7]	185 [11.3]	231 [14.1]	293 [17.9]	370 [22.6]	740 [45.0]
1 in. Straight w/ Woodruff key O-Ring	7/8-14 O-Ring	101-1749	-1009	-1750	-1010	-1011	-1751	-1752	-1012	-1013	-1014	-1015	-1016	—
	1/2 NPTF	101-1753	-1001	-1754	-1002	-1003	-1755	-1756	-1004	-1005	-1006	-1007	-1008	—
	Manifold*	101-1757	-1017	-1758	-1018	-1019	-1759	-1760	-1020	-1021	-1022	-1023	-1024	—
1 in. SAE 6B Splined	7/8-14 O-Ring	101-1761	-1057	-1762	-1058	-1059	-1872	-1763	-1060	-1061	-1062	-1063	-1064	—
	1/2 NPTF	101-1764	-1049	-1765	-1050	-1051	-1766	-1767	-1052	-1053	-1054	-1055	-1056	—
	Manifold*	101-1768	-1065	-1769	-1066	-1067	-1770	-1771	-1068	-1069	-1070	-1071	-1072	—
1 in. Straight w/ .31 Dia. Crosshole	7/8-14 O-Ring	101-1835	-1836	-1837	-1838	-1839	-1840	-1841	-1842	—	—	—	—	—
	1/2 NPTF	101-1843	-1497	-1844	-1449	-1352	-1845	—	-1847	—	—	—	—	—
	Manifold*	101-1811	-1466	-1849	-1459	-1850	—	-1852	-1853	—	—	—	—	—
1 in. Straight w/ .40 Dia. Crosshole	7/8-14 O-Ring	101-1854	-1311	-1855	-1856	-1857	-1858	-1859	-1860	—	—	—	—	—
	1/2 NPTF	101-1861	-1313	-1824	-1312	-1314	-1863	-1827	-1315	—	—	—	—	—
	Manifold*	101-1829	-1305	-1830	-1306	-1307	-1833	-1868	-1871	—	—	—	—	—

101-1834

4 Bolt Flange with corrosion protection

Shaft	Port size	Displ. cm³/ r [in³/ r] / product number												
		36 [2.2]	46 [2.8]	59 [3.6]	74 [4.5]	97 [5.9]	120 [7.3]	146 [8.9]	159 [9.7]	185 [11.3]	231 [14.1]	293 [17.9]	370 [22.6]	740 [45.0]
1 in. Straight w/ Woodruff key O-Ring	1/2 NPTF	101-2032	-2014	—	—	—	—	—	-2015	-2028	—	-2030	-2031	—
	Manifold*	—	-2067	—	—	-2223	—	—	-2151	—	—	—	—	—

* Manifold product numbers shown are for motors with four 5/16-18 port face mounting threads. Manifold, manifold mounting O-Rings and bolts are NOT included.

For H Series Motors with a configuration Not Shown in the charts above: Use the model code system on page B-2-32 to specify the product in detail.

The following 25-digit coding system has been developed to identify all of the configuration options for the H motor. Use this model code to specify a motor with the desired features. All 25-digits of the code must be present when ordering.

M	H 0	***	**	**	**	**	*	*	**	**	00	**	*	**	00	J
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

H0 H Motor

4 5 6 — Displacement cm³/r [in³/r]

022 36 [2.2]†
028 46 [2.8]
035 58 [3.5]†
045 74 [4.5]
059 96 [5.9]
073 120 [7.3]
089 146 [8.9]
097 159 [9.7]
113 185 [11.3]
141 231 [14.1]
179 294 [17.9]
226 370 [22.6]
451 739 [45.1]†
† The H Series motors with the displacement code "022", "035", or "451" must also specify free running gerotor. (option "A" in position 15).

7 8 — Mounting type

AA 2 Bolt (standard) 82.50 [3.248] Dia. x 3.05 [.120] pilot, 13.59 [.535] Dia. mounting holes on 106.35 [4.187] Dia. B.C.
BA 4 Bolt (standard) 44.40 [1.748] Dia. x 3.05 [.120] pilot, .375-16 UNC-2B mounting holes on 82.55 [3.250] Dia. B.C.
DD 2 Bolt (standard) 101.60 [4.000] Dia. x 6.10 [.240] Pilot, 14.35 [.565] Dia. Mounting holes on 146.05 [5.750] Dia. B.C. (SAE B)
FA 4 Bolt (standard) 44.40 [1.748] Dia. x 3.05 [.120] pilot, M10 x 1.5-6H mounting holes on 82.55 [3.250] Dia. B.C.
MA 2 Bolt (standard) 82.50 [3.248] Dia. x 8.13 [.320] Pilot, 13.59 [.535] Dia. Mounting holes on 106.35 [4.187] Dia. B.C.

9 10 — Output shaft

01 25.4 [1.00] Dia. Straight, woodruff key, .250-20 UNC-2B hole in shaft end
02 25.4 [1.00] Dia. SAE 6B Spline, .250-20 UNC-2B Hole in Shaft End
08 25.4 [1.00] Dia. Straight, 10.31 [.406] Dia. Cross hole 15.7 [.62] from End, .250-20 UNC-2B hole in shaft end
16 22.22 [.875] Dia. SAE 13 Tooth Spline (SAE B)
18 25.4 [1.00] Dia. Tapered, woodruff key and nut, 34.92 [1.375] taper length
24 25.00 [.984] Dia. Straight, 8.00 [.315] KEY, M8 x 1.25-6H hole in shaft end
39 25.00 [.984] Dia. Straight (k6), 8.00 [.315] Key, M8 x 1.25-6H Hole in Shaft End

11 12 — Ports

AA .875-14 UNF-2B SAE O-Ring Ports
AB .500-14 NPTF Dry seal pipe thread ports
AC Manifold ports (.3125-18 UNC-2B mounting holes)
AD Manifold ports (M8 x 1.25-6H mounting holes)
AF G 1/2 BSP Straight Thread Ports
EB†† End ports: .750-16 UNF-2B SAE O-Ring ports
EC†† End ports: G 1/2 BSP straight thread ports
†† End ported motor pressure is derated.
Note Reference page B-2-18 for ratings.

13 14 — Case flow options

00 None
01 .4375-20 UNF-2B SAE o-ring port (end cap)
02 G 1/4 BSP straight THD port (end cap)
A Internal check valves

15 — Gerotor options

0 None
A Free running

H Series (101-)

Model code

The following 25-digit coding system has been developed to identify all of the configuration options for the H motor. Use this model code to specify a motor with the desired features. All 25-digits of the code must be present when ordering.

M	H 0	***	**	**	**	**	*	*	**	**	00	**	*	**	00	J
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

16 Shaft options

0	None
N	Electroless nickel plated

17 18 Seal options

00	Standard seals
02	Seal guard
03	Viton seals
07	High pressure shaft seal
A	Extreme duty shaft seal

19 20 Speed sensor options

00	None
AA	Digital speed pickup (15 pulse), M12 connector (A=Power, B=Common, C=Signal)
AB	Magnetic speed pickup (60 pulse by quadrature), with M12 connector (A=Power, B=Common, C=Signal)
AE	Digital Speed Pickup (15 pulse), 127 [5.0] lead wire with weather pack shroud connector (A=Power, B=Signal, C=Common)

21 22 Manifold block options

00	None
*****	Contact your Eaton sales representative for available options.

23 24 Special features (hardware)

00	None
AB	Low speed valving
JM	Low flow housing and low speed valving
EX	ATEX certification

25 Special features (assembly)

0	None
1	Reverse rotation
2	Flange rotated 90°

26 27 Paint/special packaging

00	No paint
AA	Low gloss black primer
AF	Environmental coated black
AY	Nickel plated motor (excluding shaft)

28 29 Eaton assigned code when applicable

00	None

30 Eaton assigned design code

J	Nine

See Eatonpowersource.com/ for more options and configurations.

Description

The Char-Lynn S Series motors with optimized Geroler geometry offers enhanced performance with reduced drive-running angle while retaining a compact package size. Design features include a steel end cap and optimized Geroler set for high performance. The Geroler set has precision machined rollers in the outer ring which provide support with rolling contact between the star and ring. This improves mechanical efficiency, especially at start-up and at low speed conditions. The S Series motor provides reliable leak-free performance and smooth operation at start-up conditions.

Specifications

Geroler element	10 Displacements
Flow l/min [GPM]	55 [15] Continuous***
	75 [20] Intermittent**
Speed	Up to 960 RPM
Pressure bar [PSI]	135 [2000] Cont.***
	170 [2500] Inter.**
Torque Nm [lb-in]	465 [4112] Cont.***
	530 [4687] Inter.**

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

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

Features:

- Constant clearance Geroler design
- Three moving components (gerotor, drive, shaft)
- Optimized drive running angle
- Three-zone pressure design (inlet, return and case)
- Variety of displacements, shafts and mounts

Benefits:

- High efficiency
- Smooth low speed operation
- Extended motor life
- Design flexibility
- Ability to optimize designs for your application needs
- Extended leak-free performance

Applications:

- Agricultural augers, harvesters, seeders
- Car wash brushes
- Food processing
- Railroad maintenance equipment
- Machine tools
- Conveyors
- Industrial sweepers and floor polishers
- Saw mill works
- Turf equipment
- Concrete and asphalt equipment
- Skid steer attachments


Casting

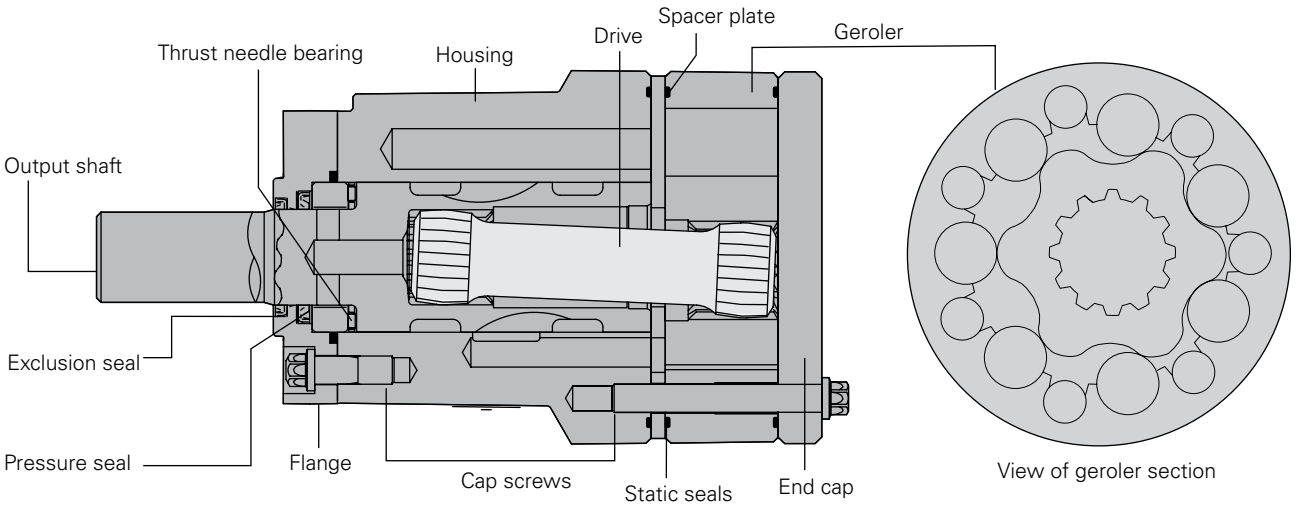

Conveyor


Amusement ride


Combine

S Series (103-)

Specifications



Specification data — S motors

Displ. cm³/r [in³/r]		59 [3.6]	75 [4.6]	97 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]
Max. Speed (RPM) @ continuous flow		960	741	602	469	389	341	304	253	190	153
Flow LPM [GPM]	Continuous	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]
	Intermittent	68 [18]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	114 [1011]	147 [1297]	182 [1610]	233 [2059]	266 [2358]	304 [2692]	331 [2932]	369 [3265]	433 [3835]	465 [4112]
	Intermittent	143 [1264]	184 [1628]	227 [2012]	289 [2559]	327 [2894]	366 [3239]	400 [3539]	440 [3894]	512 [4536]	530 [4687]
Min. Starting torque Nm[lb-in]	@ Cont. Pressure	90 [800]	113 [1000]	148 [1310]	184 [1630]	212 [2050]	232 [2330]	263 [2670]	302 [2990]	338 [3270]	369 [3270]
	@ Int. Pressure	116 [1030]	146 [1290]	190 [1680]	236 [2090]	271 [2400]	289 [2560]	329 [2910]	374 [3310]	417 [3690]	438 [3880]
Pressure Δ Bar [Δ PSI]	Continuous	138 [2000]	138 [2000]	138 [2000]	138 [2000]	131 [1900]	131 [1900]	128 [1850]	117 [1700]	103 [1500]	90 [1300]
	Intermittent	172 [2500]	172 [2500]	172 [2500]	172 [2500]	162 [2350]	159 [2300]	155 [2250]	141 [2050]	124 [1800]	103 [1500]
Weight kg [lbs]		6.1 [13.4]	6.2 [13.7]	6.4 [14.1]	6.6 [14.6]	6.8 [15.0]	6.9 [15.2]	7.1 [15.7]	7.4 [16.3]	7.9 [17.4]	8.4 [18.5]

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

A simultaneous maximum torque and maximum speed NOT recommended.

Note: To assure best motor life, run motor in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

Maximum Inlet Pressure:
172 Bar [2500 PSI] without regard to Δ Bar [Δ PSI] and/ or back pressure ratings or combination thereof. 6B Splined or Tapered shafts are recommended whenever operating above 282 Nm [2500 lb-in] of torque, especially for those applications subject to frequent reversals.

Δ Pressure:
The true Δ bar [Δ PSI] 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, level 20/18/13

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temprature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

B-3

Δ Pressure bar [PSI]
S Motor 59 cm³/r [3.6 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	28	41	55	69	83	97	110	124	138	172
[2]	[86]	[190]	[292]	[390]	[484]	[578]	[662]	[729]	[764]	[803]	
	10	22	33	44	55	65	75	82	86	91	
8	126	121	115	107	97	85	75	63	45	24	
[4]	[79]	[185]	[289]	[395]	[498]	[600]	[702]	[804]	[903]	[998]	[1156]
	9	21	33	45	56	68	79	91	102	113	131
15	256	250	243	235	224	212	199	183	166	147	89
[6]	[71]	[177]	[280]	[387]	[495]	[602]	[704]	[808]	[909]	[1011]	[1257]
	8	20	32	44	56	68	80	91	103	114	142
23	383	377	369	360	349	336	320	302	284	266	207
[8]	[62]	[166]	[274]	[379]	[488]	[594]	[699]	[806]	[907]	[1007]	[1264]
	7	19	31	43	55	67	79	91	102	114	143
30	514	508	500	490	477	464	448	430	409	390	333
[10]	[52]	[155]	[264]	[369]	[475]	[583]	[686]	[793]	[897]	[1000]	[1257]
	6	17	30	42	54	66	78	90	101	113	142
38	642	635	628	617	605	591	575	557	538	517	461
[12]	[38]	[141]	[248]	[354]	[462]	[568]	[674]	[777]	[884]	[987]	[1244]
	4	16	28	40	52	64	76	88	100	111	141
45	772	764	757	747	736	722	706	687	670	648	592
[14]	[21]	[125]	[231]	[337]	[445]	[551]	[658]	[763]	[868]	[972]	[1233]
	2	14	26	38	50	62	74	86	98	110	139
53	900	893	885	876	866	852	836	819	798	778	721
[15]	[8]	[116]	[223]	[328]	[434]	[543]	[648]	[756]	[862]	[965]	[1225]
	1	13	25	37	49	61	73	85	97	109	138
Max. Continuous 57	960	958	949	940	929	915	900	882	863	842	784
[18]		[86]	[191]	[296]	[403]	[511]	[617]	[726]	[831]	[935]	[1195]
		10	22	33	46	58	70	82	94	106	135
Max. Intermittent 68		1151	1139	1128	1117	1105	1090	1074	1054	1033	977

Max. Continuous
Max. Intermittent

S Series (103-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
S Motor 75 cm³/r [4.6 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	28	41	55	69	83	97	110	124	138	172
[2]	[91]	[218]	[343]	[467]	[590]	[708]	[815]	[900]	[981]	[1086]	
	10	25	39	53	67	80	92	102	111	123	
8	93	89	81	75	66	59	43	31	23	16	
[4]	[87]	[217]	[352]	[484]	[616]	[748]	[874]	[1001]	[1123]	[1236]	[1472]
	10	25	40	55	70	85	99	113	127	140	166
15	193	188	181	173	163	150	139	125	107	89	37
[6]	[82]	[219]	[355]	[492]	[627]	[763]	[898]	[1027]	[1155]	[1284]	[1590]
	9	25	40	56	71	86	101	116	131	145	180
23	292	286	277	269	258	244	228	214	202	186	140
[8]	[69]	[202]	[341]	[481]	[619]	[761]	[896]	[1032]	[1165]	[1296]	[1618]
	8	23	38	54	70	86	101	117	132	146	183
30	390	384	375	364	355	342	326	309	295	276	230
[10]	[56]	[193]	[330]	[471]	[610]	[751]	[887]	[1025]	[1162]	[1297]	[1628]
	6	22	37	53	69	85	100	116	131	147	184
38	489	484	476	467	457	444	431	416	399	381	336
[12]	[39]	[175]	[315]	[453]	[595]	[736]	[873]	[1011]	[1148]	[1284]	[1617]
	4	20	36	51	67	83	99	114	130	145	183
45	587	582	573	564	552	540	526	510	494	476	427
[14]	[12]	[153]	[290]	[431]	[571]	[716]	[856]	[993]	[1129]	[1265]	[1605]
	1	17	33	49	65	81	97	112	128	143	181
53	691	680	673	665	654	641	628	613	594	578	533
[15]	[9]	[143]	[281]	[424]	[567]	[708]	[846]	[985]	[1121]	[1259]	[1599]
	1	16	32	48	64	80	96	111	127	142	181
Max. Continuous 57	741	729	723	714	704	690	675	661	644	628	580
[20]		[82]	[220]	[362]	[505]	[645]	[784]	[922]	[1061]	[1200]	[1545]
		9	25	41	57	73	89	104	120	136	175
Max. Intermittent 76		970	963	957	948	935	921	906	888	871	825

Max. Continuous
Max. Intermittent

[143] Torque [lb-in]
16 Nm
729 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
S Motor 93 cm³/r [5.7 in³/r]

Flow LPM [GPM]		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2500] 172
	[2]	[146]	[308]	[466]	[620]	[771]	[913]	[1031]	[1086]	[1176]	[1281]	
		16	35	53	70	87	103	116	123	133	145	
	8	76	72	64	55	48	34	22	7	4	1	
	[4]	[136]	[301]	[466]	[633]	[797]	[959]	[1116]	[1275]	[1430]	[1570]	[1798]
		15	34	53	72	90	108	126	144	162	177	203
	15	158	153	146	138	126	115	103	90	77	59	17
	[6]	[113]	[278]	[446]	[616]	[786]	[952]	[1116]	[1280]	[1444]	[1603]	[1971]
		13	31	50	70	89	108	126	145	163	181	223
	23	238	232	225	215	206	191	175	161	145	129	87
	[8]	[98]	[262]	[431]	[604]	[777]	[947]	[1112]	[1279]	[1446]	[1610]	[2006]
		11	30	49	68	88	107	126	144	163	182	227
	30	319	313	306	296	284	270	255	240	224	208	165
	[10]	[81]	[246]	[415]	[590]	[763]	[935]	[1100]	[1271]	[1439]	[1604]	[2012]
		9	28	47	67	86	106	124	144	163	181	227
	38	400	394	388	378	366	353	340	324	306	288	244
	[12]	[65]	[232]	[401]	[574]	[746]	[916]	[1081]	[1255]	[1425]	[1591]	[2001]
		7	26	45	65	84	103	122	142	161	180	226
	45	481	476	469	460	448	435	423	408	394	374	326
	[14]	[42]	[207]	[376]	[552]	[721]	[893]	[1064]	[1235]	[1405]	[1570]	[1983]
		5	23	43	62	81	101	120	140	159	177	224
	53	561	557	549	541	531	519	504	489	470	455	412
	[15]	[31]	[196]	[364]	[538]	[708]	[881]	[1052]	[1223]	[1391]	[1560]	[1974]
		4	22	41	61	80	100	119	138	157	176	223
Max. Continuous	57	602	597	591	582	571	559	546	530	514	498	453
	[20]		[119]	[290]	[461]	[633]	[807]	[976]	[1145]	[1315]	[1485]	[1904]
			13	33	52	72	91	110	129	149	168	215
Max. Intermittent	76		799	792	785	775	762	748	734	717	702	660

Max. Continuous
Max. Intermittent

S Series (103-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
S Motor 120 cm³/r [7.3 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	28	41	55	69	83	97	110	124	138	172
[2]	[191]	[403]	[605]	[801]	[978]	[1146]	[1288]	[1440]	[1552]	[1679]	
	22	46	68	91	110	129	146	163	175	190	
8	60	56	50	43	36	29	19	15	8	6	
[4]	[188]	[403]	[617]	[829]	[1031]	[1236]	[1438]	[1632]	[1816]	[1990]	[1914]
	21	46	70	94	117	140	162	184	205	225	216
15	122	118	112	106	98	87	78	67	56	49	16
[6]	[172]	[391]	[607]	[821]	[1030]	[1241]	[1449]	[1654]	[1858]	[2056]	[2522]
	19	44	69	93	116	140	164	187	210	232	285
23	186	180	175	167	159	149	137	126	114	103	73
[8]	[156]	[375]	[593]	[807]	[1015]	[1229]	[1439]	[1648]	[1855]	[2059]	[2557]
	18	42	67	91	115	139	163	186	210	233	289
30	249	244	237	229	220	210	199	185	174	162	128
[10]	[130]	[349]	[567]	[785]	[995]	[1210]	[1420]	[1630]	[1838]	[2045]	[2559]
	15	39	64	89	112	137	160	184	208	231	289
38	311	307	301	293	286	275	264	252	239	227	193
[12]	[103]	[320]	[539]	[756]	[965]	[1175]	[1383]	[1593]	[1799]	[2003]	[2500]
	12	36	61	85	109	133	156	180	203	226	282
45	374	369	363	355	346	336	327	314	303	288	253
[14]	[70]	[285]	[502]	[715]	[923]	[1131]	[1335]	[1540]	[1745]	[1948]	[2452]
	8	32	57	81	104	128	151	174	197	220	277
53	437	433	427	419	411	402	391	379	369	355	322
[15]	[54]	[267]	[485]	[705]	[913]	[1122]	[1329]	[1540]	[1746]	[1947]	[2441]
	6	30	55	80	103	127	150	174	197	220	276
Max. Continuous 57	469	465	459	452	444	433	423	411	400	386	349
[20]		[159]	[377]	[600]	[815]	[1026]	[1232]	[1444]	[1651]	[1859]	[2383]
		18	43	68	92	116	139	163	186	210	269
Max. Intermittent 76		621	618	612	603	594	583	571	560	549	515

[267] Torque [lb-in]
30 Nm
465 Speed RPM

Max. Continuous
Max. Intermittent

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
S Motor 144 cm³/r [8.8 in³/r]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1900]	[2350]
	14	28	41	55	69	83	97	110	124	131	162
[2]	[222]	[480]	[729]	[967]	[1190]	[1402]	[1591]	[1786]	[2031]	[2107]	
	25	54	82	109	134	158	180	202	229	238	
8	49	45	40	34	29	21	17	15	14	13	
[4]	[217]	[475]	[728]	[987]	[1237]	[1488]	[1727]	[1957]	[2181]	[2292]	[2310]
	24	54	82	112	140	168	195	221	246	259	261
15	101	97	91	84	77	69	61	52	45	42	22
[6]	[193]	[453]	[715]	[976]	[1234]	[1494]	[1746]	[1995]	[2239]	[2358]	[2867]
	22	51	81	110	139	169	197	225	253	266	324
23	153	149	143	136	128	119	110	101	91	86	66
[8]	[173]	[434]	[699]	[961]	[1218]	[1479]	[1735]	[1984]	[2235]	[2358]	[2894]
	20	49	79	109	138	167	196	224	252	266	327
30	205	202	195	187	179	170	160	150	139	134	109
[10]	[144]	[407]	[673]	[940]	[1197]	[1459]	[1715]	[1967]	[2218]	[2344]	[2890]
	16	46	76	106	135	165	194	222	251	265	327
38	259	254	247	240	231	221	211	202	191	185	158
[12]	[118]	[380]	[644]	[907]	[1167]	[1429]	[1685]	[1941]	[2194]	[2319]	[2878]
	13	43	73	102	132	161	190	219	248	262	325
45	312	307	301	294	286	277	267	257	246	241	217
[14]	[87]	[346]	[610]	[871]	[1131]	[1395]	[1651]	[1907]	[2163]	[2289]	[2851]
	10	39	69	98	128	158	187	215	244	259	322
53	363	359	354	346	339	330	319	309	299	293	266
[15]	[69]	[327]	[592]	[853]	[1113]	[1376]	[1633]	[1890]	[2146]	[2271]	[2835]
	8	37	67	96	126	156	185	214	242	257	320
Max. Continuous 57	389	386	380	372	364	355	344	336	323	317	289
[20]		[200]	[460]	[726]	[987]	[1251]	[1512]	[1770]	[2025]	[2153]	[2724]
		23	52	82	112	141	171	200	229	243	308
Max. Intermittent 76		516	513	507	499	491	480	470	459	454	427

Max. Continuous	Max. Intermittent

S Series (103-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

B-3

Δ Pressure bar [PSI]
S Motor 166 cm³/r [10.1 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	Max. Continuous [1900]	Max. Intermittent [2300]
	14	28	41	55	69	83	97	110	124	131	159
[2]	[267]	[563]	[841]	[1105]	[1364]	[1622]	[1852]	[2081]	[2288]		
	30	64	95	125	154	183	209	235	259		
8	43	39	35	30	27	21	16	13	10		
[4]	[247]	[544]	[838]	[1129]	[1418]	[1707]	[1988]	[2255]	[2514]	[2641]	[3116]
	28	61	95	128	160	193	225	255	284	298	352
15	89	85	80	74	68	60	53	47	41	38	28
[6]	[217]	[517]	[813]	[1108]	[1401]	[1700]	[1994]	[2281]	[2559]	[2692]	[3214]
	25	58	92	125	158	192	225	258	289	304	363
23	134	131	125	120	113	105	96	88	79	75	58
[8]	[195]	[494]	[794]	[1089]	[1387]	[1687]	[1983]	[2269]	[2552]	[2691]	[3239]
	22	56	90	123	157	191	224	256	288	304	366
30	180	176	171	164	156	147	138	128	118	114	96
[10]	[176]	[477]	[776]	[1072]	[1371]	[1668]	[1960]	[2249]	[2537]	[2676]	[3228]
	20	54	88	121	155	188	221	254	287	302	365
38	227	222	217	210	203	194	185	175	165	160	136
[12]	[136]	[436]	[737]	[1037]	[1335]	[1636]	[1928]	[2217]	[2509]	[2651]	[3210]
	15	49	83	117	151	185	218	251	284	300	363
45	272	269	264	258	249	241	233	223	214	208	186
[14]	[93]	[394]	[696]	[995]	[1296]	[1599]	[1890]	[2185]	[2475]	[2617]	[3178]
	11	44	79	112	146	181	214	247	280	296	359
53	318	315	310	303	296	287	279	269	259	254	230
[15]	[73]	[371]	[672]	[973]	[1272]	[1575]	[1867]	[2159]	[2453]	[2596]	[3158]
	8	42	76	110	144	178	211	244	277	293	357
Max. Continuous 57	341	338	333	326	319	309	300	290	280	274	253
[20]		[227]	[527]	[829]	[1128]	[1430]	[1724]	[2020]	[2313]	[2457]	[3030]
		26	60	94	127	162	195	228	261	278	342
Max. Intermittent 76		452	449	443	435	426	417	407	396	390	366

[371] Torque [lb-in]
42 Nm
338 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

B-3

Δ Pressure bar [PSI]
S Motor 187 cm³/r [11.4 in³/r]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	**Max. Continuous** [1850]	**Max. Intermittent** [2250]
	14	28	41	55	69	83	97	110	124	128	155
[2]	[298]	[627]	[944]	[1244]	[1532]	[1805]	[2030]	[2250]	[2478]		
	34	71	107	141	173	204	229	254	280		
8	37	34	31	25	22	18	10	9	7		
[4]	[298]	[640]	[969]	[1291]	[1607]	[1919]	[2219]	[2511]	[2799]	[2869]	[3411]
	34	72	109	146	182	217	251	284	316	324	385
15	78	75	70	65	60	53	47	41	35	33	19
[6]	[279]	[621]	[953]	[1283]	[1608]	[1930]	[2243]	[2551]	[2850]	[2922]	[3502]
	32	70	108	145	182	218	253	288	322	330	396
23	119	115	110	104	97	89	82	74	66	64	50
[8]	[252]	[593]	[928]	[1257]	[1579]	[1905]	[2224]	[2542]	[2855]	[2932]	[3539]
	28	67	105	142	178	215	251	287	323	331	400
30	160	156	151	144	137	129	120	110	101	99	78
[10]	[211]	[555]	[888]	[1217]	[1546]	[1872]	[2193]	[2516]	[2831]	[2909]	[3518]
	24	63	100	138	175	211	248	284	320	329	397
38	201	198	193	187	180	173	164	154	143	141	114
[12]	[162]	[502]	[835]	[1164]	[1490]	[1818]	[2139]	[2463]	[2780]	[2857]	[3476]
	18	57	94	131	168	205	242	278	314	323	393
45	243	240	235	229	222	214	206	196	184	181	154
[14]	[118]	[452]	[786]	[1117]	[1443]	[1772]	[2095]	[2417]	[2736]	[2814]	[3438]
	13	51	89	126	163	200	237	273	309	318	388
53	283	280	276	270	262	254	245	235	224	221	194
[15]	[91]	[425]	[759]	[1089]	[1418]	[1747]	[2068]	[2389]	[2708]	[2786]	[3410]
	10	48	86	123	160	197	234	270	306	315	385
Max. Continuous 57	304	301	296	290	283	274	265	256	243	240	214
[20]		[259]	[590]	[925]	[1255]	[1585]	[1907]	[2229]	[2552]	[2633]	[3265]
		29	67	105	142	179	216	252	288	297	369
Max. Intermittent 76		403	400	394	387	379	370	359	347	344	319

S Series (103-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
S Motor 225 cm³/r [13.7 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1700]	[2050]
	14	28	41	55	69	83	97	110	117	141
[2]	[358]	[765]	[1139]	[1498]	[1842]	[2163]	[2474]	[2738]	[2894]	
	40	86	129	169	208	244	280	309	327	
8	32	29	27	23	20	16	12	10	8	
[4]	[367]	[774]	[1177]	[1577]	[1956]	[2325]	[2680]	[3022]	[3191]	[3753]
	41	87	133	178	221	263	303	341	361	424
15	66	63	60	55	50	46	40	34	31	23
[6]	[348]	[758]	[1161]	[1567]	[1960]	[2344]	[2716]	[3083]	[3264]	[3863]
	39	86	131	177	221	265	307	348	369	437
23	99	96	92	88	82	76	70	63	59	45
[8]	[313]	[721]	[1124]	[1529]	[1921]	[2312]	[2696]	[3073]	[3265]	[3894]
	35	81	127	173	217	261	305	347	369	440
30	133	132	127	123	117	111	104	96	92	76
[10]	[262]	[669]	[1069]	[1473]	[1859]	[2247]	[2627]	[2997]	[3184]	[3810]
	30	76	121	166	210	254	297	339	360	430
38	167	165	161	157	152	146	139	130	126	107
[12]	[203]	[609]	[1006]	[1400]	[1782]	[2160]	[2531]	[2912]	[3098]	[3721]
	23	69	114	158	201	244	286	329	350	420
45	202	199	196	191	186	180	173	165	160	141
[14]	[143]	[544]	[938]	[1324]	[1700]	[2079]	[2452]	[2824]	[3008]	[3639]
	16	62	106	150	192	235	277	319	340	411
53	236	233	230	225	219	214	207	199	194	177
[15]	[106]	[504]	[897]	[1281]	[1653]	[2027]	[2393]	[2761]	[2944]	[3576]
	12	57	101	145	187	229	270	312	333	404
Max. Continuous 57	253	251	248	243	237	231	224	215	211	192
[20]		[303]	[697]	[1091]	[1477]	[1854]	[2214]	[2581]	[2765]	[3399]
		34	79	123	167	210	250	292	312	384
Max. Intermittent 76		336	334	330	325	318	312	304	298	282

Max. Continuous

Max. Intermittent

[504] Torque [lb-in]
57 Nm
251 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

B-3

Δ Pressure bar [PSI]
S Motor 298 cm³/r [18.2 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1500] 103	[1800] 124
[2]	[487]	[1009]	[1509]	[1991]	[2460]	[2931]	[3360]	[3577]	[4113]
	55	114	170	225	278	331	380	404	465
8	24	22	20	18	17	14	11	10	8
[4]	[498]	[1043]	[1576]	[2093]	[2597]	[3087]	[3567]	[3798]	[4500]
	56	118	178	236	293	349	403	429	508
15	49	47	45	41	38	34	31	29	25
[6]	[470]	[1017]	[1552]	[2080]	[2594]	[3097]	[3594]	[3835]	[4536]
	53	115	175	235	293	350	406	433	513
23	74	72	69	66	62	57	52	49	42
[8]	[423]	[967]	[1502]	[2031]	[2549]	[3062]	[3563]	[3807]	[4526]
	48	109	170	229	288	346	403	430	511
30	100	98	95	92	88	83	77	73	64
[10]	[357]	[901]	[1433]	[1961]	[2477]	[2989]	[3486]	[3730]	[4456]
	40	102	162	222	280	338	394	421	504
38	126	124	121	118	113	108	101	97	87
[12]	[287]	[826]	[1357]	[1884]	[2402]	[2917]	[3410]	[3652]	[4363]
	32	93	153	213	271	330	385	413	493
45	152	150	147	144	140	134	126	121	109
[14]	[199]	[733]	[1261]	[1786]	[2303]	[2818]	[3316]	[3561]	[4276]
	22	83	142	202	260	318	375	402	483
53	177	176	173	170	165	160	152	147	134
[15]	[154]	[688]	[1218]	[1742]	[2258]	[2771]	[3273]	[3518]	[4241]
	17	78	138	197	255	313	370	398	479
Max. Conts. 57	190	189	186	183	178	173	165	160	146
[20]		[418]	[945]	[1471]	[1986]	[2502]	[3004]	[3253]	[3997]
		47	107	166	224	283	339	368	452
Max. Conts. 76		253	251	248	244	239	231	226	212

Max. Continuous Max. Intermittent

Δ Pressure bar [PSI]
S Motor 372 cm³/r [22.7 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1300] 90	[1500] 103
[2]	[629]	[1287]	[1905]	[2501]	[3066]	[3624]	[3886]	[4370]
	71	145	215	283	346	409	439	494
8	19	18	16	14	13	11	9	7
[4]	[628]	[1304]	[1962]	[2600]	[3206]	[3799]	[4082]	[4642]
	71	147	222	294	362	429	461	525
15	40	38	36	34	30	27	25	23
[6]	[587]	[1261]	[1926]	[2578]	[3203]	[3813]	[4112]	[4687]
	66	142	218	291	362	431	465	530
23	60	59	56	54	50	45	43	38
[8]	[529]	[1201]	[1867]	[2518]	[3148]	[3769]	[4072]	[4657]
	60	136	211	285	356	426	460	526
30	81	79	77	75	71	66	64	58
[10]	[451]	[1124]	[1779]	[2429]	[3056]	[3678]	[3983]	[4583]
	51	127	201	274	345	416	450	518
38	102	100	98	96	92	86	84	78
[12]	[359]	[1030]	[1688]	[2333]	[2963]	[3587]	[3889]	[4482]
	41	116	191	264	335	405	439	506
45	122	121	119	117	113	107	104	98
[14]	[256]	[922]	[1577]	[2226]	[2864]	[3487]	[3787]	[4381]
	29	104	178	252	324	394	428	495
53	143	142	140	137	134	128	126	119
[15]	[199]	[862]	[1514]	[2167]	[2797]	[3424]	[3727]	[4322]
	22	97	171	245	316	387	421	488
Max. Conts. 57	153	152	150	148	144	138	135	129
[20]		[534]	[1187]	[1832]	[2470]	[3093]	[3402]	[4004]
		60	134	207	279	349	384	452
Max. Conts. 76		204	202	200	197	192	189	183

[862] 97 152 } Torque [lb-in] Nm Speed RPM

Dimensions

Ports

Standard rotation viewed from shaft end

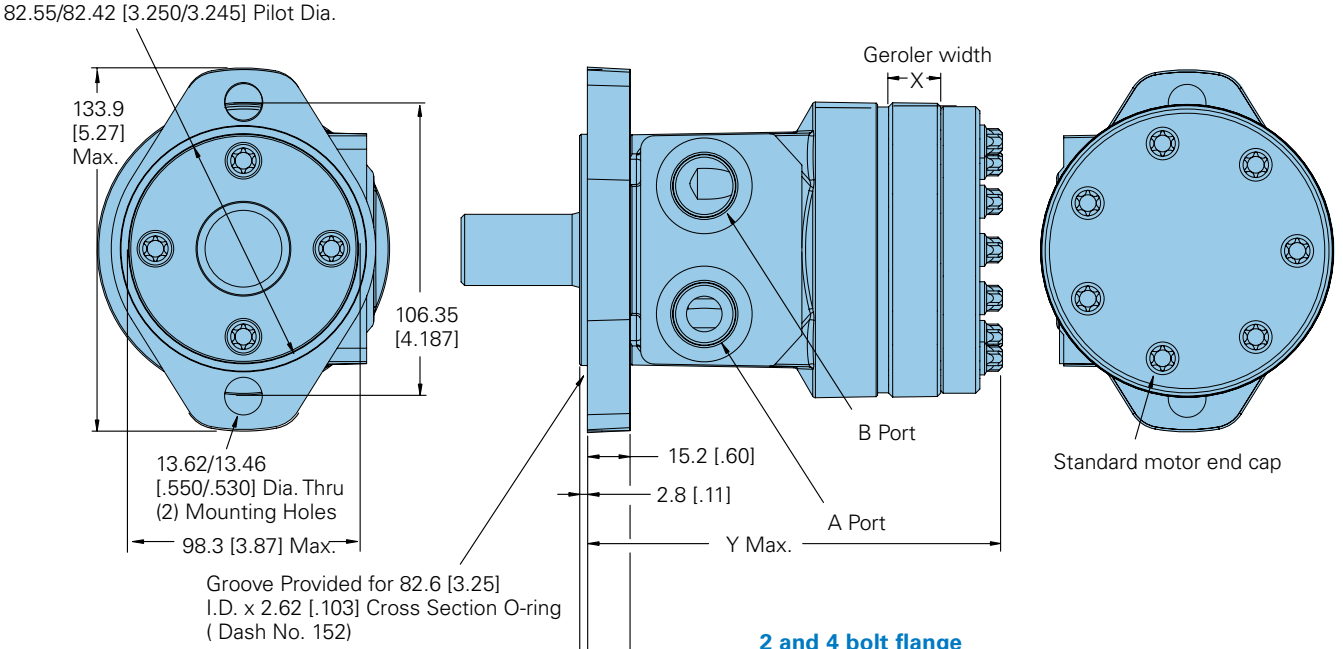
Port A pressurized — CW

Port B pressurized — CCW

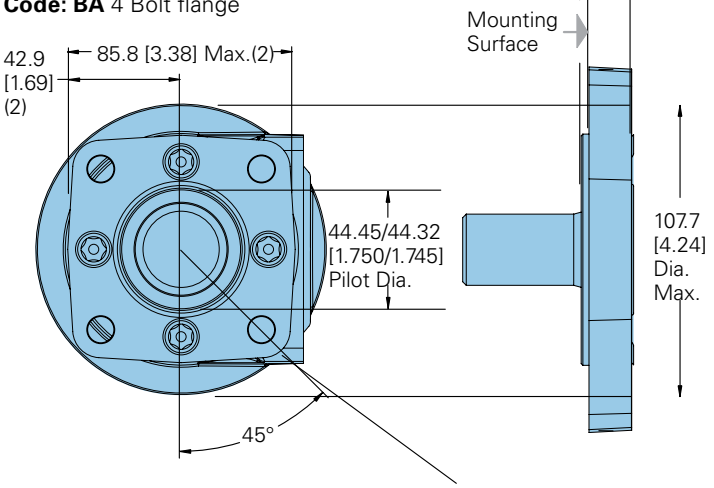
Note: Mounting surface flatness requirement is 13 mm [.005 inch] Max.

B-3

Code: AA 2 Bolt flange



Code: BA 4 Bolt flange



3/8-16 UNC (15.2 [.60] Max. Bolt Thread Engagement)
Mounting Holes (4) Equally Spaced on 82.6 [3.25] Dia. Bolt Circle
or
M10 x 1.5 (15.2 [.60] Max. Bolt Thread Engagement) Mounting Holes (4) Equally Spaced on 82.6 [3.25] Dia. Bolt Circle

2 and 4 bolt flange

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
58 [3.6]	7.5 [.30]	138.0 [5.43]
76 [4.6]	9.8 [.39]	140.3 [5.52]
93 [5.7]	12.0 [.47]	142.5 [5.61]
120 [7.3]	15.5 [.61]	146.0 [5.75]
144 [8.8]	18.6 [.73]	149.1 [5.87]
165 [10.1]	21.3 [.84]	151.8 [5.98]
186 [11.4]	24.0 [.94]	154.5 [6.08]
225 [13.7]	28.9 [1.14]	159.4 [6.28]
299 [18.2]	38.5 [1.52]	169.0 [6.66]
371 [22.7]	47.9 [1.88]	178.4 [7.02]

Use three-digit prefix (103-) plus four-digit number from charts for complete product number (ex: 103-1093). Orders will not be accepted without the three-digit prefix.

2 Bolt flange

Shaft	Port size	Displ. cm³/ r [in³/ r] / product number									
		59 [3.6]	75 [4.6]	93 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]
1 in. Straight w/ Woodruff Key	7/8-14 O-Ring	103-1537	-1034	-1035	-1538	-1539	-1036	-1037	-1038	-1039	-1040
	1/2 NPTF	103-1540	-1026	-1027	-1541	-1542	-1028	-1029	-1030	-1031	-1032
	Manifold	103-1543	-1042	-1043	-1544	-1545	-1044	-1045	-1046	-1047	-1048
1 in. SAE 6B Splined	7/8-14 O-Ring	103-1552	-1082	-1083	-1553	-1554	-1084	-1085	-1086	-1087	-1088
	1/2 NPTF	103-1555	-1074	-1075	-1556	-1557	-1076	-1077	-1078	-1079	-1080
	Manifold	103-1558	-1090	-1091	-1559	-1560	-1092	-1093	-1094	-1095	-1096

103-1560

4 Bolt flange

Shaft	Port size	Displ. cm³/ r [in³/ r] / product number									
		59 [3.6]	75 [4.6]	93 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]
1 in. Straight w/ Woodruff key O-Ring	7/8-14 O-Ring	103-1570	-1010	-1011	-1571	-1572	-1012	-1013	-1014	-1015	-1016
	1/2 NPTF	103-1573	-1002	-1003	-1574	-1575	-1004	-1005	-1006	-1007	-1008
	Manifold	103-1576	-1018	-1019	-1577	-1578	-1020	-1021	-1022	-1023	-1024
1 in. SAE 6B Splined	7/8-14 O-Ring	–	-1058	-1059	–	-1581	-1060	-1061	-1062	-1063	-1064
	1/2 NPTF	–	-1050	-1051	-1583	-1584	-1052	-1053	-1054	-1055	-1056
	Manifold	103-1585	-1066	-1067	–	-1587	-1068	-1069	-1070	–	-1072

103-1587

For S Series Motors with a configuration Not Shown in the charts above: Use the model code system on page B-3-48 to specify the product in detail.

S Series with low speed valving

Product numbers

Motors with the low speed valving option enable very smooth low speed operation while maintaining high torque.

Designed to run continuously at up to 200 RPM at standard rated pressures and reduced flows, this option provides smooth operation at low speeds. Furthermore, they resist slippage and have more momentary load holding ability than the standard H and S Series motors. Motors with this valving are not intended for low pressure applications (A minimum of 300 psi delta must be maintained between A port pressure and case pressure). Shaft side / radial load ratings are not affected by this valving.

Use digit prefix—103- plus four digit number from charts for complete product number-—Example: 103-2678.

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

2 Bolt flange

Shaft	Port size	Displ. cm³/ r [in³/ r] / product number									
		59 [3.6]	75 [4.6]	93 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]
1 in. Straight w/ Woodruff Key	7/8 -14 O-Ring	103- —	-1427	-1428	—	—	-1429	-1430	-1431	-1432	-1433
	1/2 NPTF	103- —	-1419	-1420	—	—	-1421	-1422	-1423	-1424	-1425
	Manifold*	103- —	—	—	—	—	—	—	—	—	—
1 in. SAE 6B Splined	7/8 -14 O-Ring	103- —	-1525	—	—	-2692	—	-2764	—	-3373	-3155
	1/2 NPTF	103- —	—	-1634	—	—	-2690	—	—	—	—
	Manifold*	103- —	-1522	—	—	—	—	—	—	—	-1527

4 Bolt flange

Shaft	Port size	Displ. cm³/ r [in³/ r] / product number									
		59 [3.6]	75 [4.6]	93 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]
1 in. Straight w/ Woodruff Key	7/8 -14 O-Ring	103- —	-1410	-1411	-1626	-2531	-1412	—	—	-1415	-1416
	1/2 NPTF	103- —	-1402	-1403	—	—	-1404	-1405	-1406	-1407	-1408

103-1404 103-1408

* Manifold product numbers shown are for motors with four 5/16-18 port face mounting threads. Manifold, manifold mounting O-Rings and bolts are NOT included.

For S Series Motors with a configuration Not Shown in the charts above: Use the model code system on page B-3-48 to specify the product in detail.

The following 25-digit coding system has been developed to identify all of the configuration options for the S motor. Use this model code to specify a motor with the desired features. All 25-digits of the code must be present when ordering.

M	S0	***	**	**	**	**	0	*	**	**	00	**	*	**	00	M
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

S0	S Series Motor

4 5 6 Displacement cm³/r [in³/r]

036	58 [3.6]
046	76 [4.6]
057	93 [5.7]
073	120 [7.3]
088	144 [8.8]
101	165 [10.1]
114	186 [11.4]
137	224 [13.7]
182	299 [18.2]
227	371 [22.7]

7 8 Mounting type

AA	2 Bolt Std: 82.50 [3.248] Dia. x 3.05 [.120] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C.
BA	4 Bolt Std: 44.40 [1.748] Dia. x 3.05 [.120] Pilot, .375-16 UNC-2B Mounting Holes on 82.55 [3.250] Dia. B.C.
DD	2 Bolt Std: 101.60 [4.000] Dia. x 6.10 [.240] Pilot, 14.35 [.565] Dia. Mounting Holes on 146.05 [5.750] Dia. B.C. (SAE B) (Ductile)
EA	4 Bolt Magneto: 82.50 [3.248] Dia. x 3.05 [.120] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C.
FA	4 Bolt Std: 44.40 [1.748] Dia. x 3.05 [.120] Pilot, M10 x 1.5-6h Mounting Holes on 82.55 [3.250] Dia. B.C.
MA	2 Bolt (Standard) 82.50 [3.248] Dia. x 8.13 [.320] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C.

9 10 Output shaft

01	25.4 [1.00] Dia. Straight, woodruff key, .250-20 UNC-2B hole in shaft end
02	25.4 [1.00] Dia. SAE 6B Spline, .250-20 UNC-2B hole in shaft end
08	25.4 [1.00] Dia. Straight, 10.31 [.406] Dia. crosshole 15.7 [.62] from end, .250-20 UNC-2B hole in shaft end
16	22.22 [.875] Dia. SAE 13 tooth spline (SAE B)
18	25.4 [1.00] Dia. Tapered, woodruff key and nut, 34.92 [1.375] taper length
24	25.00 [.984] Dia. Straight, 8.00 [.315] Key, M8 x 1.25-6H Hole in shaft end
39	25.00 [.984] Dia. Straight (k6), 8.00 [.315] Key, M8 x 1.25-6H hole in shaft end

11 12 Port type

AA	.875-14 UNF-2B SAE O-Ring ports
AB	.500-14 NPTF Dryseal pipe thread ports
AC	Manifold ports (.3125-18 UNC-2B mounting holes)
AD	Manifold ports (M8 x 1.25-6H Mounting Holes)
AF	G 1/2 BSP Straight thread ports

13 14 Case flow options ††

00	None specified
01	4375-20 UNF-2B SAE O-Ring port (end cap)
02	G 1/4 BSP straight THD port (end cap)
03	Manifold case drain
††	Internal check valves are standard features.

15 Geroler options

0	None specified

16 Shaft options

0	None specified
N	Electroless nickel plated

S Series (103-)

Model code

The following 25-digit coding system has been developed to identify all of the configuration options for the S motor. Use this model code to specify a motor with the desired features. All 25-digits of the code must be present when ordering.

M	S0	***	**	**	**	**	0	*	**	**	00	**	*	**	00	M
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

17 18 Seal options

00	Standard seals
02	Seal guard
03	Viton seals
07	High pressure shaft seal
15	Extreme duty shaft seal

19 20 Speed sensor options

0	**None**
AA	Digital speed pickup (15 pulse), M12 connector (A=Power, B=Common, C=Signal)
AB	Magnetic speed pickup (60 pulse by quadrature), with M12 connector (A=Power, B=Common, C=Signal)
AE	Digital speed pickup - (15 pulse) 127 [5.0] lead wire with weather pack shroud connector (A=Power, B=Signal, C=Common)

21 22 Manifold block options

00	**None**
*****	Contact your Eaton sales representative for available options.

23 24 Special features (hardware)

00	None specified
AB	Low speed valving
EX	ATEX certification

25 Special assembly instructions

0	**None**
1	Reverse rotation
2	Flange rotated 90°
3	Reverse rotation, flange rotated 90°

26 27 Paint/packaging options

00	No paint
AA	Low gloss black primer
AF	Environmental coated black
AY	Nickel plated motor (excluding shaft)

28 29 Eaton assigned code when applicable

00	None

30 Eaton assigned design code

M	Twelve

See Eatonpowersource.com/ for more options and configurations.

Description

The T Series features the latest innovations in Geroler technology. These innovations include optimized Geroler geometry with lower drive running angle for improved life and improved low speed performance. In addition, the improved housing and smaller diameter end cap results in increased envelope rigidity which improves efficiency under high pressure loads. All of these innovations come together to make the T Series motor the highest performing motor in its class.

Specifications

Geroler element	11 Displacements
Flow l/min [GPM]	61[16] Continuous***
	75 [20] Intermittent**
Speed	Up to 1021 RPM
Pressure bar [PSI]	177[2565] Cont.***
	202[2930] Inter.**
Torque Nm [lb-in]	441 [3905] Cont.***
	486 [4300] Inter.**

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

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

Features:

- Constant clearance Geroler geometry
- Optimized drive system with reduced running angle
- Three-pressure zone design (ability to reduce case pressure)
- Variety of displacements, shafts and mounts
- Special options to meet customer needs

Benefits:

- High efficiency
- Smooth low-speed operation
- Extended motor life (especially at low speed conditions)
- Design flexibility
- Ability to optimize designs for your application needs
- Extends leak-free performance

Applications:

- Agricultural augers, harvesters, seeders
- Car wash brushes
- Food processing
- Railroad maintenance equipment
- Machine tools
- Conveyors
- Industrial sweepers and floor polishers
- Saw mills
- Turf equipment
- Concrete and asphalt equipment
- Skid steer attachments


Crane (winch)

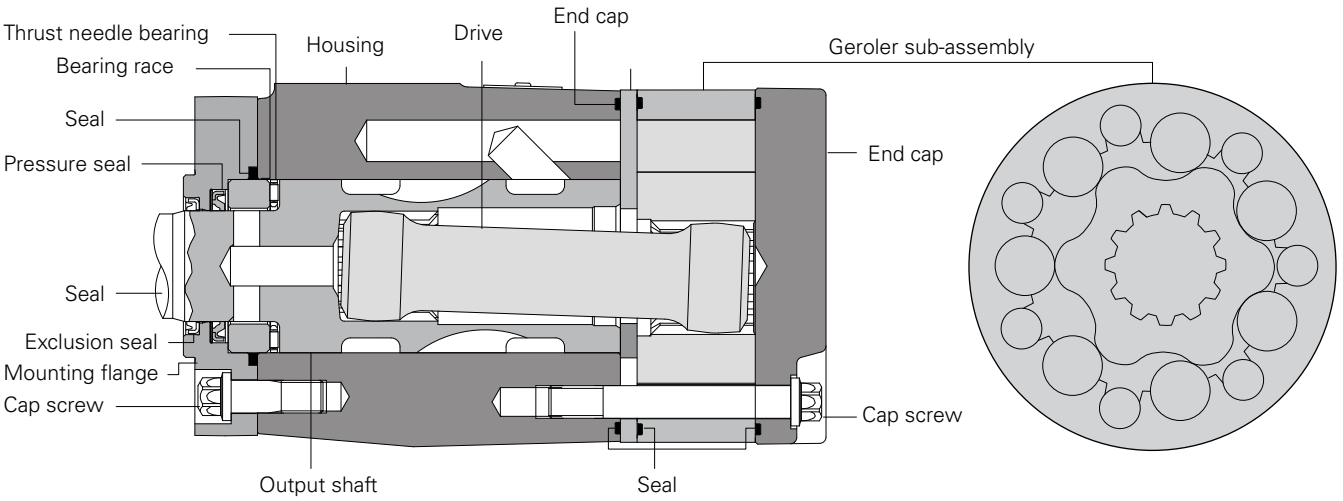

Paving


Harvester


Marine

T Series (158-)

Specifications



B-4

Specification data — T Motors

Displ. cm³/ r [in³/ r]		36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
Max. speed (RPM) @continuous flow		1021	906	898	740	586	454	379	306	244	195	162
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]
	Intermittent	38 [10]	57 [15]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	87 [766]	119 [1055]	157 [1389]	198 [1749]	248 [2192]	315 [2785]	349 [3091]	359 [3178]	410 [3633]	441 [3905]	431 [3811]
	Intermittent	99 [872]	135 [1197]	178 [1578]	225 [1992]	280 [2478]	353 [3123]	410 [3631]	445 [3936]	485 [4290]	483 [4275]	486 [4300]
Pressure Δ bar [ΔPSI]	Continuous	177 [2565]	177 [2565]	177 [2565]	177 [2565]	177 [2565]	177 [2565]	167 [2415]	138 [2000]	127 [1850]	110 [1600]	90 [1300]
	Intermittent	202 [2930]	202 [2930]	202 [2930]	202 [2930]	202 [2930]	202 [2930]	202 [2930]	177 [2565]	155 [2250]	124 [1800]	103 [1500]
Weight kg [lbs]		5.2 [11.5]	5.3 [11.7]	5.5 [12.1]	5.6 [12.3]	5.7 [12.6]	5.9 [13.0]	6.1 [13.4]	6.4 [14.1]	6.8 [15.0]	7.2 [15.9]	7.7 [17.0]

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

A simultaneous maximum torque and maximum speed NOT recommended.

Note: To assure best motor life, run motor in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

Maximum inlet pressure:
202 Bar [2900 PSI] without regard to Bar [ΔPSI] and/ or back pressure ratings or combination thereof. 6B splined or Tapered shafts are recommended whenever operation above 282 NM [2500 lb-in] of torque, especially for those applications subject to frequent reversals.

Δ Pressure:
The true Δ bar [Δ PSI] 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, level 20/18/13

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
36 cm³/r [2.2 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	[2565] Max. Continuous	[2750] Max. Intermittent	[2930]
	14	28	41	55	69	83	97	110	124	138	152	155	177	190	202
[2]	[50]	[110]	[172]	[233]	[291]	[348]	[401]	[455]	[501]	[546]	[590]	[596]	[630]	[635]	[673]
	6	12	19	26	33	39	45	51	57	62	67	67	71	72	76
8	209	203	197	191	189	181	167	164	153	139	122	116	87	64	49
[4]	[50]	[109]	[172]	[233]	[296]	[355]	[414]	[475]	[534]	[584]	[646]	[659]	[741]	[786]	[836]
	6	12	19	26	33	40	47	54	60	66	73	74	89	283	94
15	415	411	398	388	384	381	368	357	354	323	304	302	289	89	259
[6]	[43]	[108]	[171]	[233]	[298]	[361]	[420]	[479]	[538]	[595]	[657]	[672]	[766]	[824]	[872]
	5	12	19	26	34	41	47	54	61	67	74	76	87	93	99
23	617	613	602	595	585	570	563	558	534	520	504	496	456	425	409
[8]	[39]	[101]	[164]	[226]	[292]	[354]	[415]	[475]	[538]	[592]	[656]	[670]	[764]	[819]	[870]
	4	11	19	26	33	40	47	54	61	67	74	76	86	92	98
30	821	815	803	797	784	774	758	747	732	707	688	680	638	607	585
[10]	[30]	[93]	[155]	[214]	[278]	[342]	[406]	[473]	[532]	[590]	[650]	[668]	[756]	[805]	[861]
	3	11	18	24	31	39	46	53	60	67	73	75	85	91	97
38	1021	1014	1002	999	981	965	953	937	921	903	880	873	830	799	778

Max. Continuous

Max. Intermittent

[93] Torque [lb-in]
11 Nm
1014 Speed RPM

Δ Pressure bar [PSI]
49 cm³/r [3.0 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	2565 Max. Continuous	[2750] Max. Intermittent	2930
	14	28	41	55	69	83	97	110	124	138	152	155	177	190	202
[2]	[73]	[161]	[245]	[327]	[408]	[486]	[563]	[641]	[710]	[786]	[849]	[866]	968	[1023]	1079
	8	18	28	37	46	55	64	72	80	89	96	98	109	116	122
8	152	152	148	147	142	141	134	124	115	109	95	92	72	58	44
[4]	[72]	[160]	[246]	[329]	[416]	[500]	[584]	[668]	[746]	[825]	[901]	[922]	1048	[1123]	1188
	8	18	28	37	47	56	66	75	84	93	102	104	118	127	134
15	303	298	294	290	276	273	265	261	245	243	235	228	187	152	149
[6]	[58]	[148]	[234]	[326]	[413]	[500]	[583]	[663]	[746]	[827]	[909]	[928]	1055	[1131]	1197
	7	17	26	37	47	56	66	75	84	93	103	105	119	128	135
23	461	450	445	438	434	421	419	410	407	389	376	373	356	344	332
[8]	[44]	[127]	[216]	[306]	[392]	[480]	[566]	[652]	[734]	[815]	[897]	[917]	1048	[1125]	1195
	5	14	24	35	44	54	64	74	83	92	101	104	118	127	135
30	607	603	600	590	583	576	564	554	545	536	522	520	508	503	488
[10]	[39]	[128]	[213]	[302]	[391]	[477]	[562]	[647]	[731]	[815]	[897]	[917]	1041	[1121]	1191
	4	14	24	34	44	54	63	73	83	92	101	104	118	127	135
38	755	750	745	738	732	719	713	702	696	682	663	661	646	638	621
[12]	[33]	[119]	[203]	[291]	[378]	[464]	[551]	[635]	[719]	[802]	[883]	[900]	1028	[1061]	1163
	4	13	23	33	43	52	62	72	81	91	100	102	116	120	131
45	906	902	895	883	875	862	859	844	835	819	806	804	792	788	775
[15]	[26]	[86]	[172]	[256]	[342]	[430]	[505]	[591]	[674]	[745]	[830]	[851]	980		
	3	10	19	29	39	49	57	67	76	84	94	96	111		
57	1132	1124	1113	1115	1106	1106	1098	1093	1079	1070	1058	1056	1039		

Max. Continuous

Max. Intermittent

T Series (158-, 185-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
66 cm³/r [4.0 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2250] 155	[2565] 177	Max. Continuous [2750] 190	Max. Intermittent [2930] 202
[2]	[78]	[191]	[303]	[414]	[522]	[625]	[706]	[804]	[898]	[991]	[1081]	[1103]	[1237]	[1318]	[1384]
	9	22	34	47	59	71	80	91	101	112	122	125	140	149	156
8	114	111	110	107	105	101	96	92	87	81	73	72	58	48	41
[4]	[97]	[209]	[325]	[441]	[548]	[657]	[766]	[873]	[972]	[1077]	[1181]	[1205]	[1354]	[1437]	[1524]
	11	24	37	50	62	74	87	99	110	122	133	136	153	162	172
15	229	229	217	216	212	205	194	190	186	183	181	178	172	170	166
[6]	[79]	[192]	[309]	[426]	[534]	[649]	[760]	[874]	[984]	[1090]	[1190]	[1218]	[1389]	[1488]	[1578]
	9	22	35	48	60	73	86	99	111	123	134	138	157	168	178
23	344	343	335	334	321	320	319	315	291	288	279	276	270	270	255
[8]	[75]	[191]	[304]	[419]	[532]	[645]	[759]	[871]	[982]	[1092]	[1197]	[1222]	[1379]	[1458]	[1557]
	8	22	34	47	60	73	86	98	111	123	135	138	156	165	176
30	456	451	447	442	431	426	419	415	412	401	391	386	361	339	334
[10]	[49]	[163]	[283]	[398]	[509]	[623]	[742]	[856]	[971]	[1080]	[1186]	[1209]	[1371]	[1425]	[1528]
	6	18	32	45	58	70	84	97	110	122	134	137	155	161	173
38	569	565	560	552	547	541	532	525	512	504	498	496	482	475	464
[12]	[24]	[156]	[270]	[385]	[502]	[614]	[729]	[845]	[963]	[1067]	[1182]	[1209]	[1373]	[1472]	[1570]
	3	18	31	43	57	69	82	95	109	121	134	137	155	166	177
45	681	678	671	665	658	651	641	635	623	612	604	601	582	571	559
[14]	[19]	[143]	[261]	[370]	[485]	[602]	[718]	[837]	[948]	[1064]	[1175]	[1199]	[1359]	[1436]	[1542]
	2	16	29	42	55	68	81	95	107	120	133	135	154	162	174
53	793	788	787	778	771	762	753	746	733	723	715	711	690	677	665
[15]	[13]	[120]	[236]	[352]	[471]	[590]	[707]	[823]	[939]	[1052]	[1165]	[1192]	[1351]	[1462]	[1567]
	1	14	27	40	53	67	80	93	106	119	132	135	153	165	177
57	849	844	839	832	826	819	806	800	786	779	770	766	742	725	714
[16]		[122]	[234]	[347]	[464]	[579]	[695]	[812]	[927]	[1041]	[1152]	[1179]	[1346]	[1451]	[1551]
		14	26	39	52	65	79	92	105	118	130	133	152	164	175
Max. Continuous 61		898	894	888	880	870	863	855	842	831	820	815	793	774	757
[18]		[107]	[215]	[326]	[442]	[555]	[669]	[786]	[900]	[1016]	[1123]	[1152]	[1327]		
		12	24	37	50	63	76	89	102	115	127	130	150		
68		1006	1003	998	988	976	975	965	952	940	924	919	896		
[20]		[76]	[182]	[290]	[408]	[520]	[623]	[737]	[845]	[960]	[1075]	[1104]	[1304]		
		9	21	33	46	59	70	83	95	108	121	125	147		
Max. Intermittent 76		1115	1115	1109	1103	1088	1086	1075	1064	1052	1035	1030	1003		

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous

Intermittent

Δ Pressure bar [PSI]
80 cm³/r [4.9 in³/r]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	[2565] Max. Continuous	[2750]	[2930] Max. Intermittent
	14	28	41	55	69	83	97	110	124	138	152	155	177	190	202
[2]	[123]	[265]	[405]	[544]	[680]	[804]	[934]	[1052]	[1181]	[1079]	[937]	[895]			
	14	30	46	61	77	91	106	119	133	122	106	101			
8	93	90	86	83	80	75	70	63	57	43	24	20			
[4]	[120]	[264]	[406]	[551]	[689]	[828]	[965]	[1101]	[1237]	[1369]	[1505]	[1537]	[1740]	[1857]	[1973]
	14	30	46	62	78	94	109	124	140	155	170	174	197	210	223
15	187	185	183	179	175	171	166	162	156	150	142	140	129	121	113
[6]	[113]	[255]	[398]	[542]	[682]	[823]	[963]	[1101]	[1239]	[1373]	[1508]	[1541]	[1749]	[1868]	[1986]
	13	29	45	61	77	93	109	124	140	155	170	174	198	211	224
23	279	275	271	267	265	258	253	248	240	232	223	221	207	198	188
[8]	[99]	[243]	[386]	[528]	[669]	[812]	[954]	[1094]	[1233]	[1368]	[1503]	[1537]	[1749]	[1872]	[1992]
	11	27	44	60	76	92	108	124	139	155	170	174	198	212	225
30	372	367	364	359	354	351	343	338	333	324	315	313	299	289	280
[10]	[84]	[228]	[371]	[514]	[655]	[798]	[941]	[1080]	[1219]	[1357]	[1496]	[1530]	[1745]	[1870]	[1992]
	9	26	42	58	74	90	106	122	138	153	169	173	197	211	225
38	463	460	456	450	446	441	435	428	420	412	403	399	381	368	358
[12]	[63]	[209]	[354]	[498]	[638]	[782]	[926]	[1067]	[1208]	[1346]	[1484]	[1520]	[1737]	[1864]	[1987]
	7	24	40	56	72	88	105	121	136	152	168	172	196	211	225
45	557	552	547	543	537	530	523	515	509	500	489	487	476	470	459
[14]	[55]	[185]	[331]	[476]	[620]	[762]	[904]	[1046]	[1188]	[1327]	[1467]	[1502]	[1718]	[1842]	[1969]
	6	21	37	54	70	86	102	118	134	150	166	170	194	208	222
53	649	646	642	635	630	622	616	609	599	592	581	578	561	550	539
[15]	[51]	[176]	[316]	[463]	[609]	[748]	[891]	[1037]	[1177]	[1316]	[1457]	[1491]	[1715]	[1844]	[1960]
	6	20	36	52	69	85	101	117	133	149	165	168	194	208	221
57	694	691	687	680	673	668	660	650	642	634	622	619	606	598	591
[16]	[38]	[171]	[315]	[462]	[609]	[748]	[884]	[1029]	[1172]	[1317]	[1447]	[1487]	[1701]	[1822]	[1948]
	4	19	36	52	69	85	100	116	132	149	163	168	192	206	220
61	740	735	731	721	717	707	699	697	681	672	668	665	657	650	643
[20]		[160]	[305]	[455]	[578]	[737]	[857]	[968]	[1144]	[1277]	[1412]	[1446]	[1668]		
		18	34	51	65	83	97	109	129	144	160	163	188		
76		916	910	893	893	875	866	877	843	833	839	836	821		

Max. Continuous

Max. Intermittent

[176] Torque [lb-in]
20 Nm
691 Speed RPM

T Series (158-, 185-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
102 cm³/r [6.2 in³/r]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	[2565] Max. Continuous	[2750]	[2930] Max. Intermittent
	14	28	41	55	69	83	97	110	124	138	152	155	177	190	202
[2]	[161]	[341]	[519]	[697]	[871]	[1030]	[1193]	[1349]	[1511]	[1496]	[1441]	[1421]			
	18	39	59	79	98	116	135	152	171	169	163	161			
8	73	71	68	66	63	60	56	51	46	36	23	20			
[4]	[157]	[340]	[520]	[702]	[879]	[1056]	[1229]	[1401]	[1567]	[1727]	[1889]	[1925]	[2151]	[2271]	[2412]
	18	38	59	79	99	119	139	158	177	195	213	217	243	257	273
15	149	146	144	141	138	135	131	128	124	118	111	109	99	92	86
[6]	[147]	[329]	[510]	[692]	[871]	[1050]	[1227]	[1401]	[1571]	[1731]	[1895]	[1936]	[2192]	[2339]	[2478]
	17	37	58	78	98	119	139	158	178	196	214	219	248	264	280
23	221	217	214	211	208	204	199	195	190	184	176	174	162	154	147
[8]	[132]	[315]	[497]	[675]	[857]	[1038]	[1216]	[1392]	[1564]	[1725]	[1891]	[1932]	[2184]	[2326]	[2470]
	15	36	56	76	97	117	137	157	177	195	214	218	247	263	279
30	294	290	287	284	280	277	271	267	262	255	247	245	231	220	213
[10]	[109]	[293]	[477]	[657]	[839]	[1018]	[1198]	[1374]	[1542]	[1711]	[1878]	[1918]	[2178]	[2326]	[2470]
	12	33	54	74	95	115	135	155	174	193	212	217	246	263	279
38	367	363	360	355	351	347	343	337	332	325	318	315	299	287	277
[12]	[84]	[271]	[457]	[638]	[818]	[999]	[1179]	[1354]	[1527]	[1697]	[1858]	[1901]	[2168]	[2323]	[2465]
	9	31	52	72	92	113	133	153	173	192	210	215	245	262	279
45	440	436	432	429	424	419	414	409	402	395	386	384	372	364	355
[14]	[59]	[242]	[428]	[611]	[794]	[974]	[1151]	[1328]	[1502]	[1674]	[1841]	[1883]	[2148]	[2301]	[2447]
	7	27	48	69	90	110	130	150	170	189	208	213	243	260	276
53	513	510	506	501	497	492	487	482	475	469	458	456	440	428	420
[15]	[39]	[227]	[411]	[595]	[780]	[957]	[1136]	[1314]	[1486]	[1658]	[1828]	[1869]	[2137]	[2285]	[2435]
	4	26	46	67	88	108	128	148	168	187	207	211	241	258	275
57	550	545	542	537	532	528	522	516	510	502	492	490	474	463	454
[16]	[22]	[213]	[395]	[581]	[767]	[943]	[1119]	[1301]	[1471]	[1642]	[1825]	[1861]	[2124]	[2271]	[2425]
	2	24	45	66	87	107	126	147	166	186	206	210	240	257	274
Max. Continuous 61	586	581	576	574	567	563	556	549	544	535	526	524	508	497	486
[20]		[154]	[328]	[515]	[710]	[874]	[1060]	[1243]	[1405]	[1579]	[1763]	[1803]	[2071]		
		17	37	58	80	99	120	140	159	178	199	204	234		
Max. Intermittent 76		724	718	720	709	707	696	684	683	670	659	660	640		

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
131 cm³/r [8.0 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2500] 172	[2565] 177	Max. Continuous [2930] 202
[2]	[219] 25	[450] 51	[682] 77	[915] 103	[1144] 129	[1348] 152	[1561] 176	[1771] 200	[1979] 224	[2159] 244			
8	57	55	53	51	49	47	43	40	36	30			
[4]	[212] 24	[449] 51	[681] 77	[917] 104	[1148] 130	[1376] 155	[1600] 181	[1822] 206	[2025] 229	[2221] 251	[2629] 297	[2704] 306	[3043] 344
15	115	113	110	109	107	105	102	99	96	91	75	74	62
[6]	[197] 22	[435] 49	[669] 76	[903] 102	[1139] 129	[1370] 155	[1600] 181	[1818] 205	[2032] 230	[2226] 252	[2718] 307	[2785] 315	[3123] 353
23	171	168	166	163	160	157	154	150	147	142	125	124	112
[8]	[181] 20	[417] 47	[657] 74	[886] 100	[1122] 127	[1359] 154	[1589] 180	[1812] 205	[2022] 228	[2215] 250	[2699] 305	[2768] 313	[3101] 350
30	227	225	222	219	217	213	209	206	202	196	175	174	159
[10]	[144] 16	[389] 44	[631] 71	[859] 97	[1098] 124	[1330] 150	[1562] 176	[1783] 201	[1993] 225	[2198] 248	[2687] 304	[2755] 311	[3094] 350
38	284	281	278	275	271	267	265	261	258	252	231	230	217
[12]	[114] 13	[361] 41	[605] 68	[838] 95	[1075] 121	[1307] 148	[1532] 173	[1755] 198	[1965] 222	[2177] 246	[2671] 302	[2737] 309	[3079] 348
45	341	338	334	332	328	325	321	318	312	307	285	284	269
[14]	[82] 9	[327] 37	[569] 64	[803] 91	[1042] 118	[1273] 144	[1498] 169	[1722] 195	[1935] 219	[2147] 243	[2655] 300	[2721] 307	[3073] 347
53	397	394	391	387	384	361	378	374	370	365	339	338	329
[15]	[66] 7	[302] 34	[550] 62	[785] 89	[1025] 116	[1254] 142	[1480] 167	[1704] 193	[1915] 216	[2119] 239	[2648] 299	[2709] 306	[3066] 346
57	426	423	422	415	412	409	405	402	398	392	367	365	351
[16]	[41] 5	[281] 32	[529] 60	[767] 87	[1004] 113	[1238] 140	[1468] 166	[1685] 190	[1904] 215	[2106] 238	[2621] 296	[2678] 303	[3041] 344
Max. Continuous 61	454	451	448	443	440	436	433	429	425	418	401	396	374
[20]		[177] 20	[429] 48	[678] 77	[908] 103	[1143] 129	[1375] 155	[1596] 180	[1811] 205	[2017] 228			
Max. Intermittent 76		565	560	556	553	549	546	541	536	527			

[302] Torque [lb-in]
34 Nm
23 Speed RPM

T Series (158-, 185-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
157 cm³/r [9.6 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2415] 167	Max. Continuous [2500] 172	Max. Intermittent [2930] 202
[2]	[264]	[541]	[819]	[1092]	[1357]	[1605]	[1847]	[2084]	[2311]	[1858]			
	30	61	93	123	153	181	209	235	261	210			
8	47	45	44	42	40	37	34	30	25	16			
[4]	[259]	[541]	[822]	[1101]	[1373]	[1638]	[1890]	[2145]	[2383]	[2613]	[3005]	[3063]	[3466]
	29	61	93	124	155	185	214	242	269	295	340	346	392
15	96	95	92	91	90	88	85	82	78	73	63	60	47
[6]	[241]	[526]	[808]	[1090]	[1368]	[1638]	[1900]	[2150]	[2399]	[2628]	[3086]	[3169]	[3612]
	27	59	91	123	155	185	215	243	271	297	349	358	408
23	142	140	138	136	134	132	129	125	121	114	102	99	84
[8]	[219]	[506]	[789]	[1068]	[1348]	[1625]	[1885]	[2140]	[2388]	[2619]	[3091]	[3178]	[3631]
	25	57	89	121	152	184	213	242	270	296	349	359	410
30	189	187	185	183	181	178	175	172	166	159	144	140	122
[10]	[180]	[472]	[759]	[1037]	[1319]	[1590]	[1853]	[2111]	[2355]	[2594]	[3076]	[3170]	[3631]
	20	53	86	117	149	180	209	239	266	293	348	358	410
38	237	234	232	230	227	224	222	218	211	203	188	183	163
[12]	[141]	[436]	[728]	[1010]	[1292]	[1561]	[1821]	[2079]	[2331]	[2573]	[3063]	[3162]	[3630]
	16	49	82	114	146	176	206	235	263	291	346	357	410
45	284	282	279	277	274	272	269	265	257	248	230	225	202
[14]	[101]	[397]	[687]	[969]	[1252]	[1519]	[1778]	[2040]	[2295]	[2539]	[3043]	[3147]	[3629]
	11	45	78	109	141	172	201	230	259	287	344	356	410
53	332	329	326	323	321	319	316	311	305	296	279	274	253
[15]	[81]	[367]	[665]	[944]	[1231]	[1497]	[1755]	[2018]	[2273]	[2512]	[3028]	[3136]	[3620]
	9	41	75	107	139	169	198	228	257	284	342	354	409
57	355	353	350	347	344	342	339	334	327	318	304	300	280
[16]	[51]	[344]	[639]	[924]	[1209]	[1480]	[1743]	[2005]	[2261]	[2505]	[3009]	[3119]	[3594]
	6	39	72	104	137	167	197	227	255	283	340	352	406
Max. Continuous 61	379	377	373	370	368	365	362	357	350	343	329	325	305
[20]		[221]	[519]	[814]	[1095]	[1368]	[1631]	[1891]	[2149]	[2396]	[2895]		
		25	59	92	124	155	184	214	243	271	327		
Max. Intermittent 76		472	467	464	462	459	455	450	443	433	417		

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
195 cm³/r [11.9 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1750] 121	[1800] 124	[2000] 138	Max. Continuous [2500] 172	Max. Intermittent [2565] 177
[2]	[330]	[671]	[1016]	[1345]	[1654]	[1969]	[2242]	[2507]	[2689]	[2748]	[2973]		
	37	76	115	152	187	222	253	283	304	310	336		
8	38	36	34	33	31	28	25	20	16	14	8		
[4]	[328]	[675]	[1026]	[1366]	[1692]	[2010]	[2289]	[2586]	[2799]	[2867]	[3144]	[3797]	[3867]
	37	76	116	154	191	227	259	292	316	324	355	429	437
15	77	77	75	73	73	71	68	65	62	61	55	40	38
[6]	[306]	[658]	[1011]	[1360]	[1698]	[2021]	[2324]	[2604]	[2829]	[2901]	[3178]	[3831]	[3905]
	35	74	114	154	192	228	263	294	320	328	359	433	441
23	115	113	111	110	109	107	104	100	97	95	87	68	66
[8]	[272]	[634]	[980]	[1331]	[1675]	[2003]	[2300]	[2592]	[2815]	[2888]	[3174]	[3864]	[3936]
	31	72	111	150	189	226	260	293	318	326	359	437	445
30	153	151	150	148	146	144	142	139	134	132	123	99	98
[10]	[238]	[596]	[945]	[1296]	[1637]	[1960]	[2255]	[2565]	[2786]	[2857]	[3140]	[3816]	[3894]
	27	67	107	146	185	221	255	290	315	323	355	431	440
38	192	189	188	186	184	183	181	176	168	166	156	133	130
[12]	[181]	[545]	[908]	[1260]	[1607]	[1924]	[2223]	[2529]	[2759]	[2836]	[3121]	[3807]	[3883]
	20	62	103	142	182	217	251	286	312	320	353	430	439
45	230	228	226	224	222	221	219	213	207	204	192	160	159
[14]	[154]	[500]	[860]	[1211]	[1556]	[1869]	[2175]	[2483]	[2713]	[2792]	[3080]	[3778]	[3860]
	17	56	97	137	176	211	246	281	307	315	348	427	436
53	268	266	264	261	259	259	256	251	244	242	229	199	196
[15]	[140]	[465]	[832]	[1179]	[1525]	[1835]	[2144]	[2459]	[2693]	[2768]	[3061]	[3764]	[3852]
	16	53	94	133	172	207	242	278	304	313	346	425	435
57	287	285	283	281	279	278	275	269	262	260	247	220	216
[16]	[105]	[438]	[800]	[1155]	[1505]	[1824]	[2128]	[2440]	[2678]	[2754]	[3056]	[3755]	[3843]
	12	49	90	130	170	206	240	276	303	311	345	424	434
Max. Continuous 61	306	305	302	300	298	297	294	289	281	279	267	241	236
[20]		[291]	[653]	[1013]	[1366]	[1689]	[1987]	[2298]	[2540]	[2622]	[2928]		
		33	74	114	154	191	225	260	287	296	331		
Max. Intermittent 76		382	378	375	373	372	368	363	356	353	342		

[465] Torque [lb-in]
53 Nm
285 Speed RPM

T Series (158-, 185-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
244 cm³/r [14.9 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1650] 114	[1800] 124	[1850] 128	Max. Continuous [2250] 155
[2]	[406]	[833]	[1260]	[1655]	[2038]	[2403]	[2707]	[2597]	[2552]	[2373]	[2299]	
	46	94	142	187	230	272	306	293	288	268	260	
8	30	29	27	26	24	22	17	12	11	7	6	
[4]	[404]	[843]	[1277]	[1695]	[2083]	[2468]	[2820]	[3177]	[3261]	[3509]	[3589]	[4194]
	46	95	144	192	235	279	319	359	368	396	406	474
15	62	62	60	59	59	57	55	50	49	46	44	35
[6]	[382]	[823]	[1261]	[1687]	[2088]	[2477]	[2843]	[3196]	[3285]	[3547]	[3633]	[4290]
	43	93	142	191	236	280	321	361	371	401	410	485
23	92	91	90	89	88	86	82	78	76	72	71	60
[8]	[341]	[787]	[1220]	[1651]	[2059]	[2454]	[2820]	[3177]	[3265]	[3530]	[3615]	[4285]
	39	89	138	187	233	277	319	359	369	399	408	484
30	123	122	121	120	119	116	113	108	106	101	99	85
[10]	[297]	[744]	[1177]	[1611]	[2017]	[2412]	[2774]	[3151]	[3241]	[3504]	[3593]	[4269]
	34	84	133	182	228	273	313	356	366	396	406	482
38	154	152	151	150	148	146	143	136	134	127	125	107
[12]	[225]	[687]	[1132]	[1553]	[1967]	[2360]	[2734]	[3105]	[3194]	[3466]	[3554]	[4237]
	25	78	128	175	222	267	309	351	361	392	402	479
45	184	183	181	180	179	177	173	166	163	156	153	134
[14]	[154]	[628]	[1072]	[1498]	[1910]	[2298]	[2674]	[3052]	[3148]	[3419]	[3510]	[4226]
	17	71	121	169	216	260	302	345	356	386	397	477
53	214	213	212	211	209	207	202	195	193	185	182	161
[15]	[119]	[586]	[1035]	[1458]	[1872]	[2261]	[2637]	[3022]	[3116]	[3389]	[3488]	[4220]
	13	66	117	165	212	255	298	341	352	383	394	477
57	229	228	227	226	224	222	217	209	207	200	197	174
[16]	[78]	[547]	[993]	[1415]	[1829]	[2218]	[2589]	[2956]	[3037]	[3299]	[3393]	[4170]
	9	62	112	160	207	251	293	334	343	373	383	471
Max. Continuous 61	244	243	242	241	239	237	231	223	221	213	209	189
[20]		[372]	[816]	[1251]	[1663]	[2067]	[2448]	[2832]	[2928]	[3214]	[3312]	
		42	92	141	188	234	277	320	331	363	374	
Max. Intermittent 76		305	303	301	300	297	292	284	281	273	270	

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

Δ Pressure bar [PSI]
306 cm³/r [18.7 in³/r]

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1500] 103	[1600] 110	[1800] 124
[2]	[499] 56	[1035] 117	[1560] 176	[2034] 230	[2501] 283	[2912] 329	[3239] 366	[2859] 323	[2400] 271	
8	24	23	22	21	19	16	11	8	5	
[4]	[497] 56	[1052] 119	[1590] 180	[2101] 237	[2561] 289	[3023] 342	[3464] 391	[3680] 416	[3886] 439	[4221] 477
15	49	49	48	48	47	47	44	41	38	30
[6]	[480] 54	[1031] 116	[1578] 178	[2096] 237	[2564] 290	[3023] 342	[3464] 391	[3689] 417	[3905] 441	[4275] 483
23	74	74	72	72	71	69	64	62	60	51
[8]	[427] 48	[975] 110	[1520] 172	[2051] 232	[2525] 285	[2998] 339	[3448] 390	[3667] 414	[3881] 438	[4264] 482
30	99	98	97	97	96	94	89	86	83	73
[10]	[370] 42	[930] 105	[1467] 166	[2001] 226	[2477] 280	[2955] 334	[3406] 385	[3631] 410	[3852] 435	[4264] 482
38	123	122	121	120	120	117	112	108	104	92
[12]	[281] 32	[871] 98	[1410] 159	[1908] 216	[2400] 271	[2887] 326	[3352] 379	[3573] 404	[3790] 428	[4189] 473
45	147	146	145	145	145	142	136	131	127	112
[14]	[192] 22	[791] 89	[1338] 151	[1851] 209	[2338] 264	[2816] 318	[3281] 371	[3511] 397	[3743] 423	[4135] 467
53	171	171	170	170	169	165	159	154	150	133
[15]	[148] 17	[738] 83	[1288] 146	[1803] 204	[2287] 258	[2773] 313	[3243] 366	[3475] 393	[3705] 419	[4098] 463
57	183	183	182	182	181	177	171	165	160	146
[16]	[97] 11	[692] 78	[1236] 140	[1742] 197	[2229] 252	[2714] 307	[3195] 361	[3410] 385	[3639] 411	[4064] 459
Max. Continuous 61	195	195	194	194	193	189	182	177	171	157
[20]		[476] 54	[1020] 115	[1544] 174	[2010] 227	[2519] 285	[3010] 340	[3243] 366	[3495] 395	
Max. Intermittent 76		243	242	242	241	238	231	226	209	

[738] 83 183 } Torque [lb-in] Nm Speed RPM

T Series (158-, 185-)

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.

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

Continuous Intermittent

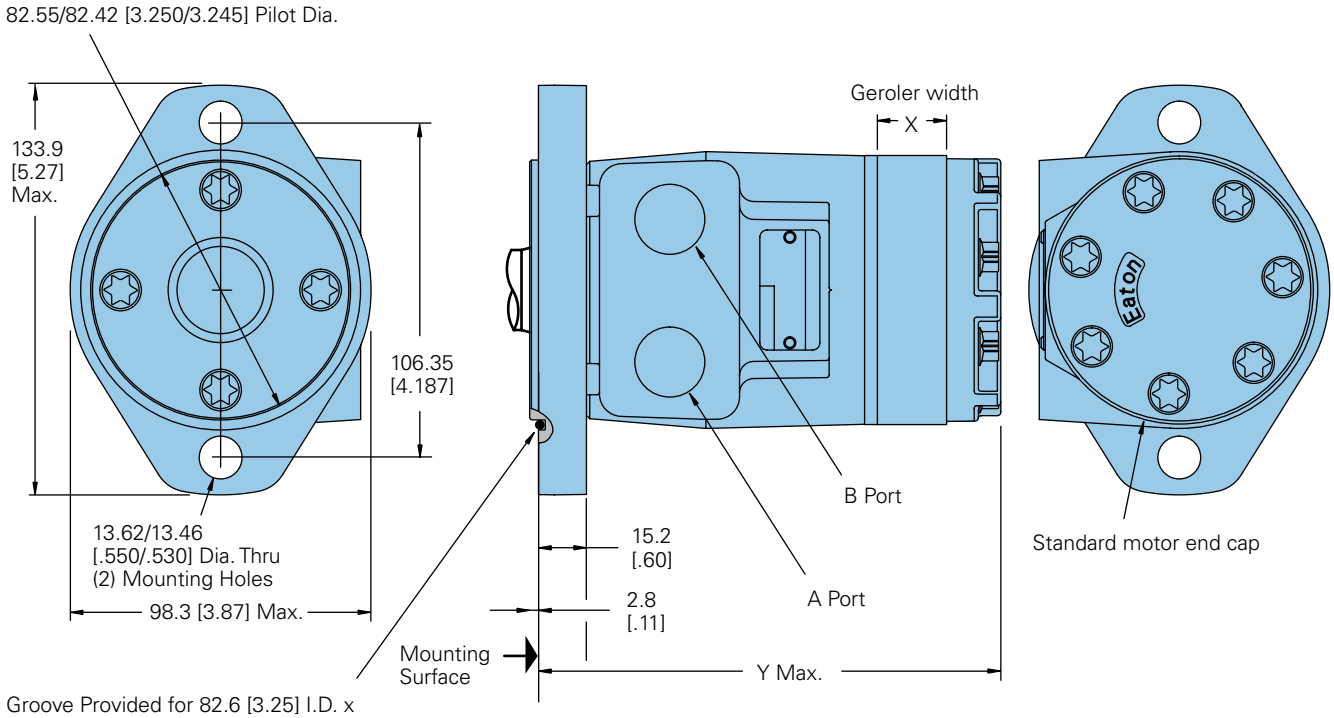
Flow LPM [GPM]	Δ Pressure bar [PSI] 370 cm³/r [22.6 in³/r]						Max. Continuous	Max. Intermittent
	200	400	600	800	1000	1200	1300	1500
	14	28	41	55	69	83	90	103
[2]	[590]	[1237]	[1858]	[2406]	[2953]	[3388]	[3586]	
	67	140	210	272	334	383	405	
8	20	19	18	17	15	12	11	
[4]	[588]	[1263]	[1906]	[2506]	[3029]	[3557]	[3811]	[4252]
	66	143	215	283	342	402	431	480
15	41	41	40	40	39	38	37	36
[6]	[580]	[1245]	[1899]	[2506]	[3029]	[3544]	[3788]	[4300]
	66	141	215	283	342	400	428	486
23	61	60	60	59	58	57	56	54
[8]	[514]	[1164]	[1824]	[2452]	[2975]	[3518]	[3783]	[4284]
	58	132	206	277	336	397	427	484
30	82	81	80	79	78	77	77	75
[10]	[444]	[1119]	[1759]	[2391]	[2928]	[3479]	[3750]	[4275]
	50	126	199	270	331	393	424	483
38	102	102	101	101	100	97	96	93
[12]	[337]	[1062]	[1690]	[2256]	[2813]	[3393]	[3685]	[4273]
	38	120	191	255	318	383	416	483
45	122	121	120	119	119	118	116	112
[14]	[231]	[958]	[1608]	[2201]	[2748]	[3319]	[3610]	[4198]
	26	108	182	249	310	375	408	474
53	142	141	140	139	138	137	134	129
[15]	[178]	[896]	[1543]	[2147]	[2683]	[3272]	[3572]	[4187]
	20	101	174	243	303	370	404	473
57	152	152	151	150	149	147	146	140
[16]	[118]	[843]	[1481]	[2065]	[2609]	[3194]	[3495]	[4131]
	13	95	167	233	295	361	395	467
Max. Continuous 61	162	162	161	160	159	157	155	150
[20]		[587]	[1228]	[1833]	[2331]	[2948]	[3273]	
		66	139	207	263	333	370	
Max. Intermittent 76		202	201	201	200	198	196	

Standard rotation viewed from shaft end

Port A pressurized — CW

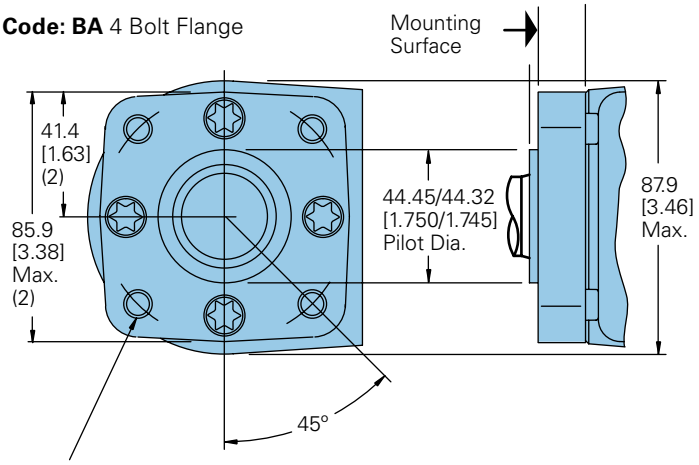
Port B pressurized — CCW

Code: AA 2 Bolt Flange



Groove Provided for 82.6 [3.25] I.D. x
2.62 [.103] Cross Section O-ring (Dash No. 152)

Code: BA 4 Bolt Flange



3/8-16 UNC (15.2 [.60] Max. Bolt thread engagement)
Mounting holes (4) equally spaced on 82.6 [3.25] Dia.
Bolt circle or M10 x 1.5 (15.2 [.60] Max. Bolt
thread engagement) mounting holes (4) equally
spaced on 82.6 [3.25] Dia. Bolt circle

2 and 4 bolt flange port dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
36 [2.2]	6.6 [.26]	132.2 [5.21]
49 [3.0]	9.1 [.36]	134.6 [5.30]
66 [4.0]	12.2 [.48]	137.7 [5.42]
80 [4.9]	14.7 [.58]	140.3 [5.53]
102 [6.2]	18.5 [.73]	144.3 [5.68]
131 [8.0]	24.1 [.95]	149.6 [5.89]
157 [9.6]	29.0 [1.14]	154.5 [6.09]
195 [11.9]	35.6 [1.40]	161.3 [6.35]
244 [14.9]	44.7 [1.76]	170.3 [6.71]
306 [18.7]	56.1 [2.21]	181.6 [7.16]
370 [22.6]	72.1 [2.84]	197.9 [7.79]

T Series (158-)

Product numbers

Use digit prefix—158- plus four digit number from charts for complete product number-—Example: 158-1067.

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

Standard

Mounting	Shaft	Port size	Displ. cm³/ r [in³/ r] / product number										
			36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
2 Bolt Flange	1 in. Straight w/Woodruff Key	7/8 -14 O-Ring	158- —	—	-1537	-1034	-1035	-1538	-1036	-1037	-1038	-1039	-1040
		1/2 NPTF	158- —	—	-1540	-1026	-1027	-1541	-1028	-1029	-1030	-1031	-1032
		Manifold*	158- —	—	-1543	-1042	-1043	-1544	-1044	-2045	-1046	-1047	-1048
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158- —	—	-1552	-1082	-1083	-1553	-1084	-1085	-1086	-1087	-1088
		1/2 NPTF	158- —	—	-1555	-2074	-1075	—	-1076	-1077	-2078	-1079	-1080
		Manifold*	158- —	—	-1558	-1647	-1091	-1559	-1092	-1093	-1094	-1095	-3065
4 Bolt Flange	1 in. Straight w/Woodruff Key	7/8 -14 O-Ring	158- —	—	-1570	-1010	-1011	-1571	-1012	-1013	-1014	-1015	-1016
		1/2 NPTF	158- —	—	-1573	-1002	-1003	-1574	-1004	-1005	-1006	-1007	-1008
		Manifold*	158- —	—	-1576	-1018	-1019	-1577	-1020	-1021	-1022	-1023	-1024
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158- —	—	-1579	-1058	-1059	-1580	-1060	-1061	-1062	-1063	-1064
		1/2 NPTF	158- —	—	-1582	-1050	-2051	-1583	-1052	-1053	—	-1055	-1056
		Manifold*	158- —	—	-1585	-1066	-2067	-1586	—	-1069	-3976	-1071	-1072

158-2067

T Series motors with corrosion protection

Mounting	Shaft	Port size	Displ. cm³/ r [in³/ r] / product number										
			36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
2 Bolt Flange	1 in. Straight w/ Woodruff Key	7/8 -14 O-Ring	158-—	—	-4246	-3469	-4247	—	-3416	—	—	—	-3490
4 Bolt Flange		1/2 NPTF	158- —	—	—	—	—	—	—	—	—	—	-1621

T Series motors with low speed valving

Mounting	Shaft	Port size	Displ. cm³/ r [in³/ r] / product number										
			36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
2 Bolt Flange	1 in. Straight w/ Woodruff Key	7/8 -14 O-Ring	158- —	—	—	-1427	-1428	—	—	-1430	-1431	-1432	-1433
		1/2 NPTF	158- —	—	—	-1419	-1420	—	—	-1422	-1423	-1424	—
		Manifold*	158- —	—	—	—	—	—	—	—	—	—	—
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158- —	—	—	-1525	—	—	—	—	-1675	—	—
		1/2 NPTF	158- —	—	—	—	-1634	—	—	—	—	—	—
4 Bolt Flange	1 in. Straight w/ Woodruff Key	Manifold*	158- —	—	—	-1522	—	—	—	—	—	—	-1527
		7/8 -14 O-Ring	158- —	—	-1625	-1410	-1411	-1626	-1412	-1413	-1414	-1415	-3385
		1/2 NPTF	158- —	—	-1644	-1402	-1403	—	-1404	-1405	-1406	-1407	-1408

158-1403

*Manifold product numbers shown are for motors with four 5/16 -18 port face mounting threads. Manifold, manifold mounting O-Rings and bolts are NOT included.

For T Series Motors with a configuration Not Shown in the charts above: Use the model code system on page B-4-10 to specify the product in detail.

The following 25-digit coding system has been developed to identify all of the configuration options for the T motor. Use this model code to specify a motor with the desired features. All 25-digits of the code must be present when ordering.

M	T0	***	**	**	**	**	*	*	**	**	00	**	*	**	00	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

T0	T Series

4 5 6 Displacement cm³/r [in³/r]

022	35 [2.2]
030	49 [3.0]
040	65 [4.0]
049	80 [4.9]
062	102 [6.2]
080	131 [8.0]
096	158 [9.6]
119	195 [11.9]
149	244 [14.9]
187	306 [18.7]
226	370 [22.6]

7 8 Mounting type

AA	2 Bolt (standard) 82,6 [3.248] Dia. and 3,05 [.120] pilot, 13,59 [.535] Dia. Mounting holes 106,35 [4.187] Dia. B.C.
BA	4 Bolt (standard) 44,40 [1.748] Dia. x 3,05 [.120] pilot, .375-16 UNC-2B mounting holes 82,55 [3.250] Dia. B.C.
DD	2 Bolt (Std.) 101,60 [4.000] Dia. x 6.10 [.240] pilot, 14,35 [.565] Dia. Mounting holes 146,05 [5.750] Dia. B.C. (SAE B) (Ductile)
EA	4 Bolt magneto 82,50 [3.248] Dia. x 3,05 [.120] Pilot, 13,59 [.535] Dia. Mounting holes 106,35 [4.187] Dia. B.C.
FA	4 Bolt (standard) 44,40 [1.748] Dia. x 3,05 [.120] pilot, M10 x 1.5-6H mounting holes on 82,55 [3.250] Dia. B.C.
MA	2 Bolt (standard) 82.50 [3.248] Dia. x 8.13 [.320] Pilot, 13.59 [.535] Dia. Mounting holes on 106.35 [4.187] Dia. B.C.

9 10 Output shaft description

01	25,4 [1.00] Dia. Straight, woodruff key, .250-20 UNC-2B hole in shaft end
02	25,4 [1.00] Dia. SAE 6B Spline, .25-20 UNC-2B hole in shaft end
08	25,4 [1.00] Dia. Straight, 10,31 [.406] Dia. crosshole 15,7 [.62] from end, .250-20 UNC-2B hole in shaft end
16	22,22 [.875] Dia. SAE 13 tooth spline (SAE B)
18	25,4 [1.00] Dia. Tapered, Woodruff key and Nut, 34,92 [1.375] taper length
24	25.00 [.984] Dia. Straight, 8.0 [.315] key, MB x 1.25-6H hole in shaft end
39	25.00 [.984] Dia. Straight (k6), 8.00 [.315] Key, M8 x 1.25-6H hole in shaft end

11 12 Port type

AA	.875-14 UNF-2B SAE O-Ring ports
AB	.500-14 NPTF Dryseal pipe thread ports
AC	Manifold (.3125-18 UNC-2B mounting holes)
AD	Manifold ports (MB x 1.25-6H mounting holes)
AF	G 1/2 BSP straight thread ports

13 14 Case flow options

00	None specified
01	.4375-20 UNF-2B SAE O-ring port (end cap)
02	G 1/4 BSP straight thread port (end cap)
A	Internal check valves

15 Geroler options

0	None
A	Free running

16 Shaft options

0	None
N	Electroless nickel plated

T Series (158-)

Model code

The following 25-digit coding system has been developed to identify all of the configuration options for the T motor. Use this model code to specify a motor with the desired features. All 25-digits of the code must be present when ordering.

M	T0	***	**	**	**	**	*	*	**	**	00	**	*	**	00	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

17 18 Seal options

00	Standard seals
02	Seal guard
03	Viton seals
07	High pressure shaft seal
11	High pressure shaft seal & seal guard

19 20 Speed sensor options

00	None
AA	Digital speed pickup (15 pulse), M12 connector (A=Power, B=Common, C=Signal)
AB	Magnetic speed pickup (60 pulse by quadrature), M12 connector, (A=Power, B=Common, C=Signal)
AE	Digital speed pickup (15 pulse), 127 [5.0] lead wire with weather pack shroud connector (A=Power, B=Signal, C=Common)

21 22 Valve options

00	None

23 24 Special features (hardware)

00	None specified
AB	Low speed valving
JM	Low flow housing and low speed valving
EX	ATEX certification

25 Special assembly instructions

0	None
1	Reverse rotation
2	Flange rotation 90°

26 27 Paint/packaging options

00	No paint
AA	Low gloss black primer
AY	Nickel plated motor (excluding shaft)
AF	Environmental coated black

28 29 Eaton assigned code when applicable

00	None

30 Design code

A	One

See Eatonpowersource.com/ for more options and configurations.

Description

The T Series Motor with Parking Brake utilizes brake pads that rotate at 6 times the speed of the output shaft, thereby giving the brake a 6-to-1 mechanical advantage. The T Series Motor with Parking Brake utilizes the same Geroler, and Spool Valve technologies as the standard Char-Lynn motors. Therefore, in addition to providing dependable load-holding capability, T Series Motor with Parking Brake provides the same smooth, reliable operation, with similar performance, as the T Series Motor.

Specifications

Geroler element	11 Displacements
Flow l/min [GPM]	61[16] Continuous
	75 [20] Intermittent
Speed	Up to 1021 RPM
Pressure bar [PSI]	177[2565] Cont.
	202[2930] Inter.
Torque Nm [lb-in]	441 [3905] Cont.
	486 [4300] Inter.

Features

- Integrated, compact, patented design
- Capability of combining 4 inventory items into a single assembly (motor, brake, counter-balance valve, brake release line)
- Rear-mounted integrated brake with 6:1 torque advantage
- Access port for manual brake release (for over-riding brake in the event of loss of release pressure.)

Benefits

- Cost-effective packaged system solution
- Simplifies ordering and inventory requirements
- Reduces assembly labor
- Design flexibility
- Wet brake is environmentally protected and provides long life

Applications

- Truck-mounted equipment (boom rotate and winch)
- Conveyors – positioners – indexers
- Marine cranes (boom rotate and winch)
- Fishing winches
- Recycling and refuse equipment
- Vehicle recovery winches
- Mining equipment
- Specialty utility vehicles/machines
- Forestry grapples
- Agricultural equipment
- Railroad equipment
- Airport support vehicles
- Lawn & turf equipment
- Anywhere load-holding is needed in a low-speed high-torque drive system

Crane and winches

Boom Lift (Swing)

Maintenance Equipment

Principle of operation

The wet brake is a spring applied / pressure release design. Load holding is applied by a mechanical spring and released by hydraulic pressure. The spring force holds the brake on when hydraulic pressure is absent.

Release pressure

Release pressure is defined as the amount of pressure required to fully release the brake. The brake pressure cavity is common (shared) with the motor case. As a result, maximum release pressure is constrained by the motor case-pressure capability. The T Series Motor with Parking Brake incorporates a shaft seal capable up to 1500 psi (see page B-4-70). However, seal life is reduced at higher case pressure.

Residual pressure

Residual pressure is the pressure trapped in the system by restrictions or long return lines. Residual pressure in the motor case will lower the rated load holding torque of the brake. Therefore, special attention needs to be given when applying this product. Keep in mind that long return lines create higher pressure that will reduce brake holding torque. In applications with high system pressures, the use of a pressure reducing valve to limit case and release pressure is recommended.

Holding torque and motor output torque

Holding torque is based on grade holding requirements for a vehicle or other load holding requirements in the application. System pressure and motor displacement are the factors in determining motor output torque. Motor displacement, measured in cubic centimeters or cubic inches, is the volume of fluid required to make one revolution. Motor output torque is the rotary force and is usually measured in inch pounds, newton meters or foot pounds. Maximum motor torque depends on pressure and motor displacement. Both output shaft size and shaft type can also affect motor torque. The T Series Motor with Parking Brake load holding capacity is factory set to match any limiting factor in each specific motor configuration (e.g. displacement, output shaft, etc).

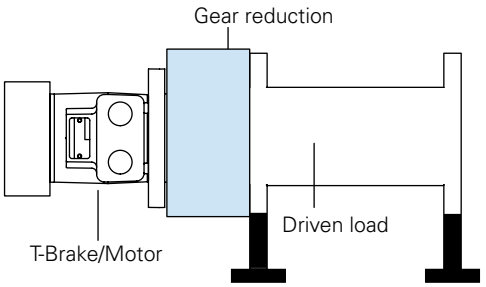
Note: Eaton Corporation does not approve any products for customer applications. It is the sole responsibility of the customer to qualify and verify the correct operation of products in their systems.

Note: Special attention should be given to system back pressure. System back pressure directly affects brake release pressure and can cause the brake to release at undesired conditions.

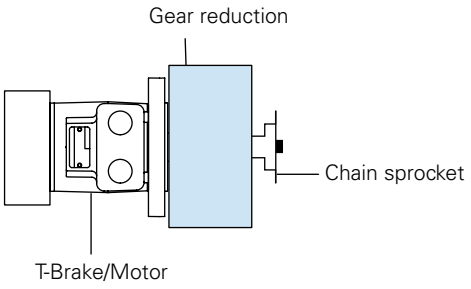
Note: The T Series with parking brake is not compatible with water based fluids.

Typical applications

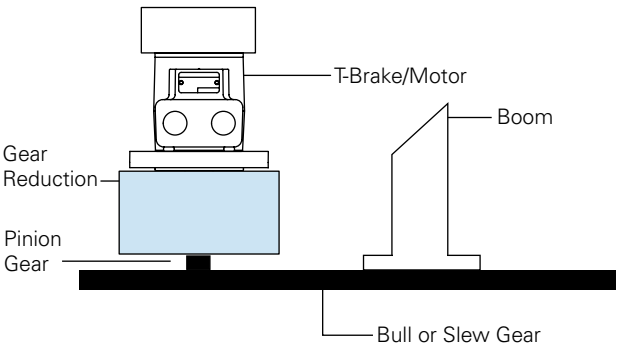
Winch

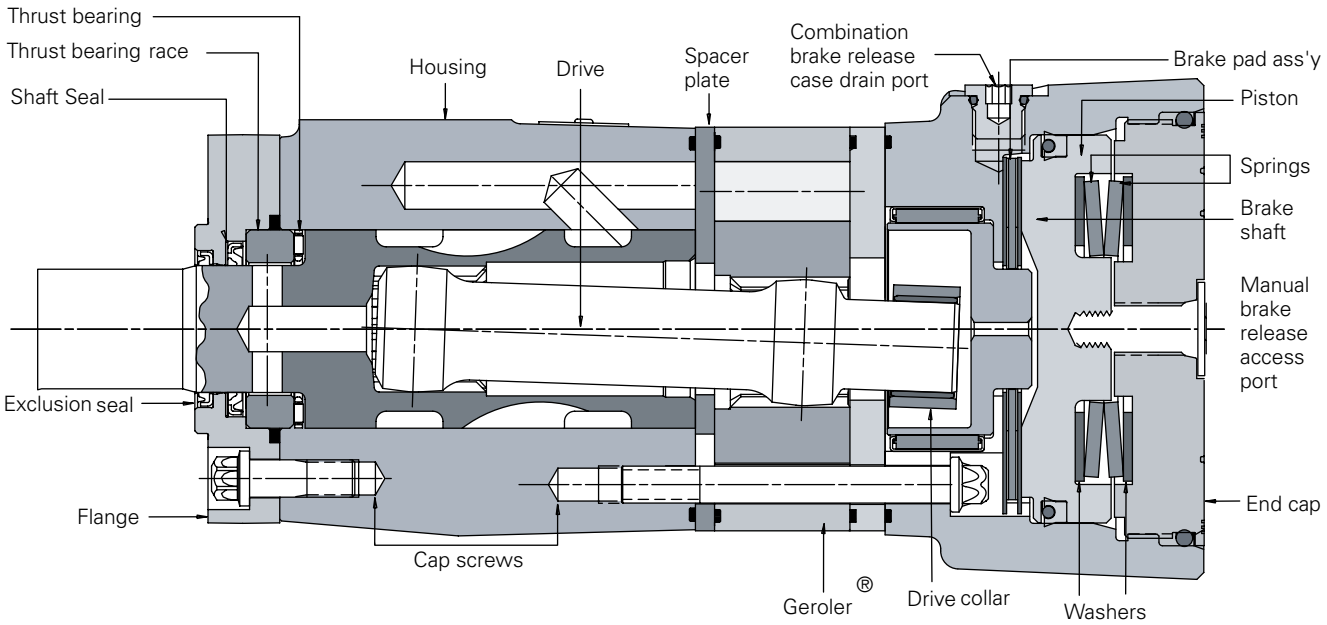


Machine drive



Swing boom





Specification Data — T Series with parking brake motors

Shaft

Displ. cm³/r [in³/r]		**36 [2.2]**	**49 [3.0]**	**66 [4.0]**	**80 [4.9]**	**102 [6.2]**	**131 [8.0]**	**157 [9.6]**	**195 [11.9]**	**244 [14.9]**	**306 [18.7]**	**370 [22.6]**
Max. Speed (RPM) @ continuous flow		1021	906	898	694	550	426	355	287	229	183	152
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]
	Intermittent	38 [10]	57 [15]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	76 [672]	105 [928]	138 [1222]	174 [1541]	219 [1936]	251 [2226]	297 [2628]	359 [3178]	410 [3633]	441 [3905]	430 [3811]
	Intermittent **	93 [824]	118 [1131]	168 [1488]	212 [1872]	264 [2339]	307 [2718]	359 [3178]	437 [3864]	485 [4290]	483 [4275]	486 [4300]
Pressure Δ Bar [Δ PSI]	Continuous	177 [2565]	177 [2565]	177 [2565]	177 [2565]	177 [2565]	177 [2565]	167 [2415]	138 [2000]	127 [1850]	110 [1600]	90 [1300]
	Intermittent***	202 [2930]	202 [2930]	202 [2930]	202 [2930]	202 [2930]	202 [2930]	202 [2930]	177 [2565]	155 [2250]	124 [1800]	103 [1500]
Weight kg [lbs]		8.5 [18.7]	8.6 [19.0]	8.8 [19.4]	8.9 [19.6]	9.0 [19.8]	9.3 [20.5]	9.5 [20.9]	9.7 [21.4]	10.1 [22.3]	10.5 [23.1]	11.1 [24.5]

Maximum case pressure: See case pressure seal limitation graph. *See shaft torque ratings for limitations.

Note: See page B-4-51 for additional motor specification notes and definitions. The T Series with Parking Brake performance is similar to the standard T Series motor. High speed conditions may reduce performance on T Series with Parking Brake.

T Series brake holding torque settings:

Shaft code	**Output shaft description**	**[in³/r]**	**2.2**	**3.0**	**4.0**	**4.9**	**6.2**	**8.0**	**9.6**	**11.9**	**14.9**	**18.7**	**22.6**
18	1 Tapered w/key and nut		2,000	2,000	2,000	3,500	3,500	3,500	5,000	5,000	5,000	5,000	5,000
02	1 SAE 6B Splined		2,000	2,000	2,000	3,500	3,500	3,500	5,000	5,000	5,000	5,000	5,000
24	25mm Straight w/key		2,000	2,000	2,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
01	1 Straight w/key		2,000	2,000	2,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
07	1 Straight w/.31 Dia. crosshole		2,000	2,000	2,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
08	1 Straight w/.40 Dia. crosshole		2,000	2,000	2,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
16	7/8 SAE B 13T Splined		2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
17	7/8 SAE B Straight w/key		2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

Note: The factory setting values are used for each motor based on motor displacement and shaft type. Average Static torque may vary +/- 14% from rated values.

in-lbs Full capacity brake

in-lbs Limited capacity brake

T Series with Parking Brake (185-)

Dimensions

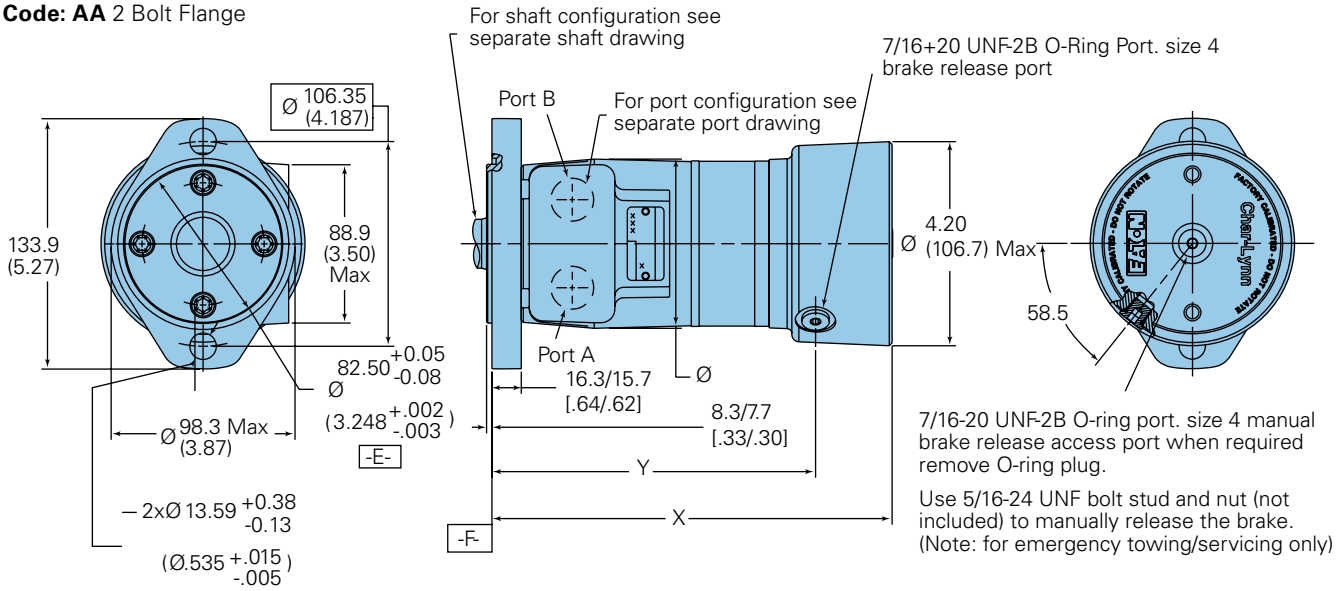
Standard rotation viewed from shaft end

Port A pressurized -- CW

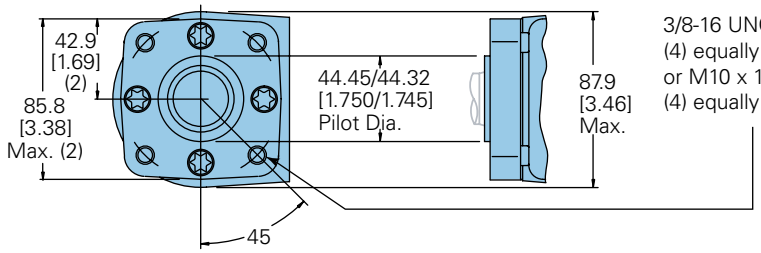
Port B pressurized -- CCW

Note: Mounting surface flatness requirement is 13 mm [.005 inch] Max.

Code: AA 2 Bolt Flange



Code: BA 4 Bolt Flange



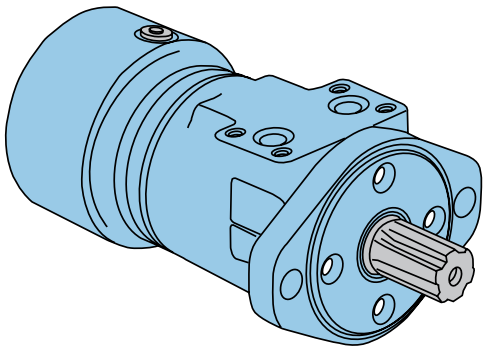
T-Series with parking brake dimensions

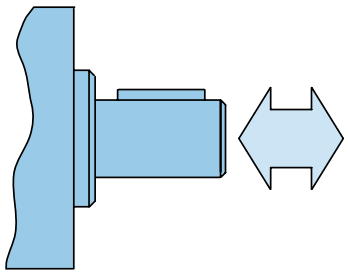
Displacement	X	Y
cm³/r [in³/r]	mm [inch]	mm [inch]
36 [2.2]	190.2 [7.49]	143.9±0.9 [5.66±0.3]
41 [2.5]	190.8 [7.51]	144.5±0.9 [5.69±0.3]
49 [3.0]	192.5 [7.58]	146.3±0.9 [5.76±0.3]
59 [3.6]	194.3 [7.65]	148.1±0.9 [5.83±0.3]
66 [4.0]	195.6 [7.70]	149.3±0.9 [5.88±0.3]
80 [4.9]	198.4 [7.81]	152.0±0.9 [5.98±0.3]
102 [6.2]	202.2 [7.96]	155.9±0.9 [6.14±0.3]
131 [8.0]	207.5 [8.17]	161.3±0.9 [6.35±0.3]
157 [9.6]	212.6 [8.37]	166.2±0.9 [6.54±0.3]
195 [11.9]	219.2 [8.63]	172.9±0.9 [6.81±0.3]
244 [14.9]	228.3 [8.99]	181.9±0.9 [7.16±0.3]
306 [18.7]	239.5 [9.43]	193.3±0.9 [7.61±0.3]
370 [22.6]	251.2 [9.89]	205.0±0.9 [8.07±0.3]

Brake release and motor case pressure

The T Series Motor with Parking Brake is durable and has long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds.

Motor life will be shortened if case pressure exceeds recommended ratings (acceptability may vary with application). Refer to the Case Pressure/ Shaft Seal chart below. This chart is based on case pressure and motor shaft speed. A minimum release pressure of 17 Bar [250 PSI] must be maintained to fully release the brake.





$P_C \approx .6DP + P_2$

PC = Case Pressure

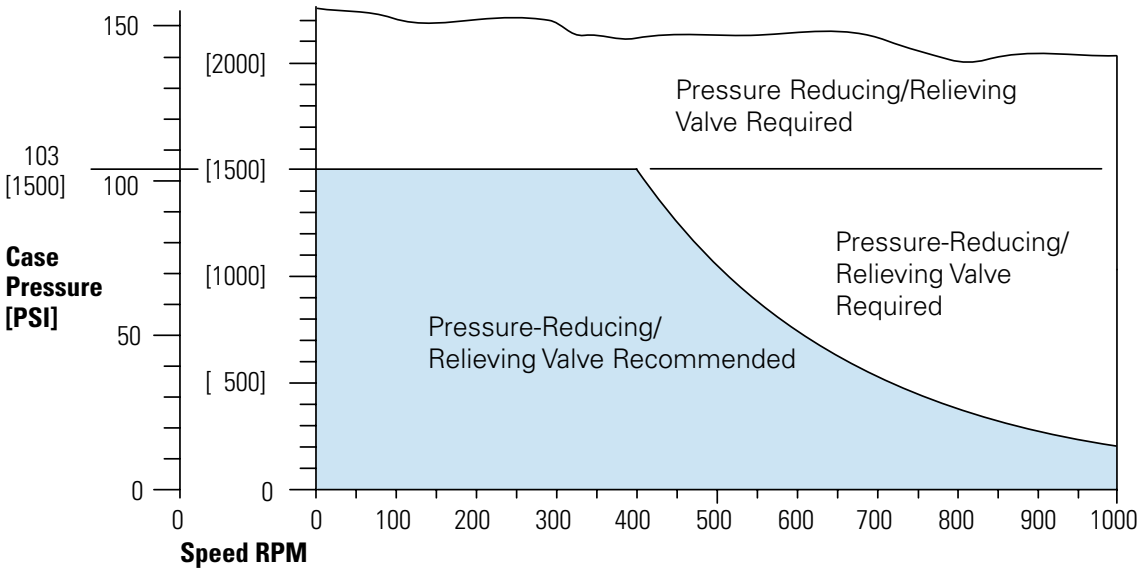
P_1 = Inlet Line Pressure

P_2 = Back Pressure

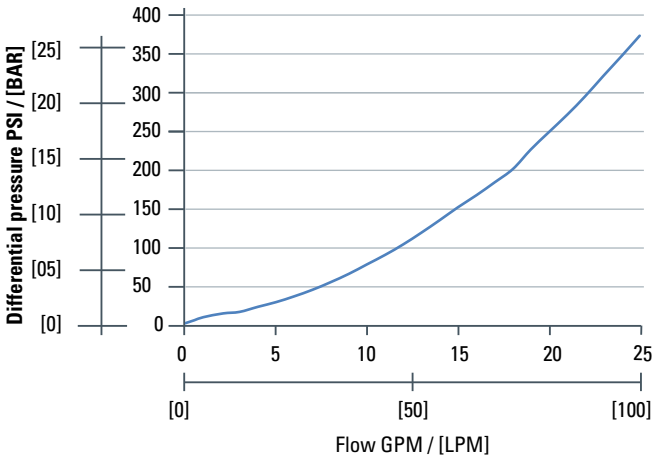
$DP = P_1 - P_2$

Max. Axial loads 454 kg [1000 lb]

Case pressure/shaft seal



T Series with Parking Brake NLPD - no load pressure drop



T Series with Parking Brake (185-)

Product numbers

Use digit prefix — 185 plus four digit number from charts for complete product number — Example 185-2068.

Orders will not be accepted without three digit prefix.

Standard valving

Mounting	Shaft	Port size	Displ. cm³/ r [in³/ r] / product number									
			3.0	4.0	4.9	6.2	8.0	9.6	11.9	14.9	18.7	22.6
2 Bolt	1 Keyed	7/8-14 O-Ring	185-2000	—	2002	2003	2004	2005	2006	2007	2008	2009
		Manifold	185-2010	—	2012	—	2014	2015	2016	—	2018	2019
	6B Splined	7/8-14 O-Ring	185-2020	—	2022	2023	2024	2025	—	2027	2028	2029
		Manifold	185-2030	2031	2032	2033	—	2035	2036	2037	2038	2039
	13T Splined 16/32 pitch	7/8-14 O-Ring	185-2040	—	—	2043	2044	2045	—	2047	2048	—
		Manifold	185-2050	2051	—	—	2054	2055	2056	2057	2058	2059
4-Bolt	1 Keyed	7/8-14 O-Ring	—	—	2062	—	2064	2065	—	2067	—	2069
		Manifold	—	—	2072	2073	2074	—	—	2077	2078	—
	6B Splined	7/8-14 O-Ring	185-2080	2081	2082	—	2084	—	2086	—	2088	—
		Manifold	185-2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
	13T Splined 16/32 pitch	7/8-14 O-Ring	185-2100	2101	2102	2103	2104	2105	2106	2107	2108	2109
		Manifold	185-2110	2111	2112	2113	2114	2115	—	2117	2118	2119
2-Bolt SAE B	1 Keyed	7/8-14 O-Ring	—	2121	—	2123	—	2125	2126	2127	2128	—
		Manifold	185-2130	2131	2132	2133	2134	2135	2136	2137	2138	2139
	6B Splined	7/8-14 O-Ring	185-2140	2141	2142	2143	2144	—	2146	2147	2148	—
		Manifold	185-2150	2151	2152	2153	2154	2155	2156	2157	2158	2159
	13T Splined 16/32 pitch	7/8-14 O-Ring	185-2160	—	—	—	2164	2165	2166	2167	—	2169
		Manifold	—	2171	—	2173	2174	—	2176	2177	2178	2179

Low speed valving

Mounting	Shaft	Port size	Displ. cm³/ r [in³/ r] / product number									
			3.0	4.0	4.9	6.2	8.0	9.6	11.9	14.9	18.7	22.6
2 Bolt	1 Keyed	7/8-14 O-Ring	—	2181	2182	—	—	2185	2186	—	—	2189
		Manifold	185-2190	2191	2192	2193	2194	2195	2196	2197	—	2199
	6B Splined	7/8-14 O-Ring	185-2200	2201	2202	—	—	2205	—	—	—	—
		Manifold	185-2210	2211	2212	2213	—	2215	2216	2217	2218	2219
	13T Splined 16/32 pitch	7/8-14 O-Ring	185-2220	2221	2222	2223	2224	—	—	2227	2228	2229
		Manifold	185-2230	2231	2232	2233	—	2235	2236	2237	2238	2239
4-Bolt	1 Keyed	7/8-14 O-Ring	—	2241	2242	2243	—	2245	2246	—	2248	—
		Manifold	—	2251	2252	2253	2254	—	2256	2257	2258	2259
	6B Splined	7/8-14 O-Ring	185-2260	2261	2262	—	2264	2265	—	2267	2268	2269
		Manifold	185-2270	2271	2272	2273	2274	2275	2276	2277	2278	2279
	13T Splined 16/32 pitch	7/8-14 O-Ring	185-2280	2281	2282	—	2284	2285	2286	2287	2288	2289
		Manifold	185-2290	2291	2292	2293	2294	2295	2296	2297	2298	2299
2-Bolt SAE B	1 Keyed	7/8-14 O-Ring	185-2300	2301	2302	2303	2304	2305	2306	—	2308	2309
		Manifold	185-2310	2311	2312	2313	2314	2315	2316	2317	2318	2319
	6B Splined	7/8-14 O-Ring	185-2320	2321	2322	2323	2324	2325	2326	2327	2328	—
		Manifold	185-2330	2331	2332	2333	2334	2335	2336	2337	2338	2339
	13T Splined 16/32 pitch	7/8-14 O-Ring	185-2340	2341	2342	2343	2344	2345	2346	2347	2348	2349
		Manifold	185-2350	2351	2352	2353	2354	2355	2356	2357	2358	2359

185-2357

Motors with the low speed valving option enable very smooth low speed operation while maintaining high torque.

Designed to run continuously at up to 200 RPM at standard rated pressures and reduced flows, this option provides smooth operation at low speeds. Furthermore, they resist slippage and have more momentary load holding ability than the standard motors.

Motors with this valving are not intended for low pressure applications (A minimum of 300 psi delta must be maintained between A port pressure and case pressure).

Shaft side / radial load ratings are not affected by this valving. For a T Series motor with parking brake configuration not shown in the charts above use the model code system on page B-4-72 to specify the product in detail.

The following 25-digit coding system has been developed to identify all of the configuration options for the T Series Motor with Parking Brake. Use this model code to specify a motor with the desired features. All 25-digits of the code must be present when ordering.

M	TB	***	**	**	**	**	*	*	**	**	00	**	*	**	00	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

TB T Series motor with parking brake

4 5 6 Displacement cm³/r [in³/r]

022 36 [2.2]
030 49 [3.0]
040 66 [4.0]
049 80 [4.9]
062 102 [6.2]
080 131 [8.0]
096 157 [9.6]
119 195 [11.9]
149 244 [14.9]
187 306 [18.7]
226 370 [22.6]

7 8 Mounting type

AA 2 Bolt (Standard) 82,5 [3.248] Dia. and 3,05 [.120] pilot, 13,59 [.535] Dia. Mounting Holes 106,35 [4.187] Dia. B.C.
BA 4 Bolt (Standard) 44,40 [1.748] Dia. x 3,05 [.120] pilot, .375-16 UNC-2B Mounting Holes 82,55 [3.250] Dia. B.C.
DA 2 Bolt (Std.) 101,60 [4.000] Dia. x 6.10 [.240] pilot, 14,35 [.565] Dia. Mounting Holes 146,05 [5.750] Dia. B.C. (SAE B)
EA 4 Bolt Magneto 82,50 [3.248] Dia. x 3,05 [.120] Pilot, 13,59 [.535] Dia. Mounting Holes 106,35 [4.187] Dia. B.C.
FA 4 Bolt (Standard) 44,40 [1.748] Dia. x 3,05 [.120] pilot, M10 x 1.5-6H Mounting Holes on 82,55 [3.250] Dia. B.C.

9 10 Output shaft description

01 25,4 [1.00] Dia. Straight, Woodruff Key, .250-20 UNC-2B Hole in Shaft End
02 25,4 [1.00] Dia. SAE 6B Spline, .25-20 UNC-2B Hole in Shaft End
16 SAE 13 Tooth Spline, 16/32 Pitch, 21,74 (.856) Dia. (SAE B)
18 25,4 [1.00] Dia. Tapered, Woodruff Key and Nut, 34,92 [1.375] Taper Length
24 25.00 [.984] Dia. Straight, 8.0 [.315] Key, MB x 1.25-6H Hole in Shaft End

11 12 Port type

AA .875-14 UNF-2B SAE O-Ring Ports
AB .500-14 NPTF Dryseal Pipe Thread Ports
AC Manifold (.3125-18 UNC-2B Mounting Holes)
AD Manifold Ports (MB x 1.25-6H Mounting Holes)

13 14 Case flow options

00 None specified
03 Manifold case drain

15 Geroler options

A Standard
B Free running

16 Shaft options

0 None
N Electroless nickel plated

17 18 Seal options

00 Standard seals
03 Viton seals
07 High pressure shaft seal

19 20 Speed sensor options

00 None
AA Digital speed pickup (15 pulse), M12 connector (A=Power, B=Common, C=Signal)

T Series with Parking Brake (185-)

Model code

The following 25-digit coding system has been developed to identify all of the configuration options for the T Series Motor with Parking Brake. Use this model code to specify a motor with the desired features. All 25-digits of the code must be present when ordering.

M	TB	***	**	**	**	**	*	*	**	**	00	**	*	**	00	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

21 22 Valve options

00	**None**

23 24 Special features (hardware)

00	None specified
AB	Low speed valving

25 Special assembly instructions

0	None
2	Flange rotation 90°

26 27 Paint/packaging options

00	No paint
AA	Low gloss black primer

28 29 Eaton assigned code when applicable

00	None

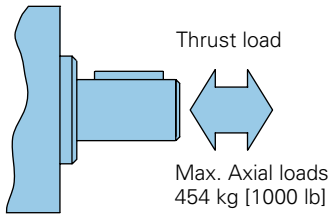
30 Design code

B	**Two**

See Eatonpowersource.com/ for more options and configurations.

Case pressure and case drain instead

Char-Lynn H Series, S Series and T 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 below — chart based on case pressure and shaft speed. If a case drain line is needed, connect drain line to assure that the motor will always remain full of fluid.



$PC \approx .6\ \Delta P + P_2$

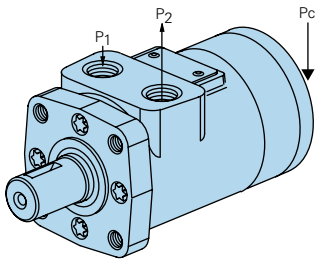
PC = Case Pressure

P_1 = Inlet Line Pressure

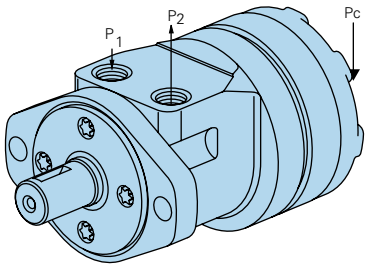
P_2 = Back Pressure

$\Delta P = P_1 - P_2$

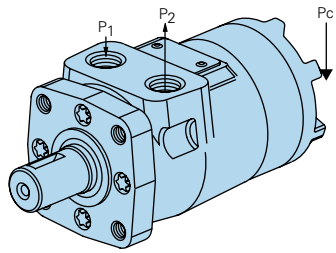
H Series

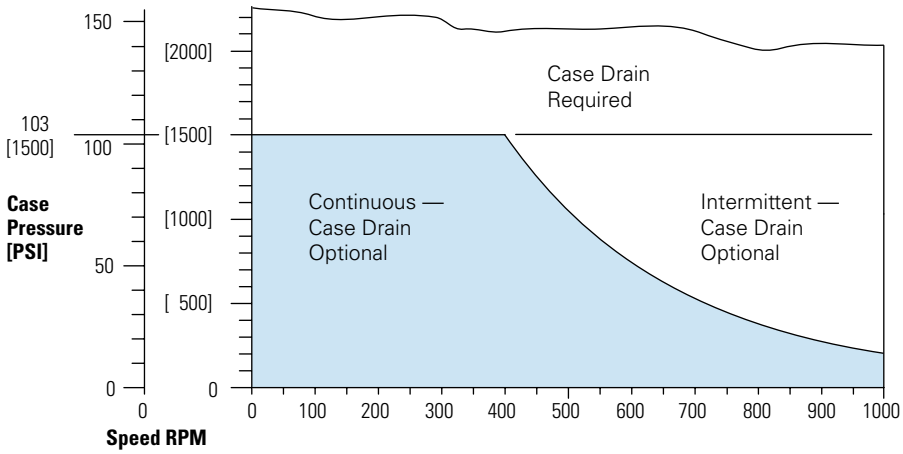


S Series

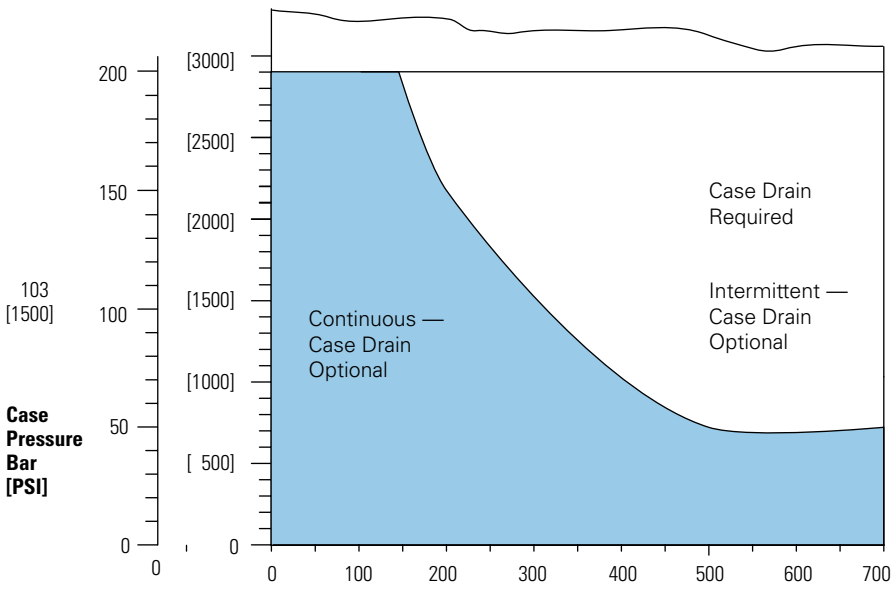


T Series





High pressure shaft seal



H, S and T Series (101-, 103-, 158-, 185-)

Side load capacity

The hydrodynamic bearing has infinite life when shaft load ratings are not exceeded. Hence, the shaft side load capacity is more than adequate to handle most externally applied loads (such as belts, chains, etc.), providing the motor to shaft size is applied within its torque rating. Allowable side load chart, shaft load location drawing and load curves (below) are based on the side / radial loads being applied to shaft at locations A, B, and C, to determine the shaft side load capacity at locations other than those shown use the formula (shown below). For more information about shaft side loads on Char-Lynn motors contact your Eaton representative.

Note: When the speed sensor option is used, side load ratings are reduced 25%.

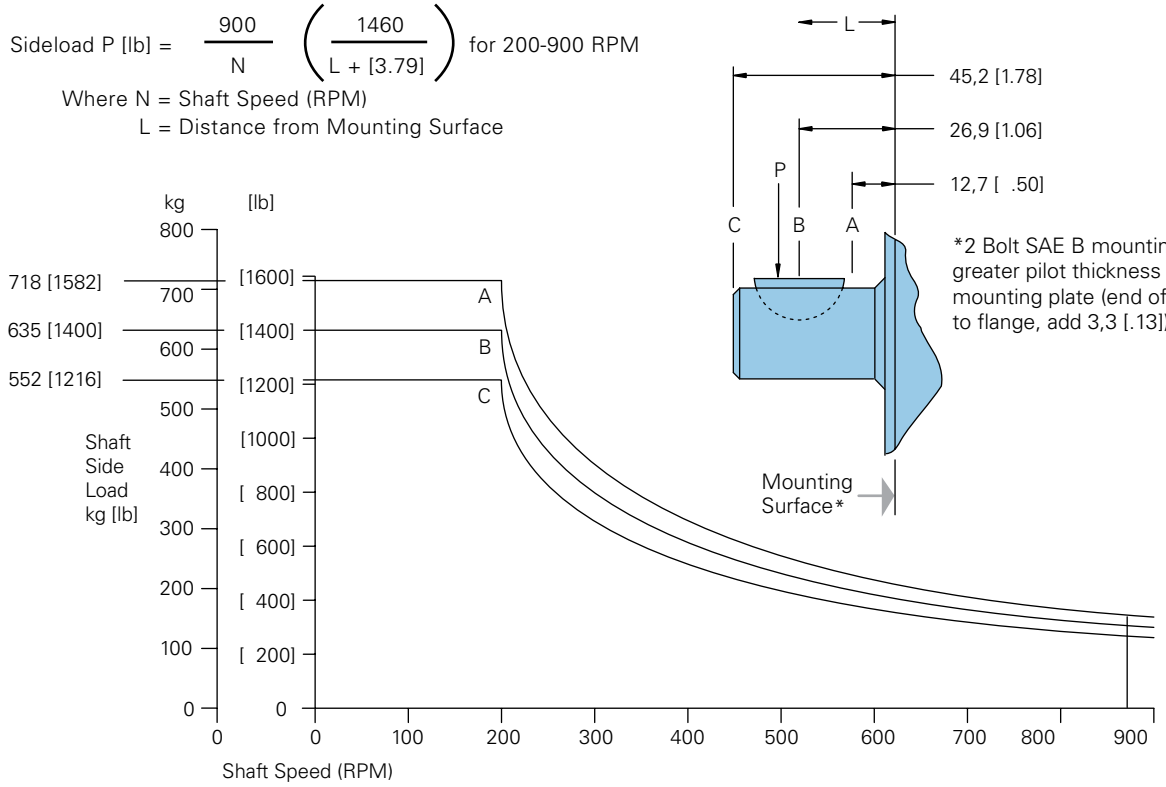
RPM Allowable shaft side load — Kg [lb]

	A	B	C
900	154 [339]	136 [300]	118 [261]
625	205 [452]	181 [400]	158 [348]
500	256 [565]	227 [500]	197 [435]
400	307 [678]	272 [600]	237 [522]
300	410 [904]	363 [800]	316 [696]
200	718 [1582]	635 [1400]	552 [1216]

$$\text{Sideload P kg} = \frac{900}{N}\left(\frac{16800}{L + 96{,}3}\right) \text{ for 200-900 RPM}$$

$$\text{Sideload P [lb]} = \frac{900}{N}\left(\frac{1460}{L + [3.79]}\right) \text{ for 200-900 RPM}$$

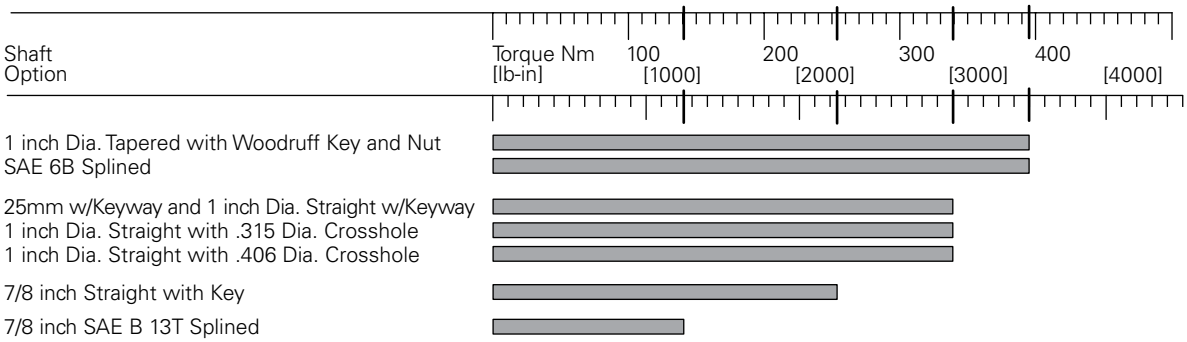
Where N = Shaft Speed (RPM)
L = Distance from Mounting Surface



*2 Bolt SAE B mounting flange has a greater pilot thickness and a thinner mounting plate (end of shaft to flange, add 3,3 [.13]).

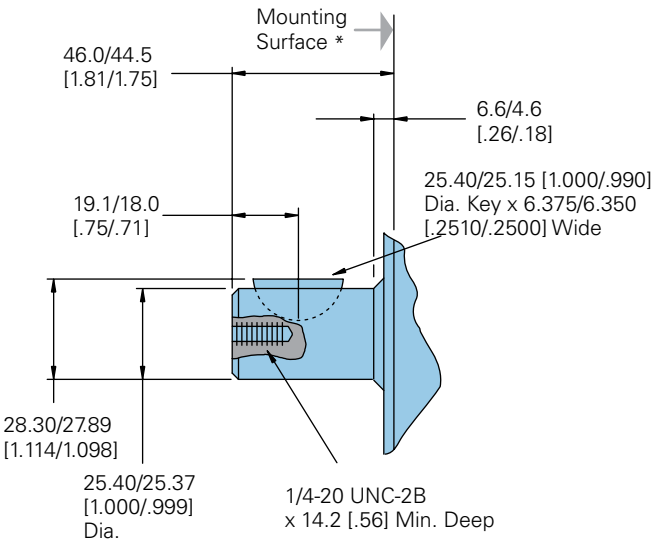
Shafts

Shaft size motor torque combination limit guide



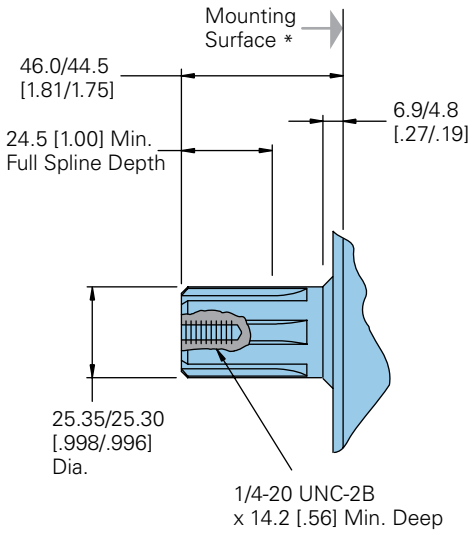
Code: 01

1 in. Dia. Straight with woodruff key



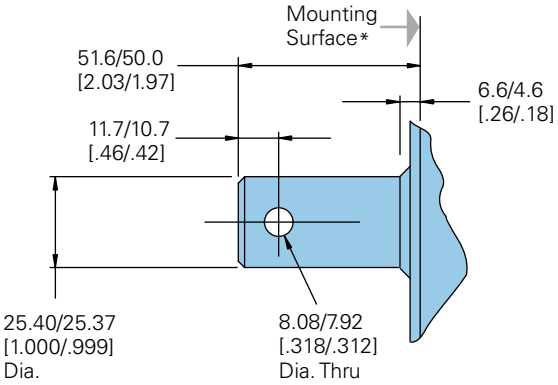
Code: 02

SAE 6B Splined shaft code: 02



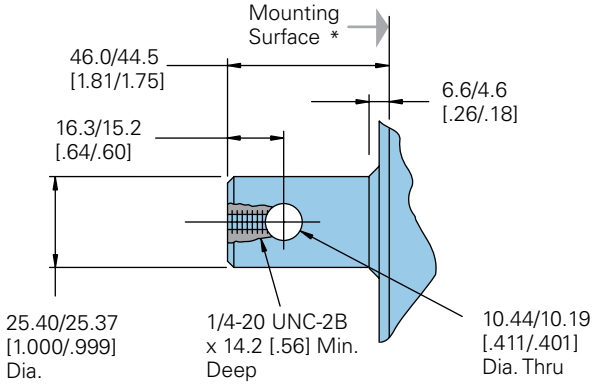
Code: 07

1 in. Dia. Straight Shaft with .315 Dia. Crosshole code: 07



Code: 08

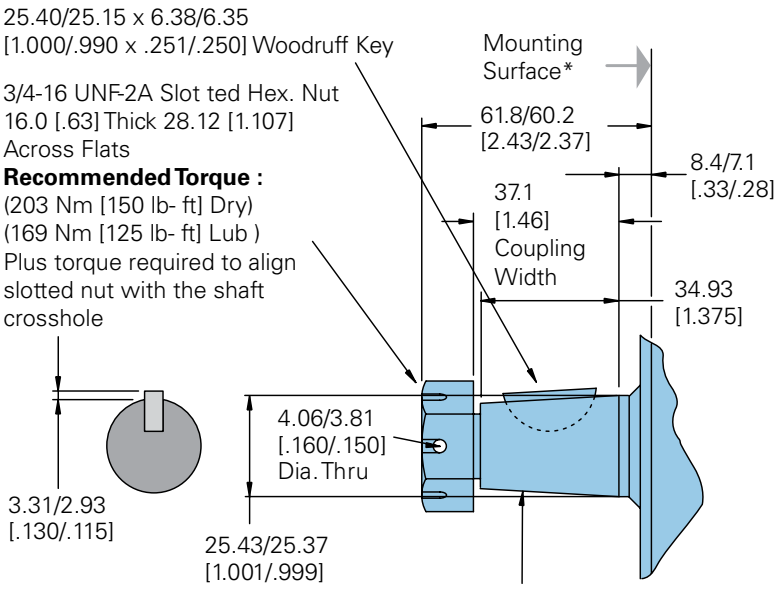
1 in. Dia. Straight Shaft with .406 Dia. Crosshole code: 08



Shafts

Code: 18

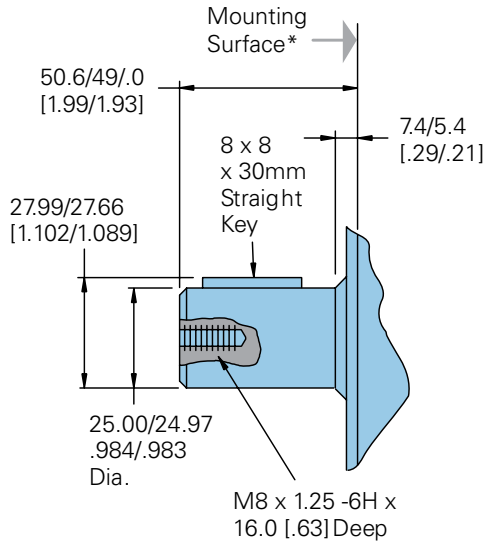
1 in. Dia. Tapered Shaft with woodruff key and nut



125.000.17mm Taper Per Meter [1.500.002 inch Taper Per Foot
Tapered Shaft End Per SAE J501 Except as specified

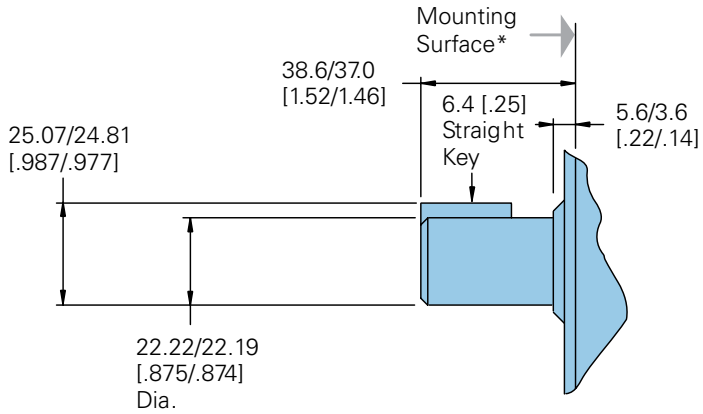
Code: 24

25mm Dia. Straight Shaft with 8mm Keyway



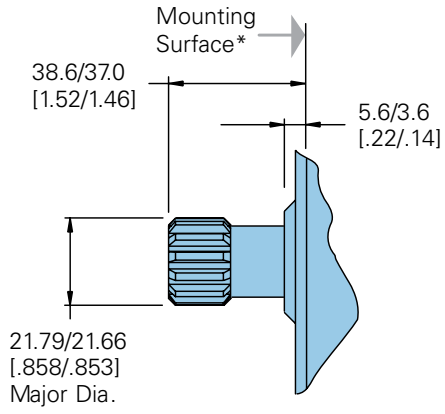
Code: 17

7/8 in. Dia. Straight shaft with key



Code: 16

7/8 in. Dia. SAE B Shaft 13 T Splined



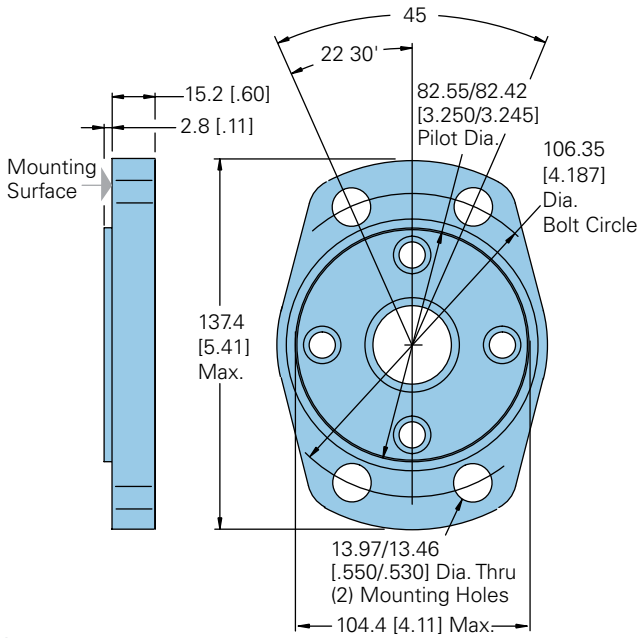
* 2 Bolt SAE B mounting flange has a greater pilot thickness and a thinner mounting plate (end of shaft to flange, add 3,3 [.13]).

Mounting options

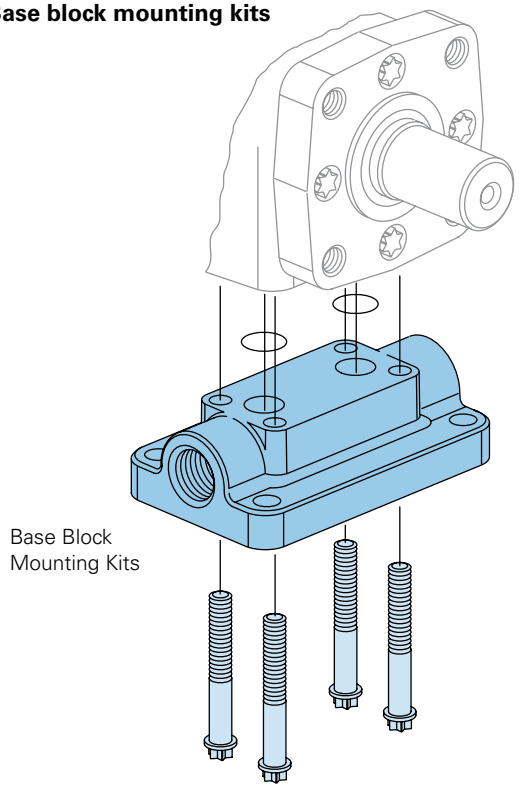
Note: Mounting surface flatness requirement is ,13 mm [.005 inch] Max.

Code: MA

4 Bolt Magneto

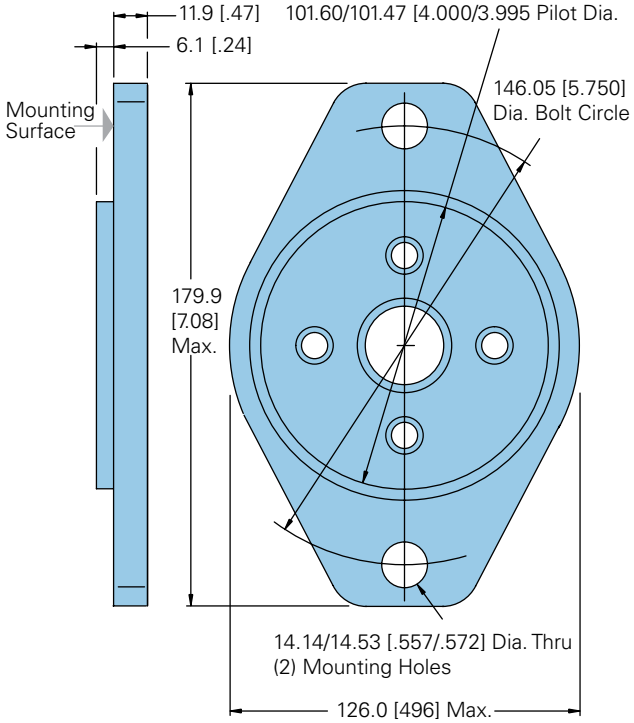


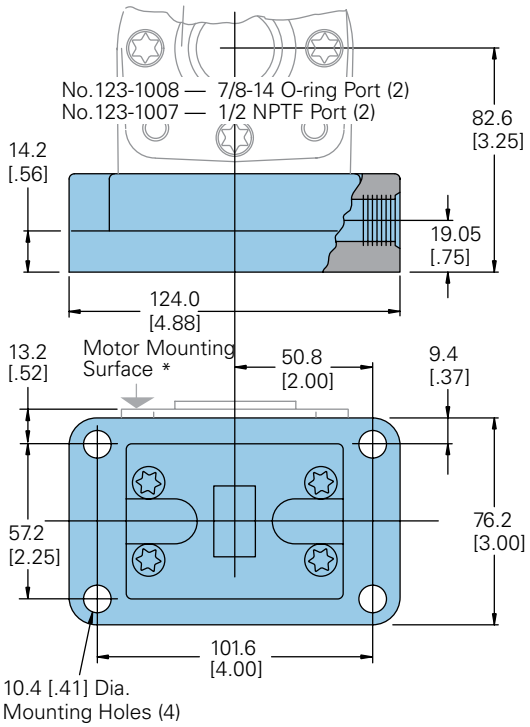
Base block mounting kits



Code: DD

2 Bolt SAE B





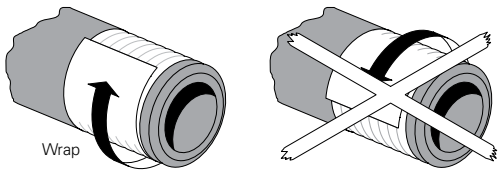
*2 Bolt SAE B mounting flange has a greater pilot thickness and a thinner mounting plate.

Use of Teflon tape sealant/ lubricant (with 1/2 14 NPTF port connectors only).

When using fittings with Teflon tape, be careful when taping and tightening. Over tightening or improperly taped fittings can cause damage to housing or leakage.

Use the following procedures:

- Wrap approx. 1 1/2 Turns of 13 mm [1/2 in.] wide Teflon tape around fitting threads — start tape 2 threads up from end of fitting.
- Tighten threads to a Maximum of 34 Nm [25 lb-ft]. — Do not tighten further —
- If fittings leak when tightened to maximum torque, either retape, reseal, or replace fittings.



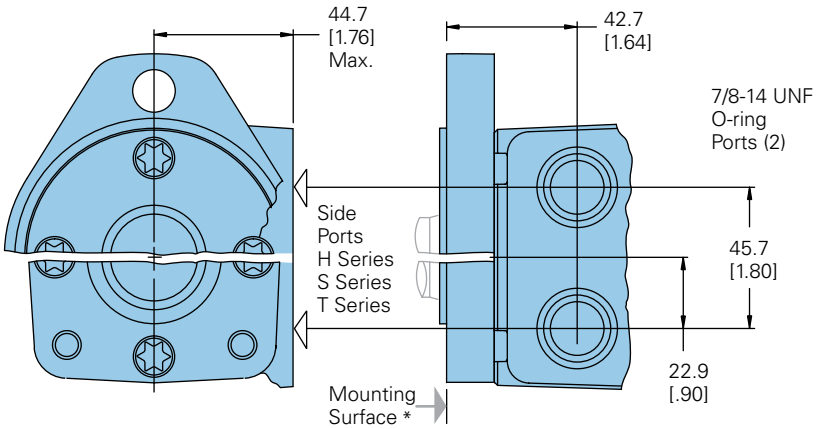
Ports

End Ports — H Series only

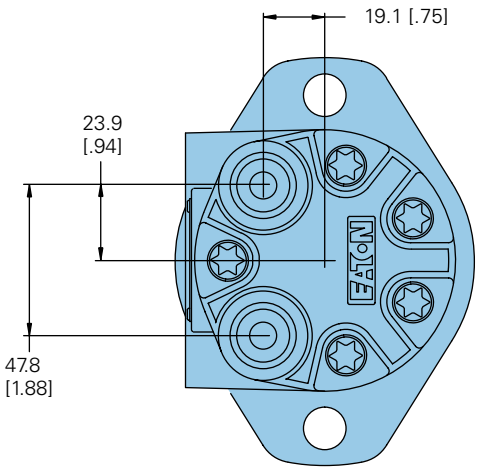
Code: EC G 1/2 (BSP) (2)
or
Code: EB 3/4-16 O-Ring (2)

Note: End ported motor pressure is derated. Reference page B-2-2 for ratings.

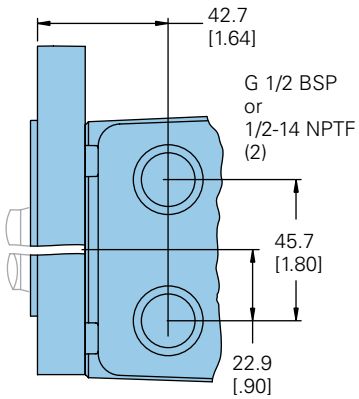
7/8-14 ports Code: AA



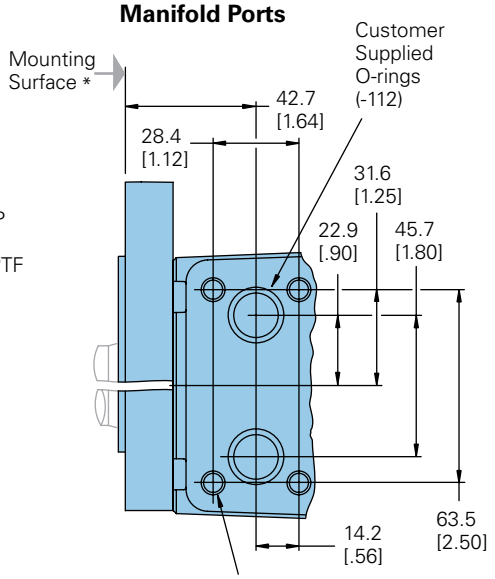
End Ports (H Series only)



G-1/2 or 1/2 NPTF ports

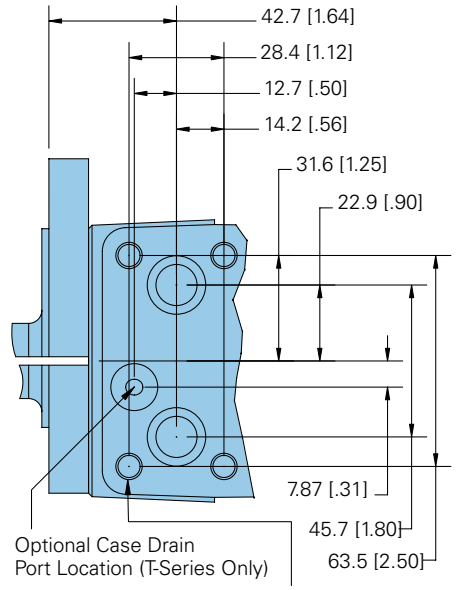


Manifold Ports



Code: AC 5/16-18 UNC (12.7 [.50] Max. Screw Thread Engagement) (4)
or
Code: AD M8 x 1.25 (12.7 [.50] Max. Screw Thread Engagement) (4)

Manifold Ports w/manifold case port



5/16-18 UNC (12.7 [.50] Max. Screw Thread Engagement) (4)
or M8x1.25 (12.7 [.50] Max. Screw Thread Engagement) (4)

Disc Valve Hydraulic Motors

Disc Valve: 2000, 4000 Compact, Delta, 4000, 6000, 10,000 Series

State of the art motors benefiting from 65 years of experience and innovation to fit your demands.

Disc valve hydraulic motors

Highlights

Product description

In the late 1950's the original low speed, high torque hydraulic motor was developed from a pump gerotor element consisting of an internal gear ring and a mating gear or star. While attaching the internal gear ring to the housing as a non moving part, oil was ported to pressurize and turn the internal star in an orbit around a center point. This slow turning star coupled with a splined drive to the output shaft became the Char-Lynn Orbit® motor.

A few years after this original Char-Lynn Orbit motor was introduced another original motor concept went into production. This motor had rolls incorporated into the internal gear ring, this element was identified by the name Geroler and is a registered trade name of Eaton Hydraulics. From these early years the Geroler motor has seen many design changes to make these Geroler motors the best the industry has to offer. Examine the simplicity of these Geroler disc valve motors shown below. Also examine all the following pages for high value Char-Lynn disc valve motors from Eaton Hydraulics.

Features:

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

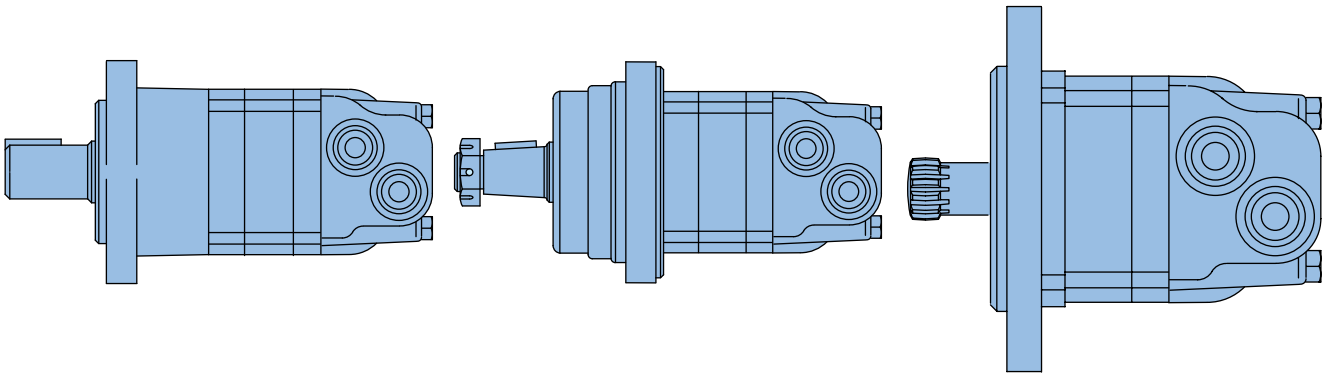
- Displacement (Geroler size)
- Output shaft
- No shaft and bearing assembly (bearingless motor)
- Port configuration
- Mounting flange
- Other special features

Benefits:

- Lowest pressure drop motor in the industry
- Widest range of options
- The most experienced manufacturer of LSHT motors

Applications:

- Swing motor
- Brush cutters & mowers
- Harvesting equipment
- Directional boring
- Turf equipment
- Skid steer loaders
- Fairway mowers
- Harvesters
- Mowing
- Snow removal
- Sprayers
- Trencher
- Wood products
- Grinders and mixers
- Forestry equipment
- Irrigation reels



Standard motor

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

Wheel motor

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

Bearingless motor

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

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Description:

The popular 2000 Series provides torque up to 850 Nm. [7,500 lb-in]. This proven design is reliable and durable. Eaton has added options that make the motor more flexible to use in a wide variety of applications. The expanded displacement range using patented "Drive in Drive" technology is the latest innovation in the 2000 series of motors.

2000 Series	
Geroler element	13 Displacements
Flow l/min [GPM]	75 [20] Continuous**
	115 [30] Intermittent*
Speed RPM	1215 Cont.**
	1215 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.

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 valve option

Benefits:

- Easy to design in a system
- Proven reliability and performance in tough applications
- Compact design that maximizes power density

Applications:

- Skid steer attachments
- Swing motor
- Brush cutters & mowers
- Harvesting equipment
- Directional Boring any place pressure relief protection is optimal for system or motor performance and life
- Turf equipment

C-1


Harvestor

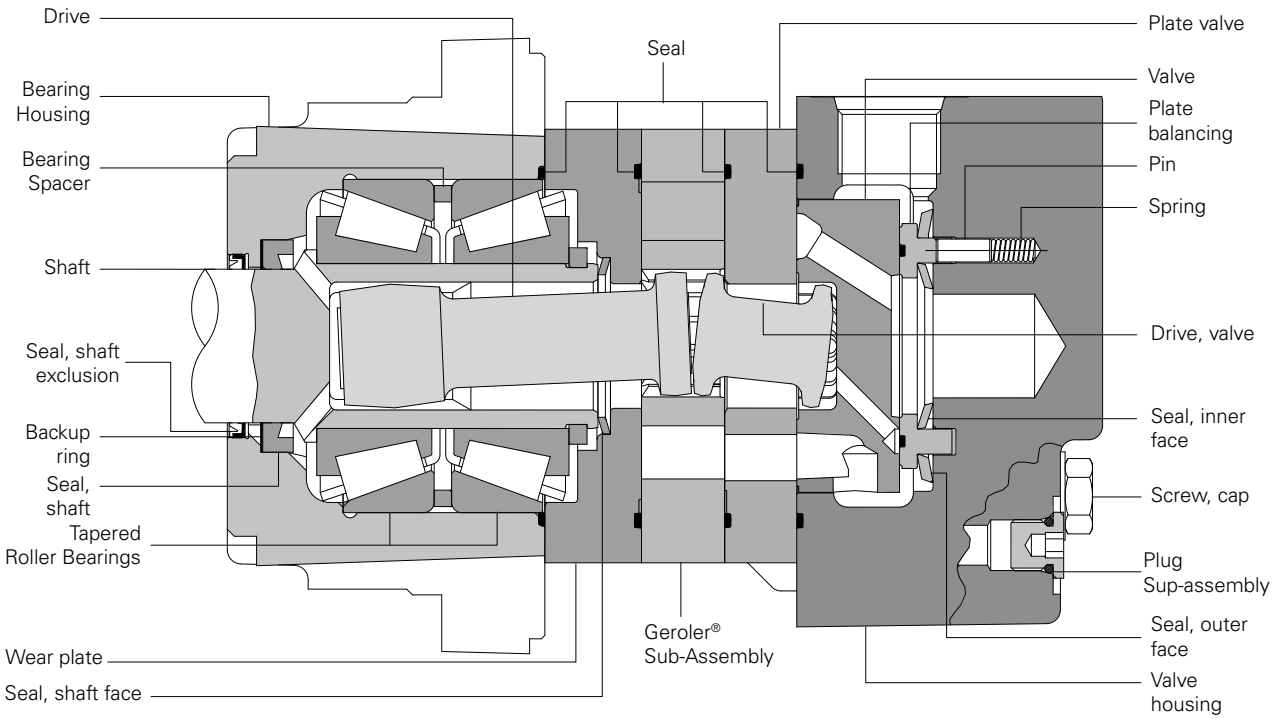

Paving equipment


Conveyors


Boom lifts

2000 Series

Specifications



C-1

Specification data — 2000 series motors

Displ. cm³/r [in³/r]		34 [2.1]	41 [2.5]	66 [4.0]	80 [4.9]	90 [5.5]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
Max. Speed (RPM) @ Flow	Continuous	1215	1104	1075	908	836	742	576	477	385	308	246	191	153
	Intermittent	1215	1216	1214	908	1042	924	720	713	577	462	365	335	230
Flow l/min [GPM]	Continuous	42 [11]	45 [12]	72 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Intermittent	42 [11]	53 [14]	87 [23]	75 [20]	95 [25]	95 [25]	95 [25]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]
Torque* Nm [lb - in]	Continuous	98 [864]	112 [988]	186 [1643]	235 [2065]	265 [2326]	295 [2630]	385 [3420]	455 [4040]	540 [4780]	660 [5850]	765 [6750]	775 [6840]	845 [7470]
	Intermittent	142 [1261]	169 [1497]	276 [2446]	345 [3035]	390 [3458]	445 [3950]	560 [4970]	570 [5040]	665 [5890]	820 [7250]	885 [7820]	925 [8170]	930 [8225]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	155 [2250]	120 [1750]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	240 [3500]	190 [2750]	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	225 [3250]	170 [2500]
Weight kg [lb]	Standard or Wheel mount	8.8 [19.4]	8.8 [19.4]	8.8 [19.4]	9.3 [20.5]	9.3 [20.5]	9.5 [21.0]	9.8 [21.5]	10.0 [22.0]	10.4 [23.0]	11.3 [25.0]	11.3 [25.0]	11.8 [26.0]	12.2 [27.0]
	Bearingless	6.8 [15.0]	6.8 [15.0]	6.8 [15.0]	7.3 [16.0]	7.3 [16.0]	7.5 [16.5]	7.7 [17.0]	7.9 [17.5]	8.4 [18.5]	9.3 [20.5]	9.3 [20.5]	9.8 [21.5]	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 in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

Maximum inlet pressure:
310 bar [4500 PSI]

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

Maximum return pressure:
310 bar [4500 PSI] with case drain line installed.

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

Δ bar [Δ PSI]
The true pressure difference between inlet port and outlet port

Continuous rating:
Motor may be run continuously at these ratings

Intermittent operation:
10% of every minute

Peak operation:
1% of every minute

Recommended fluids:
Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 13 cSt [70 SUS] at operating temperature.

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

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

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

2000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

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Δ Pressure bar [PSI] 34 cm³/r [2.1 in³/r]

Flow LPM [GPM]	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[2]	[114]	[262]	[405]	[549]					
	13	30	46	62					
8	210	189	178	162					
[4]	[110]	[256]	[404]	[552]	[704]	[828]	[962]		
	12	29	46	62	80	94	109		
15	432	416	393	363	347	313	284		
[6]	[115]	[249]	[400]	[550]	[708]	[864]	[996]	[1099]	[1250]
	13	28	45	62	80	98	113	124	141
23	651	636	613	580	546	518	467	425	404
[8]	[126]	[232]	[393]	[548]	[702]	[856]	[1003]	[1135]	[1244]
	14	26	44	62	79	97	113	128	141
30	856	856	830	795	759	712	657	578	549
[10]	[114]	[239]	[386]	[541]	[697]	[850]	[995]	[1136]	[1261]
	13	27	44	61	79	96	112	128	142
38	1105	1077	1049	1015	975	923	859	775	707
[11]	[99]	[231]	[380]	[533]	[679]	[834]	[987]	[1133]	[1245]
	11	26	43	60	77	94	112	128	141
42	1215	1191	1160	1117	1073	1023	945	854	819

[231] 26 1191 } Torque [lb-in] Nm Speed RPM

Δ Pressure bar [PSI] 66 cm³/r [4.0 in³/r]

Flow LPM [GPM]	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[2]	[226]	[503]	[746]	[987]					
	26	57	84	112					
8	103	102	93	88					
[4]	[226]	[508]	[791]	[1072]	[1342]	[1609]	[1810]	[2012]	[2220]
	26	57	89	121	152	182	204	227	251
15	214	208	194	188	181	172	158	136	134
[6]	[216]	[503]	[792]	[1075]	[1353]	[1629]	[1890]	[2123]	[2332]
	24	57	89	121	153	184	214	240	264
23	329	318	305	290	284	270	257	235	228
[8]	[208]	[495]	[781]	[1070]	[1352]	[1633]	[1910]	[2186]	[2405]
	23	56	88	121	153	184	216	247	272
30	444	430	415	401	387	372	355	339	320
[10]	[195]	[486]	[777]	[1070]	[1359]	[1643]	[1920]	[2191]	[2446]
	22	55	88	121	154	186	217	248	276
38	560	544	529	513	497	480	461	440	419
[12]	[182]	[472]	[757]	[1052]	[1345]	[1627]	[1912]	[2189]	[2444]
	21	53	86	119	152	184	216	247	276
45	672	658	643	623	606	586	565	547	528
[14]	[187]	[459]	[750]	[1045]	[1339]	[1633]	[1926]	[2198]	[2443]
	21	52	85	118	151	184	218	248	276
53	788	776	758	738	720	701	680	654	640
[16]	[182]	[436]	[724]	[1019]	[1313]	[1604]	[1915]	[2181]	[2443]
	21	49	82	115	148	181	216	246	276
61	901	887	870	849	829	808	785	753	734
[19]	[167]	[407]	[702]	[996]	[1283]	[1588]	[1866]	[2157]	[2441]
	19	46	79	113	145	179	211	244	276
72	1075	1061	1040	1017	996	967	950	919	876
[21]	[162]	[391]	[679]	[967]	[1255]	[1556]	[1840]	[2268]	[2432]
	18	44	77	109	142	176	208	256	275
79	1188	1175	1152	1129	1105	1075	1052	987	988
[23]					[1226]	[1523]	[1814]	[1985]	[2387]
					139	172	205	224	270
87					1214	1185	1155	1125	1107

Δ Pressure bar [PSI] 41 cm³/r [2.5 in³/r]

Flow LPM [GPM]	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[2]	[138]	[306]	[468]	[659]					
	16	35	53	74					
8	171	160	156	135					
[4]	[129]	[296]	[466]	[552]	[807]	[966]	[1110]	[1316]	[1421]
	15	33	53	62	91	109	125	149	161
15	364	352	336	363	295	272	248	235	217
[6]	[135]	[300]	[473]	[550]	[818]	[985]	[1147]	[1292]	[1495]
	15	34	53	62	92	111	130	146	169
23	550	535	516	491	465	437	406	352	326
[8]	[130]	[285]	[461]	[548]	[816]	[988]	[1150]	[1320]	[1477]
	15	32	52	62	92	112	130	149	167
30	734	722	699	670	641	616	568	519	470
[10]	[137]	[276]	[455]	[541]	[802]	[979]	[1153]	[1329]	[1497]
	15	31	51	61	91	111	130	150	169
38	921	909	884	855	825	784	743	687	635
[12]	[119]	[268]	[441]	[618]	[794]	[969]	[1141]	[1321]	[1494]
	13	30	50	70	90	109	129	149	169
45	1104	1093	1068	1036	1003	972	902	833	785
[14]				[597]	[787]	[953]	[1124]	[1309]	[1479]
				67	89	108	127	148	167
53				1216	1184	1144	1073	997	921

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous | Peak | Intermittent | No operation

Δ Pressure bar [PSI]
80 cm³/r [4.9 in³/r]

Flow LPM [GPM]

	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.25] 0.95	[210] 25 3	[420] 45 1							
[0.5] 1.9	[250] 30 17	[500] 56 8	[740] 85 3						
[1] 4	[330] 35 44	[670] 75 40	[990] 110 37	[1300] 145 34	[1550] 175 28	[1800] 205 22	[1950] 220 14	[2110] 240 2	
[2] 8	[330] 35 90	[670] 75 85	[995] 110 81	[1310] 150 78	[1580] 180 72	[1840] 210 65	[2100] 235 57	[2365] 265 49	[2630] 295 42
[4] 15	[325] 35 182	[670] 75 176	[1005] 115 170	[1330] 150 166	[1620] 185 159	[1920] 215 152	[2200] 250 140	[2480] 280 128	[2765] 310 117
[6] 23	[320] 35 273	[665] 75 267	[1010] 115 259	[1340] 150 254	[1655] 185 246	[1975] 225 238	[2270] 255 223	[2570] 290 207	[2880] 325 192
[8] 0	[310] 35 365	[660] 75 375	[1015] 115 349	[1345] 150 341	[1685] 190 333	[2020] 230 325	[2330] 265 306	[2640] 300 286	[2960] 335 266
[10] 38	[300] 35 456	[650] 75 448	[1010] 115 439	[1350] 155 429	[1700] 190 420	[2050] 230 411	[2370] 270 388	[2690] 305 364	[3010] 340 341
[12] 45	[285] 30 547	[640] 70 537	[1005] 115 530	[1350] 155 516	[1705] 195 507	[2065] 235 497	[2390] 270 470	[2715] 305 442	[3035] 345 415
[14] 53	[270] 30 638	[625] 70 629	[990] 110 622	[1340] 150 603	[1705] 195 593	[2065] 235 584	[2395] 270 553	[2720] 305 521	[3030] 340 490
[16] 61	[255] 30 729	[610] 70 720	[975] 110 714	[1330] 150 689	[1690] 190 679	[2055] 230 670	[2385] 270 635	[2700] 305 599	[2995] 340 564
[18] 68	[230] 25 818	[590] 65 810	[955] 110 795	[1310] 150 775	[1680] 190 765	[2025] 230 756	[2355] 265 717	[2660] 300 677	[2935] 330 638
[20] 76	[210] 25 908	[570] 65 901	[930] 105 880	[1290] 145 861	[1645] 185 851	[1985] 225 842	[2305] 260 799	[2600] 295 755	[2845] 320 712

[570] Torque [lb-in]
65 Nm
1901 Speed RPM

Δ Pressure bar [PSI]
90 cm³/r [5.5 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.25] 0.95	[124] 14 5	[233] 26 2	[471] 53 1							
[0.5] .9	[133] 15 15	[273] 31 13	[555] 63 6	[832] 94 2						
[1] 4	[151] 17 39	[358] 40 39	[744] 84 35	[1091] 123 32	[1424] 161 28	[1697] 192 21	[1952] 221 13	[2189] 247 12	[2368] 268 2	
[2] 8	[151] 17 82	[358] 40 80	[744] 84 76	[1099] 124 72	[1439] 163 68	[1737] 196 61	[2015] 228 50	[2293] 259 38	[2570] 290 29	[2855] 323 20
[4] 15	[151] 17 167	[350] 40 163	[732] 83 158	[1113] 126 152	[1473] 166 148	[1800] 203 139	[2132] 241 126	[2454] 277 115	[2775] 314 102	[3100] 350 90
[6] 23	[142] 16 250	[348] 39 245	[736] 83 240	[1114] 126 233	[1492] 169 227	[1851] 209 218	[2208] 249 203	[2552] 288 191	[2898] 327 176	[3249] 367 161
[8] 30	[133] 15 335	[338] 38 328	[729] 82 329	[1128] 127 314	[1509] 170 306	[1890] 214 295	[2269] 256 281	[2635] 298 266	[3000] 339 249	[3367] 380 231
[10] 38	[124] 14 418	[331] 37 410	[724] 82 404	[1130] 128 395	[1521] 172 385	[1912] 216 373	[2309] 261 361	[2670] 302 342	[3036] 343 322	[3398] 384 302
[12] 45	[106] 12 502	[315] 36 493	[714] 81 485	[1127] 127 477	[1525] 172 464	[1924] 217 451	[2326] 263 441	[2704] 306 417	[3082] 348 394	[3458] 391 372
[14] 53	[98] 11 585	[298] 34 575	[706] 80 567	[1115] 126 559	[1525] 172 543	[1924] 217 529	[2326] 263 521	[2707] 306 493	[3080] 348 467	[3450] 390 431
[16] 61	[80] 9 670	[285] 32 658	[688] 78 650	[1107] 125 641	[1510] 171 622	[1907] 215 607	[2311] 261 610	[2697] 305 568	[3070] 347 541	[3432] 388 513
[18] 68	[62] 7 753	[262] 30 740	[673] 76 732	[1087] 123 719	[1490] 168 701	[1892] 214 685	[2281] 258 680	[2662] 301 643	[3030] 342 613	[3381] 382 583
[20] 76	[53] 6 836	[242] 27 822	[644] 73 814	[1045] 118 796	[1447] 163 780	[1850] 209 765	[2246] 254 748	[2617] 296 719	[2988] 338 686	[3301] 373 653
[22] 83	[35] 4 920	[231] 26 916	[639] 72 907	[1047] 118 895	[1437] 162 876	[1836] 207 854	[2218] 251 749	[2599] 294 803	[2981] 337 774	
[24] 91	[18] 2 1003	[204] 23 1000	[612] 69 991	[1011] 114 978	[1366] 154 960	[1792] 202 940	[2182] 247 918	[2573] 291 882	[2963] 335 850	
[25] 95		[195] 22 1042	[594] 67 1033	[994] 112 1020	[1384] 156 1003	[1765] 199 984	[2173] 246 954	[2564] 290 921		

2000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
100 cm³/r [6.2 in³/r]

Flow LPM [GPM]	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.25] 0.95	[140] 15 4	[260] 30 2								
[0.5] 1.9	[150] 15 13	[300] 35 9	[620] 70 5	[940] 105 2						
[1] 4	[170] 20 35	[390] 45 34	[830] 95 31	[1210] 135 28	[1570] 175 23	[1870] 210 15	[2130] 240 6			
[2] 8	[170] 20 73	[390] 45 71	[830] 95 68	[1220] 140 63	[1590] 180 59	[1920] 215 51	[2220] 250 38	[2520] 285 24	[2810] 315 14	[3120] 355 4
[4] 15	[170] 20 148	[380] 45 145	[820] 90 141	[1240] 140 136	[1640] 185 131	[2010] 225 121	[2380] 270 104	[2750] 310 94	[3120] 355 80	[3490] 395 69
[6] 23	[160] 20 222	[380] 45 219	[820] 90 215	[1260] 140 209	[1670] 190 202	[2080] 235 192	[2480] 280 172	[2880] 325 163	[3280] 370 149	[3680] 415 134
[8] 30	[150] 15 297	[370] 40 294	[810] 90 288	[1260] 140 281	[1700] 190 273	[2130] 240 261	[2560] 290 243	[2990] 340 231	[3420] 385 216	[3840] 435 200
[10] 38	[140] 15 371	[368] 40 367	[810] 90 362	[1270] 145 354	[1720] 195 344	[2160] 245 330	[2610] 295 316	[3020] 340 300	[3440] 390 283	[3850] 435 266
[12] 45	[120] 15 445	[350] 40 442	[800] 90 436	[1270] 145 427	[1730] 195 415	[2180] 245 399	[2630] 295 389	[3070] 345 369	[3510] 395 350	[3950] 445 332
[14] 53	[110] 10 519	[330] 35 516	[800] 90 509	[1260] 140 500	[1740] 195 486	[2180] 245 469	[2630] 295 463	[3070] 345 437	[3500] 395 417	[3940] 445 378
[16] 61	[90] 10 594	[320] 35 591	[780] 90 583	[1260] 140 573	[1720] 195 558	[2160] 245 540	[2610] 295 537	[3060] 345 506	[3500] 395 485	[3940] 445 463
[18] 68	[70] 10 668	[300] 35 665	[770] 85 657	[1240] 140 646	[1700] 190 630	[2140] 240 611	[2580] 290 609	[3020] 340 574	[3460] 390 552	[3900] 440 529
[20] 76	[60] 5 742	[280] 30 739	[730] 80 731	[1180] 135 715	[1630] 185 703	[2090] 235 684	[2550] 290 662	[2980] 335 643	[3440] 390 619	[3830] 435 595
[22] 83	[40] 5 816	[260] 30 813	[720] 80 805	[1180] 135 794	[1620] 185 777	[2070] 235 758	[2500] 280 749	[2930] 330 712	[3360] 380 687	
[24] 91	[20] 1 890	[230] 23 887	[690] 80 879	[1140] 130 868	[1540] 175 852	[2020] 230 834	[2460] 280 814	[2900] 330 782	[3340] 375 754	
[25] 95		[220] 25 924	[670] 75 916	[1120] 125 905	[1560] 175 890	[1990] 225 873	[2450] 275 846	[2890] 325 817		

Δ Pressure bar [PSI]
130 cm³/r [8.0 in³/r]

Flow LPM [GPM]	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.25] 0.95	[170] 20 3									
[0.5] 1.9	[190] 20 12	[410] 45 8	[870] 100 2							
[1] 4	[230] 25 28	[510] 60 27	[1070] 120 23	[1580] 180 19	[2050] 230 16	[2520] 285 13	[2920] 309 9	[3310] 375 3		
[2] 8	[230] 25 56	[510] 60 56	[1080] 120 53	[1600] 180 47	[2090] 235 42	[2580] 290 39	[2930] 330 36	[3320] 375 28	[3640] 410 21	[3990] 450 13
[4] 15	[220] 25 114	[500] 55 113	[1080] 120 111	[1620] 185 104	[2150] 245 97	[2660] 300 95	[3100] 350 92	[3540] 400 85	[3980] 450 77	[4420] 500 70
[6] 23	[220] 25 172	[490] 55 171	[1080] 120 169	[1640] 185 161	[2190] 245 153	[2740] 310 149	[3260] 370 146	[3770] 425 132	[4280] 485 118	[4800] 540 104
[8] 30	[200] 25 230	[480] 55 224	[1080] 120 222	[1650] 185 219	[2220] 250 210	[2780] 315 204	[3310] 375 201	[3840] 435 192	[4360] 495 184	[4890] 550 175
[10] 38	[180] 20 287	[470] 55 286	[1070] 120 282	[1650] 185 276	[2230] 250 269	[2800] 315 261	[3420] 385 255	[3940] 445 243	[4450] 505 231	[4970] 560 219
[12] 45	[160] 20 345	[460] 50 344	[1060] 120 338	[1640] 185 333	[2230] 250 327	[2800] 315 317	[3350] 380 307	[3910] 440 295	[4440] 500 284	[4960] 560 272
[14] 53	[150] 15 403	[440] 50 402	[1030] 115 395	[1620] 185 391	[2220] 250 385	[3000] 340 373	[3350] 380 360	[3910] 440 348	[4440] 500 336	
[16] 61	[130] 15 461	[420] 45 460	[1010] 115 452	[1600] 180 447	[2200] 250 443	[2780] 315 430	[3330] 375 411	[3890] 440 397	[4440] 500 384	
[18] 68	[110] 10 518	[400] 45 517	[990] 110 509	[1580] 180 504	[2160] 245 500	[2750] 310 484	[3300] 375 471	[3860] 435 456	[4410] 500 440	
[20] 76	[90] 10 576	[380] 45 575	[960] 110 568	[1550] 175 560	[2130] 240 551	[2710] 305 539	[3280] 370 524	[3840] 435 508		
[22] 83	[60] 5 634	[350] 40 633	[940] 105 624	[1520] 170 619	[2100] 235 604	[2680] 305 597	[3250] 365 579	[3820] 430 560		
[24] 91	[40] 5 692	[325] 35 691	[920] 105 682	[1490] 170 676	[2070] 235 665	[2650] 300 651	[3220] 365 633	[3780] 425 616		
[25] 95	[20] 1 720	[310] 35 719	[900] 100 712	[1480] 165 705	[2050] 230 692	[2630] 295 679	[3200] 360 682	[3700] 420 656		

[1560] 175 890 } Torque [lb-in] Nm Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
160 cm³/r [9.6 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[3750] 259
[0.25] 0.95	[200] 25 3								
[0.5] 1.9	[240] 25 9	[490] 55 7	[990] 110 5	[1570] 175 3	[2140] 240 1				
[1] 4	[280] 30 23	[590] 65 21	[1170] 130 19	[1730] 195 17	[2290] 260 13	[2830] 320 8	[3330] 375 3	[3820] 430 2	[4070] 460 1
[2] 8	[300] 35 46	[610] 70 45	[1210] 135 42	[1790] 200 39	[2350] 265 35	[2920] 330 34	[3480] 395 33	[4050] 460 28	[4330] 490 22
[4] 15	[320] 35 93	[630] 70 92	[1260] 140 89	[1890] 215 85	[2530] 285 79	[3170] 360 77	[3820] 430 75	[4460] 505 59	[4780] 540 43
[6] 23	[320] 35 142	[650] 75 140	[1300] 145 137	[1960] 220 131	[2620] 295 124	[3280] 370 118	[3940] 445 113	[4600] 520 104	[4930] 560 96
[8] 30	[310] 35 190	[650] 75 187	[1330] 150 184	[2010] 225 178	[2670] 300 170	[3330] 375 166	[4000] 450 164	[4660] 525 153	[4990] 565 142
[10] 38	[290] 35 237	[640] 70 235	[1340] 150 231	[2030] 230 226	[2850] 320 217	[3410] 385 212	[4030] 455 209	[4700] 530 193	[5030] 570 187
[12] 45	[270] 30 286	[620] 70 283	[1320] 150 279	[2030] 230 274	[2700] 305 265	[3370] 380 254	[4040] 455 246	[4710] 530 235	[5040] 570 224
[14] 53	[240] 25 334	[590] 65 331	[1300] 145 326	[2020] 230 322	[2690] 305 312	[3360] 380 305	[4030] 455 297	[4700] 530 286	
[16] 61	[220] 25 382	[570] 65 378	[1270] 145 374	[1980] 225 369	[2660] 300 360	[3330] 375 349	[4010] 455 339	[4680] 530 326	
[18] 68	[190] 20 429	[540] 60 426	[1240] 140 422	[1960] 220 416	[2640] 300 407	[3320] 375 394	[3990] 450 387		
[20] 76	[170] 20 477	[510] 60 474	[1210] 135 469	[1920] 215 462	[2630] 300 451	[3310] 375 440	[3940] 445 430		
[22] 83	[150] 15 525	[480] 55 522	[1170] 130 517	[1880] 210 510	[2600] 295 501	[3290] 370 484	[3920] 445 473		
[24] 91	[120] 15 572	[450] 50 569	[1150] 130 564	[1860] 210 556	[2570] 290 546	[3260] 370 531	[3900] 440 522		
[25] 95	[90] 10 596	[440] 50 593	[1140] 130 587	[1840] 210 580	[2560] 290 566	[3230] 365 553	[3880] 440 544		
[30] 114		[330] 35 713	[1040] 120 706	[1750] 200 696	[2470] 280 682	[3140] 355 672	[3800] 430 658		

[330] Torque [lb-in]
35 Nm
713 Speed RPM

C-1

2000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Intermittent

Peak

No operation

Δ Pressure bar [PSI]
195 cm³/r [11.9in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190	[3000] 207	[3250] 224	[3500] 241	[3750] 259
[0.25] 0.95	[240] 25 4	[590] 65 2													
[0.5] 1.9	[290] 35 8	[640] 70 6	[990] 110 5	[1340] 150 2											
[1] 4	[380] 45 17	[730] 80 16	[1100] 125 15	[1430] 160 14	[1790] 200 13	[2120] 240 11	[2450] 275 9	[2720] 305 7	[2990] 340 5	[3260] 370 4	[3540] 400 3	[3810] 430 2	[4080] 460 2	[4350] 490 1	[4620] 520 1
[2] 8	[390] 45 37	[755] 85 35	[1135] 130 34	[1470] 165 33	[1860] 210 32	[2195] 250 31	[2535] 285 28	[2880] 325 26	[3120] 355 24	[3680] 415 21	[4090] 460 20	[4500] 510 19	[4800] 540 17	[5100] 575 14	[5400] 610 14
[4] 15	[405] 45 76	[795] 90 74	[1185] 135 73	[1540] 175 72	[1970] 225 71	[2310] 260 70	[2675] 300 66	[3040] 345 64	[3420] 385 62	[3790] 430 61	[4160] 470 59	[4520] 510 57	[4890] 550 55	[5260] 595 51	[5630] 635 45
[6] 23	[405] 45 115	[815] 90 113	[1220] 140 111	[1590] 180 110	[2035] 230 109	[2395] 270 108	[2780] 315 104	[3170] 360 102	[3560] 400 100	[3940] 445 99	[4320] 490 96	[4700] 530 94	[5070] 570 91	[5450] 615 87	[5830] 660 81
[8] 30	[400] 45 154	[820] 90 151	[1230] 140 149	[1625] 185 148	[2065] 235 147	[2450] 275 146	[2850] 320 143	[3260] 370 140	[3670] 415 137	[4040] 455 135	[4410] 500 132	[4780] 540 130	[5150] 580 127	[5520] 625 123	[5890] 665 117
[10] 38	[380] 45 193	[810] 95 190	[1230] 140 188	[1645] 185 187	[2095] 235 186	[2480] 280 184	[2895] 325 181	[3310] 375 177	[3730] 420 175	[4100] 465 173	[4470] 505 170	[4840] 545 168	[5210] 590 164	[5590] 630 160	
[12] 45	[355] 40 231	[790] 90 229	[1215] 135 227	[1650] 185 226	[2100] 235 224	[2485] 280 221	[2915] 330 219	[3340] 375 218	[3760] 425 215	[4120] 465 211	[4480] 505 208	[4850] 550 204			
[14] 53	[320] 35 269	[765] 85 267	[1190] 135 267	[1645] 185 264	[2090] 235 261	[2475] 280 260	[2915] 330 257	[3350] 380 254	[3770] 425 250	[4130] 465 248	[4480] 505 245	[4860] 550 241			
[16] 61	[290] 30 308	[730] 80 306	[1160] 130 305	[1625] 185 303	[2070] 235 299	[2455] 275 296	[2900] 330 294	[3340] 375 290	[3760] 425 286	[4130] 465 283	[4490] 505 279	[4860] 550 276			
[18] 68	[290] 30 346	[690] 80 345	[1120] 125 345	[1590] 180 342	[2035] 230 337	[2420] 270 334	[2870] 325 333	[3310] 375 327	[3730] 420 321	[4100] 465 315	[4480] 505 308				
[20] 76	[210] 25 385	[650] 75 384	[1080] 120 383	[1550] 175 380	[1995] 225 375	[2380] 270 372	[2830] 320 371	[3270] 370 367	[3690] 415 363	[4070] 460 359	[4450] 500 355				
[22] 83	[170] 20 424	[610] 70 423	[1040] 120 422	[1500] 170 418	[1955] 220 414	[2340] 265 410	[2785] 315 408	[3220] 365 404	[3640] 410 399	[4050] 460 395					
[24] 91	[135] 15 462	[570] 65 461	[1000] 115 460	[1440] 165 457	[1910] 215 453	[2300] 260 449	[2735] 304 441	[3170] 353 436	[3600] 402 432	[4020] 451 432					
[25] 95	[120] 15 484	[550] 60 482	[980] 110 479	[1410] 160 476	[1890] 215 473	[2280] 260 469	[2695] 286 459	[3120] 332 454	[3560] 384 449	[3990] 384 449					
[30] 114		[420] 45 577	[860] 95 575	[1290] 145 571	[1700] 190 567	[2120] 240 562	[2530] 285 556	[2940] 330 550	[3400] 385 542						

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Intermittent

Peak

No operation

Δ Pressure bar [PSI]
245 cm³/r [14.9 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190	[3000] 207	[3250] 224	[3500] 241	[3750] 259
[0.5]	410	850													
	45	95													
1.9	4	2													
[1]	450	930	1420	1850	2320	2780	3250	3650	4100	4540	4980	5430	5870	6310	
	50	105	160	210	260	315	365	410	465	515	560	615	665	715	
4	14	13	12	11	10	9	8	6	5	4	4	3	2	1	
[2]	460	960	1460	1900	2400	2860	3340	3780	4320	4770	5210	5660	6110	6570	6950
	50	110	165	215	270	325	375	425	490	540	590	640	690	740	785
8	29	28	27	26	25	23	22	20	19	18	17	15	14	12	10
[4]	470	1000	1540	1980	2510	3010	3480	3980	4450	4910	5380	5850	6320	6780	7250
	55	115	175	225	285	340	395	450	505	555	610	660	715	765	820
15	60	59	58	56	54	53	51	49	48	47	47	46	45	44	42
[6]	460	1020	1550	2040	2580	3110	3590	4120	4580	5050	5520	5980	6440	6910	
	50	115	175	230	290	350	405	465	515	570	625	675	730	780	
23	91	90	89	87	84	83	81	78	76	73	71	69	67	65	
[8]	460	1010	1560	2080	2630	3170	3670	4210	4680	5160	5630	6110	6590		
	50	115	175	235	295	360	415	475	530	585	635	690	745		
30	122	121	120	118	115	113	111	108	106	104	102	101	99		
[10]	440	1000	1550	2110	2650	3200	3730	4250	4730	5210	5720	6230			
	50	115	175	240	300	360	420	480	535	589	645	705			
38	153	152	150	148	146	144	142	139	137	135	133	130			
[12]	410	960	1530	2100	2640	3190	3760	4260	4740	5220	5730				
	45	110	175	235	300	360	425	480	535	590	645				
45	184	183	182	180	177	175	173	170	168	165	162				
[14]	380	910	1500	2080	2600	3160	3760	4230	4710	5190					
	40	105	170	235	295	355	425	480	530	585					
53	215	214	213	211	209	207	204	201	198	195					
[16]	340	860	1460	2040	2570	3120	3740	4180	4660	5140					
	40	95	165	230	290	355	425	470	525	580					
61	246	245	244	242	240	238	235	232	227	223					
[18]	290	810	1420	2000	2520	3060	3700	4130	4610	5090					
	30	90	160	225	285	345	420	465	520	575					
68	277	276	275	273	271	269	266	263	258	253					
[20]	250	800	1350	1910	2460	3010	3630	4110	4610						
	30	90	155	215	280	340	410	465	520						
76	308	306	304	302	300	298	295	291	288						
[22]	200	710	1300	1870	2390	2940	3560	4010	4510						
	25	80	145	210	270	330	400	455	510						
83	339	337	337	334	332	330	327	323	318						
[24]	150	670	1240	1790	2330	2880	3460	3960	4460						
	15	75	140	200	265	325	390	445	505						
91	370	369	367	364	362	360	357	353	344						
[25]	120	660	1210	1750	2300	2860	3410	3950	4470						
	15	75	135	200	260	325	385	445	505						
95	385	384	382	379	377	375	372	367	363						
[30]		520	1080	1620	2180	2720	3260	3790							
		60	120	185	245	305	370	430							
114		462	460	458	456	453	450	447							

[3790] Torque [lb-in]
430 } Nm
447 Speed RPM

C-1

2000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Intermittent

Peak

No operation

Δ Pressure bar [PSI]
305 cm³/r [18.7in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190	[3000] 207	[3250] 224	[3500] 241
[0.5] 1.9	[500] 55 4	[1050] 120 2												
[1] 4	[610] 70 12	[1180] 135 11	[1750] 200 11	[2330] 260 10	[2870] 325 10	[3440] 390 9	[3930] 445 8	[4410] 500 6	[4900] 555 3	[5380] 610 1				
[2] 8	[620] 70 24	[1210] 135 24	[1800] 205 23	[2400] 270 22	[2970] 335 22	[3510] 395 20	[4050] 460 19	[4600] 520 18	[5140] 580 17	[5680] 640 15	[6220] 705 13	[6750] 765 11	[7290] 825 8	[7820] 885 6
[4] 15	[680] 75 49	[1250] 140 49	[1880] 210 48	[2500] 280 47	[3120] 355 47	[3690] 415 45	[4260] 480 43	[4840] 545 42	[5410] 610 40	[5980] 675 38	[6550] 740 36	[7120] 805 34	[7690] 870 33	
[6] 23	[620] 70 74	[1270] 145 74	[1920] 215 72	[2560] 290 72	[3230] 365 71	[3810] 430 69	[4390] 495 66	[4970] 560 64	[5560] 630 61	[6130] 695 58	[6710] 760 55	[7290] 825 52		
[8] 30	[600] 70 98	[1270] 145 98	[1940] 220 97	[2600] 295 96	[3290] 370 95	[3880] 440 93	[4470] 505 90	[5070] 575 86	[5660] 640 83	[6250] 705 80	[6840] 775 77			
[10] 38	[570] 65 123	[1250] 140 122	[1940] 220 121	[2610] 295 120	[3310] 375 119	[3920] 440 117	[4530] 510 113	[5150] 580 110	[5760] 650 106	[6370] 720 102				
[12] 45	[530] 60 148	[1220] 140 147	[1920] 215 145	[2600] 295 144	[3300] 375 143	[3920] 440 142	[4530] 510 138	[5150] 580 133	[5760] 650 128	[6370] 720 124				
[14] 53	[480] 55 172	[1180] 135 172	[1870] 210 170	[2560] 290 168	[3260] 370 167	[3900] 440 165	[4510] 510 160	[5120] 580 156	[5730] 645 152					
[16] 61	[430] 50 196	[1120] 125 196	[1820] 205 194	[2500] 280 192	[3210] 365 191	[3870] 440 188	[4480] 505 183	[5080] 575 178	[5690] 645 174					
[18] 68	[370] 40 221	[1060] 120 221	[1760] 200 218	[2440] 275 217	[3140] 355 215	[3800] 440 212	[4420] 500 207	[5050] 570 202						
[20] 76	[320] 35 246	[980] 110 245	[1680] 190 243	[2360] 265 241	[3050] 345 239	[3710] 420 236	[4370] 495 231	[5020] 565 226						
[22] 83	[240] 25 271	[920] 105 270	[1620] 185 268	[2300] 260 266	[2990] 340 263	[3560] 400 260	[4190] 475 258	[4820] 545 255						
[24] 91	[180] 20 296	[870] 100 294	[1550] 175 293	[2240] 255 290	[2920] 330 288	[3420] 385 285	[4020] 455 283	[4630] 525 280						
[25] 95	[150] 15 308	[840] 95 307	[1520] 170 305	[2200] 250 303	[2890] 325 300	[3340] 375 298	[3930] 445 295	[4520] 510 293						
[30] 114		[680] 75 365	[1360] 155 362	[2040] 230 360	[2720] 305 357	[3140] 355 356	[3810] 430 352							

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
395 cm³/r [24.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190
[0.5] 1.9	[560] 65 4	[1310] 150 3									
[1] 4	[770] 85 9	[1540] 175 9	[2290] 260 9	[3080] 350 8	[3780] 430 8	[4480] 505 7	[5170] 585 7	[5880] 665 6	[6580] 745 5	[7270] 820 4	[7980] 900 3
[2] 8	[790] 90 18	[1580] 180 18	[2360] 265 18	[3180] 360 17	[3930] 445 17	[4680] 530 16	[5430] 615 15	[6180] 700 14	[6840] 775 13	[7500] 845 11	[8170] 925 10
[4] 15	[810] 90 37	[1660] 190 37	[2480] 280 37	[3320] 375 36	[4130] 465 36	[4940] 560 35	[5740] 650 34	[6550] 740 33	[7230] 815 31	[7880] 890 28	
[6] 23	[820] 90 57	[1700] 190 56	[2550] 290 56	[3420] 385 55	[4250] 480 54	[5080] 575 52	[5920] 670 50	[6750] 765 49	[7420] 840 47	[8000] 905 45	
[8] 30	[820] 90 76	[1700] 190 75	[2580] 290 75	[3460] 390 74	[4300] 485 73	[5130] 580 71	[5960] 675 69	[6800] 770 68			
[10] 38	[800] 90 95	[1700] 190 94	[2590] 295 94	[3480] 395 93	[4320] 490 92	[5160] 585 90	[6000] 680 88	[6840] 775 86			
[12] 45	[770] 85 114	[1680] 190 113	[2570] 290 113	[3470] 390 112	[4310] 485 111	[5150] 580 109	[5990] 675 106	[6830] 770 103			
[14] 53	[740] 85 133	[1640] 185 132	[2530] 285 132	[3430] 390 131	[4280] 485 129	[5120] 580 127	[5960] 675 124				
[16] 61	[690] 80 153	[1590] 180 152	[2480] 280 152	[3370] 380 150	[4220] 475 149	[5060] 570 146	[5910] 670 144				
[18] 68	[640] 70 172	[1530] 170 171	[2420] 275 171	[3310] 375 170	[4160] 470 169	[5010] 565 167	[5870] 665 164				
[20] 76	[580] 65 191	[1470] 165 190	[2370] 270 190	[3260] 370 189	[4110] 465 188	[4960] 560 186	[5820] 660 184				
[22] 83	[510] 60 210	[1390] 155 209	[2290] 260 209	[3170] 360 208	[4030] 455 207	[4880] 550 206					
[24] 91	[440] 50 230	[1330] 150 229	[2220] 250 228	[3100] 350 227	[3950] 445 225	[4800] 540 224					
[26] 98	[350] 40 249	[1240] 140 248	[2130] 240 247	[3020] 340 246	[3880] 440 244	[4730] 535 242					
[28] 106	[270] 30 268	[1150] 130 267	[2050] 230 265	[2930] 330 264	[3790] 430 261	[4650] 525 259					
[30] 114	[180] 20 287	[1060] 120 286	[1960] 220 284	[2850] 320 283	[3710] 420 281	[4570] 515 277					
[35] 132		[840] 95 335	[1760] 200 334	[2640] 300 333	[3480] 395 332						

[1760] 200 334 } Torque [lb-in] Nm Speed RPM

C-1

2000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
490 cm³/r [29.8in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138
[0.5] 1.9	[670] 75 2	[1600] 180 1						
[1] 4	[920] 105 7	[2000] 225 6	[2990] 340 5	[3900] 440 4	[4880] 550 2			
[2] 8	[950] 105 14	[2060] 235 13	[3110] 350 12	[4080] 460 10	[5110] 575 9	[6320] 715 7		
[4] 15	[980] 110 30	[2130] 240 29	[3230] 365 28	[4270] 480 27	[5350] 605 26	[6370] 720 24	[7380] 835 22	[7980] 900 20
[6] 23	[980] 110 45	[2120] 240 44	[3230] 365 43	[4300] 485 42	[5370] 605 41	[6420] 725 39	[7470] 845 37	[8225] 930 35
[8] 30	[980] 110 61	[2110] 240 60	[3220] 365 59	[4330] 490 58	[5400] 610 57	[6470] 730 55	[7550] 855 52	
[10] 38	[920] 105 76	[2050] 230 75	[3170] 360 74	[4300] 485 73	[5390] 610 72	[6460] 730 70	[7550] 855 68	
[12] 45	[860] 95 91	[1990] 225 90	[3120] 355 90	[4260] 480 89	[5370] 605 87	[6460] 730 85	[7560] 855 84	
[14] 53	[790] 90 106	[1930] 220 105	[3055] 345 105	[4185] 475 104	[5300] 600 102	[6400] 725 100		
[16] 61	[720] 80 122	[1870] 210 121	[2990] 340 120	[4110] 465 119	[5230] 590 118	[6340] 715 116		
[18] 68	[630] 70 137	[1770] 200 136	[2890] 325 135	[4020] 455 134	[5140] 580 133	[6260] 705 131		
[20] 76	[550] 60 153	[1670] 190 152	[2800] 315 151	[3940] 445 150	[5060] 570 149	[6180] 700 146		
[22] 83	[450] 50 168	[1570] 175 168	[2700] 305 167	[3830] 435 165	[4960] 560 164	[6070] 685 161		
[24] 91	[360] 40 184	[1480] 165 184	[2600] 295 183	[3730] 420 181	[4860] 550 179	[5970] 675 177		
[26] 98	[270] 30 199	[1390] 155 195	[2510] 285 194	[3640] 410 192	[4770] 540 190			
[28] 106	[1260] 140 212	[2370] 270 211	[3520] 400 209	[4630] 525 207				
[30] 114	[1130] 125 230	[2240] 255 229	[3400] 385 227	[4500] 510 224				

Standard mount

Ports

7/8 -14 UNF-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

7/8 -14 UNF-2B SAE O-ring end ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1) or

G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

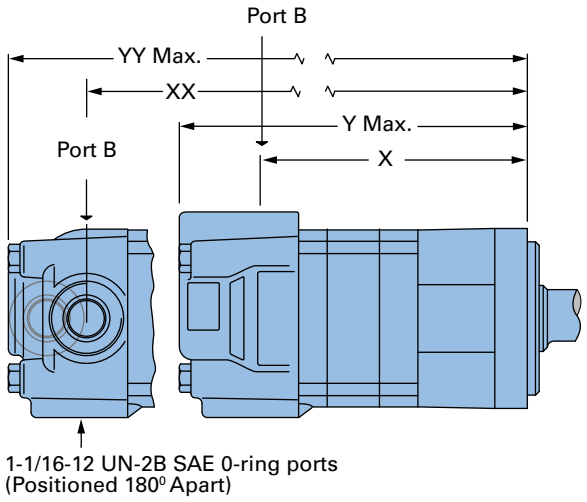
Manifold mount

7/16 -20 UNF-2B SAE O-ring case drain port (1)

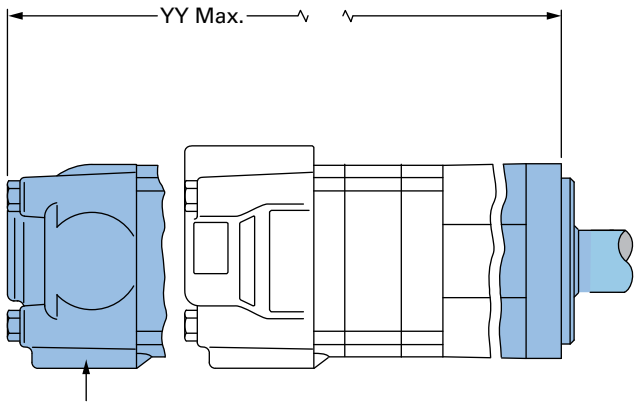
Standard rotation viewed from shaft end

Port A Pressurized — CW
Port B Pressurized — CCW

Standard mount



1-1/16-12 UN-2B SAE 0-ring ports
(Positioned 180° Apart)



7/8-14 UNF-2B SAE 0-ring end ports

Standard mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
34 [2.1]	126.7 [4.99]	174.0 [6.85]	129.0 [5.08]	175.3 [6.90]
41 [2.5]	128.0 [5.04]	175.3 [6.90]	130.5 [5.14]	176.8 [6.96]
66 [4.0]	133.9 [5.27]	181.1 [7.13]	136.1 [5.36]	182.4 [7.18]
80 [4.9]	136.9 [5.39]	184.2 [7.25]	139.2 [5.48]	185.4 [7.30]
100 [6.2]	141.5 [5.57]	189.0 [7.44]	143.8 [5.66]	190.3 [7.49]
130 [8.0]	147.9 [5.83]	195.4 [7.69]	150.2 [5.92]	196.6 [7.74]
160 [9.6]	147.9 [5.83]	195.4 [7.69]	150.2 [5.92]	196.6 [7.74]
195 [11.9]	154.7 [6.09]	202.2 [7.96]	157.0 [6.18]	203.2 [8.00]
245 [14.9]	163.7 [6.45]	211.1 [8.31]	166.0 [6.54]	212.4 [8.36]
305 [18.7]	175.1 [6.90]	222.3 [8.75]	177.4 [6.99]	223.5 [8.80]
395 [24.0]	191.0 [7.52]	238.6 [9.39]	193.3 [7.61]	239.8 [9.44]
490 [29.8]	208.4 [8.21]	255.8 [10.07]	210.7 [8.30]	257.0 [10.12]

Standard mount with integral relief valve

Ports

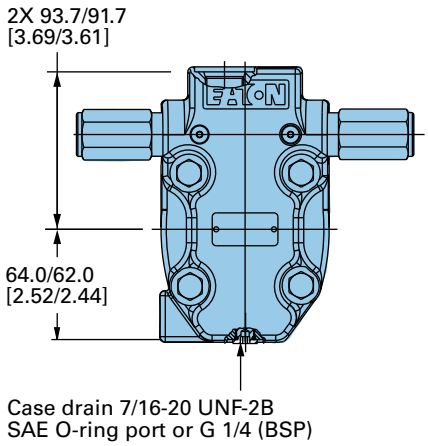
7/8 -14 UNF-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1) or

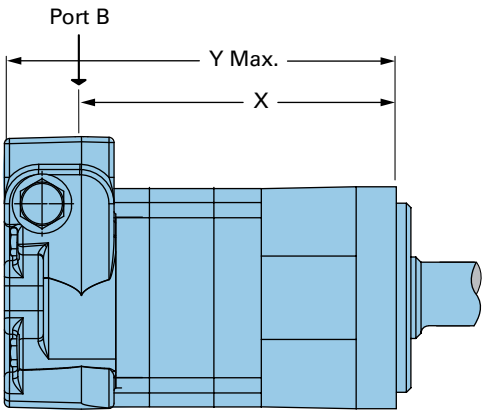
G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

Standard mount with integral relief valve





Standard mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
34 [2.1]	126.7 [4.99]	174.0 [6.85]
41 [2.5]	128.2 [5.05]	175.5 [6.91]
66 [4.0]	133.9 [5.27]	181.2 [7.13]
80 [4.9]	137.0 [5.40]	184.5 [7.26]
100 [6.2]	141.6 [5.58]	189.0 [7.44]
130 [8.0]	147.9 [5.83]	195.4 [7.69]
160 [9.6]	147.9 [5.83]	195.4 [7.69]
195 [11.9]	154.8 [6.10]	202.2 [7.96]
245 [14.9]	163.7 [6.45]	211.1 [8.31]
305 [18.7]	175.1 [6.90]	222.6 [8.76]
395 [24.0]	191.1 [7.53]	238.6 [9.39]
490 [29.8]	208.4 [8.21]	255.8 [10.07]

Wheel mount

Ports

7/8 -14 UNF-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

7/8 -14 UNF-2B SAE O-ring end ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

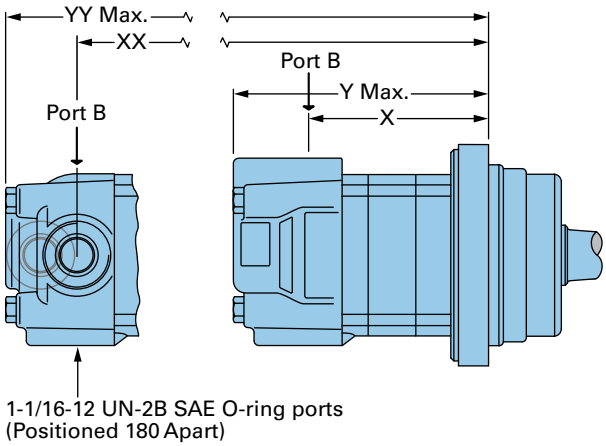
Manifold mount

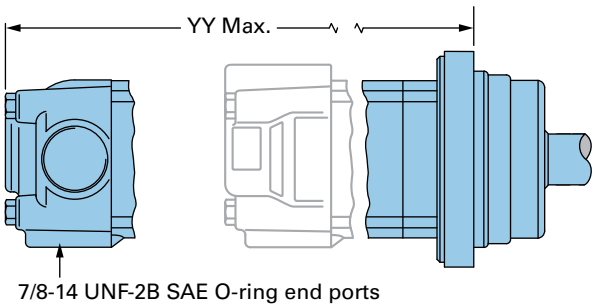
7/16 -20 UNF-2B SAE O-ring case drain port (1)

Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

Wheel mount





Wheel mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
34 [2.1]	86.5 [3.41]	133.8 [5.27]	88.8 [3.50]	135.1 [5.32]
41 [2.5]	88.0 [3.47]	135.3 [5.33]	90.3 [3.56]	136.6 [5.38]
66 [4.0]	93.7 [3.69]	141.0 [5.55]	96.0 [3.78]	142.3 [5.60]
80 [4.9]	96.8 [3.81]	144.0 [5.67]	99.1 [3.90]	145.3 [5.72]
100 [6.2]	101.3 [3.99]	148.9 [5.86]	103.6 [4.08]	150.2 [5.91]
130 [8.0]	107.8 [4.25]	155.2 [6.11]	110.1 [4.34]	156.5 [6.16]
160 [9.6]	107.8 [4.25]	155.2 [6.11]	110.1 [4.34]	156.5 [6.16]
195 [11.9]	114.6 [4.51]	161.8 [6.37]	116.8 [4.60]	163.1 [6.42]
245 [14.9]	123.5 [4.87]	171.0 [6.73]	125.8 [4.96]	125.8 [4.96]
305 [18.7]	135.0 [5.32]	182.1 [7.17]	137.4 [5.41]	183.4 [7.22]
395 [24.0]	150.9 [5.94]	198.4 [7.81]	153.2 [6.03]	199.7 [7.86]
490 [29.8]	168.2 [6.63]	215.7 [8.49]	170.7 [6.72]	217.0 [8.54]

Dimensions

Wheel mount with intergal relief valve

Ports

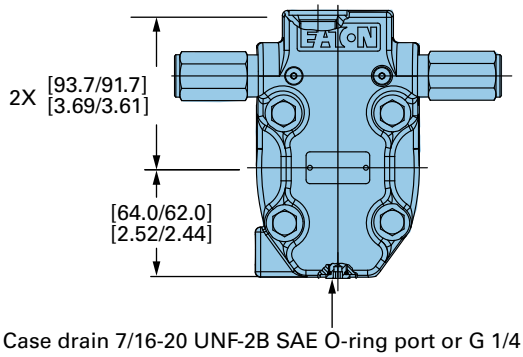
7/8 -14 UNF-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

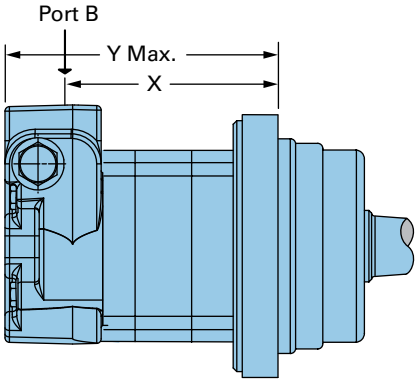
Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

Wheel mount with integral relief valve



Case drain 7/16-20 UNF-2B SAE O-ring port or G 1/4 (BSP)



Wheel mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
34 [2.1]	86.5 [3.41]	133.8 [5.27]
41 [2.5]	88.0 [3.47]	135.3 [5.33]
66 [4.0]	93.7 [3.69]	141.0 [5.55]
80 [4.9]	96.9 [3.82]	144.3 [5.68]
100 [6.2]	101.4 [4.00]	148.9 [5.86]
130 [8.0]	107.8 [4.25]	155.2 [6.11]
160 [9.6]	107.8 [4.25]	155.2 [6.11]
195 [11.9]	114.6 [4.52]	162.1 [6.38]
245 [14.9]	123.5 [4.87]	171.0 [6.73]
305 [18.7]	135.0 [5.32]	182.4 [7.18
395 [24.0]	151.0 [5.95]	198.4 [7.81]
490 [29.8]	168.2 [6.63]	215.7 [8.49]

Bearingless

Ports

7/8 -14 UNF-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

7/8 -14 UNF-2B SAE O-ring end ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

Manifold mount

7/16 -20 UNF-2B SAE O-ring case drain port (1)

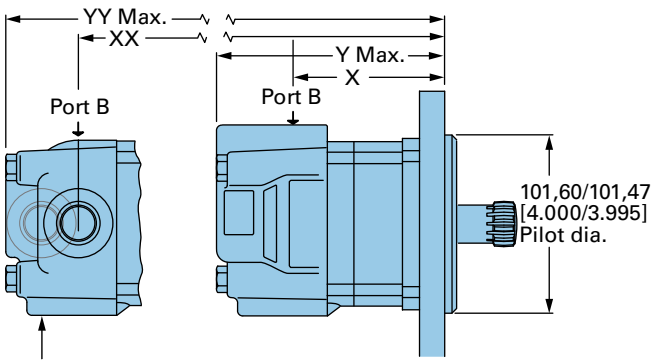
Standard rotation viewed from drive end

Port A pressurized — CW

Port B pressurized — CCW

C-1

Bearingless

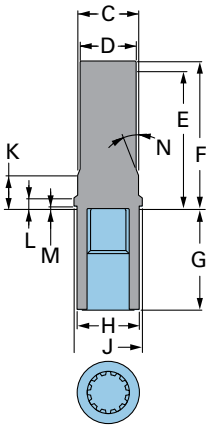


1 1/16-12 UN-2B SAE O-ring ports (Positioned 180° Apart)

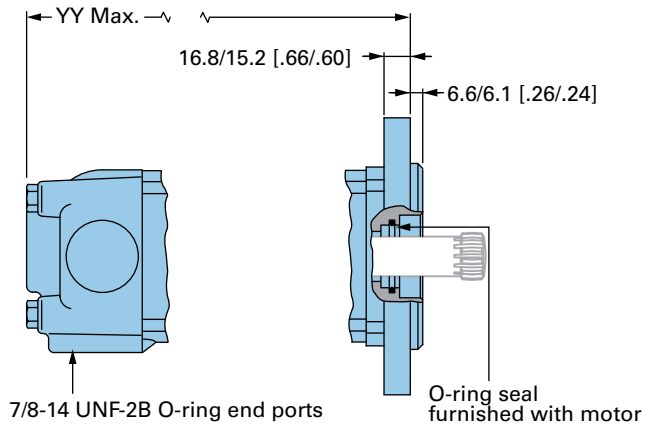
For 2000 Series bearingless motor application information contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

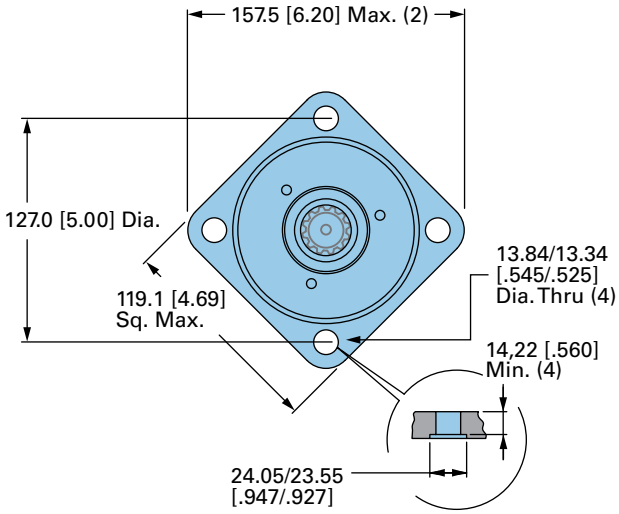
Blank Dimensions

C	35.87 [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	725.91 [1.020]
L	8.25 [.325]
M	0.89 [.035]
N	15°



Mating coupling blank
Eaton Part no. 13307-003





Bearingless motors dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
34 [2.1]	68.7 [2.70]	116.3 [4.58]	70.9 [2.79]	117.6 [4.63]
41 [2.5]	70.1 [2.76]	117.7 [4.63]	72.4 [2.85]	119.1 [4.69]
66 [4.0]	75.7 [2.98]	123.4 [4.86]	78.1 [3.08]	124.8 [4.91]
80 [4.9]	79.0 [3.11]	126.5 [4.98]	81.3 [3.20]	127.8 [5.03]
100 [6.2]	83.5 [3.29]	131.4 [5.17]	85.8 [3.38]	132.6 [5.22]
130 [8.0]	89.9 [3.54]	137.7 [5.42]	92.2 [3.63]	139.0 [5.47]

Bearingless motors dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
160 [9.6]	89.9 [3.54]	137.7 [5.42]	92.2 [3.63]	139.0 [5.47]
195 [11.9]	96.8 [3.81]	144.6 [5.68]	99.0 [3.90]	145.5 [5.73]
245 [14.9]	105.6 [4.16]	153.5 [6.04]	107.9 [4.25]	154.7 [6.09]
305 [18.7]	117.1 [4.61]	164.9 [6.48]	119.4 [4.70]	165.9 [6.53]
395 [24.0]	133.1 [5.24]	180.9 [7.12]	135.4 [5.33]	182.1 [7.17]
490 [29.8]	150.3 [5.92]	198.2 [7.80]	152.7 [6.01]	199.3 [7.85]

Dimensions

Bearingless with integral relief valve

Ports

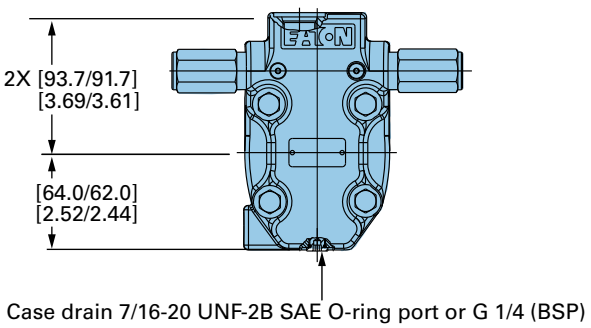
7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

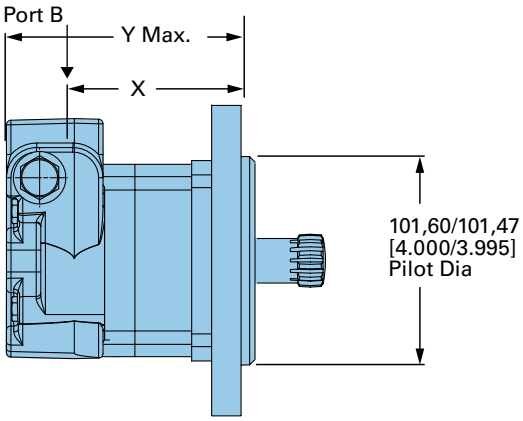
G 1/2 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1)

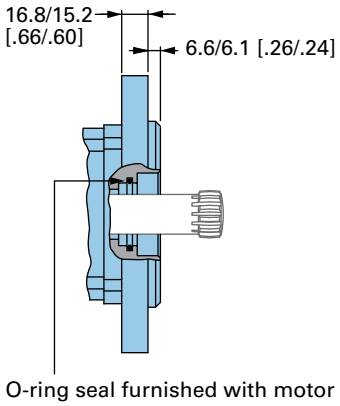
Standard rotation viewed from shaft end

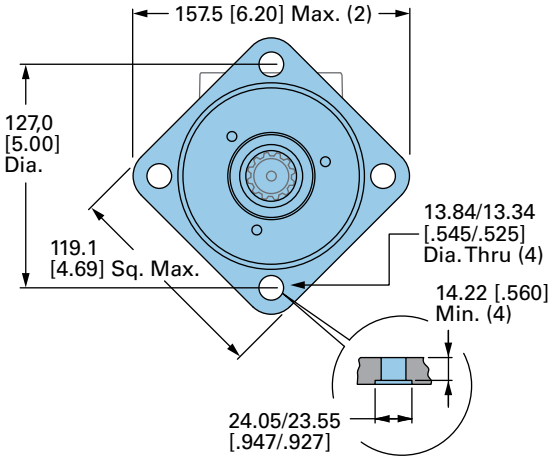
Port A Pressurized — CW
Port B Pressurized — CCW

Bearingless with integral relief valve









Bearingless motors dimensions

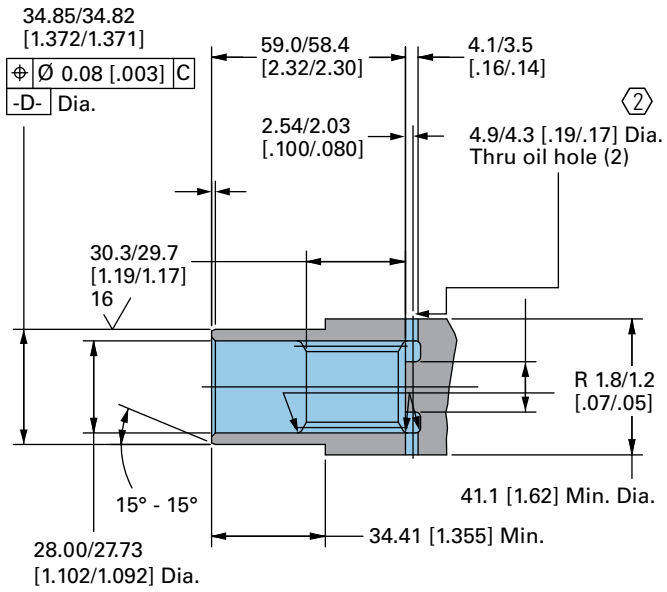
Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
34 [2.1]	68.6 [2.70]	116.3 [4.58]
41 [2.5]	70.1 [2.76]	117.8 [4.64]
66 [4.0]	75.8 [2.99]	123.5 [4.86]
80 [4.9]	79.0 [3.11]	126.8 [4.99]
100 [6.2]	83.5 [3.29]	131.4 [5.17]
130 [8.0]	89.9 [3.54]	137.7 [5.42]

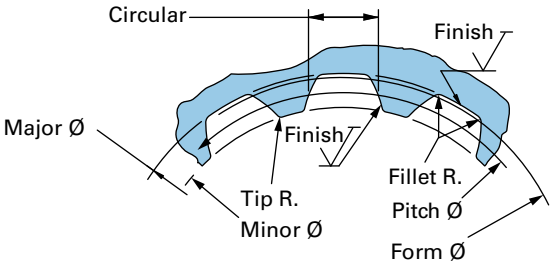
Bearingless motors dimensions

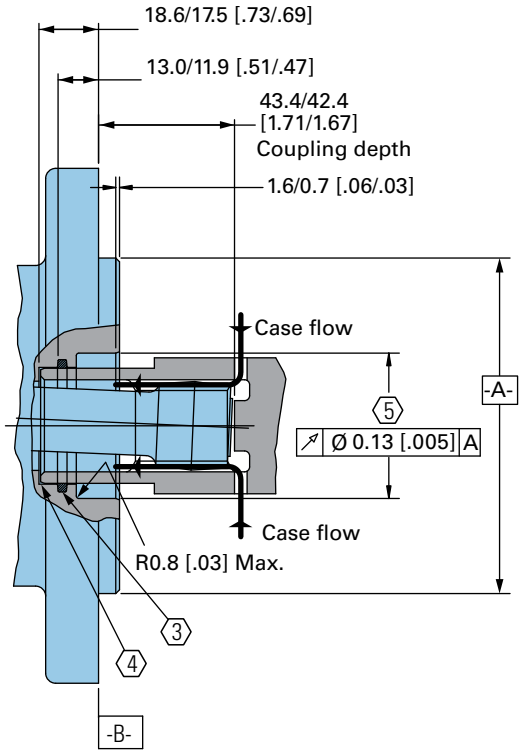
Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
160 [9.6]	89.9 [3.54]	137.7 [5.42]
195 [11.9]	96.8 [3.81]	144.6 [5.69]
245 [14.9]	105.6 [4.16]	153.5 [6.04]
305 [18.7]	117.1 [4.61]	164.9 [6.49]
395 [24.0]	133.1 [5.24]	180.9 [7.12]
490 [29.8]	150.3 [5.92]	198.2 [7.80]

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. Means of maintaining clearance between shaft and mounting flange must be provided.
5. Counter bore 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







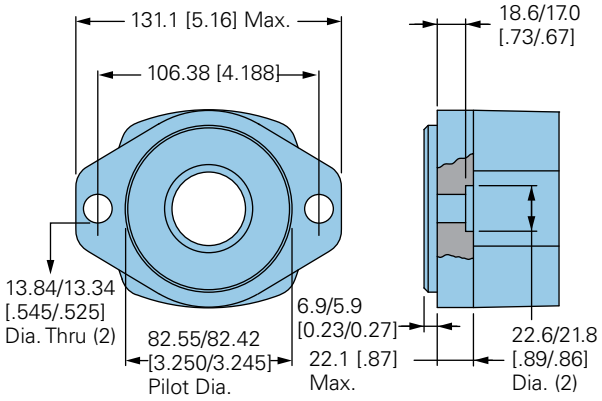
Spline pitch	12/24
Pressure angle	30°
Number of teeth	12
Class of fit	Ref. 5
Type of fit	Side
Pitch diameter	Ref. 25.400000 [1.0000000]
Base diameter	Ref. 21.997045 [.8660254] ◎ 0,21 [.008] D
Major diameter	(27.74 [1.092] Max. 27.59 [1.086] Min.)
Minor diameter	23.097 - 23.224 [.9093 - .9143]
Form diameter, 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

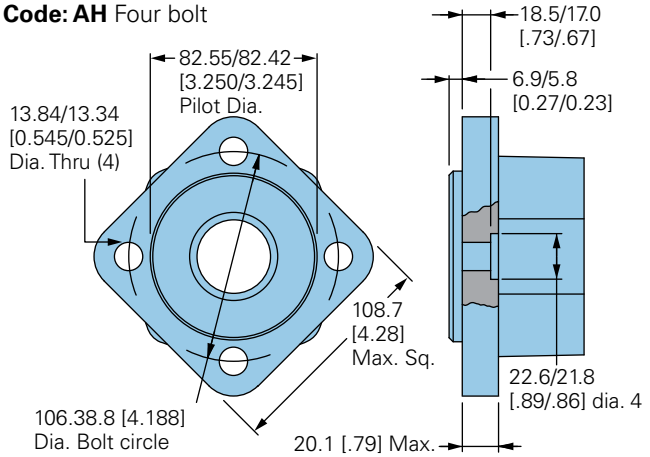
C-1

Mounting options

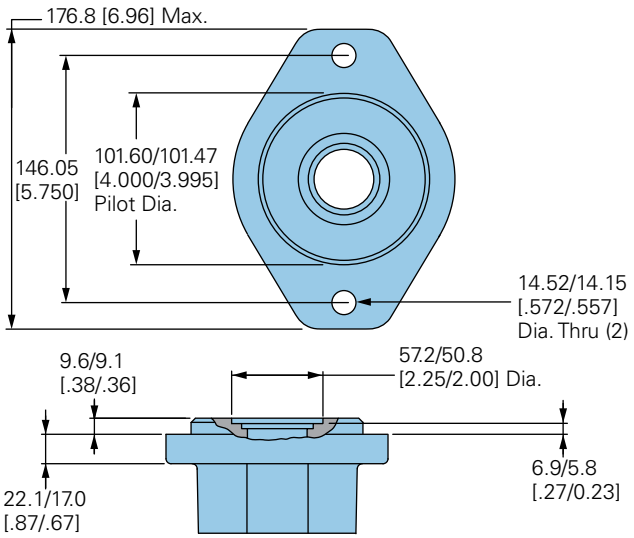
Code: AC SAE A - Two bolt (Standard motor)



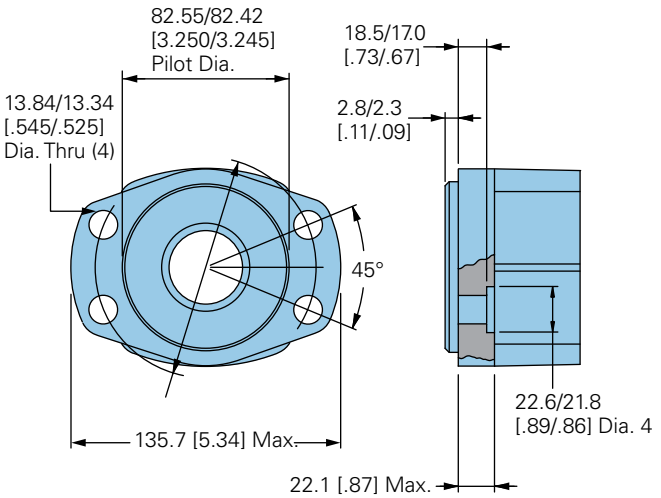
Code: AH Four bolt



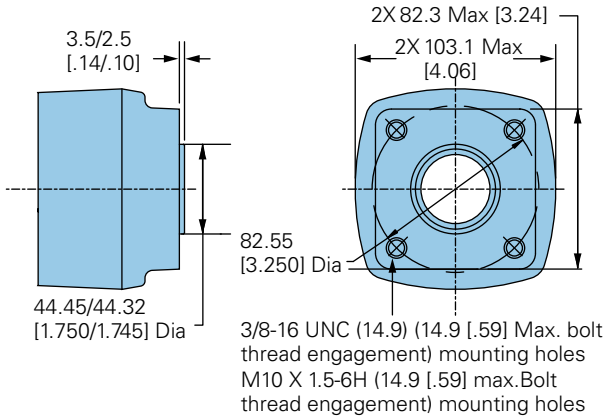
Code: AF SAE B - Two bolt



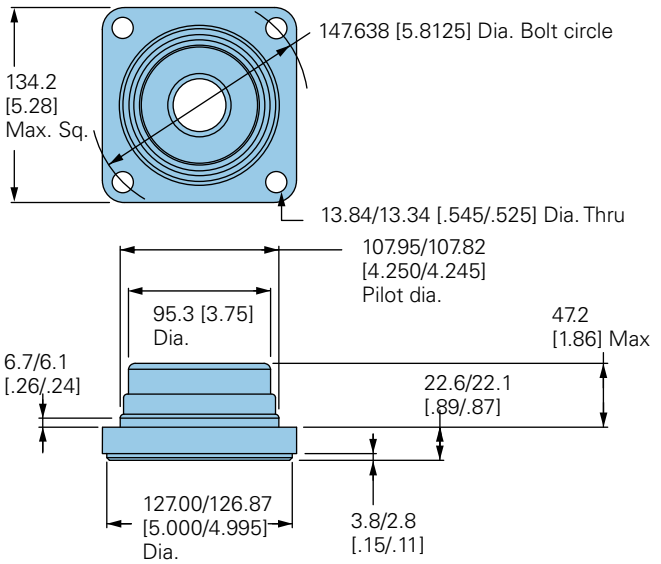
Code: AJ Four bolt magneto



Code: BY Four bolt (Standard motor)



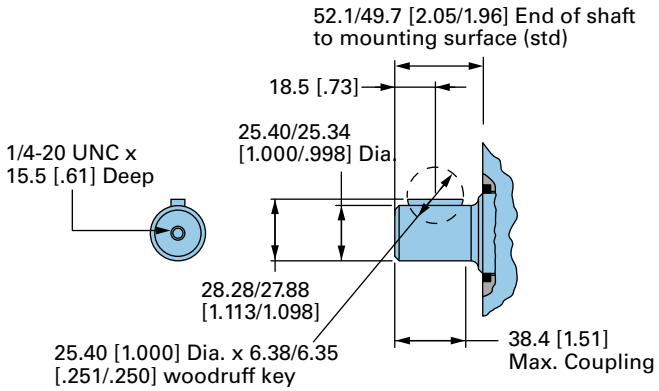
Code: AB Four bolt (Wheel motor)



Shafts

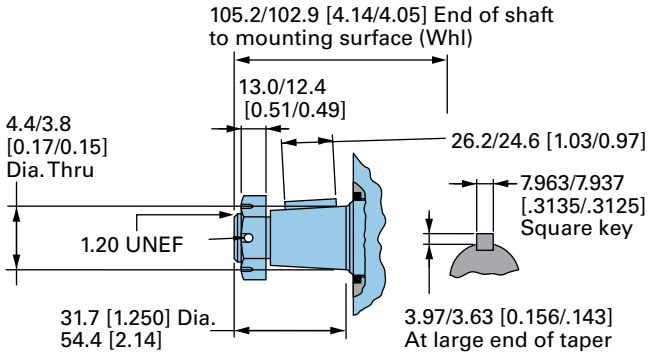
Code: 01 1 Inch straight

395 [3500] Max. Torque Nm [lb-in]

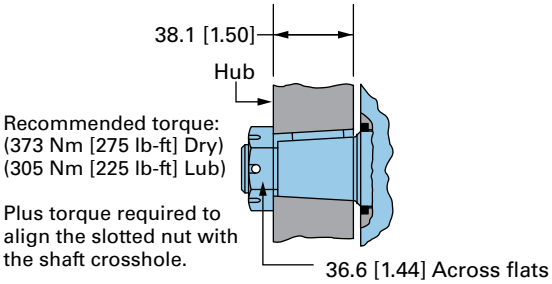


Code: 03 1 1/4 Inch tapered

768 [6800] Max. Torque Nm [lb-in]

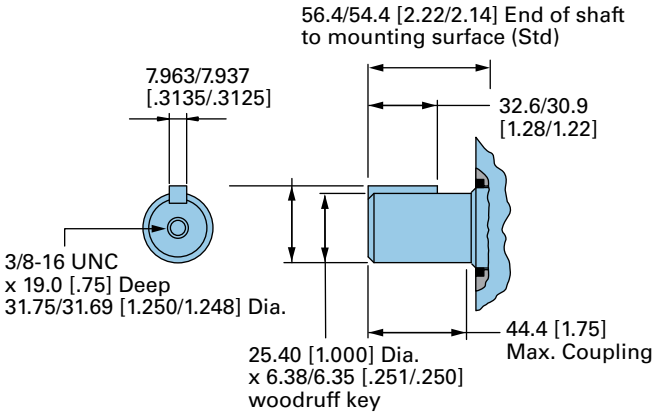


SAE J501 Standard tapered shaft 125.00±0.17 Taper per meter
[1.500±.002 Taper per foot]



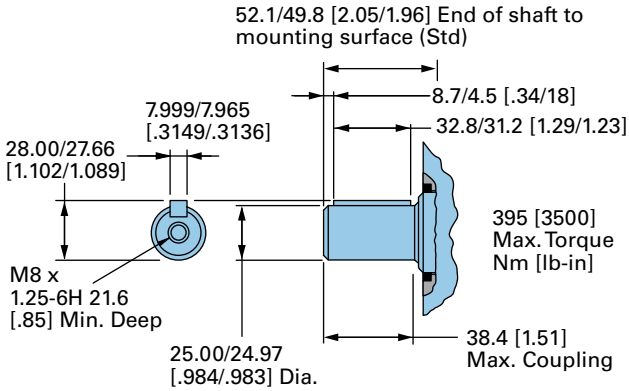
Code: 02 1 1/4 Inch straight

768 [6800] Max. Torque Nm [lb-in]



Code: 19 25 mm straight

395 [3500] Max. Torque Nm [lb-in]

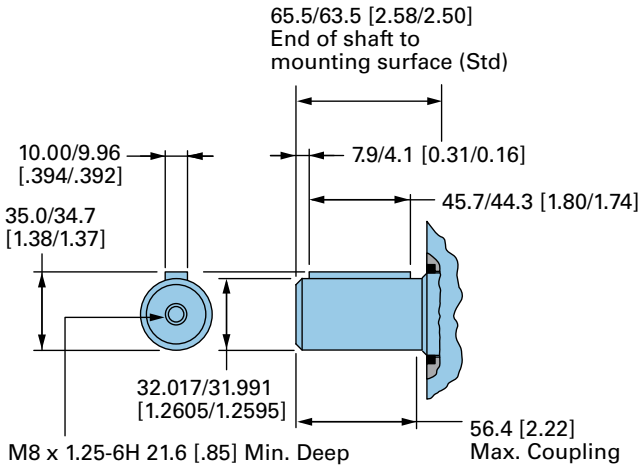


C-1

Shafts

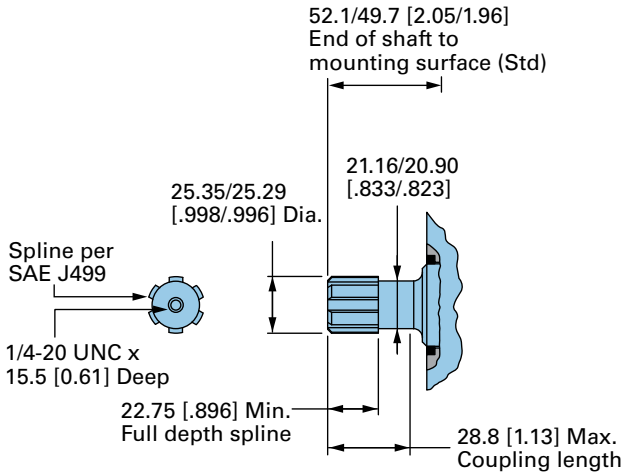
Code: 16 32 mm straight

768 [6800] Max. Torque Nm [lb-in]



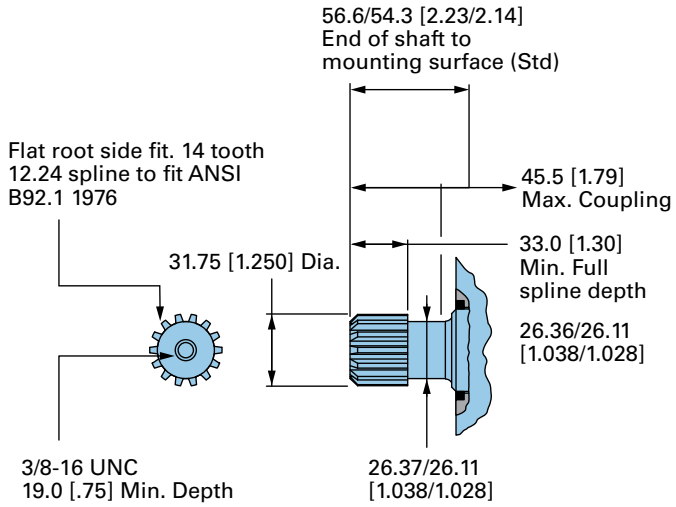
Code: 05 SAE 6B splined

395 [3500] Max. Torque Nm [lb-in]



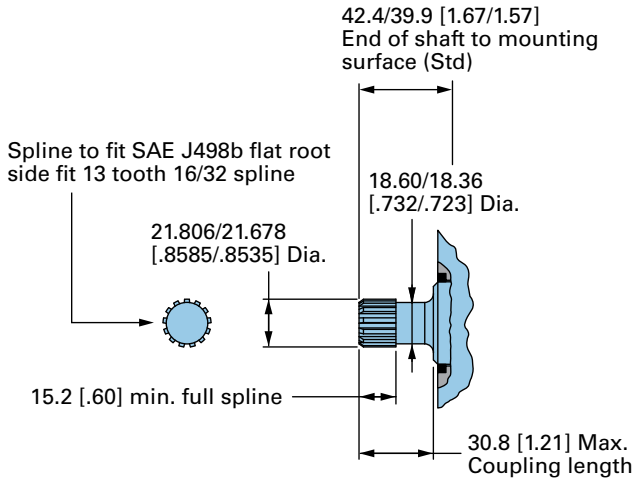
Code: 04 1 1/4 -14 Tooth splined

768 [6800] Max. Torque Nm [lb-in]



Code: 07 13 Tooth splined

141 [1250] Max. Torque Nm [lb-in]

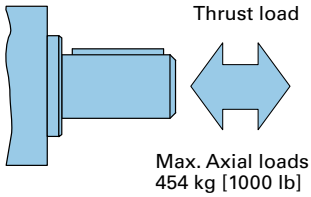


These curves indicate the radial load capacity on the motor shaft at various locations with an allowable external thrust load of 454 kg [1000 lb].

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 61 kg/7 Bar [135 lb/100 PSI].

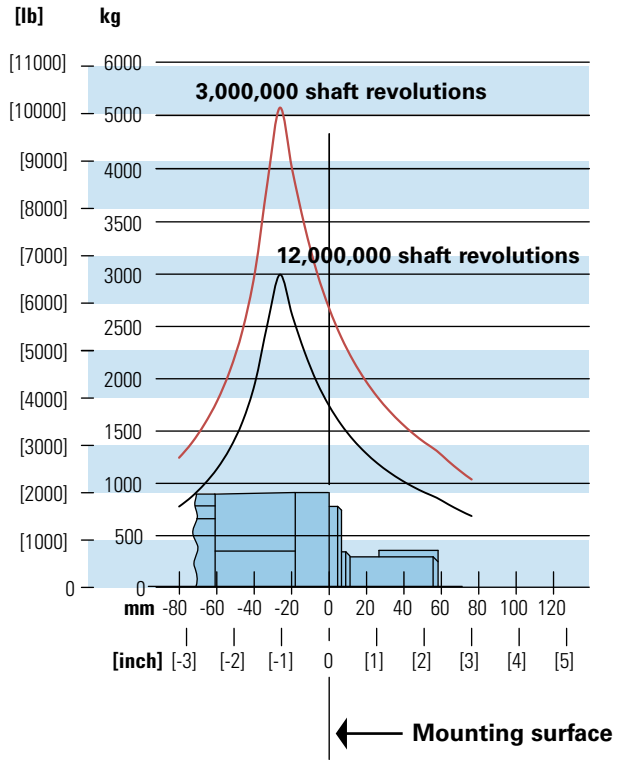
Each curve is based on B 10 bearing life (2000 Hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

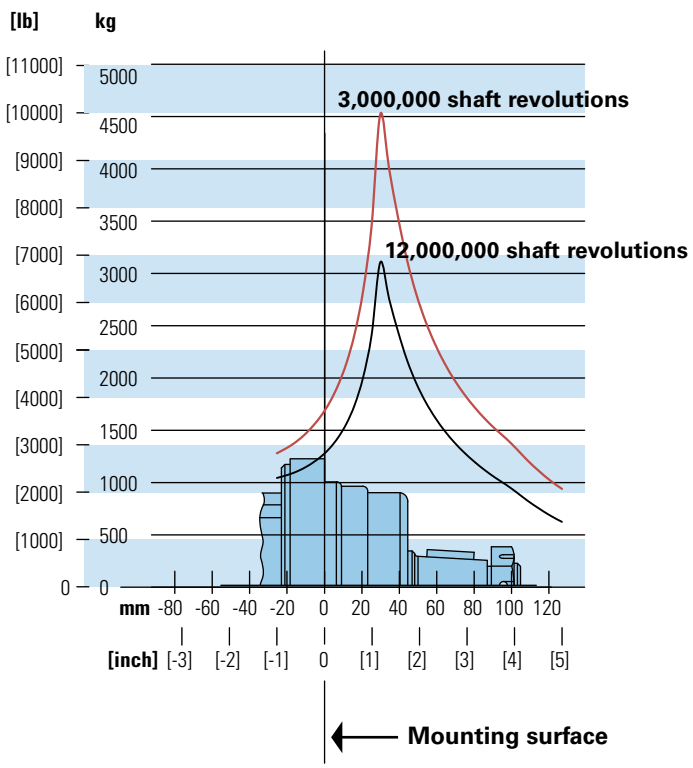


RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

Standard motor straight and splined shafts



Wheel motor Tapered shaft



2000 Series

Case pressure and case porting

Char-Lynn 2000 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 advantages:

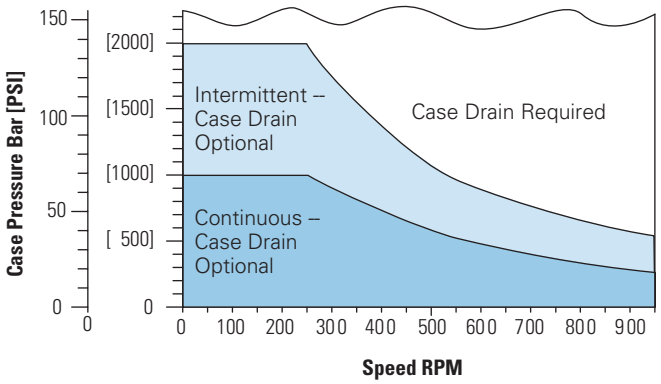
Contamination control — flushing the motor case.

Cooler motor — exiting oil draws motor heat away.

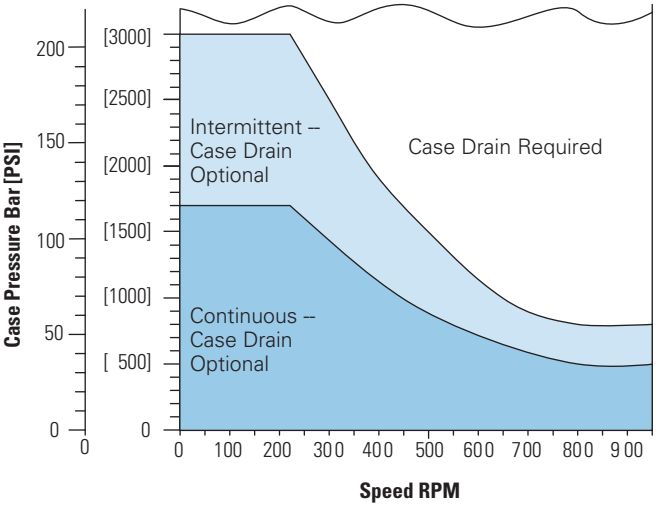
Extend motor seal life — maintain low case pressure with a preset restriction in the case drain line.

Case pressure seal limitation

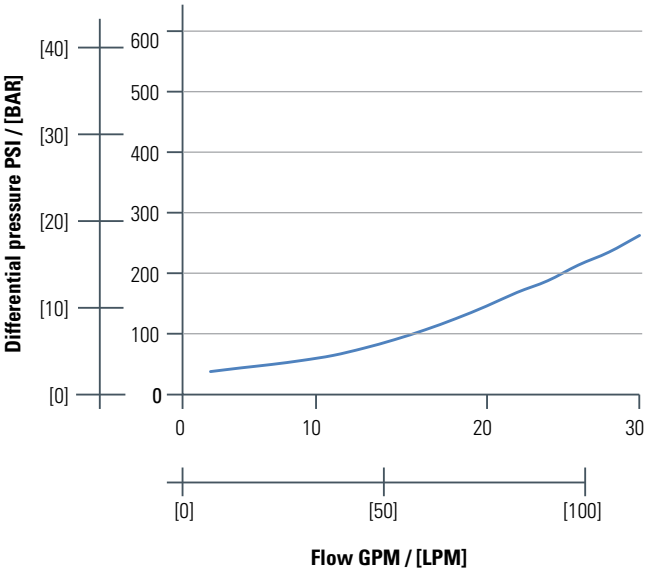
Standard shaft seal



High pressure shaft seal



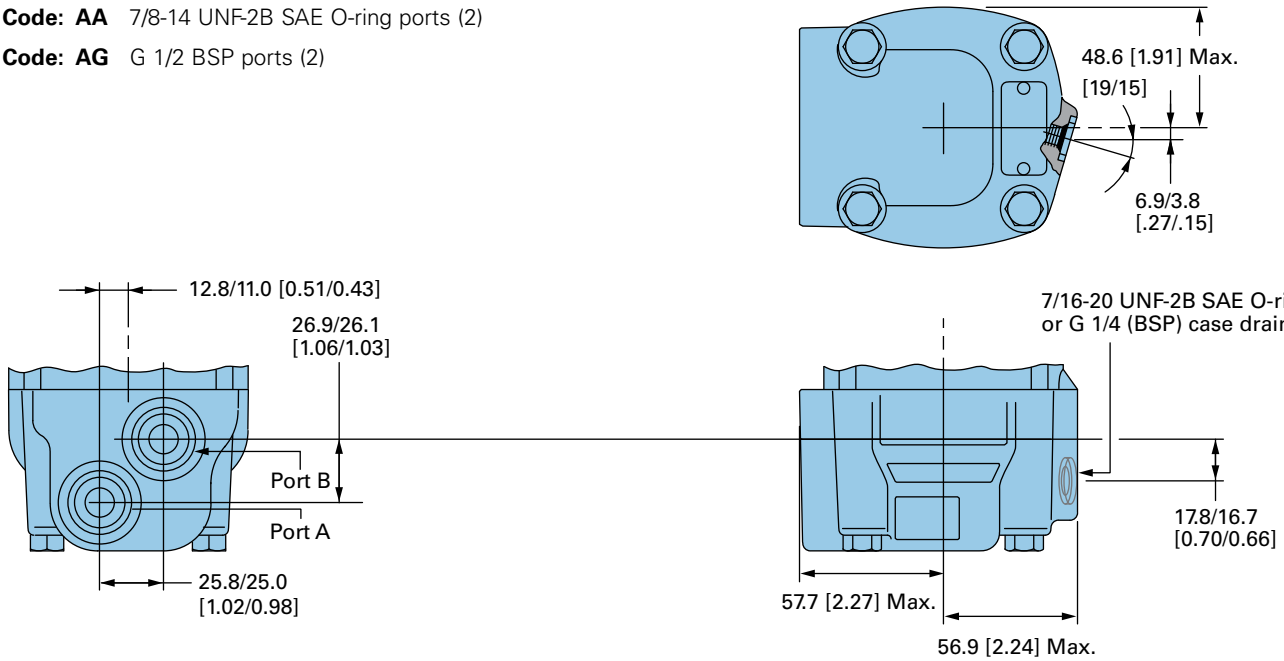
2000 Series NLPD - No Load Pressure Drop



Ports

Code: AA 7/8-14 UNF-2B SAE O-ring ports (2)

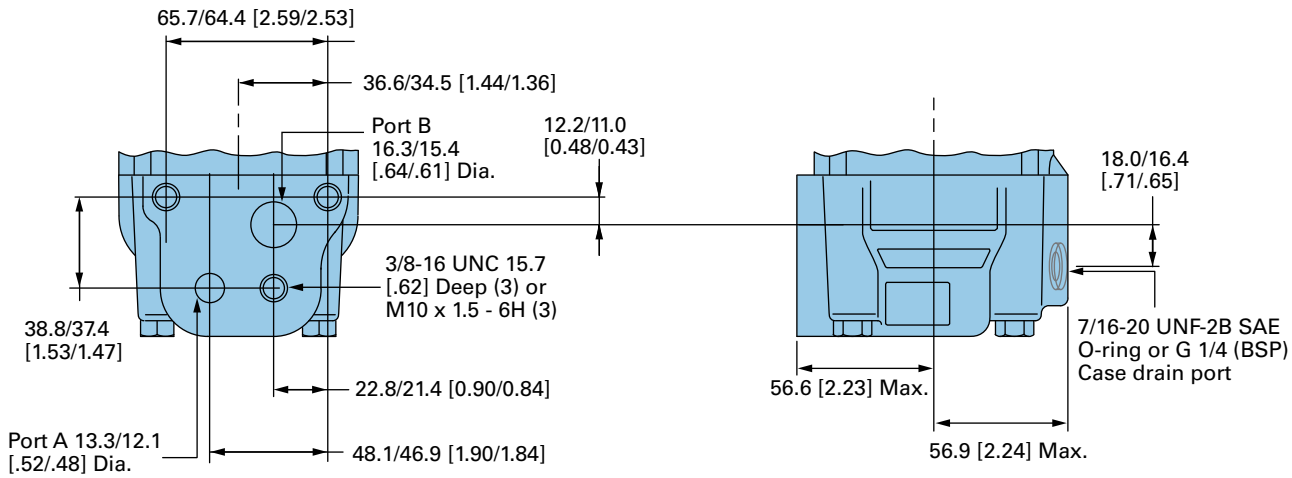
Code: AG G 1/2 BSP ports (2)



C-1

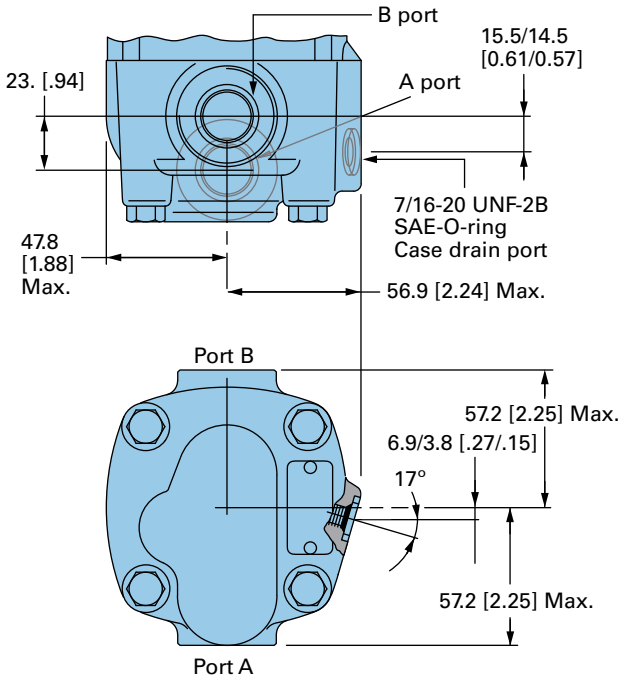
Code: AB 3/8-16 UNC threaded holes

Code: AE M10x1.5 -6H threaded holes

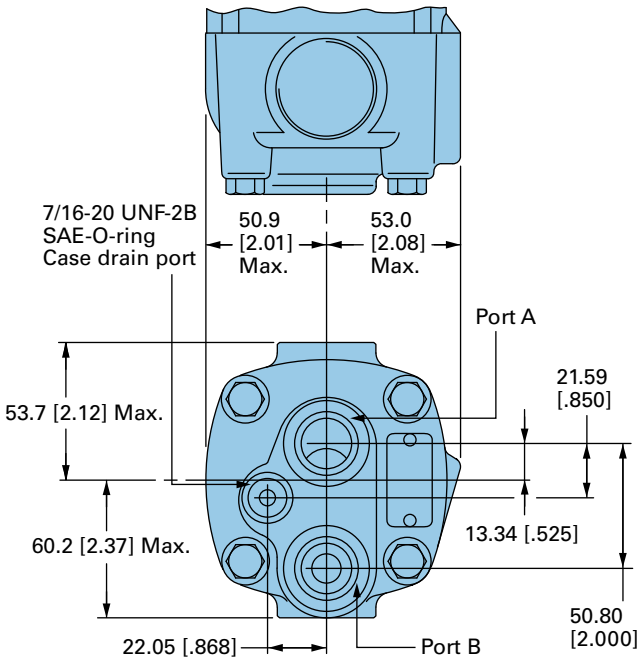


Ports

Code: AF 1-1/16-12 UN-2B SAE O-ring Ports (2) Positioned 180° Apart

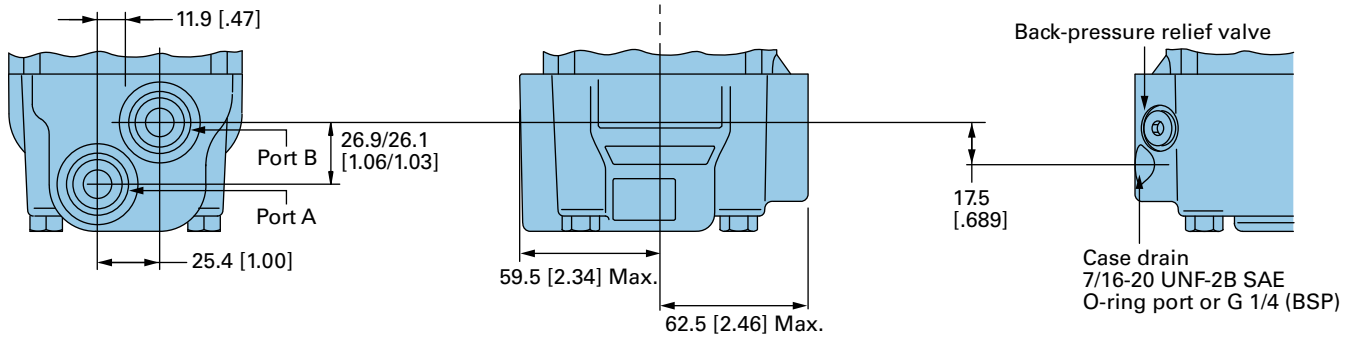


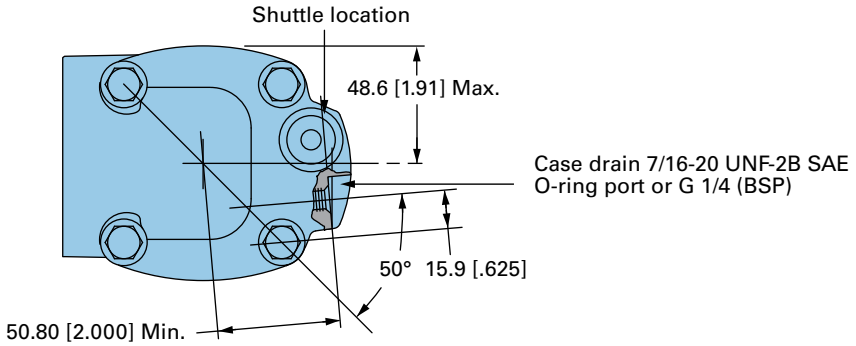
Code: AD 7/8-14 UNF-2B SAE O-ring end ports (2)



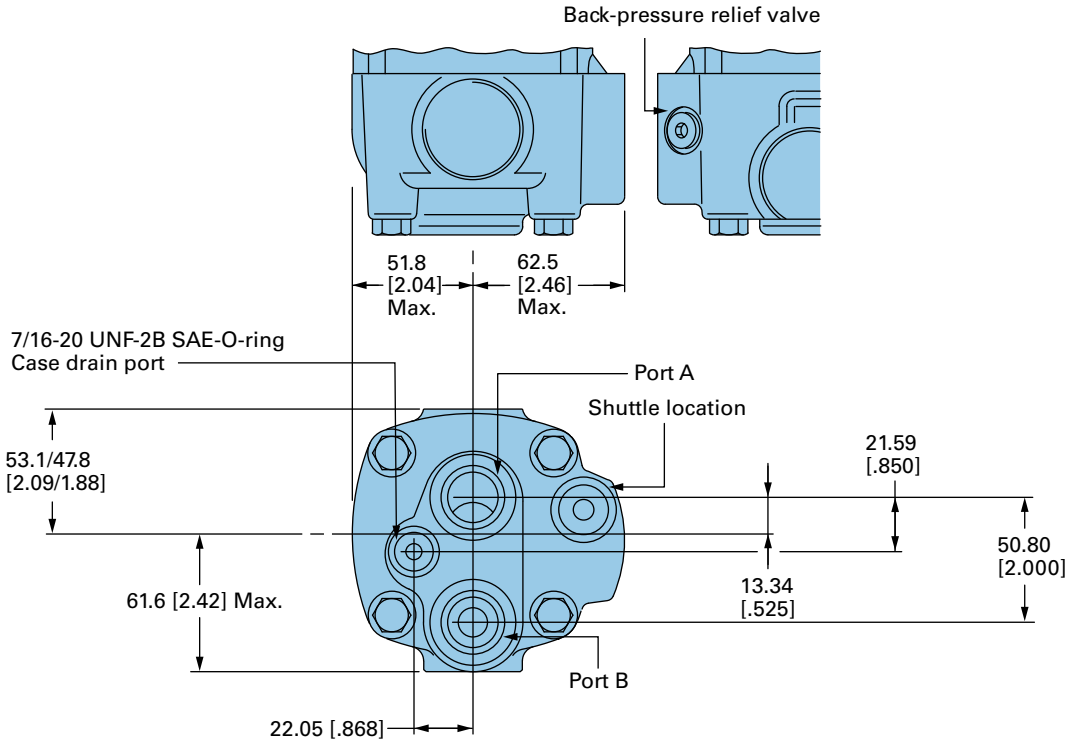
C-1

Ports with Shuttle





This port option is available with shuttle and back pressure relief valve for closed loop applications.



C-1

2000 Series

Product numbers

Note: For 2000 Series Motors with a configuration **Not Shown** in the charts below: Use model code number system on the next page to specify product in detail.

Use digit prefix — 104-, 105-, or 106- plus four digit number from charts for complete product number— Example 106-1043.

Orders will not be accepted without three digit prefix.

C-1

Mounting	Shaft	Port size	Displ. cm³/ r [in³/r] / product number										
			41	80	90	100	130	160	195	245	305	395	490
			[2.5]	[4.9]	[5.5]	[6.2]	[8.0]	[9.6]	[11.9]	[14.9]	[18.7]	[24.0]	[29.8]
2 Bolt sae A flange	1 Inch straight	7/8 -14 O-ring staggered	104-4708	-1001	—	-1002	-1003	-1004	-1005	-1006	-1007	-1143	—
		1 1/16 -12 O-ring 180° apart	104-––––	-1037	—	-1038	-1039	-1040	-1041	-1042	-1043	-1044	—
	1 ¼ Inch straight	7/8 -14 O-ring staggered	104-4774	-1022	—	-1023	-1024	-1025	-1026	-1027	-1028	-1228	-1420
		1 1/16 -12 O-ring 180° apart	104-––––	-1061	—	-1062	-1063	-1064	-1065	-1066	-1067	-1068	-1421
	1 ¼ Inch - 14 T splined	7/8 -14 O-ring staggered	104-4764	-1029	—	-1030	-1031	-1032	-1033	-1034	-1035	-1229	-1422
		1 1/16 -12 O-ring 180° apart	104-––––	-1087	—	-1088	-1089	-1090	-1091	-1092	-1093	-1094	-1423
2 Bolt SAE B flange	1 ¼ Inch straight	7/8-14 O-ring staggered	104-––––	-1200	—	1201	-1202	-1203	-1204	-1205	-1206	-1207	—
	1 ¼ Inch involute SAE C splined	7/8 -14 O-ring staggered	104-––––	-1208	—	-1209	-1210	-1211	-1212	-1213	-1214	-1215	—
	1 Inch SAE 6B splined	7/8 -14 O-ring staggered	104-––––	-1193	—	-1194	-1195	-1196	-1197	-1198	-1199	—	—
	7/8 Inch SAE B splined	7/8 -14 O-ring staggered	104-––––	-1216	—	-1217	-1218	-1219	-1220	—	—	—	—
Standard with 4 bolt flange	32 mm Straight	G 1/2 (BSP))	104-4672	-1384	—	-1385	-1386	-1387	-1388	-1389	-1390	-1391	—
	1 ¼ Inch 14 T splined	G 1/2 (BSP)	104-––––	-1376	—	-1377	-1378	-1379	-1380	-1381	-1382	-1383	—
Wheel motor	1 ¼ Inch straight	7/8 -14 O-ring staggered	105-––––	—	—	—	—	—	—	—	—	—	-1148
		1 1/16 -12 O-ring 180° Apart	105-––––	—	—	—	—	—	—	—	—	—	-1149
	32 mm straight	G 1/2 (BSP)	105-––––	-1134	—	-1135	-1136	-1137	-1138	-1139	-1140	-1141	—
	1 ¼ Inch tapered	7/8 -14 O-ring staggered	105-––––	-1001	—	-1002	-1003	-1004	-1005	-1006	-1007	-1060	-1152
		1 1/16 -12 O-ring 180° apart	105-––––	-1071	—	-1072	-1073	-1074	-1075	-1076	-1077	-1078	—
	1 ¼ Inch 14 T splined	7/8 -14 O-ring staggered	105-––––	-1029	—	-1030	-1031	-1032	-1033	-1034	-1035	-1096	—
		1 1/16 -12 O-ring 180° apart	105-––––	-1079	—	—	—	-1082	-1083	-1084	-1085	-1086	—
Bearingless		7/8 -14 O-ring staggered	106-––––	-1008	—	-1009	-1010	-1011	-1012	-1013	-1014	-1015	-1047
		G 1/2 (BSP)	106-––––	-1038	—	-1039	-1040	-1041	-1042	-1043	-1044	-1045	—

106-1044

Mounting	Shaft	Port size	Displ. cm³/ r [in³/r] / product number										
			41	80	90	100	130	160	195	245	305	395	490
			[2.5]	[4.9]	[5.5]	[6.2]	[8.0]	[9.6]	[11.9]	[14.9]	[18.7]	[24.0]	[29.8]
2 Bolt SAE A flange	1 Inch straight	7/8 -14 O-ring Staggered	104-––––	-1528	—	-1529	-1530	-1531	-1532	-1533	-1534	-1519	-1535
	1 1/4 Inch straight	7/8 -14 O-ring	104-––––	-3615	—	-1536	-1537	-1568	-1539	-1452	-1479	-1509	-1489

The following 30-digit coding system has been developed to identify all of the configuration options for the 2000 Series motor. Use this model code to specify a motor with the desired features. All 30 digits of the code must be present when ordering.

M	0 2	* * *	* *	* *	* *	* *	*	* *	*	*	* *	0 0	* *	* *	A A	F
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	2000 Series motor

2 3 Product series

02	2000 Series Motor

4 5 6 Displacement

021	34.0 cm^3/r [in^3/r]
025	40.8 cm^3/r [in^3/r]
040	66.5 cm^3/r [in^3/r]
049	80.6 cm^3/r [4.92 in^3/r]
055	90.6 cm^3/r [5.53 in^3/r]
062	101.6 cm^3/r [6.20 in^3/r]
080	130.6 cm^3/r [7.97 in^3/r]
096	158.1 cm^3/r [9.65 in^3/r]
119	194.8 cm^3/r [11.89 in^3/r]
149	244.3 cm^3/r [14.91 in^3/r]
187	306.6 cm^3/r [18.71 in^3/r]
240	393.8 cm^3/r [24.03 in^3/r
298	489.0 cm^3/r [29.84 in^3/r]

7 8 Mounting type

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
AF	Standard, 2 Bolt: 101.6 [4.00] Pilot dia. 14.35 [.565] Dia. Holes on 146.0 [5.75] Dia. Bolt circle. SAE B
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
AL	Wheel (European), 4 Bolt: 125 [4.92] Pilot Dia. 13.79 [.543] Dia. Holes on 159.99 [6.299] Dia. Bolt Circle
AP	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. Spigot reduced to 88.9 [3.50] Dia. by 25.4 [1.00] Depth.
AZ	Bearingless (w/ leakage slots), 4 Bolt: 100.0 [3.94] Pilot Dia. 11.0 [.43] Dia. Holes on 125.0 [4.92] Dia bolt circle (european)

9 10 Output shaft

00	None (Bearingless)
01	25.40 [1.000] Dia. Straight shaft with 1/4-20UNC-2B Thread in End, 6.35 [.250] wide x 25.40 [1.000] Dia.Woodruff key
02	31.75 [1.250] Dia. Straight shaft with .375-16UNC-2B Thread in end, 7.938 [.3125] Sq x 31.75 [1.250] straight key
03	31.75 [1.250] Dia. 0.125:1 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 [1.0] straight key
04	31.75 [1.250] Dia. Flat root side fit, 14 tooth, 12/24 DP 30° involute spline w/ .375-16UNC-2B Thread in end, 33.0 [1.30] Min. Full spline length
05	25.40 [1.000] Dia. 6B spline per SAE J499 with .250- 20UNC-2B thread in end, 22.76 [.896] Min. Full spline length
07	22.22 [.875] Dia. Flat root side fit, 13 tooth, 16/32 DP 30° SAE B Involute Spline, 15.2 [.60] Min. 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
17	31.75 [1.250] Dia. Straight shaft with 3/8 -16 UNC-2B Thread in end, 7.938 [.3125] Sq x 31.75 [1.250] straight key, corrosion resistant (seal area to shaft end)
19	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 31.82 [1.254]L key
41	35.00 [1.378] Dia. 10:1 Tapered shaft per ISO R775 with M20 x 1.5-6g threaded shaft end and slotted hex nut, 6.00 [.236] Sq. X 20.00 [.787] Key
42	35.00 [1.378] 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

C-1

2000 Series

Model code

M	0 2	* * *	* *	* *	* *	* *	*	* *	*	*	* *	0 0	* *	* *	A A	F
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

11 12 Ports

AA	.875-14 UNF-2B SAE O-ring Ports - Staggered Ports
AB	12.70 [.500] and 15.88 [.625] Dia. Manifold ports with 3 x .375-16 UNC-2B port block mounting holes
AC	.875-14 UNF-2B SAE O-ring ports - ports oriented 180° to each other
AE	12.70 [.500] and 15.88 [.625] Dia. Manifold ports with 3 x M10 x 1.5-6H Port block mounting holes
AF	1.0625-12 UN-2B SAE O-ring ports - ports oriented 180° to each other
AG	G-1/2 BSP straight THD ports - staggered ports
AN	G-1/2 BSP Straight THD Ports - end ported
AS	G-1/2 Bsp Straight THD ports - staggered port with 2 x M10 x 1.5-6H port block mounting holes - european

13 14 Case flow options

(Shuttles available with port code AA only)

01	.4375-20 UNF-2B SAE O-Ring Port
02	G 1/4 BSP Straight THD Port
13	Reverse flow shuttle valve w/ .4375-20 UNF-2B SAE O-Ring port, .062 Dia. Shuttle flow orifice

15 Low pressure relief

0	None
A	Set at 4.5 bar [65 lbf/in²]
B	Set at 15.2 bar [220 lbf/in²]
C	Set at 20.7 bar [300 lbf/in²]
E	Set at 11.03 bar [160 lbf/in²]

16 17 Pressure/flow option

0	None
	Integral cross-over relief valve:
30	Set at 103.4 bar [1500 lbf/in²]
31	Set at 120.6 bar [1750 lbf/in²]
32	Set at 137.9 bar [2000 lbf/in²]
33	Set at 155.1 bar [2250 lbf/in²]
34	Set at 172.4 bar [2500 lbf/in²]
35	Set at 189.6 bar [2750 lbf/in²]
36	Set at 206.8 bar [3000 lbf/in²]
37	Set at 234.4 bar [3400 lbf/in²]

18 Geroler option

1	Standard
2	Free running
6	Reduced side clearance, no warranty for galling

19 Seal option

0	Standard
1	Viton
2	Viton shaft seal
3	High pressure shaft seal
4	Seal guard
5	Extreme duty seal guard
6	High pressure shaft seal, seal guard

20 21 Accessories

00	None
AA	Digital speed pickup (30 pulse), 127 [5.0] lead wire with weather pack shroud connector (A=Power, B=Signal, C=Common)
AD	Digital speed pickup (30 pulse), M12 connector (A=Power, B=Common, C=Signal)
AG	M12 connector (60 pulse per rev speed signal and one directional signal, (Pin 1=Power, Pin 2= Direction, Pin 3=Common, Pin 4=Speed)

22 23 Special features (hardware)

00	None

24 25 Special features (assembly)

00	None
AA	Flange rotated 90 degrees
AB	Reverse rotation
AE	Flange rotated 45 degrees

26 27 Paint/packaging

AA	No paint, indiv. Box
AB	Low gloss black primer, indiv. Box
AT	Epoxy coated black, individual box
BJ	Nickel plated motor (excluding shaft), individual box

28 29 Customer ID

AA	None

30 Design code

F	Sixth

See Eatonpowersource.com/ for more options and configurations.

The Eaton 2000 Series motors are available with an integral two speed feature that changes the displacement in a ratio of 1 to 2 and shifts the motor from a low speed high torque (LSHT) mode to a high speed low torque (HSLT) mode. The open center selector valve shifts the speed mode from low to high speed when pilot pressure of 6.9 D Bar [100 D PSI] minimum is applied to the pilot port (6.9 Bar [100 PSI] higher than case pressure). In the high speed mode torque values are approximately one half with twice the speed of the conventional 2000 Series single speed motors.

An external two position three way valve is required for shifting the pilot pressure port between signal pressure (HSLT) and low pressure (LSHT) Two speed motors are available with a return line closed center shuttle for closed circuit applications. Low speed high torque mode is the normal position of the speed selector valve. When a differential pressure is supplied to the pilot port and 6.9 Bar [100 PSI] is reached, the selector valve overcomes the return spring force and the spool shifts to the high speed mode. The oil in the opposite side of the spool is drained internally. Pressure between the pilot supply and case drain or return line (depending on open or closed circuit system) must be maintained to keep the motor in the high speed mode.

When pilot pressure is removed from the pilot port the pressure in the pilot end of the spool valve is relieved and drained back through this three way valve, the spring force returns the spool valve to LSHT position. Pilot pressure may come from any source that will provide uninterrupted pressure during the high speed mode operation. Pilot pressure 6.9 Δ Bar [100 Δ PSI] minimum, up to the full operating pressure of the motor.

In normal LSHT operation the Char-Lynn two speed motor will function with equal shaft output in either direction (CW or CCW), the same as the single speed Char-Lynn disc valve motors.

However, to prevent cavitation in the HSLT mode, the preferred direction of shaft rotation is counter clockwise (port B pressurized). This unique disc valve is not symmetrical in porting the fluid for the HSLT mode. Consequently, when the pressure is reversed for HSLT CW rotation, cavitation can occur. Installing a restriction (200 psi or more depending on flow) in the hydraulic line that connects port B will prevent cavitation. If you are operating in a critical area and a restriction in the hydraulic line causes concern, these two speed motors can be ordered timed with CW preferred HSLT shaft rotation. Hence, with this option port B will have to be pressurized for CW preferred HSLT shaft rotation. The restriction recommended for the line connecting port B remains unchanged.

In closed circuit applications a hydraulic line restriction is not required. Instead, the charge pump can be used to supply and maintain a minimum pressure of 14 Bar [200 PSI].

Performance data

In the high speed mode torque values are approximately one half with twice the speed of the conventional 2000 Series single speed motors.

In the low speed mode torque and speed values are the same as the conventional 2000 Series motors.

Note: Displacements under 130 cm3/r [8.0 in3/r] have limited starting torque when started in high speed mode.

Be certain in closed loop applications that the charge pump when used for back pressure on the B port, has sufficient displacement to maintain charge pressure especially in dynamic braking or overrunning load conditions.

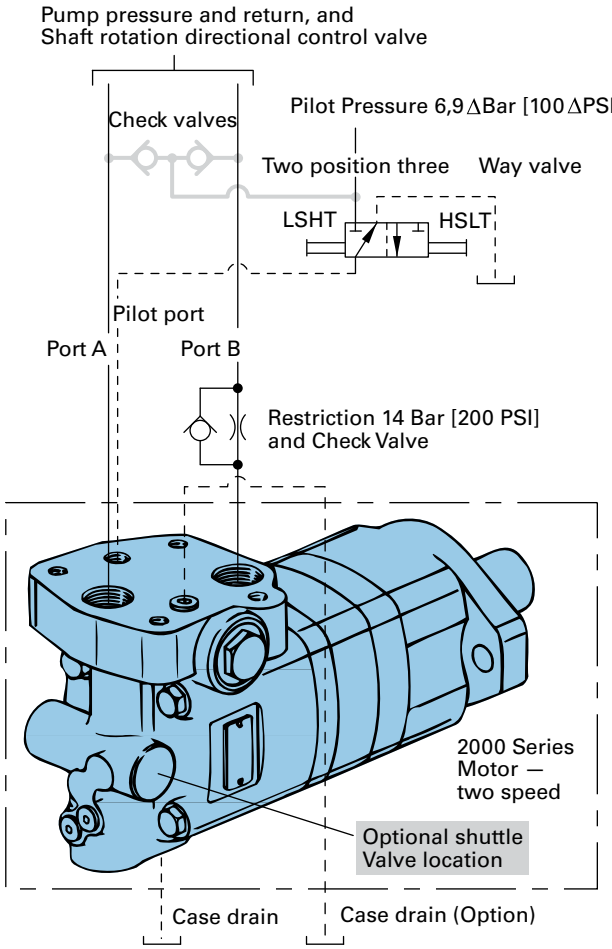
Due to potential problems in maintaining charge pump pressure at port B for uninterrupted back pressure during dynamic braking, Eaton does not recommend the two speed motor where overrunning conditions may exist.

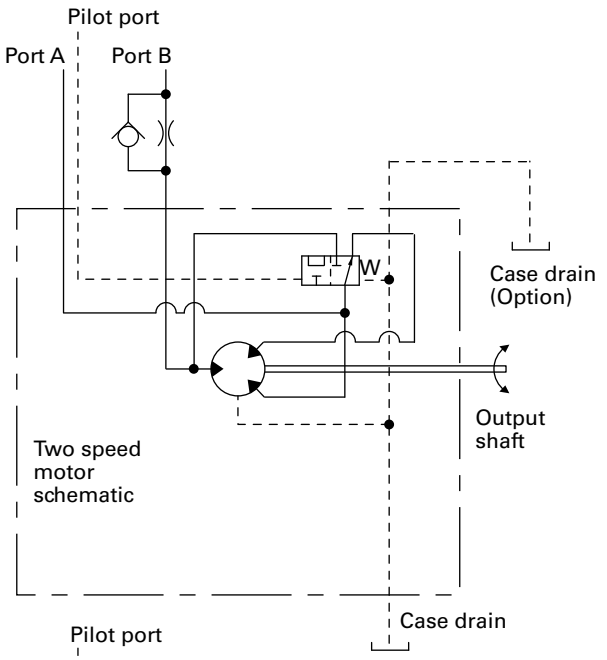
2000 Series Two-speed

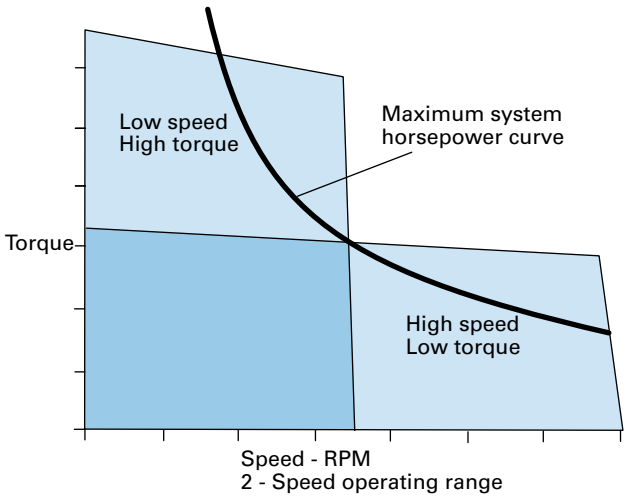
Typical hydraulic circuit

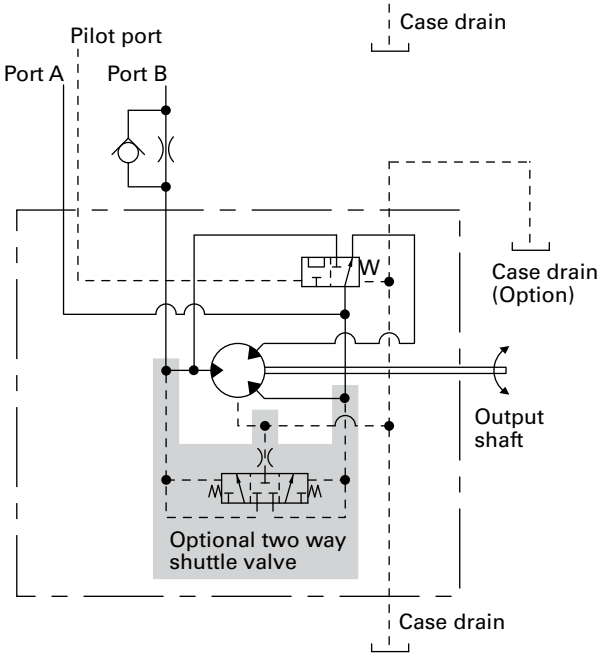
Note:

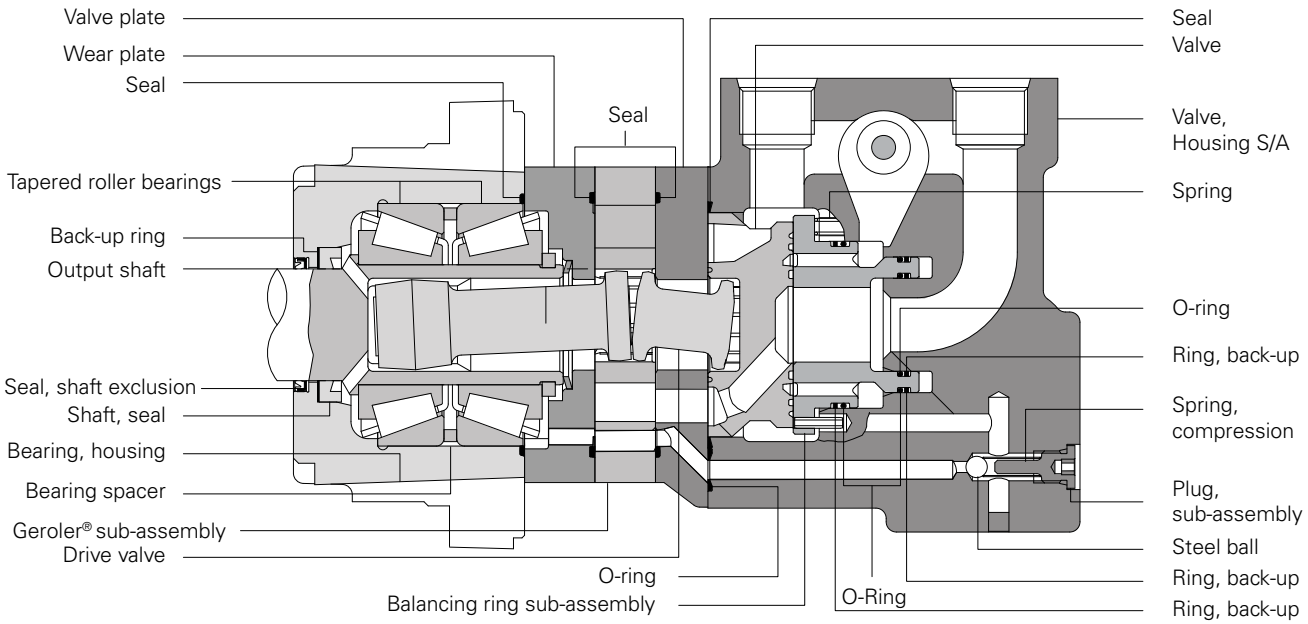
This is the low speed biased motor circuit. For the high speed biased motor circuit please contact your Eaton Hydraulics representative.











Specification data — 2000 series two-speed motors

Displ. cm³/r [in³/r]	High speed mode	40 [2.45]	50 [3.1]	65 [4.0]	80 [4.8]	95 [5.95]	120 [7.45]	155 [9.35]	195 [12.0]	245 [14.9]
	Low speed mode	**80 [4.9]**	**100 [6.2]**	**130 [8.0]**	**160 [9.6]**	**195 [11.9]**	**245 [14.9]**	**305 [18.7]**	**395 [24.0]**	**490 [29.8]**
Max. Speed (RPM) @ Continuous flow	High speed mode	1000	1000	990	860	700	560	450	350	230
	Low speed mode	500	500	495	430	350	280	225	175	115
Flow l/min [GPM]	High speed mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Low speed mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
Torque* Nm [lb - in]	High speed mode continuous intermittent	100 [880]	125 [1115]	165 [1450]	195 [1725]	240 [2150]	300 [2675]	380 [3350]	365 [3225]	448 [3970]
		145 [1300]	185 [1660]	240 [2150]	240 [2150]	300 [2650]	375 [3330]	440 [3900]	445 [3940]	486 [4300]
Torque* Nm [lb - in]	Low speed mode continuous intermittent	235 [2065]	295 [2630]	385 [3420]	455 [4040]	540 [4780]	660 [5850]	765 [6750]	775 [6840]	845 [7470]
		345 [3035]	445 [3950]	560 [4970]	570 [5040]	665 [5890]	820 [7250]	885 [7820]	925 [8170]	930 [8225]
Pressure Δ bar [Δ PSI]	Continuous intermittent	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	155 [2250]	120 [1750]
		310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	240 [3500]	190 [2750]	140 [2000]
Weight kg [lb]	Standard or wheel mount bearingless	13,8 [30.5]	14,1 [31.0]	14,3 [31.5]	14,5 [32.0]	15,0 [33.0]	15,4 [34.0]	15,9 [35.0]	16,3 [36.0]	16,8 [37.0]
		11.8 [26.0]	12,0 [26.5]	12,2 [27.0]	12,5 [27.5]	12.9 [28.5]	13,4 [29.5]	13,8 [30.5]	14,3 [31.5]	14,7 [32.5]

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

Note: To assure best motor life, run motor in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

High speed mode: (Reduced motor displacement)

Low speed mode: (Full motor displacement)

Maximum inlet pressure:
310 bar [4500 PSI] Do not exceed Δ pressure rating (see chart above).

Maximum return pressure:
310 bar [4500 PSI] with case drain line installed.

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

Δ bar [Δ PSI]:
The true pressure difference between inlet port and outlet port

Continuous rating:
Motor may be run continuously at these ratings

Intermittent operation: 10% of every minute

Peak operation: 1% of every minute

Recommended fluids:
Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 13 cSt [70 SUS] at operating temperature.

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

Recommended filtration:
per ISO Cleanliness code, 4406: 20/18/13

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

2000 Series Two-speed

Dimensions

Standard and Wheel

Ports

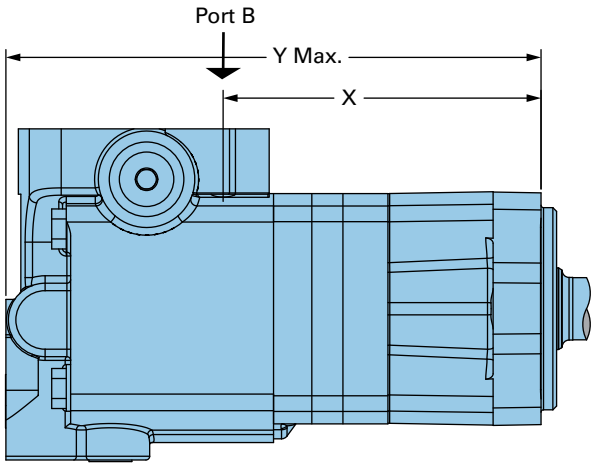
7/8 -14 UNF-2B SAE O-ring staggered ports (2)
9/16 -18 UNF-2B SAE O-ring case drain port (1)
7/16 -20 UNF-2B SAE O-ring pilot control port (1)

G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)
G 1/4 (BSP) pilot control port (1)

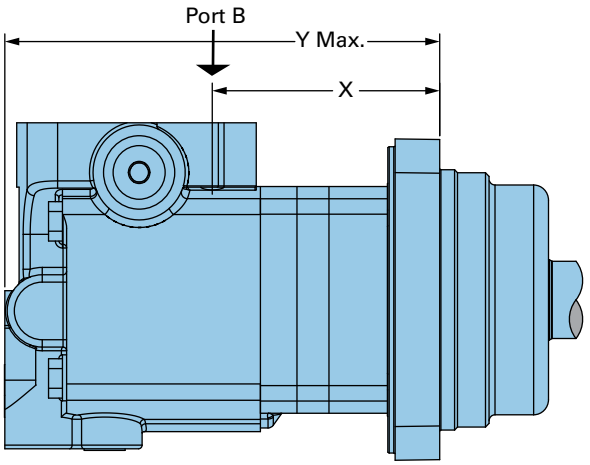
Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

Two-speed standard motors



Two-speed wheel motors



Standard mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
80 [4.9]	137.4 [5.41]	231.6 [9.12]
100 [6.2]	142.0 [5.59]	236.5 [9.31]
130 [8.0]	148.5 [5.85]	242.9 [9.56]
160 [9.6]	148.5 [5.85]	242.9 [9.56]
195 [11.9]	155.2 [6.11]	249.4 [9.82]
245 [14.9]	164.2 [6.47]	258.6 [10.18]
305 [18.7]	175.7 [6.92]	270.1 [10.63]
395 [24.0]	191.5 [7.54]	286.1 [11.26]
490 [29.8]	209.0 [8.23]	303.3 [11.94]

Wheel mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
80 [4.9]	97.2 [3.83]	191.5 [7.54]
100 [6.2]	101.8 [4.01]	196.4 [7.73]
130 [8.0]	108.3 [4.27]	202.7 [7.98]
160 [9.6]	108.3 [4.27]	202.7 [7.98]
195 [11.9]	115.0 [4.53]	209.3 [8.24]
245 [14.9]	124.2 [4.89]	218.5 [8.60]
305 [18.7]	135.5 [5.34]	229.9 [9.05]
395 [24.0]	151.4 [5.96]	245.9 [9.68]
490 [29.8]	168.9 [6.65]	263.1 [10.36]

Bearingless

Ports

7/8 -14 UNF-2B SAE O-ring staggered ports (2)
9/16 -18 UNF-2B SAE O-ring case drain port (1)
7/16 -20 UNF-2B SAE O-ring pilot control port (1)

G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)
G 1/4 (BSP) pilot control port (1)

Standard rotation viewed from shaft end

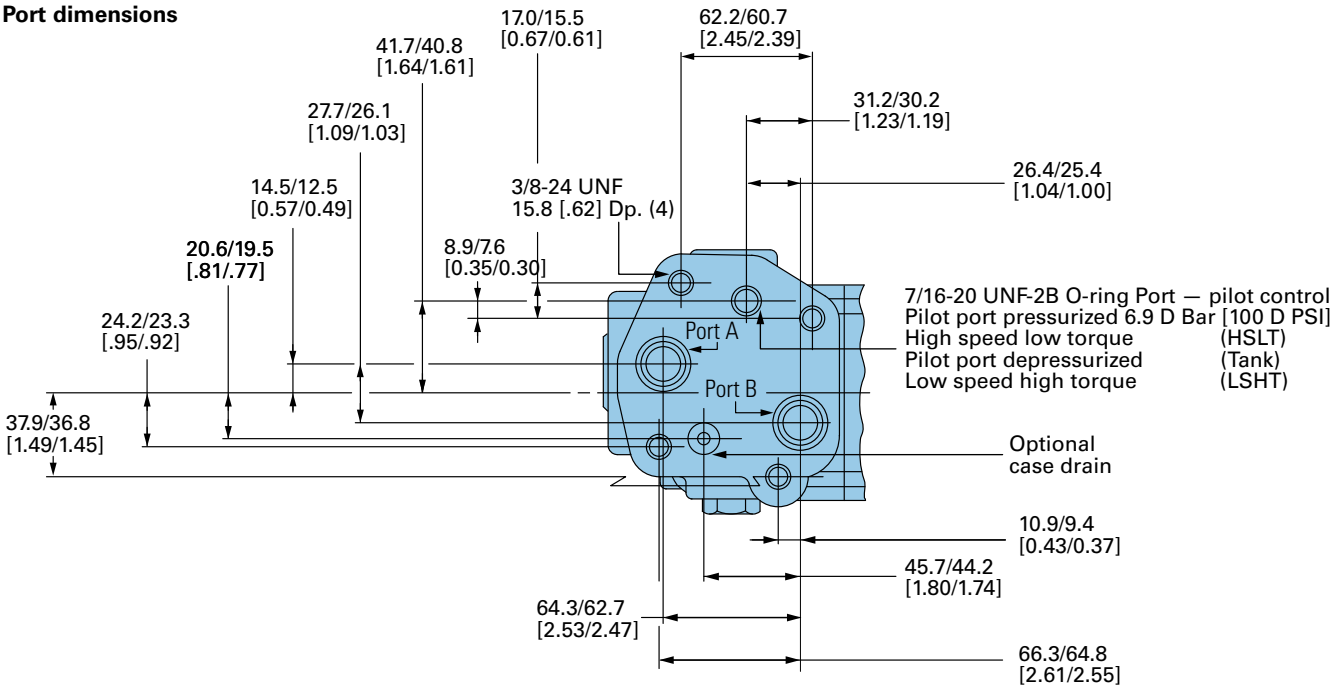
Port A pressurized — CW
Port B pressurized — CCW

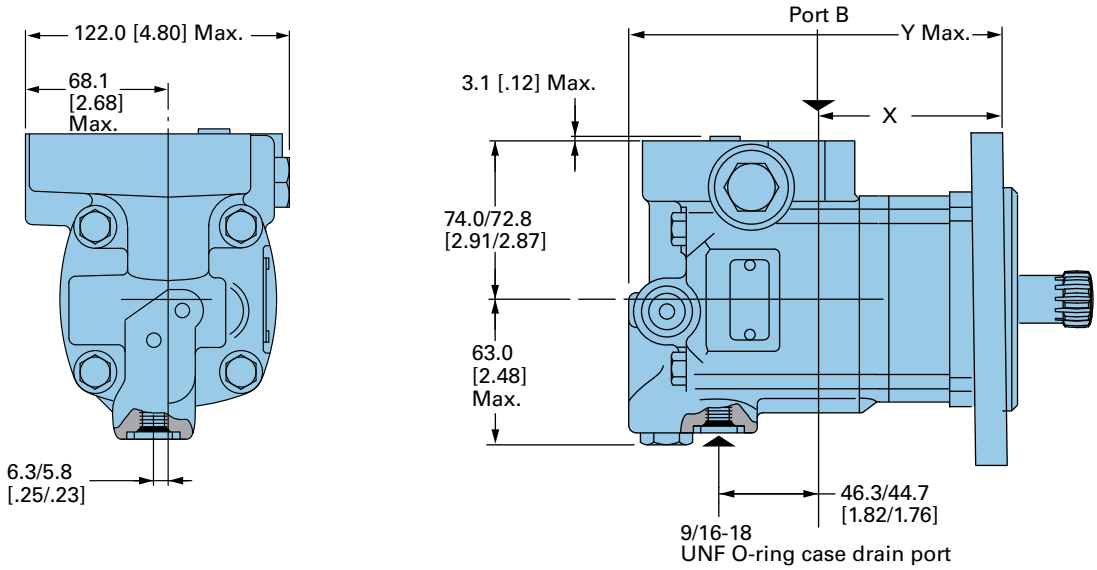
Bearingless motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
80 [4.9]	79.3 [3.13]	174.0 [6.85]
100 [6.2]	84.1 [3.31]	178.9 [7.04]
130 [8.0]	90.7 [3.57]	185.2 [7.29]
160 [9.6]	90.7 [3.57]	185.2 [7.29]
195 [11.9]	97.3 [3.83]	191.8 [7.55]
245 [14.9]	106.4 [4.19]	201.0 [7.91]
305 [18.7]	117.8 [4.64]	212.4 [8.36]
395 [24.0]	133.6 [5.26]	228.4 [8.99]
490 [29.8]	151.1 [5.95]	245.6 [9.67]

C-1

Port dimensions





2000 Series Two-speed

Product numbers

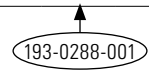
For 2000 Series Motors with a configuration not shown in the charts below: Use model code number system on the next page to specify product in detail.

Use digit prefix — 193- plus four digit number from charts for complete product number—Example 193-0002.

Orders will not be accepted without three digit prefix.

C-1

Mounting	Shaft	Port size	Displ. cm³/ r [in³/r] / product number								
			80	100	130	160	195	245	305	395	490
			[4.9]	[6.2]	[8.0]	[9.6]	[11.9]	[14.9]	[18.7]	[24.0]	[29.8]
2 Bolt SAE A flange	1 Inch straight	7/8 -14 O-ring staggered	193-0002-001	-0003	-0004	-0005	-0006	-0007	-0008	-0009	—
	1 1/4 Inch straight	7/8 -14 O-ring staggered	193-0010-001	-0011	-0012	-0013	-0014	-0015	-0016	-0017	-0070
	1 1/4 Inch 14 T splined	7/8 -14 O-ring staggered	193-0018-001	-0019	-0020	-0021	-0022	-0023	-0024	-0025	—
Wheel motor	1 1/4 Inch Tapered	7/8 -14 O-ring staggered	193-0222-001	—	—	-0225	-0226	-0227	-0228	-0229	—
	1 1/4 Inch 14 T splined	7/8 -14 O-ring staggered	—	—	-0232	-0257	-0234	-0235	-0236	-0237	—
Bearingless		7/8 -14 O-ring staggered	193-0282-001	-0283	-0234	-0285	-0286	-0287	-0288	-0289	—



The following 30-digit coding system has been developed to identify all of the configuration options for the 2000 Series motor. Use this model code to specify a motor with the desired features. All 30 digits of the code must be present when ordering.

M	22	**	**	**	**	**	0	00	1	*	00	00	00	**	AA	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

22 2000 2 speed series (1:2 ratio)

4 5 6 Displacement

049 80.6 cm³/r [4.92 in³/r]
062 101.6 cm³/r [6.20 in³/r]
080 130.6 cm³/r [7.97 in³/r]
096 158.1 cm³/r [9.65 in³/r]
119 194.8 cm³/r [11.89 in³/r]
149 244.3 cm³/r [14.91 in³/r]
187 306.6 cm³/r [18.71 in³/r]
240 393.8 cm³/r [24.03 in³/r
298 489.0 cm³/r [29.84 in³/r]

7 8 Mounting description

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
AE 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
AF Standard, 2 Bolt: 101.6 [4.00] Pilot Dia. 14.35 [.565] Dia. Holes on 146.0 [5.75] Dia. Bolt Circle. SAE B Dia bolt circle (european)

9 10 Output shaft description

00 None (bearingless)
01 25.40 [1.000] Dia. Straight shaft with 1/4-20UNC-2B thread in end, 6.35 [.250] Wide x 25.40 [1.000] Dia. Woodruff key
02 31.75 [1.250] Dia. Straight shaft with .375-16UNC-2B Thread in end, 7.938 [.3125] Sq x 31.75 [1.250] straight key
04 31.75 [1.250] Dia. Flat root side fit, 14 tooth, 12/24 DP 30° involute spline w/ .375-16UNC-2B thread in end, 33.0 [1.30] Min. Full spline

11 12 Ports description

AA .875-14 UNF-2B SAE O-ring ports - staggered ports
AD G1/2 BSP ports - Staggered with M10x1.5-6H port block mounting holes

13 14 Case flow options/ Selector valve

01 .5625-10 UNF-2B SAE O-Ring case drain port, .4375-20 UNF-2B SAE O-Ring pilot control port, optional .4375-20 UNF-2B SAE case drain port for pilot, normally low speed
02 G1/4 Case drain port, G1/4 pilot control port, optional G1/4 case drain port for pilot, normally low speed

15 Shuttle valve/Low pressure relief

0 None

16 17 Pressure/flow option

00 None

18 Geroler option

1 Standard

19 Seal option

0 Standard
1 Viton
2 High Pressure shaft Seal
3 Seal Guard

20 21 Accessories

00 None

22 23 Special features (Hardware)

00 None

24 25 Special features (Assembly)

00 None

26 27 Paint/packaging

AA No paint, individual box
AB Low gloss black primer, individual box
BT Epoxy coated black, individual box

28 29 Customer Identification

AA None

30 Design code

A First

See Eatonpowersource.com/ for more options and configurations.

C-1

4000 Compact Series

Highlights

Description:

This new compact addition in a family of disc valve hydraulic motors produces the same amount of torque as the current 4000 Series. Yet, it is housed in an envelope similar to its smaller counterpart, the 2000 Series. The unit's intermittent torque rating is 1220 Nm [10800 lb-in]. A variety of mounting options include two 2 bolt mounts (SAE A, SAE B), and four 4 bolt mounts (magneto, standard and wheel mounts.) For added flexibility, the motor can be specified with either the larger size shafts of the 2000 Series of standard output shaft sizes of the 4000 Series.

Specifications

Geroler element	6 Displacements
Flow l/min [GPM]	75 [20] Continuous**
	115 [30] Intermittent*
Speed RPM	464 Cont.**
	699 Inter.*
Pressure bar [PSI]	225 [3250] Cont.**
	310 [4500] Inter.*
Torque Nm [lb-in]	975 [8627] Cont.**
	1218 [10788] Inter.*

** Continuous— (Cont.) Continuous rating, motor may be run continuously at these ratings.
* Intermittent— (Inter.) Intermittent operation, 10% of every minute.

Features:

- Shuttle valve with back-pressure relief valve
- Speed sensors
- End ports
- Two Speed option

Benefits:

- Higher bearing capacity than 2000 Series
- Torque of 4000 Series

Applications:

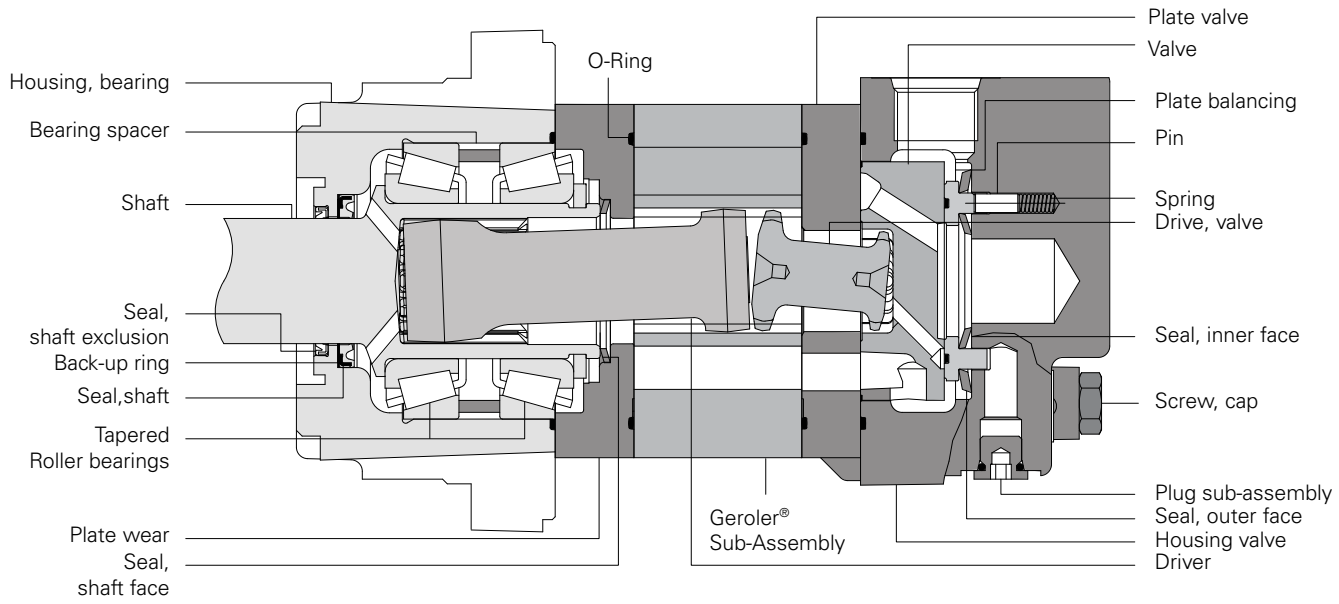
- Skid steer loaders
- Fairway mowers
- Harvesters
- Vehicles where space is at a premium

Lawn and Turf

Paving equipment

Boom lift

Skid steer



Specification data — 4000 Compact Series motors

Displ. cm³/r [in³/r]		160 [9.8]	200 [12.3]	250 [15.4]	325 [19.8]	405 [24.6]	490 [29.8]
Max. Speed (RPM) @ Flow	Continuous	464	375	300	234	188	155
	Intermittent	699	563	450	351	282	232
Flow l/min [GPM]	Continuous	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Intermittent	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]
Torque* Nm [lb - in]	Continuous	510 [4514]	646 [5715]	734 [6500]	793 [7021]	800 [7079]	975 [8627]
	Intermittent	690 [6108]	840 [7436]	935 [8272]	1053[9320]	921[8153]	1218 [10778]
Pressure Δ bar [Δ PSI]	Continuous	225 [3250]	225 [3250]	205 [3000]	170 [2500]	140 [2000]	140 [2000]
	Intermittent	310 [4500]	295 [4250]	260 [3750]	240 [3500]	170 [2500]	170 [2500]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	275 [4000]	260 [3750]
Weight kg [lb]	Standard or Wheel mount	10.4 [23.0]	10.9 [24.0]	11.3 [25.0]	11.8 [26.0]	12.2 [27.0]	12.2 [27.0]
	Bearingless	8.4 [18.5]	8.8 [19.5]	9.3 [20.5]	9.8 [21.5]	10.2 [22.5]	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 in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

Maximum inlet pressure:
310 bar [4500 PSI] Do not exceed Δ pressure rating (see chart above).

Maximum return pressure:
310 bar [4500 PSI] with case drain line installed.

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

Δ bar [Δ PSI]:
The true pressure difference between inlet port and outlet port

Continuous rating: Motor may be run continuously at these ratings

Intermittent operation: 10% of every minute

Peak operation: 1% of every minute

Recommended fluids:
Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 13 cSt [70 SUS] at operating temperature.

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

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

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

4000 Compact Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous | Peak | Intermittent | No operation

Δ Pressure bar [PSI]
160 cm³/r [9.8 in³/r]

Flow LPM [GPM]	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170	[2750] 190	[3000] 205	[3250] 225	[3500] 240	[3750] 260	[4000] 275	[4250] 295	[4500] 310
[0.5]	[244]	[543]																
	28	61																
2	4	3																
[1]	[274]	[554]	[854]															
	31	63	96															
4	10	8	7															
[2]	[274]	[593]	[899]	[1210]	[1513]	[1816]	[2092]	[2361]	[2621]	[2874]	[3088]							
	31	67	102	137	171	205	236	267	296	325	349							
8	22	21	20	19	17	14	12	10	9	7	6							
[4]	[301]	[623]	[940]	[1261]	[1579]	[1898]	[2197]	[2492]	[2766]	[3033]	[3270]	[3496]	[3761]	[4022]				
	34	70	106	143	178	214	248	282	313	343	369	395	425	454				
15	40	39	38	36	35	33	31	28	24	20	17	14	10	6				
[6]	[305]	[662]	[1004]	[1354]	[1699]	[2046]	[2386]	[2725]	[3049]	[3368]	[3693]	[4016]	[4319]	[4618]	[4828]	[5022]		
	34	75	113	153	192	231	270	308	344	381	417	454	488	522	545	567		
[23]	87	85	83	81	79	77	74	72	67	63	59	55	49	44	35	27		
[8]	[293]	[659]	[1003]	[1357]	[1705]	[2056]	[2399]	[2741]	[3074]	[3405]	[3751]	[4098]	[4417]	[4732]	[5023]	[5308]		
	33	74	113	153	193	232	271	310	347	385	424	463	499	535	568	600		
[30]	133	131	129	127	124	121	118	114	109	104	99	93	87	80	71	63		
[10]	[280]	[656]	[1002]	[1360]	[1711]	[2066]	[2412]	[2758]	[3100]	[3442]	[3809]	[4180]	[4514]	[4846]	[5218]	[5593]	[5856]	[6108]
	32	74	113	154	193	233	273	312	350	389	430	472	510	548	590	632	662	690
[38]	181	179	177	175	172	169	166	162	157	152	145	139	133	127	120	113	104	96
[12]	[259]	[630]	[978]	[1348]	[1701]	[2061]	[2408]	[2755]	[3102]	[3450]	[3806]	[4163]	[4500]	[4835]	[5191]	[5547]	[5784]	
	29	71	110	152	192	233	272	311	351	390	430	470	508	546	586	627	653	
[45]	228	225	223	220	217	213	209	204	199	193	186	179	172	165	157	150	141	
[14]	[238]	[604]	[954]	[1336]	[1692]	[2056]	[2403]	[2752]	[3105]	[3458]	[3802]	[4146]	[4485]	[4824]	[5163]	[5501]		
	27	68	108	151	191	232	272	311	351	391	430	468	507	545	583	622		
[53]	275	272	269	266	262	258	253	247	241	235	229	223	214	205	197	189		
[16]	[210]	[577]	[923]	[1308]	[1665]	[2034]	[2385]	[2739]	[3092]	[3447]	[3796]	[4144]	[4487]	[4830]				
	24	65	104	148	188	230	269	310	349	390	429	468	507	546				
[61]	322	319	316	313	308	304	298	293	286	279	272	265	256	247				
[18]	[182]	[550]	[893]	[1280]	[1638]	[2012]	[2367]	[2727]	[3080]	[3436]	[3789]	[4143]	[4489]	[4836]				
	21	62	101	145	185	227	267	308	348	388	428	468	507	546				
[68]	370	367	363	360	356	351	345	339	332	324	317	309	301	292				
[20]	[143]	[514]	[853]	[1247]	[1601]	[1973]	[2329]	[2692]	[3045]	[3401]	[3756]	[4114]						
	16	58	96	141	181	223	263	304	344	384	424	465						
[76]	417	414	410	406	401	397	390	383	375	366	358	350						
[22]	[105]	[478]	[814]	[1213]	[1564]	[1935]	[2291]	[2658]	[3010]	[3366]	[3724]	[4085]						
	12	54	92	137	177	219	259	300	340	380	421	462						
[83]	464	461	457	453	448	442	435	428	418	409	400	390						
[25]		[433]	[762]	[1167]	[1518]	[1893]	[2252]	[2623]	[2973]	[3328]	[3682]	[4040]						
		49	86	132	172	214	254	296	336	376	416	456						
[95]		508	504	500	495	489	482	474	465	456	446	436						
[30]		[387]	[711]	[1121]	[1472]	[1851]	[2212]	[2589]	[2937]	[3291]	[3641]	[3995]						
		44	80	127	166	209	250	292	332	372	411	451						
[114]		556	552	548	542	537	529	521	513	504	493	483						
[35]		[363]	[683]	[1095]	[1445]	[1824]	[2184]	[2561]	[2910]	[3266]								
		41	77	124	163	206	247	289	329	369								
[132]		580	576	572	566	560	552	544	535	526								
[35]		[244]	[546]	[967]	[1308]	[1689]	[2045]	[2421]	[2777]	[3144]								
		28	62	109	148	191	231	274	314	355								
[132]		699	695	692	685	678	669	660	648	637								

[2777] Torque [lb-in]
314 Nm
648 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
200 cm³/r [12.3 in³/r]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170	[2750] 190	[3000] 205	[3250] 225	[3500] 240	[3750] 260	[4000] 275	[4250] 295
[0.25] 0.95	[115] 13 4	[504] 57 3															
[0.5] 1.9	[268] 30 8	[584] 66 7	[963] 109 4	[1274] 144 3													
[1] 3.8	[306] 35 17	[721] 81 16	[1104] 125 14	[1516] 171 13	[1913] 216 12	[2243] 253 10	[2397] 271 9	[2772] 313 6									
[2] 7.5	[402] 45 35	[841] 95 34	[1218] 138 32	[1647] 186 31	[2107] 238 30	[2478] 280 28	[2826] 319 27	[3238] 366 24	[3954] 447 29	[4451] 503 26	[4755] 537 23	[5127] 579 21	[5407] 611 17	[5569] 629 11	[5855] 662 8		
[4] 15	[403] 46 72	[896] 101 70	[1361] 154 69	[1780] 201 68	[2247] 254 66	[2649] 299 65	[3068] 347 62	[3513] 397 60	[3947] 446 56	[4367] 493 53	[4710] 532 50	[5125] 579 46	[5509] 622 42	[5880] 664 37	[6249] 706 31	[6547] 740 24	[6753] 763 19
[6] 23	[385] 44 109	[863] 98 107	[1354] 153 106	[1785] 202 104	[2260] 255 102	[2657] 300 100	[3087] 349 97	[3547] 401 93	[3965] 448 90	[4389] 496 86	[4793] 542 81	[5218] 590 77	[5610] 634 72	[6015] 680 66	[6408] 724 60	[6754] 763 52	[7436] 840 47
[8] 30	[368] 42 147	[831] 94 146	[1347] 152 144	[1790] 202 142	[2273] 257 140	[2665] 301 137	[3106] 351 134	[3581] 405 130	[3982] 450 127	[4408] 498 122	[4876] 551 117	[5311] 600 113	[5712] 645 108	[6151] 695 103	[6567] 742 98	[6961] 786 91	[7334] 829 83
[10] 38	[353] 40 185	[822] 93 184	[1319] 149 181	[1774] 200 179	[2212] 250 177	[2642] 299 174	[3086] 349 170	[3556] 402 165	[3974] 449 161	[4410] 498 156	[4839] 547 151	[5297] 598 146	[5715] 646 140	[6147] 695 134	[6563] 742 129		
[12] 45	[339] 38 223	[813] 92 222	[1291] 146 219	[1758] 199 217	[2151] 243 214	[2620] 296 211	[3067] 346 207	[3530] 399 202	[3965] 448 197	[4408] 498 192	[4802] 543 186	[5283] 597 180	[5718] 646 174	[6144] 694 167	[6568] 742 164		
[14] 53	[282] 32 261	[762] 86 260	[1237] 140 257	[1693] 191 255	[2121] 240 252	[2601] 294 248	[2968] 335 244	[3504] 396 238	[3953] 447 233	[4368] 493 227	[4832] 546 221	[5261] 594 214	[5690] 643 208				
[16] 61	[224] 25 299	[712] 80 298	[1183] 134 296	[1629] 184 293	[2091] 236 290	[2581] 292 286	[2870] 324 282	[3477] 393 275	[3940] 445 269	[4328] 489 263	[4861] 549 256	[5240] 592 249	[5661] 640 243				
[18] 68	[200] 23 337	[667] 75 336	[1148] 130 334	[1619] 183 331	[2053] 232 328	[2520] 285 324	[2899] 328 320	[3442] 389 314	[3906] 441 307	[4337] 490 301	[4819] 544 293	[5245] 593 285	[5644] 638 278				
[20] 76	[176] 20 375	[623] 70 374	[1112] 126 372	[1609] 182 369	[2014] 228 366	[2458] 278 363	[2929] 331 358	[3407] 385 353	[3872] 437 346	[4347] 491 339	[4777] 540 331	[5250] 593 322	[5627] 636 315				
[22] 83		[565] 64 412	[1053] 119 410	[1530] 173 407	[1934] 219 404	[2387] 270 401	[2868] 324 396	[3347] 378 390	[3804] 430 383	[4254] 481 375	[4698] 531 367						
[24] 91		[507] 57 449	[994] 112 448	[1450] 164 446	[1855] 210 443	[2316] 262 439	[2806] 317 434	[3287] 371 427	[3737] 422 420	[4162] 470 412	[4618] 522 403						
[25] 95		[465] 53 468	[950] 107 467	[1411] 159 464	[1820] 206 462	[2276] 257 458	[2768] 313 453	[3233] 365 446	[3688] 417 439	[4116] 465 431	[4493] 508 423						
[30] 114		[259] 29 562	[726] 82 563	[1214] 137 559	[1645] 186 555	[2072] 234 556	[2577] 291 550	[2961] 335 545	[3443] 389 536	[3889] 439 527	[3866] 437 521						

[2072] 234 556 } Torque [lb-in] Nm Speed RPM

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4000 Compact Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
250 cm³/r [15.4 in³/r]

Flow LPM [GPM]	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170	[2750] 190	[3000] 205	[3250] 225	[3500] 240	[3750] 260
[0.5]	[384] 43	[833] 94													
1.9	6	5													
[1]	[438] 49	[904] 102	[1403] 158	[1887] 213	[2359] 267	[2798] 316	[3221] 364	[3657] 413	[3822] 432	[4326] 489					
3.8	14	14	13	12	11	9	8	7	4	3					
[2]	[492] 56	[1054] 119	[1563] 177	[2081] 235	[2623] 296	[3160] 357	[3717] 420	[4147] 469	[4585] 518	[5070] 573	[5470] 618	[5721] 646	[5962] 674		
7.5	28	27	26	25	24	23	21	17	16	13	9	7	5		
[4]	[603] 68	[1183] 134	[1771] 200	[2275] 257	[2817] 318	[3364] 380	[3895] 440	[4495] 508	[5005] 565	[5496] 621	[5982] 676	[6500] 734	[7054] 797	[7519] 850	[7941] 897
15	58	56	55	54	52	50	47	44	42	38	35	32	28	24	17
[6]	[587] 66	[1159] 131	[1741] 197	[2329] 263	[2815] 318	[3369] 381	[3951] 446	[4483] 506	[5021] 567	[5555] 628	[6068] 686	[6557] 741	[7131] 806	[7641] 863	[8107] 916
23	88	86	84	82	80	77	74	71	67	63	59	55	50	45	38
[8]	[571] 65	[1135] 128	[1710] 193	[2384] 269	[2813] 318	[3375] 381	[4008] 453	[4471] 505	[5038] 569	[5613] 634	[6154] 695	[6614] 747	[7209] 815	[7763] 877	[8272] 935
30	118	116	114	112	110	107	103	100	96	92	87	83	78	73	67
[10]	[552] 62	[1138] 129	[1671] 189	[2304] 260	[2804] 317	[3361] 380	[3950] 446	[4452] 503	[5006] 566	[5587] 631	[6123] 692	[6612] 747	[7201] 814		
38	148	146	144	142	139	136	131	127	123	119	113	109	102		
[12]	[532] 60	[1140] 129	[1631] 184	[2224] 251	[2796] 316	[3347] 378	[3892] 440	[4434] 501	[4974] 562	[5561] 628	[6093] 688	[6610] 747	[7193] 813		
45	178	177	175	173	170	166	161	157	151	146	141	136	129		
[14]	[441] 50	[1072] 121	[1600] 181	[2207] 249	[2754] 311	[3320] 375	[3888] 439	[4433] 501	[4958] 560	[5529] 625	[6066] 685	[6590] 745			
53	209	207	205	202	199	195	190	185	179	174	168	162			
[16]	[349] 39	[1003] 113	[1568] 177	[2190] 247	[2711] 306	[3292] 372	[3884] 439	[4431] 501	[4941] 558	[5496] 621	[6039] 682	[6570] 742			
61	239	237	235	233	229	225	220	214	208	202	195	189			
[18]	[306] 35	[940] 106	[1513] 171	[2114] 239	[2653] 300	[3251] 367	[3830] 433	[4380] 495	[4904] 554	[5446] 615	[5984] 676	[6518] 736			
68	269	267	265	263	259	255	250	243	236	230	223	214			
[20]	[263] 30	[876] 99	[1458] 165	[2038] 230	[2595] 293	[3210] 363	[3777] 427	[4328] 489	[4867] 550	[5395] 610	[5928] 670	[6471] 731			
76	300	298	296	293	290	285	280	272	265	259	251	241			
[22]		[826] 93	[1414] 160	[1991] 225	[2528] 286	[3144] 355	[3709] 419	[4262] 482	[4806] 543	[5354] 605	[5915] 668				
83		328	326	323	320	315	309	302	295	288	279				
[24]		[776] 88	[1370] 155	[1945] 220	[2462] 278	[3079] 348	[3642] 411	[4196] 474	[4745] 536	[5313] 600	[5901] 667				
91		359	356	354	350	345	339	332	325	317	308				
[25]		[732] 83	[1322] 149	[1959] 221	[2426] 274	[3026] 342	[3594] 406	[4153] 469	[4696] 531	[5152] 582					
95		374	371	369	365	360	354	347	340	333					
[30]		[509] 57	[1082] 122	[2029] 229	[2246] 254	[2761] 312	[3358] 379	[3939] 445	[4450] 503	[4347] 491					
114		450	449	445	442	437	430	423	414	413					

[2246] Torque [lb-in]
254 Nm
442 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
325 cm³/r [19.8 in³/r]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170	[2750] 190	[3000] 205	[3250] 225	[3500] 240
[0.5] 1.9	[536] 61 5	[1152] 130 4												
[1] 3.8	[555] 63 11	[1220] 138 10	[1900] 215 10	[2559] 289 9	[3222] 364 9	[3862] 436 8	[4522] 511 7	[5061] 572 5	[5580] 630 3	[6106] 690 3				
[2] 7.5	[643] 73 22	[1349] 152 21	[2025] 229 20	[2712] 306 19	[3378] 382 19	[4051] 458 17	[4696] 531 15	[5335] 603 13	[5889] 665 10	[6366] 719 5	[6876] 777 3			
[4] 15	[679] 77 45	[1420] 160 44	[2140] 242 43	[2852] 322 42	[3557] 402 40	[4259] 481 38	[4947] 559 36	[5628] 636 33	[6300] 712 30	[6960] 786 26	[7596] 858 23	[8201] 927 19	[8767] 991 14	[9320] 1053 11
[6] 23	[654] 74 68	[1400] 158 67	[2132] 241 66	[2859] 323 64	[3575] 404 62	[4281] 484 59	[4977] 562 56	[5668] 640 53	[6346] 717 49	[7021] 793 44	[7678] 868 40	[8244] 931 38	[8792] 993 35	
[8] 30	[629] 71 92	[1379] 156 90	[2125] 240 89	[2866] 324 87	[3592] 406 85	[4304] 486 82	[5007] 566 79	[5707] 645 75	[6392] 722 71	[7082] 800 66	[7760] 877 61	[8400] 949 56		
[10] 38	[587] 66 115	[1337] 151 114	[2082] 235 112	[2827] 319 110	[3556] 402 107	[4272] 483 103	[4976] 562 100	[5672] 641 94	[6362] 719 90	[7053] 797 85				
[12] 45	[546] 62 139	[1295] 146 137	[2040] 230 136	[2787] 315 134	[3520] 398 130	[4240] 479 125	[4944] 559 121	[5638] 637 115	[6332] 715 110	[7023] 794 105				
[14] 53	[489] 55 162	[1238] 140 161	[1984] 224 159	[2729] 308 157	[3467] 392 153	[4193] 474 148	[4903] 554 143	[5600] 633 136	[6293] 711 131					
[16] 61	[431] 49 186	[1182] 134 185	[1929] 218 183	[2671] 302 181	[3415] 386 177	[4145] 468 171	[4861] 549 165	[5562] 628 159	[6254] 707 153					
[18] 68	[360] 41 210	[1110] 125 208	[1856] 210 206	[2600] 294 204	[3343] 378 200	[4073] 460 195	[4794] 542 189	[5499] 621 183						
[20] 76	[288] 33 234	[1038] 117 232	[1784] 202 230	[2529] 286 228	[3271] 370 224	[4001] 452 220	[4726] 534 214	[5436] 614 207						
[22] 83		[958] 108 256	[1706] 193 254	[2451] 277 251	[3194] 361 248	[3926] 444 243	[4650] 525 237	[5360] 606 229						
[24] 91		[878] 99 279	[1628] 184 277	[2373] 268 275	[3116] 352 271	[3850] 435 266	[4574] 517 260	[5285] 597 252						
[25] 95		[826] 93 291	[1576] 178 289	[2320] 262 287	[3063] 346 283	[3798] 429 277	[4523] 511 271							
[30] 114		[566] 64 351	[1314] 148 349	[2056] 232 346	[2799] 316 342	[3536] 399 337	[4268] 482 332							

[2799] Torque [lb-in]
316 Nm
342 Speed RPM

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4000 Compact Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
405 cm³/r [24.6 in³/r]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170
[0.5]	[719]	[1458]								
	81	165								
1.9	3	2								
[1]	[777]	[1631]	[2423]	[3148]	[3690]					
	88	184	274	356	417					
3.8	8	7	5	4	3					
[2]	[853]	[1812]	[2596]	[3375]	[4179]	[4845]	[5375]	[5841]	[6501]	
	96	205	293	381	472	547	607	660	735	
7.5	17	15	14	12	11	9	8	3	2	
[4]	[878]	[1859]	[2687]	[3667]	[4554]	[5388]	[6232]	[7004]	[7660]	[8153]
	99	210	304	414	515	609	704	791	865	921
15	35	34	32	30	28	25	23	19	16	11
[6]	[882]	[1836]	[2716]	[3680]	[4577]	[5388]	[6269]	[7079]	[7856]	
	100	207	307	416	517	609	708	800	888	
23	54	52	51	48	46	42	39	35	31	
[8]	[885]	[1813]	[2746]	[3694]	[4600]	[5388]	[6307]	[7153]	[8052]	
	100	205	310	417	520	609	713	808	910	
30	73	72	70	68	65	62	58	55	50	
[10]	[810]	[1736]	[2693]	[3639]	[4540]	[5390]	[6310]	[7151]	[7994]	
	92	196	304	411	513	609	713	808	903	
38	92	90	89	86	84	80	75	71	67	
[12]	[735]	[1660]	[2640]	[3584]	[4480]	[5391]	[6314]	[7149]		
	83	188	298	405	506	609	713	808		
45	111	110	108	106	103	98	93	88		
[14]	[661]	[1622]	[2560]	[3512]	[4412]	[5330]	[6242]	[7059]		
	75	183	289	397	498	602	705	798		
53	130	128	127	124	121	117	112	108		
[16]	[587]	[1585]	[2480]	[3440]	[4343]	[5268]	[6170]			
	66	179	280	389	491	595	697			
61	149	147	146	143	141	137	131			
[18]	[492]	[1472]	[2379]	[3333]	[4270]	[5190]	[6084]			
	56	166	269	377	482	586	687			
68	168	167	165	162	160	156	150			
[20]	[397]	[1359]	[2279]	[3226]	[4197]	[5112]	[5999]			
	45	153	257	365	474	578	678			
76	188	186	184	182	179	175	170			
[22]		[1264]	[2194]	[3124]	[4093]	[5008]	[5904]			
		143	248	353	462	566	667			
83		205	203	201	198	193	188			
[24]		[1169]	[2110]	[3023]	[3989]	[4904]	[5810]			
		132	238	342	451	554	656			
91		224	222	220	216	212	207			
[25]		[1106]	[2049]	[2961]	[3929]	[4851]	[5766]			
		125	231	335	444	548	651			
95		233	232	229	226	222	217			
[30]		[790]	[1744]	[2655]	[3634]	[4587]	[5543]			
		89	197	300	411	518	626			
114		282	280	277	274	270	266			

[2655] Torque [lb-in]
300 Nm
227 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
490 cm³/r [29.8 in³/r]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170
[0.5] 1.9	[375] 42 3	[1669] 189 3								
[1] 3.8	[525] 59 7	[1762] 199 7	[2945] 333 6	[3965] 448 6	[5099] 576 6	[5926] 670 5	[6715] 759 4	[7503] 848 3		
[2] 7.5	[639] 72 14	[2108] 238 14	[3287] 371 13	[4169] 471 13	[5416] 612 11	[6570] 742 11	[7188] 812 9	[8295] 937 6	[8959] 1012 5	
[4] 15	[981] 111 30	[2201] 249 29	[3333] 377 29	[4574] 517 28	[5558] 628 27	[6634] 750 26	[7694] 869 24	[8627] 975 21	[9567] 1081 18	[10399] 1175 13
[6] 23	[1049] 119 45	[2218] 251 45	[3332] 376 44	[4584] 518 43	[5604] 633 42	[6670] 754 40	[7711] 871 38	[8713] 984 35	[9698] 1096 31	[10588] 1196 26
[8] 30	[1118] 126 61	[2236] 253 60	[3331] 376 60	[4593] 519 59	[5650] 638 58	[6705] 758 56	[7727] 873 54	[8798] 994 51	[9828] 1110 48	[10778] 1218 44
[10] 38	[1060] 120 76	[2230] 252 76	[3304] 373 75	[4503] 509 75	[5607] 633 73	[6693] 756 72	[7721] 872 69	[8836] 998 66		
[12] 45	[1003] 113 92	[2223] 251 91	[3276] 370 91	[4413] 499 90	[5564] 629 89	[6680] 755 88	[7715] 872 85	[8874] 1003 82		
[14] 53	[858] 97 108	[2127] 240 107	[3136] 354 107	[4320] 488 106	[5496] 621 105	[6542] 739 103	[7653] 865 100			
[16] 61	[713] 81 124	[2030] 229 123	[2997] 339 122	[4226] 477 122	[5428] 613 121	[6403] 723 119	[7590] 858 115			
[18] 68	[631] 71 139	[1907] 215 139	[2935] 332 138	[4133] 467 137	[5330] 602 136	[6339] 716 134	[7431] 840 130			
[20] 76	[548] 62 155	[1784] 202 154	[2872] 325 153	[4041] 457 153	[5232] 591 152	[6275] 709 150	[7362] 832 148			
[22] 83		[1669] 189 170	[2704] 306 169	[3928] 444 169	[5048] 570 168	[6124] 692 166	[7208] 814 164			
[24] 91		[1553] 175 186	[2536] 287 185	[3816] 431 185	[4864] 550 184	[5972] 675 182	[7055] 797 179			
[25] 95		[1469] 166 193	[2475] 280 193	[3737] 422 193	[4810] 543 192	[5909] 668 190	[6959] 786 187			
[30] 114		[1047] 118 232	[2172] 245 232	[3341] 378 232	[4538] 513 231	[5592] 632 229	[6482] 732 227			

[3341] Torque [lb-in]
378 Nm
232 Speed RPM

C-2

Standard mount

Ports

7/8 -14 UNF-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

7/8 -14 UNF-2B SAE O-ring end ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

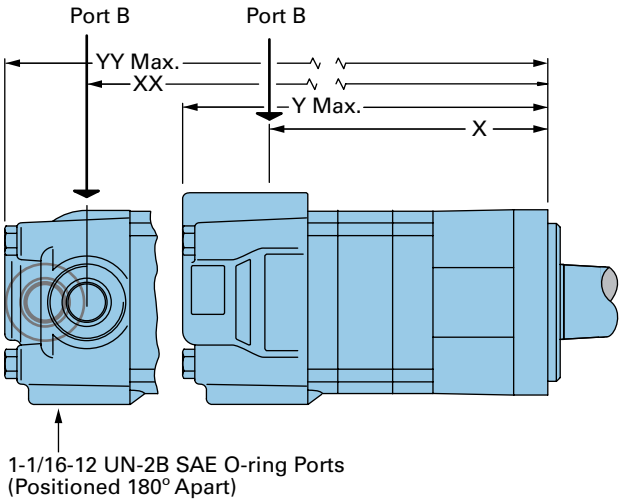
Manifold Mount

7/16 -20 UNF-2B SAE O-ring case drain port (1)

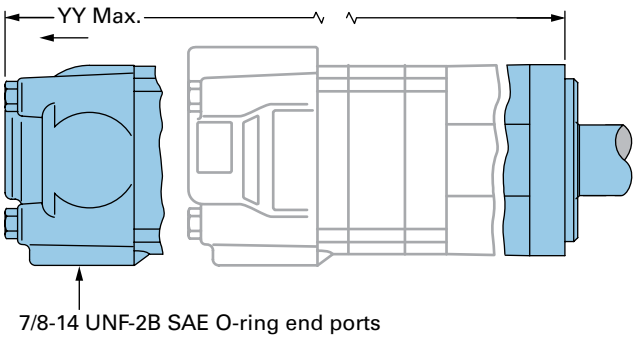
Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

Standard mount



1-1/16-12 UN-2B SAE O-ring Ports
(Positioned 180° Apart)



7/8-14 UNF-2B SAE O-ring end ports

Standard mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
160 [9.8]	154.7 [6.09]	201.9 [7.95]	157.0 [6.18]	203.3 [8.00]
200 [12.3]	163.8 [6.45]	211.1 [8.31]	166.1 [6.54]	212.3 [8.36]
250 [15.4]	175.3 [6.90]	222.5 [8.76]	177.5 [6.99]	223.8 [8.81]
325 [19.8]	191.0 [7.52]	238.5 [9.39]	193.3 [7.61]	239.8 [9.44]
405 [24.6]	208.5 [8.21]	255.8 [10.07]	210.8 [8.30]	257.0 [10.12]
490 [29.8]	208.5 [8.21]	255.8 [10.07]	210.8 [8.30]	257.0 [10.12]

Wheel mount

Ports

7/8 -14 UNF-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

7/8 -14 UNF-2B SAE O-ring end ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

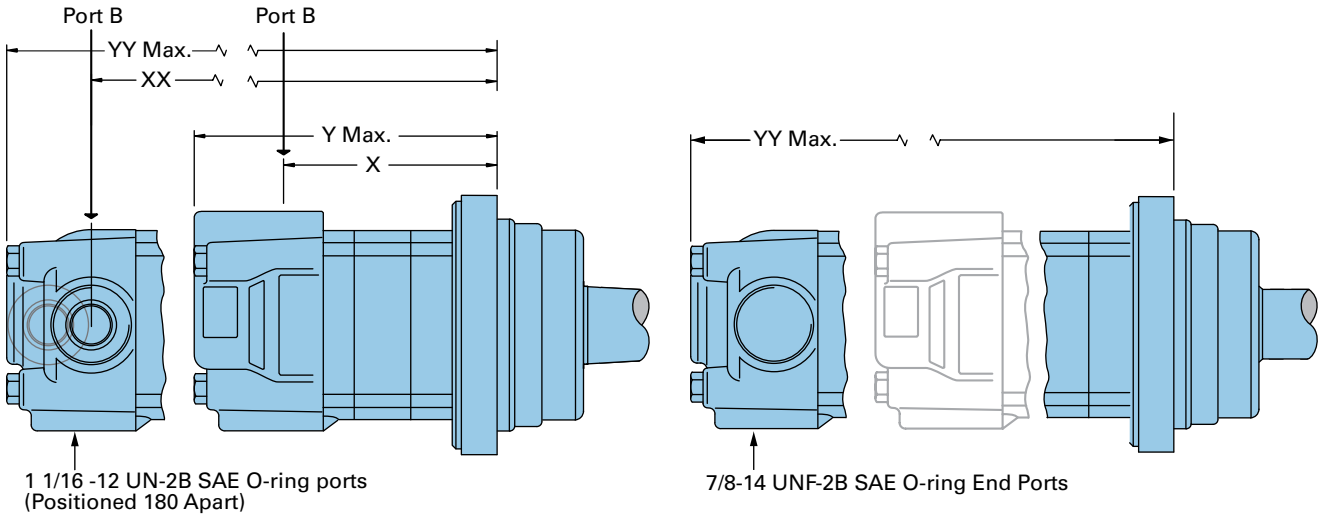
Manifold Mount

7/16 -20 UNF-2B SAE O-ring case drain port (1)

Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

Standard wheel



Wheel mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
160 [9.8]	114.6 [4.51]	161.8 [6.37]	114.6 [4.51]	161.8 [6.37]
200 [12.3]	123.7 [4.87]	170.9 [6.73]	123.7 [4.87]	170.9 [6.73]
250 [15.4]	135.1 [5.32]	182.4 [7.18]	135.1 [5.32]	182.4 [7.18]
325 [19.8]	150.9 [5.94]	198.4 [7.81]	150.9 [5.94]	198.4 [7.81]
405 [24.6]	168.4 [6.63]	215.6 [8.49]	168.4 [6.63]	215.6 [8.49]
490 [29.8]	168.4 [6.63]	215.6 [8.49]	168.4 [6.63]	215.6 [8.49]

Bearingless

Ports

7/8 -14 UNF-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)r

1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

7/8 -14 UNF-2B SAE O-ring end ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1/2 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

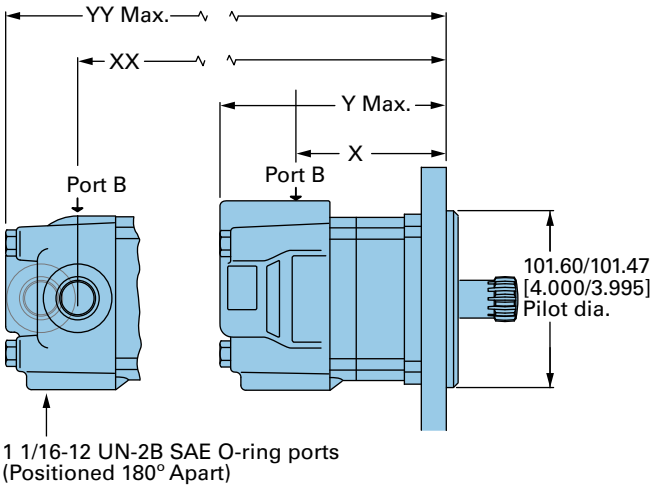
Manifold mount

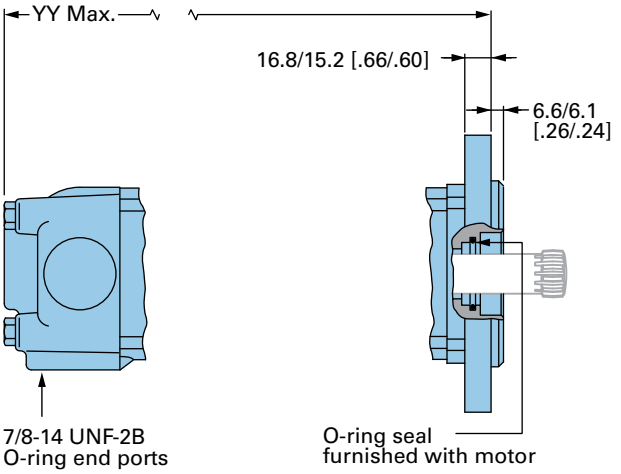
7/16 -20 UNF-2B SAE O-ring case drain port (1)

Standard rotation viewed from drive end

Port A pressurized — CW
Port B pressurized — CCW

Bearingless





Shaft blank dimensions

C 47.2 [1.86] Dia.

D 112.5 [4.43] Max.

E 107.4 [4.23] Full form dia.

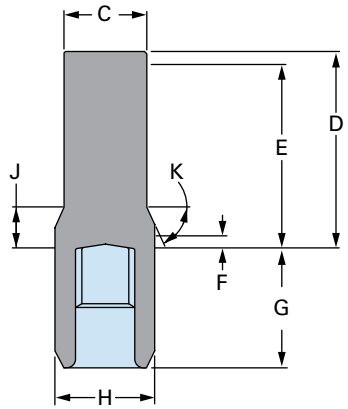
F 7.4 [.29] Min. Full form dia.

G 68.8 [2.71] Max.

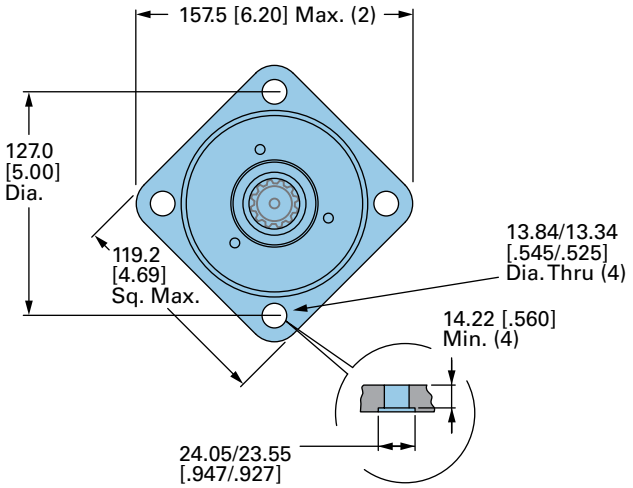
H 56.9 [2.24] Dia.

J 18.29 [.720]

K 38°



Mating coupling blank
Eaton Part no. 12745-003



Bearingless motor dimensions

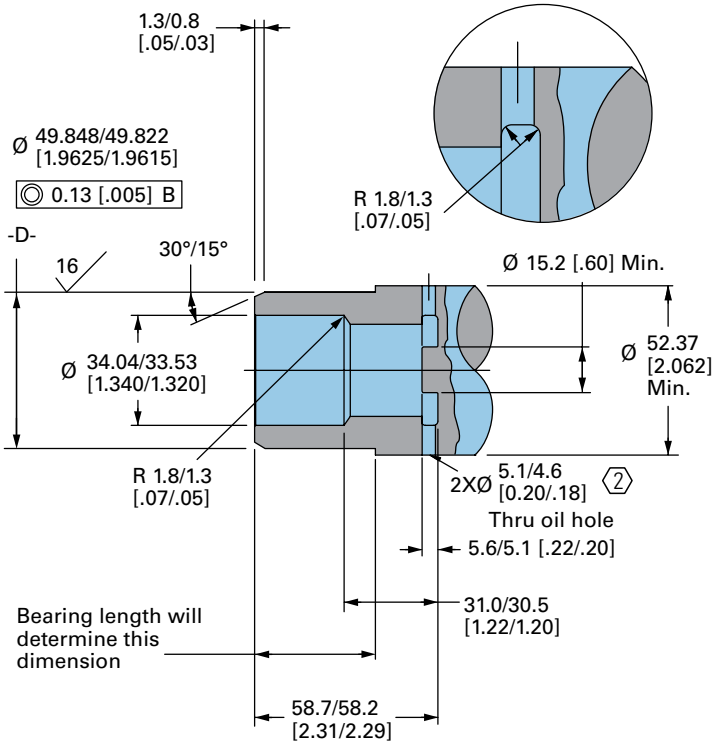
Displacement cm3/r [in3/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
160 [9.8]	96.8 [3.81]	144.3 [5.68]	99.1 [3.90]	145.5 [5.73]
200 [12.3]	105.7 [4.16]	153.4 [6.04]	108.0 [4.25]	154.7 [6.09]
250 [15.4]	117.1 [4.61]	164.8 [6.49]	119.4 [4.70]	166.1 [6.54]
325 [19.8]	133.1 [5.24]	180.8 [7.12]	135.4 [5.33]	182.1 [7.17]
405 [24.6]	150.4 [5.92]	198.1 [7.80]	152.7 [6.01]	199.4 [7.85]
490 [29.8]	150.4 [5.92]	198.1 [7.80]	152.7 [6.01]	199.4 [7.85]

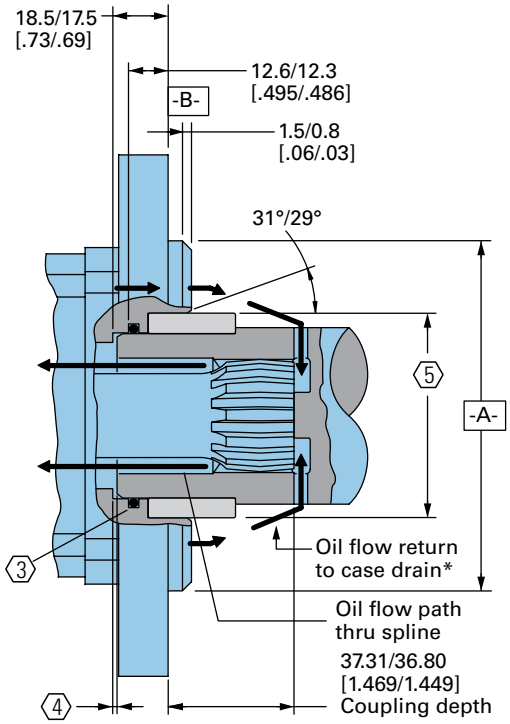
For 4000 compact series bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

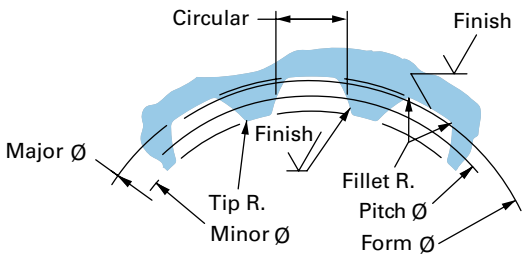
Note: After machining blank, part must be hardened per Eaton specification.

Bearingless

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 0.76 - 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. Counter bore 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) Source: Beemer Precision Inc. www.oilite.com, 1-800-836-2340 AAM 50 mm ID - 60 mm OD Length Determined by the Customer. Stock bearing lengths: 35 mm, 50 mm, 60 mm, 70 mm, 75 mm





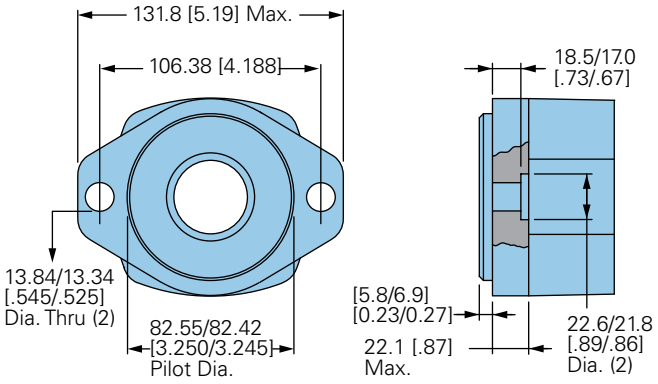


Spline pitch	10/20
Pressure angle	30°
Number of teeth	12
Class of fit	Ref. 5
Type of fit	Side
Pitch diameter	Ref. 30.480000 [1.2000000]
Base diameter	Ref. 26.396455 [1.0392305] ⌭ 0,21 [.008] Ⓜ D
Major diameter	(33.43 [1.316] Max. 33.23 [1.308] Min.)
Minor diameter	28.40 - 25.58 [1.118 - 1.125]
Form diameter, Min	32.59 [1.283]
Fillet radius	0.63 - 0.76 [.025 - .030]
Tip radius	0.26 - 0.51 [.010 - .020]

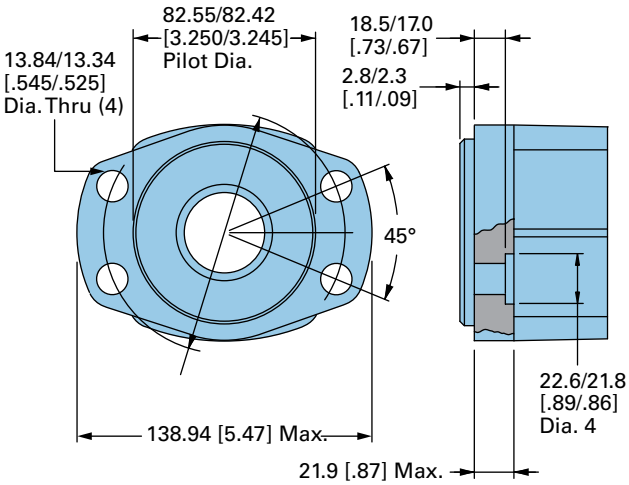
Finish	1.6 (63)
Involute profile variation	+0.000 -0.025 [+.0000 -.0010]
Total index variation	0.038 [.0015]
Lead variation	0.013 [.0005]
Circular space width:	
Maximum actual	5.045 [.1986]
Minimum effective	4.995 [.1951]
Maximum effective	Ref. 5.009 [.1972]
Minimum actual	Ref. 4.986 [.1963]
Dimension 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

Mounting options

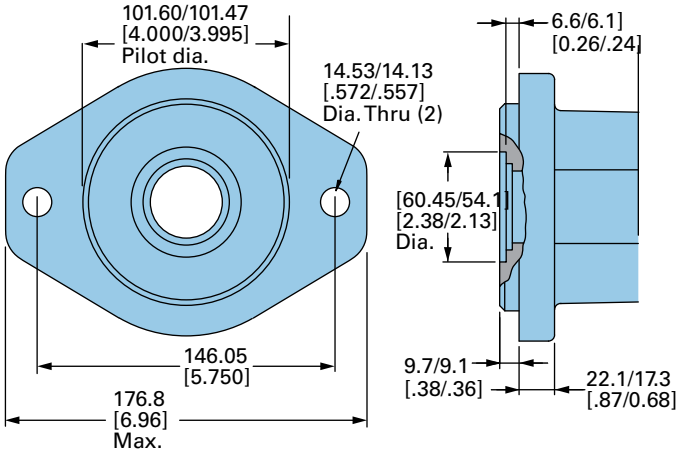
Code: AC SAE A - Two bolt (Standard motor)



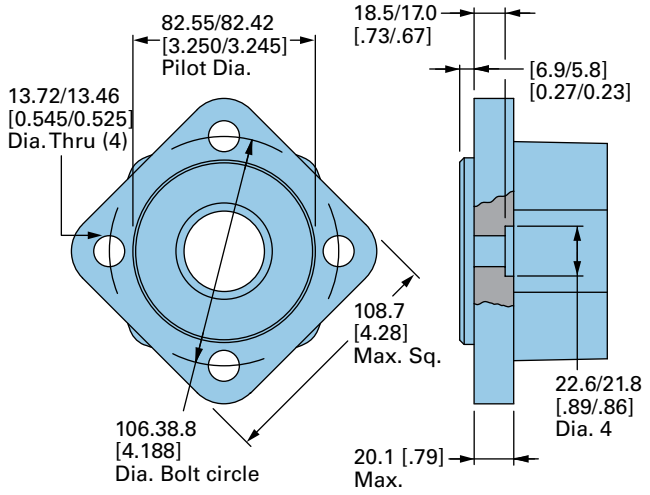
Code: AJ Four bolt magneto



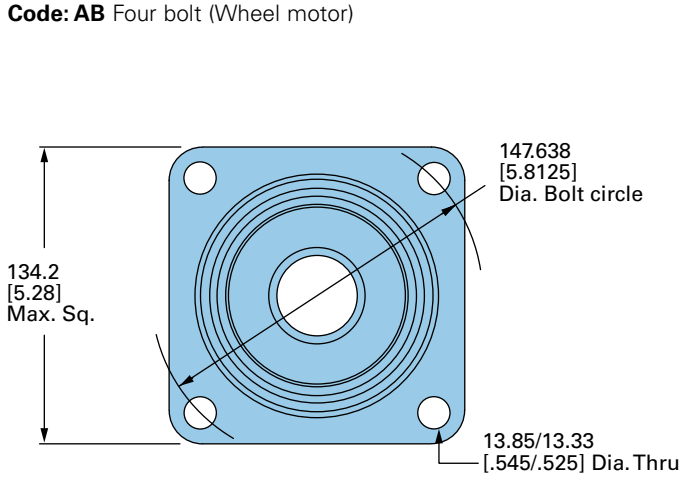
Code: AF Two bolt SAE B

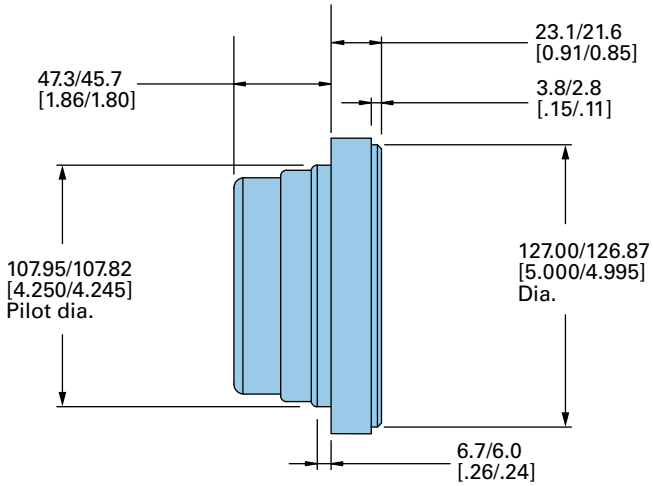


Code: AH Four bolt



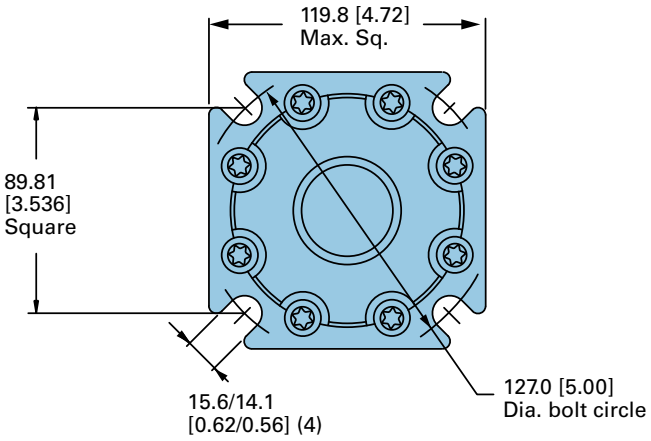
Code: AB Four bolt (Wheel motor)

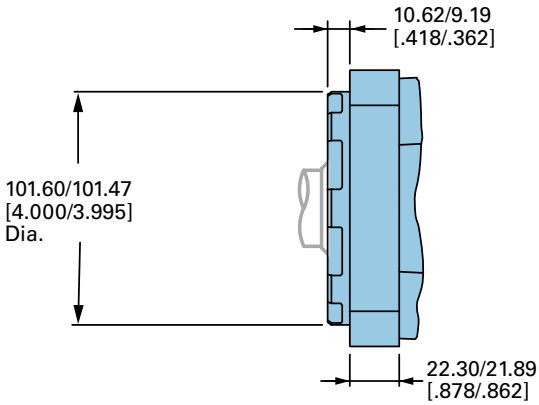




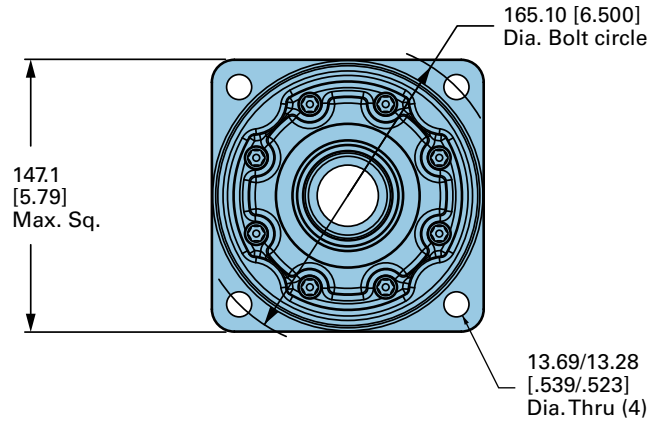
Mounting options for use with enhanced bearings

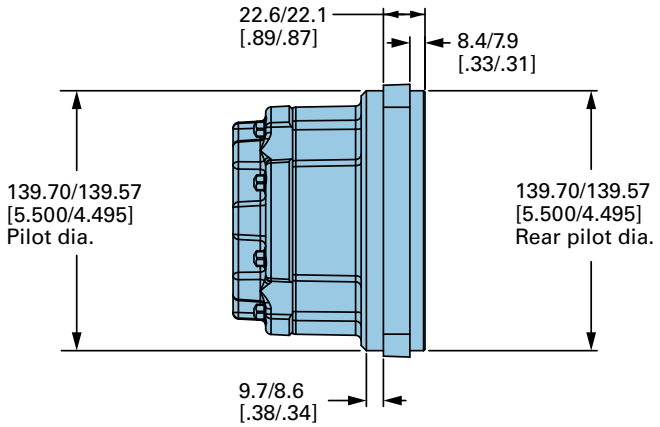
Code: BB Standard flange- Similar to SAE B type



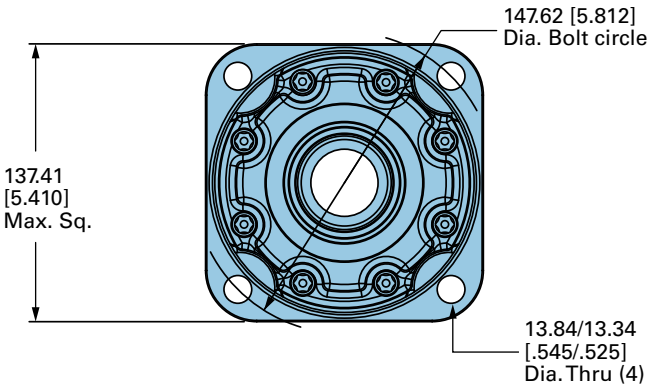


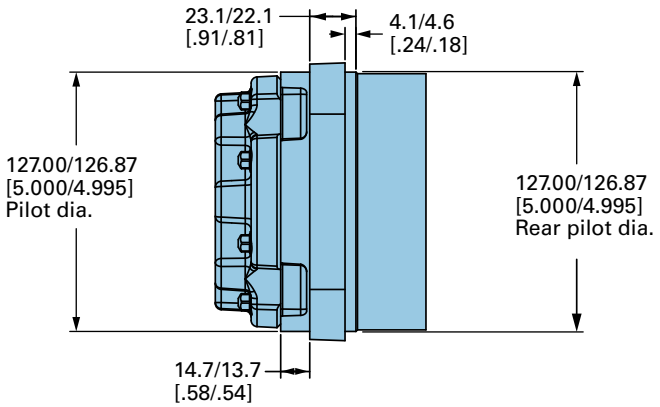
Code: BE Four bolt (Wheel motor)





Code: BG Four bolt (Wheel motor- short)



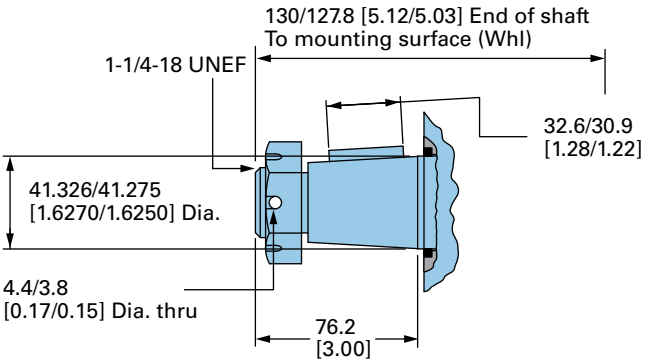


C-2

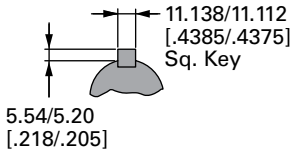
Shafts

Code: 98 1-5/8 Inch tapered

972 [8600] Max. Torque Nm [lb-in]



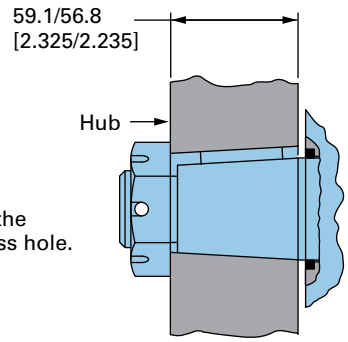
SAE J501 Standard Tapered Shaft
125.00 0.17 Taper per Meter
[1.500±.002 Taper per Foot]



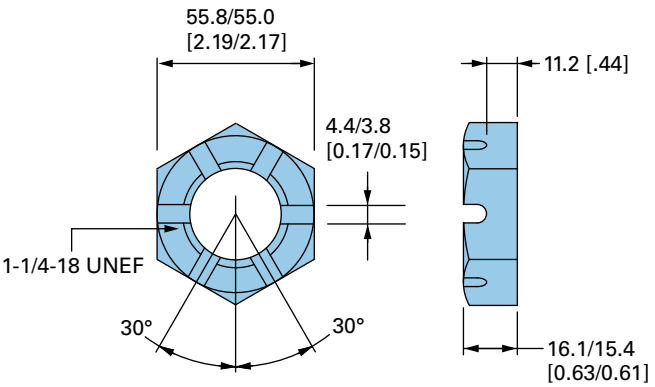
Tapered shaft hub data

Recommended torque:
(645 Nm [475 lb-ft] Dry)
(510 Nm [375 lb-ft] Lub)

Plus torque required to align the slotted nut with the Shaft Cross hole.

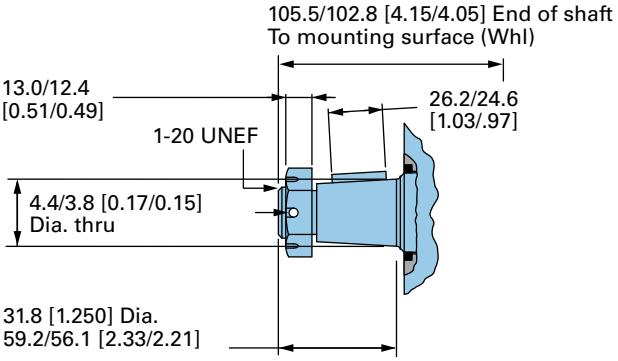


Tapered shaft hub data

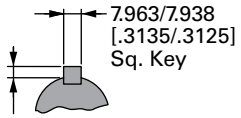


Code: 03 1-1/4 Inch tapered

768 [6800] Max. Torque Nm [lb-in]



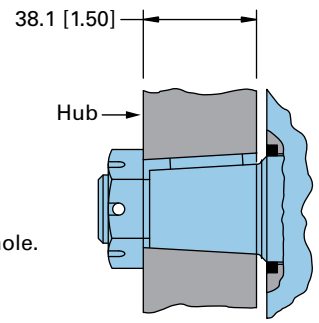
SAE J501 Standard tapered shaft 125.00 0.17 Taper per Meter [1.500±.002 Taper per Foot]



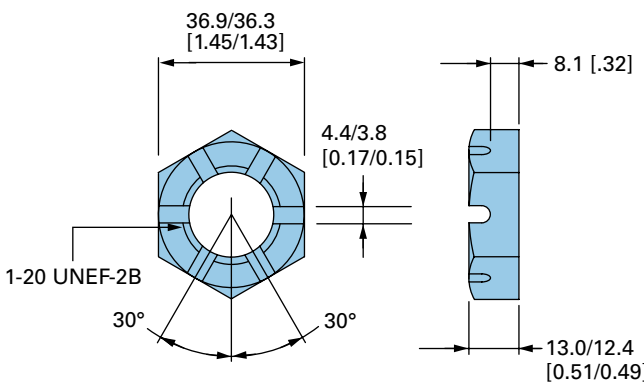
Tapered shaft hub data

Recommended torque:
(373 Nm [275 lb-ft] Dry)
(305 Nm [225 lb-ft] Lub)

Plus torque required to align the slotted nut with the Shaft Cross hole.



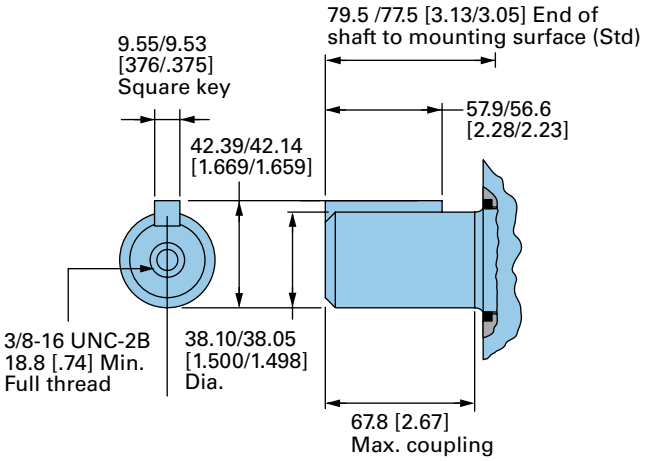
Tapered shaft hub data



Shafts

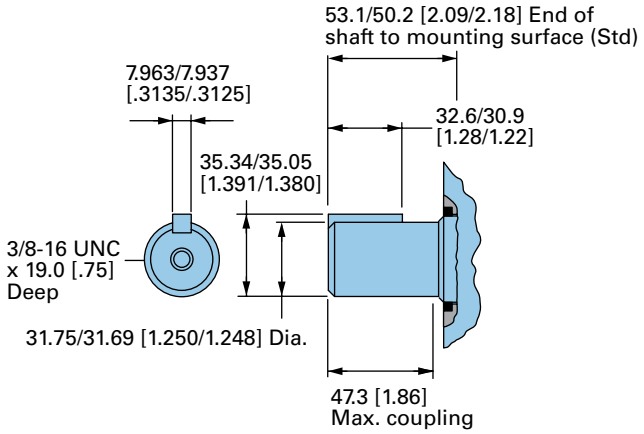
Code: 11 1-1/2 Inch straight

972 [8600] Max. torque Nm [lb-in]



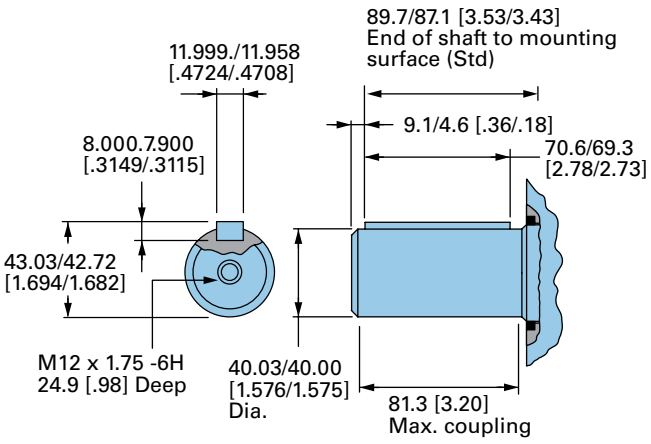
Code: 02 1-1/4 Inch straight

768 [6800] Max. torque Nm [lb-in]



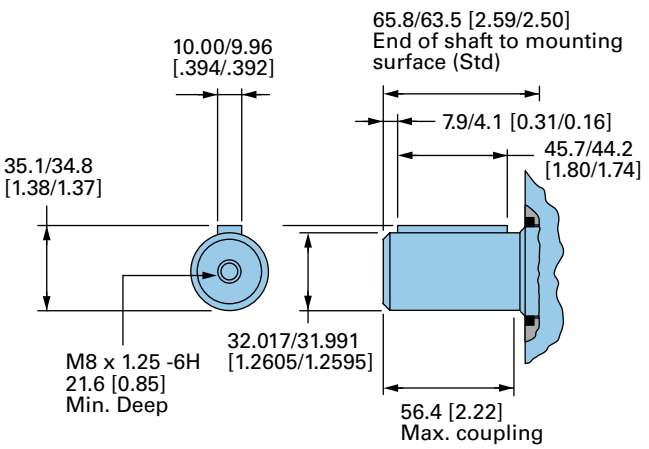
Code: 08 40 mm straight

972 [8600] Max. torque Nm [lb-in]



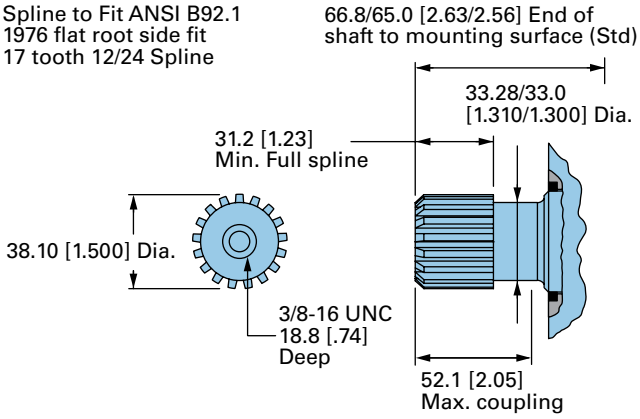
Code: 10 32 mm straight

768 [6800] Max. torque Nm [lb-in]



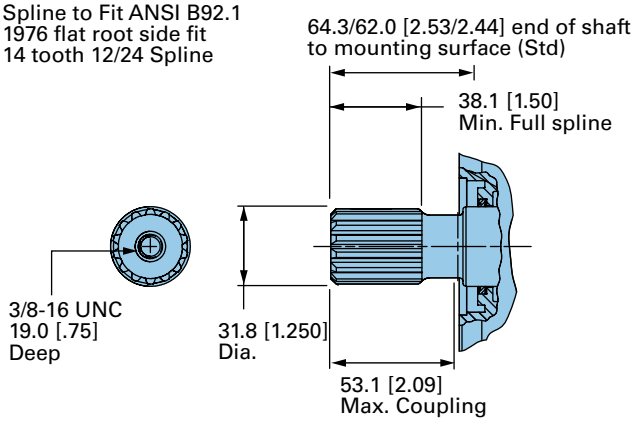
Code: 99 1-1/2 Inch 17 tooth straight

972 [8600] Max. torque Nm [lb-in]



Code: 06 1-1/4 Inch 14 tooth splined

768 [6800] Max. torque Nm [lb-in]



C-2

4000 Compact Series

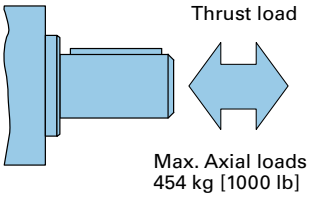
Shaft side load capacity

These curves indicate the radial load capacity on the motor shaft at various locations with an allowable external thrust load of 454 kg [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 B 10 bearing life (2000 Hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

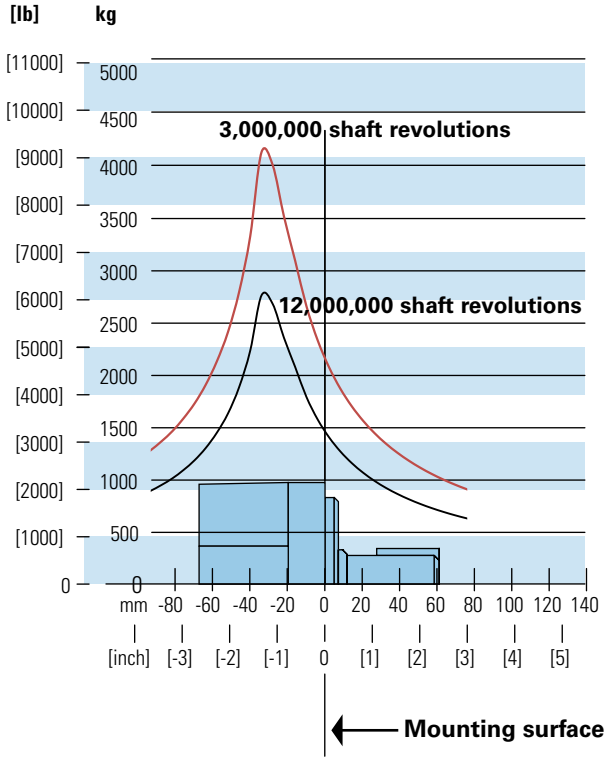
To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.



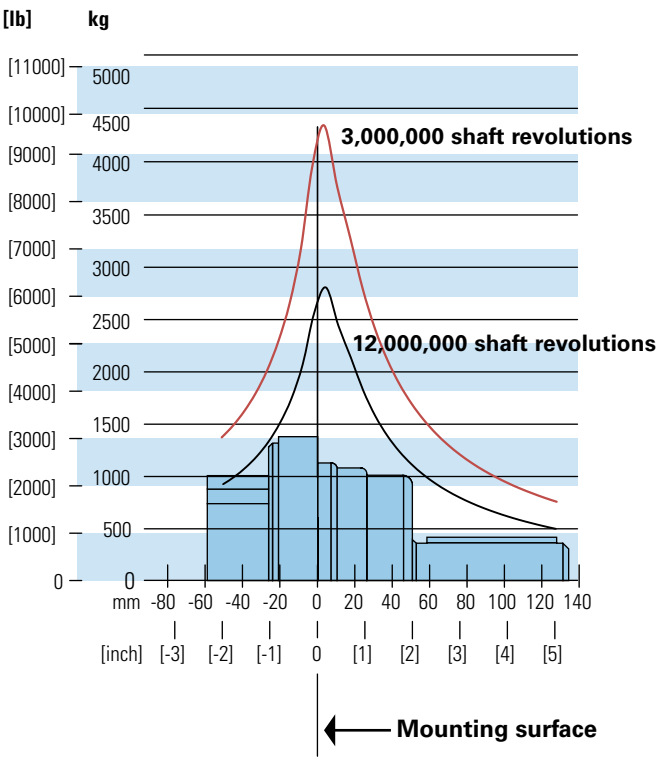
RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

C-2

Standard mount- all shaft options 1-1/4 inch and larger



Wheel mount- all shaft options 1-1/4 inch and larger



Char-Lynn 4000 Compact 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 charts.

Case porting advantage

Contamination control — flushing the motor case.

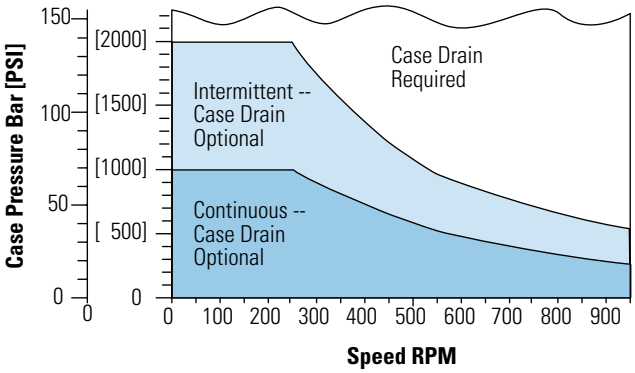
Cooler motor — exiting oil draws motor heat away.

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

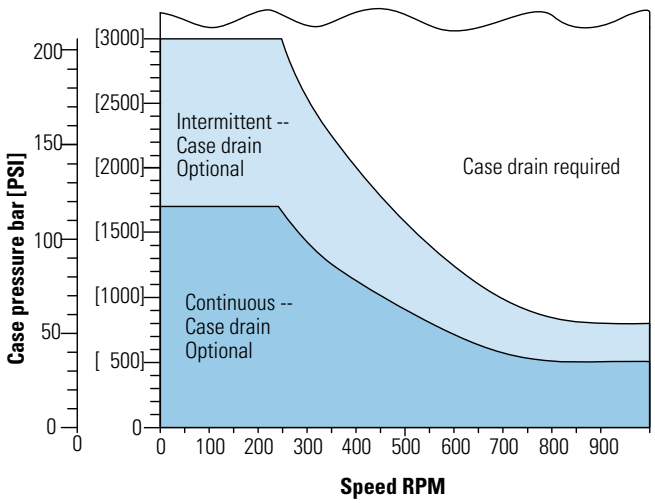
All shaft options 1-1/4 inch and smaller

Case pressure seal limitation

Standard shaft seal



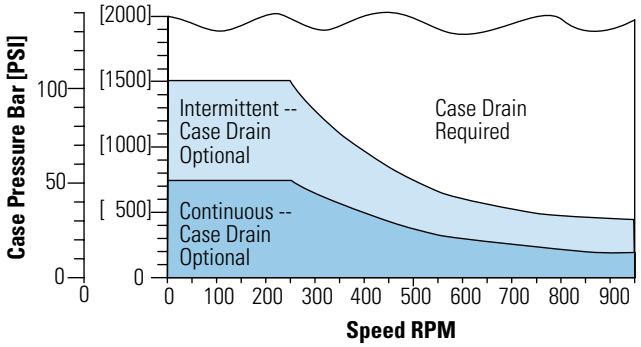
High Pressure Shaft seal



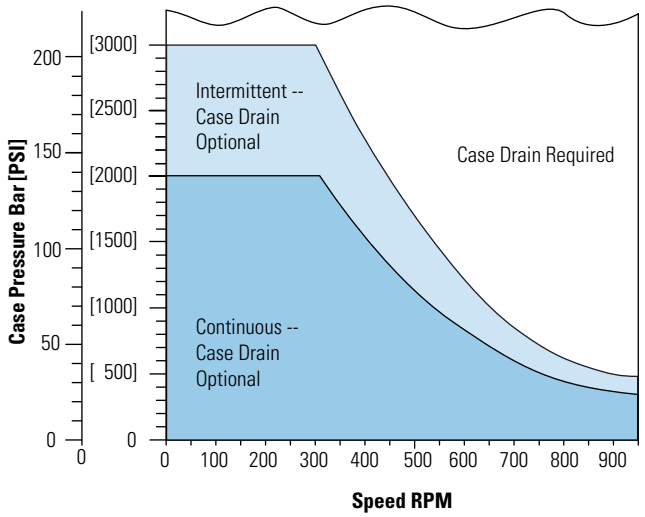
All shaft options larger than 1-1/4 inch.

Case pressure seal limitation

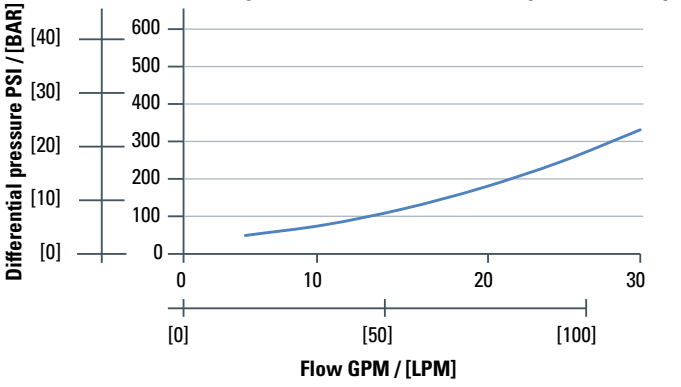
Standard shaft seal



High Pressure Shaft seal



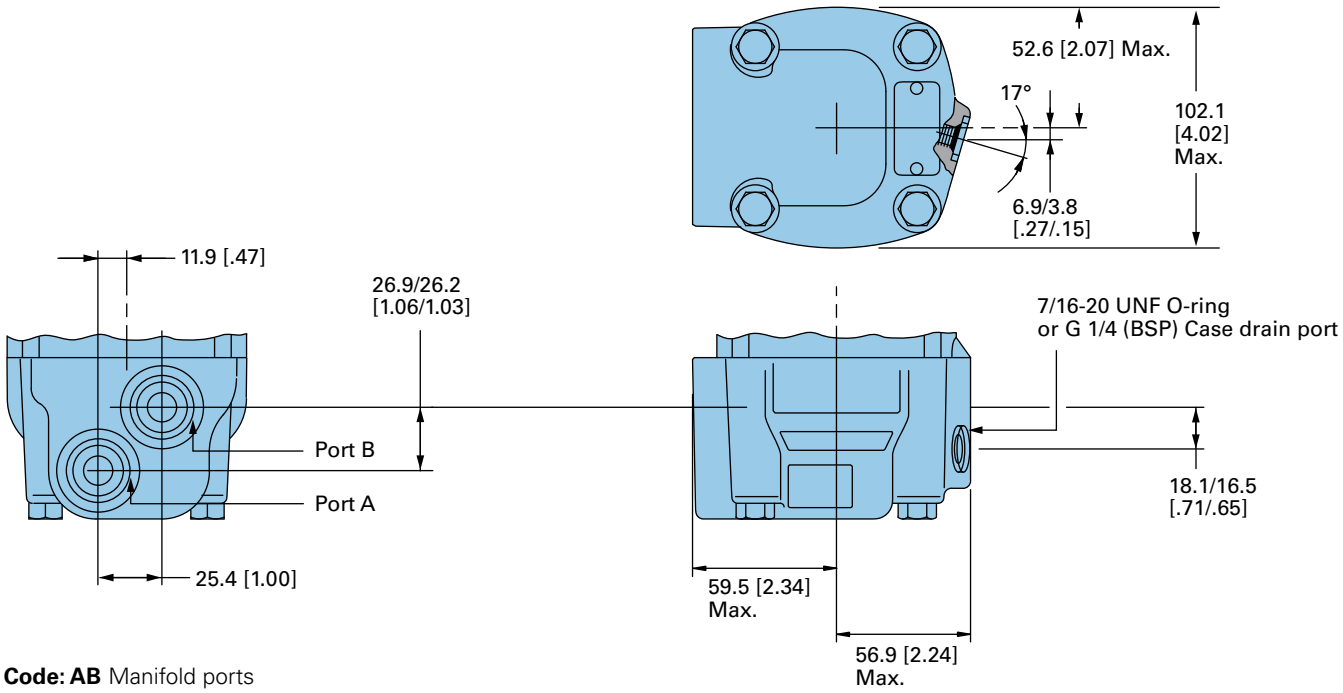
4000 compact series NLPD No load pressure drop



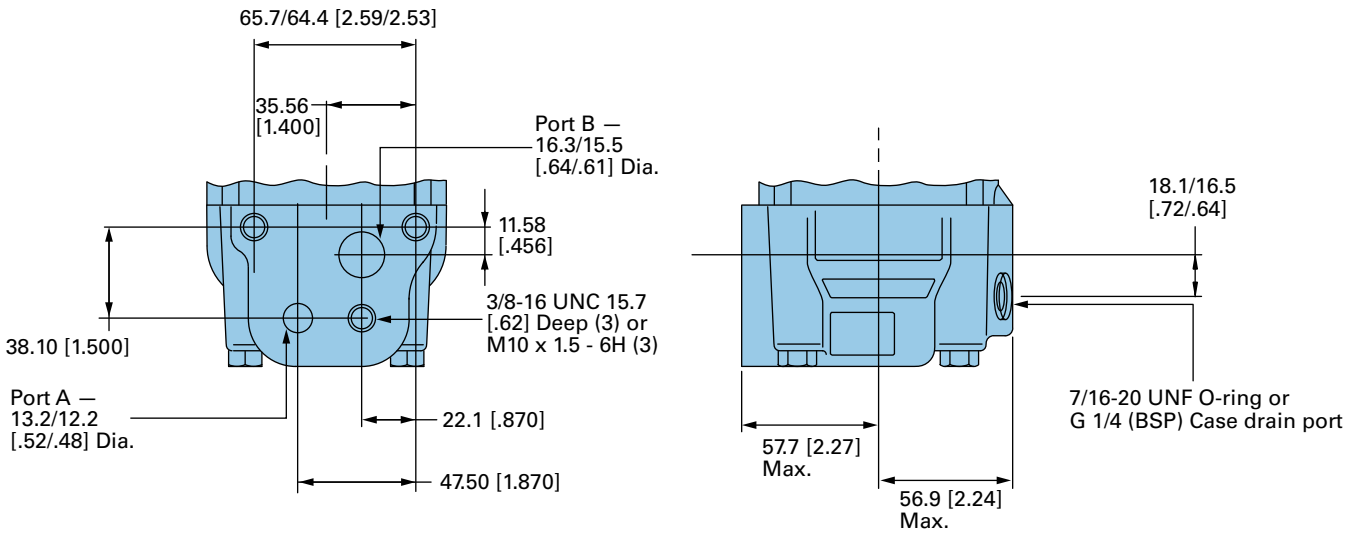
C-2

Ports

Code: AA Standard flange- Similar to SAE B type

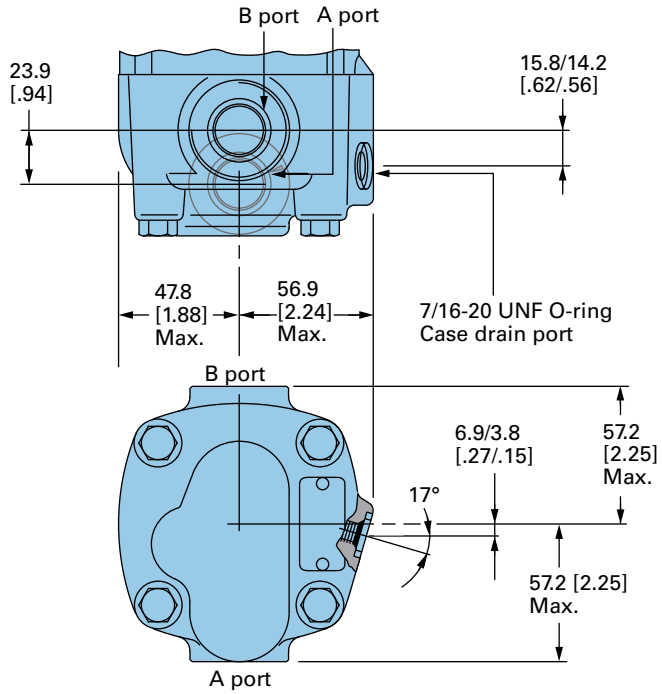


Code: AB Manifold ports

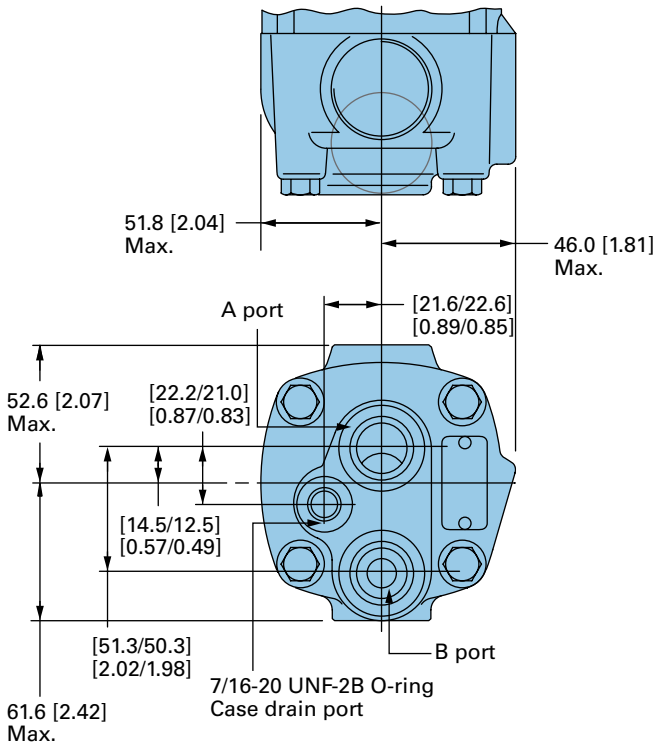


Ports

Code: AH 1-1/16-12 O-ring Ports Positioned 180 apart



Code: AD 7/8-14 O-ring end ports

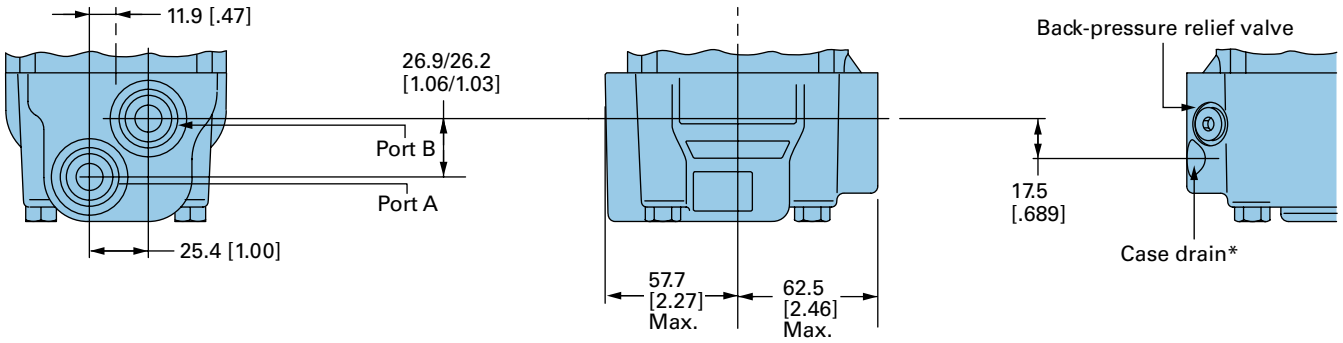


C-2

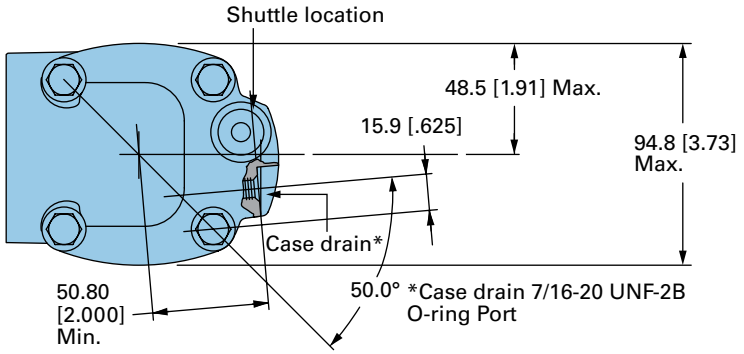
Ports with shuttle

7/8-14 O-ring ports (2)

G 1/2 (BSP) ports (2)

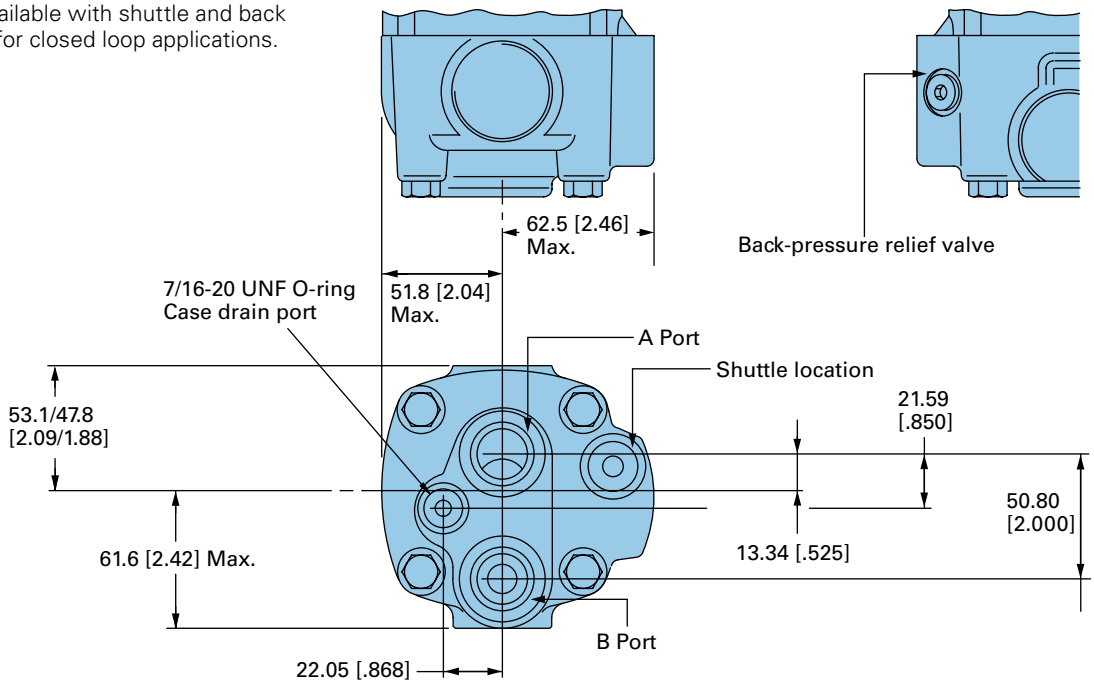


This port option is available with shuttle and back pressure relief valve for closed loop applications.



7/8-14 O-ring end ports (2)

This port option is available with shuttle and back pressure relief valve for closed loop applications.



The following 24-digit coding system has been developed to identify all of the configuration options for the 4000 Compact Series motor. Use this model code to specify a motor with the desired features. All 24 digits of the code must be present when ordering.

A D K	* *	* *	* *	* *	* *	*	0 0	* *	0 0	*	*	0	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

1 2 3 Product series

ADK 4000 Compact Series Motor

4 5 Displacement cm³/r [in³/r]

10 160 [9.8]
12 200 [12.3]
15 250 [15.4]
20 325 [19.8]
25 405 [24.6]
30 490 [29.8]

6 7 Mounting type

AB 4 Bolt (Wheel) 108,0 [4.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes on 147,6 [5.81] Dia. B.C. 127,0 [5.00] Dia. Rear Mount Pilot
AC 2 Bolt SAE A (Std.) 82,5 [3.25] pilot dia and 13,59 [.535] Dia. Mtg. Holes on 106,4 [4.19] Dia. B.C.
AF 2 Bolt SAE B (Std.) 101,6 [4.00] Pilot Dia. and 14,35 [.565] Dia. Mtg. Holes on 146,0 [5.75] Dia. B.C.
AH 4 Bolt (standard) 82,5 [3.25] pilot Dia. and 14,59 [.535] Dia. Mounting holes on 106,4 [4.19] Dia. B.C.
AJ 4 Bolt magneto (Std.) 82,6 [3.25] pilot Dia. and 13,59 [.535] dia. Mtg. Holes on 106,4 [4.19] Dia. B.C. 2,79 [.110] pilot length
AG 4 Bolt (wheel - short) 91.9 [3.62] pilot Dia. 14.35 [.565] Dia. Holes on 147.6 [5.81] Dia. Bolt circle with O-ring groove
BB* 4 Bolt (SAE B) (standard) 101,6 [4.00] Pilot Dia. and 14,7 [.58] Dia. Mounting slots on 127,0 [5.00] Dia. Bolt circle
BE* 4 Bolt (Wheel) 139,7 [5.50] front and rear pilot Dia. and 13,49 [.531] Dia. Mounting holes on 165,1 [6.50] Dia. Bolt circle

* These mounting options are available with shaft options 08, 11, 98 and 99.

8 9 Output shaft

00 None (Bearingless)
02 1 1/4 inch Dia. Straight with 3 /8 -16 thread in end, 7,938 [.3125] Sq. x 31,75 [1.250] straight Key
03 1 1/4 inch Dia. .125 : 1 Tapered shaft per SAE J501 with 1-20 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° involute spline with .375-16 UNC-2B Thread in End, 33.0 [1.30] minimum full spline length
06 1 1/4 inch Dia. Splined 14T with 38,1 [1.50] Min. Full spline length and 53,1 [2.09] Max. Coupling length
08 40 mm Dia. Straight (with straight key) M12 x 1,75 - 6H thread in end
10 32 mm dia. Straight (with Straight Key) M8 x 1,25 -6H Thread in end, and 56,4 [2.22] Max. Coupling Length
11 1 1/2 inch Dia. Straight (with Straight Key) 3 /8 -16 Thread in end
17 28.22 [1.111] Dia. Flat root side fit, 17 tooth, 16/32 DP 30° involute spline, 28.58 [1.125] Minimum full spline length
98 1 5/8 inch Dia. Tapered with straight key and 1 1/4 -18 UNEF slotted hex. Nut
99 1 1/2 inch Dia. Splined 17T with 31,2 [1.23] Min. Full spline length

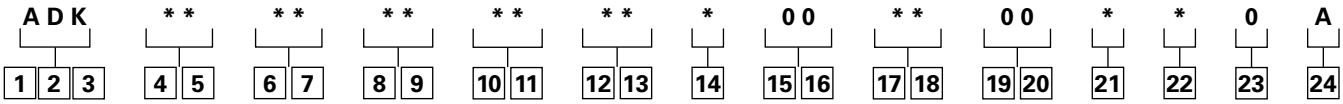
10 11 Ports

AA 7/8 -14 UNF –2B SAE O-ring (Staggered)
AB 12,70 [.500] and 15,88 [.625] Dia. Ports (Manifold) and 3x 3 /8 -16 UNC port block mounting holes
AD 7/8 -14 UNF –2B SAE O-ring (end ports)
AE 12,70 [.500] and 15,88 [.625] Dia. Ports (manifold) and 3 x M10 x 1,5-6H port block mounting holes
AG G 1/2 BSP straight thread ports (staggered)

C-2

4000 Compact Series

Model code



12 13 Case flow options

00	None
01	7/16 -20 UNF –2B SAE O-ring Port (Case Drain)
02	G 1/4 (BSP) Straight Thread Port (Case Drain)

14 Back-pressure relief valve

0	None
A	Set at 4,5 bar [65 PSI]

15 16 Valve options

00	None

17 18 Accessories

00	None
AA	Seal guard
AF	M12 threaded connector, (two 30 pulse per rev signals, Pin 1=Power, Pin 2=Output 1, Pin 3=Common, Pin 4=Output 2)
AG	M12 threaded connector, digital speed and direction pickup (one 60 pulse per rev speed signal and one directional signal (Pin 1=Power, Pin 2=Direction, Pin 3=Common, Pin 4=Speed)

19 20 Special features (hardware)

00	None

21 Special features (assembly)

0	None
A	Flange rotated 90°
B	Reverse rotation

22 Paint/ special packaging

0	No Paint, Individual Box
A	Low gloss black primer, individual box
S	Epoxy coated black, individual box

23 Eaton assigned code when applicable

0	None

24 Eaton assigned design code

A	First

See Eatonpowersource.com/ for more options and configurations.

Description

The Delta motor provides torques up to 11,500 in-lbs. Eaton has packed this motor with many "best in class" features: the optimized Geroler profile ensures smooth operation; the disc valve technology has the best performance and the bearing capacity is the highest in the industry for very demanding applications.

Delta series

Geroler element	13 Displacements
Flow l/min [GPM]	76 [20] Continuous**
	114 [30] Intermittent*
Speed RPM	668 Continuous**
	831 Intermittent*
Pressure bar [PSI]	207 [3000] Continuous**
	276 [4000] Intermittent*
Torque Nm [lb-in]	1039 [9199] Continuous**
	1253[11100] Intermittent*

** Continuous— (Cont.) Continuous rating, motor may be run continuously at these ratings.
* Intermittent— (Inter.) Intermittent operation, 10% of every minute.

Features:

- Excellent reliability with time proven Char-Lynn design
- Proven disc valve technology with high efficiencies
- Leak resistant motor with the front bearing protecting the shaft seal
- Torque up to 10,500 lb-in intermittent duty / Flow up to 30 GPM intermittent
- 12 displacements available from 6.9 to 46 CID
- Shaft sizes up to 1-5/8 inch
- 3-1/4 inch front pilot and 5 inch rear pilot

Benefits:

- Perfect replacement for Parker® TF-TG and White™ RE motors
- Torque of 4000 Series
- Lowest no load pressure drop which leads to longer life and lower temperature operation
- High overall efficiency: more available HP to the system than competitive motors
- High side load capacity with 4,500 lbs at 3" from the mount face

Applications:

- Scissor lift
- Boom lift
- Industrial sweeper
- Mower

C-3

Parker is a registered trademark of Parker Intangibles LLC.
White is a trademark of Danfoss.

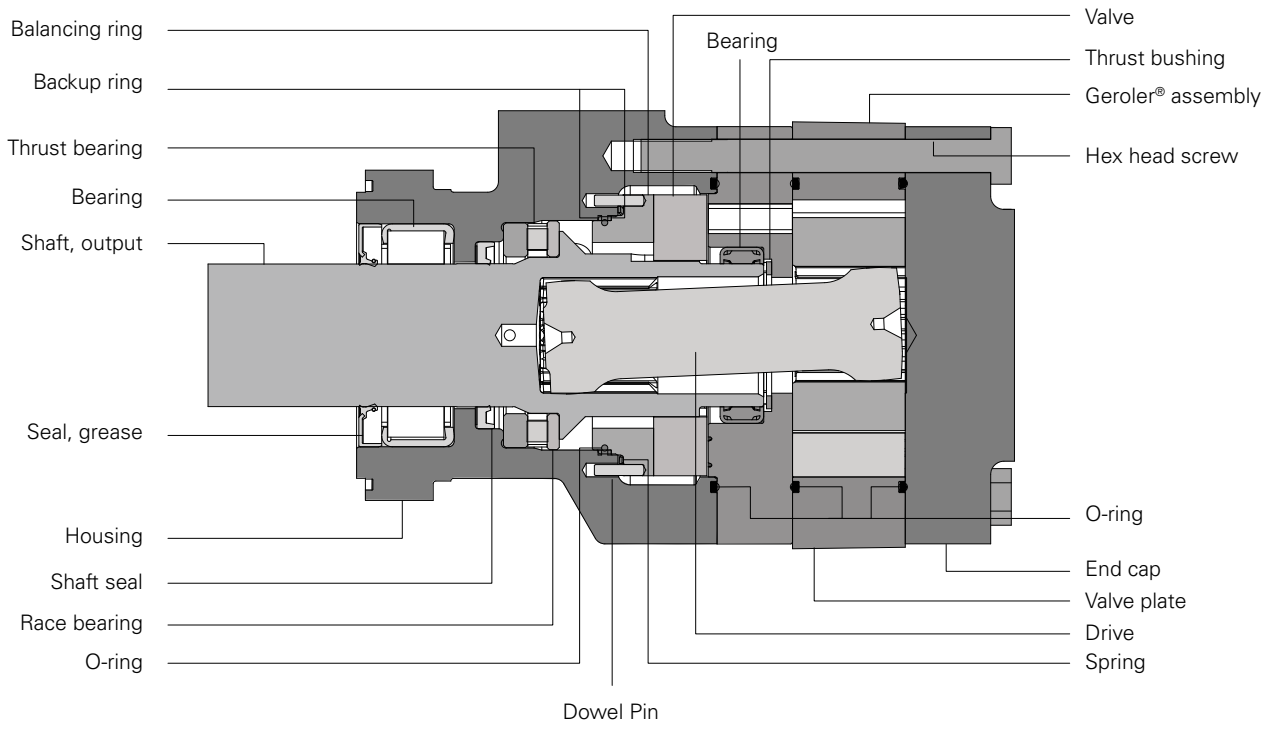
Boom lift

Sweeper

Mower

Delta Series

Specifications



C-3

Delta Series motors

Displ. cm³/r [in³/rev]		113 [6.9]	146 [8.9]	176 [10.7]	198 [12.1]	234 [14.3]	252 [15.4]	300 [18.3]	347 [21.2]	395 [24.1]	470 [28.7]	542 [33.1]	649 [39.6]	754 [46.0]
Max speed (RPM) @ Flow	Continuous	668	519	432	382	323	300	252	218	192	161	140	117	100
	Intermittent	831	778	615	516	485	450	379	327	288	241	209	175	151
Flow l/min [GPM]	Continuous	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Intermittent	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]
Torque* Nm [lb - in]	Continuous	320 [2834]	429 [3800]	500 [4427]	554 [4904]	651 [5763]	712 [6311]	844 [7472]	933 [8260]	972 [8607]	1039 [9199]	994 [8809]	1028 [9102]	985 [8721]
	Intermittent	417 [3697]	563 [4984]	658 [5822]	725 [6421]	852 [7543]	930 [8236]	1087 [9629]	1208 [10698]	1206 [10684]	1222 [10824]	1202 [10644]	1253 [11100]	1232 [10910]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	190 [2750]	170 [2500]	140 [2000]	120 [1750]	100 [1500]
	Intermittent	275 [4000]	275 [4000]	275 [4000]	275 [4000]	275 [4000]	275 [4000]	275 [4000]	275 [4000]	240 [3500]	205 [3000]	170 [2500]	155 [2250]	140 [2000]
Weight kg [lb]		12.7 [28.0]	12.9 [28.5]	13.5 [29.7]	13.8 30.5	14.3 [31.5]	15 [33.0]	15 [33.0]	15.4 [34.0]	16.1 [36.5]	16.8 [37.0]	17.5 [38.5]	18.4 [40.5]	19.1 [42.0]

*See shaft torque ratings for limitations.

Note: To assure best motor life, run motor in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

When pressurizing B port, all displacements have a continuous rating of 2000 psi.

Maximum inlet pressure:
310 bars (4500 PSI)
Do not exceed Δ pressure rating (see chart above).

Recommended fluids:
Premium quality, anti-wear type hydraulic coil with a viscosity of no 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

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
113 cm³/r [6.9 in³/r]

Flow LPM [GPM]

	[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
[2]	[204]	[450]	[686]	[915]	[1140]	[1355]	[1593]	[1814]	[2018]	[2197]	[2349]	[2573]	[2776]	[2975]	[3182]	[3362]
	23	51	77	103	129	153	180	205	228	248	265	290	313	336	359	380
7.6	65	64	63	62	60	60	59	57	56	55	56	54	52	48	49	44
[4]	[210]	[457]	[706]	[950]	[1194]	[1436]	[1677]	[1906]	[2129]	[2351]	[2571]	[2790]	[3010]	[3231]	[3454]	[3660]
	24	52	80	107	135	162	189	215	240	265	290	315	340	365	390	413
15	132	131	130	129	128	127	126	125	123	122	120	118	115	113	112	110
[6]	[196]	[445]	[696]	[942]	[1186]	[1432]	[1674]	[1914]	[2144]	[2367]	[2587]	[2805]	[3027]	[3252]	[3476]	[3695]
	22	50	79	106	134	162	189	216	242	267	292	317	342	367	392	417
23	199	196	196	195	193	192	191	190	189	185	183	182	180	177	174	172
[8]	[176]	[425]	[677]	[921]	[1168]	[1420]	[1666]	[1906]	[2152]	[2386]	[2616]	[2834]	[3051]	[3265]	[3481]	[3697]
	20	48	76	104	132	160	188	215	243	269	295	320	344	369	393	417
30	266	264	263	261	261	259	257	257	255	252	250	248	246	244	241	237
[10]	[160]	[407]	[659]	[901]	[1149]	[1398]	[1650]	[1894]	[2134]	[2370]	[2601]	[2823]	[3044]	[3258]	[3457]	[3654]
	18	46	74	102	130	158	186	214	241	268	294	319	344	368	390	413
38	333	333	329	326	324	323	321	320	318	314	312	309	306	303	301	295
[12]	[134]	[382]	[632]	[876]	[1122]	[1372]	[1621]	[1868]	[2111]	[2353]	[2589]	[2821]	[3046]	[3270]	[3479]	[3680]
	15	43	71	99	127	155	183	211	238	266	292	319	344	369	393	415
45	399	398	396	393	392	389	387	386	383	381	377	374	372	370	367	364
[14]	[111]	[357]	[608]	[855]	[1102]	[1350]	[1599]	[1847]	[2090]	[2330]	[2569]	[2800]	[3024]	[3250]	[3455]	[3614]
	13	40	69	97	124	152	181	208	236	263	290	316	341	367	390	408
53	466	465	462	460	457	455	453	451	449	446	442	438	436	433	429	415
[16]	[81]	[325]	[577]	[822]	[1071]	[1321]	[1572]	[1817]	[2063]	[2307]	[2549]	[2781]	[3011]	[3237]	[3436]	[3578]
	9	37	65	93	121	149	177	205	233	260	288	314	340	365	388	404
61	533	532	529	527	524	522	520	517	516	513	509	506	503	500	496	477
[18]	[48]	[295]	[543]	[790]	[1036]	[1283]	[1535]	[1781]	[2027]	[2271]	[2512]	[2751]	[2984]	[3214]	[3431]	[3597]
	5	33	61	89	117	145	173	201	229	256	284	311	337	363	387	406
68	601	600	597	593	591	587	586	583	581	577	573	570	568	564	559	542
[20]	[14]	[263]	[510]	[758]	[1005]	[1249]	[1499]	[1746]	[1988]	[2231]	[2474]	[2712]	[2945]	[3176]	[3395]	[3597]
	2	30	58	86	113	141	169	197	224	252	279	306	332	359	383	406
76	668	666	664	661	658	654	652	649	646	644	640	637	634	630	628	621
[22]		[228]	[477]	[725]	[972]	[1218]	[1468]	[1712]	[1957]	[2201]	[2447]	[2686]	[2917]	[3149]	[3350]	[3523]
		26	54	82	110	138	166	193	221	249	276	303	329	355	378	398
83		733	731	728	724	721	718	715	713	710	705	704	700	697	688	664
[25]		[170]	[416]	[663]	[913]	[1153]	[1402]	[1646]	[1891]	[2136]	[2382]	[2622]	[2856]	[3081]	[3273]	[3452]
		19	47	75	103	130	158	186	214	241	269	296	322	348	369	390
95		831	829	827	825	821	818	815	812	809	805	803	800	794	776	745
[30]		[114]	[429]	[755]	[1076]	[1400]	[1725]	[2047]	[2368]	[2687]	[3003]	[3323]	[3635]	[3942]	[4249]	[4552]
		13	48	85	122	158	195	231	267	303	339	375	410	445	480	514
114		778	777	773	770	765	759	756	753	749	746	744	742	740	737	735

114 } Torque [lb-in]
13 } Nm
778 Speed RPM

C-3

Delta Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
146 cm³/r [8.9 in³/r]

Flow LPM [GPM]

	[17] 250	[34] 500	[52] 750	[69] 1000	[86] 1250	[103] 1500	[121] 1750	[138] 2000	[155] 2250	[172] 2500	[190] 2750	[207] 3000	[224] 3250	[241] 3500	[259] 3750	[276] 4000
[2]	[288]	[596]	[907]	[1184]	[1445]	[1718]	[1992]	[2247]	[2537]	[2810]	[3039]	[3290]	[3595]	[3846]	[3996]	[4265]
	32	67	102	134	163	194	225	254	286	317	343	371	406	434	451	482
7.6	50	48	46	42	44	43	40	39	38	37	36	34	32	31	25	28
[4]	[289]	[619]	[947]	[1267]	[1593]	[1914]	[2227]	[2482]	[2755]	[3042]	[3295]	[3615]	[3916]	[4135]	[4456]	[4680]
	33	70	107	143	180	216	251	280	311	343	372	408	442	467	503	528
15	102	100	98	96	95	95	94	93	91	88	84	81	79	76	74	70
[6]	[275]	[604]	[934]	[1259]	[1588]	[1908]	[2232]	[2552]	[2869]	[3181]	[3497]	[3800]	[4102]	[4397]	[4680]	[4955]
	31	68	105	142	179	215	252	288	324	359	395	429	463	496	528	559
23	154	151	149	148	146	145	144	143	141	137	135	133	130	128	125	123
[8]	[256]	[580]	[909]	[1235]	[1566]	[1887]	[2209]	[2528]	[2845]	[3160]	[3475]	[3783]	[4091]	[4397]	[4692]	[4984]
	29	66	103	139	177	213	249	285	321	357	392	427	462	496	530	563
30	206	204	201	200	198	198	196	195	190	187	185	182	179	179	176	173
[10]	[227]	[553]	[879]	[1204]	[1535]	[1861]	[2184]	[2504]	[2820]	[3133]	[3447]	[3757]	[4061]	[4369]	[4667]	[4963]
	26	62	99	136	173	210	247	283	318	354	389	424	459	493	527	560
38	258	256	253	251	250	249	248	246	241	238	236	233	231	229	228	225
[12]	[199]	[521]	[850]	[1172]	[1501]	[1825]	[2148]	[2469]	[2780]	[3091]	[3402]	[3714]	[4017]	[4324]	[4627]	[4922]
	23	59	96	132	170	206	243	279	314	349	384	419	454	488	522	556
45	310	308	305	303	301	300	299	297	292	290	287	284	282	281	278	276
[14]	[157]	[480]	[809]	[1130]	[1458]	[1784]	[2104]	[2426]	[2743]	[3057]	[3369]	[3679]	[3983]	[4291]	[4593]	[4892]
	18	54	91	128	165	201	238	274	310	345	380	415	450	484	519	552
53	362	360	356	354	353	352	351	346	344	341	339	337	335	332	331	329
[16]	[132]	[457]	[780]	[1102]	[1429]	[1753]	[2081]	[2397]	[2714]	[3025]	[3335]	[3645]	[3947]	[4255]	[4558]	[4857]
	15	52	88	124	161	198	235	271	306	342	377	412	446	480	515	548
61	414	412	408	406	405	403	402	398	395	392	389	387	384	382	380	377
[18]	[98]	[414]	[742]	[1065]	[1390]	[1715]	[2039]	[2360]	[2675]	[2986]	[3295]	[3605]	[3906]	[4213]	[4518]	[4817]
	11	47	84	120	157	194	230	266	302	337	372	407	441	476	510	544
68	467	465	461	459	457	456	453	450	447	444	442	439	437	435	432	430
[20]	[42]	[373]	[700]	[1020]	[1347]	[1670]	[1989]	[2308]	[2628]	[2944]	[3255]	[3568]	[3866]	[4172]	[4475]	[4774]
	5	42	79	115	152	189	225	261	297	332	368	403	436	471	505	539
76	519	517	514	511	509	507	503	500	498	495	492	489	488	485	484	482
[22]	[16]	[328]	[659]	[978]	[1306]	[1628]	[1950]	[2268]	[2586]	[2900]	[3211]	[3522]	[3823]	[4128]	[4429]	[4732]
	2	37	74	110	147	184	220	256	292	327	362	398	432	466	500	534
83	571	569	565	562	559	559	555	552	549	546	544	541	538	536	534	531
[25]		[253]	[576]	[899]	[1221]	[1544]	[1864]	[2179]	[2500]	[2811]	[3120]	[3433]	[3736]	[4036]	[4337]	[4639]
		29	65	102	138	174	210	246	282	317	352	388	422	456	490	524
95		647	645	641	639	637	633	629	626	624	621	618	616	613	612	609
[30]		[114]	[429]	[755]	[1076]	[1400]	[1725]	[2047]	[2368]	[2687]	[3003]	[3323]	[3635]	[3942]	[4249]	[4552]
		13	48	85	122	158	195	231	267	303	339	375	410	445	480	514
114		778	777	773	770	765	759	756	753	749	746	744	742	740	737	735

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Delta Pressure bar [PSI]
176cm³/r[10.7 in³/r]

Flow LPM [GPM]

	[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
[2]	[311]	[682]	[1037]	[1366]	[1695]	[2027]	[2027]	[2703]	[3049]	[3379]	[3679]	[3987]	[4317]	[4609]	[4837]	[5194]
	35	77	117	154	192	229	229	305	344	382	416	450	488	521	547	587
7.6	41	40	38	36	36	35	35	32	31	30	28	27	25	23	20	22
[4]	[336]	[730]	[1112]	[1487]	[1859]	[2228]	[2596]	[2922]	[3258]	[3602]	[3926]	[4286]	[4637]	[4938]	[5295]	[5588]
	38	82	126	168	210	252	293	330	368	407	444	484	524	558	598	631
15	85	83	81	80	79	78	77	75	74	72	69	66	65	63	61	59
[6]	[326]	[717]	[1106]	[1488]	[1868]	[2240]	[2614]	[2980]	[3345]	[3706]	[4068]	[4421]	[4772]	[5118]	[5455]	[5785]
	37	81	125	168	211	253	295	337	378	419	460	500	539	578	616	654
23	127	126	125	123	121	120	119	117	115	113	111	109	106	106	103	102
[8]	[305]	[694]	[1085]	[1471]	[1856]	[2232]	[2609]	[2979]	3347]	[3709]	[4071]	[4425]	[4775]	[5122]	5463	[5803]
	35	78	123	166	210	252	295	337	378	419	460	500	539	579	617	656
30	171	169	168	166	165	164	162	161	158	156	154	152	150	148	146	144
[10]	[278]	[668]	[1059]	[1446]	[1835]	[2217]	[2597]	[2971]	[3342]	[3707]	[4069]	[4427]	[4780]	[5134]	[5480]	[5822]
	31	75	120	163	201	250	293	336	378	419	460	500	540	580	619	658
38	214	213	211	209	208	206	205	203	200	198	196	194	192	190	188	186
[12]	[245]	[631]	[1023]	[1408]	[1796]	[2179]	[2559]	[2934]	[3303]	[3669]	[4031]	[4392]	[4743]	[5095]	[5441]	[5782]
	28	71	116	159	203	246	289	331	373	415	455	496	536	576	615	653
45	258	256	255	253	252	250	249	247	244	242	239	237	235	234	231	229
[14]	[200]	[585]	[977]	[1359]	[1748]	[2132]	[2510]	[2886]	[3160]	[3628]	[3993]	[4354]	[4707]	[5061]	[5406]	[5751]
	23	66	110	154	197	241	284	326	368	410	451	492	532	572	611	650
53	302	300	297	296	295	293	291	288	286	284	281	279	277	275	274	271
[16]	[164]	[551]	[939]	[1323]	[1709]	[2091]	[2475]	[2848]	[3221]	[3588]	[3952]	[4314]	[4668]	[5023]	[5370]	[5712]
	19	62	106	149	193	236	280	322	364	405	446	487	527	568	607	645
61	345	343	341	339	338	336	335	332	330	328	325	323	321	319	317	315
[18]	[120]	[500]	[891]	[1276]	[1663]	[2048]	[2428]	[2804]	[3176]	[3544]	[3908]	[4271]	[4615]	[4961]	[5312]	[5658]
	14	56	101	144	188	231	274	317	359	400	442	483	521	561	600	639
68	388	386	384	382	380	379	377	374	372	370	368	366	364	362	360	358
[20]	[69]	[426]	[812]	[1195]	[1581]	[1962]	[2341]	[2717]	[3091]	[3460]	[3825]	[4188]	[4543]	[4904]	[5262]	[5615]
	8	48	92	135	179	222	264	307	349	391	432	473	513	554	594	634
76	432	430	427	425	424	422	419	417	414	412	409	406	405	403	401	399
[22]	[16]	[366]	[754]	[1138]	[1526]	[1906]	[2286]	[2663]	[3036]	[3405]	[3770]	[4133]	[4488]	[4842]	[5193]	[5539]
	2	41	85	129	172	215	258	301	343	385	426	467	507	547	587	626
83	475	473	471	469	466	465	462	460	457	455	453	450	448	446	444	442
[25]		[273]	[656]	[1040]	[1423]	[1806]	[2185]	[2558]	[2931]	[3299]	[3662]	[4028]	[4387]	[4738]	[5090]	[5438]
		31	74	118	161	204	247	289	331	373	414	455	496	535	575	614
95		538	537	535	533	531	528	525	523	521	519	517	515	513	511	508
[30]		[141]	[523]	[912]	[1299]	[1683]	[2061]	[2435]	[2809]	[3179]	[3544]	[3915]	[4280]	[4636]	[4993]	[5345]
		16	59	103	147	190	233	275	317	359	400	442	484	524	564	604
114		615	609	601	595	592	592	594	596	597	599	600	600	600	598	596

C-3

Delta Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
198 cm³/r [12.1 in³/r]

Flow LPM [GPM]

	[17] 250	[34] 500	[52] 750	[69] 1000	[86] 1250	[103] 1500	[121] 1750	[138] 2000	[155] 2250	[172] 2500	[190] 2750	[207] 3000	[224] 3250	[241] 3500	[259] 3750	[276] 4000
[2]	[313]	[732]	[1113]	[1480]	[1870]	[2249]	[2668]	[3059]	[3447]	[3822]	[4189]	[4544]	[4875]	[5194]	[5508]	[5948]
	35	83	126	167	211	254	301	345	389	432	473	513	550	586	622	671
7.6	36	35	34	32	31	30	29	27	27	26	24	22	21	18	17	18
[4]	[367]	[809]	[1228]	[1640]	[2038]	[2437]	[2844]	[3234]	[3623]	[4010]	[4398]	[4779]	[5164]	[5545]	[5917]	[6275]
	41	91	139	185	230	275	321	365	409	453	497	540	583	626	668	708
15	75	74	72	71	69	68	67	65	63	62	61	58	56	56	54	52
[6]	[365]	[799]	[1231]	[1654]	[2066]	[2473]	[2878]	[3270]	[3665]	[4056]	[4446]	[4833]	[5215]	[5598]	[5975]	[6347]
	41	90	139	187	233	279	325	369	414	458	502	546	589	632	675	717
23	112	111	110	109	107	106	104	102	101	99	98	96	95	93	91	89
[8]	[343]	[782]	[1219]	[1648]	[2069]	[2484]	[2898]	[3300]	[3702]	[4093]	[4482]	[4865]	[5237]	[5607]	[5976]	[6349]
	39	88	138	186	234	280	327	373	418	462	506	549	591	633	675	717
30	151	150	149	147	146	145	143	142	140	138	135	134	133	131	129	127
[10]	[322]	[759]	[1201]	[1633]	[2063]	[2483]	[2904]	[3316]	[3726]	[4125]	[4515]	[4904]	[5290]	[5672]	[6048]	[6421]
	36	86	136	184	233	280	328	374	421	466	510	554	597	640	683	725
38	190	188	187	186	185	182	181	178	177	174	173	171	169	168	166	164
[12]	[283]	[719]	[1158]	[1590]	[2020]	[2448]	[2868]	[3279]	[3691]	[4096]	[4492]	[4883]	[5265]	[5644]	[6015]	[6385]
	32	81	131	180	228	276	324	370	417	462	507	551	594	637	679	721
45	229	227	226	224	223	221	220	218	216	215	212	211	209	206	205	202
[14]	[238]	[671]	[1110]	[1538]	[1970]	[2396]	[2816]	[3228]	[3644]	[4050]	[4451]	[4846]	[5231]	[5613]	[5982]	[6357]
	27	76	125	174	222	271	318	364	411	457	503	547	591	634	675	718
53	267	266	264	262	261	259	257	255	253	251	249	246	244	242	240	238
[16]	[191]	[625]	[1063]	[1493]	[1923]	[2345]	[2768]	[3182]	[3596]	[4003]	[4403]	[4801]	[5191]	[5576]	[5947]	[6316]
	22	71	170	169	217	265	312	359	406	452	497	542	586	630	671	713
61	305	304	303	301	300	298	296	295	293	291	289	287	285	284	281	279
[18]	[139]	[567]	[1006]	[1438]	[1871]	[2299]	[2720]	[3133]	[3547]	[3956]	[4359]	[4760]	[5128]	[5492]	[5871]	[6247]
	16	64	114	162	211	260	307	354	400	447	492	537	579	620	663	705
68	342	341	340	339	337	335	333	331	330	328	326	324	322	321	319	317
[20]	[99]	[457]	[886]	[1315]	[1745]	[2168]	[2590]	[3006]	[3418]	[3822]	[4224]	[4622]	[5018]	[5418]	[5816]	[6208]
	11	52	100	148	197	245	292	339	386	432	477	522	567	612	657	701
76	382	380	378	377	375	373	371	369	366	364	362	359	358	356	354	352
[22]	[15]	[383]	[810]	[1243]	[1676]	[2096]	[2520]	[2938]	[3351]	[3759]	[4161]	[4558]	[4953]	[5339]	[5722]	[6095]
	2	43	91	140	189	237	284	332	378	424	470	515	559	603	646	688
83	420	417	416	415	413	411	409	407	405	403	401	399	397	395	392	390
[25]		[272]	[700]	[1131]	[1559]	[1985]	[2408]	[2823]	[3231]	[3639]	[4042]	[4443]	[4842]	[5229]	[5617]	[5992]
		31	79	128	176	224	272	319	365	411	456	502	547	590	634	677
95		476	475	474	472	470	468	466	465	463	461	459	457	455	453	450
[30]		[163]	[600]	[1037]	[1474]	[1902]	[2315]	[2723]	[3134]	[3536]	[3933]	[4338]	[4737]	[5125]	[5516]	[5899]
		18	68	117	166	215	261	307	354	399	444	490	535	579	623	666
114		516	506	494	487	484	488	494	501	506	511	514	515	516	515	514

163 } Torque [lb-in]
18 } Nm
516 } Speed RPM

C-3

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
234 cm³/r [14.3 in³/r]

Flow LPM [GPM]

	[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
[2]	[470]	[971]	[1457]	[1921]	[2414]	[2877]	[3348]	[3821]	[4275]	[4730]	[5164]	[5630]	[5997]	[6446]	[6863]	[7217]
	53	110	164	217	273	325	378	431	483	534	583	636	677	728	775	815
7.6	31	30	29	28	26	25	25	25	24	23	22	21	19	20	19	15
[4]	[468]	[988]	[1504]	[1989]	[2482]	[2964]	[3447]	[3916]	[4384]	[4843]	[5302]	[5763]	[6213]	[6668]	[7113]	[7543]
	53	112	170	225	280	335	389	442	495	547	599	651	701	753	803	852
15	64	62	61	60	59	58	57	56	56	55	55	54	52	51	50	48
[6]	[449]	[966]	[1484]	[1980]	[2470]	[2953]	[3445]	[3922]	[4397]	[4851]	[5304]	[5750]	[6197]	[6643]	[7085]	[7524]
	51	109	168	224	279	333	389	443	496	548	599	649	700	750	800	849
23	96	95	93	92	92	91	90	89	88	88	88	87	86	86	84	83
[8]	[416]	[931]	[1446]	[1954]	[2458]	[2948]	[3438]	[3909]	[4381]	[4835]	[5280]	[5714]	[6150]	[6584]	[7015]	[7445]
	47	105	163	221	277	333	388	441	495	546	596	645	694	743	792	841
30	129	128	126	125	124	123	123	121	121	120	120	119	119	118	117	116
[10]	[380]	[896]	[1410]	[1917]	[2425]	[2919]	[3412]	[3890]	[4373]	[4831]	[5280]	[5716]	[6148]	[6586]	[7017]	[7452]
	43	101	159	216	274	330	385	439	494	545	596	645	694	744	792	841
38	161	160	158	157	156	155	154	153	153	152	151	150	149	148	147	146
[12]	[341]	[856]	[1366]	[1876]	[2384]	[2880]	[3370]	[3843]	[4319]	[4782]	[5229]	[5665]	[6102]	[6537]	[6962]	[7392]
	39	97	154	212	269	325	380	434	488	540	590	640	689	738	786	835
45	194	193	191	190	189	188	187	186	185	185	184	183	182	181	180	178
[14]	[290]	[804]	[1312]	[1813]	[2320]	[2821]	[3315]	[3793]	[4268]	[4732]	[5181]	[5623]	[6057]	[6485]	[6907]	[7327]
	33	91	148	205	262	318	374	428	482	534	585	635	684	732	780	827
53	226	225	224	222	221	220	219	218	217	216	216	215	214	212	211	209
[16]	[239]	[743]	[1249]	[1756]	[2264]	[2759]	[3255]	[3735]	[4207]	[4669]	[5122]	[5568]	[6004]	[6432]	[6845]	[7268]
	27	84	141	198	256	312	367	422	475	527	578	629	678	726	773	820
61	258	258	257	255	254	253	252	251	251	250	249	247	246	245	244	242
[18]	[176]	[688]	[1187]	[1694]	[2203]	[2698]	[3195]	[3676]	[4146]	[4603]	[5055]	[5497]	[5930]	[6358]	[6774]	[7194]
	20	78	134	191	249	305	361	415	468	520	571	621	669	718	765	812
68	291	291	289	287	286	285	284	283	282	281	279	278	277	276	276	275
[20]	[108]	[614]	[1121]	[1623]	[2124]	[2620]	[3118]	[3603]	[4077]	[4541]	[4990]	[5430]	[5865]	[6301]	[6720]	[7139]
	12	69	127	183	240	296	352	407	460	513	563	613	662	711	759	806
76	323	323	322	320	319	317	317	316	314	312	311	310	310	310	309	309
[22]	[28]	[535]	[1081]	[1582]	[2082]	[2579]	[3071]	[3550]	[4018]	[4483]	[4943]	[5406]	[5855]	[6300]	[6723]	[7139]
	3	60	122	179	235	291	347	401	454	506	558	610	661	711	759	806
83	355	355	355	352	351	350	349	348	345	343	342	341	341	341	341	341
[25]		[410]	[956]	[1460]	[1959]	[2454]	[2941]	[3419]	[3892]	[4356]	[4806]	[5251]	[5683]	[6117]	[6531]	[6939]
		46	108	165	221	277	332	386	439	492	543	593	642	691	737	783
95		404	404	402	401	399	398	397	394	392	391	390	390	389	390	389
[30]		[171]	[700]	[1297]	[1735]	[2226]	[2718]	[3204]	[3689]	[4162]	[4623]	[5079]	[5519]	[5959]	[6377]	[6781]
		19	79	146	196	251	307	362	417	470	522	573	623	673	720	766
114		485	485	485	483	481	480	478	476	474	472	472	471	471	471	471

C-3

Delta Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
252 cm³/r [15.4 in³/r]

Flow LPM [GPM]	[17] 250	[34] 500	[52] 750	[69] 1000	[86] 1250	[103] 1500	[121] 1750	[138] 2000	[155] 2250	[172] 2500	[190] 2750	[207] 3000	[224] 3250	[241] 3500	[259] 3750	[276] 4000
[2]	[485]	[1011]	[1520]	[2032]	[2564]	[3059]	[3569]	[4065]	[4561]	[5085]	[5589]	[6054]	[6536]	[6891]	[7388]	[7872]
	55	114	172	229	289	345	403	459	515	574	631	683	738	778	834	889
7.6	28	27	26	26	25	24	23	23	22	23	23	22	22	19	19	20
[4]	[504]	[1062]	[1609]	[2145]	[2684]	[3213]	[3744]	[4263]	[4780]	[5294]	[5804]	[6311]	[6811]	[7308]	[7787]	[8236]
	57	120	182	242	303	363	423	481	540	598	655	712	769	825	879	930
15	59	57	56	56	55	55	54	54	53	53	53	51	51	49	49	47
[6]	[478]	[1031]	[1585]	[2132]	[2670]	[3195]	[3717]	[4222]	[4726]	[5222]	[5721]	[6211]	[6700]	[7179]	[7658]	[8118]
	54	116	179	241	301	361	420	477	534	590	646	701	756	810	865	917
23	89	88	86	85	85	84	84	84	84	84	83	82	82	80	78	78
[8]	[453]	[1012]	[1571]	[2115]	[2664]	[3191]	[3717]	[4224]	[4725]	[5215]	[5706]	[6194]	[6678]	[7161]	[7628]	[8076]
	51	114	177	239	301	360	420	477	533	589	644	699	754	808	861	912
30	120	118	117	115	114	113	113	112	113	113	113	112	111	110	109	108
[10]	[398]	[957]	[1516]	[2063]	[2609]	[3137]	[3668]	[4181]	[4678]	[5157]	[5636]	[6116]	[6589]	[7059]	[7522]	[7974]
	45	108	171	233	295	354	414	472	528	582	636	690	744	797	849	900
38	149	148	147	145	144	143	142	142	142	143	142	142	141	140	139	138
[12]	[370]	[914]	[1468]	[2011]	[2557]	[3085]	[3614]	[4125]	[4622]	[5102]	[5577]	[6059]	[6538]	[7017]	[7497]	[7966]
	42	103	166	227	289	348	408	466	522	576	630	684	738	792	846	899
45	180	179	178	176	174	173	172	172	172	172	172	172	171	171	170	169
[14]	[290]	[842]	[1399]	[1948]	[2496]	[3024]	[3552]	[4065]	[4571]	[5056]	[5525]	[5987]	[6445]	[6905]	[7359]	[7813]
	33	95	158	220	282	341	401	459	516	571	624	676	728	780	831	882
53	210	209	208	206	205	203	202	201	200	199	199	200	200	200	200	199
[16]	[239]	[795]	[1346]	[1891]	[2434]	[2962]	[3494]	[4003]	[4511]	[4995]	[5461]	[5919]	[6382]	[6841]	[7292]	[7743]
	27	90	152	213	275	334	395	452	509	564	616	668	720	772	823	874
61	240	240	238	237	235	233	232	231	229	228	229	230	230	230	230	230
[18]	[157]	[716]	[1265]	[1810]	[2355]	[2881]	[3408]	[3921]	[4431]	[4924]	[5401]	[5860]	[6310]	[6749]	[7184]	[7627]
	18	81	143	204	266	325	385	443	500	556	610	662	712	762	811	861
68	270	270	269	267	265	264	261	261	258	256	256	258	259	260	260	260
[20]	[96]	[650]	[1203]	[1750]	[2294]	[2820]	[3345]	[3857]	[4366]	[4865]	[5340]	[5801]	[6242]	[6686]	[7122]	[7553]
	11	73	136	198	259	318	378	435	493	549	603	655	705	755	804	853
76	300	300	299	297	295	293	292	289	287	286	286	287	289	290	291	290
[22]	[26]	[569]	[1111]	[1656]	[2195]	[2725]	[3250]	[3763]	[4268]	[4769]	[5259]	[5733]	[6182]	[6609]	[7030]	[7459]
	3	64	125	187	248	308	367	425	482	538	594	647	698	746	794	842
83	330	330	330	328	327	324	322	320	316	314	313	314	316	318	320	320
[25]		[425]	[967]	[1508]	[2042]	[2574]	[3093]	[3605]	[4110]	[4602]	[5084]	[5561]	[6028]	[6482]	[6899]	[7316]
		48	109	170	231	291	349	407	464	520	574	628	681	732	779	826
95		375	375	374	372	369	366	364	361	358	357	356	358	361	364	364
[30]		[179]	[723]	[1266]	[1800]	[2330]	[2852]	[3364]	[3868]	[4368]	[4856]	[5338]	[5811]	[6269]	[6701]	[7096]
		20	82	143	203	263	322	380	437	493	548	603	656	708	757	801
114		450	450	450	449	447	443	439	436	433	430	430	431	434	437	438

179 Torque [lb-in]
20 Nm
450 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
300 cm³/r [18.3 in³/r]

Flow LPM [GPM]

	[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
[2]	[608]	[1257]	[1919]	[2553]	[3196]	[3824]	[4475]	[5087]	[5707]	[6307]	[6901]	[7472]	[8015]	[8484]	[8962]	[9413]
	69	142	217	288	361	432	505	574	644	712	779	844	905	958	1012	1063
7.6	24	23	23	22	21	21	21	20	19	18	17	16	15	13	11	11
[4]	[612]	[1283]	[1940]	[2587]	[3227]	[3856]	[4483]	[5094]	[5693]	[6293]	[6881]	[7462]	[8024]	[8574]	[9113]	[9629]
	69	145	219	292	364	435	506	575	643	710	777	842	906	968	1029	1087
15	50	48	47	46	45	44	44	44	43	42	41	40	40	39	38	37
[6]	[570]	[1248]	[1906]	[2547]	[3178]	[3800]	[4420]	[5025]	[5619]	[6203]	[6773]	[7345]	[7899]	[8449]	[8992]	[9525]
	64	141	215	288	359	429	499	567	634	700	765	829	892	954	1015	1075
23	76	74	73	71	70	69	68	68	69	68	68	67	66	65	64	63
[8]	[540]	[1210]	[1871]	[2522]	[3152]	[3781]	[4404]	[5008]	[5607]	[6186]	[6749]	[7319]	[7879]	[8433]	[8977]	[9512]
	61	137	211	285	356	427	497	565	633	698	762	826	890	952	1013	1074
30	101	100	98	96	94	93	92	92	92	93	93	93	93	92	91	91
[10]	[496]	[1161]	[1825]	[2471]	[3110]	[3733]	[4362]	[4968]	[5574]	[6157]	[6721]	[7274]	[7811]	[8356]	[8887]	[9416]
	56	131	206	279	351	421	492	561	629	695	759	821	882	943	1003	1063
38	126	126	124	122	120	118	115	113	113	113	114	116	118	118	117	117
[12]	[443]	[1108]	[1768]	[2418]	[3059]	[3688]	[4307]	[4918]	[5526]	[6114]	[6681]	[7239]	[7786]	[8338]	[8876]	[9411]
	50	125	200	273	345	416	486	555	624	690	754	817	879	941	1002	1062
45	151	151	150	148	145	143	141	140	139	139	140	142	144	144	144	144
[14]	[387]	[1034]	[1701]	[2346]	[2985]	[3610]	[4227]	[4839]	[5452]	[6050]	[6622]	[7184]	[7723]	[8269]	[8816]	[9362]
	44	117	192	265	337	408	477	546	615	683	748	811	872	934	995	1057
53	177	177	176	173	171	168	166	165	163	163	165	167	169	171	170	170
[16]	[366]	[961]	[1620]	[2264]	[2903]	[3530]	[4147]	[4753]	[5366]	[5960]	[6540]	[7098]	[7642]	[8169]	[8685]	[9211]
	41	109	183	256	328	399	468	537	606	673	738	801	863	922	980	1040
61	202	202	201	199	197	195	192	190	189	188	188	189	191	194	196	196
[18]	[291]	[893]	[1546]	[2187]	[2829]	[3450]	[4067]	[4678]	[5283]	[5873]	[6451]	[7005]	[7537]	[8064]	[8580]	[9103]
	33	101	175	247	319	390	459	528	596	663	728	791	851	910	969	1028
68	227	227	227	224	222	219	217	215	213	211	212	214	217	220	221	221
[20]	[204]	[797]	[1444]	[2094]	[2736]	[3361]	[3974]	[4585]	[5184]	[5775]	[6353]	[6907]	[7448]	[7974]	[8489]	[8992]
	23	90	163	236	309	380	449	518	585	652	717	780	841	900	958	1015
76	252	252	252	251	249	246	243	241	239	238	238	239	242	245	247	248
[22]	[102]	[710]	[1366]	[2013]	[2651]	[3270]	[3885]	[4496]	[5096]	[5689]	[6271]	[6831]	[7362]	[7877]	[8375]	[8880]
	12	80	154	227	299	369	439	508	575	642	708	771	831	889	945	1003
83	278	278	278	277	274	272	269	267	265	264	263	265	269	273	275	275
[25]		[553]	[1208]	[1851]	[2489]	[3114]	[3726]	[4335]	[4930]	[5523]	[6108]	[6670]	[7220]	[7783]	[8298]	[8777]
		62	136	209	281	352	421	489	557	624	690	753	815	879	937	991
95		316	316	316	313	310	307	303	301	299	298	298	301	306	310	312
[30]		[233]	[941]	[1539]	[2179]	[2811]	[3430]	[4028]	[4625]	[5217]	[5802]	[6385]	[6957]	[7522]	[8060]	[8565]
		26	106	174	246	317	387	455	522	589	655	721	785	849	910	967
114		379	379	379	377	374	371	367	365	363	362	361	364	368	374	376

C-3

Delta Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
347 cm³/r [21.2 in³/r]

Flow LPM [GPM]

	[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
[2]	[687]	[1415]	[2128]	[2824]	[3532]	[4248]	[4947]	[5633]	[6298]	[6964]	[7575]	[8182]	[8743]	[9209]	[9624]	[10081]
	78	160	240	319	399	480	558	636	711	786	855	924	987	1040	1087	1138
7.6	20	19	18	18	17	18	17	17	16	15	14	13	12	9	8	4
[4]	[689]	[1443]	[2179]	[2891]	[3606]	[4302]	[4986]	[5653]	[6316]	[6965]	[7615]	[8260]	[8891]	[9515]	[10120]	[10698]
	78	163	246	326	407	486	563	638	713	786	860	933	1004	1074	1143	1208
15	42	41	41	40	39	37	38	38	39	38	38	37	37	35	33	31
[6]	[648]	[1406]	[2154]	[2866]	[3580]	[4276]	[4970]	[5641]	[6290]	[6921]	[7563]	[8190]	[8812]	[9427]	[10029]	[10630]
	73	159	243	324	404	483	561	637	710	781	854	925	995	1064	1132	1200
23	64	64	63	61	60	58	57	57	59	60	60	59	58	57	56	55
[8]	[606]	[1356]	[2105]	[2825]	[3545]	[4241]	[4943]	[5621]	[6274]	[6899]	[7522]	[8144]	[8768]	[9388]	[9998]	[10598]
	68	153	238	319	400	479	558	635	708	779	849	919	990	1060	1129	1196
30	87	86	85	84	82	81	79	78	79	81	82	81	81	80	78	77
[10]	[550]	[1295]	[2041]	[2765]	[3488]	[4188]	[4891]	[5585]	[6264]	[6899]	[7505]	[8091]	[8672]	[9283]	[9885]	[10488]
	62	146	230	312	394	473	552	631	707	779	847	913	979	1048	1116	1184
38	109	108	107	106	104	103	100	98	97	98	100	103	103	103	102	101
[12]	[478]	[1227]	[1976]	[2698]	[3411]	[4108]	[4802]	[5479]	[6146]	[6782]	[7396]	[7992]	[8585]	[9176]	[9767]	[10345]
	54	139	223	305	385	464	542	619	694	766	835	902	969	1036	1103	1168
45	131	130	130	129	127	125	122	119	117	115	115	119	123	125	125	124
[14]	[409]	[1151]	[1896]	[2624]	[3344]	[4048]	[4742]	[5418]	[6083]	[6722]	[7339]	[7939]	[8541]	[9142]	[9738]	[10318]
	46	130	214	296	378	457	535	612	687	759	829	896	964	1032	1099	1165
53	153	153	152	152	149	147	145	142	140	139	139	143	147	148	147	147
[16]	[339]	[1033]	[1774]	[2494]	[3209]	[3907]	[4605]	[5280]	[5956]	[6610]	[7243]	[7850]	[8438]	[9014]	[9592]	[10166]
	38	117	200	282	362	441	520	596	672	746	818	886	953	1018	1083	1148
61	174	174	174	174	172	169	166	164	162	159	159	160	165	168	170	170
[18]	[245]	[943]	[1676]	[2401]	[3113]	[3809]	[4500]	[5175]	[5837]	[6477]	[7107]	[7711]	[8308]	[8895]	[9466]	[10040]
	28	106	189	271	351	430	508	584	659	731	802	871	938	1004	1069	1133
68	196	196	196	195	193	192	189	187	185	183	181	182	185	188	192	193
[20]	[143]	[832]	[1571]	[2290]	[3003]	[3697]	[4386]	[5050]	[5715]	[6351]	[6968]	[7569]	[8147]	[8721]	[9297]	[9855]
	16	94	177	259	339	417	495	570	645	717	787	855	920	985	1050	1113
76	218	218	218	218	216	214	212	209	207	205	203	203	205	210	214	215
[22]	[34]	[715]	[1454]	[2175]	[2896]	[3594]	[4280]	[4950]	[5602]	[6236]	[6854]	[7449]	[8027]	[8590]	[9150]	[9705]
	4	81	164	246	327	406	483	559	632	704	774	841	906	970	1033	1096
83	240	240	240	240	240	238	236	233	230	228	226	226	228	231	237	240
[25]		[523]	[1251]	[1969]	[2693]	[3395]	[4081]	[4756]	[5414]	[6057]	[6687]	[7296]	[7882]	[8457]	[9011]	[9534]
		59	141	222	304	383	461	537	611	684	755	824	890	955	1017	1076
95		272	272	272	272	272	269	266	263	261	259	259	261	265	270	272
[30]		[152]	[1072]	[1749]	[2434]	[3123]	[3802]	[4468]	[5114]	[5763]	[6400]	[7018]	[7633]	[8232]	[8819]	[8997]
		17	121	197	275	353	429	504	577	651	723	792	862	929	996	1016
114		327	327	327	327	327	323	319	315	314	313	315	319	323	327	327

152 Torque [lb-in]
17 Nm
327 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
395 cm³/r [24.1 in³/r]

Flow LPM [GPM]

	[17] 250	[34] 500	[52] 750	[69] 1000	[86] 1250	[103] 1500	[121] 1750	[138] 2000	[155] 2250	[172] 2500	[190] 2750	[207] 3000	[224] 3250	[241] 3500
[2]	[782]	[1622]	[2436]	[3237]	[4034]	[4837]	[5650]	[6428]	[7213]	[7911]	[8607]	[9235]	[9798]	[10439]
	88	183	275	365	455	546	638	726	814	893	972	1043	1106	1179
7.6	18	17	17	16	16	16	17	16	15	15	15	14	13	12
[4]	[770]	[1643]	[2476]	[3287]	[4088]	[4860]	[5617]	[6357]	[7103]	[7838]	[8566]	[9285]	[9990]	[10684]
	87	186	280	371	462	549	634	718	802	885	967	1048	1128	1206
15	38	37	36	35	33	33	35	36	36	35	35	34	34	33
[6]	[746]	[1609]	[2460]	[3280]	[4083]	[4867]	[5644]	[6384]	[7103]	[7811]	[8520]	[9232]	[9930]	[10616]
	84	182	278	370	461	549	637	721	802	882	962	1042	1121	1199
23	58	57	55	54	52	51	50	51	53	54	55	54	53	53
[8]	[699]	[1561]	[2430]	[3249]	[4062]	[4852]	[5638]	[6398]	[7126]	[7820]	[8506]	[9198]	[9884]	[10565]
	79	176	274	367	459	548	637	722	805	883	960	1038	1116	1193
30	77	76	75	74	72	70	68	67	69	72	74	74	74	73
[10]	[630]	[1489]	[2345]	[3180]	[4008]	[4819]	[5622]	[6397]	[7142]	[7856]	[8525]	[9142]	[9776]	[10438]
	71	168	265	359	453	544	635	722	806	887	962	1032	1104	1178
38	96	96	95	93	91	90	87	85	83	83	88	93	93	93
[12]	[556]	[1412]	[2264]	[3090]	[3898]	[4689]	[5473]	[6225]	[6976]	[7710]	[8415]	[9081]	[9681]	[10304]
	63	159	256	349	440	529	618	703	788	870	950	1025	1093	1163
45	115	115	115	113	111	109	107	105	102	100	100	105	110	113
[14]	[469]	[1325]	[2178]	[2999]	[3819]	[4611]	[5391]	[6137]	[6867]	[7581]	[8270]	[8942]	[9598]	[10234]
	53	150	246	339	431	521	609	693	775	856	934	1010	1084	1155
53	134	134	134	133	131	128	126	124	122	120	119	123	133	134
[16]	[360]	[1220]	[2069]	[2894]	[3715]	[4506]	[5290]	[6048]	[6782]	[7495]	[8190]	[8873]	[9534]	[10181]
	41	138	234	327	419	509	597	683	766	846	925	1002	1076	1149
61	153	153	153	153	151	148	145	143	140	138	138	139	145	151
[18]	[334]	[1098]	[1951]	[2777]	[3591]	[4386]	[5172]	[5924]	[6665]	[7387]	[8087]	[8763]	[9418]	[10048]
	38	124	220	314	405	495	584	669	752	834	913	989	1063	1134
68	173	173	173	173	171	169	166	162	161	159	157	158	162	169
[20]	[221]	[993]	[1837]	[2660]	[3479]	[4259]	[5030]	[5780]	[6518]	[7238]	[7939]	[8613]	[9258]	[9892]
	25	112	207	300	393	481	568	653	736	817	896	972	1045	1117
76	192	192	192	192	191	189	186	183	181	179	177	178	182	188
[22]	[115]	[862]	[1698]	[2521]	[3337]	[4135]	[4895]	[5641]	[6366]	[7067]	[7752]	[8414]	[9062]	[9702]
	13	97	192	285	377	467	553	637	719	798	875	950	1023	1095
83	211	211	211	211	211	209	206	203	201	200	199	200	204	209
[25]		[637]	[1473]	[2296]	[3117]	[3909]	[4687]	[5434]	[6163]	[6861]	[7536]	[8192]	[8829]	[9475]
		72	166	259	352	441	529	613	696	775	851	925	997	1070
95		240	240	240	240	238	235	232	229	227	227	228	233	240
[30]		[211]	[1079]	[1903]	[2725]	[3526]	[4311]	[5079]	[5824]	[6547]	[7240]	[7921]	[8577]	[9228]
		24	122	215	308	398	487	573	658	739	817	894	968	1042
114		288	288	288	288	286	283	280	277	274	273	275	280	287

C-3

Delta Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
470 cm³/r [28.7 in³/r]

Flow LPM [GPM]

	[17] 250	[34] 500	[52] 750	[69] 1000	[86] 1250	[103] 1500	[121] 1750	[138] 2000	[155] 2250	[172] 2500	[190] 2750	[207] 3000
[2]	[925] 104	[1885] 213	[2820] 318	[3727] 421	[4639] 524	[5526] 624	[6404] 723	[7270] 821	[8129] 918	[8978] 1014	[9794] 1106	[10551] 1191
7.6	14	14	13	12	12	12	11	10	9	9	8	7
[4]	[942] 106	[1942] 219	[2917] 329	[3849] 435	[4776] 539	[5692] 643	[6594] 744	[7488] 845	[8352] 943	[9199] 1039	[10014] 1131	[10824] 1222
15	31	30	29	29	28	27	27	26	25	24	23	23
[6]	[906] 102	[1921] 217	[2892] 327	[3833] 433	[4772] 539	[5676] 641	[6572] 742	[7440] 840	[8309] 938	[9152] 1033	[9974] 1126	[10786] 1218
23	47	46	45	45	44	43	43	42	42	41	41	40
[8]	[856] 97	[1866] 211	[2853] 322	[3795] 428	[4730] 534	[5634] 636	[6520] 736	[7379] 833	[8230] 929	[9075] 1025	[9895] 1117	[10693] 1207
30	63	62	62	61	60	58	57	57	58	58	57	56
[10]	[780] 88	[1799] 203	[2800] 316	[3745] 423	[4685] 529	[5594] 632	[6479] 731	[7337] 828	[8177] 923	[9009] 1017	[9843] 1111	[10638] 1201
38	79	79	78	77	76	75	74	72	72	74	74	74
[12]	[699] 79	[1709] 193	[2711] 306	[3661] 413	[4597] 519	[5508] 622	[6403] 723	[7258] 819	[8101] 915	[8916] 1007	[9719] 1097	[10506] 1186
45	96	95	94	93	92	91	90	89	89	90	90	91
[14]	[596] 67	[1612] 182	[2609] 295	[3561] 402	[4490] 507	[5390] 608	[6268] 708	[7112] 803	[7941] 897	[8743] 987	[9519] 1075	[10282] 1161
53	112	111	111	110	109	107	106	104	103	101	102	104
[16]	[467] 53	[1486] 168	[2480] 280	[3440] 388	[4371] 493	[5268] 595	[6152] 695	[6992] 789	[7810] 882	[8601] 971	[9370] 1058	[10118] 1142
61	129	128	127	126	125	123	122	120	119	117	116	116
[18]	[332] 37	[1353] 153	[2357] 266	[3317] 375	[4256] 481	[5157] 582	[6043] 682	[6892] 778	[7713] 871	[8501] 960	[9270] 1047	[10026] 1132
68	145	145	144	143	142	140	138	136	135	134	132	133
[20]	[304] 34	[1226] 138	[2218] 250	[3172] 358	[4102] 463	[4994] 564	[5873] 663	[6731] 760	[7557] 853	[8365] 944	[9147] 1033	[9922] 1120
76	161	161	160	159	158	157	155	153	152	150	149	150
[22]	[137] 15	[1059] 120	[2048] 231	[3004] 339	[3945] 445	[4840] 546	[5727] 647	[6576] 742	[7399] 835	[8198] 926	[8967] 1012	[9715] 1097
83	177	177	177	176	175	174	172	170	169	167	166	166
[25]		[833] 94	[1816] 205	[2765] 312	[3680] 415	[4575] 517	[5455] 616	[6313] 713	[7133] 805	[7928] 895	[8691] 981	[9436] 1065
95		201	201	201	200	198	196	194	193	191	191	192
[30]		[491] 55	[1318] 149	[2295] 259	[3232] 365	[4142] 468	[5022] 567	[5881] 664	[6721] 759	[7522] 849	[8300] 937	[9320] 1052
114		241	241	241	241	240	237	236	236	233	232	227

491 } Torque [lb-in]
55 } Nm
241 Speed RPM

C-3

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
542 cm³/r [33.1 in³/r]

Flow LPM [GPM]

	[17] 250	[34] 500	[52] 750	[69] 1000	[86] 1250	[103] 1500	[121] 1750	[138] 2000	[155] 2250	[172] 2500
[2]	[1131]	[2304]	[3433]	[4558]	[5668]	[6725]	[7732]	[8683]	[9645]	[10457]
	128	260	388	515	640	759	873	980	1089	1181
76	13	12	11	11	11	11	10	8	8	7
[4]	[1139]	[2352]	[3515]	[4638]	[5735]	[6781]	[7819]	[8809]	[9752]	[10644]
	129	266	397	524	648	766	883	994	1101	1202
15	27	26	25	25	25	25	24	23	23	22
[6]	[1063]	[2267]	[3433]	[4549]	[5645]	[6694]	[7697]	[8675]	[9630]	[10557]
	120	256	388	514	637	756	869	979	1087	1192
23	41	40	39	38	38	38	39	38	37	36
[8]	[992]	[2186]	[3354]	[4475]	[5578]	[6646]	[7665]	[8608]	[9535]	[10449]
	112	247	379	505	630	750	865	972	1076	1180
30	56	55	54	53	52	52	51	52	52	51
[10]	[897]	[2090]	[3259]	[4378]	[5482]	[6555]	[7602]	[8578]	[9482]	[10343]
	101	236	368	494	619	740	858	968	1071	1168
38	70	69	68	67	67	65	64	64	64	65
[12]	[807]	[1980]	[3138]	[4256]	[5365]	[6440]	[7494]	[8481]	[9403]	[10275]
	91	224	354	481	606	727	846	957	1062	1160
45	84	83	83	81	80	79	78	77	76	77
[14]	[693]	[1873]	[3028]	[4138]	[5218]	[6268]	[7318]	[8304]	[9235]	[10105]
	78	211	342	467	589	708	826	937	1043	1141
53	98	98	97	96	95	93	91	90	91	92
[16]	[554]	[1732]	[2882]	[3993]	[5083]	[6107]	[7118]	[8089]	[9032]	[9928]
	63	196	325	451	574	689	804	913	1020	1121
61	112	112	111	110	109	108	106	104	104	106
[18]	[409]	[1582]	[2738]	[3844]	[4924]	[5952]	[6956]	[7928]	[8874]	[9772]
	46	179	309	434	556	672	785	895	1002	1103
68	126	126	126	125	124	123	121	119	119	121
[20]	[355]	[1428]	[2587]	[3696]	[4767]	[5804]	[6813]	[7786]	[8732]	[9624]
	40	161	292	417	538	655	769	879	986	1087
76	140	140	140	139	138	137	136	134	134	135
[22]	[310]	[1259]	[2412]	[3518]	[4595]	[5619]	[6618]	[7589]	[8536]	[9438]
	35	142	272	397	519	634	747	857	964	1065
83	154	154	154	154	152	151	150	148	148	149
[25]		[958]	[2107]	[3215]	[4281]	[5310]	[6305]	[7264]	[8204]	[9110]
		108	238	363	483	599	712	820	926	1029
95		174	174	174	174	173	171	170	168	169
[30]		[521]	[1599]	[2696]	[3769]	[4804]	[5809]	[6776]	[7705]	[8617]
		59	181	304	425	542	656	765	870	973
114		209	209	209	209	208	207	207	205	205

C-3

Delta Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
649 cm³/r [39.6 in³/r]

Flow LPM [GPM]

	[17] 250	[34] 500	[52] 750	[69] 1000	[86] 1250	[103] 1500	[121] 1750	[138] 2000	[155] 2250
[2]	[1365]	[2787]	[4156]	[5488]	[6775]	[7949]	[9102]	[10174]	[11100]
	154	315	469	620	765	897	1028	1149	1253
7.6	10	10	10	9	9	8	7	6	3
[4]	[1326]	[2770]	[4113]	[5400]	[6632]	[7819]	[8973]	[10030]	[11015]
	150	313	464	610	749	883	1013	1132	1244
15	22	22	21	20	21	20	19	19	18
[6]	[1258]	[2663]	[3998]	[5270]	[6521]	[7692]	[8774]	[9808]	[10809]
	142	301	451	595	736	868	991	1107	1220
23	35	34	33	32	32	32	32	32	31
[8]	[1154]	[2558]	[3902]	[5195]	[6455]	[7659]	[8775]	[9770]	[10708]
	130	289	441	587	729	865	991	1103	1209
30	47	46	45	44	42	42	42	43	43
[10]	[1045]	[2442]	[3787]	[5076]	[6331]	[7541]	[8691]	[9685]	[10573]
	118	276	428	573	715	851	981	1093	1194
38	58	58	57	56	55	53	53	54	55
[12]	[928]	[2321]	[3662]	[4939]	[6193]	[7385]	[8536]	[9577]	[10469]
	105	262	413	558	699	834	964	1081	1182
45	70	70	70	68	67	66	65	65	66
[14]	[740]	[2127]	[3469]	[4746]	[5989]	[7188]	[8352]	[9433]	[10439]
	84	240	392	536	676	812	943	1065	1179
53	82	82	82	81	80	79	77	76	76
[16]	[614]	[1990]	[3318]	[4588]	[5795]	[6942]	[8081]	[9154]	[10141]
	69	225	375	518	654	784	912	1033	1145
61	93	93	93	93	92	91	90	89	90
[18]	[448]	[1830]	[3158]	[4414]	[5619]	[6754]	[7853]	[8890]	[9873]
	51	207	356	498	634	763	887	1004	1115
68	105	105	105	105	104	103	102	102	104
[20]	[281]	[1618]	[2944]	[4198]	[5410]	[6551]	[7653]	[8689]	[9676]
	32	183	332	474	611	740	864	981	1092
76	117	117	117	117	117	116	114	114	115
[22]	[276]	[1518]	[2842]	[4099]	[5313]	[6453]	[7554]	[8596]	[9576]
	31	171	321	463	600	728	853	970	1081
83	128	128	128	128	128	128	126	125	126
[25]		[1079]	[2393]	[3646]	[4834]	[5969]	[7071]	[8112]	[9105]
		122	270	412	546	674	798	916	1028
95		146	146	146	146	146	145	144	144
[30]		[436]	[1747]	[3013]	[4225]	[5356]	[6454]	[7489]	[8479]
		49	197	340	477	605	729	845	957
114		175	175	175	175	175	174	174	175

8479 } Torque [lb-in]
957 } Nm
175 Speed RPM

C-3

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
754cm³/r [46.0 in³/r]

Flow LPM [GPM]

	[17] 250	[34] 500	[52] 750	[69] 1000	[86] 1250	[103] 1500	[121] 1750	[138] 2000
[2]	[1561]	[3128]	[4605]	[6014]	[7422]	[8721]	[9978]	[10910]
	176	353	520	679	838	985	1127	1232
7.6	9	8	8	8	7	7	6	5
[4]	[1548]	[3142]	[4650]	[6029]	[7350]	[8605]	[9785]	[10892]
	175	355	525	681	830	971	1105	1230
15	19	18	18	18	18	18	17	17
[6]	[1470]	[3084]	[4608]	[6022]	[7346]	[8555]	[9722]	[10850]
	166	348	520	680	829	966	1098	1225
23	30	29	28	27	27	27	27	27
[8]	[1359]	[2975]	[4504]	[5925]	[7263]	[8488]	[9638]	[10694]
	153	336	509	669	820	958	1088	1207
30	40	39	38	38	37	36	37	38
[10]	[1240]	[2844]	[4364]	[5815]	[7185]	[8458]	[9603]	[10584]
	140	321	493	656	811	955	1084	1195
38	50	50	49	48	47	46	46	47
[12]	[1079]	[2686]	[4207]	[5641]	[7008]	[8248]	[9390]	[10400]
	122	303	475	637	791	931	1060	1174
45	60	60	60	59	58	57	57	57
[14]	[932]	[2512]	[4038]	[5477]	[6850]	[8124]	[9274]	[10286]
	105	284	456	618	773	917	1047	1161
53	70	70	70	70	69	68	67	67
[16]	[753]	[2328]	[3834]	[5246]	[6577]	[7831]	[8999]	[10040]
	85	263	433	592	742	884	1016	1133
61	80	80	80	80	80	79	78	78
[18]	[547]	[2119]	[3632]	[5024]	[6320]	[7551]	[8706]	[9721]
	62	239	410	567	714	852	983	1097
68	90	90	90	90	90	90	90	90
[20]	[310]	[1919]	[3430]	[4826]	[6126]	[7339]	[8466]	[9430]
	35	217	387	545	692	829	956	1065
76	100	100	100	100	100	100	100	100
[22]	[248]	[1666]	[3172]	[4571]	[5878]	[7102]	[8254]	[9269]
	28	188	358	516	664	802	932	1046
83	110	110	110	110	110	110	110	110
[25]		[1261]	[2784]	[4191]	[5504]	[6727]	[7873]	[8911]
		142	314	473	621	759	889	1006
95		126	126	126	126	126	126	126
[30]		[545]	[2055]	[3474]	[4800]	[6036]	[7175]	[8231]
		62	232	392	542	681	810	929
114		151	151	151	151	151	151	151

C-3

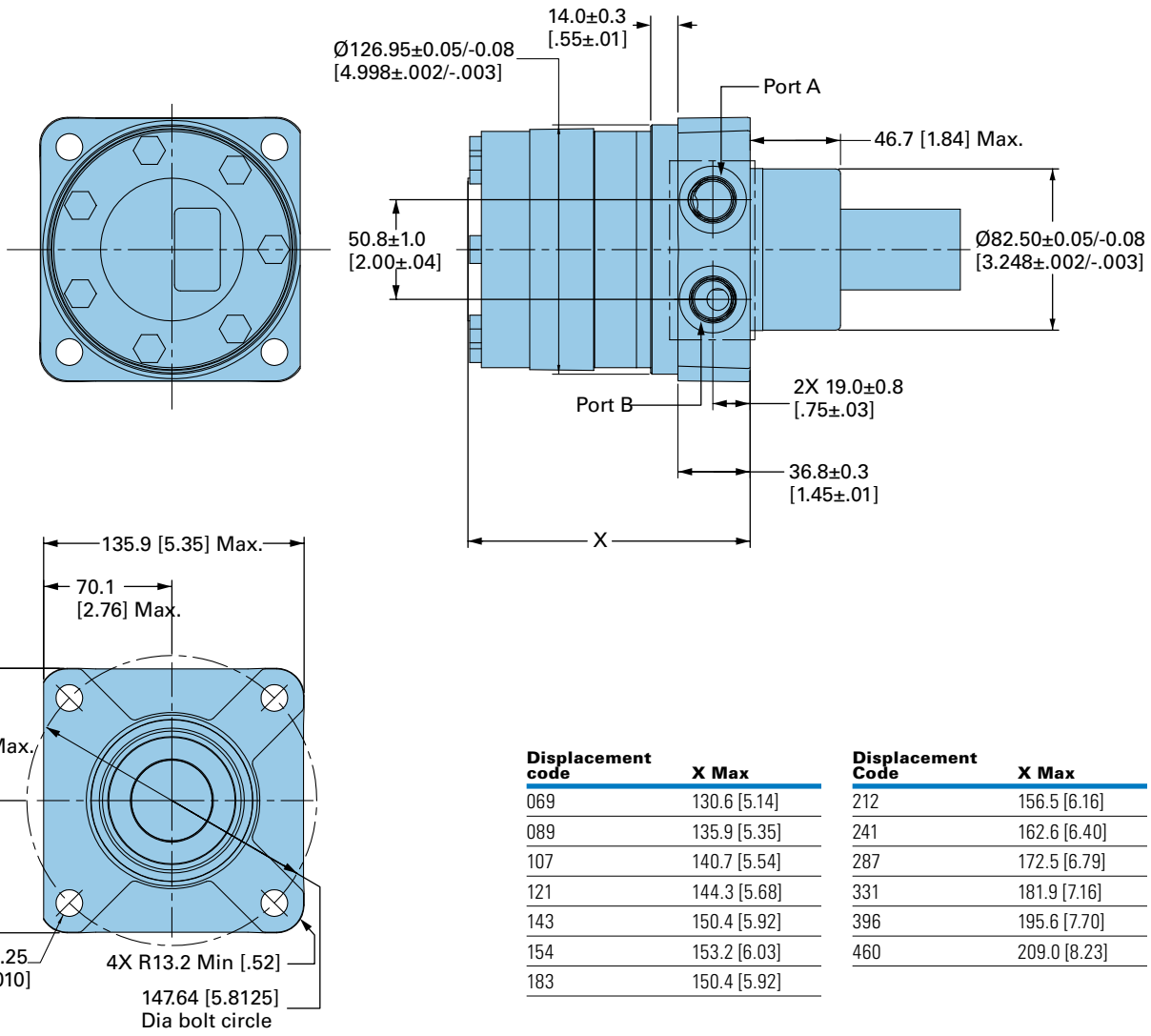
Wheel mount

Ports

7/8 -14 UNF-2B SAE O-ring ports
G 1/2 (BSP) ports

Standard rotation viewed from shaft end

Port A pressurized — CCW
Port B pressurized — CW



Displacement code	X Max
069	130.6 [5.14]
089	135.9 [5.35]
107	140.7 [5.54]
121	144.3 [5.68]
143	150.4 [5.92]
154	153.2 [6.03]
183	150.4 [5.92]

Displacement Code	X Max
212	156.5 [6.16]
241	162.6 [6.40]
287	172.5 [6.79]
331	181.9 [7.16]
396	195.6 [7.70]
460	209.0 [8.23]

Standard mount

Ports

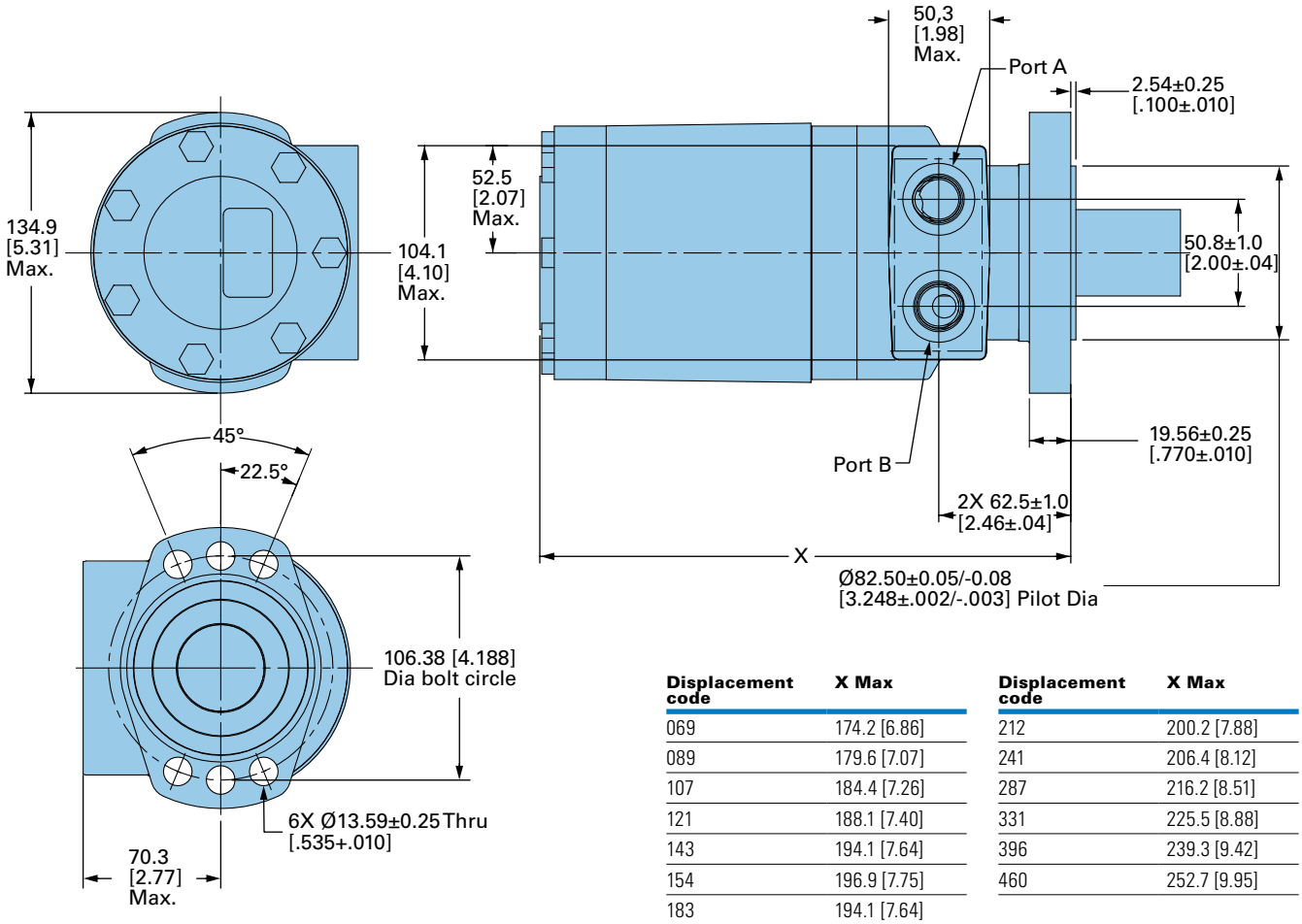
Code: AA 7/8-14 UNF-2B SAE O-ring ports

Code: AC G 1/2 (BSP) ports

Standard rotation viewed from shaft end

Port A pressurized — CCW

Port B pressurized — CW

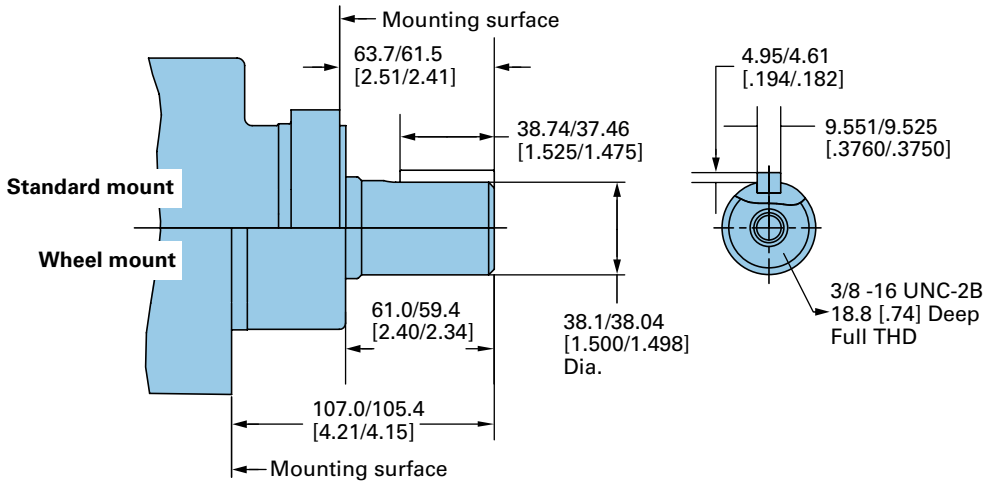


Displacement code	X Max
069	174.2 [6.86]
089	179.6 [7.07]
107	184.4 [7.26]
121	188.1 [7.40]
143	194.1 [7.64]
154	196.9 [7.75]
183	194.1 [7.64]

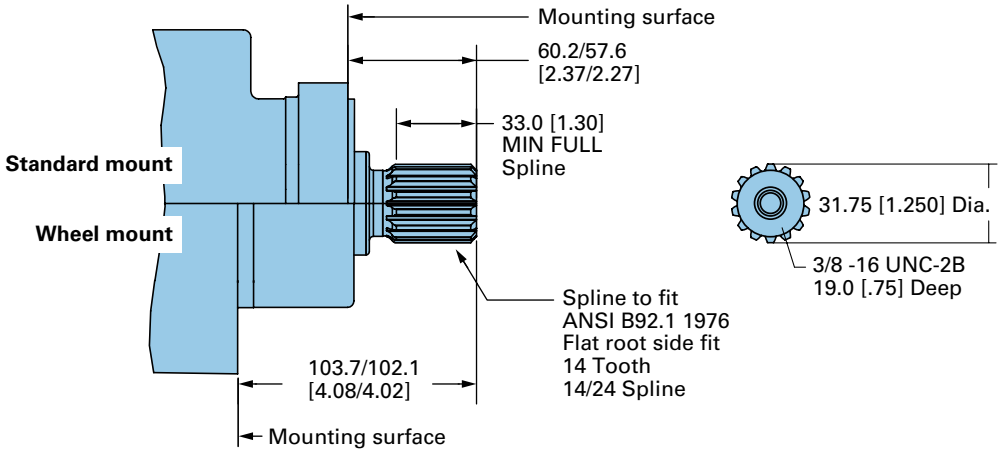
Displacement code	X Max
212	200.2 [7.88]
241	206.4 [8.12]
287	216.2 [8.51]
331	225.5 [8.88]
396	239.3 [9.42]
460	252.7 [9.95]

Shafts

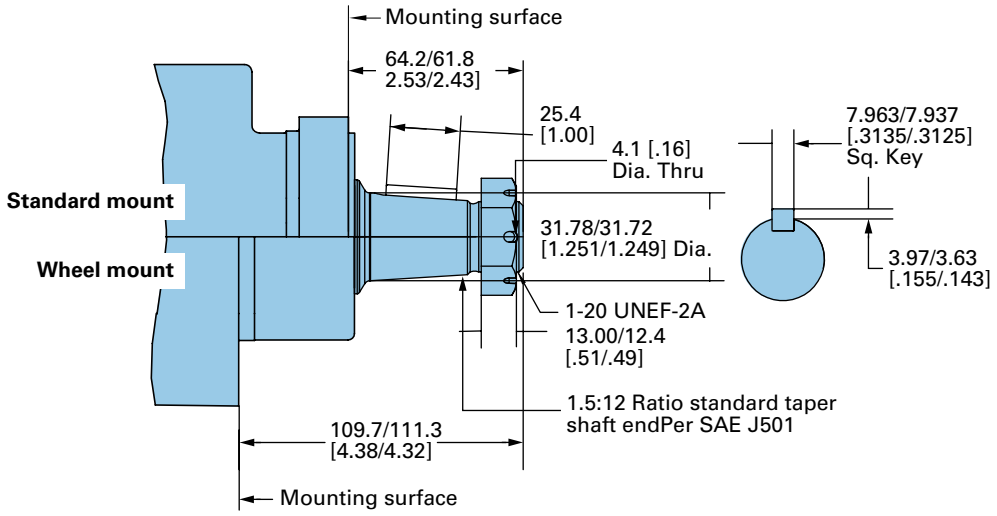
Code: 01 1½ Inch straight
972[8600] Max. Torque Nm [lb-in]



Code: 04 1¼ Inch 14 Tooth splined
768[6800] Max. Torque Nm [lb-in]



Code: 02 1¼ Inch tapered
768[6800] Max. Torque Nm [lb-in]



C-3

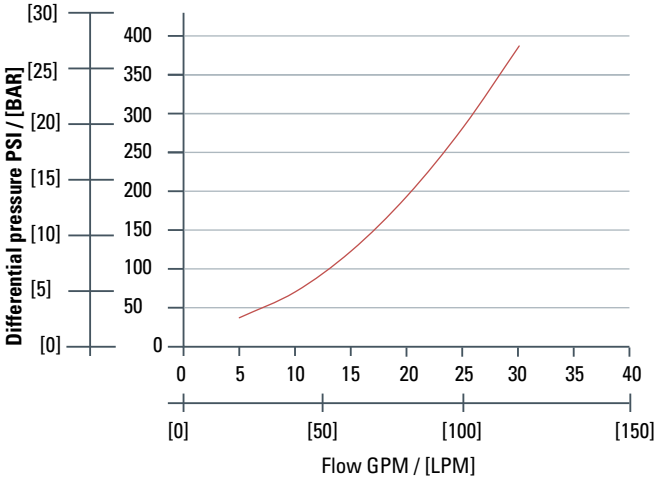
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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.

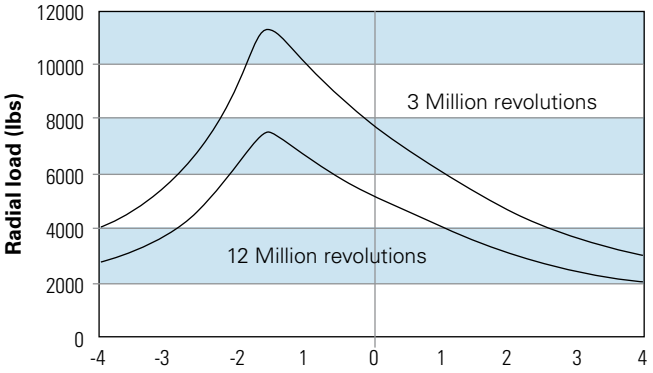
RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

Delta Series NLPD - No Load Pressure Drop



Side load chart for standard mount

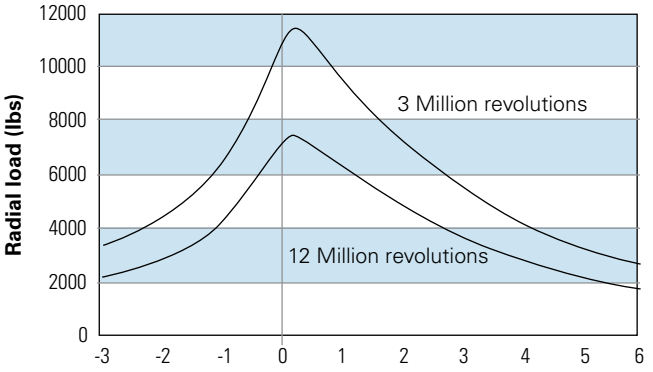
Allowable radial load, Delta Motor
L_{10} Bearing life per ISO 281



Distance from standard mount flange (inches)

Side load chart for wheel mount

Allowable radial load, delta motor
L_{10} Bearing Life per ISO 281



Distance from wheel mount flange (inches)

C-3

Delta Series

Product numbers

Note: For Delta Series Motors with a configuration **not shown** in the charts below contact your Eaton representative.

Mounting	Shaft	Port size	Time	Displacement cm³/r [in³/r] / Product number			
				113 [6.9]	**146 [8.9]**	**198 [12.1]**	**234 [14.3]**
	1-1/4 Inch Tapered	7/8" O-ring	Standard -CCW	184-0005-002	184-0006-002	184-0002-002	184-0001-002
			Standard -CW	184-0025-002	184-0026-002	184-0027-002	184-0028-002
	1-1/2 Inch 17 T Splined	7/8" O-ring	Standard -CCW	184-0013-002	184-0014-002	184-0015-002	184-0016-002
			Standard -CW	184-0037-002	184-0038-002	184-0039-002	184-0040-002
				252 [15.4]	**300 [18.3]**	**347 [21.2]**	**395 [24.1]**
Wheel motor	1-1/4 Inch Tapered	7/8" O-ring	Standard -CCW	184-0003-002	184-0004-002	184-0007-002	184-0008-002
			Standard -CW	184-0029-002	184-0030-002	184-0031-002	184-0032-002
	1-1/2 Inch 17 T Splined	7/8" O-ring	Standard -CCW	184-0017-002	184-0018-002	184-0019-002	184-0020-002
			Standard -CW	184-0041-002	184-0042-002	184-0043-002	184-0044-002
				470 [28.7]	**542 [33.1]**	**649 [39.6]**	**649 [46.0]**
	1-1/4 Inch Tapered	7/8" O-ring	Standard -CCW	184-0009-002	184-0010-002	184-0011-002	184-0012-002
			Standard -CW	184-0033-002	184-0034-002	184-0035-002	184-0036-002
	1-1/2 Inch 17 T Splined	7/8" O-ring	Standard -CCW	184-0021-002	184-0022-002	184-0023-002	184-0024-002
			Standard -CW	184-0045-002	184-0046-002	184-0047-002	184-0048-002

The following 26-digit coding system has been developed to identify all of the configuration options for the Delta low speed high torque motor. Use this model code to specify a motor with the desired features. All 26 digits of the code must be present when ordering.

M	DL	***	**	**	**	0	*	*	**	00	**	**	00	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

1 Product

M Motor

2 3 Series

DL Delta Series

4 5 6 Displacement cm³/r [in³/r]

069 113 [6.9]
089 146 [8.9]
107 176 [10.7]
121 198 [12.1]
143 234 [14.3]
154 252 [15.4]
183 300 [18.3]
212 347 [21.2]
241 395 [24.1]
287 470 [28.7]
331 542 [33.1]
396 649 [39.6]
460 754 [46.0]

7 8 Mounting type

AA Wheel, 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes On 147.6 [5.81] Dia. Bolt Circle. 127.0 [5.00] Dia. Rear Mount Pilot
AB Standard, 6 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. .100 [2.54] Pilot Length. Sae A, Magneto

9 10 Output shaft

01 38.10 [1.500] Dia. Straight with .375-16 UNC-2B Thread, and 9.52 [.375] Sq x 38.10 [1.500] straight key
02 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
03 41.30 [1.626] Dia. .125:1 tapered shaft per SAE J501 with 1.250-18 UNEF-2A threaded shaft end and slotted hex nut, 11.125 [.4380] Sq x 34.04 [1.340] straight key
04 31.75 [1.250] Dia. Flat root side fit, 14 tooth, 12/24 DP 30 Deg. Involute spline with .375-16 UNC-2B thread in end, 33.0 [1.30] minimum full spline length
05 38.10 [1.500] Dia. Flat root side fit, 17 tooth, 12/24 DP 30 Deg. Involute spline, 31.8 [1.25] minimum full spline length, with .375-16 UNC-2B thread in end
06 38.10 [1.500] Dia. Tapered shaft per SAE J501 with 1.000-20 UNEF-2A thread in end, 7.938 [.3125] Sq x 31.75 [1.250] Key

11 12 Ports

AA .875-14 UNF-2B SAE O-Ring
AC G 1/2 BSP Straight Thread

13 Pressure/flow option

0 None

14 Geroler option

0 Standard
B Tight fitting Geroler
C Reduced Noise*

*Option C required on all displacements higher than 20 CID

15 Seal option

0 Standard
1 Viton
4 Seal guard
5 Viton with seal guard
A Extreme duty seal guard

16 17 Accessories

00 None
01 Spring applied pressure release brake

18 19 Special features (hardware)

00 None

20 21 Special features (assembly)

00 Standard rotation - CCW
01 Reverse rotation - CW

22 23 Paint/packaging

AA No paint, individual box
AB Low gloss black primer, individual box
AS Epoxy coated black, individual box
AE No paint, bulk box
AF Low gloss black primer, bulk box

24 25 Customer identification

00 None

26 Design code

B Two

C-3

See Eatonpowersource.com/ for more options and configurations.

Delta Series with Parking Brake

Highlights

Description

Eaton's offering in LSHT motor technology is the Delta series motor with parking brake. It utilizes brake pads that rotate at 6 times the speed of the output shaft, thereby giving the brake a 6-to-1 mechanical advantage. It has the same Geroler, and disc valve technologies as the standard Char-Lynn motors. In addition to providing dependable load-holding capability, Delta series motor with parking brake provides the same smooth, reliable operation, with similar performance, as the Delta series motor.

The wet brake is a spring applied pressure release design. Load-holding is applied by a mechanical spring and released by hydraulic pressuer. The spring force holds the brake on when hydraulic pressure is absent.

Features:

- Integrated, Compact, Patented Design
- Rear-mounted intergrated brake with 6:1 torque advantage
- Access port for manual brake release (for over-riding brake in the event of loss of release pressure)
- Available on all Delta series displacements

Benefits:

- Cost-effective packaged solution simplifies ordering and inventory requirements
- Reduces assembly labor
- Design flexibility
- Wet brake is enviornmentally protected and provides long life

Specifications

Geroler elements	12 Displacements
Brake torque*	Min. to hold intermittent torque of motor
Release Pressure-bar[psi]	Min. 10 [150] Max. 69 [1000]

*Max brake torque is higher than motor intermittent torque rating / shaft torque rating. Make sure unit is not loaded beyond shaft torque rating.

Wheel Mount

Ports

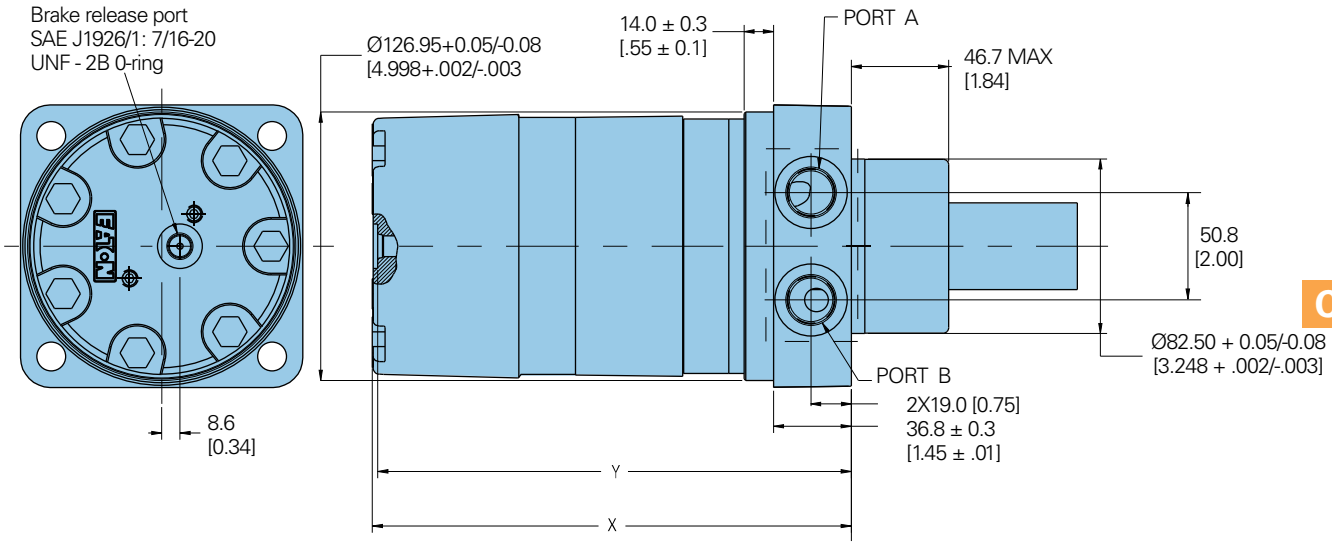
Code: AA 7/8-14 UNF-2B SAE O-ring ports

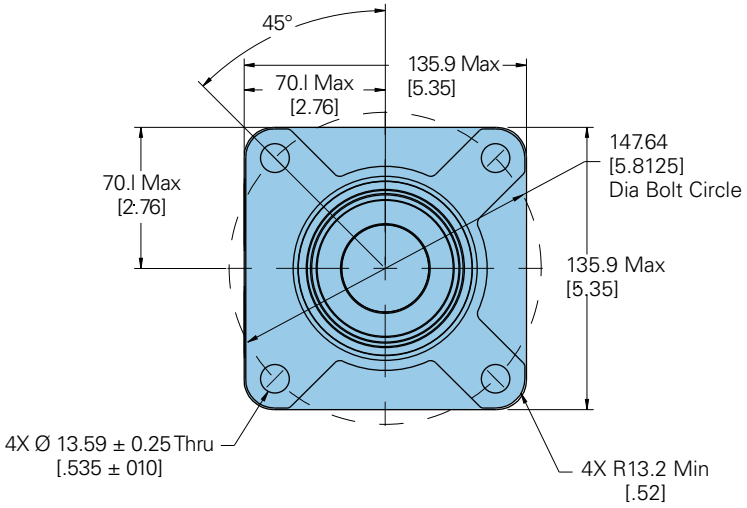
Code: AC G 1/2 (BSP) ports

Standard Rotation Viewed from Shaft End

Port A Pressurized - CCW

Port B Pressurized - CW





Delta Series with parking brake dimensions

Displacement Code	X mm [inch]	Y mm [inch]
069	190.9 [7.52]	188.4 [7.42]
089	196.3 [7. 73]	193.7 [7.63]
107	201.1 [7.92]	198.6 [7.82]
121	204.6 [8.06]	202.1 [7.96]
143	210.7 [8.30]	208.2 [8.20]
154	213.5 [8.41]	211.0 [8.31]
183	214.8 [8.46]	212.3 [8.36]
212	220.9 [8.70]	218.4 [8.60]
241	227.0 [8.94]	224.5 [8.84]
287	236.9 [9.33]	234.4 [9.23]
331	246.3 [9.70]	243.8 [9.60]
396	260.0 [10.24]	257.5 [10.14]
460	273.5 [10.17]	270.9 [10.67]

Delta Series Parking Brake

Dimensions

Standard Mount

Ports

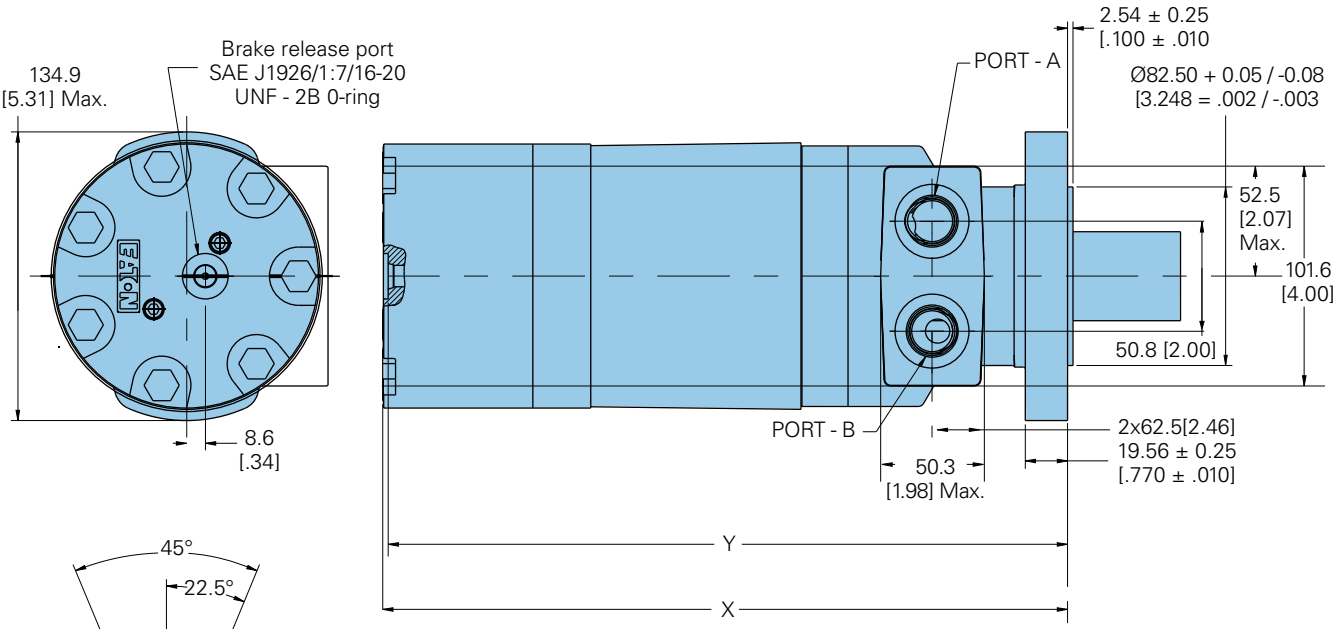
Code: AA 7/8-14 UNF-2B SAE O-ring ports

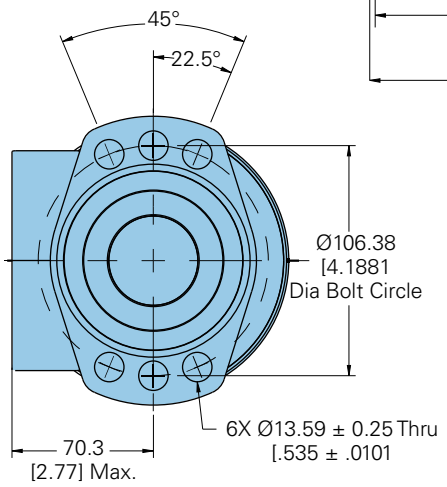
Code: AC G 1/2 (BSP) ports

Standard Rotation Viewed from Shaft End

Port A Pressurized - CCW

Port B Pressurized - CW





Delta Series with parking brake dimensions

Displacement Code	X mm [inch]	Y mm [inch]
069	235.5 [9.27)	232.1 [9.14)
089	240.9 [9.48)	237.4 [9.35)
107	245.7 [9.67)	242.2 [9.54)
121	249.3 [9.81)	245.8 [9.68)
143	255.3 [10.05)	251 .9 [9.92)
154	258.1 [10.16)	254.7 [10.03)
183	259.3 [10.21)	256.0 [10.08)
212	265.4 [10.45)	262.1 [10.321
241	271 .5 [10.69)	268.1 [10.56)
287	281.4(11.08)	278.1 [10.95)
331	290.8 [11 .45)	287.5(11 .32)
396	304.5 11.99]	301 .2 [11.86)
460	318.0 [12.52)	314.6 [12.39)

Description:

The 4000 Series share the same architecture of the industry leading 2000 Series motor, but has a larger frame size for higher torques and flows. The 4000 Series offers up to 8600 in-lb of torque and 25 gpm (continuous ratings).

4000 Series motors

Geroler element	10 Displacements
Flow l/min [GPM]	95 [25] Continuous**
	151 [40] Intermittent*
Speed RPM	722 Cont.**
	868 Inter.*
Pressure bar [PSI]	207 [3000] Cont.**
	310 [4500] Inter.*
Torque Nm [lb-in]	972 [8600] Cont.**
	1181 [10450] Inter.*

** Continuous— (Cont.) Continuous rating, motor may be run continuously at these ratings.
* Intermittent— (Inter.) Intermittent operation, 10% of every minute.

Features:

- 10 displacements, a variety of mounting flanges and output shafts
- Reliable, proven design
- High efficiency
- Environmental protection options

Benefits:

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

Applications:

- Mowing
- Snow removal
- Sprayer
- Trencher
- Wood products

C-4


Mower

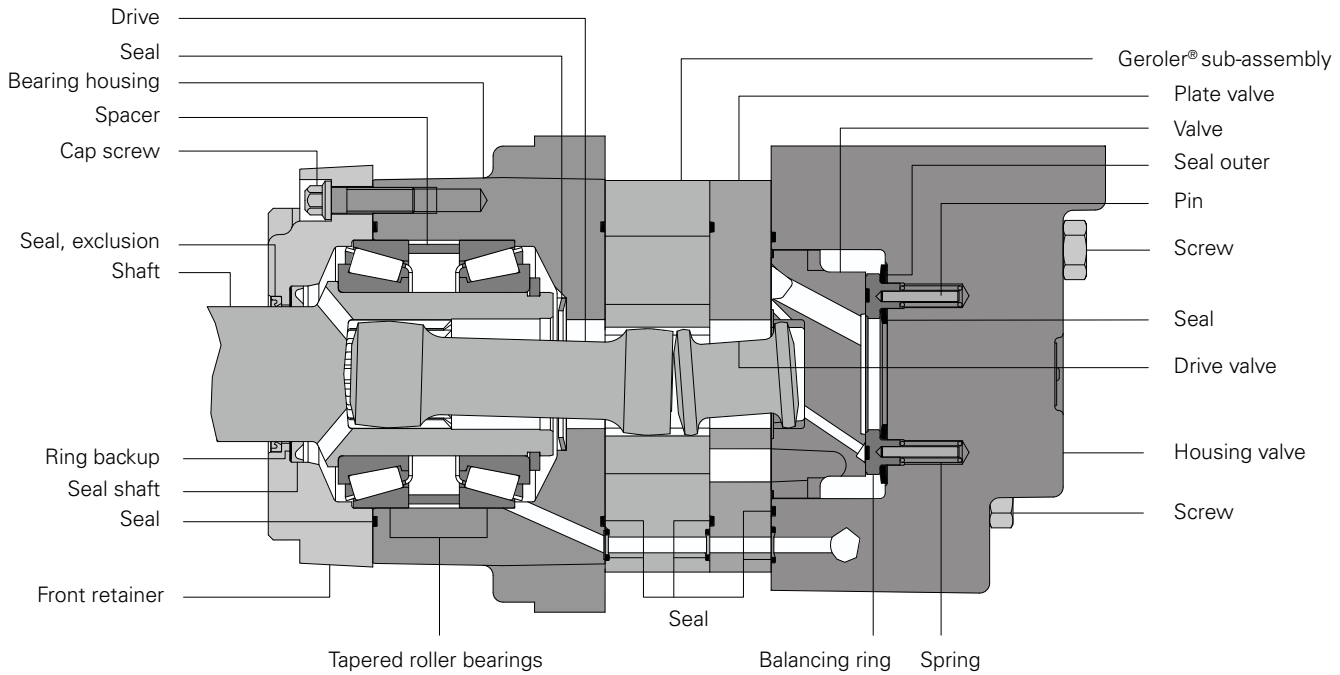

Snow removal


Paving equipment


Trencher

4000 Series

Specifications



C-4

4000 series motors

Displ. cm³/r [in³/rev]		110 [6.7]	130 [7.9]	160 [9.9]	205 [12.5]	245 [15.0]	280 [17.1]	310 [19.0]	395 [24.0]	495 [30.0]	625 [38.0]
Max speed (RPM) @ Flow	Continuous	626	722	582	459	383	336	303	239	191	151
	Intermittent	697	862	693	546	532	468	422	376	305	241
Flow l/min [GPM]	Continuous	75 [20]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]
	Intermittent	95 [25]	115 [30]	115 [30]	115 [30]	130 [35]	130 [35]	130 [35]	150 [40]	150 [40]	150 [40]
Torque* Nm [lb - in]	Continuous	322 [2850]	376 [3330]	485 [4290]	599 [5300]	705 [6240]	753 [6666]	851 [7530]	931 [8240]	946 [8375]	972 [8605]
	Intermittent	470 [4160]	558 [4940]	705 [6240]	802 [7100]	844 [7470]	957 [8471]	1064 [9420]	1183 [10470]	1169 [10350]	1181 [10450]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	190 [2750]	140 [2000]	115 [1700]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	240 [3500]	170 [2500]	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	295 [4250]	230 [3300]	180 [2600]
Weight kg [lb]	Standard or Wheel mount	17.9 [39.5]	18.1 [40.0]	18.1 [40.0]	18.4 [40.5]	18.6 [41.0]	19.1 [42.0]	19.5 [43.0]	20.4 [45.0]	21.8 [48.0]	23.1 [51.0]
	Bearingless	14.1 [31.0]	14.1 [31.0]	14.3 [31.5]	14.5 [32.0]	14.7 [32.5]	15.2 [33.5]	15.6 [34.5]	16.6 [36.5]	17.9 [39.5]	19.3 [42.5]

Maximum case pressure: See case pressure seal limitation graph.
*See shaft torque ratings for limitations.

Note: To assure best motor life, run motor in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

Maximum inlet pressure:
310 bars (4500 PSI)
Do not exeed Δ pressure rating (see chart above).

Maximum return pressure:
310 bar [4500 PSI] with case drain line installed.
Do not exceed Δ pressure rating (see chart above).

Δ bar [Δ PSI]:
The true pressure difference between inlet port and outlet port

Continuous rating:
Motor may be run continuously at these ratings

Intermittent operation:
10% of every minute

Peak operation:
1% of every minute

Recommended fluids:
Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 13 cSt [70 SUS] at operating temperature.

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

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

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

4000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
110 cm³/r [6.7 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.5]	[150]	[390]	[850]	[1290]						
	15	45	95	145						
2	14	10	5	2						
[2]	[170]	[440]	[900]	[1380]	[1860]	[2270]	[2680]	[3110]		
	20	50	100	155	210	255	305	350		
8	34	33	31	28	25	22	18	11		
[4]	[180]	[450]	[910]	[1390]	[1860]	[2280]	[2700]	[3120]	[3450]	
	20	50	105	155	210	260	305	355	390	
15	68	67	62	56	50	44	36	28	18	
[6]	[190]	[460]	[940]	[1400]	[1870]	[2310]	[2730]	[3140]	[3560]	[3880]
	20	50	105	160	210	260	310	355	400	440
23	138	136	123	110	97	84	70	56	42	28
[8]	[200]	[470]	[960]	[1420]	[1880]	[2320]	[2760]	[3200]	[3640]	[3950]
	25	55	110	160	210	260	310	360	410	445
30	207	204	200	193	184	174	163	150	136	121
[10]	[190]	[460]	[950]	[1420]	[1880]	[2340]	[2790]	[3230]	[3670]	[4010]
	20	50	105	160	210	265	315	365	415	445
38	277	274	270	262	253	241	228	213	196	179
[12]	[180]	[460]	[950]	[1420]	[1890]	[2350]	[2820]	[3260]	[3700]	[4070]
	20	50	105	160	215	265	320	370	420	460
45	347	344	340	331	322	308	292	274	255	236
[14]	[160]	[450]	[940]	[1420]	[1880]	[2350]	[2820]	[3260]	[3710]	[4080]
	20	50	105	160	210	265	320	370	420	460
53	417	414	410	400	390	374	355	335	313	292
[16]	[140]	[440]	[930]	[1420]	[1880]	[2350]	[2830]	[3280]	[3730]	[4110]
	15	50	105	160	210	265	320	370	420	465
61	487	484	480	469	458	440	419	416	410	348
[18]	[130]	[440]	[920]	[1410]	[1870]	[2350]	[2840]	[3300]	[3750]	[4120]
	15	50	105	160	210	265	320	375	425	465
68	556	553	549	537	525	505	482	455	428	404
[20]	[100]	[440]	[910]	[1400]	[1870]	[2350]	[2840]	[3300]	[3770]	[4140]
	10	50	105	160	210	265	320	375	425	465
76	626	622	618	606	593	570	545	516	485	460
[25]	[80]	[430]	[900]	[1370]	[1860]	[2350]	[2850]	[3320]	[3790]	[4160]
	10	50	100	155	210	265	320	375	430	470
95	697	694	690	677	664	638	611	579	545	518

[430] Torque [lb-in]
50 Nm
694 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
130 cm³/r [7.9 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.5]	[310] 35	[510] 60	[1060] 120	[1590] 180						
2	12	9	5	2						
[1]	[290] 35	[530] 60	[1080] 120	[1600] 180	[2110] 240	[2640] 300	[3060] 345	[3450] 390		
4	30	28	25	19	14	13	12	4		
[2]	[280] 30	[530] 60	[1100] 125	[1620] 185	[2140] 240	[2660] 300	[3180] 360	[3600] 405	[4020] 455	[4080] 460
8	57	56	53	47	42	40	38	29	20	12
[4]	[260] 30	[520] 60	[1100] 125	[1650] 185	[2200] 250	[2700] 305	[3210] 365	[3660] 415	[4100] 465	[4560] 515
15	116	114	111	105	100	95	90	70	50	37
[6]	[240] 25	[510] 60	[1100] 125	[1650] 185	[2200] 250	[2720] 305	[3240] 365	[3710] 420	[4180] 470	[4660] 525
23	173	170	167	161	156	149	142	123	104	91
[8]	[230] 25	[510] 60	[1080] 120	[1640] 185	[2210] 250	[2740] 310	[3270] 370	[3770] 425	[4270] 480	[4750] 535
30	228	225	222	216	210	202	194	176	158	145
[10]	[210] 25	[510] 60	[1080] 120	[1640] 185	[2210] 250	[2750] 310	[3300] 375	[3820] 430	[4350] 490	[4840] 545
38	283	285	278	272	266	256	246	229	212	189
[12]	[200] 25	[500] 55	[1070] 120	[1640] 185	[2220] 250	[2750] 310	[3300] 375	[3840] 435	[4370] 495	[4870] 550
45	341	338	335	329	323	312	300	282	263	237
[14]	[180] 20	[490] 55	[1060] 120	[1640] 185	[2220] 250	[2750] 310	[3310] 375	[3860] 435	[4390] 495	[4890] 550
53	400	396	392	386	380	368	355	335	311	286
[16]	[160] 20	[490] 55	[1050] 120	[1630] 185	[2220] 250	[2760] 310	[3310] 375	[3860] 435	[4400] 495	[4920] 555
61	457	453	449	443	437	424	410	388	366	335
[18]	[130] 15	[480] 55	[1050] 120	[1630] 185	[2220] 250	[2760] 310	[3320] 375	[3870] 435	[4420] 500	[4940] 560
68	516	511	506	500	494	480	465	442	418	384
[20]	[110] 10	[470] 55	[1040] 120	[1620] 185	[2210] 250	[2760] 310	[3330] 375	[3890] 440	[4440] 500	
76	574	569	564	559	551	536	520	495	470	
[22]	[70] 10	[450] 50	[1020] 115	[1610] 180	[2190] 245	[2750] 310	[3320] 375	[3880] 440	[4440] 500	
83	633	628	624	615	606	590	573	547	520	
[25]	[50] 5	[430] 50	[1000] 115	[1580] 180	[2160] 245	[2720] 305	[3300] 375	[3860] 435	[4430] 500	
95	722	718	714	702	690	672	653	625	595	
[30]		[400] 45	[940] 105	[1500] 170	[2080] 235	[2670] 300	[3200] 360	[3740] 425		
114		862	855	842	827	806	783	749		

C-4

4000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
160 cm³/r [9.9 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.5]	[300] 35	[680] 75	[1320] 150	[2050] 230	[2750] 310					
2	8	7	5	3	1					
[1]	[320] 35	[700] 80	[1350] 155	[2070] 235	[2780] 315	[3300] 375	[3940] 445	[4410] 500	[4950] 560	
4	23	22	20	19	18	16	15	8	2	
[2]	[330] 35	[700] 80	[1360] 155	[2080] 235	[2790] 315	[3340] 375	[3970] 450	[4530] 510	[5090] 575	[5590] 630
8	46	45	41	40	37	32	29	27	25	13
[4]	[320] 35	[710] 80	[1400] 160	[2100] 240	[2820] 320	[3420] 385	[4020] 455	[4620] 520	[5220] 590	[5730] 645
15	93	92	90	88	84	76	73	62	51	35
[6]	[300] 35	[710] 80	[1420] 160	[2140] 240	[2850] 320	[3510] 395	[4180] 470	[4760] 540	[5340] 605	[5870] 665
23	137	135	134	131	126	120	114	90	75	57
[8]	[280] 30	[720] 80	[1450] 165	[2180] 245	[2900] 330	[3560] 400	[4230] 480	[4850] 550	[5470] 620	[6010] 680
30	184	182	180	176	171	163	154	138	122	100
[10]	[260] 30	[720] 80	[1480] 165	[2220] 250	[2950] 335	[3610] 410	[4290] 485	[4920] 555	[5560] 630	[6160] 695
38	232	229	226	221	216	206	194	182	169	142
[12]	[240] 25	[700] 80	[1450] 165	[2190] 245	[2920] 330	[3590] 405	[4280] 485	[4920] 555	[5570] 630	[6180] 700
45	277	274	272	266	260	250	238	224	209	182
[14]	[220] 25	[680] 75	[1420] 160	[2160] 245	[2890] 325	[3570] 405	[4270] 480	[4920] 555	[5580] 630	[6200] 700
53	321	319	318	311	304	294	282	266	249	222
[16]	[200] 25	[670] 75	[1400] 160	[2130] 240	[2860] 325	[3550] 400	[4260] 480	[4920] 555	[5590] 630	[6220] 705
61	366	364	362	356	348	338	326	308	289	262
[18]	[180] 20	[650] 75	[1360] 155	[2100] 235	[2830] 320	[3530] 400	[4250] 480	[4910] 555	[5600] 635	[6240] 705
68	410	409	407	401	392	382	370	350	329	302
[20]	[150] 15	[630] 70	[1340] 150	[2070] 235	[2800] 315	[3510] 395	[4240] 480	[4910] 555	[5610] 635	
76	460	458	456	448	440	429	417	396	373	
[22]	[120] 15	[620] 70	[1330] 150	[2060] 235	[2790] 315	[3500] 395	[4220] 475	[4910] 555	[5600] 635	
83	509	506	502	494	484	473	461	438	413	
[25]	[70] 10	[600] 70	[1320] 150	[2050] 230	[2780] 315	[3480] 395	[4210] 475	[4900] 555	[5590] 630	
95	582	578	573	563	552	540	526	501	474	
[30]		[560] 65	[1280] 145	[1990] 225	[2700] 305	[3430] 390	[3970] 450	[4640] 525		
114		693	687	675	661	647	630	600		

[1990] 225 675 } Torque [lb-in] Nm Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
205 cm³/r [12.5 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.5]	[400]	[810]	[1500]							
	45	90	170							
2	8	5	1							
[1]	[410]	[830]	[1590]	[2220]	[2860]	[3860]	[4560]	[5390]	[5510]	
	45	95	180	250	325	435	515	610	625	
4	17	17	16	15	14	12	11	9	3	
[2]	[420]	[850]	[1680]	[2410]	[3140]	[4060]	[4800]	[5420]	[6000]	[6210]
	45	95	190	270	355	460	540	610	680	700
8	36	35	34	32	29	27	25	22	16	8
[4]	[430]	[870]	[1770]	[2590]	[3140]	[4260]	[5040]	[5730]	[6340]	[6740]
	50	100	200	295	355	480	570	645	715	760
15	73	73	71	70	68	61	57	45	35	23
[6]	[430]	[880]	[1800]	[2620]	[3530]	[4370]	[5170]	[5900]	[6590]	[7100]
	50	100	205	295	400	495	585	665	745	800
23	107	106	105	103	101	98	90	81	74	65
[8]	[410]	[870]	[1820]	[2660]	[3560]	[4410]	[5240]	[6020]	[6770]	
	45	100	205	300	400	500	590	680	765	
30	144	143	142	138	136	132	125	116	109	
[10]	[390]	[860]	[1820]	[2700]	[3580]	[4460]	[5300]	[6110]	[6890]	
	45	95	205	305	405	505	600	690	780	
38	182	180	179	174	170	166	160	152	143	
[12]	[350]	[850]	[1810]	[2690]	[3570]	[4440]	[5300]	[6120]		
	40	95	205	305	405	500	600	690		
45	217	216	215	211	202	200	194	185		
[14]	[330]	[840]	[1790]	[2670]	[3560]	[4430]	[5290]	[6120]		
	35	95	200	300	400	500	600	690		
53	256	254	252	248	243	237	229	219		
[16]	[290]	[820]	[1770]	[2650]	[3540]	[4410]	[5280]	[6120]		
	35	95	200	300	400	500	595	690		
61	291	290	289	284	280	272	264	253		
[18]	[270]	[810]	[1750]	[2640]	[3520]	[4400]	[5270]	[6120]		
	30	90	200	300	400	495	595	690		
68	329	327	325	321	316	308	298	287		
[20]	[230]	[800]	[1730]	[2620]	[3510]	[4380]	[5270]	[6120]		
	25	90	195	295	395	495	595	690		
76	366	364	362	358	353	345	334	321		
[22]	[190]	[780]	[1690]	[2600]	[3500]	[4370]	[5260]			
	20	90	190	295	395	495	595			
83	402	400	398	394	389	380	368			
[25]	[150]	[750]	[1640]	[2560]	[3480]	[4360]	[5240]			
	15	85	185	290	395	495	590			
95	459	456	453	448	442	434	421			
[30]		[710]	[1540]	[2510]	[3350]	[4190]	[5030]			
		80	175	285	380	475	570			
114		546	542	537	529	520	504			

C-4

4000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
245 cm³/r [15.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190	[3000] 207	[3250] 224	[3500] 241	[3750] 259
[0.5]	[460]	[980]													
2	50	110													
	5	2													
[1]	[480]	[990]	[1490]	[1990]	[2480]	[2970]	[3400]	[3830]	[4250]	[4680]	[5020]				
4	55	110	170	225	280	335	385	435	480	530	565				
	14	14	14	13	13	12	12	11	11	10	4				
[2]	[500]	[1000]	[1520]	[2040]	[2540]	[3050]	[3420]	[3930]	[4440]	[4900]	[5320]	[5740]	[6160]	[6640]	[7150]
8	55	115	170	230	285	345	385	445	500	555	600	650	695	750	810
	30	30	29	29	28	27	26	24	23	22	20	18	16	14	11
[4]	[510]	[1030]	[1560]	[2080]	[2600]	[3130]	[3630]	[4130]	[4630]	[5120]	[5570]	[6030]	[6480]	[6870]	[7340]
15	60	115	175	235	295	355	410	465	525	580	630	680	730	775	830
	61	61	60	60	59	59	58	56	53	49	47	44	42	39	36
[6]	[510]	[1040]	[1570]	[2100]	[2620]	[3160]	[3660]	[4200]	[4710]	[5220]	[5690]	[6140]	[6620]	[7050]	[7430]
23	60	120	175	235	295	355	415	475	530	590	645	695	750	795	840
	91	90	90	89	88	88	86	83	80	75	72	70	67	63	59
[8]	[500]	[1020]	[1560]	[2110]	[2630]	[3150]	[3680]	[4210]	[4740]	[5250]	[5720]	[6200]	[6670]	[7090]	[7470]
30	55	115	176	240	295	355	415	475	535	595	645	700	755	800	845
	121	121	120	119	118	117	115	113	111	106	103	99	96	91	87
[10]	[470]	[1000]	[1540]	[2100]	[2620]	[3150]	[3690]	[4230]	[4770]	[5290]	[5670]	[6240]	[6710]	[7140]	
38	55	115	175	235	295	355	415	480	540	600	640	705	760	805	
	152	151	150	148	148	147	145	143	141	137	133	129	125	120	
[12]	[450]	[980]	[1530]	[2080]	[2610]	[3140]	[3680]	[4220]	[4760]	[5280]	[5750]	[6230]	[6700]		
45	50	110	175	235	295	355	415	475	540	595	650	705	755		
	183	182	180	179	178	178	176	173	170	166	161	157	152		
[14]	[420]	[960]	[1520]	[2060]	[2600]	[3130]	[3670]	[4200]	[4740]	[5260]	[5740]	[6220]			
53	45	110	170	235	295	355	415	475	535	595	650	705			
	213	212	211	210	209	208	206	203	200	195	190	185			
[16]	[400]	[950]	[1500]	[2040]	[2580]	[3120]	[3660]	[4190]	[4730]	[5250]	[5730]	[6210]			
61	45	105	170	230	290	355	415	475	535	595	645	700			
	244	243	242	241	240	239	236	232	229	225	219	213			
[18]	[380]	[930]	[1480]	[2020]	[2560]	[3110]	[3650]	[4180]	[4710]	[5230]	[5720]	[6200]			
68	45	105	165	230	290	350	410	470	530	590	645	700			
	275	274	273	272	270	269	266	262	259	254	248	241			
[20]	[350]	[910]	[1460]	[2000]	[2550]	[3100]	[3640]	[4170]	[4700]	[5220]	[5710]				
76	40	105	165	225	290	350	410	470	530	590	645				
	305	305	304	303	302	300	296	292	288	283	276				
[22]	[310]	[870]	[1420]	[1970]	[2500]	[3050]	[3590]	[4140]	[4680]	[5200]	[5680]				
83	35	100	160	225	280	345	405	470	530	590	640				
	337	336	335	334	332	330	326	323	319	313	306				
[25]	[260]	[820]	[1380]	[1930]	[2460]	[2980]	[3540]	[4090]	[4640]	[5180]					
95	30	95	155	220	280	335	400	460	525	585					
	383	382	381	380	378	376	372	369	365	357					
[30]		[680]	[1250]	[1860]	[2390]	[2900]	[3430]	[3960]	[4460]	[4950]					
114		75	140	210	270	330	390	445	505	560					
		457	456	455	453	450	445	442	437	427					
[35]			[1110]	[1740]	[2270]	[2790]	[3340]	[3910]	[4400]						
132			125	195	255	315	375	440	495						
			532	531	528	525	519	515	509						

[3440] Torque [lb-in]
375 Nm
519 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
280 cm³/r [17.1 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190	[3000] 207	[3250] 224	[3500] 241	[3750] 259
[0.5]	[533]	[1074]													
2	60 4	121 2													
[1]	[553]	[1136]	[1714]	[2287]	[2841]	[3394]	[3868]	[4389]	[4895]	[5380]	[5870]	[6368]	[6811]	[7239]	[7654]
4	62 12	128 12	194 12	258 11	321 11	384 11	437 10	496 10	553 10	608 8	663 6	720 6	770 6	818 5	865 4
[2]	[568]	[1146]	[1740]	[2328]	[2902]	[3461]	[3955]	[4524]	[4922]	[5630]	[6146]	[6666]	[7191]	[7749]	[8323]
8	64 26	130 26	197 25	263 25	328 24	391 24	447 23	511 22	556 21	636 20	694 19	753 17	813 17	876 15	940 13
[4]	[579]	[1167]	[1771]	[2374]	[2962]	[3557]	[4139]	[4712]	[5285]	[5848]	[6395]	[6946]	[7502]	[8020]	[8471]
15	65 53	132 53	200 52	268 52	335 51	402 51	468 50	532 49	597 47	661 45	722 44	785 42	848 41	906 40	957 38
[6]	[583]	[1177]	[1781]	[2395]	[2987]	[3601]	[4193]	[4793]	[5376]	[5959]	[6521]	[7082]	[7607]	[8097]	
23	66 79	133 79	201 78	271 78	338 77	407 77	474 76	542 74	607 72	673 69	737 67	800 66	859 65	915 64	
[8]	[573]	[1167]	[1780]	[2404]	[3007]	[3610]	[4218]	[4812]	[5411]	[5994]	[6556]	[7022]	[7518]		
30	65 106	132 106	201 105	272 105	340 104	408 104	477 102	544 101	611 99	677 96	741 94	793 92	849 90		
[10]	[547]	[1146]	[1765]	[2395]	[2997]	[3629]	[4238]	[4837]	[5442]	[6035]	[6601]	[7022]	[7518]		
38	62 134	130 133	199 133	271 131	339 131	410 130	479 129	547 127	615 126	682 122	746 119	793 115	849 111		
[12]	[527]	[1126]	[1745]	[2369]	[2991]	[3609]	[4228]	[4832]	[5441]	[6034]	[6586]	[6940]			
45	60 161	127 160	197 166	268 158	338 157	408 157	478 156	546 154	615 152	682 148	744 144	784 141			
[14]	[497]	[1106]	[1730]	[2344]	[2972]	[3585]	[4213]	[4816]	[5430]	[6028]	[6511]	[6940]			
53	56 187	125 187	195 186	265 186	336 185	405 184	476 182	544 180	614 178	681 174	736 170	784 166			
[16]	[472]	[1096]	[1715]	[2324]	[2947]	[3565]	[4203]	[4811]	[5420]	[5919]	[6436]				
61	53 214	124 214	194 213	263 212	333 211	403 210	475 208	544 206	612 203	669 199	727 195				
[18]	[437]	[1075]	[1690]	[2299]	[2917]	[3541]	[4188]	[4801]	[5400]	[5919]	[6362]				
68	49 241	121 241	191 240	260 239	330 237	400 236	473 234	542 231	610 229	669 224	719 219				
[20]	[402]	[1055]	[1669]	[2274]	[2898]	[3521]	[4178]	[4791]	[5394]	[5851]					
76	45 268	119 268	189 268	257 267	327 266	398 264	472 261	541 258	609 255	661 249					
[22]	[366]	[1005]	[1629]	[2257]	[2856]	[3480]	[4136]	[4756]	[5205]						
83	41 296	114 295	184 295	255 294	323 292	393 290	467 288	537 285	588 279						
[25]	[301]	[940]	[1588]	[2231]	[2825]	[3419]	[4086]	[4710]	[5205]						
95	34 336	106 336	179 335	252 334	319 333	386 331	462 328	532 325	588 314						
[30]		[845]	[1480]	[2151]	[2759]	[3328]	[3984]	[4573]	[5021]						
114		96 402	167 401	243 400	312 398	376 396	450 392	517 389	567 377						
[35]			[1348]	[2057]	[2623]	[3183]	[3883]	[4354]							
132			152 468	232 466	296 464	360 463	439 457	492 449							

C-4

4000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
310 cm³/r [19.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190	[3000] 207	[3250] 224	[3500] 241	[3750] 259
[0.5] 2	[600] 70 4	[1150] 130 2													
[1] 4	[620] 70 11	[1270] 145 11	[1920] 215 11	[2560] 290 10	[3170] 360 10	[3780] 425 10	[4290] 485 9	[4900] 555 9	[5490] 620 9	[6080] 685 8	[6670] 755 8	[7270] 820 7	[7880] 890 7	[8490] 960 6	[9080] 1025 5
[2] 8	[630] 70 23	[1280] 145 23	[1940] 220 22	[2590] 295 22	[3230] 365 21	[3830] 435 21	[4450] 505 20	[5070] 575 20	[5680] 640 19	[6300] 710 18	[6910] 780 18	[7530] 850 17	[8160] 920 17	[8790] 995 16	[9420] 1065 15
[4] 15	[640] 70 47	[1290] 145 47	[1960] 220 46	[2640] 300 46	[3290] 370 45	[3940] 445 45	[4600] 520 44	[5240] 590 44	[5880] 665 43	[6510] 735 42	[7150] 810 42	[7790] 880 41	[8450] 955 41	[9100] 1030 40	
[6] 23	[650] 75 71	[1300] 145 71	[1970] 225 70	[2660] 300 70	[3320] 375 69	[4000] 450 69	[4680] 530 68	[5330] 600 67	[5980] 675 66	[6630] 750 64	[7280] 825 64	[7940] 895 63			
[8] 30	[640] 70 96	[1300] 145 96	[1980] 225 95	[2670] 300 95	[3350] 380 94	[4030] 455 94	[4710] 530 93	[5360] 605 92	[6020] 680 91	[6670] 755 89	[7320] 825 88				
[10] 38	[620] 70 121	[1280] 145 120	[1970] 225 120	[2660] 300 119	[3340] 375 119	[4070] 460 118	[4740] 535 117	[5390] 610 116	[6050] 685 115	[6710] 760 112	[7370] 835 109				
[12] 45	[600] 70 145	[1260] 140 144	[1940] 220 144	[2630] 295 143	[3340] 375 142	[4040] 455 142	[4730] 535 141	[5390] 610 140	[6060] 685 139	[6720] 760 135					
[14] 53	[570] 65 169	[1240] 140 169	[1920] 215 168	[2600] 295 168	[3310] 375 167	[4000] 450 167	[4710] 530 165	[5380] 610 164	[6060] 685 163	[6730] 760 159					
[16] 61	[540] 60 193	[1230] 140 193	[1900] 215 192	[2580] 290 192	[3280] 370 190	[3970] 450 189	[4700] 530 188	[5380] 610 187	[6050] 685 185						
[18] 68	[490] 55 217	[1210] 135 217	[1880] 210 216	[2550] 290 216	[3240] 365 214	[3930] 445 213	[4680] 530 211	[5370] 605 209	[6040] 680 207						
[20] 76	[450] 50 242	[1190] 135 242	[1860] 210 242	[2520] 285 241	[3210] 365 240	[3900] 440 238	[4670] 530 236	[5360] 605 234	[6030] 680 232						
[22] 83	[420] 45 267	[1130] 130 266	[1820] 205 266	[2520] 285 265	[3180] 360 264	[3870] 435 262	[4640] 525 260	[5320] 600 258							
[25] 95	[340] 40 303	[1050] 120 303	[1780] 200 302	[2510] 285 301	[3160] 355 300	[3820] 430 299	[4590] 520 296	[5280] 595 293							
[30] 114		[1010] 115 363	[1700] 190 362	[2420] 275 360	[3100] 350 359	[3720] 420 358	[4500] 510 354	[5140] 580 351							
[35] 132			[1580] 180 422	[2360] 265 420	[2950] 335 419	[3540] 400 418	[4390] 495 413								

[4390] Torque [lb-in]
495 Nm
413 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
395 cm³/r [24.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190	[3000] 207	[3250] 224	[3500] 241
[0.5]	[700] 80 4	[1340] 150 2												
[1] 4	[750] 85 9	[1430] 160 9	[2110] 240 8	[2770] 315 8	[3460] 390 8	[4170] 470 7	[4890] 550 7	[5610] 635 7	[6310] 715 5	[7010] 790 4	[7700] 870 2			
[2] 8	[800] 90 18	[1550] 175 18	[2290] 260 17	[3030] 340 16	[3850] 435 16	[4620] 520 15	[5310] 600 15	[6000] 680 14	[6750] 765 13	[7010] 790 4	[7700] 870 2			
[4] 15	[860] 95 38	[1630] 185 38	[2470] 280 37	[3310] 375 36	[4120] 465 36	[4900] 555 35	[5640] 635 35	[6390] 720 34	[7190] 810 34	[7490] 845 13	[8240] 930 12	[8990] 1015 11	[9730] 1100 10	[10470] 1185 8
[6] 23	[860] 95 57	[1690] 190 57	[2540] 285 56	[3410] 385 55	[4180] 470 54	[4980] 565 53	[5780] 655 52	[6580] 745 50	[7400] 835 49	[7890] 890 33	[8780] 990 32			
[8] 30	[840] 95 76	[1680] 190 76	[2550] 290 75	[3400] 385 74	[4260] 480 73	[5090] 575 72	[5870] 665 70	[6650] 750 68	[7480] 845 66	[8220] 930 47				
[10] 38	[800] 90 95	[1680] 190 95	[2550] 290 94	[3400] 385 93	[4260] 480 92	[5100] 575 91	[5920] 670 89	[6730] 760 86	[7560] 855 84					
[12] 45	[760] 85 114	[1660] 190 114	[2520] 285 113	[3380] 380 112	[4270] 480 111	[5110] 575 110	[5900] 665 108	[6690] 755 105						
[14] 53	[740] 85 133	[1640] 185 133	[2490] 280 132	[3370] 380 131	[4260] 480 130	[5100] 575 129	[5880] 665 127	[6650] 750 124						
[16] 61	[710] 80 153	[1620] 185 153	[2460] 280 152	[3350] 380 151	[4240] 480 149	[5080] 575 147	[5840] 660 145							
[18] 68	[680] 75 172	[1600] 180 172	[2430] 275 171	[3340] 375 170	[4220] 475 168	[5060] 570 166	[5810] 655 164							
[20] 76	[610] 70 192	[1580] 180 191	[2400] 270 190	[3320] 375 189	[4210] 475 187	[5040] 570 185	[5780] 655 183							
[22] 83	[570] 65 211	[1490] 170 210	[2340] 265 209	[3220] 365 208	[4160] 470 206	[5010] 565 204	[5740] 650 201							
[25] 95	[490] 55 239	[1350] 155 238	[2250] 255 237	[3080] 350 236	[4070] 460 235	[4960] 560 233	[5700] 645 230							
[30] 114		[1080] 120 285	[1650] 185 284	[2270] 255 282	[3020] 340 281	[3850] 435 279								
[35] 132			[1520] 170 331	[2120] 240 330	[2870] 325 328	[3760] 425 325								
[40] 151				[2050] 230 376	[2790] 315 374	[3620] 410 371								

C-4

4000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
495 cm³/r [30 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172
[0.5]	[800] 90	[1750] 200	[1750] 200							
2	3	1	1							
[1]	[880] 100	[1875] 210	[2875] 325	[3825] 430	[4775] 540	[5720] 645	[6670] 755	[7600] 860		
4	7	6	6	5	4	3	2	1		
[2]	[905] 100	[1940] 220	[2975] 335	[3990] 450	[5010] 565	[6010] 680	[7010] 790	[8000] 905	[8980] 1015	
8	18	17	17	16	15	12	11	10	8	
[4]	[935] 105	[2005] 225	[3075] 345	[4160] 470	[5245] 595	[6300] 710	[7355] 830	[8375] 945	[9400] 1060	[10350] 1170
15	30	29	28	27	26	23	21	19	17	14
[6]	[920] 105	[2010] 225	[3100] 350	[4185] 475	[5265] 595	[6345] 715	[7420] 840	[8445] 955	[9465] 1070	
23	45	44	43	42	40	37	35	32	30	
[8]	[905] 100	[2015] 230	[3125] 355	[4205] 475	[5290] 600	[6385] 720	[7485] 845	[8510] 960		
30	61	60	59	57	55	52	49	46		
[10]	[880] 100	[1995] 225	[3095] 350	[4205] 475	[5295] 600	[6390] 720	[7480] 845	[8525] 960		
38	76	75	74	72	70	66	63	59		
[12]	[860] 95	[1975] 225	[3095] 350	[4200] 475	[5305] 600	[6390] 720	[7475] 845			
45	91	90	89	87	85	81	77			
[14]	[830] 95	[1945] 220	[3055] 345	[4165] 470	[5275] 595	[6360] 720	[7445] 840			
53	106	105	104	102	100	96	92			
[16]	[805] 90	[1910] 215	[3020] 340	[4130] 465	[5245] 595	[6330] 715	[7420] 840			
61	122	120	119	117	115	111	107			
[18]	[740] 85	[1860] 210	[2980] 335	[4105] 465	[5235] 590	[6305] 715	[7380] 835			
68	137	136	134	132	130	125	121			
[20]	[680] 75	[1810] 205	[2940] 330	[4085] 460	[5225] 590	[6285] 710				
76	153	152	150	147	145	140				
[25]	[570] 65	[1665] 190	[2800] 315	[4005] 455	[5210] 590	[6135] 695				
95	191	189	187	184	182	177				
[30]		[1520] 170	[2645] 300	[3765] 425	[4885] 550	[5985] 675				
114		228	226	223	220	215				
[35]			[2400] 270	[3510] 395						
132			265	263						
[40]			[2155] 245	[3260] 370						
151			305	303						

[2155] } Torque [lb-in]
245 } Nm
305 Speed RPM

C-4

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous
Peak
Intermittent
No operation

Δ Pressure bar [PSI]
625 cm³/r [38 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1600] 110	[1700] 117	[1800] 124	[2000] 138
[0.5] 2	[1000] 115 2									
[1] 4	[1080] 120 5	[2340] 265 5	[3600] 405 5	[4850] 550 4	[6100] 690 4	[7350] 830 3	[7820] 885 3	[8290] 935 2	[8760] 990 2	
[2] 8	[1085] 125 14	[2380] 270 14	[3675] 415 14	[5010] 565 13	[6350] 715 12	[7625] 860 11	[8115] 915 10	[8605] 970 9	[9095] 1030 8	[10075] 1140 7
[4] 15	[1090] 125 23	[2420] 275 23	[3750] 425 23	[5175] 585 22	[6600] 745 21	[7900] 895 19	[8410] 950 18	[9000] 1015 17	[9590] 1085 16	[10450] 1180 14
[6] 23	[1095] 125 35	[2460] 280 35	[3825] 430 35	[5220] 590 34	[6620] 750 33	[7950] 900 31	[8430] 950 30	[8910] 1005 29	[9490] 1070 28	
[8] 30	[1100] 125 48	[2500] 280 48	[3900] 440 47	[5270] 595 46	[6640] 750 45	[7990] 905 43	[8460] 955 43	[8925] 1010 42		
[10] 38	[1130] 130 60	[2550] 290 60	[3975] 450 59	[5320] 600 58	[6670] 755 57	[8045] 910 54	[8595] 970 53	[9150] 1035 52		
[12] 45	[1160] 130 72	[2600] 295 72	[4050] 460 71	[5375] 605 70	[6700] 755 69	[8100] 915 65	[8660] 980 64			
[14] 53	[1105] 125 84	[2535] 285 84	[3965] 450 83	[5325] 600 82	[6685] 755 81	[8065] 910 77	[8620] 975 76			
[16] 61	[1050] 120 96	[2465] 280 95	[3880] 440 95	[5275] 595 94	[6670] 755 93	[8035] 910 89	[8580] 970 88			
[18] 68	[990] 110 108	[2405] 270 107	[3825] 430 107	[5240] 590 105	[6655] 750 104	[7345] 830 100				
[20] 76	[930] 105 121	[2350] 265 120	[3770] 425 120	[5205] 590 118	[6640] 750 116					
[25] 95	[750] 85 151	[2175] 245 150	[3600] 405 149	[5000] 565 147	[6400] 725 146					
[30] 114	[550] 60 181	[1975] 225 180	[3400] 385 179	[4800] 542 177	[6200] 700 176					
[35] 132			[3125] 355 210	[4545] 515 208						
[40] 151			[2850] 320 241	[4295] 485 239						

C-4

Standard mount

Ports

1 1/16 -12 UN-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

4 Bolt 3/4 inch split flange ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 3/4 (BSP) Staggered ports (2)
G 1/4 (BSP) Case drain port (1)

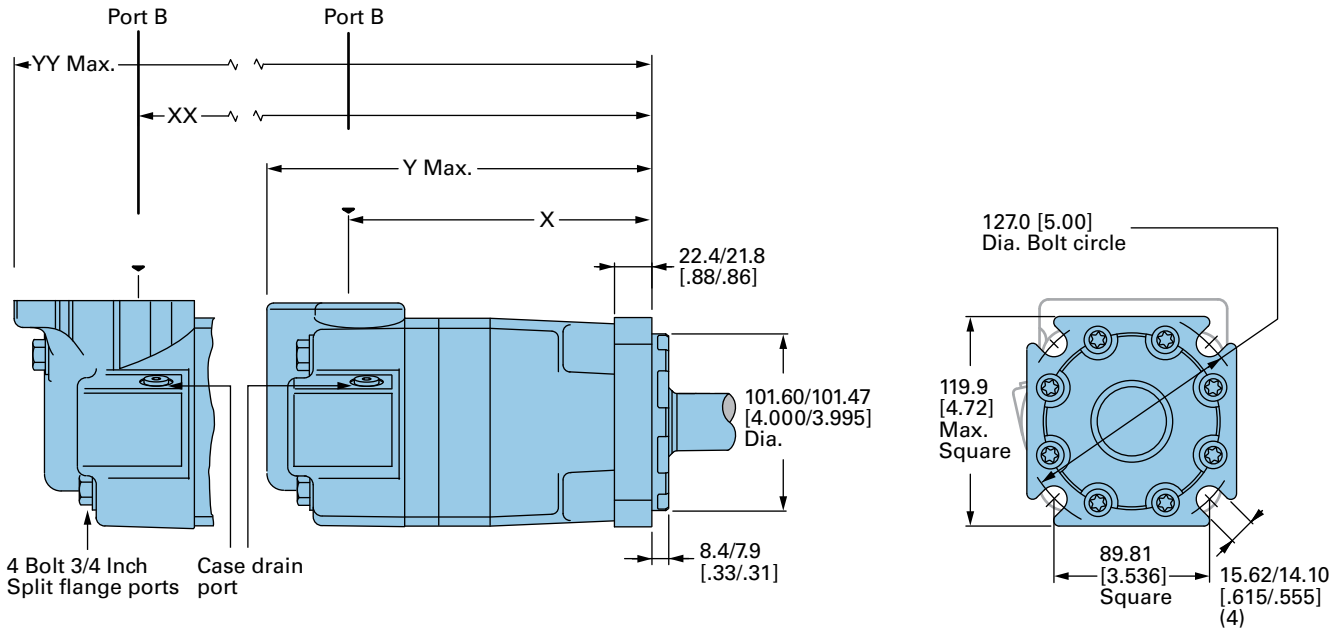
Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

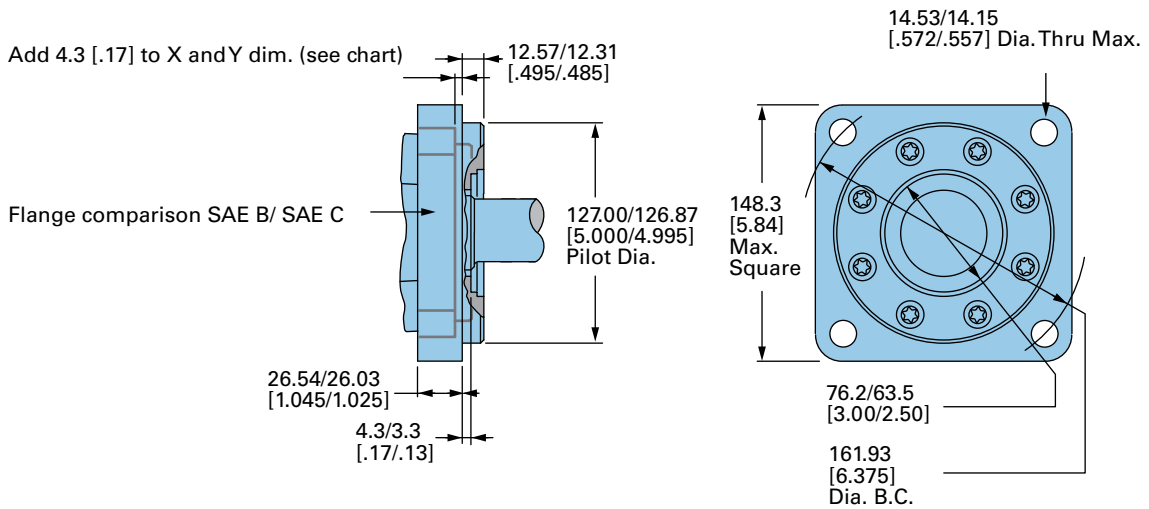
Standard mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	158.3 [6.23]	214.4 [8.44]	167.3 [6.59]	246.3 [9.70]
130 [7.9]	162.3 [6.39]	218.4 [8.60]	171.5 [6.75]	250.4 [9.86]
160 [9.9]	168.7 [6.64]	224.7 [8.85]	177.7 [7.00]	256.7 [10.11]
205 [12.5]	177.2 [6.98]	233.2 [9.18]	186.2 [7.33]	265.2 [10.44]
245 [15.0]	168.7 [6.64]	224.7 [8.85]	177.7 [7.00]	256.7 [10.11]
310 [19.0]	177.2 [6.98]	233.2 [9.18]	186.2 [7.33]	265.2 [10.44]
395 [24.0]	187.9 [7.40]	243.9 [9.60]	196.9 [7.75]	275.9 [10.86]
495 [30.0]	200.7 [7.90]	256.8 [10.11]	209.7 [8.26]	288.8 [11.37]
625 [38.0]	217.8 [8.58]	273.9 [10.78]	226.7 [8.93]	305.9 [12.04]

Standard mount



SAE C Flange



Wheel mount

Ports

1 1/16 -12 UN-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

4 Bolt 3/4 inch split flange ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 3/4 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

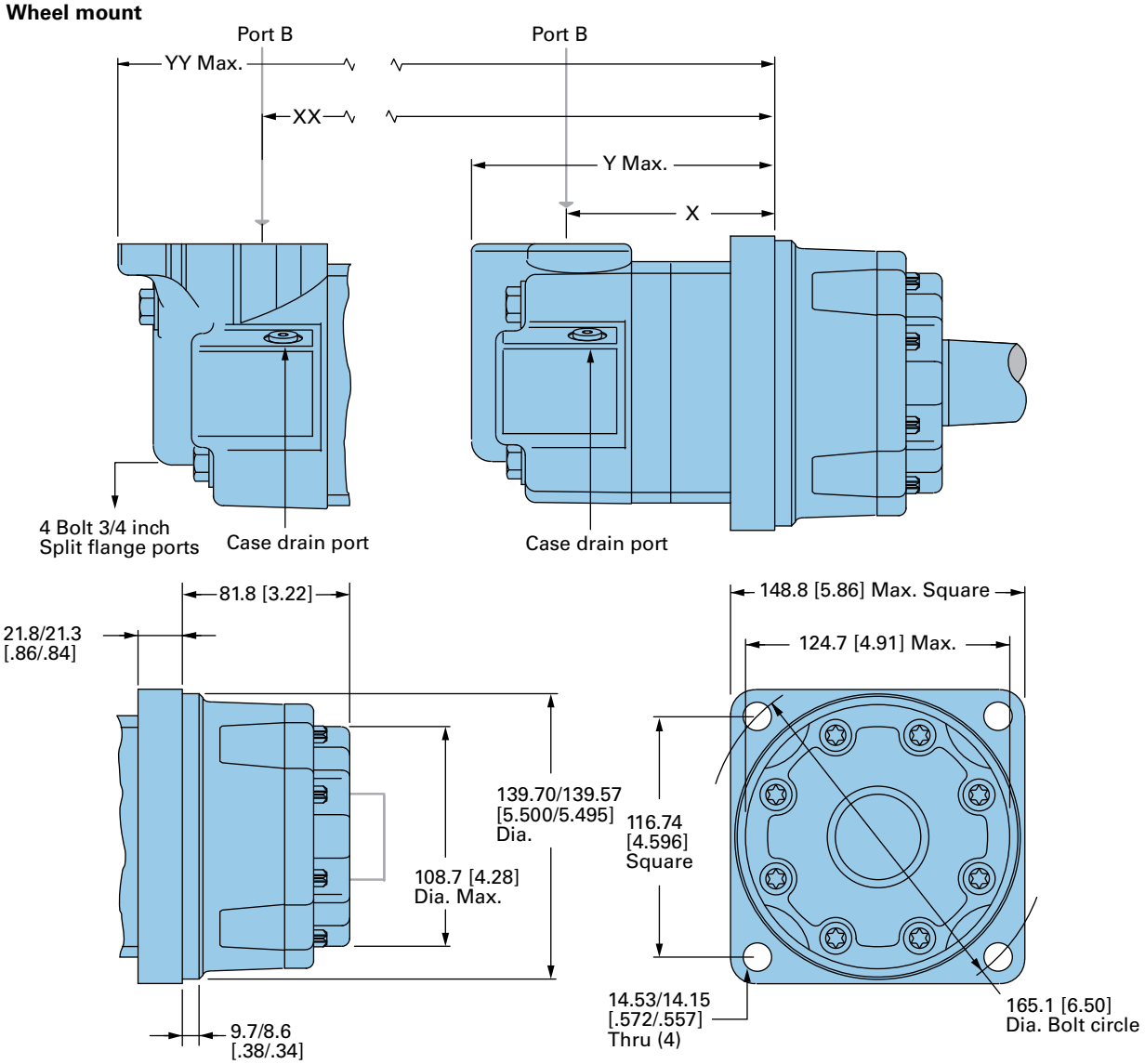
Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

Wheel mount motor dimensions

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	87.5 [3.45]	143.3 [5.64]	96.4 [3.80]	175.3 [6.90]
130 [7.9]	91.6 [3.61]	147.3 [5.80]	100.5 [3.96]	179.3 [7.06]
160 [9.9]	97.8 [3.85]	153.7 [6.05]	106.8 [4.21]	185.7 [7.31]
205 [12.5]	106.4 [4.19]	162.3 [6.39]	115.6 [4.55]	194.3 [7.65]
245 [15.0]	97.8 [3.85]	153.7 [6.05]	106.8 [4.21]	185.7 [7.31]
310 [19.0]	106.4 [4.19]	162.3 [6.39]	115.6 [4.55]	194.3 [7.65]
395 [24.0]	117.1 [4.61]	172.8 [6.81]	126.1 [4.97]	205.0 [8.07]
495 [30.0]	129.9 [5.12]	185.7 [7.31]	138.8 [5.47]	217.7 [8.57]
625 [38.0]	147.1 [5.79]	202.9 [7.99]	156.0 [6.14]	235.0 [9.25]

Wheel mount



C-4

Bearingless

Ports

1 1/16 -12 UN-2B SAE O-ring staggered ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

4 Bolt 3/4 inch split flange ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 3/4 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

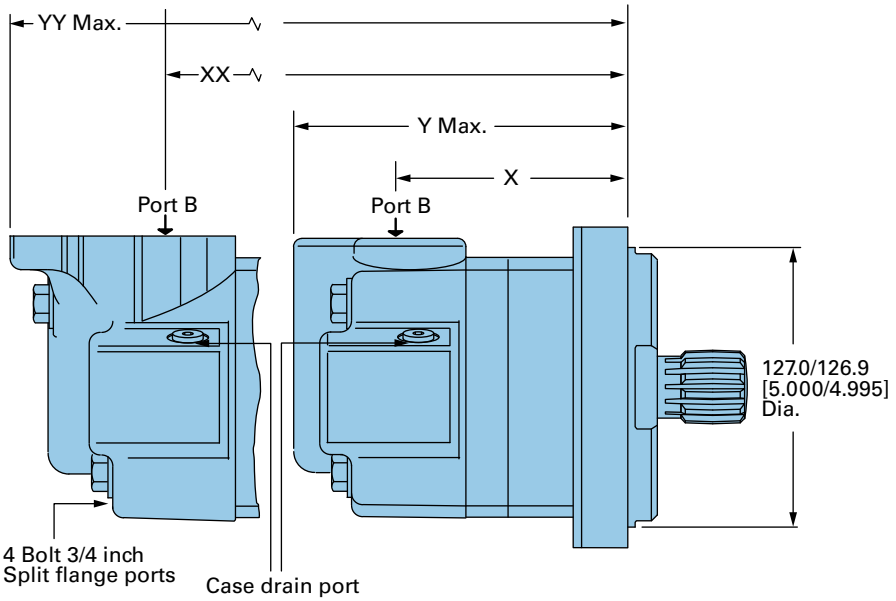
Standard rotation viewed from drive end

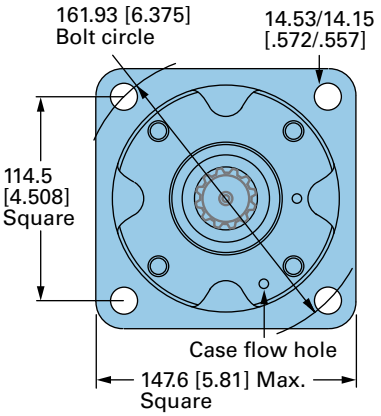
Port A pressurized — CW
Port B pressurized — CCW

Wheel mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	91.0 [3.58]	146.8 [5.78]	100.1 [3.94]	178.8 [7.04]
130 [7.9]	95.0 [3.74]	150.8 [5.94]	104.1 [4.10]	182.9 [7.20]
160 [9.9]	101.6 [4.00]	157.1 [6.19]	110.5 [4.35]	189.2 [7.45]
205 [12.5]	109.9 [4.33]	165.7 [6.52]	118.9 [4.68]	197.6 [7.78]
245 [15.0]	101.6 [4.00]	157.1 [6.19]	110.5 [4.35]	189.2 [7.45]
310 [19.0]	109.9 [4.33]	165.7 [6.52]	118.9 [4.68]	197.6 [7.78]
395 [24.0]	120.6 [4.75]	176.3 [6.94]	129.5 [5.10]	208.3 [8.20]
495 [30.0]	133.5 [5.26]	189.2 [7.45]	142.5 [5.61]	221.2 [8.71]
625 [38.0]	150.5 [5.93]	206.3 [8.12]	159.5 [6.28]	238.3 [9.38]

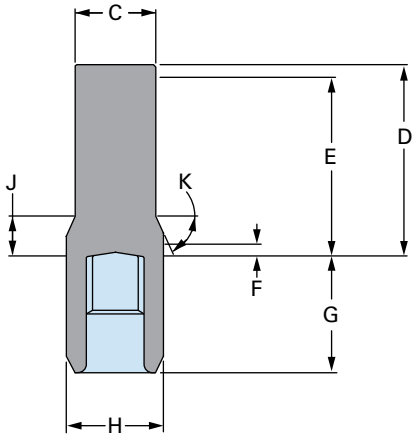
Bearingless

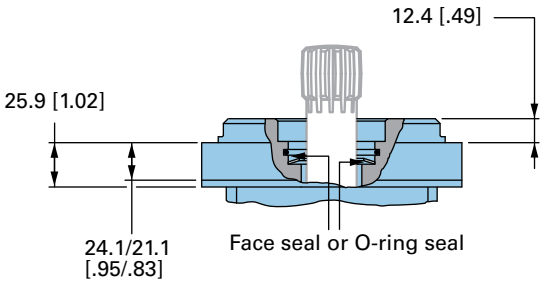




Shaft blank dimensions

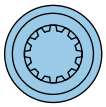
C 47.2 [1.86] Dia.
D 112.5 [4.43] Max.
E 107.4 [4.23]
Full form dia.
F 7.4 [.29] Min.
Full form dia.
G 68.8 [2.71] Max.
H 56.9 [2.24] Dia.
J 18.29 [.720]
K 38°





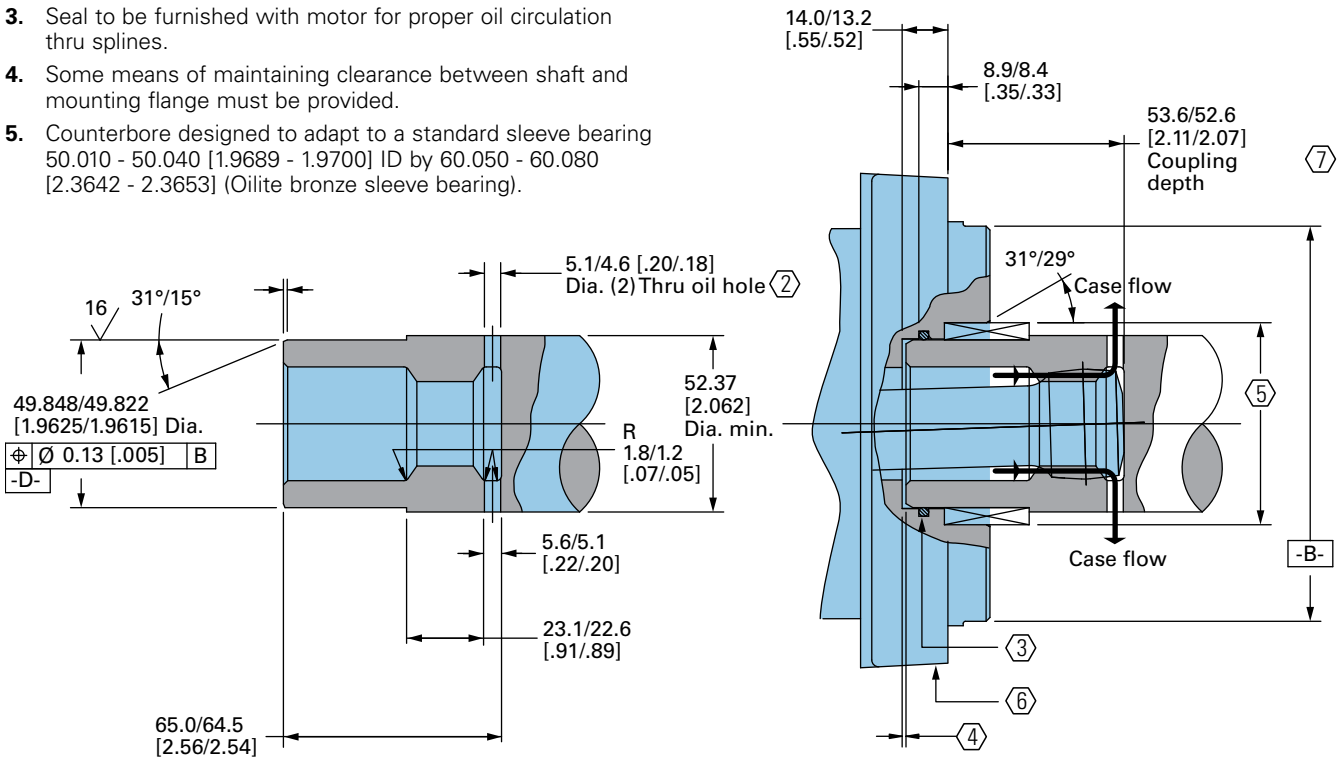
For 4000 Series bearingless motor application information contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

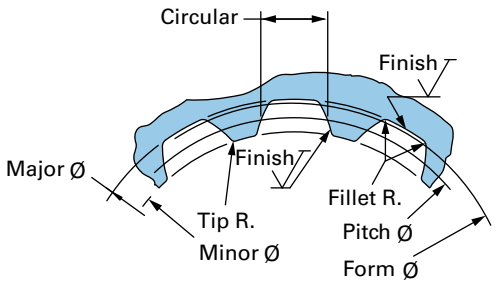
Mating coupling blank
Eaton Part no. 12745-003



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 (this is required on displacement code number 24 only).



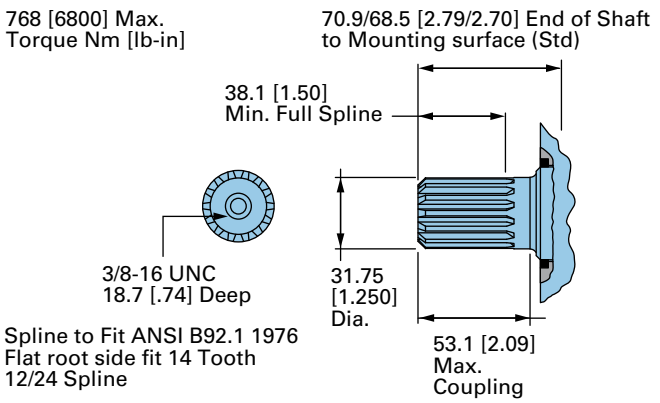


Spline pitch	10/20
Pressure angle	30°
Number of teeth	12
Class of fit	Ref. 5
Type of fit	Side
Pitch diameter	Ref. 30.480000 [1.2000000]
Base diameter	Ref. 26.396455 [1.0392305] ⌭ 0,21 [.008] D
Major diameter	33.43 [1.316] Max. 33.23 [1.308] Min.
Minor diameter	28.40 - 25.58 [1.118 - 1.125]
Form diameter, Min	32.59 [1.283]
Fillet radius	0.63 - 0.76 [.025 - .030]
Tip radius	0.26 - 0.51 [.010 - .020]

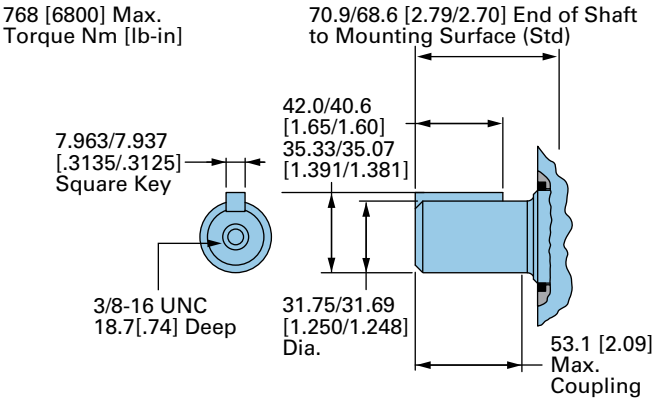
Finish	1.6 (63)
Involute profile variation	+0.000 -0.025 [+.0000 -.0010]
Total index variation	0.038 [.0015]
Lead variation	0.013 [.0005]
Circular space width:	
Maximum actual	5.045 [.1986]
Minimum effective	4.995 [.1951]
Maximum effective	Ref. 5.009 [.1972]
Minimum actual	Ref. 4.986 [.1963]
Dimension 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

Shafts

Code: 03 1 1/4 -14 Tooth splined

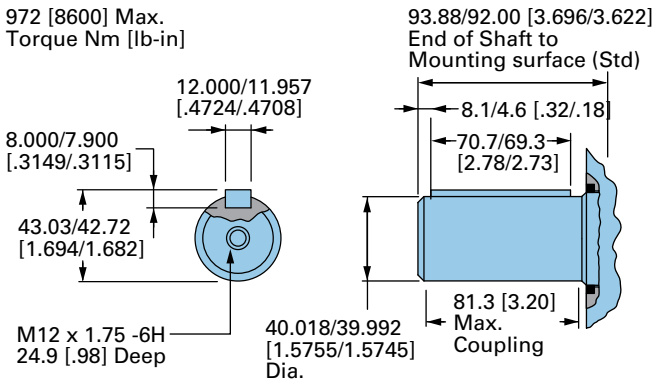


Code: 01 1 1/4 Inch straight

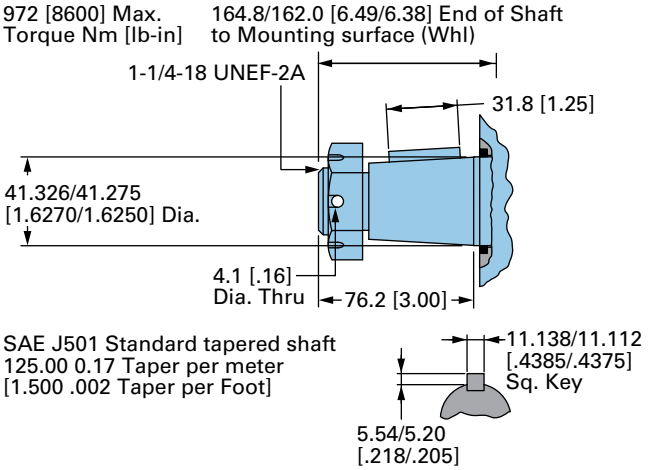


C-4

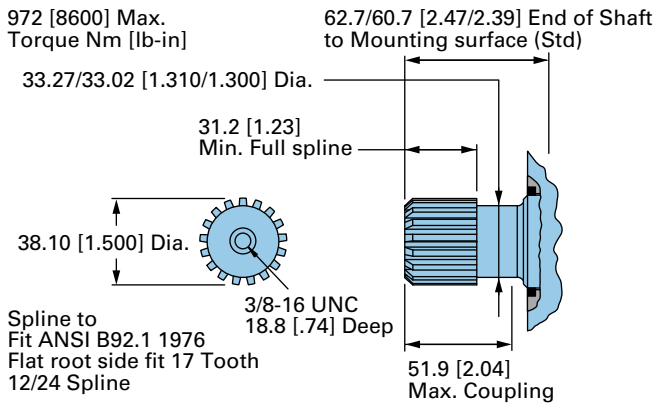
Code: 11 40 mm Straight



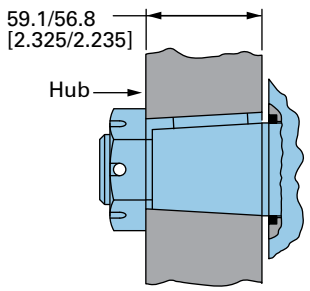
Code: 02 1 5/8 Tapered



Code: 10 1 1/2 Inch 17-Tooth splined



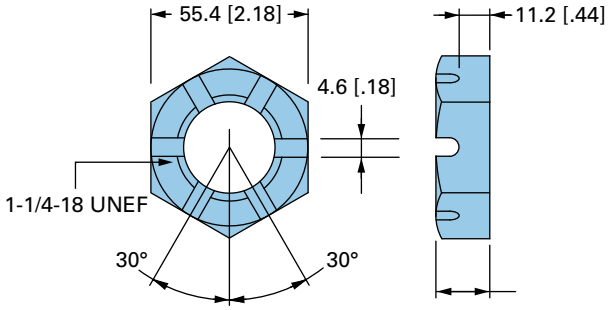
Tapered shaft hub data



Recommended torque :
(645 Nm [475 lb-ft] Dry)
(510 Nm [375 lb-ft] Lub)

Plus Torque required t o
align the slotted nut with
the Shaft crosshole.

Slotted hexagon nut

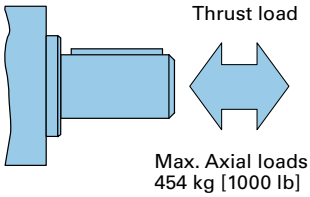


These curves indicate the radial load capacity on the motor shaft(s) at various locations with an allowable external thrust load of 454 kg [1000 lb].

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 [208lb/100 PSI].

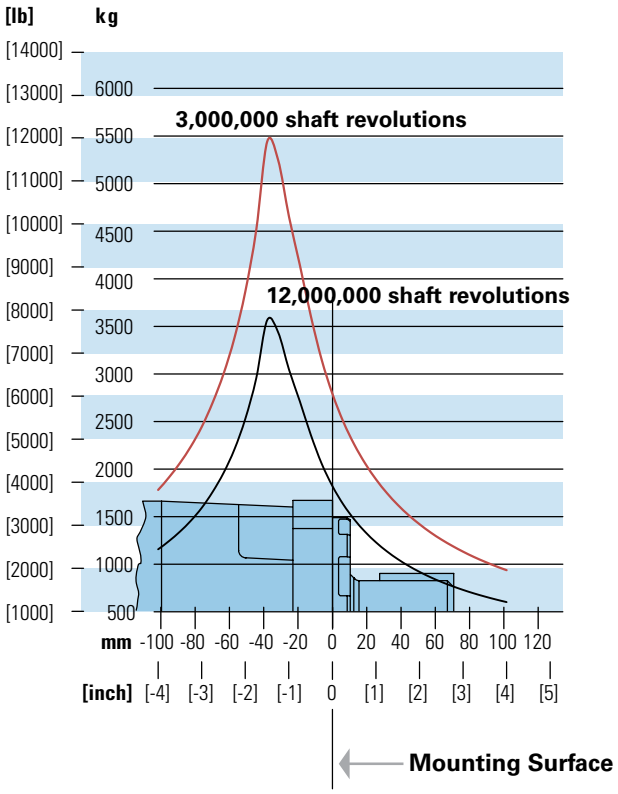
Each curve is based on B10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

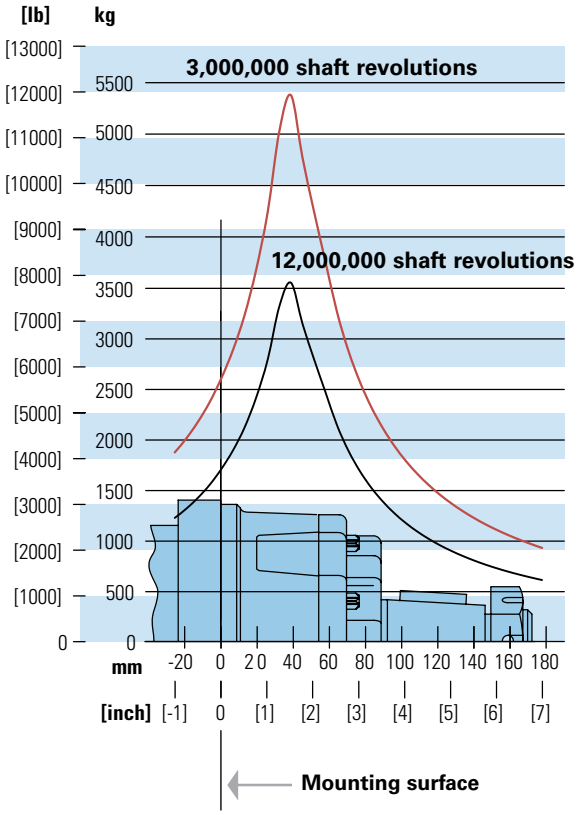


RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

Standard Motor Straight and Splined Shafts



Wheel motor tapered shaft



C-4

Case pressure and case port

Char-Lynn 4000 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.

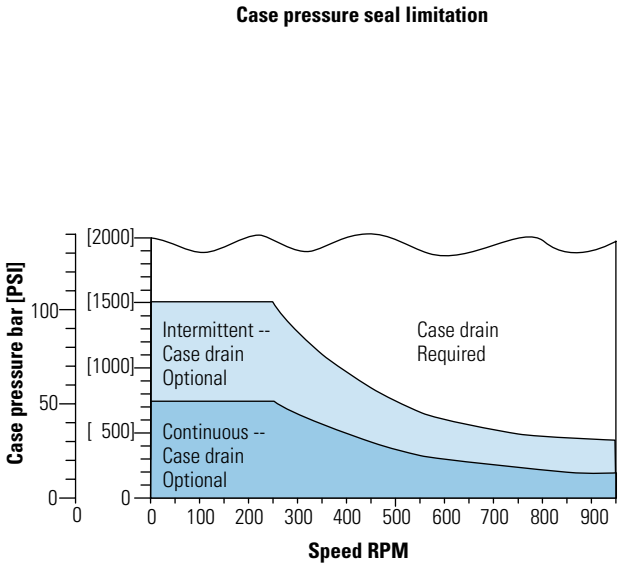
Case porting advantage

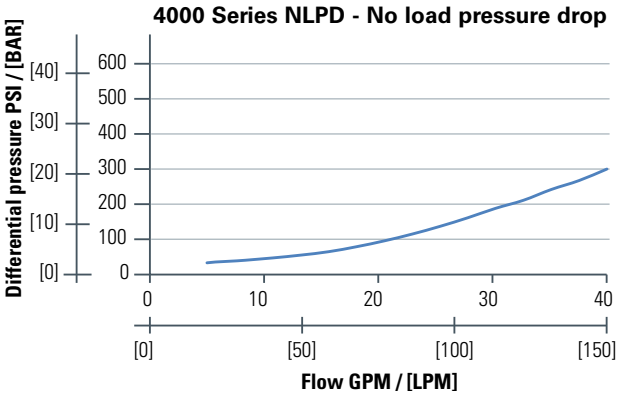
Contamination control — flushing the motor case.

Cooler motor — exiting oil draws motor heat away.

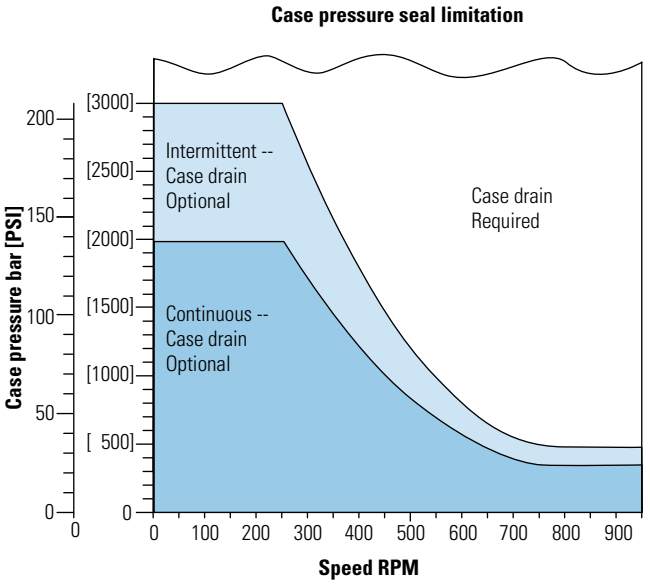
Extend motor seal life — maintain low case pressure with a preset restriction in the case drain line.

Standard shaft seal





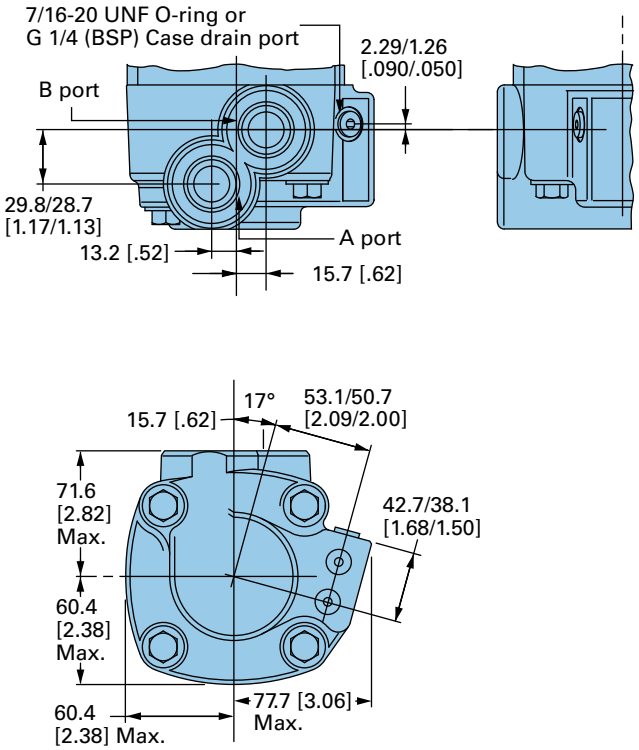
High pressure shaft seal



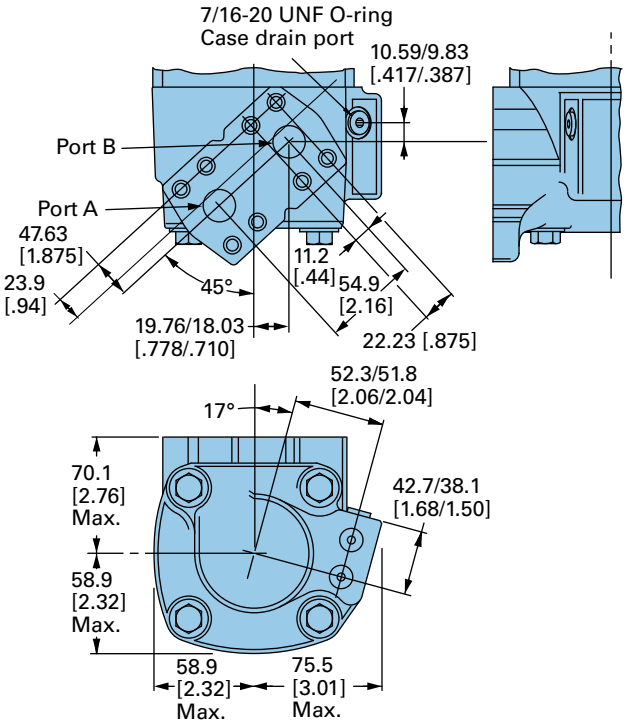
C-4

Ports

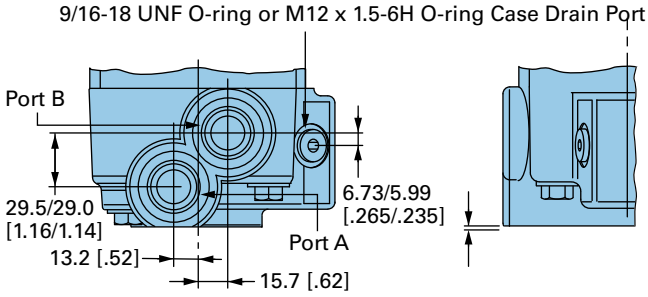
Code: AB 1-1/16-12 O-ring ports
Code: AC G 3/4 (BSP) ports



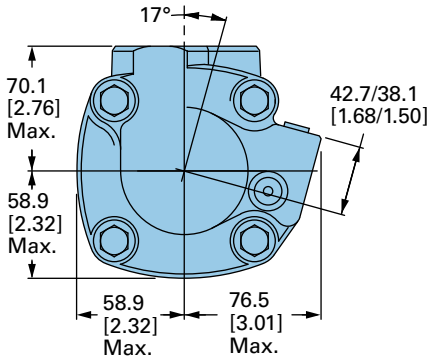
Code: AD Four Bolt 3/4 inch split flange SAE J518c (code 61)



Code: AA 7/8-14 O-ring ports
Code: AE M22 x 1.5-6H ports



6.9 [.27] Material Removed from this Housing for 7/8-14 O-ring Ports and M22 x 1.5-6H Ports



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4000 Series

Product numbers

Note: For 4000 Series Motors with a configuration Not Shown in the charts below: Use model code number system on the next page to specify product in detail.

Use digit prefix —109-, 110-, or 111- plus four digit number from charts for complete product number— Example 111-1057.

Orders will not be accepted without three digit prefix.

Mounting		Shaft	Port size	Port size displ. cm³/r [in³/r] / product number								
			110 [6.7]	130 [7.9]	160 [9.9]	205 [12.5]	245 [15.0]	280* [17.1]	310 [19.0]	395 [24.0]	495 [30.0]	625 [38.0]
Standard SAE B-Mount	1 1/4 Inch Straight	1 1/16 O-ring	109-1100	-1101	-1102	-1103	-1103	-1094	-1105	-1106	-1212	-1215
		3/4 inch Split flange	109-1001	-1054	-1002	-1003	-1055	—	-1056	-1057	—	—
	1 5/8 Inch Tapered	1 1/16 O-ring	109-1107	-1108	-1109	-1110	-1111	—	-1112	-1113	-1479	-1455
		3/4 inch Split flange	109-1006	—	—	-1008	-1059	—	-1402	-1061	—	—
	1 1/4 Inch 14 T Splined	1 1/16 O-ring	109-1114	-1115	-1116	-1117	-1118	—	-1119	-1120	—	—
		3/4 inch Split flange	109-1011	-1062	-1012	-1013	-1063	—	-1064	-1065	—	—
Standard SAE C-Mount	40 mm Straight	G 3/4 (BSP)	109-1184	-1185	-1227	-1224	-1225	—	-1189	-1190	—	—
	1 1/4 Inch 17 T Splined	G 3/4 (BSP)	109-1191	-1192	-1193	-1194	-1195	—	-1196	—	—	—
Wheel motor	1 1/4 Inch straight	1 1/16 O-ring	110-1074	-1075	-1076	-1077	-1078	—	-1079	-1080	—	-1122
		3/4 inch Split flange	—	—	-1002	—	—	—	—	—	—	—
	40 mm Straight	G 3/4 (BSP)	—	-1109	-1110	-1111	-1112	—	-1113	-1125	—	—
	1 5/8 Inch Tapered	1 1/16 O-ring	110-1081	-1082	-1083	-1084	-1085	—	-1086	-1087	1116	-1117
		3/4 inch Split flange	110-1006	-1044	-1007	—	—	—	—	-1047	—	—
	1 1/4 Inch 14 T Splined	1 1/16 O-ring	110-1088	-1089	-1090	-1091	-1092	—	-1093	-1094	—	—
		3/4 inch Split flange	—	—	—	—	—	—	—	—	—	—
Bearingless		1 1/16 O-ring	111-1033	-1034	-1035	-1036	-1037	—	-1038	-1039	-1062	-1063
		3/4 inch Split flange	111-1044	-1015	-1045	-1046	-1016	—	-1017	-1018	—	—
		G 3/4 (BSP)	111-1052	-1053	-1054	-1055	-1056	—	-1057	-1058	—	—

111-1057

C-4

The following 30-digit coding system has been developed to identify all of the configuration options for the 4000 Series motor. Use this model code to specify a motor with the desired features. All 30 digits of the code must be present when ordering.

M	04	***	**	**	**	**	*	00	0	*	**	**	00	**	00	F
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

04 4000 Series

4 5 6 Displacement cm³/r [in³/r]

067 109.8 cm³/r[6.70 in³/r]
080 130.3 cm³/r [7.95 in³/r]
099 162.2 cm³/r [9.90 in³/r]
125 205.5 cm³/r [12.54 in³/r]
150 246.3 cm³/r [15.03 in³/r]
171 280.1 cm³/r [17.09 in³/r]
190 311.8 cm³/r [19.03 in³/r]
225 369.0 cm³/r [22.52 in³/r]
240 393.9 cm³/r [24.04 in³/r]
301 492.6 cm³/r [30.06 in³/r]
342 560.2 cm³/r [34.18 in³/r]
381 623.9 cm³/r [38.07 in³/r]

7 8 Mounting type

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 Wheel, 4 Bolt: 139.70 [5.500] Pilot Dia. 14.27 [.562] Dia. Holes on 165.10 [6.500] Dia. Bolt circle.
AD Wheel, 4 Bolt: 127.00 [5.000] Pilot Dia. .500-13 UNC-2B Threaded Holes on 147.62 [5.812] Dia. Bolt circle.
AF Standard, 4 Bolt: 127.00 [5.000] Pilot Dia. 14.27 [.562] Dia. Holes on 161.92 [6.375] Dia. Bolt circle. (SAE C)
AH 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

00 None (Bearingless)
01 31.75 [1.250] Dia. Straight With .375-16UNC- 2B Thread, 53.1 [2.09] Max Coupling Length, 7.938 [.3125] Sq x 41.27 [1.625] Straight Key
02 41.28 [1.625] Dia. Tapered with 11.112 [.4375] Sq x 31.75 [1.250] Straight Key, 1.250-18UNEF-2A Thread with Slotted Hex Nut
03 31.75 [1.250] Dia. Flat root side fit, 14 tooth, 12/24 DP 30° involute spline, 38.1 [1.50] minimum full spline length with .375-16UNC-2B thread
10 38.10 [1.500] Dia. Flat root side fit, 17 tooth, 12/24 DP 30°. Involute spline, 31.2 [1.23] minimum full spline length, with .375-16 UNC-2B thread in end
11 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

11 12 Ports

AA .875-14 UNF-2B SAE O-Ring ports - staggered ports
AB 1.0625-12 UN-2B SAE O-Ring ports - staggered ports
AC G 3/4 Ports - Staggered ports
AD 19.05 [.750] 4 bolt split flange staggered ports standard pressure series (Code 61)

13 14 Case flow options

00 None
01 .5625-18 UNF-2B SAE O-Ring port with shuttle
02 .4375-20 UNF-2B SAE O-Ring port with check valve
03 G 1/4 BSP Straight thread with check valve
06 .4375-20 UNF-2B SAE O-ring port with reverse flow shuttle

15 Low pressure relief

0 None
A Set at 4.5 Bar [65 lbf/in²]
B Set at 15.2 Bar [220 lbf/in²]

16 17 Pressure/Flow option

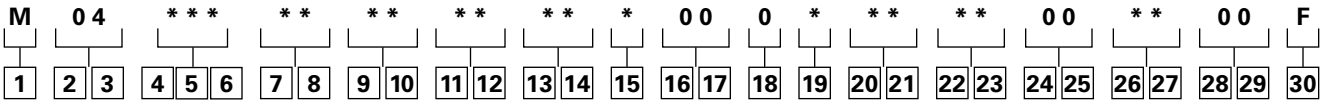
00 None

18 Geroler option

0 Standard

4000 Series

Model code



19 **Seal option**

- **0** Standard
- **1** Viton
- **3** Viton Shaft Seal
- **7** Extreme Duty Seal guard
- **B** High pressure Shaft Seal

20 21 **Accessories**

- **00** None
- **AC** M12 threaded connector, long body digital speed and direction pickup (two 36 pulse signals in quadrature per revolution pin 1=power supply, pin 2=output signal 1, pin 3=common, pin 4=output signal 2)
- **AD** M12 Threaded connector, digital speed and direction pickup (one 72 pulse per rev speed signal and one directional signal (pin 1=power, pin 2=direction, pin 2=common, pin 4=speed)

22 23 **Special features (hardware)**

- **00** None
- **17** Low noise valve plate

24 25 **Special features (assembly)**

- **00** None

26 27 **Paint/packaging**

- **00** No paint, individual box
- **AA** Low gloss black primer, individual box
- **AB** Epoxy coated (frost gray), individual box

28 29 **Customer Identification**

- **00** None

30 **Design code**

- **F** Sixth

See Eatonpowersource.com/ for more options and configurations.

Description:

With torque up to 1685 Nm [15,000 in-lbs] and 150 lpm [40 gpm] continuous, this motor is packed with power operates very smoothly.

Features:

- 9 displacements available
- Presents a multitude of options that make this motor very "smart" and flexible to apply

Benefits:

- Very tough motor for demanding applications
- Can be used in a multitude of industries
- Very easy/flexible to integrate in a system

Applications:

- Mobile equipment
- Snow removal, mowing
- Sprayer, trencher
- Wood products

Specifications

Geroler element	9 Displacements
Flow l/min [GPM]	150 [40] Continuous**
	225 [60] Intermittent*
Speed RPM	775 Cont.**
	866 Inter.*
Pressure bar [PSI]	200 [3000] Cont.**
	300 [4500] Inter.*
Torque Nm [lb-in]	1685 [14920] Cont.**
	1875 [16580] Inter.*

** Continuous— (Cont.) Continuous rating, motor may be run continuously at these ratings.
* Intermittent— (Inter.) Intermittent operation, 10% of every minute.


Skid steer loader

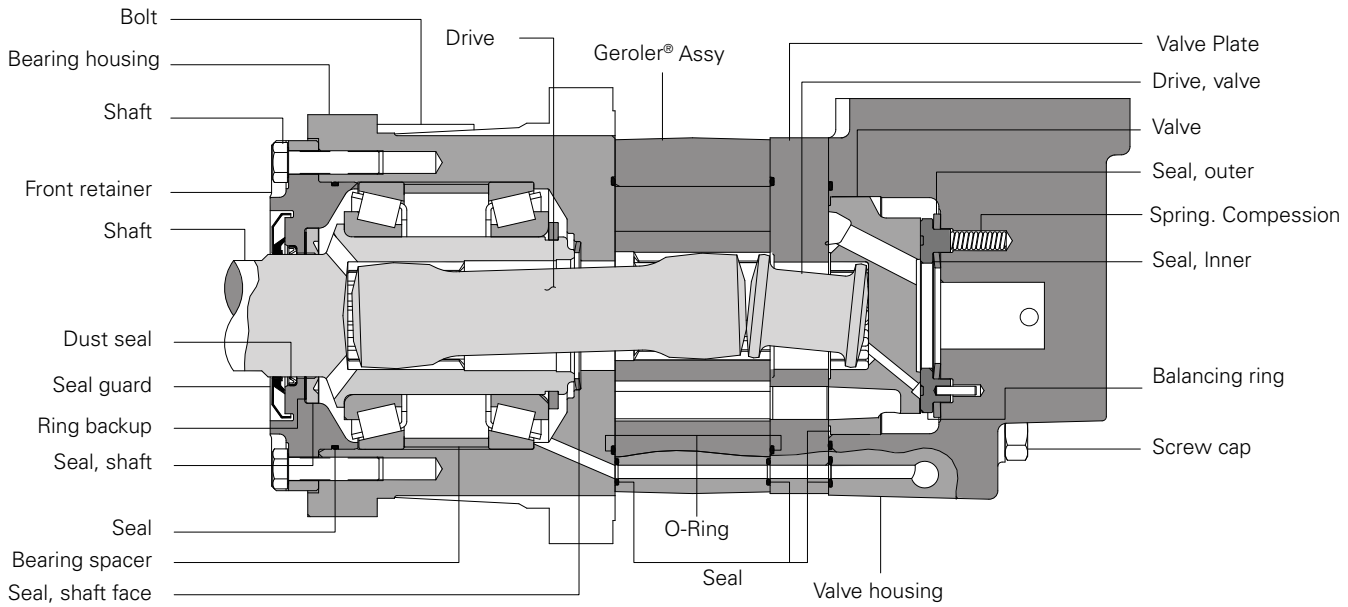

Vertical drills


Paving equipment


Trencher

6000 Series

Specifications



C-5

6000 series motors

Displ. cm³/r [in³/rev]		195 [11.9]	245 [15.0]	310 [19.0]	390 [23.9]	490 [30.0]	625 [38.0]	735 [45.0]	805 [49.0]	985 [60.0]
Max speed (RPM) @ Flow	Continuous	775	615	485	387	307	241	203	187	153
	Intermittent	866	834	698	570	454	353	303	280	230
Flow l/min [GPM]	Continuous	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]
	Intermittent	170 [45]	210 [55]	225 [60]	225 [60]	225[60]	225 [60]	225[60]	225[60]	225 [60]
Torque* Nm [lb - in]	Continuous	575 [5100]	735 [6510]	930 [8230]	1155 [10230]	1445 [12800]	1480 [13100]	1378 [12192]	1582 [14004]	1685 [14920]
	Intermittent	860 [7620]	1100 [9740]	1355 [11990]	1635 [14490]	1885 [16670]	1898 [16800]	1699 [15040]	1850 [16377]	1875 [16580]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	170 [2500]	140 [2000]	140 [2000]	140 [2000]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	275 [4000]	221 [3200]	170 [2500]	170 [2500]	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	240 [3500]	205 [3000]	170 [2500]	170 [2500]
Weight kg [lb]	Standard or Wheel mount	24.9 [55.0]	25.2 [55.5]	25.6 [56.5]	26.3 [58.0]	27.0 [59.5]	27.9 [61.5]	28.6 [63.0]	29 [64.0]	30.4 [67.0]
	Bearingless	20.2 [44.5]	20.4 [45.0]	20.9 [46.0]	21.5 [47.5]	22.2 [49.0]	23.1 [51.0]	23.8 [52.5]	24.3 [53.5]	25.6 [56.5]

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

Note: To assure best motor life, run motor in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

Maximum inlet pressure:
310 bars (4500 PSI)

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

Maximum return pressure:
310 bar [4500 PSI] with case drain line installed.

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

Δ bar [Δ PSI]:
The true pressure difference between inlet port and outlet port

Continuous rating:
Motor may be run continuously at these ratings

Intermittent operation:
10% of every minute

Peak operation:
1% of every minute

Recommended fluids:
Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 13 cSt [70 SUS] at operating temperature.

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

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

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
195 cm³/r [11.9 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.5]	[280]	[650]	[1450]	[2290]						
	30	75	165	260						
2	9	7	5	2						
[2]	[290]	[680]	[1500]	[2340]	[3100]	[3880]	[4140]			
	35	75	170	265	350	440	470			
8	38	37	35	34	30	26	18			
[4]	[300]	[710]	[1500]	[2390]	[3200]	[4030]	[4600]	[5200]	[5790]	
	35	80	170	270	360	455	520	590	655	
15	77	76	74	72	66	62	46	32	18	
[8]	[310]	[740]	[1590]	[2450]	[3280]	[4120]	[4810]	[5530]	[6250]	[6900]
	35	85	180	275	370	465	545	625	705	780
30	154	153	148	144	131	119	116	99	83	65
[14]	[320]	[750]	[1610]	[2480]	[3330]	[4190]	[4990]	[5810]	[6630]	[7320]
	35	85	180	280	375	475	565	655	750	825
53	232	230	225	221	212	203	186	167	148	118
[16]	[300]	[730]	[1600]	[2470]	[3340]	[4210]	[5090]	[5900]	[6710]	[7470]
	35	80	180	280	375	475	575	665	760	845
61	309	307	303	300	291	283	258	236	214	181
[20]	[270]	[720]	[1590]	[2460]	[3350]	[4240]	[5100]	[5950]	[6800]	[7620]
	30	80	180	280	380	480	575	670	770	860
76	387	384	379	374	365	356	332	306	280	247
[24]	[240]	[700]	[1570]	[2440]	[3330]	[4220]	[5080]	[5940]	[6810]	
	25	80	175	275	375	475	575	670	770	
91	465	462	456	450	440	429	413	388	363	
[28]	[190]	[660]	[1530]	[2400]	[3300]	[4200]	[5060]	[5940]	[6810]	
	20	75	175	270	375	475	570	670	770	
106	542	539	532	526	514	502	476	448	421	
[32]	[160]	[630]	[1500]	[2370]	[3270]	[4160]	[5040]	[5920]	[6790]	
	20	70	170	270	370	470	570	670	765	
121	620	617	609	602	589	576	542	511	480	
[36]	[120]	[620]	[1480]	[2350]	[3240]	[4130]	[5000]	[5880]	[6760]	
	15	70	165	265	365	465	565	665	765	
136	697	692	683	674	659	645	601	564	527	
[40]	[80]	[610]	[1450]	[2320]	[3210]	[4100]	[4960]	[5840]		
	10	70	165	260	365	465	560	660		
151	775	770	759	749	733	718	666	624		
[45]		[590]	[1410]	[2280]	[3170]	[4060]	[4920]	[5790]		
		65	160	260	360	460	555	655		
170		866	854	843	825	808	749	702		

[5790] Torque [lb-in]
655 Nm
702 Speed RPM

C-5

6000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Intermittent

Peak

No operation

Δ Pressure bar [PSI]
245 cm³/r [15.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.5] 2	[430] 50 7	[860] 95 4	[1890] 215 1							
[2] 8	[440] 50 30	[900] 100 29	[1940] 220 26	[2990] 340 24	[3960] 445 21	[4920] 555 17	[5425] 615 11	[5930] 670 6		
[4] 15	[460] 50 61	[940] 105 60	[2000] 225 56	[3060] 345 54	[4080] 460 48	[5090] 575 42	[5680] 640 39	[6630] 750 30	[7570] 855 12	[8520] 965 6
[8] 30	[470] 55 122	[960] 110 120	[2060] 235 116	[3150] 355 113	[4210] 475 104	[5260] 595 95	[6180] 700 81	[7100] 800 67	[8020] 905 53	[9020] 1020 37
[14] 53	[480] 55 183	[970] 110 182	[2080] 235 178	[3180] 360 174	[4270] 480 165	[5360] 605 157	[6390] 720 141	[7420] 840 125	[8450] 955 109	[9510] 1075 92
[16] 61	[450] 50 245	[960] 110 244	[2070] 235 240	[3180] 360 236	[4290] 485 228	[5420] 610 221	[6480] 730 202	[7490] 845 184	[8480] 960 165	[9540] 1080 145
[20] 76	[420] 45 307	[940] 105 306	[2050] 230 301	[3160] 355 297	[4290] 485 287	[5440] 615 277	[6510] 735 257	[7580] 855 238	[8660] 980 218	[9740] 1100 197
[24] 91	[380] 45 368	[920] 105 365	[2020] 230 361	[3120] 355 358	[4260] 480 348	[5400] 610 338	[6490] 735 316	[7590] 860 294	[8680] 980 271	
[28] 106	[330] 35 430	[870] 100 426	[1980] 225 421	[3100] 350 416	[4240] 480 404	[5380] 610 376	[6480] 730 358	[7580] 855 340	[8670] 980 322	
[32] 121	[290] 35 491	[800] 90 489	[1920] 215 481	[3050] 345 475	[4170] 470 461	[5290] 600 448	[6410] 725 423	[7520] 850 398	[8640] 975 373	
[36] 136	[250] 30 556	[730] 80 549	[1850] 210 543	[2980] 335 537	[4060] 460 524	[5150] 580 509	[6300] 710 482	[7440] 840 456		
[40] 151	[200] 25 615	[690] 80 612	[1790] 200 606	[2940] 330 599	[4010] 455 585	[5130] 580 570	[6190] 700 540	[7100] 800 510		
[45] 170		[570] 65 688	[1760] 200 682	[2860] 325 674	[3960] 445 658	[5070] 575 641	[6080] 685 608	[6690] 755 574		
[50] 189			[1720] 195 758	[2800] 315 749	[3890] 440 731	[4920] 555 712	[5940] 670 676			
[55] 208			[1670] 190 834	[2740] 310 824	[3820] 430 804	[4890] 550 783	[5880] 665 744			

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
310 cm³/r [19.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[0.5] 2	[530] 60 6	[1120] 125 4	[2440] 275 1							
[2] 8	[540] 60 24	[1150] 130 23	[2460] 280 22	[3620] 410 20	[4780] 540 17	[5690] 645 14	[6670] 755 10	[7780] 880 4		
[4] 15	[550] 60 48	[1180] 135 47	[2560] 290 45	[3800] 430 42	[5030] 570 38	[6050] 685 32	[7070] 800 24	[8260] 935 17	[9070] 1025 10	[9530] 1075 3
[8] 30	[560] 65 96	[1250] 140 95	[2650] 300 91	[3970] 450 87	[5280] 595 81	[6480] 730 73	[7710] 870 64	[8740] 985 55	[9770] 1105 46	[10990] 1240 35
[14] 53	[570] 65 144	[1260] 140 143	[2690] 305 140	[4050] 460 135	[5420] 610 129	[6730] 760 121	[8040] 910 111	[9260] 1045 99	[10490] 1185 88	[11800] 1335 76
[16] 61	[540] 60 193	[1230] 140 192	[2660] 300 188	[4060] 460 184	[5450] 615 178	[6800] 770 167	[8150] 920 156	[9400] 1060 141	[10660] 1205 126	[11990] 1355 109
[20] 76	[510] 60 242	[1200] 135 241	[2630] 295 236	[4040] 455 232	[5450] 615 226	[6820] 770 216	[8190] 925 201	[9520] 1075 184	[10840] 1225 167	
[24] 91	[480] 55 290	[1160] 130 289	[2600] 295 282	[4020] 455 279	[5440] 615 273	[6840] 775 260	[8230] 930 248	[9560] 1080 232	[10900] 1230 215	
[28] 106	[420] 45 339	[1130] 130 336	[2570] 290 333	[3990] 450 328	[5420] 610 320	[6820] 770 308	[8220] 930 295	[9520] 1075 276	[10840] 1225 257	
[32] 121	[360] 40 388	[1100] 125 384	[2510] 285 381	[3920] 445 375	[5330] 600 368	[6750] 765 354	[8170] 925 341	[9440] 1065 320		
[36] 136	[300] 35 436	[1060] 120 430	[2440] 275 421	[3830] 435 416	[5220] 590 410	[6660] 750 396	[8100] 915 383	[9330] 1055 360		
[40] 151	[270] 30 485	[1020] 115 478	[2400] 270 466	[3780] 425 461	[5150] 580 456	[6580] 745 441	[8020] 905 427	[9220] 1040 403		
[50] 189		[982] 110 597	[2180] 245 582	[3420] 385 576	[4660] 525 570	[6050] 685 551	[7440] 840 534			
[60] 227			[1960] 220 698	[3250] 365 691	[4540] 515 684	[5750] 650 661	[7080] 800 641			

[5750] Torque [lb-in]
650 Nm
661 Speed RPM

C-5

6000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Intermittent

Peak

No operation

Δ Pressure bar [PSI]
390 cm³/r [23.9 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276	[4500] 310
[1] 4	[760] 85 4	[1570] 175 2	[3230] 365 1							
[2] 8	[780] 90 19	[1610] 180 18	[3270] 370 17	[4910] 555 16	[6440] 730 14	[7760] 875 12	[9080] 1025 9	[10590] 1195 4		
[4] 15	[800] 90 38	[1640] 185 38	[3300] 375 37	[4970] 560 35	[6570] 740 33	[8160] 920 29	[9570] 1080 22	[11270] 1275 14	[12880] 1455 5	[14490] 1635 1
[8] 30	[810] 90 77	[1650] 185 76	[3370] 380 74	[5080] 575 72	[6740] 760 68	[8430] 950 65	[10050] 1135 55	[11620] 1315 45	[12880] 1455 33	[14480] 1635 21
[14] 53	[800] 90 115	[1620] 185 115	[3390] 385 112	[5130] 580 109	[6810] 770 105	[8520] 965 100	[10190] 1150 91	[11860] 1340 81	[13640] 1540 79	
[16] 61	[750] 85 154	[1600] 180 154	[3380] 380 151	[5120] 580 147	[6820] 770 143	[8560] 965 132	[10230] 1155 126	[11920] 1345 116		
[20] 76	[680] 75 193	[1580] 180 193	[3360] 380 189	[5120] 580 187	[6840] 775 182	[8590] 970 175	[10280] 1160 162	[11980] 1355 152		
[24] 91	[620] 70 232	[1520] 170 230	[3280] 370 229	[5060] 570 225	[6780] 765 220	[8530] 965 212	[10240] 1155 204			
[28] 106	[570] 65 270	[1460] 165 268	[3210] 365 266	[5000] 565 261	[6730] 760 256	[8480] 960 248	[10200] 1150 236			
[32] 121	[530] 60 309	[1420] 160 306	[3140] 355 304	[4930] 555 299	[6640] 750 292	[8380] 945 282	[10120] 1145 269			
[36] 136	[450] 50 348	[1370] 155 346	[3010] 340 340	[4840] 545 336	[6500] 735 329	[8250] 930 317	[10000] 1130 301			
[40] 151	[380] 45 387	[1320] 150 386	[2880] 325 380	[4740] 535 375	[6460] 730 368	[8120] 915 359				
[50] 189		[1140] 130 482	[2650] 300 475	[4540] 515 469	[6440] 730 460	[8050] 910 449				
[60] 227			[2460] 280 570	[4430] 500 562	[6360] 720 552	[7860] 890 538				

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
490 cm³/r [30.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276
[1] 4	[1010] 115 7	[2200] 235 7	[4260] 480 5	[6140] 695 3					
[2] 8	[1020] 115 15	[2110] 240 14	[4270] 480 13	[6280] 710 12	[8350] 945 11	[10420] 1175 8	[12140] 1370 3		
[4] 15	[1030] 115 30	[2100] 235 30	[4280] 485 29	[6410] 725 28	[8500] 960 27	[10590] 1195 25	[12500] 1410 21	[14580] 1645 17	[16670] 1885 12
[8] 30	[1020] 115 60	[2090] 235 60	[4290] 485 59	[6490] 735 57	[8620] 975 54	[10740] 1215 51	[12800] 1445 45	[14930] 1685 38	
[14] 53	[1000] 115 91	[2080] 235 91	[4290] 485 89	[6500] 735 87	[8650] 975 84	[10800] 1220 79	[12890] 1455 71		
[16] 61	[1100] 124 122	[2060] 235 122	[4260] 480 121	[6480] 730 118	[8650] 975 114	[10820] 1220 109	[12900] 1460 100		
[20] 76	[900] 100 153	[1980] 225 152	[4180] 470 150	[6420] 725 147	[8620] 975 144	[10820] 1220 139			
[24] 91	[850] 95 184	[1930] 220 184	[4150] 470 181	[6390] 720 180	[8580] 970 176	[10770] 1215 171			
[28] 106	[740] 85 215	[1840] 210 214	[4070] 460 211	[6290] 710 208	[8500] 960 204	[10720] 1210 198			
[32] 121	[690] 80 245	[1710] 195 244	[3970] 450 241	[6190] 700 237	[8420] 950 232	[10660] 1205 226			
[36] 136	[670] 75 276	[1560] 175 275	[3860] 435 272	[6080] 685 265	[8340] 940 260	[10420] 1175 255			
[40] 151	[570] 65 307	[1400] 160 306	[3750] 425 303	[5970] 675 295	[8140] 920 290	[10180] 1150 284			
[50] 189		[1140] 130 382	[3240] 365 379	[5220] 590 369	[7620] 860 362				
[60] 227			[2860] 325 454	[4860] 550 442	[7140] 805 435				

[2860] Torque [lb-in]
325 Nm
454 Speed RPM

C-5

6000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
625 cm³/r [38.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3200] 221
[1] 4	[1060] 120 5	[2205] 250 5	[4515] 510 4	[6690] 755 2				
[2] 8	[1090] 125 12	[2300] 260 12	[4720] 535 12	[7025] 795 10	[9360] 1060 6			
[4] 15	[1145] 130 24	[2450] 275 24	[5052] 570 24	[7520] 850 21	[10090] 1140 16	[12700] 1434 13		
[8] 30	[1195] 135 45	[2600] 295 45	[5350] 605 44	[8195] 925 42	[11220] 1270 37	[13100] 1480 35	[15800] 1785 32	[16800] 1898 30
[14] 53	[1200] 135 72	[2600] 295 72	[5390] 610 71	[8145] 920 68	[10570] 1195 64	[13000] 1469 60	[15700] 1774 56	
[16] 61	[1120] 125 94	[2530] 285 94	[5340] 605 92	[8105] 915 89	[10530] 1190 85	[13000] 1469 83		
[20] 76	[1050] 120 120	[2465] 280 119	[5285] 595 117	[8080] 915 115	[11725] 1325 110			
[24] 91	[950] 105 144	[2365] 265 143	[5180] 585 140	[7990] 905 138	[11705] 1320 132			
[28] 106	[855] 95 169	[2255] 255 168	[5080] 575 165	[7915] 895 162	[11640] 1315 156			
[32] 121	[730] 80 193	[2140] 240 192	[4960] 560 188	[7775] 880 185	[11505] 1300 179			
[36] 136	[555] 65 217	[1965] 220 216	[4780] 540 213	[7585] 855 210				
[40] 151	[380] 45 241	[1790] 200 240	[4600] 520 238	[7395] 835 236				
[50] 189			[4180] 470 296	[6985] 790 290				
[60] 227			[3800] 430 353	[6600] 745 345				

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Intermittent

Peak

No operation

Δ Pressure bar [PSI]
735 cm³/r [45.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172
[1] 4	[1311] 148 4	[2775] 314 4	[4200] 475 3	[5480] 619 3	[7000] 791 2					
[2] 8	[1340] 151 10	[2856] 323 10	[4535] 512 10	[6020] 680 10	[7551] 853 9	[8685] 981 7	[10182] 1150 6	[11121] 1257 5		
[4] 15	[1253] 142 20	[2854] 322 20	[4363] 493 19	[5813] 657 18	[7272] 822 17	[8714] 985 16	[10135] 1145 14	[11537] 1303 13	[12970] 1465 11	[15040] 1699 11
[8] 30	[1290] 146 40	[2889] 326 39	[4540] 513 38	[6130] 693 38	[7703] 870 37	[9202] 1040 37	[10666] 1205 35	[12192] 1378 33	[13713] 1549 32	
[14] 53	[1277] 144 61	[2821] 319 60	[4528] 512 59	[6180] 698 58	[7795] 881 57	[9338] 1055 56	[10877] 1229 54	[12419] 1403 52		
[16] 61	[1196] 135 82	[2753] 311 80	[4478] 506 79	[6148] 695 78	[7768] 878 77	[9376] 1059 76	[10984] 1241 74			
[20] 76	[1092] 123 102	[2794] 316 101	[4320] 488 101	[6021] 680 99	[7697] 870 97	[9311] 1052 96	[10907] 1232 93			
[24] 91	[1206] 136 123	[2556] 289 122	[4162] 470 120	[5871] 663 119	[7564] 855 118	[9289] 1049 116				
[28] 106	[1083] 122 145	[2338] 264 142	[4040] 456 141	[5666] 640 139	[7365] 832 137	[9022] 1019 135				
[32] 121	[950] 107 163	[2110] 238 162	[3795] 429 162	[5457] 617 159	[7122] 805 159	[8828] 997 156				
[36] 136	[726] 82 184	[1845] 208 183	[3517] 397 182	[5223] 590 181	[6853] 774 179					
[40] 151	[515] 58 203	[2227] 252 202	[3270] 369 202	[4965] 561 201	[6672] 754 199					
[50] 189			[3869] 437 254	[4870] 550 252	[5850] 661 250					
[60] 227				[4856] 549 303	[6604] 746 301					

[6604] Torque [lb-in]
746 Nm
301 Speed RPM

6000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
805 cm³/r [49.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172
[1] 4	[1455] 164 4	[3100] 350 4	[4680] 529 2	[6031] 681 2	[7799] 881 1					
[2] 8	[1483] 168 9	[3173] 359 9	[5121] 579 9	[6432] 727 8	[8510] 961 7	[9633] 1088 6	[11319] 1279 5	[12127] 1370 5		
[4] 15	[1547] 175 19	[3331] 376 19	[5292] 598 18	[7000] 790 17	[8714] 984 16	[10075] 1138 15	[11352] 1283 14	[12965] 1465 12	[14564] 1645 11	[16377] 1850 10
[8] 30	[1599] 181 35	[3473] 392 35	[5415] 612 34	[7170] 810 33	[8934] 1009 32	[10629] 1201 31	[12300] 1390 29	[14004] 1582 29	[15441] 1745 28	
[14] 53	[1599] 181 56	[3469] 392 56	[5415] 612 55	[7093] 801 53	[9024] 1020 53	[10658] 1204 52	[12283] 1388 50	[13726] 1551 50		
[16] 61	[1543] 174 73	[3395] 384 73	[5357] 605 72	[7032] 794 70	[8983] 1015 69	[10640] 1202 68	[12010] 1357 67			
[20] 76	[1457] 165 93	[3312] 374 92	[5292] 598 91	[6968] 787 89	[8943] 1010 88	[10583] 1196 87	[12146] 1372 86			
[24] 91	[1352] 153 112	[3183] 360 112	[5088] 575 111	[6811] 769 110	[8812] 996 108	[10411] 1176 106				
[28] 106	[1213] 137 131	[3055] 345 131	[5047] 570 131	[6713] 758 129	[8681] 981 128	[10411] 1176 127				
[32] 121	[1075] 121 150	[2907] 328 149	[4884] 552 149	[6546] 740 146	[8395] 949 145	[10060] 1137 144				
[36] 136	[823] 93 168	[2692] 304 168	[4663] 527 168	[6320] 714 167	[8118] 917 165					
[40] 151	[592] 67 187	[2477] 280 186	[4426] 500 186	[6085] 688 185	[7832] 885 184					
[50] 189		[2730] 308 234	[4214] 476 233	[5849] 661 231	[7603] 859 230					
[60] 227			[3806] 430 280	[5459] 617 277	[7407] 837 275					

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
985 cm³/r [60.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138
[1] 4	[1890] 215 3	[4110] 465 3	[5730] 645 2	[7640] 865 2	[9550] 1080 1			
[2] 8	[1910] 215 8	[4140] 470 8	[6270] 710 7	[8300] 940 7	[10420] 1175 6	[12500] 1410 5	[13860] 1565 4	[14920] 1685 3
[4] 15	[1980] 225 15	[4290] 485 15	[6480] 730 15	[8540] 965 14	[10670] 1205 14	[12800] 1445 13	[13900] 1570 13	[15850] 1790 12
[8] 30	[2030] 230 30	[4400] 495 30	[6630] 750 30	[8790] 995 29	[10940] 1235 28	[13090] 1480 27	[14500] 1640 26	[16580] 1875 25
[14] 53	[2020] 230 45	[4390] 495 45	[6630] 750 45	[8860] 1000 44	[11050] 1250 43	[13240] 1495 42	[15040] 1700 41	
[16] 61	[2010] 225 61	[4320] 490 61	[6560] 740 61	[8790] 995 60	[11000] 1245 59	[13260] 1500 58		
[20] 76	[1910] 215 77	[4220] 475 77	[6480] 730 76	[8720] 985 76	[10950] 1235 75	[13160] 1485 74		
[24] 91	[1810] 205 92	[4060] 460 92	[6230] 705 92	[8500] 960 91	[10790] 1220 90	[12990] 1470 89		
[28] 106	[1620] 185 107	[3920] 445 107	[6180] 700 107	[8420] 950 106	[10630] 1200 105	[12820] 1450 103		
[32] 121	[1480] 165 123	[3740] 425 123	[5980] 675 122	[8200] 925 121	[10280] 1160 120			
[36] 136	[1140] 130 138	[3490] 395 138	[5710] 645 138	[7930] 895 137	[9940] 1125 135			
[40] 151	[850] 95 153	[3240] 365 153	[5420] 610 152	[7640] 865 151	[9590] 1085 150			
[50] 189		[2960] 325 191	[5160] 585 190	[7350] 830 189	[9310] 1050 188			
[60] 227			[4660] 525 230	[7160] 810 229	[9070] 1025 226			

[7160] Torque [lb-in]
810 Nm
229 Speed RPM

C-5

Dimensions

Standard mount

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)

4 Bolt 3/4 inch Split flange ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1 (BSP) Staggered ports (2)
G 1/4 (BSP) Case drain port (1)

1 5/16 UN-2B SAE O-ring staggered ports (2) with shuttle
9/16 -20 UNF-2B SAE O-ring case drain port (1)

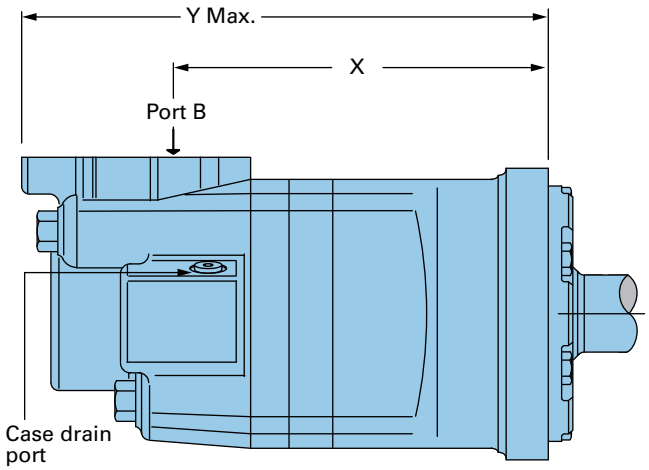
Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

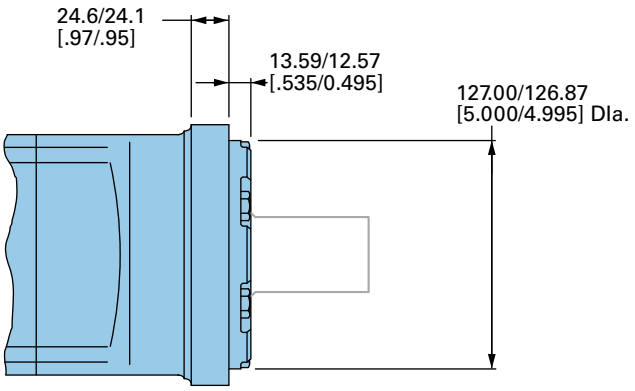
Standard motor mount dimensions

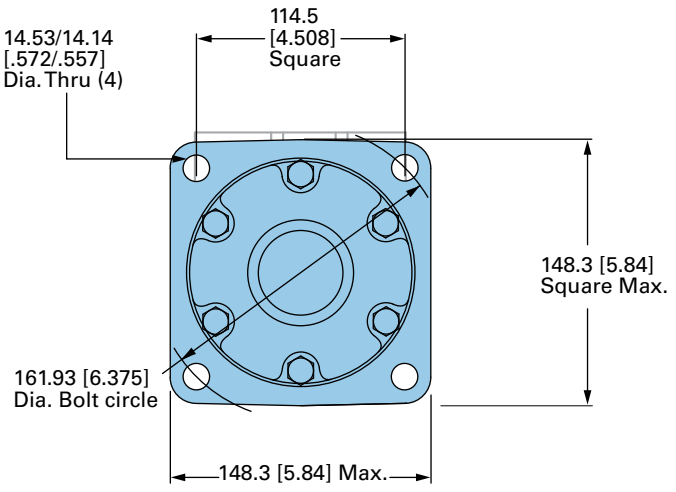
Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
195 [11.9]	187.7 [7.39]	270.4 [10.65]
245 [15.0]	193.3 [7.61]	276.0 [10.87]
310 [19.0]	200.7 [7.9]	283.3 [11.15]
390 [23.9]	209.3 [8.24]	292.1 [11.50]
490 [30.0]	220.5 [8.68]	303.2 [11.94]
625 [38.0]	235.0 [9.25]	317.9 [12.52]
735 [45.0]	247.5 [9.74]	330.5 [13.01]
805 [49]	254.89 [10.035]	337.8 [13.30]
985 [60.0]	274.9 [10.82]	357.6 [14.08]

Standard mount



Standard SAE CC Flange





Wheel mount

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)

4 Bolt 3/4 inch split flange ports (2)
7/16 -20 UNF-2B SAE O-ring Case drain port (1)

G 1 (BSP) Staggered ports (2)
G 1/4 (BSP) Case drain port (1)

1 5/16 UN-2B SAE O-ring staggered ports (2) with shuttle
9/16 -20 UNF-2B SAE O-ring case drain port (1)

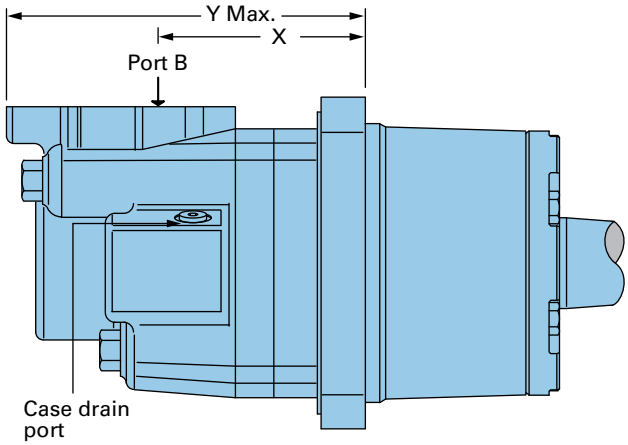
Standard rotation viewed from shaft end

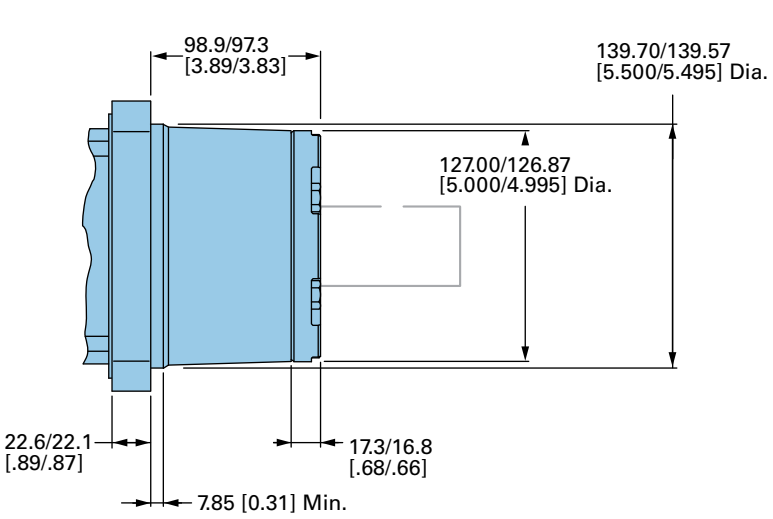
Port A pressurized — CW
Port B pressurized — CCW

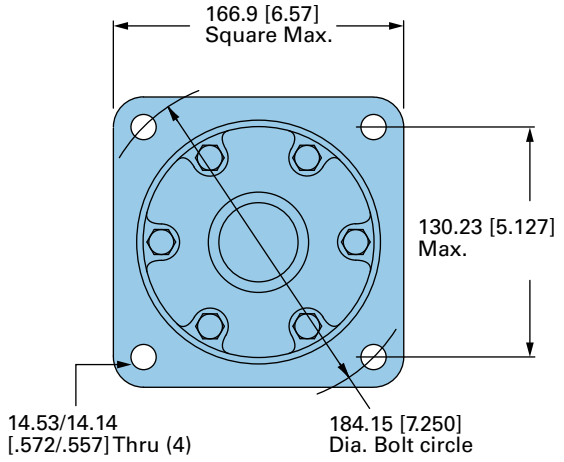
Wheel mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
195 [11.9]	102.6 [4.04]	185.6 [7.31]
245 [15.0]	108.2 [4.26]	191.3 [7.53]
310 [19.0]	115.6 [4.55]	198.5 [7.82]
390 [23.9]	124.5 [4.90]	207.3 [8.16]
490 [30.0]	135.4 [5.33]	218.4 [8.60]
625 [38.0]	150.1 [5.91]	233.1 [9.18]
735 [45]	162.8 [6.41]	245.7 [9.67]
805 [49]	169.9 [6.9]	253 [9.96]
985 [60.0]	189.7 [7.47]	272.8 [10.74]

Wheel mount







C-5

Global mount (ISO)

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)

4 Bolt 3/4 inch Split flange ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1 (BSP) Staggered ports (2)
G 1/4 (BSP) Case drain port (1)

1 5/16 UN-2B SAE O-ring staggered ports (2) with shuttle
9/16 -20 UNF-2B SAE O-ring case drain port (1)

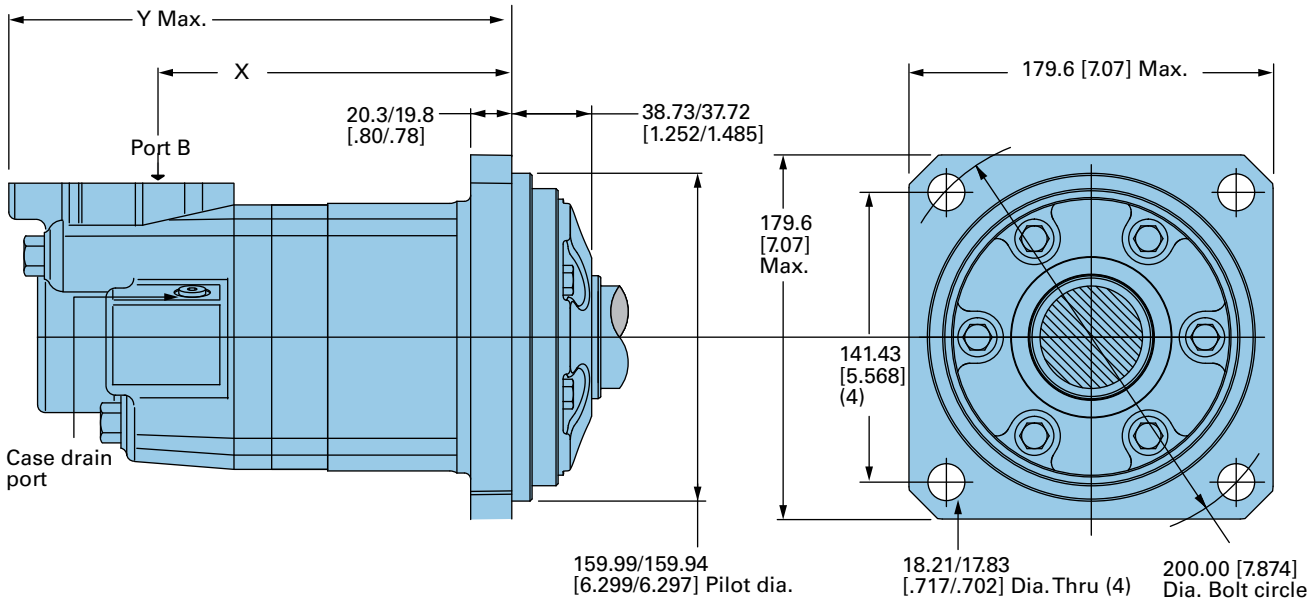
Standard rotation viewed from shaft end

Port A pressurized — CW
Port B pressurized — CCW

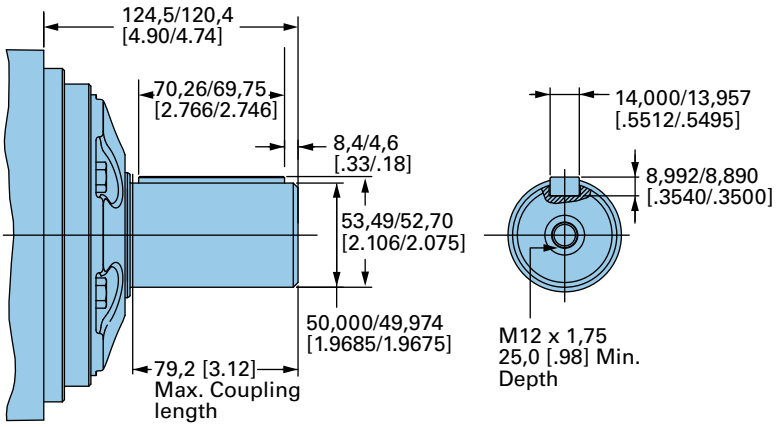
Global mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
310 [19.0]	182.4 [7.18]	264.9 [10.43]
390 [24.0]	191.0 [7.52]	273.6 [10.77]
490 [30.0]	202.2 [7.96]	284.7 [11.21]
625 [38.0]	216.9 [8.54]	299.5 [11.79]
800 [45.0]	229.4 [9.03]	312.2 [12.29]
800 [49.0]	236.7 [9.32]	319.3 [12.57]
985 [60.0]	256.5 [10.10]	339.1 [13.35]

Global mount (ISO)



50 mm Dia. Straight shaft



Bearlingless

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)

4 Bolt 3/4 inch split flange ports (2)
7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1 (BSP) staggered ports (2)
G 1/4 (BSP) case drain port (1)

1 5/16 UN-2B SAE O-ring staggered ports (2) with shuttle
9/16 -20 UNF-2B SAE O-ring case drain port (1)

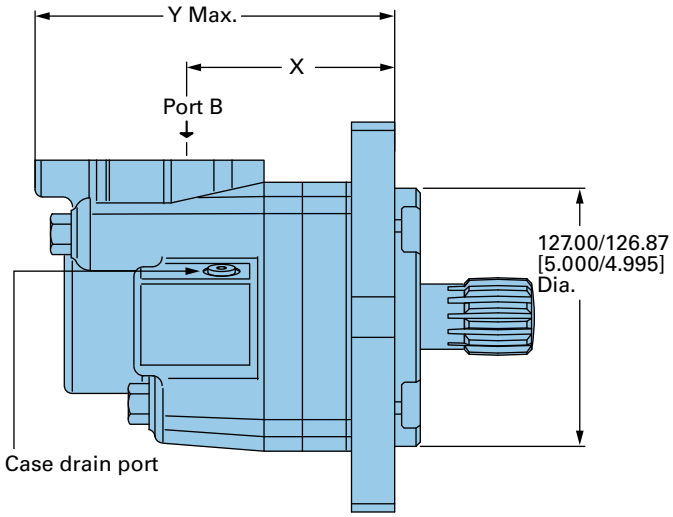
Standard rotation viewed from drive end

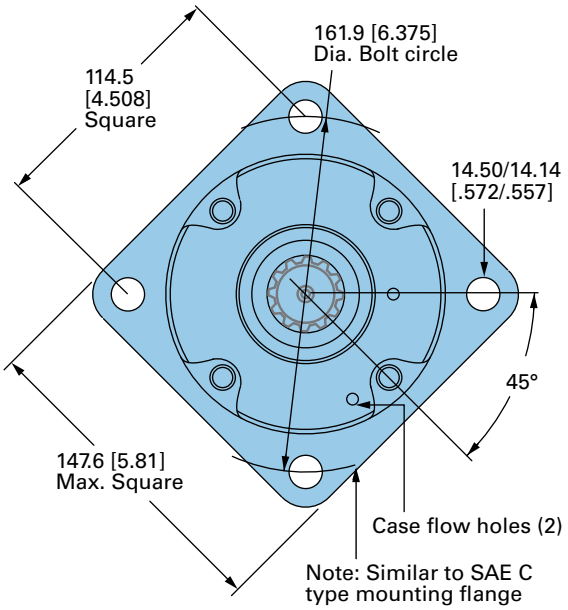
Port A pressurized — CW
Port B pressurized — CCW

Bearingless motor dimensions

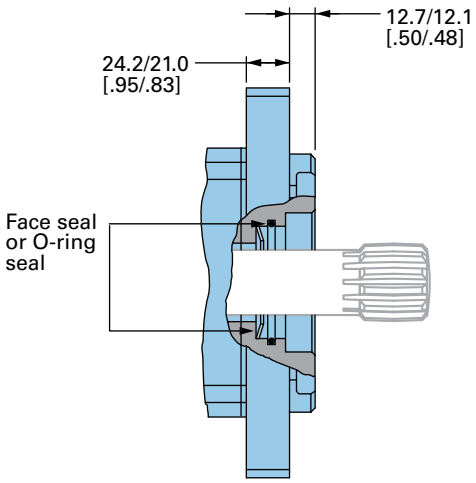
Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
195 [11.9]	105.4 [4.15]	188.0 [7.40]
245 [15.0]	111.0 [4.37]	193.5 [7.62]
310 [19.0]	118.4 [4.66]	200.7 [7.90]
390 [23.9]	127.3 [5.01]	209.6 [8.25]
490 [30.0]	138.2 [5.44]	220.7 [8.69]
625 [38.0]	152.9 [6.02]	235.5 [9.27]
735 [45]	166.1 [6.54]	248.2 [9.77]
805 [49]	172.85 [6.805]	255.3 [10.05]
985 [60.0]	192.8 [7.59]	275.1 [10.83]

Bearingless



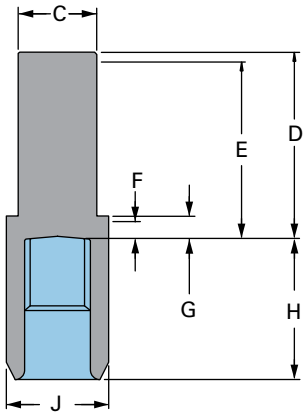


For 6000 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

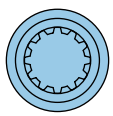


Bearingless blank dimensions

C 47.2 [1.86] Dia.
D 112.5 [4.39] Max.
E 106.4 [4.19]
Full form dia.
F 6.9 [.27] Min.
Full form dia.
G 10.2 [.40] Max.
H 86.1 [3.39] Max.
J 66.5 [2.62] Dia.

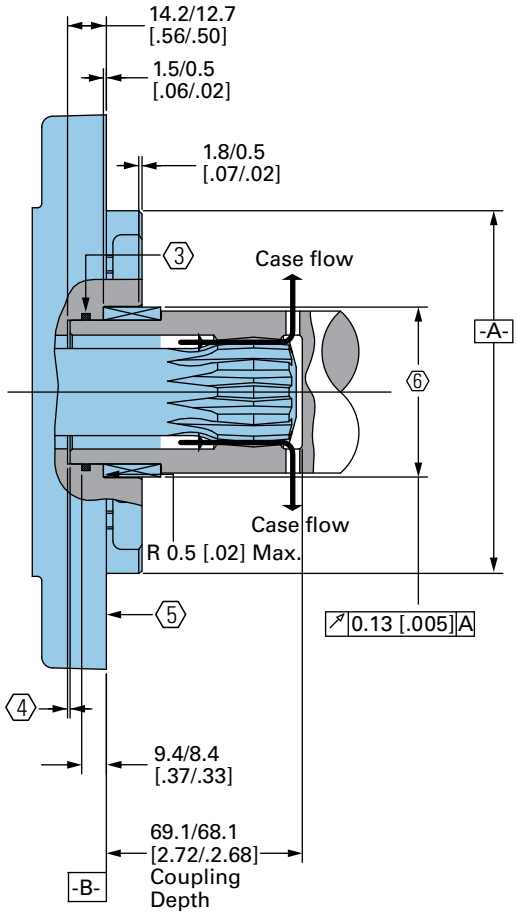


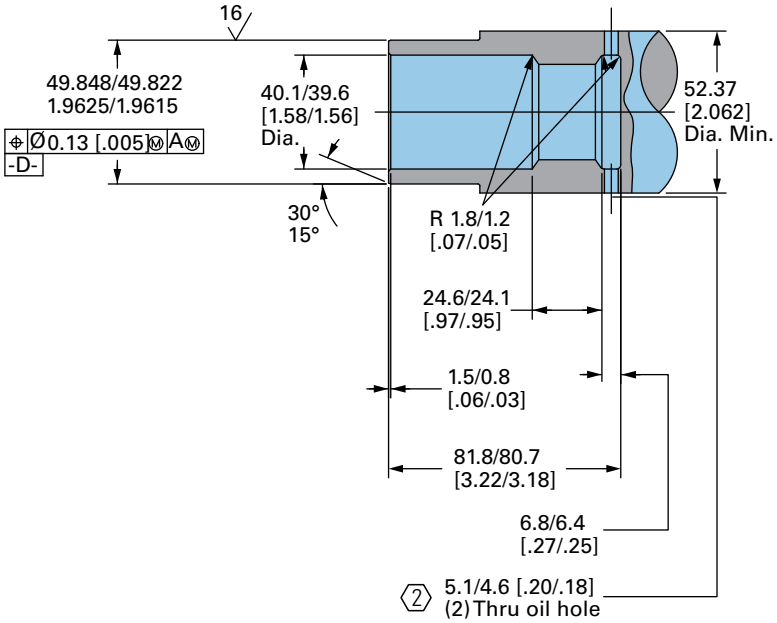
Mating coupling blank Eaton Part no. 12778-002

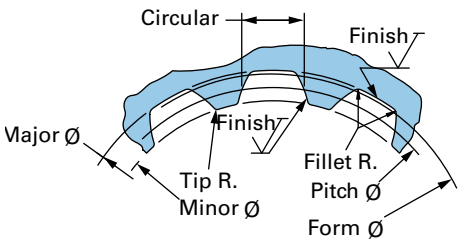


C-5

Bearingless







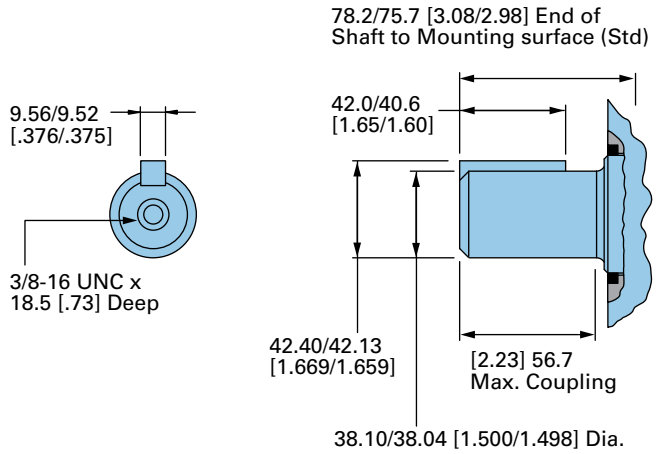
1. Internal spline in mating part to be as follows: Material to be ASTM A304, 8620H. Carbonize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0.076 - 1.02 [.030 - .040] (dimensions apply after heat treat).
2. Mating part to have critical dimensions as shown. Oil holes must be provided and open 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. Similar to SAE "C" Four Bolt Flange.
6. Counterbore designed to adapt to a standard sleeve bearing 50.010 - 50.038 [1.9689 - 1.9700] ID by 60.051 - 60.079 [2.3642 - 2.3653] O.D. (Oilite bronze sleeve bearing).

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]
Base diameter	Ref. 31.054652 [1.2226241] 0.21 [.008] D
Major diameter	39.17 [1.542] Max. 38.97 [1.534] Min.
Min. Minor diameter	33.30 - 33.48 [1.311 - 1.318]
Form diameter, Min	38.33 [1.509]
Fillet radius	0.64 - 0.76 [.025 - .030]
Tip radius	0.25 - 0.51 [.010 - .020]
Finish	1.6 (63)
Involute profile variation	+0.000 -0.025 [+.0000 -.0010]
Total index variation	0.038 [.0015]
Lead variation	0.038 [.0015]
Circular space width:	
Maximum actual	5.898 [.2322]
Minimum effective	5.804 [.2285]
Maximum effective	Ref. 5.857 [.2306]
Minimum actual	Ref. 5.834 [.2297]
Dimension between two pins	Ref. 26.929 - 27.084 [1.0602 - 1.0663]
Pin diameter	6.223 [.2450] Pins to Have 4.0 [.160] Wide flat for root clearance

Shafts splined

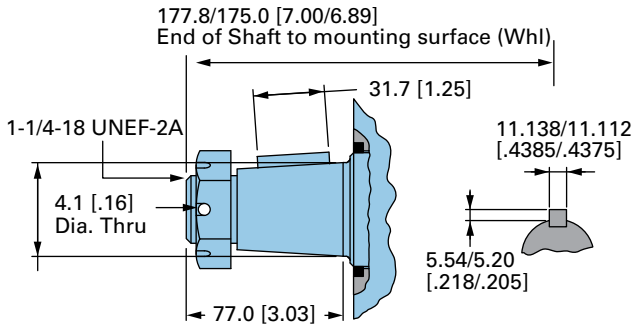
Code: 01 1 1/2 Inch Straight

1328 [11750] Max. Torque Nm [lb-in]



Code: 02 1 3/4 Inch tapered

2107 [18650] Max. Torque Nm [lb-in]

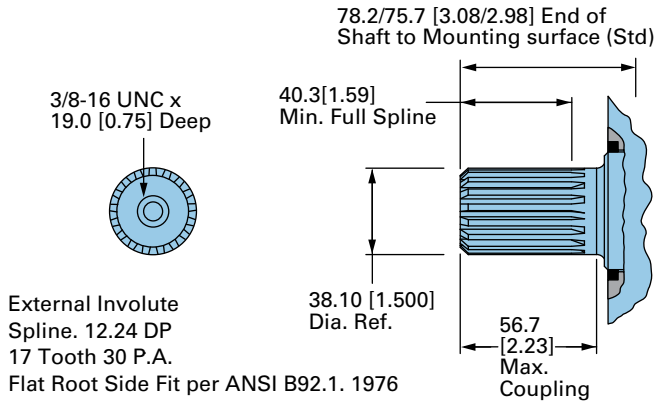


SAE J501 Standard tapered shaft 125.00 0.17 Taper per Meter
[1.500±.002 Taper per Foot]

C-5

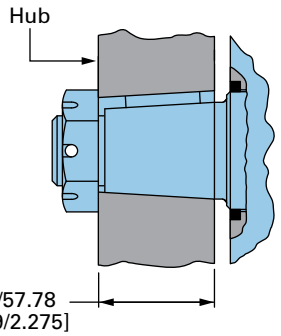
Code: 03 1 1/2 Inch 17 Tooth splined

1328 [11750] Max. Torque Nm [lb-in]



External Involute
Spline. 12.24 DP
17 Tooth 30 P.A.
Flat Root Side Fit per ANSI B92.1. 1976

Tapered shaft hub data

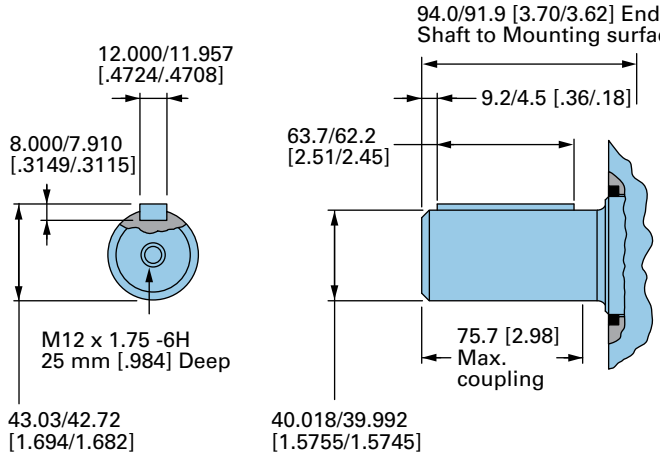


Recommended Torque:
(645 Nm [475 lb-ft] Dry)
(510 Nm [375 lb-ft] Lub)

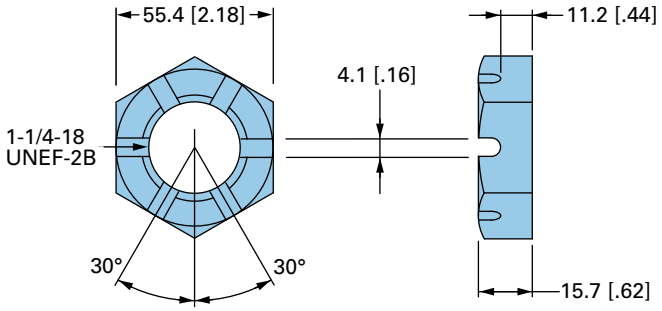
Plus Torque required to
align the slotted nut with
the Shaft Crosshole.

Code: 04 40 mm Straight

1328 [11750] Max. Torque Nm [lb-in]



Slotted hexagon nut



6000 Series

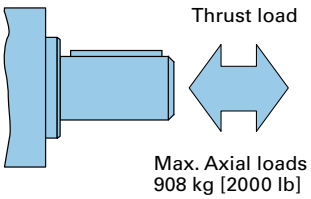
Shaft side load capacity

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].

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

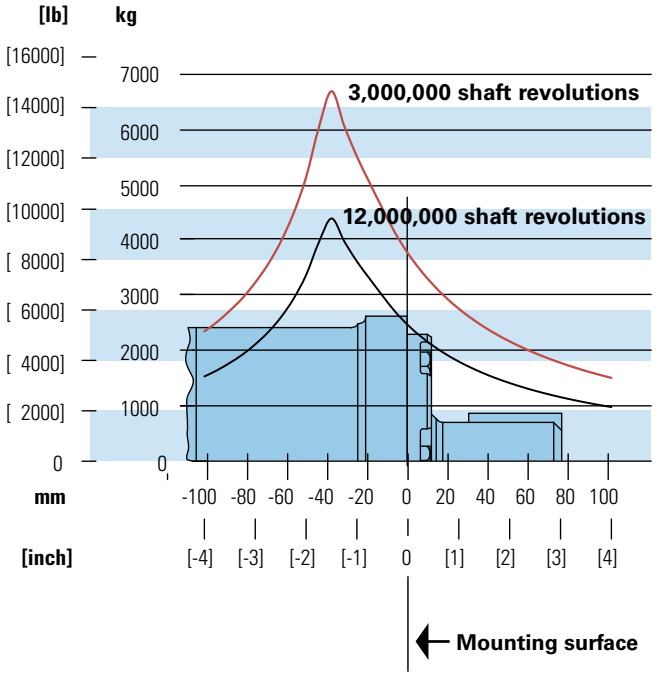
Each curve is based on B10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

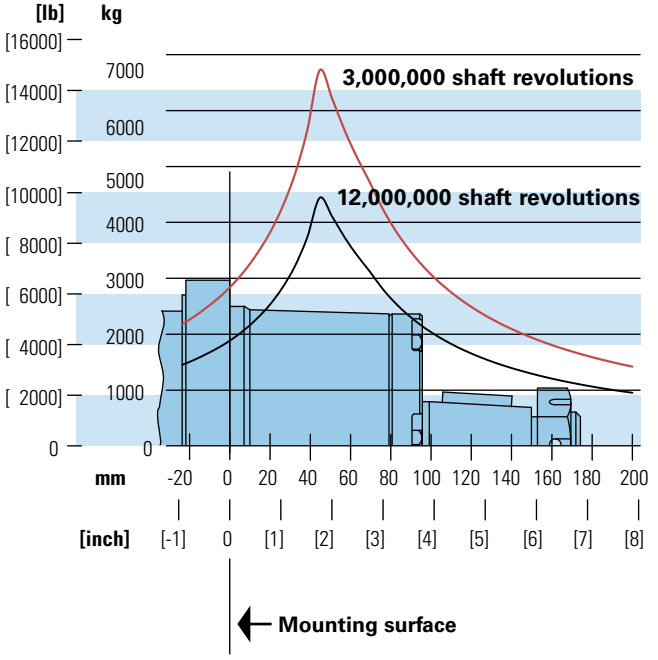


RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

Standard motor straight and splined shafts



Wheel motor tapered shaft



Char-Lynn 6000 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.

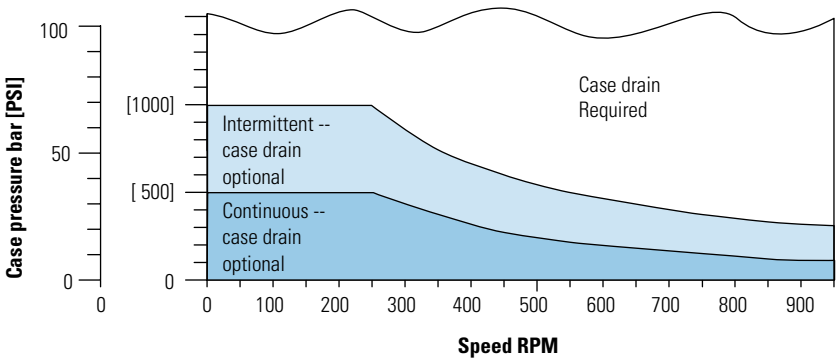
Case porting advantage

Contamination control — flushing the motor case.

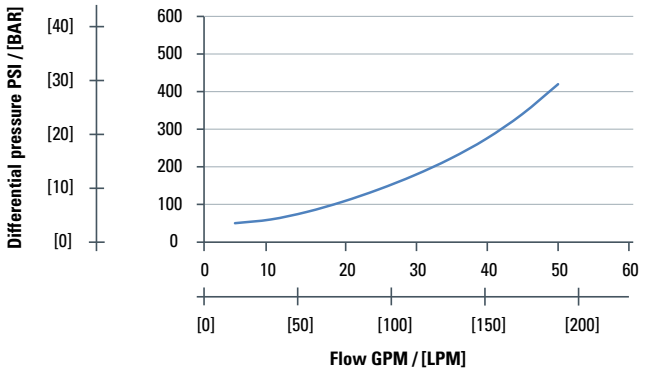
Cooler motor — exiting oil draws motor heat away.

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

Case pressure seal limitation



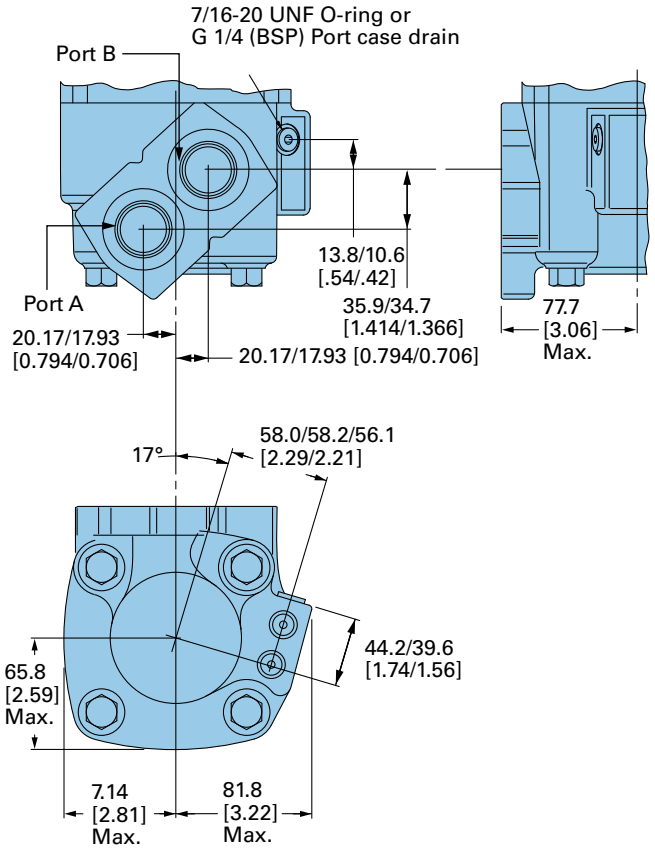
6000 Series NLPD - No load pressure drop



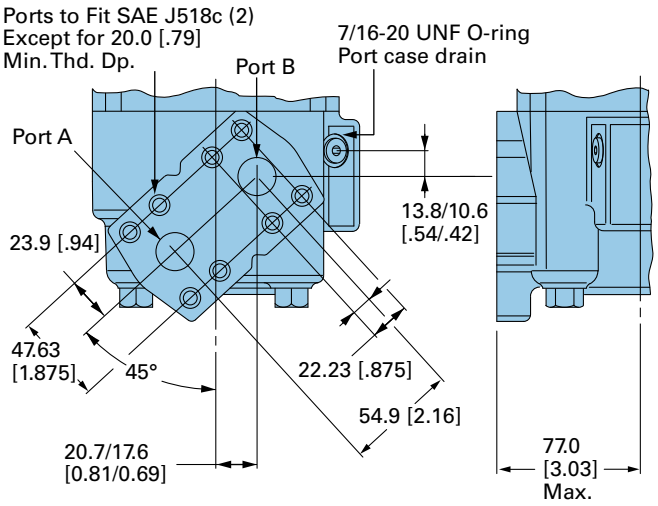
C-5

Ports

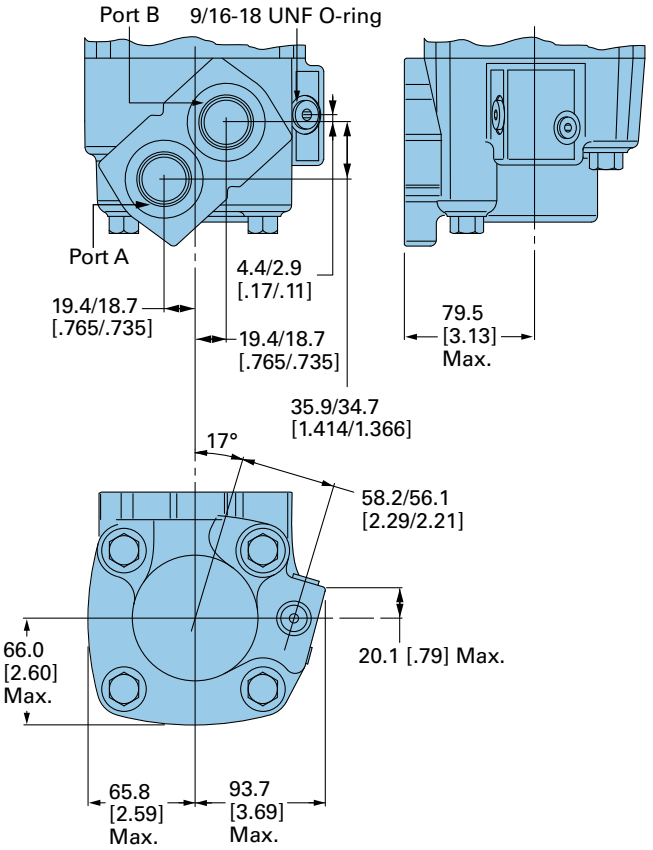
Code: AA 1-5/16-12 O-ring ports
Code: AC G 1 (BSP) ports



Code: AB 4 Bolt 3/4 Inch split flange



Code: AA 1 5/16 -12 O-ring ports (2) with shuttle



C-5

Note: For 6000 Series Motors with a configuration Not Shown in the charts above: Use model code number system on the next page to specify product in detail.

Use digit prefix — 112-, 113-, or 114 - plus four digit number from charts for complete product number— Example 114-1047.

Orders will not be accepted without three digit prefix.

Mounting	Shaft	Port size	Displ. cm³/r [in³/r] / product number								
			195 [11.9]	245 [15.0]	310 [19.0]	390 [23.9]	490 [30.0]	625 [38.0]	735* [45.0]	805* [49.0]	985 [60.0]
Standard	1 1/2 inch Straight	1 5/16 O-ring	112-1064	-1065	-1066	-1067	-1068	-1107	-1145	—	-1069
	40 mm Straight	G 1 (BSP)	112-1094	-1095	-1096	-1097	-1098	—	—	—	-1099
	1 1/2 Inch	1 5/16 O-ring	112-1058	-1059	-1060	-1061	-1062	-1109	-1163	—	-1063
	17 T Splined	G 1 (BSP)	112-1088	-1089	-1090	-1091	-1092	—	—	—	-1093
Wheel motor	40 mm Straight	G 1 (BSP)	113-1082	-1083	-1084	-1085	-1086	-1100	—	—	-1087
	1-3/4 Inch Tapered	1 5/16 O-ring	113-1070	-1071	-1072	-1073	-1074	-1093	—	—	-1075
Bearingless		1 5/16 O-ring	114-1031	-1032	-1033	-1034	-1035	-1055	—	—	-1036
		G 1 (BSP)	114-1043	-1044	-1045	-1046	-1047	—	—	—	-1048

*New release

114-1047

Mounting type - Standard (Code AH), 4 Bolt:

- 160.0 [6.30] Pilot Dia.
- 18.01 [.709] Dia. Mounting holes
- 200.0 [7.87] Dia. Bolt circle

Use digit prefix — 112- plus four digit number from charts for complete product number— Example 112-1215.

Orders will not be accepted without three digit prefix.

C-5

Output shaft - straight (code 12)

Ports - G1 (BSP) staggered G 1/4 case drain Code: (AC & 03)

Paint - Low gloss black (code AA)

Mounting	Shaft	Port size	Displ. cm³/r [in³/r] / product number						
			310 [19.0]	390 [23.9]	490 [30.0]	625 [38.0]	735 [45.0]	805 [49.0]	985 [60.0]
Standard	50 mm Straight	G 1 (BSP)	112-1217	-1218	-1215	-1216	-1247	-1219	-1220

112-1215

6000 Series

Model code

The following 30-digit coding system has been developed to identify all of the configuration options for the 6000 Series motor. Use this model code to specify a motor with the desired features. All 30-digits of the code must be present when ordering.

M	06	***	**	**	**	**	*	00	*	*	00	00	**	**	00	F
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

06 6000 Series

4 5 6 Displacement cm³/r [in³/r]

120 195.8 [11.95]
150 246.5 [15.04]
190 312.0 [19.04]
239 391.7 [23.90]
300 491.4 [29.99]
381 624.2 [38.09]
450 737.4 [45.00]
490 803.4 [49.03]
600 982.7 [59.97]

7 8 Mounting type

AA Bearingless, 4 Bolt: 127,0 [5.00] Pilot Dia. and 14,35 [.565] Dia. Holes 162,0 [6.38] Dia. Bolt circle
AB Standard, 4 bolt (SAE CC): 127,0 [5.00] pilot Dia. and 14,35 [.565] Dia. Holes on 162,0 [6.38] Dia. B.C.
AC Wheel, 4 Bolt 139,7 [5.50] Pilot Dia. and 14,35 [.565] Dia. Holes on 184,2 [7.25] Dia. Bolt circle
AH Standard, 4 Bolt: 160.0 [6.30] pilot Dia. 18,01 [.709] Dia. Holes on 200.0 [7.87] Dia. Bolt circle.
AL Wheel, 4 Bolt: 160.0 [6.30] Pilot Dia. with 5.8 [.23] pilot length and 18.00 [.709] Dia. Holes on 200.0 [7.874] Bolt circle (ISO compatible)

9 10 Output shaft description

00 None (Bearingless)
01 38,10 [1.50) Dia. Straight shaft with .375-16 UNC-2B Thread in End, 9,52 [.375] Sq x 41,28 [1.625] straight key
02 44,45 [1.75] Dia. .125:1 tapered shaft per SAE J501 with 1.25-18 UNEF-2A threaded shaft end, 11,11 [.4375] Sq. x 31,8 [1.25] straight key
03 38,10 [1.50] Dia. Flat root side fit, 17 tooth, 12/24 DP 30 DEG. Involute spline with .375-16 UNC-2B thread in end 40.4 [1.59] minimum full spline length
04 40,00 [1.575] Dia. Straight shaft with M12 x 1.75-6H thread in end, 12W x 8H x 63L [.472W x .313H x 2.480L] Key
12 49,99 [1.968] Dia. Straight shaft with M12 x 1.75-6H thread in End, 14W x 9H x 70L [.550W x .354H x 2.756L] Key

11 12 Ports description

AA 1.3125-12 UNF-2B SAE O-Ring ports–staggered ports
AB SAE 19.05 [.750] Dia. 4-Bolt split flange - staggered ports
AC G 1 Staggered Ports
AG .750-16 UNF-2B SAE O-ring ports - staggered

13 14 Case flow

00 None
02 .4375-20 UNF-2B SAE O-Ring port with check valve
03 G 1/4 BSP straight thread port with check valve
06 .5625-18 UNF-2B SAE O-Ring port with shuttle valve

15 Low pressure relief

0 None
A Set at 4.5 [65 lbf/in²]
B Set at 15.2 [220 lbf/in²]

16 17 Pressure/flow option

00 None

18 Geroler option

0 Standard
2 Tight fitting

19 Seal option

0 Standard
1 Viton
2 Viton Shaft Seal
3 Seal Guard
5 Heavy Duty Seal Guard
6 Extreme Duty Seal Guard

20 21 Accessories

00 None

22 23 Special features (hardware)

00 None

24 25 Special features (assembly)

00 None
AA Reverse rotation

M	0 6	* * *	* *	* *	* *	* *	*	0 0	*	*	0 0	0 0	* *	* *	0 0	F
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

26 27 Paint/Packaging

00	No Paint, Individual box
AA	Low gloss black primer
AD	No Paint, Bulk box option
AE	Low gloss black primer, Bulk box option
AK	Epoxy coated black

28 29 Customer ID

00	None

30 Design code

F	Sixth

See Eatonpowersource.com/ for more options and configurations.

10,000 Series

Highlights

Description:

This is the biggest disc valve motor of our line with up to 170 lpm [45 gpm] and 2700 Nm [23,910 in-lbs] in-lb of torque in continuous mode, this motor is powerful and yet provides exceptional efficiency and side-load capability.

Specifications

Geroler element	4 Displacements
Flow l/min [GPM]	170 [45] Continuous**
	265 [70] Intermittent*
Speed RPM	501 Cont.**
	784 Inter.*
Pressure bar [PSI]	205 [3000] Cont.**
	275 [4000] Inter.*
Torque Nm [lb-in]	2700 [23910] Cont.**
	3440 [30460] Inter.*

** Continuous— (Cont.) Continuous rating, motor may be run continuously at these ratings.
* Intermittent— (Inter.) Intermittent operation, 10% of every minute.

Features:

- High torque and flow
- Speed sensing capability
- Low pressure loss even in higher flows

Benefits:

- High power density for demanding mobile and industrial applications
- Large front bearing pack

Applications:

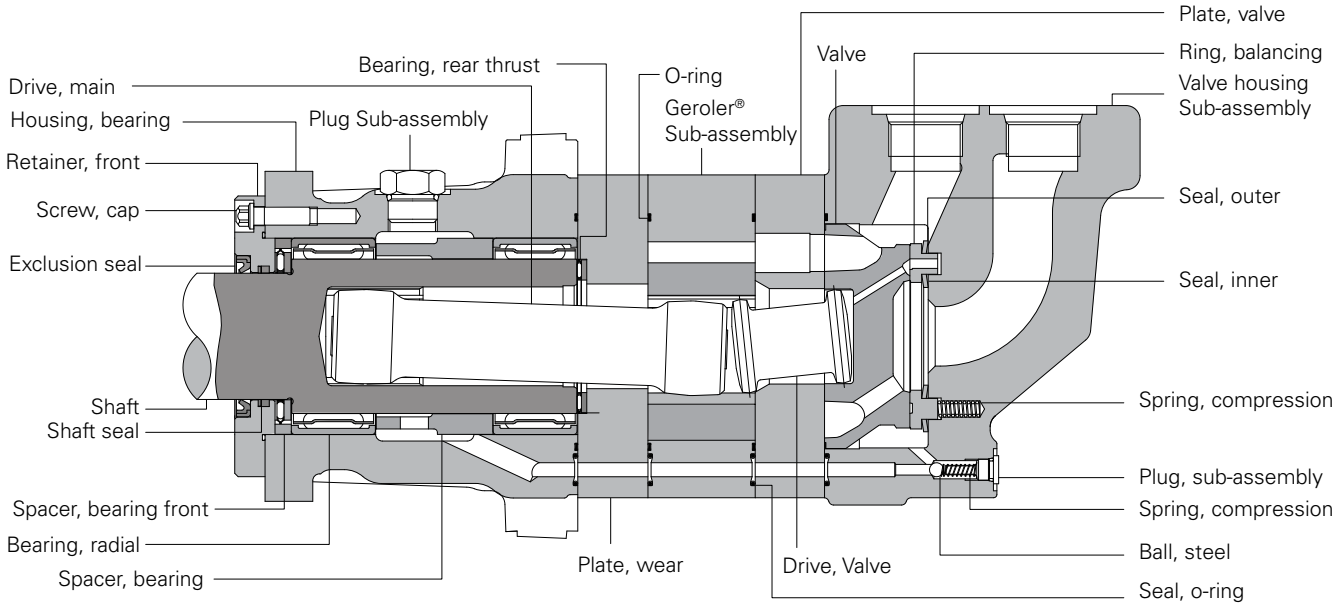
- Boring
- Industrial
- Metal forming
- Port equipment
- Saw mill


Boring


Metal forming


Port equipment


Vertical drilling



10,000 series motors

Displ. cm³/r [in³/rev]		345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]
Max speed (RPM) @ Flow	Continuous	501	354	254	179
	Intermittent	784	552	396	279
Flow l/min [GPM]	Continuous	170 [45]	170 [45]	170 [45]	170 [45]
	Intermittent	265 [70]	265 [70]	265 [70]	265 [70]
Torque* Nm [lb - in]	Continuous	1040 [9220]	1475 [13050]	2085 [18450]	2700 [23910]
	Intermittent	1390 [12310]	1965 [17410]	2610 [23080]	3440 [30460]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	190 [2750]
	Intermittent	275 [4000]	275 [4000]	260 [3750]	240 [3500]
	Peak	275 [4000]	275 [4000]	275 [4000]	260 [3750]
Weight kg [lb]	Standard or wheel mount	43.5 [96.0]	45.4 [100.0]	46.3 [100.0]	47.2 [104.0]
	Bearingless	31.3 [69.0]	33.1 [73.0]	33.1 [73.0]	34.9 [77.0]

*See shaft torque ratings for limitations..

Note: To assure best motor life, run motor in low speed high torque mode at approximately 30% of continuous pressure and 50% of continuous flow for 30 minutes in each direction before application of full load. Ensure that motor is filled with fluid prior to operation.

Maximum inlet pressure:
275 bar [4000 PSI]

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

Maximum return pressure:
275 bar [4000 PSI] with case drain line installed.

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

Maximum case pressure:
20 bar [300 PSI]

Δ bar [Δ PSI]:
The true pressure difference between inlet port and outlet port

Continuous rating:
Motor may be run continuously at these ratings

Intermittent operation:
10% of every minute

Peak operation:
1% of every minute

Recommended fluids:
Premium quality, anti-wear type hydraulic oil with a viscosity of not less than 13 cSt [70 SUS] at operating temperature.

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

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

Thermal shock warning:
Do not operate the motor with fluid that is 70F or more above the motor temperature.

Minimum delta pressure warning:
Motors must not run with equal inlet and outlet pressure 50 PSID minimum delta pressure between motor ports is required at all times (expect when switching direction of rotation)

10,000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Intermittent

Peak

No operation

Δ Pressure bar [PSI]
345 cm³/r [21.0 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276
[1] 4	[600] 70 3	[1310] 150 1							
[2] 8	[740] 85 21	[1510] 170 19	[3050] 345 15	[4600] 520 11	[6140] 695 8	[7680] 870 4			
[4] 15	[730] 80 43	[1500] 170 41	[3040] 345 37	[4590] 520 33	[6140] 695 30	[7680] 870 26	[9220] 1040 22	[10770] 1215 18	[12310] 1390 14
[8] 30	[720] 80 87	[1490] 170 86	[3030] 340 82	[4580] 515 78	[6120] 690 74	[7670] 865 70	[9210] 1040 66	[10750] 1215 62	[12300] 1390 58
[12] 45	[700] 80 131	[1470] 165 130	[3020] 340 127	[4560] 515 123	[6100] 690 118	[7650] 865 114	[9190] 1040 110	[10740] 1215 106	[12280] 1385 102
[16] 61	[680] 75 176	[1450] 165 175	[3000] 340 172	[4540] 515 167	[6080] 685 163	[7630] 860 158	[9170] 1035 154	[10720] 1210 149	[12260] 1385 145
[20] 76	[660] 75 221	[1430] 160 220	[2970] 335 217	[4520] 510 212	[6060] 685 207	[7600] 860 202	[9150] 1035 198	[10690] 1210 193	[12230] 1380 189
[24] 91	[630] 70 266	[1400] 160 265	[2950] 335 261	[4490] 505 256	[6030] 680 252	[7580] 855 246	[9120] 1030 242	[10660] 1205 237	[12210] 1380 232
[28] 106	[600] 70 310	[1370] 155 309	[2920] 330 306	[4460] 505 301	[6000] 680 296	[7550] 855 291	[9090] 1025 286	[10640] 1200 280	[12180] 1375 275
[32] 121	[570] 65 356	[1340] 150 355	[2890] 325 351	[4430] 500 346	[5970] 675 340	[7520] 850 335	[9060] 1025 329	[10610] 1200 324	[12150] 1375 319
[36] 136	[540] 60 400	[1310] 150 399	[2850] 320 396	[4400] 495 390	[5940] 670 384	[7480] 845 379	[9030] 1020 373	[10570] 1195 368	[12120] 1370 362
[40] 151	[500] 55 445	[1270] 145 444	[2820] 320 441	[4360] 495 435	[5910] 670 429	[7450] 840 423	[8990] 1015 417	[10540] 1190 412	
[45] 170	[460] 50 501	[1220] 140 500	[2760] 310 498	[4300] 485 492	[5840] 660 486	[7380] 835 480	[8910] 1005 473	[10450] 1180 467	
[60] 227		[1080] 120 668	[2620] 295 665	[4160] 470 658	[5710] 645 651	[7250] 820 644	[8800] 995 637		
[70] 265		[960] 110 784	[2510] 285 777	[4050] 460 769	[5590] 630 761	[7140] 805 754	[8680] 980 746		

[2510] Torque [lb-in]
285 Nm
777 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
480 cm³/r [29.3 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[1000] 69	[1500] 103	[2000] 138	[2500] 172	[3000] 207	[3500] 241	[4000] 276
[1]	[760]	[1540]	[3120]	[4640]					
	85	175	355	525					
4	6	5	4	2					
[2]	[1040]	[2140]	[4320]	[6500]	[8690]	[10870]			
	120	240	490	735	980	1230			
8	15	13	11	8	5	2			
[4]	[1040]	[2130]	[4310]	[6490]	[8680]	[10860]	[13050]	[15230]	[17410]
	120	240	485	735	980	1225	1475	1720	1965
15	31	29	27	24	21	18	16	13	10
[8]	[1020]	[2110]	[4290]	[6480]	[8660]	[10840]	[13030]	[15210]	[17390]
	115	240	485	730	980	1225	1470	1720	1965
30	62	61	58	55	53	50	47	44	42
[12]	[990]	[2080]	[4270]	[6450]	[8630]	[10820]	[13000]	[15180]	[17370]
	110	235	480	730	975	1220	1470	1715	1965
45	94	93	90	87	84	81	78	75	73
[16]	[960]	[2060]	[4240]	[6420]	[8600]	[10790]	[12970]	[15150]	[17340]
	110	235	480	725	970	1220	1465	1710	1960
61	125	124	122	119	116	113	110	107	104
[20]	[930]	[2020]	[4200]	[6390]	[8570]	[10750]	[12940]	[15120]	[17300]
	105	230	475	720	970	1215	1460	1710	1955
76	157	156	154	150	147	144	141	138	135
[24]	[890]	[1980]	[4170]	[6350]	[8530]	[10720]	[12900]	[15080]	
	100	225	470	715	965	1210	1460	1705	
91	189	188	185	182	179	175	172	169	
[28]	[850]	[1940]	[4130]	[6310]	[8490]	[10680]	[12860]	[15040]	
	95	220	465	715	960	1205	1455	1700	
106	221	220	217	214	210	207	203	200	
[32]	[810]	[1900]	[4080]	[6270]	[8450]	[10630]	[12820]	[15000]	
	90	215	460	710	955	1200	1450	1695	
121	252	251	249	245	242	238	235	231	
[36]	[760]	[1850]	[4040]	[6220]	[8400]	[10590]	[12770]		
	85	210	455	705	950	1195	1445		
136	282	281	280	277	273	270	266		
[40]	[710]	[1800]	[3990]	[6170]	[8350]	[10540]	[12720]		
	80	205	450	695	945	1190	1435		
151	318	316	312	308	305	301	297		
[45]	[647]	[1740]	[3920]	[6110]	[8290]	[10470]	[12660]		
	75	195	445	690	935	1185	1430		
170	354	353	351	348	344	340	336		
[60]	[430]	[1520]	[3710]	[5890]	[8070]	[10260]	[12440]		
	50	170	420	665	910	1160	1405		
227	474	473	471	467	462	458	454		
[70]		[1360]	[3540]	[5730]	[7910]	[10100]	[12280]		
		155	400	645	895	1140	1385		
265		552	550	546	541	536	532		

C-6

10,000 Series

Performance data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
665 cm³/r [40.6 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190	[3000] 207	[3250] 224	[3500] 241	[3750] 259
[1] 4	[1470] 165 4	[3010] 340 3	[4550] 515 3	[6100] 690 2	[7630] 860 1										
[2] 8	[1480] 165 10	[3020] 340 9	[4560] 515 8	[6110] 690 7	[7650] 865 7	[9200] 1040 6	[10740] 1215 5	[12280] 1385 4	[13830] 1565 3	[15370] 1735 2	[16910] 1910 1				
[4] 15	[1470] 165 22	[3010] 340 21	[4550] 515 20	[6100] 690 19	[7640] 865 18	[9190] 1040 17	[10730] 1210 16	[12270] 1385 15	[13820] 1560 14	[15360] 1735 13	[16900] 1910 12	[18450] 2085 11	[19990] 2260 10	[21540] 2435 9	[23080] 2610 8
[8] 30	[1440] 165 44	[2980] 335 43	[4530] 510 42	[6070] 685 41	[7610] 860 40	[9160] 1035 39	[10700] 1210 38	[12250] 1385 37	[13790] 1560 36	[15330] 1730 35	[16880] 1905 34	[18420] 2080 33	[19960] 2255 32	[21510] 2430 32	[23050] 2605 31
[12] 45	[1400] 160 67	[2950] 335 66	[4490] 505 65	[6040] 680 64	[7580] 855 63	[9120] 1030 62	[10670] 1205 61	[12210] 1380 60	[13750] 1555 59	[15300] 1730 58	[16840] 1905 57	[18380] 2075 56	[19930] 2250 55	[21470] 2425 54	[23020] 2600 53
[16] 61	[1360] 155 89	[2910] 330 88	[4450] 505 87	[5990] 675 86	[7540] 850 85	[9080] 1025 84	[10620] 1200 83	[12170] 1375 82	[13710] 1550 81	[15260] 1725 80	[16800] 1900 79	[18340] 2070 78	[19890] 2245 77	[21400] 2420 76	
[20] 76	[1310] 150 112	[2860] 375 111	[4400] 495 110	[5940] 670 109	[7490] 845 108	[9030] 1020 107	[10580] 1195 106	[12120] 1370 104	[13660] 1545 103	[15210] 1720 102	[16750] 1890 101	[18300] 2070 100	[19840] 2240 99		
[24] 91	[1260] 140 135	[2800] 315 134	[4350] 490 132	[5890] 665 131	[7440] 840 130	[8980] 1015 129	[10520] 1190 128	[12070] 1365 127	[13610] 1540 126	[15150] 1710 124	[16700] 1885 123	[18240] 2060 122			
[28] 106	[1200] 135 157	[2750] 310 156	[4290] 485 155	[5840] 660 154	[7380] 835 153	[8920] 1010 151	[10470] 1185 150	[12010] 1355 149	[13550] 1530 148	[15100] 1705 147	[16640] 1880 146				
[32] 121	[1140] 130 180	[2690] 305 179	[4230] 480 177	[5770] 650 176	[7320] 825 175	[8860] 1000 174	[10400] 1175 173	[11950] 1350 172	[13490] 1525 170	[15040] 1700 169	[16580] 1875 168				
[36] 136	[1080] 120 202	[2620] 295 201	[4160] 470 200	[5710] 645 199	[7250] 820 198	[8800] 995 196	[10340] 1170 195	[11880] 1340 194	[13430] 1515 193	[14970] 1690 191	[16510] 1865 190				
[40] 151	[1010] 115 225	[2550] 290 224	[4100] 465 222	[5640] 635 221	[7180] 810 220	[8730] 985 219	[10270] 1160 217	[11810] 1335 216	[13360] 1510 215	[14900] 1685 214	[16440] 1855 212				
[45] 170	[920] 105 254	[2460] 280 252	[4000] 450 251	[5550] 625 249	[7090] 800 248	[8630] 975 247	[10180] 1150 245	[11720] 1325 244	[13260] 1500 243	[14810] 1675 242					
[60] 227	[610] 70 338	[2150] 245 336	[3700] 420 335	[5240] 590 334	[6780] 765 332	[8330] 940 331	[9870] 1115 329	[11420] 1290 328	[12960] 1465 327						
[70] 265	[380] 45 396	[1930] 220 393	[3470] 390 391	[5010] 565 390	[6560] 740 388	[8100] 915 387	[9640] 1090 385	[11190] 1265 384							

[3470] Torque [lb-in]
390 Nm
391 Speed RPM

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

Continuous

Peak

Intermittent

No operation

Δ Pressure bar [PSI]
940 cm³/r [57.4 in³/r]

Flow LPM [GPM]

	[250] 17	[500] 34	[750] 52	[1000] 69	[1250] 86	[1500] 103	[1750] 121	[2000] 138	[2250] 155	[2500] 172	[2750] 190	[3000] 207	[3250] 224	[3500] 241
[1] 4	[2080] 235 3	[4260] 480 2	[6440] 730 1											
[2] 8	[2090] 235 7	[4270] 480 6	[6450] 730 5	[8640] 975 5	[10820] 1220 4	[13000] 1470 3	[15190] 1715 2	[17370] 1965 1						
[4] 15	[2080] 235 15	[4260] 480 14	[6440] 730 13	[8620] 975 13	[10810] 1220 12	[12990] 1470 11	[15170] 1715 10	[17360] 1960 9	[19540] 2210 8	[21720] 2455 7	[23910] 2700 7	[26090] 2950 6	[28270] 3195 5	[30460] 3440 4
[8] 30	[2040] 230 31	[4220] 475 30	[6400] 725 29	[8590] 970 28	[10770] 1215 28	[12950] 1465 27	[15140] 1710 26	[17320] 1955 25	[19500] 2205 24	[21690] 2450 23	[23870] 2695 22			
[12] 45	[1990] 225 47	[4170] 470 46	[6350] 715 45	[8540] 965 44	[10720] 1210 43	[12900] 1460 43	[15090] 1705 42	[17270] 1950 41	[19450] 2200 40	[21640] 2445 39				
[16] 61	[1930] 220 63	[4110] 465 62	[6290] 710 61	[8480] 960 60	[10660] 1205 59	[12840] 1450 58	[15030] 1700 58	[17210] 1945 57	[19390] 2190 56					
[20] 76	[1860] 210 79	[4040] 455 78	[6220] 705 77	[8410] 950 76	[10590] 1195 75	[12770] 1445 74	[14960] 1690 73	[17140] 1935 72	[19320] 2185 72					
[24] 91	[1780] 200 95	[3970] 450 94	[6150] 695 93	[8330] 940 92	[10520] 1190 91	[12700] 1435 90	[14880] 1680 89	[17080] 1930 88						
[28] 106	[1700] 190 111	[3890] 440 110	[6070] 685 109	[8250] 930 108	[10440] 1180 107	[12620] 1425 106	[14800] 1675 105	[16990] 1920 104						
[32] 121	[1620] 185 127	[3800] 430 126	[5980] 675 125	[8160] 920 124	[10350] 1170 123	[12530] 1415 122	[14720] 1665 121							
[36] 136	[1520] 170 143	[3710] 420 142	[5890] 665 141	[8070] 910 140	[10260] 1160 139	[12440] 1405 138	[14620] 1650 137							
[40] 151	[1420] 160 159	[3610] 410 158	[5790] 655 157	[7970] 900 156	[10160] 1150 155	[12340] 1395 154	[14520] 1640 153							
[45] 170	[1290] 145 179	[3480] 395 178	[5660] 640 177	[7840] 885 176	[10020] 1130 174	[12210] 1380 174	[14400] 1625 173							
[60] 227	[860] 95 239	[3040] 345 238	[5230] 590 236	[7410] 835 235	[9600] 1085 234	[11780] 1330 233								
[70] 265	[540] 60 279	[2720] 305 278	[4910] 555 276	[7090] 800 275	[9270] 1045 274	[11460] 1295 273								

C-6

Dimensions

Ports

1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
9/16 -18 UNF-2B SAE O-ring case drain port (1)

4 Bolt 11/4 inch split flange ports (2)
9/16 -18 UNF-2B SAE O-ring case drain port (1)

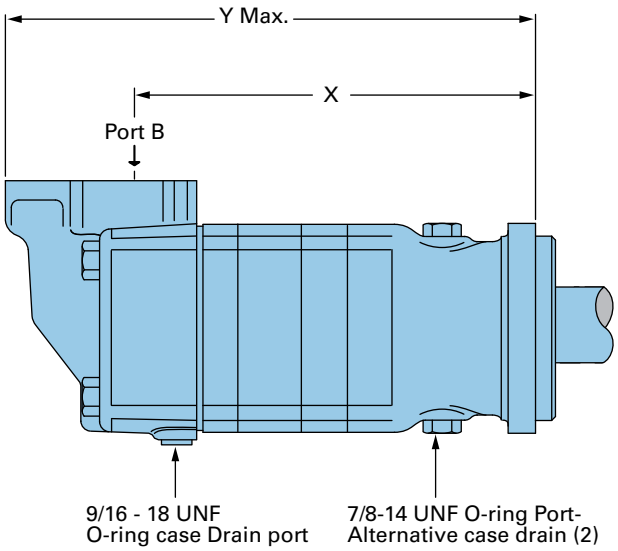
Standard rotation viewed from shaft end

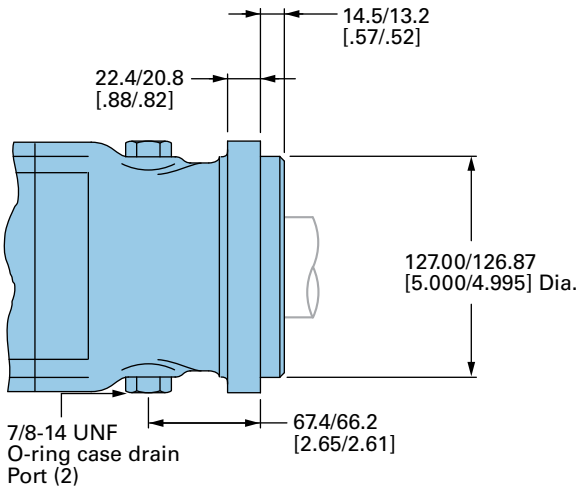
Port A pressurized — CW
Port B pressurized — CCW

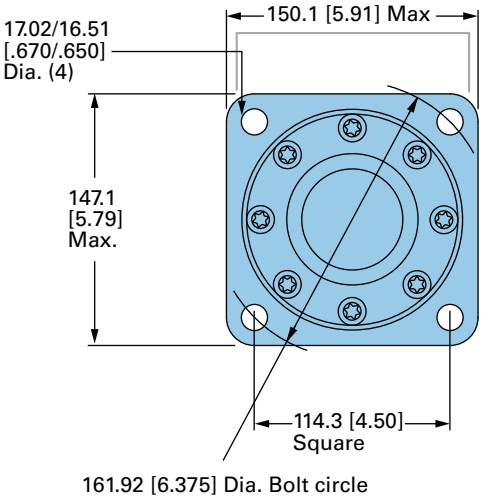
Standard mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
345 [21.0]	282.4 [11.12]	380.9 [15]
480 [29.2]	295.1 [11.62]	393.6 [15.50]
585 [35.6]	304.9 [11.99]	403.3 [15.88]
665 [40.6]	295.1 [11.62]	393.6 [15.50]
940 [57.4]	313.4 [12.34]	412.1 [16.22]

Standard mount







Ports

1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
9/16 -18 UNF-2B SAE O-ring case drain port (1)

4 Bolt 11/4 inch split flange ports (2)
9/16 -18 UNF-2B SAE O-ring case drain port (1)

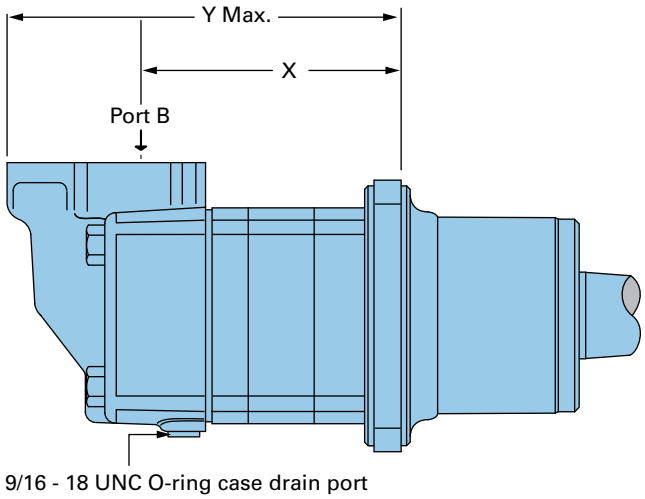
Standard rotation viewed from shaft end

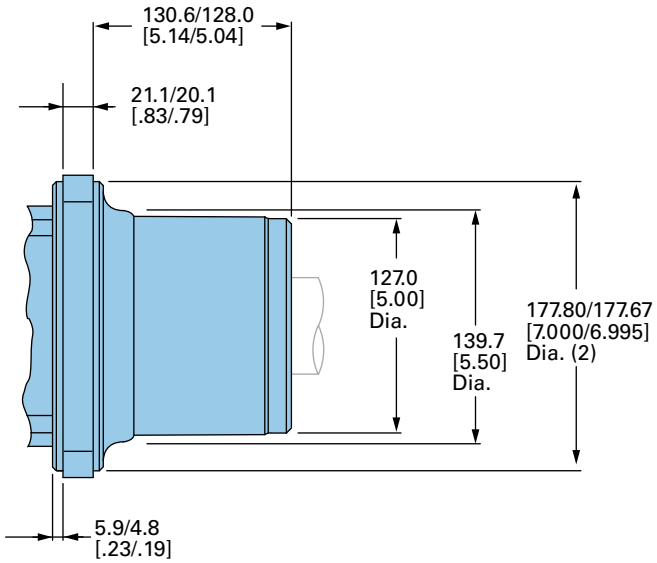
Port A pressurized — CW
Port B pressurized — CCW

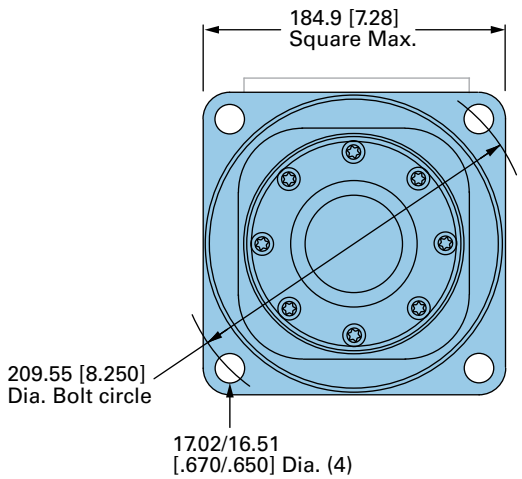
Wheel mount motor dimensions

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
345 [21.0]	166.9 [6.57]	265.9 [10.47]
480 [29.2]	179.6 [7.07]	278.6 [10.97]
585 [35.6]	179.3 [7.06]	288.4 [35.6]
665 [40.6]	179.6 [7.07]	278.6 [10.97]
940 [57.4]	197.8 [7.79]	297.2 [11.70]

Wheel mount







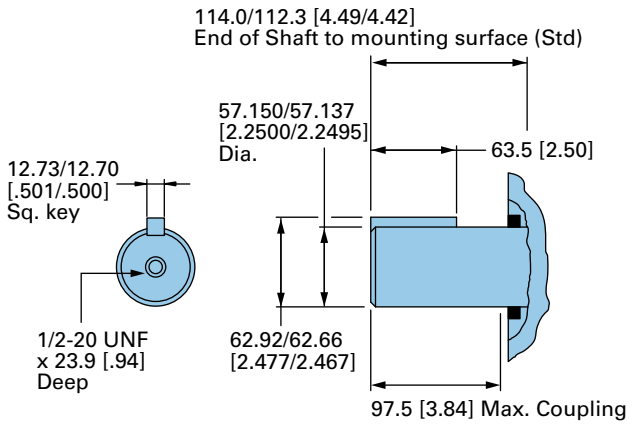
C-6

Dimensions

Shafts

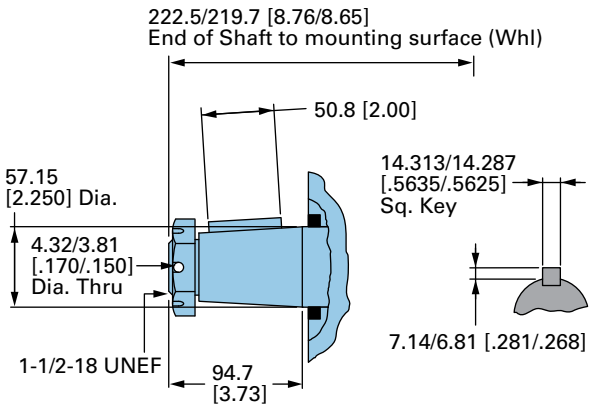
Code: 01 2 1/4 Inch straight

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



Code: 02 2 1/4 Inch tapered

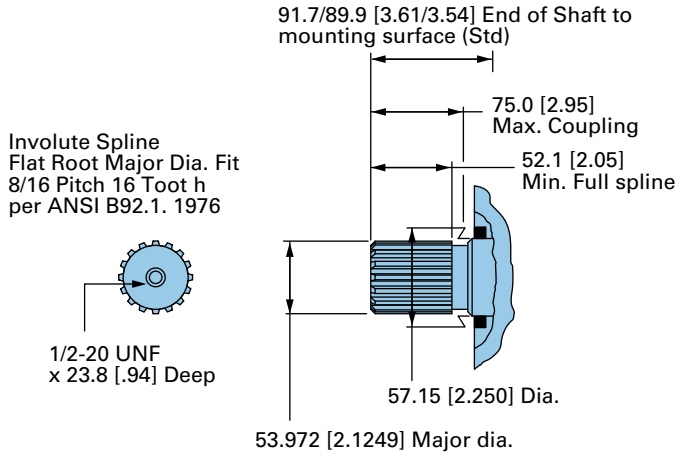
2712 [24000] Max. Torque Nm [lb-in]



SAE J501 Standard tapered shaft 125.00 0.17 Taper per Meter [1.500±.002 Taper per Foot]

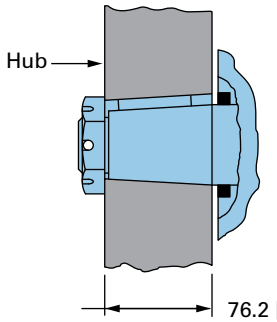
Code: 03 2 1/8 Inch 16 Tooth splined

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



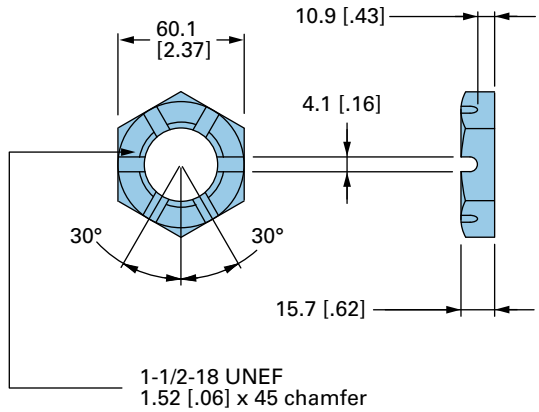
Tapered shaft hub data

Recommended torque:
(1150 Nm [850 lb-ft] Dry)
(880 Nm [650 lb-ft] Lub)



Plus Torque required to align the slotted nut with the Shaft Crosshole.

Slotted hexagon nut



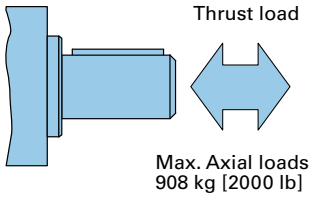
C-6

These curves indicate the radial load capacity on the motor shaft at various locations with an external thrust load of 454 kg [1000 lb]. The maximum allowable thrust load is 908 kg [2000 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 200 kg/7 Bar [441 lb/100 PSI].

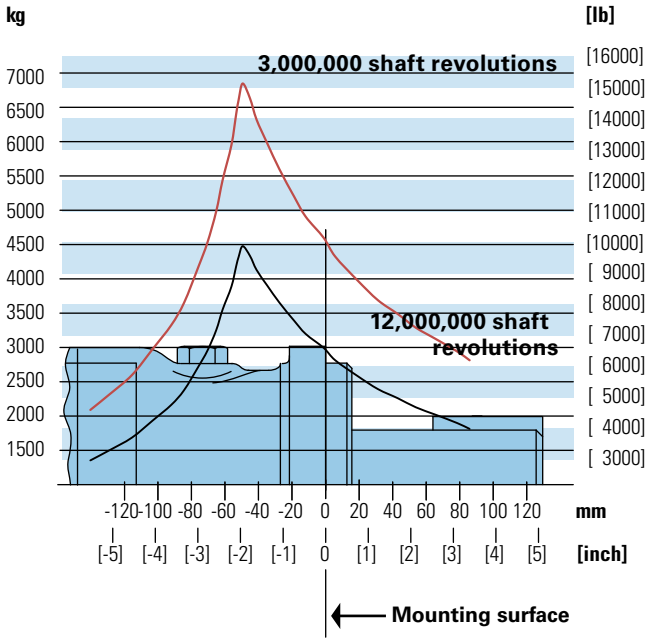
Each curve is based on B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

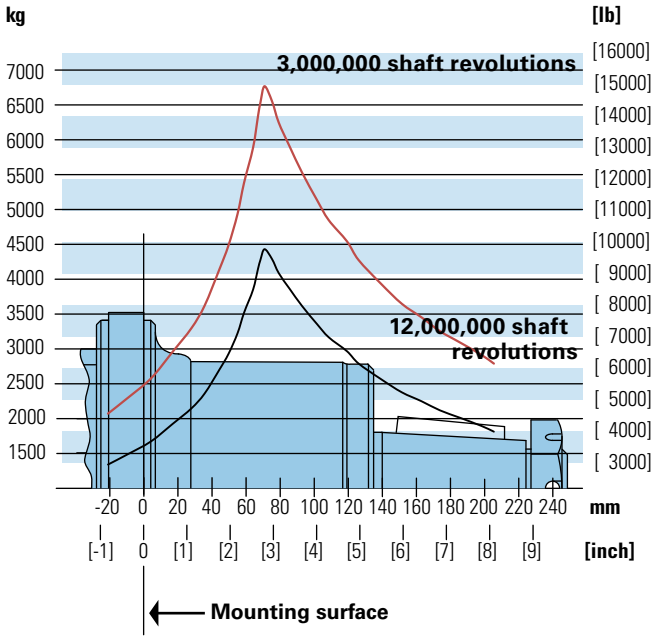


RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

Standard motor
straight and splined shaft



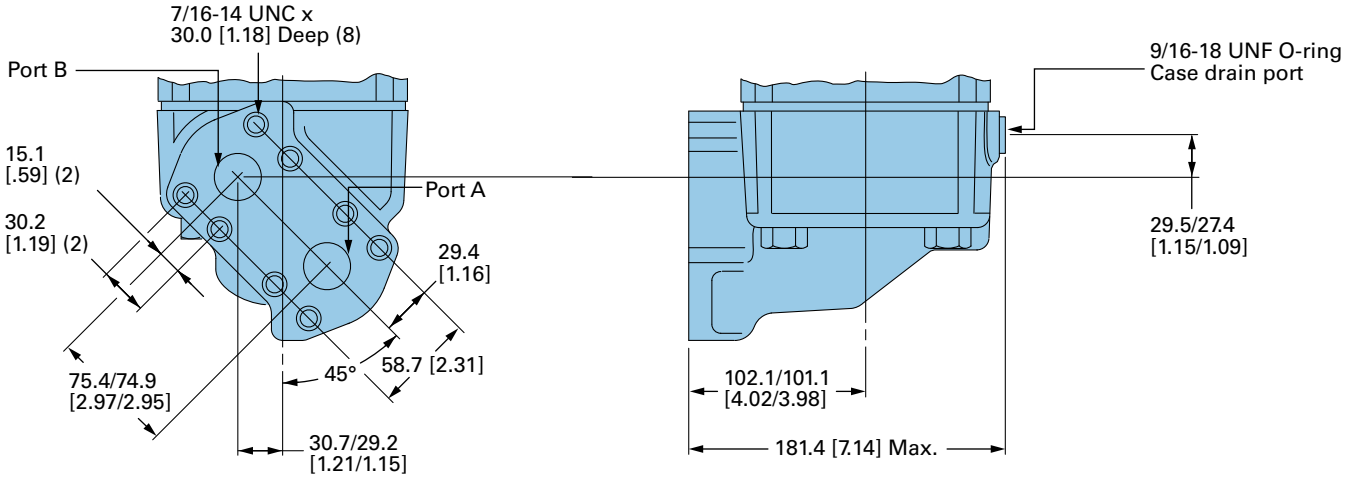
Wheel motor
tapered shaft



C-6

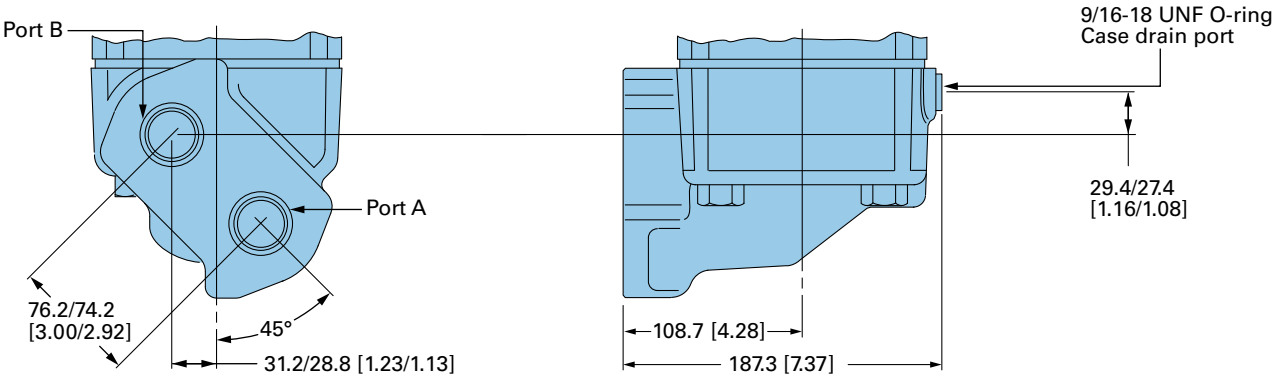
Ports

Code: AB 1 1/4 inch split flange ports (2)

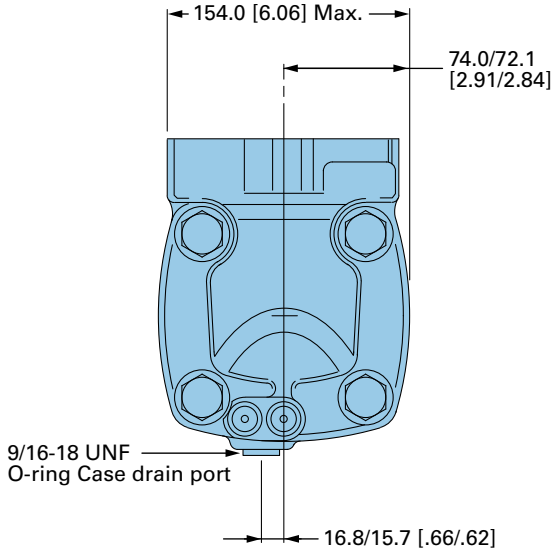


C-6

Code: AA 1 5/16-12 O-ring ports (2)



End View common dimensions



Note: For 10,000 Series motors with a configuration not shown in the chart below: Use model code number system on the next page to specify product in detail.

Use digit prefix — 119- or 120- plus four digit number from charts for complete product number— Example 120-1014

Orders will not be accepted without three digit prefix.

Mounting	Shaft	Port size	Displ. cm³/r [in³/r] / product number			
			345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]
Standard SAE C-Mount	2 1/4 Inch Straight	1 5/16 O-ring	119-1028	-1029	-1030	-1031
		1 1/4 inch Split flange	119-1040	-1041	-1042	-1043
	2 1/8 Inch 16 T Splined	1 5/16 O-ring	119-1032	-1033	-1034	-1035
		1 1/4 inch Split flange	119-1044	-1045	-1045	-1047
	2 1/4 Inch Tapered	1 5/16 O-ring	119-1036	-1037	-1038	-1039
		1 1/4 inch Split flange	119-1048	-1049	-1050	-1051
Wheel motor	2 1/4 Inch straight	1 5/16 O-ring	–	-1006	-1007	-1008
		1 1/4 inch Split flange	–	–	–	-1020
	2 1/8 Inch 16 T Splined	1 5/16 O-ring	–	–	-1011	-1012
		1 1/4 inch Split flange	–	–	–	–
	2 1/4 Inch Tapered	1 5/16 O-ring	120-1013	-1014	-1015	-1016
		1 1/4 inch Split flange	–	-1029	-1027	-1028

10,000 Series

Model code

The following 30-digit coding system has been developed to identify all of the configuration options for the 10,000 Series motor. Use this model code to specify a motor with the desired features. All 30-digits of the code must be present when ordering.

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

1 **Product**

M Motor

2 3 **Series**

10 10,000 Series

4 5 6 **Displacement cm³/r [in³/r]**

210 343.8 [20.98]

293 479.5 [29.26]

406 665.3 [40.60]

574 940.8 [57.41]

7 8 **Mounting description**

AA Standard, 4 Bolt: 127,0 [5.00] Pilot Dia. 16,76 [.660] Dia. Holes on 161,92 [6.375] Dia. Bolt circle

AB Wheel, 4 Bolt: 16,76 [.660] Dia. Holes on 209,55 [8.250] Dia. Bolt circle

9 10 **Output shaft description**

01 57,15 [2.250] Dia. Straight with .500-20 UNF-2B thread in end, 12.7 [.50] square x 63,5 [2.50] straight end

02 57,15 [2.250] Dia. .125:1 tapered shaft per SAE J512 with 1.500-18 UNEF-2A threaded shaft end and slotted hex nut, 14,288 [.5625] square x 50,8 [2.00] straight key

03 53,98 [2.125] Dia. flat root, major dia. Fit, 16 tooth, 8/16 DP, 30 degree involute spline with .500-20 UNF-20 thread in End. 52,07 [2.050] minimum full spline length

11 12 **Ports**

AA 1.3125 -12 UNF-2B O-Ring staggered ports

AB 31,75 [1.250] Dia. 4 Bolt split flange staggered ports with .4375-15 UNC-2B Tapped mounting holes

13 14 **Case flow options**

01 .5625-18 UNF-2B Case Drain SAE O-Ring Port

15 **Low pressure relief**

0 None

16 17 **Pressure/flow option**

00 None

18 **Geroler option**

0 Standard

19 **Seal option**

0 Standard

4 Seal guard

20 21 **Accessories**

00 None

22 23 **Special features (hardware)**

00 None

24 25 **Special features (assembly)**

00 None

AA Reverse rotation

26 27 **Paint/packaging**

00 None

AA Low gloss black primer

28 29 **Customer identification**

00 None

30 **Design code**

C Third

See Eatonpowersource.com/ for more options and configurations.

Char-Lynn Specialty Motors

Orbit motor

Introduction

D-1

With over 45 years of manufacturing in Kameoka, Japan, Eaton's global suite of low speed high torque motors are customers first choice for swing and track drive applications. With industry leading control and efficiency, these motors are tuned for use at very low flows and speeds. Their compact integrated design, allows for substantial space savings and integrated propel valves and brake packages simplify systems and offer valuable solutions.

Table of Contents

Char-Lynn Low speed high torque orbit motor for brake application

S Series with pin brake, S Series with mechanical brake and 2000 Series with mechanical brake

S Series Motor with Pin Brake

D-1

Characteristics & Advantages

The S series Motor with a pin brake offers an easy parking brake option within the Spool Motor category. The simple design provides a reliable and cost effective solution.

These motors can be chosen with an external or internal pilot system.

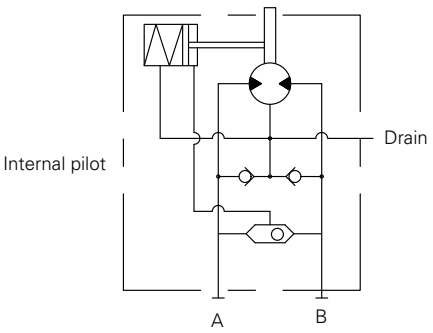
Specifications

Series	Brake torque	Brake release pressure	Brake release system
SBP	5.9 Nm [52.22 lb-in]	5 bar [73 psi]	Internal Pilot
SBR	5.9 Nm [52.22 ib-in]	5 bar [73 psi]	External Pilot

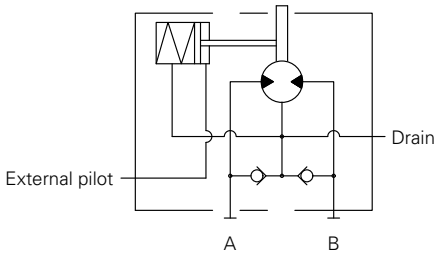
Note:

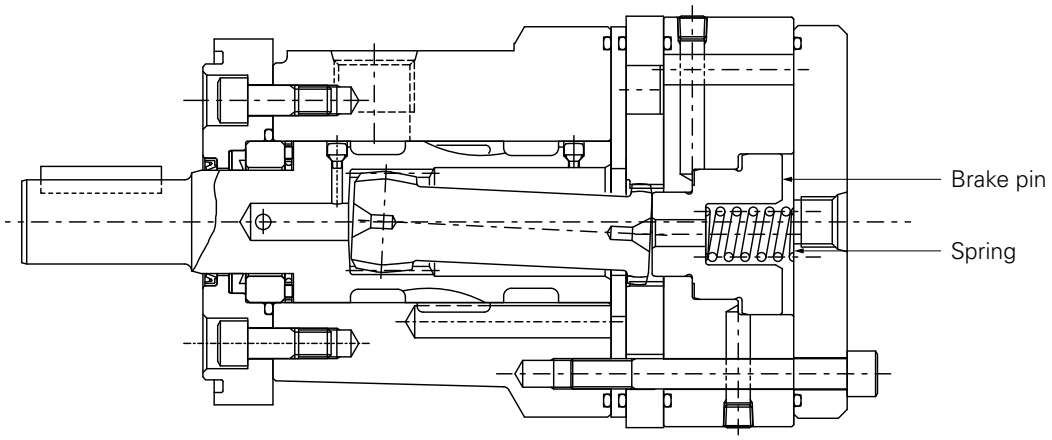
1. Must use an external drain line
2. Do not operate the pin brake in dynamic conditions
3. Output shaft is locked at a position of 60°

SBP Series

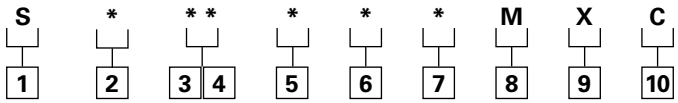


SBR Series





Model code



1 Series

S	S Series motor with pin brake

2 Brake specifications

P	Internal Pilot, 5.9Nm [52.22 lb-in]
R	External Pilot, 5.9Nm [52.22 lb-in]

3 4 Displacement

05	58cm³/r [3.5 in³/r]
07	76cm³/r [4.6 in³/r]
10	93cm³/r [5.7 in³/r]
12	120cm³/r [7.3 in³/r]
14	144cm³/r [8.8 in³/r]

5 Port

A	G1/2 O-ring port
B	Manifold mount
C	1/2NPTF port
D	Rc1/2 port
E	7/8UNF O-ring port

6 Shaft

B	Ø1" SAE 6B Splined shaft
C	Ø1" Straight with Woodruff key
D	Ø25 Straight with Parallel key, 8mm

7 Flange mounting

2	2 Bolt
4	4 Bolt

8 Special features (none of standard motor)

B	Special seal for phosphate ester fluid
M	Metric mounting holes

9 Drain port

X	Standard, with Drain port

10 Design code

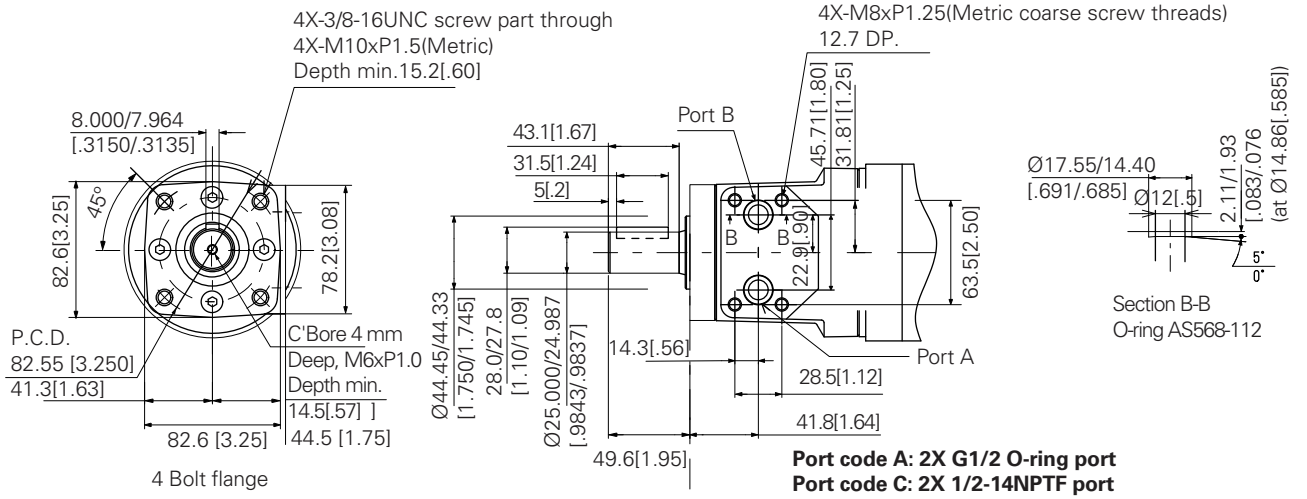
D-1

Dimension and mounting data

- Rotation: Viewed from shaft end
- CW: Port A pressurized
- CCW: Port B pressurized

Model	X: Length mm [inch]	Y: Length mm [inch]
SB-05	5.30[134.7]	6.76[171.7]
SB-07	5.39[137.0]	6.85[174.0]
SB-10	5.48[139.2]	6.94[176.2]
SB-12	5.62[142.7]	7.07[179.7]
SB-14	5.74[145.8]	7.20[182.8]

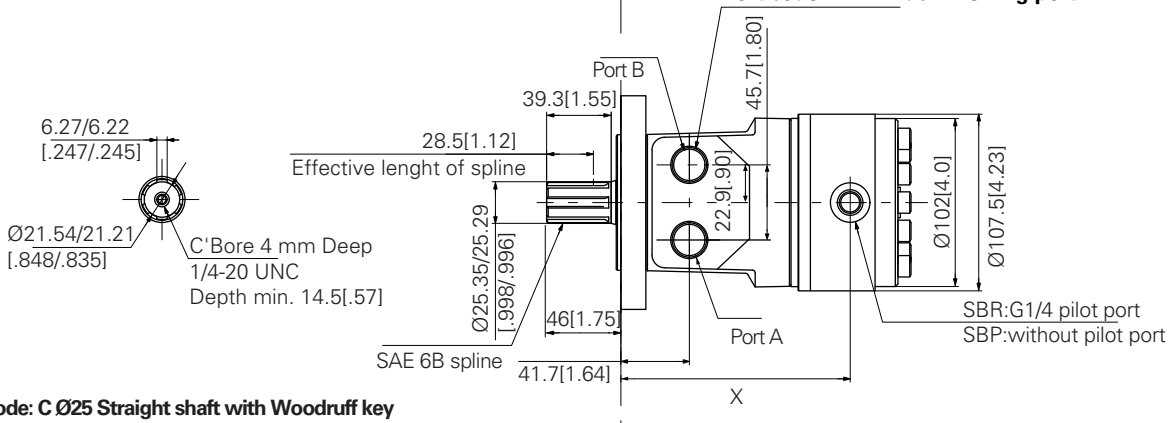
Shaft code: D Ø25 Straight shaft with Parallel key, 8 mm
Max. Torque: 350 N-m [3098 lb-in]



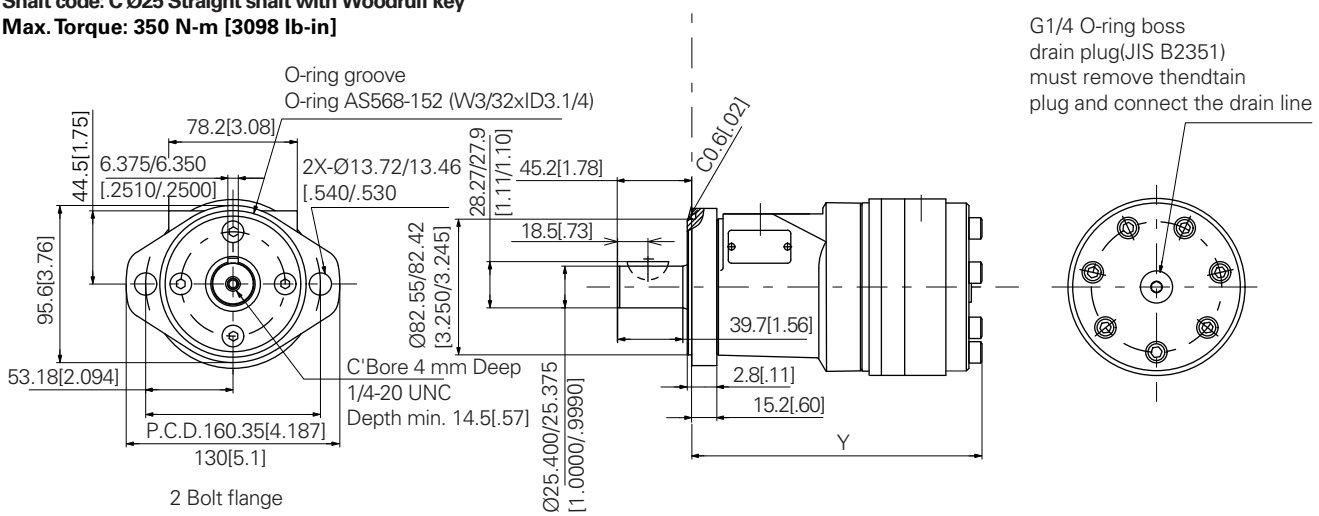
Port code B: Manifold mount
4X-5/16-18UNC
4X-M8xP1.25(Metric coarse screw threads)
12.7 DP.

Port code A: 2X G1/2 O-ring port
Port code C: 2X 1/2-14NPTF port
Port code D: 2X Rc 1/2 port
Port code E: 2X 7/8UNF O-ring port

Shaft code: B Ø25 SAE 6B Splined shaft



Shaft code: C Ø25 Straight shaft with Woodruff key
Max. Torque: 350 N-m [3098 lb-in]



Characteristics & Advantages

The S series Motor with mechanical brake utilizes a compact parking brake integrated into the motor. This motor has many uses in construction, winches, marine, and industrial vehicles.

Braking is applied when the pilot pressure is not supplied. The mechanical release of the brake is possible for the SBD and SBE series.

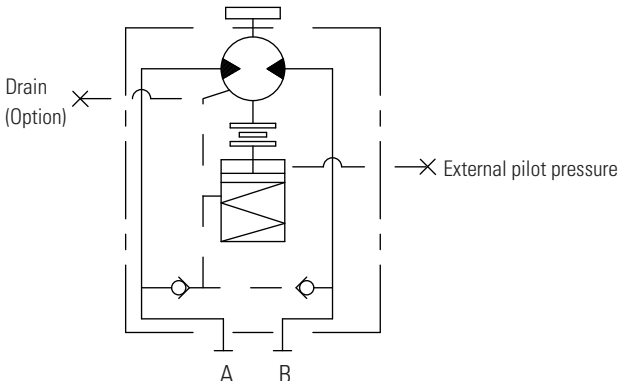
Specifications

Series	Brake torque	Brake release pressure	Brake release system
SBA	98Nm [868 lb-in]	10 bar [145 psi]	External Pilot
SBD	98Nm [868 lb-in]	10 bar [145 psi]	External Pilot + Mechanical System
SBE	157Nm [1,390 lb-in]	16 bar [232 psi]	External Pilot + Mechanical System
SBF	157Nm [1,390 lb-in]	16 bar [232 psi]	External Pilot

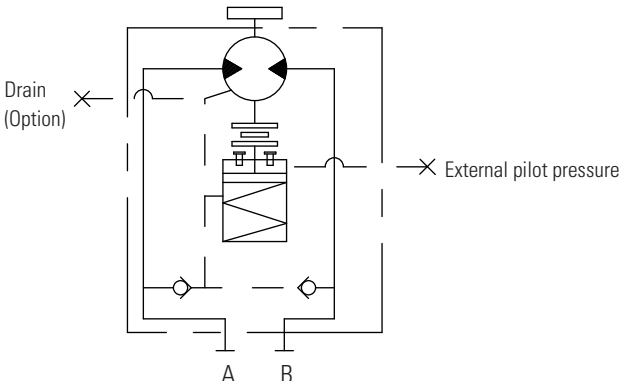
Note:

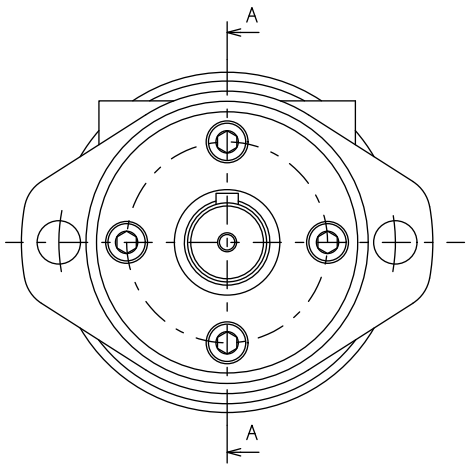
1. Other specifications are same as Standard S Series motor.
2. Fire resistant fluid need special specification motor. Please contact your Eaton representative.
3. This Brake can be used as a Parking Brake only. In case of dynamic brake application, Please contact your Eaton representative.
4. This is not a full capacity brake, but is a limited capacity brake, designed to hold loads from moving when no pressure is applied to the circuit.

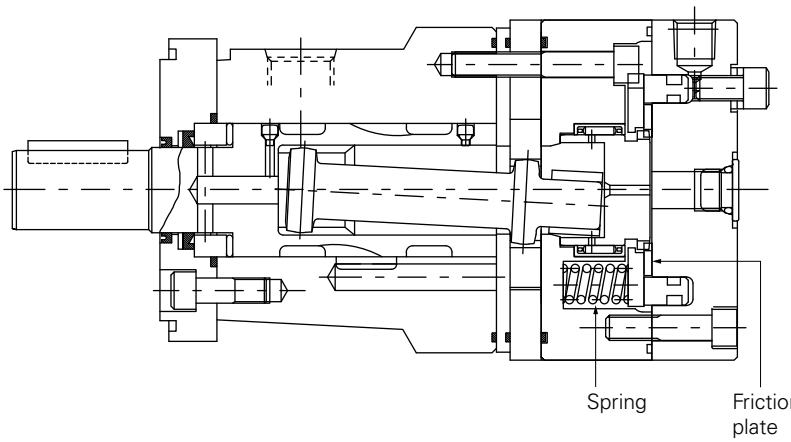
SBA,SBF Series



SBD,SBE Series







S Series Motor with Mechanical Brake

Model code

S B	*	* *	*	*	*	M	X	D
1 2	3	4 5	6	7	8	9	10	11

1 2 Series

SB	S Series motor with mechanical brake

3 Brake specifications

A	External pilot, 98Nm [868 lb-in]
D	External pilot + Mechanical release system, 98Nm [868 lb-in]
E	External pilot + Mechanical release system, 157Nm [1,390 lb-in]
F	External Pilot, 157Nm [1,390 lb-in]

4 5 Displacement

05	58cm³/r [3.5 in³/r]
07	76cm³/r [4.6 in³/r]
10	93cm³/r [5.7 in³/r]
12	120cm³/r [7.3 in³/r]
14	144cm³/r [8.8 in³/r]
16	165cm³/r [10.1 in³/r]
19	186cm³/r [11.3 in³/r]
22	224cm³/r [13.6 in³/r]
30	299cm³/r [18.2 in³/r]
38	371cm³/r [22.6 in³/r]

6 Port

A	G1/2 O-ring port
B	Manifold mount
C	1/2-14NPTF port
D	Rc1/2 port
E	7/8-14 UNF O-ring port

7 Shaft

B	Ø1" SAE 6B Splined shaft
C	Ø1" Straight with Woodruff key
D	Ø25 Straight with Parallel key, 8mm

8 Flange mounting

2	2 Bolt
4	4 Bolt

9 Special features (none of standard motor)

M	Metric mounting holes

10 Drain port

X	Standard, with Drain port

11 Design code

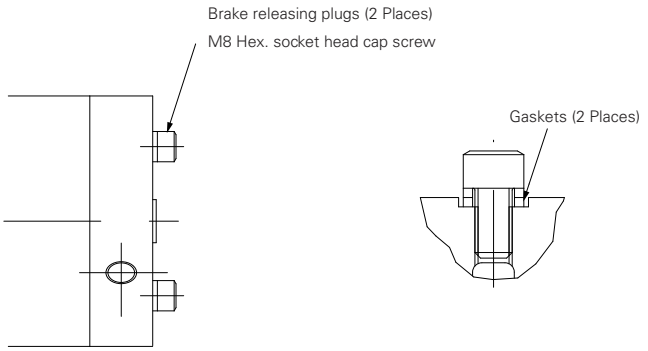
How to release the brake mechanically

The SBD and SBE Series are provided with a mechanical type brake releasing mechanism.

Remove the (2) gaskets and alternately tighten two brake releasing plugs. The brake will be released mechanically.

To restore braking, insert the gaskets and tighten the brake releasing plugs at a torque of 25.5~31.4N-m [225.69~277.91 lb-in] (At this time, clean the surface of sealing).

More specific features (Displacements, etc) are available on request, please contact with sales.



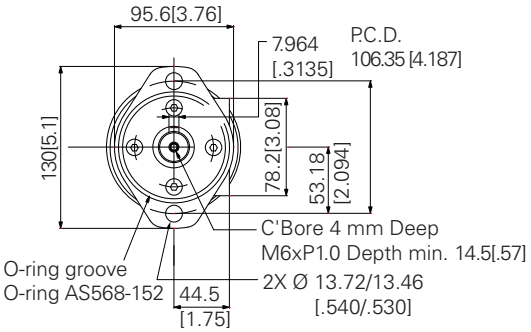
Dimension and mounting data

- Rotation: Viewed from shaft end
  - CW: Port A pressurized
  - CCW: Port B pressurized
- Need to select the port code B with metric 4-M8 thread
- A chang coupler of Rc3/8 is available (AH0039A)

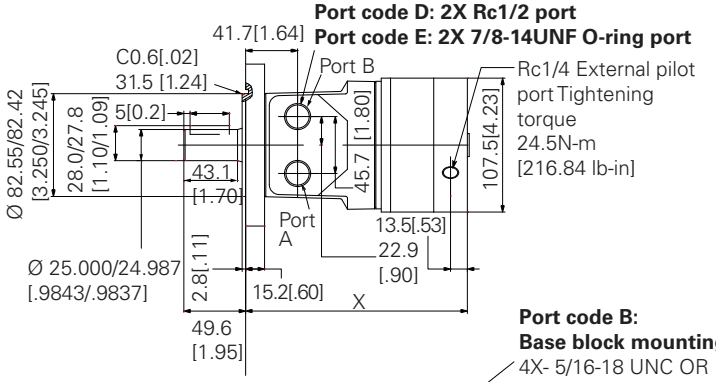
Model	X: Length mm [inch]
SB-05	177.0 [6.97]
SB-07	179.3 [7.06]
SB-10	181.5 [7.14]
SB-12	184.9 [7.28]
SB-14	188.1 [7.41]

Model	X: Length mm [inch]
SB-16	190.7 [7.51]
SB-19	193.4 [7.61]
SB-22	198.3 [7.81]
SB-30	208.0 [8.19]
SB-38	217.3 [8.56]

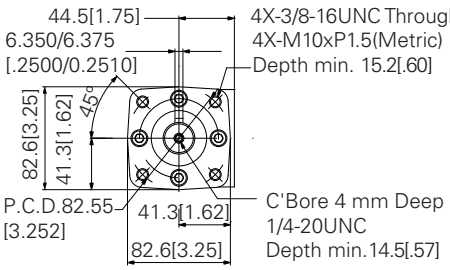
Shaft code: D Ø25 Straight shaft with Parallel key, 8 mm
Max. Torque: 350 N-m [3098 lb-in]



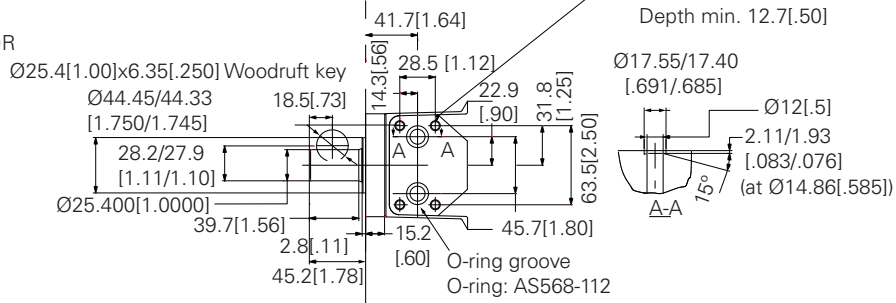
Port code A: 2X G1/2 O-ring port
Port code C: 2X 1/2-14NPTF port
Port code D: 2X Rc1/2 port
Port code E: 2X 7/8-14UNF O-ring port



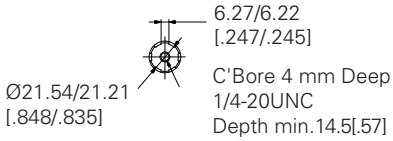
Shaft code: C Ø25 Straight shaft with Woodruff key
Max. Torque: 350 N-m [3098 lb-in]

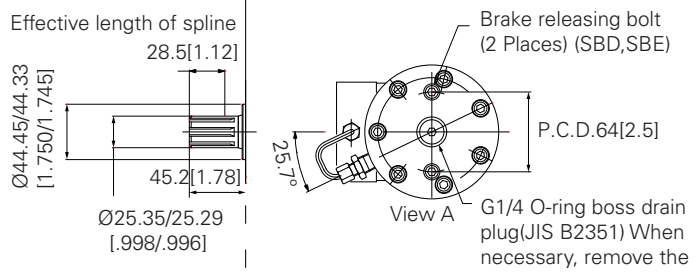


Port code B:
Base block mounting
4X- 5/16-18 UNC OR
4X- M8 x P1.25(Metric)
Depth min. 12.7[.50]

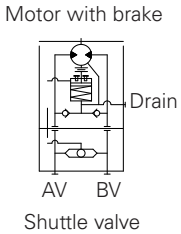


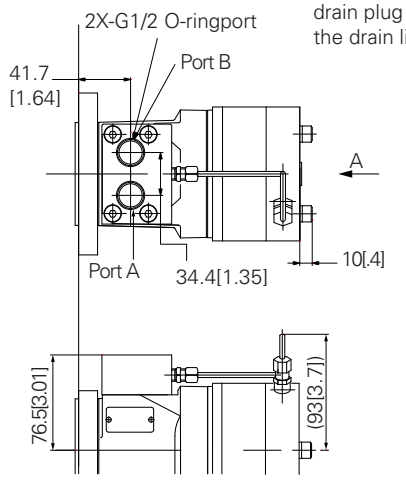
Shaft code: B Ø25 SAE 6B Splined shaft





Internal pilot with shuttle valve (VSDD4A+PIPE KET)





2000 Series Motor with Mechanical Brake (Brake Torque 98-196N-m [867-1,735 lb-in])

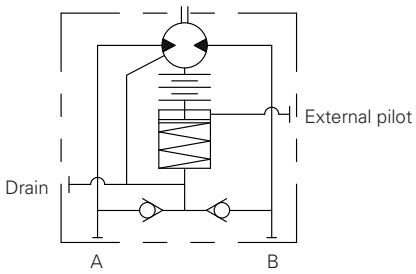
Characteristics & Advantages

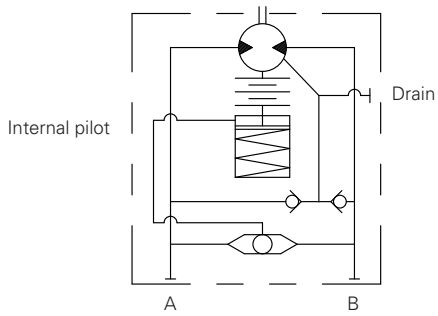
The 2K series motor with mechanical brake utilizes a pressure-release mechanical brake built into the motor. This parking brake can be used in applications such as winches, fishing equipment, industrial vehicles, industrial machinery, and much more.

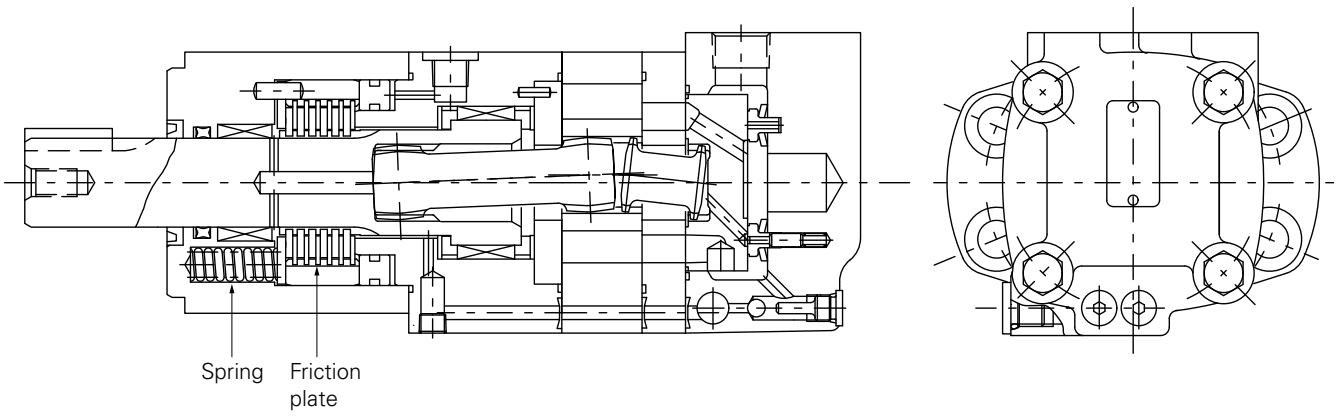
Note: This is not a full capacity brake, but is a limited capacity brake, designed to hold loads from moving when no pressure is applied to the circuit.

Specifications

Model Code	Brake Torque	Brake Release Pressure	Brake Release System
2-□□□K□□	98N-m [867lb-in]	9.8bar [142psi]	External Pilot
2-□□□L□□	196N-m [1735lb-in]	19.6bar [284psi]	External Pilot
2-□□□M□□	98N-m [867lb-in]	9.8bar [142psi]	Internal Pilot
2-□□□N□□	196N-m [1735lb-in]	19.6bar [284psi]	Internal Pilot

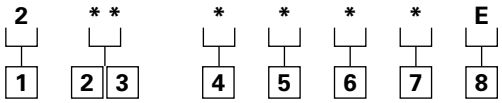






2000 Series Motor with Mechanical Brake (Brake Torque 98-196N-m [867-1,735 lb-in])

Model code



1 Series

2	2000 series

2 3 Displacement

08	78cm³/r [4.8in³/r]
10	97cm³/r [5.9in³/r]
12	123cm³/r [7.5in³/r]
16	158cm³/r [9.6in³/r]
20	195cm³/r [11.9in³/r]
25	244cm³/r [14.9in³/r]
29	288cm³/r [17.6in³/r]
31	306cm³/r [18.7in³/r]
39	393cm³/r [24.0in³/r]

4 Brake specifications [in-lb] Brake Torque

K	98N-m[867lb-in], External pilot
M	196N-m[1,735 lb-in], External pilot
L	98N-m[867lb-in], Internal pilot
N	196N-m[1,735 lb-in], Internal pilot

5 Shaft

A	Ø32 Straight with 10x8x31.5 Key
B	Ø1-1/4" Splined
D	Ø1-1/4" Straight with 5/16" Square key
F	Ø1" Straight with 1/4" Key

6 Flange Mounting

2	2 Bolt
4	4 Bolt (unequally spaced)

7 Port Connection

None	G1/2 O-ring port
A	7/8UNF O-ring port (External pilot only)
C	Rc1/2 port
U	7/8UNF O-ring port (pitch 50.8mm)

8 Design Code

More specific features (Displacements, etc) are available on request, please contact with sales.

Dimension and mounting data

External pilot

D-3

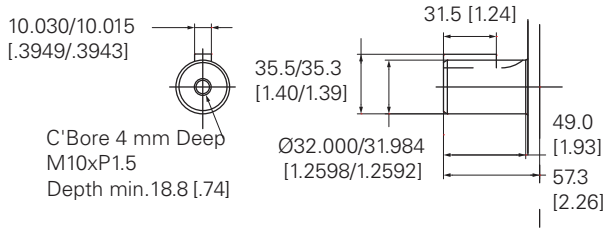
Rotation: Viewed from shaft end

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

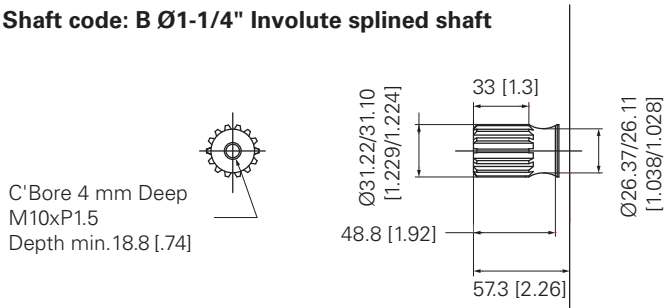
Model	X mm [inch]	Y mm [inch]
2-080	229 [9.0]	186 [7.3]
2-100	232 [9.1]	189 [7.4]
2-125	237 [9.3]	194 [7.6]
2-160	243 [9.6]	200 [7.9]
2-200	250 [9.8]	207 [8.1]
2-250	259 [10.2]	216 [8.5]
2-290	267 [10.5]	224 [8.8]
2-315	271 [10.7]	228 [9.0]
2-390	286 [11.3]	243 [9.6]

1-1/4" SAE Involute Spline (External)	
D.P	12/24
Number of teeth	14
Pitch Dia.	29.634[1.1667]
Base Dia.	25.664[1.0104]
Pressure angle	30°
Type of fit	Side fit
Class of fit	II
Major Dia.	31.22/31.10[1.229/1.224]
Minor Dia.	26.99/26.66[1.063/1.050]
Form Dia.	Max. 27.488[1.0822]
Fillet radius	Max. 0.39[0.015]
Dimension over two pins	35.797/35.750 [1.4093/1.4075]
Pin Dia.	4.064[.1600]

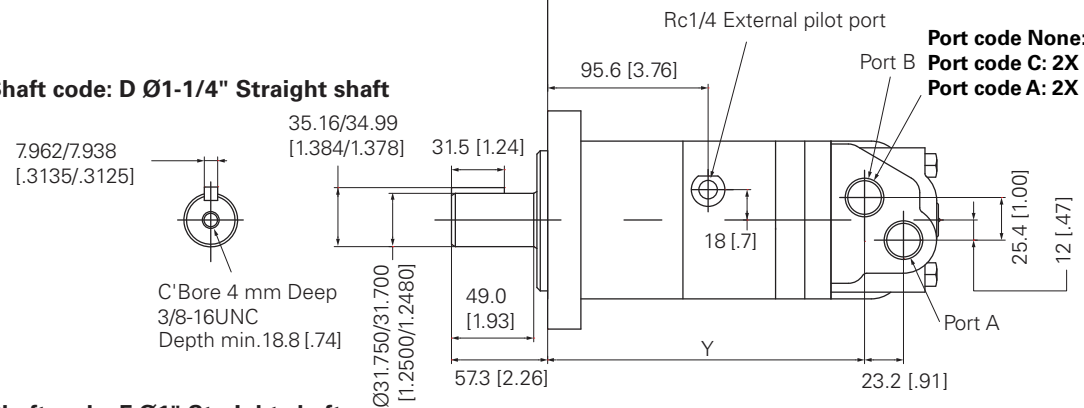
Shaft code: A Ø32 Straight shaft



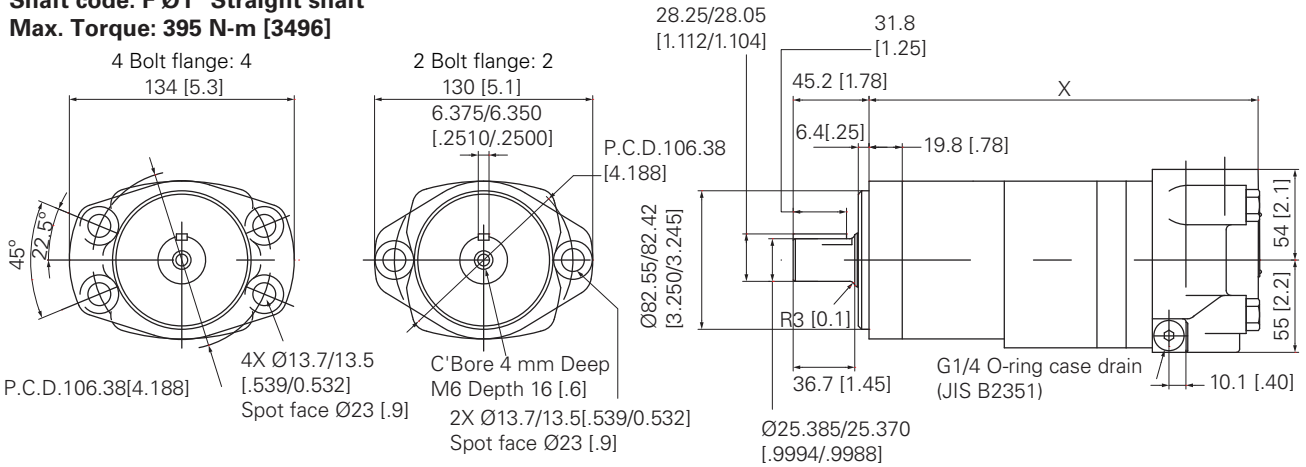
Shaft code: B Ø1-1/4" Involute splined shaft



Shaft code: D Ø1-1/4" Straight shaft



Shaft code: F Ø1" Straight shaft
Max. Torque: 395 N-m [3496]



Dimension and mounting data

Internal pilot

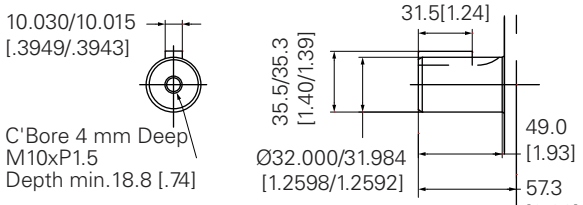
Rotation: Viewed from shaft end

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

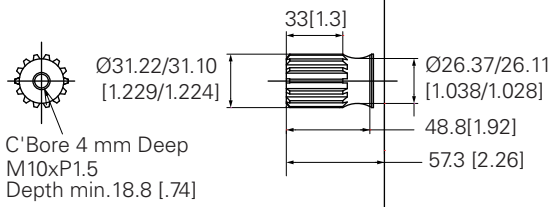
Model	X mm [inch]	Y mm [inch]
2-080	229[9.0]	186[7.3]
2-100	232[9.1]	189[7.4]
2-125	237[9.3]	194[7.6]
2-160	243[9.6]	200[7.9]
2-200	250[9.8]	207[8.1]
2-250	259[10.2]	216[8.5]
2-290	267[10.5]	224[8.8]
2-315	271[10.7]	228[9.0]
2-390	286[11.3]	243[9.6]

1-1/4" SAE Involute Spline (External)	
D.P	12/24
Number of teeth	14
Pitch Dia.	29.634[1.1667]
Base Dia.	25.664[1.0104]
Pressure angle	30°
Type of fit	Side fit
Class of fit	II
Major Dia.	31.22/31.10[1.229/1.224]
Minor Dia.	26.99/26.66[1.063/1.050]
Form Dia.	Max. 27.488[1.0822]
Fillet radius	Max. 0.39[0.015]
Dimension over two pins	35.797/35.750 [1.4093/1.4075]
Pin Dia.	4.064[.1600]

Shaft code: A Ø32 Straight shaft

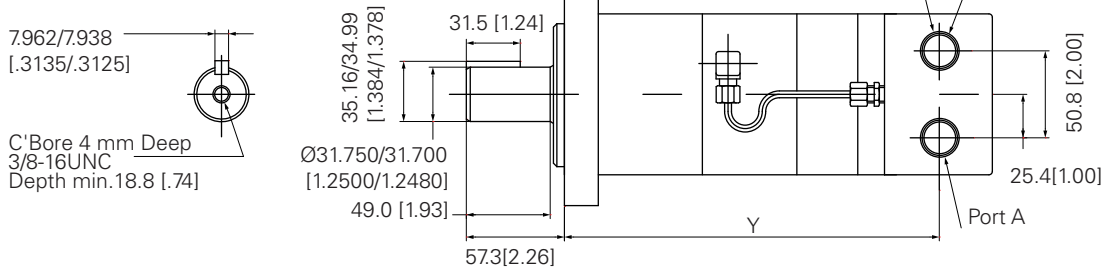


Shaft code: B Ø1-1/4" Involute splined shaft



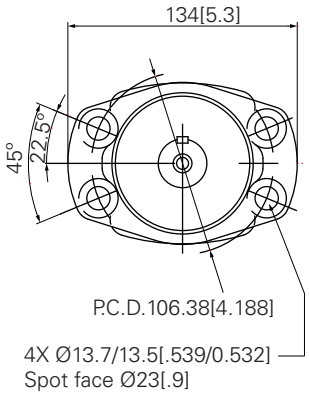
Port code None: 2X G1/2 O-ring port
Port code C: 2X Rc1/2 port
Port code U: 2X 7/8UNF O-ring port

Shaft code: D Ø1-1/4" Straight shaft

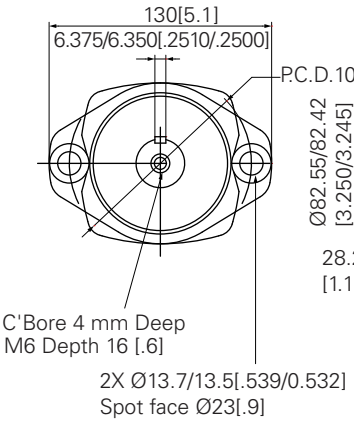


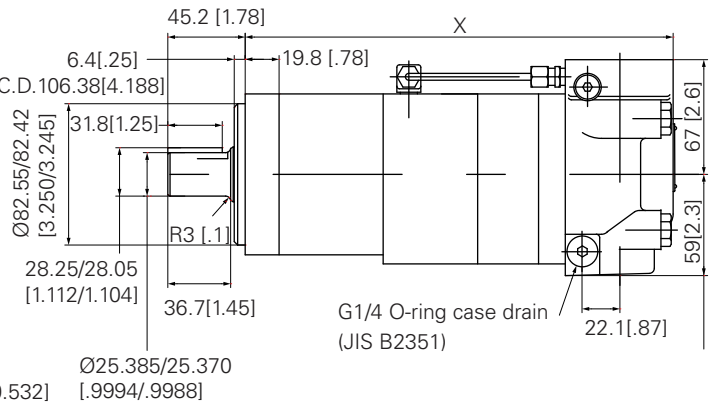
Shaft code: F Ø1" Straight shaft
Max. Torque: 395 N-m [3496]

4 Bolt flange



2 Bolt flange



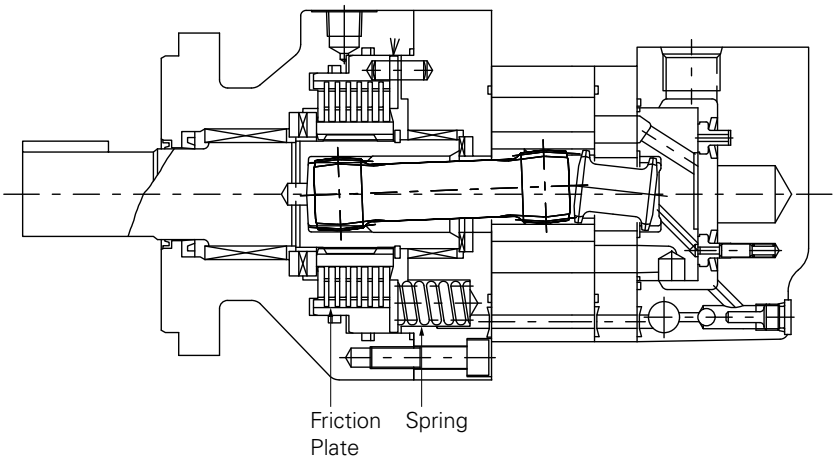


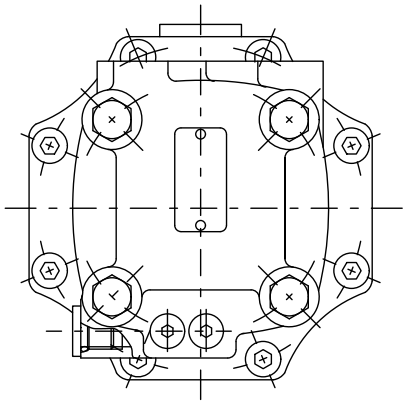
2000 Series Motor with Mechanical Brake (Brake Torque 294-392N-m [2,602-3,470 lb-in])

Specifications

Model code	Brake torque	Brake release pressure	Brake release system
2BE□□A□4-B	294N-m[2602lb-in]	20bar[290psi]	External Pilot
2BF□□A□4-B	392N-m[3470lb-in]	25bar[363psi]	External Pilot

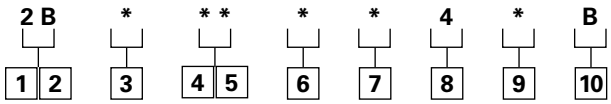
Note: 1. This Brake can be used as a Parking Brake only. In case of dynamic brake application, please contact Eaton.





2000 Series Motor with Mechanical Brake (Brake Torque 294-392N-m [2,602-3,470 lb-in])

Model code



1 2 Series

2B	2000 Series with mechanical brake

3 Brake Torque

E	294N-m, External pilot
F	392N-m, External pilot

4 5 Displacement

08	78cm³/r [4.8in³/r]
10	97cm³/r [5.9in³/r]
12	123cm³/r [7.5in³/r]
16	158cm³/r [9.6in³/r]
20	195cm³/r [11.9in³/r]
25	244cm³/r [14.9in³/r]
29	288cm³/r [17.6in³/r]
31	306cm³/r [18.7in³/r]
39	393cm³/r [24.0in³/r]

6 Motor type

A	Standard

7 Shaft

A	Ø32 Straight with 10x8x31.5 Key
B	Ø1-1/4" Splined
C	Ø1-1/4" Tapered
D	Ø1-1/4" Straight with 5/16" Square key

8 Flange mounting

4	4 Bolt (P.C.D. 127)

9 Port connections

-	G1/2 O-ring port
A	7/8UNF O-ring port
C	Rc1/2 port

10 Design code

More specific features (Displacements, etc) are available on request, please contact with sales.

Dimension and mounting data

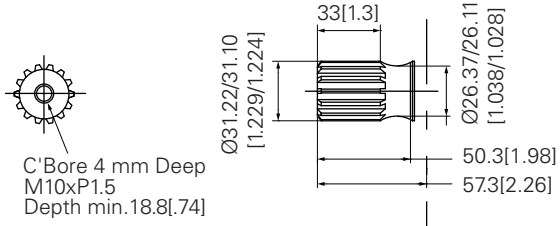
Rotation: Viewed from shaft end

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

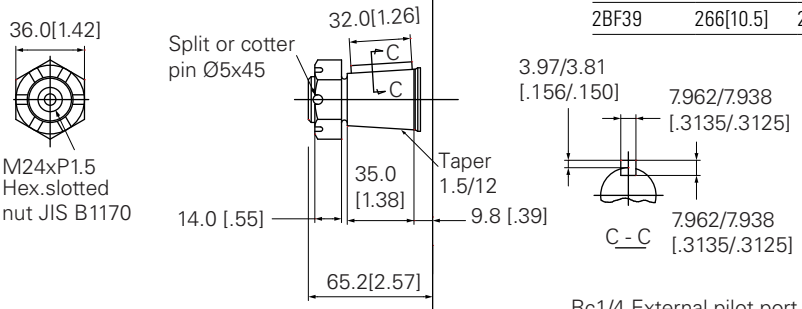
Model	X mm [inch]	Y mm [inch]
2BF08	208[8.2]	165[6.5]
2BF10	211[8.3]	168[6.6]
2BF12	216[8.5]	173[6.8]
2BF16	223[8.8]	180[7.1]
2BF20	229[9.0]	186[7.3]
2BF25	238[9.4]	195[7.7]
2BF29	246[9.7]	203[8.0]
2BF31	250[9.8]	207[8.1]
2BF39	266[10.5]	223[8.8]

1-1/4" SAE involute spline (External)	
D.P	12/24
Number of teeth	14
Pitch Dia.	29.634[1.1667]
Base Dia.	25.664[1.0104]
Pressure angle	30°
Type of fit	Side fit
Class of fit	II
Major Dia.	31.22/31.10 [1.229/1.224]
Minor Dia.	26.99/26.66 [1.063/1.050]
Form Dia.	Max. 27.488 [1.0822]
Fillet radius	Max. 0.39 [.015]
Dimension over two pins	35.797/35.750 [1.4093/1.4075]
Pin Dia.	4.064 [.1600]

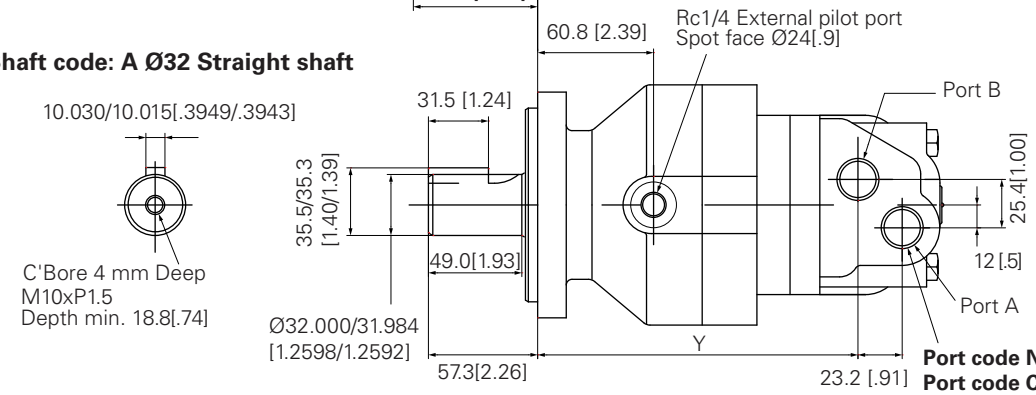
Shaft code: B Ø1-1/4" Involute splined shaft



Shaft code: C Ø1-1/4" Tapered shaft

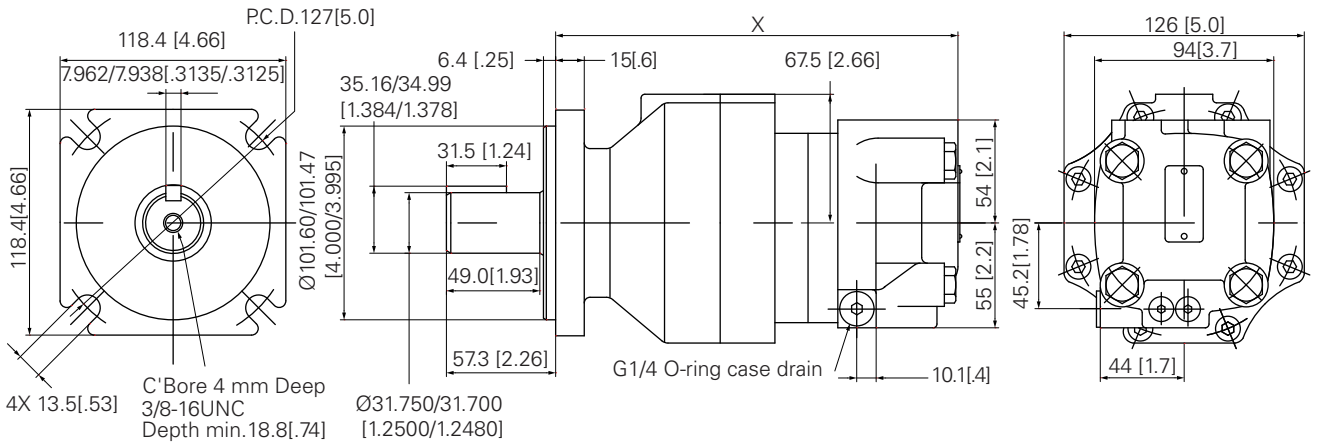


Shaft code: A Ø32 Straight shaft



Port code None: 2X G1/2 O-ring port
Port code C: 2X Rc1/2 port
Port code A: 2X 7/8UNF O-ring port

Shaft code: D Ø1-1/4" Straight shaft



Char-Lynn Low speed high torque orbit motors for swing drive

S series, 2K series, 2.5K series, 4K series, 4.5K series swing motors

Features

- Low speed high torque Char-Lynn motor for Swing
- Direct drive (no reduction gear)
- Displacement from 165cm³/rev[10.1in³/rev] to 393 cm³/rev [24.0 in³/rev], maximum pressure up to 196bar[2843psi]
- Optionally integrate mechanical parking brake, time delay valve and shock less relief valve

Benefits

- Maintenance cost saving cause no reduction gear oil required
- Cost competitive due to simple structure design
- Reduced energy consuming attributed to higher mechanical and volumetric efficiency
- Less mechanical shocks by smooth and precise control
- Proven performance by 30+ years experience

Typical application

- Mini excavator
- Excavator attachment
- General swing application

Typical mini excavator weight (ton)

0.5	0.7	1.0	1.5	2.0	2.5	3.0	3.5	Model
■								S-160
■	■	■						S-190
	■	■						S-220
	■	■						S-300
		■	■					2P*16
		■	■					2P*20
		■	■					2P*25
			■					25P*16
			■	■				25P*20
			■	■				25P*25
				■	■			4P*25
				■	■			4P*31
				■	■			4P*39
					■	■		45P*31
					■	■		45P*33
					■	■		45P*39

Recommendation fluids: ISO VG32, 46, 56, 68 mineral oil

Recommended system operation temperature: -30°C to 80°C [-22°F to 176°F]

Recommended oil viscosity: 24 to 50 cSt[120 to 233 SUS]

Recommended cleanliness: ISO 18/13

Characteristics & Advantages

S series motor is special designed spool valve Char-Lynn motor which can work on radial load.

Compact dimension and cost competitive are the key benefits for S series motor.

S series motor specifically fit for Swing drive of mini-excavators which tonnage less than 1 ton.

Pinion gear and valve can be easily assembled on the S series motor directly.

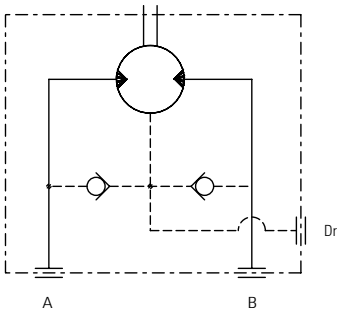
Specification

Model		S-160	S-190	S-220	S-300
Motor displacement	cm^3/r [in^3/r]	165 [10.1]	186 [11.4]	224 [13.7]	299 [18.3]
Max output Torque	N-m [lb-in]	180 [1593]	203 [1797]	242 [2141.9]	323 [2858.8]
Max pressure	bar [psi]	68 [986.3]	68 [986.3]	68 [986.3]	68 [986.3]
Max speed	rpm	80	80	80	80
Mass	kg[lb]	7.4[16.3]	7.6[16.8]	7.9[17.4]	8.4[18.5]

Note:

1. Drain line recommended
2. Back pressure should be max 20bar[290.1psi]

Circuit diagram



Model Code

S - *** * * 2 * X M + option valve

1 | 2 3 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 12 13

1 Series

S	S Series swing motor

2 3 4 Displacement

160	165cm^3/r [10.1in^3/r]
190	186cm^3/r [11.4in^3/r]
220	224cm^3/r [13.7in^3/r]
300	299cm3/r [18.3in3/r]

5 Port

A	G1/2 O-ring port
E	7/8UNF O-ring port
G	G1/4 O-ring port

6 Output shaft

K	1 inch 6B spline
M	Ø25 straight shaft long type
S	1 inch 6B spline with bearing support

7 Flange

2	2 bolt flange

8 Special requirement

H	Geroler load holding
N	Low noise
V	Low leakage

9 X: With drain port (plugged)

10 Design code

11 12 13 Option valve

VSE	Relief valve
VSW	Counter balance valve with relief
	Keep blank for no optional valve required

Model code and relief setting pressure are required in order sheet.

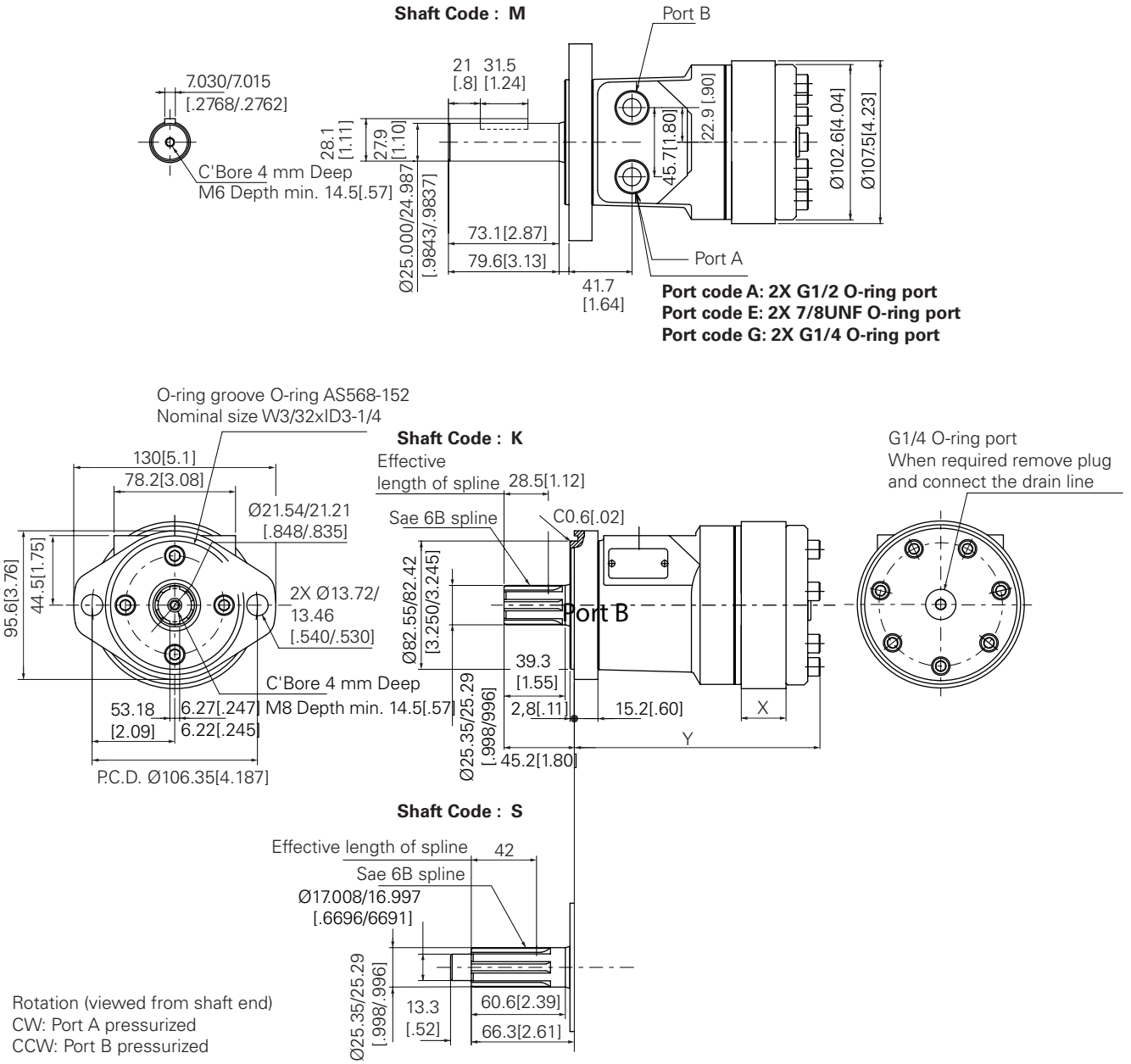
*More displacement/Port are optional based on customer request

*For any special requirement please contact with sales.

For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify. (see end cover)

D-5

Installation dimension



Model	X mm [inch]	Y mm [inch]
S-160	21.3[.84]	150.5[5.93]
S-190	24.0[.95]	153.2[6.03]
S-220	28.9[1.14]	158.1[6.22]
S-300	38.5[1.52]	167.8[6.61]

Note: Please prepare the pinion gear, bearing, and bearing case at the customer's site. Please calculate the radial and follow the allowable radial load diagram.

Side load Capacity

The hydrodynamic bearing has infinite life when shaft load ratings are not exceeded. Hence, the shaft side load capacity is more than adequate to handle most externally applied loads (such as belts, chains, etc.), providing the motor to shaft size is applied within its torque rating. Allowable side load chart, shaft load location drawing and load curves (below) are based on the side / radial loads being applied to shaft at locations A, B, and C, to determine the shaft side load capacity at locations other than those shown use the formula (shown below). For more information about shaft side loads on Char-Lynn motors contact your Eaton representative.

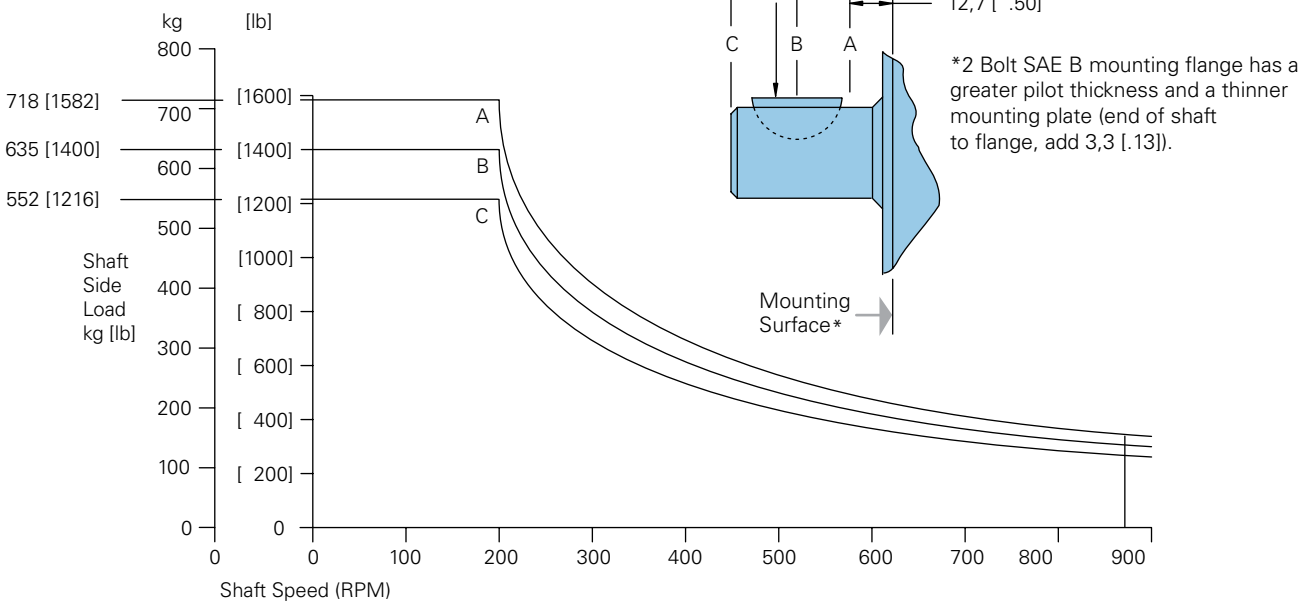
RPM Allowable shaft side load — Kg [lb]

	A	B	C
900	154 [339]	136 [300]	118 [261]
625	205 [452]	181 [400]	158 [348]
500	256 [565]	227 [500]	197 [435]
400	307 [678]	272 [600]	237 [522]
300	410 [904]	363 [800]	316 [696]
200	718 [1582]	635 [1400]	552 [1216]

$$\text{Sideload P kg} = \frac{900}{N}\left(\frac{16800}{L + 96{,}3}\right) \text{ for 200-900 RPM}$$

$$\text{Sideload P [lb]} = \frac{900}{N}\left(\frac{1460}{L + [3.79]}\right) \text{ for 200-900 RPM}$$

Where N = Shaft Speed (RPM)
L = Distance from Mounting Surface



*2 Bolt SAE B mounting flange has a greater pilot thickness and a thinner mounting plate (end of shaft to flange, add 3,3 [.13]).

2K Series

Swing motor

Characteristics & Advantages

2K series motor is disc valve Char-Lynn® motor which can work with low leakage under high pressure.

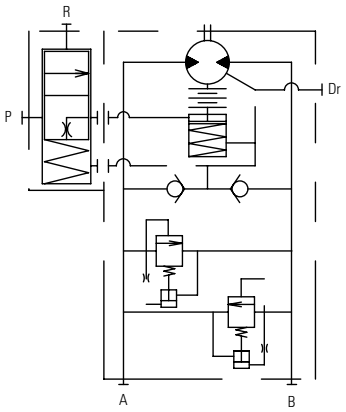
The integrated pinion gear and big capacity bearing ensured the 2K series motor high reliability even under high radial load.

Specifically fitting for Swing drive on mini-excavators which tonnage less than 1.5 ton.

Integrated relief valve (or other required valves) can be easily assembled on the 2K series motor directly.

Circuit diagram

This hydraulic circuit includes time delay valve and schockless relief valve (option)



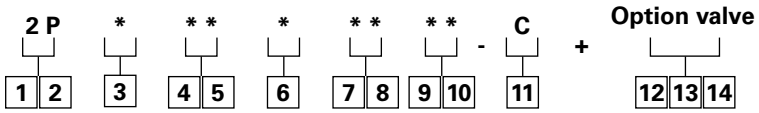
Specification

Model		2P*16	2P*20	2P*25
Motor displacement	cm^3/rev [in^3/rev]	158 [9.6]	195 [11.9]	244 [14.9]
Max output torque	N-m [lb-in]	308 [2726.0]	411 [3637.6]	420 [3717.3]
Max pressure	bar [psi]	123 [1784]	132 [1915]	108 [1566]
Max speed	rpm	80	80	80
Mechanical brake torque	N-m [lb-in]	441[3903.2] (Min. release pressure: 20bar[290psi], Max release pressure: 49bar[711psi])		
Mass	kg[lb]	21.0[46.3]	21.5[47.4]	22.0[48.5]

Note:

1. Max pressure is relief valve setting pressure
2. Need drain line (Back pressure should be max 20bar [290psi]).

Model Code



1 2 Series

2P	2K Series swing motor

3 Brake specification

N	Without mechanical brake
C	With mechanical brake

4 5 Displacement

16	158cm^3/r[9.6in^3/r]
20	195cm^3/r[11.9in^3/r]
25	244cm^3/r[14.9in^3/r]

6 Load holding spec.

A	Geroler Load holding (Middle)
B	Geroler Load holding (Light)

7 8 Port

11	G3/8 O-ring port with shockless relief valve
31	G3/8 O-ring port with relief valve

9 10 Output pinion shaft

15	m4 z11
34	m4 z13

11 Design code

12 13 14 Option valve

VNS	Shockless relief valve
V2T	Time delay valve
VSW	Counter balance valve with relief
	Keep blank for no optional valve required

Model code and relief setting pressure are required in order sheet.

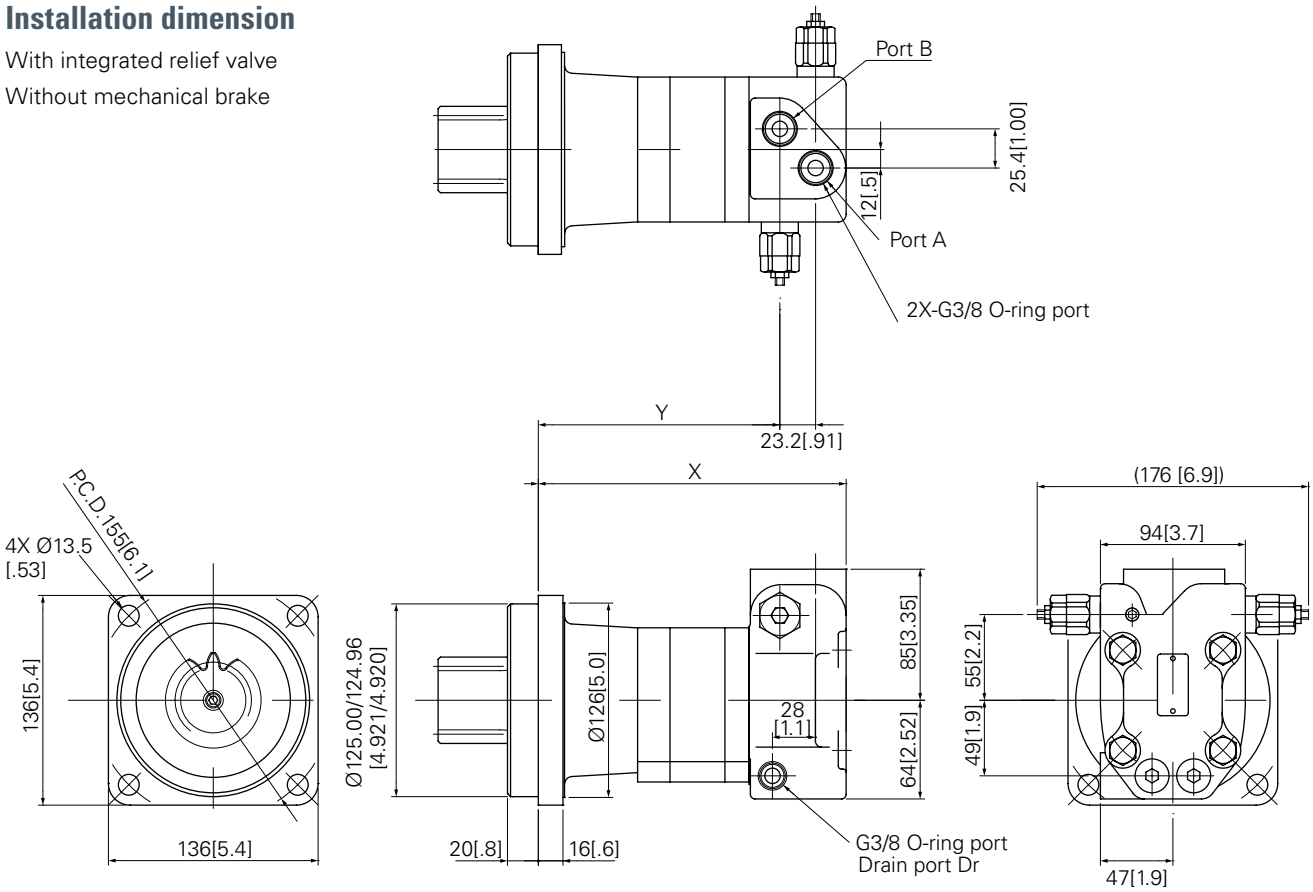
*More displacement/Port are optional based on customer request

For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify. (see end cover)

Installation dimension

With integrated relief valve

Without mechanical brake



Rotation (viwed from shaft end)
CW : Port A pressurized
CCW : Port B pressurized

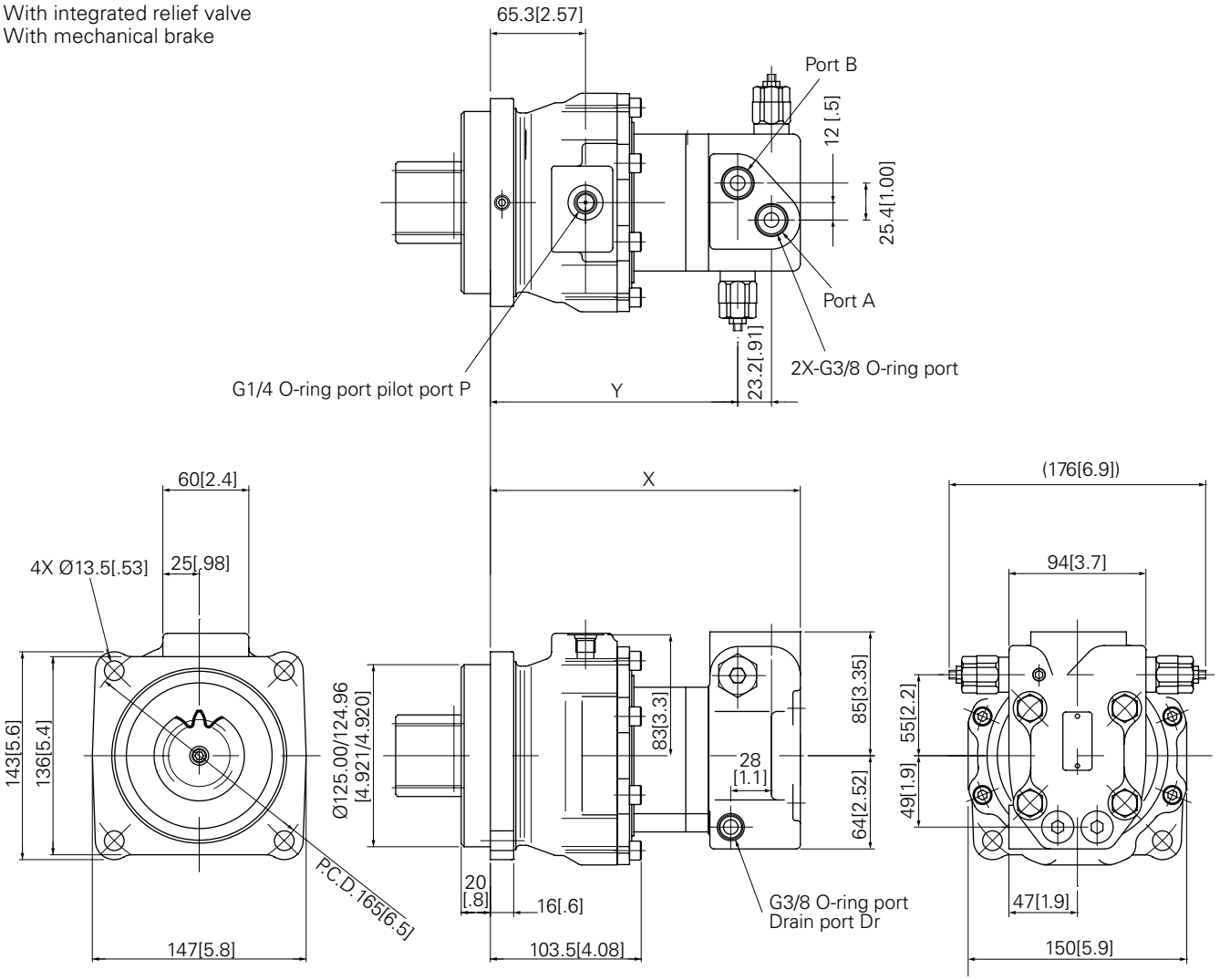
Pinion Gear Dimension (Reference)

Module	4	4	4.5	4.5
Number of teeth	11	13	11	12
Pressure angle	20	20	20	20
Pitch diameter mm [inch]	44[1.7]	52[2.1]	49.5[1.95]	54[2.1]
Add modification coefficient	0.55	0.6	0.5	0.4

Note: as per JIS standard Output torque is limited depending on pinion dimension In case of small pinion, output torque is limited less than spec..

Model	X mm [inch]	Y mm [inch]
2PN16	193[7.6]	150[5.9]
2PN20	200[7.9]	157[6.2]
2PN25	209[8.2]	166[6.5]

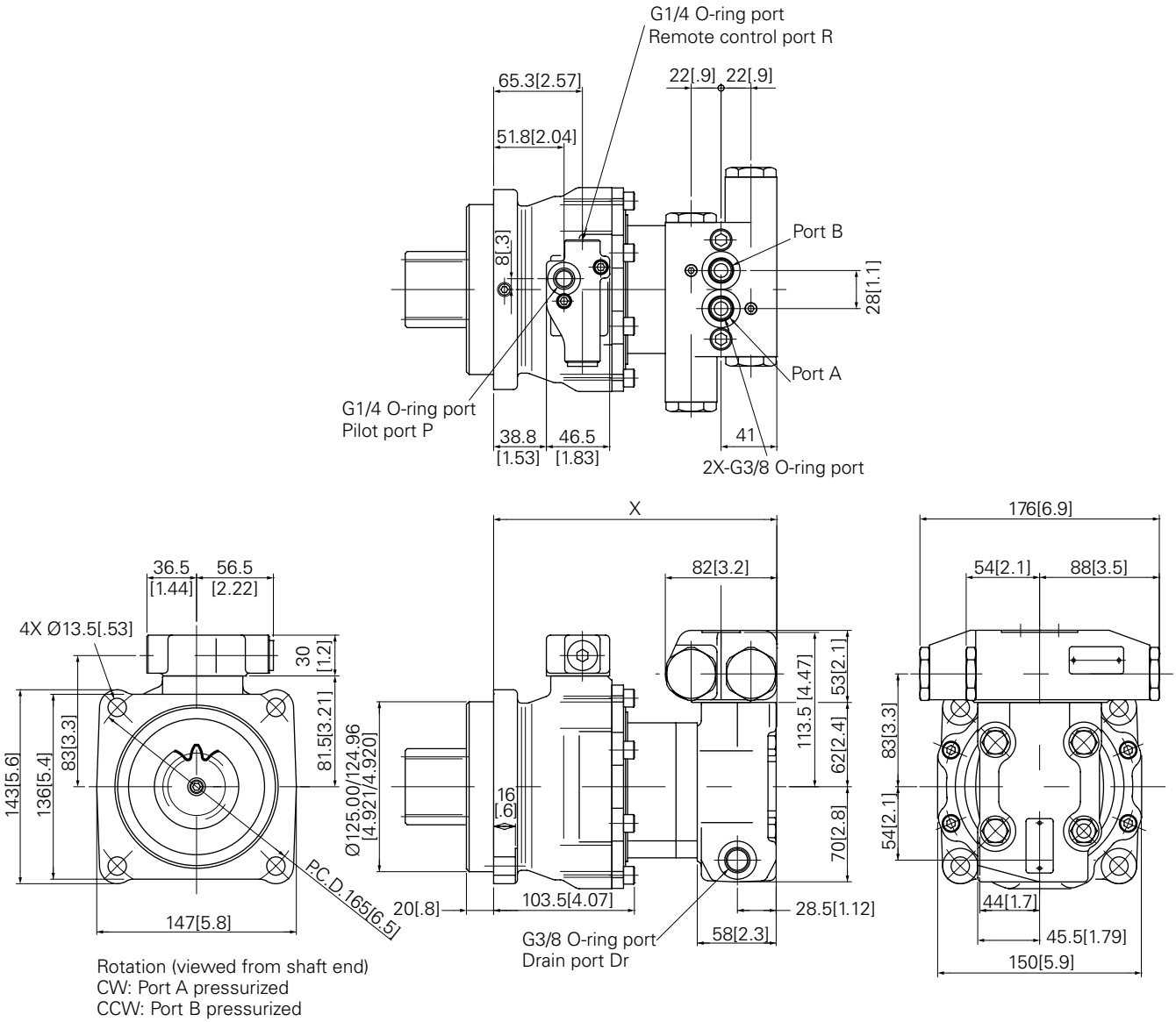
With integrated relief valve
With mechanical brake



Rotation (viewed from shaft end)
CW: Port A pressurized
CCW: Port B pressurized

Model	X mm [inch]	Y mm [inch]
2PC16	206[8.1]	163[6.4]
2PC20	213[8.4]	170[6.7]
2PC25	222[8.7]	179[7.0]

With Shockless relief valve and time delay valve option.
With mechanical brake



Model	X mm [inch]
2PC16	206[8.1]
2PC20	213[8.4]
2PC25	222[8.7]

2.5K Series

Swing motor

Characteristics & Advantages

2.5K series motor is disc valve Char-Lynn® motor which can work with low leakage under high pressure.

The integrated pinion gear and big capacity bearing ensured the 2.5K series motor high reliability even under high radial load.

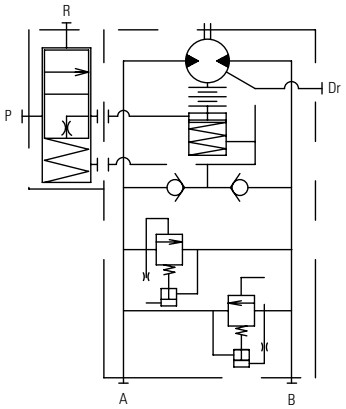
Specifically fitting for Swing drive on mini-excavators which tonnage less than 2 ton.

Integrated relief valve (or other required valves) can be easily assembled on the 2.5K series motor directly/

2.5K series is a motor used with heavier duty specifications than 2K series.

Circuit diagram

This hydraulic circuit includes time delay valve and schockless relief valve (option)



Specification

Model		25P*16	25P*20	25P*25
Motor displacement	cm^3/rev [in^3/rev]	158 [9.6]	195 [11.9]	244 [14.9]
Max output torque	N-m [lb-in]	369 [3265.9]	472 [4177.6]	515 [4558.1]
Max pressure	bar [psi]	147 [2132]	152 [2205]	132 [1915]
Max speed	rpm	80	80	80
Mechanical brake torque	N-m [lb-in]	441[3903.2] (Min. release pressure: 20bar[290psi], Max release pressure: 49bar[711psi])		
Mass	kg[lb]	21.0[46.3]	21.5[47.4]	22.0[48.5]

Note:

1. Max pressure is relief valve setting pressure
2. Need drain line (Back pressure should be max 20bar [290psi]).

Model Code

25P	*	**	*	**	**	-	C	+	Option valve
1 2 3	4	5 6	7	8 9	10 11		12		13 14 15

1 2 3 Series

25P	2.5K Series swing motor

4 Brake specification

N	Without mechanical brake
C	With mechanical brake

5 6 Displacement

16	158cm^3/r[9.6in^3/r]
20	195cm^3/r[11.9in^3/r]
25	244cm^3/r[14.9in^3/r]

7 Load holding spec.

A	Geroler Load holding (Middle)
B	Geroler Load holding (Light)

8 9 Port

11	G3/8 O-ring port with shockless relief valve
31	G3/8 O-ring port with relief valve

10 11 Output pinion shaft

15	m4 z11
34	m4 z13

12 Design code

13 14 15 Option valve

VNS	Shockless relief valve
V2T	Time delay valve
VSW	Counter balance valve with relief
	Keep blank for no optional valve required

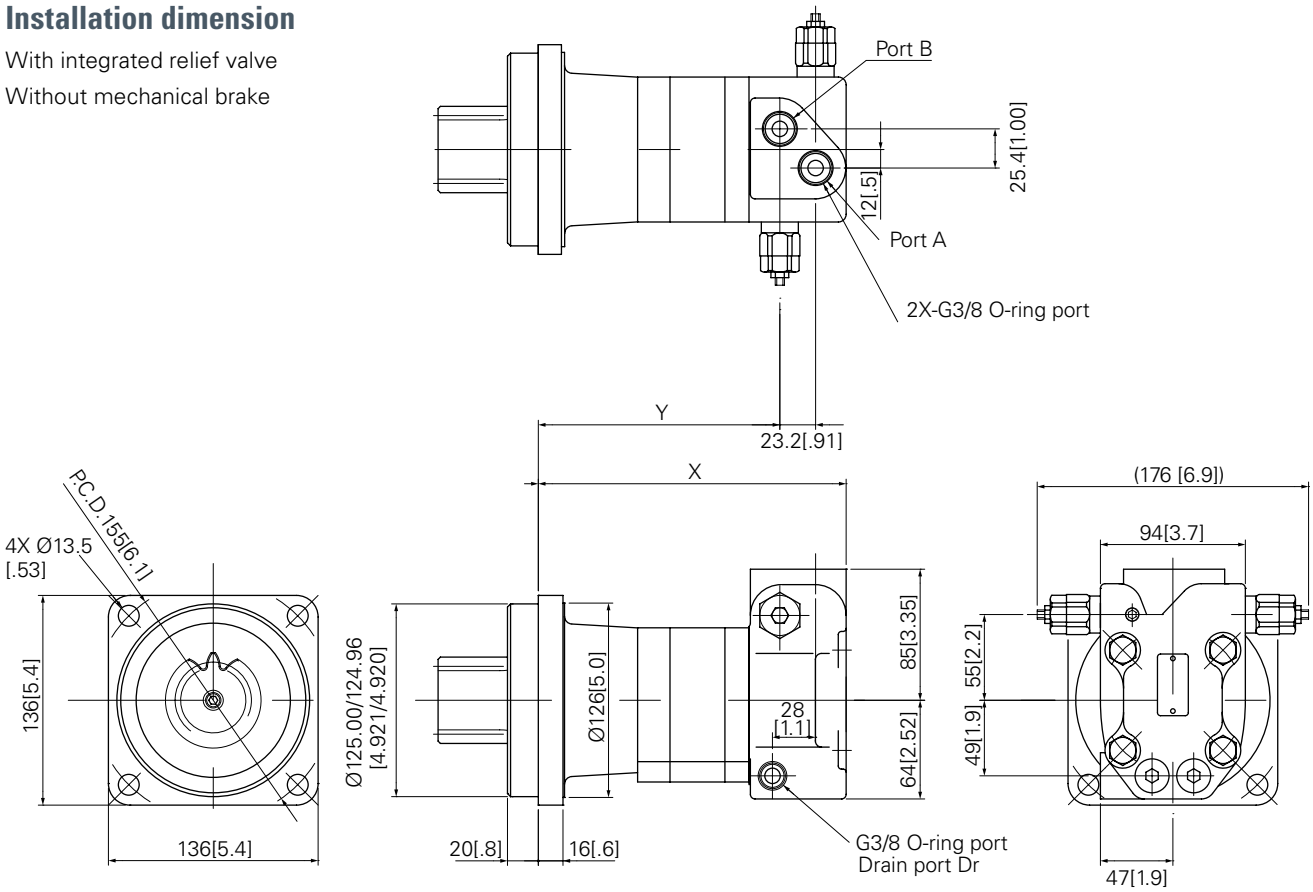
Model code and relief setting pressure are required in order sheet.

*More displacement/Port are optional based on customer request

For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify. (see end cover)

Installation dimension

With integrated relief valve
Without mechanical brake



Rotation (viwed from shaft end)
CW : Port A pressurized
CCW : Port B pressurized

Pinion Gear Dimension (Reference)

Module	4	4	4.5	4.5
Number of teeth	11	13	11	12
Pressure angle	20	20	20	20
Pitch diameter mm [inch]	44[1.7]	52[2.1]	49.5[1.95]	54[2.1]
Add modification coefficient	0.55	0.6	0.5	0.4

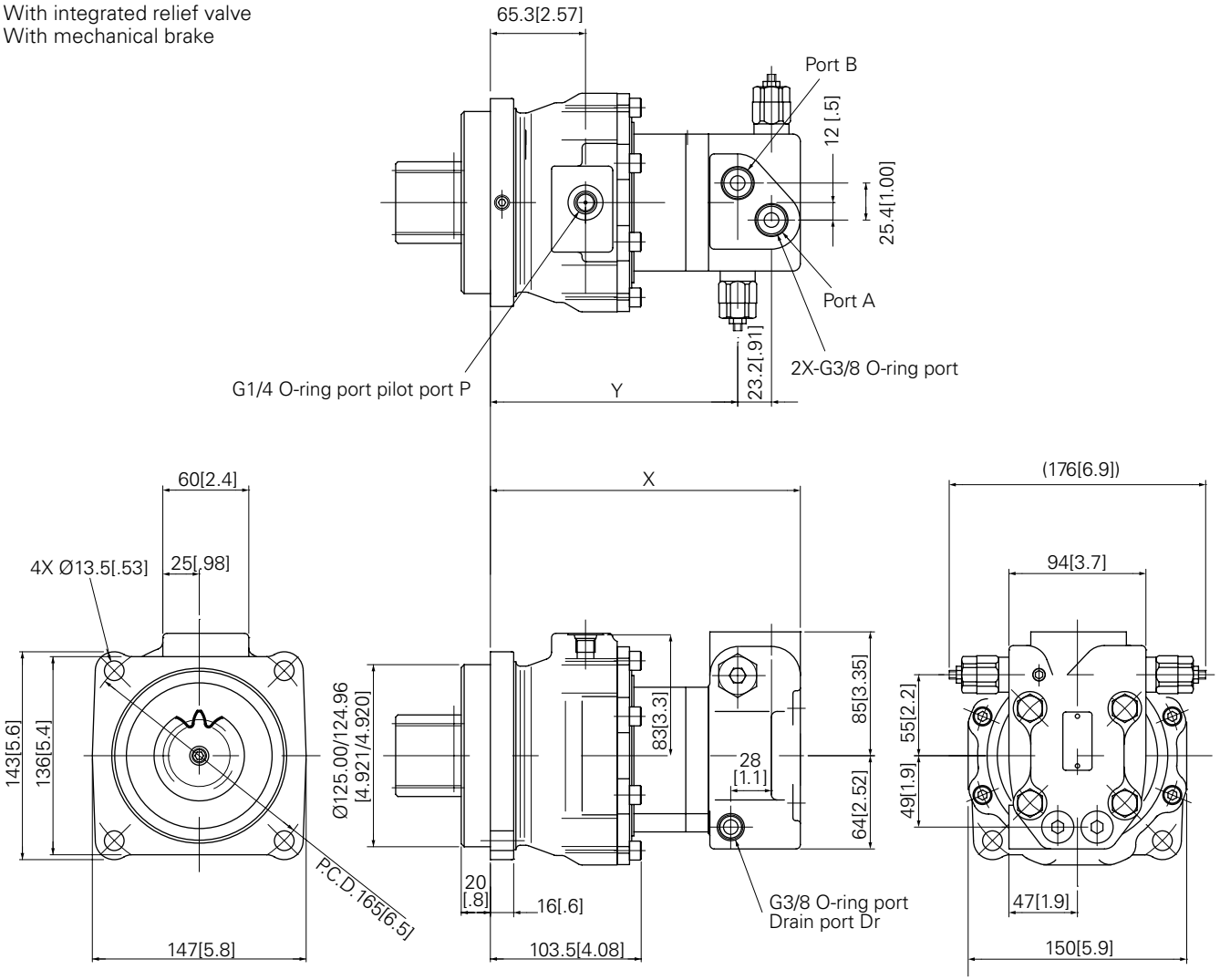
Note: as per JIS standard Output torque is limited depending on pinion dimension In case of small pinion, output torque is limited less than spec..

Model	X mm [inch]	Y mm [inch]
25PN16	193[7.6]	150[5.9]
25PN20	200[7.9]	157[6.2]
25PN25	209[8.2]	166[6.5]

2.5K Series

Swing Motor

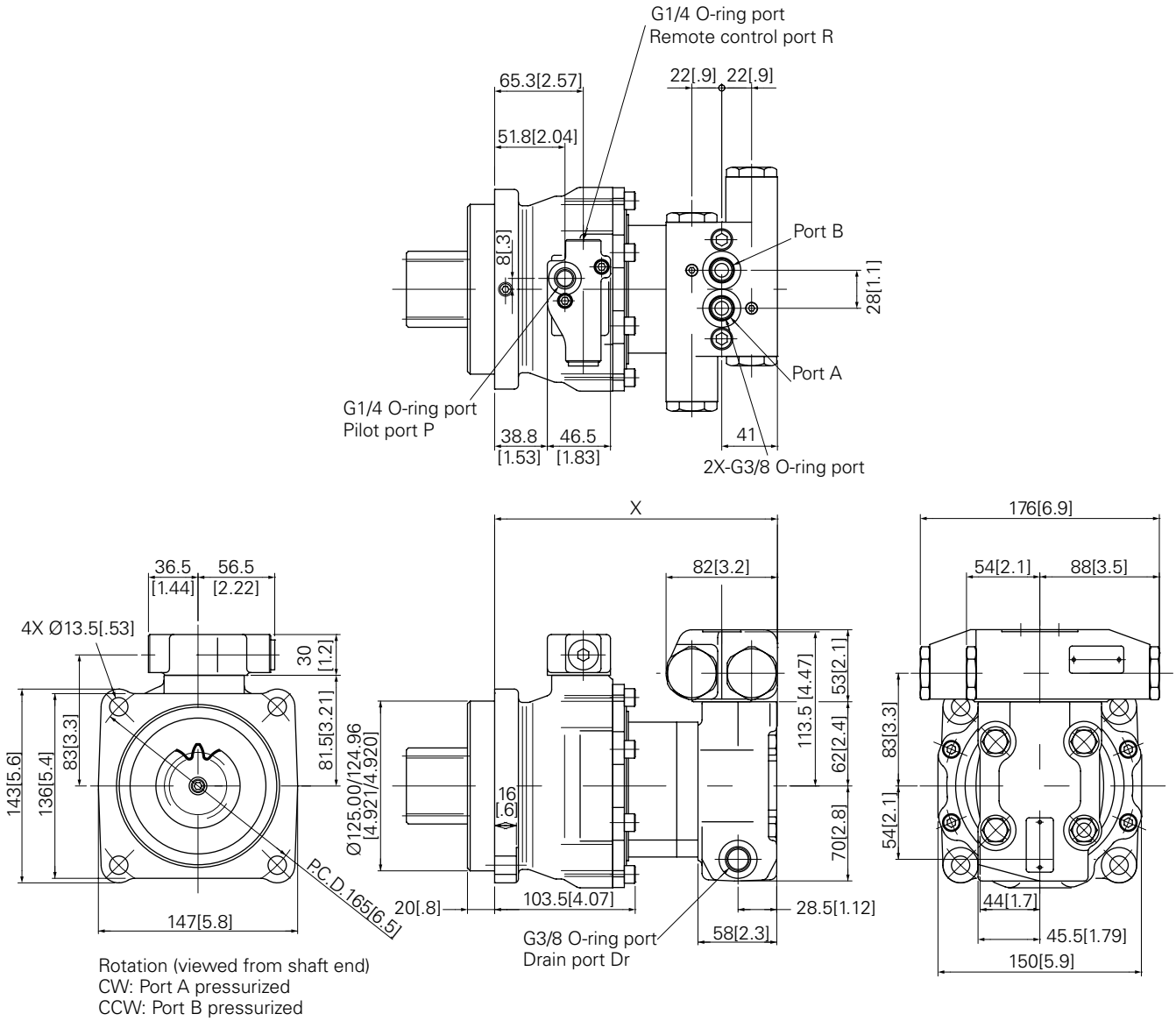
With integrated relief valve
With mechanical brake



Rotation (viewed from shaft end)
CW: Port A pressurized
CCW: Port B pressurized

Model	X mm [inch]	Y mm [inch]
25PC16	206[8.1]	163[6.4]
25PC20	213[8.4]	170[6.7]
25PC25	222[8.7]	179[7.0]

With Shockless relief valve and time delay valve option.
With mechanical brake



Model	X mm [inch]
25PC16	206[8.1]
25PC20	213[8.4]
25PC25	222[8.7]

4K series

Swing motor

Characteristics & Advantages

4K series motor is disc valve Char-Lynn® motor which can work with low leakage under high pressure.

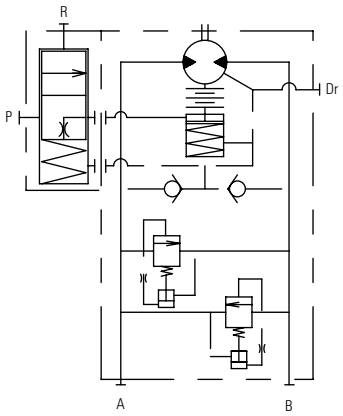
The integrated pinion gear and big capacity bearing ensured the 4K series motor high reliability even under high radial load.

Specifically fitting for Swing drive on mini-excavators which tonnage less than 2.5 ton.

Integrated relief valve (or other required valves) can be easily assembled on the 4K series motor directly.

Circuit diagram

This hydraulic circuit includes time delay valve.



D-8

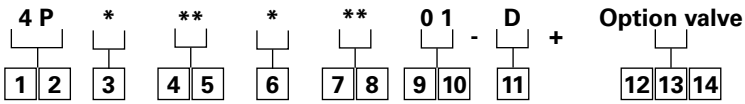
Specification

Model		4P*25	4P*31	4P*39
Motor displacement	cm^3/rev [in^3/rev]	246 [15.0]	311 [19.0]	393 [24.0]
Max output torque	N-m [lb-in]	691 [6115.8]	850 [7523.1]	859 [7602.8]
Max pressure	bar[psi]	177 [2567]	172 [2495]	137 [1987]
Max speed	rpm	80	80	80
Mechanical brake	N-m [lb-in]	785[6947.8] (Minimum release pressure: 20bar[290psi], Max release pressure: 39bar[566psi])		
Mass	kg[lb]	28.5[62.8]	29.0[63.9]	30.0[66.1]

Note:

1. Max pressure is relief valve setting pressure.
2. Need drain line (Back pressure should be max 20bar[290psi]).

Model Code



1 2 Series

4P 4K Series swing motor

3 Brake specification

M Without mechanical brake

H With mechanical brake

4 5 Displacement

25 246cm^3/r [15.0in^3/r]

31 311cm^3/r [19.0in^3/r]

39 393cm^3/r [24.0in^3/r]

6 Load holding spec.

C Geroler Load holding (Light)

F Geroler Load holding (Middle)

7 8 Port

23 G3/8 O-ring port with shockless relief valve

24 Manifold (valve mount type)

9 10 Output pinion shaft

01 Module 4 (Module 4 is standard option, other available shaft in Page 12)

11 Design code

12 13 14 Option valve

V2T Time delay valve

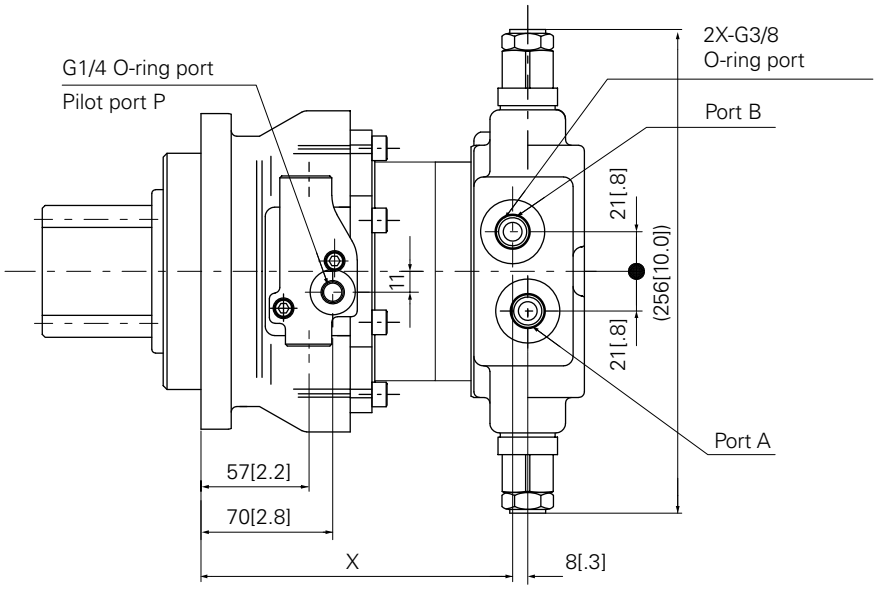
Keep blank for no optional valve required

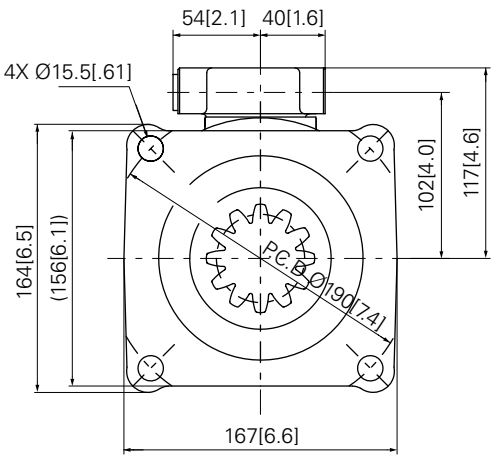
*More displacement/Port are optional based on customer request

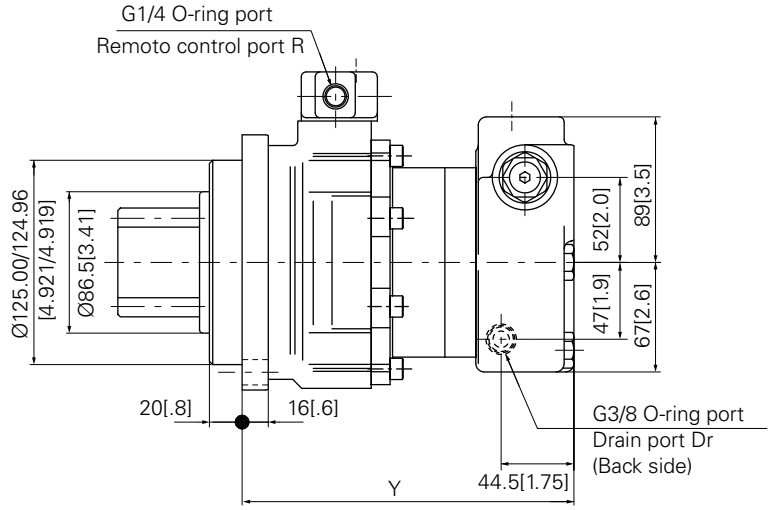
For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify.(see end cover)

Installation Dimension

With integrated shockless relief valve and time delay valve (option)
With mechanical brake







Rotation (viewed from shaft end)
CW: Port A pressurized
CCW: Port B pressurized

Pinion gear dimension (reference)

Module	4	4.5	5	6
Number of teeth	13	11	12	11
Pressure angle	20	20	20	20
Pitch diameter mm [inch]	52[2.05]	49.5[1.95]	60[2.4]	66[2.6]
Add modification coefficient	0.45	0.55	0.5	0.55

Note: as per JIS standard output torque is limited depending on pinion dimension

Model	X mm [inch]		Y mm [inch]	
4PH25	165	[6.5]	203	[8.0]
4PH31	173.5	[6.83]	211.5	[8.33]
4PH39	184	[7.2]	222	[8.7]

4.5K series

Swing motor

Characteristics & Advantages

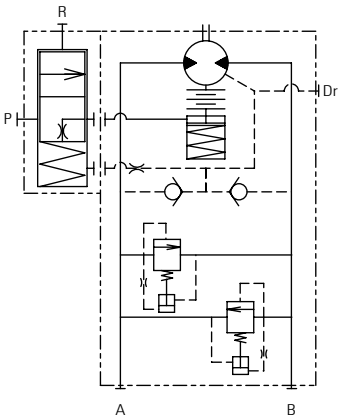
4.5K series motor is disc valve Char-Lynn® motor which can work with low leakage under high pressure.

The integrated pinion gear and big capacity bearing ensured the 4.5K series motor high reliability even under high radial load. Specifically fitting for Swing drive on mini-excavators which tonnage less than 3.5 ton.

Integrated relief valve (or other required valves) can be easily assembled on the 4.5K series motor directly.

Circuit diagram

This hydraulic circuit includes time delay valve.



D-9

Specification

Model		45P*31	45P*33	45P*39
Motor displacement	cm^3/rev [in^3/rev]	311 [19.0]	333 [20.3]	393 [24.0]
Max output torque	N-m [lb-in]	898 [7948.0]	996 [8815.3]	951 [8417.1]
Max pressure	bar[psi]	181 [2625]	177 [2567]	152 [2205]
Max speed	rpm	80	80	80
Mass	kg[lb]	32.0[70.6]	32.5[71.6]	33.0[72.8]

Note:

1. Max pressure is relief valve setting pressure.
2. Need drain line (Back pressure should be max 20bar [290psi]).

Model code

1 2 3	4	5 6	7	8 9	10		11		12 13 14
4 5 P	*	**	*	**	*	-	C	+	Option valve

1 2 3 Series

45P 4.5K Series swing motor

4 Brake specification

M Without mechanical brake

C With mechanical brake

5 6 Displacement

31 311cm3/r[19.0in3/r]

33 333cm3/r[20.3in3/r]

39 393cm3/r[24.0in3/r]

7 Load holding spec.

A Geroler Load holding (Light)

H Geroler Load holding (Middle)

8 9 Port

23 G3/8 O-ring port with shockless relief valve

24 Manifold (valve mount type)

10 Output pinion shaft

Please check with our sales

11 Design code

12 13 14 Option valve

V2T Time delay valve

Keep blank for no optional valve required

*More displacement/Port are optional based on customer request

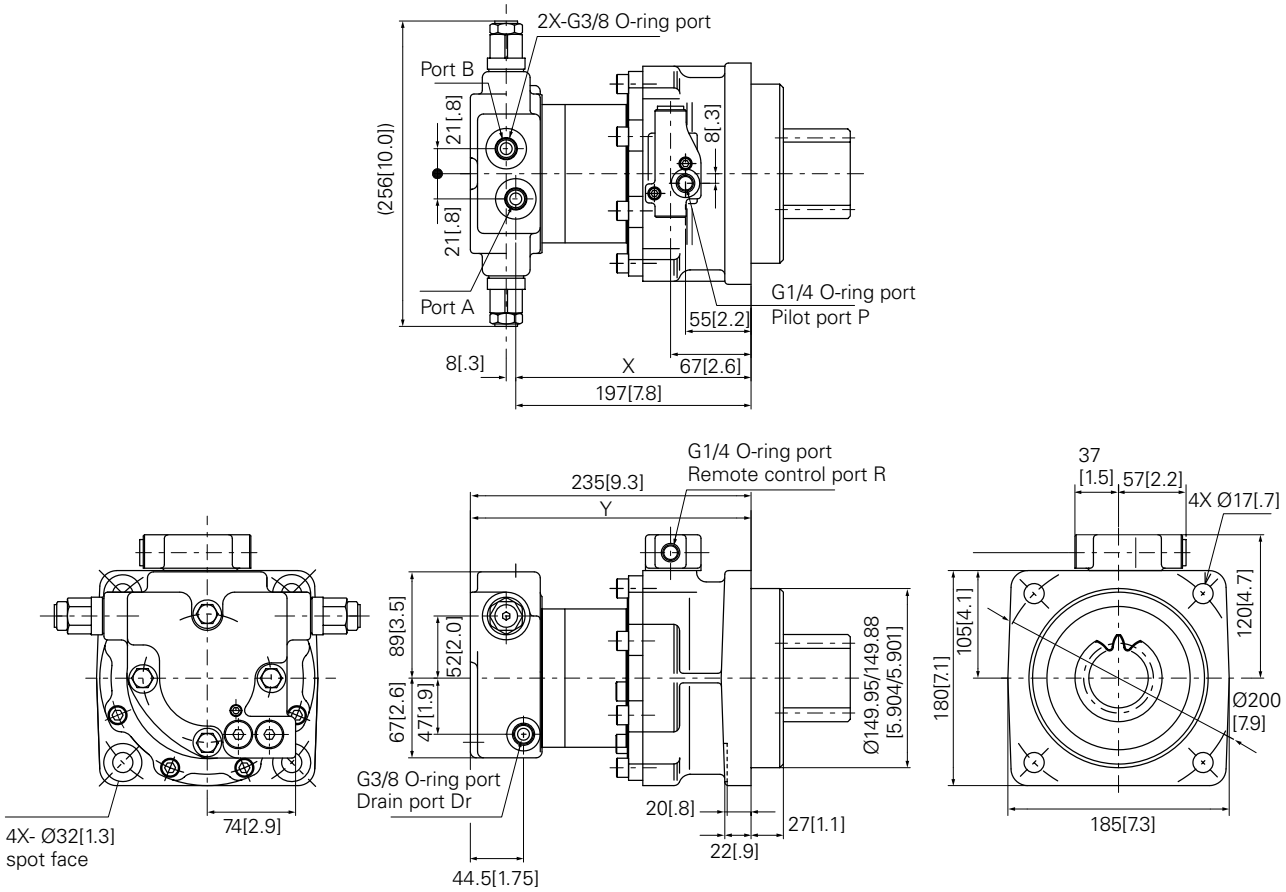
For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify.(see end cover)

Note: Pre-Production

Installation Dimension

With integrated shockless relief valve and time delay valve (option)

With mechanical brake



Rotation (viewed from shaft end)
CW: Port A pressurized
CCW: Port B pressurized

Model	X mm [inch]	Y mm [inch]
45P*31	186[7.3]	224[8.8]
45P*33	189[7.4]	227[8.9]
45P*39	197[7.8]	235[9.3]

Pinion Gear Dimension

Please contact us

Char-Lynn Low speed high torque orbit motor for traction drive

K-D, and TRB traction motors

Features

- Low speed high torque Char-Lynn® motor for Traction
- Direct drive (no reduction gear)
- Displacement from 180cm³/rev [11.0in³/rev] to 490cm³/rev[29.9in³/rev], maximum pressure up to 206bar[2988psi]
- Integrated counter balance valve

Benefits

- Reduced energy consuming attributed to higher mechanical and volumetric efficiency
- Less mechanical shocks by smooth and precise control
- Cost competitive due to simple structure design
- Proven performance by 20+ years experience
- No reduction gear oil to change/maintain

Typical application

- Mini excavator
- Belt conveyor
- General traction application
- Harvester
- Winch
- Paver

Typical mini excavator weight (ton)

0.5	0.8	1.0	1.5	1.7	Model
■					K-D18
■	■				TRBF20
	■	■			TRBF31
	■	■			TRBV31
		■	■		TRBV35
			■		TRBV39
			■		TRBV44
			■	■	TRBV49

Recommendation fluids: ISO VG32, 46, 56, 68 mineral oil

Recommended system operation temperature: -30°C to 80°C [-22°F to 176°F]

Recommended oil viscosity: 24 to 50 cSt[120 to 233 SUS]

Recommended cleanliness: ISO 18/13

K-D series

Traction Motor

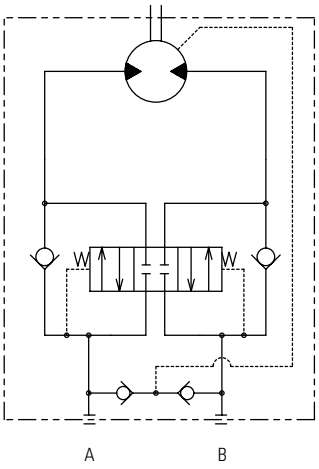
Characteristics & Advantages

K-D series motor designed based on 2000 series Char-Lynn motor. The disc valve in the K-D series motor is more compact and efficient. This allows a shorter package and better performance at low speeds.

Specification

Model		K-D18
Motor displacement	cm^3/rev [in^3/rev]	180 [11.0]
Max output torque	N-m [lb-in]	470 [4159.8]
Max pressure	bar [psi]	167 [2422]
Max flow	l/min [GPM]	10 [2.6]
Max case pressure	bar [psi]	20 [290]
Mass weight	kg[lb]	13.5[29.8]

Circuit diagram



D-10

Model code

K-D	1 8	A	D	O	A	A	-	A
1 2	3 4	5	6	7	8	9		10

1 2 Series

K-D K–D Series Traction motor

3 4 Displacement

18 180cm^3/r [11.0in^3/r]

5 End-Cover spec.

A G1/4 O-ring port, integrated counter balance valve

6 Wheel type

D Pilot dia. Ø125, Bolt P.C.D. 140, 9-M8

7 Flange type

O Pilot dia. Ø140, Bolt P.C.D. 155, 8-M8

8 Load holding spec.

A Tight fitting, Low leakage

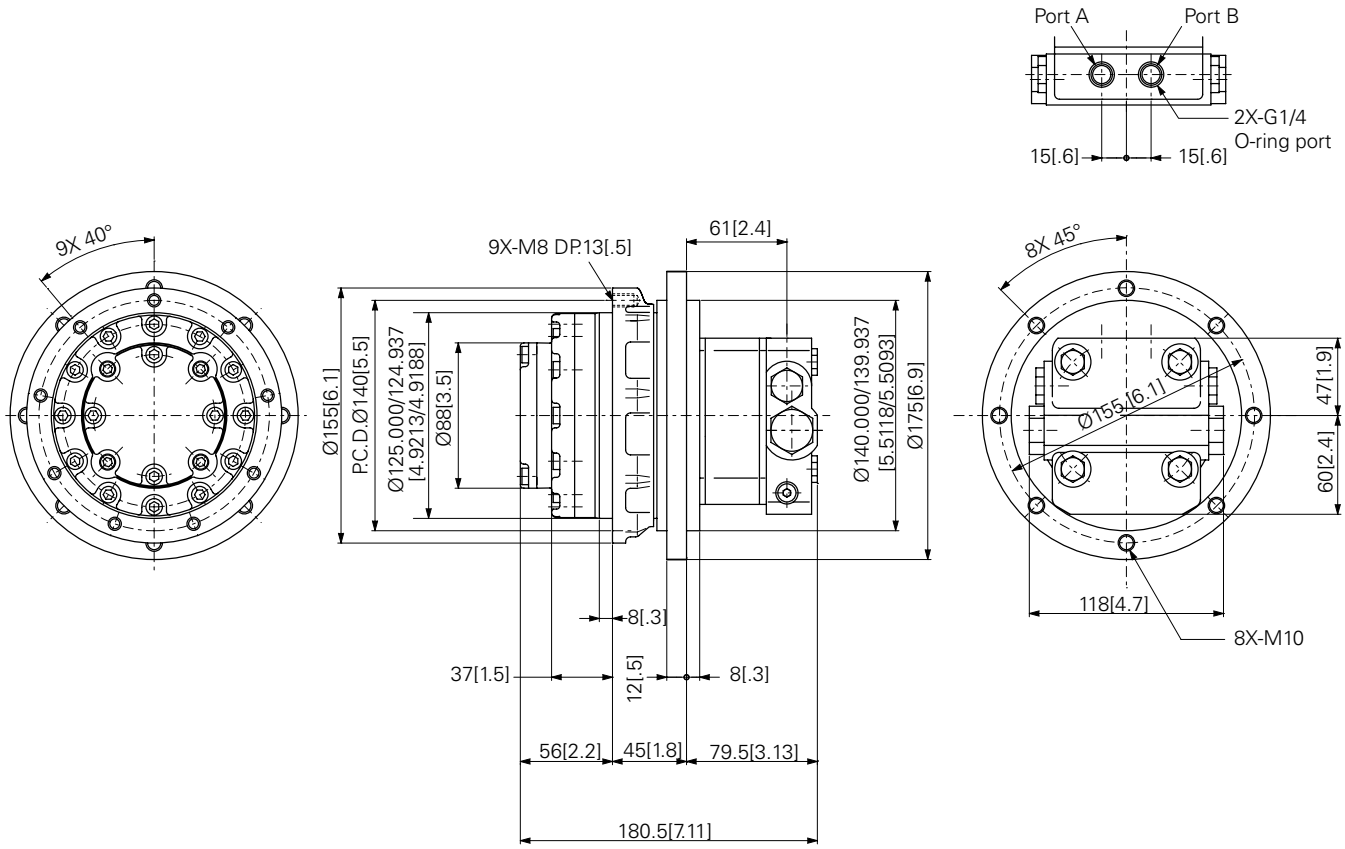
9 Special feature

A None

10 Design Code

More specific features (Displacements, etc) are available on request, please contact with sales.

Installation Dimension



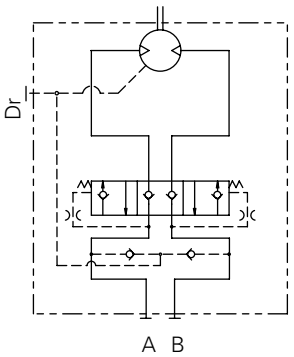
TRB Series

Traction motor

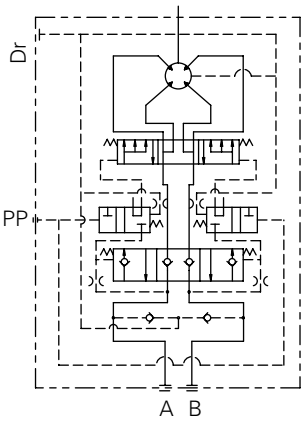
Characteristics & Advantages

TRB series motor designed based on 6000 series Char-Lynn motor. By using Eaton's special disc valve design, the TRB motor is very compact and very efficient at high pressures. This allows superior performance at low speeds. Also to increase machine performance two speed options are available.

TRBF series



TRBV series



Model Code

T	R	B	*	**	*	**	*	*	-	C
1	2	3	4	5	6	7	8	9	10	11	12

1 2 3 Series

TRB	TRB Series traction motor

4 Two speed spec.

F	Fixed displacement
V	Variable displacement (2 speed motor)
S	Auto 2 speed

5 6 Displacement

31	310cm³/r [18.9in³/r]
35	350cm³/r [21.4in³/r]
39	390cm³/r [23.8in³/r]
44	440cm³/r [26.9in³/r]
49	490cm³/r [29.9in³/r]

7 Load holding spec.

A	Tight fitting (Medium)
C	Tight fitting (Light)

8 9 End-cover spec

11	Fixed displacement, G1/4 O-ring port, integrated counter balance valve
12	Variable displacement, G1/4 O-ring port, integrated counter balance valve
21	Fixed displacement, G3/8 O-ring port, integrated counter balance valve
22	Variable displacement, G3/8 O-ring port, integrated counter balance valve

10 Special feature

0	Standard
3	High temperature/ High pressure

11 Wheel and Flange spec.

1	Wheel Pilot dia. Ø140, Bolt P.C.D. 157, 8-M10 Flange Pilot dia. Ø140, Bolt P.C.D. 157, 8-M10
4	Wheel Pilot dia. Ø160, Bolt P.C.D. 180, 9-M10 Flange Pilot dia. Ø155, Bolt P.C.D. 175, 8-M10
8	Wheel Pilot dia. Ø140, Bolt P.C.D. 155, 9-M10 Flange Pilot dia. Ø140, Bolt P.C.D. 155, 8-M10

12 Design Code

More specific features (Displacements, etc) are available on request, please contact with sales.

*High temperature/high pressure

Intermittent oil temperature is 100°C[212°F]

Intermittent pressure is 235[3408] bar[psi]

Specification

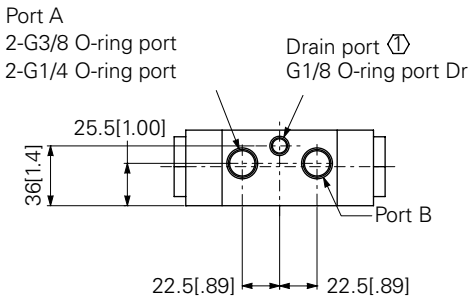
Model		TRB20	TRB31	TRB35	TRB39	TRB44	TRB49
Motor displacement Fixed(Variable)	cm^3/rev [in^3/rev]	195[11.9] 97.5[5.95]	310[18.9] (155[9.5])	350[21.4] (175[10.7])	390[23.8] (195[11.9])	440[26.9] (220[13.4])	490[29.9] (245[15.0])
Max output torque	N-m [lb-in]	518 [4584.7]	1020 [9027.7]	1148 [10160.6]	1279 [11320.0]	1443 [12771.6]	1607 [14223.1]
Max pressure	bar [psi]	167 [2422]	206 [2988]	206 [2988]	206 [2988]	206 [2988]	206 [2988]
Max flow	l/min[GPM]	20 [5.1]	20 [5.1]	20 [5.1]	20 [5.1]	20 [5.1]	20 [5.1]
Max case pressure	bar[psi]	TRBV: 5[73] TRBF: 20[290]	TRBV; 5[73] TRBF; 20[290]	TRBV; 5[73] TRBF; 20[290]	TRBV; 5[73] TRBF; 20[290]	TRBV; 5[73] TRBF; 20[290]	TRBV; 5[73] TRBF; 20[290]
2 speed pilot pressure	bar[psi]	14 [203]	14 [203]	14 [203]	14 [203]	14 [203]	14 [203]
Mass weight	kg[lb]	20[44.1]	22.0[48.5]	22.5[49.6]	23.0[50.7]	23.5[51.8]	24.0[52.9]

Installation dimension

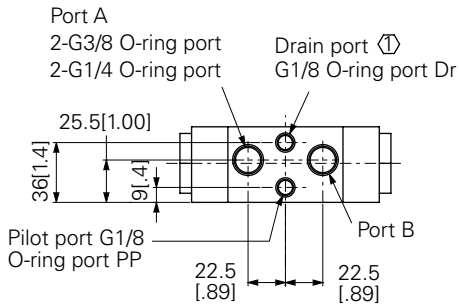
Wheel and Flange 1 type

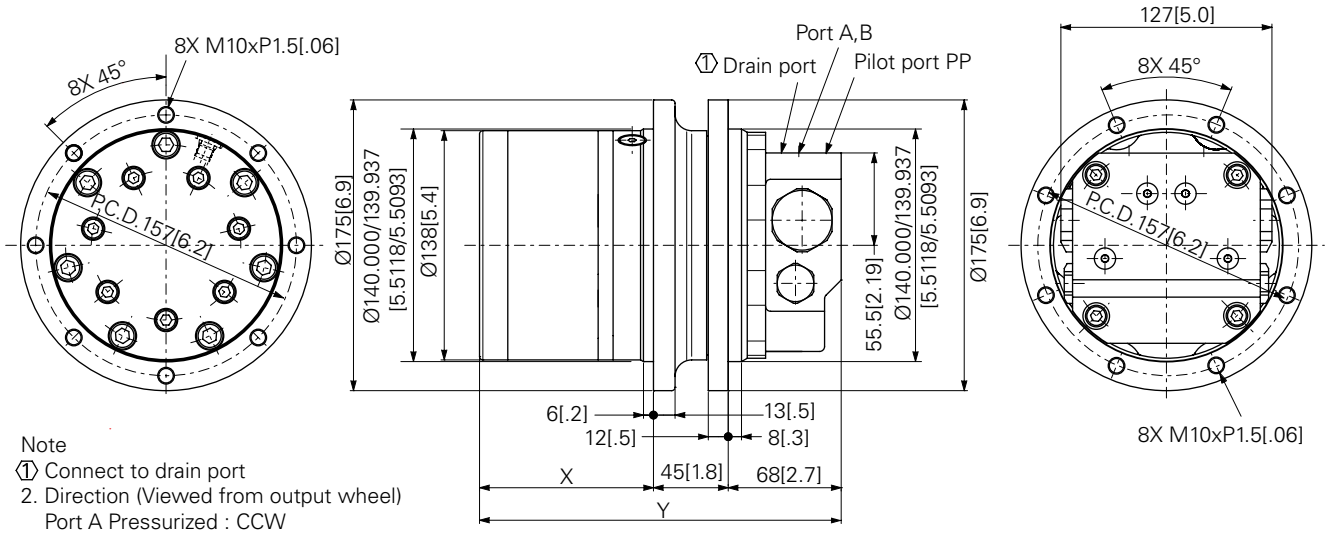
Model	X mm [inch]	Y mm [inch]
TRB20	72.1 [2.84]	185.1 [7.29]
TRB31	85.0 [3.35]	198.0 [7.80]
TRB35	89.4 [3.52]	202.4 [7.97]
TRB39	93.7 [3.69]	206.7 [8.14]
TRB44	99.1 [3.90]	212.1 [8.35]
TRB49	104.7 [4.12]	217.7 [8.57]

TRBF;Fixed Displacment



TRBV; Variable displacement



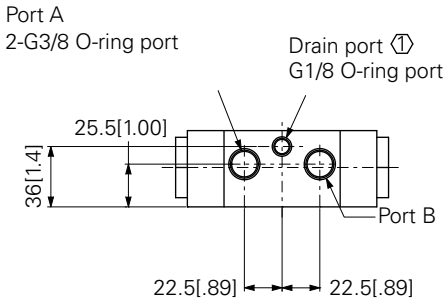


Note
① Connect to drain port
2. Direction (Viewed from output wheel)
Port A Pressurized : CCW
Port B Pressurized : CW

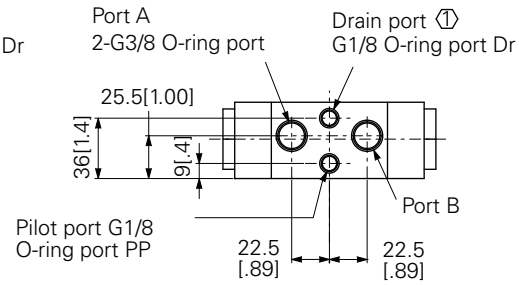
Wheel and Flange 4 type

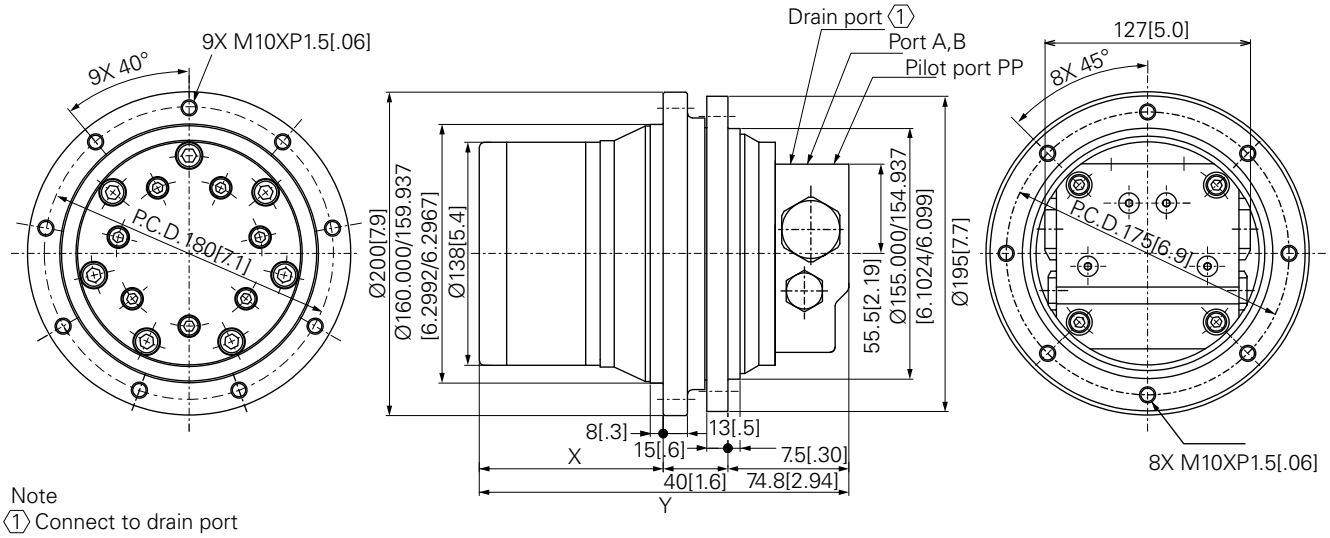
Model	X mm [inch]	Y mm [inch]
TRB39	108.3 [4.26]	223.1 [8.78]
TRB44	113.8 [4.48]	228.6 [9.00]
TRB49	119.3 [4.70]	234.1 [9.22]

TRBF;Fixed Displacment



TRBV; Variable displacement





Note

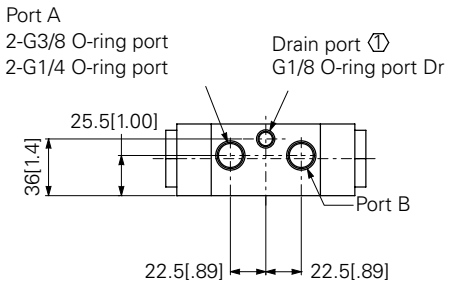
⟨1⟩ Connect to drain port

2. Direction (Viewed from output wheel)
   Port A Pressurized : CCW
   Port B Pressurized : CW

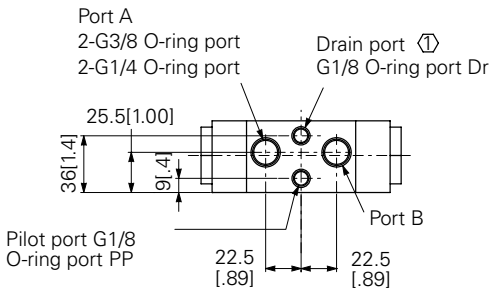
Wheel and Flange 8 type

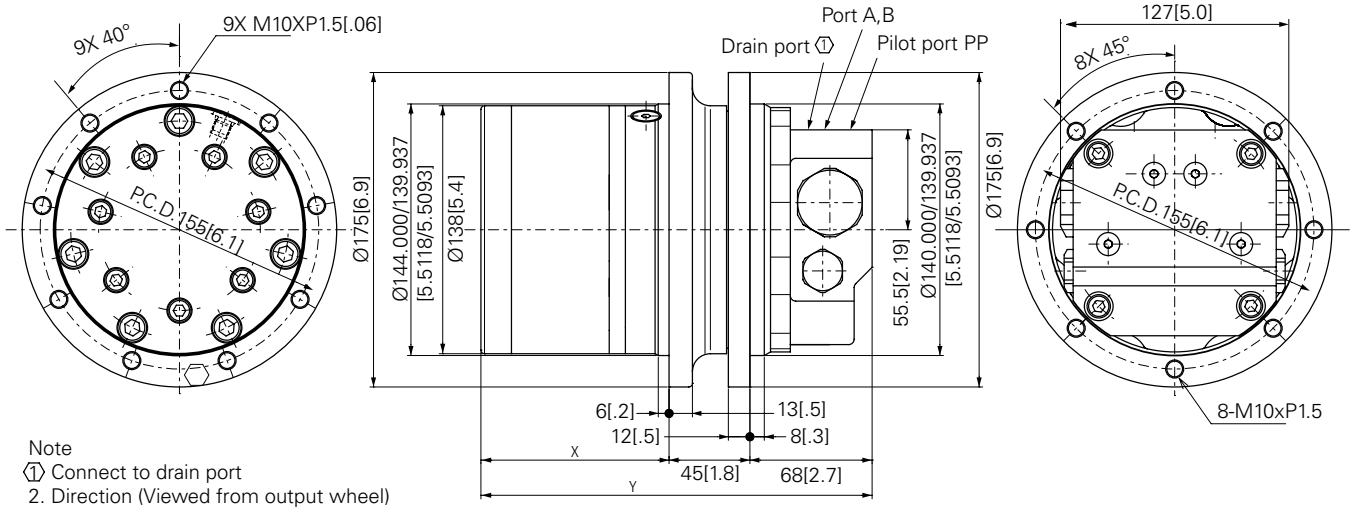
Model	X mm [inch]	Y mm [inch]
TRB20	72.1 [2.84]	185.1 [7.29]
TRB31	85.0 [3.35]	198.0 [7.80]
TRB35	89.4 [3.52]	202.4 [7.97]
TRB39	93.7 [3.69]	206.7 [8.14]
TRB44	99.1 [3.90]	212.1 [8.35]
TRB49	104.7 [4.12]	217.7 [8.57]

TRBF;Fixed Displacment



TRBV; Variable displacement





Note
① Connect to drain port
2. Direction (Viewed from output wheel)
Port A Pressurized : CCW
Port B Pressurized : CW

D-11

Orbit Motor, Optional Products

S Series motor with rotation detecting shaft

- This series of motors are suited in combination with a tachometer or encoder. Motor comes with a rear output shaft that spins at motor shaft speed for use in applications with precise speed control.
- Applications: Plastic Injection Machine, Industrial Machine and Mobile

2000 Series motor with rotation detecting shaft

- By the rotation detecting shaft, these motors are especially adapted to combination with tachometers. This series of motors are suited in combination with a tachometer or encoder. Motor comes with a rear output shaft that spins at motor speed. In particular, Injection molding machines needing rpm detection will find the most convenient.
- Applications: Plastic Injection Machine, Industrial Machine and Mobile

Orbit motor with GJ type planetary-gear reducer

- The motors of this series are combinations of H, S, 2000 Series Motor and planetary-gear reducer. The reducer shaft, not frame, is the driving member.
- Applications: Industrial Machines, Fishing Machines

Orbit motor with GW type planetary-gear reducer

- The motors of this series are intended for use driving travelling mechanism and winches, each being a combination of 2000 Series Motor and planetary-gear reducer. The reducer frame is the driving member.
- Applications: Construction Machines, Agricultural and Forestry Machines, Fishing Machines

Please reach out to your Eaton representative for more information on these products.

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