

Low Speed, High Torque Motors

Spool Valve: J, H, S, T, and W Series

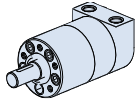
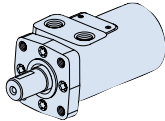
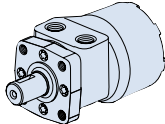
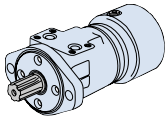
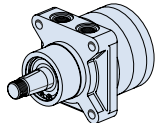
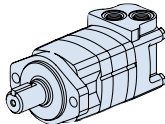
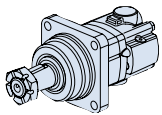
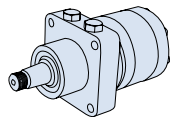
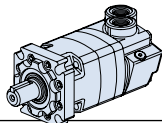
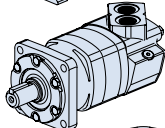
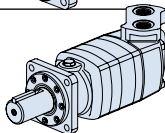
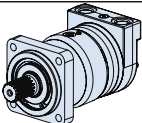
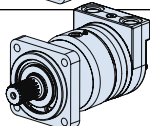
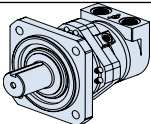
Disc Valve: 2,000, 4,000 Compact, Delta,
4,000, 6,000, and 10,000 Series

VIS: VIS 30, VIS 40, and VIS 45 Series



Powering Business Worldwide

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Char-Lynn, Hydraulic Motors

Introduction

For the past 45 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 options include:

- Displacement size (cubic inches or cc's per revolution)
- Output shaft size and type
- Mounting flange type
- Porting interface
- A wide selection of special features such as integrated brakes, sensors, integrated cross-over 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**
- **VIS (Valve-in-Star)**

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.

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 [3905]	165 [2400]	62 [18]	725 [1600]
Disc Valve	2700 [24000]	205 [3000]	170 [45]	4500 [10000]
VIS (valve-in-star)	4520 [40000]	345 [5000]	170 [45]	8640 [19000]

Circuits

Circuit Design Considerations

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 spring-applied, hydraulic release brake. It is common to use a shuttle valve for directing flow to release the spring-applied 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. In addition, spring-applied, hydraulic release brakes are used. The T Series Motor w/Parking Brake meets this need.

Typical applications using closed loop circuits include:

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

Design Flexibility

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.

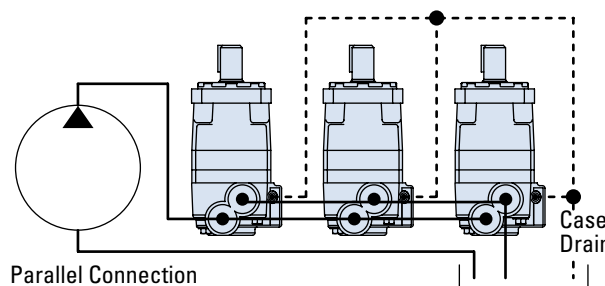
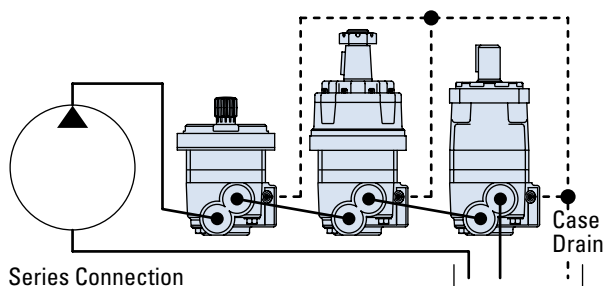
Case Drain and Shuttle Valve Options

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 (Bearingless motor applications) can also be controlled. In applications where more system cooling

and flushing is required, a shuttle valve option is available in W series, 2000, 4000 Compact, 4000, 6000 series, VIS 30, VIS 40 and VIS 45 series motors.



Motor Application Information

Vehicle Drive Calculations

Step One — Calculate Motor Speed (RPM)

$$\text{RPM} = \frac{2.65 \times \text{KPH} \times G}{R_m} \quad \text{RPM} = \frac{168 \times \text{MPH} \times G}{R_i}$$

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.

$$\text{RR} = \text{GVW} \times \rho \text{ (kg) (lb)}$$

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	ρ
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.

$$\text{GR} = \text{GVW} (\sin \theta + \rho \cos \theta)$$

TABLE 2

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:

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

FA = Acceleration Force (Newton)
t = Time (Seconds)

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

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).

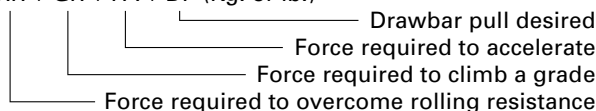
Motor Application Information

Vehicle Drive Calculations

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.

$$TE = RR + GR + FA + DP \text{ (Kg. or lb.)}$$



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)

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

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

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.

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

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

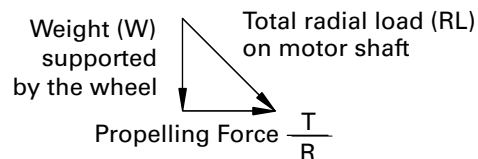
Where: f = coefficient of friction
W = loaded vehicle weight over drive wheel

	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)

$$T = q \frac{\Delta P}{2\pi} = \text{Nm} \frac{\text{bar} \times \text{cm}^3/\text{rev}}{62.8} = \text{Nm} \frac{\text{PSI} \times \text{in}^3/\text{rev}}{6.28} = \text{lb - in}$$

Shaft Speed (N)

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

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

Power (into motor)

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

Power (out of motor)

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

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

OPTIONAL FEATURE	BENEFIT
2 Speed motors	Allows motor to have two displacements (higher speed has lower torque)
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 environment
Nickel Plated Shaft	For highly corrosive environment or food/sanitary applications
Integrated Parking Brake	Spring applied hydraulic release brake
Mechanical Disc Brake	Bolt on caliper brake for wheel motor applications
Free running option	Improved mechanical efficiency at high-speed/high-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 and reduce case pressure , 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)
Vented Two-Stage seal	Extends shaft seal life
Viton seals	For higher temperature or chemical resistance applications
Integral cross over valving	Cost effective design that limits the differential pressure across the motor
Metric Shafts, Ports, & Mounts	EU specific threads
Reverse Rotation	Allows clockwise shaft rotation with B port pressurized

Optional Features

OPTIONAL FEATURES	TYPICAL APPLICATIONS*													
	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				
High Pressure Shaft Seal	x								x					
Environmental protection					x	x							x	x
Nickel Plated Shaft					x	x							x	
Integrated Parking Brake	x	x			x			x			x			x
Mechanical Disc Brake							x				x			
Free running 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				x		x	
Vented Two-Stage seal					x	x	x				x			
Integral cross over valving	x	x		x										x
Metric Shafts, Ports, & Mounts	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Reverse Rotation					x									

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

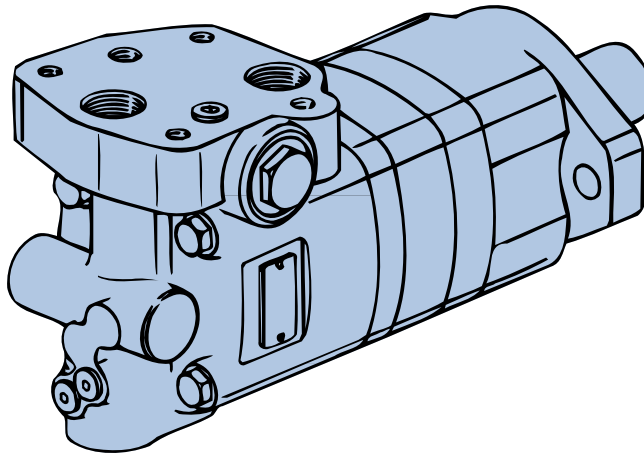
Optional Features

FEATURE DESCRIPTION	CATALOG PAGE NUMBER	SPOOL VALVE MOTORS					DISC VALVE MOTORS					VIS MOTORS		
		J Series	H Series	S Series	T Series	W series	2000 Series	4000 Compact Series	4000 Series	6000 Series	10000 Series	VIS 30	VIS 40	VIS 45
2 Speed motors	A-11	---	---	---	---	---	0	---	---	---	0	0	0	0
Seal Guard	A-12	---	0	0	0	---	0	0	0	0	0	0	0	0
Viton seals	A-12	0	0	0	0	0	0	0	0	0	0	0	0	0
High pressure Shaft Seal	A-13	---	0	0	0	---	0	0	---	---	---	---	---	---
Environmental protection	A-13	0	0	0	0	0	0	0	0	0	0	0	0	0
Integrated Parking Brake	A-14	---	---	---	0	0	---	---	---	---	---	0	0	0
Mechanical Disc Brake	A-14	---	---	---	---	0	0	0	---	---	---	---	---	---
Free running option	A-15	0	0	0	0	0	0	0	0	0	0	0	0	0
Speed sensors	A-16	0	0	0	0		0	0	0	0	0	0	0	0
Shuttle valve	A-17					0	0	0	0	0	---	0	0	0
Case port	A-18	0	0	0	0	0	S	S	S	S	S	S	S	S
Internal check valves	A-18	S	0	S	0	0	---	---	---	---	---	---	---	---
Low speed valving	A-19	---	0	0	0	S	---	---	---	---	---	---	---	---
Vented Two-Stage seal	A-20	---	0	0	0		---	---	---	---	---	---	---	---
Integral cross over valving	A-21	---	---	---	---		0	0	---	---		---	---	---
Metric Shafts, Ports, & Mounts	—	0	0	0	0	0	0	0	0	0	0	0	0	0
Reverse Rotation	—	0	0	0	0	0	0	0	0	0	0	0	0	0

0 Optional
 S Standard
 — Not applicable

Two Speed Motors

This option is available on all 2000, 10,000, VIS 30, VIS 40 and VIS 45 motors.



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 or pressure. 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.

Benefits:

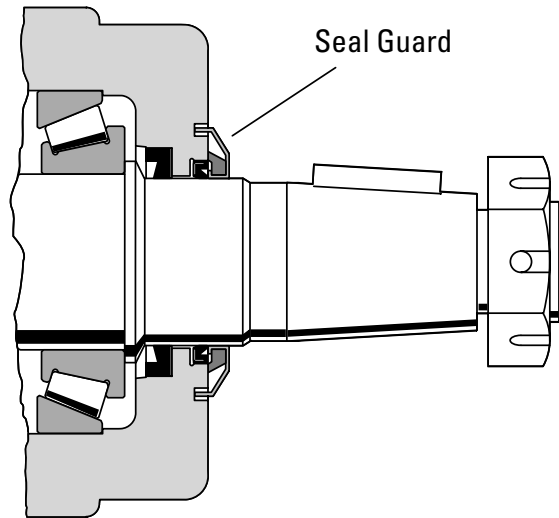
- Two operating speeds and torque levels with one motor
- Two selectable performance ranges in one motor package

Application:

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

Seal Guard

This option is available on H, S, T, 2000, 4000, 6000, 10,000, VIS 30, VIS 40 and VIS 45 series motors



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 (ZTR)
- Harvesting machinery
- Mining equipment

Viton Seals

This option is available on all 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

Applications:

- Industrial conveyors
- Plastic injection molding

High Pressure Seals

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

Features:

Eaton has introduced a high-pressure shaft seal option for its H, S, T and 2000 series motors. The seal geometry is optimized for applications that operate under extreme conditions. The seal geometry increases the clamping force of the sealing lip against the output shaft to prevent seal leakage at extreme pressure conditions. Case pressure forces the lip of the seal to clamp more tightly against the output shaft. The result is a seal that handles high pressure spike conditions without failure. 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
- 20 bars (300 PSI) for VIS 30, 40, 45

Benefits:

- Increases ability to handle high-pressure spike conditions.
- Eliminates the use of case port line in application with intermittent extreme operating conditions.
- Can be an effective alternative to additional case port plumbing.

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.

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).

Part Numbers:

H Series – Kit No. 60572-000
S Series – Kit No. 60578-000
T Series – Kit No. 60579-000
Shaft Seal –
Part No. 14778-001
2000 Series –
Kit No. 61329-000.
Shaft Seal – No. 14857-001

Environmental Protection

(epoxy paint)
(plated shafts)

This option is available on all Char-Lynn motors.

Features:

All motors are available with a corrosion resistant coating for use in hostile environments. The Char-Lynn line is also available with the output shaft plated, or with plated shaft and entire motor exterior coating.

Benefits:

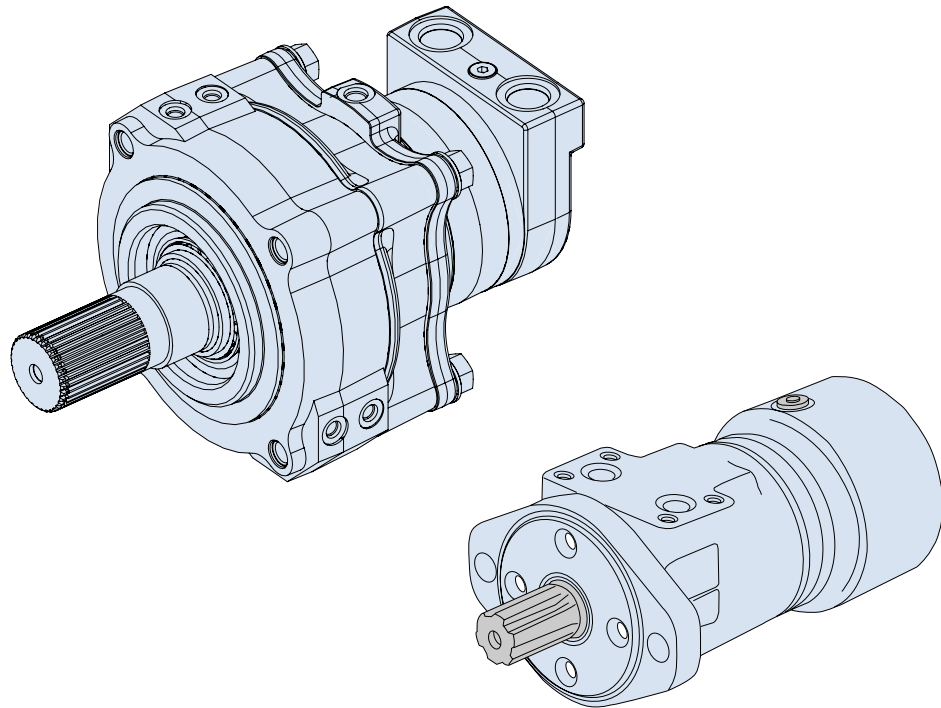
This coating protects the motor from salt water and various chemicals. Motor output shaft plating helps eliminate seal damage caused by caustic or acidic materials.

Applications:

- Marine
- Food processing,
- Cleansing
- Fishing and agricultural applications

Brake Solutions

Integrated brake options are available for all T, W, VIS 30, and VIS 40 series motors. Mechanical bolt-on packages are available for all W, 2000 and 4000 Compact 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
- W Series with Integrated Parking Brake
- VIS Series with Integrated 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.

There are also a variety of bolt-on mechanical brake options including Hayes brake system. This compact brake package can be used on 2000 Series and W Series wheel motors.

Benefits:

- Complete compact system package
- Performance-matched brake / motor solution
- Increases design flexibility
- Reduces assembly costs and simplifies service requirements
- Streamlines inventory and order processing.
- Ability to direct port release pressure (eliminate brake release hose correction)

Applications:

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

For 2000 and 4000 Compact Series motors, a mechanical disc brake is available from Hayes Industrial Brake, Inc. They provide up to 1450 lb. of clamping force. These are mechanical parking/service brakes.

Contact:

Hayes Industrial Brake, Inc
5800 West Donges Bay Rd
Mequon, WI 57092
Phone: (262) 242-4300
Fax: (262) 242-0524

Free Running Geroler Sets/ Gerotor Sets

This feature is available in all Char-Lynn motors.

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:

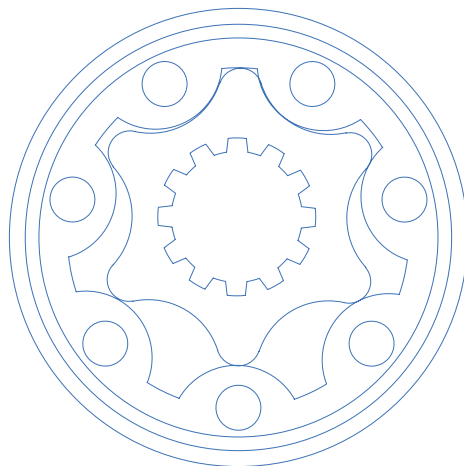
- Suited for applications with rapid stop/start or rapid reversals.
- Reduces starting pressure and increases starting torque efficiency.
- Reduces pressure spikes through the orbit gear set.

Applications:

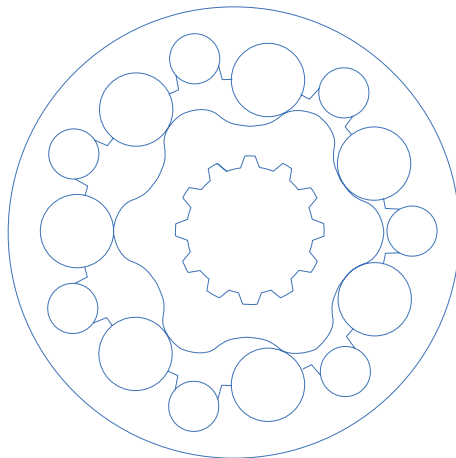
- Harvesters
- Stump Grinders
- Skid Steer Loader Attachments
- Machine Tools
- Especially suited for continuous high speed/ high flow applications.
- Also suited for applications with high-pressure spikes from rapid reversals.

Special Notes:

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



Gerotor



Geroler

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:

$20 \times \text{psi} / \text{RPM} = \text{SUS}$ (use this formula to determine minimum fluid viscosity)

RPM = speed of output shaft in revolutions per minute

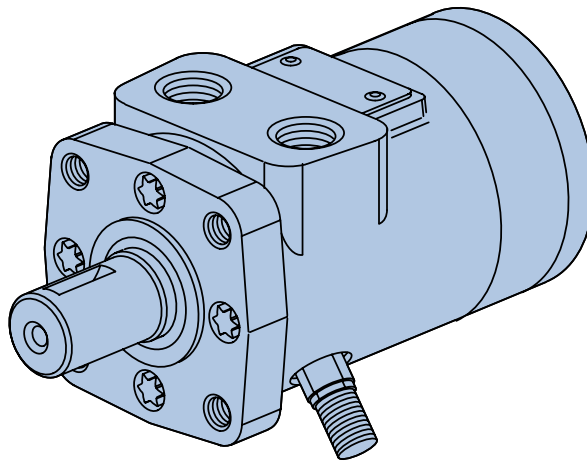
SUS = minimum viscosity measured in SUS.

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 $20 \text{ psi/RPM} = \text{SUS}$.
- 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.

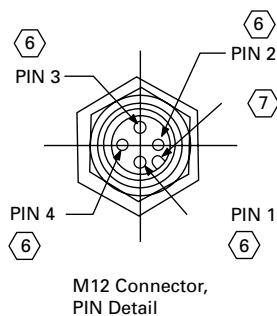
Speed Sensors



Note:

The speed sensor option does NOT include read-out display. Possible sources for read-out display include:

Eaton Corporation Durant Products 901 South 12 Street Watertown, WI 57094 — Phone 1-800-289-3866.



Features:

Eaton has developed speed sensors specifically designed for LSHT motors.

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.

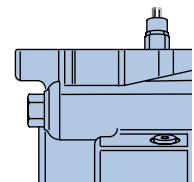
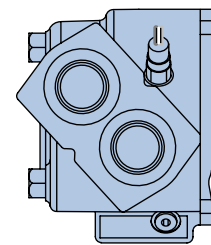
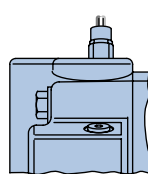
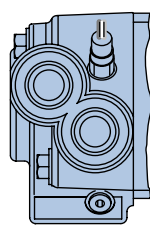
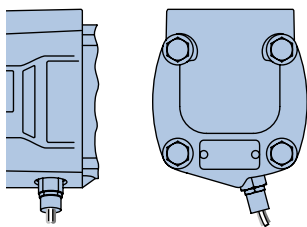
- The first version speed sensor has two output signals 90° out of phase. Each output provides one pulse per target.
- The second version has a speed signal that is twice the output pulses per revolution and it also has a direction signal. (Direction not available on spool motors)

Benefits:

These speed sensors provide vital information that can be collected and interpreted by a PLC or other device.

Applications:

- Salt/Sand Spreaders
- Irrigation Drives
- Machine Tools
- Mixers/Grinders
- Industrial Conveyors
- Food Processing Equipment
- Underground Boring Equipment



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
VIS 30, 40, 45	30	60

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

Shuttle Valve

Lubricating Shuttle

The shuttle valve option is available in W, 2000, 4000, 6000, and VIS 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.

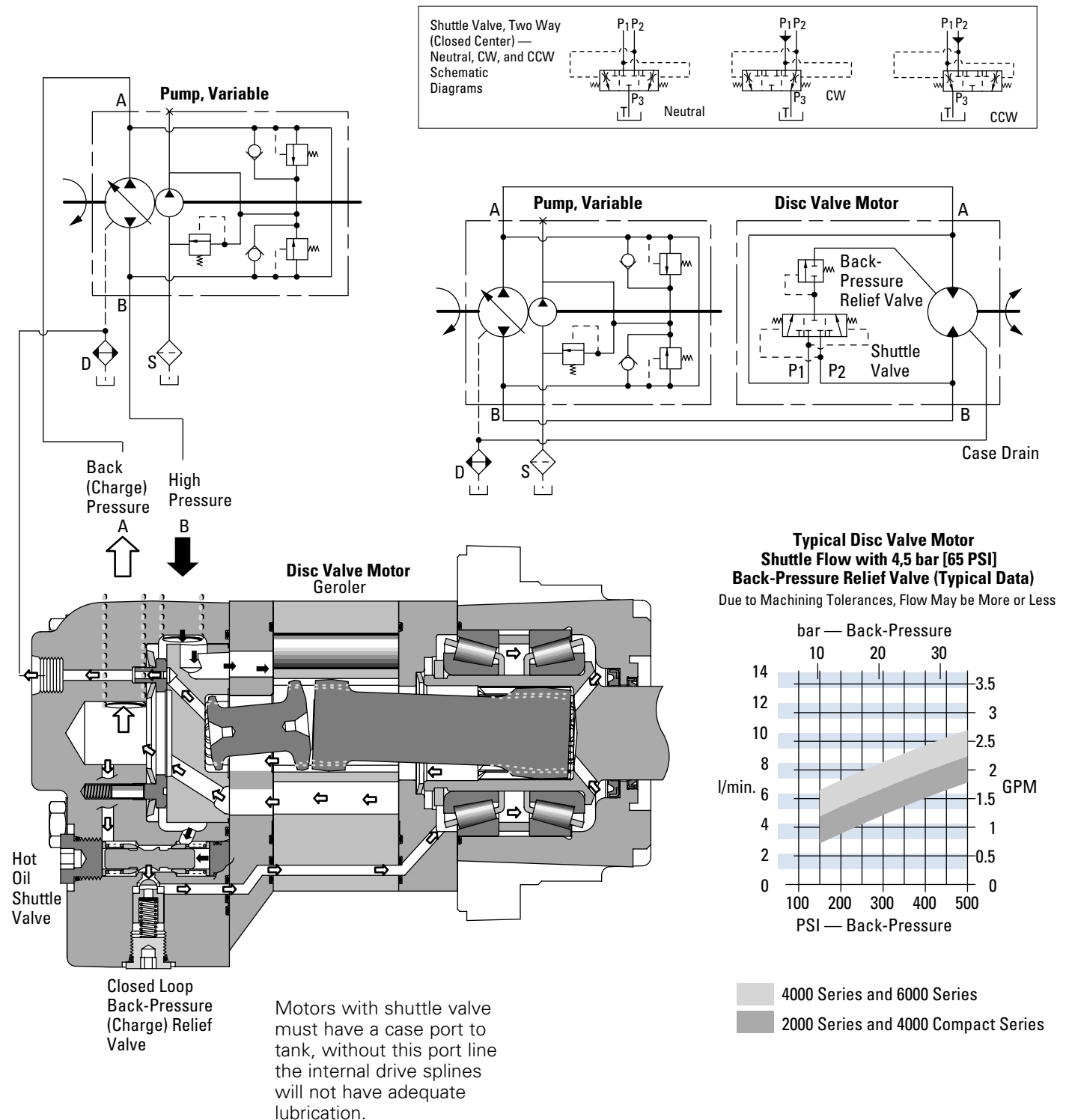
Benefits

- Flushing
- Cooling
- Longer system life

Applications

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

Closed Loop Circuit

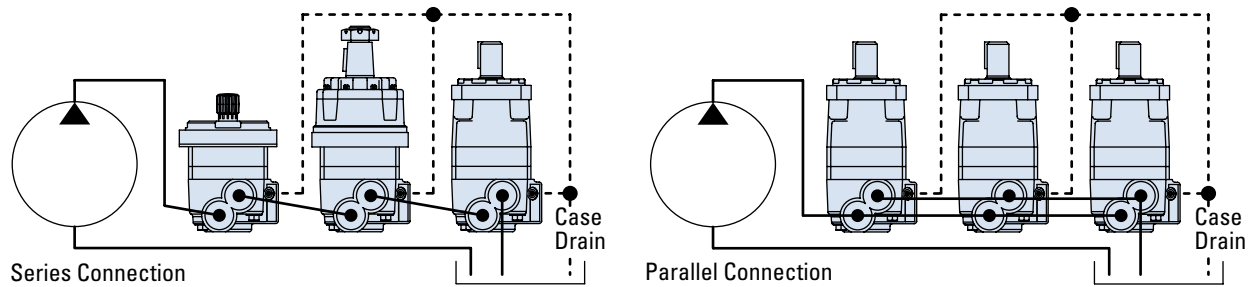


Motors with shuttle valve must have a case port to tank, without this port line the internal drive splines will not have adequate lubrication.

Low Speed High Torque Hydraulic Motors with Shuttle and Charge Pressure Relief Valve — Patent No. U.S. 4,645,438.

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:

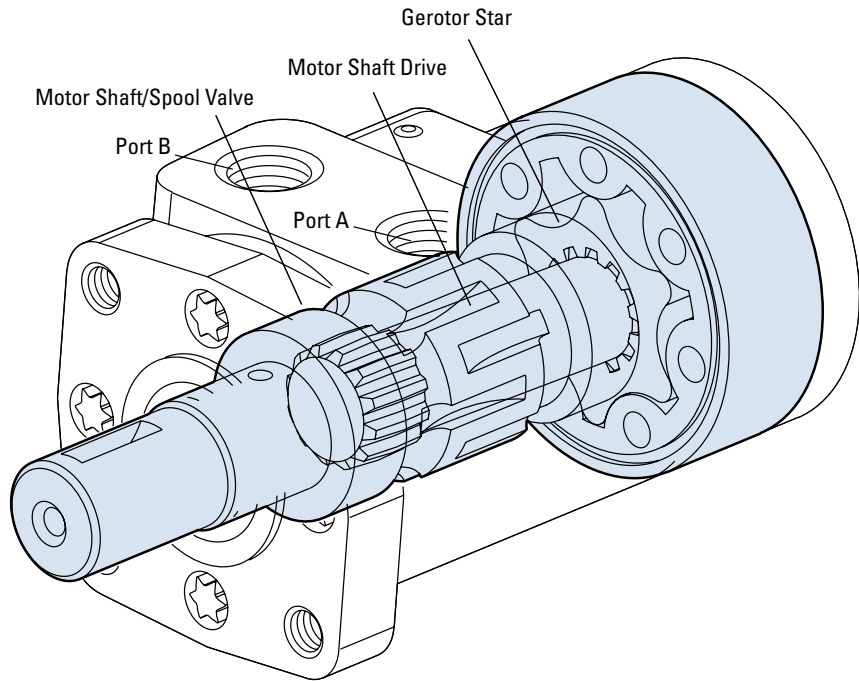
- Extends shaft seal life
- Extends thrust bearing life
- Reduces shaft seal leakage problems
- Improves flushing of the circuit to reduce system contaminants and cooling the system.

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

Low Speed Valving

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



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.

Notes:

Motors with this valving are not intended for low pressure applications (41 bar [600 psi minimum])

Vented Two-Stage Seal

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



Features:

- Patent-Pending design splits seal requirements into two stages
- Inboard (high-pressure) and outboard (low-pressure) seal designs are optimized for pressure conditions at each stage
- Combines latest low and high pressure sealing technologies into one design
- Vented port connection allows seal lube flow to be returned to system

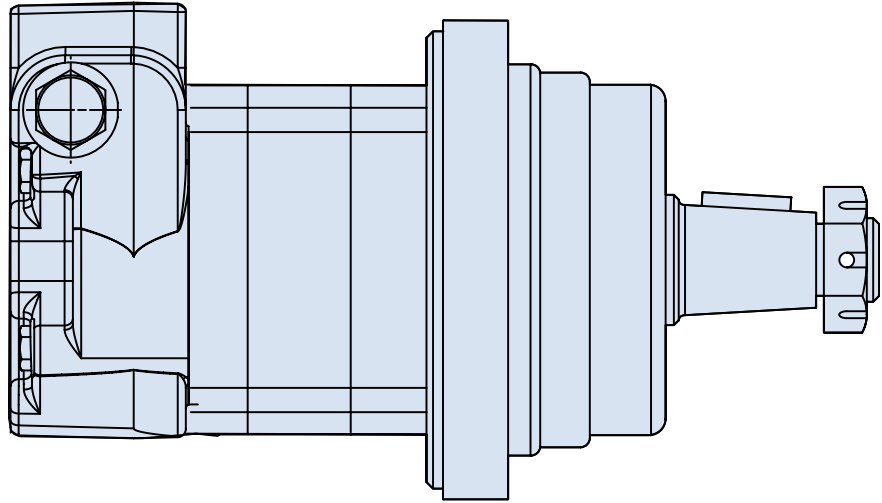
Benefits:

- Significantly increases seal life
- Higher case-pressure conditions increase motor performance
- Dependable leak free performance

Applications:

- Harvesters
- Car Washes
- Sweeper Brush drives
- Consider for applications running high case pressures for extending seal life and maximizing efficiency.

Integral Valves for 2000 Series



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 will reduce production and assembly time significantly.

Applications:

- Skid-steer attachments
- Swing motors
- Brush cutters & Mowers
- Harvesting equipment
- Directional boring
- Winch
- Auger

Any place where pressure relief is optimal for system or motor performance and life

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

REPLACEMENT CARTRIDGES

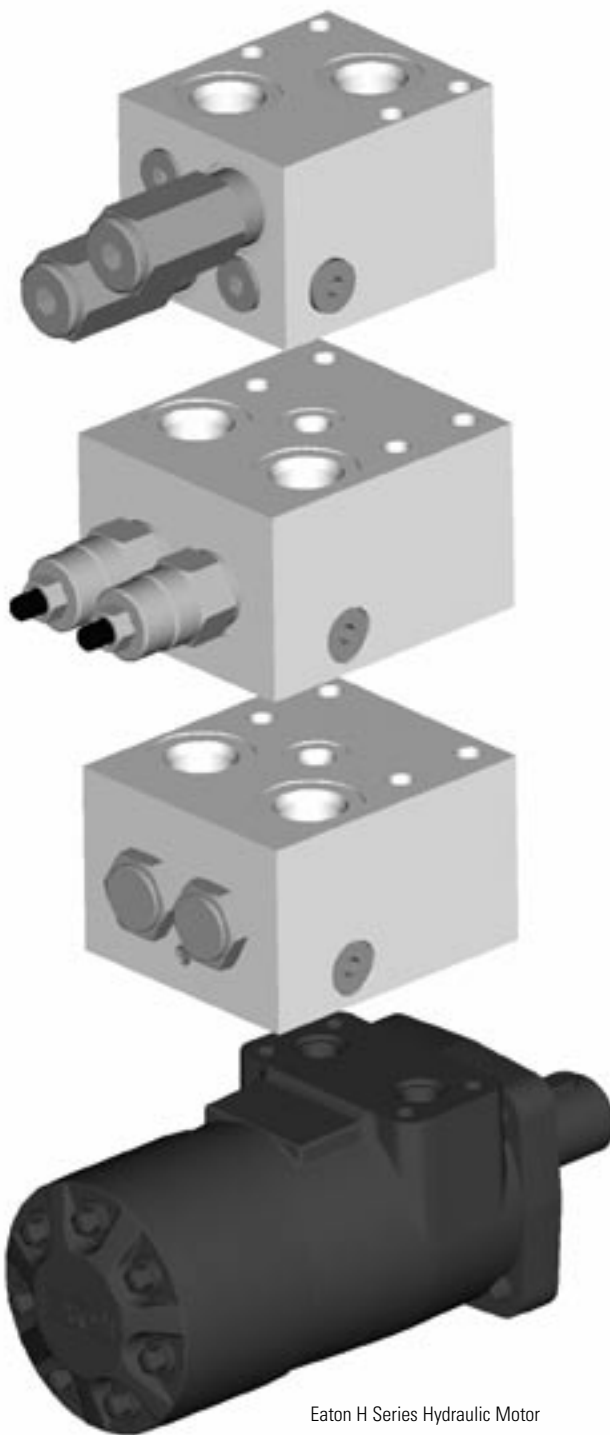
Item part #	Item desc.	Relief valve setting
02-199291	RV5A-10-F-0-35/15	1500 PSI
02-199292	RV5A-10-F-0-35/17.5	1750 PSI
02-199293	RV5A-10-F-0-35/20	2000 PSI
02-199295	RV5A-10-F-0-35/22.5	2250 PSI
02-198563	RV5A-10-F-0-35/25	2500 PSI
02-199294	RV5A-10-F-0-35/27.5	2750 PSI
02-199296	RV5A-10-F-0-35/30	3000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

Special Housings Bolt on Solutions

Cartridge Valves &
Manifolds for Spool
& Disk Valve Motors

We Manufacture Solutions

Designing hydraulic systems with Eaton-Vickers Cartridge Valves & Manifolds is a cost effective way of bringing your design into production well within the most demanding of production schedules. Minimizing the use of hoses, tubing and fittings will reduce production and assembly time significantly.



Eaton H Series Hydraulic Motor

Features

- Compatible with Eaton H & T series spool valve motors, and most 2000 series disk valve motors
- Aluminum Manifolds Anodized Black
- Pre-set cartridges to your specifications
- 100% production tested assembly
- Wide range of settings available
- Intelligent model code
- Manifolds are available with out cartridge valves, or pre-assembled and tested to your specifications
- 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

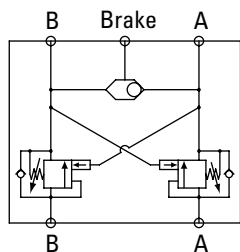
Dual CBV Package for H & T Series Motors

Cartridge valves &
manifolds for spool
valve motors

Dual Counterbalance Valve Assembly with Brake Release Shuttle

When the motor is in a stationary, unpowered mode, this assembly will prevent excessive drift in either direction of rotation. It will also prevent motor overspeed when exposed to an overrunning load, and will control motor deceleration to a stop. A shuttle within the assembly provides a pilot to release a parking or holding brake as either motor port is pressurized. Typical applications are swing drives, winch drives, and vehicle propulsion circuits. If the shuttle is not required the "Brake" port may be plugged.

Functional Symbol



How to Order

Complete pre-assembled packages are specified using the CBV*-10 model code, position 6 of the model code is "H". To order the manifold

sub-assembly, without the two CBV valves, but with integral shuttle valve order 4997072-001.

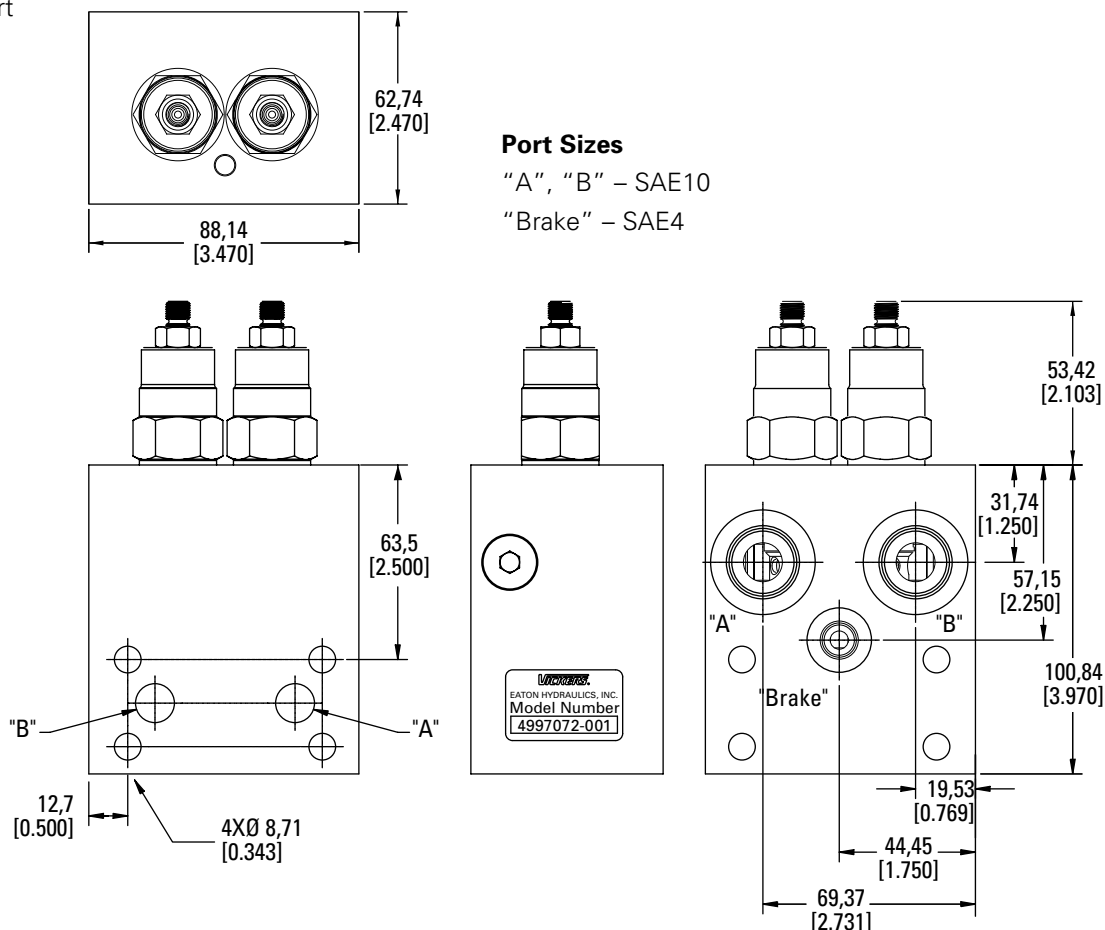
RATINGS AND SPECIFICATIONS

Rated flow	60L/min(15USgpm)
Rated pressure	210 bar (3000 psi)
Internal leakage (maximum)	5 drops/min max @ 77% of crack pressure
Pilot ratio	4:1 or 10:1
Manifold sub-assembly only	4997072-001
Installation kit (includes cap screws, washers and o-rings)	4997242-001

For detailed specifications refer to the CBV*-10 data sheet

Dimensions

mm (inch)



Port Sizes

"A", "B" – SAE10

"Brake" – SAE4

Dual POC Package for H & T Series Motors

Cartridge valves and manifolds for spool valve motors

Dual Pilot Operated Check Valve Assembly

When the motor is in a stationary, unpowered mode, this assembly will prevent excessive drift in either direction of rotation. Although it not designed to modulate the flow of oil to or from the motor, it will also prevent motor runaway if an overrunning load exists in the powered mode. A shuttle within the assembly provides a pilot to release a parking or holding brake as either motor port is pressurized. If the shuttle is not required the "Brake" port may be plugged.

How to Order

Complete pre-assembled packages are specified using the POC1-10 model code, position 6 of the model code is "H". To order the manifold

sub-assembly, without the two POC1 valves, but with integral shuttle valve order 4997072-001.

RATINGS AND SPECIFICATIONS

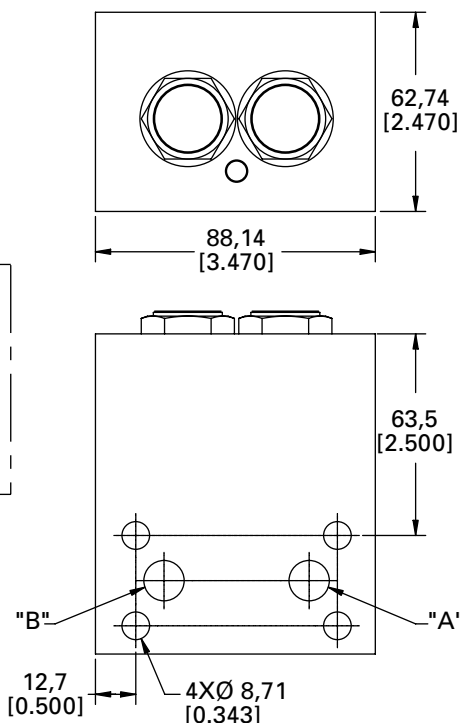
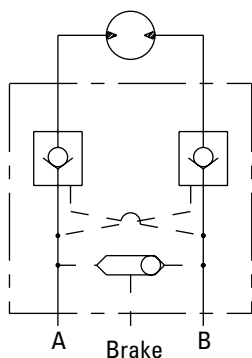
Rated flow	60L/min(15USgpm)
Rated pressure	210 bar(3000psi)
Internal leakage (maximum)	less than 5 drops/min @ 3000psi
Pilot ratio	3:1
Manifold sub-assembly	4997072-001
Installation kit (includes cap screws, washers and o-rings)	4997242-001

For detailed specifications refer to the POC1-10 data sheet

Dimensions

mm (inch)

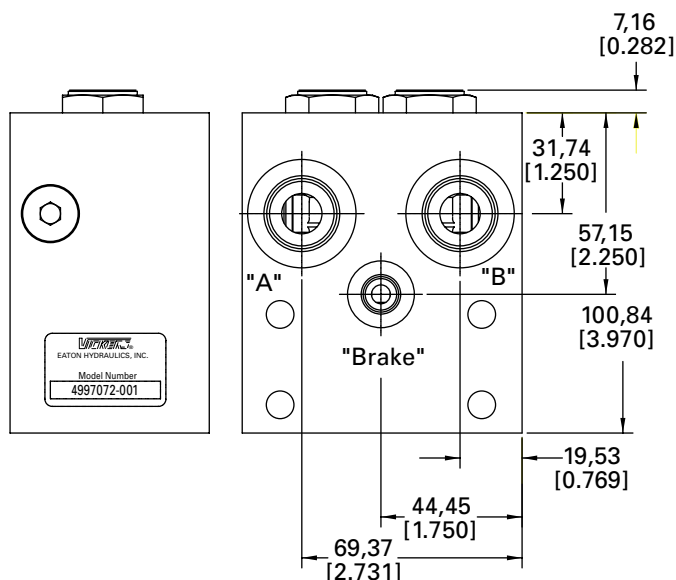
Functional Symbol



Port Sizes

"A", "B" – SAE10

"Brake" – SAE4



Dual Cross-over Relief Package for H & T Series Motors

Cartridge valves & manifolds for spool valve motors

Dual Crossover Relief Valve Assembly

This valve assembly provides motor over-pressure protection in both directions of rotation, while supplying the return or lower pressure side of the motor with makeup oil. If closed center valving is used, an additional function is controlled braking.

Typical applications are vehicle propulsion and motor work circuits in which pressure limiting is required.

How to Order

Complete pre-assembled packages are specified using the RV3A-10 model code. Option "A" must be selected for the cage seals,

position 6 of the model code is "H". To order the manifold separately, without the two RV3A cartridges, order the part number 4997062-001.

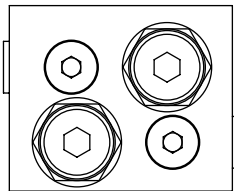
RATINGS AND SPECIFICATIONS

Rated flow	76 L/min(20USgpm)
Rated pressure	210 bar (3000psi)
Internal leakage (maximum)	less than 5 drops/min @ 85% of nominal setting
Manifold sub-assembly only	4997062-001
Installation kit (includes cap screws, washers and o-rings)	4997242-001

For detailed specifications refer to the RV3A-10 data sheet

Dimensions

mm (inch)

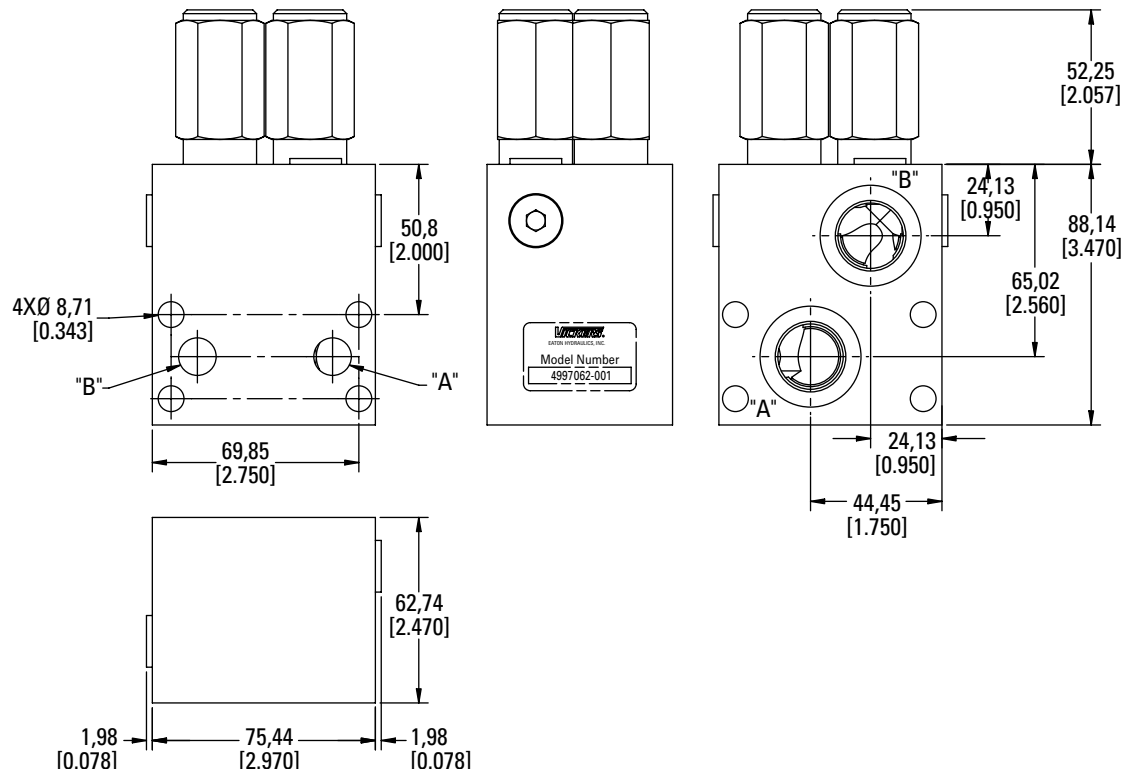
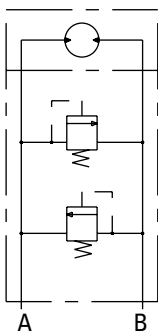


Port Sizes

"A", "B" – SAE10

"Brake" – SAE4

Functional Symbol



Dual Cross-over Relief Package for 2000 Series Disc Valve Motors

Cartridge valves &
manifolds for disc
valve motors

Dual Crossover Relief Valve Assembly

This valve assembly provides motor over-pressure protection in both directions of rotation, while supplying the return or lower pressure side of the motor with makeup oil. If closed center valving is used, an additional function is controlled braking.

Typical applications are vehicle propulsion and motor work circuits in which pressure limiting is required.

How to Order

Complete pre-assembled packages are specified using the RV3A-10 model code. Option "A" must be selected for the cage seals, position 6 of the model code is

"2K". To order the manifold separately, without the two RV3A cartridges, order 4997060-001

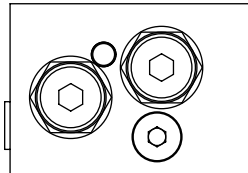
RATINGS AND SPECIFICATIONS

Rated flow	76 L/min(20USgpm)
Rated pressure	210 bar (3000psi)
Internal leakage (maximum)	less than 5 drops/min @ 85% of nominal setting
Manifold sub-assembly only	4997060-001
Installation kit (includes cap screws, washers and o-rings)	02-372492

For detailed specifications refer to the RV3A-10 data sheet.

Dimensions

mm (inch)



Port Sizes

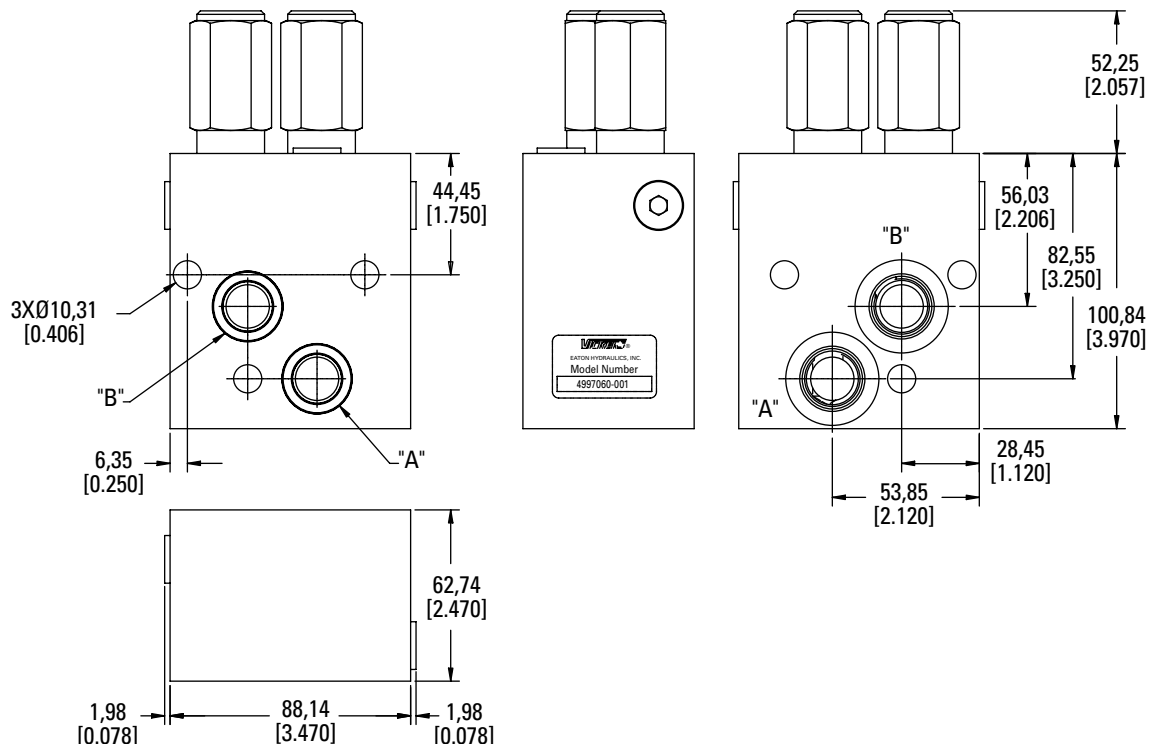
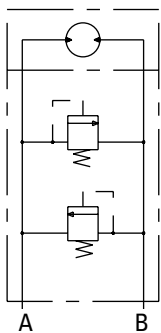
"A", "B" – SAE10
"Brake" – SAE4



Warning

This manifold package may not be suitable for application with all 2000 series motors - please check installation dimensions carefully.

Functional Symbol



Dual CBV Package for 2000 Series Disc Valve Motors

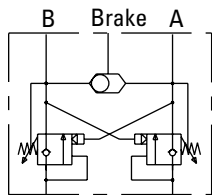
Cartridge valves &
manifolds for disc
valve motors

Dual Counterbalance Valve Assembly

When the motor is in a stationary, unpowered mode, this assembly will prevent excessive drift in either direction of rotation. It will also prevent motor overspeed when exposed to an overrunning load, and will control motor deceleration to a stop. A shuttle within the assembly provides a pilot to release a parking or holding brake as either motor port is pressurized.

Typical applications are swing drives, winch drives, and vehicle propulsion circuits. If the shuttle is not required the "Brake" port may be plugged.

Functional Symbol



How to Order

Complete pre-assembled packages are specified using the CBV*-10 model code, position 6 of the model code is "2K". To order the manifold

sub-assembly, without the two CBV valves, but with integral shuttle valve order 4997070-001.

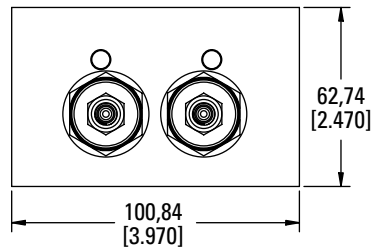
RATINGS AND SPECIFICATIONS

Rated flow	60L/min(15USgpm)
Rated pressure	210 bar (3000 psi)
Internal leakage (maximum)	5 drops/min max @ 77% of crack pressure
Pilot ratio	4:1 or 10:1
Manifold sub-assembly only	4997070-001
Installation kit (includes cap screws, washers and o-rings)	02-372492

For detailed specifications refer to the CBV*-10 data sheet.

Dimensions

mm (inch)



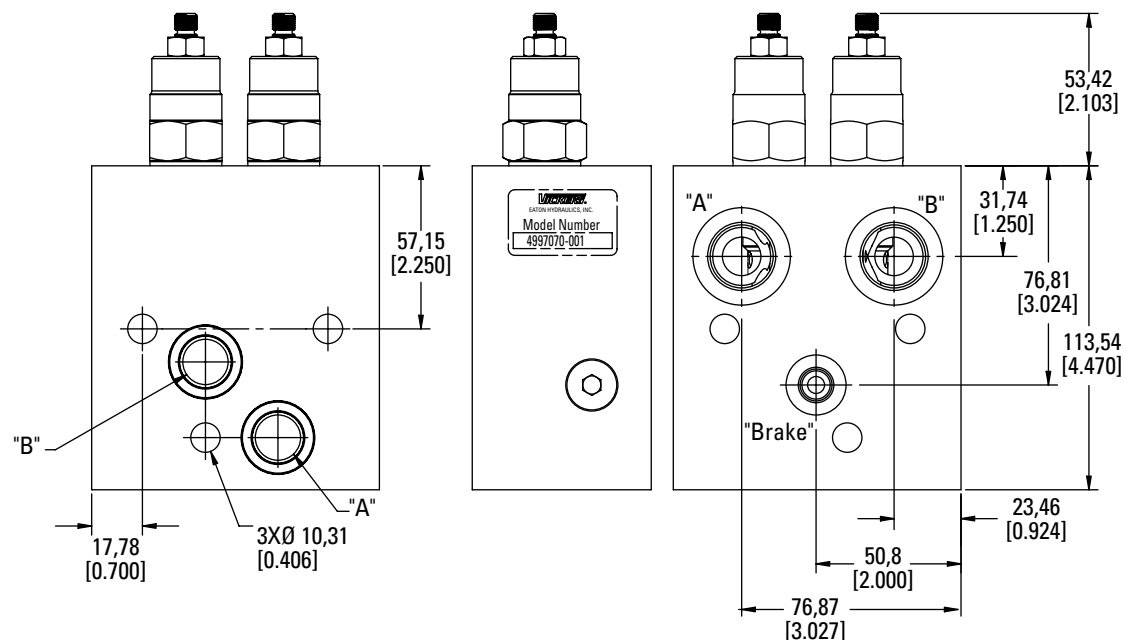
Port Sizes

"A", "B" – SAE10
"Brake" – SAE4



Warning

This manifold package may not be suitable for application with all 2000 series motors - please check installation dimensions carefully.



Dual POC Package for 2000 Series Disc Valve Motors

Cartridge valves &
manifolds for disc
valve motors

Dual Pilot Operated Check Valve Assembly

When the motor is in a stationary, unpowered mode, this assembly will prevent excessive drift in either direction of rotation. Although it not designed to modulate the flow of oil to or from the motor, it will also prevent motor runaway if an overrunning load exists in the powered mode. A shuttle within the assembly provides a pilot to release a parking or holding brake as either motor port is pressurized. If the shuttle is not required the "Brake" port may be plugged.

How to Order

Complete pre-assembled packages are specified using the POC1-10 model code, position 6 of the model code is "2K". To order the manifold

sub-assembly, without the two POC1 valves, but with integral shuttle valve order 4997070-001.

RATINGS AND SPECIFICATIONS

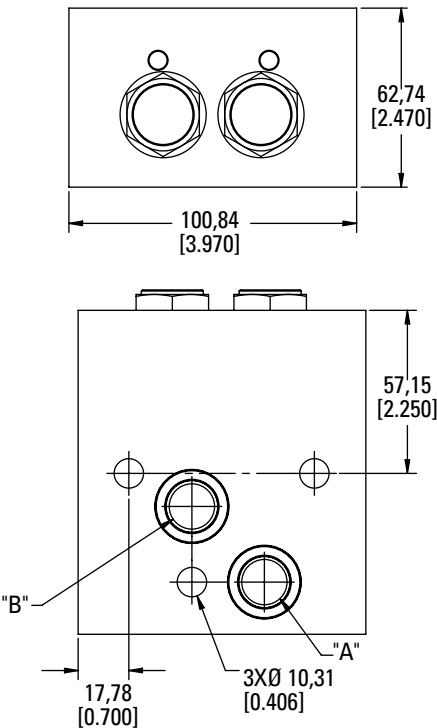
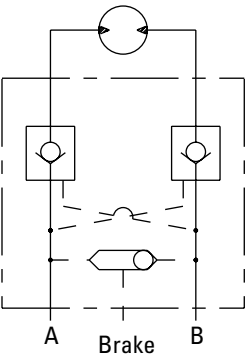
Rated flow	60L/min(15USgpm)
Rated pressure	210 bar(3000psi)
Internal leakage (maximum)	less than 5 drops/min @ 3000psi
Pilot ratio	3:1
Manifold sub-assembly only	4997070-001
Installation kit (includes cap screws, washers and o-rings)	02-372492

For detailed specifications refer to the POC1-10 data sheet

Dimensions

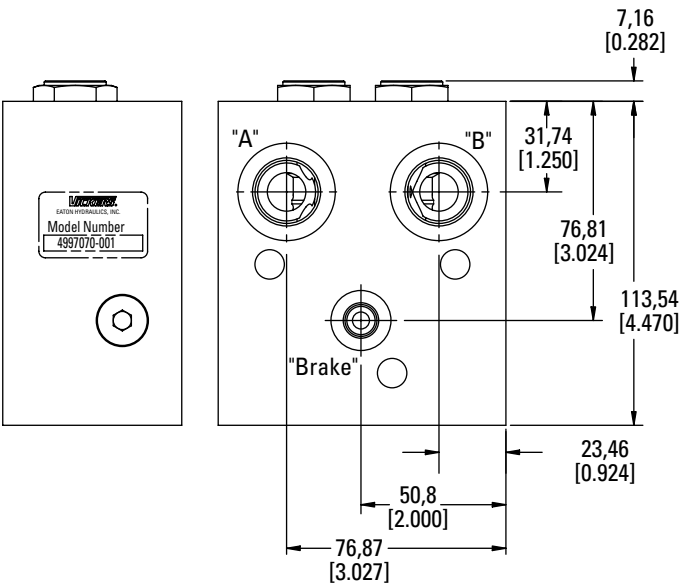
mm (inch)

Functional Symbol



Port Sizes

"A", "B" – SAE10
"Brake" – SAE4



Fluid Recommendations

Product Line	Viscosity Minimum	Viscosity Best Range	ISO Cleanliness Requirements
J-2, S, W, T Series	70 SUS 13 cst	100-200 SUS 20-43 cst	20/18/13
H Series	100 SUS 20 cst	100-200 SUS 20-43 cst	20/18/13
Disc Valve Series	70 SUS 13 cst	100-200 SUS 20-43 cst	20/18/13
VIS Series	70 SUS 13 cst	100-200 SUS 20-43 cst	20/18/13

Introduction

The ability of Eaton hydraulic components to provide the desired performance and life expectancy depends largely on the fluid used. 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.

One of the most important characteristic to consider when choosing a fluid to be used in a hydraulic system is viscosity. Viscosity choice is always a compromise; the fluid must be thin enough to flow easily but thick enough to seal and maintain a lubricating film between bearing and sealing surfaces. Viscosity requirements, see chart below.

Viscosity and Temperature

Fluid temperature affects viscosity. In general, as the fluid warms it gets thinner and its viscosity decreases. The opposite is true when fluid cools. When choosing a fluid, it is important to consider the start-up and operating temperatures of the hydraulic system.

Generally, the fluid is thick when the hydraulic system is started. With movement, the fluid warms to a point where a cooling system begins to operate.

From then on, the fluid is maintained at the temperature for which the hydraulic system was designed. In actual applications this sequence varies; hydraulic systems are used in many environments

from very cold to very hot. Cooling systems also vary from very elaborate to very simple, so ambient temperature may affect operating temperature. Equipment manufacturers who use Eaton hydraulic components in their products should anticipate temperature in their designs and make the appropriate fluid recommendations to their customers.

Cleanliness

Cleanliness of the fluid in a hydraulic system is extremely important. Eaton recommends that the fluid used in its hydraulic components be maintained at 20/18/13 per ISO Cleanliness Code 4406. This code allows a maximum of: 10,000 particles greater than 2µm per mL fluid, 2500 particles greater than 5µm per mL fluid, and 80 particles greater than 15 µm per mL fluid. Cleanliness requirements for specific products are given in the table below.

OEM's and distributors who use Eaton hydraulic components in their products should provide for these requirements in their designs. A reputable filter supplier can supply filter information.

Fluid Maintenance

Maintaining correct fluid viscosity and cleanliness level is essential for all hydraulic systems. Since Eaton hydraulic components are used in a wide variety of applications it is impossible for Eaton to publish a fluid maintenance schedule that

would cover every situation. Field testing and monitoring are the only ways to get accurate measurements of system cleanliness. OEM's and distributors who use Eaton hydraulic components should test and establish fluid maintenance schedules for their products. These maintenance schedules should be designed to meet the viscosity and cleanliness requirements laid out in this document.

Fluid Selection

Premium grade petroleum based hydraulic fluids will provide the best performance in Eaton hydraulic components. These fluids typically contain additives that are beneficial to hydraulic systems. Eaton recommends fluids that contain anti-wear agents, rust inhibitors, anti-foaming agents, and oxidation inhibitors. Premium grade petroleum based hydraulic fluids carry an ISO VG rating.

SAE grade crankcase oils may be used in systems that employ Eaton hydraulic components, but it should be noted that these oils may not contain all of the recommended additives. This means using crankcase oils may increase fluid maintenance requirements.

Hydraulic fluids that contain V.I. (viscosity index) improvers, sometimes called multi-viscosity oils, may be used in systems that employ Eaton hydraulic components. These V.I. improved fluids are known to "shear-down" with use. This means that their actual viscosity drops below the rated value.

Fluid maintenance must be increased if V.I. improved fluids are used. Automotive automatic transmission fluids contain V.I. improvers.

Synthetic fluids may be used in Eaton hydraulic components. A reputable fluid supplier can provide information on synthetic fluids. Review applications that require the use of synthetic fluids with your Eaton representative.

Additional Notes:

- Fluids too thick to flow in cold weather start-ups will cause pump cavitation and possible damage. Motor cavitation is not a problem during cold start-ups.
- When choosing a hydraulic fluid, all the components in the system must be considered and the best viscosity range adjusted accordingly. For example, when a medium duty piston pump is combined with a Geroler motor the best viscosity range becomes 100 - 150 SUS [20 - 32 cSt] and viscosity should never fall below 70 SUS [13 cSt].
- If the natural color of the fluid has become black it is possible that an overheating problem exists.
- If the fluid becomes milky a water contamination problem may exist.
- Take fluid level reading when the system is cold.
- Contact your Eaton representative if you have specific questions about the fluid requirements of Eaton hydraulic components.

Notes



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



Powering Business Worldwide

Spool Valve Motors

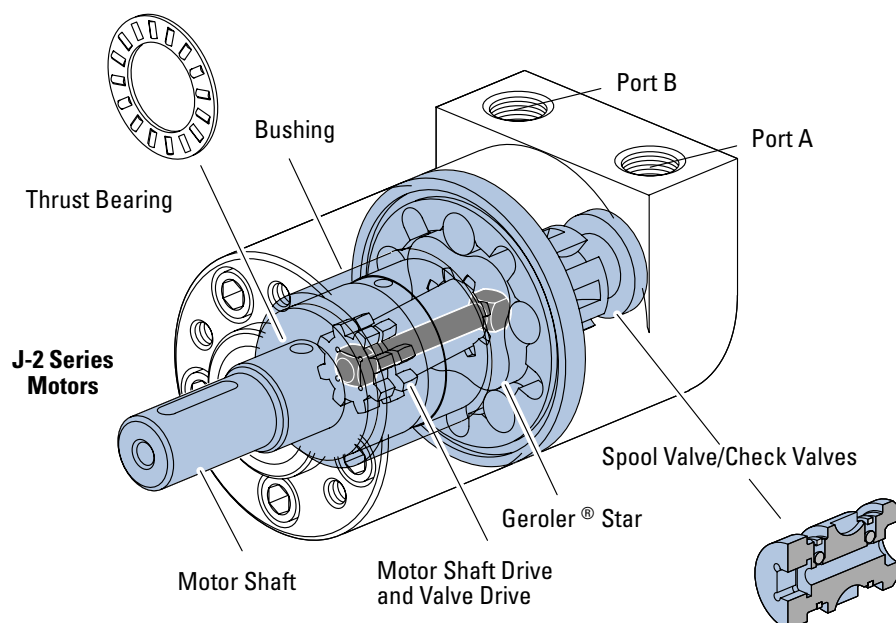
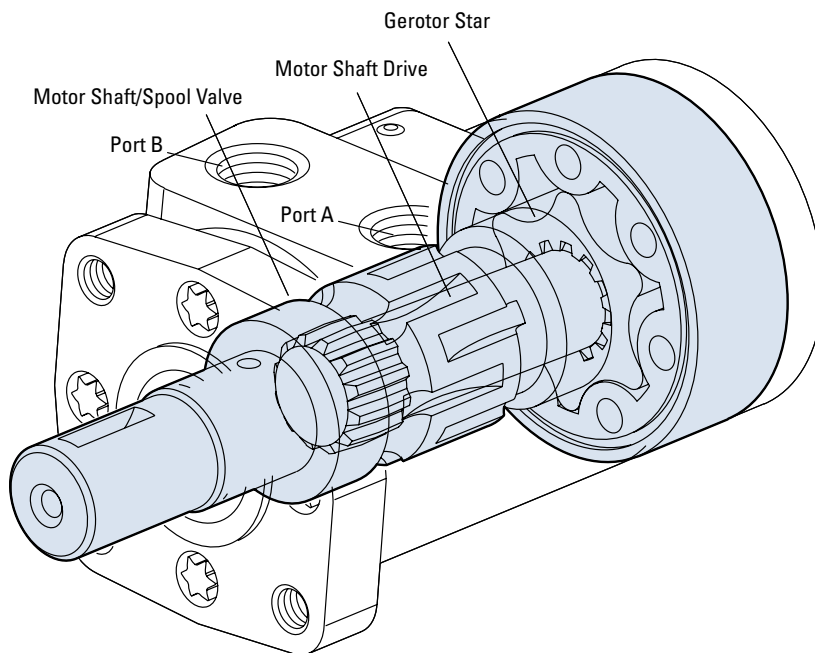
Highlights

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. The 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, Benefits, and Applications

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. The W series is similar except a ball bearing is used for the front bearing for increased side-load capacity. 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 [550]	140 [2030]	21 [5.5]	196 [430]
H Series	407 [3607]	124 [1800]	57 [15]	635 [1400]
S Series	430 [3800]	135 [2000]	55 [15]	635 [1400]
T Series	450 [4000]	155 [2250]	55 [15]	635 [1400]
W Series	410 [3625]	165 [2400]	68 [18]	845 [1900]

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

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

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W Series (162-)

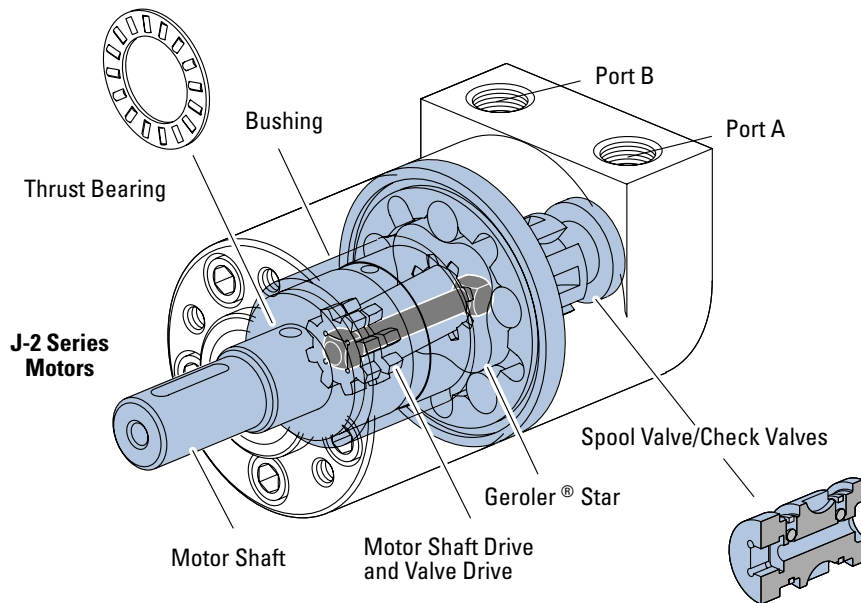
Highlights	B-5-1
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W Series with Parking Brake (162-)

Dimensions	B-5-9
Product Numbers	B-5-10
Model Code	B-5-11

J Series (129-)

Highlights



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
- Many more

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.



Plastic Injection



Metal Forming



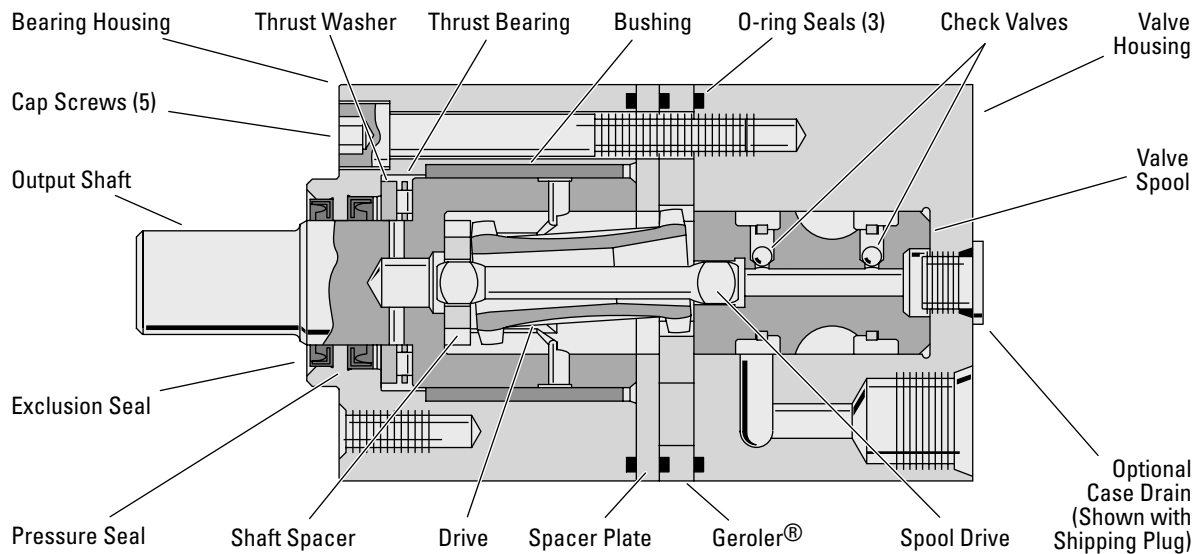
Food Processing



Ship-Boat Building

J Series (129-)

Specifications



SPECIFICATION DATA — J MOTORS

Displ. cm ³ /r [in ³ /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 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.

Note:

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

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

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended System Operating Temp.:

-34°C to 82°C
[-30°F to 180°F]

Recommended Filtration:

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

J Series (129-)

Performance Data

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

Performance data is typical at 120 SUS. Actual data may vary slightly from motor to motor in production.

		8,2 cm ³ /r [.50 in ³ /r]												Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]													
		Continuous													
		[200]	[400]	[500]	[600]	[700]	[800]	[1000]	[1400]	[1500]	[2000]	[2030]	[2400]		
		14	28	34	41	48	55	69	97	103	138	140	165		
Flow LPM [GPM]	[1]	[11] 1	[25] 3	[33] 4	[40] 5	[47] 5	[55] 6	[69] 8	[96] 11	[102] 12	[130] 15	[132] 15	[146] 16		
	3,8	456	444	437	429	422	412	394	347	332	250	239	170		
	[2]	[9] 1	[24] 3	[31] 4	[38] 4	[46] 5	[53] 6	[68] 8	[97] 11	[105] 12	[139] 16	[141] 16	[163] 18		
	7,6	897	886	877	867	860	847	823	768	749	657	647	557		
	[3]	[6] 1	[20] 2	[28] 3	[35] 4	[44] 5	[51] 6	[65] 7	[94] 11	[102] 12	[137] 15	[139] 16	[164] 19		
Max. Continuous	11,4	1349	1331	1318	1309	1296	1285	1261	1198	1176	1070	1060	959		
	[4.25]		[16] 2	[23] 3	[30] 3	[36] 4	[44] 5	[60] 7	[90] 11	[97] 12	[133] 15	[135] 15	[160] 18		
Max. Intermittent	16,0		1902	1885	1873	1858	1846	1817	1750	1721	1599	1585	1475		
	[4.5]		[16] 2	[23] 3	[29] 3	[36] 4	[43] 5	[59] 7	[89] 10	[96] 11	[131] 15	[134] 15	[160] 18		
Max. Intermittent	17,0		1992	1979	1964	1947	1929	1900	1833	1808	1684	1673	1553		
	[5.5]		[12] 1	[18] 2	[26] 3	[33] 4	[40] 5	[54] 6	[83] 9	[92] 10	[124] 14	[129] 15	[154] 17		
Max. Intermittent	20,8		2458	2437	2420	2405	2387	2353	2272	2255	2134	2115	1994		



Continuous



Intermittent

		12,9 cm ³ /r [0.79 in ³ /r]												Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]													
		Continuous													
		[200]	[400]	[500]	[600]	[700]	[800]	[1000]	[1400]	[1450]	[1500]	[2000]	[2030]		
		14	28	34	41	48	55	69	97	100	103	138	140		
Flow LPM [GPM]	[1]	[19] 2	[43] 5	[54] 6	[65] 7	[76] 9	[88] 10	[109] 12	[154] 17	[159] 18	[164] 19	[214] 24	[217] 25	[250] 28	
	3,8	290	285	281	277	273	268	260	237	234	230	194	189	151	
	[2]	[16] 2	[39] 4	[51] 6	[63] 7	[74] 8	[86] 10	[109] 12	[155] 18	[160] 18	[165] 19	[221] 25	[225] 25	[263] 30	
	7,6	573	566	561	555	549	544	534	501	496	490	442	437	396	
	[3]	[11] 1	[35] 4	[47] 5	[58] 7	[70] 8	[82] 9	[105] 12	[152] 17	[157] 18	[163] 18	[219] 25	[223] 25	[263] 30	
Max. Continuous	11,4	859	849	843	838	832	825	810	777	771	763	708	701	652	
	[4]	[6] 1	[30] 3	[41] 5	[53] 6	[64] 7	[76] 9	[99] 11	[146] 16	[152] 17	[157] 18	[214] 24	[217] 25	[260] 29	
Max. Intermittent	15,1	1153	1140	1135	1129	1124	1117	1101	1060	1051	1044	982	975	924	
	[5.5]		[19] 2	[30] 3	[42] 5	[54] 6	[65] 7	[89] 10	[136] 15	[142] 16	[148] 17	[205] 23	[209] 24	[251] 28	
Max. Intermittent	20,8		1575	1566	1556	1547	1539	1521	1473	1466	1457	1396	1387	1330	
	[6.5]		[11] 1	[23] 3	[35] 4	[46] 5	[56] 6	[81] 9	[130] 15	[135] 15	[140] 16	[198] 22	[202] 23	[243] 27	
Max. Intermittent	24,6		1859	1851	1842	1831	1820	1804	1755	1743	1734	1670	1663	1599	

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

J Series (129-)

Performance Data

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

Performance data is typical at 120 SUS. Actual data may vary slightly from motor to motor in production.

		19.8 cm ³ /r [1.21 in ³ /r]												Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]													
		Continuous													
Flow LPM [GPM]	[1]	[200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1400] 97	[1450] 100	[1500] 103	[2000] 138	[2030] 140	[2400] 165	
	3,8	[32] 4 189	[67] 8 187	[85] 10 186	[102] 12 185	[119] 13 183	[136] 15 182	[170] 19 179	[236] 27 172	[244] 28 170	[253] 29 169	[321] 36 141	[325] 37 138	[374] 42 114	
	[2]	[30] 3 379	[65] 7 375	[83] 9 373	[101] 11 370	[119] 13 368	[136] 15 366	[172] 19 361	[223] 25 351	[248] 28 349	[257] 29 347	[328] 37 312	[333] 38 309	[388] 44 285	
	7,6	[21] 2 569	[57] 6 565	[75] 8 563	[93] 11 560	[111] 13 558	[128] 14 556	[163] 18 551	[231] 26 529	[240] 27 526	[248] 28 523	[325] 37 487	[330] 38 484	[405] 46 459	
	[3]	[12] 1 761	[47] 5 758	[65] 7 754	[83] 9 751	[101] 11 749	[119] 13 746	[154] 17 741	[221] 25 717	[230] 26 711	[239] 27 707	[316] 36 660	[320] 37 656	[382] 43 628	
	11,4														
Max. Continuous	[5.5]		[31] 4 1043	[49] 6 1040	[67] 8 1035	[84] 9 1033	[101] 11 1028	[137] 15 1021	[202] 23 997	[211] 24 993	[218] 25 990	[295] 33 938	[299] 34 934	[365] 41 899	
Max. Intermittent	[6.5]			[21] 2 1226	[38] 4 1222	[56] 6 1219	[74] 8 1215	[91] 10 1211	[126] 14 1204	[189] 21 1179	[196] 22 1174	[206] 23 1169	[278] 31 1121	[283] 32 1117	[347] 39 1079

Continuous

Intermittent

		31.6 cm ³ /r [1.93 in ³ /r]												Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]													
		Continuous													
Flow LPM [GPM]	[1]	[200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1400] 97	[1450] 100	[1500] 103	[1750] 121	[2175] 150		
	3,8	[51] 6 118	[106] 12 116	[133] 15 115	[160] 18 113	[187] 21 112	[213] 24 111	[265] 30 107	[362] 41 91	[372] 42 85	[383] 43 81	[439] 50 70			
	[2]	[46] 5 236	[103] 12 234	[132] 15 232	[159] 18 230	[187] 21 228	[214] 24 225	[269] 30 221	[362] 41 187	[374] 42 179	[387] 44 175	[446] 50 165	[546] 62 145		
	7,6	[36] 4 355	[94] 11 352	[122] 14 349	[149] 17 347	[177] 20 345	[205] 23 342	[259] 29 336	[351] 40 296	[364] 41 292	[377] 43 287	[440] 50 273	[542] 61 245		
	[3]	[24] 3 474	[79] 9 472	[107] 12 469	[135] 15 466	[162] 18 462	[190] 21 460	[246] 28 452	[337] 38 404	[349] 39 397	[362] 41 393	[425] 48 373	[528] 60 346		
	11,4														
Max. Continuous	[5.5]		[55] 6 650	[83] 9 647	[111] 13 645	[139] 16 640	[167] 19 636	[221] 25 629	[307] 35 584	[320] 36 580	[334] 38 575	[400] 45 550	[505] 57 513		
Max. Intermittent	[6.5]		[35] 4 767	[64] 7 764	[93] 11 760	[121] 14 755	[150] 17 751	[204] 23 742	[279] 32 712	[294] 33 707	[308] 35 701	[378] 43 675	[485] 55 637		

		50.0 cm ³ /r [3.00 in ³ /r]												Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]													
		Continuous													
Flow LPM [GPM]	[1]	[200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1100] 76	[1200] 83	[1300] 90	[1400] 97	[2030] 140		
	3,8	[82] 9 75	[167] 19 72	[211] 24 72											
	[2]	[70] 8 149	[156] 18 147	[201] 23 145	[243] 28 144	[286] 32 143	[327] 37 142								
	7,6	[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			
	[3]	[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		
	11,4														
Max. Continuous	[5.5]		[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. Intermittent	[6.5]		[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		

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

J Series (129-)

Dimensions

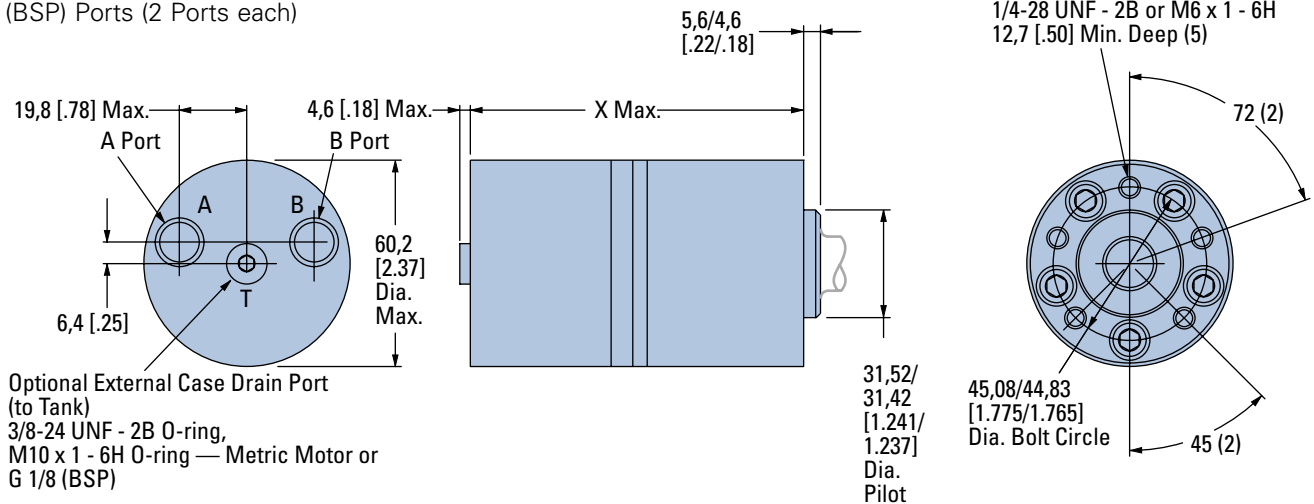
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

9/16 Inch End Port

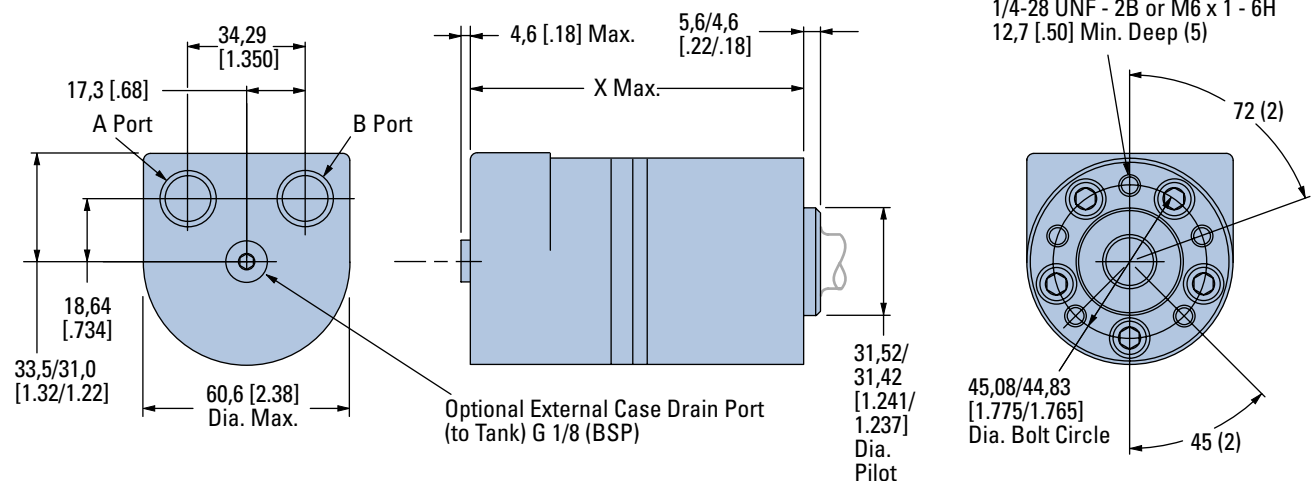
9/16 -18 UNF - 2B O-Ring Ports, M14 x
1,5 - 6H O-Ring Ports — Metric Motor or
G 1/4 (BSP) Ports (2 Ports each)



END PORT DIMENSIONS

Displacement cm ³ /r [in ³ /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]

3/8 Inch End Port



END PORT DIMENSIONS

Displacement cm ³ /r [in ³ /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]

J Series (129-)

Dimensions

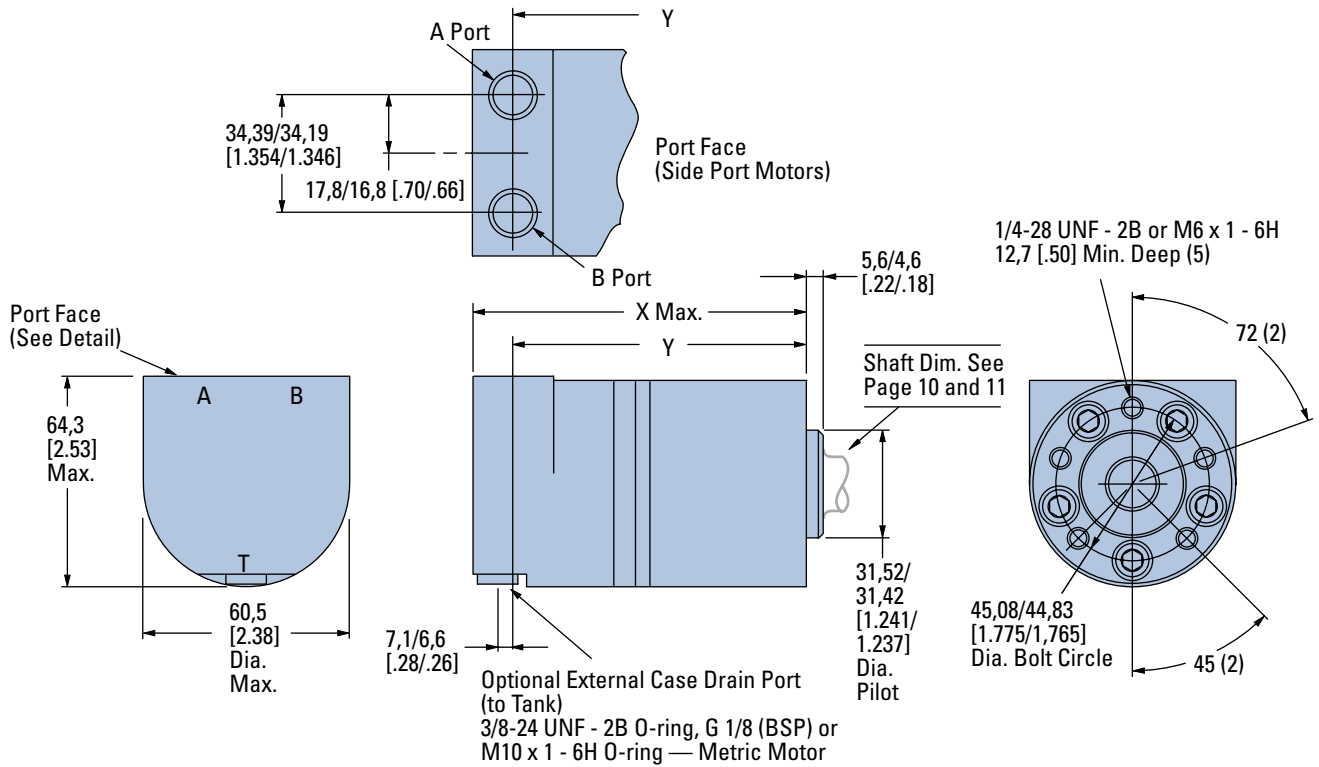
Ports

9/16 -18 UNF - 2B O-Ring Ports,
M14 x 1,5 -6H O-Ring Ports — Metric Motor,
G 3/8 or G 1/4 (BSP) Ports (2)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Side Port



SIDE PORT MOTORS

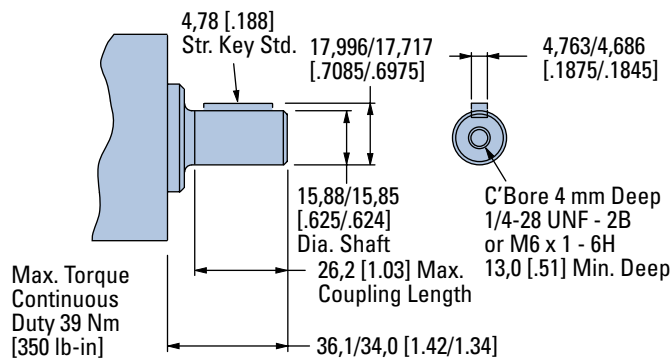
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
8,2 [.50]	103,9 [4.09]	89,4/ 87,4 [3.52/3.44]
12,9 [.79]	106,9 [4.21]	92,5/ 90,4 [3.64/3.56]
19,8 [1.21]	112,5 [4.38]	96,8/ 94,7 [3.81/3.73]
31,6 [1.93]	118,9 [4.68]	104,4/102,4 [4.11/4.03]
50,0 [3.00]	130,0 [5.12]	115,7/113,9 [4.56/4.48]

J Series (129-)

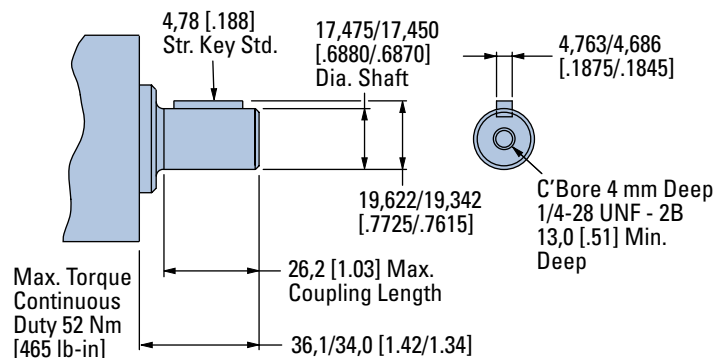
Dimensions

Shafts

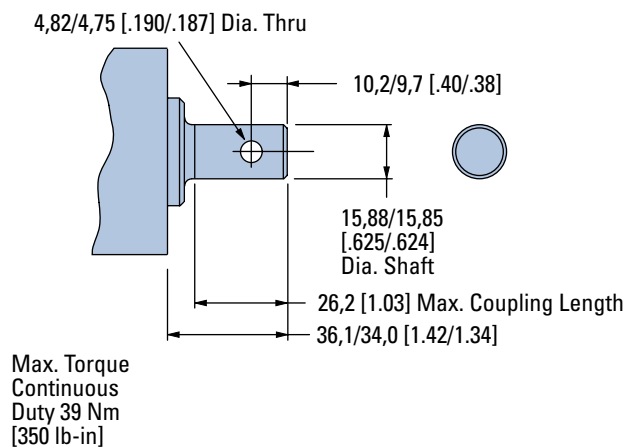
5/8 Inch Straight Keyed



11/16 Inch Straight Keyed



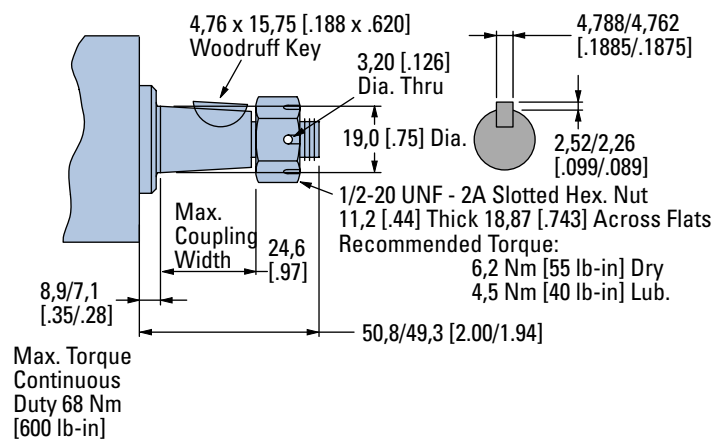
5/8 Inch Straight Keyed w/ Crosshole



3/4 Inch Tapered

(Tapered Shaft End Per SAE J744)

Except as Specified — 1.5 : 12 Ratio)

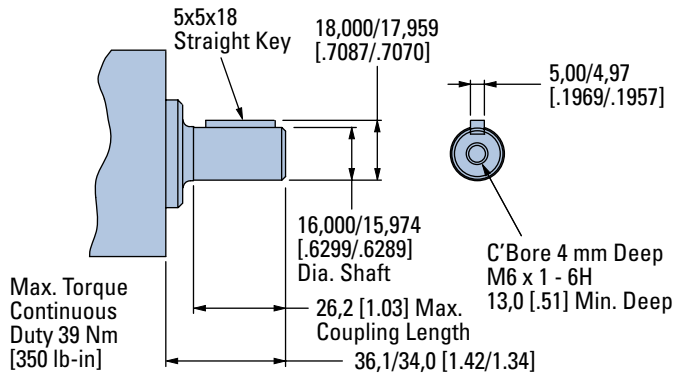


J Series (129-)

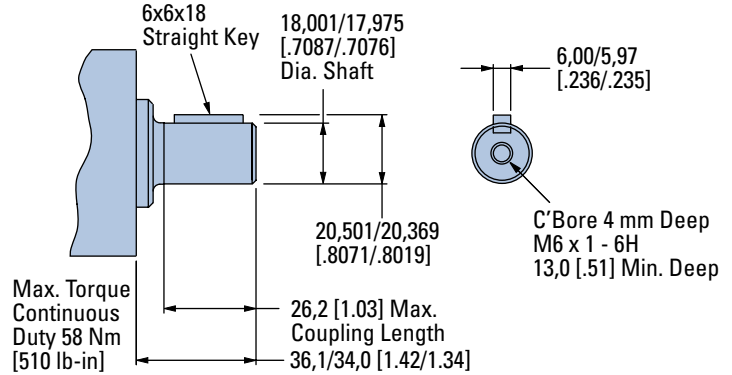
Dimensions

Shafts and Flange Kit

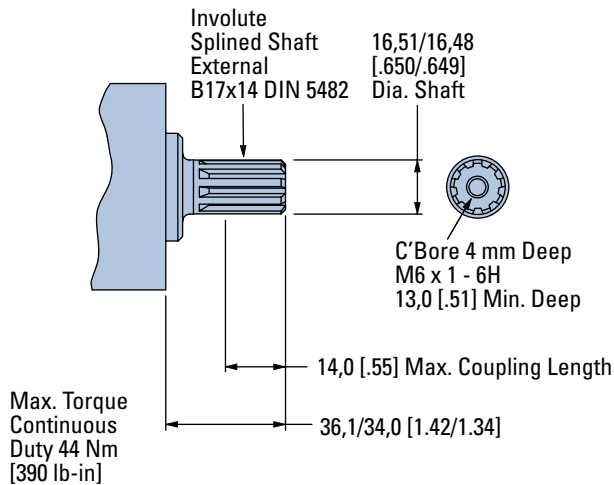
16 mm Straight Keyed



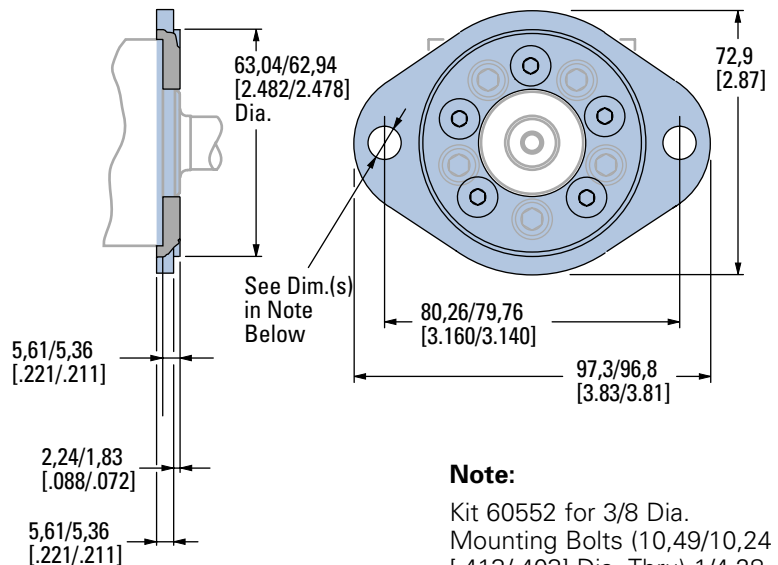
18 mm Straight Keyed



Involute 9T Splined — Metric



2 Bolt Flange Kits (2)



Note:

Kit 60552 for 3/8 Dia.
Mounting Bolts (10,49/10,24 [1.413/.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 [1.359/.349] Dia. Thru) M6 x 1 - 6H screws for attaching flange to motor (5)

J Series (129-)

Product Numbers

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.**

End Port

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /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	9/16 -18 UNF 2B O-Ring (2)	129-0291	-0292	-0293	-0294	-0458
	11/16 inch Straight		129-0295	-0296	-0297	-0298	-0459
	Splined — Metric		129-0299	-0300	-0301	-0302	-0460
	3/4 inch Tapered		129-0480				
M6 x 1 - 6H	16 mm Straight	M14 x 1,5 - 6H O-Ring (2)	129-0303	-0304	-0305	-0306	-0461
	18 mm Straight		129-0307	-0308	-0309	-0310	-0462
	Splined — Metric		129-0311	-0312	-0313	-0314	-0463
	16 mm Straight	G 1/4 (BSP) (2)	129-0315	-0316	-0317	-0318	-0464
	18 mm Straight		129-0319	-0320	-0321	-0322	-0465
	Splined — Metric		129-0323	-0324	-0325	-0326	-0466
	16 mm Straight	G 3/8 (BSP) (2)*	129-0327	-0328	-0329	-0330	-0467
	18 mm Straight		129-0331	-0332	-0333	-0334	-0468
	Splined — Metric		129-0335	-0336	-0337	-0338	-0469

*Note: The Same Casting used for Side Ports is Required for G 3/8 (BSP) End Ports

129-0336

Side Port

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /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	9/16 -18 UNF 2B O-Ring (2)	129-0339	-0340	-0341	-0342	-0470
	11/16 inch Straight		129-0343	-0344	-0345	-0346	-0471
	Splined — Metric		129-0347	-0348	-0349	-0350	-0472
	3/4 inch Tapered		129-0481				
M6 x 1 - 6H	16 mm Straight	M14 x 1,5 - 6H O-Ring (2)	129-0351	-0352	-0353	-0354	-0473
	18 mm Straight		129-0355	-0356	-0357	-0358	-0474
	Splined — Metric		129-0359	-0360	-0361	-0362	-0475
	16 mm Straight	G 1/4 (BSP) (2)	129-0363	-0364	-0365	-0366	-0476
	18 mm Straight		129-0367	-0368	-0369	-0370	-0477
	Splined — Metric		129-0371	-0372	-0373	-0374	-0403
	16 mm Straight	G 3/8 (BSP) (2)	129-0375	-0376	-0377	-0378	-0478
	18 mm Straight		129-0379	-0380	-0381	-0382	-0479
	Splined — Metric						

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)

J Series (129-)

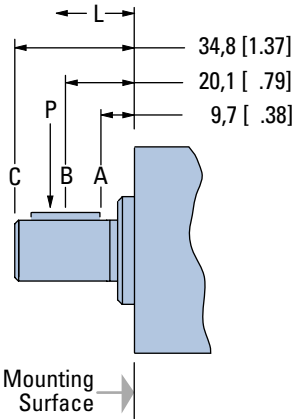
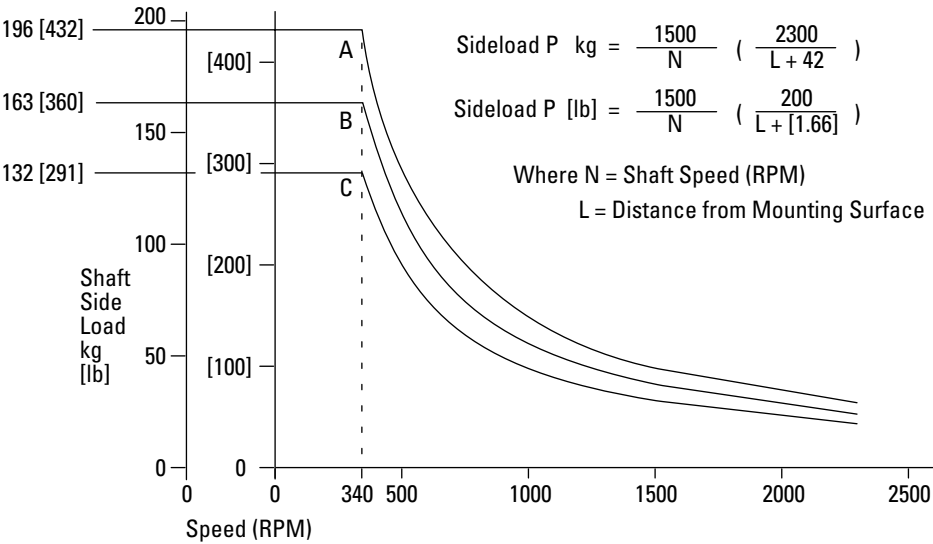
Shaft Side Load Capacity

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 (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]



J Series (129-)

Case Pressure and Case Drain

The J Series now 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 pushing inward on shaft. Tension load is 82 kg under all case pressure conditions.

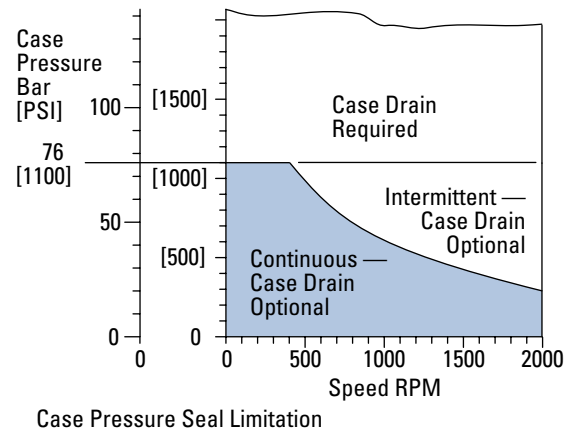
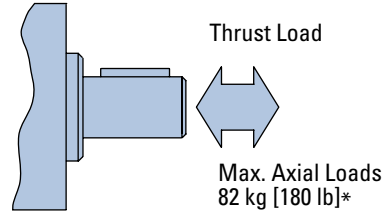
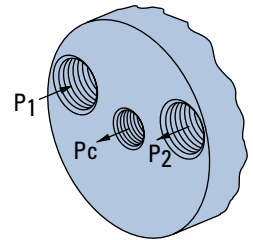
Example:

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.

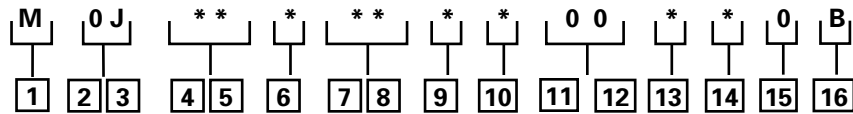
Case pressure will add to the allowable compressive thrust load. Case pressure will push outward on the shaft at 20 kg/7 Bar [44 lb/100 PSI].



J Series (129-)

Model Code

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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



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

D – 2 Bolt: Dia. 62,99 [2.480] x 2,0 [.08] Pilot 9,0 [.354] 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 Dia. Straight with 4,75 [.187] Dia. Crosshole

08 – 3/4 inch Tapered with Woodruff Key and Nut

09 – 5/8 inch Dia. Straight with 4,72 [.186] Sq. Key with 1/4-28 UNF -2B Threaded Hole (Plated for Corrosion Protection)

14 – 16 mm Dia. Straight with 5,00 [.197] Sq. Key with M6 x 1- 6H Threaded Hole (Plated for Corrosion Protection)

9 Ports

A – 9/16 -18 UNF - 2B O-Ring End Ported

B – G 1/4 (BSP) 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

F – G 1/4 (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

13 Special Features (Assembly)

0 – None

1 – Reverse Rotation

14 Paint/Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

15 Eaton Assigned Code when Applicable

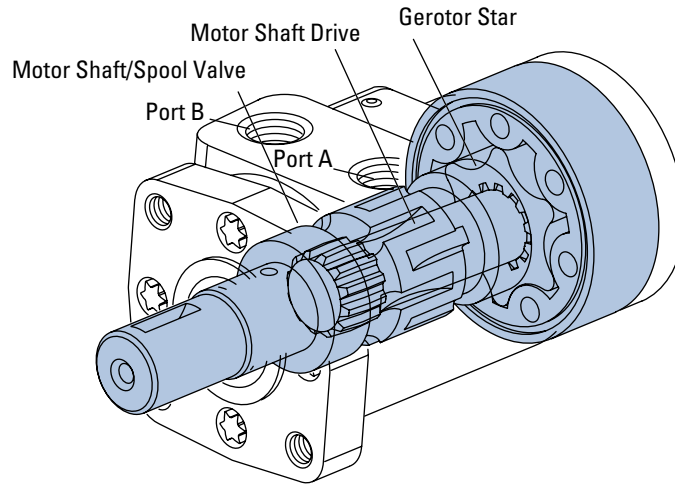
0 – Assigned Code

16 Eaton Assigned Design Code

B – Assigned Design Code

H Series (101-)

Highlights



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]	57 [15] Continuous***
	76 [20] Intermittent**
Speed	Up to 1100 RPM
Pressure bar [PSI]	125 [1800] Cont.***
	165 [2400] 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
- Many more



Conveyer



Combine



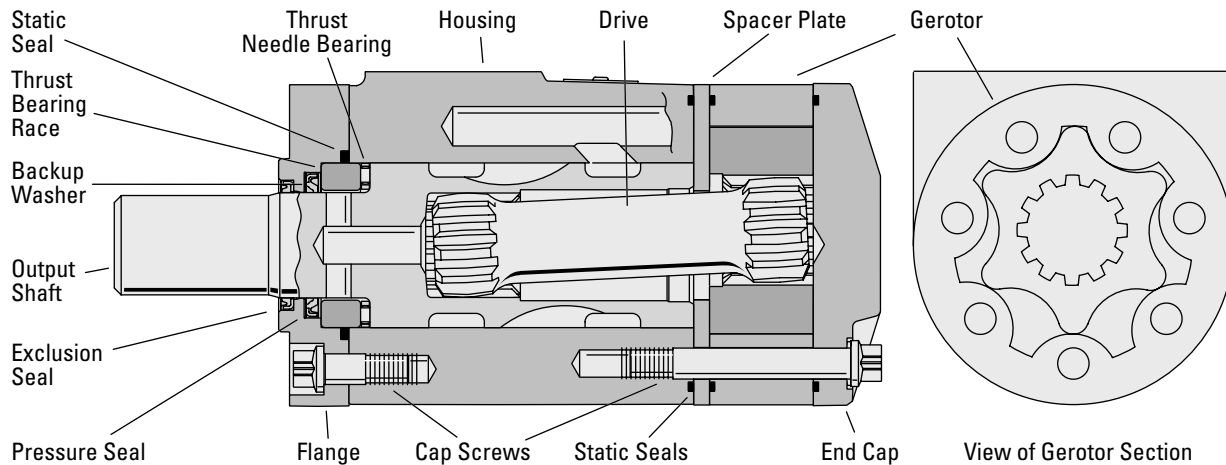
Sweeper



Salt and Sand Spreader

H Series (101-)

Specifications



SPECIFICATION DATA — H MOTORS

Displ. cm ³ /r [in ³ /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	953	760	585	469	385	353	304	243	192	152	74
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]
	Intermittent	38 [10]	53 [14]	64 [17]	68 [18]	68 [18]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	56 [497]	73 [650]	91 [802]	118 [1044]	155 [1368]	192 [1699]	221 [1954]	233 [2059]	265 [2343]	302 [2669]	351 [3110]	407 [3604]	389 [3440]
	Intermittent	75 [668]	99 [876]	122 [1076]	158 [1401]	207 [1829]	257 [2278]	300 [2653]	319 [2824]	356 [3151]	415 [3671]	466 [4121]	484 [4283]	520 [4600]
Min. Starting Torque @ Cont. Pressure		46 [410]	59 [520]	76 [670]	95 [840]	124 [1100]	154 [1360]	176 [1560]	186 [1650]	211 [1870]	238 [2110]	282 [2500]	330 [2920]	316 [2800]
	@ Int. Pressure	63 [560]	81 [720]	104 [920]	130 [1150]	171 [1510]	2102 [1860]	46 [2180]	262 [2320]	293 [2590]	339 [3000]	388 [3430]	408 [3610]	434 [3840]
Pressure ΔBar [Δ PSI]	Continuous	124 [1800]	124 [1800]	124 [1800]	124 [1800]	124 [1800]	124 [1800]	117 [1700]	114 [1650]	110 [1600]	100 [1450]	93 [1350]	86 [1250]	41 [600]
	Intermittent	165 [2400]	165 [2400]	165 [2400]	165 [2400]	165 [2400]	165 [2400]	159 [2300]	155 [2250]	148 [2150]	138 [2000]	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]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Note:

Δ pressure is derated for end ported units.

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 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:

Recommended Fluids — Premium quality, anti-wear type hydraulic oil. Minimum oil viscosity (at operating temperature) should be the highest of the following:

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

Recommended Maximum System Operating Temp.:

82°C [180°F]

Recommended Filtration:

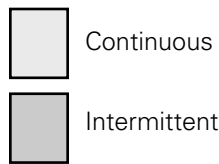
per ISO Cleanliness Code 4406, level 20/18/13

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 120 SUS. Actual data may vary slightly from unit to unit in production.



		36 cm ³ /r [2.2 in ³ /r]										Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]											
		Continuous											
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]			
		14	28	41	55	69	83	97	110	124			[2400]
Flow LPM [GPM]	[2]	[49]	[103]	[162]	[189]	[270]	[325]	[379]	[432]	[489]			[650]
	7,6	6	12	18	21	31	37	43	49	55			73
		204	201	198	194	189	184	177	170	162			122
	[4]	[47]	[106]	[160]	[191]	[274]	[327]	[384]	[439]	[495]			[654]
	15,1	5	12	18	22	31	37	43	50	56			74
		408	407	402	399	394	387	381	373	365			323
Max. Continuous	[6]	[44]	[102]	[158]	[188]	[272]	[328]	[383]	[440]	[496]			[661]
	22,7	5	12	18	21	31	37	43	50	56			75
		613	612	609	604	599	591	586	576	565			523
Max. Continuous	[8]	[40]	[97]	[153]	[184]	[270]	[326]	[383]	[440]	[497]			[668]
	30,3	5	11	17	21	31	37	43	50	56			75
		817	817	814	807	799	793	785	776	762			721
Max. Continuous	[10]	[36]	[90]	[148]	[180]	[265]	[322]	[380]	[438]	[495]			[664]
	37,9	4	10	17	20	30	36	43	49	56			75
		1021	1021	1015	1008	1001	991	981	969	959			920

[90]
10
1021

} Torque [lb-in]
Nm
Speed RPM

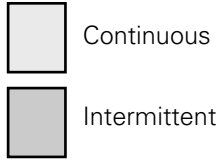
		46 cm ³ /r [2.8 in ³ /r]										Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]											
		Continuous											
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]			
		14	28	41	55	69	83	97	110	124			[2400]
Flow LPM [GPM]	[2]	[64]	[136]	[212]	[284]	[355]	[426]	[497]	[567]	[641]			[852]
	7,6	7	15	24	32	40	48	56	64	72			96
		161	158	156	153	148	145	139	133	127			95
	[4]	[61]	[139]	[209]	[286]	[359]	[429]	[503]	[576]	[649]			[857]
	15,1	7	16	24	32	41	48	57	65	73			97
		323	320	316	314	310	304	300	293	287			253
Max. Continuous	[6]	[58]	[134]	[207]	[282]	[356]	[430]	[502]	[577]	[650]			[867]
	22,7	7	15	23	32	40	49	57	65	73			98
		486	481	479	475	471	464	461	453	444			410
Max. Continuous	[8]	[52]	[128]	[200]	[276]	[354]	[428]	[502]	[577]	[651]			[876]
	30,3	6	14	23	31	40	48	57	65	74			99
		648	643	640	635	628	623	617	610	599			566
Max. Continuous	[10]	[47]	[118]	[194]	[269]	[347]	[423]	[498]	[575]	[649]			[871]
	37,9	5	13	22	30	39	48	56	65	73			98
		808	803	798	793	787	779	771	761	753			722
Max. Intermittent	[12]	[36]	[109]	[188]	[260]	[340]	[417]	[492]	[567]	[643]			[864]
	45,4	4	12	21	29	38	47	56	64	73			98
		969	964	960	952	946	938	931	922	914			877
Max. Intermittent	[14]	[25]	[98]	[175]	[249]	[327]	[404]	[484]	[559]	[634]			
	53,0	3	11	20	28	37	46	55	63	72			
		1127	1123	1115	1108	1100	1093	1086	1079	1068			

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 120 SUS. Actual data may vary slightly from unit to unit in production.



		59 cm ³ /r [3.6 in ³ /r] Pressure Bar [PSI] Continuous								Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2400] 165
Flow LPM [GPM]	[2] 7,6	[79] 9 127	[169] 19 125	[260] 29 123	[305] 34 121	[437] 49 117	[526] 59 114	[616] 70 109	[704] 80 103	[796] 90 96	[1055] 119 65
	[4] 15,1	[76] 9 254	[168] 19 254	[257] 29 251	[307] 35 249	[441] 50 246	[529] 60 241	[620] 70 236	[710] 80 230	[800] 90 224	[1065] 120 193
	[6] 22,7	[73] 8 381	[161] 18 381	[252] 28 380	[303] 34 377	[439] 50 373	[529] 60 368	[618] 70 364	[709] 80 358	[802] 91 349	[1069] 121 319
	[8] 30,3	[64] 7 508	[151] 17 508	[243] 27 508	[294] 33 504	[428] 48 500	[519] 59 496	[609] 69 491	[701] 79 484	[794] 90 476	[1076] 122 446
	[10] 37,9	[57] 6 635	[141] 16 635	[234] 26 634	[283] 32 630	[419] 47 626	[512] 58 621	[602] 68 614	[693] 78 608	[786] 89 601	[1071] 121 571
	[12] 45,4	[45] 5 762	[131] 15 762	[227] 26 762	[274] 31 757	[409] 46 753	[505] 57 747	[593] 67 741	[684] 77 734	[778] 88 728	[1058] 120 694
	[14] 53,0	[33] 4 889	[118] 13 889	[213] 24 887	[266] 30 882	[396] 45 877	[492] 56 872	[583] 66 866	[676] 76 860	[770] 87 851	[1055] 119 813
	Max. Contin- uous 56,8	[29] 3 953	[111] 13 953	[205] 23 951	[260] 29 945	[389] 44 940	[486] 55 935	[576] 65 929	[670] 76 921	[765] 86 913	[1055] 119 872
	Max. Inter- mittent 75,7	[20] 2 1080	[98] 11 1080	[192] 22 1077	[252] 28 1071	[377] 43 1067	[475] 54 1062	[567] 64 1055	[660] 75 1049	[757] 86 1040	
	[111] 13 953 Torque [lb-in] Nm Speed RPM										

		74 cm ³ /r [4.5 in ³ /r] Pressure Bar [PSI] Continuous								Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2400] 165
Flow LPM [GPM]	[2] 7,6	[103] 12 101	[220] 25 99	[339] 38 98	[454] 51 96	[569] 64 93	[685] 77 90	[801] 91 86	[916] 103 81	[1036] 117 76	[1373] 155 51
	[4] 15,1	[99] 11 203	[219] 25 201	[335] 38 199	[457] 52 197	[574] 65 194	[689] 78 191	[808] 91 187	[925] 105 182	[1042] 118 177	[1386] 157 153
	[6] 22,7	[94] 11 305	[210] 24 303	[328] 37 301	[451] 51 298	[571] 65 296	[689] 78 292	[805] 91 288	[924] 104 283	[1044] 118 276	[1392] 157 252
	[8] 30,3	[86] 10 406	[196] 22 404	[319] 36 402	[438] 49 399	[558] 63 396	[676] 76 393	[793] 90 388	[913] 103 383	[1033] 117 377	[1401] 158 352
	[10] 37,9	[74] 8 507	[183] 21 505	[310] 35 502	[422] 48 499	[545] 62 496	[667] 75 492	[784] 89 486	[903] 102 482	[1024] 116 476	[1394] 158 452
	[12] 45,4	[58] 7 608	[171] 19 606	[295] 33 603	[408] 46 600	[533] 60 596	[657] 74 591	[773] 87 587	[891] 101 581	[1013] 114 576	[1377] 156 549
	[14] 53,0	[43] 5 709	[154] 17 706	[277] 31 702	[396] 45 698	[515] 58 694	[640] 72 691	[760] 86 686	[880] 99 681	[1002] 113 674	[1374] 155 643
	Max. Contin- uous 56,8	[36] 4 760	[145] 16 757	[268] 30 753	[387] 44 749	[506] 57 744	[632] 71 740	[750] 85 735	[873] 99 729	[996] 113 723	[1373] 155 690
	Max. Inter- mittent 75,7	[20] 2 904	[121] 14 902	[233] 26 898	[351] 40 895	[482] 54 891	[609] 69 887	[725] 82 882	[856] 97 877	[981] 111 869	

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous
	Intermittent

		97 cm³/r [5.9 in³/r] Δ Pressure Bar [PSI] Continuous								Max. Contin- uous	Max. Inter- mittent
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2400]
		14	28	41	55	69	83	97	110	124	165
Flow LPM [GPM]	[2] 7,6	[134] 15 78	[292] 33 76	[442] 50 75	[593] 67 73	[746] 84 71	[899] 102 68	[1054] 119 65	[1209] 137 61	[1365] 154 55	[1806] 204 33
	[4] 15,1	[131] 15 156	[281] 32 155	[436] 49 153	[596] 67 151	[750] 85 149	[903] 102 147	[1059] 120 143	[1212] 137 139	[1367] 154 134	[1828] 207 113
	[6] 22,7	[126] 14 234	[269] 30 233	[425] 48 231	[588] 66 230	[747] 84 228	[900] 102 224	[1054] 119 221	[1206] 136 217	[1368] 155 210	[1823] 206 189
	[8] 30,3	[110] 12 312	[246] 28 311	[408] 46 310	[566] 64 308	[718] 81 305	[873] 99 303	[1023] 116 300	[1177] 133 295	[1339] 151 291	[1829] 207 269
	[10] 37,9	[96] 11 390	[231] 26 389	[392] 44 387	[539] 61 385	[699] 79 383	[859] 97 380	[1005] 114 376	[1156] 131 373	[1318] 149 368	[1821] 206 346
	[12] 45,4	[77] 9 468	[218] 25 467	[378] 43 465	[522] 59 463	[681] 77 460	[844] 95 457	[990] 112 453	[1142] 129 449	[1301] 147 445	[1792] 202 421
	[14] 53,0	[60] 7 546	[197] 22 544	[358] 40 542	[513] 58 539	[662] 75 537	[828] 94 535	[973] 110 531	[1131] 128 526	[1293] 146 521	[1776] 201 499
	Max. Contin- uous 56,8	[52] 6 585	[189] 21 583	[346] 39 581	[495] 56 578	[651] 74 575	[819] 93 573	[963] 109 569	[1126] 127 564	[1286] 145 559	[1778] 201 536
	Max. Inter- mittent 75,7	[20] 3 701	[25] 18 700	[311] 35 697	[455] 51 694	[625] 71 691	[790] 89 688	[941] 106 684	[1110] 125 681	[1272] 144 674	

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

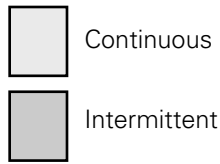
		120 cm³/r [7.3 in³/r] Δ Pressure Bar [PSI] Continuous								Max. Contin- uous	Max. Inter- mittent
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2400]
		14	28	41	55	69	83	97	110	124	165
Flow LPM [GPM]	[2] 7,6	[162] 18 62	[357] 40 61	[544] 61 61	[736] 83 59	[927] 105 58	[1116] 126 55	[1305] 147 53	[1498] 169 49	[1687] 191 45	[2231] 252 26
	[4] 15,1	[160] 18 125	[348] 39 124	[539] 61 123	[736] 83 121	[930] 105 120	[1119] 126 119	[1316] 149 116	[1506] 170 114	[1698] 192 110	[2268] 256 90
	[6] 22,7	[155] 18 188	[338] 38 187	[530] 60 186	[729] 82 185	[923] 104 183	[1116] 126 180	[1310] 148 178	[1500] 169 175	[1699] 192 170	[2271] 257 152
	[8] 30,3	[139] 16 250	[319] 36 250	[515] 58 249	[710] 80 247	[901] 102 245	[1094] 124 243	[1283] 145 241	[1476] 167 237	[1673] 189 233	[2278] 257 216
	[10] 37,9	[121] 14 313	[303] 34 312	[497] 56 311	[686] 78 309	[883] 100 308	[1081] 122 306	[1267] 143 302	[1460] 165 300	[1655] 187 296	[2268] 256 278
	[12] 45,4	[102] 12 375	[288] 33 374	[480] 54 373	[664] 75 371	[862] 97 370	[1060] 120 367	[1246] 141 365	[1440] 163 361	[1640] 185 358	[2232] 252 338
	[14] 53,0	[78] 9 438	[263] 30 437	[458] 52 435	[652] 74 433	[841] 95 431	[1041] 118 430	[1228] 139 427	[1420] 160 423	[1616] 183 419	[2213] 250 401
	Max. Contin- uous 56,8	[67] 8 469	[253] 29 468	[446] 50 466	[632] 71 464	[828] 94 462	[1030] 116 460	[1214] 137 458	[1411] 159 454	[1608] 182 450	[2205] 249 430
	Max. Inter- mittent 75,7	[20] 2 626	[20] 23 624	[384] 43 621	[581] 66 618	[778] 88 617	[971] 110 614	[1169] 132 611	[1356] 153 609	[1559] 176 606	

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 120 SUS. Actual data may vary slightly from unit to unit in production.



		146 cm ³ /r [8.9 in ³ /r] Δ Pressure Bar [PSI] Continuous								Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1700] 117	[2300] 159
Flow LPM [GPM]	[2] 7,6	[198] 22 51	[435] 49 50	[664] 75 50	[897] 101 49	[1130] 128 47	[1361] 154 45	[1591] 180 43	[1827] 206 40	[1942] 219 39	[2611] 295 24
	[4] 15,1	[196] 22 103	[424] 48 102	[657] 74 101	[898] 101 99	[1133] 128 99	[1365] 154 97	[1604] 181 95	[1836] 207 93	[1954] 221 92	[2648] 299 78
	[6] 22,7	[189] 21 154	[412] 47 153	[646] 73 152	[889] 100 151	[1125] 127 150	[1361] 154 148	[1598] 181 146	[1829] 207 143	[1951] 220 141	[2653] 300 128
	[8] 30,3	[169] 19 205	[389] 44 205	[628] 71 204	[866] 98 203	[1098] 124 201	[1333] 151 200	[1564] 177 197	[1799] 203 195	[1919] 217 193	[2649] 299 180
	[10] 37,9	[148] 17 257	[369] 42 256	[605] 68 255	[836] 94 253	[1076] 122 252	[1318] 149 251	[1544] 174 248	[1780] 201 246	[1899] 215 244	[2789] 315 231
	[12] 45,4	[125] 14 308	[351] 40 307	[586] 66 306	[810] 92 305	[1051] 119 303	[1293] 146 301	[1519] 172 299	[1756] 198 296	[1878] 212 295	[2606] 294 281
	[14] 53,0	[95] 11 359	[321] 36 358	[558] 63 357	[795] 90 355	[1026] 116 354	[1290] 146 352	[1497] 169 350	[1731] 196 347	[1851] 209 346	[2580] 292 331
	Max. Contin- uous 56,8	[82] 9 85	[308] 35 384	[544] 61 383	[771] 87 381	[1010] 114 379	[1256] 142 378	[1480] 167 375	[1720] 194 373	[1840] 208 371	[2569] 290 356
	Max. Inter- mittent 75,7	[20] 3 513	[246] 28 512	[468] 53 509	[708] 80 507	[948] 107 506	[1184] 134 504	[1425] 161 501	[1653] 187 499	[1780] 201 498	

		159 cm ³ /r [9.7 in ³ /r] Δ Pressure Bar [PSI] Continuous								Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1650] 134	[2250] 155
Flow LPM [GPM]	[2] 7,6	[209] 24 47	[465] 53 46	[715] 81 46	[973] 110 45	[1228] 139 44	[1478] 167 42	[1724] 195 40	[1981] 224 38	[2046] 231 37	[2764] 312 23
	[4] 15,1	[210] 24 94	[460] 52 94	[710] 80 93	[971] 110 91	[1229] 139 91	[1480] 167 90	[1745] 197 89	[1996] 226 87	[2059] 233 87	[2813] 318 76
	[6] 22,7	[205] 23 141	[454] 51 141	[704] 80 140	[965] 109 139	[1216] 137 138	[1477] 167 136	[1738] 196 134	[1991] 225 132	[2055] 232 132	[2824] 319 119
	[8] 30,3	[186] 21 188	[440] 50 188	[693] 78 187	[951] 107 186	[1205] 136 185	[1461] 165 183	[1716] 194 181	[1973] 223 179	[2038] 230 178	[2808] 317 166
	[10] 37,9	[164] 19 235	[422] 48 234	[671] 76 234	[930] 105 232	[1189] 134 232	[1451] 164 230	[1702] 192 228	[1965] 219 226	[2032] 230 225	[2789] 315 213
	[12] 45,4	[144] 16 282	[404] 46 281	[652] 74 281	[900] 102 279	[1163] 131 279	[1421] 161 277	[1674] 189 275	[1937] 219 273	[2004] 226 272	[2770] 313 260
	[14] 53,0	[109] 12 330	[374] 42 329	[623] 70 328	[883] 100 327	[1140] 129 325	[1396] 158 323	[1653] 187 322	[1900] 215 319	[1963] 222 319	[2727] 308 306
	Max. Contin- uous 56,8	[92] 10 353	[359] 41 352	[612] 69 351	[861] 97 350	[1123] 127 348	[1381] 156 347	[1633] 185 345	[1886] 213 343	[1950] 220 342	[2712] 306 330
	Max. Inter- mittent 75,7	[26] 3 471	[268] 30 470	[510] 58 467	[772] 87 465	[1034] 117 464	[1290] 146 462	[1553] 175 460	[1802] 204 458	[1865] 211 458	

[359]
41
352 } 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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous
	Intermittent

185 cm³/r [11.3 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[2150] 148
[2]	[257] 29	[554] 63	[847] 96	[1150] 130	[1447] 163	[1739] 196	[2035] 230	[2320] 262	[3103] 351
7,6	40	40	39	38	37	36	33	29	12
[4]	[254] 29	[546] 62	[845] 95	[1145] 129	[1448] 164	[1744] 197	[2049] 232	[2343] 265	[3147] 356
15,1	81	81	80	79	78	77	76	74	63
[6]	[246] 28	[540] 61	[834] 94	[1137] 128	[1434] 162	[1736] 196	[2036] 230	[2337] 264	[3151] 356
22,7	121	121	120	120	119	117	115	112	100
[8]	[224] 25	[520] 59	[820] 93	[1117] 126	[1414] 160	[1716] 194	[2014] 228	[2315] 262	[3133] 354
30,3	162	162	161	160	159	157	155	152	140
[10]	[202] 23	[499] 56	[793] 90	[1095] 124	[1394] 158	[1699] 192	[1997] 226	[2299] 260	[3112] 352
37,9	202	202	201	201	200	198	196	193	181
[12]	[176] 20	[475] 54	[767] 87	[1063] 120	[1368] 155	[1664] 188	[1969] 222	[2268] 256	[3088] 349
45,4	243	242	242	241	240	238	236	234	222
[14]	[140] 16	[443] 50	[735] 83	[1035] 117	[1340] 151	[1637] 185	[1936] 219	[2227] 252	[3051] 345
53,0	283	283	282	281	280	279	277	274	262
Max. Contin- uous	[120] 14	[425] 48	[719] 81	[1014] 115	[1320] 149	[1618] 183	[1914] 216	[2205] 249	[3023] 342
56,8	304	303	302	301	300	299	297	294	283
Max. Inter- mittent	[20] 3	[321] 36	[612] 69	[911] 103	[1211] 137	[1504] 170	[1795] 203		
75,7	405	404	402	401	400	398	397		

231 cm³/r [14.1 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1450] 100	[2000] 138
[2]	[338] 38	[707] 80	[1074] 121	[1456] 165	[1827] 206	[2192] 248	[2572] 291	[2657] 300	
7,6	32	32	31	30	30	28	26	25	
[4]	[328] 37	[695] 79	[1076] 122	[1447] 163	[1827] 206	[2201] 249	[2577] 291	[2669] 302	[3671] 415
15,1	65	65	64	63	62	62	60	60	50
[6]	[317] 36	[687] 78	[1057] 119	[1434] 162	[1811] 205	[2186] 247	[2555] 289	[2650] 299	[3668] 414
22,7	97	97	97	96	95	94	92	91	80
[8]	[289] 33	[659] 74	[1038] 117	[1406] 159	[1777] 201	[2160] 244	[2531] 286	[2625] 297	[3644] 412
30,3	130	130	130	129	128	127	124	124	112
[10]	[265] 30	[631] 71	[1004] 113	[1381] 156	[1751] 198	[2131] 241	[2510] 284	[2602] 294	[3608] 408
37,9	162	162	162	162	160	158	156	156	145
[12]	[230] 26	[599] 68	[968] 109	[1345] 152	[1722] 195	[2088] 236	[2480] 280	[2571] 290	[3571] 403
45,4	195	195	194	194	193	192	189	189	178
[14]	[191] 22	[563] 64	[927] 105	[1299] 147	[1686] 190	[2058] 233	[2428] 274	[2519] 285	[3532] 399
53,0	227	227	227	226	226	224	222	221	212
Max. Contin- uous	[167] 19	[538] 61	[904] 102	[1279] 145	[1661] 188	[2030] 229	[2404] 272	[2493] 282	[3488] 394
56,8	243	243	243	242	242	240	238	238	229
Max. Inter- mittent	[20] 3	[411] 46	[785] 89	[1152] 130	[1520] 172	[1877] 212	[2222] 251	[2318] 262	
75,7	324	324	323	322	322	320	319	318	

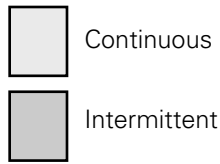
[538]
61 } Torque [lb-in]
243 } Nm
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.



		293 cm³/r [17.9 in³/r]							Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]								
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1350]		
		14	28	41	55	69	83	93		[1800] 124
Flow LPM [GPM]	[2]	[427]	[893]	[1361]	[1829]	[2293]	[2672]	[2977]		
	7,6	48 26	101 25	154 25	207 24	259 22	302 16	336 13		
	[4]	[419]	[886]	[1362]	[1833]	[2305]	[2771]	[3110]		[4107]
	15,1	47 51	100 51	154 51	207 50	260 49	313 47	351 44		464 22
	[6]	[402]	[872]	[1342]	[1819]	[2291]	[2757]	[3098]		[4121]
	22,7	45 77	99 77	152 76	206 76	259 74	312 71	350 68		466 54
	[8]	[367]	[838]	[1316]	[1785]	[2252]	[2723]	[3070]		[4086]
	30,3	41 102	95 102	149 102	202 101	254 100	308 98	347 95		462 84
	[10]	[332]	[803]	[1276]	[1749]	[2215]	[2684]	[3034]		[4061]
	37,9	38 128	91 128	144 128	198 127	250 126	303 123	343 120		459 108
Max. Continuous	[12]	[289]	[760]	[1230]	[1706]	[2177]	[2634]	[2989]		[4012]
	45,4	33 153	86 153	139 153	193 153	246 151	298 149	338 146		453 135
	[14]	[241]	[712]	[1176]	[1650]	[2126]	[2592]	[2935]		[3963]
	53,0	27 179	80 179	133 179	186 179	240 177	293 175	332 172		448 161
Max. Intermittent	[15]	[211]	[683]	[1149]	[1623]	[2096]	[2558]	[2905]		[3914]
	56,8	24 192	77 192	130 192	183 191	237 190	289 188	328 185		442 174
		[20]	[43]	[527]	[1001]	[1463]	[1919]	[2375]	[2720]	
		75,7	5 256	60 256	113 255	165 255	217 254	268 252	307 249	

		370 cm³/r [22.6 in³/r]							Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]								
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1250]		
		14	28	41	55	69	83	86		[1500] 103
Flow LPM [GPM]	[2]	[537]	[1121]	[1715]	[2285]	[2862]				
	7,6	61 20	127 20	194 20	258 19	323 16				
	[4]	[532]	[1123]	[1715]	[2308]	[2893]	[3467]	[3604]		[4274]
	15,1	60 40	127 40	194 40	261 39	327 38	392 36	407 35		483 27
	[6]	[508]	[1100]	[1693]	[2294]	[2884]	[3458]	[3598]		[4283]
	22,7	57 61	124 61	191 61	259 60	326 58	391 55	407 53		484 47
	[8]	[463]	[1060]	[1661]	[2255]	[2840]	[3414]	[3557]		[4254]
	30,3	52 81	120 81	188 81	255 80	321 79	386 76	402 74		481 68
	[10]	[414]	[1017]	[1613]	[2203]	[2788]	[3363]	[3506]		[4212]
	37,9	47 101	115 101	182 101	249 101	315 99	380 96	396 94		476 88
Max. Continuous	[12]	[363]	[960]	[1553]	[2152]	[2737]	[3305]	[3446]		[4152]
	45,4	41 121	108 121	175 121	243 121	309 119	373 116	389 115		469 109
	[14]	[303]	[897]	[1484]	[2086]	[2667]	[3246]	[3386]		[4092]
	53,0	34 142	101 142	168 142	236 142	301 140	367 137	383 136		462 130
Max. Intermittent	[15]	[266]	[862]	[1452]	[2050]	[2630]	[3206]	[3347]		[4054]
	56,8	30 152	97 152	164 152	232 152	297 150	362 148	378 147		458 140
		[20]	[61]	[1269]	[1847]	[2410]	[2987]	[3119]		
		75,7	7 202	76 202	143 202	209 202	272 199	337 198	352 198	

		739 cm³/r [45.1 in³/r]				Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]					
		[200]	[400]	[600]	[800]		
		14	28	41	55		
Flow LPM [GPM]	[2]	[1080]	[2250]	[3440]	[4570]		
	7,6	122 10	254 10	389 10	516 9		
	[4]	[1070]	[2250]	[3440]	[4600]		
	15,1	121 20	254 20	389 19	520 18		
	[6]	[1020]	[2200]	[3390]	[4590]		
	22,7	115 30	249 30	383 29	519 27		
	[8]	[945]	[2135]	[3330]	[4515]		
	30,3	107 40	241 40	376 39	510 37		
	[10]	[840]	[2050]	[3250]	[4430]		
	37,9	95 50	232 50	367 48	501 46		
Max. Continuous	[12]	[740]	[1945]	[3130]	[4320]		
	45,4	84 60	220 59	354 58	488 55		
	[14]	[630]	[1820]	[3005]	[4195]		
	53,0	71 69	206 68	340 68	474 66		
Max. Intermittent	[15]	[540]	[1735]	[2905]	[4130]		
	56,8	61 74	196 74	328 73	467 72		
		[20]	[143]	[1350]	[2565]	[3705]	
		75,7	16 99	153 98	290 97	419 96	

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

H Series (101-)

Dimensions

(Refer to pages B-4-19 thru B-4-22 for shaft and port dimensions.)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

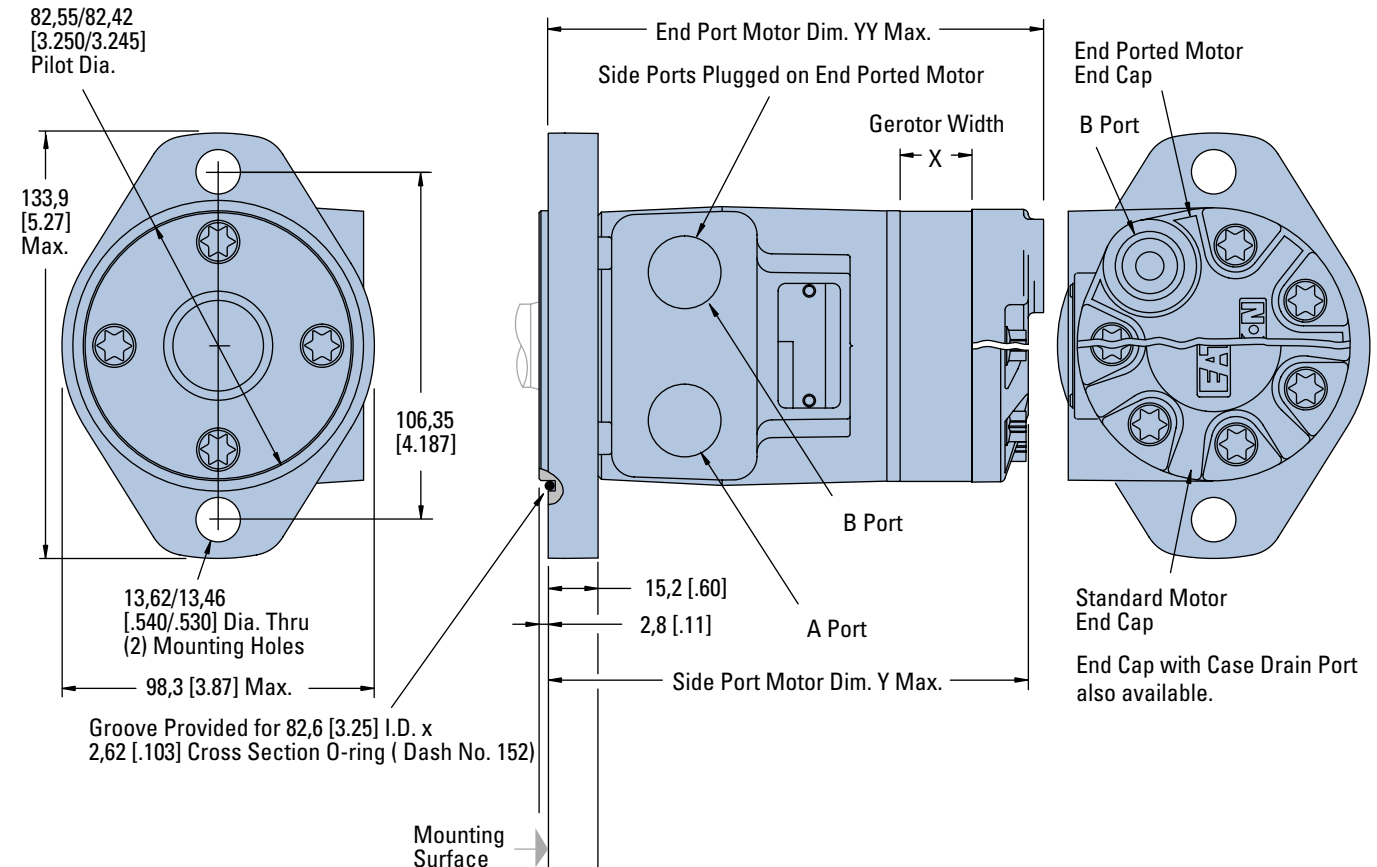
Note:

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

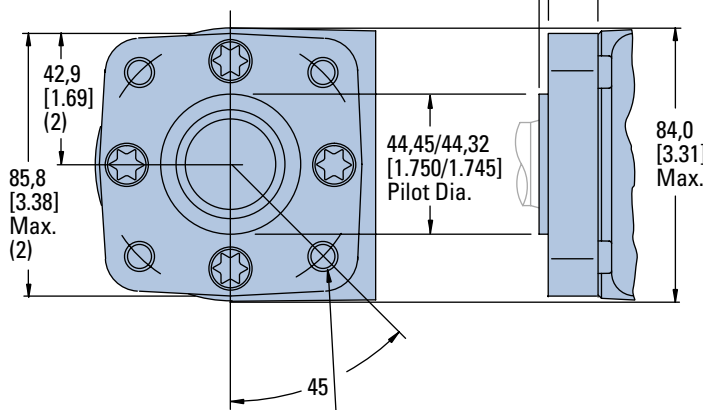
Note:

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

2 Bolt Flange



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 cm ³ /r [in ³ /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. cm ³ /r [in ³ /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	-1809	-1810	—	—	—	—	—
	Manifold*	101-1811	-1812	-1813	-1814	-1815	-1816	-1817	-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. cm ³ /r [in ³ /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	101-1749	-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	-1846	-1847	—	—	—	—	—
	Manifold*	101-1848	-1466	-1849	-1459	-1850	-1851	-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	-1862	-1312	-1314	-1863	-1864	-1315	—	—	—	—	—
	Manifold*	101-1865	-1305	-1866	-1306	-1307	-1867	-1868	-1869	—	—	—	—	—

101-1868

4 Bolt Flange with Corrosion Protection

SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /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	1/2 NPTF	101-2032	-2014	-2093	-2027	-2013	-2094	-2095	-2015	-2028	-2029	-2030	-2031	—
	Manifold*		-2067							-2068	-2069			

*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-2-11 to specify the product in detail.

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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

M	H	0	***			**		**		**		*	*	*	**		*	0	**		*	*	0	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

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 displacement code "022" or "035" must also specify free running gerotor (option "AA" in position 11,12).

7, 8 Mounting Type

AA - 2 Bolt (Standard)
82.50 [3.248] Dia. x 3.05 [1.20] Pilot, 13.59 [5.35] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C.

BA - 4 Bolt (Standard)
44.40 [1.748] Dia. x 3.05 [1.20] Pilot, .375-16 UNC-2B Mounting Holes on 82.55 [3.250] Dia. B.C.

CA - 2 Bolt (Standard)
82.50 [3.248] Dia. x 6.10 [2.40] Pilot, 10.41 [4.10] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C. (SAE A)

DD - 2 Bolt (Standard)
101.60 [4.000] Dia. x 6.10 [2.40] Pilot, 14.35 [5.665] 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 [1.20] Pilot, M10 x 1.5-6H Mounting Holes on 82.55 [3.250] Dia. B.C.

GA - 4 Bolt (Round) 82.50 [3.248] Dia. x 6.35 [2.50] Pilot, 19.05 [7.50] Dia. Mounting Holes on 109.48 [4.310] 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

07 - 25.4 [1.00] Dia. Straight, 8.03 [3.16] Dia. Cross Hole 11.2 [4.4] from End, 5.6 [2.2] Extra Length

08 - 25.4 [1.00] Dia. Straight, 10.31 [4.06] Dia. Cross Hole 15.7 [6.2] from End, .250-20 UNC-2B Hole in Shaft End

16 - 22.22 [8.75] Dia. SAE 13 Tooth Spline (SAE B)

17 - 22.22 [8.75] Dia. Straight, 6.4 [2.5] x 19.0 [7.5] Square Key (SAE B)

18 - 25.4 [1.00] Dia. Tapered, Woodruff Key and Nut, 34.92 [1.375] Taper Length

24 - 25.00 [9.84] Dia. Straight, 8.00 [3.15] 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

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

13 Case Flow Options

0 - None

1 - .4375-20 UNF-2B SAE O-Ring Port (End Cap)

2 - G 1/4 BSP Straight THD Port (End Cap)

A - Internal Check Valves

14 Gerotor Options

0 - None

A - Free Running

15 Shaft Options

0 - None

N - Electroless Nickel Plated

16, 17 Seal Options

00 - Standard Seals

02 - Seal Guard

03 - Viton Seals

04 - Viton Shaft Seal

05 - Vented Two-Stage Seal

07 - High Pressure Shaft Seal

18 Speed Sensor Options

0 - None

A - Digital Speed Pickup (15 Pulse), No Lead Wire with M12 Connector (A=Power, B=Common, C=Signal)

B - Magnetic Speed Pickup (60 Pulse by Quadrature), No Lead Wire with M12 Connector (A=Power, B=Common, C=Signal)

19 Manifold Block Options

0 - None

* - Contact your Eaton Sales Representative for available options.

20, 21 Special Features (Hardware)

00 - None

AB - Low Speed Valving

SS - Stainless Steel Flange Bolts

22 Special Features (Assembly)

0 - None

1 - Reverse Rotation

2 - Flange Rotated 90°

23 Paint/ Special Packaging

0 - No Paint

A - Painted Low Gloss Black

D - Environmental Coated Gloss White

F - Environmental Coated Black

24 Eaton Assigned Code when Applicable

0 - Assigned Code

25 Eaton Assigned Design Code

J - Nine (9)

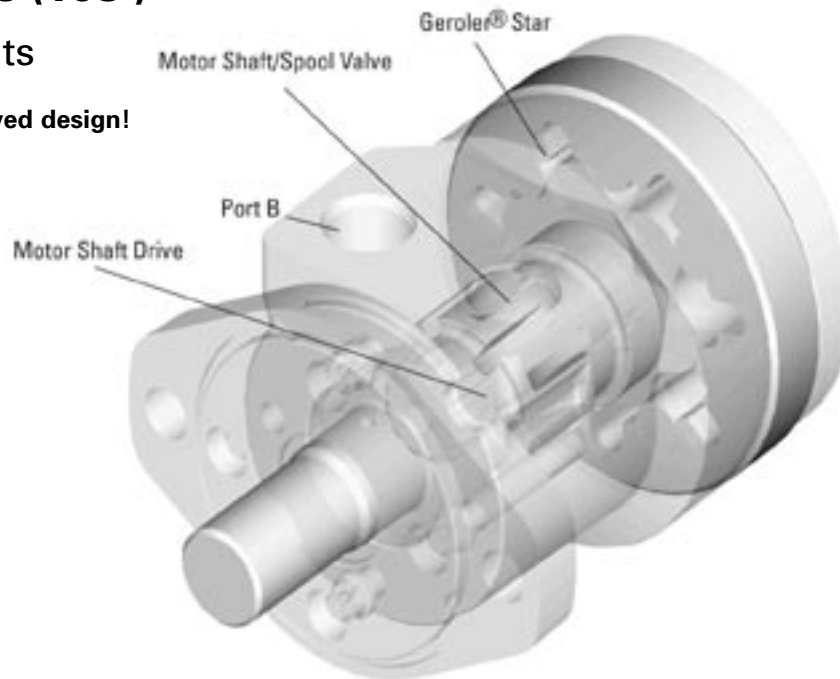
Feature in **bold** are preferred and allow for shorter lead time.

Notes

S Series (103-)

Highlights

New, improved design!



Description

The new improved Char-Lynn S Series motors with optimized Geroler geometry offers enhanced performance with reduced drive-running angle while retaining the overall package size of the original S series. Design improvements include upgraded steel end cap, O-Ring section seals, and optimized Geroler set. 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. Improvements incorporated into the latest S Series motor provide 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 963 RPM
Pressure bar [PSI]	135 [2000] Cont.*** 170 [2500] Inter.**
Torque Nm [lb-in]	528 [4672] Cont.*** 587 [5190] 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
- Special options to meet customer needs!

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
- Many more



Conveyor



Casting



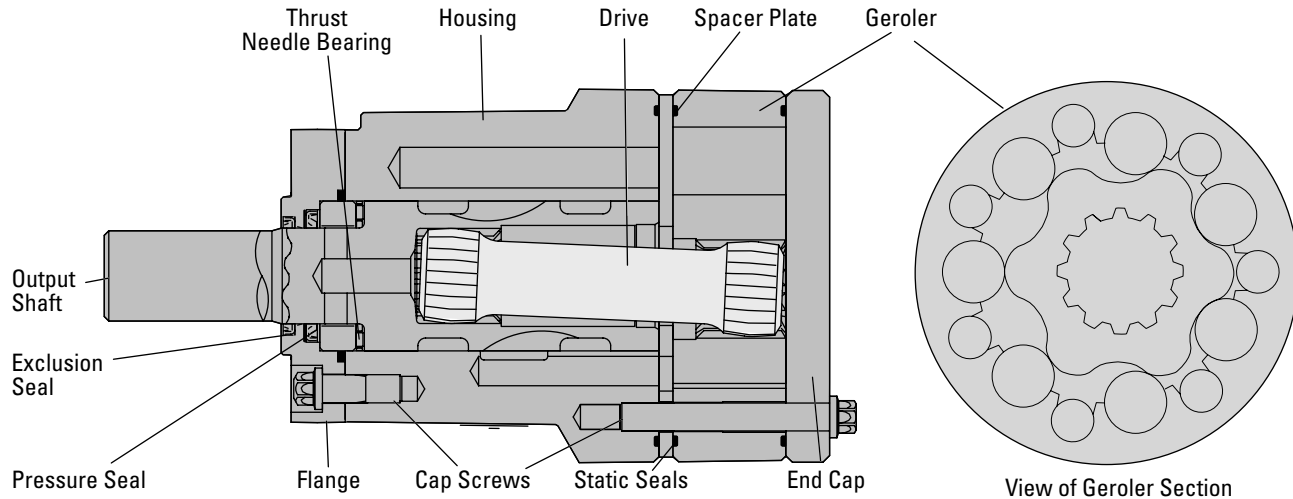
Amusement ride



Combine

S Series (103-)

Specifications



SPECIFICATION DATA — S MOTORS

Displ. cm ³ /r [in ³ /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		963	792	607	472	394	343	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	115 [1021]	150 [1325]	183 [1623]	237 [2010]	265 [2347]	301 [2662]	333 [2950]	372 [3290]	491 [4345]	528 [4672]
	Intermittent	144 [1271]	186 [1649]	225 [1992]	292 [2582]	324 [2870]	360 [3191]	399 [3533]	434 [3843]	505 [4467]	587 [5200]
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 Bar [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]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82°C [180°F]

Recommended Filtration:

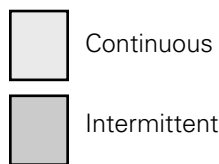
per ISO Cleanliness Code 4406, level 20/18/13

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 120 SUS. Actual data may vary slightly from unit to unit in production



S Motor 59 cm³/r [3.6 in³/r]

Δ Pressure Bar [PSI]

	[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	
7,6	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
15,1	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
22,7	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
30,3	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
37,9	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
45,4	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
53,0	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
56,8	482	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
68,1		1151	1139	1128	1117	1105	1090	1074	1054	1033	977

S Motor 75 cm³/r [4.6 in³/r]

Δ Pressure Bar [PSI]

	[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	
7,6	93	89	81	75	66	59	43	21	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
15,1	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
22,7	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
30,3	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
37,9	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
45,4	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
53,0	343	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
56,8	491	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
75,7		970	963	957	948	935	921	906	888	871	825

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

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 120 SUS. Actual data may vary slightly from unit to unit in production

Continuous

Intermittent

S Motor 93 cm³/r [5.7 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	28	41	55	69	83	97	110	124	138	172
[2]	146	308	466	620	771	913	1031	1086	1176	1281	
	16	35	53	70	87	103	116	123	133	145	
7,6	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
15,1	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
22,7	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
30,3	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
37,9	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
45,4	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
53,0	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
56,8	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
75,7		799	792	785	775	762	748	734	717	702	660

S Motor 120 cm³/r [7.3 in³/r]

Δ Pressure Bar [PSI]

	[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	
7,6	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
15,1	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
22,7	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
30,3	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
37,9	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
45,4	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
53,0	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
56,8	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
75,7		621	618	612	603	594	583	571	560	549	515

[267]

30

465

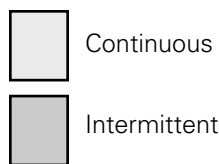
Torque [lb-in]
Nm
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production



S Motor 144 cm³/r [8.8 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1900]	[2350]
	14	28	41	55	69	83	97	110	124	138	172
[2]	222	480	729	967	1190	1402	1591	1786	2031	2107	
7,6	25	54	82	109	134	158	180	202	229	238	
	49	45	40	34	29	21	17	13	14	14	
[4]	217	475	728	987	1237	1488	1727	1957	2181	2292	2310
15,1	24	54	82	112	140	168	195	221	246	259	261
	101	97	91	84	77	69	61	52	45	42	22
[6]	193	453	715	976	1234	1494	1746	1995	2239	2358	2867
22,7	22	51	81	110	139	169	197	225	253	266	324
	153	149	143	136	128	119	110	101	91	86	66
[8]	173	434	699	961	1218	1479	1735	1984	2235	2358	2894
30,3	20	49	79	109	138	167	196	224	252	266	327
	205	202	195	187	179	170	160	150	139	134	109
[10]	144	407	673	940	1197	1459	1715	1967	2218	2344	2890
37,9	16	46	76	106	135	165	194	222	251	265	327
	259	254	247	240	231	221	211	202	191	185	158
[12]	118	380	644	907	1167	1429	1685	1941	2194	2319	2878
45,4	13	43	73	102	132	161	190	219	248	262	325
	312	307	301	294	286	277	267	257	246	241	217
[14]	87	346	610	871	1131	1395	1651	1907	2163	2289	2851
53,0	10	39	69	98	128	158	187	215	244	259	322
	363	359	354	346	339	330	319	309	299	293	266
[15]	69	327	592	853	1113	1376	1633	1890	2146	2271	2835
56,8	8	37	67	96	126	156	185	214	242	257	320
	389	386	380	372	364	355	344	336	323	317	289
[20]		200	460	726	987	1251	1512	1770	2025	2153	2724
75,7		23	52	82	112	141	171	200	229	243	308
		516	513	507	499	491	480	470	459	454	427

S Motor 166 cm³/r [10.1 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1900]	[2300]
	14	28	41	55	69	83	97	110	124	138	172
[2]	267	563	841	1105	1364	1622	1852	2081	2288		
7,6	30	64	95	125	154	183	209	235	259		
	43	39	35	30	27	21	16	13	13		
[4]	247	544	838	1129	1418	1707	1988	2255	2514	2641	3116
15,1	28	61	95	128	160	193	225	255	284	298	352
	89	85	80	74	68	60	53	47	41	38	28
[6]	217	517	813	1108	1401	1700	1994	2281	2559	2692	3214
22,7	25	58	92	125	158	192	225	258	289	304	363
	134	131	125	120	113	105	96	88	79	75	58
[8]	195	494	794	1089	1387	1687	1983	2269	2552	2691	3239
30,3	22	56	90	123	157	191	224	256	288	304	366
	180	176	171	164	156	147	138	128	118	114	96
[10]	176	477	776	1072	1371	1668	1960	2249	2537	2676	3228
37,9	20	54	88	121	155	188	221	254	287	302	365
	227	222	217	210	203	194	185	175	165	160	136
[12]	136	436	737	1037	1335	1636	1928	2217	2509	2651	3210
45,4	15	49	83	117	151	185	218	251	284	300	363
	272	269	264	258	249	241	233	223	214	208	186
[14]	93	394	696	995	1296	1599	1890	2185	2475	2617	3178
53,0	11	44	79	112	146	181	214	247	280	296	359
	318	315	310	303	296	287	279	269	259	254	230
[15]	73	371	672	973	1272	1575	1867	2159	2453	2596	3158
56,8	8	42	76	110	144	178	211	244	277	293	357
	341	338	333	326	319	309	300	290	280	274	253
[20]		227	527	829	1128	1430	1724	2020	2313	2457	3030
75,7		26	60	94	127	162	195	228	261	278	342
		452	449	443	435	426	417	407	396	390	366

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

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 120 SUS. Actual data may vary slightly from unit to unit in production

Continuous

Intermittent

S Motor 187 cm³/r [11.4 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1850]	[2250]
	14	28	41	55	69	83	97	110	124	138	172
[2]	298	627	944	1244	1532	1805	2030	2250	2478		
	34	71	107	141	173	204	229	254	280		
7,6	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
15,1	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
22,7	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
30,3	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
37,9	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
45,4	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
53,0	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
56,8	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
75,7		403	400	394	387	379	370	359	347	344	319

S Motor 225 cm³/r [13.7 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1700]	[2050]
	14	28	41	55	69	83	97	110	124	138
[2]	358	765	1139	1498	1842	2163	2474	2738	2894	
	40	86	129	169	208	244	280	309	327	
7,6	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
15,1	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
22,7	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
30,3	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
37,9	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
45,4	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
53,0	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
56,8	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
75,7		336	334	330	325	318	312	304	298	282

[504]

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251

Torque [lb-in]

Nm

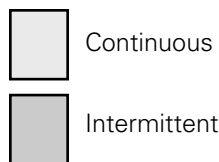
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production



S Motor 298 cm³/r [18.2 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1500]	[1800]
	14	28	41	55	69	83	97	110	124
[2]	487	1009	1509	1991	2460	2931	3360	3577	4113
	55	114	170	225	278	331	380	404	465
7,6	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
15,1	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
22,7	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
30,3	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
37,9	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
45,4	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
53,0	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
56,8	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
75,7		253	251	248	244	239	231	226	212

S Motor 372 cm³/r [22.7 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1500]
	14	28	41	55	69	83	97	110
[2]	629	1287	1905	2501	3066	3624	3886	4370
	71	145	215	283	346	409	439	494
7,6	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
15,1	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
22,7	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
30,3	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
37,9	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
45,4	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
53,0	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
56,8	153	152	150	148	144	138	135	129
[20]		534	1187	1832	2470	3093	3402	4004
		60	134	207	279	349	384	452
75,7		204	202	200	197	192	189	183

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

S Series (103-)

Dimensions

(Refer to pages B-4-19 thru B-4-22 for shaft and port dimensions.)

Ports

7/8-14 SAE O-Ring

6-1/2 (BSP) Straight thread manifold

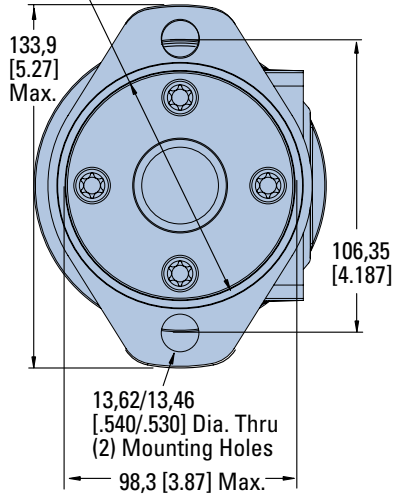
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

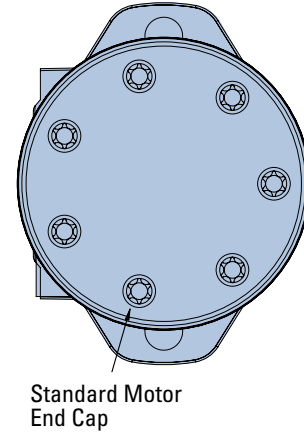
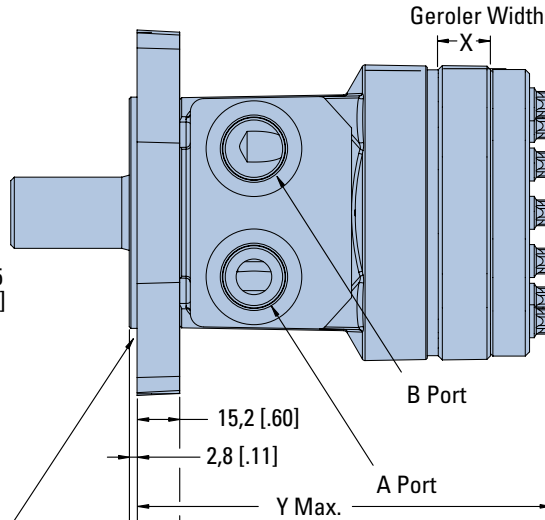
Port B Pressurized — CCW

2 Bolt Flange

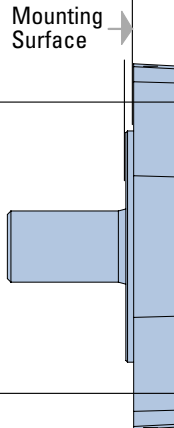
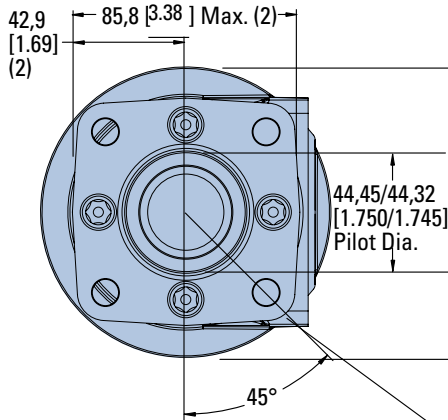
82,55/82,42
[3.250/3.245]
Pilot Dia.



Groove Provided for 82,6 [3.25]
I.D. x 2,62 [.103] Cross Section O-ring
(Dash No. 152)



4 Bolt Flange



Displacement cm ³ /r [in ³ /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]

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

S Series (103-)

Product Numbers

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. cm ³ /r [in ³ /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

103-1093

4 Bolt Flange

SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /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	103-1570	-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 6BSplined	7/8-14 O-Ring	103-1579	-1058	-1059	-1580	-1581	-1060	-1061	-1062	-1063	-1064
	1/2 NPTF	103-1582	-1050	-1051	-1583	-1584	-1052	-1053	-1054	-1055	-1056
	Manifold	103-1585	-1066	-1067	-1586	-1587	-1068	-1069	-1070	-1071	-1072

103-1069

S Series Motors with Corrosion Protection

SHAFT	MOUNTING	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	2 Bolt Flange	7/8-14 O-Ring	103-1645	—	—	—	—	—	—	-1649	—	-1650
	4 Bolt Flange	1/2 NPTF	—	—	—	—	—	—	—	-1620	—	-1621

*Manifold product numbers shown are for motors with four 5/16 z-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 number system on page B-3-11 to specify the product in detail.

S Series with Low Speed Valving

Product Number

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 (41 Bar [600 PSI] Minimum). 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. cm ³ /r [in ³ /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	—	—	-1675	—	—
	1/2 NPTF	103- —	—	-1634	—	—	—	—	—	—	—
	Manifold*	103- —	-1522	-2678	—	—	—	—	—	—	-1527

4 Bolt Flange

SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /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	103-1625 -1410 -1411 -1626 -2531 -1412 -1413 -1414 -1415 -1416									
	1/2 NPTF	103-1644	-1402	-1403	—	—	-1404	-1405	-1406	-1407	-1408

103-1404

103-1527

*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 Low Speed Valving Not Shown in the chart above: Use the model code number system on page B-3-11 to specify the product in detail.

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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

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

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.

CA – 2 Bolt Std: 82.50
[3.248] Dia. x 6.10 [.240]
Pilot, 10.41 [.410] Dia.
Mounting Holes on 106.35
[4.187] Dia. B.C. (SAE A)

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.

LA – 2 Bolt Std: 44.45
[1.750] Dia. x 3.05 [.120]
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

07 – 25.4 [1.00] Dia.
Straight, 8.03 [.316] Dia.
Crosshole 11.2 [.44] From
End, 5.6 [.22] Extra Length

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)

17 – 22.22 [.875] Dia.
Straight, 6.4 [.25] x 19.0
[.75] Square Key (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

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 Case Flow Options †† 0 – None Specified

1 – 4375-20 UNF-2B SAE
O-Ring Port (End Cap)

2 – G 1/4 BSP Straight
THD Port (End Cap)

3 – Manifold Case Drain

†† – Internal check valves
are standard features.

14 Geroler Options 0 – None Specified

15 Shaft Options 0 – None Specified

N – Electroless Nickel Plated

16, 17 Seal Options

00 – Standard Seals

02 – Seal Guard

03 – Viton Seals

04 – Viton Shaft Seal

05 – Vented Two-Stage Seal

07 – High Pressure Shaft
Seal

18 Speed Sensor Options 0 – None

A – Speed Sensor Options
12mm Digital Speed Pickup
(15 pulse) without lead wire

B – Magnetic Speed Pickup
(60 Pulse by Quadrature),
No lead wire with M12
connector

(A=Power, B=Common,
C=Signal)

19 Manifold Block Options

0 – None

* Contact your Eaton sales
representative for available
options.

20, 21 Special Features (Hardware)

00 – None Specified

AB – Low Speed Valving

SS – Stainless Steel Flange
Bolts

22 Special Assembly Instructions

0 – None

1 – Reverse Rotation

2 – Flange Rotated 90°

3 – Reverse Rotation, Flange
Rotated 90°

23 Paint/Packaging Options

0 – No Paint

A – Painted Low Gloss
Black

D – Environmental Coated
Gloss White

F – Environmental Coated
Black

24 Eaton Assigned Code When Applicable

0 – Assigned Code

25 Eaton Assigned Design Code

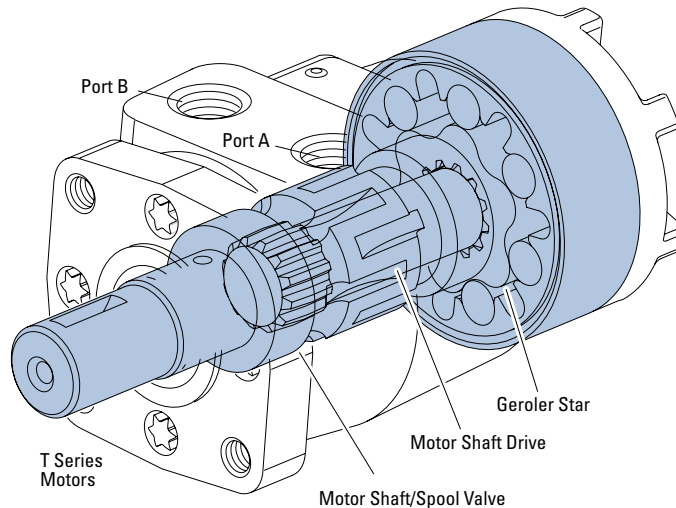
M – Twelve (12)

Feature in **bold** are preferred and
allow for shorter lead time.

Notes

T Series (158-)

Highlights



Description

The newest Geroler motor, 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 for T Series Motors

Geroler Element	11 Displacements
Flow l/min [GPM]	55 [15] Continuous***
	75 [20] Intermittent**
Speed	Up to 1021 RPM
Pressure bar [PSI]	155 [2250] Cont.***
	190 [2750] 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 mill works
- Turf equipment
- Concrete and asphalt equipment
- Skid steer attachments
- Many more



Crane (winch)



Paving



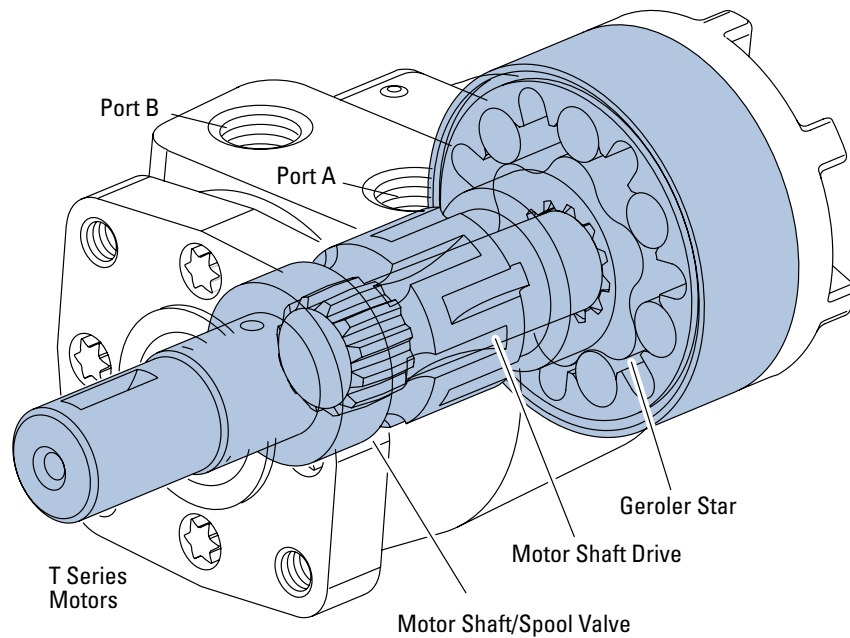
Harvester



Crane and winches

T Series (158-)

Specifications



SPECIFICATION DATA — T MOTORS

Displ. cm ³ /r [in ³ /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	849	694	550	426	355	287	229	183	152
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]
	Intermittent	38 [10]	57 [15]	68 [18]	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	Continuous*	155 [2250]	155 [2250]	155 [2250]	155 [2250]	155 [2250]	138 [2000]	138 [2000]	138 [2000]	127 [1850]	110 [1600]	90 [1300]
Δ PSI]	Intermittent**	190 [2750]	190 [2750]	190 [2750]	190 [2750]	190 [2750]	172 [2500]	172 [2500]	172 [2500]	155 [2250]	124 [1800]	103 [1500]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

190 Bar [2750 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] 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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82°C [180°F]

Recommended Filtration:

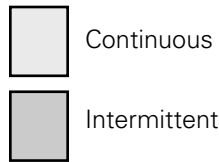
per ISO Cleanliness Code 4406, level 20/18/13

T Series (158-, 185-)

Performance Data

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

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



		36 cm³/r [2.2 in³/r] Δ Pressure Bar [PSI] Continuous												Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2250] 155		[2750] 190
Flow LPM [GPM]	[2] 7,6	[50] 6 209	[110] 12 203	[172] 19 197	[233] 26 191	[291] 33 189	[348] 39 181	[401] 45 167	[455] 51 164	[501] 57 153	[546] 62 139	[590] 67 122	[596] 67 116		[635] 72 64
	[4] 15,1	[50] 6 415	[109] 12 411	[172] 19 398	[233] 26 388	[296] 33 384	[355] 40 381	[414] 47 368	[475] 54 357	[534] 60 354	[584] 66 323	[646] 73 304	[659] 74 302		[786] 89 283
	[6] 22,7	[43] 5 617	[108] 12 613	[171] 19 602	[233] 26 595	[298] 34 585	[361] 41 570	[420] 47 563	[479] 54 558	[538] 61 534	[595] 67 520	[657] 74 504	[672] 76 496		[824] 93 425
	[8] 30,3	[39] 4 821	[101] 11 815	[164] 19 803	[226] 26 797	[292] 33 784	[354] 40 774	[415] 47 758	[475] 54 747	[538] 61 732	[592] 67 707	[656] 74 688	[670] 76 680		[819] 92 607
	[10] 37,9	[30] 3 1021	[93] 11 1014	[155] 18 1002	[214] 24 999	[278] 31 981	[342] 39 965	[406] 46 953	[473] 53 937	[532] 60 921	[590] 67 903	[650] 73 880	[668] 75 873		[805] 91 799
	Max. Contin- uous														

[93]
11
1014

} Torque [lb-in]
Nm
Speed RPM

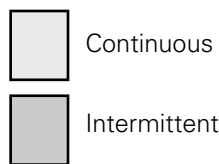
		49 cm³/r [3.0 in³/r] Δ Pressure Bar [PSI] Continuous												Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2250] 155		[2750] 190
Flow LPM [GPM]	[2] 7,6	[73] 8 152	[161] 18 152	[245] 28 148	[327] 37 147	[408] 46 142	[486] 55 141	[563] 64 134	[641] 72 124	[710] 80 115	[786] 89 109	[849] 96 95	[866] 98 92		[1023] 116 58
	[4] 15,1	[72] 8 303	[160] 18 298	[246] 28 294	[329] 37 290	[416] 47 276	[500] 56 273	[584] 66 265	[668] 75 261	[746] 84 245	[825] 93 243	[901] 102 235	[922] 104 228		[1123] 127 152
	[6] 22,7	[58] 7 461	[148] 17 450	[234] 26 445	[326] 37 438	[413] 47 434	[500] 56 421	[583] 66 419	[663] 75 410	[746] 84 407	[827] 93 389	[909] 103 376	[928] 105 373		[1131] 128 344
	[8] 30,3	[44] 5 607	[127] 14 603	[216] 24 600	[306] 35 590	[392] 44 583	[480] 54 576	[566] 64 564	[652] 74 554	[734] 83 545	[815] 92 536	[897] 101 522	[917] 104 520		[1125] 127 503
	[10] 37,9	[39] 4 755	[128] 14 750	[213] 24 745	[302] 34 738	[391] 44 732	[477] 54 719	[562] 63 713	[647] 73 702	[731] 83 696	[815] 92 682	[897] 101 663	[917] 104 661		[1121] 127 638
	Max. Contin- uous														
Max. Inter- mittent	[12] 45,4	[33] 4 906	[119] 13 902	[203] 23 895	[291] 33 883	[378] 43 875	[464] 52 862	[551] 62 859	[635] 72 844	[719] 81 835	[802] 91 819	[883] 100 806	[900] 102 804		[1061] 120 788
	[15] 56,8	[26] 3 1132	[86] 10 1124	[172] 19 1113	[256] 29 1115	[342] 39 1106	[430] 49 1106	[505] 57 1098	[591] 67 1093	[674] 76 1079	[745] 84 1070	[830] 94 1058	[851] 96 1056		

T Series (158-, 185-)

Performance Data

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

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



		66 cm ³ /r [4.0 in ³ /r] Pressure Bar [PSI] Continuous											Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2250] 155	[2750] 190
Flow LPM [GPM]	[2] 7,6	[78] 9 114	[191] 22 111	[303] 34 110	[414] 47 107	[522] 59 105	[625] 71 101	[706] 80 96	[804] 91 92	[898] 101 87	[991] 112 81	[1081] 122 73	[1103] 125 72	[1318] 149 48
	[4] 15,1	[97] 11 229	[209] 24 229	[325] 37 217	[441] 50 216	[548] 62 212	[657] 74 205	[766] 87 194	[873] 99 190	[972] 110 186	[1077] 122 183	[1181] 133 181	[1205] 136 178	[1437] 162 170
	[6] 22,7	[79] 9 344	[192] 22 343	[309] 35 335	[426] 48 334	[534] 60 321	[649] 73 320	[760] 86 319	[874] 99 315	[984] 111 291	[1090] 123 288	[1190] 134 279	[1218] 138 276	[1488] 168 270
	[8] 30,3	[75] 8 456	[191] 22 451	[304] 34 447	[419] 47 442	[532] 60 431	[645] 73 426	[759] 86 419	[871] 98 415	[982] 111 412	[1092] 123 401	[1197] 135 391	[1222] 138 386	[1458] 165 339
	[10] 37,9	[49] 6 569	[163] 18 565	[283] 32 560	[398] 45 552	[509] 58 547	[623] 70 541	[742] 84 532	[856] 97 525	[971] 110 512	[1080] 122 504	[1186] 134 498	[1209] 137 496	[1425] 161 475
	[12] 45,4	[24] 3 681	[156] 18 678	[270] 31 671	[385] 43 665	[502] 57 658	[614] 69 651	[729] 82 641	[845] 95 635	[963] 109 623	[1067] 121 612	[1182] 134 604	[1209] 137 601	[1472] 166 571
	[14] 53,0	[19] 2 793	[143] 16 788	[261] 29 787	[370] 42 778	[485] 55 771	[602] 68 762	[718] 81 753	[837] 95 746	[948] 107 733	[1064] 120 723	[1175] 133 715	[1199] 135 711	[1436] 162 677
	Max. Contin- uous 56,8	[13] 1 849	[120] 14 844	[236] 27 839	[352] 40 832	[471] 53 826	[590] 67 819	[707] 80 806	[823] 93 800	[939] 106 786	[1052] 119 779	[1165] 132 770	[1192] 135 766	[1462] 165 725
Max. Inter- mittent 68,1		[18] 12 1006	[107] 24 1003	[215] 37 1003	[326] 50 998	[442] 63 988	[555] 76 976	[669] 89 975	[786] 102 965	[900] 115 952	[1016] 127 940	[1123] 130 924	[1152] 130 919	

		80 cm ³ /r [4.9 in ³ /r] Pressure Bar [PSI] Continuous											Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2250] 155	[2750] 190
Flow LPM [GPM]	[2] 7,6	[123] 14 93	[265] 30 90	[405] 46 86	[544] 61 83	[680] 77 80	[804] 91 75	[934] 106 70	[1052] 119 63	[1181] 133 57	[1079] 122 43	[937] 106 24	[895] 101 20	
	[4] 15,1	[120] 14 187	[264] 30 185	[406] 46 183	[551] 62 179	[689] 78 175	[828] 94 171	[965] 109 166	[1101] 124 162	[1237] 140 156	[1369] 155 150	[1505] 170 142	[1537] 174 140	[1857] 210 121
	[6] 22,7	[113] 13 279	[255] 29 275	[398] 45 271	[542] 61 267	[682] 77 265	[823] 93 258	[963] 109 253	[1101] 124 248	[1239] 140 240	[1373] 155 232	[1508] 170 223	[1541] 174 221	[1868] 211 198
	[8] 30,3	[99] 11 372	[243] 27 367	[386] 44 364	[528] 60 359	[669] 76 354	[812] 92 351	[954] 108 343	[1094] 124 338	[1233] 139 333	[1368] 155 324	[1503] 170 315	[1537] 174 313	[1872] 212 289
	[10] 37,9	[84] 9 463	[228] 26 460	[371] 42 456	[514] 58 450	[655] 74 446	[798] 90 441	[941] 106 435	[1080] 122 428	[1219] 138 420	[1357] 153 412	[1496] 169 403	[1530] 173 399	[1870] 211 368
	[12] 45,4	[63] 7 557	[209] 24 552	[354] 40 547	[498] 56 543	[638] 72 537	[782] 88 530	[926] 105 523	[1067] 121 515	[1208] 136 509	[1346] 152 500	[1484] 168 489	[1520] 172 487	[1864] 211 470
	[14] 53,0	[55] 6 649	[185] 21 646	[331] 37 642	[476] 54 635	[620] 70 630	[762] 86 622	[904] 102 616	[1046] 118 609	[1188] 134 599	[1327] 150 592	[1467] 166 581	[1502] 170 578	[1842] 208 550
	Max. Contin- uous 56,8	[51] 6 694	[176] 20 691	[316] 36 687	[463] 52 680	[609] 69 673	[748] 85 668	[891] 101 660	[1037] 117 650	[1177] 133 642	[1316] 149 634	[1457] 165 622	[1491] 168 619	[1844] 208 598
Max. Inter- mittent 75,7		[20] 18 916	[160] 34 910	[305] 51 893	[455] 65 893	[578] 83 875	[737] 97 866	[857] 109 877	[968] 129 843	[1144] 144 833	[1277] 160 839	[1412] 163 836	[1446] 163 836	

[176]
20
691 } 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. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

	Continuous
	Intermittent

		102 cm ³ /r [6.2 in ³ /r] Pressure Bar [PSI] Continuous											Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2250] 155	[2750] 190
Flow LPM [GPM]	[2] 7,6	[161] 18 73	[341] 39 71	[519] 59 68	[697] 79 66	[871] 98 63	[1030] 116 60	[1193] 135 56	[1349] 152 51	[1511] 171 46	[1496] 169 36	[1441] 163 23	[1421] 161 20	
	[4] 15,1	[157] 18 149	[340] 38 146	[520] 59 144	[702] 79 141	[879] 99 138	[1056] 119 135	[1229] 139 131	[1401] 158 128	[1567] 177 124	[1727] 195 118	[1889] 213 111	[1925] 217 109	[2271] 257 92
	[6] 22,7	[147] 17 221	[329] 37 217	[510] 58 214	[692] 78 211	[871] 98 208	[1050] 119 204	[1227] 139 199	[1401] 158 195	[1571] 178 190	[1731] 196 184	[1895] 214 176	[1936] 219 174	[2339] 264 154
	[8] 30,3	[132] 15 294	[315] 36 290	[497] 56 287	[675] 76 284	[857] 97 280	[1038] 117 277	[1216] 137 271	[1392] 157 267	[1564] 177 262	[1725] 195 255	[1891] 214 247	[1932] 218 245	[2326] 263 220
	[10] 37,9	[109] 12 367	[293] 33 363	[477] 54 360	[657] 74 355	[839] 95 351	[1018] 115 347	[1198] 135 343	[1374] 155 337	[1542] 174 332	[1711] 193 325	[1878] 212 318	[1918] 217 315	[2326] 263 287
	[12] 45,4	[84] 9 440	[271] 31 436	[457] 52 432	[638] 72 429	[818] 92 424	[999] 113 419	[1179] 133 414	[1354] 153 409	[1527] 173 402	[1697] 192 395	[1858] 210 386	[1901] 215 384	[2323] 262 364
	[14] 53,0	[59] 7 513	[242] 27 510	[428] 48 506	[611] 69 501	[794] 90 497	[974] 110 492	[1151] 130 487	[1328] 150 482	[1502] 170 475	[1674] 189 469	[1841] 208 458	[1883] 213 456	[2301] 260 428
	Max. Contin- uous 56,8	[39] 4 550	[227] 26 545	[411] 46 542	[595] 67 537	[780] 88 532	[957] 108 528	[1136] 128 522	[1314] 148 516	[1486] 168 510	[1658] 187 502	[1828] 207 492	[1869] 211 490	[2285] 258 463
	Max. Inter- mittent 75,7	[20] 17 724	[154] 37 718	[328] 58 720	[515] 80 709	[710] 99 707	[874] 120 696	[1060] 140 684	[1243] 159 683	[1405] 178 670	[1579] 199 659	[1763] 204 660	[1803] 204 660	

		131 cm ³ /r [8.0 in ³ /r] Pressure Bar [PSI] Continuous											Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2500] 172		
Flow LPM [GPM]	[2] 7,6	[219] 25 57	[450] 51 55	[682] 77 53	[915] 103 51	[1144] 129 49	[1348] 152 47	[1561] 176 43	[1771] 200 40	[1979] 224 36	[2159] 244 30			
	[4] 15,1	[212] 24 115	[449] 51 113	[681] 77 110	[917] 104 109	[1148] 130 107	[1376] 155 105	[1600] 181 102	[1822] 206 99	[2025] 229 96	[2221] 251 91	[2629] 297 75		
	[6] 22,7	[197] 22 171	[435] 49 168	[669] 76 166	[903] 102 163	[1139] 129 160	[1370] 155 157	[1600] 181 154	[1818] 205 150	[2032] 230 147	[2226] 252 142	[2718] 307 125		
	[8] 30,3	[181] 20 227	[417] 47 225	[657] 74 222	[886] 100 219	[1122] 127 217	[1359] 154 213	[1589] 180 209	[1812] 205 206	[2022] 228 202	[2215] 250 196	[2699] 305 175		
	[10] 37,9	[144] 16 284	[389] 44 281	[631] 71 278	[859] 97 275	[1098] 124 271	[1330] 150 267	[1562] 176 265	[1783] 201 261	[1993] 225 258	[2198] 248 252	[2687] 304 231		
	[12] 45,4	[114] 13 341	[361] 41 338	[605] 68 334	[838] 95 332	[1075] 121 328	[1307] 148 325	[1532] 173 321	[1755] 198 318	[1965] 222 312	[2177] 246 307	[2671] 302 285		
	[14] 53,0	[82] 9 397	[327] 37 394	[569] 64 391	[803] 91 387	[1042] 118 384	[1273] 144 361	[1498] 169 378	[1722] 195 374	[1935] 219 370	[2147] 243 365	[2655] 300 339		
	Max. Contin- uous 56,8	[66] 7 426	[302] 34 423	[550] 62 422	[785] 89 415	[1025] 116 412	[1254] 142 409	[1480] 167 405	[1704] 193 402	[1915] 216 398	[2119] 239 392	[2648] 299 367		
	Max. Inter- mittent 75,7	[20] 20 565	[177] 48 560	[429] 77 556	[678] 103 553	[908] 129 549	[1143] 155 546	[1375] 180 541	[1596] 205 536	[1811] 228 527	[2017] 228 527			

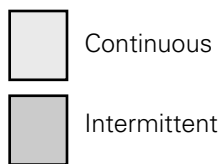
[302]
34
423 } Torque [lb-in]
Nm
Speed RPM

T Series (158-, 185-)

Performance Data

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

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



		157 cm³/r [9.6 in³/r] Δ Pressure Bar [PSI] Continuous										Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138		[2500] 172
Flow LPM [GPM]	[2] 7,6	[264] 30 47	[541] 61 45	[819] 93 44	[1092] 123 42	[1357] 153 40	[1605] 181 37	[1847] 209 34	[2084] 235 30	[2311] 261 25	[1858] 210 16		
	[4] 15,1	[259] 29 96	[541] 61 95	[822] 93 92	[1101] 124 91	[1373] 155 90	[1638] 185 88	[1890] 214 85	[2145] 242 82	[2383] 269 78	[2613] 295 73		[3063] 346 60
	[6] 22,7	[241] 27 142	[526] 59 140	[808] 91 138	[1090] 123 136	[1368] 155 134	[1638] 185 132	[1900] 215 129	[2150] 243 125	[2399] 271 121	[2628] 297 114		[3169] 358 99
	[8] 30,3	[219] 25 189	[506] 57 187	[789] 89 185	[1068] 121 183	[1348] 152 181	[1625] 184 178	[1885] 213 175	[2140] 242 172	[2388] 270 166	[2619] 296 159		[3178] 359 140
	[10] 37,9	[180] 20 237	[472] 53 234	[759] 86 232	[1037] 117 230	[1319] 149 227	[1590] 180 224	[1853] 209 222	[2111] 239 218	[2355] 266 211	[2594] 293 203		[3170] 358 183
	[12] 45,4	[141] 16 284	[436] 49 282	[728] 82 279	[1010] 114 277	[1292] 146 274	[1561] 176 272	[1821] 206 269	[2079] 235 265	[2331] 263 257	[2573] 291 248		[3162] 357 225
	[14] 53,0	[101] 11 332	[397] 45 329	[687] 78 326	[969] 109 323	[1252] 141 321	[1519] 172 319	[1778] 201 316	[2040] 230 311	[2295] 259 305	[2539] 287 296		[3147] 356 274
	Max. Contin- uous 56,8	[81] 9 355	[367] 41 353	[665] 75 350	[944] 107 347	[1231] 139 344	[1497] 169 342	[1755] 198 339	[2018] 228 334	[2273] 257 327	[2512] 284 318		[3136] 354 300
	Max. Inter- mittent 75,7	[20]	[221] 25 472	[519] 59 467	[814] 92 464	[1095] 124 462	[1368] 155 459	[1631] 184 455	[1891] 214 450	[2149] 243 443	[2396] 271 433		

		195 cm³/r [11.9 in³/r] Δ Pressure Bar [PSI] Continuous										Max. Contin- uous	Max. Inter- mittent
		[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1750] 121	[1800] 125	[2000] 138	[2500] 172
Flow LPM [GPM]	[2] 7,6	[330] 37 38	[671] 76 36	[1016] 115 34	[1345] 152 33	[1654] 187 31	[1969] 222 28	[2242] 253 25	[2507] 283 20	[2689] 304 16	[2748] 310 14	[2973] 336 8	
	[4] 15,1	[328] 37 77	[675] 76 77	[1026] 116 75	[1366] 154 73	[1692] 191 73	[2010] 227 71	[2289] 259 68	[2586] 292 65	[2799] 316 62	[2867] 324 61	[3144] 355 55	[3797] 429 40
	[6] 22,7	[306] 35 115	[658] 74 113	[1011] 114 111	[1360] 154 110	[1698] 192 109	[2021] 228 107	[2324] 263 104	[2604] 294 100	[2829] 320 97	[2901] 328 95	[3178] 359 87	[3831] 433 68
	[8] 30,3	[272] 31 153	[634] 72 151	[980] 111 150	[1331] 150 148	[1675] 189 146	[2003] 226 144	[2300] 260 142	[2592] 293 139	[2815] 318 134	[2888] 326 132	[3174] 359 123	[3864] 437 99
	[10] 37,9	[238] 27 192	[596] 67 189	[945] 107 188	[1296] 146 186	[1637] 185 184	[1960] 221 183	[2255] 255 181	[2565] 290 176	[2786] 315 168	[2857] 323 166	[3140] 355 156	[3816] 431 133
	[12] 45,4	[181] 20 230	[545] 62 228	[908] 103 226	[1260] 142 224	[1607] 182 222	[1924] 217 221	[2223] 251 219	[2529] 286 213	[2759] 312 207	[2836] 320 204	[3121] 353 192	[3807] 430 160
	[14] 53,0	[154] 17 268	[500] 56 266	[860] 97 264	[1211] 137 261	[1556] 176 259	[1869] 211 259	[2175] 246 256	[2483] 281 251	[2713] 307 244	[2792] 315 242	[3080] 348 229	[3778] 427 199
	Max. Contin- uous 56,8	[140] 16 287	[465] 53 285	[832] 94 283	[1179] 133 281	[1525] 172 279	[1835] 207 278	[2144] 242 275	[2459] 278 269	[2693] 304 262	[2768] 313 260	[3061] 346 247	[3764] 425 220
	Max. Inter- mittent 75,7	[20]	[291] 33 382	[653] 74 378	[1013] 114 375	[1366] 154 373	[1689] 191 372	[1987] 225 368	[2298] 260 363	[2540] 287 356	[2622] 296 353	[2928] 331 342	

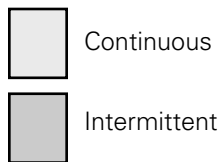
[465]
53
285 } Torque [lb-in]
Nm
Speed RPM

T Series (158-, 185-)

Performance Data

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

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



244 cm³/r [14.9 in³/r]

Pressure Bar [PSI]

Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 125	[2000] 140	[2200] 155
[2]	[406] 46 30	[833] 94 29	[1260] 142 27	[1655] 187 26	[2038] 230 24	[2403] 272 22	[2707] 306 17	[2597] 293 12	[2552] 288 11	[2373] 268 7	[2299] 260 6
[4]	[404] 46 62	[843] 95 62	[1277] 144 60	[1695] 192 59	[2083] 235 59	[2468] 279 55	[2820] 319 50	[3177] 359 49	[3261] 368 46	[3509] 396 44	[3589] 406 44
[6]	[382] 43 92	[823] 93 91	[1261] 142 90	[1687] 191 89	[2088] 236 88	[2477] 280 86	[2843] 321 82	[3196] 361 78	[3285] 371 76	[3547] 401 72	[3633] 410 71
[8]	[341] 39 123	[787] 89 122	[1220] 138 121	[1651] 187 120	[2059] 233 119	[2454] 277 116	[2820] 319 113	[3177] 359 108	[3265] 369 106	[3530] 399 101	[3615] 408 99
[10]	[297] 34 154	[744] 84 152	[1177] 133 151	[1611] 182 150	[2017] 228 148	[2412] 273 146	[2774] 313 143	[3151] 356 136	[3241] 366 134	[3504] 396 127	[3593] 406 125
[12]	[225] 25 184	[687] 78 183	[1132] 128 181	[1553] 175 180	[1967] 222 179	[2360] 267 177	[2734] 309 173	[3105] 351 166	[3194] 361 163	[3466] 392 156	[3554] 402 153
[14]	[154] 17 214	[628] 71 213	[1072] 121 212	[1498] 169 211	[1910] 216 209	[2298] 260 207	[2674] 302 202	[3052] 345 195	[3148] 356 193	[3419] 386 185	[3510] 397 182
[15]	[119] 13 229	[586] 66 228	[1035] 117 227	[1458] 165 226	[1872] 212 224	[2261] 255 222	[2637] 298 217	[3022] 341 209	[3116] 352 207	[3389] 383 200	[3488] 394 197
Max. Contin- uous	[20]	[372] 42 305	[816] 92 303	[1251] 141 301	[1663] 188 300	[2067] 234 297	[2448] 277 292	[2832] 320 284	[2928] 331 281	[3214] 363 273	[3312] 374 270
Max. Inter- mittent	[20]										

306 cm³/r [18.7 in³/r]

Pressure Bar [PSI]

Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

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

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

370 cm³/r [22.6 in³/r]

Pressure Bar [PSI]

Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

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

T Series (158-)

Dimensions

(Refer to pages B-4-19 thru B-4-22 for shaft and port dimensions.)

Ports

7/8 -14 INF O-Ring Ports (2)

1/2 -14 NPTF (2)

G 1/2 BSP (2)

Manifold Ports (5/16-18 mounting threads)

Note:

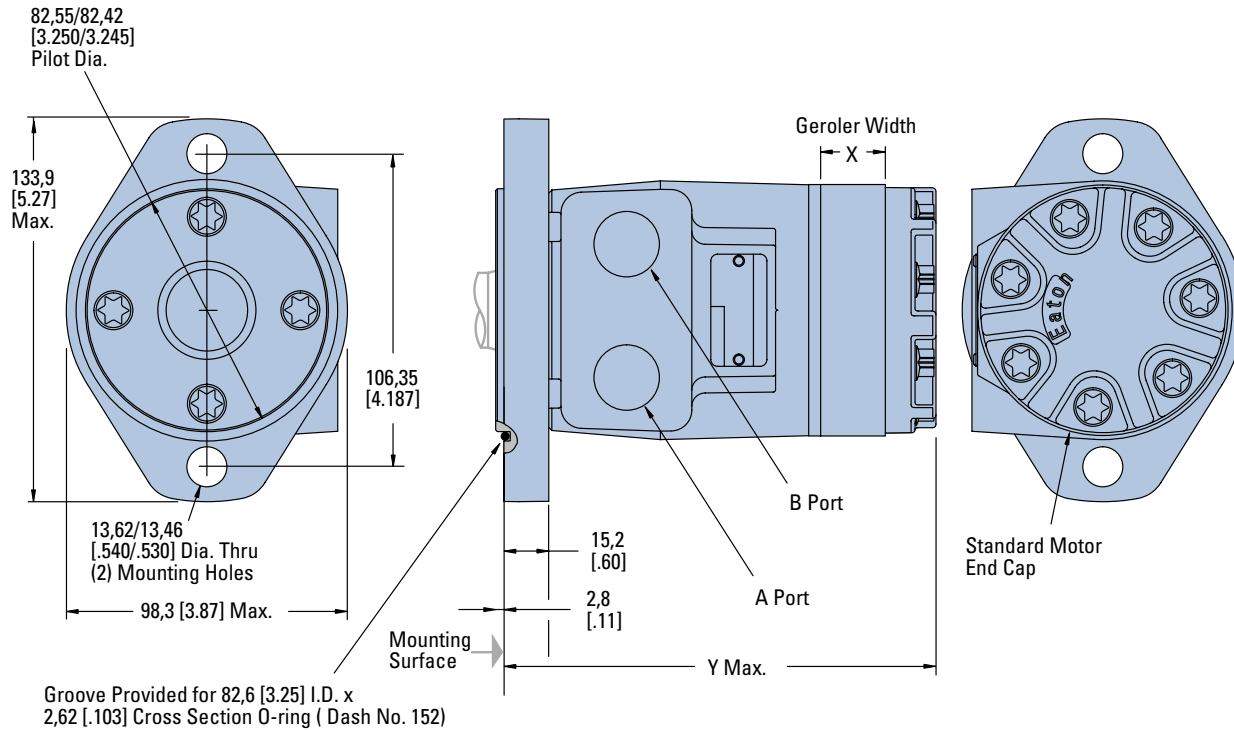
Mounting Surface Flatness Requirement is ∇ , 13 mm [.005 inch] Max.

Standard Rotation Viewed from Shaft End

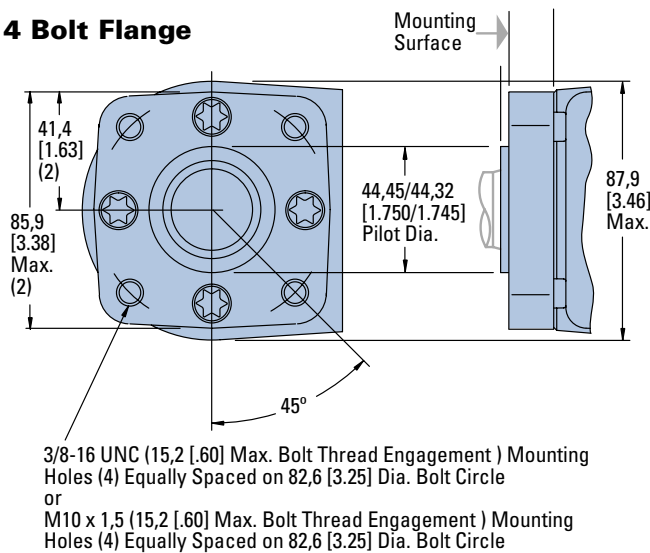
Port A Pressurized — CW

Port B Pressurized — CCW

2 Bolt Flange



4 Bolt Flange



2 AND 4 BOLT FLANGE PORT DIMENSIONS

Displacement cm ³ /r [in ³ /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	-1045	-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	-1074	-1075	-1556	-1076	-1077	-1078	-1079	-1080
		Manifold*	158	—	—	-1558	-1090	-1091	-1559	-1092	-1093	-1094	-1095	-1096
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	-1051	-1583	-1052	-1053	-1054	-1055	-1056
		Manifold*	158	—	—	-1585	-1066	-1067	-1586	-1068	-1069	-1070	-1071	-1072

158-1067

T Series Motors with Corrosion Protection

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /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-	—	—	—	1645	—	—	—	—	-1649	—	-1650
4 Bolt Flange		1/2 NPTF	158-	—	—	—	—	—	—	—	—	—	-1620	—

158-1620

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	-1425
		Manifold*	158-	—	—	—	—	—	—	—	—	—	—	—
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158-	—	—	—	-1525	—	—	—	—	-1675	—	—
		1/2 NPTF	158-	—	—	—	—	-1634	—	—	—	—	—	—
		Manifold*	158-	—	—	—	-1522	-2678	—	—	—	—	—	-1527
4 Bolt Flange	1 in. Straight w/ Woodruff Key	7/8 -14 O-Ring	158-	—	—	-1625	-1410	-1411	-1626	-1412	-1413	-1414	-1415	-1416
		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.

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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

M	T	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	25

1 Product

M – Motor

2, 3 Product 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.

CA – 2 Bolt (Standard)
82,50 [3.248] Dia. x 6,10
[.240] pilot, 10,41 [.410]
Dia. Mounting Holes 106,35
[4.187] Dia. B.C. (SAE A)

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.

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

07 – 25,4 [1.00] Dia.
Straight, 8,03 [.316] Dia.
Crosshole 11,2 [.44] from
End, 5,6 [.22] Extra Length

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)

17 – 22,22 [.875] Straight
Dia. 6,4 [2.5] x 19,0 [.75]
Square Key (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)

**AF – G 1/2 BSP Straight
Thread Ports**

13 Case Flow Options

0 – None Specified

1 – .4375-20 UNF-2B SAE
O-Ring Port (End Cap)

2 – G 1/4 BSP Straight
Thread Port (End Cap)

A – Internal Check Valves

14 Geroler Options

0 – None

A – Free Running

15 Shaft Options

0 – None

N – Electroless Nickel Plated

16, 17 Seal Options

00 – Standard Seals

02 – Seal Guard

03 – Vitron Seals

04 – Vitron Shaft Seal

05 – Vented Two-Stage Seal

**07 – High Pressure Shaft
Seal**

18 Speed Sensor Options

0 – None

A – 12 mm Digital Speed
Pickup (15 Pulse) without
Lead Wire

B – Magnetic Speed Pickup
(60 Pulse by Quadrature),
No Lead Wire with M12
Connector

(A=Power, B=Common,
C=Signal)

19 Valve Options

A – None

20, 21 Special Features (Hardware)

00 – None Specified

AB – Low Speed Valving

SS – Stainless Steel Flange
Bolts

22 Special Assembly Instructions

0 – None

A – Reverse Rotation

2 – Flange Rotation 90°

23 Paint/Packaging Options

0 – No Paint

**A – Painted Low Gloss
Black**

D – Environmental Coated
Gloss White

24 Customer ID/ Nameplate Options

A – None Specified

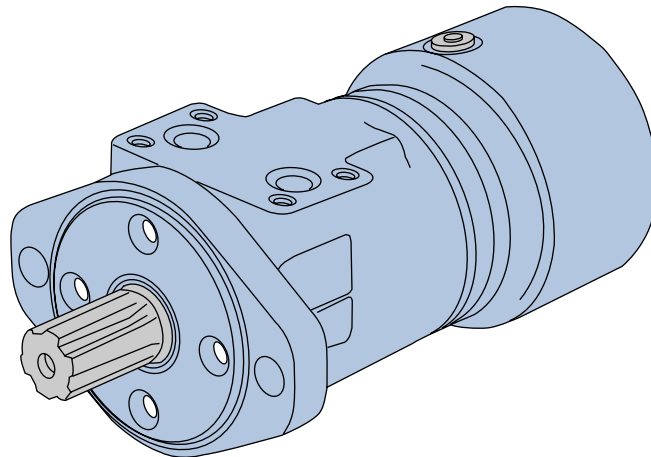
25 Design Code

A – One (1)

Feature in **bold** are preferred and
allow for shorter lead time.

T Series with Parking Brake (185-)

Highlights



Description

Eaton's latest offering in LSHT motor technology is the new T Series Motor with Parking Brake.

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]	55 [15] Continuous***
	75 [20] Intermittent**
Speed	Up to 1055 RPM
Pressure bar [PSI]	155 [2250] Cont.***
	190 [2750] 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

- 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

T Series with Parking Brake (185-)

Application Information

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-4-15). 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:

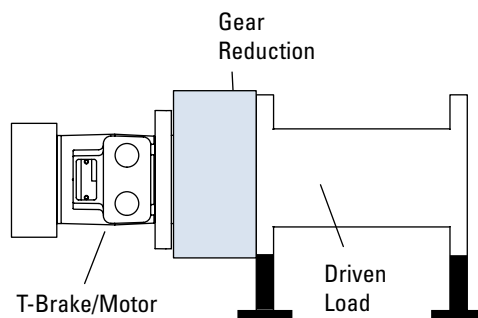
Special attention should be given to system back pressure. System back pressure directly affects brake release pressure and can cause the brake to release at undesired conditions.

Note:

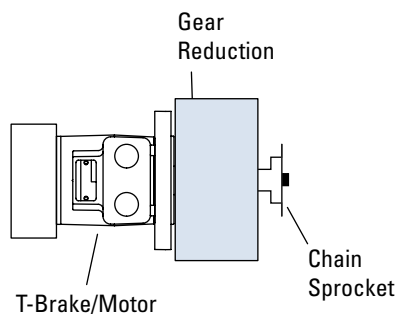
The T Series with parking brake is not compatible with water based fluids.

Typical Applications

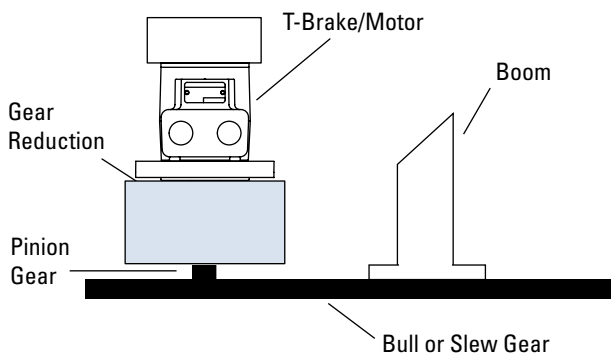
Winch



Machine Drive

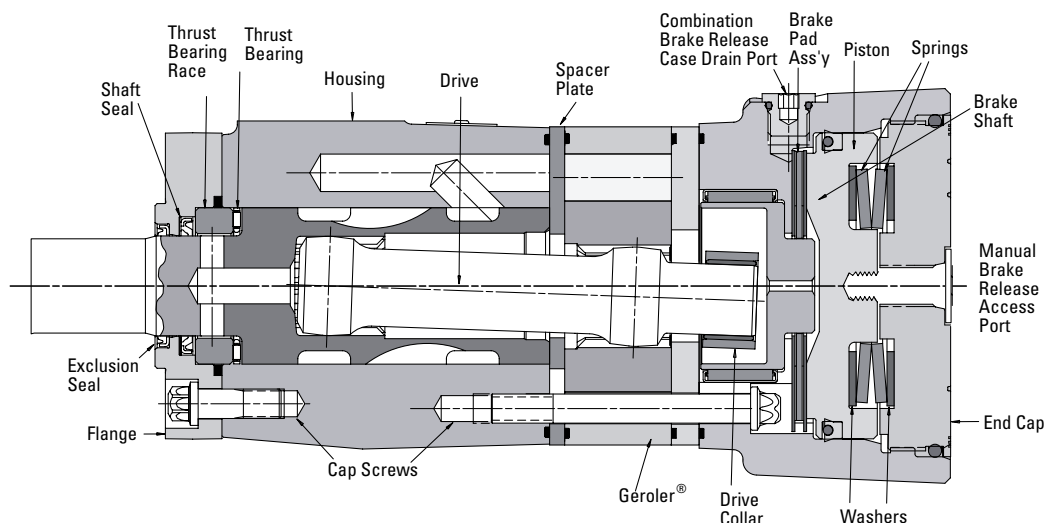


Swing Boom



T Series with Parking Brake (185-)

Specifications



SPECIFICATION DATA — T SERIES WITH PARKING BRAKE MOTORS

Displ. cm ³ /r [in ³ /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	849	694	550	426	355	287	229	183	152
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]
	Intermittent	38 [10]	57 [15]	68 [18]	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 *	155 [2250]	155 [2250]	155 [2250]	155 [2250]	155 [2250]	138 [2000]	138 [2000]	138 [2000]	127 [1850]	110 [1600]	90 [1300]
	Intermittent * **	190 [2750]	190 [2750]	190 [2750]	190 [2750]	190 [2750]	172 [2500]	172 [2500]	172 [2500]	155 [2250]	124 [1800]	103 [1500]

Note:

See page B-4-2 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	[in ³ /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

in-lbs Full Capacity Brake

in-lbs Limited Capacity Brake

Note:

The factory setting values are used for each motor based on motor displacement and shaft type.

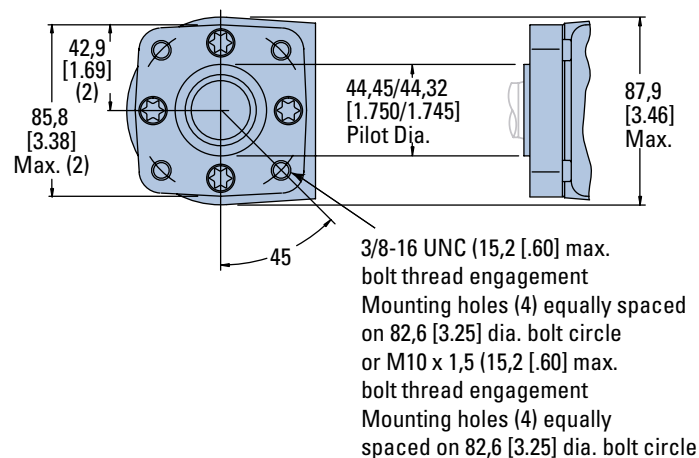
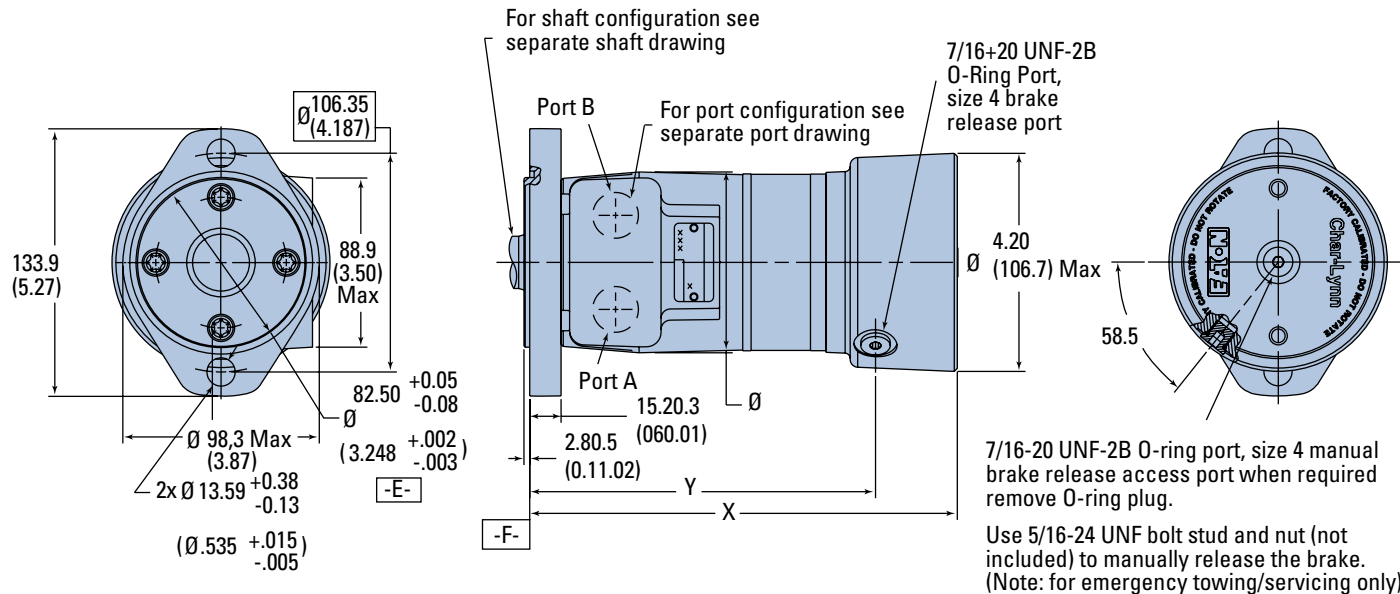
T Series with Parking Brake (185-)

Dimensions

(Refer to pages B-4-19 thru B-4-22 for shaft and port dimensions.)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW



T-SERIES WITH PARKING BRAKE DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
02	190.2 [7.49]	143.9±0.9 [5.66±0.3]
A2	190.8 [7.51]	144.5±0.9 [5.69±0.3]
03	192.5 [7.58]	146.3±0.9 [5.76±0.3]
A3	194.3 [7.65]	148.1±0.9 [5.83±0.3]
04	195.6 [7.70]	149.3±0.9 [5.88±0.3]
05	198.4 [7.81]	152.0±0.9 [5.98±0.3]
06	202.2 [7.96]	155.9±0.9 [6.14±0.3]
08	207.5 [8.17]	161.3±0.9 [6.35±0.3]
10	212.6 [8.37]	166.2±0.9 [6.54±0.3]
12	219.2 [8.63]	172.9±0.9 [6.81±0.3]
15	228.3 [8.99]	181.9±0.9 [7.16±0.3]
19	239.5 [9.43]	193.3±0.9 [7.61±0.3]
23	251.2 [9.89]	205.0±0.9 [8.07±0.3]

Note:

Standard Rotation

When facing shaft end of motor shaft to rotate clockwise when port "A" is pressurized, counterclockwise when port "B" is pressurized

Reverse Rotation

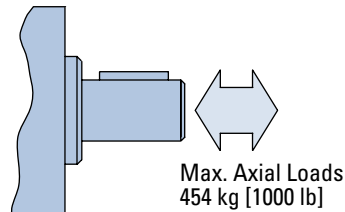
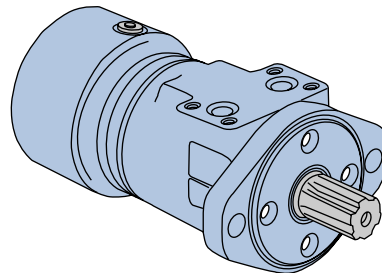
When facing shaft end of motor shaft will rotate clockwise when port "B" is pressurized, counterclockwise when port "A" is pressurized

T Series with Parking Brake (185-)

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).

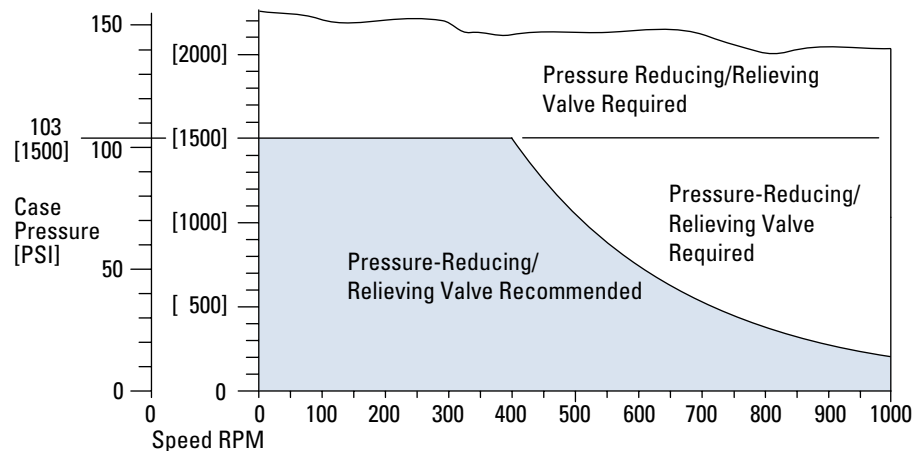
Refer to the Case Pressure/ Shaft Seal chart below. This chart is based on case pressure and motor shaft speed. A minimum release pressure of 17 Bar [250 PSI] must be maintained to fully release the brake.



$$P_C \approx 6 DP + P_2$$

P_C = Case Pressure
 P_1 = Inlet Line Pressure
 P_2 = Back Pressure
 $DP = P_1 - P_2$

Case Pressure/Shaft Seal



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. cm ³ /r [in ³ /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 Manifold	185-2000 185-2010	2001 2011	2002 2012	2003 2013	2004 2014	2005 2015	2006 2016	2007 2017	2008 2018	2009 2019
	6B Splined	7/8-14 O-Ring Manifold	185-2020 185-2030	2021 2031	2022 2032	2023 2033	2024 2034	2025 2035	2026 2036	2027 2037	2028 2038	2029 2039
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2040 185-2050	2041 2051	2042 2052	2043 2053	2044 2054	2045 2055	2046 2056	2047 2057	2048 2058	2049 2059
4-Bolt	1 Keyed	7/8-14 O-Ring Manifold	185-2060 185-2070	2061 2071	2062 2072	2063 2073	2064 2074	2065 2075	2066 2076	2067 2077	2068 2078	2069 2079
	6B Splined	7/8-14 O-Ring Manifold	185-2080 185-2090	2081 2091	2082 2092	2083 2093	2084 2094	2085 2095	2086 2096	2087 2097	2088 2098	2089 2099
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2100 185-2110	2101 2111	2102 2112	2103 2113	2104 2114	2105 2115	2106 2116	2107 2117	2108 2118	2109 2119
2-Bolt SAE B	1 Keyed	7/8-14 O-Ring Manifold	185-2120 185-2130	2121 2131	2122 2132	2123 2133	2124 2134	2125 2135	2126 2136	2127 2137	2128 2138	2129 2139
	6B Splined	7/8-14 O-Ring Manifold	185-2140 185-2150	2141 2151	2142 2152	2143 2153	2144 2154	2145 2155	2146 2156	2147 2157	2148 2158	2149 2159
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2160 185-2170	2161 2171	2162 2172	2163 2173	2164 2174	2165 2175	2166 2176	2167 2177	2168 2178	2169 2179

Low Speed Valving

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /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 Manifold	185-2180 185-2190	2181 2191	2182 2192	2183 2193	2184 2194	2185 2195	2186 2196	2187 2197	2188 2198	2189 2199
	6B Splined	7/8-14 O-Ring Manifold	185-2200 185-2210	2201 2211	2202 2212	2203 2213	2204 2214	2205 2215	2206 2216	2207 2217	2208 2218	2209 2219
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2220 185-2230	2221 2231	2222 2232	2223 2233	2224 2234	2225 2235	2226 2236	2227 2237	2228 2238	2229 2239
4-Bolt	1 Keyed	7/8-14 O-Ring Manifold	185-2240 185-2250	2241 2251	2242 2252	2243 2253	2244 2254	2245 2255	2246 2256	2247 2257	2248 2258	2249 2259
	6B Splined	7/8-14 O-Ring Manifold	185-2260 185-2270	2261 2271	2262 2272	2263 2273	2264 2274	2265 2275	2266 2276	2267 2277	2268 2278	2269 2279
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2280 185-2290	2281 2291	2282 2292	2283 2293	2284 2294	2285 2295	2286 2296	2287 2297	2288 2298	2289 2299
2-Bolt SAE B	1 Keyed	7/8-14 O-Ring Manifold	185-2300 185-2310	2301 2311	2302 2312	2303 2313	2304 2314	2305 2315	2306 2316	2307 2317	2308 2318	2309 2319
	6B Splined	7/8-14 O-Ring Manifold	185-2320 185-2330	2321 2331	2322 2332	2323 2333	2324 2334	2325 2335	2326 2336	2327 2337	2328 2338	2329 2339
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2340 185-2350	2341 2351	2342 2352	2343 2353	2344 2354	2345 2355	2346 2356	2347 2357	2348 2358	2349 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 (41 Bar [600 PSI] Minimum).

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-4-17 to specify the product in detail.

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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

M	T B		***			**		**		**		*	*	*	**		*	0	**		*	*	0	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

1 Product

M – Motor

2, **3** Series

T B – 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.
CA – 2 Bolt (Standard)
 82,50 [3.248] Dia. x 6,10 [.240] pilot, 10,41 [.410] Dia. Mounting Holes 106,35 [4.187] Dia. B.C. (SAE A)

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 Case Flow Options

0 – None Specified
3 – Manifold Case Drain

14 Geroler Options

A – Standard
B – Free Running

15 Shaft Options

0 – None
N – Electroless Nickel Plated

16, **17** Seal Options

00 – Standard Seals
03 – Vitron Seals
05 – Vented Two-Stage Seal
07 – High Pressure Shaft Seal

18 Speed Sensor Options

0 – None
A – 12 mm Digital Speed Pickup (15 Pulse) without Lead Wire
 (A=Power, B=Common, C=Signal)

19 Valve Options

A – None

20, **21** Special Features (Hardware)

00 – None Specified
AB – Low Speed Valving

22 Special Assembly Instructions

0 – None
2 – Flange Rotation 90°

23 Paint/Packaging Options

0 – No Paint
A – Painted Low Gloss Black

24 Customer ID/ Nameplate Options

0 – None Specified

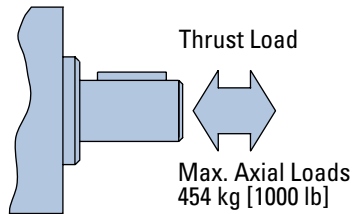
25 Design Code

B – Two (2)

Case Pressure and Case Drain — H, S, and T Series

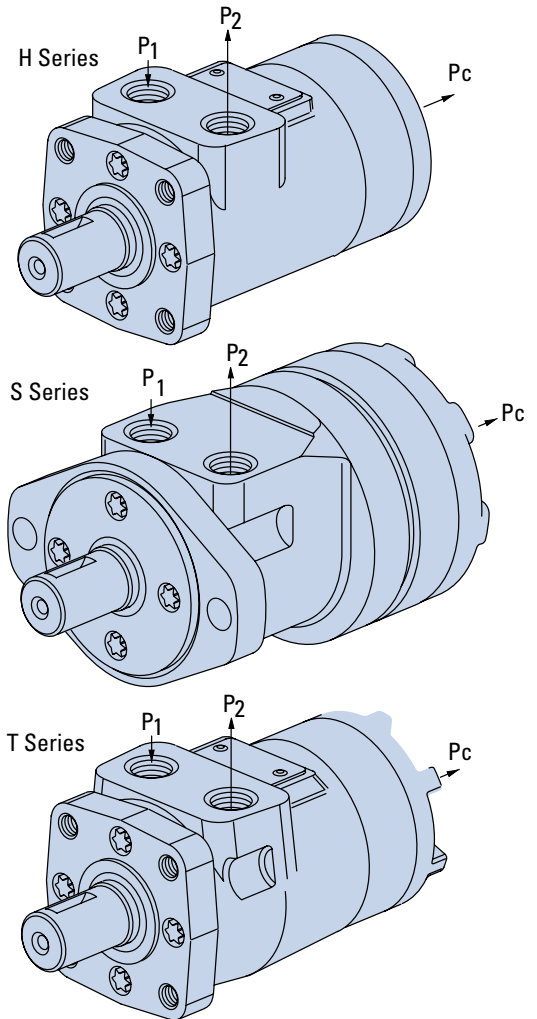
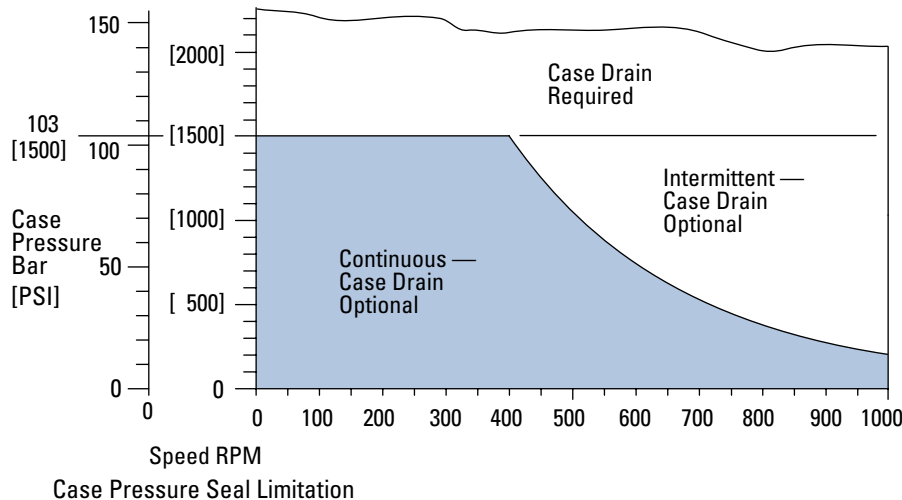
Char-Lynn H Series, S Series and T Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with 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. A pressure restriction should be added to the case drain line, during which a motor case pressure of 3,5 Bar [50 PSI] is maintained.



$$P_C \approx 6 ? P + P_2$$

P_C = Case Pressure
 P_1 = Inlet Line Pressure
 P_2 = Back Pressure
 $? P = P_1 - P_2$



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%.

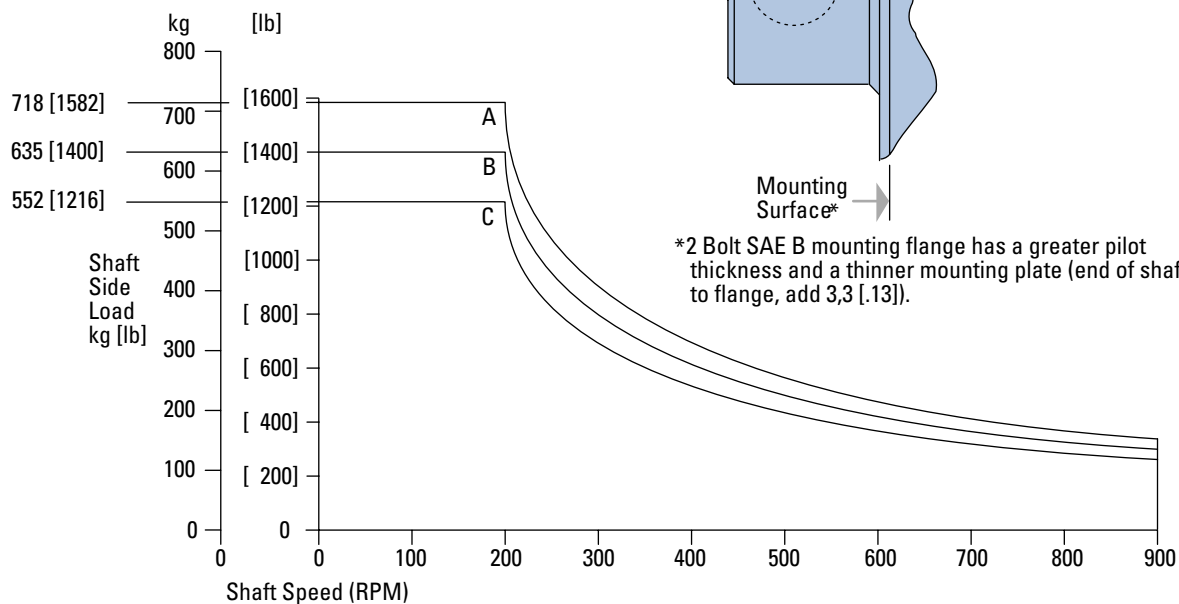
RPM	ALLOWABLE SHAFT SIDE LOAD — KG [LB]		
	A	B	C
900	154 [339]	136 [300]	118 [261]
625	205 [452]	181 [400]	158 [348]
500	256 [565]	227 [500]	197 [435]
400	307 [678]	272 [600]	237 [522]
300	410 [904]	363 [800]	316 [696]
200	718 [1582]	635 [1400]	552 [1216]

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

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

Where N = Shaft Speed (RPM)

L = Distance from Mounting Surface

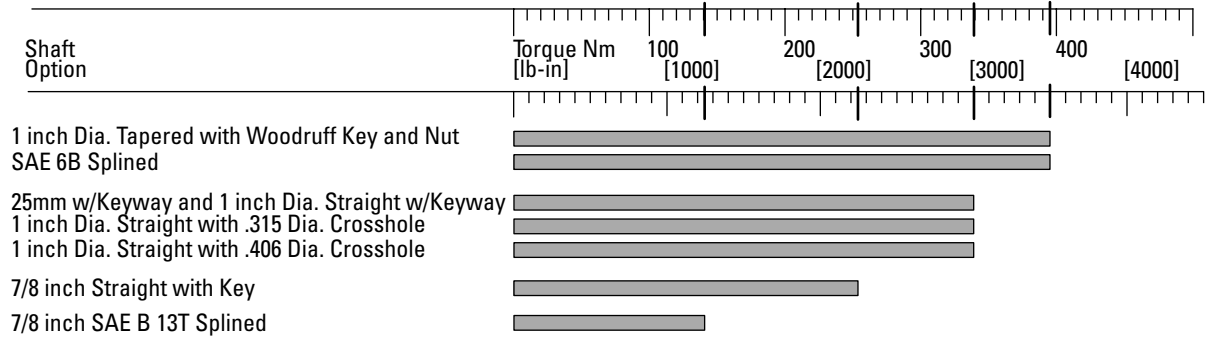


H, S and T Series (101, 103- 158, 185)

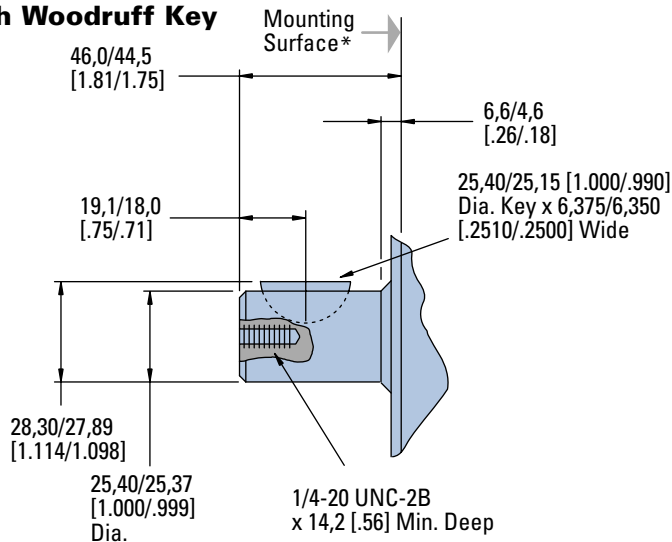
Dimensions

Shafts

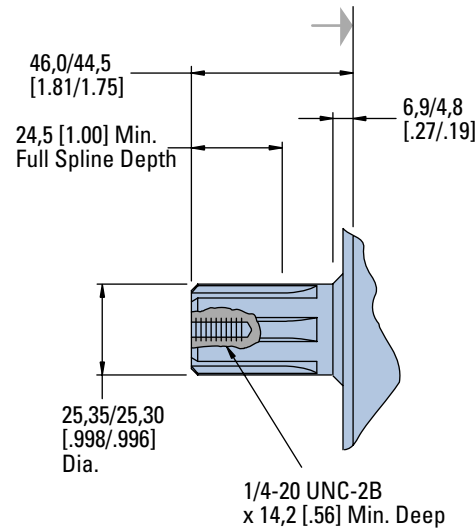
Shaft Size Motor Torque Combination Limit Guide



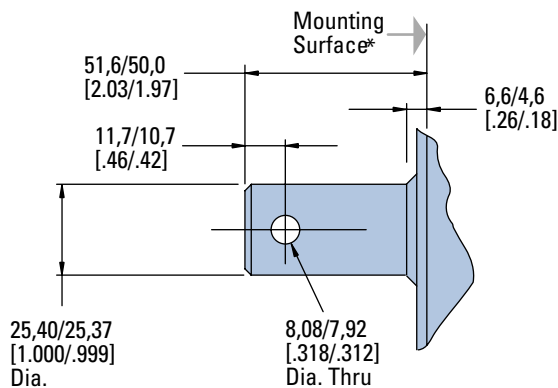
1 in. Dia. Straight with Woodruff Key



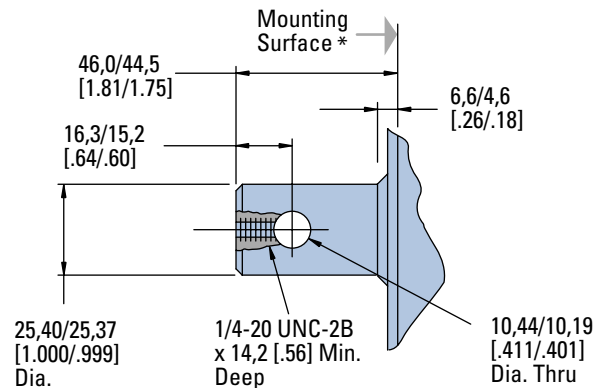
SAE 6B Splined Shaft



1 in. Dia. Straight Shaft with .315 Dia. Crosshole



1 in. Dia. Straight Shaft with .406 Dia. Crosshole



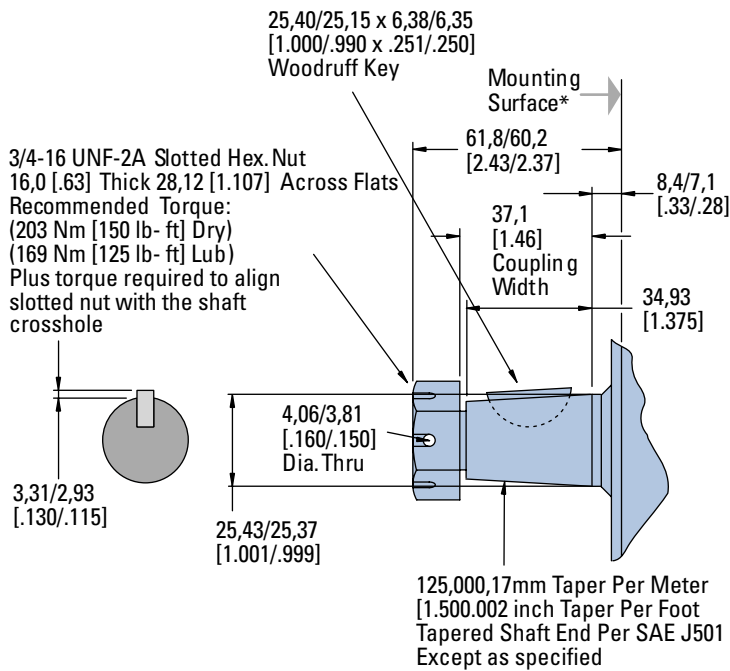
* 2 Bolt SAE B mounting flange has a greater pilot thickness and a thinner mounting plate (end of shaft to flange, add 3,3 [.13]).

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

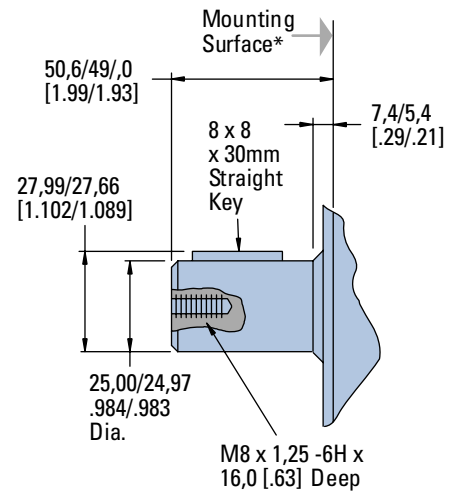
Dimensions

Shafts

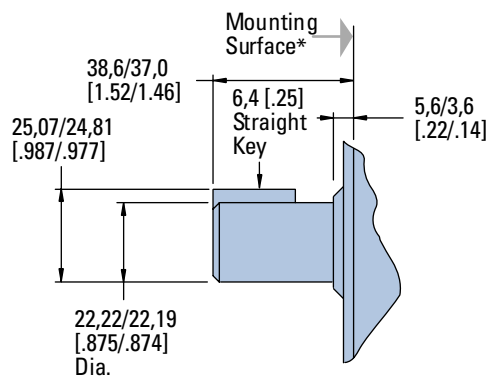
1 in. Dia. Tapered Shaft with Woodruff Key and Nut



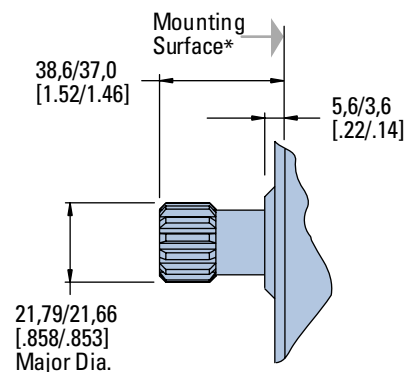
25mm Dia. Straight Shaft with 8mm Keyway



7/8 in. Dia. Straight Shaft with Key



7/8 in. Dia. SAE B Shaft 13 T Spline d



* 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]).

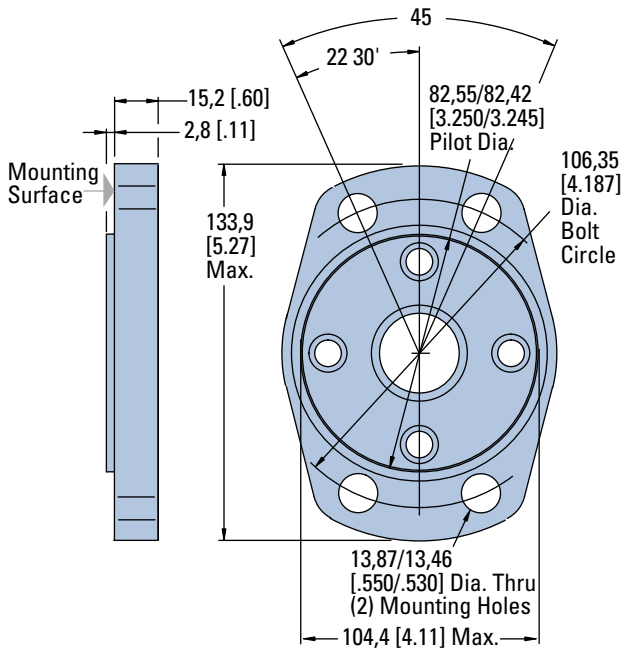
H, S and T Series (101-, 103- 158-, 185-)

Mounting Options

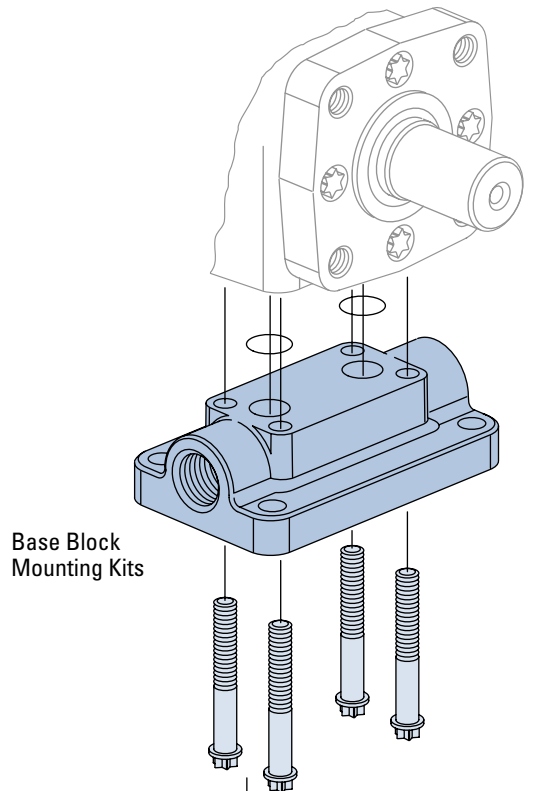
Note:

Mounting Surface Flatness Requirement is ∇ , 13mm [0.005 inch] Max.

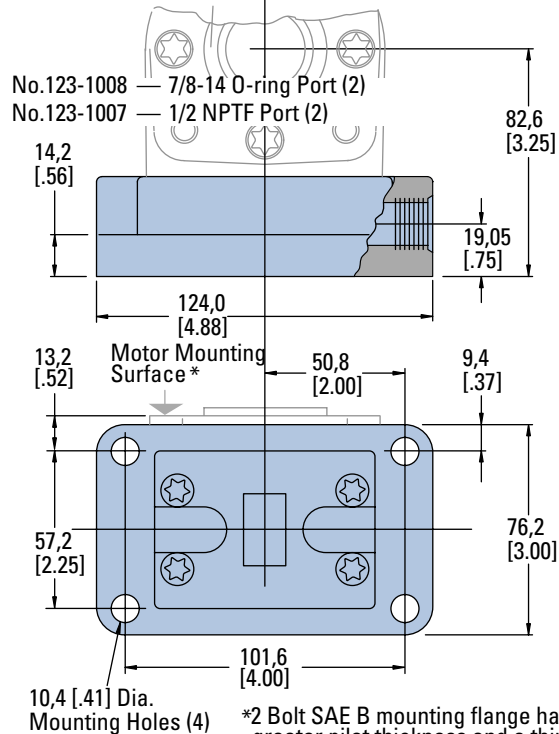
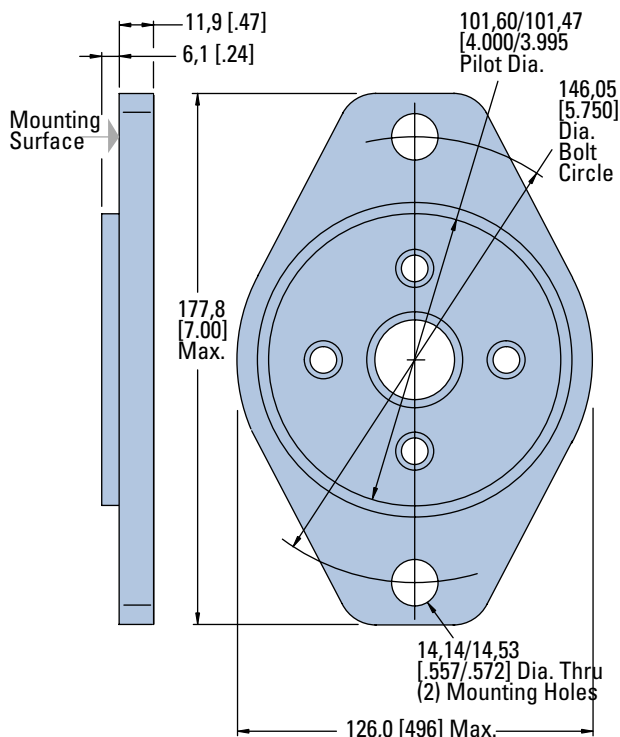
4 Bolt Magneto



Base Block Mounting Kits



2 Bolt SAE B



No.123-1008 — 7/8-14 O-ring Port (2)
No.123-1007 — 1/2 NPTF Port (2)

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

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

Dimensions

Ports

Ports

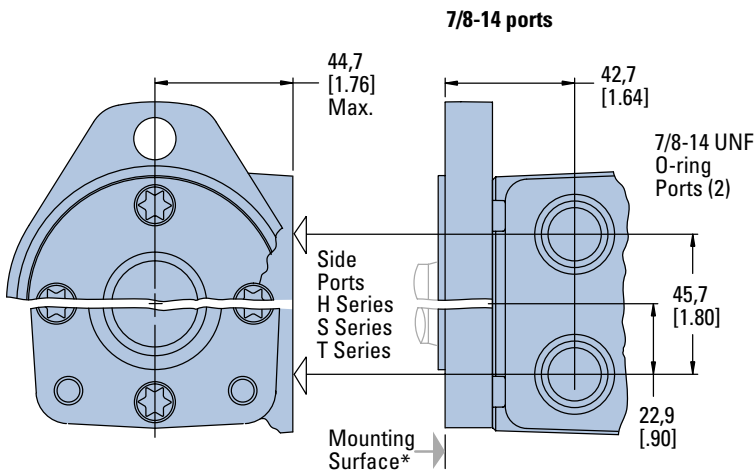
End Ports — H Series only
G 1/2 (BSP) (2)
or 3/4-16 O-Ring (2)

Standard Rotation Viewed from Drive End

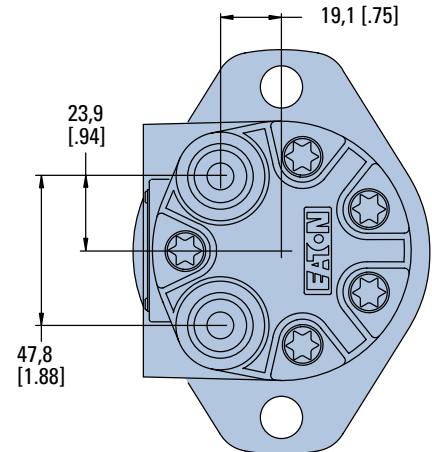
Port A Pressurized — CW
Port B Pressurized — CCW

Note:

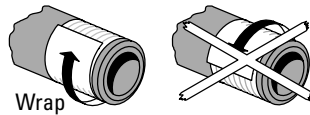
End ported motor pressure is derated. Reference page B-2-2 for ratings.



End Ports (H Series only)

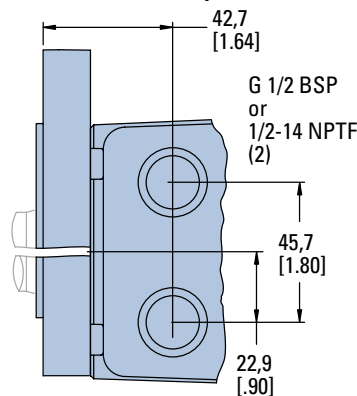


Use of Teflon Tape Sealant/Lubricant (with 1/2 14 NPTF Port Connectors only).

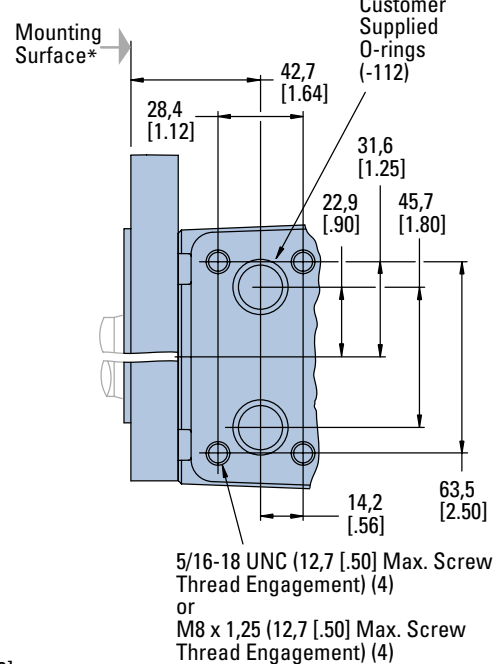


When using fittings with Teflon tape, be careful when taping and tightening. Over tightening or improperly taped fittings can cause damage to housing or leakage.

6-1/2 or 1/2 NPTF ports



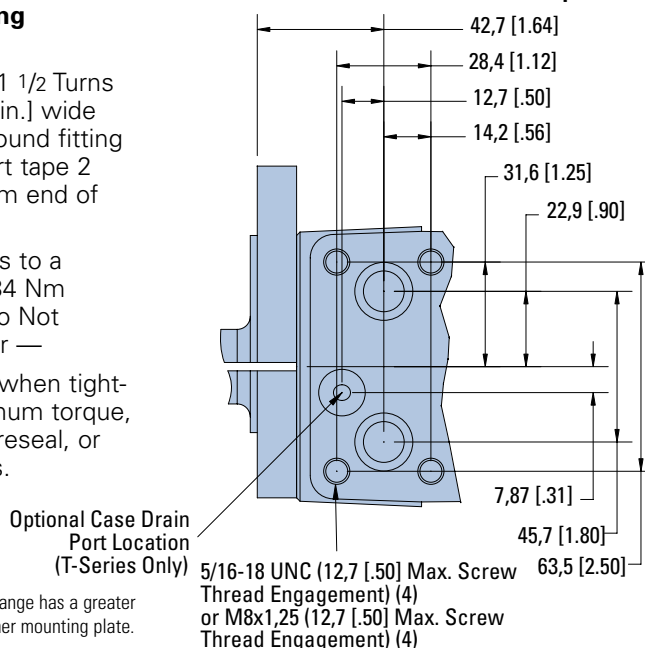
Manifold Ports



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.

Manifold Ports w/manifold case port



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

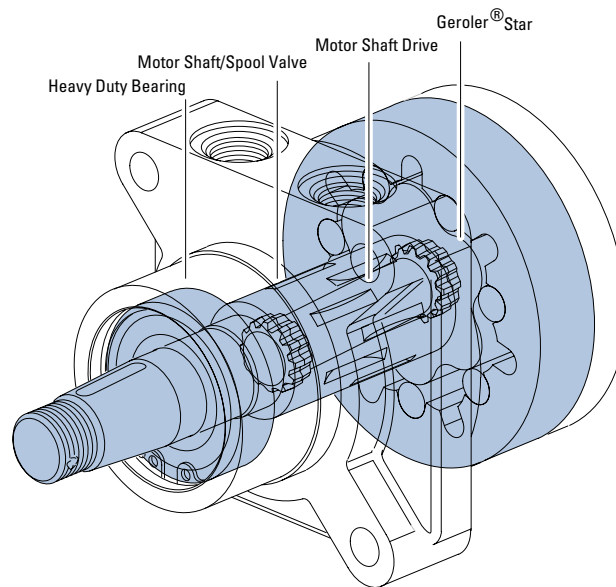
Note:

End ported motor option is derated to 1400 continuous, 1700 psi intermittent.

Notes

W Series (162-)

Highlights



Description

Char-Lynn W Series motors with the Geroler displacement element offer the same low friction and long-life advantages as the S and T Series.

The W Series features the simplicity of Eaton's proven spool valve and a Geroler element that provides superior drive life and smooth performance. In addition, this motor has a rugged housing with an extra large capacity side load bearing.

W Series Motors

Geroler Element	7 Displacements
Flow l/min [GPM]	68 [18] Continuous*** 76 [20] Intermittent**
Speed	288 RPM
Pressure bar [PSI]	165 [2400] Cont.*** 179 [2600] Inter.**
Torque Nm [lb-in]	410 [3624] Cont.*** 562 [4970] Inter.**

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

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

Features:

- Heavy duty bearing
- Wheel drive interface
- Three-pressure zone design (ability to reduce case pressure)
- Variety of displacements, shafts, mounts and special options
- Special options to meet customer needs

Benefits:

- High side-load capacity
- High shock load capability
- Wheel mount interface
- Compact powerful package
- High efficiency
- Smooth low-speed operation
- Extended leak-free performance

Applications:

- Scissors lifts
- Boom lifts
- Mid-size ZTR mowers
- Turf equipment
- Greens mowers
- Sand trap rakes
- Railroad maintenance equipment
- Industrial sweepers and floor polishers
- Skid steer attachments
- Many more



Scissor Lift



Sweeper



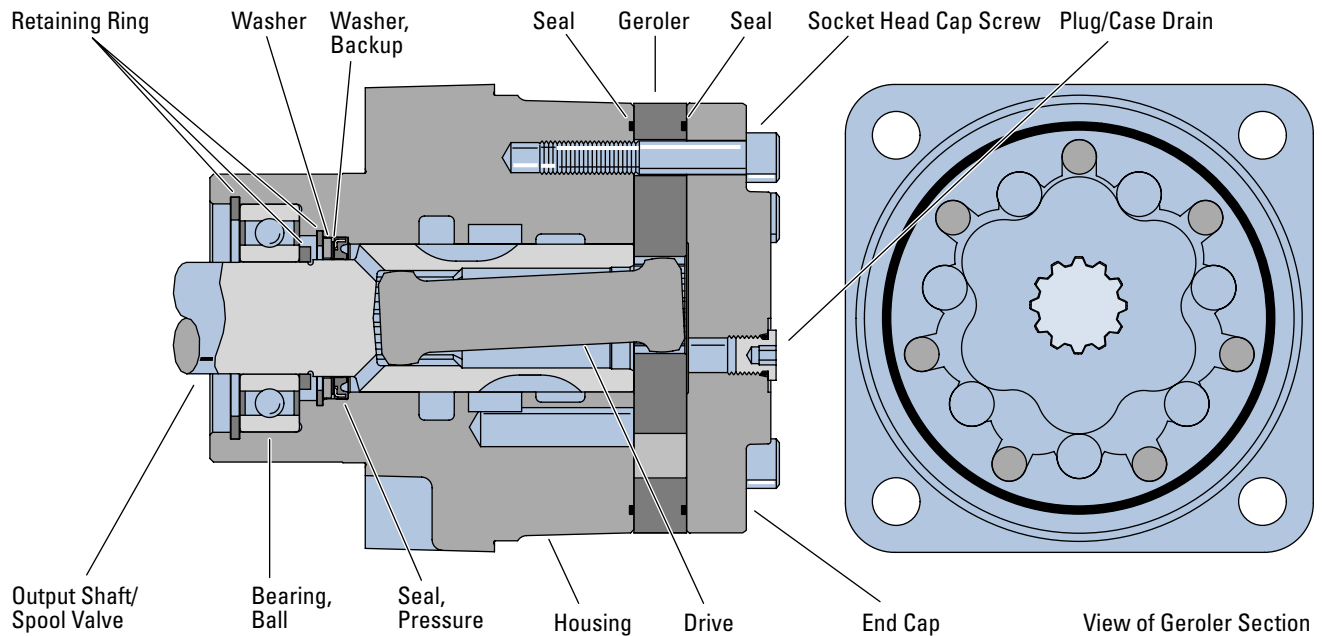
Trencher



Boom Lift

W Series (162-)

Specifications



SPECIFICATION DATA — W SERIES MOTORS

Displ. cm ³ /r [in ³ /r]		80 [4.9]	126 [7.7]	154 [9.4]	195 [11.9]	251 [15.3]	303 [18.5]	374 [22.8]
Max. Speed (RPM)		267	288	214	200	200	200	200
Flow l/min [GPM]	Continuous	23 [6]	30 [8]	34 [9]	38 [10]	53 [14]	62 [16.5]	68 [18]
	Intermittent	23 [6]	30 [8]	34 [9]	38 [10]	53 [14]	62 [16.5]	76 [20]
Theo. Torque Nm [lb-in]	Continuous	176 [1555]	279 [2470]	318 [2813]	318 [2816]	375 [3319]	387 [3429]	410 [3624]
	Intermittent	189 [1676]	298 [2640]	373 [3301]	439 [3882]	548 [4849]	539 [4769]	562 [4970]
Pressure Δbar [ΔPSI]	Continuous	165 [2400]	165 [2400]	152 [2200]	124 [1800]	110 [1600]	97 [1400]	83 [1200]
	Intermittent	179 [2600]	179 [2600]	179 [2600]	179 [2600]	165 [2400]	138 [2000]	124 [1800]

Note:

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

Maximum Inlet Pressure:

179 bar [2600 PSI]
Do Not Exceed Δ Pressure Rating (for displacement size see chart above).

Return Pressure (Back-Pressure):

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

Note:

Optional version can be used without case drain.

Case Pressure:

Minimum – No Pressure
Maximum – 103 bar [1500 PSI] without case drain.

Note:

The case must be flooded when the motor is operating.

Δ Pressure:

The true Δ bar [Δ PSI] between inlet port and return 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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82°C [180°F]

Recommended Filtration:

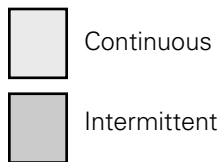
per ISO Cleanliness Code, level 20/18/13

W Series (162-)

Performance Data

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

Performance data is typical at 120 SUS. Actual data may vary slightly from motor to motor in production.



80 cm³/r [4.9 in³/r]

Δ Pressure bar [PSI]

Continuous

		[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2400]	[2600]
		28	41	55	69	83	97	110	124	138	152	165	179
Flow l/min [GPM]	[2]	[204]	[337]	[474]	[612]	[748]	[883]	[1019]	[1149]	[1281]	[1412]	[1540]	[1610]
	7.6	23	38	54	69	85	100	115	130	145	160	174	182
		93	89	88	84	83	79	73	69	69	61	56	39
	[4]	[223]	[357]	[489]	[627]	[769]	[902]	[1035]	[1169]	[1295]	[1424]	[1555]	[1676]
15.1		25	40	55	71	87	102	117	132	146	161	176	189
		178	172	170	168	165	159	157	154	146	142	131	117
	[6]	[255]	[342]	[477]	[612]	[749]	[879]	[1014]	[1154]	[1286]	[1408]	[1533]	[1648]
	22.7	29	39	54	69	85	99	115	130	145	159	173	186
		267	265	262	258	257	252	248	241	235	229	219	206

126 cm³/r [7.7 in³/r]

Δ Pressure bar [PSI]

Continuous

		[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2400]	[2600]
		28	41	55	69	83	97	110	124	138	152	165	179
Flow l/min [GPM]	[2]	[390]	[605]	[817]	[1032]	[1248]	[1448]	[1656]	[1871]	[2069]	[2243]	[2414]	[2513]
	7.6	44	68	92	117	141	164	187	211	234	253	273	284
		58	56	55	51	49	45	43	41	33	32	26	17
	[4]	[382]	[605]	[817]	[1036]	[1252]	[1463]	[1694]	[1908]	[2113]	[2306]	[2470]	[2640]
15.1		43	68	92	117	141	165	191	216	239	261	279	298
		113	106	106	104	93	97	94	88	82	79	74	60
	[6]	[367]	[587]	[802]	[1017]	[1236]	[1444]	[1668]	[1882]	[2091]	[2284]	[2459]	[2637]
	22.7	41	66	91	115	140	163	188	213	236	258	278	298
		172	167	164	161	156	152	147	141	134	130	120	103
30.3	[8]	[346]	[561]	[769]	[981]	[1203]	[1419]	[1634]	[1849]	[2039]	[2217]	[2432]	[2633]
		39	63	87	111	136	160	185	209	230	250	275	297
		228	225	220	216	213	208	201	195	188	174	163	149

154 cm³/r [9.4 in³/r]

Δ Pressure bar [PSI]

Continuous

		[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2400]	[2600]
		28	41	55	69	83	97	110	124	138	152	165	179
Flow l/min [GPM]	[2]	[450]	[723]	[989]	[1249]	[1512]	[1769]	[2021]	[2269]	[2502]	[2714]	[2904]	[3019]
	7.6	51	82	112	141	171	200	228	256	283	307	328	341
		47	47	46	44	40	39	36	33	30	26	19	10
	[4]	[470]	[737]	[1009]	[1276]	[1540]	[1802]	[2064]	[2323]	[2570]	[2813]	[3019]	[3242]
15.1		53	83	114	144	174	204	233	262	290	318	341	366
		94	93	90	89	87	84	81	78	73	67	65	52
	[6]	[435]	[715]	[984]	[1252]	[1513]	[1787]	[2020]	[2274]	[2521]	[2812]	[3042]	[3301]
	22.7	49	81	111	141	171	202	228	257	285	318	344	373
		143	140	138	137	134	131	128	124	117	112	103	91
30.3	[8]	[407]	[677]	[945]	[1214]	[1477]	[1740]	[2005]	[2260]	[2503]	[2735]	[2964]	[3206]
		46	76	107	137	167	197	227	255	283	309	335	362
		190	188	186	184	182	179	176	171	166	158	148	137
	[9]	[380]	[648]	[914]	[1183]	[1452]	[1714]	[1981]	[2243]	[2499]	[2733]	[2964]	[3195]
	34	43	73	103	134	164	194	224	253	282	309	335	361
		214	212	210	207	206	202	200	196	191	182	173	162

195 cm³/r [11.9 in³/r]

Δ Pressure bar [PSI]

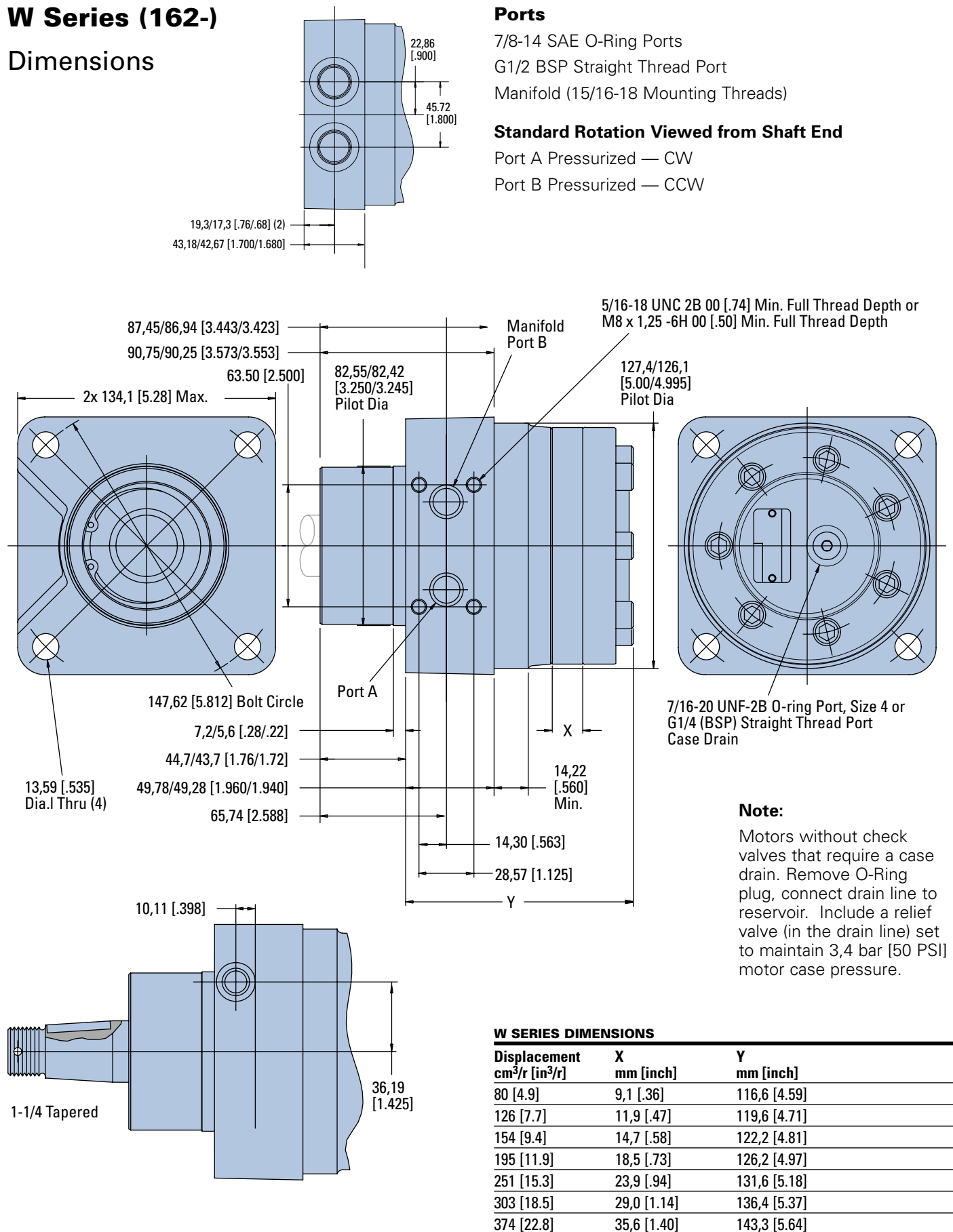
Continuous

		[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2400]	[2600]
		28	41	55	69	83	97	110	124	138	152	165	179
Flow l/min [GPM]	[2]	[478]	[827]	[1171]	[1511]	[1839]	[2153]	[2452]	[2756]	[3027]	[3275]	[3513]	[3673]
	7.6	54	93	132	171	208	243	277	311	342	370	397	415
		38	38	37	36	35	34	34	30	29	26	22	16
	[4]	[515]	[872]	[1220]	[1558]	[1886]	[2206]	[2518]	[2816]	[3107]	[3382]	[3647]	[3882]
15.1		58	99	138	176	213	249	284	318	351	382	412	439
		75	73	73	71	70	69	66	64	62	56	52	44
	[6]	[524]	[878]	[1214]	[1551]	[1875]	[2199]	[2518]	[2824]	[3113]	[3389]	[3666]	
	22.7	59	99	137	175	212	248	284	319	352	383	414	
		114	111	111	110	108	106	105	103	99	95	91	
30.3	[8]	[518]	[856]	[1187]	[1524]	[1861]	[2187]	[2499]	[2782]	[3064]	[3334]		
		59	97	134	172	210	247	282	314	346	377		
		151	150	150	149	147	145	144	143	141	136		
	[10]	[462]	[797]	[1133]	[1468]	[1799]	[2118]	[2442]	[2739]	[3023]	[3281]		
	38	52	90	128	166	203	239	276	309	342	371		
		190	188	187	186	184	184	182	179	176	160		

[3673]
415 } Torque [lb-in
16 } Nm
Speed RPM

W Series (162-)

Dimensions



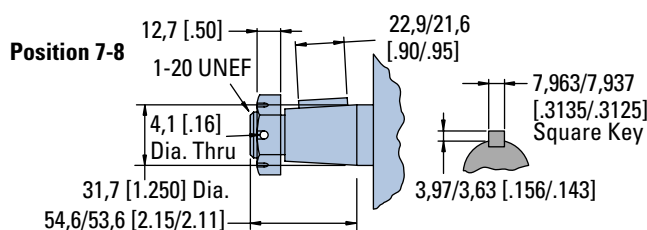
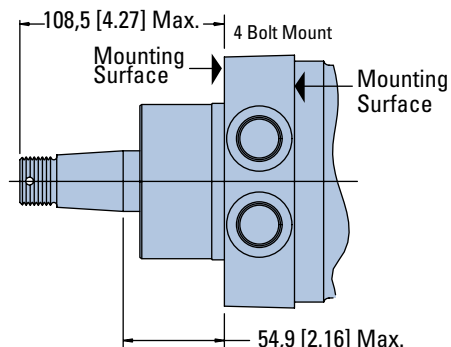
W Series (162-)

Dimensions Shafts

Recommended Torque:

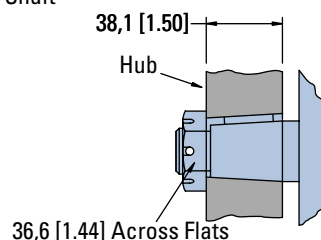
(373 Nm [275 lb-ft] Dry)
(305 Nm [225 lb-ft] Lub) Plus
Torque required to align the
slotted nut with the Shaft
Crosshole.

1 1/4 Tapered

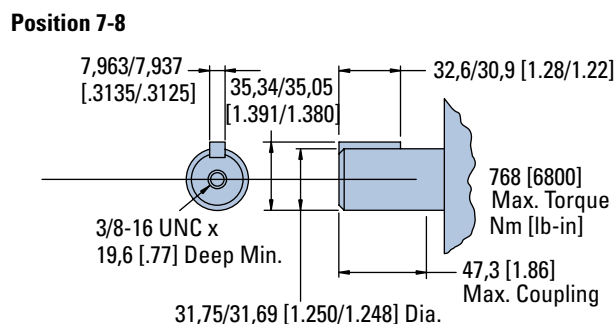
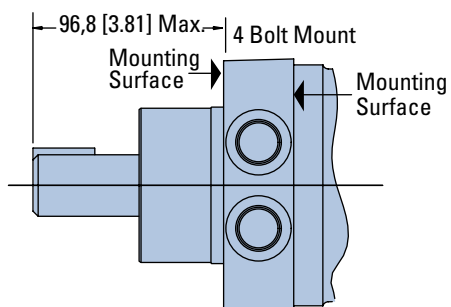


SAE J501 Standard Tapered Shaft
125,00 0,17 Taper per Meter
[1.500 .002 Taper per Foot]

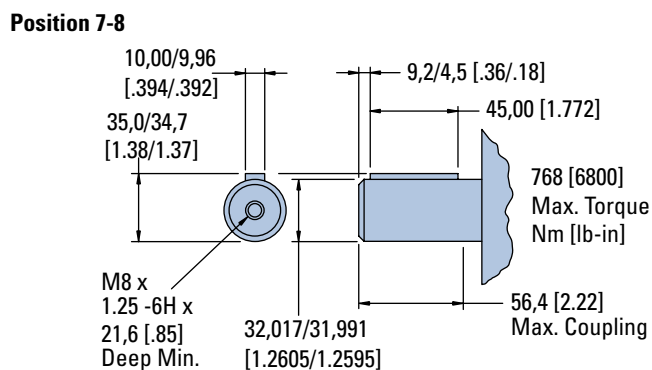
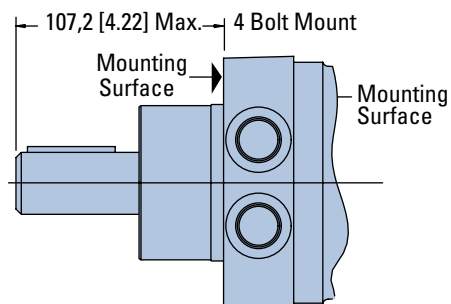
768 [6800]
Max. Torque
Nm [lb-in]



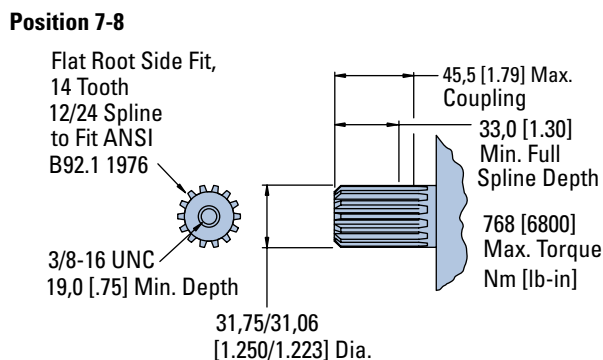
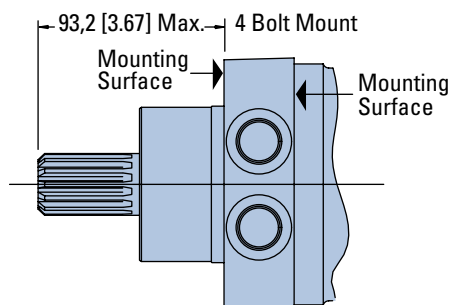
1 1/4 Inch Straight



32 mm Straight



1 1/4 14 Tooth Splined



W Series (162-)

Shaft Side Load Capacity

- 1) Case pressure needs to be added to the outward axial thrust load and subtracted from inward axial thrustload – Case Pressure bar x 87, 1 [PSI x 1.35]
- 2) Life values in Chart A can be adjusted for speeds up to 200 rpm.

$$\frac{\text{Life value} \times 100 \text{ rpm}}{\text{application rpm}}$$
- 3) Shaded areas are intermittent loading.
- 4) To convert application radial load at any load location to side load at the center of keyway multiply load by the application factor from Chart B.

Example:

Side Load: 4849 N @ 120 mm [1090 lbf @ 4.75 inch] from flange.

Average Thrust Load: 890 N [200 lbf] inward (toward motor).

Case Pressure: 66 bar [960 PSI].

Average Speed: 150 rpm.

Expected Life Calculation: Adjust side load value (due to load variation): from Chart B look at 120mm [4.75 inch] read at angled curve for load adjustment factor of 1.38.
 Adjusted load is: (4849 N [1090 lbf]) x (1.38) = 6690 N [1504 lbf]

Thrust Load Value (due to case pressure):
 (960 PSI) x (1.35) = [1296 lbf]
 (66 bar) x (87,1) = 5750 N

Average thrust load found to be 890 N [200 lbf] inwards so subtract from thrust load due from case pressure:

5750 N - 890 N = 4860 N or
 [1296 lbf] - 200 lbf = [1096 lbf]

Read Life Expectancy from Chart A: Value from chart reading across top to 6672 [1500] (6090 N [1504 lbf]) and down left side to 4895 [1100] (4875 N [1096 lbf])

Life = 1800 Hours

Speed Adjustment for over 100 rpm:

$$\frac{(1800 \text{ hrs}) \times (100 \text{ rpm})}{150 \text{ rpm}} = 1200 \text{ Hours}$$

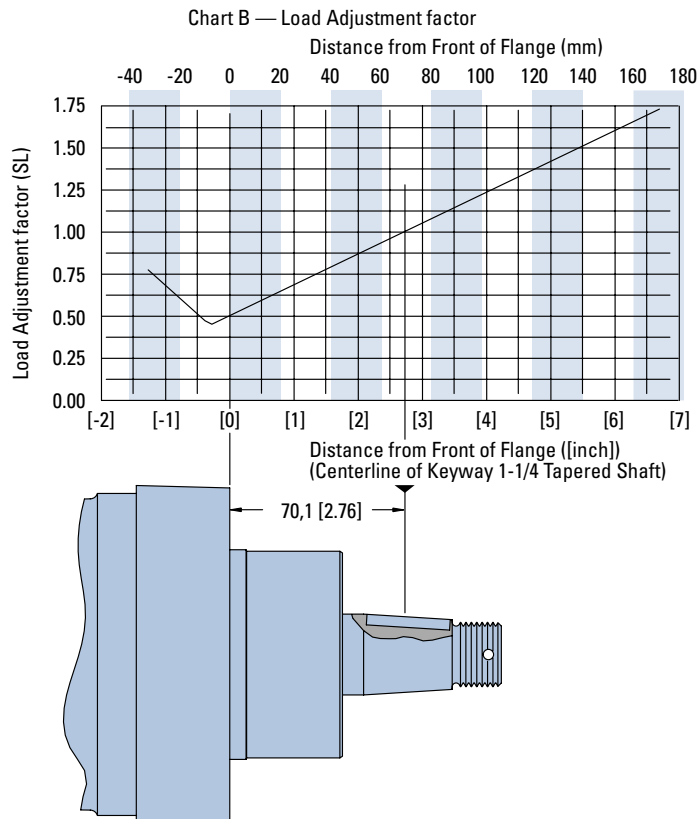


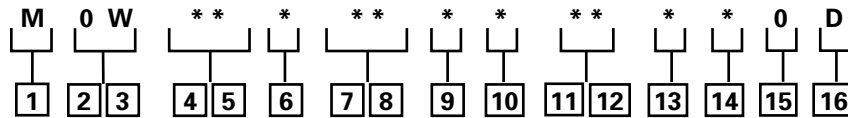
CHART A — EXPECTED B10 LIFE (HOURS) OF BEARING UNDER VARIOUS LOADS

Axial Thrust		Radial Load at Centerline of keyway at 100 RPM									
N	lbf]	1110 [250]	2225 [500]	3335 [750]	4450 [1000]	4560 [1250]	6670 [1500]	7785 [1750]	8895 [2000]	11120 N [2500lbf]	13345 N [3000lbf]
445	[100]	410 600	66 000	19 600	8 300	4 200	2 400	1 500	1 000	530	310
1335	[300]	92 700	40 900	19 600	8 300	4 200	2 400	1 500	1 000	530	310
2225	[500]	39 400	20 900	12 400	7 900	4 200	2 400	1 500	1 000	530	310
3115	[700]	21 400	12 600	8 100	5 500	3 900	2 400	1 500	1 000	530	
4005	[900]	13 300	8 400	5 700	4 000	2 900	2 200	1 500	1 000	530	
4895	[1100]	9 000	6 000	4 200	3 100	2 300	1 800	1 400	1 000		
5785	[1300]	6 500	4 500	3 200	2 400	1 900	1 500	1 200	900		
6670	[1500]	4 800	3 500	2 600	2 000	1 500	1 200	1 000			
7560	[1700]	3 700	2 800	2 100	1 600	1 300					
8450	[1900]	3 000	2 200								
8895	[2000]	Max. Thrust									

W Series (162-)

Model Code

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



1 Product

M – Motor

2, 3 Series

0W – W Series

4, 5 Displacement cm³/r [in³/r]

05 – 30 [4.9]

08 – 126 [7.7]

09 – 154 [9.4]

12 – 195 [11.9]

15 – 251 [15.3]

19 – 303 [18.5]

23 – 374 [22.8]

6 Mounting Type

B – 4 Bolt (Wheel) 82,6 [3.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes 147,6 [5.81] Dia., B.C., 127,0 [5.00] rear pilot

7, 8 Output Shaft

02 – 1 1/4 inch Dia. Flat Root Side Fit, 14 Tooth, 12/24 DP 30° Involute Spline with 3/8-16 UNC-2B Thread in End, 33,0 [1.30] Min. Full Spline

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] Square x 22,22 [.875] Straight Key

04 – 32mm Dia. Straight Shaft with M8 x 1, 25-6H Thread in End, 9,982 [.3930] Wide x 7,995 [.3132] High x 45,00 [1.772] Long Key

06 – 1 1/4 inch Dia. Straight Shaft with 3/8 – 16 UNC 2B Thread in End, 7,938 [.3125] Square x 34,92 [1.375] Straight Key

9 Ports

A – 7/8 -14 UNF - 2B SAE O-Ring Port

B – G 1/2 (BSP) Straight Thread Port

10 Case Flow Options

A – 7/16 - 20 UNF - 2B SAE O-Ring Port

B – G 1/4 (BSP) Straight Thread Port

C – Internal Check Valve

11, 12 Special Features (Hardware)

00 – None

01 – Viton Seals

13 Special Features (Assembly)

0 – None

1 – Reverse Rotation

14 Paint/Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

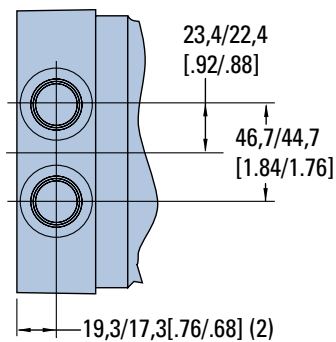
0 – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code

W Series with Parking Brake (162-)

Dimensions



Ports

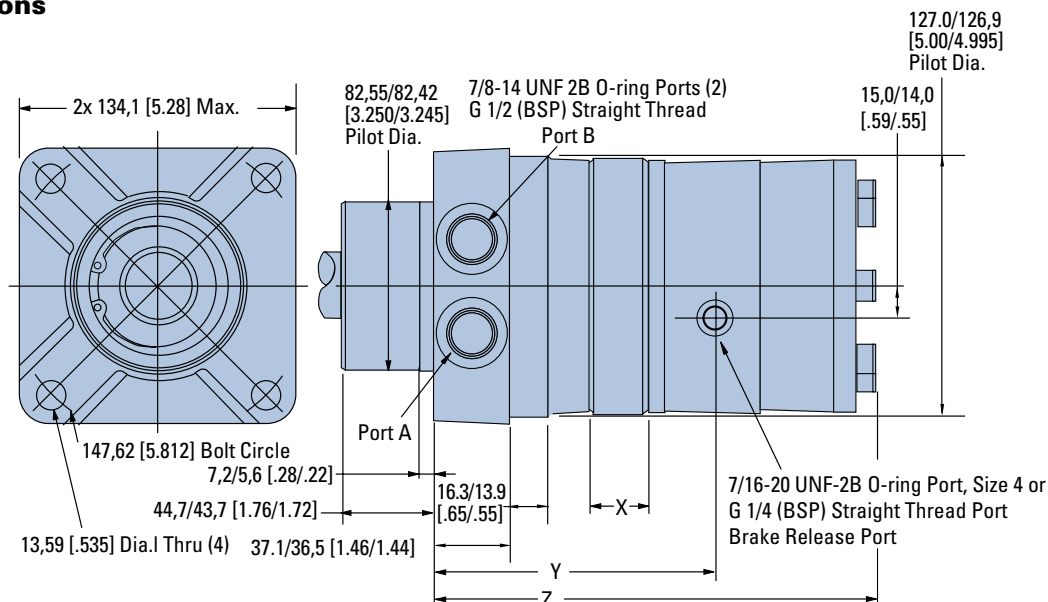
7/8 -14 UNF 2B SAE O-Ring Ports (2) or
G 1/2 (BSP) Straight Thread

Standard Rotation Viewed from Shaft End

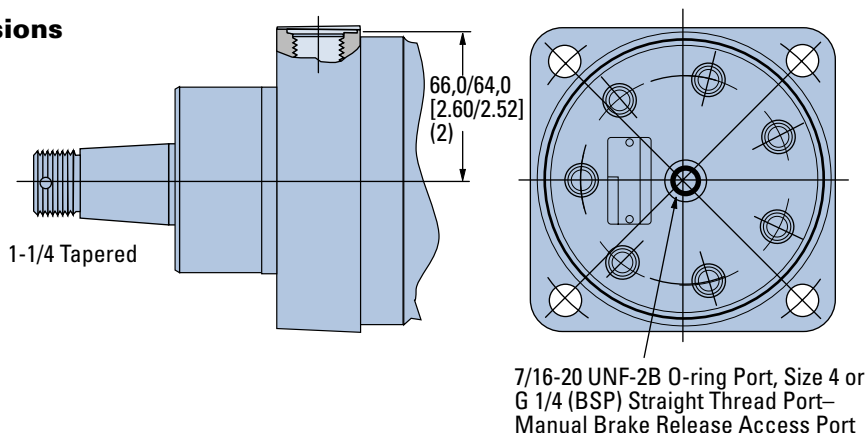
Port A Pressurized — CW

Port B Pressurized — CCW

Port Dimensions



Mounting Dimensions



PORTING AND MOUNTING DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
80 [4.9]	9,1 [0.36]	119,9 [4.72]	198,4 [7.81]
126 [7.7]	11,9 [0.47]	122,9 [4.84]	201,2 [7.92]
154 [9.4]	14,7 [0.58]	125,5 [4.94]	204,0 [8.03]
195 [11.9]	18,5 [0.73]	129,6 [5.10]	207,8 [8.18]
251 [15.3]	23,9 [0.94]	134,9 [5.31]	213,4 [8.40]
303 [18.5]	29,0 [1.14]	139,7 [5.50]	217,7 [8.59]
374 [22.8]	35,6 [1.40]	146,6 [5.77]	226,8 [8.85]

SPECIFICATIONS

Brake Release Pressure 205 bar [3000 PSI] Max.; 15 bar [250 PSI] Min.

W Series, W Series with Parking Brake (162-)

Product Numbers

Use digit prefix —
162 plus four digit number
from charts for complete
product number —
Example 162-1153.

**Orders will not be
accepted without three
digit prefix.**

Standard

SHAFT	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER						
	80 [4.9]	126 [7.7]	154 [9.4]	195 [11.9]	251 [15.3]	303 [18.5]	374 [22.8]
Standard	162-1016	-1017	-1018	-1019	-1020	-1021	-1022
w/Case Drain	162-1023	-1024	-1025	-1009	-1008	-1026	-1027

162-1009

W Series with Parking Brake

SHAFT	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER						
	80 [4.9]	126 [7.7]	154 [9.4]	195 [11.9]	251 [15.3]	303 [18.5]	374 [22.8]
Standard	162-1143	-1144	-1145	-1146	-1183	-1148	-1149

162-1146

Note:

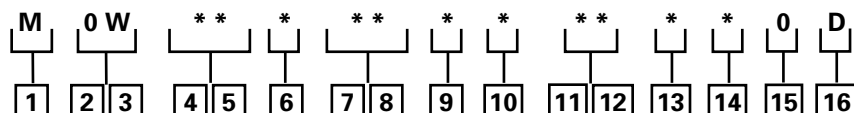
All above motors have
1-1/4 inch tapered output
shaft, 7/8 inch O-Ring Ports,
internal check valves.

For W Series Motors with
a configuration not shown
in the chart above: Use
the model code number
system to specify the
product in detail. (see page
B-5-8 and use the model
code supplement shown
on page B-5-11 for spring-
applied hydraulic-release
parking brake).

W Series with Parking Brake (162-)

Model Code

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



1 Product

M – Motor

2, 3 Series

0W – W Series with Parking Brake

4, 5 Displacement cm³/r [in³/r]

05 – 30 [4.9]

08 – 126 [7.7]

09 – 154 [9.4]

12 – 195 [11.9]

15 – 251 [15.3]

19 – 303 [18.5]

23 – 374 [22.8]

6 Mounting Type

B – 4 Bolt (Wheel) 82,6 [3.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes 147,6 [5.81] Dia., B.C., 127,0 [5.00] rear pilot

7, 8 Output Shaft

02 – 1 1/4 inch Dia. Flat Root Side Fit, 14 Tooth, 12/24 DP 30° Involute Spline with 3/8-16 UNC-2B Thread in End, 33,0 [1.30] Min. Full Spline

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] Square x 22,22 [.875] Straight Key

04 – 32mm Dia. Straight Shaft with M8 x 1, 25-6H Thread in End, 9,982 [.3930] Wide x 7,995 [.3132] High x 45,00 [1.772] Long Key

06 – 1 1/4 inch Dia. Straight Shaft with 3/8 – 16 UNC 2B Thread in End, 7,938 [.3125] Square x 34,92 [1.375] Straight Key

9 Ports

A – 7/8 -14 UNF - 2B SAE O-Ring Port

B – G 1/2 (BSP) Straight Thread Port

10 Case Flow Options

A – 7/16 - 20 UNF - 2B SAE O-Ring Port

B – G 1/4 (BSP) Straight Thread Port

C – Internal Check Valve

11, 12 Special Features (Hardware)

00 – None

01 – Viton Seals

11 – Spring-applied hydraulic-release brake

13 Special Features (Assembly)

0 – None

1 – Reverse Rotation

14 Paint/Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black - Individual Box

15 Eaton Assigned Code when Applicable

0 – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code



State of the art motors benefiting from 45 years of experience and innovating constantly to fit your demands.



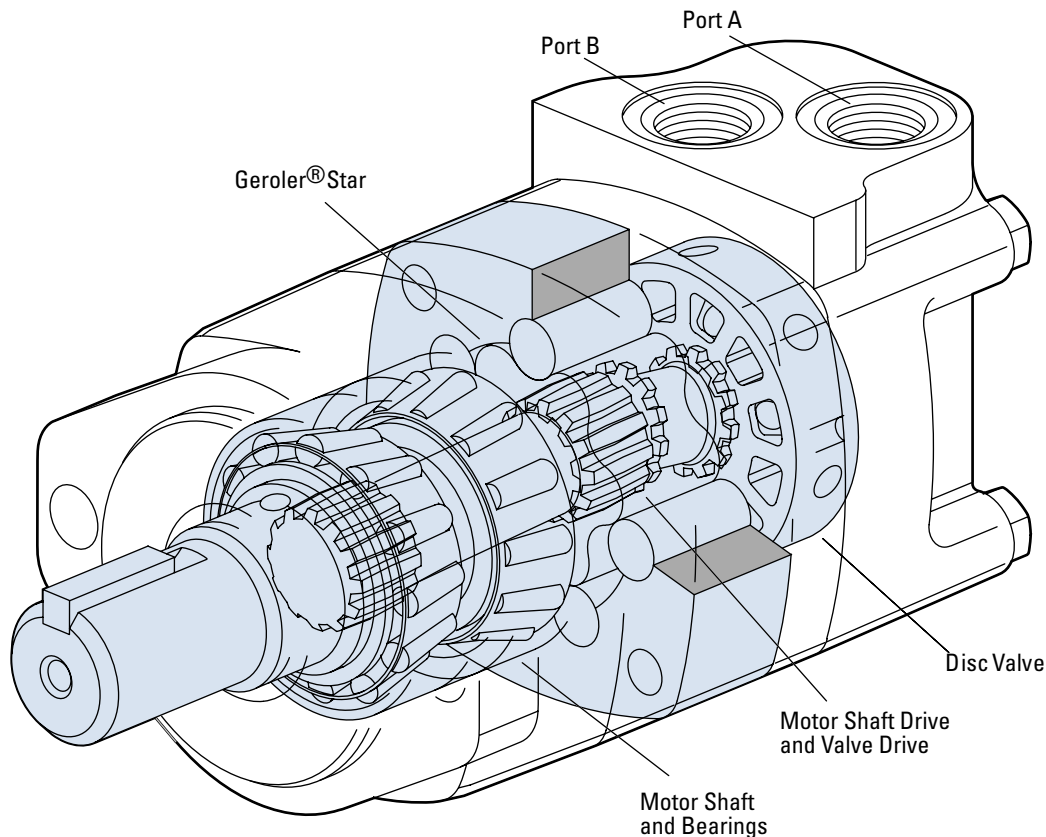
Disc Valve Hydraulic Motors

Highlights

Product Description

In the late 1950's the original low speed, high torque hydraulic motor was developed from a pump Geroler 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, Benefits, and Applications

Features

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

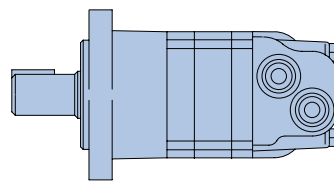
- Displacement (Geroler size)
- Output Shaft
- No Shaft and Bearing Assembly (Bearingless Motor)
- Port Configuration
- Mounting Flange
- Other Special Features

Benefits

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

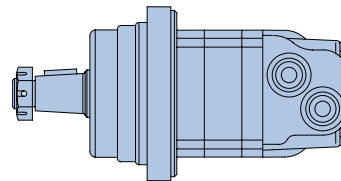
Applications

- 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



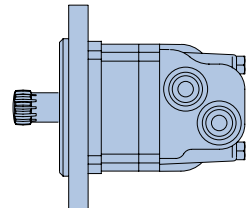
Standard Motor

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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10,000 Series

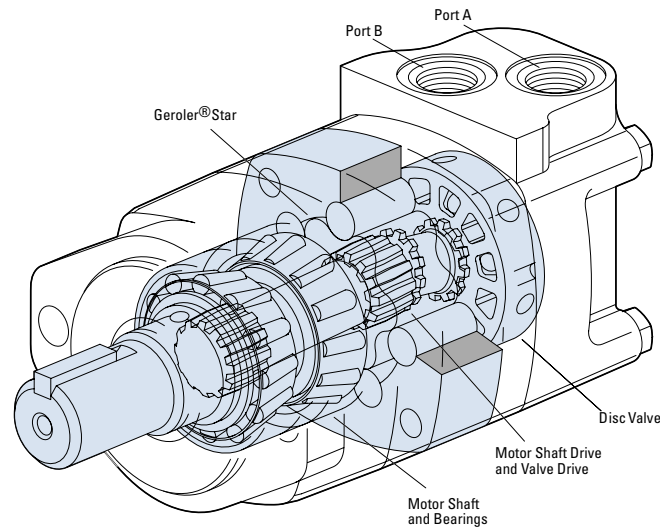
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2000 Series

Highlights



Description

The popular 2000 Series provides torque up to 7500 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 integral cross-over relief valve is the latest innovation in the 2000 series motors.

2000 Series

Geroler Element	10 Displacements
Flow l/min [GPM]	75 [20] Continuous** 115 [30] Intermittent*
Speed RPM	908 Cont.** 1042 Inter.*
Pressure bar [PSI]	200 [3000] Cont.** 300 [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
- Reliability and performance in tough application
- Compact design of the integrated cross-over relief valve option

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



Auger



Boring



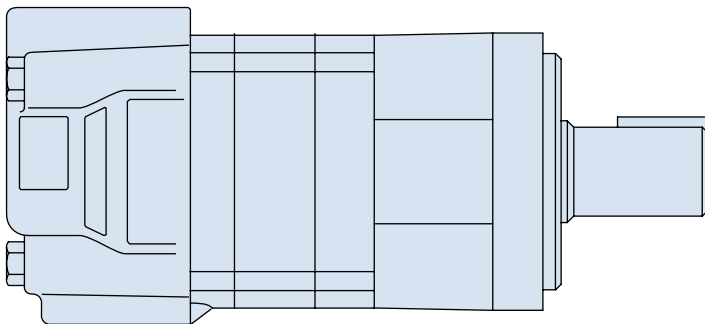
Plastic Injection



Oil and Gas Equipment

2000 Series

Specifications



SPECIFICATION DATA — 2000 SERIES MOTORS

Displ. cm ³ /r [in ³ /r]		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	908	836	742	576	477	385	308	246	191	153
	Intermittent	908	1042	924	720	713	577	462	365	287	230
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]
	Intermittent	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	235 [2065]	265 [2326]	295 [2630]	385 [3420]	455 [4040]	540 [4780]	660 [5850]	765 [6750]	775 [6840]	845 [7470]
	Intermittent	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]	155 [2250]	120 [1750]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	260 [3700]	170 [2750]	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	205 [3250]	170 [2500]
Weight kg [lb]	Standard or Wheel Mount	9.3 [20.5]	9.3 [20.5]	9.5 [21.0]	9.8 [21.5]	10.0 [22.0]	10.4 [23.0]	10.9 [24.0]	11.3 [25.0]	11.8 [26.0]	12.2 [27.0]
	Bearingless	7.3 [16.0]	7.3 [16.0]	7.5 [16.5]	7.7 [17.0]	7.9 [17.5]	8.4 [18.5]	8.8 [18.5]	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 for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

Maximum Inlet Pressure:

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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

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 120 SUS. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No Operation

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

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.25] .95	[170] 20 3									
[.5] 1.9	[190] 20 12	[410] 45 8	[870] 100 2							
[1] 3.8	[230] 25 28	[510] 60 27	[1070] 120 23	[1580] 180 19	[2050] 230 16	[2520] 285 13	[2920] 330 9	[3310] 375 3		
[2] 7.5	[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	[3350] 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] 1,0 720	[310] 35 719	[900] 100 712	[1480] 165 705	[2050] 230 692	[2630] 295 679	[3200] 360 682	[3700] 420 656		

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

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.25] .95	[140] 15 4	[260] 30 2								
[.5] 1.9	[150] 15 13	[300] 35 9	[620] 70 5	[940] 105 2						
[1] 3.8	[170] 20 35	[390] 45 34	[830] 95 31	[1210] 135 28	[1570] 175 23	[1870] 210 15	[2130] 240 6			
[2] 7.5	[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] 345 300	[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] 1,0 890	[230] 230 887	[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		

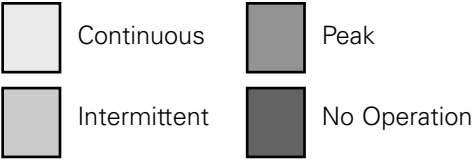
[1560]
175 } Torque [lb-in]
890 } Speed RPM
Nm

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 120 SUS. Actual data may vary slightly from unit to unit in production.



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

		[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
		15	35	50	70	85	105	120	140	155	170	190	205	225	240	260
Flow LPM [GPM]	[.5]	[410]	[850]													
	1.9	45	95													
	[1]	[450]	[930]	[1420]	[1850]	[2320]	[2780]	[3250]	[3650]	[4100]	[4540]	[4980]	[5430]	[5870]	[6310]	
	3.8	50	105	160	210	260	315	365	410	465	515	560	615	665	715	
	[2]	[460]	[960]	[1460]	[1900]	[2400]	[2860]	[3340]	[3780]	[4320]	[4770]	[5210]	[5660]	[6110]	[6570]	[6950]
	7.5	50	110	165	215	270	325	375	425	490	540	590	640	690	740	785
	[4]	[470]	[1000]	[1540]	[1980]	[2510]	[3010]	[3480]	[3980]	[4450]	[4910]	[5380]	[5850]	[6320]	[6780]	[7250]
	15	55	115	175	225	285	340	395	450	505	555	610	660	715	765	820
	[6]	[460]	[1020]	[1550]	[2040]	[2580]	[3110]	[3590]	[4120]	[4580]	[5050]	[5520]	[5980]	[6440]	[6910]	
	23	50	115	175	230	290	350	405	465	515	570	625	675	730	780	
	[8]	[460]	[1010]	[1560]	[2080]	[2630]	[3170]	[3670]	[4210]	[4680]	[5160]	[5630]	[6110]	[6590]		
	30	50	115	175	235	295	360	415	475	530	585	635	690	745		
	[10]	[440]	[1000]	[1550]	[2110]	[2650]	[3200]	[3730]	[4250]	[4730]	[5210]	[5720]	[6230]			
	38	50	115	175	240	300	360	420	480	535	585	645	705			
	[12]	[410]	[960]	[1530]	[2100]	[2640]	[3190]	[3760]	[4260]	[4740]	[5220]	[5730]				
	45	45	110	175	235	300	360	425	480	535	600	645				
	[14]	[380]	[910]	[1500]	[2080]	[2600]	[3160]	[3760]	[4230]	[4710]	[5190]					
	53	40	105	170	235	295	355	425	480	530	585					
	[16]	[340]	[860]	[1460]	[2040]	[2570]	[3120]	[3740]	[4180]	[4660]	[5140]					
	61	40	95	165	230	290	355	425	470	525	580					
	[18]	[290]	[810]	[1420]	[2000]	[2520]	[3060]	[3700]	[4130]	[4610]	[5090]					
	68	30	90	160	225	285	345	420	465	520	575					
	[20]	[250]	[800]	[1350]	[1910]	[2460]	[3010]	[3630]	[4110]	[4610]						
	76	30	90	155	215	280	340	410	465	520						
	[22]	[200]	[710]	[1300]	[1870]	[2390]	[2940]	[3560]	[4010]	[4510]						
	83	25	80	145	210	270	330	400	455	510						
	[24]	[150]	[670]	[1240]	[1790]	[2330]	[2880]	[3460]	[3960]	[4460]						
	91	15	75	140	205	265	325	390	445	505						
	[25]	[120]	[660]	[1210]	[1750]	[2300]	[2860]	[3410]	[3950]	[4470]						
	95	15	75	135	200	260	325	385	445	505						
	[30]		[520]	[1080]	[1620]	[2180]	[2720]	[3260]	[3790]							
	114		60	120	185	245	305	370	430							

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

		[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]
		15	35	50	70	85	105	120	140	155	170	190	205	225	240
Flow LPM [GPM]	[.5]	[500]	[1050]												
	1.9	55	120												
	[1]	[610]	[1180]	[1750]	[2330]	[2870]	[3440]	[3930]	[4410]	[4900]	[5380]				
	3.8	70	135	200	260	325	390	445	500	555	610				
	[2]	[620]	[1210]	[1800]	[2400]	[2970]	[3510]	[4050]	[4600]	[5140]	[5680]	[6220]	[6750]	[7290]	[7820]
	7.5	70	135	205	270	335	395	460	520	580	640	705	765	825	885
	[4]	[680]	[1250]	[1880]	[2500]	[3120]	[3690]	[4260]	[4840]	[5410]	[5980]	[6550]	[7120]	[7690]	
	15	75	140	210	280	355	415	480	545	610	675	740	805	870	
	[6]	[620]	[1270]	[1920]	[2560]	[3230]	[3810]	[4390]	[4970]	[5560]	[6130]	[6710]	[7290]		
	23	70	145	215	290	365	430	495	560	630	695	760	825		
	[8]	[600]	[1270]	[1940]	[2600]	[3290]	[3880]	[4470]	[5070]	[5660]	[6250]	[6840]			
	30	70	145	220	295	370	440	505	575	640	705	775			
	[10]	[570]	[1250]	[1940]	[2610]	[3310]	[3920]	[4530]	[5150]	[5760]	[6370]				
	38	65	140	220	295	375	440	510	580	650	720				
	[12]	[530]	[1220]	[1920]	[2600]	[3300]	[3920]	[4530]	[5150]	[5760]	[6370]				
	45	60	140	215	295	375	440	510	580	650	720				
	[14]	[480]	[1180]	[1870]	[2560]	[3260]	[3900]	[4510]	[5120]	[5730]					
	53	55	135	210	290	370	440	510	580	645					
	[16]	[430]	[1120]	[1820]	[2500]	[3210]	[3870]	[4480]	[5080]	[5690]					
	61	50	125	205	280	365	440	505	575	645					
	[18]	[370]	[1060]	[1760]	[2440]	[3140]	[3800]	[4420]	[5050]						
	68	40	120	200	275	355	440	500	570						
	[20]	[320]	[980]	[1680]	[2360]	[3050]	[3710]	[4370]	[5020]						
	76	35	110	190	265	345	420	495	565						
	[22]	[240]	[920]	[1620]	[2300]	[2990]	[3560]	[4190]	[4820]						
	83	25	105	185	260	340	400	475	545						
	[24]	[180]	[870]	[1550]	[2240]	[2920]	[3420]	[4020]	[4630]						
	91	20	100	175	255	330	385	455	525						
	[25]	[150]	[840]	[1520]	[2200]	[2890]	[3340]	[3930]	[4520]						
	95	15	95	170	250	325	375	445	510						
	[30]		[680]	[1360]	[2040]	[2720]	[3140]	[3810]							
	114		75	155	230	305	355	430							

[3260] } Torque [lb-in]
370 } Nm
450 } Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

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

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140
[.5]	[670] 75	[1600] 180						
1.9	2	1						
[1]	[920] 105	[2000] 225	[2990] 340	[3900] 440	[4880] 550			
3.8	7	6	5	4	2			
[2]	[950] 105	[2060] 235	[3110] 350	[4080] 460	[5110] 575	[6320] 715		
7.5	14	13	12	10	9	7		
[4]	[980] 110	[2130] 240	[3230] 365	[4270] 480	[5350] 605	[6370] 720	[7380] 835	[7980] 900
15	30	29	28	27	26	24	22	20
[6]	[980] 110	[2120] 240	[3230] 365	[4300] 485	[5370] 605	[6420] 725	[7470] 845	[8225] 930
23	45	44	43	42	41	39	37	35
[8]	[980] 110	[2110] 240	[3220] 365	[4330] 490	[5400] 610	[6470] 730	[7550] 855	
30	61	60	59	58	57	55	52	
[10]	[920] 105	[2050] 230	[3170] 360	[4300] 485	[5390] 610	[6460] 730	[7550] 855	
38	76	75	74	73	72	70	68	
[12]	[860] 95	[1990] 225	[3120] 355	[4260] 480	[5370] 605	[6460] 730	[7560] 855	
45	91	90	90	89	87	85	84	
[14]	[790] 90	[1930] 220	[3055] 345	[4185] 475	[5300] 600	[6400] 725		
53	106	105	105	104	102	100		
[16]	[720] 80	[1870] 210	[2990] 340	[4110] 465	[5230] 590	[6340] 715		
61	122	121	120	119	118	116		
[18]	[630] 70	[1770] 200	[2890] 325	[4020] 455	[5140] 580	[6260] 705		
68	137	136	135	134	133	131		
[20]	[550] 60	[1670] 190	[2800] 315	[3940] 445	[5060] 570	[6180] 700		
76	153	152	151	150	149	146		
[22]	[450] 50	[1570] 175	[2700] 305	[3830] 435	[4960] 560	[6070] 685		
83	168	168	167	165	164	161		
[24]	[360] 40	[1480] 165	[2600] 295	[3730] 420	[4860] 550	[5970] 675		
91	184	184	183	181	179	177		
[26]	[270] 30	[1390] 155	[2510] 285	[3640] 410	[4770] 540			
98	199	195	194	192	190			
[28]		[1260] 140	[2370] 270	[3520] 400	[4630] 525			
106		212	211	209	207			
[30]		[1130] 125	[2240] 255	[3400] 385	[4500] 510			
114		230	229	277	224			

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

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170	[2750] 190
[.5]	[560] 65	[1310] 150									
1.9	4	3									
[1]	[770] 85	[1540] 175	[2290] 260	[3080] 350	[3780] 430	[4480] 505	[5170] 585	[5880] 665	[6580] 745	[7270] 820	[7980] 900
3.8	9	9	9	8	8	7	7	6	5	4	3
[2]	[790] 90	[1580] 180	[2360] 265	[3180] 360	[3930] 445	[4680] 530	[5430] 615	[6180] 700	[6840] 775	[7500] 845	[8170] 925
7.5	18	18	18	17	17	16	15	14	13	11	10
[4]	[810] 90	[1660] 190	[2480] 280	[3320] 375	[4130] 465	[4940] 560	[5740] 650	[6550] 740	[7230] 815	[7880] 890	
15	37	37	37	36	36	35	34	33	31	28	
[6]	[820] 90	[1700] 190	[2550] 290	[3420] 385	[4250] 480	[5080] 575	[5920] 670	[6750] 765	[7420] 840	[8000] 905	
23	57	56	56	55	54	52	50	49	47	45	
[8]	[820] 90	[1700] 190	[2580] 290	[3460] 390	[4300] 485	[5130] 580	[5960] 675	[6800] 770			
30	76	75	75	74	73	71	69	68			
[10]	[800] 90	[1700] 190	[2590] 295	[3480] 395	[4320] 490	[5160] 585	[6000] 675	[6840] 775			
38	95	94	94	93	92	90	88	86			
[12]	[770] 85	[1680] 190	[2570] 290	[3470] 390	[4310] 485	[5150] 580	[5990] 675	[6830] 770			
45	114	113	113	112	111	109	106	103			
[14]	[740] 85	[1640] 185	[2530] 285	[3430] 390	[4280] 485	[5120] 580	[5960] 675				
53	133	132	132	131	129	127	124				
[16]	[690] 80	[1590] 180	[2480] 280	[3370] 380	[4220] 475	[5060] 570	[5910] 670				
61	153	152	152	150	149	146	144				
[18]	[640] 70	[1530] 170	[2420] 275	[3310] 375	[4160] 470	[5010] 565	[5870] 665				
68	172	171	171	170	169	167	164				
[20]	[580] 65	[1470] 165	[2370] 270	[3260] 370	[4110] 465	[4960] 560	[5820] 660				
76	191	190	190	189	188	186	184				
[22]	[510] 60	[1390] 155	[2290] 260	[3170] 360	[4030] 455	[4880] 550					
83	210	209	209	208	207	206					
[24]	[440] 50	[1330] 150	[2220] 250	[3100] 350	[3950] 445	[4800] 540					
91	230	229	228	227	225	224					
[26]	[350] 40	[1240] 140	[2130] 240	[3020] 340	[3880] 440	[4730] 535					
98	249	248	247	246	244	242					
[28]	[270] 30	[1150] 130	[2050] 230	[2930] 330	[3790] 430	[4650] 525					
106	268	267	265	264	261	259					
[30]	[180] 20	[1060] 120	[1960] 220	[2850] 320	[3710] 420	[4570] 515					
114	287	286	284	283	281	277					
[35]		[840] 95	[1760] 200	[2640] 300	[3480] 395						
132		335	334	333	332						

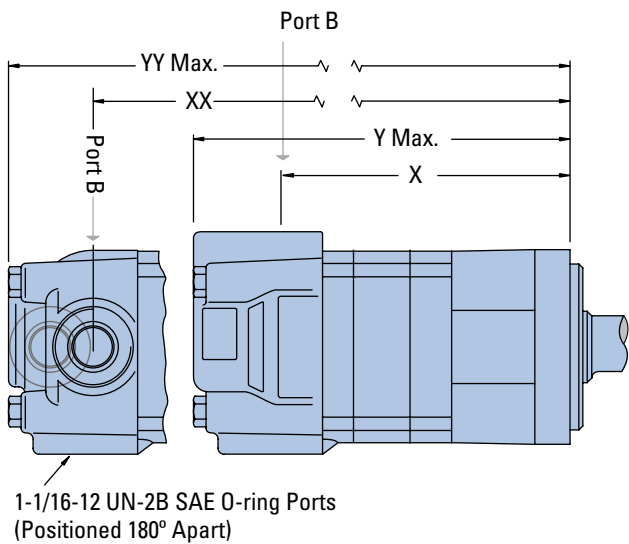
[1760]
200
334 } Torque [lb-in]
Nm
Speed RPM

2000 Series

Dimensions

Standard Mount

Standard Mount

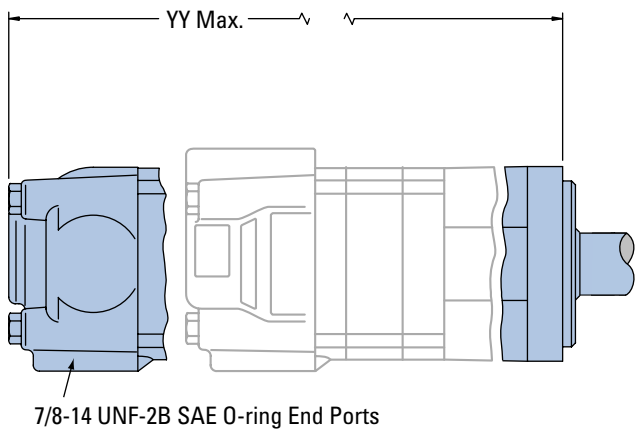


Ports

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

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
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]	270,1 [10.12]

2000 Series

Dimensions

Standard Mount with
Integral Relief Valve

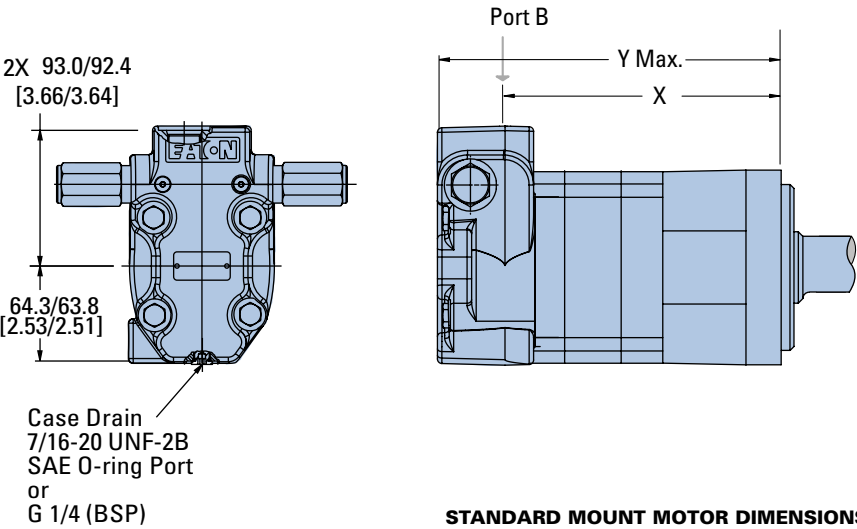
Ports

- 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 cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
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]

2000 Series

Dimensions

Wheel Mount

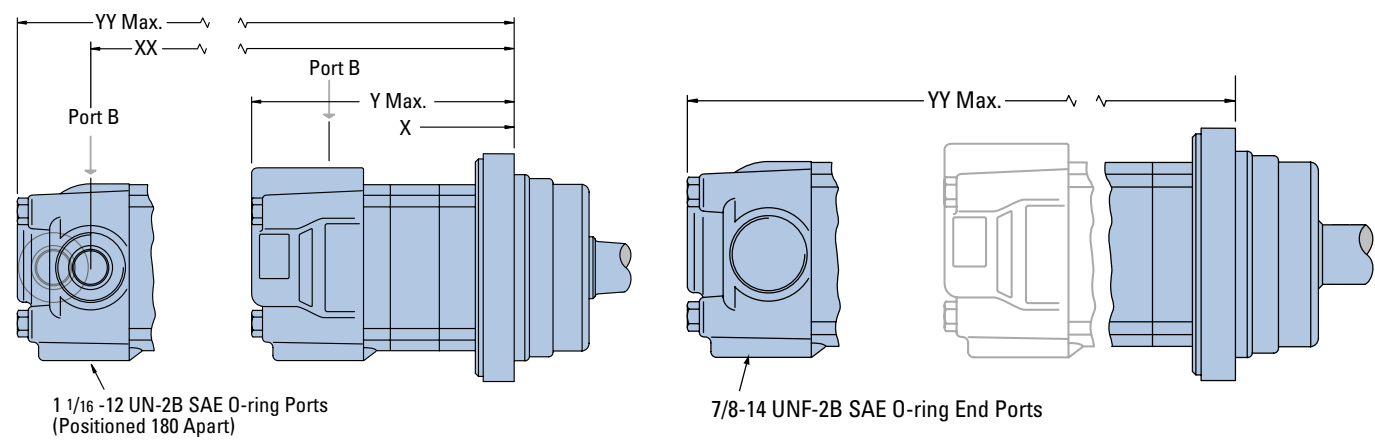
Ports

- 7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 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) or
- 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) or
- 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	X	Y	XX	YY
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]	mm [inch]
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]	172,3 [6.78]
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]

2000 Series

Dimensions

Wheel Mount with Integral
Relief Valve

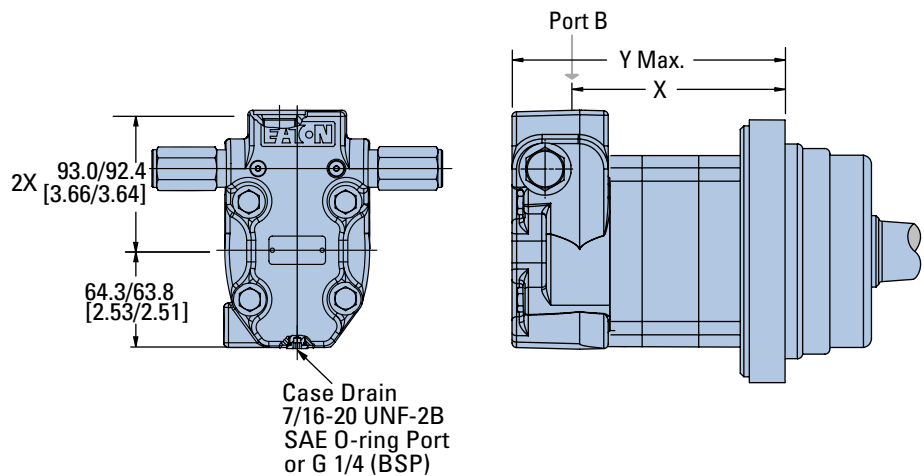
Ports

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



WHEEL MOUNT MOTOR DIMENSIONS

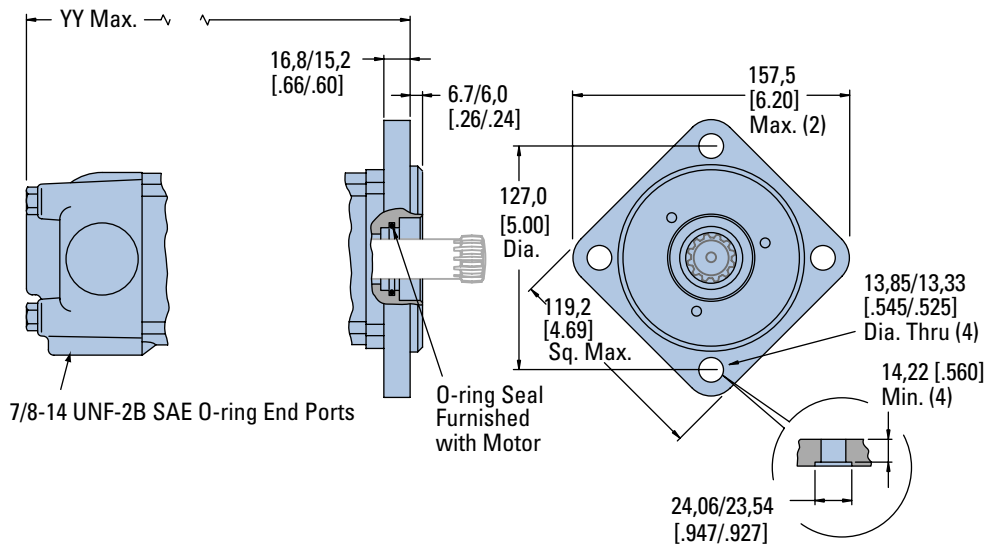
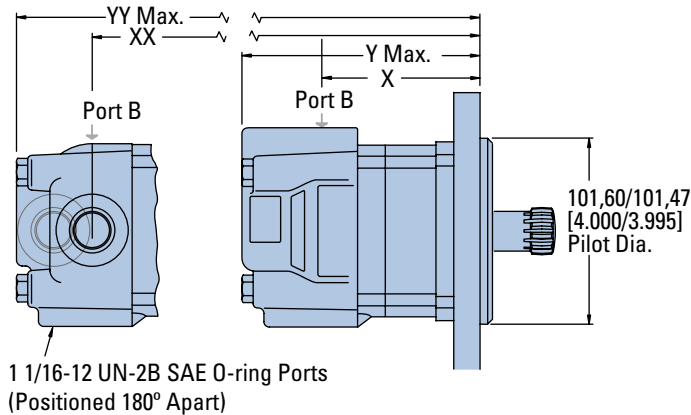
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
80 [4.9]	96,9 [3.82]	144,3 [5.68]
100 [6.2]	101,4 [4.00]	148,9 [5.86]
130 [8.0]	107,8 [4.25]	155,2 [6.11]
160 [9.6]	107,8 [4.25]	155,2 [6.11]
195 [11.9]	114,6 [4.52]	162,1 [6.38]
245 [14.9]	123,5 [4.87]	171,0 [6.73]
305 [18.7]	135,0 [5.32]	182,4 [7.18]
395 [24.0]	151,0 [5.95]	198,4 [7.81]
490 [29.8]	168,2 [6.63]	215,7 [8.49]

2000 Series

Dimensions

Bearingless

Bearingless



Ports

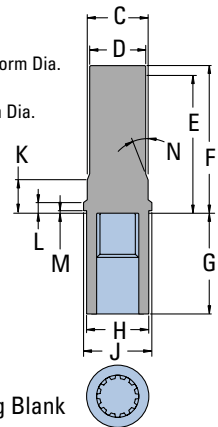
7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
 1 1/16 -12 UN-2B SAE O-ring Ports (Positioned 180° Apart) (2)
 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
 7/8 -14 UNF-2B SAE O-ring End Ports (2)
 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
 G 1/2 (BSP) Staggered Ports (2)
 G 1/4 (BSP) Case Drain Port (1) or
 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

MAT'L

C 35,86 [1.412] Dia.
 D 34,04 [1.340] Dia.
 E 81,0 [3.19] Min. Full Form Dia.
 F 86,1 [3.39] Max.
 G 62,10 [2.445] Full Form Dia.
 H 38,40 [1.512] Dia.
 J 43,7 [1.72] Dia.
 K 25,91 [1.020]
 L 8,25 [.325]
 M 0,89 [.035]
 N 15°



Mating Coupling Blank
 Eaton Part No. 13307-003

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

Note:

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

BEARINGLESS MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
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]
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]	144,3 [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]	164,6 [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]

2000 Series

Dimensions

Bearingless with Integral
Relief Valve

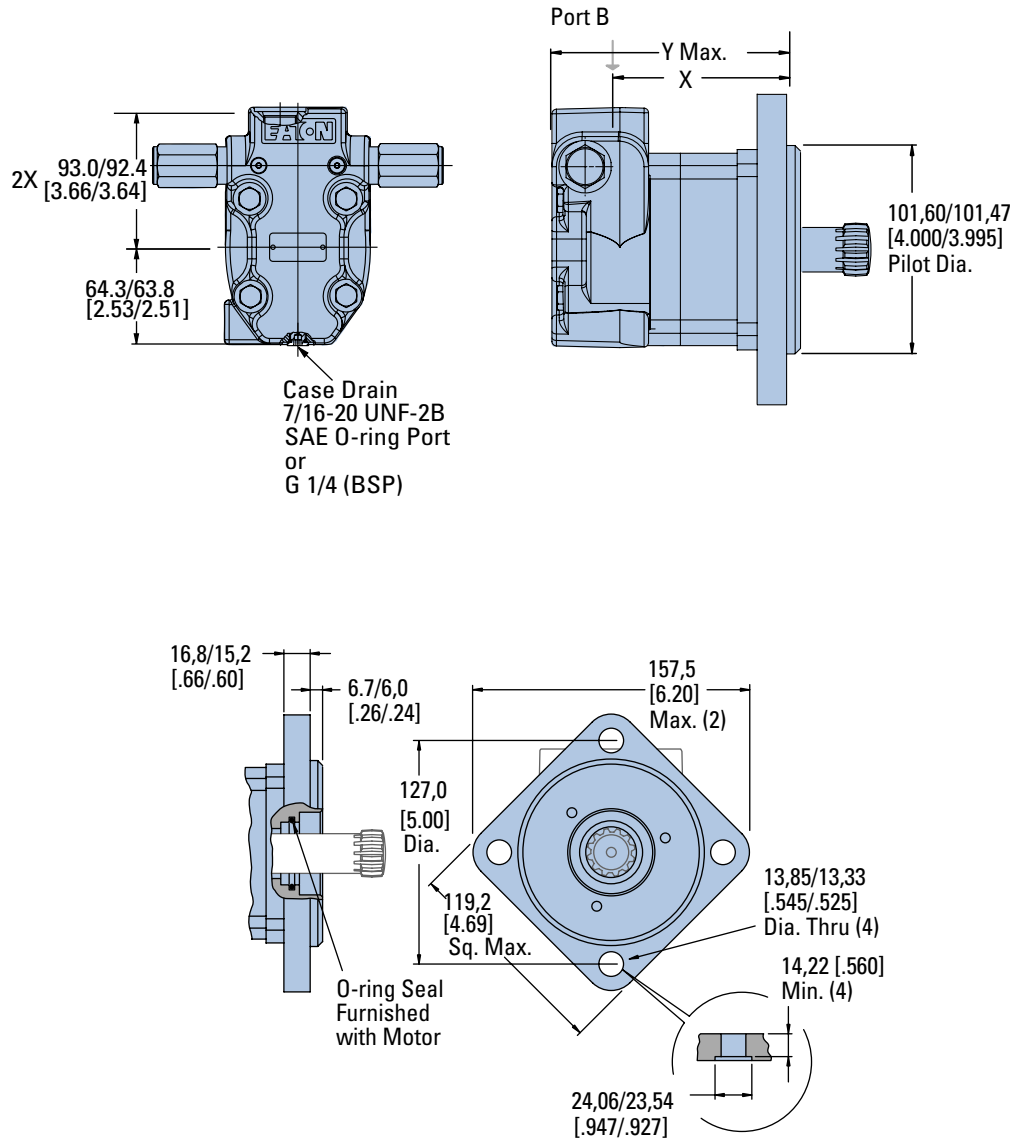
Ports

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



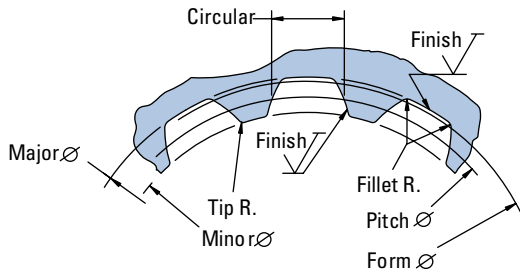
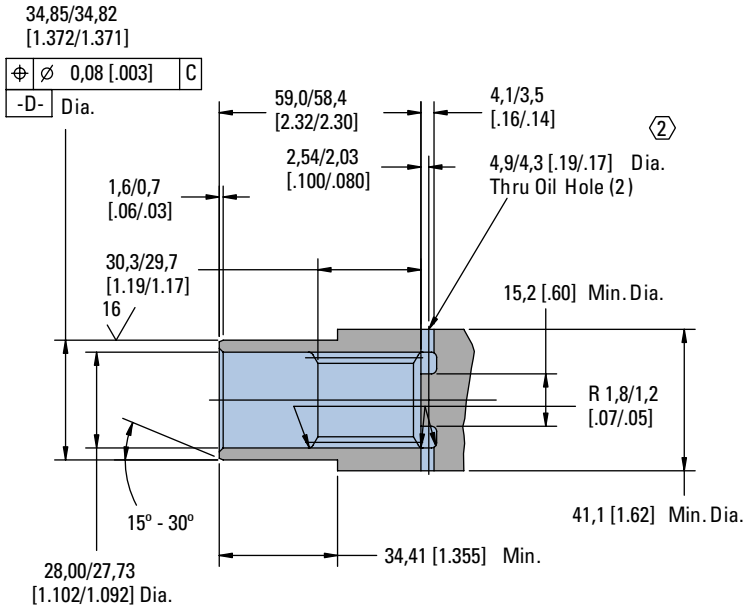
BEARINGLESS MOTORS DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
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]
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]

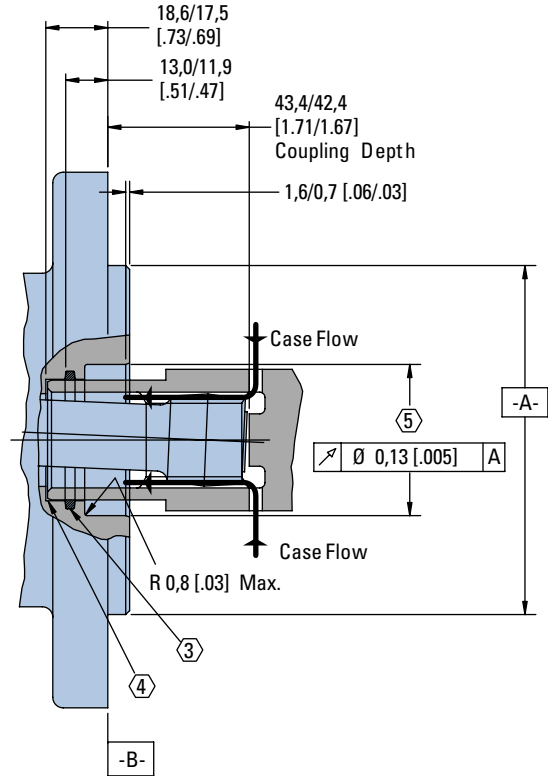
2000 Series

Installation Information

Bearingless



- 1 Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H vacuum degassed alloy steel carbonize to a hardness of 59-62 HRc with case depth (to 50HRc) of 0,076 -1,02 [.030 -.040]. Dimensions apply after heat treat.
- 2 Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
- 3 Seal to be furnished with motor for proper oil circulation thru splines.
- 4 Some means of maintaining clearance between shaft and mounting flange must be provided.
- 5 Counterbore designed to adapt a standard sleeve bearing 35,010 -35,040 [1.3784 -1.3795] I.D. by 44,040 -44,070 [1.7339 -1.7350] O.D. (Oilite Bronze Sleeve Bearing AAM3544-22).



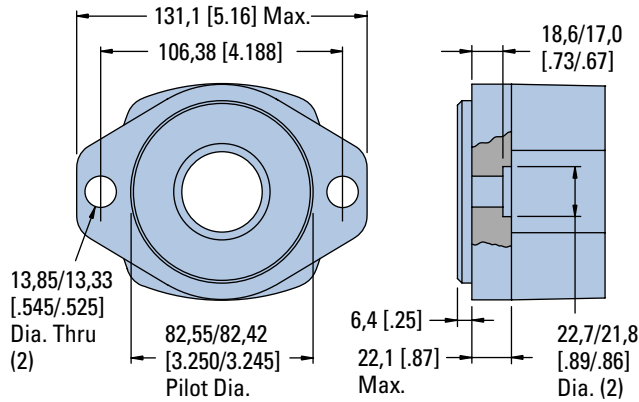
Spline Pitch.....	12/24
Pressure Angle.....	30°
Number of teeth.....	12
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Side Pitch Diameter.....	Ref. 25,400000 [1.0000000]
Base Diameter.....	Ref. 21,997045 [.8660254] $\varnothing$ 0,21 [.008] D
Major Diameter.....	(27,74 [1.092] Max. 27,59 [1.086] Min.)
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 [1.700]
Minimum Effective	4,216 [1.660]
Maximum Effective	Ref. 4,270 [1.681]
Minimum Actual	Ref. 4,247 [1.672]
Dimension Between Two Pins	Ref. 19,020 - 19,190 [.7488 - .7555]
Pin Diameter	4,496 [1.770] Pins to Have 3,38 [.133]
Wide Flat for Root Clearance	

2000 Series

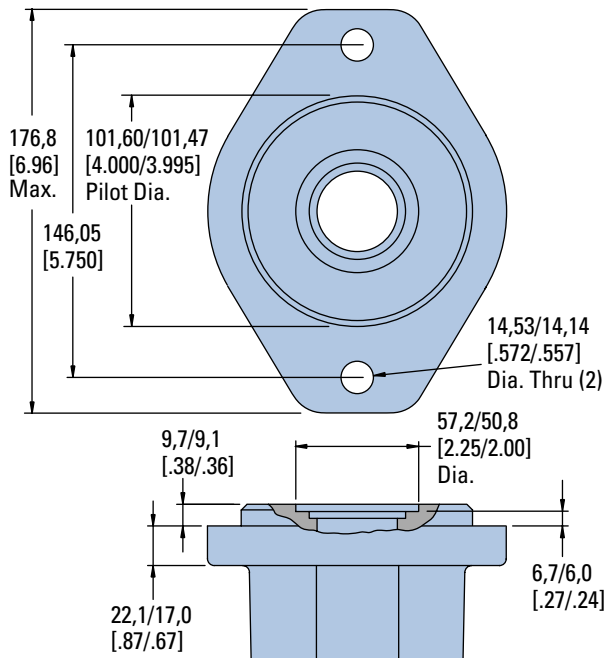
Dimensions

Mounting Options

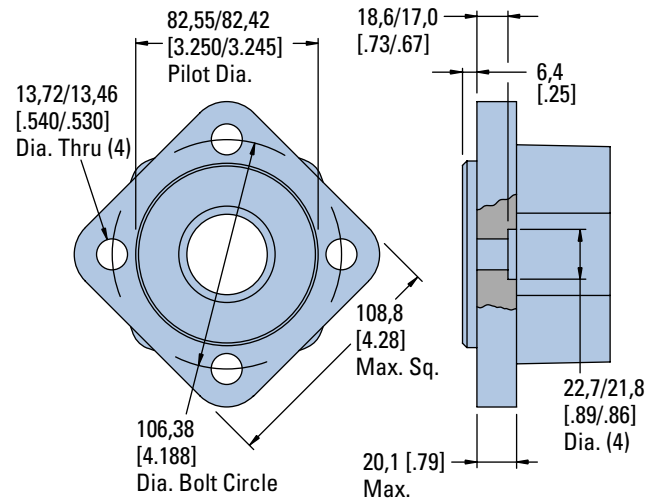
SAE A — Two Bolt (Standard Motor)



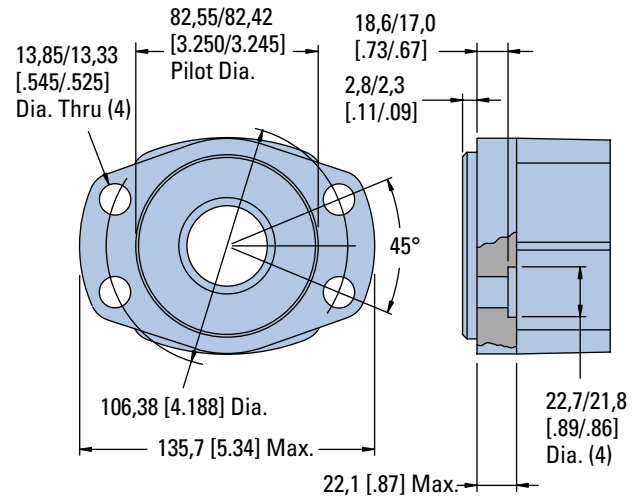
SAE B — Two Bolt



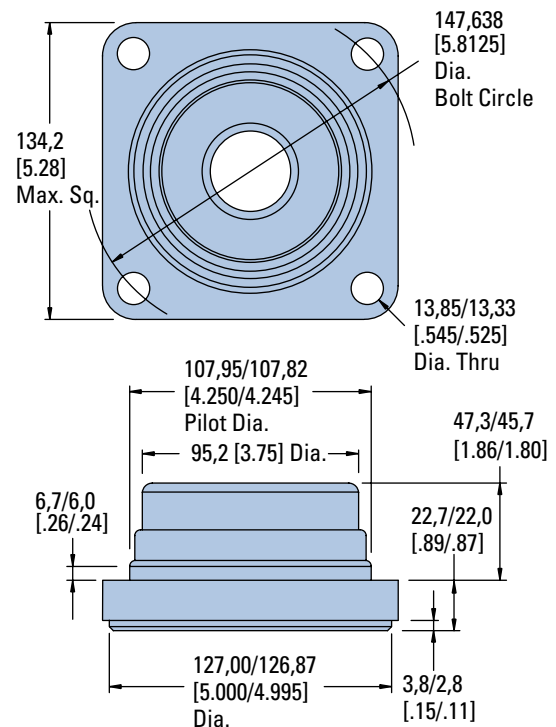
Four Bolt



Four Bolt Magneto



Four Bolt (Wheel Motor)

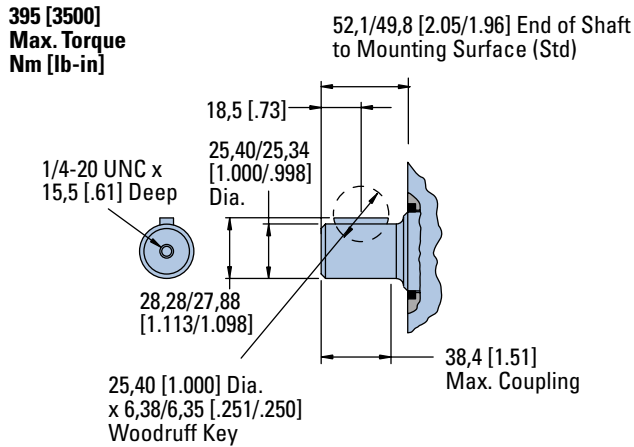


2000 Series

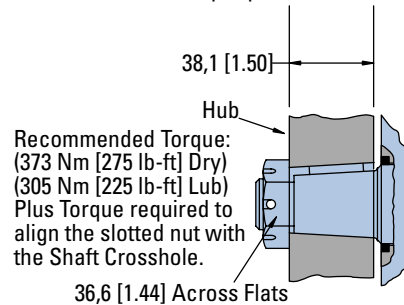
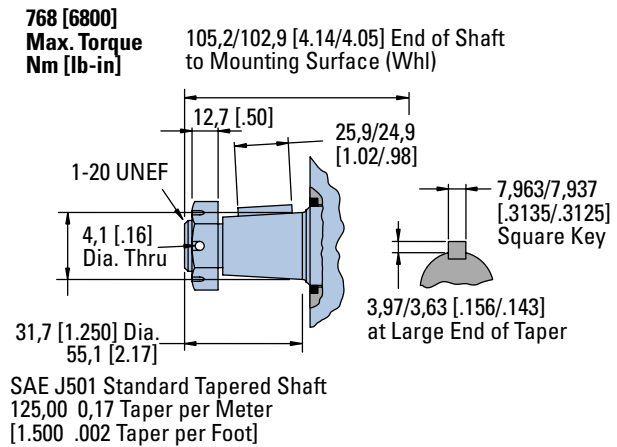
Dimensions

Shafts

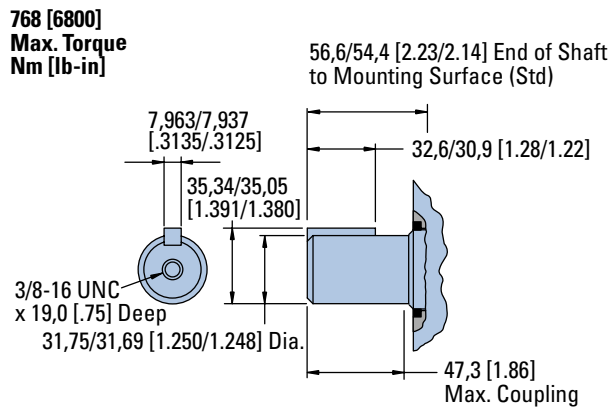
1 Inch Straight



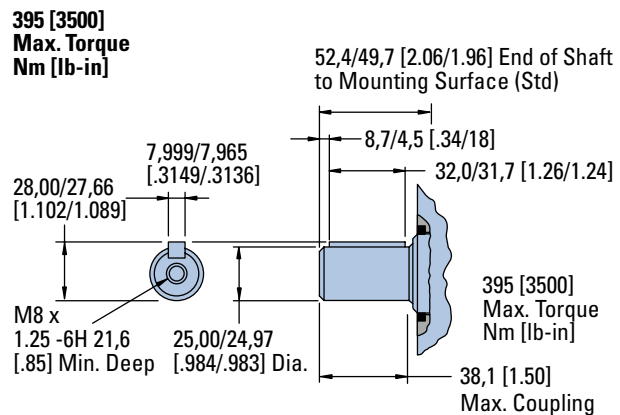
1 1/4 Inch Tapered



1 1/4 Inch Straight



25 mm Straight



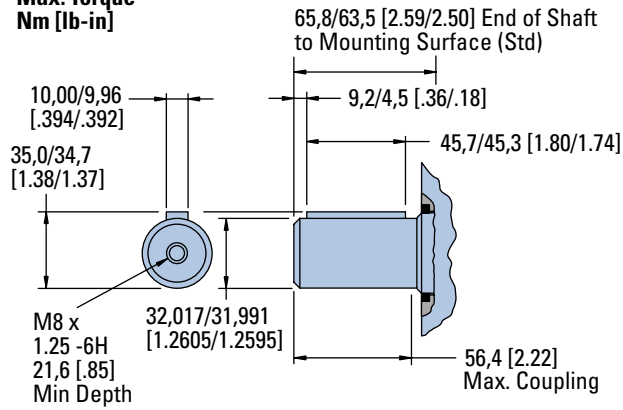
2000 Series

Dimensions

Shafts

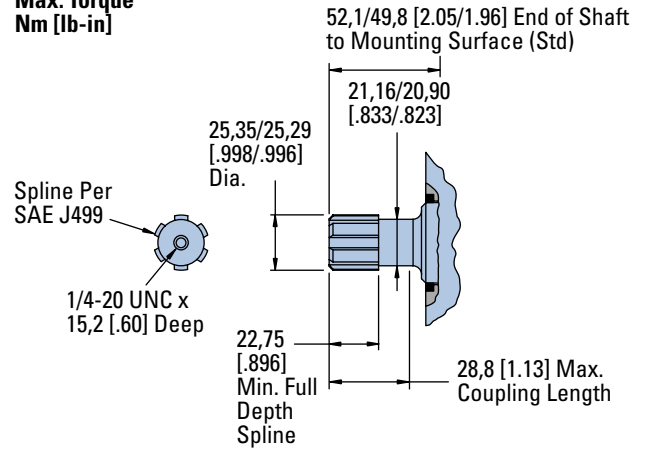
32 mm Straight

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



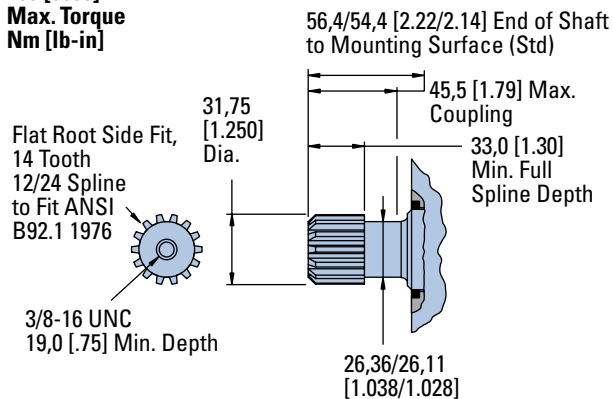
SAE 6B Splined

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



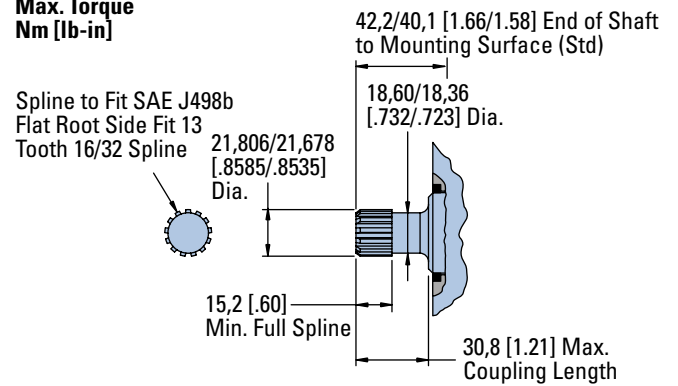
1 1/4 -14 Tooth Splined

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



13 Tooth Splined

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



2000 Series

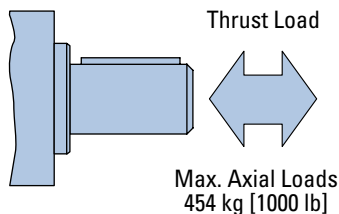
Shaft Side Load Capacity

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

Each curve is based on



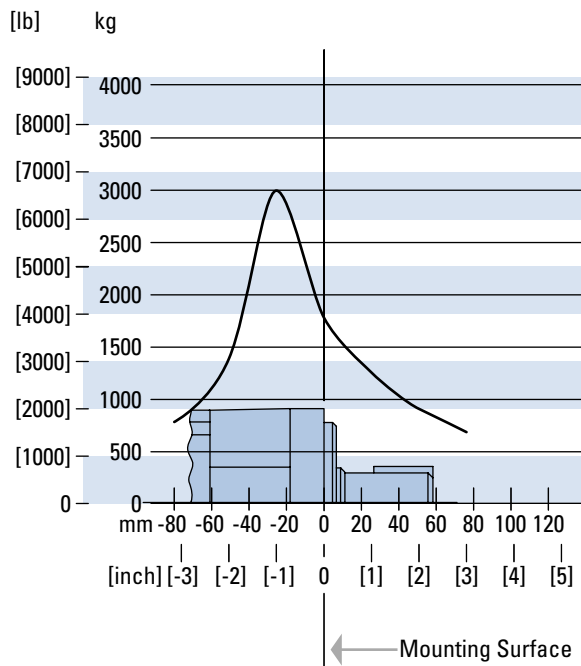
B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

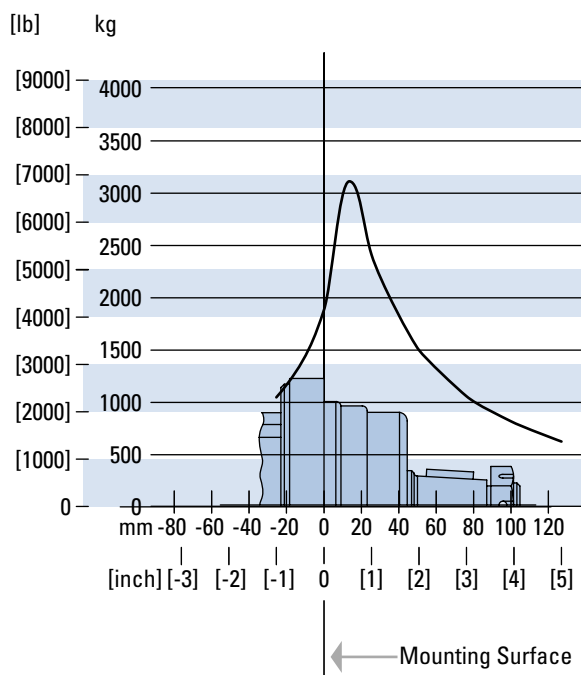
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



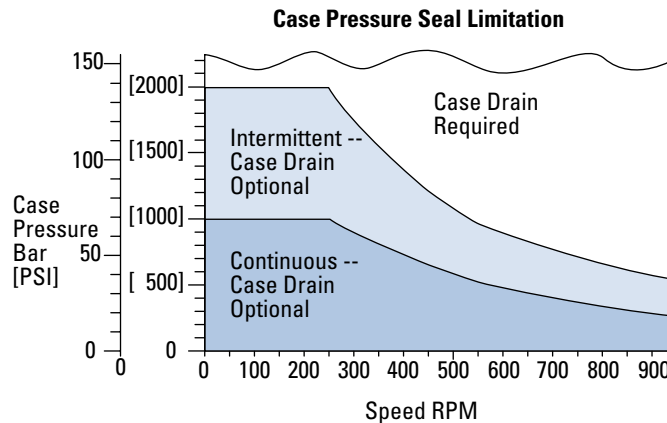
Wheel Motor
Tapered Shaft



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 Advantage

Contamination Control — flushing the motor case.

Cooler Motor — exiting oil draws motor heat away.

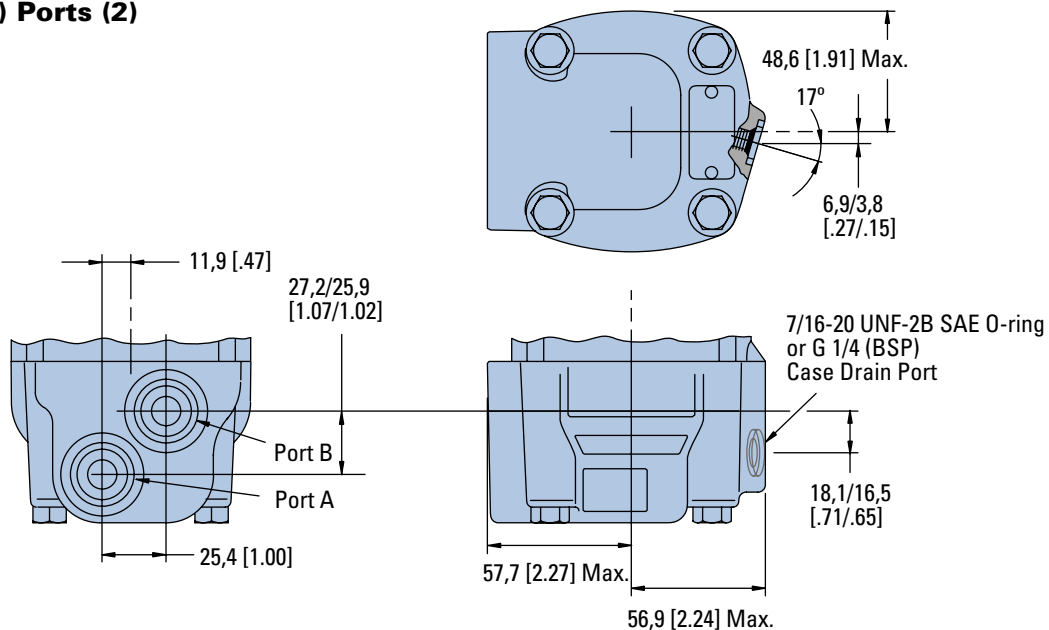
Extend Motor Seal Life — maintain low case pressure with a preset restriction in the case drain line.

2000 Series

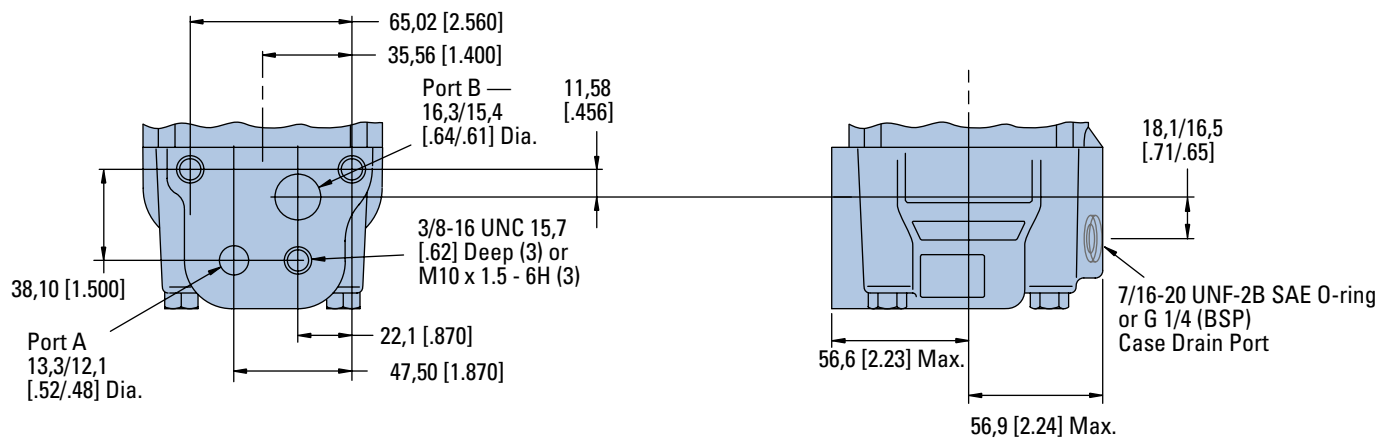
Dimensions

Ports

7/8-14 UNF-2B SAE O-ring Ports (2) or G 1/2 (BSP) Ports (2)



Manifold Mount

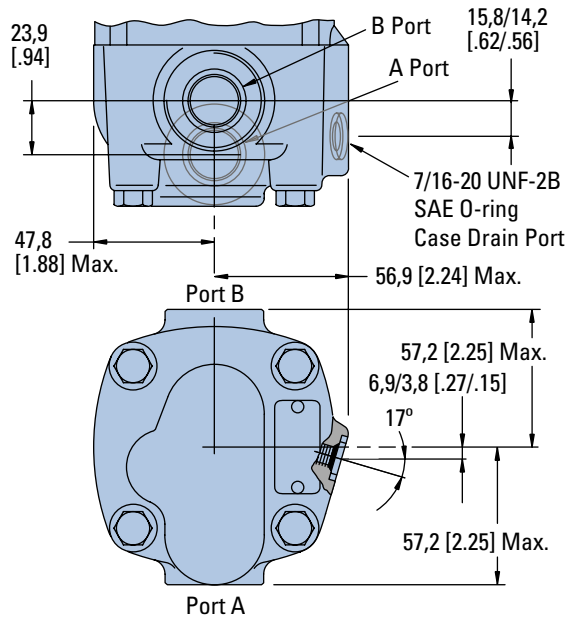


2000 Series

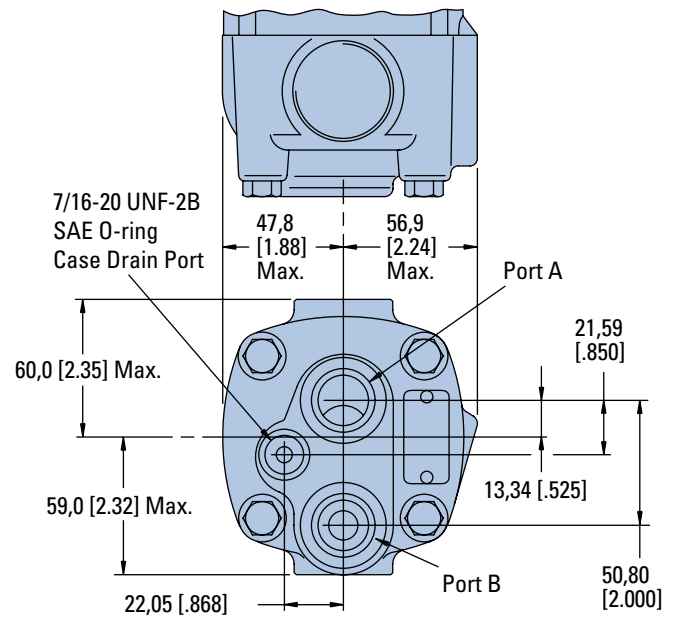
Dimensions

Ports

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



7/8-14 UNF-2B SAE O-ring End Ports (2)

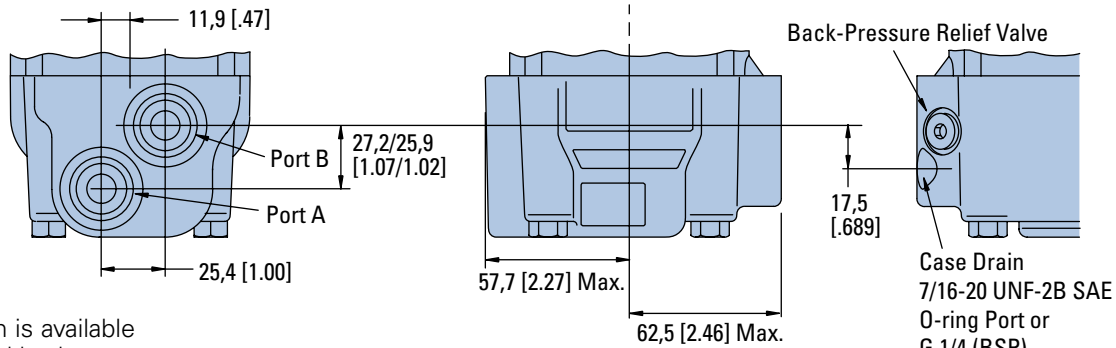


2000 Series

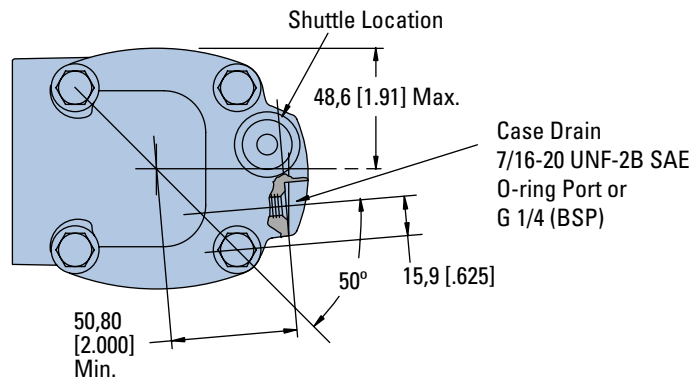
Dimensions

Ports with Shuttle

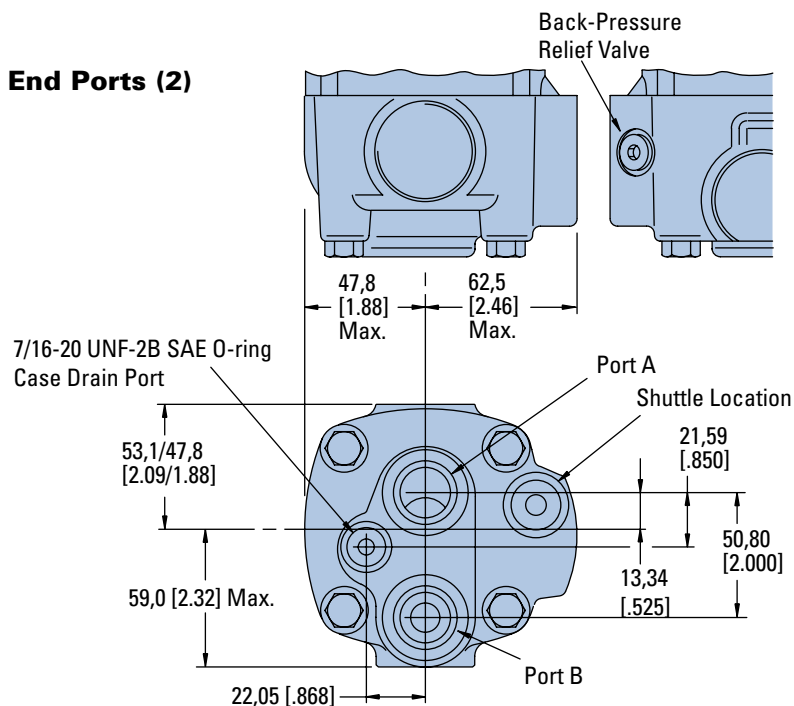
7/8 -14 UNF-2B SAE O-ring Ports (2) or G 1/2 (BSP) Ports (2)



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



7/8 -14 UNF-2B SAE O-ring End Ports (2)



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

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.

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER									
			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]
2 Bolt SAE A Flange	1 Inch Straight	7/8 -14 O-ring Staggered	104-1001	—	-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 1/4 Inch Straight	7/8 -14 O-ring Staggered	104-1022	—	-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 1/4 Inch 14 T Splined	7/8 -14 O-ring Staggered	104-1029	—	-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 1/4 Inch Straight	7/8-14 O-ring Staggered	104-1200	—	-1201	-1202	-1203	-1204	-1205	-1206	-1207	—
	1 1/4 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))	104-1384	—	-1385	-1386	-1387	-1388	-1389	-1390	-1391	—
	1 1/4 Inch 14 T Splined	G 1/2 (BSP)	104-1376	—	-1377	-1378	-1379	-1380	-1381	-1382	-1383	—
Wheel Motor	1 1/4 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 1/4 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 1/4 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	—	-1080	-1081	-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	—

*New Release

106-1044

Motors with Corrosion Protection

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER									
			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]
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	104-1516	—	-1536	-1537	-1538	-1539	-1452	-1479	-1509	-1489

*New Release

2000 Series

Model Code

M	0 2		* *			* *		* *		* *		* *		*	* *		1	*	* *		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
cm³/r [in³/r]
049 – 80.6 cm³/r [4.92]
055 – 90.6 cm³/r [5.53 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 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 (Magnet), 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. 2.79 [1.10] Pilot Length

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)

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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

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. .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)

18 – 31.75 [1.250] Dia. .125:1 Tapered Shaft per SAE J501 with 1.000-20UNEF-2A Threaded Shaft End and Slotted Hex Nut, 7.938 [.3125] Sq x 25.40 [1.000] Straight Key, Corrosion Resistant (Under seal area only)

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

28 – 32.00 [1.260] Dia. 10:1 Tapered Shaft Per ISO R775 with M10 X 1.50-6H Thread in End, 6.00 [.236] Sq. x 50.00

[1.968] Key
39 – None (Bearingless)
European Spline
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

[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

AR – .875-14 UNF-2B SAE O-ring Ports - End Ported, Cast Boss Removed

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)

00 – None

01 – .4375-20 UNF-2B SAE O-Ring Port

02 – G 1/4 BSP Straight THD Port

09 – Reverse Flow Shuttle Valve w/ G-1/4 BSP Straight THD Port, .062 Dia. Shuttle Flow Orifice

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

Integral Cross-Over Relief Valve:

00 – None

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]

[18] Geroler Option
1 – Standard

[19] Seal Options
0 – Standard

1 – Viton

2 – Viton Shaft Seal

4 – Seal Guard

[20], [21] Accessories
00 – None

AD – M 12 Threaded Connector, Digital Speed Pickup (30 Pulse)

AE – M 12 Threaded Connector, Long Body Digital Speed and Direction Pickup (1 = Power Supply, Pin 2 = Output Signal 1, Pin 3 = Common, Pin 4 = Output Signal 2)

[22], [23] Special Features (Hardware)

00 – None

[24], [25] Special Features (Assembly)

00 – None

AB – Reverse Rotation

[26], [27] Paint/Packaging
AA – No Paint, Indiv. Box
AB – Painted, Low Gloss Black, Indiv. Box

AC – Epoxy Coated (Frost Gray) Indiv. Box

[28], [29] Customer ID
AA – None

[30] Design Code
F – Sixth

2000 Series Two-Speed

Description

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 Δ Bar [100 Δ 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.

Finally 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:

Low displacement (4.9 to 8.0 CID) motors have limited starting torque when started in high speed mode.

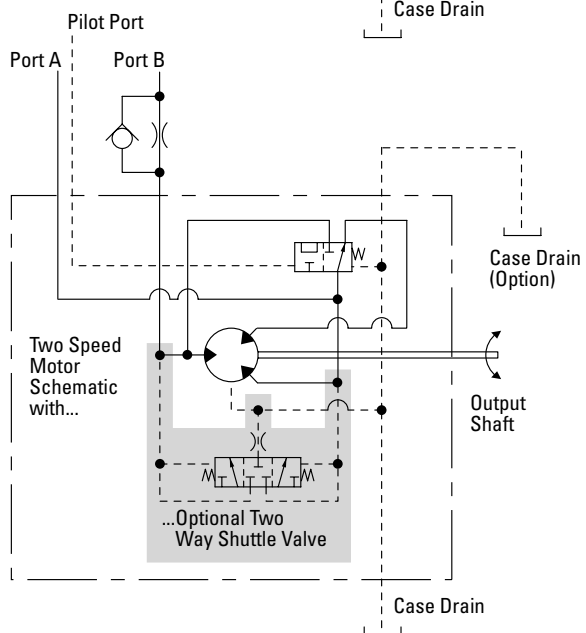
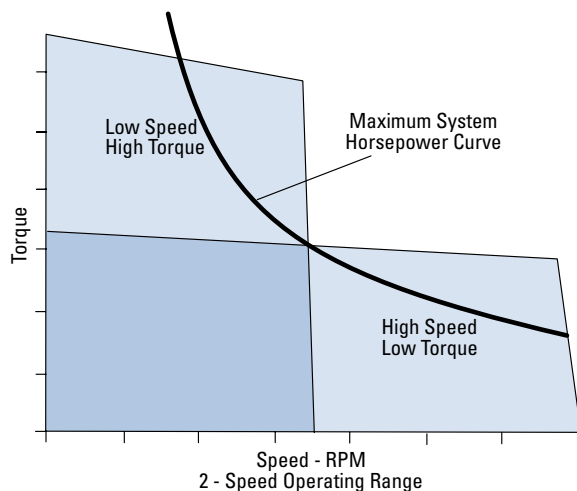
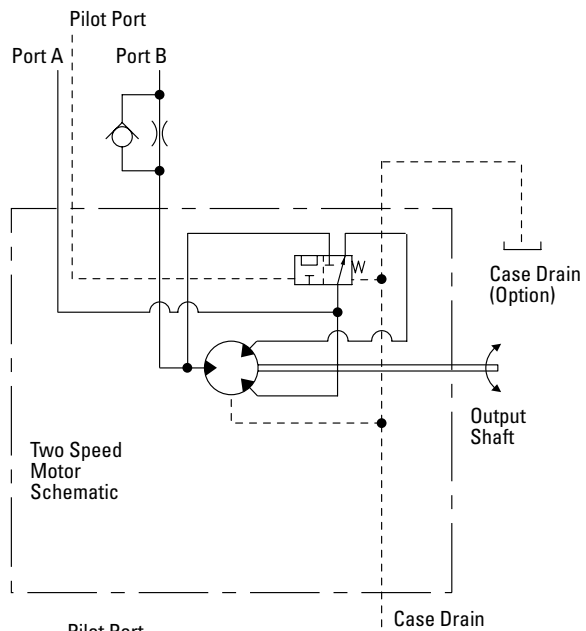
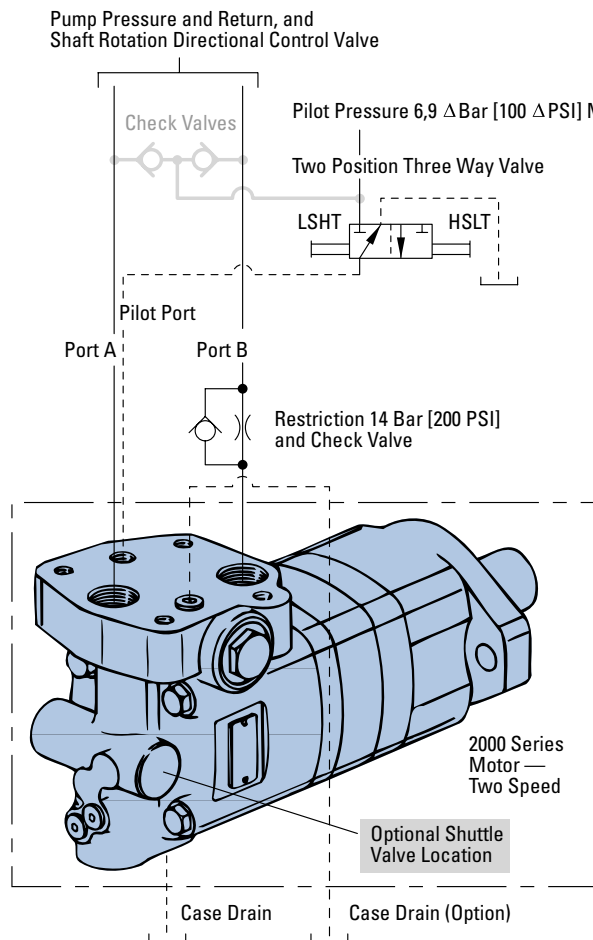
Be certain in closed loop applications that the charge pump when used for back pressure on the B port, has sufficient displacement to maintain charge pressure especially in dynamic braking or overrunning load conditions.

Important!

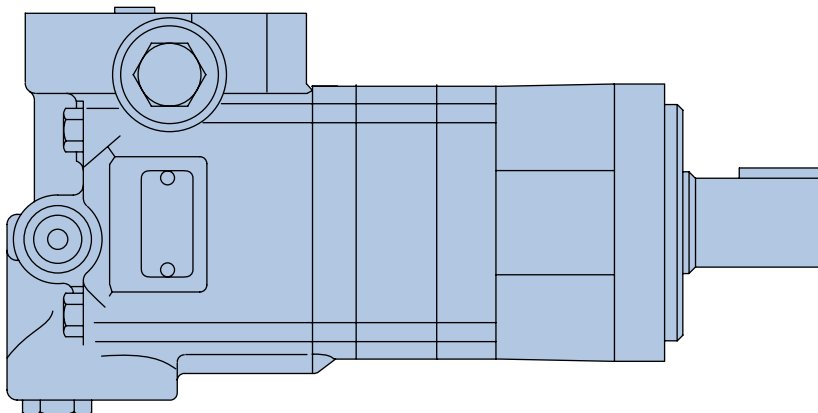
Due to potential problems in maintaining charge pump pressure at port B for uninterrupted back pressure during dynamic braking, Eaton does not recommend the two speed motor where overrunning conditions may exist.

2000 Series Two-Speed

Typical Hydraulic Circuit



2000 Series Two-Speed Specifications



SPECIFICATION DATA — 2000 SERIES TWO-SPEED MOTORS

Displ. cm ³ /r [in ³ /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)	High Speed Mode	1000	1000	990	860	700	560	450	350	230
@ Continuous Flow	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*	High Speed Mode									
Nm	Continuous	100 [880]	125 [1115]	165 [1450]	195 [1725]	240 [2150]	300 [2675]	380 [3350]	365 [3225]	448 [3970]
[lb-in]	Intermittent	145 [1300]	185 [1660]	240 [2150]	240 [2150]	300 [2650]	375 [3330]	440 [3900]	445 [3940]	486 [4300]
Torque*	Low Speed Mode									
Nm	Continuous	235 [2065]	295 [2630]	385 [3420]	455 [4040]	540 [4780]	660 [5850]	765 [6750]	775 [6840]	845 [7470]
[lb-in]	Intermittent	345 [3035]	445 [3950]	560 [4970]	570 [5040]	665 [5890]	820 [7250]	885 [7820]	925 [8170]	930 [8225]
Pressure	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	155 [2250]	120 [1750]
Δ bar [Δ PSI]	Intermittent	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	260 [3750]	190 [2750]	140 [2000]
Weight	Standard or	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]
kg [lb]	Wheel Mount									
	Bearingless	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 for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

2000 Series

Two-Speed

Dimensions

Standard and Wheel

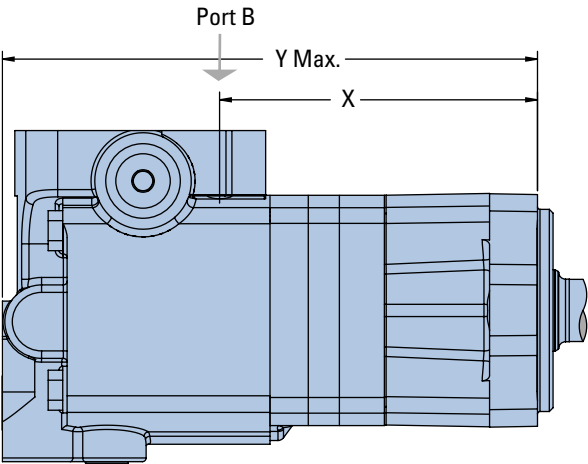
Ports

- 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) or
- 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

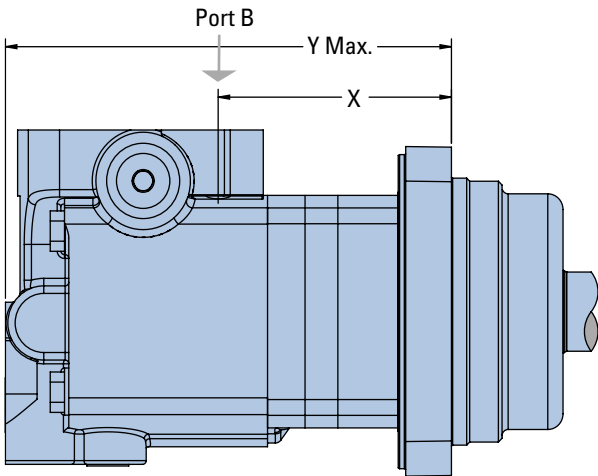
Two-Speed Standard Motors



STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /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]

Two-Speed Wheel Motors



WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /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]

2000 Series Two-Speed

Dimensions

Bearingless

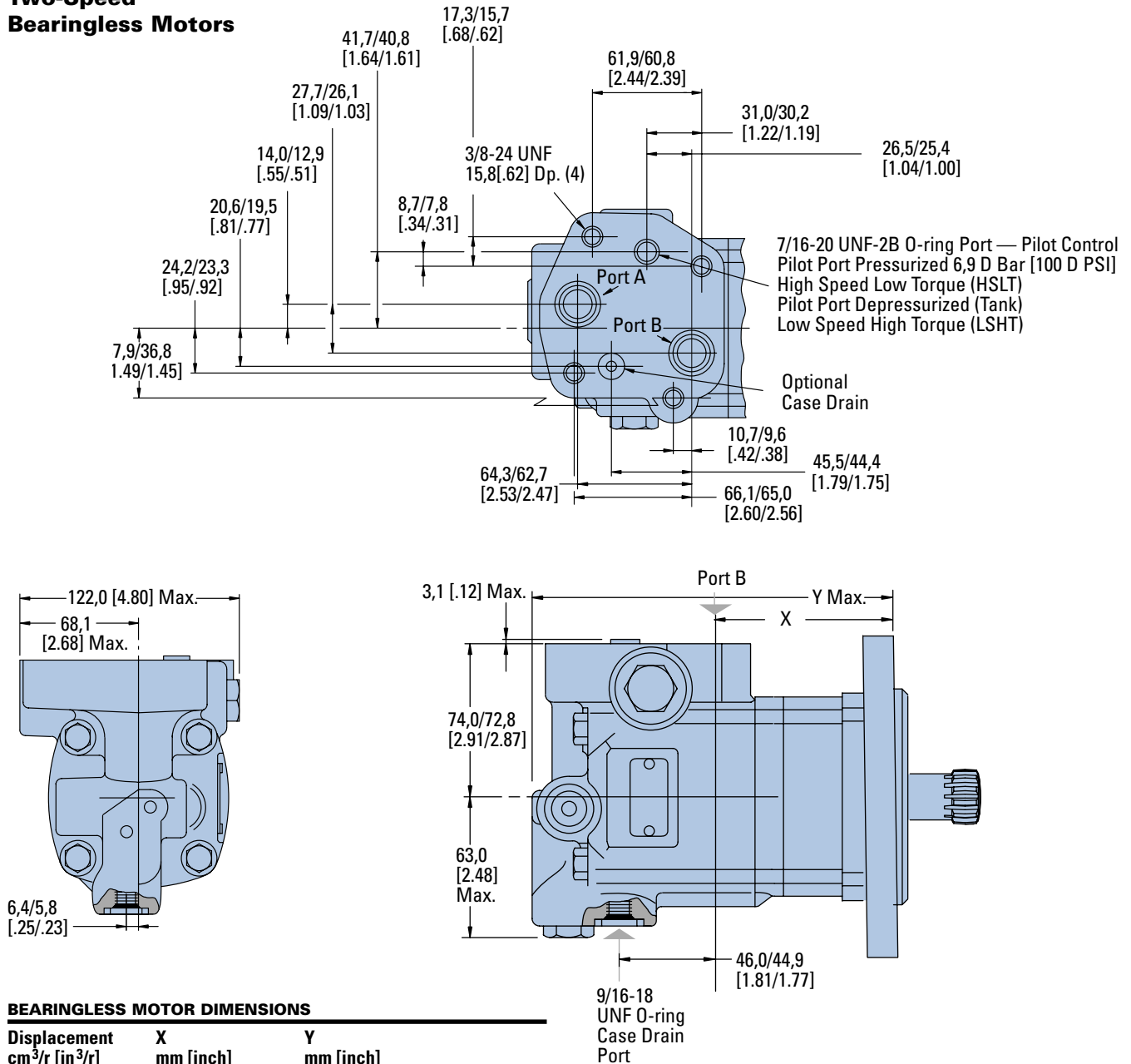
Ports

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) or
 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 Bearingless Motors



BEARINGLESS MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /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]

2000 Series Two-Speed

Product Numbers

Note:

For 2000 Series Motors with a configuration **Not Shown** in the charts below, contact your Eaton Representative.

Use digit prefix — 104-, 105-, or 106- plus four digit number from charts for complete product number— Example 106-2007.

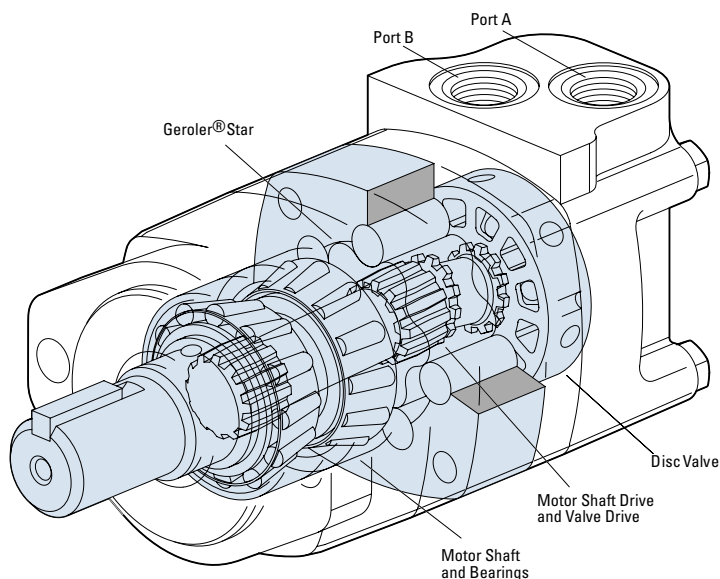
Orders will not be accepted without three digit prefix.

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER								
			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]
2 Bolt SAE A Flange	1 Inch Straight	7/8 -14 O-ring Staggered	104-2001	-2002	-2003	-2004	-2005	-2006	-2007	-2008	—
	1 1/4 Inch Straight	7/8 -14 O-ring Staggered	104-2009	-2010	-2011	-2012	-2013	-2014	-2015	-2016	-2219
	1 1/4 Inch 14 T Splined	7/8 -14 O-ring Staggered	104-2017	-2018	-2019	-2020	-2021	-2022	-2023	-2024	—
Wheel Motor	1 1/4 Inch Tapered	7/8 -14 O-ring Staggered	105-2001	-2002	-2003	-2004	-2005	-2006	-2007	-2008	—
	1 1/4 Inch 14 T Splined	7/8 -14 O-ring Staggered	105-2009	-2010	-2011	-2012	-2013	-2014	-2015	-2016	—
Bearingless		7/8 -14 O-ring Staggered	106-2001	-2002	-2003	-2004	-2005	-2006	-2007	-2008	—

106-2006

4000 Compact Series

Highlights



Features

- Shuttle Valve with Back-Pressure Relief Valve
- Speed Sensors
- End Ports.

Benefits

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

Applications

- Skid Steer Loaders
- Fairway Mowers
- Harvesters
- Vehicles where space may be at a premium.

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 or standard output shaft sizes of the 4000 Series, plus one new 1-1/2 inch straight (the small envelope and optional shaft sizes make this motor ideal for vehicles like skid-steer loaders whose hallmark is high power and productivity in a small frame.)

Specifications

Geroler Element	6 Displacements
Flow l/min [GPM]	75 [20] Continuous**
	115 [30] Intermittent*
Speed RPM	464 Cont.**
	699 Inter.*
Pressure bar [PSI]	200 [3000] Cont.**
	300 [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.



Lawn and Turf



Skid Steer



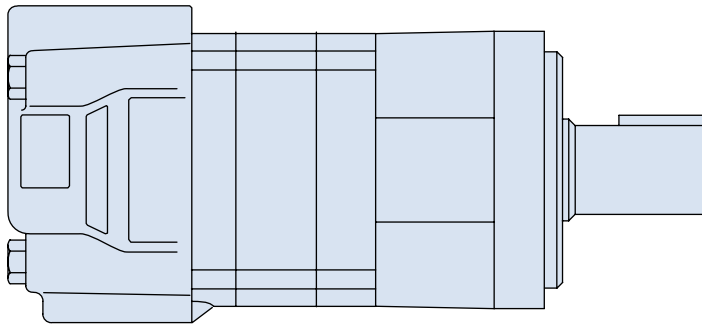
Boom Lift



Harvester

4000 Compact Series

Specifications



SPECIFICATION DATA — 4000 COMPACT SERIES MOTORS

Displ. cm ³ /r [in ³ /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	562	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]	758 [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 [3000]	225 [3000]	205 [3000]	170 [2500]	140 [2000]	140 [2000]
	Intermittent	310 [4500]	295 [4250]	260 [3750]	240 [3500]	170 [2500]	171 [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 for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

Maximum Inlet Pressure:

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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

4000 Compact Series

Performance Data

160 cm³/r [9.8 in³/r]
Δ Pressure Bar [PSI]

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

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

	Continuous
	Intermittent
	Peak
	No Operation

	[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	244 28 4	543 61 3															
[0.5] 1.9	274 31 10	554 63 8	854 96 7														
[1] 3.8	274 31 22	593 67 21	899 102 20	1210 137 19	1513 171 17	1816 205 14	2092 236 12	2361 267 10	2621 296 9	2874 325 7	3088 349 6						
[2] 7.5	301 34 40	623 70 39	940 106 38	1261 143 36	1579 178 35	1898 214 33	2197 248 31	2492 282 28	2766 313 24	3033 343 20	3270 369 17	3496 395 14	3761 425 10	4022 454 6			
[4] 15	305 34 87	662 75 85	1004 113 83	1354 153 81	1699 192 79	2046 231 77	2386 270 74	2725 308 72	3049 344 67	3368 381 63	3693 417 59	4016 454 55	4319 488 49	4618 522 44	4828 545 35	5022 567 27	
[6] 23	293 33 133	659 74 131	1003 113 129	1357 153 127	1705 193 124	2056 232 121	2399 271 118	2741 310 114	3074 347 109	3405 385 104	3751 424 99	4098 463 93	4417 499 87	4732 535 80	5023 568 71	5308 600 63	
[8] 30	280 32 181	656 74 179	1002 113 177	1360 154 175	1711 193 172	2066 233 169	2412 273 166	2758 312 162	3100 350 157	3442 389 152	3809 430 145	4180 472 139	4514 510 133	4846 548 127	5218 590 120	5593 632 113	5856 662 104
[10] 38	259 29 228	630 71 225	978 110 223	1348 152 220	1701 192 217	2061 233 213	2408 272 209	2755 311 204	3102 351 199	3450 390 193	3806 430 186	4163 470 179	4500 508 172	4835 546 165	5191 586 157	5547 627 150	5784 653 141
[12] 45	238 27 275	604 68 272	954 108 269	1336 151 266	1692 191 262	2056 232 258	2403 272 253	2752 311 247	3105 351 241	3458 391 235	3802 430 229	4146 468 223	4485 507 214	4824 545 205	5163 583 197	5501 622 189	
[14] 53	210 24 322	577 65 319	923 104 316	1308 148 313	1665 188 308	2034 230 304	2385 269 298	2739 310 293	3092 349 286	3447 390 279	3796 429 272	4144 468 265	4487 507 256	4830 546 247			
[16] 61	182 21 370	550 62 367	893 101 363	1280 145 360	1638 185 356	2012 227 351	2367 267 345	2727 308 339	3080 348 332	3436 388 324	3789 428 317	4143 468 309	4489 507 301	4836 546 292			
[18] 68	143 16 417	514 58 414	853 96 410	1247 141 406	1601 181 401	1973 223 397	2329 263 390	2692 304 383	3045 344 375	3401 384 366	3756 424 358	4114 465 350					
[20] 76	105 12 464	478 54 461	814 92 457	1213 137 453	1564 177 448	1935 219 442	2291 259 435	2658 300 428	3010 340 418	3366 380 409	3724 421 400	4085 462 390					
[22] 83		433 49 508	762 86 504	1167 132 500	1518 172 495	1893 214 489	2252 254 482	2623 296 474	2973 336 465	3328 376 456	3682 416 446	4040 456 436					
[24] 91		387 44 556	711 80 552	1121 127 548	1472 166 542	1851 209 537	2212 250 529	2589 292 521	2937 332 513	3291 372 504	3641 411 493	3995 451 483					
[25] 95		363 41 580	683 77 576	1095 124 572	1445 163 566	1824 206 560	2184 247 552	2561 289 544	2910 329 535	3266 369 526							
[30] 114		244 28 699	546 62 695	967 109 692	1308 148 685	1689 191 678	2045 231 669	2421 274 660	2777 314 648	3144 355 637							

[2777]
314 } Torque [lb-in]
648 } Nm
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No Operation

200 cm³/r [12.3 in³/r]
Δ Pressure Bar [PSI]

	[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]	[4000]	[4250]
	15	35	50	70	85	105	120	140	155	170	190	205	225	240	260	275	295
[0.25]	115	504															
0.95	13	57															
	4	3															
[0.5]	268	584	963	1274													
1.9	30	66	109	144													
	8	7	4	3													
[1]	306	721	1104	1516	1913	2243	2397	2772									
3.8	35	81	125	171	216	253	271	313									
	17	16	14	13	12	10	9	6									
[2]	402	841	1218	1647	2107	2478	2826	3238	3954	4451	4755	5127	5407	5569	5855		
7.5	45	95	138	186	238	280	319	366	447	503	537	579	611	629	662		
	35	34	32	31	30	28	27	24	29	26	23	21	17	11	8		
[4]	403	896	1361	1780	2247	2649	3068	3513	3947	4367	4710	5125	5509	5880	6249	6547	6753
15	46	101	154	201	254	299	347	397	446	493	532	579	622	664	706	740	763
	72	70	69	68	66	65	62	60	56	53	50	46	42	37	31	24	19
[6]	385	863	1354	1785	2260	2657	3087	3547	3965	4389	4793	5218	5610	6015	6408	6754	7436
23	44	98	153	202	255	300	349	401	448	496	542	590	634	680	724	763	840
	109	107	106	104	102	100	97	93	90	86	81	77	72	66	60	52	47
[8]	368	831	1347	1790	2273	2665	3106	3581	3982		4876	5311	5712	6151	6567	6961	7334
30	42	94	152	202	257	301	351	405	450	498	551	600	645	695	742	786	829
	147	146	144	142	140	137	134	130	127	122	117	113	108	103	98	91	83
[10]	353	822	1319	1774	2212	2642	3086	3556	3974	4410	4839	5297	5715	6147	6563		
38	40	93	149	200	250	299	349	402	449	498	547	598	646	695	742		
	185	184	181	179	177	174	170	165	161	156	151	146	140	134	129		
[12]	339	813	1291	1758	2151	2620	3067	3530	3965	4408	4802	5283	5718	6144	6568		
45	38	92	146	199	243	296	346	399	448	498	543	597	646	694	742		
	223	222	219	217	214	211	207	202	197	192	186	180	174	167	164		
[14]	282	762	1237	1693	2121	2601	2968	3504	3953	4368	4832	5261	5690				
53	32	86	140	191	240	294	335	396	447	493	546	594	643				
	261	260	257	255	252	248	244	238	233	227	221	214	208				
[16]	224	712	1183	1629	2091	2581	2870	3477	3940	4328	4861	5240	5661				
61	25	80	134	184	236	292	324	393	445	489	549	592	640				
	299	298	296	293	290	286	282	275	269	263	256	249	243				
[18]	200	667	1148	1619	2053	2520	2899	3442	3906	4337	4819	5245	5644				
68	23	75	130	183	232	285	328	389	441	490	544	593	638				
	337	336	334	331	328	324	320	314	307	301	293	285	278				
[20]	176	623	1112	1609	2014	2458	2929	3407	3872	4347	4777	5250	5627				
76	20	70	126	182	228	278	331	385	437	491	540	593	636				
	375	374	372	369	366	363	358	353	346	339	331	322	315				
[22]		565	1053	1530	1934	2387	2868	3347	3804	4254	4698						
83		64	119	173	219	270	324	378	430	481	531						
		412	410	407	404	401	396	390	383	375	367						
[24]		507	994	1450	1855	2316	2806	3287	3737	4162	4618						
91		57	112	164	210	262	317	371	422	470	522						
		449	448	446	443	439	434	427	420	412	403						
[25]		465	950	1411	1820	2276	2768	3233	3688	4116	4493						
95		53	107	159	206	257	313	365	417	465	508						
		468	467	464	462	458	453	446	439	431	423						
[30]		259	726	1214	1645	2072	2577	2961	3443	3889	3866						
114		29	82	137	186	234	291	335	389	439	437						

[2072] } Torque [lb-in]
234 } Nm
556 } Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous
	Intermittent
	Peak
	No Operation

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] 1.9	384 43 6	833 94 5													
[1] 3.8	438 49 14	904 102 14	1403 158 13	1887 213 12	2359 267 11	2798 316 9	3221 364 8	3657 413 7	3822 432 4	4326 489 3					
[2] 7.5	492 56 28	1054 119 27	1563 177 26	2081 235 25	2623 296 24	3160 357 23	3717 420 21	4147 469 17	4585 518 16	5070 573 13	5470 618 9	5721 646 7	5962 674 5		
[4] 15	603 68 58	1183 134 56	1771 200 55	2275 257 54	2817 318 52	3364 380 50	3895 440 47	4495 508 44	5005 565 42	5496 621 38	5982 676 35	6500 734 32	7054 797 28	7519 850 24	7941 897 17
[6] 23	587 66 88	1159 131 86	1741 197 84	2329 263 82	2815 318 80	3369 381 77	3951 446 74	4483 506 71	5021 566 67	5555 628 63	6068 686 59	6557 741 55	7131 806 50	7641 863 45	8107 916 38
[8] 30	571 65 118	1135 128 116	1710 193 114	2384 269 112	2813 318 110	3375 381 107	4008 453 103	4471 505 100	5038 569 96	5613 634 92	6154 695 87	6614 747 83	7209 815 78	7763 877 73	8272 935 67
[10] 38	552 62 148	1138 129 146	1671 181 144	2304 260 142	2804 317 139	3361 380 136	3950 446 131	4452 503 127	5006 566 123	5587 631 119	6123 692 113	6612 747 109	7201 814 102		
[12] 45	532 60 178	1140 129 177	1631 184 175	2224 251 173	2796 316 170	3347 378 166	3892 440 161	4434 501 157	4974 562 151	5561 628 146	6093 688 141	6610 747 136	7193 813 129		
[14] 53	441 50 209	1072 121 207	1600 181 205	2207 249 202	2754 311 199	3320 375 195	3888 439 190	4433 501 185	4958 560 179	5529 625 174	6066 685 168	6590 745 162			
[16] 61	349 39 239	1003 113 237	1568 177 235	2190 247 233	2711 306 229	3292 372 225	3884 439 220	4431 501 214	4941 558 208	5496 621 202	6039 682 195	6570 742 189			
[18] 68	306 35 269	940 106 267	1513 171 265	2114 239 263	2653 300 259	3251 367 255	3830 433 250	4380 495 243	4904 554 236	5446 615 230	5984 676 223	6518 736 214			
[20] 76	263 30 300	876 99 298	1458 165 296	2038 230 293	2595 293 290	3210 363 285	3777 427 280	4328 489 272	4867 550 265	5395 610 259	5928 670 251	6471 731 241			
[22] 83		826 93 328	1414 160 326	1991 225 323	2528 286 320	3144 355 315	3709 419 309	4262 482 302	4806 543 295	5354 605 288	5915 668 279				
[24] 91		776 88 359	1370 155 356	1945 220 354	2462 278 350	3079 348 345	3642 411 339	4196 474 332	4745 536 325	5313 600 317	5901 667 308				
[25] 95		732 83 374	1322 149 371	1959 221 369	2426 274 365	3026 342 360	3594 406 354	4153 469 347	4696 531 340	5152 582 333					
[30] 114		509 57 450	1082 122 449	2029 229 445	2246 254 442	2761 312 437	3358 379 430	3939 445 423	4450 503 414	4347 491 413					

{
 [2246]
 254
 442
 } Torque [lb-in]
 Nm
 Speed RPM

4000 Compact Series

Performance Data

325 cm³/r [19.8 in³/r]
 Δ Pressure Bar [PSI]

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

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

	Continuous
	Intermittent
	Peak
	No Operation

	[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]
316 } Torque [lb-in]
342 } Nm
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous
	Intermittent
	Peak
	No Operation

Flow LPM [GPM]

		405 cm ³ /r [24.6 in ³ /r]									
		Δ Pressure Bar [PSI]									
		[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170
Flow LPM [GPM]	[0.5] 1.9	719 81 3	1458 165 2								
	[1] 3.8	777 88 8	1631 184 7	2423 274 5	3148 356 4	3690 417 3					
	[2] 7.5	853 96 17	1812 205 15	2596 293 14	3375 381 12	4179 472 11	4845 547 9	5375 607 8	5841 660 3	6501 735 2	
	[4] 15	878 99 35	1859 210 34	2687 304 32	3667 414 30	4554 515 28	5388 609 25	6232 704 23	7004 791 19	7660 865 16	8153 921 11
	[6] 23	882 100 54	1836 207 52	2716 307 51	3680 416 48	4577 517 46	5388 609 42	6269 708 39	7079 800 35	7856 888 31	
	[8] 30	885 100 73	1813 205 72	2746 310 70	3694 417 68	4600 520 65	5388 609 62	6307 713 58	7153 808 55	8052 910 50	
	[10] 38	810 92 92	1736 196 90	2693 304 89	3639 411 86	4540 513 84	5390 609 80	6310 713 75	7151 808 71	7994 903 67	
	[12] 45	735 83 111	1660 188 110	2640 298 108	3584 405 106	4480 506 103	5391 609 98	6314 713 93	7149 808 88		
	[14] 53	661 75 130	1622 183 128	2560 289 127	3512 397 124	4412 498 121	5330 602 117	6242 705 112	7059 798 108		
	[16] 61	587 66 149	1585 179 147	2480 280 146	3440 389 143	4343 491 141	5268 595 137	6170 697 131			
	[18] 68	492 56 168	1472 166 167	2379 269 165	3333 377 162	4270 482 160	5190 586 156	6084 687 150			
	[20] 76	397 45 188	1359 153 186	2279 257 184	3226 365 182	4197 474 179	5112 578 175	5999 678 170			
	[22] 83		1264 143 205	2194 248 203	3124 353 201	4093 462 198	5008 566 193	5904 667 188			
	[24] 91		1169 132 224	2110 238 222	3023 342 220	3989 451 216	4904 554 212	5810 656 207			
	[25] 95		1106 125 233	2049 231 232	2961 335 229	3929 444 226	4851 548 222	5766 651 217			
	[30] 114		790 89 282	1744 197 280	2655 300 277	3634 411 274	4587 518 270	5543 626 266			

[2655]
300
227 } Torque [lb-in]
Nm
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No Operation

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

		[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170
Flow LPM [GPM]	[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]
378
232 } Torque [lb-in]
Nm
Speed RPM

4000 Compact Series

Dimensions

Standard Mount

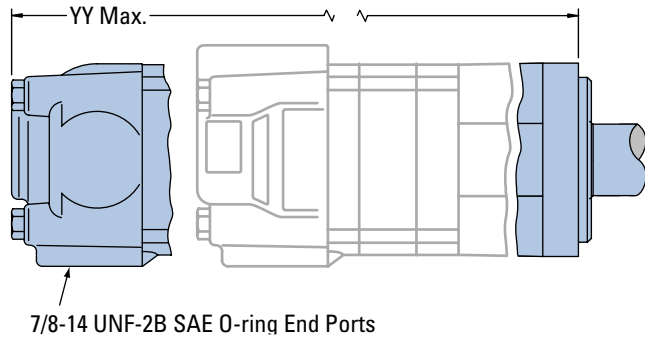
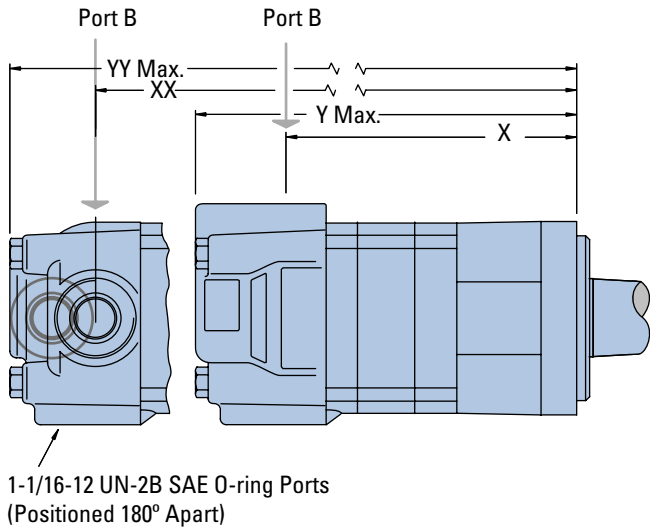
Ports

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



STANDARD MOUNT MOTOR DIMENSIONS

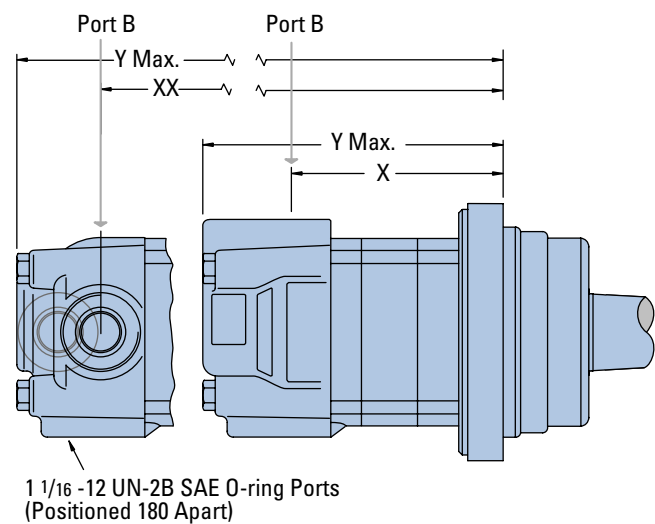
Displacement	X	Y	XX	YY
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]	mm [inch]
160 [9.8]	154,7 [6.09]	201,9 [7.95]	157,0 [6.18]	203,3 [8.00]
200 [12.3]	163,8 [6.45]	211,1 [8.31]	166,1 [6.54]	212,3 [8.36]
250 [15.4]	175,3 [6.90]	222,5 [8.76]	177,5 [6.99]	223,8 [8.81]
325 [19.8]	191,0 [7.52]	238,5 [9.39]	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]

4000 Compact Series

Dimensions

Wheel Mount

Wheel Mount

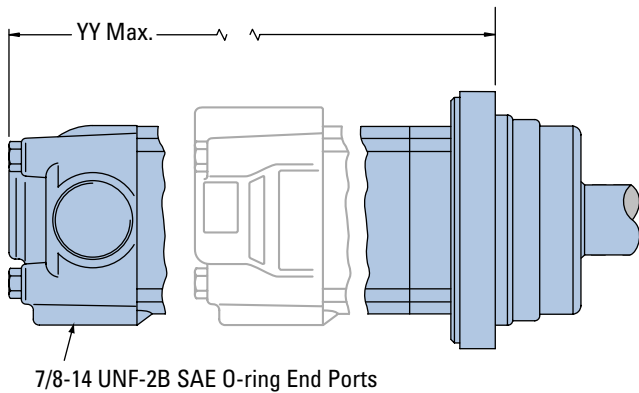


Ports

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

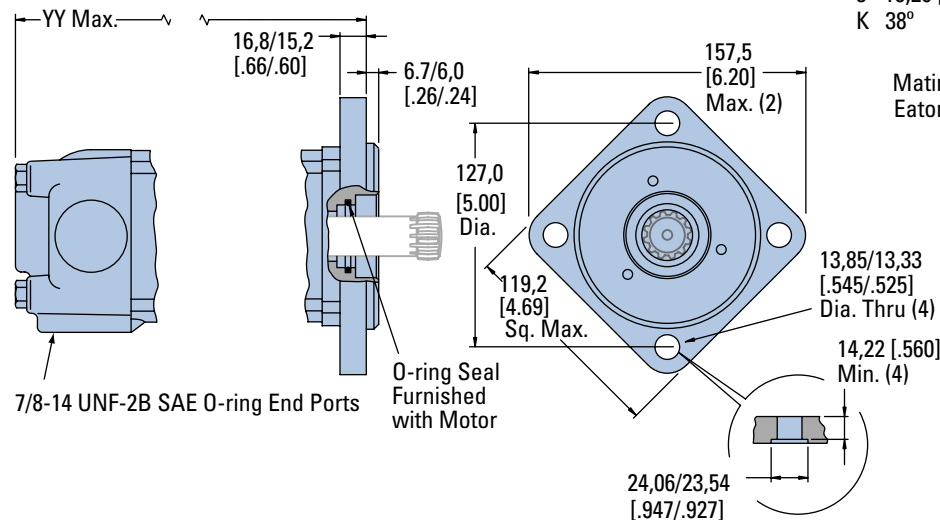
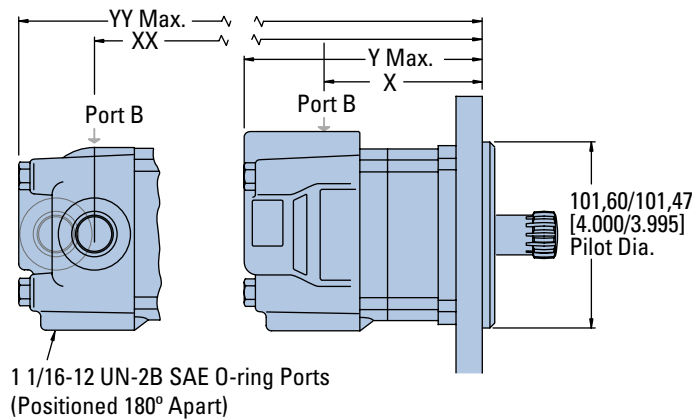
Displacement	X	Y	XX	YY
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]	mm [inch]
160 [9.8]	114,6 [4.51]	161,8 [6.37]	114,6 [4.51]	161,8 [6.37]
200 [12.3]	123,7 [4.87]	170,9 [6.73]	123,7 [4.87]	170,9 [6.73]
250 [15.4]	135,1 [5.32]	182,4 [7.18]	135,1 [5.32]	182,4 [7.18]
325 [19.8]	150,9 [5.94]	198,4 [7.81]	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]

4000 Compact Series

Dimensions

Bearingless

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) or
 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) or
 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) or
 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

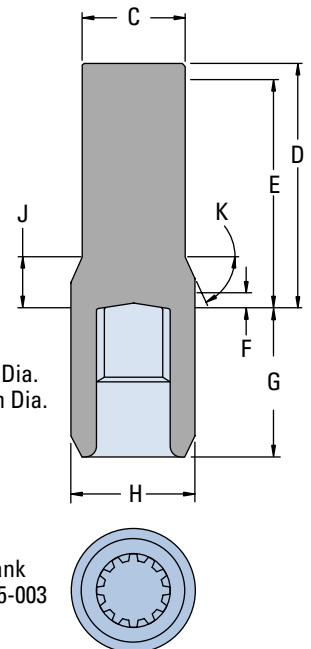
For 4000 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

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	X	Y	XX	YY
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]	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]

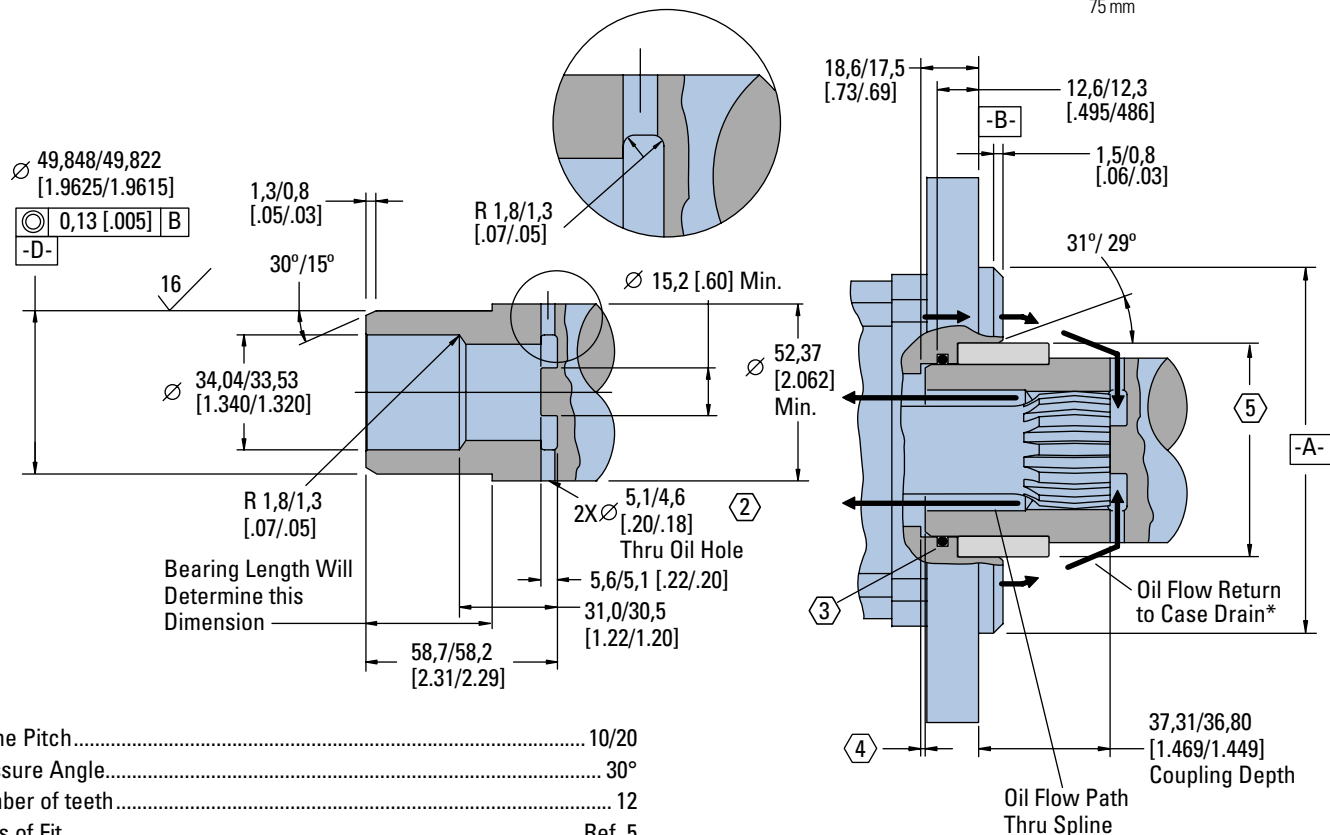
4000 Compact Series

Installation Information

Bearingless

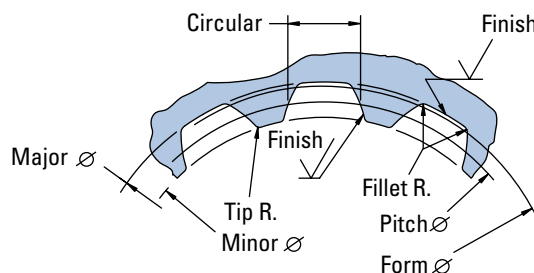
- 1 Internal spline in mating part to be per spline data specification. Material to be ASTM A304, 8620H vacuum degassed alloy steel carbonize to a hardness of 59-62 HRC with case depth (to 50HRC) of 0,76 - 1,02 [.030 - .040] dimensions apply after heat treat.
- 2 Mating part to have critical dimensions 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 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) 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] 0,20 [.008] D
Base Diameter.....	Ref. 26,396455 [1.0392305]
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 [+0.0000 - .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

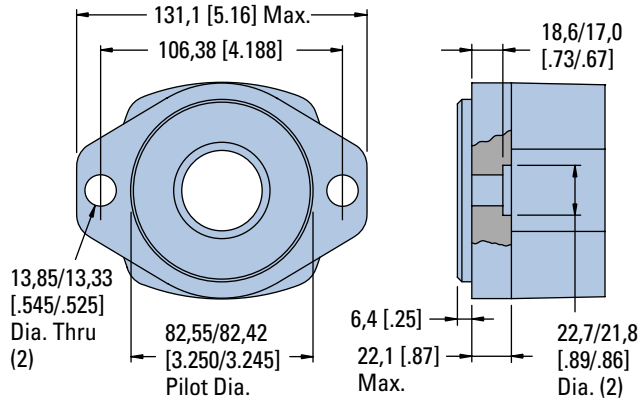


4000 Compact Series

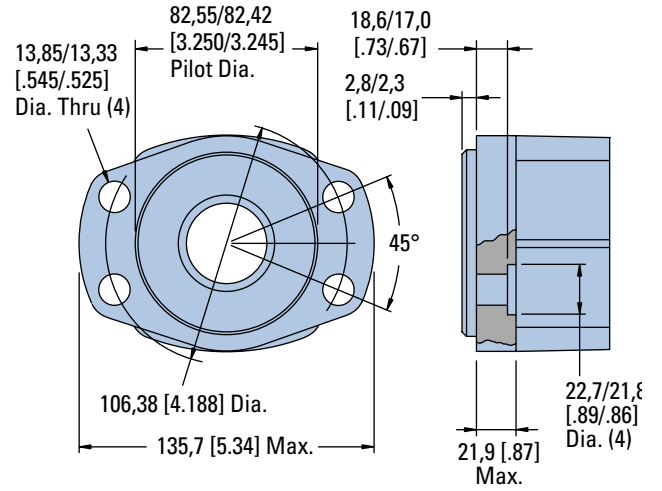
Dimensions

Mounting Options

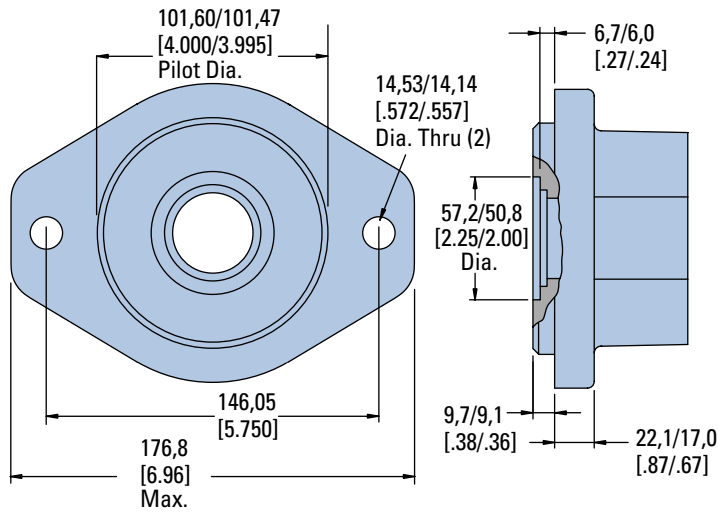
SAE A — Two Bolt (Standard Motor)



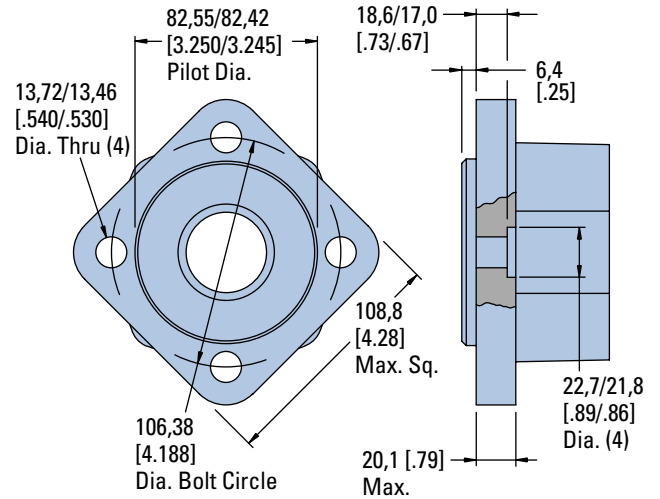
Four Bolt Magneto



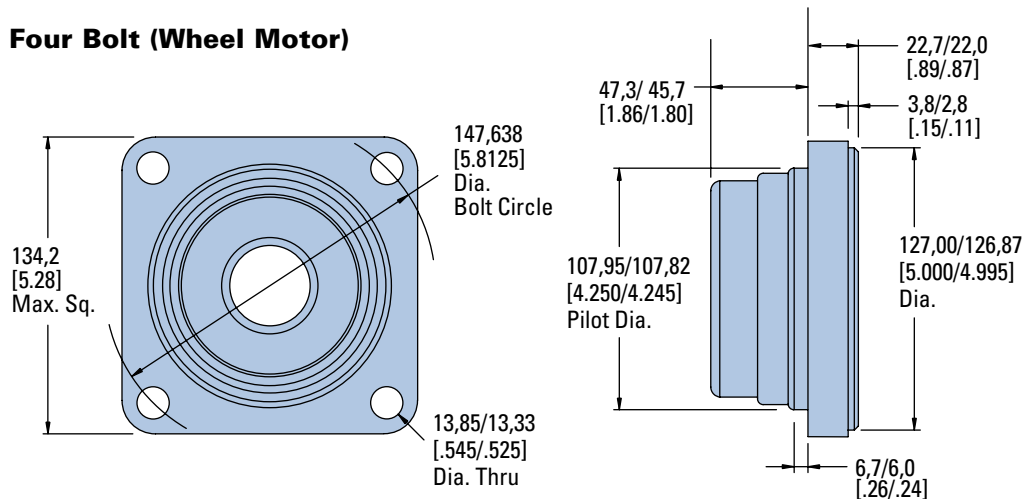
Two Bolt SAE B



Four Bolt



Four Bolt (Wheel Motor)

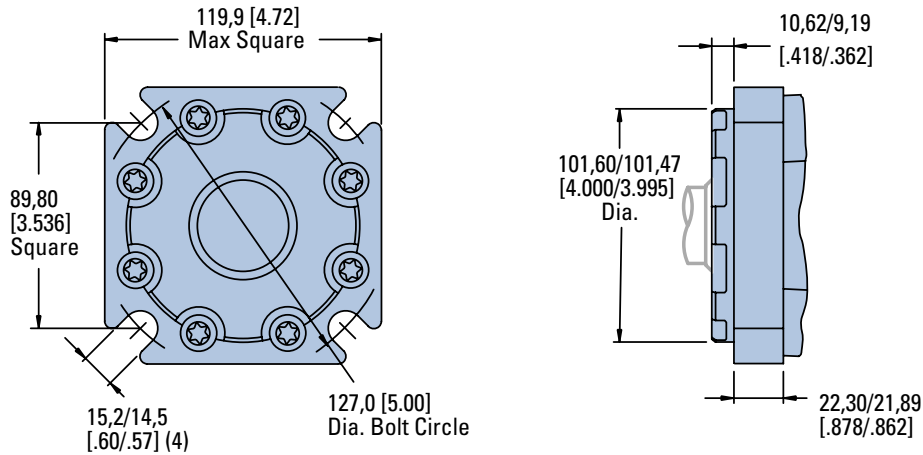


4000 Compact Series

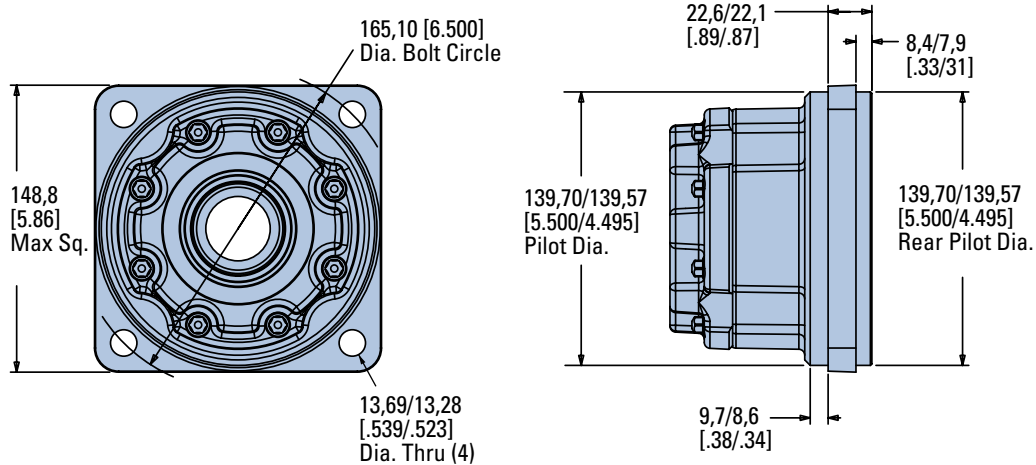
Dimensions

Mounting Options for use
with Enhanced Bearings

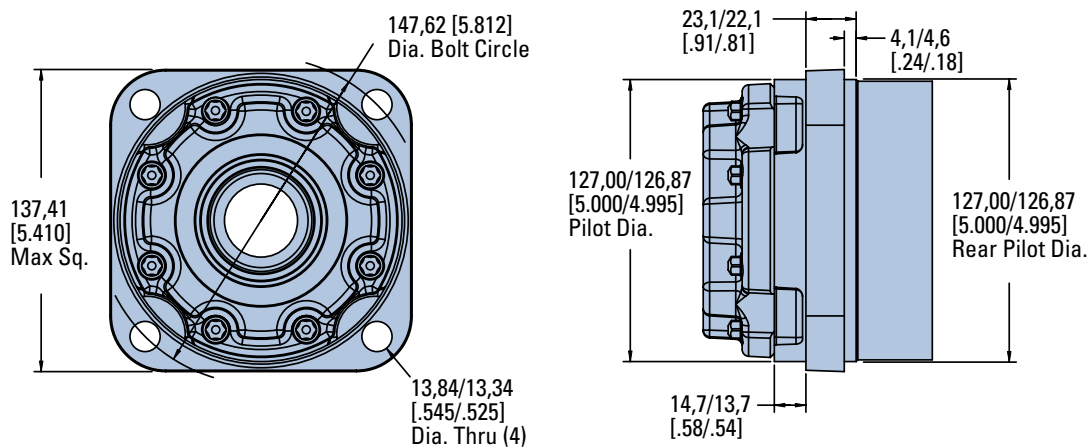
Standard Flange- Similar to SAE B type



Four Bolt (Wheel Motor)



Four Bolt (Wheel Motor- Short)

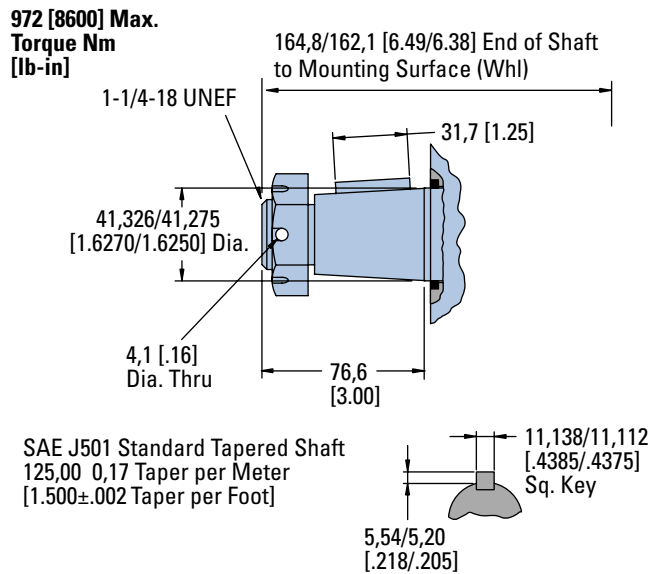


4000 Compact Series

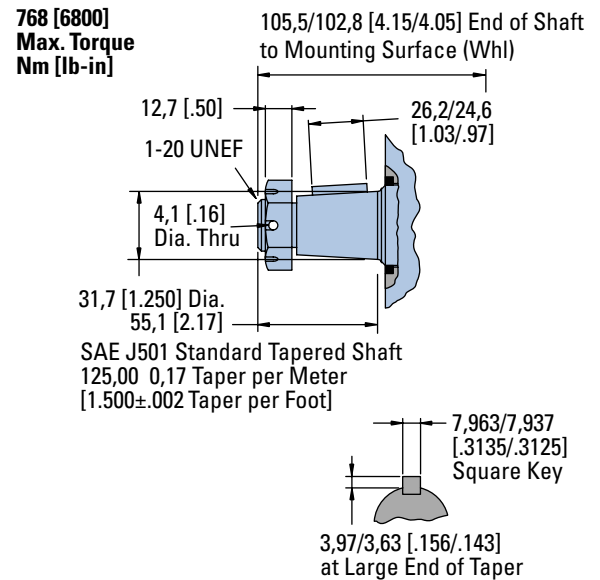
Dimensions

Shafts

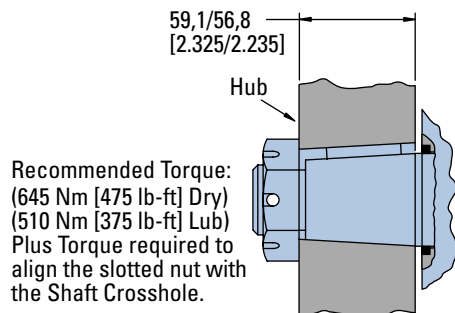
1-5/8 Inch Tapered



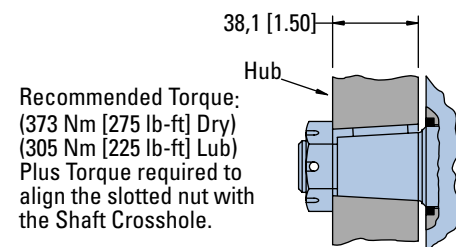
1-1/4 Inch Tapered



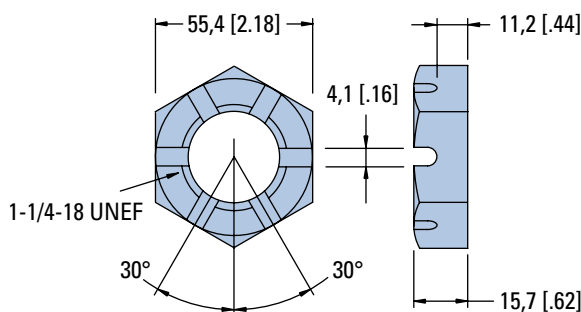
Tapered Shaft Hub Data



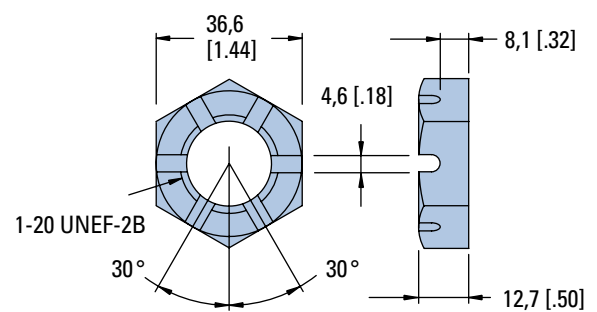
Tapered Shaft Hub Data



Slotted Hexagon Nut



Slotted Hexagon Nut

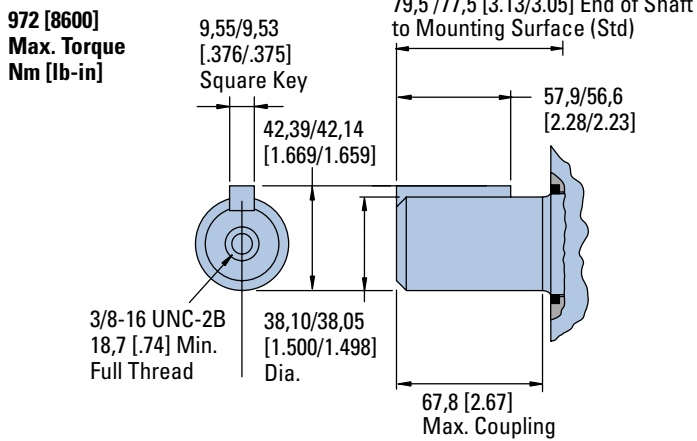


4000 Compact Series

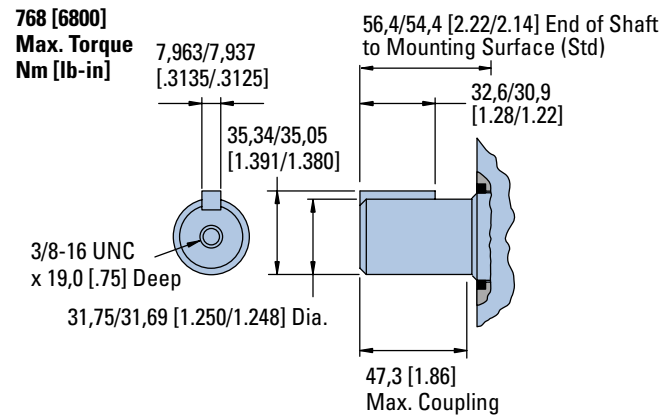
Dimensions

Shafts

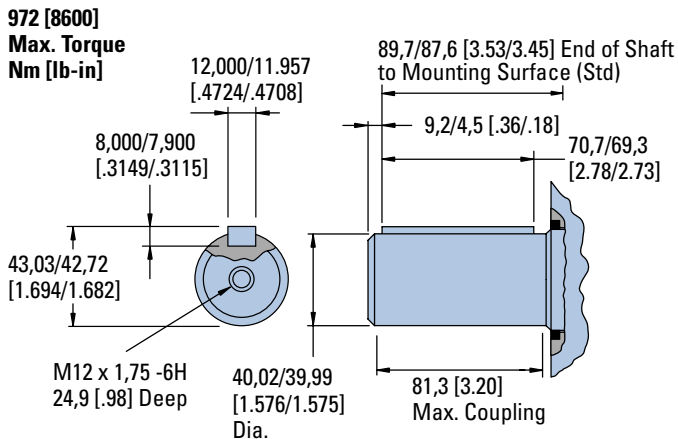
1-1/2 Inch Straight



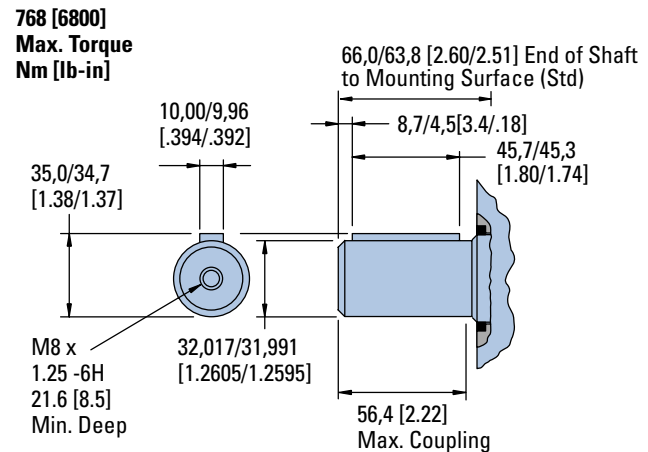
1-1/4 Inch Straight



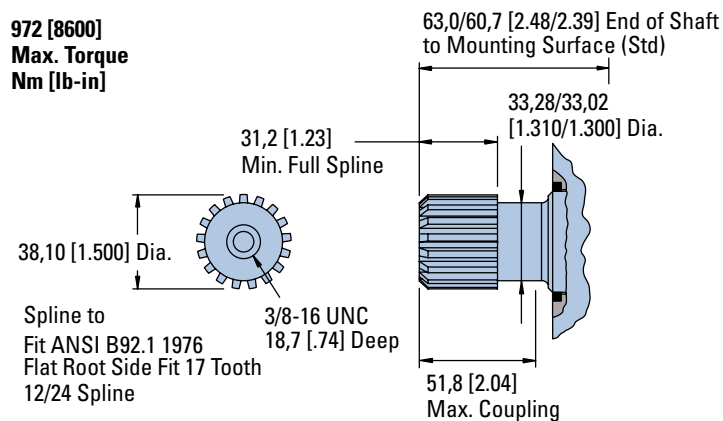
40 mm Straight



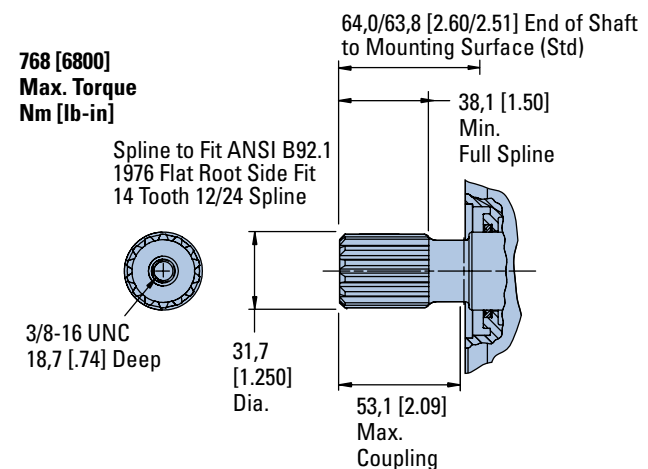
32 mm Straight



1-1/2 Inch 17 Tooth Straight



1-1/4 Inch 14 Tooth Splined



4000 Compact Series

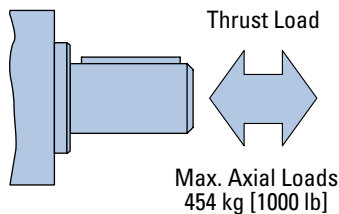
Shaft Side Load Capacity

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

Note:

Case pressure will increase the allowable inward thrust load and decrease the allowable outward thrust load. Case pressure will push outward on the shaft at 94 kg/7 Bar [208 lb/100 PSI].

Each curve is based on



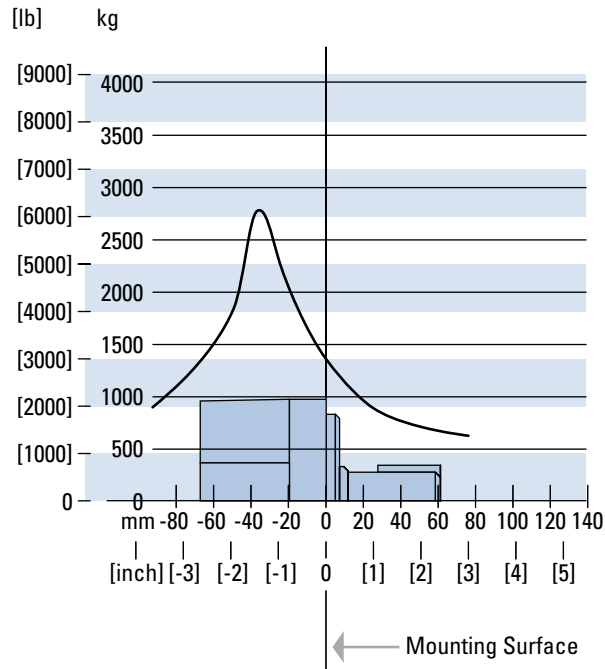
B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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

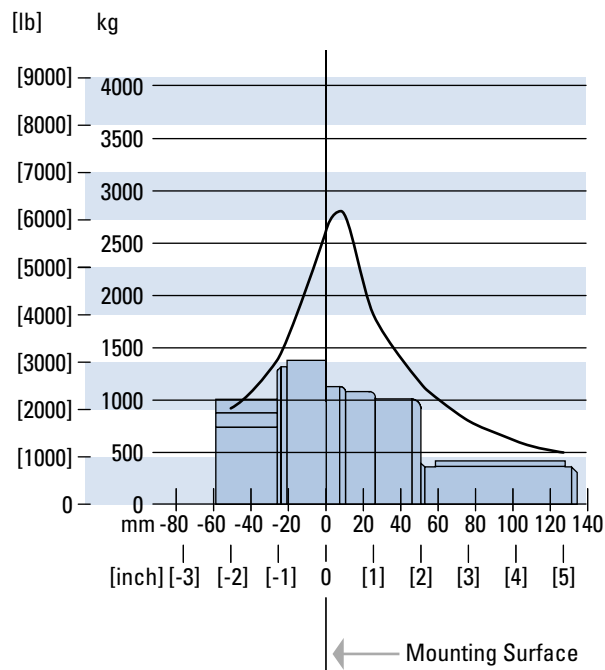
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Mount- All shaft options 1-1/4 inch and larger



Wheel Mount- All shaft options 1-1/4 inch and larger



4000 Compact Series

Case Pressure and Case Port

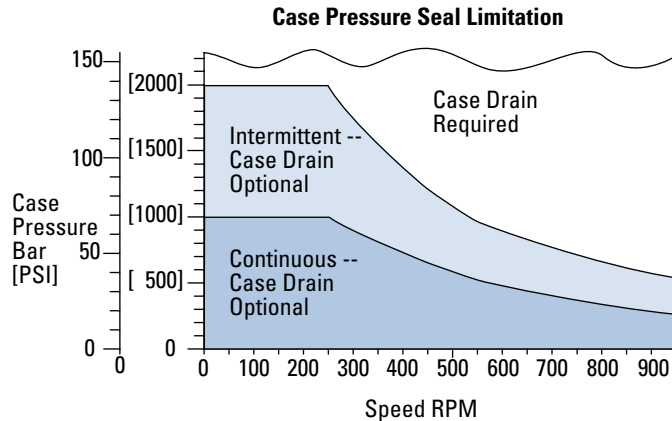
Char-Lynn 4000 Compact Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine if an external case drain is required from the case pressure seal limitation charts.

Case Porting Advantage

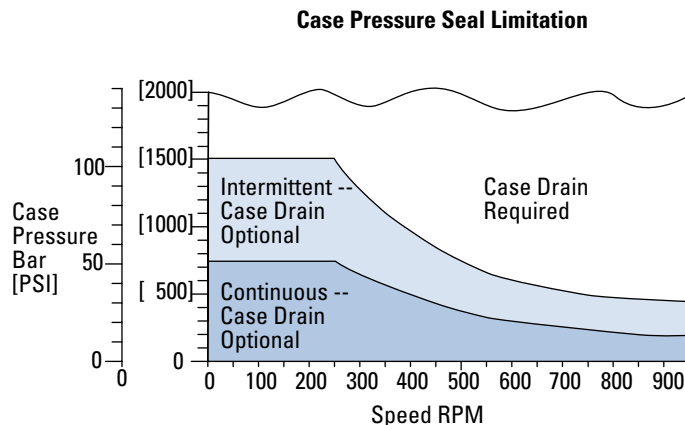
Contamination Control — flushing the motor case.

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.



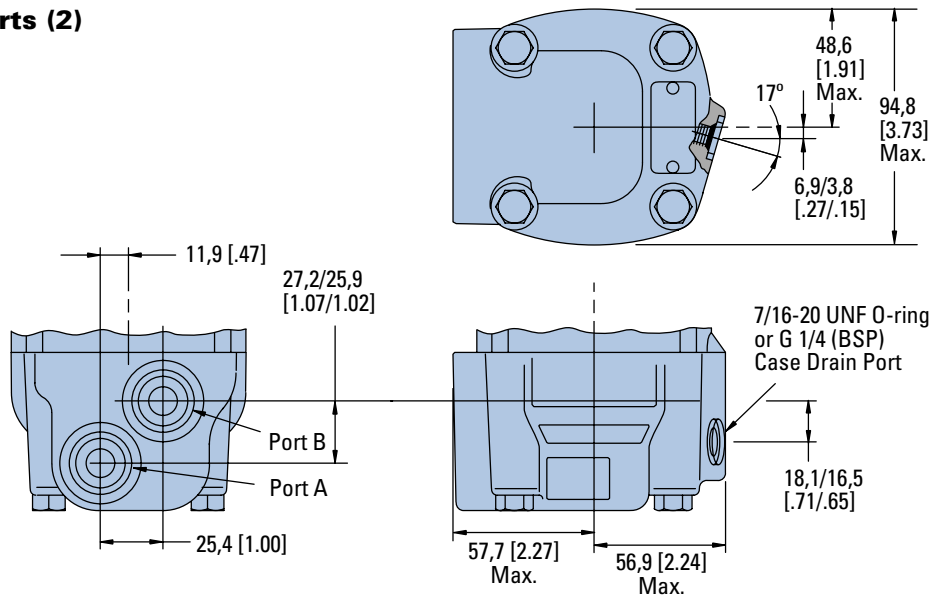
All Shaft options larger than 1-1/4 inch.

4000 Compact Series

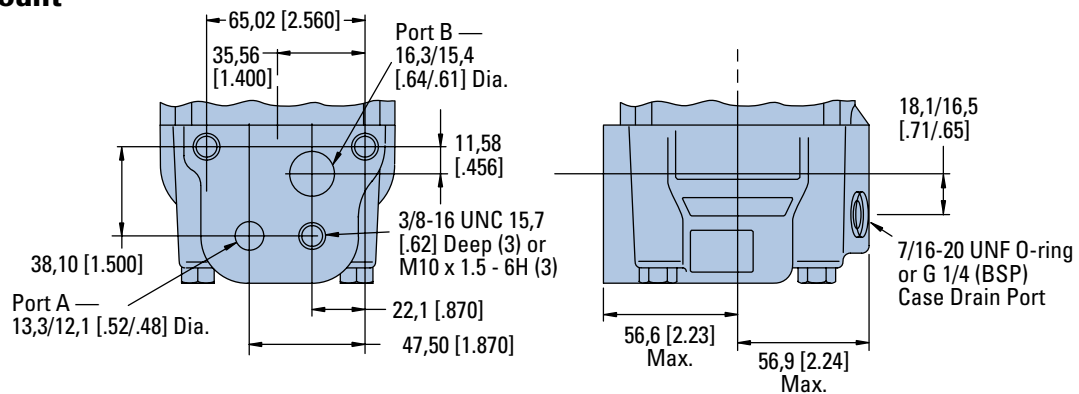
Dimensions

Ports

7/8-14 O-ring Ports (2) or G 1/2 (BSP) Ports (2)



Manifold Mount

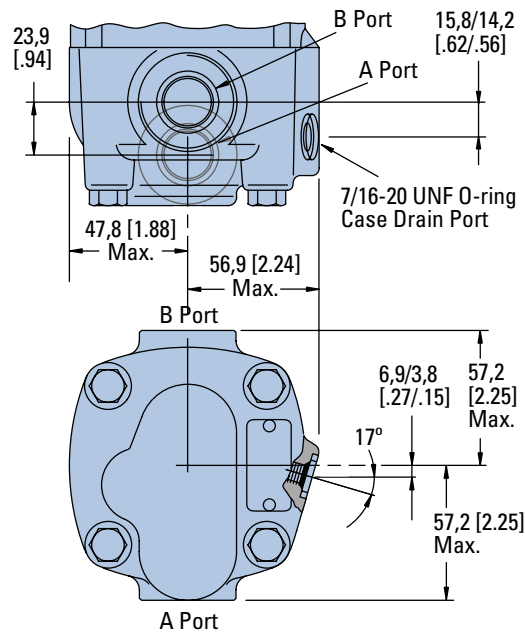


4000 Compact Series

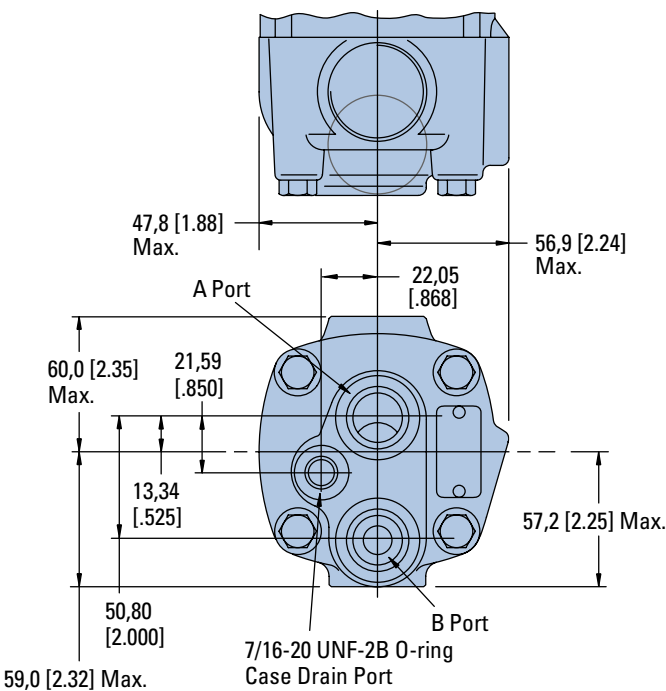
Dimensions

Ports

1-1/16-12 O-ring Ports (2) Positioned 180 Apart



7/8-14 O-ring End Ports (2)

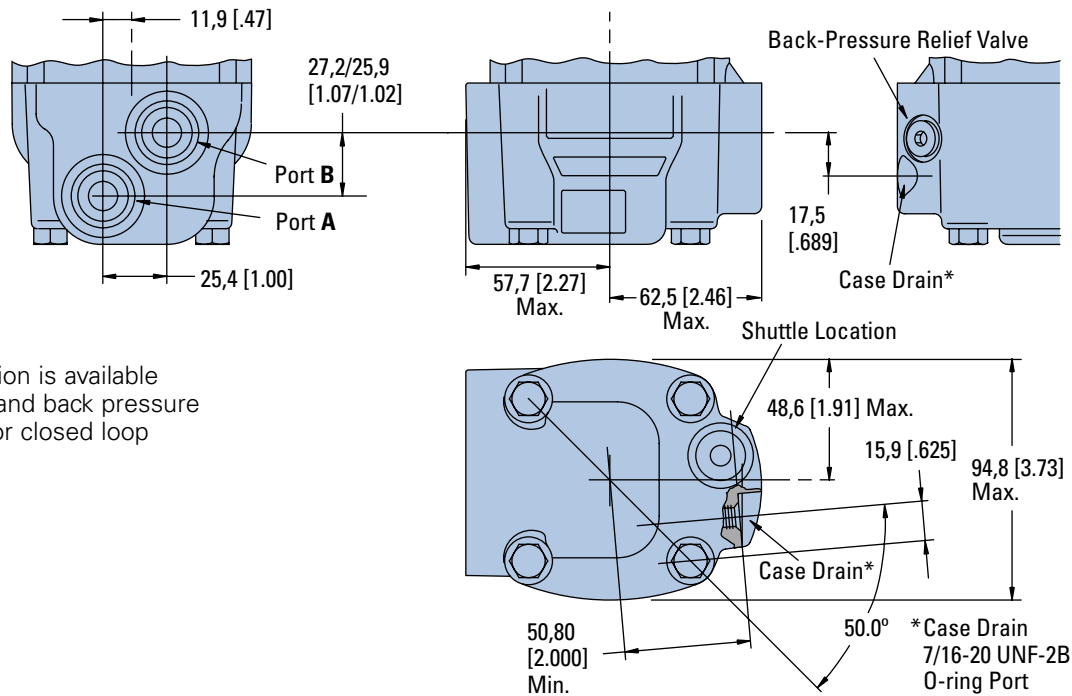


4000 Compact Series

Dimensions

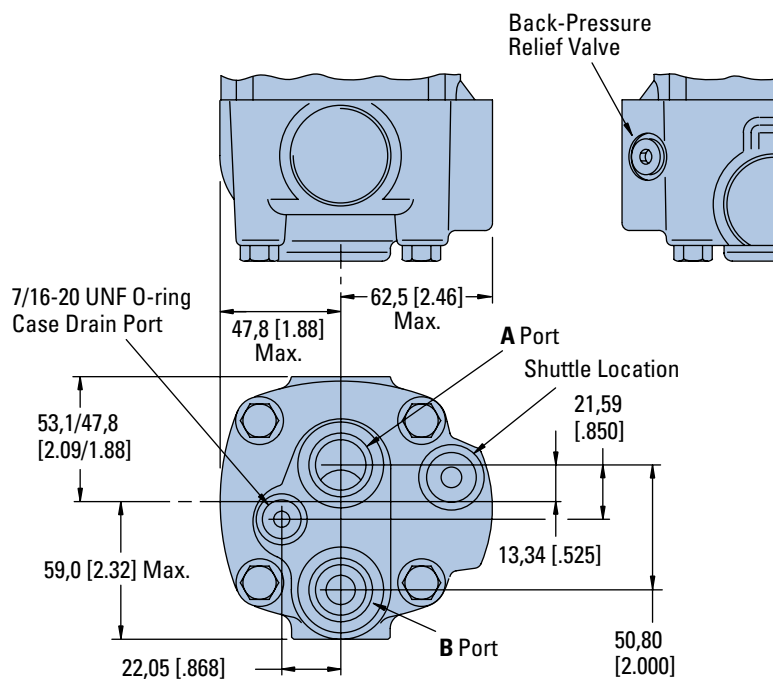
Ports with Shuttle

7/8-14 O-ring Ports (2) or 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.

4000 Compact Series

Model Code

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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

ADK			**		**		**		**		**		*	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.

AE – 4 Bolt (Bearingless) 101,6 [4.00] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes on 127,0 [5.00] 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 [1.10] Pilot Length

AP – 4 Bolt (wheel compatible for Hayes Brake) 107,9 [4.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes on 147,6 [5.81] Dia. B.C. with Turned Down Housing to 88,9 [3.50] Dia.

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

AT – 2 Bolt (Standard) 101,6 [4.00] Pilot Dia. 13,59 [.535] Dia. Holes on 146,0 [5.75] Dia. Bolt Circle (Similar to SAE B)

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

BG* – 4 Bolt (Wheel-Short) 127,0 [5.00] Front and Rear Pilot Dia. and 13,59 [.535] Dia. Mounting Holes on 147,62 [5.812] Dia. Bolt Circle

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)

AH – 1 1/16 - 12 UN-2B O-Ring ports (Positioned 180° Apart)

AJ – .750-16 UNF-2B SAE O-ring Ports – Ports Oriented 180° to each other

BA – .875-14 UNF-2B SAE O-ring Ports – Port B Recessed 11.4 [.45] from Port A – End Ports – Cast Boss Removed

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

14 Back-Pressure Relief Valve

0 – None

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

15, 16 Valve Options
00 – None

17, 18 Accessories

00 – None

AA – Seal Guard

AF – M12 Threaded Connector Digital Speed Sensor (Two 30 Pulse per rev. signals in quadrature)

AG – M12 Threaded Connector Digital Speed Sensor (One 60 Pulse per rev. speed signal and one directional signal)

19, 20 Special Features (Hardware)

00 – None

01 – Viton Seals

21 Special Features (Assembly)

0 – None

A – Flange Rotated 90°

B – Reverse Rotation

22 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

23 Eaton Assigned Code when Applicable

0 – None

24 Eaton Assigned Design Code

A – First Code

* These mounting options are available with shaft options 08, 11, 98 and 99.

Feature in **bold** are preferred and allow for shorter lead time.

Delta Series

Highlights



Description

This wheel motor is the latest addition to the Char Lynn product line. The Delta motor provides torques up to 11,100 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	12 Displacements
Flow l/min [GPM]	75 [20] Continuous**
	115 [30] Intermittent*
Speed RPM	668 Cont. **
	831 Inter.*
Pressure bar [PSI]	205 [3000] Cont. **
	275 [4000] Inter.*
Torque Nm [lb-in]	1039 [9200] Cont**.
	1253 [11100] Inter.*

** 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 components
- Proven disc valve technology with the highest efficiencies in its class
- Leak resistant motor with the front bearing protecting the shaft seal
- Torque up to 11,100 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
- Lowest no load pressure drop which leads to longer life and lower temperature operation
- Highest overall efficiency: more available HP to the system than competitive motors
- The highest side load capacity with 4,500 lbs at 3” from the wheel mount face

Applications:

- Scissor Lift
- Boom Lift
- Industrial Sweeper
- Mower

Parker is a registered trademark of Parker Intangibles LLC.

White is a trademark of White Drive Products, Inc.



Boom Lift



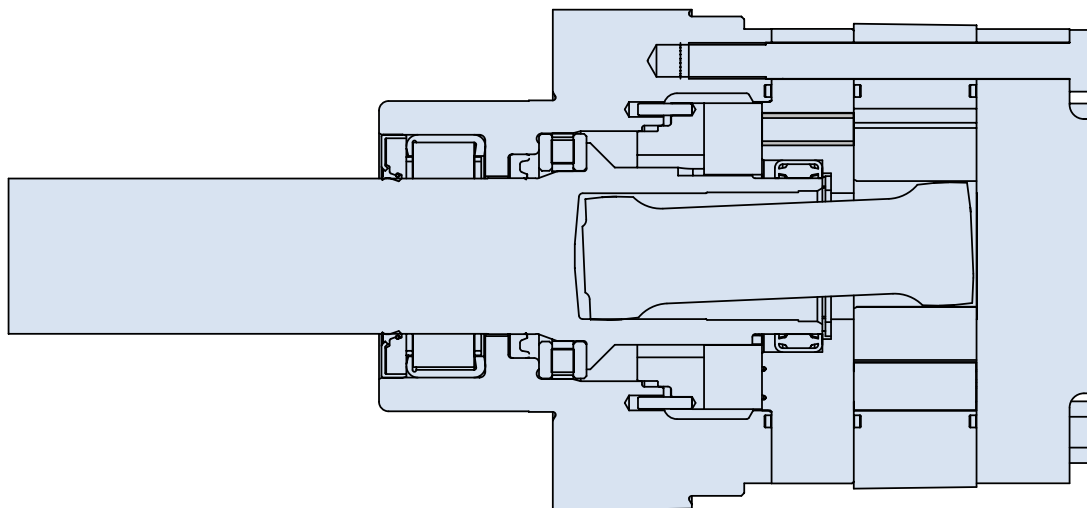
Sweeper



Mower

Delta Series

Specifications



DELTA SERIES MOTORS

Displ. cm ³ /r [in ³ /r]		110 [6.9]	142 [8.9]	194 [12.1]	229 [14.3]	246 [15.4]	293 [18.3]	340 [21.2]	386 [24.1]	459 [28.7]	530 [33.1]	634 [39.6]	736 [46.0]
Max. Speed (RPM) @Flow	Continuous	668	519	382	323	300	252	218	192	161	140	117	100
	Intermittent	831	778	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]
	Intermittent	95 [25]	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]	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]	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]	190 [2750]	170 [2500]	140 [2000]	120 [1750]	105 [1500]
	Intermittent	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]	13,8 [30.5]	14,3 [31.5]	15,0 [33.0]	15,0 [33.0]	15,4 [34.0]	16,1 [35.5]	16,8 [37.0]	17,5 [38.5]	18,4 [40.5]	19,1 [42.0]

Note:

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

Maximum Inlet Pressure:

310 bars (4500 PSI)
Do not exceed Δ pressure rating (see chart above).

Recommended Fluids:

Premium quality, anti wear type hydraulic oil with a viscosity of no less than 70 SUS at operating temperature.

Recommended Maximum System Operating Temperature:

82°C (180°F)

Recommended Filtration:

Per ISO cleanliness Code 4406: 20/18/13

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous
	Intermittent
	No operation

113 cm³/r [6.9 in³/r]

Δ Pressure Bar [PSI]

	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
7.6	23	51	77	103	129	153	180	205	228	248	265	290	313	336	359	380
	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
15	24	52	80	107	135	162	189	215	240	265	290	315	340	365	390	413
	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
23	22	50	79	106	134	162	189	216	242	267	292	317	342	367	392	417
	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
30	20	48	76	104	132	160	188	215	243	269	295	320	344	369	393	417
	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
38	18	46	74	102	130	158	186	214	241	268	294	319	344	368	390	413
	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
45	15	43	71	99	127	155	183	211	238	266	292	319	344	369	393	415
	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
53	13	40	69	97	124	152	181	208	236	263	290	316	341	367	390	408
	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
61	9	37	65	93	121	149	177	205	233	260	288	314	340	365	388	404
	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
68	5	33	61	89	117	145	173	201	229	256	284	311	337	363	387	406
	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
76	2	30	58	86	113	141	169	197	224	252	279	306	332	359	383	406
	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
83		26	54	82	110	138	166	193	221	249	276	303	329	355	378	398
		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
95		19	47	75	103	130	158	186	214	241	269	296	322	348	369	390
		831	829	827	825	821	818	815	812	809	805	803	800	794	776	745

170 } Torque lb-in
19 } Nm
831 } Speed RPM

146 cm³/r [8.9 in³/r]

Δ Pressure Bar [PSI]

	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	288	596	907	1184	1445	1718	1992	2247	2537	2810	3039	3290	3595	3846	3996	4265
7.6	32	67	102	134	163	194	225	254	286	317	343	371	406	434	451	482
	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
15	33	70	107	143	180	216	251	280	311	343	372	408	442	467	503	528
	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
23	31	68	105	142	179	215	252	288	324	359	395	429	463	496	528	559
	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
30	29	66	103	139	177	213	249	285	321	357	392	427	462	496	530	563
	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
38	26	62	99	136	173	210	247	283	318	354	389	424	459	493	527	560
	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
45	23	59	96	132	170	206	243	279	314	349	384	419	454	488	522	556
	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
53	18	54	91	128	165	201	238	274	310	345	380	415	450	484	519	552
	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
61	15	52	88	124	161	198	235	271	306	342	377	412	446	480	515	548
	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
68	11	47	84	120	157	194	230	266	302	337	372	407	441	476	510	544
	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
76	5	42	79	115	152	189	225	261	297	332	368	403	436	471	505	539
	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
83	2	37	74	110	147	184	220	256	292	327	362	398	432	466	500	534
	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
95		29	65	102	138	174	210	246	282	317	352	388	422	456	490	524
		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
114		13	48	85	122	158	195	231	267	303	339	375	410	445	480	514
		778	777	773	770	765	759	756	753	749	746	744	742	740	737	735

Delta Series

Performance Data

198 cm³/r [12.1 in³/r]
Δ Pressure Bar [PSI]

	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
7.6	35	83	126	167	211	254	301	345	389	432	473	513	550	586	622	671
4	367	809	1228	1640	2038	2437	2844	3234	3623	4010	4398	4779	5164	5545	5917	6275
15	41	91	139	185	230	275	321	365	409	453	497	540	583	626	668	708
6	365	799	1231	1654	2066	2473	2878	3270	3665	4056	4446	4833	5215	5598	5975	6347
23	41	90	139	187	233	279	325	369	414	458	502	546	589	632	675	717
8	343	782	1219	1648	2069	2484	2898	3300	3702	4093	4482	4865	5237	5607	5976	6349
30	39	88	138	186	234	280	327	373	418	462	506	549	591	633	675	717
10	322	759	1201	1633	2063	2483	2904	3316	3726	4125	4515	4904	5290	5672	6048	6421
38	36	86	136	184	233	280	328	374	421	466	510	554	597	640	683	725
12	283	719	1158	1590	2020	2448	2868	3279	3691	4096	4492	4883	5265	5644	6015	6385
45	32	81	131	180	228	276	324	370	417	462	507	551	594	637	679	721
14	238	671	1110	1538	1970	2396	2816	3228	3644	4050	4451	4846	5231	5613	5982	6357
53	27	76	125	174	222	271	318	364	411	457	503	547	591	634	675	718
16	191	625	1063	1493	1923	2345	2768	3182	3596	4003	4403	4801	5191	5576	5947	6316
61	22	71	120	169	217	265	312	359	406	452	497	542	586	630	671	713
18	139	567	1006	1438	1871	2299	2720	3133	3547	3956	4359	4760	5128	5492	5871	6247
68	16	64	114	162	211	260	307	354	400	447	492	537	579	620	663	705
20	99	457	886	1315	1745	2168	2590	3006	3418	3822	4224	4622	5018	5418	5816	6208
76	11	52	100	148	197	245	292	339	386	432	477	522	567	612	657	701
22	15	383	810	1243	1676	2096	2520	2938	3351	3759	4161	4558	4953	5339	5722	6095
83	2	43	91	140	189	237	284	332	378	424	470	515	559	603	646	688
25	272	700	1131	1559	1985	2408	2823	3231	3639	4042	4443	4842	5229	5617	5992	
95	31	79	128	176	224	272	319	365	411	456	502	547	590	634	677	
30	163	600	1037	1474	1902	2315	2723	3134	3536	3933	4338	4737	5125	5516	5899	
114	18	68	117	166	215	261	307	354	399	444	490	535	579	623	666	
	516	506	494	487	484	488	494	501	506	511	514	515	516	515	514	

163 } Torque lb-in
18 } Nm
516 } Speed RPM

234 cm³/r [14.3 in³/r]
Δ Pressure Bar [PSI]

	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	470	971	1457	1921	2414	2877	3348	3821	4275	4730	5164	5630	5997	6446	6863	7217
7.6	53	110	164	217	273	325	378	431	483	534	583	636	677	728	775	815
4	468	988	1504	1989	2482	2964	3447	3916	4384	4843	5302	5763	6213	6668	7113	7543
15	53	112	170	225	280	335	389	442	495	547	599	651	701	753	803	852
6	449	966	1484	1980	2470	2953	3445	3922	4397	4851	5304	5750	6197	6643	7085	7524
23	51	109	168	224	279	333	389	443	496	548	599	649	700	750	800	849
8	416	931	1446	1954	2458	2948	3438	3909	4381	4835	5280	5714	6150	6584	7015	7445
30	47	105	163	221	277	333	388	441	495	546	596	645	694	743	792	841
10	380	896	1410	1917	2425	2919	3412	3890	4373	4831	5280	5716	6148	6586	7017	7452
38	43	101	159	216	274	330	385	439	494	545	596	645	694	744	792	841
12	341	856	1366	1876	2384	2880	3370	3843	4319	4782	5229	5665	6102	6537	6962	7392
45	39	97	154	212	269	325	380	434	488	540	590	640	689	738	786	835
14	290	804	1312	1813	2320	2821	3315	3793	4268	4732	5181	5623	6057	6485	6907	7327
53	33	91	148	205	262	318	374	428	482	534	585	635	684	732	780	827
16	239	743	1249	1756	2264	2759	3255	3735	4207	4669	5122	5568	6004	6432	6845	7268
61	27	84	141	198	256	312	367	422	475	527	578	629	678	726	773	820
18	176	688	1187	1694	2203	2698	3195	3676	4146	4603	5055	5497	5930	6358	6774	7194
68	20	78	134	191	249	305	361	415	468	520	571	621	669	718	765	812
20	108	614	1121	1623	2124	2620	3118	3603	4077	4541	4990	5430	5865	6301	6720	7139
76	12	69	127	183	240	296	352	407	460	513	563	613	662	711	759	806
22	28	535	1081	1582	2082	2579	3071	3550	4018	4483	4943	5406	5855	6300	6723	7139
83	3	60	122	179	235	291	347	401	454	506	558	610	661	711	759	806
25	410	956	1460	1959	2454	2941	3419	3892	4356	4806	5251	5683	6117	6531	6939	
95	46	108	165	221	277	332	386	439	492	543	593	642	691	737	783	
30	171	700	1297	1735	2226	2718	3204	3689	4162	4623	5079	5519	5959	6377	6781	
114	19	79	146	196	251	307	362	417	470	522	573	623	673	720	766	
	485	485	485	483	481	480	478	476	474	472	472	471	471	471	471	

Delta Series

Performance Data

252 cm³/r [15.4 in³/r]

Δ Pressure Bar [PSI]

	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	485	1011	1520	2032	2564	3059	3569	4065	4561	5085	5589	6054	6536	6891	7388	7872
7.6	55	114	172	229	289	345	403	459	515	574	631	683	738	778	834	889
4	504	1062	1609	2145	2684	3213	3744	4263	4780	5294	5804	6311	6811	7308	7787	8236
15	57	120	182	242	303	363	423	481	540	598	655	712	769	825	879	930
6	478	1031	1585	2132	2670	3195	3717	4222	4726	5222	5721	6211	6700	7179	7658	8118
23	54	116	179	241	301	361	420	477	534	590	646	701	756	810	865	917
8	453	1012	1571	2115	2664	3191	3717	4224	4725	5215	5706	6194	6678	7161	7628	8076
30	51	114	177	239	301	360	420	477	533	589	644	699	754	808	861	912
10	398	957	1516	2063	2609	3137	3668	4181	4678	5157	5636	6116	6589	7059	7522	7974
38	45	108	171	233	295	354	414	472	528	582	636	690	744	797	849	900
12	370	914	1468	2011	2557	3085	3614	4125	4622	5102	5577	6059	6538	7017	7497	7966
45	42	103	166	227	289	348	408	466	522	576	630	684	738	792	846	899
14	290	842	1399	1948	2496	3024	3552	4065	4571	5056	5525	5987	6445	6905	7359	7813
53	33	95	158	220	282	341	401	459	516	571	624	676	728	780	831	882
16	239	795	1346	1891	2434	2962	3494	4003	4511	4995	5461	5919	6382	6841	7292	7743
61	27	90	152	213	275	334	395	452	509	564	616	668	720	772	823	874
18	157	716	1265	1810	2355	2881	3408	3921	4431	4924	5401	5860	6310	6749	7184	7627
68	18	81	143	204	266	325	385	443	500	556	610	662	712	762	811	861
20	96	650	1203	1750	2294	2820	3345	3857	4366	4865	5340	5801	6242	6686	7122	7553
76	11	73	136	198	259	318	378	435	493	549	603	655	705	755	804	853
22	26	569	1111	1656	2195	2725	3250	3763	4268	4769	5259	5733	6182	6609	7030	7459
83	3	64	125	187	248	308	367	425	482	538	594	647	698	746	794	842
25	425	967	1508	2042	2574	3093	3605	4110	4602	5084	5561	6028	6482	6899	7316	7731
95	48	109	170	231	291	349	407	464	520	574	628	681	732	779	826	876
30	179	723	1266	1800	2330	2852	3364	3868	4368	4856	5338	5811	6269	6701	7096	7506
114	20	82	143	203	263	322	380	437	493	548	603	656	708	757	801	848
	450	450	450	450	449	447	443	439	436	433	430	430	431	434	437	438

Flow LPM [GPM]

179
20
450 } Torque lb-in
Nm
Speed RPM

300 cm³/r [18.3 in³/r]

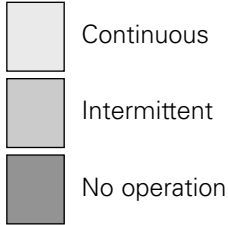
Δ Pressure Bar [PSI]

	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
7.6	69	142	217	288	361	432	505	574	644	712	779	844	905	958	1012	1063
4	612	1283	1940	2587	3227	3856	4483	5094	5693	6293	6881	7462	8024	8574	9113	9629
15	69	145	219	292	364	435	506	575	643	710	777	842	906	968	1029	1087
6	570	1248	1906	2547	3178	3800	4420	5025	5619	6203	6773	7345	7899	8449	8992	9525
23	64	141	215	288	359	429	499	567	634	700	765	829	892	954	1015	1075
8	540	1210	1871	2522	3152	3781	4404	5008	5607	6186	6749	7319	7879	8433	8977	9512
30	61	137	211	285	356	427	497	565	633	698	762	826	890	952	1013	1074
10	496	1161	1825	2471	3110	3733	4362	4968	5574	6157	6721	7274	7811	8356	8887	9416
38	56	131	206	279	351	421	492	561	629	695	759	821	882	943	1003	1063
12	443	1108	1768	2418	3059	3688	4307	4918	5526	6114	6681	7239	7786	8338	8876	9411
45	50	125	200	273	345	416	486	555	624	690	754	817	879	941	1002	1062
14	387	1034	1701	2346	2985	3610	4227	4839	5452	6050	6622	7184	7723	8269	8816	9362
53	44	117	192	265	337	408	477	546	615	683	748	811	872	934	995	1057
16	366	961	1620	2264	2903	3530	4147	4753	5366	5960	6540	7098	7642	8189	8685	9211
61	41	109	183	256	328	399	468	537	606	673	738	801	863	922	980	1040
18	291	893	1546	2187	2829	3450	4067	4678	5283	5873	6451	7005	7537	8064	8580	9103
68	33	101	175	247	319	390	459	528	596	663	728	791	851	910	969	1028
20	204	797	1444	2094	2736	3361	3974	4585	5184	5775	6353	6907	7448	7974	8489	8992
76	23	90	163	236	309	380	449	518	585	652	717	780	841	900	958	1015
22	102	710	1366	2013	2651	3270	3885	4496	5096	5689	6271	6831	7362	7877	8375	8880
83	12	80	154	227	299	369	439	508	575	642	708	771	831	889	945	1003
25	553	1208	1851	2489	3114	3726	4335	4930	5523	6108	6670	7220	7763	8298	8777	9277
95	62	136	209	281	352	421	489	557	624	690	753	815	879	937	991	1048
30	233	941	1539	2179	2811	3430	4028	4625	5217	5802	6385	6957	7522	8060	8565	9067
114	26	106	174	246	317	387	455	522	589	655	721	785	849	910	967	1024
	379	379	379	379	377	374	371	367	365	363	362	361	364	368	374	376

Flow LPM [GPM]

Delta Series

Performance Data



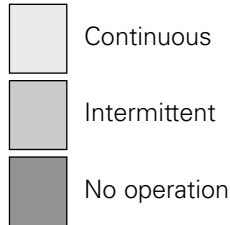
347 cm³/r [21.2 in³/r]																
Δ Pressure Bar [PSI]																
	17	34	52	69	86	103	121	138	155	172	190	207	224	241	259	276
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
2	687	1415	2128	2824	3532	4248	4947	5633	6298	6964	7575	8182	8743	9209	9624	10081
7.6	78	160	240	319	399	480	558	636	711	786	855	924	987	1040	1087	1138
	20	19	18	18	17	17	17	16	15	14	13	12	12	9	8	4
4	689	1443	2179	2891	3606	4302	4986	5653	6316	6965	7615	8260	8891	9515	10120	10698
15	78	163	246	326	407	486	563	638	713	786	860	933	1004	1074	1143	1208
	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
23	73	159	243	324	404	483	561	637	710	781	854	925	995	1064	1132	1200
	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
30	68	153	238	319	400	479	558	635	708	779	849	919	990	1060	1129	1196
	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
38	62	146	230	312	394	473	552	631	707	779	847	913	979	1048	1116	1184
	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
45	54	139	223	305	385	464	542	619	694	766	835	902	969	1036	1103	1168
	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
53	46	130	214	296	378	457	535	612	687	759	829	896	964	1032	1099	1165
	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
61	38	117	200	282	362	441	520	596	672	746	818	886	953	1018	1083	1148
	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
68	28	106	189	271	351	430	508	584	659	731	802	871	938	1004	1069	1133
	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
76	16	94	177	259	339	417	495	570	645	717	787	855	920	985	1050	1113
	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
83	4	81	164	246	327	406	483	559	632	704	774	841	906	970	1033	1096
	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
95		59	141	222	304	383	461	537	611	684	755	824	890	955	1017	1076
		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	9397
114		17	121	197	275	353	429	504	577	651	723	792	862	929	996	1061
		327	327	327	327	327	323	319	315	314	314	313	315	319	323	327

152 } Torque lb-in
17 } N/m
327 } Speed RPM

395 cm³/r [24.1 in³/r]																
Δ Pressure Bar [PSI]																
	17	34	52	69	86	103	121	138	155	172	190	207	224	241		
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500		
2	782	1622	2436	3237	4034	4837	5650	6428	7213	7911	8607	9235	9798	10439		
7.6	88	183	275	365	455	546	638	726	814	893	972	1043	1106	1179		
	18	17	17	16	16	16	16	17	16	15	15	14	13	12		
4	770	1643	2476	3287	4088	4860	5617	6357	7103	7838	8566	9285	9990	10684		
15	87	186	280	371	462	549	634	718	802	885	967	1048	1128	1206		
	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		
23	84	182	278	370	461	549	637	721	802	882	962	1042	1121	1199		
	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		
30	79	176	274	367	459	548	637	722	805	883	960	1038	1116	1193		
	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		
38	71	168	265	359	453	544	635	722	806	887	962	1032	1104	1178		
	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		
45	63	159	256	349	440	529	618	703	788	870	950	1025	1093	1163		
	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	53	150	246	339	431	521	609	693	775	856	934	1010	1084	1155		
	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		
61	41	138	234	327	419	509	597	683	766	846	925	1002	1076	1149		
	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		
68	38	124	220	314	405	495	584	669	752	834	913	989	1063	1134		
	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		
76	25	112	207	300	393	481	568	653	736	817	896	972	1045	1117		
	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		
83	13	97	192	285	377	467	553	637	719	798	875	950	1023	1095		
	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		
95		72	166	259	352	441	529	613	696	775	851	925	997	1070		
		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		
114		24	122	215	308	398	487	573	658	739	817	894	968	1042		
		288	288	288	288	286	283	280	277	274	273	275	280	287		

Delta Series

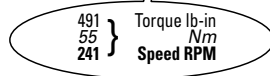
Performance Data



470 cm³/r [28.7 in³/r]

Δ Pressure Bar [PSI]

	17	34	52	69	86	103	121	138	155	172	190	207
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
2	925	1885	2820	3727	4639	5526	6404	7270	8129	8978	9794	10551
7.6	104	213	318	421	524	624	723	821	918	1014	1106	1191
	14	14	13	12	12	12	11	10	9	9	8	7
4	942	1942	2917	3849	4776	5692	6594	7488	8352	9199	10014	10824
15	106	219	329	435	539	643	744	845	943	1039	1131	1222
	31	30	29	29	28	27	27	26	25	24	23	23
6	906	1921	2892	3833	4772	5676	6572	7440	8309	9152	9974	10786
23	102	217	327	433	539	641	742	840	938	1033	1126	1218
	47	46	45	45	44	43	43	42	42	41	41	40
8	856	1866	2853	3795	4730	5634	6520	7379	8230	9075	9895	10693
30	97	211	322	428	534	636	736	833	929	1025	1117	1207
	63	62	62	61	60	58	57	57	58	58	57	56
10	780	1799	2800	3745	4685	5594	6479	7337	8177	9009	9843	10638
38	88	203	316	423	529	632	731	828	923	1017	1111	1201
	79	79	78	77	76	75	74	72	72	74	74	74
12	699	1709	2711	3661	4597	5508	6403	7258	8101	8919	9719	10506
45	79	193	306	413	519	622	723	819	915	1007	1097	1186
	96	95	94	93	92	91	90	89	89	90	90	91
14	596	1612	2609	3561	4490	5390	6268	7112	7941	8743	9519	10282
53	67	182	295	402	507	608	708	803	897	987	1075	1161
	112	111	111	110	109	107	106	104	103	101	102	104
16	467	1486	2480	3440	4371	5268	6152	6992	7810	8601	9370	10118
61	53	168	280	388	493	595	695	789	882	971	1058	1142
	129	128	127	126	125	123	122	120	119	117	116	116
18	332	1353	2357	3317	4256	5157	6043	6892	7713	8501	9270	10026
68	37	153	266	375	481	582	682	778	871	960	1047	1132
	145	145	144	143	142	140	138	136	135	134	132	133
20	304	1226	2218	3172	4102	4994	5873	6731	7557	8365	9147	9922
76	34	138	250	358	463	564	663	760	853	944	1033	1120
	161	161	160	159	158	157	155	153	152	150	149	150
22	137	1059	2048	3004	3945	4840	5727	6576	7399	8198	8967	9715
83	15	120	231	339	445	546	647	742	835	926	1012	1097
	177	177	177	176	175	174	172	170	169	167	166	166
25		833	1816	2765	3680	4575	5455	6313	7133	7928	8691	9436
95		94	205	312	415	517	616	713	805	895	981	1065
		201	201	201	200	198	196	194	193	191	191	192
30		491	1318	2295	3232	4142	5022	5881	6721	7522	8300	9320
114		55	149	259	365	468	567	664	759	849	937	1052
		241	241	241	241	240	237	236	236	233	232	227



542 cm³/r [33.1 in³/r]

Δ Pressure Bar [PSI]

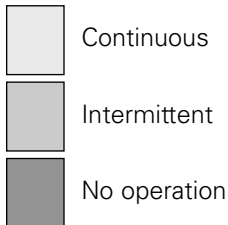
	17	34	52	69	86	103	121	138	155	172
	250	500	750	1000	1250	1500	1750	2000	2250	2500
2	1131	2304	3433	4558	5668	6725	7732	8683	9645	10457
7.6	128	260	388	515	640	759	873	980	1089	1181
	13	12	11	11	11	11	10	8	8	7
4	1139	2352	3515	4638	5735	6781	7819	8809	9752	10644
15	129	266	397	524	648	766	883	994	1101	1202
	27	26	25	25	25	25	24	23	23	22
6	1063	2267	3433	4549	5645	6694	7697	8675	9630	10557
23	120	256	388	514	637	756	869	979	1087	1192
	41	40	39	38	38	38	39	38	37	36
8	992	2186	3354	4475	5578	6646	7665	8608	9535	10449
30	112	247	379	505	630	750	865	972	1076	1180
	56	55	54	53	52	51	51	52	52	51
10	897	2090	3259	4378	5482	6555	7602	8578	9482	10343
38	101	236	368	494	619	740	858	968	1071	1168
	70	69	68	67	67	65	64	64	64	65
12	807	1980	3138	4256	5365	6440	7494	8481	9403	10275
45	91	224	354	481	606	727	846	957	1062	1160
	84	83	83	81	80	79	78	77	76	77
14	693	1873	3028	4138	5218	6268	7318	8304	9235	10105
53	78	211	342	467	589	708	826	937	1043	1141
	98	98	97	96	95	93	91	90	91	92
16	554	1732	2882	3993	5083	6107	7118	8089	9032	9928
61	63	196	325	451	574	689	804	913	1020	1121
	112	112	111	110	109	108	106	104	104	106
18	409	1582	2738	3844	4924	5952	6956	7928	8874	9772
68	46	179	309	434	556	672	785	895	1002	1103
	126	126	126	125	124	123	121	119	119	121
20	355	1428	2587	3696	4767	5804	6813	7786	8732	9624
76	40	161	292	417	538	655	769	879	986	1087
	140	140	140	139	138	137	136	134	134	135
22	310	1259	2412	3518	4595	5619	6618	7589	8536	9438
83	35	142	272	397	519	634	747	857	964	1065
	154	154	154	154	152	151	150	148	148	149
25		958	2107	3215	4281	5310	6305	7264	8204	9110
95		108	238	363	483	599	712	820	926	1029
		174	174	174	174	173	171	170	168	169
30		521	1599	2696	3769	4804	5809	6776	7705	8617
114		59	181	304	425	542	656	765	870	973
		209	209	209	209	208	207	207	205	205

Delta Series

Performance Data

649 cm³/r [39.6 in³/r]

Δ Pressure Bar [PSI]



Flow LPM [GPM]

	17 250	34 500	52 750	69 1000	86 1250	103 1500	121 1750	138 2000	155 2250
2	1365 154	2787 315	4156 469	5488 620	6775 765	7949 897	9102 1028	10174 1149	11100 1253
7.6	10	10	10	9	9	8	7	6	3
4	1326 150	2770 313	4113 464	5400 610	6632 749	7819 883	8973 1013	10030 1132	11015 1244
15	22	22	21	20	21	20	19	19	18
6	1258 142	2663 301	3998 451	5270 595	6521 736	7692 868	8774 991	9808 1107	10809 1220
23	35	34	33	32	32	32	32	32	31
8	1154 130	2558 289	3902 441	5195 587	6455 729	7659 865	8775 991	9770 1103	10708 1209
30	47	46	45	44	42	42	42	43	43
10	1045 118	2442 276	3787 428	5076 573	6331 715	7541 851	8691 981	9685 1093	10573 1194
38	58	58	57	56	55	53	53	54	55
12	928 105	2321 262	3662 413	4939 558	6193 699	7385 834	8536 964	9577 1081	10469 1182
45	70	70	70	68	67	66	65	65	66
14	740 84	2127 240	3469 392	4746 536	5989 676	7188 812	8352 943	9433 1065	10439 1179
53	82	82	82	81	80	79	77	76	76
16	614 69	1990 225	3318 375	4588 518	5795 654	6942 784	8081 912	9154 1033	10141 1145
61	93	93	93	93	92	91	90	89	90
18	448 51	1830 207	3158 356	4414 498	5619 634	6754 763	7853 887	8890 1004	9873 1115
68	105	105	105	105	104	103	102	102	104
20	281 32	1618 183	2944 332	4198 474	5410 611	6551 740	7653 864	8689 981	9676 1092
76	117	117	117	117	117	116	114	114	115
22	276 31	1518 171	2842 321	4099 463	5313 600	6453 728	7554 853	8596 970	9576 1081
83	128	128	128	128	128	128	126	125	126
25	1079 122	2393 303	3646 475	4834 637	5969 791	7071 931	8112 1060	9105 1174	9105 1174
95	146	146	146	146	146	146	145	144	144
30	436 49	1747 197	3013 340	4225 477	5356 605	6454 729	7489 845	8479 957	8479 957
114	175	175	175	175	175	175	174	174	175

754 cm³/r [46.0 in³/r]

Δ Pressure Bar [PSI]

8479
957
175

Torque lb-in
Nm
Speed RPM

Flow LPM [GPM]

	17 250	34 500	52 750	69 1000	86 1250	103 1500	121 1750	138 2000
2	1561 176	3128 353	4605 520	6014 679	7422 838	8721 985	9978 1127	10910 1232
7.6	9	8	8	8	7	7	6	5
4	1548 175	3142 355	4650 525	6029 681	7350 830	8605 971	9785 1105	10892 1230
15	19	18	18	18	18	18	17	17
6	1470 166	3084 348	4608 520	6022 680	7346 829	8555 966	9722 1098	10850 1225
23	30	29	28	27	27	27	27	27
8	1359 153	2975 336	4504 509	5925 669	7263 820	8488 958	9638 1088	10694 1207
30	40	39	38	38	37	36	37	38
10	1240 140	2844 321	4364 493	5815 656	7185 811	8458 955	9603 1084	10584 1195
38	50	50	49	48	47	46	46	47
12	1079 122	2686 303	4207 475	5641 637	7008 791	8248 931	9390 1060	10400 1174
45	60	60	60	59	58	57	57	57
14	932 105	2512 284	4038 456	5477 618	6850 773	8124 917	9274 1047	10286 1161
53	70	70	70	70	69	68	67	67
16	753 85	2328 263	3834 433	5246 592	6577 742	7831 884	8999 1016	10040 1133
61	80	80	80	80	80	79	78	78
18	547 62	2119 239	3632 410	5024 567	6320 714	7551 852	8706 983	9721 1097
68	90	90	90	90	90	90	90	90
20	310 35	1919 217	3430 387	4826 545	6126 692	7339 829	8466 956	9430 1065
76	100	100	100	100	100	100	100	100
22	248 28	1666 188	3172 358	4571 516	5878 664	7102 802	8254 932	9269 1046
83	110	110	110	110	110	110	110	110
25	1261 142	2784 314	4191 473	5504 621	6727 759	7873 889	8911 1006	9106 1006
95	126	126	126	126	126	126	126	126
30	545 62	2055 232	3474 392	4800 542	6036 681	7175 810	8231 929	9299 929
114	151	151	151	151	151	151	151	151

Delta Series

Dimensions

Wheel Mount

Ports

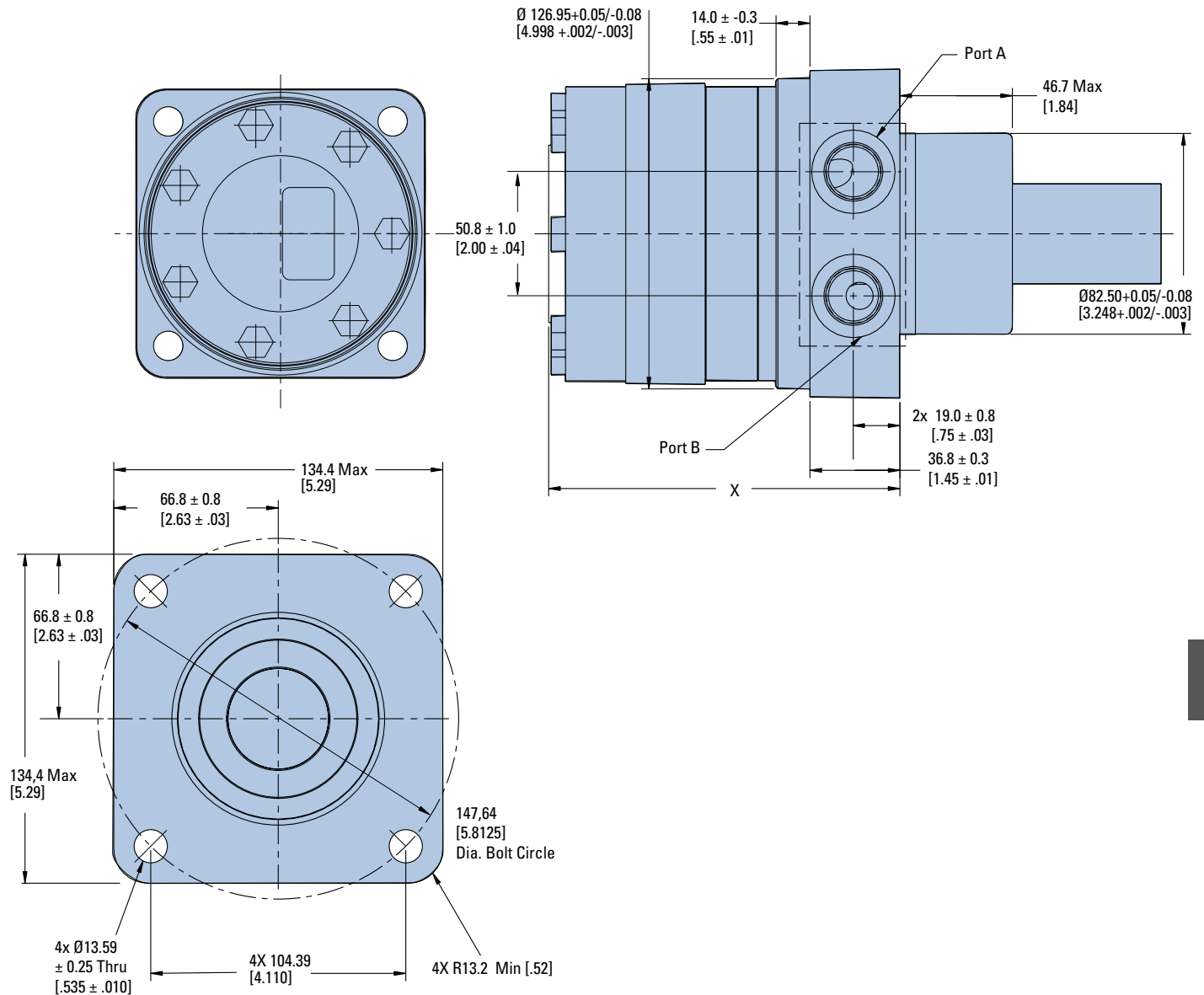
7/8 -14 UNF-2B SAE O-ring Ports

G 1/2 (BSP) Ports

Standard Rotation Viewed from Shaft End

Port A Pressurized — CCW

Port B Pressurized — CW



DISPLACEMENT CODE	X MAX	CODE	MAX
069	130.6 [5.14]	212	156.5 [6.16]
089	135.9 [5.35]	241	162.6 [6.40]
121	144.3 [5.68]	287	172.5 [6.79]
143	150.4 [5.92]	331	181.9 [7.16]
154	153.2 [6.03]	396	195.6 [7.70]
183	150.4 [5.92]	460	209.0 [8.23]

Delta Series

Dimensions

Standard Mount

Ports

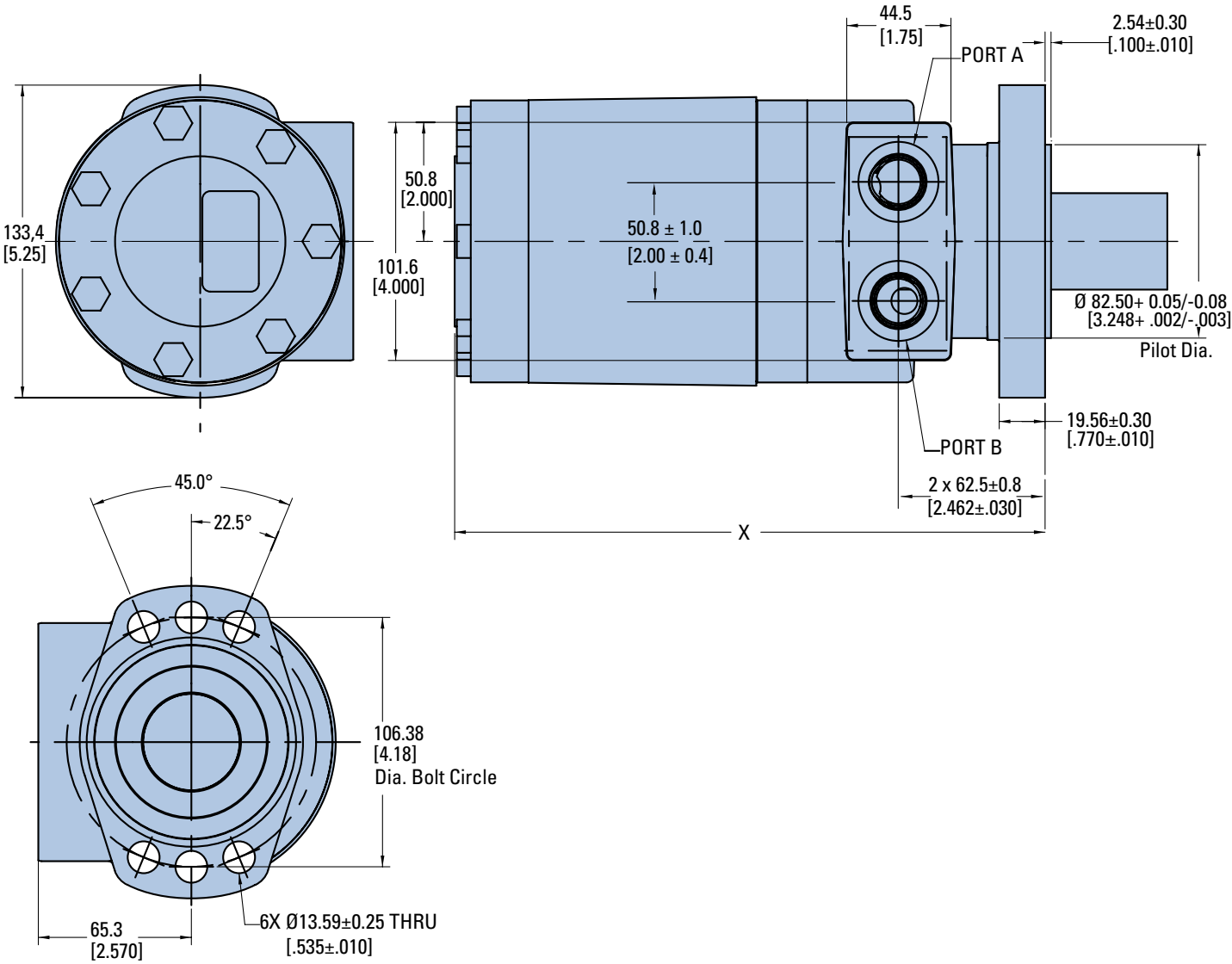
7/8 -14 UNF-2B SAE O-ring Ports

G 1/2 (BSP) Ports

Standard Rotation Viewed from Shaft End

Port A Pressurized — CCW

Port B Pressurized — CW



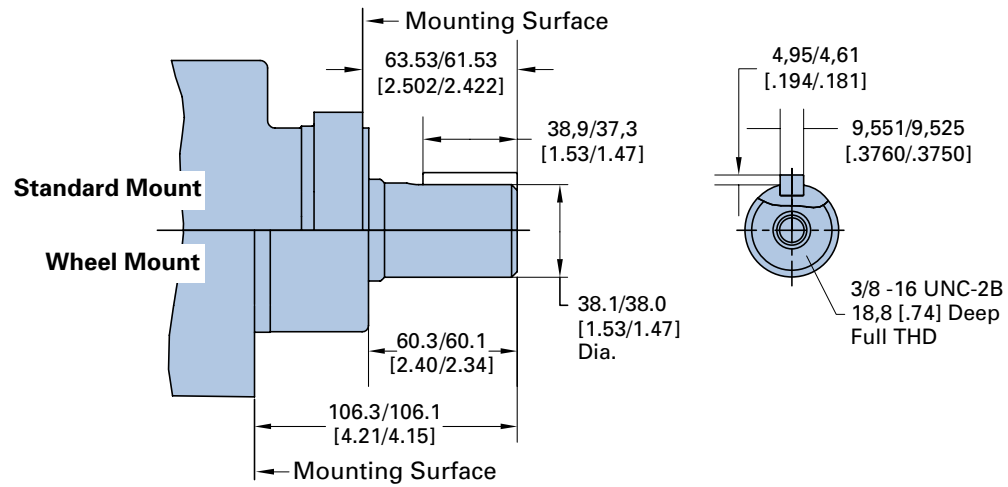
DISPLACEMENT CODE	X MAX	CODE	MAX
069	173.8 [6.84]	212	199.8 [7.87]
089	179.7 [7.08]	241	206.0 [8.11]
121	187.7 [7.39]	287	215.8 [8.50]
143	193.7 [7.63]	331	225.1 [8.86]
154	196.5 [7.74]	396	238.8 [9.40]
183	193.7 [7.63]	460	252.3 [9.93]

Delta Series

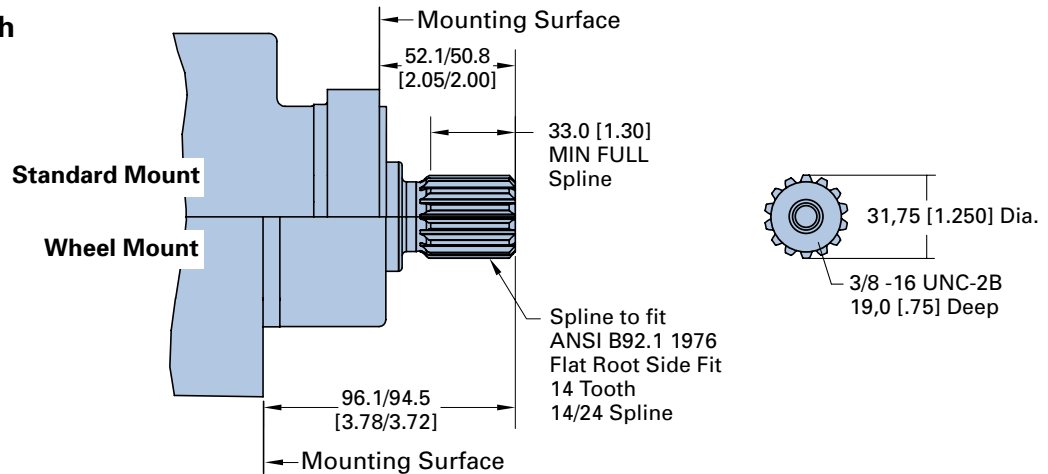
Dimensions

Shafts

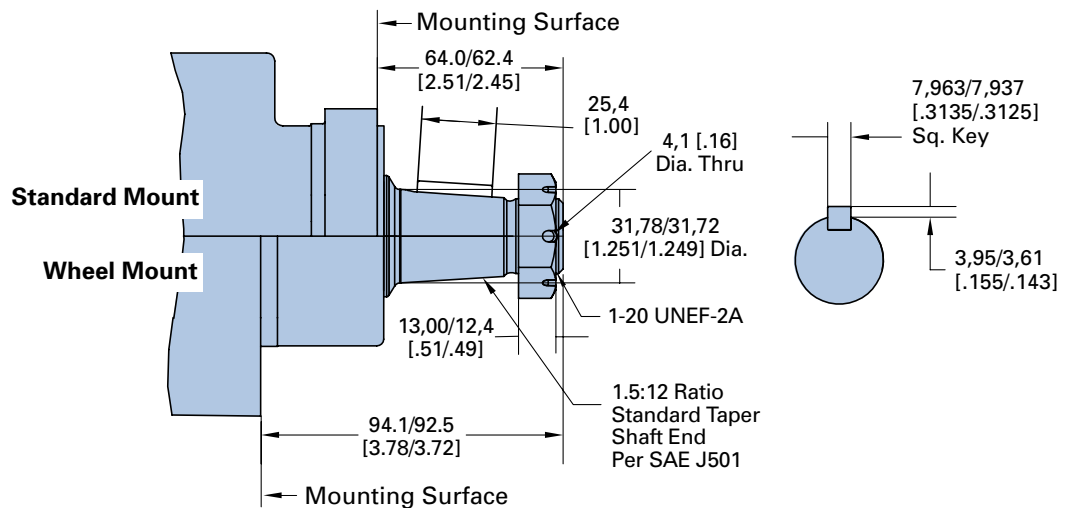
1 ½ Inch Straight



1 ¼ Inch 14 Tooth Splined



1 ¼ Inch Tapered



Delta Series

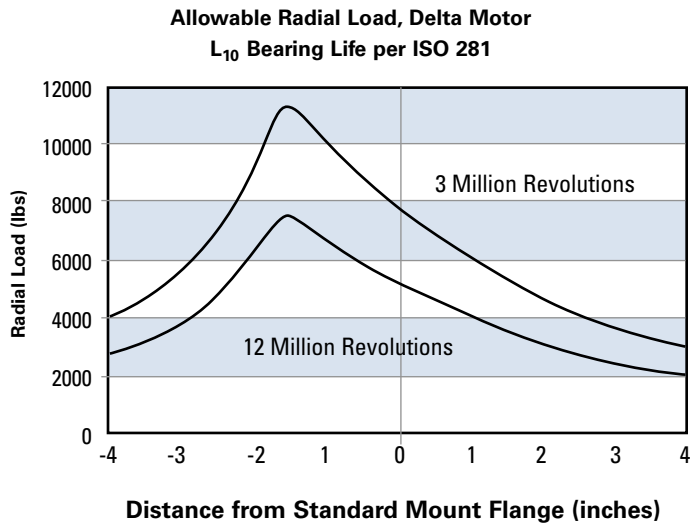
Shaft Side Load Capacity

These curves indicate the radial load capacity on the motor shaft(s) at various locations.

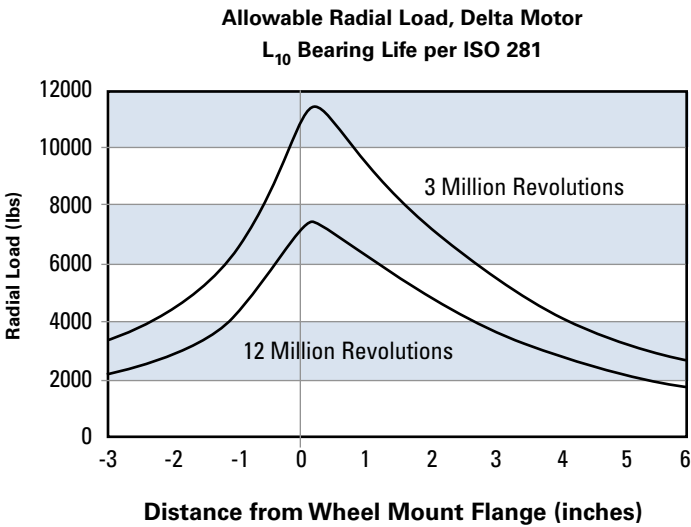
Each curve is based on **B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.** To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

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

Side Load Chart for Standard Mount



Side Load Chart for Wheel Mount



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	TIMING	DISPLACEMENT cm ³ /r [in ³ /r] / PRODUCT NUMBER			
				113 [6.9]	146 [8.9]	198 [12.1]	234 [14.3]
Wheel Motor	1-1/4 Inch	7/8" O-ring	Standard -CCW	184-0005-001	184-0006-001	184-0002-001	184-0001-001
	Tapered		Standard -CW	184-0025-001	184-0026-001	184-0027-001	184-0028-001
	1-1/2 Inch	7/8" O-ring	Standard -CCW	184-0013-001	184-0014-001	184-0015-001	184-0016-001
	17 T Splined		Standard -CW	184-0037-001	184-0038-001	184-0039-001	184-0040-001
				252 [15.4]	300 [18.3]	347 [21.2]	395 [24.1]
	1-1/4 Inch	7/8" O-ring	Standard -CCW	184-0003-001	184-0004-001	184-0007-001	184-0008-001
	Tapered		Standard -CW	184-0029-001	184-0030-001	184-0031-001	184-0032-001
	1-1/2 Inch	7/8" O-ring	Standard -CCW	184-0017-001	184-0018-001	184-0019-001	184-0020-001
	17 T Splined		Standard -CW	184-0041-001	184-0042-001	184-0043-001	184-0044-001
				470 [28.7]	542 [33.1]	649 [39.6]	754 [46.0]
	1-1/4 Inch	7/8" O-ring	Standard -CCW	184-0009-001	184-0010-001	184-0011-001	184-0012-001
	Tapered		Standard -CW	184-0033-001	184-0034-001	184-0035-001	184-0036-001
	1-1/2 Inch	7/8" O-ring	Standard -CCW	184-0021-001	184-0022-001	184-0023-001	184-0024-001
	17 T Splined		Standard -CW	184-0045-001	184-0046-001	184-0047-001	184-0048-001

Delta Series

Model Code

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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

M	DL		***			**		**		**		0	*	*	00		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

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]

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

AC – Standard, 6 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. .250 [6.35] 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 25.40 [1.000] 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 1.125-18 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

15 Seal Option

0 – Standard

1 – Viton

4 – Seal Guard

16, 17 Accessories

00 – None

18, 19 Special Features (Hardware)

00 – None

20, 21 Special Features (Assembly)

00 – Standard Rotation - CCW

01 – Standard Rotation - CW

22, 23 Paint/Packaging

AA – No Paint, Individual Box

AB – Painted Low Gloss Black, Individual Box

AC – Epoxy Coated (Frost Gray), Individual Box

AE – No Paint, Bulk Box

AF – Painted Low Gloss Black, Bulk Box

24, 25 Customer Identification

00 – None

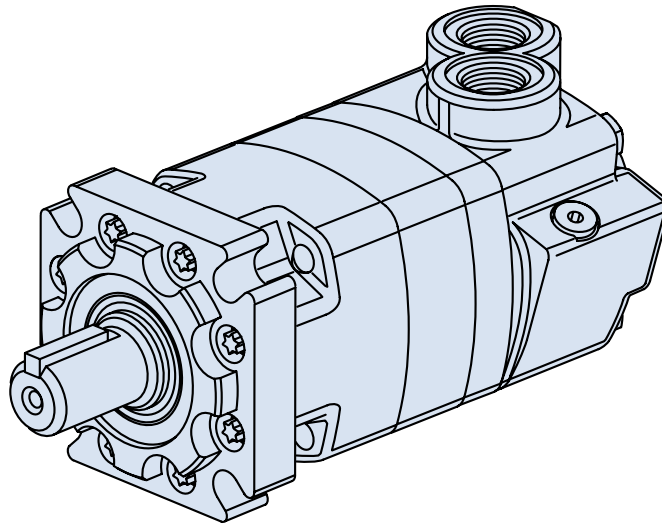
26 Design Code

A – One (1)

Feature in **bold** are preferred and allow for shorter lead time.

4000 Series

Highlights



Features

- 10 displacements, a variety of mounting flanges and output shafts
- Reliable, proven design
- High efficiency
- Environmental protection options

Benefits

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

Applications

- Mowing
- Snow Removal
- Sprayer
- Trencher
- Wood Products

Description

The 4000 Series offers up to 8600 in-lb of torque and 25 gpm (continuous ratings). This is the corner stone of the Char-Lynn line.

4000 Series Motors

Geroler Element	10 Displacements
Flow l/min [GPM]	95 [25] Continuous**
	150 [40] Intermittent*
Speed RPM	722 Cont. **
	868 Inter.*
Pressure bar [PSI]	200 [3000] Cont.**
	300 [4500] Inter.*
Torque Nm [lb-in]	970 [8600] Cont.**
	1180 [10450] Inter.*

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

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



Mowing



Snow Removal



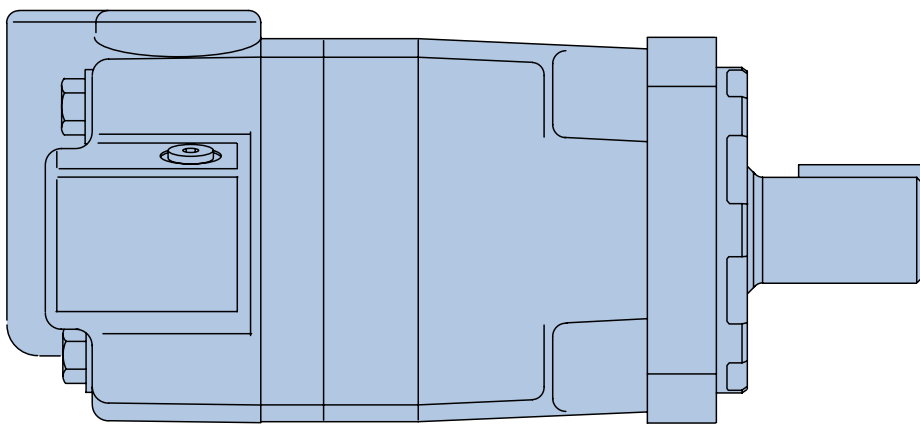
Sprayer



Trencher

4000 Series

Specifications



4000 SERIES MOTORS

Displ. cm ³ /r [in ³ /r]		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)	Continuous	697	722	582	459	383	336	303	239	191	151
	Intermittent	868	862	693	546	532	488	422	376	305	241
@ Flow											
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	320 [2850]	375 [3330]	485 [4290]	600 [5300]	705 [6240]	753 [6666]	850 [7530]	930 [8240]	945 [8375]	970 [8605]
	Intermittent	470 [4160]	560 [4940]	705 [6240]	800 [7100]	845 [7470]	957 [8471]	1065 [9420]	1185 [10470]	1170 [10350]	1180 [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]	260 [3750]	310 [4500]	260 [3750]	260 [3750]	240 [3500]	170 [2500]	140 [2000]
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]	14.3 [31.5]	14.1 [31.0]	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 for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

Maximum Inlet Pressure:

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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

130 cm³/r [7.9 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] 1,9	[310] 15	[510] 35	[1060] 120	[1590] 180						
[1] 3,8	[290] 35	[530] 60	[1080] 120	[1600] 180	[2110] 240	[2640] 300	[3060] 345	[3450] 390		
[2] 7,5	[280] 30	[530] 60	[1100] 125	[1620] 185	[2140] 240	[2660] 300	[3180] 360	[3600] 405	[4020] 455	[4080] 460
[4] 15	[260] 30	[520] 60	[1100] 125	[1650] 185	[2200] 250	[2700] 305	[3210] 365	[3660] 415	[4100] 465	[4560] 515
[6] 23	[240] 25	[510] 60	[1100] 125	[1650] 185	[2200] 250	[2720] 305	[3240] 365	[3710] 420	[4180] 470	[4660] 525
[8] 30	[230] 25	[510] 60	[1080] 120	[1640] 185	[2210] 250	[2740] 310	[3270] 370	[4270] 480	[4750] 535	
[10] 38	[210] 25	[510] 60	[1080] 120	[1640] 185	[2210] 250	[2750] 310	[3300] 375	[4350] 490	[4840] 545	
[12] 45	[200] 25	[500] 55	[1070] 120	[1640] 185	[2220] 250	[2750] 310	[3300] 375	[4370] 495	[4870] 550	
[14] 53	[180] 20	[490] 55	[1060] 120	[1640] 185	[2220] 250	[2750] 310	[3310] 375	[4390] 495	[4890] 550	
[16] 61	[160] 20	[490] 55	[1050] 120	[1630] 185	[2220] 250	[2760] 310	[3310] 375	[4400] 495	[4920] 555	
[18] 68	[130] 15	[480] 55	[1050] 120	[1630] 185	[2220] 250	[2760] 310	[3320] 375	[4420] 500	[4940] 560	
[20] 76	[110] 10	[470] 55	[1040] 120	[1620] 185	[2210] 250	[2760] 310	[3330] 375	[4440] 500		
[22] 83	[70] 10	[450] 50	[1020] 115	[1610] 180	[2190] 245	[2750] 310	[3320] 375	[3880] 440	[4440] 500	
[25] 95	[50] 5	[430] 50	[1000] 115	[1580] 180	[2160] 245	[2720] 305	[3300] 375	[3860] 435	[4430] 500	
[30] 114		[400] 45	[940] 105	[1500] 170	[2080] 235	[2670] 300	[3200] 360	[3740] 425		

110 cm³/r [6.7 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] 1,9	[150] 15	[390] 45	[850] 95	[1290] 145						
[1] 3,8	[170] 20	[440] 50	[900] 100	[1380] 155	[1860] 210	[2270] 255	[2680] 305	[3110] 350		
[2] 7,5	[180] 20	[450] 50	[910] 105	[1390] 155	[1860] 210	[2280] 260	[2700] 305	[3120] 355	[3450] 390	
[4] 15	[190] 20	[460] 50	[940] 105	[1400] 160	[1870] 210	[2310] 260	[2730] 310	[3140] 355	[3560] 400	[3880] 440
[6] 23	[200] 25	[470] 55	[960] 110	[1420] 160	[1880] 210	[2320] 260	[2760] 310	[3200] 360	[3640] 410	[3950] 455
[8] 30	[190] 20	[460] 50	[950] 105	[1420] 160	[1880] 210	[2340] 265	[2790] 315	[3230] 365	[3670] 415	[4010] 455
[10] 38	[180] 20	[460] 50	[950] 105	[1420] 160	[1890] 215	[2350] 265	[2820] 320	[3260] 370	[3700] 420	[4070] 460
[12] 45	[160] 20	[450] 50	[940] 105	[1420] 160	[1880] 210	[2350] 265	[2820] 320	[3260] 370	[3710] 420	[4080] 460
[14] 53	[140] 15	[440] 50	[930] 105	[1420] 160	[1880] 210	[2350] 265	[2830] 320	[3280] 370	[3730] 420	[4110] 465
[16] 61	[130] 15	[440] 50	[920] 105	[1410] 160	[1870] 210	[2350] 265	[2840] 320	[3300] 375	[3750] 425	[4120] 465
[18] 68	[100] 10	[440] 50	[910] 105	[1400] 160	[1870] 210	[2350] 265	[2840] 320	[3300] 375	[3770] 425	[4140] 465
[20] 76	[80] 10	[430] 50	[900] 100	[1370] 155	[1860] 210	[2350] 265	[2850] 320	[3320] 375	[3790] 430	[4160] 470
[25] 95		[400] 45	[860] 95	[1350] 155	[1850] 210	[2320] 260	[2830] 320	[3300] 375	[3780] 425	

[3780]
425 } Torque [lb-in]
690 } Nm
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

205 cm³/r [12.5 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] 1,9	[400] 45 8	[810] 90 5	[1500] 170 1							
[1] 3,8	[410] 45 17	[830] 95 17	[1590] 180 16	[2220] 250 15	[2860] 325 14	[3860] 435 12	[4560] 515 11	[5390] 610 9	[5510] 625 3	
[2] 7,5	[420] 45 36	[850] 95 35	[1680] 190 34	[2410] 270 32	[3140] 355 29	[4060] 460 27	[4800] 540 25	[5420] 610 22	[6000] 680 16	[6210] 700 8
[4] 15	[430] 50 73	[870] 100 73	[1770] 200 71	[2590] 295 70	[3410] 385 68	[4260] 480 61	[5040] 570 57	[5730] 645 45	[6340] 715 35	[6740] 760 23
[6] 23	[430] 50 107	[880] 100 106	[1800] 205 105	[2620] 295 103	[3530] 400 101	[4370] 495 98	[5170] 585 90	[5900] 665 81	[6590] 745 74	[7100] 800 65
[8] 30	[410] 45 144	[870] 100 143	[1820] 205 142	[2660] 300 138	[3560] 400 136	[4410] 500 132	[5240] 590 125	[6020] 680 116	[6770] 765 109	
[10] 38	[390] 45 182	[860] 95 180	[1820] 205 179	[2700] 305 174	[3580] 405 170	[4460] 505 166	[5300] 600 160	[6110] 690 152	[6890] 780 143	
[12] 45	[350] 40 217	[850] 95 216	[1810] 205 215	[2690] 305 211	[3570] 405 202	[4440] 500 200	[5300] 600 194	[6120] 690 185		
[14] 53	[330] 35 256	[840] 95 254	[1790] 200 252	[2670] 300 248	[3560] 400 243	[4430] 500 237	[5290] 600 229	[6120] 690 219		
[16] 61	[290] 35 291	[820] 95 290	[1770] 200 289	[2650] 300 284	[3540] 400 280	[4410] 500 272	[5280] 595 264	[6120] 690 253		
[18] 68	[270] 30 329	[810] 90 327	[1750] 200 325	[2640] 300 321	[3520] 400 316	[4400] 495 308	[5270] 595 298	[6120] 690 287		
[20] 76	[230] 25 366	[800] 90 364	[1730] 195 362	[2620] 295 358	[3510] 395 353	[4380] 495 345	[5270] 595 334	[6120] 690 321		
[22] 83	[190] 20 402	[780] 90 400	[1690] 190 398	[2600] 295 394	[3500] 395 389	[4370] 495 380	[5260] 595 368			
[25] 95	[150] 15 459	[750] 85 456	[1640] 185 453	[2560] 290 448	[3480] 395 442	[4360] 495 434	[5240] 590 421			
[30] 114		[710] 80 546	[1540] 175 542	[2510] 285 537	[3350] 380 529	[4190] 475 520	[5030] 570 504			

160 cm³/r [9.9 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] 1,9	[300] 35 8	[680] 75 7	[1320] 150 5	[2050] 230 3	[2750] 310 1					
[1] 3,8	[320] 35 23	[700] 80 22	[1350] 155 20	[2070] 235 19	[2780] 315 18	[3300] 375 16	[3940] 445 15	[4410] 500 8	[4950] 560 2	
[2] 7,5	[330] 35 46	[700] 80 45	[1360] 155 41	[2080] 235 40	[2790] 315 37	[3340] 375 32	[3970] 450 29	[4530] 510 27	[5090] 575 25	[5590] 630 13
[4] 15	[320] 35 93	[710] 80 92	[1400] 160 90	[2100] 240 88	[2820] 320 84	[3420] 385 76	[4020] 455 73	[4620] 520 62	[5220] 590 51	[5730] 645 35
[6] 23	[300] 35 137	[710] 80 135	[1420] 160 134	[2140] 240 131	[2850] 320 126	[3510] 395 120	[4180] 470 114	[4760] 540 90	[5340] 605 75	[5870] 665 57
[8] 30	[280] 30 184	[720] 80 182	[1450] 165 180	[2180] 245 176	[2900] 330 171	[3560] 400 163	[4230] 480 154	[4850] 550 138	[5470] 620 122	[6010] 680 100
[10] 38	[260] 30 232	[720] 80 229	[1480] 165 226	[2220] 250 221	[2950] 335 216	[3610] 410 206	[4290] 485 194	[4920] 555 182	[5560] 630 169	[6160] 695 142
[12] 45	[240] 25 277	[700] 80 274	[1450] 165 272	[2190] 245 266	[2920] 330 260	[3590] 405 250	[4280] 485 238	[4920] 555 224	[5570] 630 209	[6180] 700 182
[14] 53	[220] 25 321	[680] 75 319	[1420] 160 318	[2160] 245 311	[2890] 325 304	[3570] 405 294	[4270] 480 282	[4920] 555 266	[5580] 630 249	[6200] 700 222
[16] 61	[200] 25 366	[670] 75 364	[1400] 160 362	[2130] 240 356	[2860] 325 348	[3550] 400 338	[4260] 480 326	[4920] 555 308	[5590] 630 289	[6220] 705 262
[18] 68	[180] 20 410	[650] 75 409	[1360] 155 407	[2100] 235 401	[2830] 320 392	[3530] 400 382	[4250] 480 370	[4910] 555 350	[5600] 635 329	[6240] 705 302
[20] 76	[150] 15 460	[630] 70 458	[1340] 150 456	[2070] 235 448	[2800] 315 440	[3510] 395 429	[4240] 480 417	[4910] 555 396	[5610] 635 373	
[22] 83	[120] 15 509	[620] 70 506	[1330] 150 502	[2060] 235 494	[2790] 315 484	[3500] 395 473	[4220] 475 461	[4910] 555 438	[5600] 635 413	
[25] 95	[70] 10 582	[600] 70 578	[1320] 150 573	[2050] 230 563	[2780] 315 552	[3480] 395 540	[4210] 475 526	[4900] 555 501	[5590] 630 474	
[30] 114		[560] 65 693	[1280] 145 687	[1990] 225 675	[2700] 305 661	[3430] 390 647	[3970] 450 630	[4640] 525 600		

[1990]
225
675 } Torque [lb-in]
Nm
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

245 cm³/r [15.0 in³/r]
Δ Pressure Bar [PSI]

	[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
[.5] 1.9	[460] 50	[980] 110													
[1] 3.8	[480] 55	[990] 110	[1490] 14	[1990] 13	[2480] 13	[2970] 12	[3400] 12	[3830] 11	[4250] 11	[4680] 10	[5020] 4				
[2] 7.5	[500] 55	[1000] 115	[1520] 170	[2040] 230	[2540] 285	[3050] 345	[3420] 385	[3930] 445	[4440] 500	[4900] 555	[5320] 600	[5740] 650	[6160] 695	[6640] 750	[7150] 810
[4] 15	[510] 60	[1030] 115	[1560] 175	[2080] 235	[2600] 295	[3130] 355	[3630] 410	[4130] 465	[4630] 520	[5120] 580	[5570] 630	[6030] 680	[6480] 730	[6870] 775	[7340] 830
[6] 23	[510] 60	[1040] 120	[1570] 175	[2100] 235	[2620] 295	[3160] 355	[3660] 415	[4200] 475	[4710] 530	[5220] 590	[5690] 645	[6150] 695	[6620] 750	[7050] 795	[7430] 840
[8] 30	[500] 55	[1020] 115	[1560] 175	[2110] 240	[2630] 295	[3150] 355	[3680] 415	[4210] 475	[4740] 535	[5250] 595	[5720] 645	[6200] 700	[6670] 755	[7090] 800	[7470] 845
[10] 38	[470] 55	[1000] 115	[1540] 175	[2100] 235	[2620] 295	[3150] 355	[3690] 415	[4230] 480	[4770] 540	[5290] 600	[5760] 650	[6240] 705	[6710] 760	[7140] 805	
[12] 45	[450] 50	[980] 110	[1530] 175	[2080] 235	[2610] 295	[3140] 355	[3680] 415	[4220] 475	[4760] 540	[5280] 595	[5750] 645	[6230] 705	[6700] 755		
[14] 53	[420] 45	[960] 110	[1520] 170	[2060] 235	[2600] 295	[3130] 355	[3670] 415	[4200] 475	[4740] 535	[5260] 595	[5740] 650	[6220] 705			
[16] 61	[400] 45	[950] 105	[1500] 170	[2040] 230	[2580] 290	[3120] 355	[3660] 415	[4190] 475	[4730] 535	[5250] 595	[5730] 650	[6210] 700			
[18] 68	[380] 45	[930] 105	[1480] 165	[2020] 230	[2560] 290	[3110] 350	[3650] 415	[4180] 475	[4710] 530	[5230] 590	[5720] 645	[6200] 700			
[20] 76	[350] 40	[910] 105	[1460] 165	[2000] 225	[2550] 290	[3100] 350	[3640] 410	[4170] 470	[4700] 530	[5220] 590	[5710] 645				
[22] 83	[310] 35	[870] 100	[1420] 160	[1970] 225	[2500] 280	[3050] 345	[3590] 405	[4140] 465	[4680] 530	[5200] 590	[5680] 640				
[25] 95	[260] 30	[820] 95	[1380] 155	[1930] 220	[2460] 280	[2980] 335	[3540] 400	[4090] 460	[4640] 525	[5180] 585					
[30] 114		[680] 75	[1250] 140	[1860] 210	[2390] 255	[2900] 330	[3430] 390	[3960] 445	[4460] 505	[4950] 560					
[35] 132			[1110] 125	[1740] 195	[2270] 255	[2790] 315	[3340] 375	[3910] 440	[4400] 495						

280 cm³/r [17.1 in³/r]
Δ Pressure Bar [PSI]

	[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
[.5] 1.9	[533] 60	[1074] 121													
[1] 3.8	[553] 62	[1136] 128	[1714] 194	[2287] 258	[2841] 321	[3394] 384	[3868] 437	[4389] 496	[4895] 553	[5370] 608	[5870] 663	[638] 720	[6811] 770	[7239] 818	[7654] 865
[2] 7.5	[568] 64	[1146] 130	[1740] 197	[2328] 263	[2902] 328	[3461] 391	[3955] 447	[4524] 511	[5092] 566	[5630] 636	[6146] 694	[6666] 753	[7191] 813	[7749] 876	[8323] 940
[4] 15	[579] 65	[1167] 132	[1771] 200	[2374] 268	[2942] 335	[3557] 402	[4139] 468	[4712] 532	[5285] 597	[5848] 661	[6395] 722	[6946] 785	[7502] 848	[8020] 906	[8471] 957
[6] 23	[583] 66	[1177] 133	[1781] 201	[2395] 271	[2987] 338	[3601] 407	[4193] 474	[4793] 542	[5395] 607	[5959] 673	[6521] 737	[7082] 800	[7607] 859	[8097] 915	
[8] 30	[573] 65	[167] 132	[1780] 201	[2404] 272	[3007] 340	[3610] 408	[4218] 477	[4812] 544	[5411] 611	[5994] 677	[6556] 741	[7022] 793	[7518] 849		
[10] 38	[547] 62	[1146] 130	[1765] 199	[2395] 271	[2997] 339	[3629] 410	[4238] 479	[4837] 547	[5442] 615	[6035] 682	[6601] 746	[7022] 793	[7518] 849		
[12] 45	[527] 60	[1126] 127	[1745] 197	[2369] 268	[2991] 338	[3609] 408	[4228] 478	[4832] 546	[5441] 615	[6034] 682	[6586] 744	[7022] 793			
[14] 53	[497] 56	[1106] 125	[1730] 195	[2344] 265	[2972] 336	[3585] 405	[4213] 476	[4816] 544	[5430] 614	[6028] 681	[6511] 736	[6940] 784			
[16] 61	[472] 53	[1096] 124	[1715] 194	[2324] 263	[2947] 333	[3565] 403	[4203] 475	[4811] 544	[5420] 612	[5919] 669	[6436] 727				
[18] 68	[437] 39	[1075] 121	[1690] 191	[2299] 260	[2917] 330	[3541] 400	[4188] 473	[4801] 542	[5400] 610	[5919] 669	[6362] 719				
[20] 76	[402] 45	[1055] 119	[1669] 189	[2274] 257	[2898] 327	[3521] 398	[4178] 472	[4791] 541	[5394] 609	[5851] 661					
[22] 83	[366] 41	[1005] 114	[1629] 184	[2257] 255	[2856] 323	[3480] 393	[4136] 467	[4756] 537	[5305] 600						
[25] 95	[301] 34	[940] 106	[1588] 179	[2231] 252	[2825] 319	[3419] 386	[4086] 462	[4710] 532	[5205] 588						
[30] 114		[845] 96	[1480] 167	[2151] 243	[2759] 312	[3328] 376	[3984] 450	[4573] 517	[5021] 567						
[35] 132			[1348] 152	[2057] 232	[2623] 296	[3183] 360	[3833] 439	[4354] 492							

{3340}
375
519 } Torque [lb-in]
Nm
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No Operation

310 cm³/r [19.0 in³/r]
Δ Pressure Bar [PSI]

	[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
[.5]	[600] 70	[1150] 130													
1.9	4	2													
[1]	[620] 70	[1270] 145	[1920] 215	[2560] 290	[3170] 360	[3780] 425	[4290] 485	[4900] 555	[5490] 620	[6080] 685	[6670] 755	[7270] 820	[7880] 890	[8490] 960	[9080] 1025
3.8	11	11	11	10	10	10	9	9	9	8	8	7	7	6	5
[2]	[630] 70	[1280] 145	[1940] 220	[2590] 295	[3230] 365	[3830] 435	[4450] 505	[5070] 575	[5680] 640	[6300] 710	[6910] 780	[7530] 850	[8160] 920	[8790] 995	[9420] 1065
7.5	23	23	22	22	21	21	20	20	19	18	18	17	17	16	15
[4]	[640] 70	[1290] 145	[1960] 220	[2640] 300	[3290] 370	[3940] 445	[4600] 520	[5240] 590	[5880] 665	[6510] 735	[7150] 810	[7790] 880	[8450] 955	[9100] 1030	
15	47	47	46	46	45	45	44	44	43	42	42	41	41	40	
[6]	[650] 75	[1300] 145	[1970] 225	[2660] 300	[3320] 375	[4000] 450	[4680] 530	[5330] 600	[5980] 675	[6630] 750	[7280] 825	[7940] 895			
23	71	71	70	70	69	69	68	67	66	64	64	63			
[8]	[640] 70	[1300] 145	[1980] 225	[2670] 300	[3350] 380	[4030] 455	[4710] 530	[5360] 605	[6020] 680	[6670] 755	[7320] 825				
30	96	96	95	95	94	94	93	92	91	89	88				
[10]	[620] 70	[1280] 145	[1970] 225	[2660] 300	[3340] 375	[4070] 460	[4740] 535	[5390] 610	[6050] 685	[6710] 760	[7370] 835				
38	121	120	120	119	119	118	117	116	115	112	109				
[12]	[600] 70	[1260] 140	[1940] 220	[2630] 295	[3340] 375	[4040] 455	[4730] 535	[5390] 610	[6060] 685	[6720] 760					
45	145	144	144	143	142	142	141	140	139	135					
[14]	[570] 65	[1240] 140	[1920] 215	[2600] 295	[3310] 375	[4000] 450	[4710] 530	[5380] 610	[6060] 685	[6730] 760					
53	169	169	168	168	167	167	165	164	163	159					
[16]	[540] 60	[1230] 140	[1900] 215	[2580] 290	[3280] 370	[3970] 450	[4700] 530	[5380] 610	[6050] 685						
61	193	193	192	192	190	189	188	187	185						
[18]	[490] 55	[1210] 135	[1880] 210	[2550] 290	[3240] 365	[3930] 445	[4680] 530	[5370] 605	[6040] 680						
68	217	217	216	216	214	213	211	209	207						
[20]	[450] 50	[1190] 135	[1860] 210	[2520] 285	[3210] 365	[3900] 440	[4670] 530	[5360] 605	[6030] 680						
76	242	242	242	241	240	238	236	234	232						
[22]	[420] 45	[1130] 130	[1820] 205	[2520] 285	[3180] 360	[3870] 440	[4640] 525	[5320] 600							
83	267	266	266	265	264	262	260	258							
[25]	[340] 40	[1050] 120	[1780] 200	[2510] 285	[3160] 355	[3820] 430	[4590] 520	[5280] 595							
95	303	303	302	301	300	299	296	293							
[30]		[1010] 115	[1700] 190	[2420] 275	[3100] 350	[3720] 420	[4500] 510	[5140] 580							
114		363	362	360	359	358	354	351							
[35]			[1580] 180	[2360] 265	[2950] 335	[3540] 400	[4390] 495								
132			422	420	419	418	413								

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

	[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
[.5]	[700] 80	[1340] 150												
1.9	4	2												
[1]	[750] 85	[1430] 160	[2110] 240	[2770] 315	[3460] 390	[4170] 470	[4890] 550	[5610] 635	[6310] 715	[7010] 790	[7700] 870			
3.8	9	9	8	8	8	7	7	7	5	4	2			
[2]	[800] 90	[1500] 170	[2290] 260	[3030] 340	[3850] 435	[4620] 520	[5310] 600	[6000] 680	[6750] 765	[7490] 845	[8240] 930	[8990] 1015	[9730] 1100	[10470] 1185
7.5	18	18	17	16	16	15	15	14	13	13	12	11	10	8
[4]	[860] 95	[1630] 185	[2470] 280	[3310] 375	[4120] 465	[4900] 555	[5640] 635	[6390] 720	[7190] 810	[7890] 890	[8780] 990			
15	38	38	37	36	36	35	35	34	34	33	32			
[6]	[860] 95	[1690] 190	[2540] 285	[3410] 385	[4180] 470	[4980] 565	[5780] 655	[6580] 745	[7400] 835	[8220] 930				
23	57	57	56	55	54	53	52	50	49	47				
[8]	[840] 95	[1680] 190	[2550] 290	[3400] 385	[4260] 480	[5090] 575	[5870] 665	[6650] 750	[7480] 845					
30	76	76	75	74	73	72	70	68	66					
[10]	[800] 90	[1680] 190	[2550] 290	[3400] 385	[4260] 480	[5100] 575	[5920] 670	[6730] 760	[7560] 855					
38	95	95	94	93	92	91	89	86	84					
[12]	[760] 85	[1660] 190	[2520] 285	[3380] 380	[4270] 480	[5110] 575	[5900] 665	[6690] 755						
45	114	114	113	112	111	110	108	105						
[14]	[740] 85	[1640] 185	[2490] 280	[3370] 380	[4260] 480	[5100] 575	[5880] 665	[6650] 750						
53	133	133	132	131	130	129	127	124						
[16]	[710] 80	[1620] 185	[2460] 280	[3350] 380	[4240] 480	[5080] 575	[5840] 660							
61	153	153	152	151	149	147	145							
[18]	[680] 75	[1600] 180	[2430] 275	[3340] 375	[4220] 475	[5060] 570	[5810] 655							
68	172	172	171	170	168	166	164							
[20]	[610] 70	[1580] 180	[2400] 270	[3320] 375	[4210] 475	[5040] 570	[5780] 655							
76	192	191	190	189	187	185	183							
[22]	[570] 65	[1490] 170	[2340] 265	[3220] 365	[4160] 470	[5010] 565	[5740] 650							
83	211	210	209	208	206	204	201							
[25]	[490] 55	[1350] 155	[2250] 255	[3080] 350	[4070] 460	[4960] 560	[5700] 645							
95	239	238	237	236	235	233	230							
[30]		[1080] 120	[1650] 185	[2270] 255	[3020] 340	[3850] 435								
114		285	284	282	281	279								
[35]			[1520] 170	[2120] 240	[2870] 325	[3760] 425								
132			331	330	328	325								
[40]				[2050] 230	[2790] 315	[3620] 410								
151				376	374	371								

[4390] Torque [lb-in]
495 Nm
413 Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

625 cm³/r [38.0 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1600] 100	[1700] 115	[1800] 125	[2000] 140
[.5] 1.9	[1000] 115									
[1] 3.8	[1080] 120	[2340] 265	[3600] 405	[4850] 550	[6100] 690	[7350] 830	[7820] 885	[8290] 935	[8760] 990	
[2] 7.5	[1085] 125	[2380] 270	[3675] 415	[5010] 565	[6350] 715	[7625] 860	[8115] 915	[8605] 970	[9095] 1030	[10075] 1140
[4] 15	[1090] 125	[2420] 275	[3750] 425	[5175] 585	[6600] 745	[7900] 895	[8410] 950	[9000] 1015	[9590] 1085	[10450] 1180
[6] 23	[1095] 125	[2460] 280	[3825] 430	[5220] 590	[6620] 750	[7950] 900	[8430] 950	[8910] 1005	[9490] 1070	
[8] 30	[1100] 125	[2500] 280	[3900] 440	[5270] 595	[6640] 750	[7990] 905	[8460] 955	[8925] 1010		
[10] 38	[1130] 130	[2550] 290	[3975] 450	[5320] 600	[6670] 755	[8045] 910	[8595] 970	[9150] 1035		
[12] 45	[1160] 130	[2600] 295	[4050] 460	[5375] 605	[6700] 755	[8100] 915	[8660] 980			
[14] 53	[1105] 125	[2535] 285	[3965] 450	[5325] 600	[6685] 755	[8065] 910	[8620] 975			
[16] 61	[1050] 120	[2465] 280	[3880] 440	[5275] 595	[6670] 755	[8035] 910	[8580] 970			
[18] 68	[990] 110	[2405] 270	[3825] 430	[5240] 590	[6655] 750	[7345] 830				
[20] 76	[930] 105	[2350] 265	[3770] 425	[5205] 590	[6640] 750					
[25] 95	[750] 85	[2175] 245	[3600] 405	[5000] 565	[6400] 725					
[30] 114	[550] 60	[1975] 225	[3400] 385	[4800] 530	[6200] 700					
[35] 132			[3125] 355	[4545] 515						
[40] 151			[2850] 320	[4295] 485						

495 cm³/r [30.0 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170
[.5] 1.9	[800] 90	[1750] 200								
[1] 3.8	[880] 100	[1875] 210	[2875] 325	[3825] 430	[4775] 540	[5720] 645	[6670] 755	[7600] 860		
[2] 7.5	[905] 100	[1940] 220	[2975] 335	[3990] 450	[5010] 565	[6010] 680	[7010] 790	[8000] 905	[8980] 1015	
[4] 15	[935] 105	[2005] 225	[3075] 345	[4160] 470	[5245] 595	[6300] 715	[7355] 830	[8375] 945	[9400] 1060	[10350] 1170
[6] 23	[920] 105	[2010] 225	[3100] 350	[4185] 475	[5265] 595	[6345] 715	[7420] 840	[8445] 955	[9465] 1070	
[8] 30	[905] 100	[2015] 230	[3125] 355	[4205] 475	[5290] 600	[6385] 720	[7485] 845	[8510] 960		
[10] 38	[880] 100	[1995] 225	[3095] 350	[4205] 475	[5295] 600	[6390] 720	[7480] 845	[8525] 960		
[12] 45	[860] 95	[1975] 225	[3095] 350	[4200] 475	[5305] 600	[6390] 720	[7475] 845			
[14] 53	[830] 95	[1945] 220	[3055] 345	[4165] 470	[5275] 595	[6360] 720	[7445] 840			
[16] 61	[805] 90	[1910] 215	[3020] 340	[4130] 465	[5245] 595	[6330] 715	[7420] 840			
[18] 68	[740] 85	[1860] 210	[2980] 335	[4105] 465	[5235] 590	[6305] 715	[7380] 835			
[20] 76	[680] 75	[1810] 205	[2940] 330	[4085] 460	[5225] 590	[6285] 710				
[25] 95	[570] 65	[1665] 190	[2800] 315	[4005] 455	[5210] 590	[6135] 695				
[30] 114		[1520] 170	[2645] 300	[3765] 425	[4885] 550	[5985] 675				
[35] 132			[2400] 270	[3510] 395						
[40] 151			[2155] 245	[3260] 370						

[2850]
320 } Torque [lb-in]
241 } Speed RPM

4000 Series

Dimensions

Standard Mount

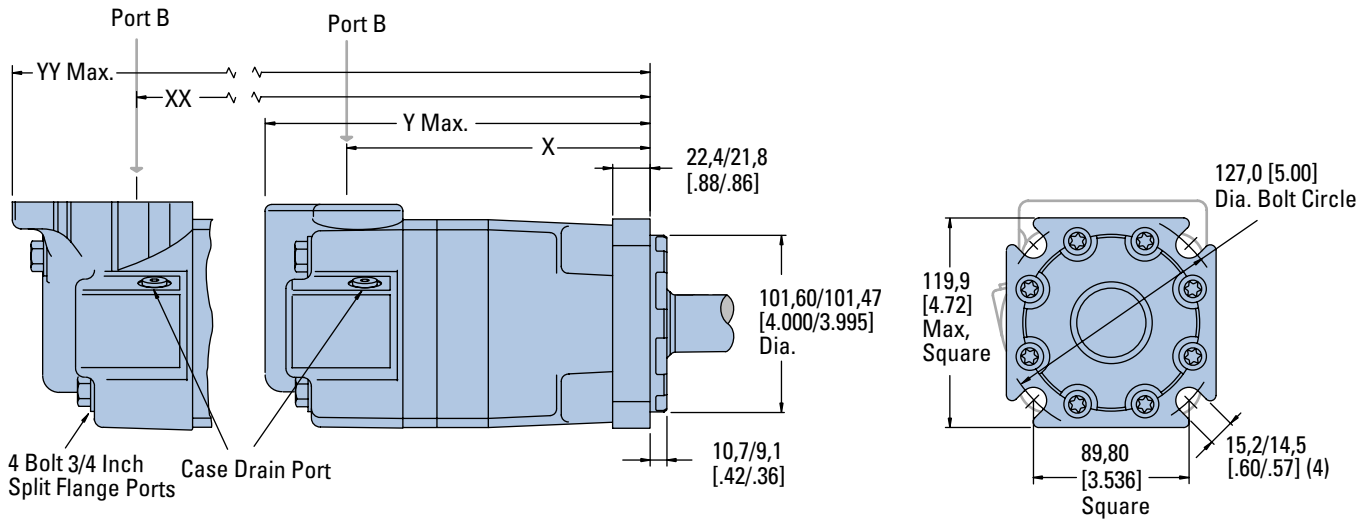
Ports

- 1 1/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 3/4 inch Split Flange Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- G 3/4 (BSP) Staggered Ports (2)
- G 1/4 (BSP) Case Drain Port (1)

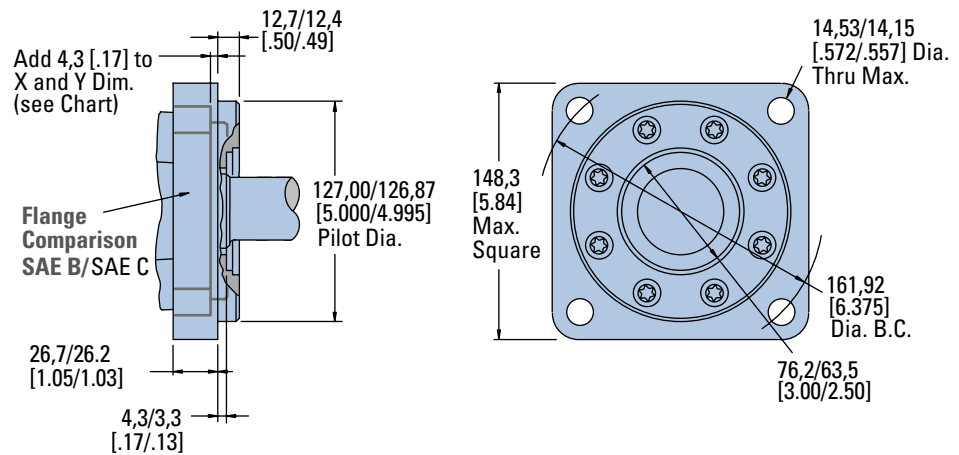
Standard Rotation Viewed from Shaft End

- Port A Pressurized — CW
- Port B Pressurized — CCW

Standard Mount



SAE C Flange



STANDARD 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]	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]	171,3 [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]

4000 Series

Dimensions

Wheel Mount

Wheel Mount

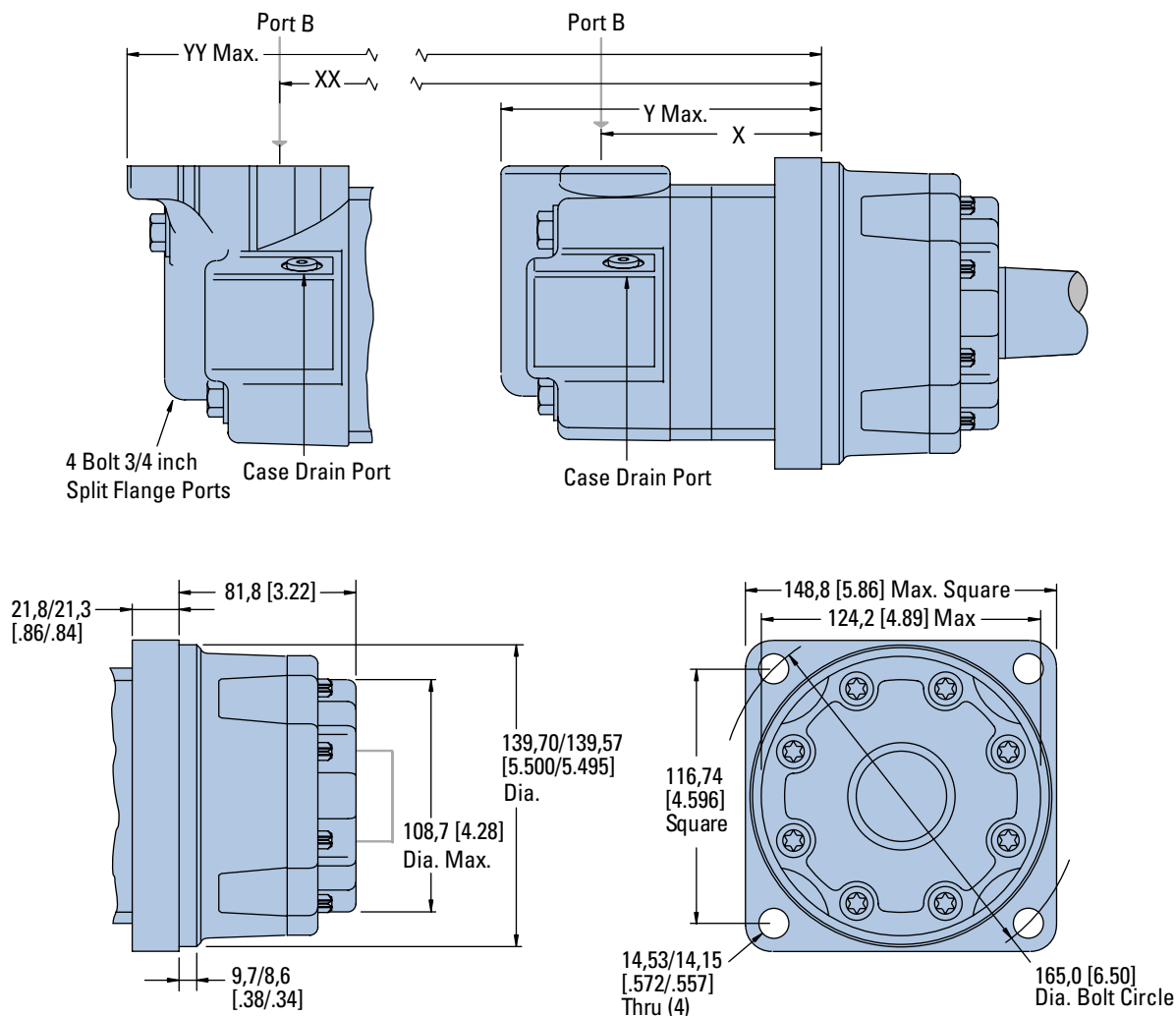
Ports

- 1 1/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 3/4 inch Split Flange Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 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]	115,4 [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]	115,4 [4.55]	194,3 [7.65]
395 [24.0]	117,1 [4.61]	173,0 [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]	146,9 [5.79]	202,9 [7.99]	156,0 [6.14]	235,0 [9.25]

4000 Series

Dimensions

Bearingless

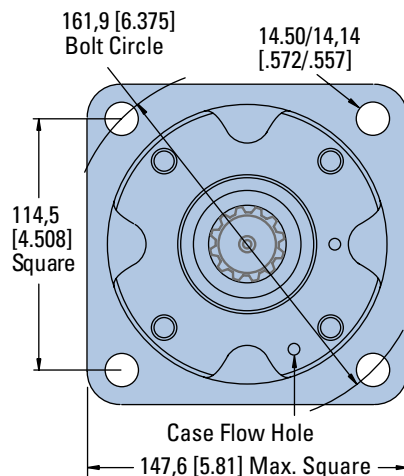
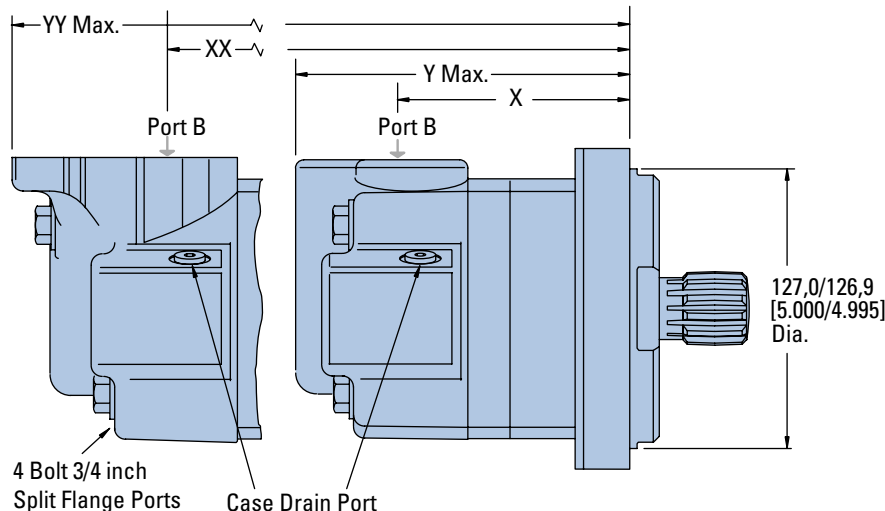
Bearingless

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) or
 4 Bolt 3/4 inch Split Flange Ports (2)
 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
 G 3/4 (BSP) Staggered Ports (2)
 G 1/4 (BSP) Case Drain Port (1)

Standard Rotation Viewed from Shaft End

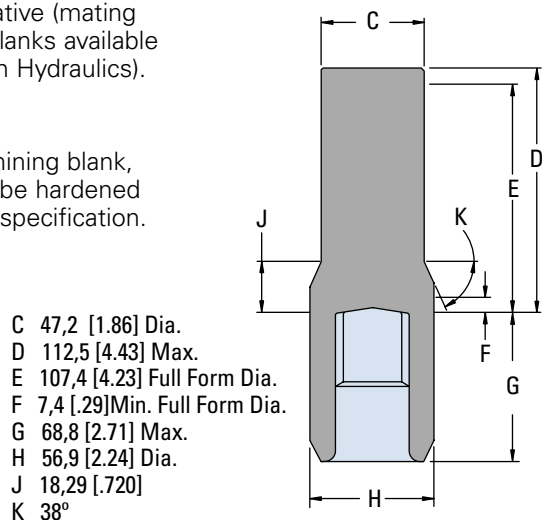
Port A Pressurized — CW
 Port B Pressurized — CCW



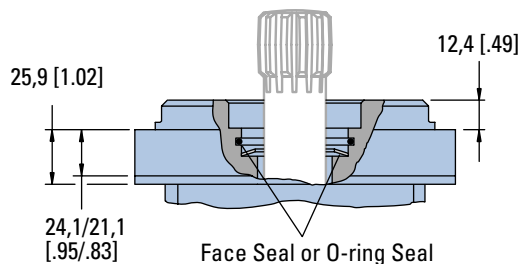
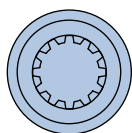
For 4000 Series Bearingless Motor application information contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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



Mating Coupling Blank
 Eaton Part No. 12745-003



BEARINGLESS MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /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]	101,4 [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]	101,4 [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]

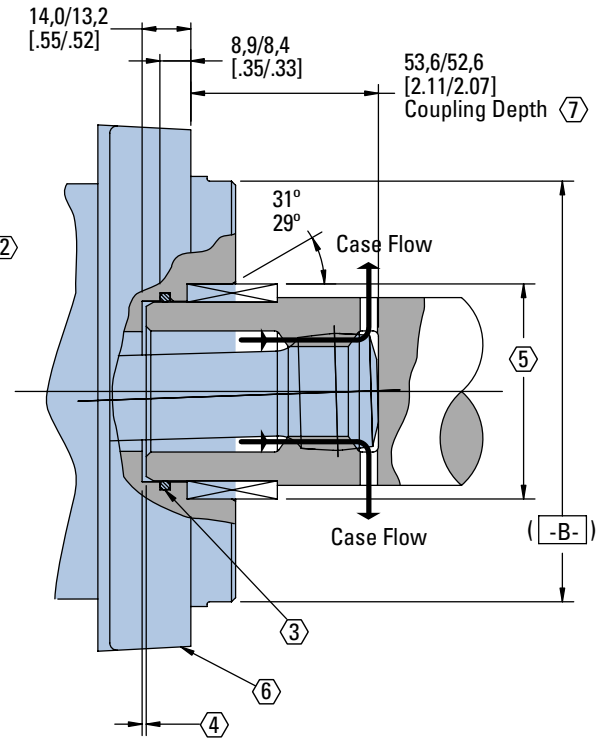
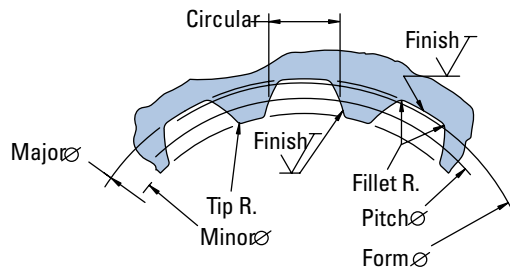
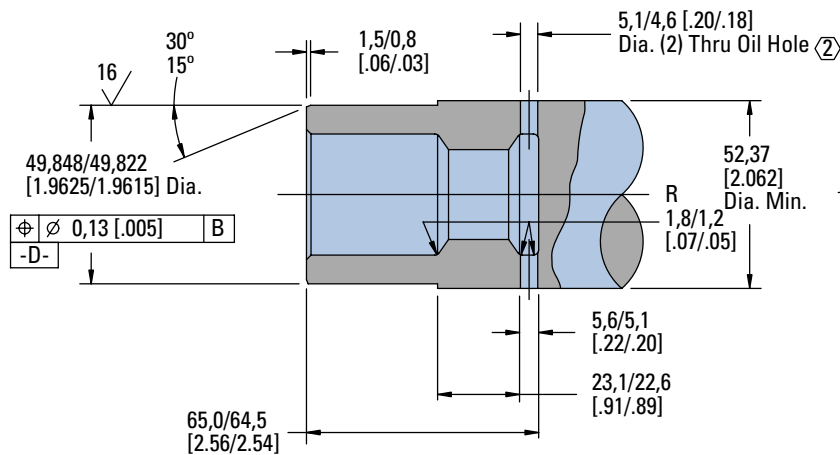
4000 Series

Installation Information

Bearingless

- 1 Internal spline in mating part to be as follows: Material to be ASTM A304, 8620H. Carbonize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 - 1,27 [.030 - .050] (dimensions apply after heat treat).
- 2 Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
- 3 Seal to be furnished with motor for proper oil circulation thru splines.

- 4 Some means of maintaining clearance between shaft and mounting flange must be provided.
- 5 Counterbore designed to adapt to a standard sleeve bearing 50,010 - 50,040 [1.9689 - 1.9700] ID by 60,050 - 60,080 [2.3642 - 2.3653] (Oilite bronze sleeve bearing).
- 6 Similar to SAE "C" Four Bolt Flange.
- 7 52,8 [2.08] Max. dimension to be maintained when assembling shipping and installing unit to insure valve drive engagement with valve (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] ∇ 0,20 [.008] D
Base Diameter.....	Ref. 26,396455 [1.0392305]
Major Diameter.....	33,43 [1.316] Max. 33,23 [1.308] Min.
Min. Minor Diameter.....	28,40 - 28,58 [1.118 - 1.125]
Form Diameter, Min.....	32,59 [1.283]
Fillet Radius.....	0,63 - 0,76 [.025 - .030]
Tip Radius.....	0,26 - 0,51 [.010 - .020]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,025 [+ .0000 - .0010]
Total Index Variation.....	0,038 [.0015]
Lead Variation.....	0,013 [.0005]
Circular Space Width:	
Maximum Actual.....	5,045 [1.986]
Minimum Effective.....	4,995 [1.951]
Maximum Effective.....	Ref. 5,009 [1.972]
Minimum Actual.....	Ref. 4,986 [1.963]
Dimension Between Two Pins.....	Ref. 22,783 - 22,929 [.8970 - .9027]
Pin Diameter.....	5,334 [.2100] Pins to Have 3,73 [.147]

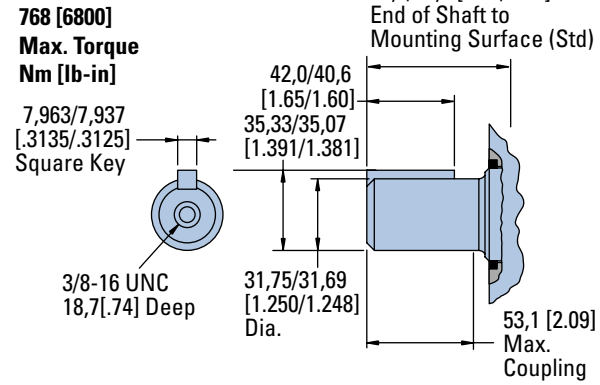
Wide Flat for Root Clearance

4000 Series

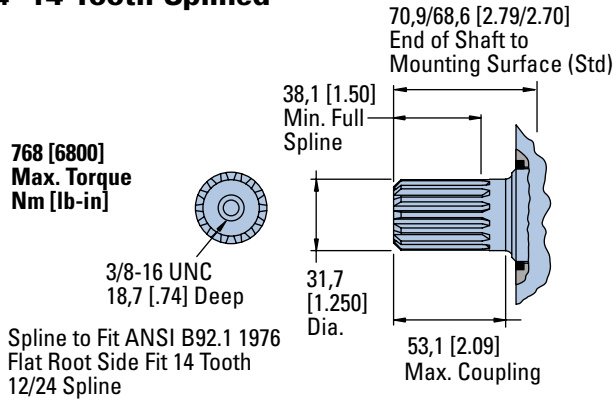
Dimensions

Shafts

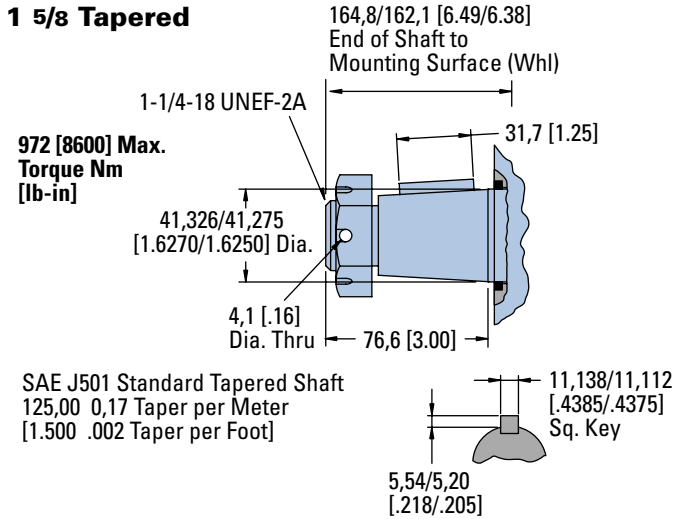
1 1/4 Inch Straight



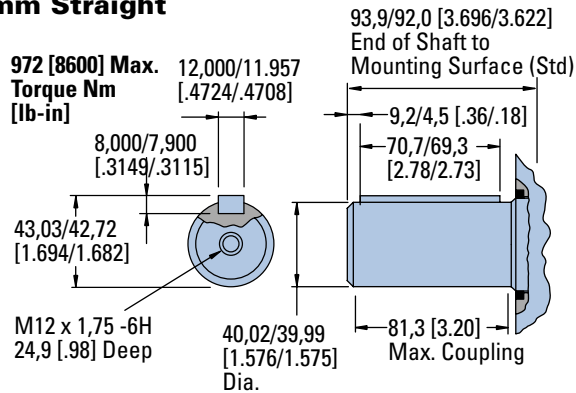
1 1/4 -14 Tooth Splined



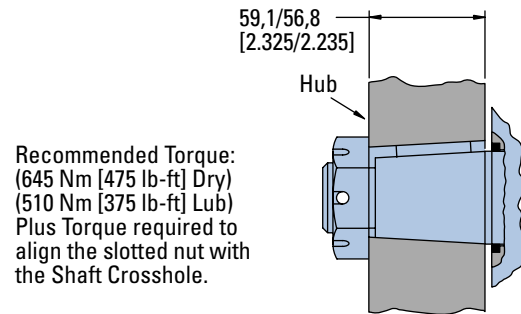
1 5/8 Tapered



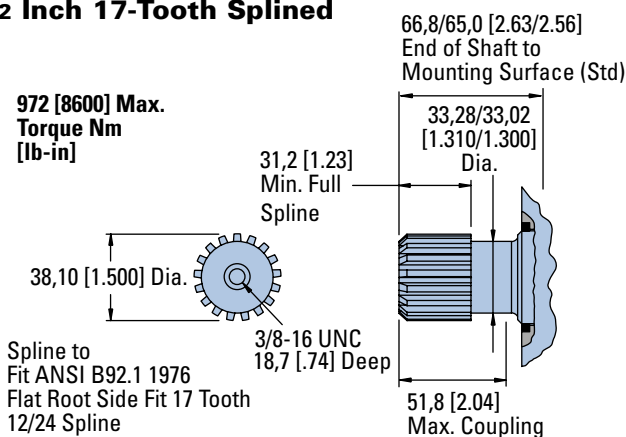
40 mm Straight



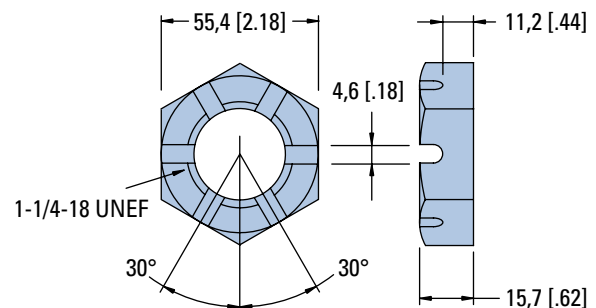
Tapered Shaft Hub Data



1 1/2 Inch 17-Tooth Splined



Slotted Hexagon Nut



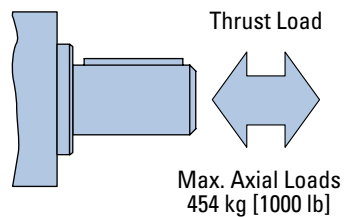
4000 Series

Shaft Side Load Capacity

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

Note:

Case pressure will increase the allowable Inward thrust load and decrease the allowable outward thrust load. Case pressure will push outward on the shaft at 94 kg/7 Bar [208 lb/100 PSI].



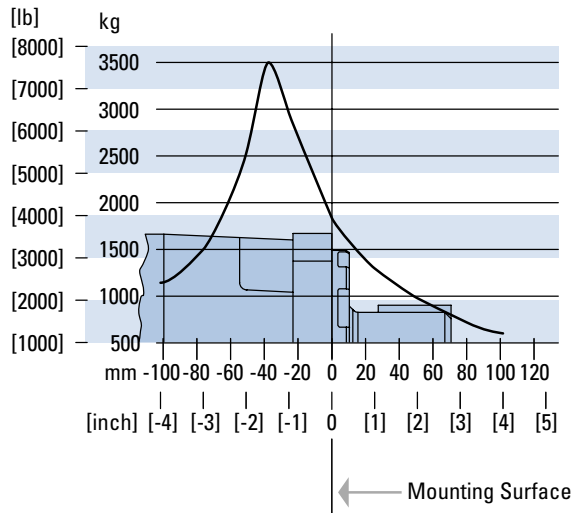
Each curve is based on B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

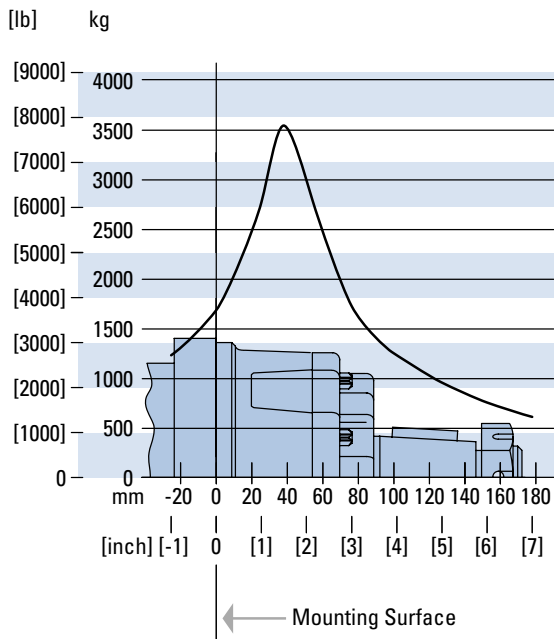
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



Wheel Motor Tapered Shaft



4000 Series

Case Pressure and Case Port

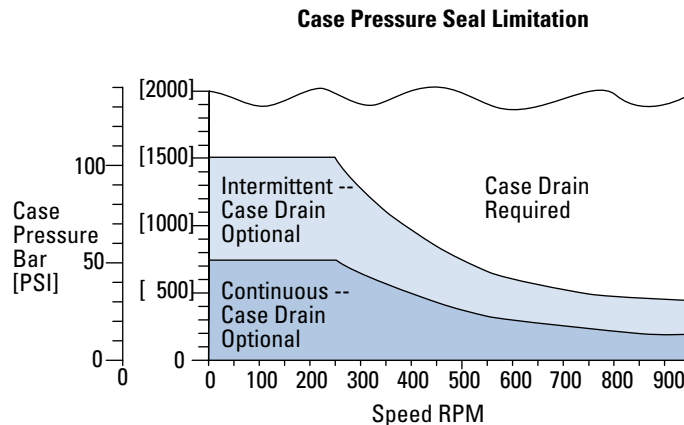
Char-Lynn 4000 Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine 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.

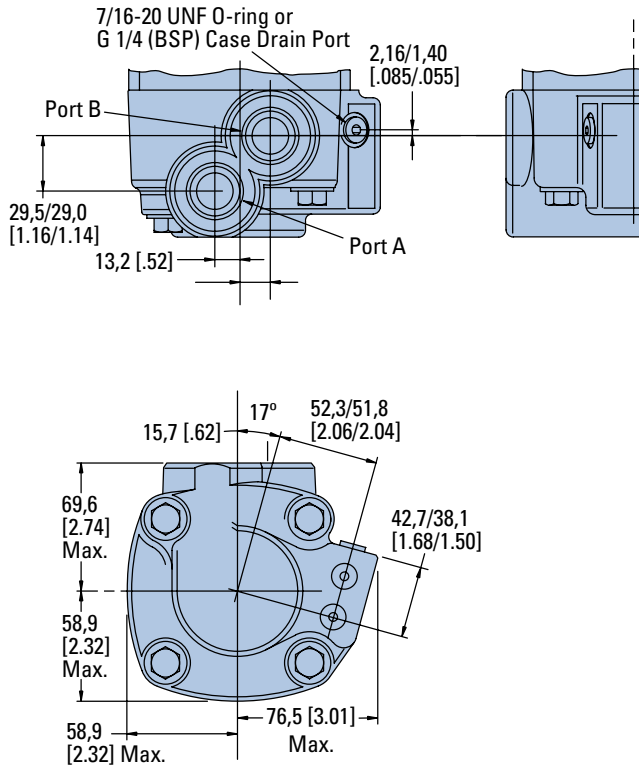


4000 Series

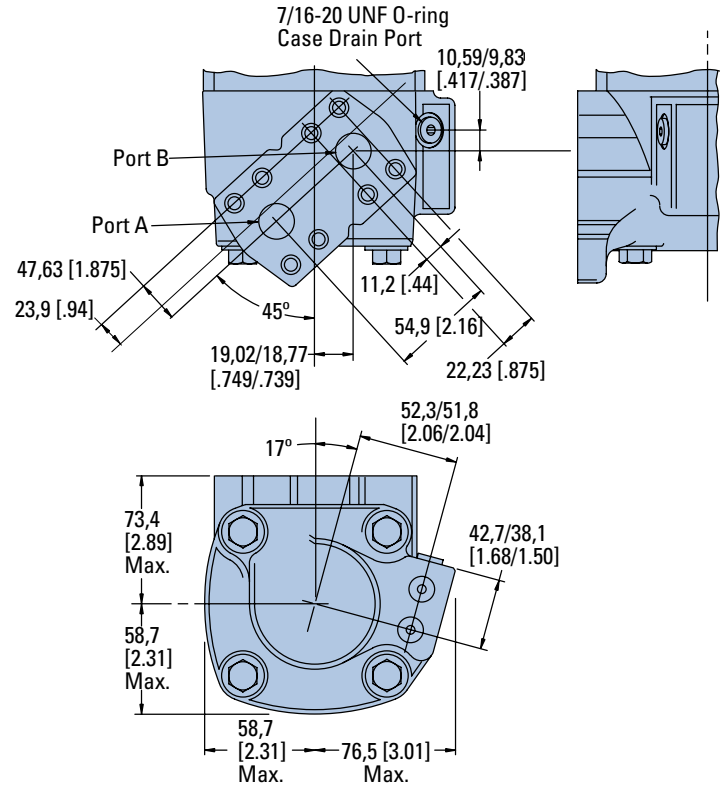
Dimensions

Ports

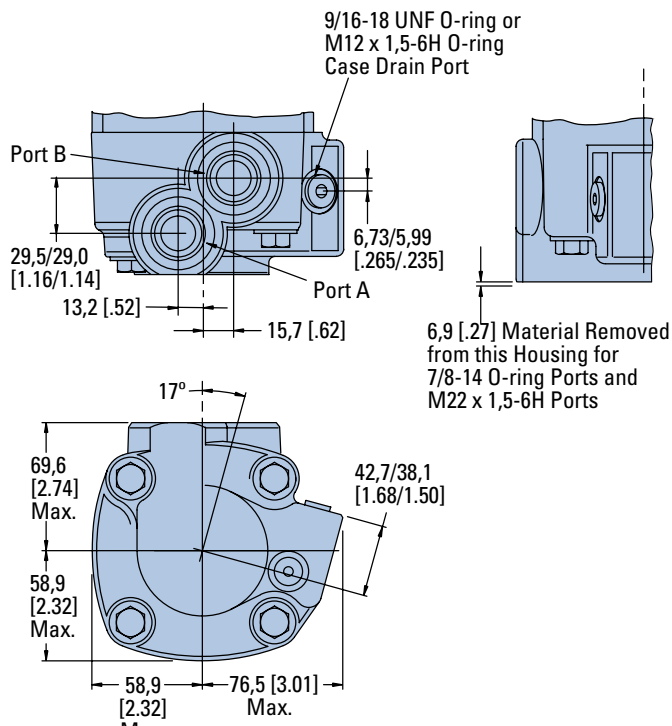
1-1/16-12 O-ring Ports (2) or G 3/4 (BSP) Ports (2)



4 Bolt 3/4 Inch Split Flange Ports to Fit SAE J518 c (2)



7/8-14 O-ring Ports (2) or M22 x 1,5-6H Ports (2)



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 SIZEDISPL. cm ³ /r [in ³ /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	-1104	-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	-1058	-1007	-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	-1197	—	—
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	110-1001	-1040	-1002	-1003	-1041	—	-1042	-1043	—	—
	40 mm Straight	G 3/4 (BSP)	110-1108	-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	-1008	-1045	—	-1046	-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		110-1011	-1048	-1012	-1013	-1049	—	-1050	-1051	—	—	
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	—	—

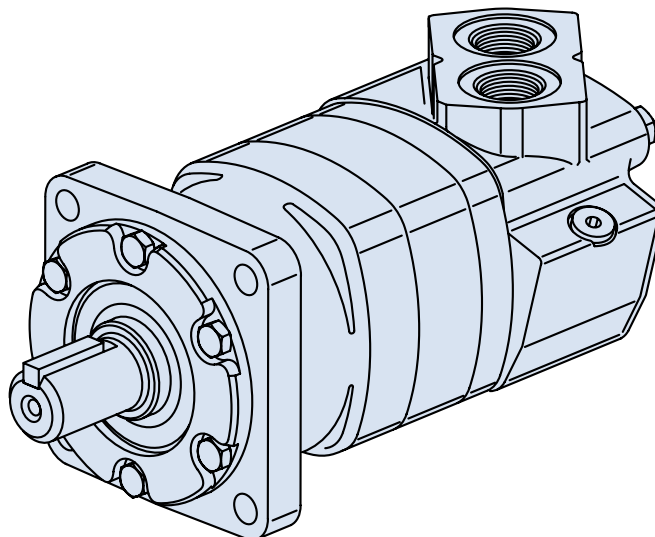
* New Release

111-1057

Notes

6000 Series

Highlights



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

Description

With torque up to 15,000 in-lb and 40 gpm continuous, this motor is packed with power operates very smoothly.

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.



Mowing



Snow Removal



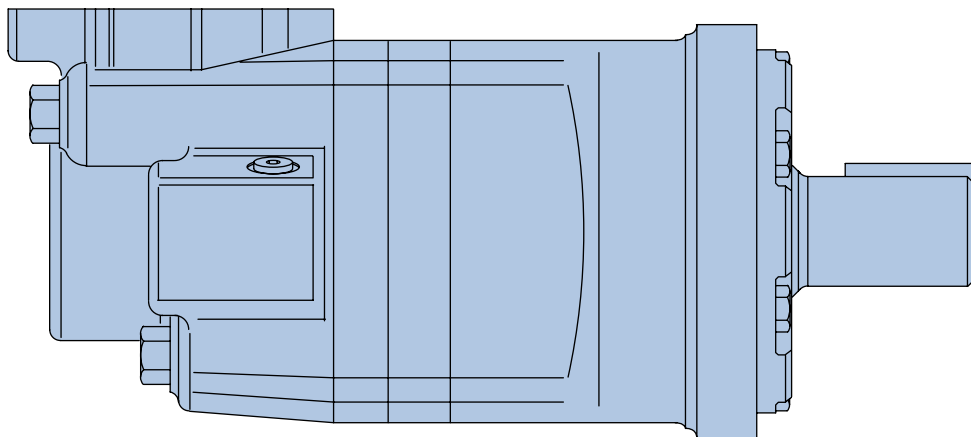
Sprayer



Trencher

6000 Series

Specifications



6000 SERIES MOTORS

Displ. cm ³ /r [in ³ /r]		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)	Continuous	775	615	485	387	307	241	203	187	153
	Intermittent	866	834	698	570	454	355	303	280	230
@ Flow										
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 [2250]
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]	28,3 [52.5]	28,8 [53.5]	30,2 [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 for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

Maximum Inlet Pressure:

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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

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

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] 1,9	[280] 30	[650] 75	[1450] 165	[2290] 260						
[2] 7,5	[290] 35	[680] 75	[1500] 170	[2340] 265	[3100] 350	[3880] 440	[4140] 470			
[4] 15	[300] 35	[710] 80	[1500] 175	[2390] 270	[3210] 365	[4030] 455	[4600] 520	[5200] 590	[5790] 655	
[8] 30	[310] 35	[740] 85	[1590] 180	[2450] 275	[3280] 370	[4120] 465	[4810] 545	[5530] 625	[6250] 705	[6900] 780
[12] 45	[320] 35	[750] 85	[1610] 180	[2480] 280	[3330] 375	[4190] 475	[4990] 565	[5810] 655	[6630] 750	[7320] 825
[16] 61	[300] 35	[730] 80	[1600] 180	[2470] 280	[3340] 375	[4210] 475	[5090] 575	[5900] 665	[6710] 760	[7470] 845
[20] 76	[270] 30	[720] 80	[1590] 180	[2460] 280	[3350] 380	[4240] 480	[5100] 575	[5950] 670	[6800] 770	[7620] 860
[24] 91	[240] 25	[700] 80	[1570] 175	[2440] 275	[3330] 375	[4220] 475	[5080] 575	[5940] 670	[6810] 770	
[28] 106	[190] 20	[660] 75	[1530] 175	[2400] 270	[3300] 375	[4200] 475	[5060] 570	[5940] 670	[6810] 770	
[32] 121	[160] 20	[630] 70	[1500] 170	[2370] 270	[3270] 370	[4160] 470	[5040] 570	[5920] 670	[6790] 765	
[36] 136	[120] 15	[620] 70	[1480] 165	[2350] 265	[3240] 365	[4130] 465	[5000] 565	[5880] 665	[6760] 765	
[40] 151	[80] 10	[610] 70	[1450] 165	[2320] 260	[3210] 365	[4100] 465	[4960] 560	[5840] 660		
[45] 170		[590] 65	[1410] 160	[2280] 260	[3170] 360	[4060] 460	[4920] 555	[5790] 655		

245 cm³/r [15.0 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] 1,9	[430] 50	[860] 95	[1890] 215							
[2] 7,5	[440] 50	[900] 100	[1940] 220	[2990] 340	[3960] 445	[4920] 555	[5040] 570	[5930] 670		
[4] 15	[460] 50	[940] 105	[2000] 225	[3060] 345	[4080] 460	[5090] 575	[5680] 640	[6630] 750	[7570] 855	[8520] 965
[8] 30	[470] 55	[960] 110	[2060] 235	[3150] 355	[4210] 475	[5260] 595	[6180] 700	[7100] 800	[8020] 905	[9020] 1020
[12] 45	[480] 55	[970] 110	[2080] 235	[3180] 360	[4270] 480	[5360] 605	[6390] 720	[7420] 840	[8450] 955	[9510] 1075
[16] 61	[450] 50	[960] 110	[2070] 235	[3180] 360	[4290] 485	[5420] 610	[6480] 730	[7490] 845	[8480] 960	[9540] 1180
[20] 76	[420] 45	[940] 105	[2050] 230	[3160] 355	[4290] 485	[5440] 615	[6510] 735	[7580] 855	[8660] 980	[9740] 1100
[24] 91	[380] 45	[920] 105	[2020] 230	[3120] 355	[4260] 480	[5400] 610	[6490] 735	[7590] 860	[8680] 980	
[28] 106	[330] 35	[870] 100	[1980] 225	[3100] 350	[4240] 480	[5380] 610	[6480] 730	[7580] 855	[8670] 980	
[32] 121	[290] 35	[800] 90	[1920] 215	[3050] 345	[4170] 470	[5290] 600	[6410] 725	[7520] 850	[8640] 975	
[36] 136	[250] 30	[730] 80	[1850] 210	[2980] 335	[4060] 460	[5150] 580	[6300] 710	[7440] 840		
[40] 151	[200] 25	[690] 80	[1790] 200	[2940] 330	[4010] 455	[5130] 580	[6190] 700	[7100] 800		
[45] 170		[570] 65	[1760] 200	[2860] 325	[3960] 445	[5070] 575	[6080] 685	[6690] 755		
[50] 189			[1720] 195	[2800] 315	[3890] 440	[4920] 555	[5940] 670			
[55] 208			[1670] 190	[2740] 310	[3820] 430	[4890] 550	[5880] 665			

[5790]
655 } Torque [lb-in]
702 } Nm
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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

310 cm³/r [19.0 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] 1.9	[530] 60 6	[1120] 125 4	[2440] 275 1							
[2] 7.5	[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
[12] 45	[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	[260] 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] 920 341	[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			

390 cm³/r [23.9 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[1] 3.8	[760] 85 4	[1570] 175 2	[3230] 365 1							
[2] 7.5	[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	[12120] 1370 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
[12] 45	[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] 730 329	[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				

[5750]
650
661 } Torque [lb-in]
Nm
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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

625 cm³/r [38.0 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3200] 221
[1] 3,8	[1060] 120 5	[2205] 250 5	[4515] 510 4	[6690] 755 2				
[2] 7,5	[1090] 125 12	[2300] 260 12	[4720] 535 13	[7025] 795 10	[9360] 1060 6			
[4] 15	[1145] 130 24	[2450] 275 24	[5052] 570 24	[7520] 850 21	[9410] 1065 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
[12] 45	[1200] 135 72	[2600] 295 72	[5390] 610 71	[8145] 920 68	[11770] 1330 64	[13000] 1469 60	[15700] 1774 56	
[16] 61	[1120] 125 94	[2530] 285 94	[5340] 605 92	[8105] 915 89	[11740] 1325 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				

490 cm³/r [30.0 in³/r]
Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275
[1] 3,8	[1010] 115 7	[1200] 235 7	[4260] 480 5	[6140] 695 3					
[2] 7,5	[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	
[12] 45	[1000] 115 91	[2080] 235 91	[4290] 485 89	[6500] 735 87	[8650] 975 84	[10800] 1220 79	[12890] 1455 71		
[16] 61	[110] 960 122	[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]
325
454 } Torque [lb-in]
Nm
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 120 SUS. Actual data may vary slightly from unit to unit in production.

Continuous
Peak
Intermittent
No Operation

805 cm³/r [49.0 in³/r]
Δ Pressure Bar [PSI]

735 cm³/r [45.0 in³/r]
Δ Pressure Bar [PSI]

Table with 11 columns (Flow LPM [GPM] and 10 pressure bars) and 16 rows. Contains performance data for 735 cm³/r motor.

[6604] } Torque [lb-in]
746 } Nm
301 } Speed RPM

Table with 11 columns (Flow LPM [GPM] and 10 pressure bars) and 16 rows. Contains performance data for 805 cm³/r motor.

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

985 cm³/r [60.0 in³/r]

D Pressure Bar [PSI]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140
[1] 3,8	[1890] 215 3	[4110] 465 3	[5730] 645 2	[7640] 865 2	[9550] 1080 1			
[2] 7,5	[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] 775 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
[12] 45	[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]
810
229 } Torque [lb-in]
Nm
Speed RPM

6000 Series

Dimensions

Standard Mount

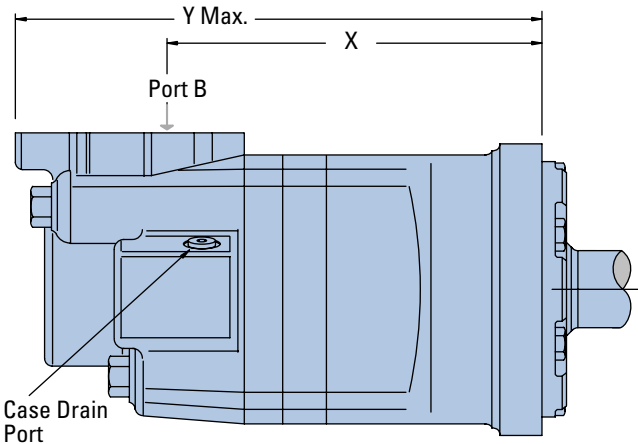
Ports

- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 3/4 inch Split Flange Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- G 1 (BSP) Staggered Ports (2)
- G 1/4 (BSP) Case Drain Port (1) or
- 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)

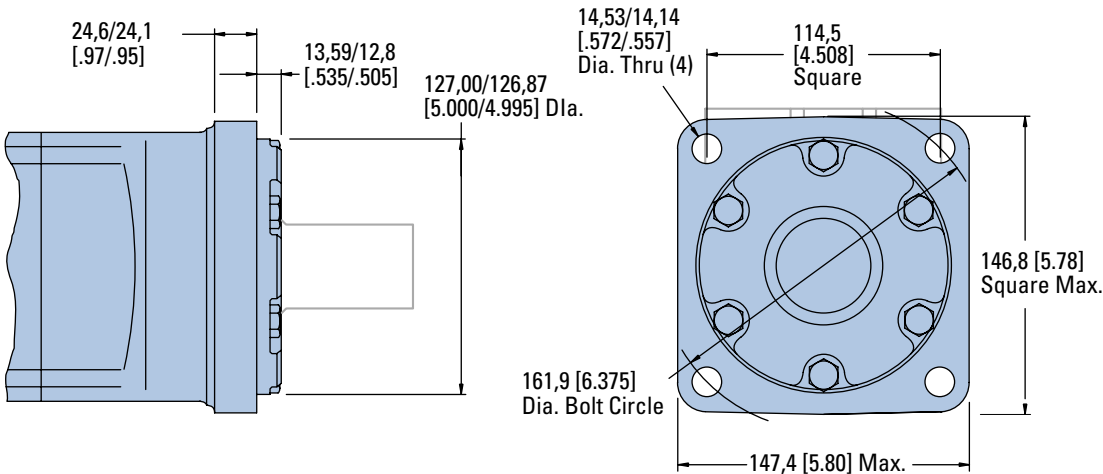
Standard Rotation Viewed from Shaft End

- Port A Pressurized — CW
- Port B Pressurized — CCW

Standard Mount



Standard SAE CC Flange



STANDARD MOTOR MOUNT DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
195 [11.9]	187,5 [7.38]	270,0 [10.63]
245 [15.0]	193,0 [7.60]	275,6 [10.85]
310 [19.0]	200,4 [7.89]	283,0 [11.14]
390 [23.9]	209,0 [8.23]	291,6 [11.48]
490 [30.0]	220,2 [8.67]	302,8 [11.92]
625 [38.0]	235,0 [9.25]	317,5 [12.50]
985 [60.0]	274,6 [10.81]	357,1 [14.06]

6000 Series

Dimensions

Wheel Mount

Ports

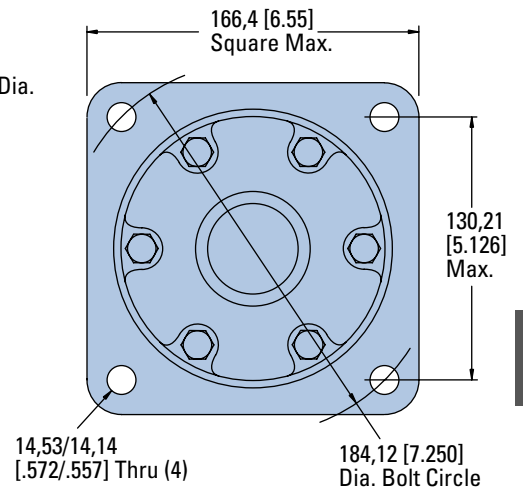
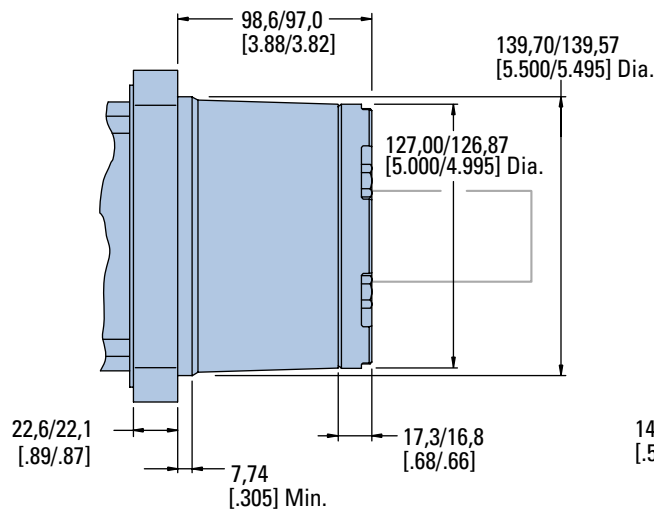
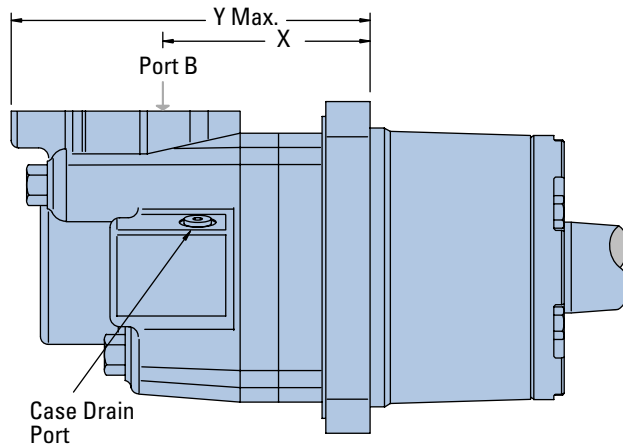
- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 3/4 inch Split Flange Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- G 1 (BSP) Staggered Ports (2)
- G 1/4 (BSP) Case Drain Port (1) or
- 1 5/16 UN-2B SAE O-ring Staggered Ports (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



WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
195 [11.9]	102,6 [4.04]	185,2 [7.29]
245 [15.0]	108,2 [4.26]	190,8 [7.51]
310 [19.0]	115,6 [4.55]	198,1 [7.80]
390 [23.9]	124,5 [4.90]	207,1 [8.15]
490 [30.0]	135,4 [5.33]	217,9 [8.58]
625 [38.0]	150,1 [5.91]	232,7 [9.16]
985 [60.0]	189,7 [7.47]	272,5 [10.73]

6000 Series

Dimensions

Global Mount (ISO)

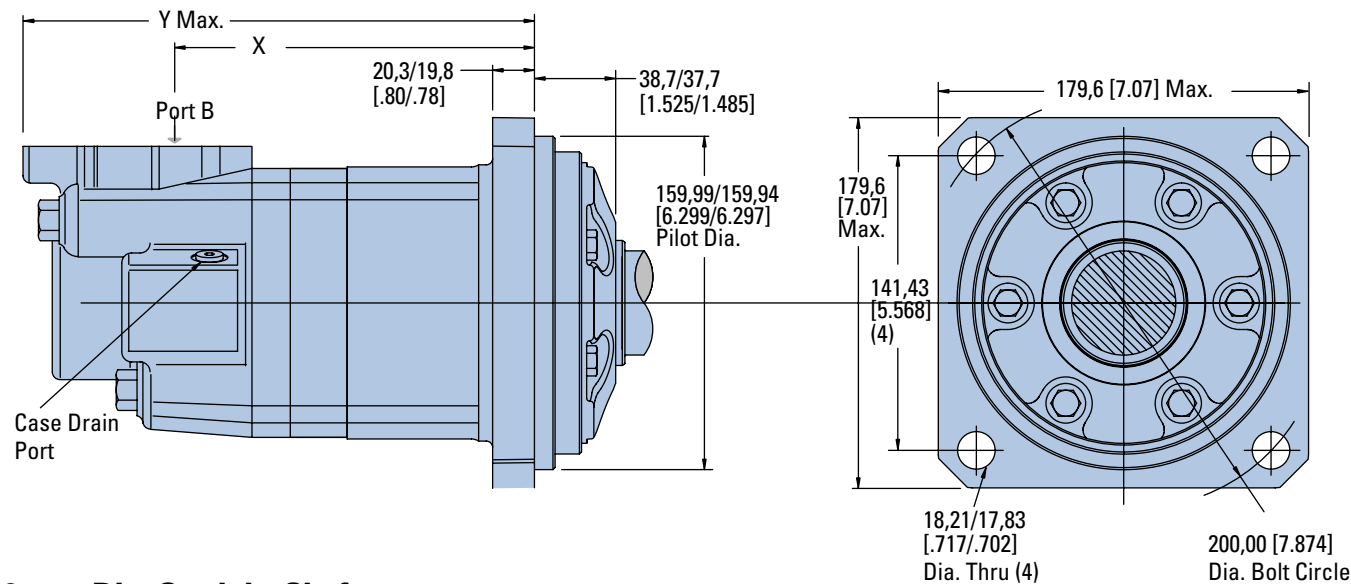
Global Mount (ISO)

Ports

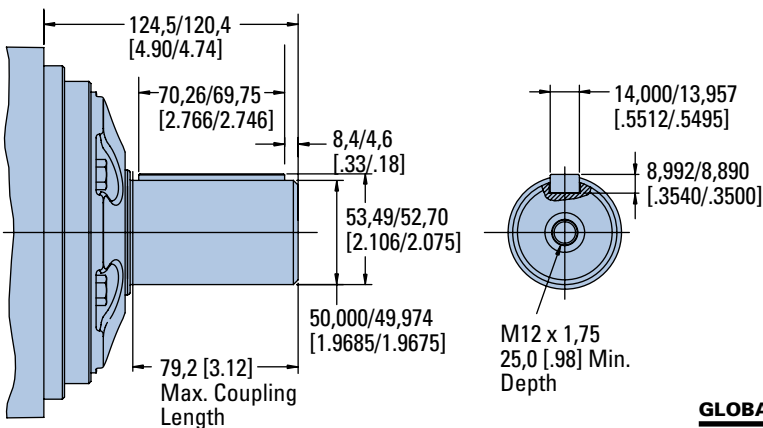
- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 3/4 inch Split Flange Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- G 1 (BSP) Staggered Ports (2)
- G 1/4 (BSP) Case Drain Port (1) or
- 1 5/16 UN-2B SAE O-ring Staggered Ports (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



50 mm Dia. Straight Shaft



GLOBAL MOUNT MOTOR DIMENSIONS

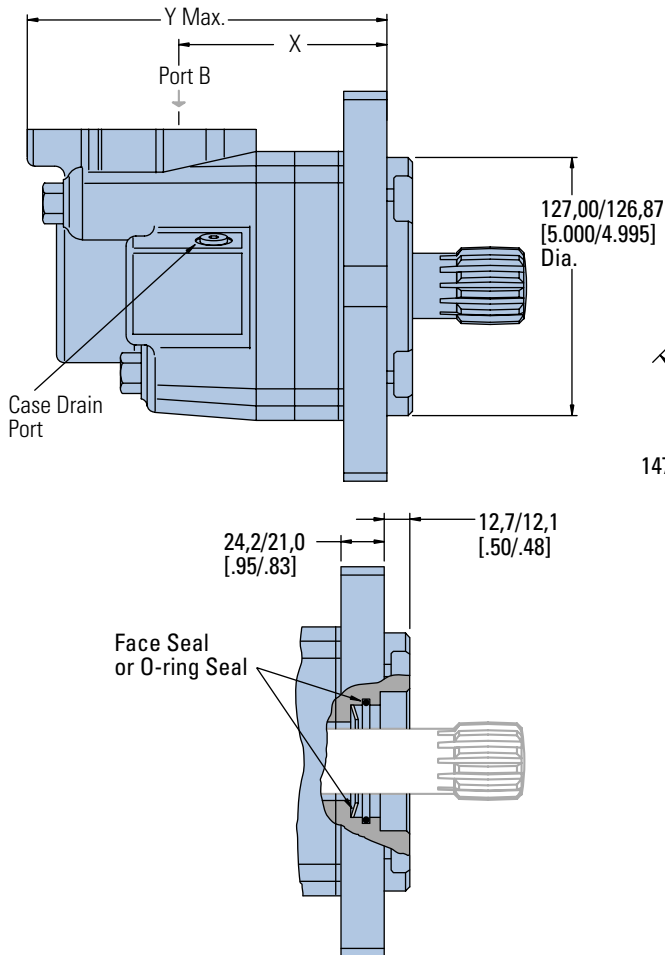
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
310 [19.0]	182,4 [7.18]	264,9 [10.43]
390 [24.0]	191,0 [7.52]	273,6 [10.77]
490 [30.0]	202,2 [7.96]	284,7 [11.21]
625 [38.0]	216,9 [8.54]	299,5 [11.79]
800 [45.0]	229,4 [9.03]	312,2 [12.29]
800 [49.0]	236,7 [9.32]	319,3 [12.57]
985 [60.0]	256,5 [10.10]	339,1 [13.35]

6000 Series

Dimensions

Bearingless

Bearingless



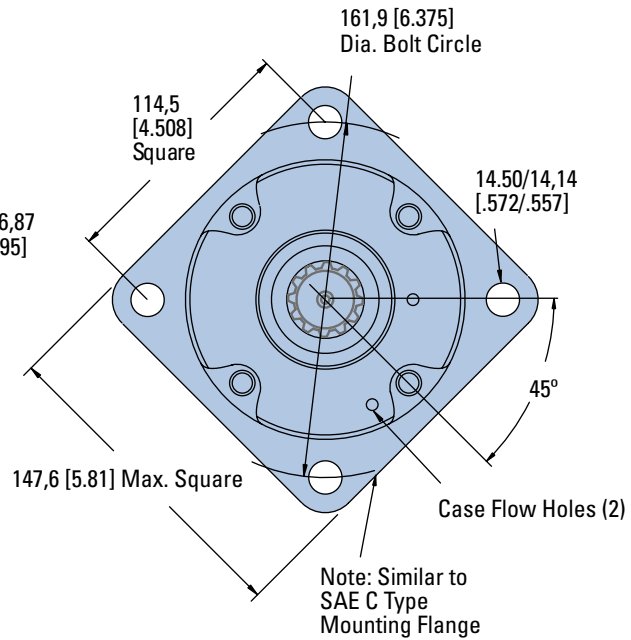
Ports

- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 3/4 inch Split Flange Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- G 1 (BSP) Staggered Ports (2)
- G 1/4 (BSP) Case Drain Port (1) or
- 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

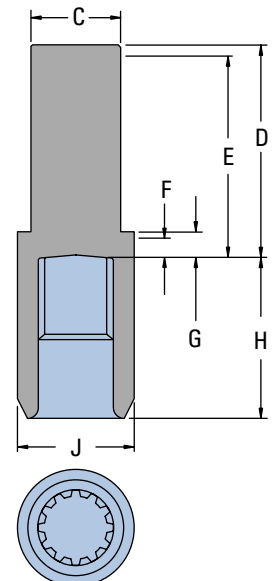


For 6000 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

- C 47,2 [1.86] Dia.
- D 111,5 [4.39] Max.
- E 106,4 [4.19] Full Form Dia.
- F 6,9 [.27] Min. Full Form Dia.
- G 10,2 [.40] Min.
- H 86,1 [3.39] Max.
- J 66,5 [2.62] Dia.



Mating Coupling Blank
Eaton Part No. 12778-002

BEARINGLESS MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /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]	200,9 [7.91]
390 [23.9]	127,3 [5.01]	209,6 [8.25]
490 [30.0]	138,2 [5.44]	220,7 [8.69]
625 [38.0]	152,9 [6.02]	235,5 [9.27]
985 [60.0]	192,8 [7.59]	275,1 [10.83]

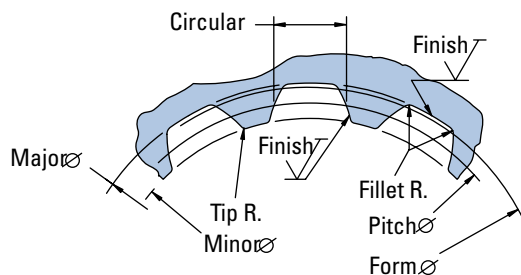
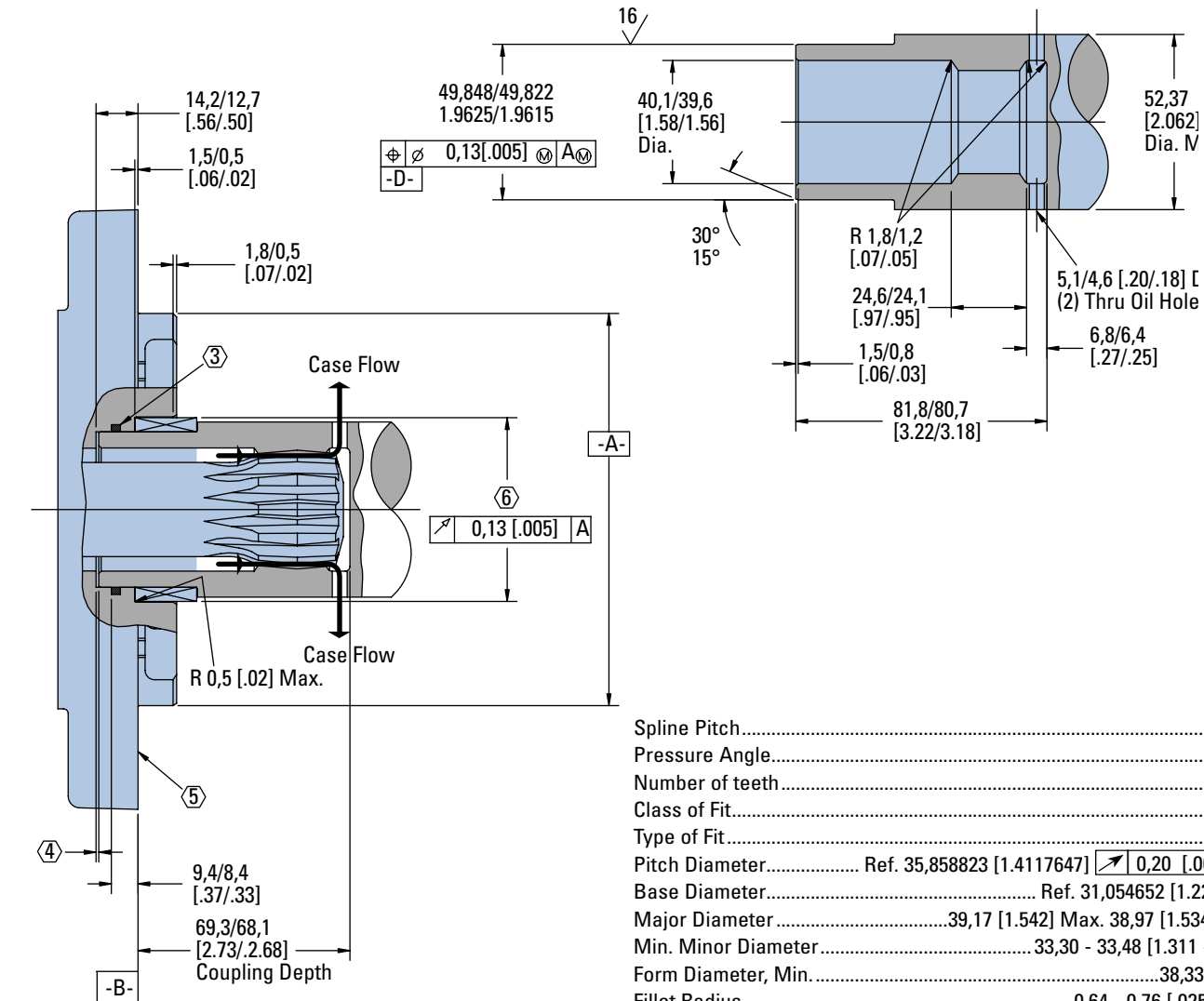
6000 Series

Installation Information

Bearingless

- 1 Internal spline in mating part to be as follows: Material to be ASTM A304, 8620H. Carbonize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 - 1,02 [.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).



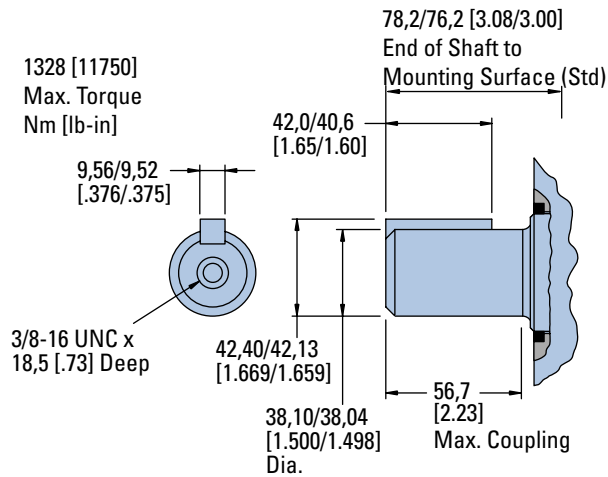
Spline Pitch.....	8.5/17
Pressure Angle.....	30°
Number of teeth.....	12
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter.....	Ref. 35,858823 [1.4117647] 0,20 [.008] D
Base Diameter.....	Ref. 31,054652 [1.2226241]
Major Diameter.....	39,17 [1.542] Max. 38,97 [1.534] Min..
Min. Minor Diameter.....	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 [+0.000 - .0010]
Total Index Variation	0,038 [.0015]
Lead Variation	0,013 [.0005]
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	

6000 Series

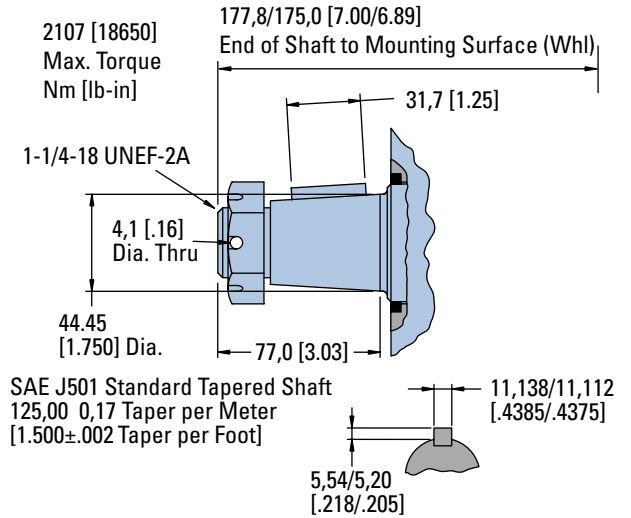
Dimensions

Shafts Splined

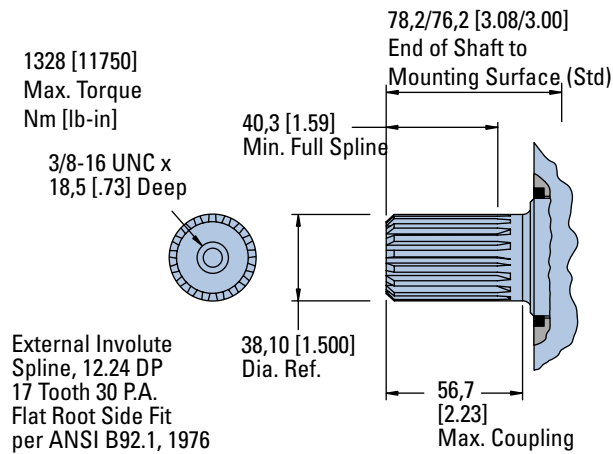
1 1/2 Inch Straight



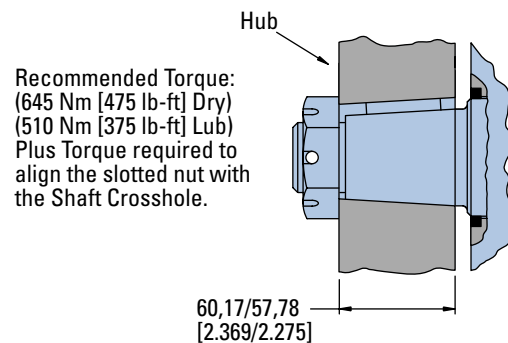
1 3/4 Inch Tapered



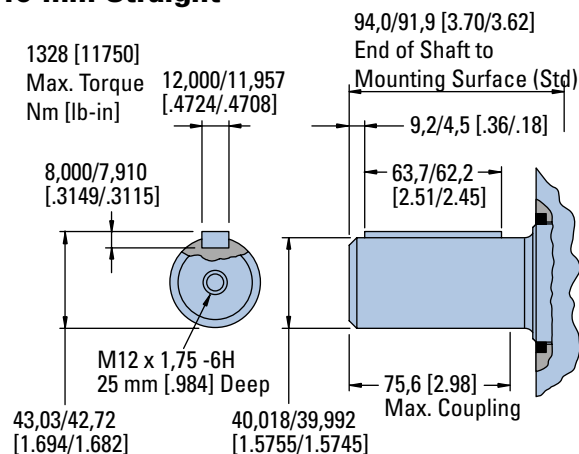
1 1/2 Inch 17 Tooth Splined



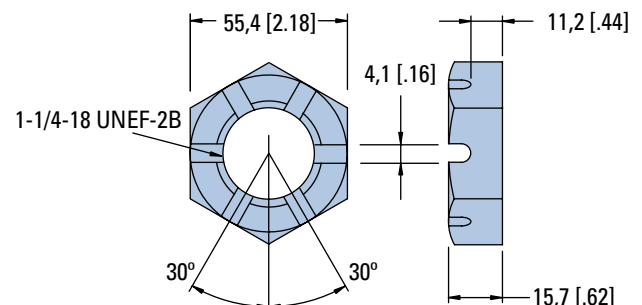
Tapered Shaft Hub Data



40 mm Straight



Slotted Hexagon Nut



6000 Series

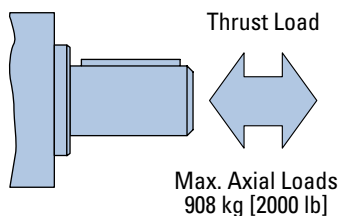
Shaft Side Load Capacity

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



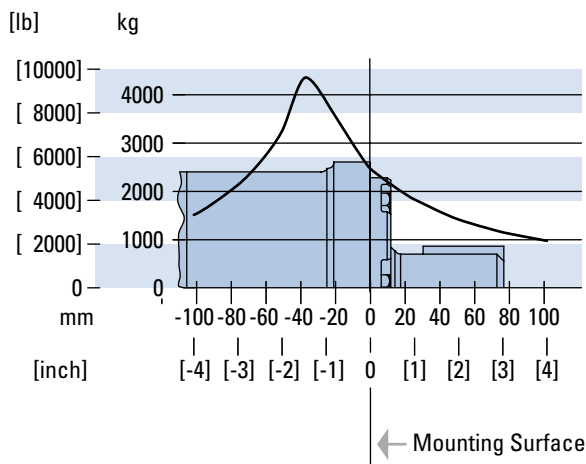
B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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

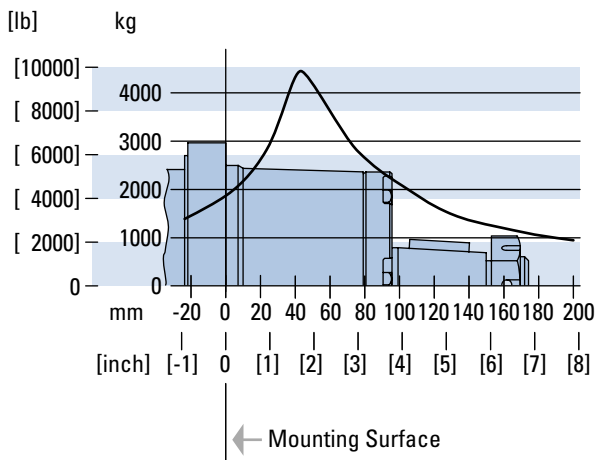
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



Wheel Motor Tapered Shaft



6000 Series

Case Pressure and Case Port

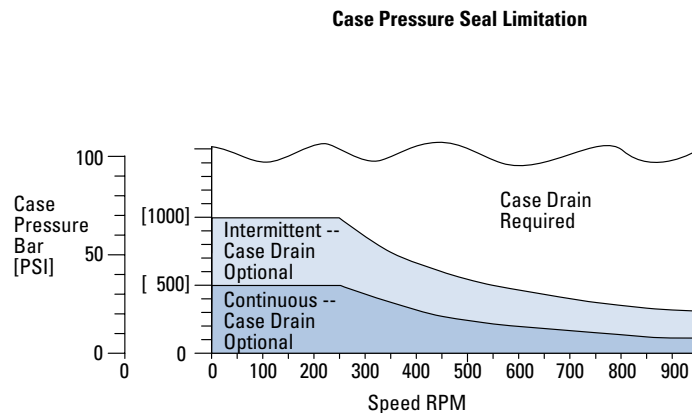
Char-Lynn 6000 Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine 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.

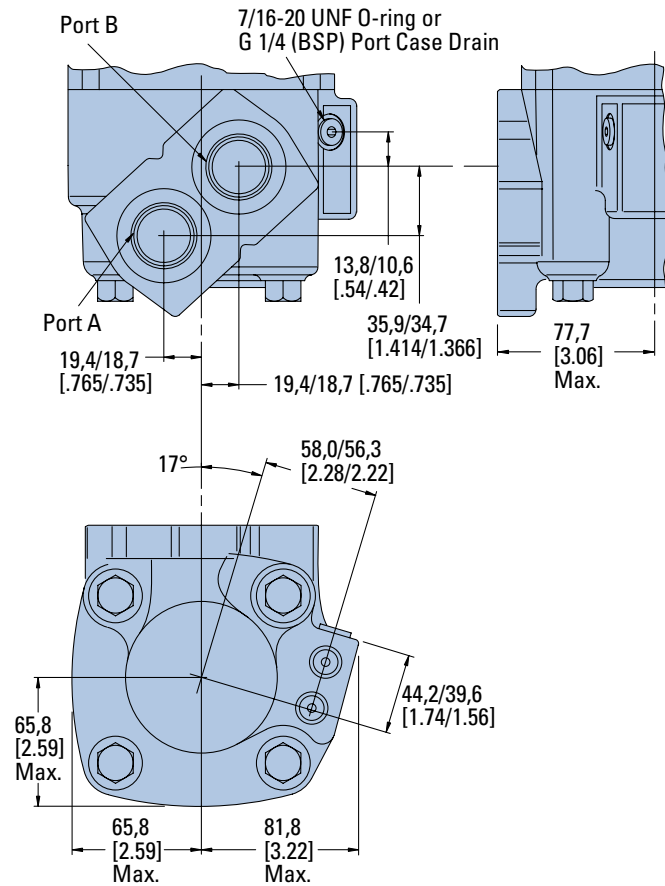


6000 Series

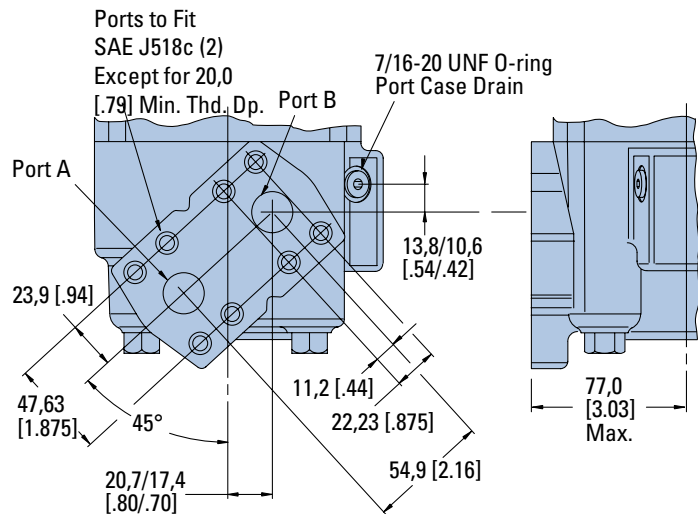
Dimensions

Ports

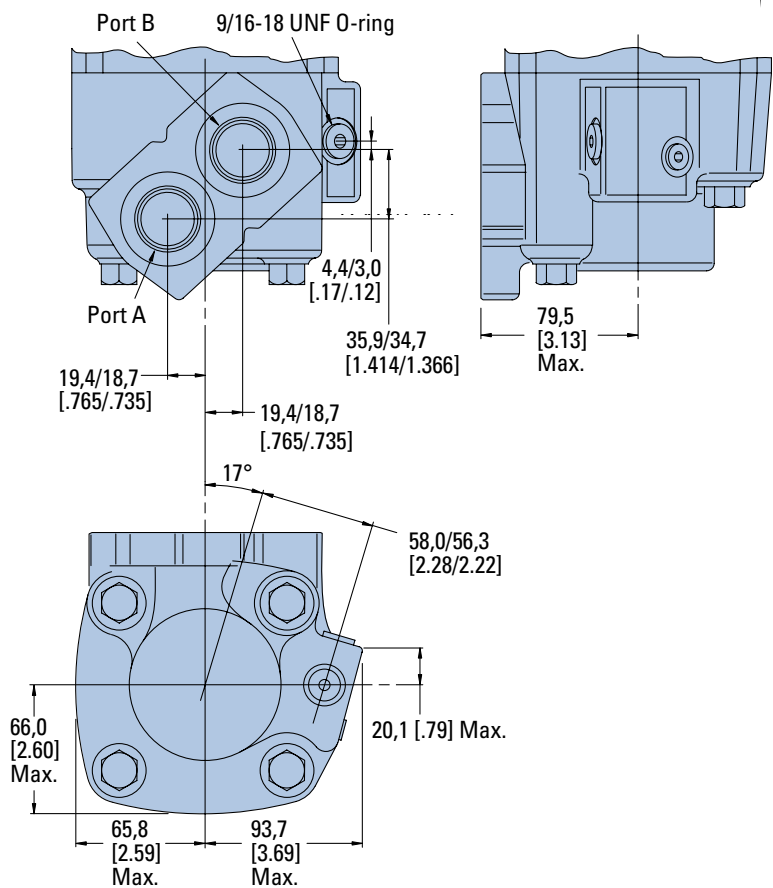
1 5/16 -12 O-ring Ports (2) or G 1 (BSP) Ports (2)



4 Bolt 3/4 Inch Split Flange



1 5/16 -12 O-ring Ports (2) with Shuttle



6000 Series

Product Numbers

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. cm ³ /r [in ³ /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 17 T Splined	1 5/16 O-ring	112-1058	-1059	-1060	-1061	-1062	-1109	1163	—	-1063
		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 H), 4 Bolt:

- 160,0 [6.30] Pilot Dia.
- 18,01 [.709] Dia. Mounting Holes
- 200,0 [7.87] Dia. Bolt Circle

Output Shaft - Straight (Code 21)

Ports - G1 (BSP) Staggered G 1/4 Case Drain (Code C)

Paint - Low Gloss Black (Code A)

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.

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

M	0	6		*	*	*		*	*		*	*		*	*	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	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

AD – Standard, 4 Bolt, (SAE
D): 152,4 [6.00] Pilot Dia.
15,24 [.600] Dia. Holes on
228,6 [9.00] Dia. Bolt Circle
(SAE D) with O-Ring Groove
to Accept ARP-163 O-Ring
AH – Standard, 4 Bolt: 10,0
[6.30] Pilot Dia. 18,01 [.709]
Dia. Holes on 200,0 [7.87]
Dia. Bolt Circle.

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
15 – 60mm Dia. 10:1 Tapered
Shaft per ISO R775 with M42
x 3-6H Threaded Shaft End,
16W x 10H x 32L [.630W x
.394H x 1.26L] Key
16 – 53,98 [2.125] Dia. Flat
Root Side Fit, 16 Tooth, 8/16
DP 30 Deg. Involute Spline
with M12 x 1.75-6H Thread
in End, 55,9 [2.20] Min Full
Spline

11, 12 Port Description AA – 1,3125-12 UN-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 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 10 – .750-16 UNF-2B SAE O-ring Ports, External Lubrication Circuit Requires Case Drain must be Connected, .063 Shuttle Flow Orifice

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 3 – Seal Guard

20, 21 Accessories 00 – None

22, 23 Special Features (Hardware) 00 – None 01 – Non-Masked Nameplate 02 – Non-Masked Nameplate, Low Noise Valve Plate 03 – Low Noise Valve Plate

24, 25 Special Features (Assembly) 00 – None AA – Reverse Rotation

26, 27 Paint/Packaging 00 – No Paint, Individual Box AA – Painted Low Gloss Black AD – No Paint, Bulk Box Option AE – Painted Low Gloss Black, Bulk Box Option

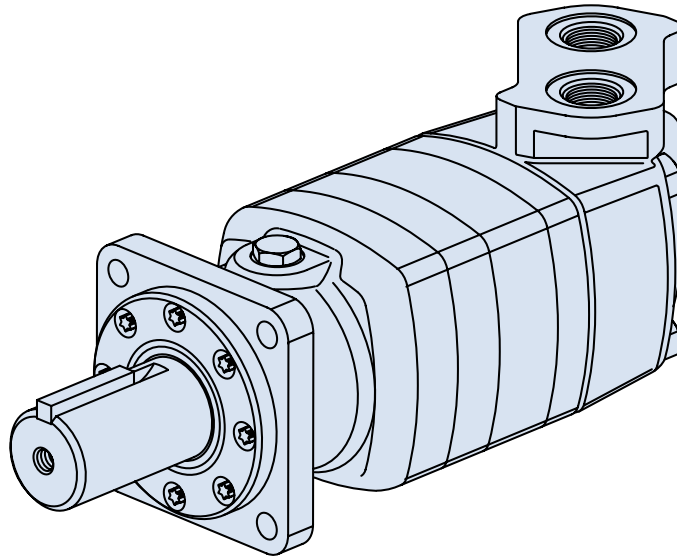
28, 29 Customer ID 00 – None

30 Design Code F – Sixth

Feature in bold are preferred
and allow for shorter lead time

10,000 Series

Highlights



Features

- High torque and flow
- Many options like 2 speed and speed sensors make this motor “smart”
- Low pressure loss even in higher flows

Benefits

- High power density for demanding mobile and industrial applications
- Many options to draw from

Applications

- Boring
- Industrial
- Metal Forming
- Port Equipment
- Saw Mill

Description

This is the biggest disc valve motor of our line with up to 45 GPM and 24,000 in-lb of torque in continuous mode, this motor is powerful and yet provides good efficiency.

Specifications

Geroler Element	4 Displacements
Flow l/min [GPM]	170 [45] Continuous**
	265 [70] Intermittent*
Speed RPM	501 Cont.**
	784 Inter.*
Pressure bar [PSI]	200 [3000] Cont.**
	270 [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.



Boring



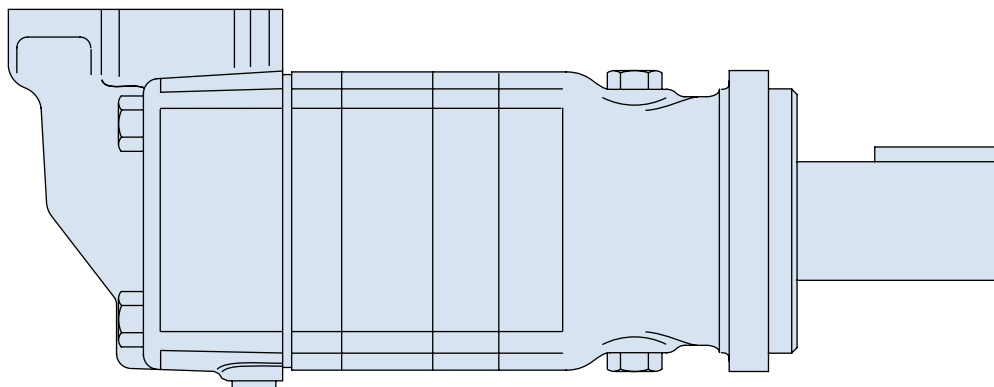
Metal Forming



Port Equipment

10,000 Series

Specifications



10,000 SERIES MOTORS

Displ. cm ³ /r [in ³ /r]		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 for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

Maximum Inlet Pressure:

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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous		Peak
	Intermittent		No Operation

480 cm³/r [29.3 in³/r]

Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275
[1] 3,8	[760] 85 6	[1540] 175 5	[3120] 355 4	[4640] 525 2					
[2] 7,5	[1040] 120 15	[2140] 240 13	[4320] 490 11	[6500] 735 8	[8690] 980 5	[10870] 1230 2			
[4] 15	[1040] 120 31	[2130] 240 29	[4310] 485 27	[6490] 735 24	[8680] 980 21	[10860] 1225 18	[13050] 1475 16	[15230] 1720 13	[17410] 1965 10
[8] 30	[1020] 115 62	[2110] 240 61	[4290] 485 58	[6480] 730 55	[8660] 980 53	[10840] 1225 50	[13030] 1470 47	[15210] 1720 44	[17390] 1965 42
[12] 45	[990] 110 94	[2080] 235 93	[4270] 480 90	[6450] 730 87	[8630] 975 84	[10820] 1220 81	[13000] 1470 78	[15180] 1715 75	[17370] 1965 73
[16] 61	[960] 110 125	[2060] 235 124	[4240] 480 122	[6420] 725 119	[8600] 970 116	[10790] 1220 113	[12970] 1465 110	[15150] 1710 107	[17340] 1960 104
[20] 76	[930] 105 157	[2020] 230 156	[4200] 475 154	[6390] 720 150	[8570] 970 147	[10750] 1215 144	[12940] 1460 141	[15120] 1710 138	[17300] 1955 135
[24] 91	[890] 100 189	[1980] 225 188	[4170] 470 185	[6350] 715 182	[8530] 965 179	[10720] 1210 175	[12900] 1460 172	[15080] 1705 169	
[28] 106	[850] 95 221	[1940] 220 220	[4130] 465 217	[6310] 715 214	[8490] 960 210	[10680] 1205 207	[12860] 1455 203	[15040] 1700 200	
[32] 121	[810] 90 252	[1900] 215 251	[4080] 460 249	[6270] 710 245	[8450] 955 242	[10630] 1200 238	[12820] 1450 235	[15000] 1695 231	
[36] 136	[760] 85 282	[1850] 210 281	[4040] 455 280	[6220] 705 277	[8400] 950 273	[10590] 1195 270	[12770] 1445 266		
[40] 151	[710] 80 318	[1800] 205 316	[3990] 450 312	[6170] 695 308	[8350] 945 305	[10540] 1190 301	[12720] 1440 297		
[45] 170	[647] 75 354	[1740] 195 353	[3920] 445 351	[6110] 690 348	[8290] 935 344	[10470] 1185 340	[12660] 1430 336		
[60] 227	[430] 50 474	[1520] 170 473	[3710] 420 471	[5890] 665 467	[8070] 910 462	[10260] 1160 458	[12440] 1405 454		
[70] 265		[1360] 155 552	[3540] 400 550	[5730] 645 546	[7910] 895 541	[10100] 1140 536	[12280] 1385 532		

345 cm³/r [21.0 in³/r]

Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275
[1] 3,8	[600] 70 3	[1310] 150 1							
[2] 7,5	[740] 85 21	[1510] 170 19	[3050] 345 15	[4600] 520 11	[6140] 695 8	[7680] 865 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] 1380 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] 1370 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] 130 668	[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]
285
777 } Torque [lb-in]
Nm
Speed RPM

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 120 SUS. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No Operation

665 cm³/r [40.6 in³/r]
Δ Pressure Bar [PSI]

		[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
		15	35	50	70	85	105	120	140	155	170	190	205	225	240	260
Flow LPM [GPM]	[1]	[1470]	[3010]	[4550]	[6100]	[7630]										
	3.8	165	340	515	690	860										
	[2]	[1480]	[3020]	[4560]	[6110]	[7650]	[9200]	[10740]	[12280]	[13830]	[15370]	[16910]				
	7.5	165	340	515	690	865	1040	1215	1385	1565	1735	1910				
	[4]	[1470]	[3010]	[4550]	[6100]	[7640]	[9190]	[10730]	[12270]	[13820]	[15360]	[16900]	[18450]	[19990]	[21540]	[23080]
	15	165	340	515	690	865	1040	1210	1385	1560	1735	1910	2085	2260	2435	2610
	[8]	[1440]	[2980]	[4530]	[6070]	[7610]	[9160]	[10700]	[12250]	[13790]	[15330]	[16880]	[18420]	[19960]	[21510]	[23050]
	30	165	335	510	685	860	1035	1210	1385	1560	1730	1905	2080	2255	2430	2605
	[12]	[1400]	[2950]	[4490]	[6040]	[7580]	[9120]	[10670]	[12210]	[13750]	[15300]	[16840]	[18380]	[19930]	[21470]	[23020]
	45	160	335	505	680	855	1030	1205	1380	1555	1730	1905	2075	2250	2425	2600
	[16]	[1360]	[2910]	[4450]	[5990]	[7540]	[9080]	[10620]	[12170]	[13710]	[15260]	[16800]	[18340]	[19890]	[21430]	
	61	155	330	505	675	850	1025	1200	1375	1550	1725	1900	2070	2245	2420	
	[20]	[1310]	[2860]	[4400]	[5940]	[7490]	[9030]	[10580]	[12120]	[13660]	[15210]	[16750]	[18300]	[19840]		
	76	150	375	495	670	845	1020	1195	1370	1545	1720	1890	2070	2240		
	[24]	[1260]	[2800]	[4350]	[5890]	[7440]	[8980]	[10520]	[12070]	[13610]	[15150]	[16700]	[18240]			
	91	140	315	490	665	840	1015	1190	1365	1540	1710	1885	2060			
	[28]	[1200]	[2750]	[4290]	[5840]	[7380]	[8920]	[10470]	[12010]	[13550]	[15100]	[16640]				
	106	135	310	485	660	835	1010	1185	1355	1530	1705	1880				
	[32]	[1140]	[2690]	[4230]	[5770]	[7320]	[8860]	[10400]	[11950]	[13490]	[15040]	[16580]				
	121	130	305	480	650	825	1000	1175	1350	1525	1700	1875				
	[36]	[1080]	[2620]	[4160]	[5710]	[7250]	[8800]	[10340]	[11880]	[13430]	[14970]	[16510]				
	136	120	295	470	645	820	995	1170	1340	1515	1690	1865				
	[40]	[1010]	[2550]	[4100]	[5640]	[7180]	[8730]	[10270]	[11810]	[13360]	[14900]	[16440]				
	151	115	290	465	635	810	985	1160	1335	1510	1685	1855				
	[45]	[920]	[2460]	[4000]	[5550]	[7090]	[8630]	[10180]	[11720]	[13260]	[14810]					
	170	105	280	450	625	800	975	1150	1325	1500	1675					
	[60]	[610]	[2150]	[3700]	[5240]	[6780]	[8330]	[9870]	[11420]	[12960]						
	227	70	245	420	590	765	940	1115	1290	1465						
	[70]	[380]	[1930]	[3470]	[5010]	[6560]	[8100]	[9640]	[11190]							
	265	45	220	390	565	740	915	1090	1265							
		396	393	391	390	388	387	385	384							

[3470]

390

391

Torque [lb-in]

Nm

Speed RPM

940 cm³/r [57.4 in³/r]
Δ Pressure Bar [PSI]

		[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]
		15	35	50	70	85	105	120	140	155	170	190	205	225	240
Flow LPM [GPM]	[1]	[2080]	[4260]	[6440]											
	3.8	235	480	730											
	[2]	[2090]	[4270]	[6450]	[8640]	[10820]	[13000]	[15190]	[17370]						
	7.5	235	480	730	975	1220	1470	1715	1965						
	[4]	[2080]	[4260]	[6440]	[8620]	[10810]	[12990]	[15170]	[17360]	[19540]	[21720]	[23910]	[26090]	[28270]	[30460]
	15	235	480	730	975	1220	1470	1715	1960	2210	2455	2700	2950	3195	3440
	[8]	[2040]	[4220]	[6400]	[8590]	[10770]	[12950]	[15140]	[17320]	[19500]	[21690]	[23870]			
	30	230	475	725	970	1215	1465	1710	1955	2200	2450	2695			
	[12]	[1990]	[4170]	[6350]	[8540]	[10720]	[12900]	[15090]	[17270]	[19450]	[21640]				
	45	225	470	715	965	1210	1460	1705	1950	2200	2445	2690			
	[16]	[1930]	[4110]	[6290]	[8480]	[10660]	[12840]	[15030]	[17210]	[19390]					
	61	220	465	710	960	1205	1450	1700	1945	2190					
	[20]	[1860]	[4040]	[6220]	[8410]	[10590]	[12770]	[14960]	[17140]	[19320]					
	76	210	455	705	950	1195	1445	1690	1935	2185					
	[24]	[1780]	[3970]	[6150]	[8330]	[10520]	[12700]	[14880]	[17070]						
	91	200	450	695	940	1190	1435	1680	1930						
	[28]	[1700]	[3890]	[6070]	[8250]	[10440]	[12620]	[14800]	[16990]						
	106	190	440	685	930	1180	1425	1675	1920						
	[32]	[1620]	[3800]	[5980]	[8160]	[10350]	[12530]	[14720]							
	121	185	430	675	920	1170	1415	1665							
	[36]	[1520]	[3710]	[5890]	[8070]	[10260]	[12440]	[14620]							
	136	170	420	665	910	1160	1405	1650							
	[40]	[1420]	[3610]	[5790]	[7970]	[10160]	[12340]	[14520]							
	151	160	410	655	900	1150	1395	1640							
	[45]	[1290]	[3480]	[5660]	[7840]	[10020]	[12210]	[14400]							
	170	145	395	640	885	1130	1380	1625							
	[60]	[860]	[3040]	[5230]	[7410]	[9600]	[11780]								
	227	95	345	590	835	1085	1330								
	[70]	[540]	[2720]	[4910]	[7090]	[9270]	[11460]								
	265	60	305	555	800	1045	1295								
		279	278	276	275	274	273								

10,000 Series

Dimensions

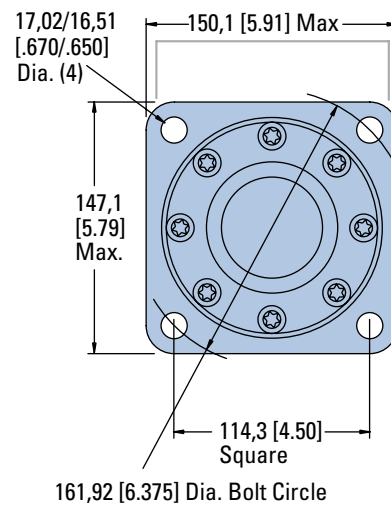
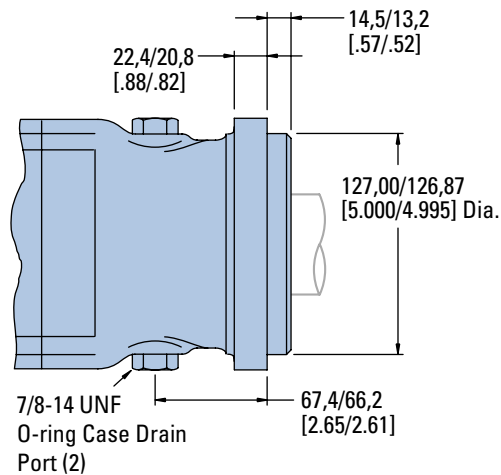
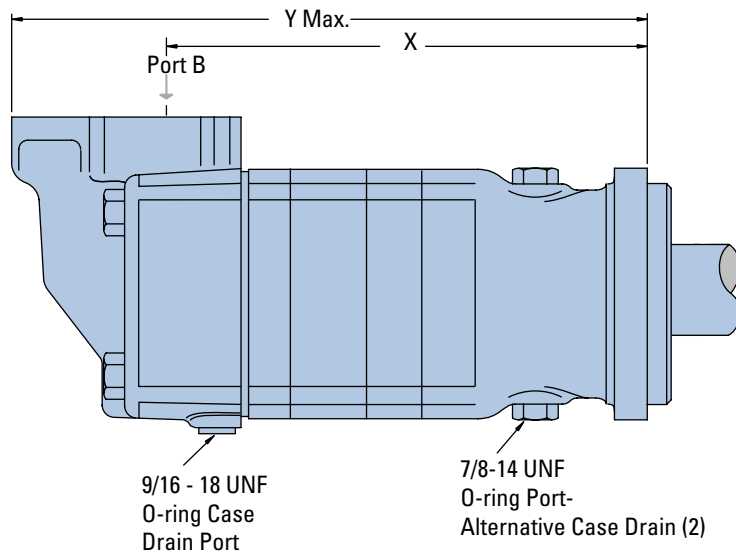
Ports

- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 9/16 -18 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 1 1/4 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



STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
345 [21.0]	282,4 [11.12]	380,7 [14.99]
480 [29.2]	295,1 [11.62]	393,4 [15.49]
665 [40.6]	295,1 [11.62]	393,4 [15.49]
940 [57.4]	313,4 [12.34]	411,7 [16.21]

10,000 Series

Dimensions

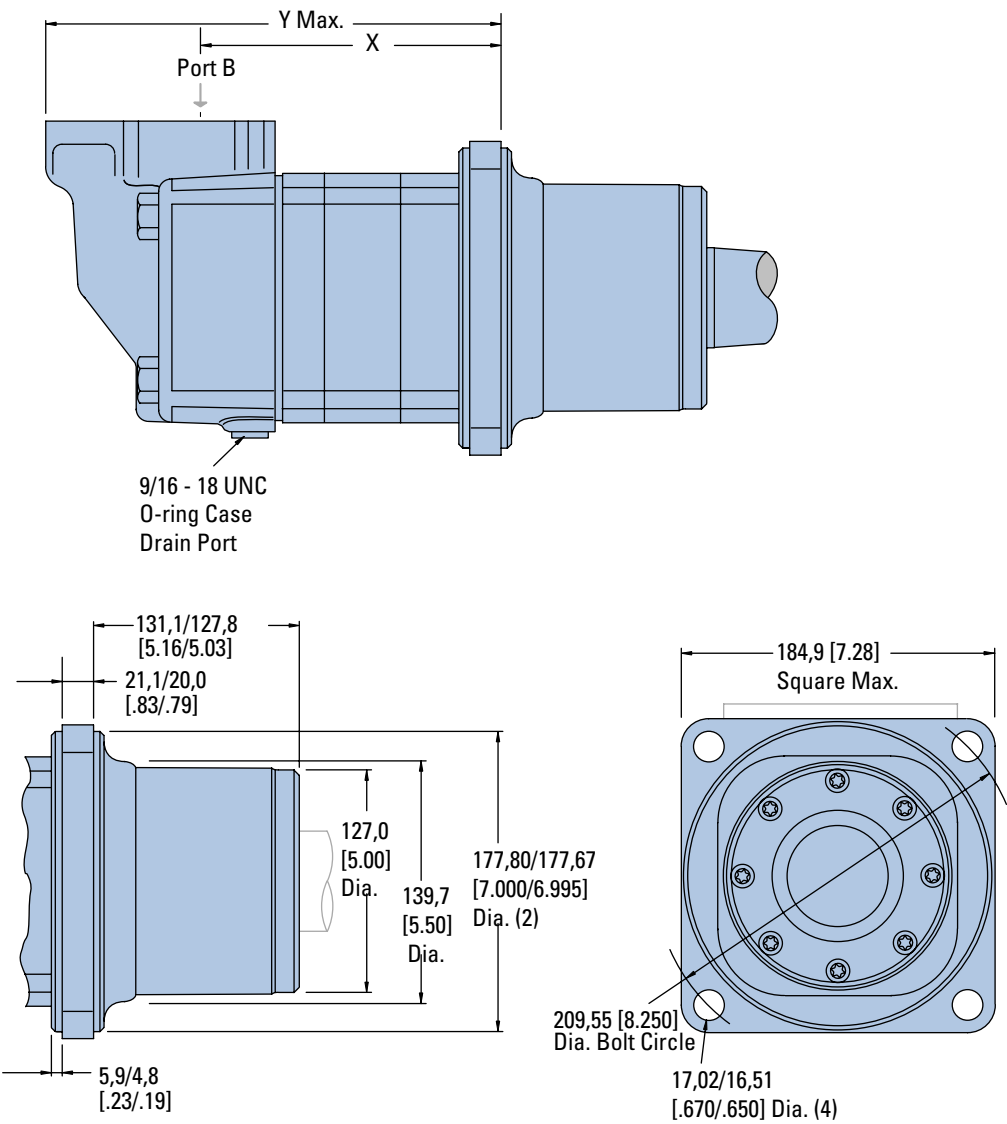
Ports

- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 9/16 -18 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 1 1/4 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



WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /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]
665 [40.6]	179,6 [7.07]	278,6 [10.97]
940 [57.4]	197,8 [7.79]	297,2 [11.70]

10,000 Series

Dimensions

Bearingless

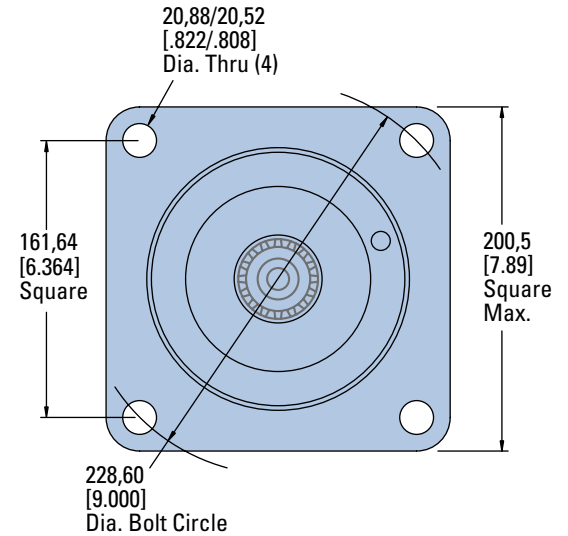
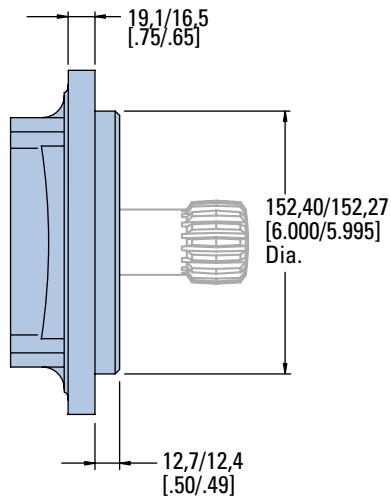
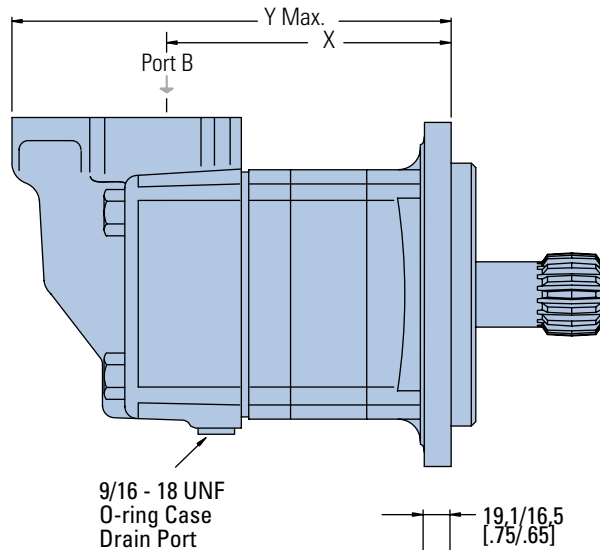
Ports

- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 9/16 -18 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 1 1/4 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

Bearingless



BEARINGLESS MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
345 [21.0]	158,0 [6.22]	256.3 [10.09]
480 [29.2]	170,7 [6.72]	269,0 [10.59]
665 [40.6]	170,7 [6.72]	269,0 [10.59]
940 [57.4]	189,0 [7.44]	287,5 [11.32]

Mating Coupling Blank

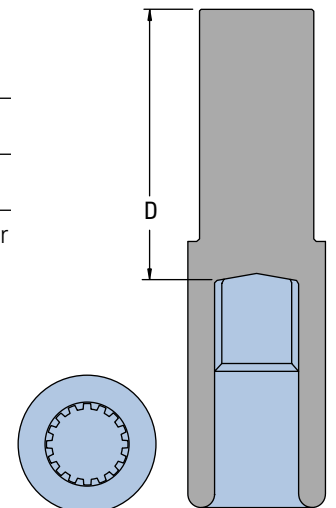
Dimension D mm [inch]
Eaton Part No.

13280-001	133,6/128,5 [5.26/5.06]
13280-002	156,0/150,9 [6.14/5.94]

For 10,000 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

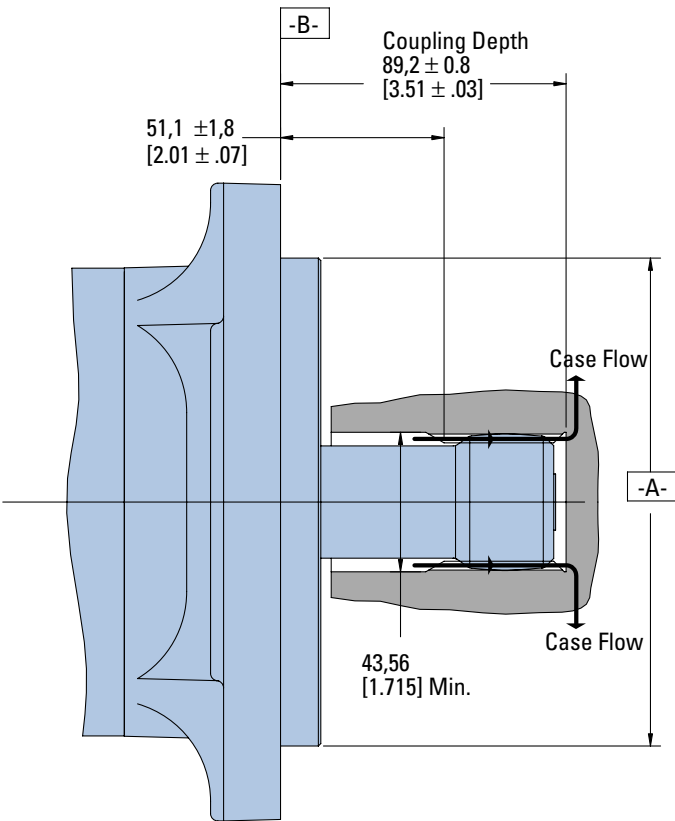
After machining blank, part must be hardened per Eaton specification.



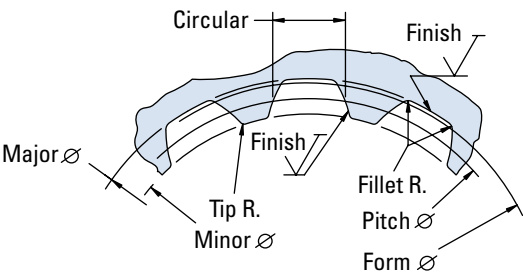
10,000 Series

Installation
Information

Bearingless



- 1 Internal spline in mating part to be as follows: Material to be ASTM A304, 8620H. Carbonize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 - 1,02 [.030 - .040] (dimensions apply after heat treat).



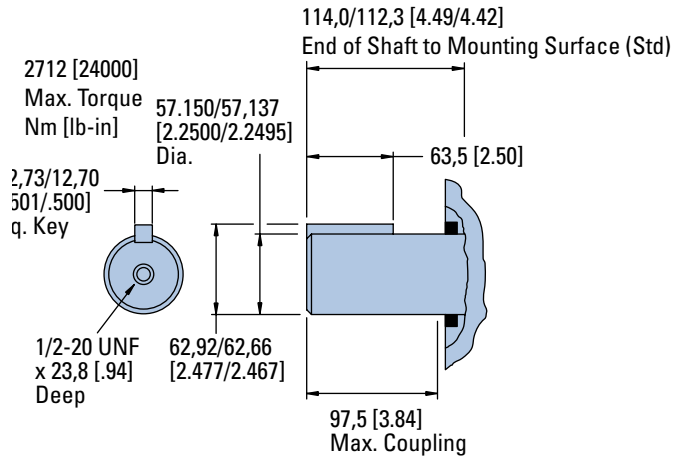
Spline Pitch.....	10/20
Pressure Angle.....	30°
Number of teeth.....	16
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter	Ref. 40,640000 [1.6000000] ⊙ 0,25 [.010] D
Base Diameter.....	Ref. 35,195272 [1.3856406]
Major Diameter.....	43,56 [1.715] Max. 43,18 [1.700] Min.
Min. Minor Diameter.....	36,83 - 37,08 [1.450 - 1.460]
Form Diameter, Min.	42,47 [1.672]
Fillet Radius.....	0,64 - 0,76 [.025 - .030]
Tip Radius.....	0,25 - 0,51 [.010 - .020]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,028 [+0.0000 -0.0011]
Total Index Variation	0,041 [.0016]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual.....	4,105 [.1616]
Minimum Effective	3,995 [.1573]
Maximum Effective	Ref. 4,056 [.1597]
Minimum Actual	Ref. 4,018 [.1582]
Dimension Between Two Pins	Ref. 26,929 - 27,084 [1.0602 - 1.0663]
Pin Diameter	Ref. 34,272 - 34,450 [1.3493 - 1.3563]
Wide Flat for Root Clearance	

10,000 Series

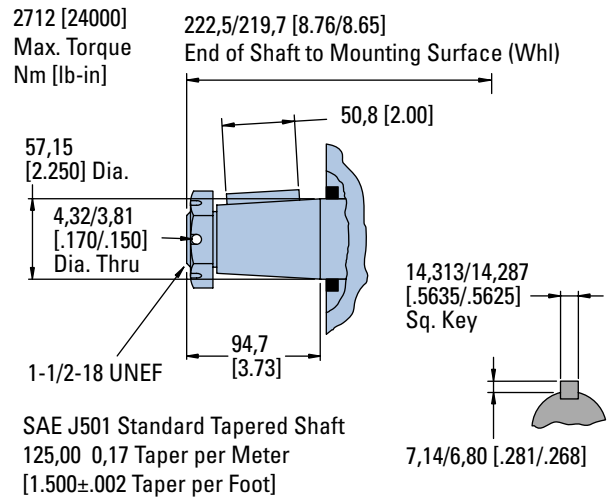
Dimensions

Shafts

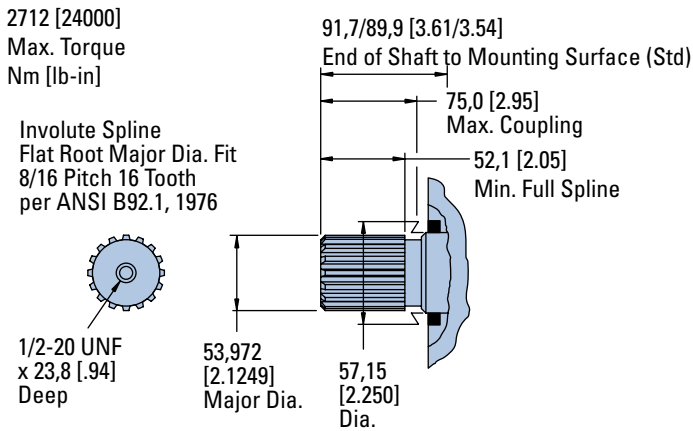
2 1/4 Inch Straight



2 1/4 Inch Tapered

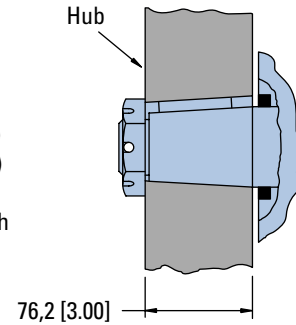


2 1/8 Inch 16 Tooth Splined

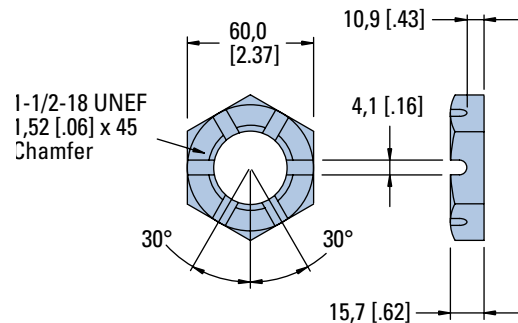


Tapered Shaft Hub Data

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



10,000 Series

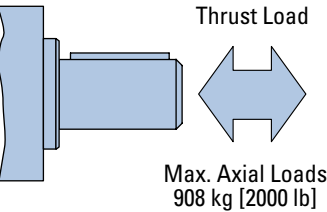
Side Shaft Load Capacity

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

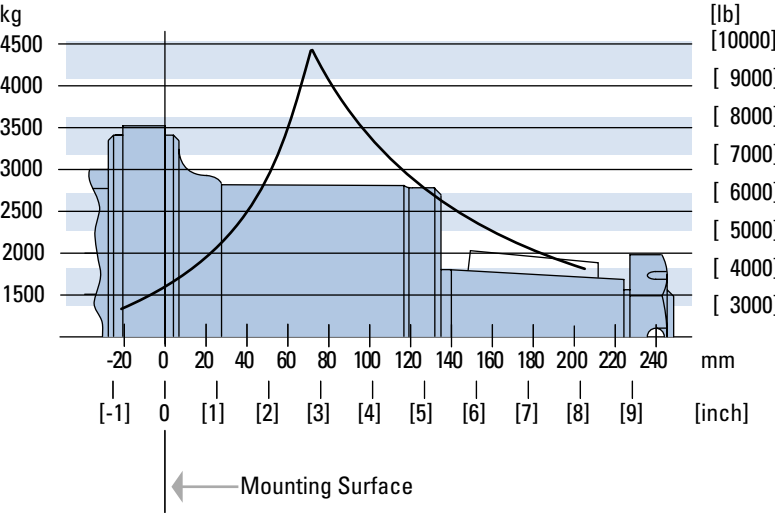
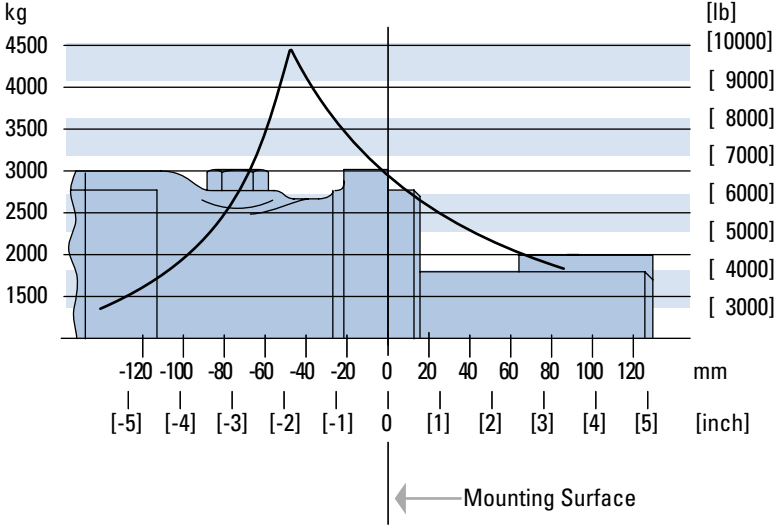


B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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

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



Ports

Technical drawing of the 1000 Series Hydraulic Pump, showing front and side views with dimensions in inches and millimeters.

Front View Dimensions:

- Top Port: 7/16-14 UNC x 29,2 [1.15] Deep (8)
- Port B: 15,10 [.594] (2)
- Port A: 29,40 [1.156]
- Bottom Port: 30,20 [1.188] (2)
- Bottom Port Angle: 45°
- Bottom Port Distance: 58,70 [2.312]
- Bottom Port Distance: 30,8/29,2 [1.21/1.15]
- Bottom Port Distance: 75,5/74,9 [2.97/2.95]

Side View Dimensions:

- Case Drain Port: 9/16-18 UNF O-ring
- Case Drain Port Distance: 29,5/27,4 [1.16/1.08]
- Case Drain Port Distance: 102,2/101,0 [4.02/3.98]
- Case Drain Port Distance: 182,9 [7.20] Max.

Port B

Port A

45°

76,2/74,1
[3.00/2.92]

30,8/29,2 [1.21/1.15]

9/16-18 UNF O-ring
Case Drain Port

29,5/27,4
[1.16/1.08]

106,2 [4.18]

184,7 [7.27]

Technical drawing of the front view of the 1000 Series Case Drain Valve. The drawing shows a blue valve body with four mounting holes and a central case drain port. Dimensions are provided in inches and millimeters.

- Overall width: 154,0 [6.06] Max.
- Distance from centerline to mounting hole center: 74,0/72,1 [2.91/2.84]
- Case Drain Port: 9/16-18 UNF O-ring Case Drain Port
- Case Drain Port diameter: 16,8/15,7 [.66/.62]

10,000 Series

Product Numbers

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-, 120-, or 121 - plus four digit number from charts for complete product number— Example 121-1014.

Orders will not be accepted without three digit prefix.

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /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	-1046	-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	120-1005	-1006	-1007	-1008
		1 1/4 inch Split Flange	120-1017	-1018	-1019	-1020
	2 1/8 Inch 16 T Splined	1 5/16 O-ring	120-1009	-1010	-1011	-1012
		1 1/4 inch Split Flange	120-1021	-1022	-1023	-1024
	2 1/4 Inch Tapered	1 5/16 O-ring	120-1013	-1014	-1015	-1016
		1 1/4 inch Split Flange	120-1025	-1026	-1027	-1028
Bearingless		1 5/16 O-ring	121-1007	-1008	-1009	-1010
		1 1/4 inch Split Flange	121-1011	-1012	-1013	-1014

121-1014

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. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

M	1	0		*	*	*		*	*		*	*	*	*	*		0	0	*	*	*	*	0	0	*	*	*	0	0	*
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

AC – Bearingless, 4 Bolt:
152,4 [6.00] Pilot Dia. 20,70
[.815] Holes on 228,60 [9.00]
Dia. Bolt Circle

9, 10 Output Shaft Description

00 – None (Bearingless)

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 UN 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

1 - Free Running

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 – Painted Low Gloss
Black

28, 29 Customer Identification

00 – None

30 Design Code

C – Third (Standard and
Wheel Mounts)

D – Fourth (Bearingless
Mount)

Feature in **bold** are preferred and
allow for shorter lead time.

10,000 Series Two-Speed

Description

The Eaton 10,000 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 Δ Bar [100 Δ 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 10,000 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. Finally 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].

Note:

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.

Important!

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.

Performance Data

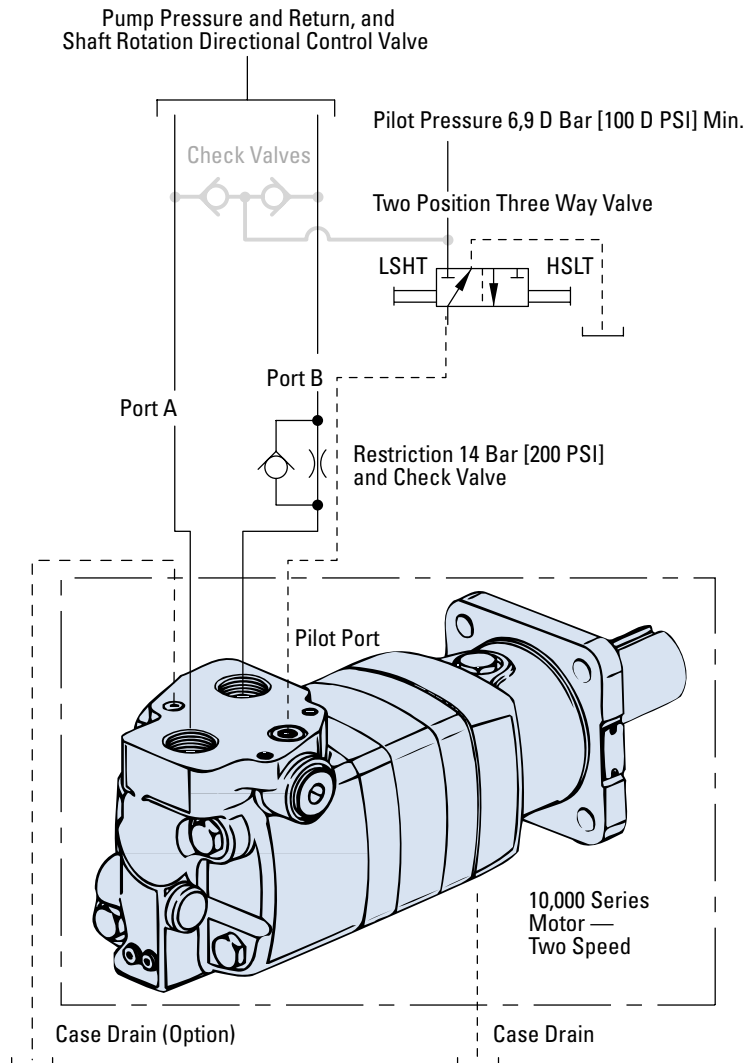
10,000 Series Two-Speed

In the high speed mode torque values are approximately one half with twice the speed of the conventional 10,000 Series single speed motors.

In the low speed mode torque and speed values are the same as the conventional 10,000 series single speed motors.

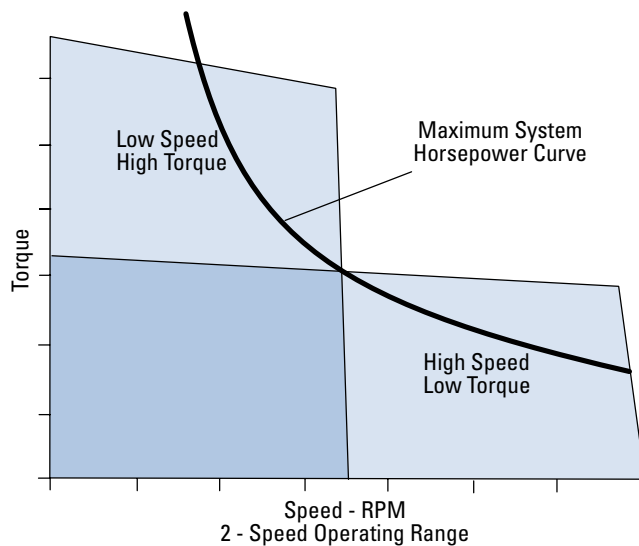
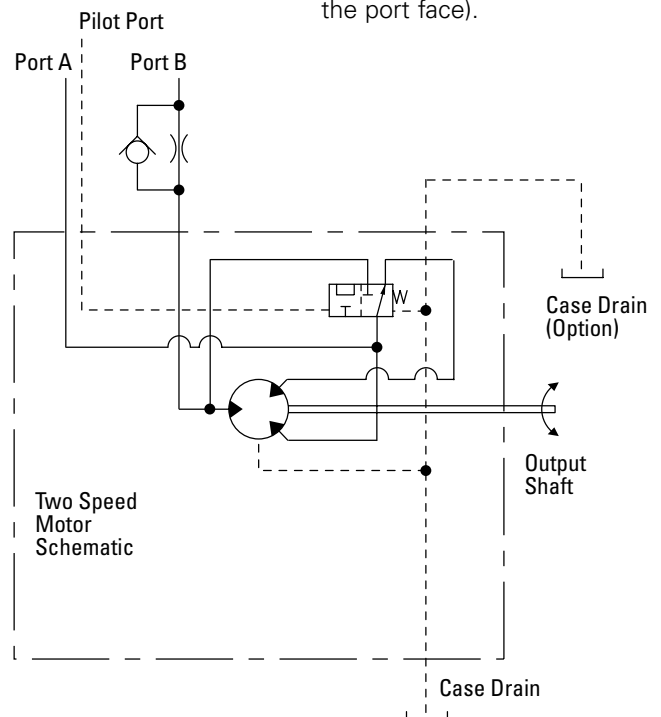
10,000 Series Two-Speed

Typical Hydraulic Circuit



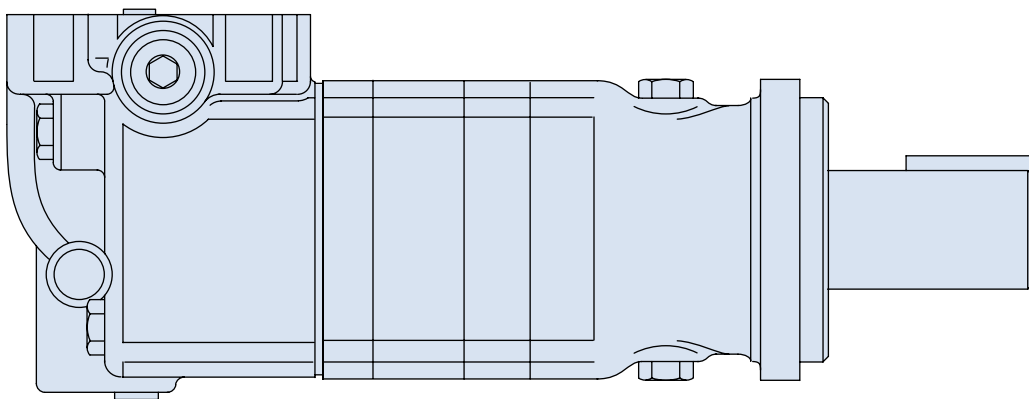
Note:

The schematic diagram below applies to 10,000 series two-speed motors – differs only in orientation of shift valve spool and spring (this orientation of spool and spring positions the pilot port on the opposite side of the port face).



10,000 Series Two-Speed

Specifications



10,000 SERIES TWO-SPEED MOTORS

Displ. cm ³ /r [in ³ /r]	High Speed Mode	169 [10.3]	239 [14.6]	332,7 [20.3]	470 [28.7]
	Low Speed Mode	345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]
Max. Speed (RPM) @ Continuous Flow	High Speed Mode	750	630	500	400
	Low Speed Mode	375	315	250	200
Flow l/min [GPM]	High Speed Mode	130 [35]	170 [45]	170 [45]	170 [45]
	Low Speed Mode	130 [35]	170 [45]	170 [45]	170 [45]
Torque* Nm [lb-in]	High Speed Mode				
	Continuous	440 [3900]	630 [5600]	905 [8000]	1175 [10400]
	Intermittent	585 [5200]	845 [7500]	1130 [10000]	1470 [13000]
Torque* Nm [lb-in]	Low Speed Mode				
	Continuous	1015 [9000]	1470 [13000]	2090 [18500]	2710 [24000]
	Intermittent	1355 [12000]	1965 [17400]	2600 [23000]	3445 [30500]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	190 [2750]
	Intermittent	275 [4000]	275 [4000]	260 [3750]	240 [3500]
Weight kg [lb]	Standard or Wheel Mount	50,3 [111.0]	52,2 [115.0]	52,2 [115.0]	54,0 [119.0]
	Bearingless	38,1 [84.0]	39,9 [88.0]	39,9 [88.0]	41,7 [92.0]

*See shaft torque ratings for limitations..

Note:

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

High Speed Mode

(Reduced Motor Displacement)

Low Speed Mode

(Full Motor Displacement)

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).

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 70 SUS at operating temperature.

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

10,000 Series Two-Speed

Dimensions

Standard and Wheel

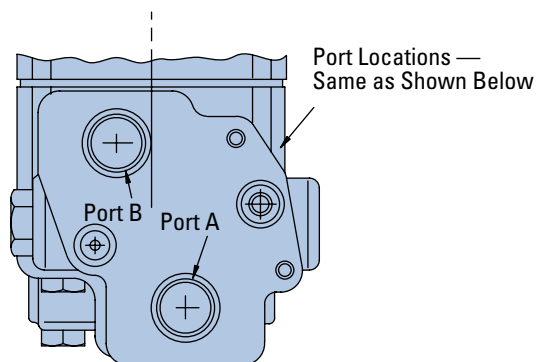
Ports

1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
 3/4 -16 UNF-2B SAE O-ring Case Drain Port (1)
 7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1) or
 4 bolt 1 1/4 inch Split Flange Ports (2)
 3/4 -16 UNF-2B SAE O-ring Case Drain Port (1)
 7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1)

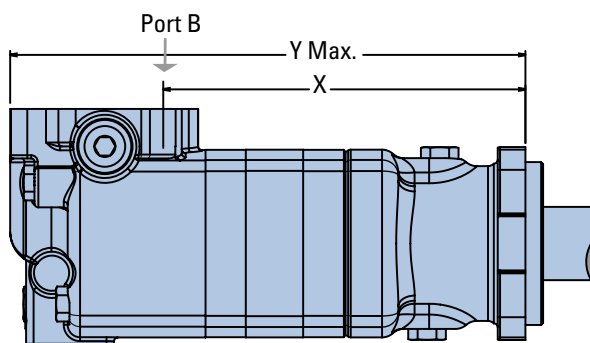
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
 Port B Pressurized — CCW

1 5/16 -12 O-ring Staggered Ports



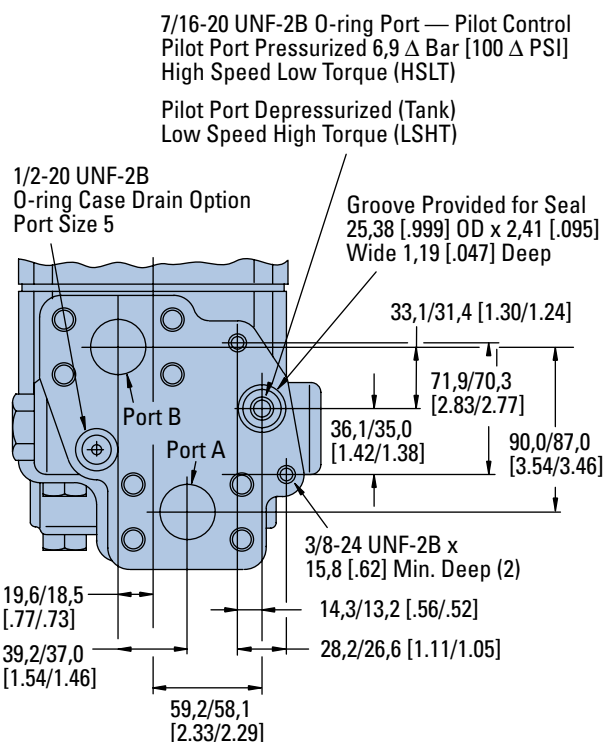
Two-Speed Standard Motors



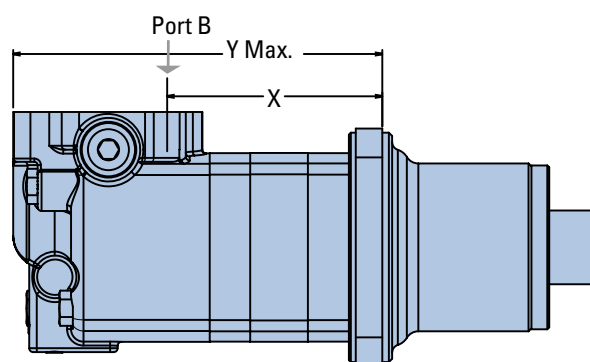
STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
345 [21.0]	270,8 [10.66]	392,7 [15.46]
480 [29.2]	283,5 [11.16]	405,4 [15.96]
665 [40.6]	283,5 [11.16]	405,4 [15.96]
940 [57.4]	301,8 [11.88]	423,7 [16.68]

4 Bolt 1 1/4 Inch Split Flange Ports



Two-Speed Wheel Motors



WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
345 [21.0]	155,2 [6.11]	277,9 [10.94]
480 [29.2]	167,9 [6.61]	290,6 [11.44]
665 [40.6]	167,9 [6.61]	290,6 [11.44]
940 [57.4]	186,2 [7.33]	309,1 [12.17]

10,000 Series

Two-Speed

Dimensions

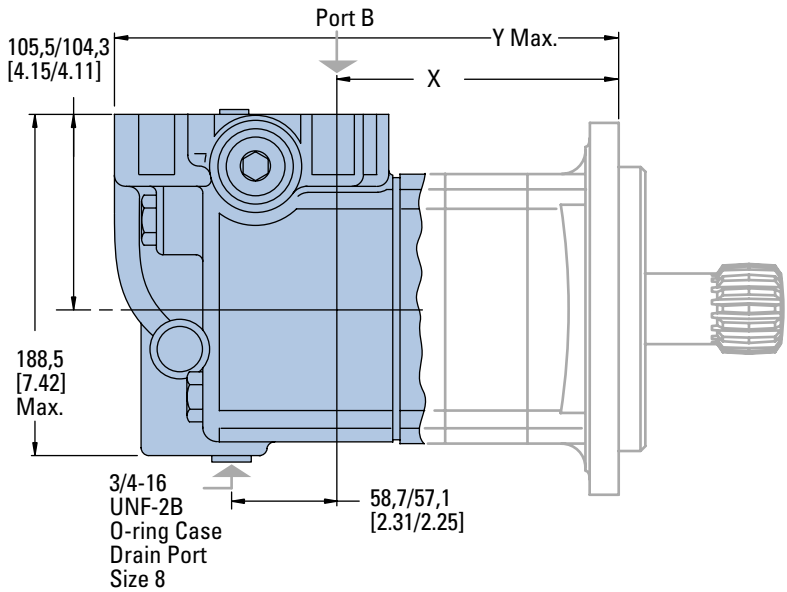
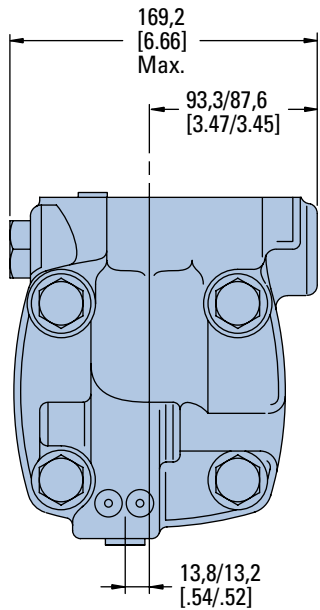
Bearingless

Ports

- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 3/4 -16 UNF-2B SAE O-ring Case Drain Port (1)
- 7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1) or
- 4 bolt 1 1/4 inch Split Flange Ports (2)
- 3/4 -16 UNF-2B SAE O-ring Case Drain Port (1)
- 7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1)

Standard Rotation Viewed from Shaft End

- Port A Pressurized — CW
- Port B Pressurized — CCW



BEARINGLESS MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
345 [21.0]	146,3 [5.76]	268,2 [10.56]
480 [29.2]	159,0 [6.26]	280,9 [11.06]
665 [40.6]	159,0 [6.26]	280,9 [11.06]
940 [57.4]	177,3 [6.98]	299,5 [11.79]

10,000 Series Two-Speed

Product Numbers

Note:

For 10,000 Series Motors with a configuration **Not Shown** in the chart below: Use model code number system on the page C-6-13 to specify product in detail.

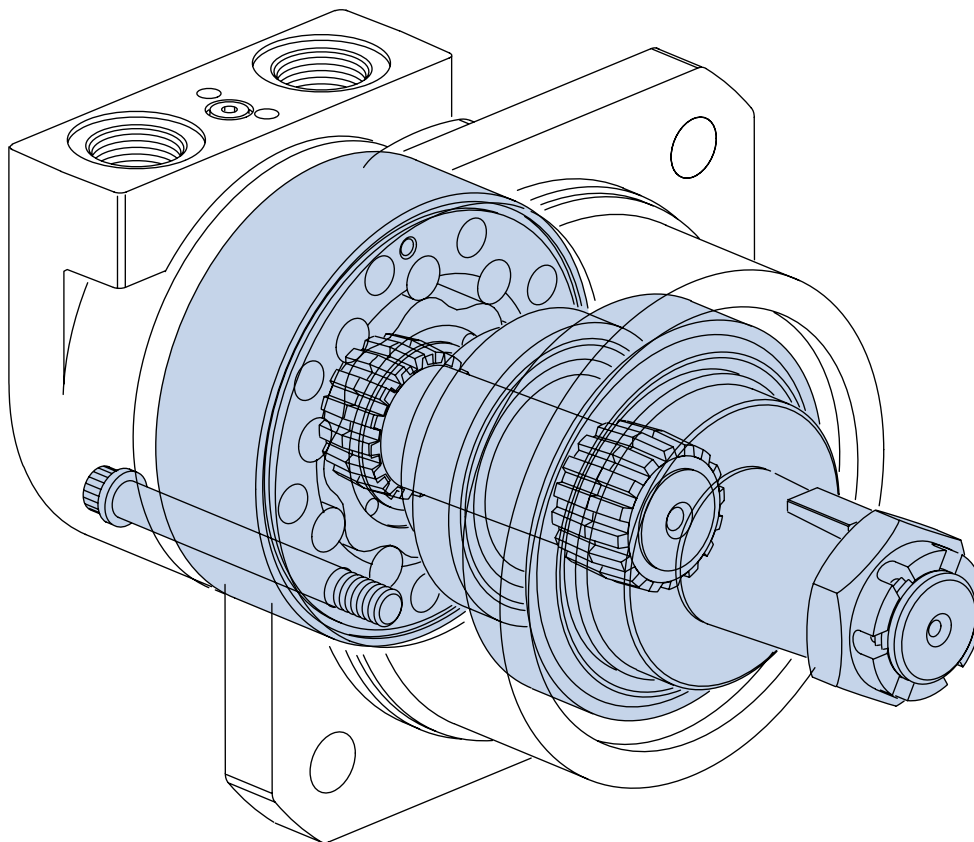
Use digit prefix — 119-, 120-, or 121 - plus four digit number from charts for complete product number— Example 121-2002.

Orders will not be accepted without three digit prefix.

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER			
			345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]
Standard	2 1/4 Inch Straight	1 5/16 O-ring	119-2013	-2014	-2015	-2016
		1 1/4 inch Split Flange	119-2001	-2002	-2003	-2004
	2 1/8 Inch 16 T Splined	1 5/16 O-ring	119-2021	-2022	-2023	-2024
		1 1/4 inch Split Flange	119-2009	-2010	-2011	-2012
	2 1/4 Inch Tapered	1 5/16 O-ring	119-2017	-2018	-2019	-2020
		1 1/4 inch Split Flange	119-2005	-2006	-2007	-2008
Wheel Motor	2 1/4 Inch Straight	1 1/4 inch Split Flange	120-2005	-2006	-2007	-2008
	2 1/8 Inch 16 T Splined	1 1/4 inch Split Flange	120-2009	-2010	-2011	-2012
	2 1/4 Inch Tapered	1 5/16 O-ring	120-2013	-2014	-2015	-2016
		1 1/4 inch Split Flange	120-2001	-2002	-2003	-2004
Bearingless		1 5/16 O-ring	121-2005	-2006	-2007	-2008
		1 1/4 inch Split Flange	121-2001	-2002	-2003	-2004

121-2002

Notes



The next step in the evolution of low speed
high torque (LSHT) hydraulic motors.

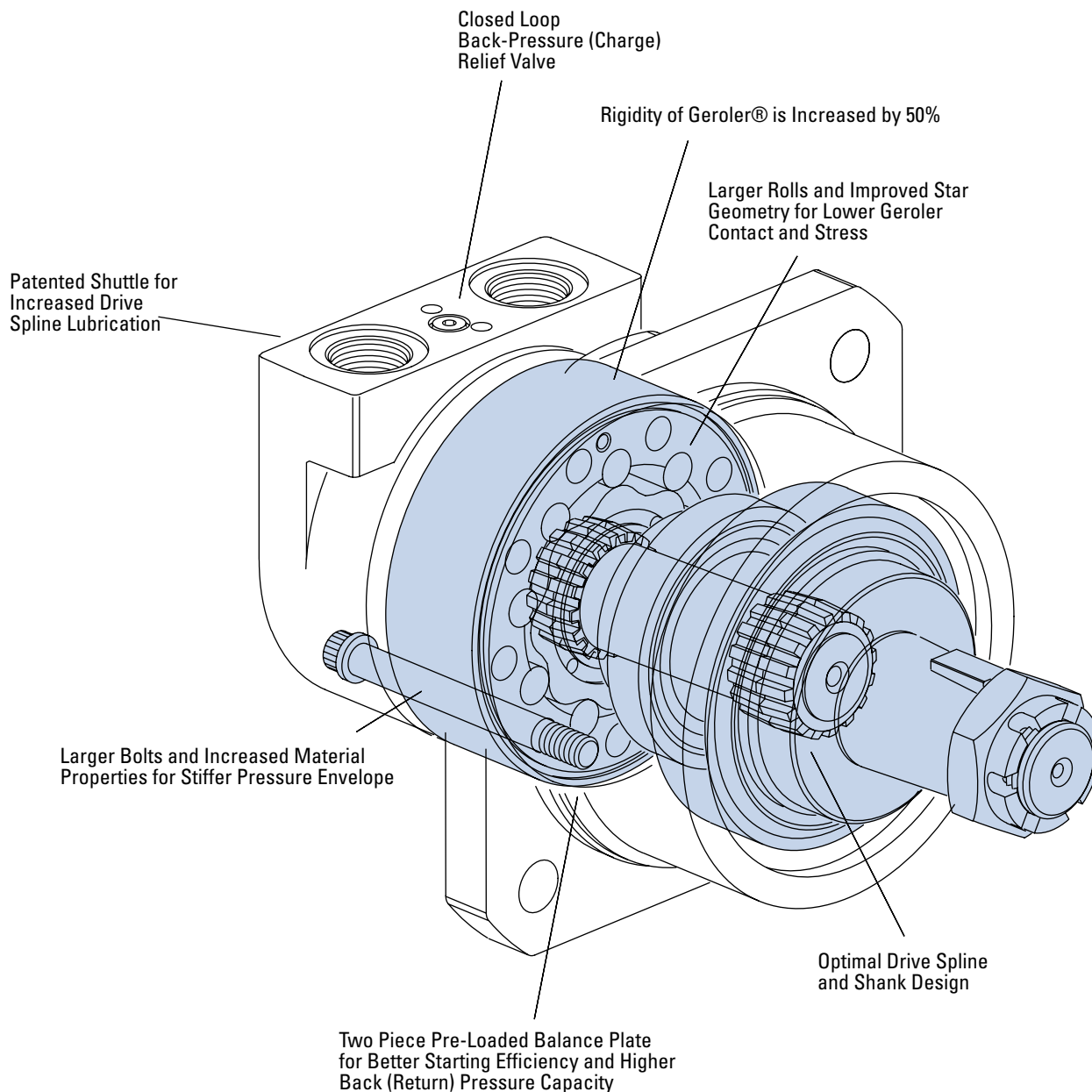
VIS Motors

Highlights

Product Description

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

VIS motors are primarily intended for use in closed loop circuit applications. Consult your Eaton representative for assistance on open loop circuit applications.



Features, Benefits, and Applications

Features

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

Benefits

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

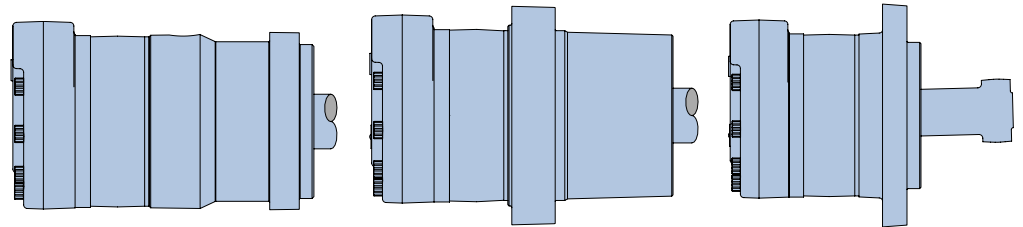
Applications

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

Design Features

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

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



Standard Motor

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

Wheel Motor

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

Bearingless Motor

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

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Model Code	D-3-15

VIS 45 Series Two-speed

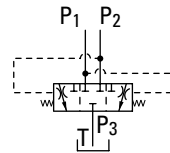
Specifications	D-3-16
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Dimensions	D-3-17
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Model Code	D-3-21

Typical Hydraulic Circuit

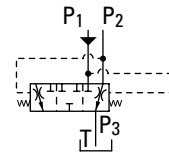
VIS 30, 40 and 45 Series

Shuttle Valve, Two Way (Closed Center) —

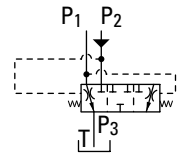
Schematic Diagrams



Neutral

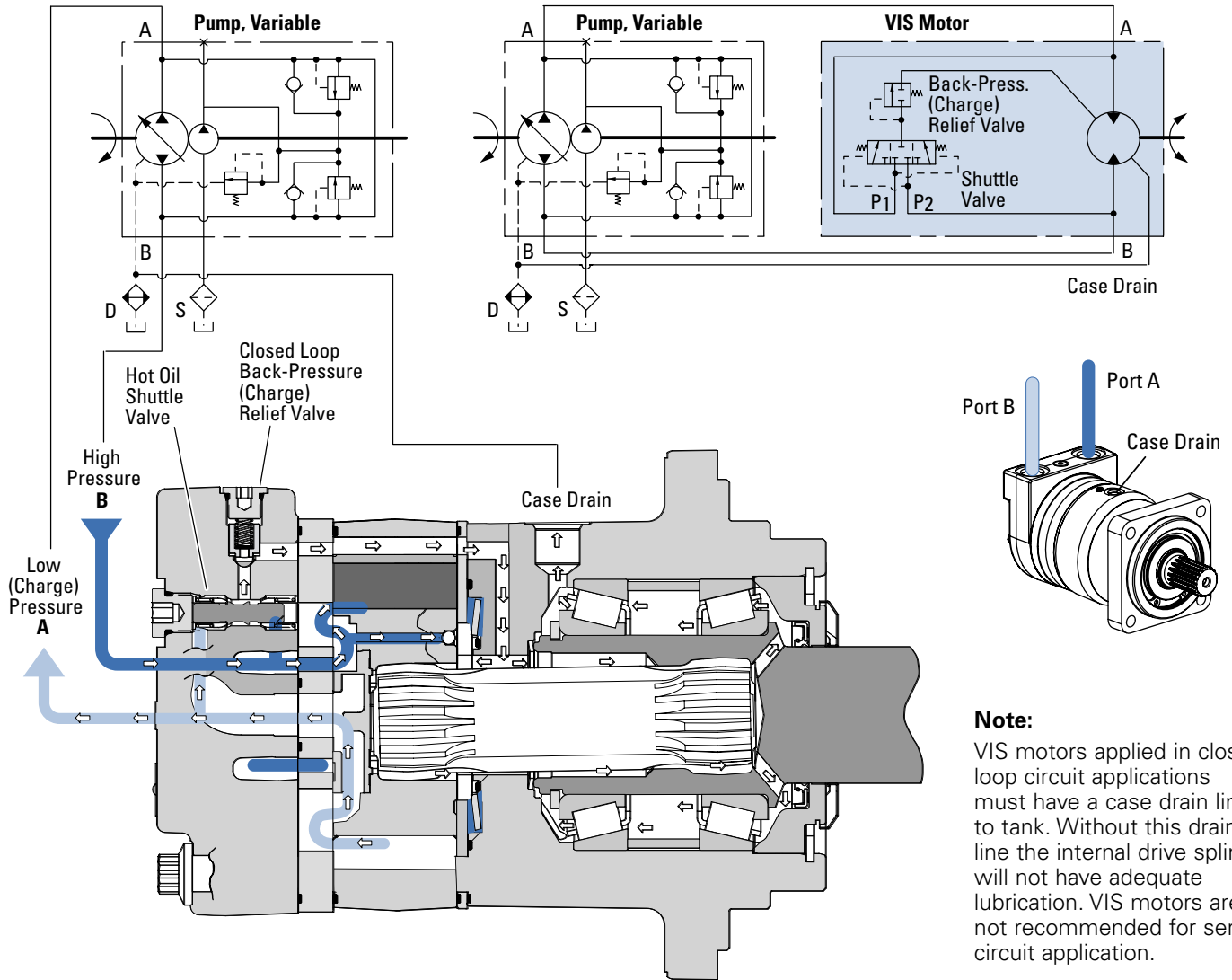


CW

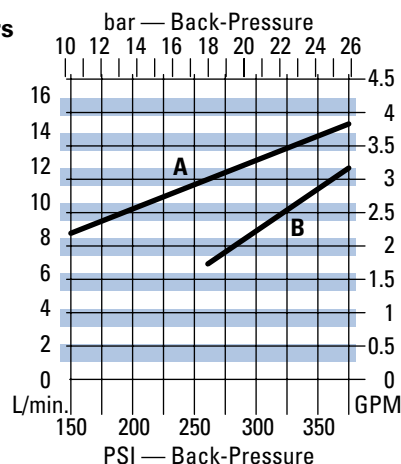


CCW

Closed Loop Circuit



VIS 30, 40 and 45 Motors Shuttle Flow Charts



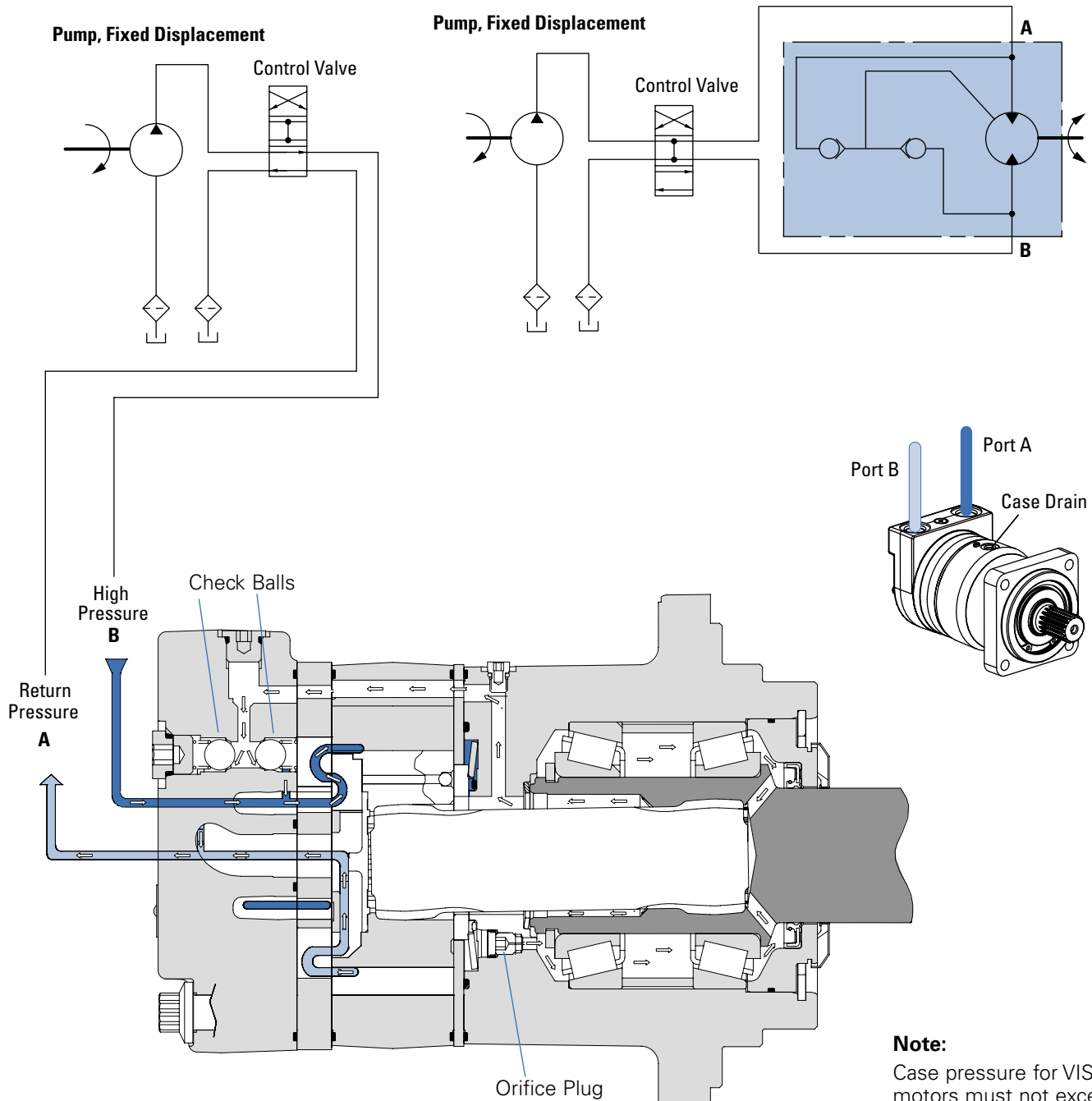
- A**
4,5 bar [65 PSI] @ 60° C [140° F]
Δ Between Back-Pressure and Case Pressure (Typical Data)
- B**
15,2 bar [220 PSI] @ 60° C [140° F]
Δ Between Back-Pressure and Case Pressure (Typical Data)

Due to Machining Tolerances,
Flow May be More or Less

Typical Hydraulic Circuit

VIS 30, 40 and 45 Series

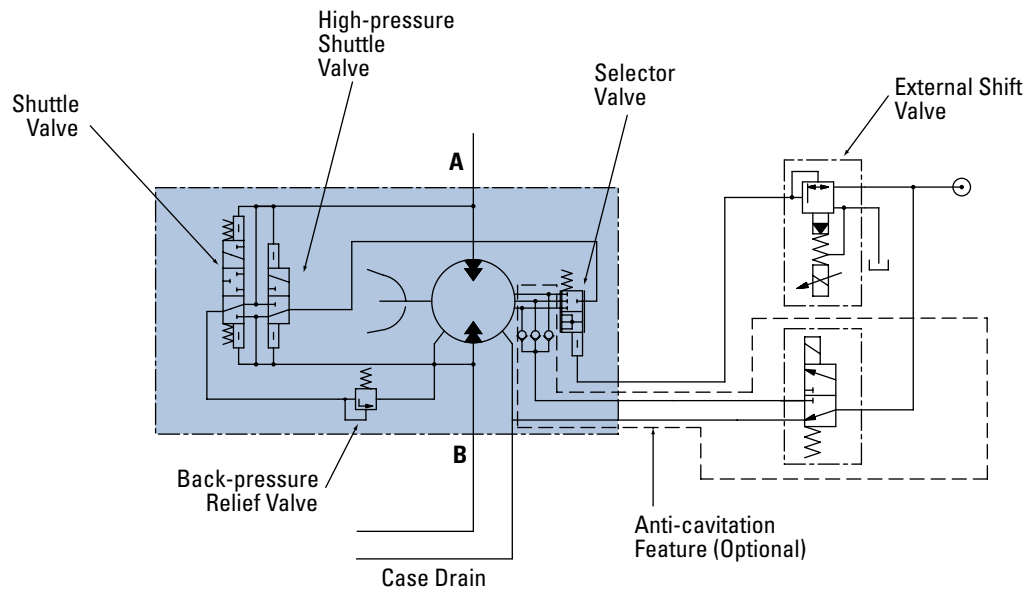
Open Loop Circuit



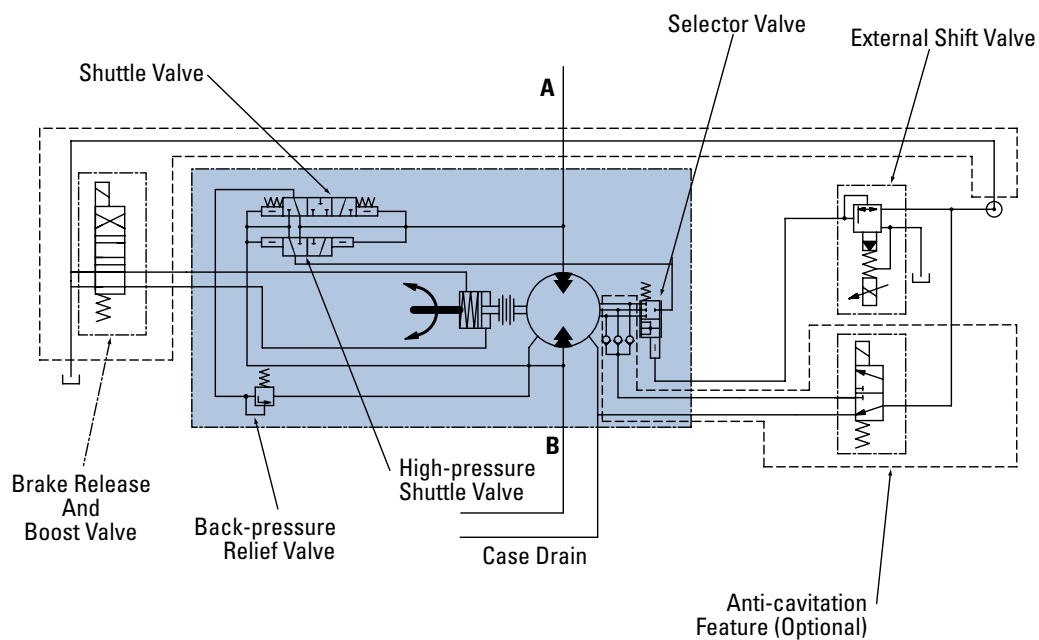
Typical Hydraulic Circuit

VIS 30, 40 and 45 Series

Two-speed Circuit



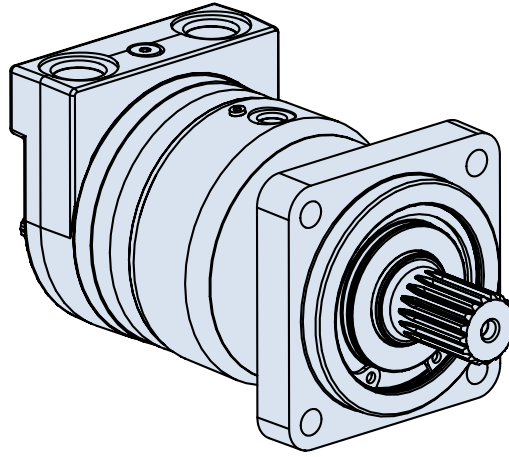
Two-Speed Brake Motor Circuit



Notes

VIS 30 Series

Highlights



Description

The Eaton VIS 30 motor is the most compact motor in the VIS motor line. It is rated at 151LPM [40 GPM] and pressures to 310 bar [4500 PSI]. Maximum continuous output torque capability is rated to 1632 Nm [14,400 lb-in.]. This motor provides high torque with high efficiency, smooth performance, and quiet operation. The motor utilizes patented VIS technology with improved high-strength Geroler, optimized drive geometry, and two-piece pre-loaded balance plate for increased starting efficiency, reduced leakage and higher back pressure capacity. A wide variety of options are available including two-speed option, brake packages and case flow options for both closed-loop and open-loop applications

Specifications

Geroler Element	4 Displacements
Flow l/min [GPM]	151 [40] Continuous*** 170 [45] Intermittent**
Speed	Up to 454 RPM
Pressure bar [PSI]	310 [4500] Cont.*** 345 [5000] Inter.** 380 [5500] Peak.*
Torque Nm [lb - in]	1632 [14440] Cont.*** 2034 [18000] Inter.**

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

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

* Peak—(Peak) Peak operation, 1% of every minute.

Features

- Patented VIS Geroler technology
- Three moving components: (Geroler, star, drive, and output shaft)
- Two-piece pre-loaded pressure balance plate
- Shuttle valve option for reliable internal drive lubrication
- High-pressure capability – ratings compatible with high-pressure piston pumps
- Variety of optional features including two-speed option, brake packages, and case flow solutions for both closed-loop and open-loop applications.

Benefits

- Extremely compact powerful package
- Highest output torque in its class
- High efficiency
- Reliable performance
- Reduced system temperatures
- Quiet, smooth operation
- High horsepower density
- Design flexibility

Applications

- Skid Steer Loaders
- Sprayers
- Underground Boring Equipment
- Forestry Equipment
- Irrigation Reels
- Grinders / Mixers
- Material Handling Equipment
- Augers



Skid Steer



Sprayer



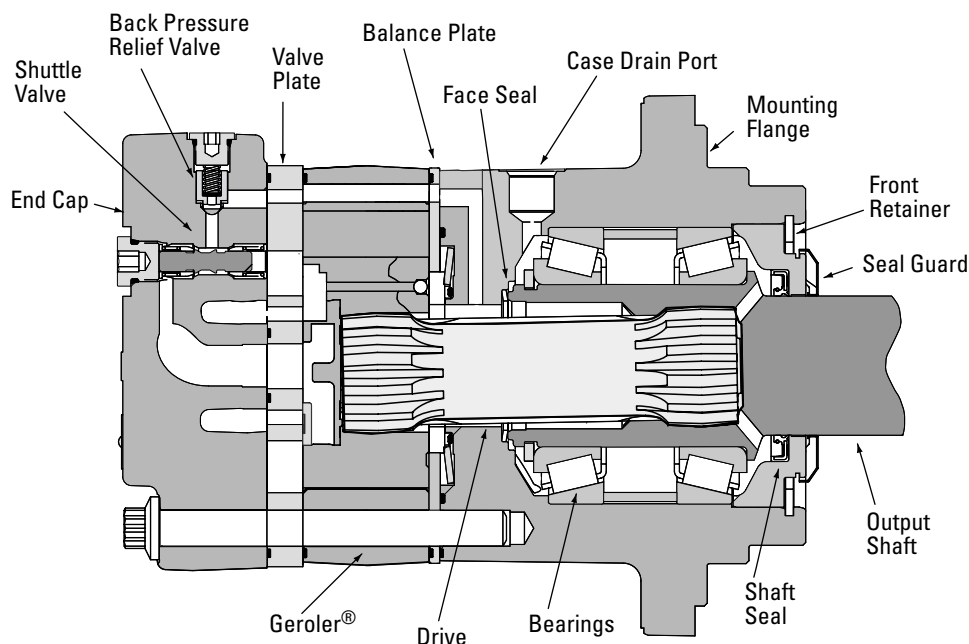
Boring



Injection Molding

VIS 30 Series

Specifications



SPECIFICATION DATA — VIS 30 SERIES MOTORS

Displ. cm ³ /r [in ³ /r]		325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Max. Speed (RPM) @ Flow	Continuous	440	357	284	249
	Intermittent	454	368	293	257
Flow l/min [GPM]	Continuous	151 [40]	151 [40]	151 [40]	151 [40]
	Intermittent	170 [45]	170 [45]	170 [45]	170 [45]
Torque Nm [lb-in]	Continuous	1445 [12789]	1589 [14063]	1632 [14440]	1632 [14440]
	Intermittent	1597 [14137]	1968 [17421]	2034 [18000]	2034 [18000]
	Peak	380 [5500]	380 [5500]	305 [4420]	268 [3890]
Pressure Δ bar [Δ PSI]	Continuous	310 [4500]	255 [3700]	203 [2950]	179 [2600]
	Intermittent	345 [5000]	320 [4635]	254 [3685]	223 [3240]
Weight kg [lb]	Standard or Wheel Mount	28,5 [62.9]	29,1 [64.2]	29,9 [66.0]	30,5 [67.2]
	Bearingless	16,3 [36.0]	16,9 [37.3]	17,7 [39.1]	18,3 [40.3]
Weight kg [lb]	Two-speed Standard or Wheel Mount	32,1 [70.8]	32,7 [72.1]	33,5 [73.9]	34,1 [75.1]
	Two-speed Bearingless	19,9 [43.9]	20,5 [45.2]	21,3 [47.0]	21,9 [48.2]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

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

Return Pressure (Back-Pressure):

Minimum – 3,5 bar [50 PSI]
Maximum – 21 bar [300 PSI]

Note:

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

Case Pressure:

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

Note:

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

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

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

Shuttle:

Standard

Back-Pressure Relief Valve:

Required for closed loop circuit.

VIS 30 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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous
	Intermittent
	Will Operate at Reduced Life

325 cm³/r [19.8 in³/r]

Δ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	35	70	105	140	170	205	240	275	310	345	380
4	668	1399	2834	4251	5583	6924	8258	9528	10387	11637	12659	
	75	158	320	480	631	782	933	1076	1174	1315	1430	
15	46	46	46	44	43	43	42	42	39	37	36	
8	680	1419	2867	4303	5711	7126	8530	9876	11269	12460	13782	14840
	77	160	324	486	645	805	964	1116	1273	1408	1557	1677
8	9	91	90	87	85	84	83	81	78	74	70	66
12	647	1412	2879	4340	5768	7195	8619	10010	11360	12672	14029	15246
	73	160	325	490	652	813	974	1131	1284	1432	1585	1723
45	139	137	133	132	129	129	129	127	126	124	113	109
16	690	1420	2852	4316	5741	7191	8621	10014	11412	12736	14081	15435
	78	160	322	488	649	812	974	1131	1289	1439	1591	1744
61	186	184	181	179	174	170	168	168	166	161	154	151
20	657	1250	2774	4407	5695	7170	8741	9952	11392	12789	14137	15339
	74	141	313	498	643	810	988	1124	1287	1445	1597	1733
76	233	229	226	223	217	214	211	209	208	203	200	197
25	544	1266	2814	4154	5858	7220	8518	9936	11269	12654	14037	15334
	61	143	318	469	662	816	962	1123	1273	1430	1586	1732
95	291	287	283	280	277	269	266	264	260	256	254	248
30	146	1177	2605	3968	5401	6882	8315	9678	11092	12536	13960	15321
	16	133	294	448	610	778	939	1094	1253	1416	1577	1731
114	341	345	340	336	333	325	323	320	316	312	307	303
35	114	1144	2532	3960	5322	6768	8232	9589	11019	12228	13298	15023
	13	129	286	447	601	765	930	1083	1245	1382	1503	1697
132	396	402	396	392	387	378	377	372	369	363	353	354
40	92	557	2047	3574	5032	6507	7944	9282	10687	12112	13439	14938
	10	63	231	404	569	735	898	1049	1207	1368	1518	1688
151	454	452	440	433	430	429	430	428	425	420	413	408

400 cm³/r [24.4 in³/r]

Δ Pressure Bar [PSI]

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

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

VIS 30 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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous
	Intermittent
	Will Operate at Reduced Life

505 cm³/r [30.7 in³/r]
Δ Pressure Bar [PSI]

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

570 cm³/r [34.9 in³/r]
Δ Pressure Bar [PSI]

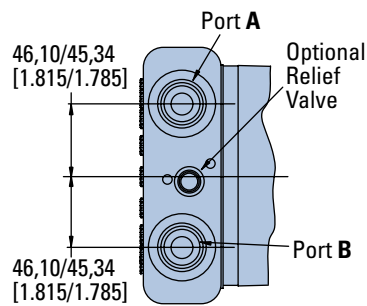
	250 15	500 35	1000 70	1500 105	2000 140	2500 170	3000 205	3500 240	4000 275	4500 310
4	1177 133	2466 279	4996 564	7494 847	9841 1112	12204 1379	14556 1645	16794 1897	18308 2069	20511 2317
15	26	26	26	25	24	24	24	24	22	21
8	1199 135	2501 283	5053 571	7584 857	10067 1137	12560 1419	15034 1699	17408 1967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

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

VIS 30 Series

Dimensions

Standard and Wheel Mount
– SAE



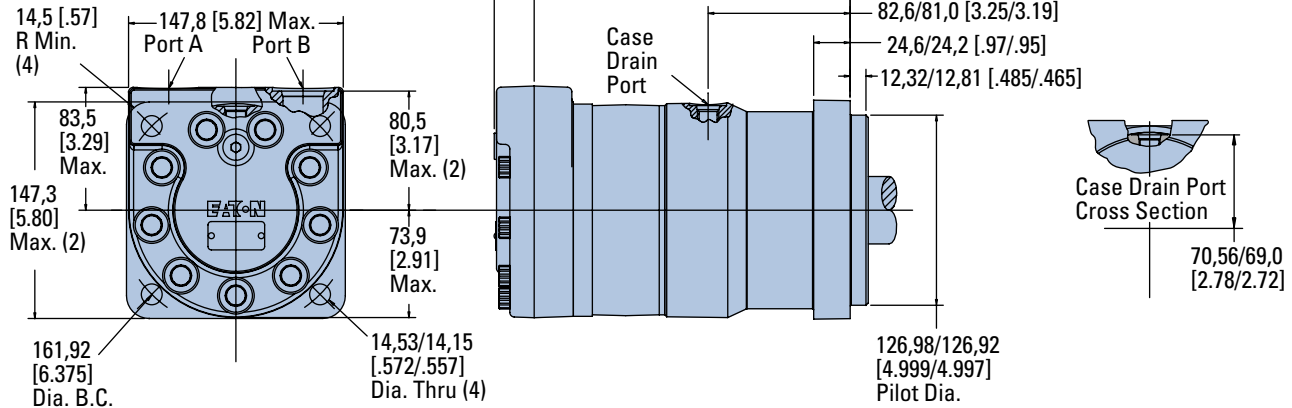
Ports

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

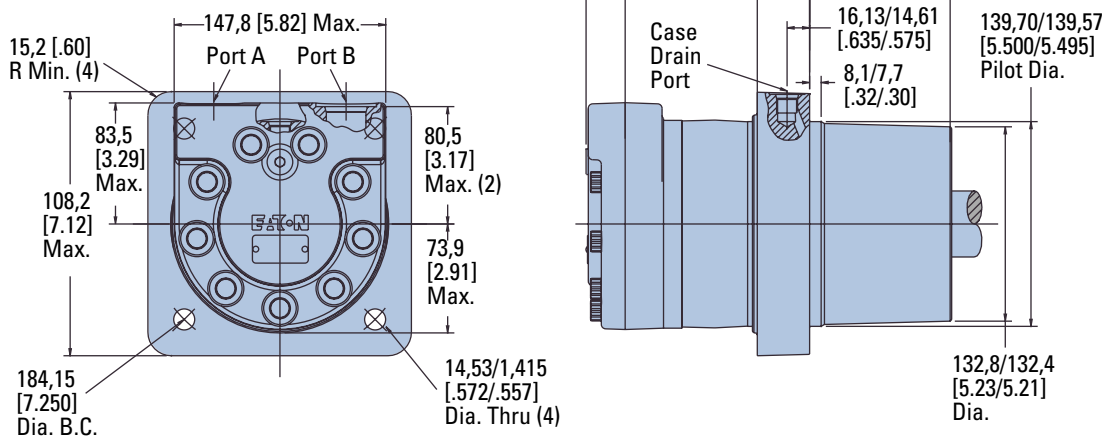
Standard Motors (SAE)



STANDARD MOTORS (SAE)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
325 [19.8]	223,5 [8.80]	195,3 [7.69]
400 [24.4]	230,4 [9.07]	201,9 [7.95]
505 [30.7]	239,3 [9.42]	211,1 [8.31]
570 [34.9]	245,4 [9.66]	217,2 [8.55]

Wheel Motors (SAE)



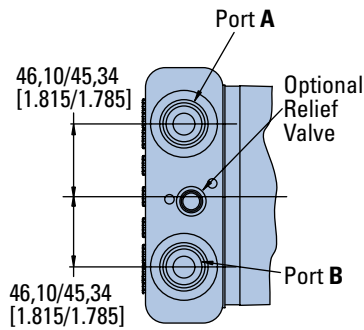
WHEEL MOTORS (SAE)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
325 [19.8]	138,7 [5.46]	110,5 [4.35]
400 [24.4]	145,5 [5.73]	117,1 [4.61]
505 [30.7]	154,5 [6.08]	126,2 [4.97]
570 [34.9]	160,5 [6.32]	132,3 [5.21]

VIS 30 Series

Dimensions

Standard and Wheel Mount
– ISO



Ports

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

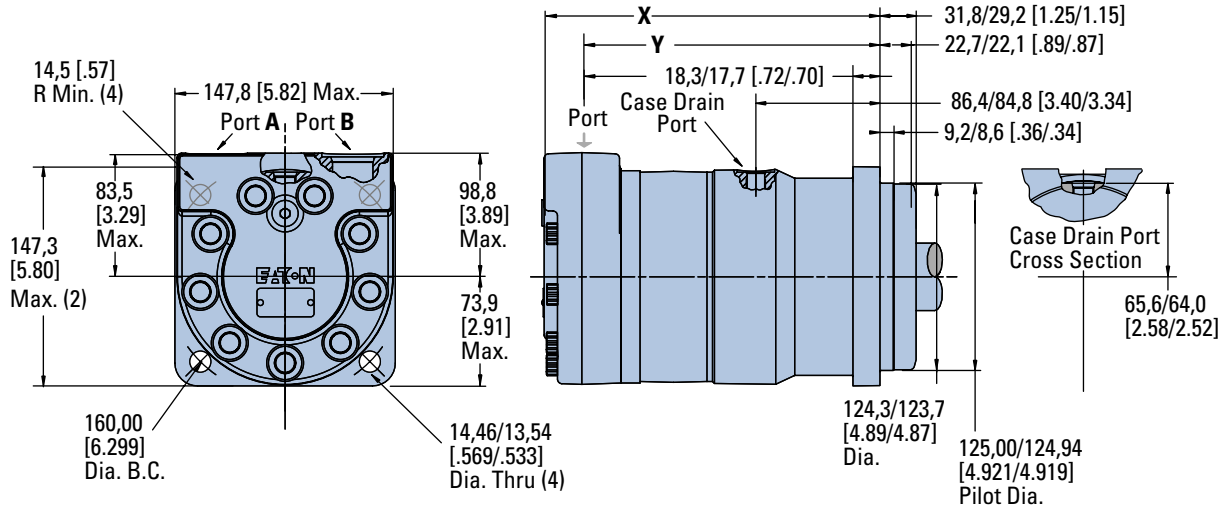
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

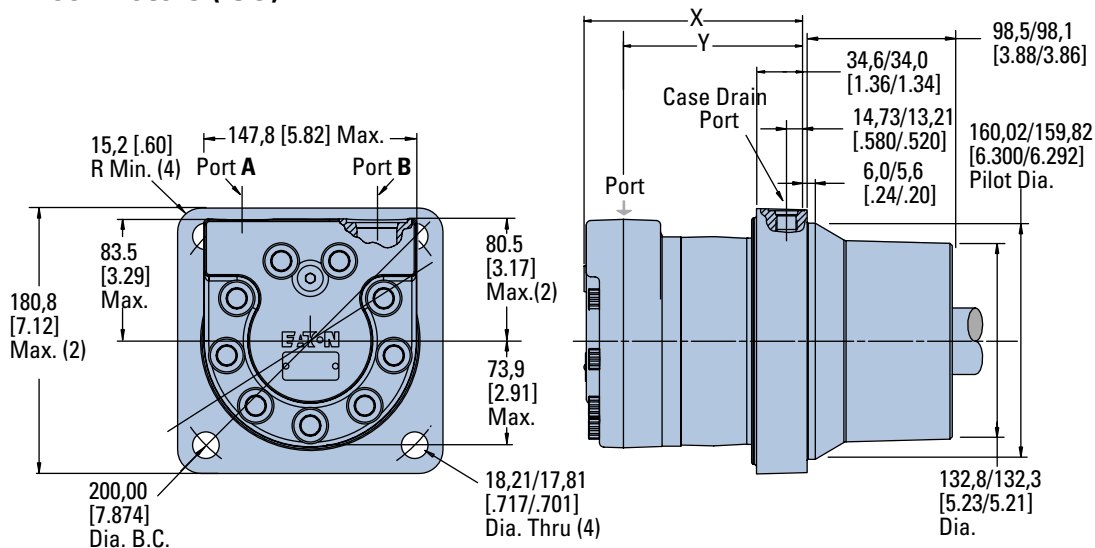
Standard Motors (ISO)



STANDARD MOTORS (ISO)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
325 [19.8]	211,6 [8.33]	183,1 [7.21]
400 [24.4]	218,2 [8.59]	190,0 [7.48]
505 [30.7]	227,3 [8.95]	198,9 [7.83]
570 [34.9]	233,4 [9.19]	205,2 [8.08]

Wheel Motors (ISO)



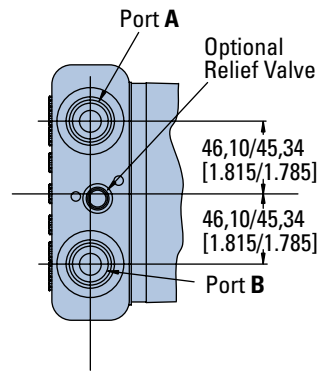
WHEEL MOTORS (ISO)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
325 [19.8]	137,4 [5.41]	109,0 [4.29]
400 [24.4]	144,0 [5.67]	115,8 [4.56]
505 [30.7]	153,2 [6.03]	124,7 [4.91]
570 [34.9]	159,3 [6.27]	131,1 [5.16]

VIS 30 Series

Dimensions

Bearingless



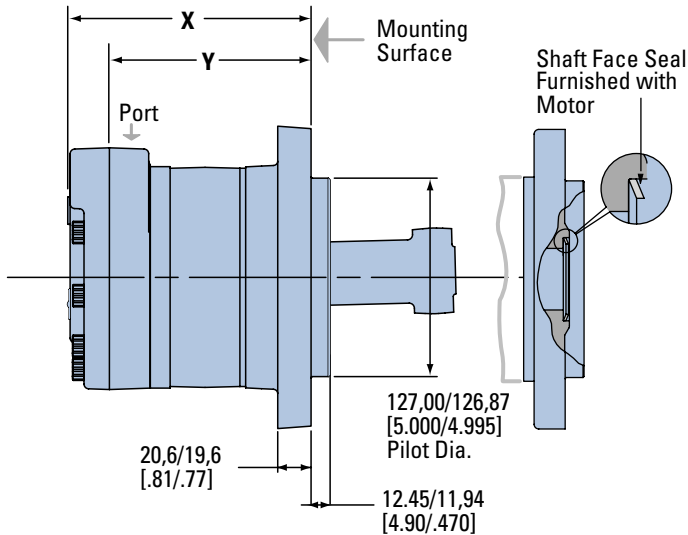
Ports

1-1/16-12 UN-2B SAE O-ring Ports (2)
 9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
 Or
 G 3/4 (BSP) O-ring Ports (2)
 G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Drive End

Port A Pressurized — CW

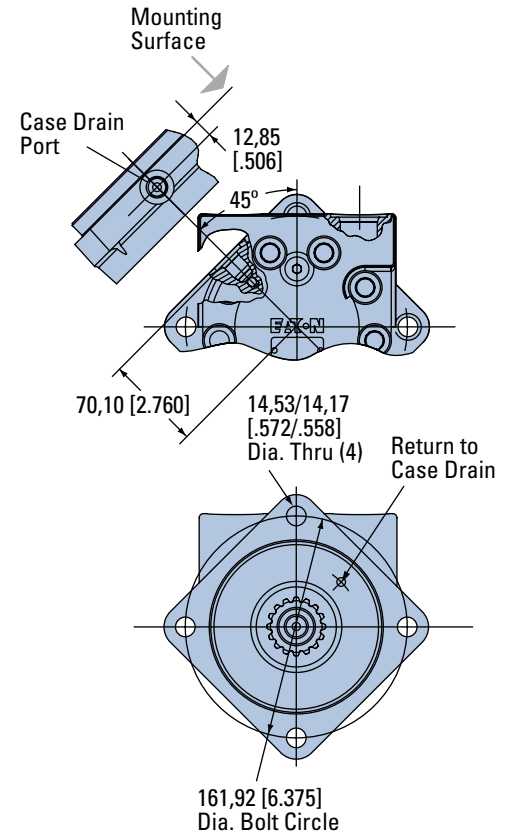
Port B Pressurized — CCW



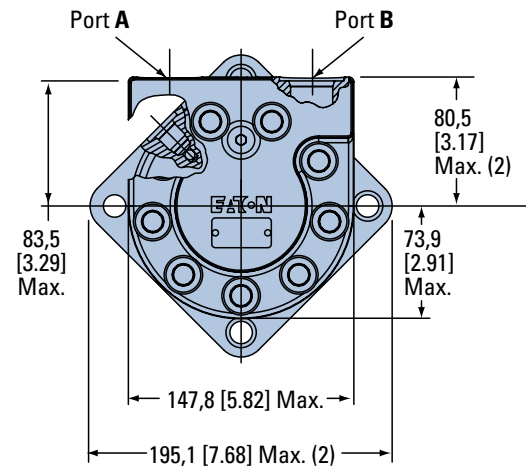
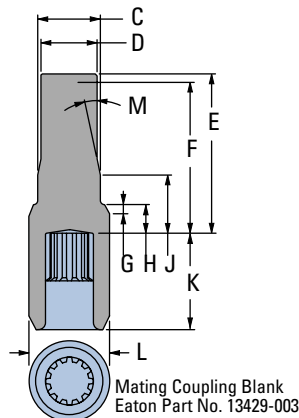
For VIS 30 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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



C 52,80 [2.08] Dia.
 D 49,00 [1.93] Dia.
 E 147,57 [5.81] Max.
 F 142,49 [5.61] Min.
 Full Form Dia.
 G 7,87 [.310] Max.
 H 17,27 [.680]
 J 33,30 [1.31]
 K 84,20 [3.315]
 Full Form Dia.
 L 69,60 [2.74]
 M 15



BEARINGLESS MOTORS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
325 [19.8]	141,2 [5.56]	113,3 [4.46]
400 [24.4]	148,1 [5.83]	120,1 [4.73]
505 [30.7]	157,2 [6.19]	129,0 [5.08]
570 [34.9]	163,3 [6.43]	135,1 [5.32]

VIS 30 Series

Installation Information

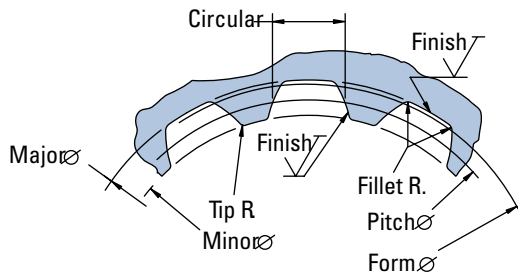
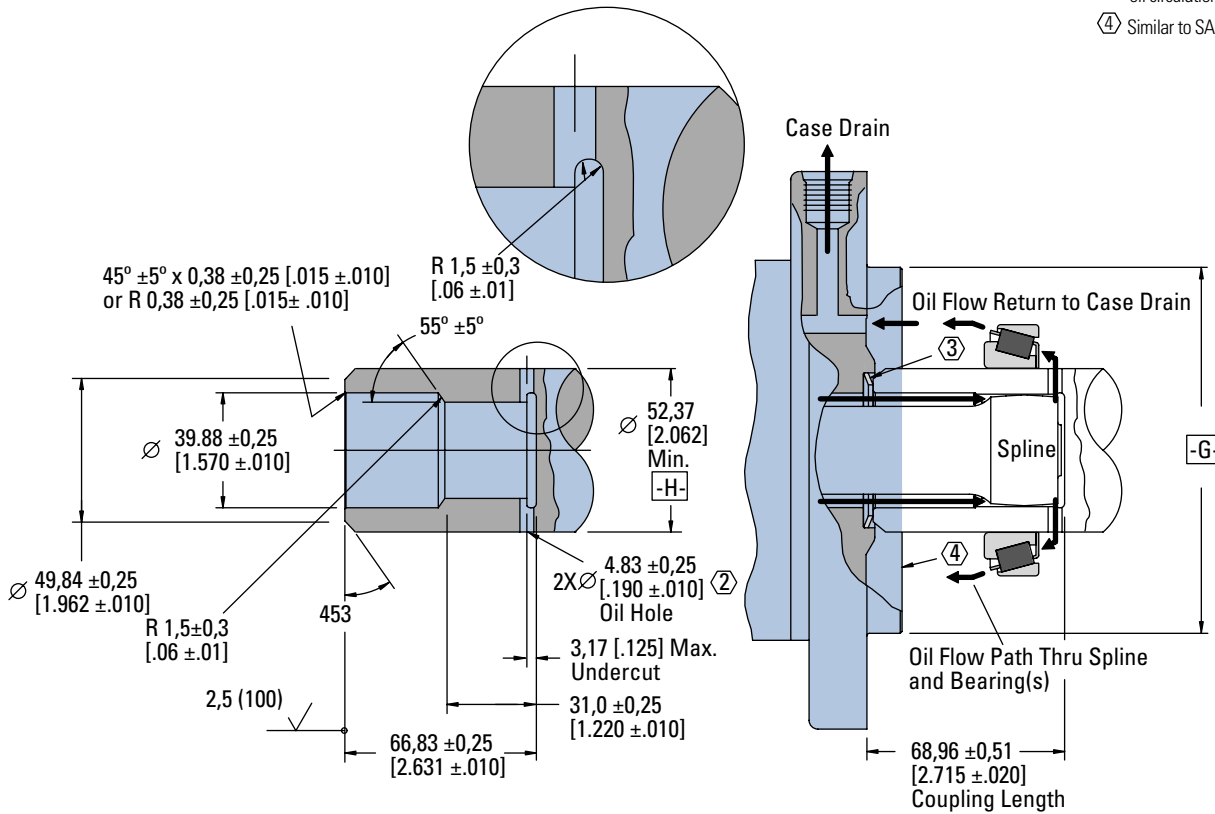
Bearingless

1 Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 60-64 HRC with case depth (to 50HRC) of 0,076 - 1,27 [.030 -.050]. Dimensions apply after heat treat.

② Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.

③ Seal to be furnished with motor for proper oil circulation thru splines.

④ Similar to SAE "C" Four Bolt Flange.



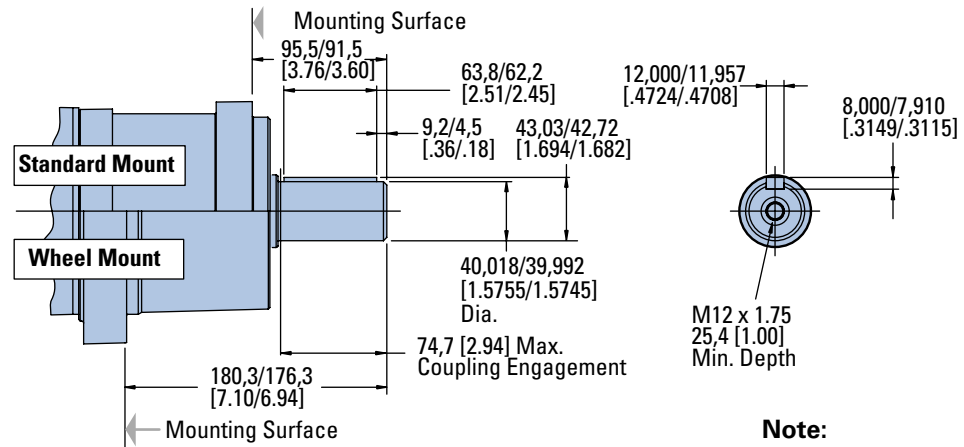
Spline Pitch.....	8.5/17
Pressure Angle.....	30°
Number of teeth.....	12
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter.....	Ref. 35,858823 [1.4117647] H G 0,20 [.008] H
Base Diameter.....	Ref. 31,054652 [1.2226241]
Major Diameter.....	39,17 [1.542] Max. 38,97 [1.534] Min.
Minor Diameter.....	33,30 -33,48 [1.311 -1.318]
Form Diameter, Min.	38,33 [1.509]
Fillet Radius.....	0,64 -0,76 [.025 -.030]
Tip Radius.....	0,25 -0,51 [.010 -.020]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,025 [+0.0000 -.0010]
Total Index Variation.....	0,038 [.0015]
Lead Variation.....	0,013 [.0005]
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	

VIS 30 Series

Dimensions Shafts

SAE

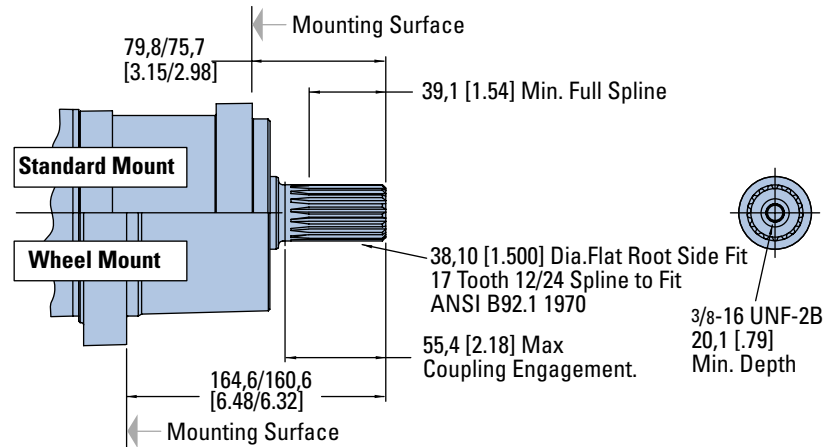
40 mm Straight



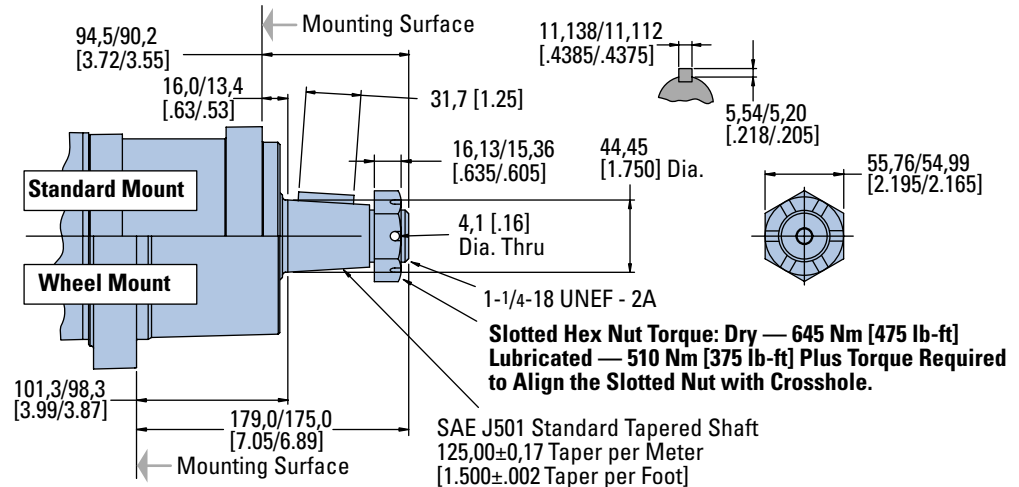
Note:

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

1-1/2 Inch 17 Tooth Splined



1-3/4 Inch Tapered



VIS 30 Series

Shaft Side Load Capacity

SAE

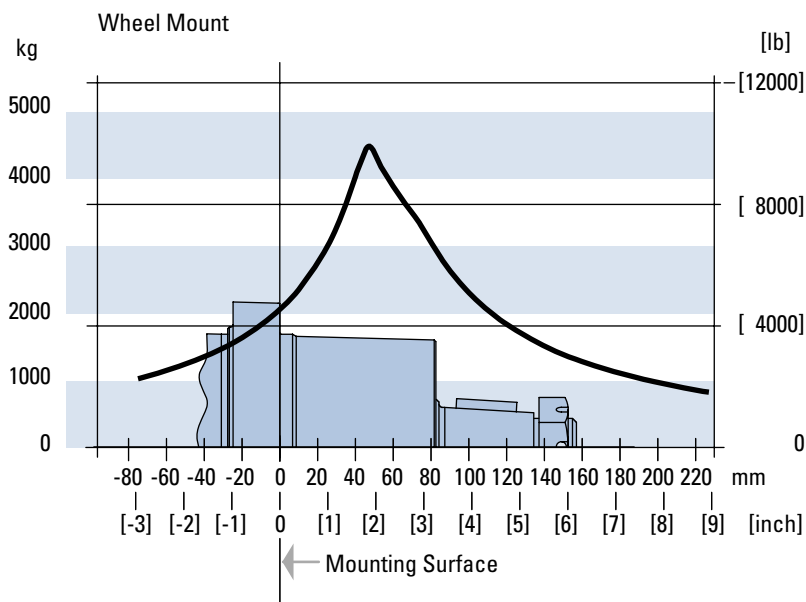
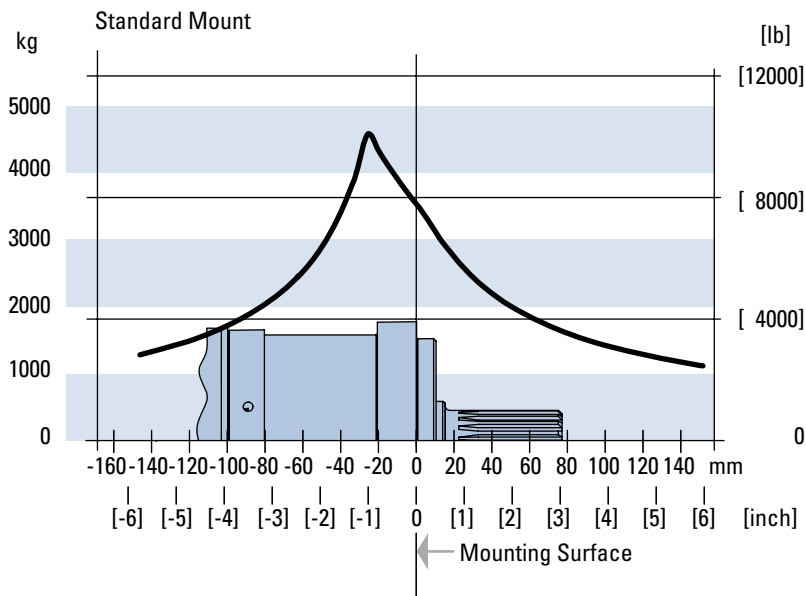
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

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

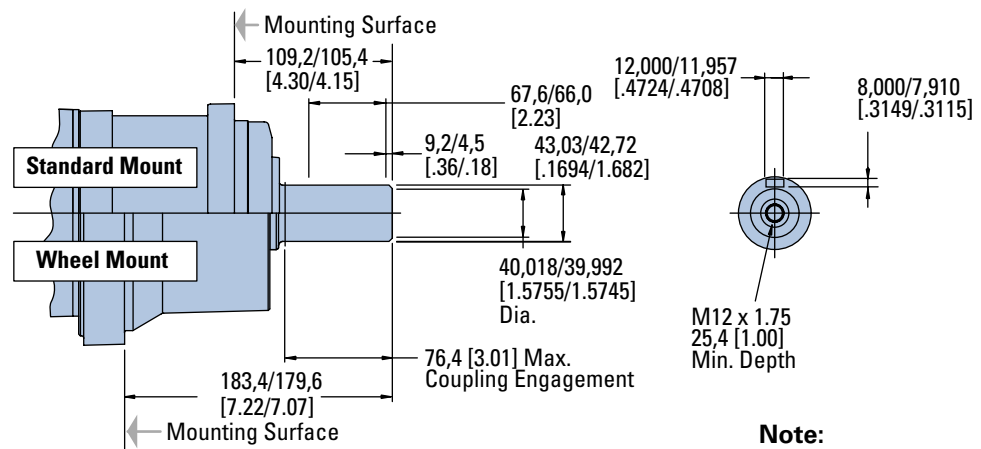
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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



ISO

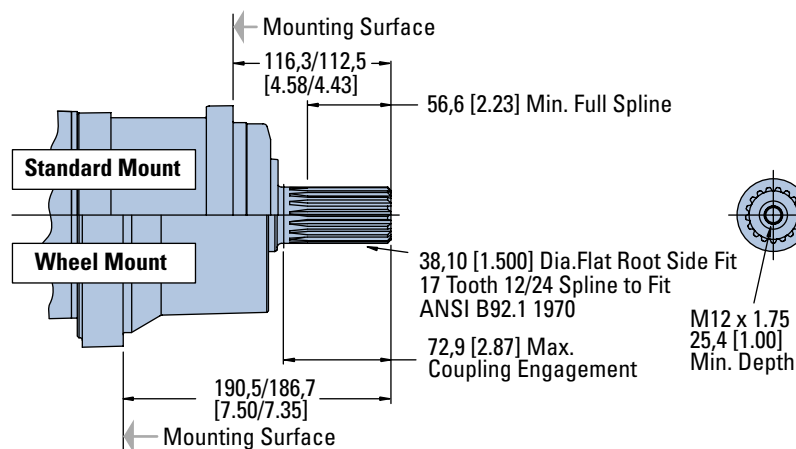
40 mm Straight



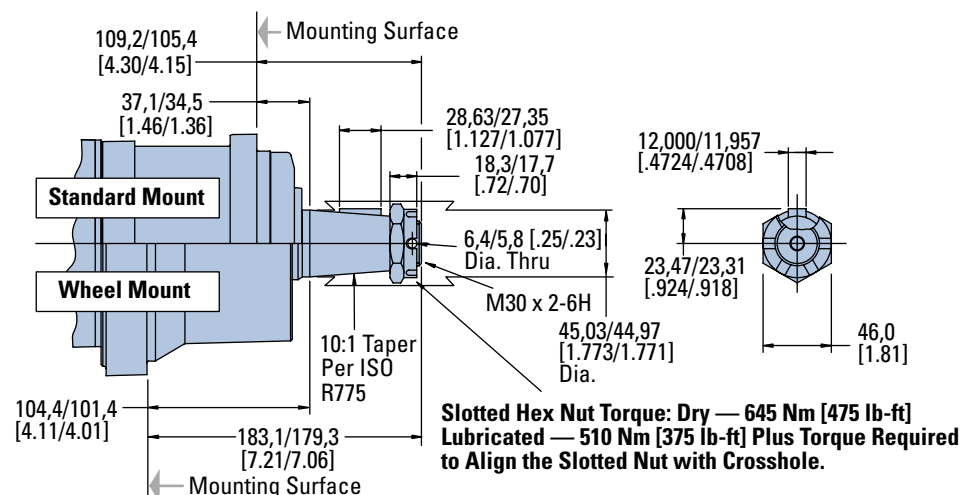
Note:

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

38,1 mm [1-1/2 Inch]
17 Tooth Splined



45 mm Tapered



VIS 30 Series

Shaft Side Load Capacity

ISO

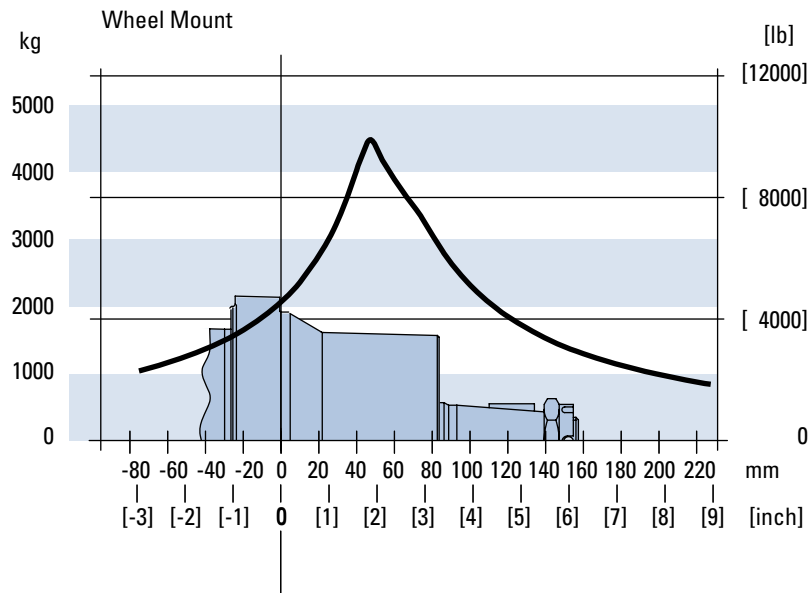
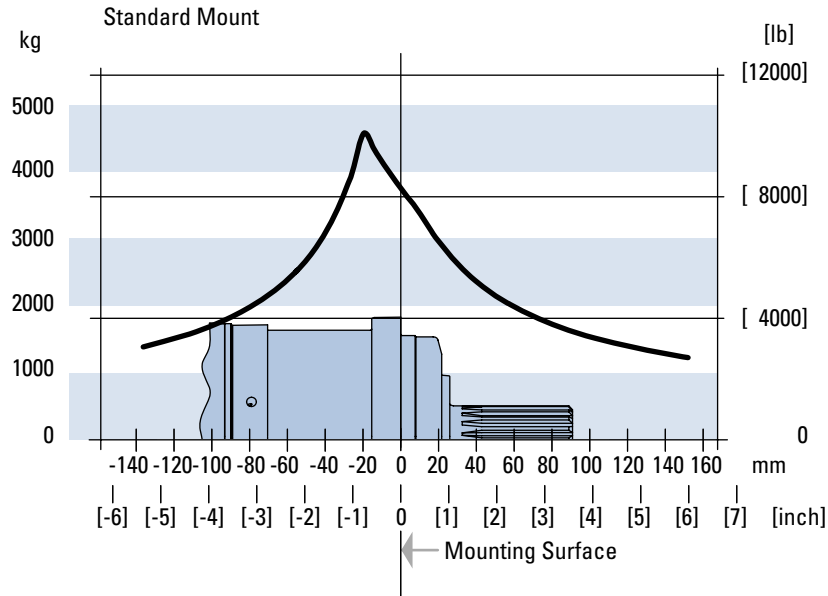
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

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

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

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



VIS 30 Series

Product Numbers

Closed Loop

Use digit prefix — 159-, 160-, or 161- plus four digit number from charts for complete product number— Example 161-0064.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0103	-0094	-0104	-0105
	1-1/2 inch 17 Tooth Splined	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0107	-0108	-0109	-0110
	1-3/4 inch Tapered	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0112	-0113	-0114	-0115
Wheel	40 mm Straight	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0054	-0055	-0056	-0057
	1-1/2 inch 17 Tooth Splined	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0059	-0060	-0061	-0062
	1-3/4 inch Tapered	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0064	-0065	-0066	-0067
Bearingless		1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	161-0045	-0064	-0065	-0090

161-0064

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0117	-0118	-0119	-0120
	1-1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0122	-0123	-0124	-0125
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0127	-0128	-0129	-0130
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0069	-0070	-0071	-0072
	1-1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0074	-0075	-0076	-0077
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0079	-0080	-0081	-0092
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	161-0067	-0068	-0069	-0070

161-0068

Note:

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

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

VIS 30 Series

Product Numbers

Open Loop

Use digit prefix —
159-, 160-, or 161- plus four
digit number from charts for
complete product number—
Example 161-0064.

**Orders will not be accepted
without three digit prefix.**

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0035	-0038	-0041	-0131
	1-1/2 inch 17 Tooth Splined	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0036	-0039	-0042	-0132
	1-3/4 inch Tapered	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0034	-0037	-0040	-0133
Wheel	40 mm Straight	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0021	-0024	-0027	-0083
	1-1/2 inch 17 Tooth Splined	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0022	-0025	-0028	-0084
	1-3/4 inch Tapered	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0020	-0023	-0026	-0085
Bearingless		1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	161-0030	-0034	-0020	-0077

161-0034

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0051	-0054	-0057	-0134
	1-1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0050	-0053	-0056	-0135
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0049	-0052	-0055	-0136
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0037	-0040	-0043	-0086
	1-1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0036	-0039	-0042	-0087
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0035	-0038	-0041	-0088
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	161-0035	-0036	-0037	-0078

161-0036

Note:

All product numbers in the charts (above) are for motors **without** a back-pressure relief valve. These motors would generally be used in open loop circuits.

Note:

Case pressure for VIS motors must not exceed 50 psi. With an "Open Loop Option" VIS motor, a case drain is not required, except if the return pressure is greater than 50 psi.

VIS 30 Series

Model Code

The following 16 - digit coding system has been developed to identify all of the configuration options for the VIS 30 motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

A C D			* *		*	* *		*	*	*	0 0		*	0	D
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1, 2, 3 Product Series ACD – VIS 30 Motor

4, 5 Displacement cm³/r [in³/r]

- 20 – 325 [19.8]
- 24 – 400 [24.4]
- 31 – 505 [30.7]
- 35 – 570 [34.9]

6 Mounting Type

- A** – 4 Bolt Bearingless 127,00 [5.000] Pilot Dia. with 12,19 [.480] Pilot Length and 14,35 [.565] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle
- B** – 4 Bolt Wheel Mount 160 [6.3] Pilot Dia. with 5,8 [.23] Pilot Length and 18,00 [.709] Dia. Holes on 200,00 [7.874] Dia. Bolt Circle (ISO Compatible)
- F** – 4 Bolt Standard Mount (SAE CC) 127,00 [5.000] Pilot Dia. with 12,2 [.48] Pilot Length and 14,32 [.564] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle
- G** – 4 Bolt Wheel Mount 139,7 [5.50] Pilot Dia. with 7,9 [.31] Pilot Length and 14,32 [.564] Dia. Holes on 184,15 [7.250] Dia. Bolt Circle (SAE Compatible)
- H** – 4 Bolt Standard Mount 125,0 [4.92] Pilot Dia. with 8,9 [.35] Pilot Length and 14,00 [.551] Dia. Holes on 160,00 [6.299] Dia. Bolt Circle (ISO Compatible)

7, 8 Output Shaft

- 00** – None (Bearingless)
- 01** – 45 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M30 x 2- 6H Threaded Shaft End, 12W x 8H x 28L [.472W x .313H x 1.102L] Key
- 02** – 1–3/4 inch Dia. .125:1 Tapered Shaft Per SAE J 501 with 1-1/4–18 UNEF - 2A Threaded Shaft End, 11,11 [.4375] Square x 31,8 [1.25] Straight Key
- 07** – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 63L [.472W x .313H x 2.480L] Key (SAE Compatible)
- 08** – 1–1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 39,1 [1.54] Minimum Full Spline with 3/8 -16 UNC - 2B Thread in End (SAE Compatible)
- 09** – 1–1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP30 Degree Involute Spline, 56,6 [2.23] Minimum Full Spline with M12 x 1,75 - 6H Thread in End (ISO Compatible)
- 10** – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 67L [.472W x .313H x 2.630L] Key (ISO Compatible)

9 Ports

- A** – 1–1/16-12 UN-2B Size 12 O-ring Port, Accepts Fittings for SAE J1926
- B** – G 3/4 (BSP) Straight Thread Port

10 Case Flow Options

- A** – Shuttle Valve with 9/16-18 UNF-2B, Size 6 O-ring Port Case Drain, Accepts Fittings for SAE J1926
- B** – Shuttle Valve with G 1/4 (BSP) Straight Thread Port Case Drain
- C** – Check valve with leakage orifice, no case drain (for Open Loop only)

11 Back-Pressure Relief

- 0** – None (for Open Loop Only)
- 1** – Set at 4,5 bar [65 PSI] (for Manual Pumps)
- 2** – Set at 15,2 bar [220 PSI] (for Servo Pumps)
- 4** – Set at 15,2 bar [300 PSI] (for high charge Servo Pumps)

12, 13 Special Features

- 00** – None

14 Paint/ Special Packaging

- 0** – No Paint, Individual Box
- A** – Painted Low Gloss Black, Individual Box
- B** – No Paint, Bulk Box Option
- C** – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

- 0** – Assigned Code

16 Eaton Assigned Design Code

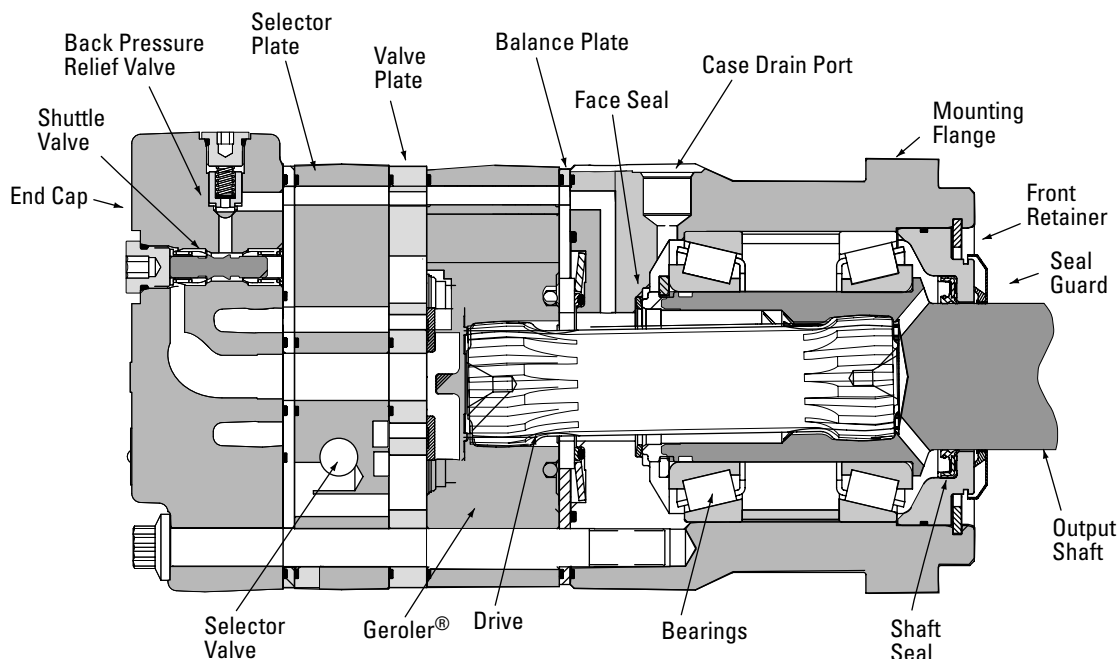
- E** – Assigned Design Code

Note

- A case drain is recommended for all VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].
- In open loop circuits, return pressure must be 3,5 bar [50 PSI] greater than case pressure to properly lubricate the internal drive.

VIS 30 Series Two-speed

Specifications



VIS 30 Series motors are available with an integral two-speed feature that allows the operator to shift the motor between low speed high torque (LSHT) mode and high speed low torque (HSLT) mode.

In the LSHT mode, output torque and rotation speed values are equal to those of the conventional VIS 30 motor. In the HSLT mode motor displacement is reduced by one third, resulting in a fifty percent increase in rotation speed and a torque output reduction of one third.

The VIS 30 two-speed motor is bidirectional. It will function with equal shaft

output in either rotation direction (CW or CCW) in both LSHT and HSLT modes. Shift on the fly technology allows full-power operation throughout the full duration of the shift.

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

An integral selector valve shifts the motor from LSHT mode to HSLT mode. Initially, low pressure is supplied to the pilot port. The selector valve is biased to LSHT mode by a return

spring. When pilot signal pressure is supplied to the pilot port and 3,5 Δbar [50 PSI] is reached, the selector valve overcomes return spring force and the shifts the spool to select HSLT mode.

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

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

All VIS 30 Series two-speed motors are equipped with a return line shuttle for closed circuit applications as standard equipment. All options available on the conventional VIS 30 are also available on VIS 30 two-speed motors.

Performance Data

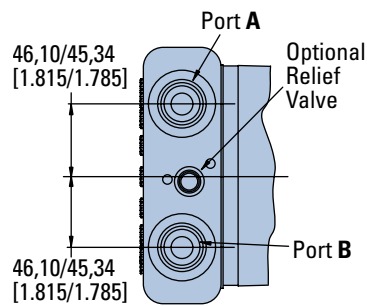
In the LSHT mode, torque and speed values are equal to those of the conventional VIS 30 motor (refer to single speed motor performance data.) In the HSLT mode, rotation speed is increased by fifty percent and torque output is reduced by one third. The VIS 30 Two-speed motor will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes.

VIS 30 Series

Two-speed

Dimensions

Standard and Wheel Mount
– SAE



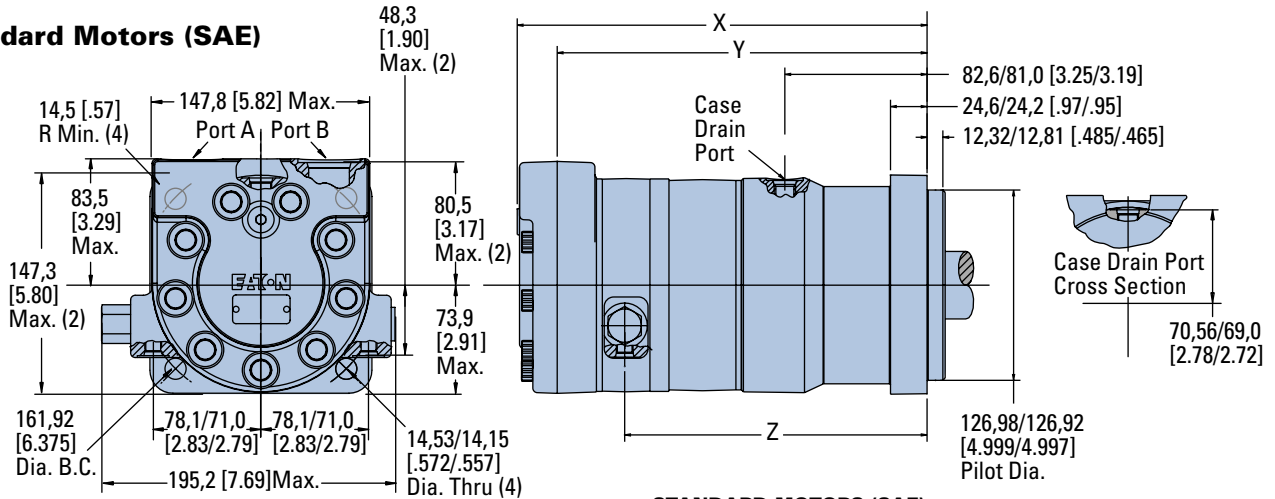
Ports

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

Standard Rotation Viewed from Shaft End

- Port A Pressurized — CW
- Port B Pressurized — CCW

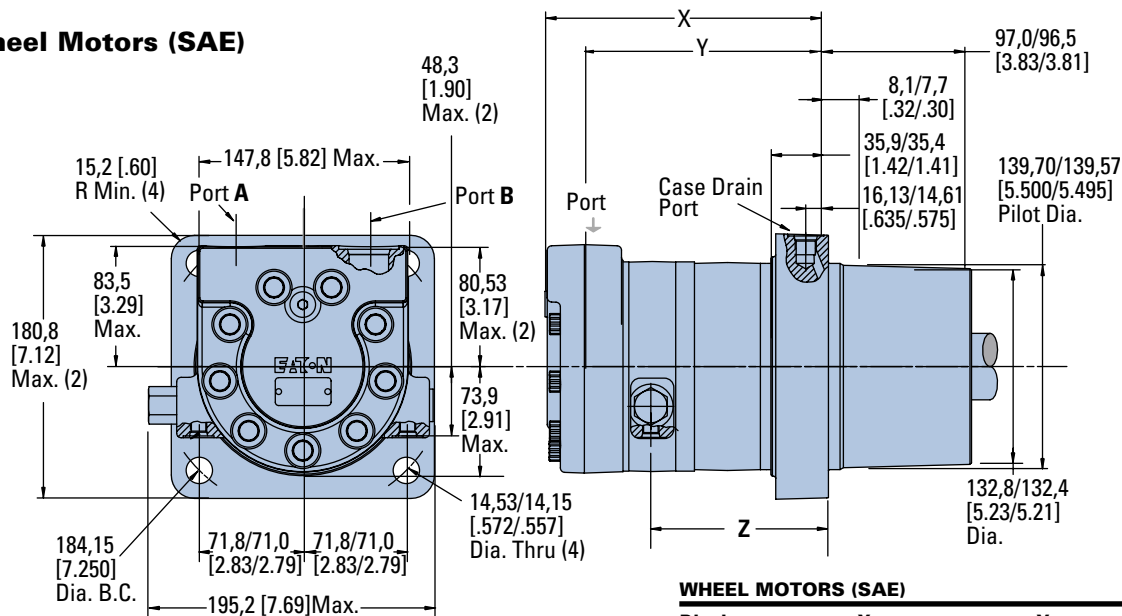
Standard Motors (SAE)



STANDARD MOTORS (SAE)

Displacement	X	Y	Z
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	259,3 [10.21]	231,4 [9.11]	186,2 [7.33]
400 [24.4]	265,9 [10.47]	238,0 [9.37]	193,0 [7.60]
505 [30.7]	275,1 [10.83]	246,9 [9.72]	201,7 [7.94]
570 [34.9]	281,2 [11.07]	253,0 [9.96]	208,0 [8.19]

Wheel Motors (SAE)



WHEEL MOTORS (SAE)

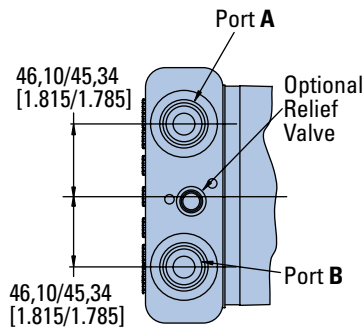
Displacement	X	Y	Z
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	174,5 [6.87]	146,6 [5.77]	101,3 [3.99]
400 [24.4]	181,1 [7.13]	153,2 [6.03]	108,2 [4.26]
505 [30.7]	190,2 [7.49]	162,1 [6.38]	116,8 [4.60]
570 [34.9]	196,3 [7.73]	168,1 [6.62]	123,2 [4.85]

VIS 30 Series

Two-speed

Dimensions

Standard and Wheel Mount
– ISO



Ports

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

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

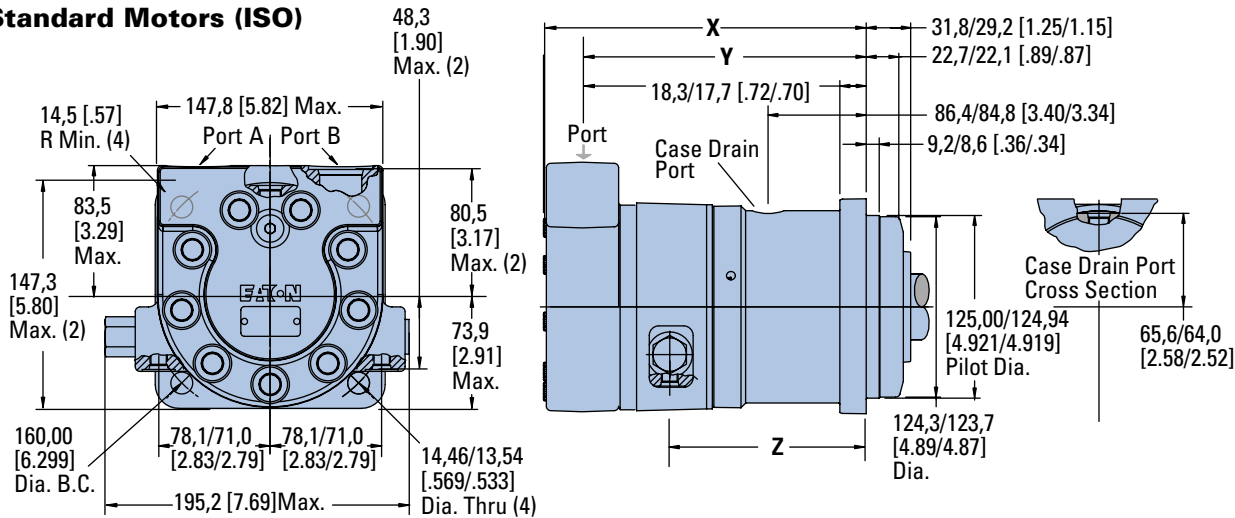
7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

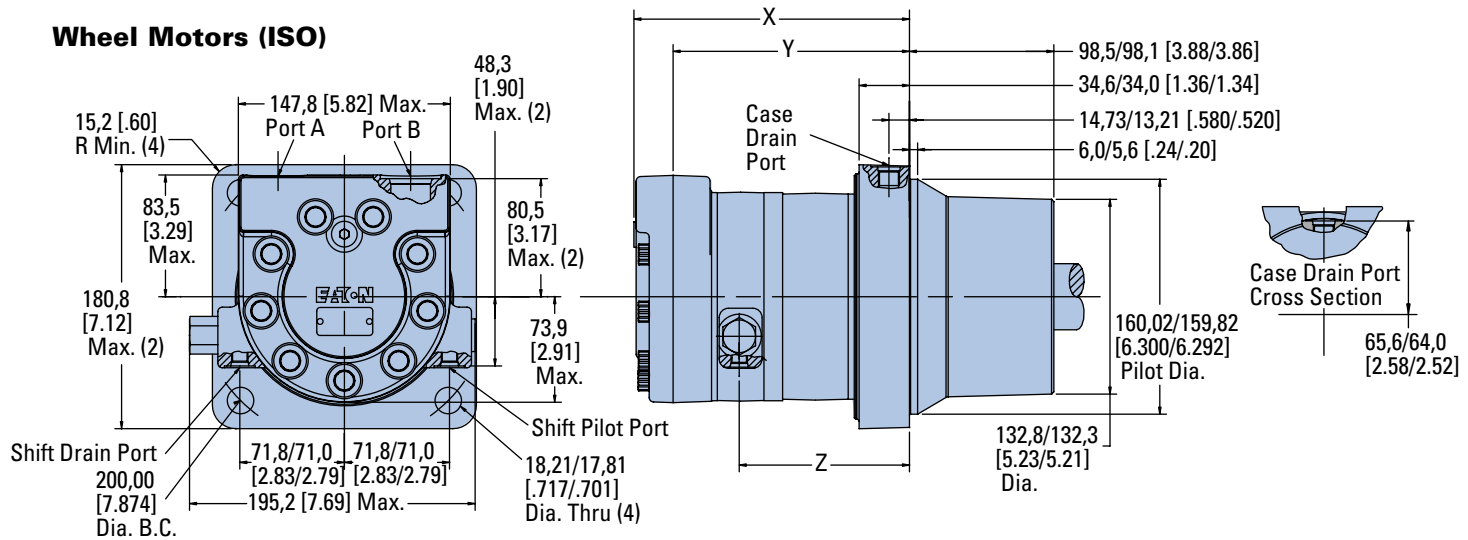
Standard Motors (ISO)



STANDARD MOTORS (ISO)

Displacement	X	Y	Z
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	247,4 [9.74]	219,5 [8.64]	174,2 [6.86]
400 [24.4]	253,7 [9.99]	225,8 [8.89]	180,8 [7.12]
505 [30.7]	263,1 [10.36]	235,0 [9.25]	189,7 [7.47]
570 [34.9]	269,2 [10.60]	241,0 [9.49]	196,1 [7.72]

Wheel Motors (ISO)



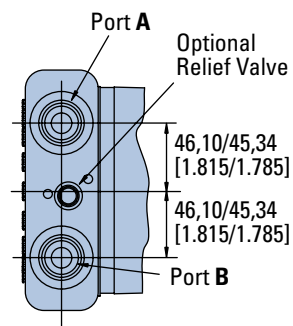
WHEEL MOTORS (ISO)

Displacement	X	Y	Z
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	173,2 [6.82]	145,3 [5.72]	100,1 [3.94]
400 [24.4]	179,6 [7.07]	151,6 [5.97]	106,7 [4.20]
505 [30.7]	189,0 [7.44]	160,8 [6.33]	115,6 [4.55]
570 [34.9]	195,1 [7.68]	166,9 [6.57]	121,9 [4.80]

VIS 30 Series Two-speed

Dimensions

Bearingless

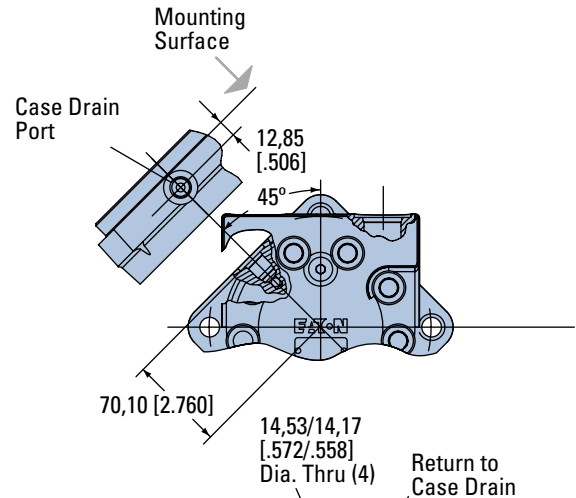
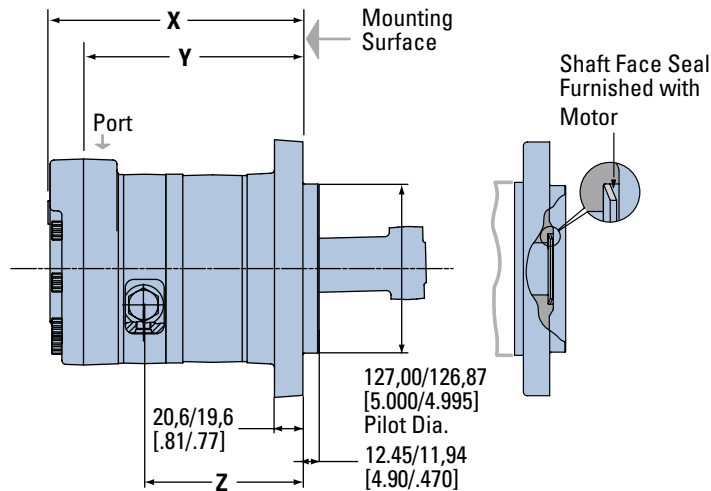


Ports

1-1/16-12 UN-2B SAE O-ring Ports (2)
9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
7/16-20 UNF -2B SAE O-ring Shift Ports (2)
Or
G 3/4 (BSP) O-ring Ports (2)
G 1/4 (BSP) O-ring Case Drain Port (1)
7/16-20 UNF -2B SAE O-ring Shift Ports (2)

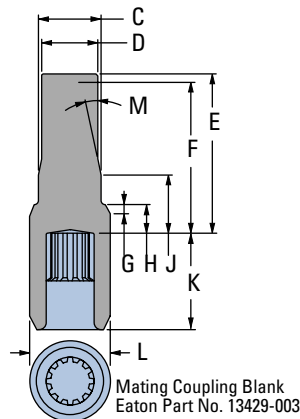
Standard Rotation Viewed from Drive End

Port A Pressurized — CW
Port B Pressurized — CCW



For VIS 30 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

C	52,80	[2.08]	Dia.
D	49,00	[1.93]	Dia.
E	147,57	[5.81]	Max.
F	142,49	[5.61]	Min.
			Full Form Dia.
G	7,87	[.310]	Max.
H	17,27	[.680]	
J	33,30	[1.31]	
K	84,20	[3.315]	
			Full Form Dia.
L	69,60	[2.74]	
M	15		

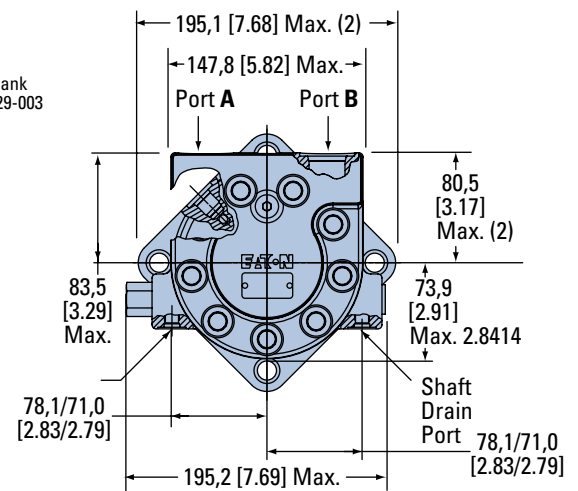


Note:

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

BEARINGLESS MOTORS

Displacement	X	Y	Z
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	177,0 [6.97]	149,1 [5.87]	103,9 [4.09]
400 [24.4]	183,6 [7.23]	155,7 [6.13]	110,7 [4.36]
505 [30.7]	193,0 [7.60]	164,8 [6.49]	119,6 [4.71]
570 [34.9]	199,1 [7.84]	170,9 [6.73]	126,0 [4.96]

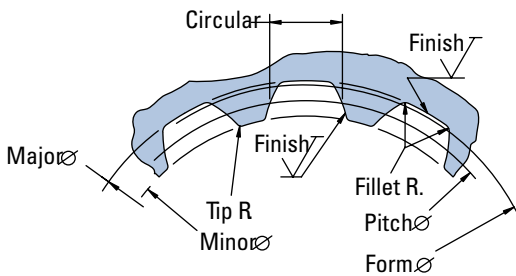
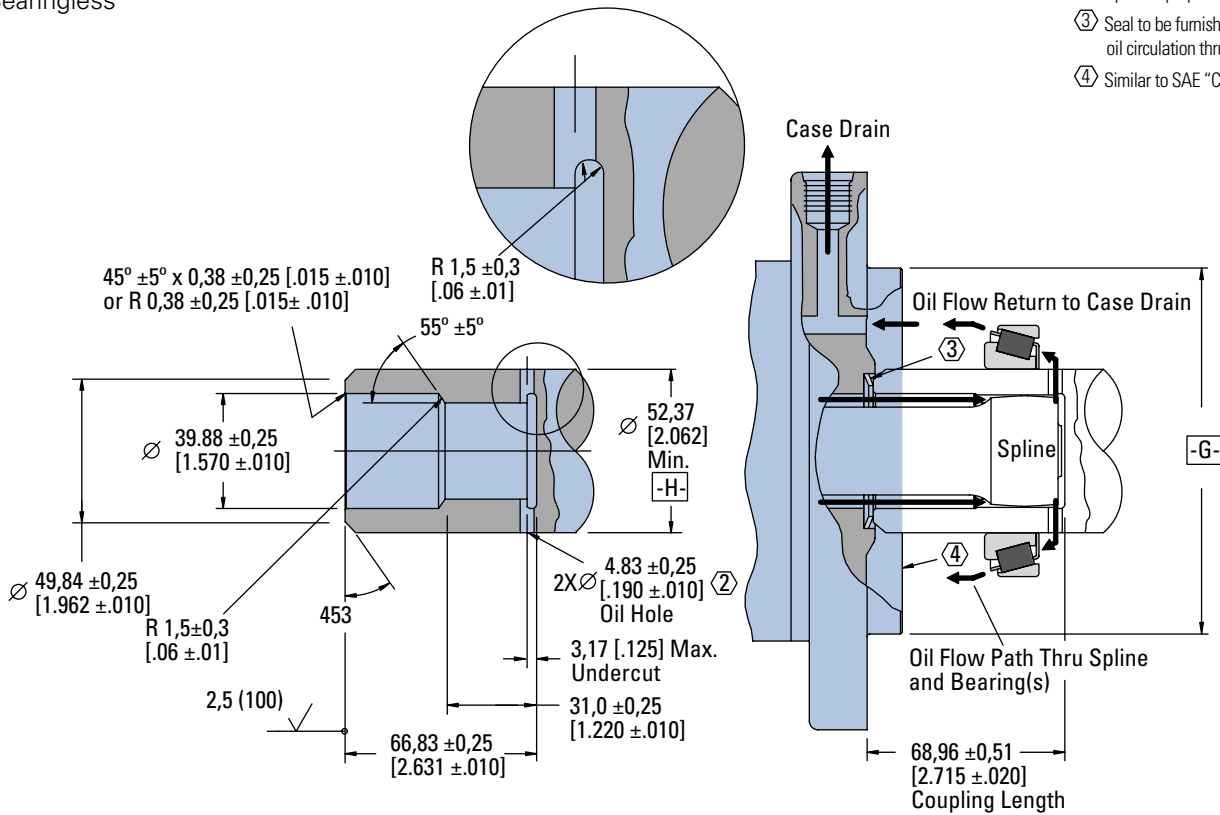


VIS 30 Series Two-speed

Installation Information

Bearingless

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



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] H 0,20 [.008] H
Base Diameter.....	Ref. 31,054652 [1.2226241]
Major Diameter.....	39,17 [1.542] Max. 38,97 [1.534] Min.
Minor Diameter.....	33,30 -33,48 [1.311 -1.318]
Form Diameter, Min.	38,33 [1.509]
Fillet Radius.....	0,64 -0,76 [.025 -.030]
Tip Radius.....	0,25 -0,51 [.010 -.020]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,025 [+0.0000 -.0010]
Total Index Variation.....	0,038 [.0015]
Lead Variation.....	0,013 [.0005]
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	

VIS 30 Series Two-speed

Product Numbers

Closed Loop

Use digit prefix —
171-, 172-, or 181- plus four
digit number from charts for
complete product number—
Example 171-0016.

**Orders will not be accepted
without three digit prefix.**

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	172-0017	-0018	-0019	-0020
	1-1/2 inch 17 Tooth Splined	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	172-0021	-0022	-0023	-0024
	1-3/4 inch Tapered	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	172-0025	-0026	-0027	-0028
Wheel	40 mm Straight	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	181-0001	-0002	-0003	-0004
	1-1/2 inch 17 Tooth Splined	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	181-0005	-0006	-0007	-0008
	1-3/4 inch Tapered	1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	181-0009	-0010	-0011	-0012
Bearingless		1-1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	171-0015	-0016	-0017	-0018

171-0016

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	172-0029	-0030	-0031	-0032
	1-1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	172-0033	-0034	-0035	-0036
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	172-0037	-0038	-0039	-0040
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	181-0013	-0014	-0015	-0016
	1-1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	181-0017	-0018	-0019	-0020
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	181-0021	-0022	-0023	-0024
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	171-0019	-0020	-0021	-0022

171-0020

Note:

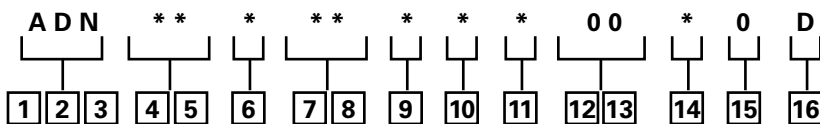
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

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

VIS 30 Series Two-speed

Model Code

The following 16-digit coding system has been developed to identify all of the configuration options for the VIS 30 two-speed motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1, 2, 3 Product Series

ADN – VIS 30- Two-speed Motor

4, 5 Displacement cm³/r [in³/r]

20 – 325 [19.8]

24 – 400 [24.4]

31 – 505 [30.7]

35 – 570 [34.9]

6 Mounting Type

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

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

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

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

H – 4 Bolt Standard Mount 125,0 [4.92] Pilot Dia. with 8,9 [.35] Pilot Length and 14,00 [.551] Dia. Holes on 160,00 [6.299] Dia. Bolt Circle (ISO Compatible)

7, 8 Output Shaft

00 – None (Bearingless)

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

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

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

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

09 – 1–1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP30 Degree Involute Spline, 56,6 [2.23] Minimum Full Spline with M12 x 1,75 - 6H Thread in End (ISO Compatible)

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

9 Ports

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

B – G 3/4 (BSP) Straight Thread Port

10 Case Flow Options

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

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

11 Back-Pressure Relief

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

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

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

12, 13 Special Features

00 – None

14 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

C – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

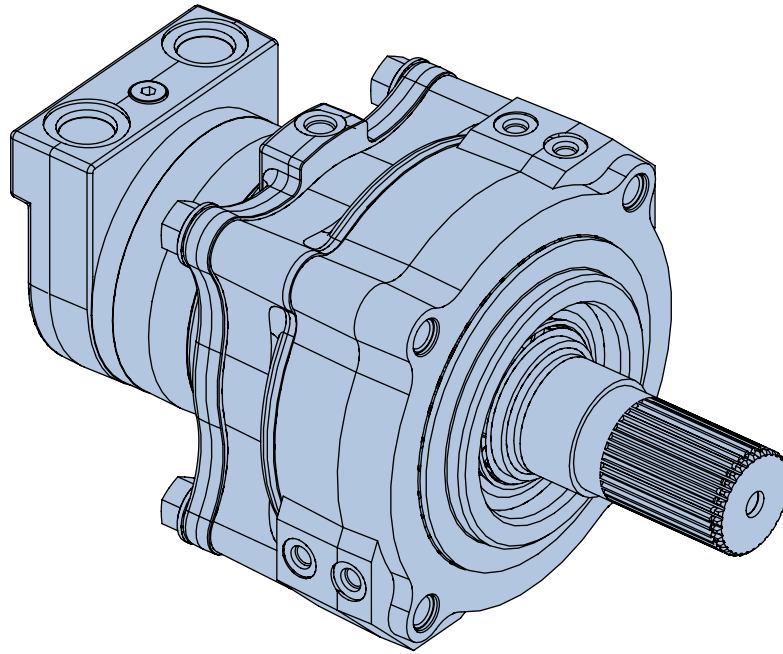
0 – Assigned Code

16 Eaton Assigned Design Code

E – Assigned Design Code

VIS 30 Series

Brake Description



Features

- Spring-Applied/
Hydraulically Released
Multi-Disc Brake
- Spring automatically
applies brake when hydro-
static pressure is absent
- Environmentally Protected
- Integral Design –
Motor and brake as a sin-
gle package to minimize
length and cost.
- Infinite Braking –
Eliminates machine creep
associated with park pawl
mechanisms
- Boost Feature –
Increases holding capacity
to match full motor output
torque
- No adjustments needed
- Two Sets of Release
and Boost Ports –
Allows for multiple plumb-
ing options and facilitates
bleeding

Applications

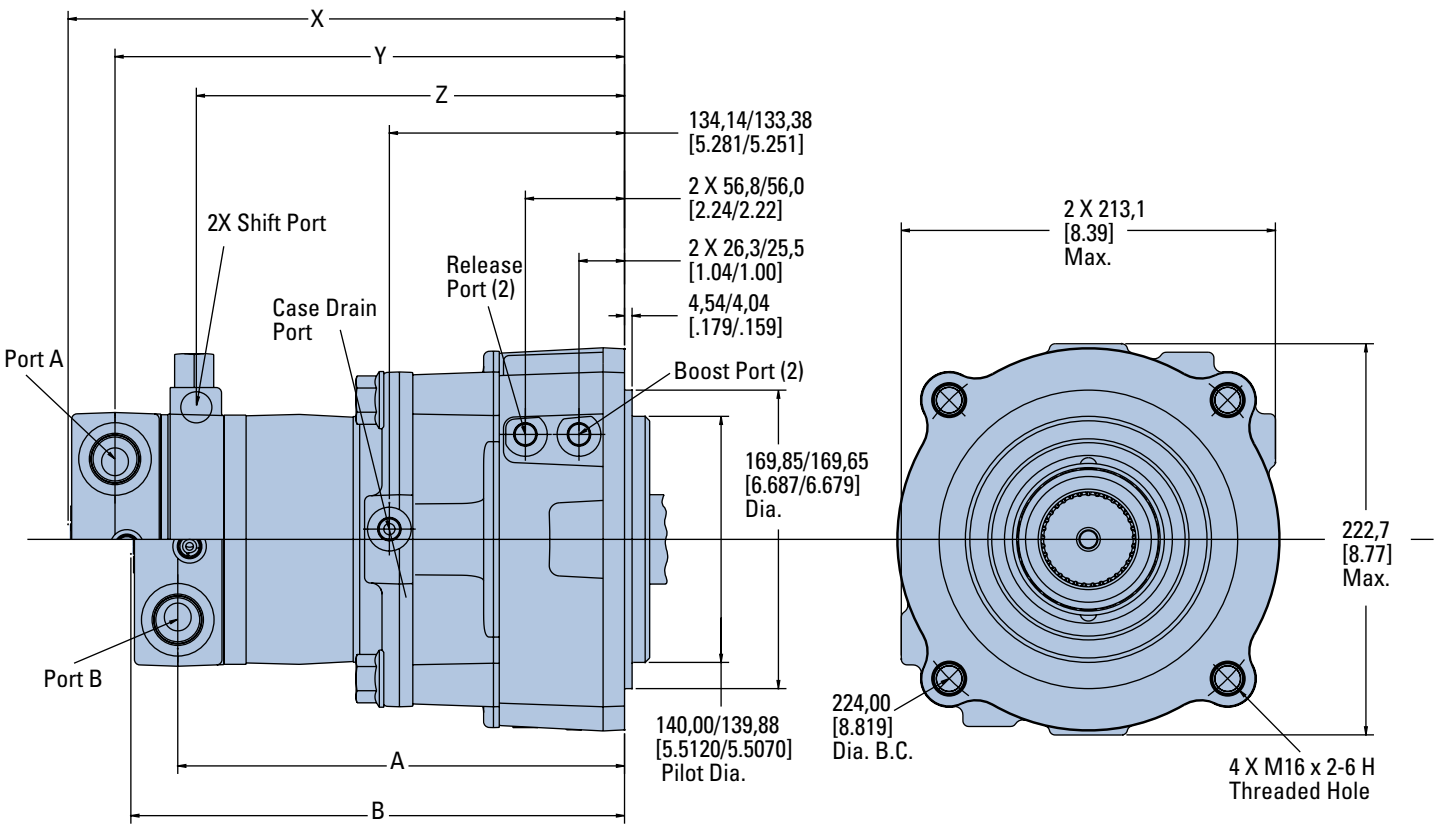
- Skid Steer Loaders
- Mini Excavators
- Trenchers
- Road Rollers
- Anywhere load-holding is
needed on a Low-Speed
High-Torque drive system

Specifications

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

VIS 30 Series

Brake Dimensions



BRAKE MOTORS (SINGLE-SPEED)

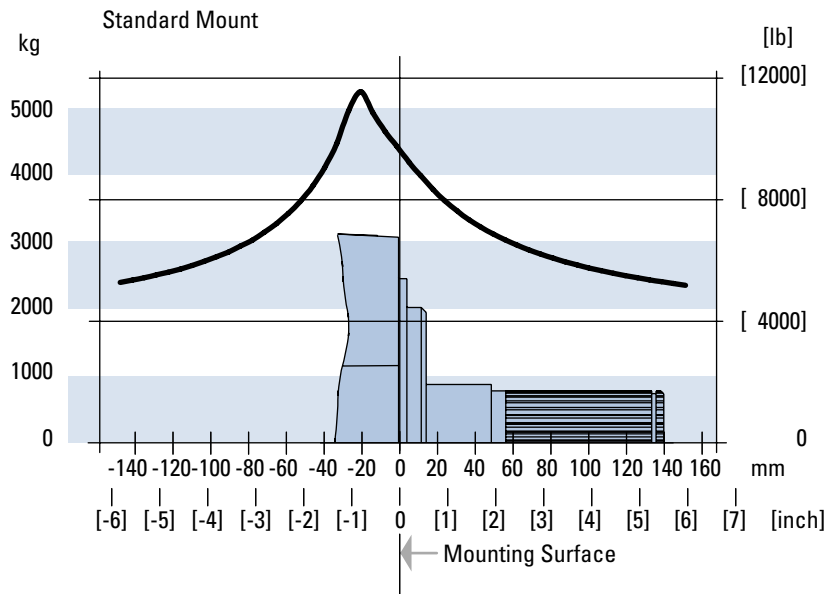
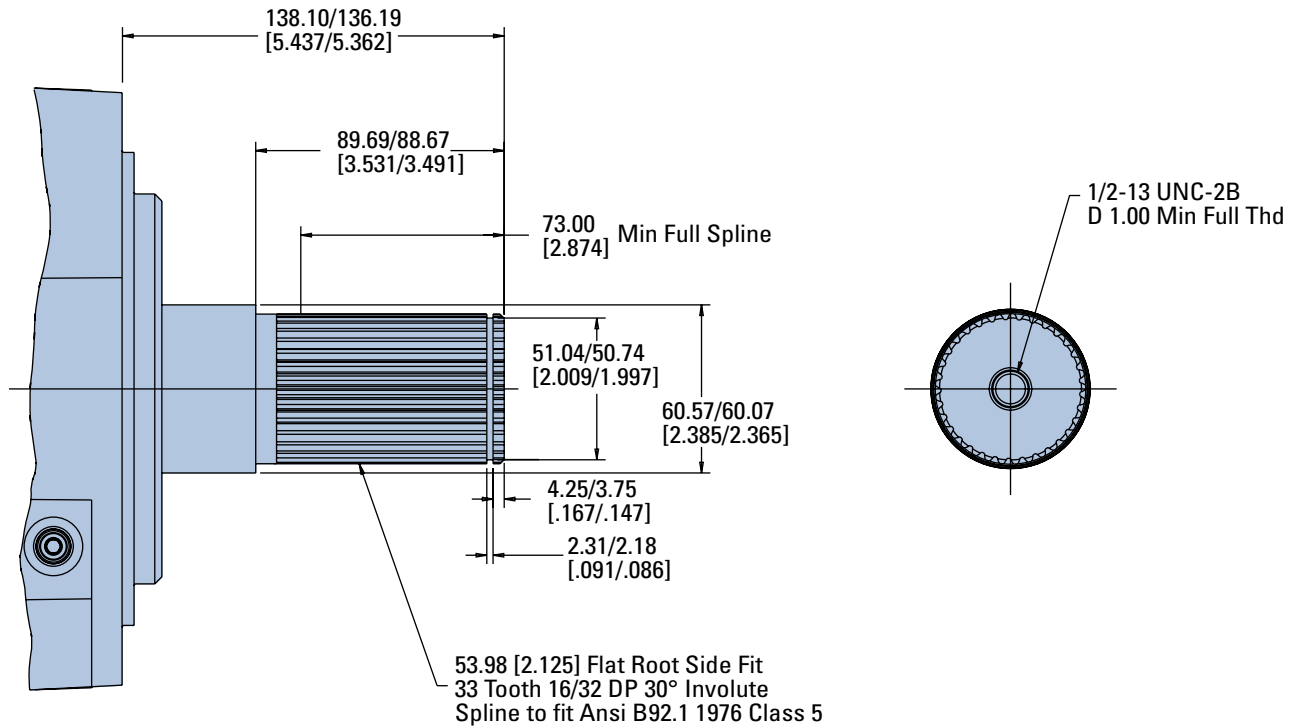
Displacement cm ³ /r [in ³ /r]	A mm [inch]	B mm [inch]
325 [19.8]	220,9 [8.78]	250,2 [9.85]
400 [24.4]	229,7 [9.05]	256,9 [10.11]
505 [30.7]	238,7 [9.40]	265,9 [10.47]
570 [34.9]	244,9 [9.64]	272,1 [10.71]

BRAKE MOTORS (TWO-SPEED)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
325 [19.8]	286,1 [11.26]	258,9 [10.20]	213,5 [8.41]
400 [24.4]	292,7 [11.52]	265,7 [10.46]	220,3 [8.67]
505 [30.7]	301,9 [11.88]	274,7 [10.82]	229,3 [9.03]
570 [34.9]	308,0 [12.12]	280,9 [11.06]	235,5 [9.27]

VIS 30 Series

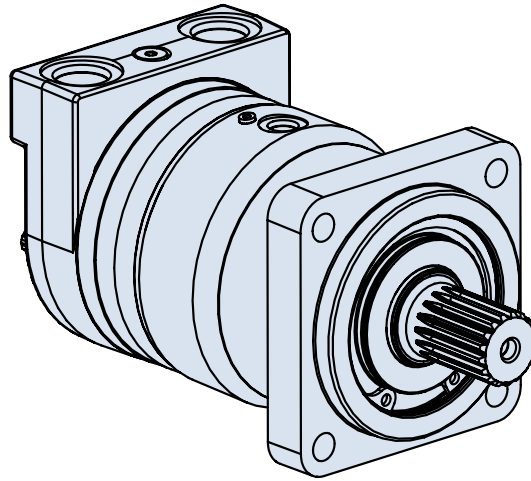
Brake Shaft Dimensions and Sideload Curves



Notes

VIS 40 Series

Highlights



Features

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

Description

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

Specifications

Geroler Element	6 Displacements
Flow l/min [GPM]	151 [40] Continuous*** 170 [45] Intermittent**
Speed	Up to 293 RPM
Pressure bar [PSI]	310 [4500] Cont.*** 345 [5000] Inter.** 380 [5500] Peak.*
Torque Nm [lb - in]	2531 [22400] Cont.*** 3165 [28000] Inter.**

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

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

* Peak— (Peak) Peak operation, 1% of every minute.

Benefits

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

Applications

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



Skid Steer



Trencher



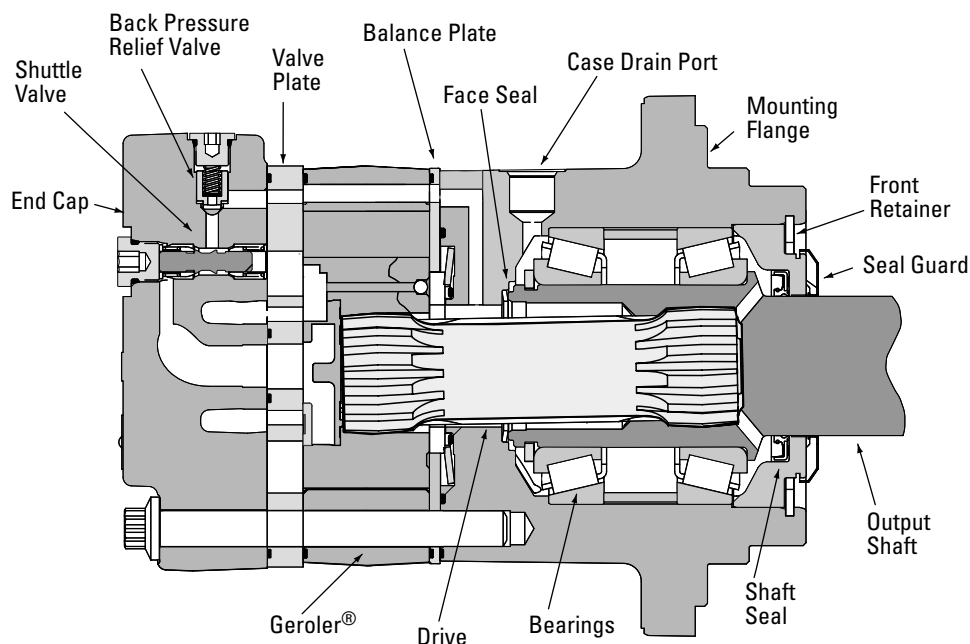
Digger



Port Equipment

VIS 40 Series

Specifications



SPECIFICATION DATA — VIS 40 MOTORS

Displ. cm ³ /r [in ³ /r]		505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Max. Speed (RPM) @ Flow	Continuous	279	244	221	204	177	148
	Intermittent	293	257	233	215	187	148
Flow l/min [GPM]	Continuous	151 [40]	151 [40]	151 [40]	151 [40]	151 [40]	151 [40]
	Intermittent	170 [45]	170 [45]	170 [45]	170 [45]	170 [45]	170 [45]
Torque Nm [lb - in]	Continuous	2240 [19829]	2531 [22400]	2531 [22400]	2531 [22400]	2531 [22400]	2531 [22400]
	Intermittent	2746 [21919]	2815 [24918]	3165 [28000]	3165 [28000]	3165 [28000]	3165 [28000]
Pressure Δ bar [Δ PSI]	Continuous	310 [4500]	279 [4040]	254 [3686]	235 [3389]	208 [3012]	171 [2489]
	Intermittent	345 [5000]	309 [4486]	315 [4574]	290 [4212]	254 [3682]	214 [3100]
	Peak	380 [5500]	380 [5500]	380 [5500]	380 [5500]	300 [4355]	250 [3621]
Weight kg [lb]	Standard or Wheel Mount	29,9 [66.0]	30,5 [67.2]	31,4 [68.2]	31,4 [69.2]	32,2 [71.0]	33,4 [73.6]
	Bearingless	17,7 [39.1]	18,3 [40.3]	18,7 [41.3]	19,2 [42.3]	20,0 [44.1]	21,2 [46.7]
Weight kg [lb]	Two-speed Standard or Wheel Mount	33,5 [73.9]	34,1 [75.1]	34,5 [76.1]	35,0 [77.1]	35,8 [78.9]	37,0 [81.5]
	Two-speed Bearingless	21,3 [47.0]	21,9 [48.2]	22,3 [49.2]	22,8 [50.2]	23,6 [52]	24,8 [54.6]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

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

Return Pressure (Back-Pressure):

Minimum – 3,5 bar [50 PSI]
Maximum – 21 bar [300 PSI]

Note:

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

Δ Pressure:

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

Case Pressure:

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

Note:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

Shuttle:

Standard

Back-Pressure Relief Valve:

Required for closed loop circuit.

VIS 40 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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous
	Intermittent
	Will Operate at Reduced Life

505 cm³/r [30.7 in³/r]

Δ Pressure Bar [PSI]

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

570 cm³/r [34.9 in³/r]

Δ Pressure Bar [PSI]

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

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

VIS 40 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 120 SUS. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Will Operate at Reduced Life

630 cm³/r [38.5 in³/r] Δ Pressure Bar [PSI]													
	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	
	15	35	70	105	140	170	205	240	275	310	345	380	
Flow LPM [GPM]	4	1298	2720	5511	8267	10856	13463	16058	18526	20197	22627	24615	
		147	307	623	934	1227	1521	1814	2093	2282	2556	2781	
	15	23	23	23	23	22	22	22	22	20	19	18	
	8	1323	2759	5575	8366	11105	13856	16585	19204	21913	24227	26797	28856
		149	312	630	945	1255	1565	1874	2170	2476	2737	3028	3260
	30	48	47	46	45	44	43	42	42	40	38	36	34
	12	1257	2746	5598	8439	11216	13990	16760	19464	22089	24640	27279	29646
		142	310	632	954	1267	1581	1894	2199	2496	2784	3082	3350
	45	72	70	68	68	67	67	67	65	65	64	58	56
	16	1341	2761	5546	8393	11163	13982	16763	19472	22190	24765	27381	30012
Flow LPM [GPM]		152	312	627	948	1261	1580	1894	2200	2507	2798	3094	3391
	61	96	94	93	92	89	87	86	86	86	83	79	78
	20	1278	2430	5394	8569	11073	13942	16996	19352	22151	24867	27488	29825
		144	275	609	968	1251	1575	1920	2186	2503	2810	3106	3370
	76	120	118	116	115	112	110	108	108	107	104	103	102
	25	1057	2461	5471	8076	11390	14038	16563	19320	21912	24605	27295	29815
		119	278	618	912	1287	1586	1871	2183	2476	2780	3084	3369
	95	150	148	146	144	143	138	137	136	134	132	130	128
	30	283	2288	5065	7716	10502	13381	16167	18819	21569	24375	27145	29792
		32	258	572	872	1187	1512	1827	2126	2437	2754	3067	3366
Flow LPM [GPM]	114	175	177	175	173	171	167	166	164	163	160	158	156
	35	221	2225	4923	7700	10349	13160	16006	18646	21427	23776	25858	29212
		25	251	556	870	1169	1487	1808	2107	2421	2686	2922	3301
	132	204	207	203	202	199	194	194	191	190	187	182	182
	40	178	1084	3980	6950	9785	12652	15446	18048	20780	23551	26132	29047
		20	122	450	785	1106	1430	1745	2039	2348	2661	2952	3282
	151	233	233	226	223	221	221	221	220	219	216	213	210

685 cm³/r [41.7 in³/r] Δ Pressure Bar [PSI]													
	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	
	15	35	70	105	140	170	205	240	275	310	345	380	
Flow LPM [GPM]	4	1406	2947	5969	8954	11758	14582	17392	20066	21875	24507	26661	
		159	333	674	1012	1328	1647	1965	2267	2472	2769	3012	
	15	22	22	22	21	20	20	20	20	19	18	17	
	8	1433	2989	6038	9062	12028	15007	17964	20800	23734	26241	29025	31254
		162	338	682	1024	1359	1696	2030	2350	2682	2965	3279	3531
	30	44	43	43	42	40	40	39	39	37	35	33	31
	12	1362	2974	6063	9141	12148	15152	18153	21082	23925	26688	29547	32110
		154	336	685	1033	1373	1712	2051	2382	2703	3015	3338	3628
	45	66	65	63	63	61	61	61	60	60	59	54	52
	16	1453	2991	6007	9090	12090	15145	18156	21091	24034	26823	29656	32506
Flow LPM [GPM]		164	338	679	1027	1366	1711	2051	2383	2715	3031	3351	3673
	61	88	87	86	85	83	81	80	80	79	77	73	72
	20	1384	2632	5842	9281	11994	15100	18408	20960	23992	26934	29773	32304
		156	297	660	1049	1355	1706	2080	2368	2711	3043	3364	3650
	76	111	109	107	106	103	102	100	99	99	96	95	94
	25	1145	2666	5926	8748	12337	15205	17939	20926	23733	26650	29563	32293
		129	301	670	988	1394	1718	2027	2364	2681	3011	3340	3649
	95	138	136	135	133	132	128	126	126	124	122	120	118
	30	307	2478	5486	8357	11375	14493	17511	20383	23361	26401	29401	32268
		35	280	620	944	1285	1637	1978	2303	2639	2983	3322	3646
Flow LPM [GPM]	114	162	164	161	160	158	154	153	152	150	148	146	144
	35	239	2410	5332	8340	11209	14254	17337	20196	23207	25752	28007	31640
		27	272	602	942	1266	1610	1959	2282	2622	2910	3164	3575
	132	188	191	188	186	184	179	179	177	175	172	168	168
	40	193	1174	4311	7527	10598	13704	16730	19548	22507	25508	28304	31461
		22	133	487	850	1197	1548	1890	2209	2543	2882	3198	3555
	151	215	215	209	206	204	204	204	203	202	199	196	194

10598
1197
204

Torque [lb-in]
Nm
Speed RPM

VIS 40 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 120 SUS. Actual data may vary slightly from unit to unit in production.

	Continuous
	Intermittent
	Will Operate at Reduced Life

785 cm³/r [48.0 in³/r]
Δ Pressure Bar [PSI]

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

940 cm³/r [57.4 in³/r]
Δ Pressure Bar [PSI]

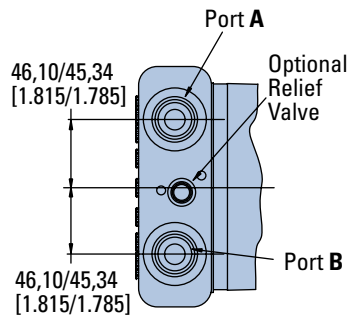
	250	500	1000	1500	2000	2500	3000	3500	4000
	15	35	70	105	140	170	205	240	275
4	1935	4056	8216	12325	16185	20071	23940	27620	30111
	219	458	928	1393	1829	2268	2705	3121	3402
	15	16	16	16	15	15	15	14	14
8	1972	4114	8311	12473	16557	20658	24727	28631	32670
	223	465	939	1409	1871	2334	2794	3235	3691
	30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

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

VIS 40 Series

Dimensions

Standard and Wheel Mount
– SAE



Ports

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

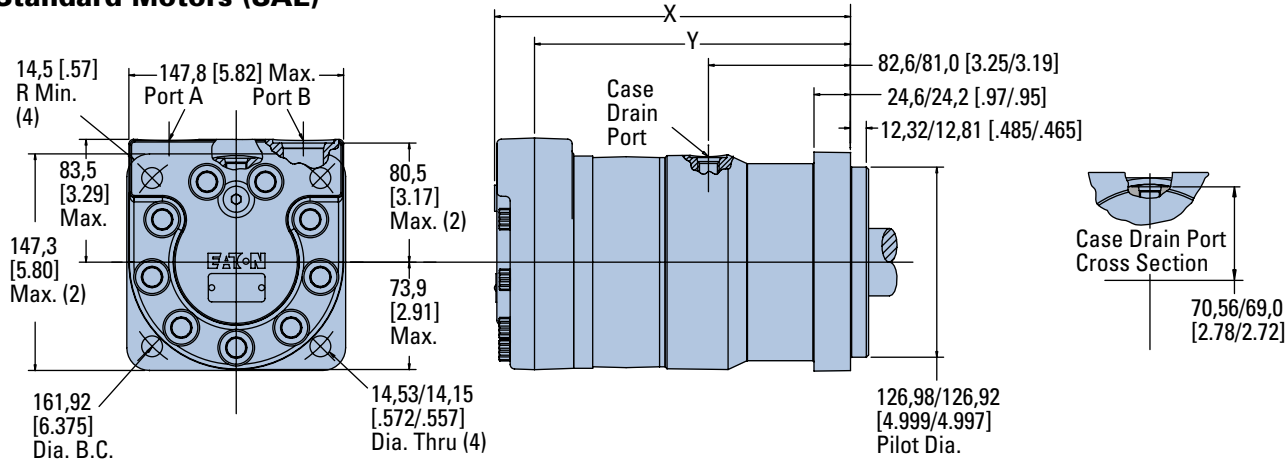
9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

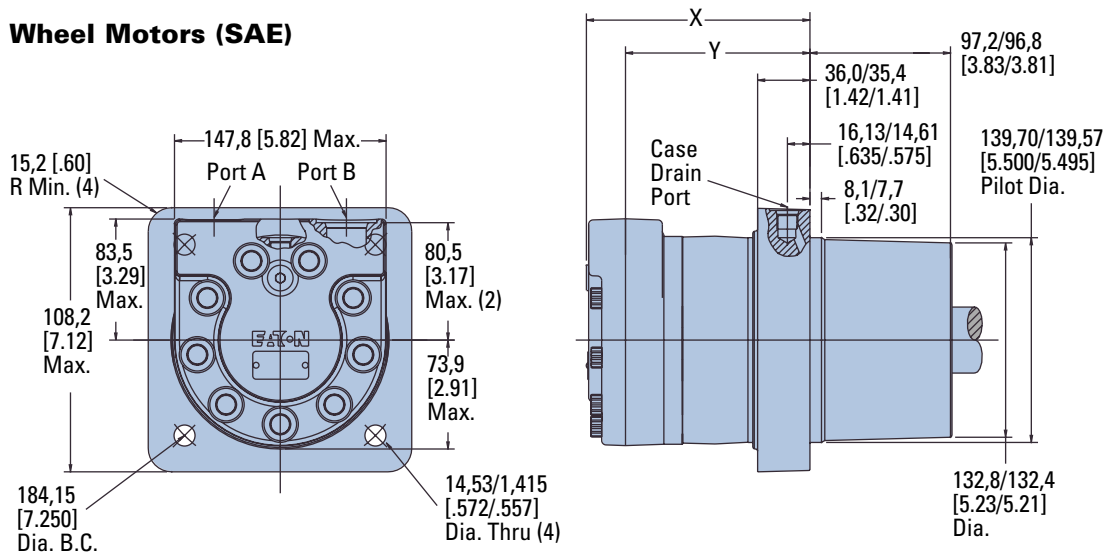
Standard Motors (SAE)



STANDARD MOTORS (SAE)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
505 [30.7]	239,3 [9.42]	211,1 [8.31]
570 [34.9]	245,4 [9.66]	217,2 [8.55]
630 [38.5]	250,7 [9.87]	222,5 [8.76]
685 [41.7]	255,3 [10.05]	227,1 [8.94]
785 [48.0]	264,7 [10.42]	236,2 [9.30]
940 [57.4]	278,4 [10.96]	249,9 [9.84]

Wheel Motors (SAE)



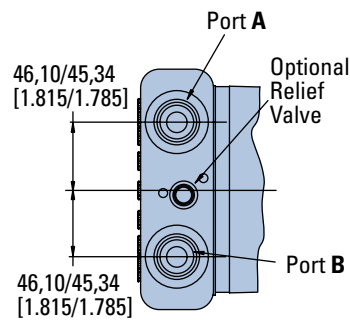
WHEEL MOTORS (SAE)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
505 [30.7]	154,4 [6.08]	126,2 [4.97]
570 [34.9]	160,5 [6.32]	132,3 [5.21]
630 [38.5]	165,9 [6.53]	137,7 [5.42]
685 [41.7]	170,4 [6.71]	142,2 [5.60]
785 [48.0]	179,8 [7.08]	151,4 [5.96]
940 [57.4]	193,5 [7.62]	165,1 [6.50]

VIS 40 Series

Dimensions

Oversize Flange
224,0 [8.82] B.C.

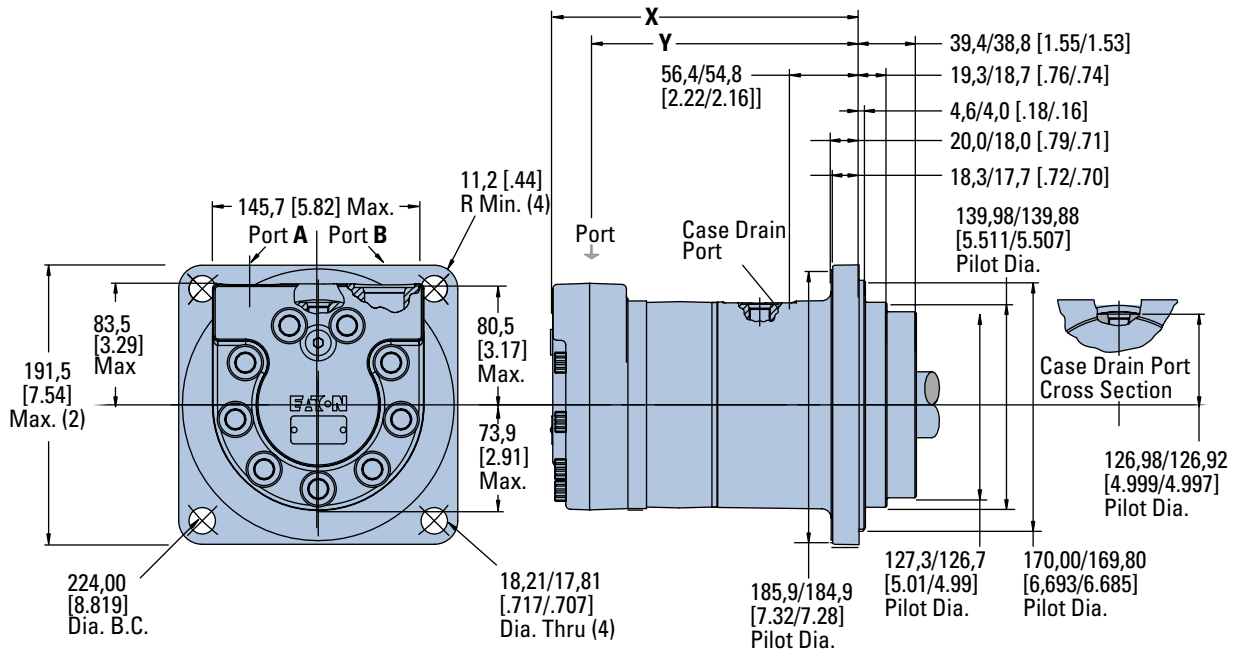


Ports

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW



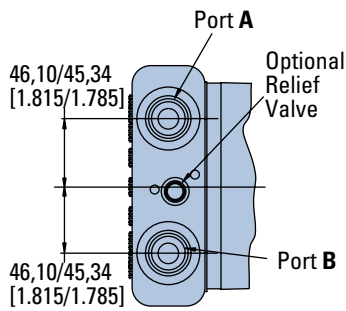
STANDARD MOTORS (OVERSIZE)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
505 [30.7]	213,1 [8.39]	181,4 [8.36]
570 [34.9]	219,2 [8.63]	187,4 [8.60]
630 [38.5]	224,5 [8.84]	192,5 [8.81]
685 [41.7]	229,1 [9.02]	197,6 [8.99]
785 [48.0]	238,5 [9.39]	206,8 [9.35]
940 [57.4]	252,0 [9.92]	220,5 [9.89]

VIS 40 Series

Dimensions

Standard and Wheel Mount
– ISO



Ports

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

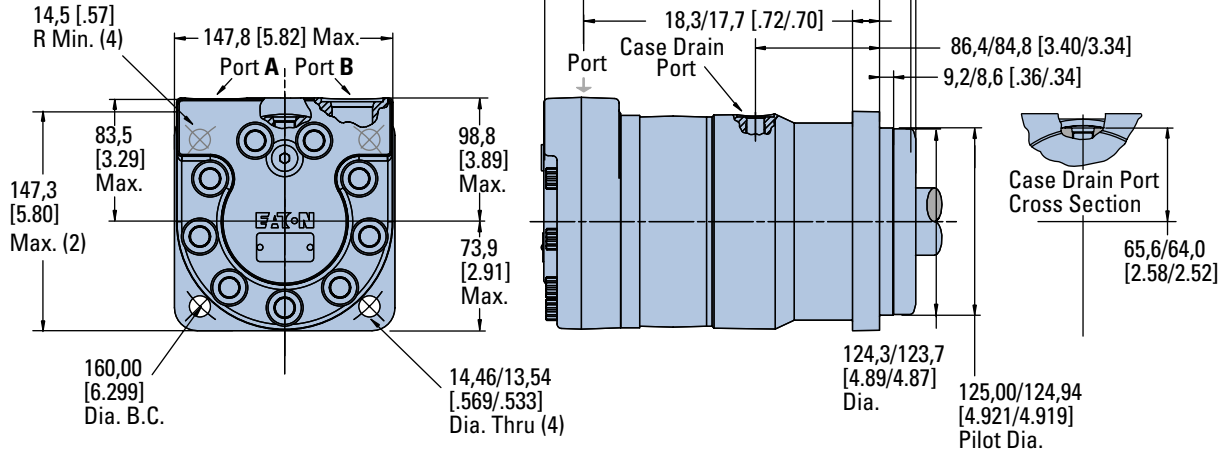
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

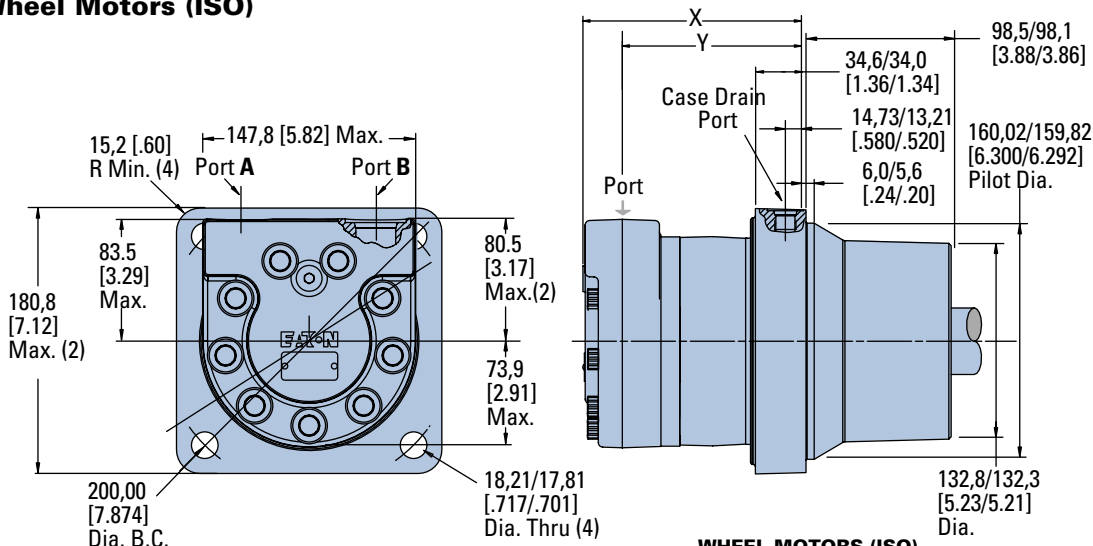
Standard Motors (ISO)



STANDARD MOTORS (ISO)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
505 [30.7]	227,3 [8.95]	198,9 [7.83]
570 [34.9]	233,4 [9.19]	205,2 [8.08]
630 [38.5]	238,8 [9.40]	210,3 [8.28]
685 [41.7]	243,3 [9.58]	214,9 [8.46]
785 [48.0]	252,5 [9.94]	224,3 [8.83]
940 [57.4]	266,2 [10.48]	238,0 [9.37]

Wheel Motors (ISO)



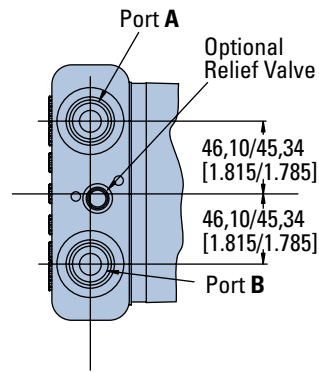
WHEEL MOTORS (ISO)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
505 [30.7]	153,2 [6.03]	124,7 [4.91]
570 [34.9]	159,3 [6.27]	131,1 [5.16]
630 [38.5]	164,6 [6.48]	136,1 [5.36]
685 [41.7]	169,2 [6.66]	140,7 [5.54]
785 [48.0]	178,3 [7.02]	150,1 [5.91]
940 [57.4]	192,0 [7.56]	163,8 [6.45]

VIS 40 Series

Dimensions

Bearingless



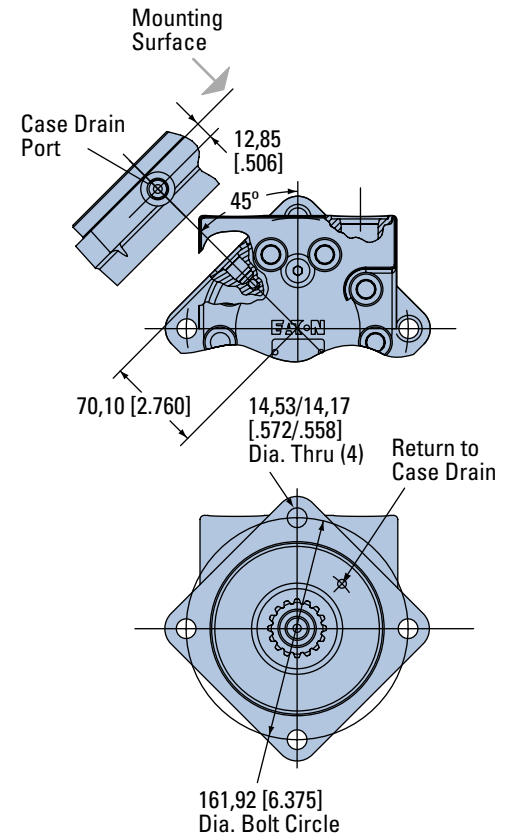
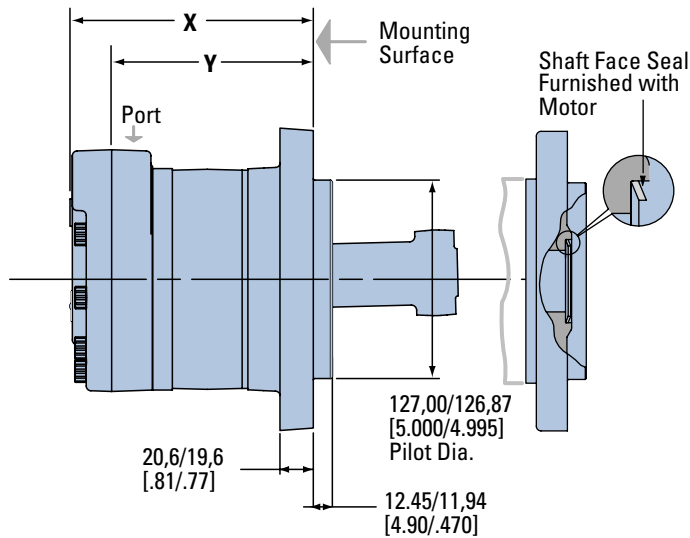
Ports

1-1/16-12 UN-2B SAE O-ring Ports (2)
 9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
 Or
 G 3/4 (BSP) O-ring Ports (2)
 G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Drive End

Port A Pressurized — CW

Port B Pressurized — CCW

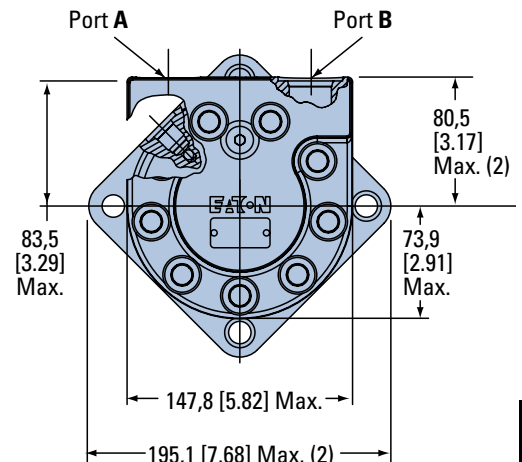
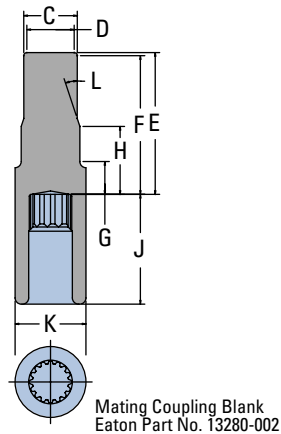


For VIS 40 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

C	59,94	[2.36]	Dia.
D	49,00	[1.93]	Dia.
E	155,86	[6.14]	Max.
F	150,88	[5.94]	Min.
			Full Form Dia.
G	26,92	[1.06]	
H	33,30	[1.21]	
J	106,43	[4.19]	
			Full Form Dia.
K	72,64	[2.86]	
L	15		



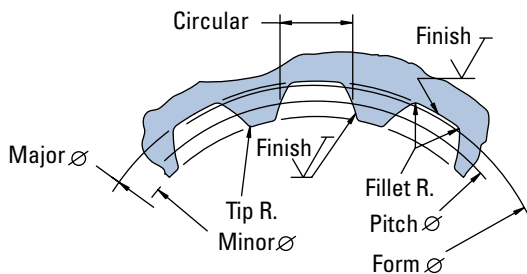
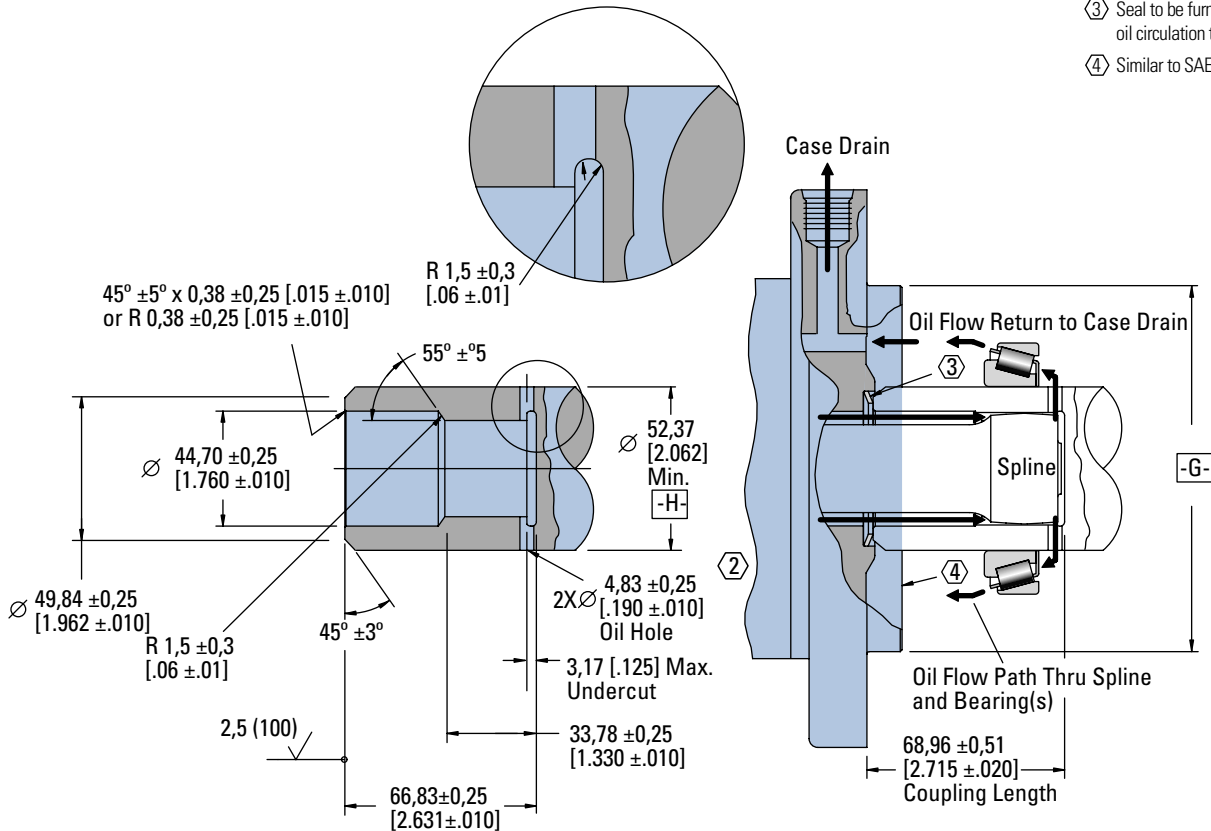
BEARINGLESS MOTORS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
505 [30.7]	157,2 [6.19]	129,0 [5.08]
570 [34.9]	163,3 [6.43]	135,1 [5.32]
630 [38.5]	168,4 [6.63]	140,5 [5.53]
685 [41.7]	173,2 [6.82]	145,3 [5.72]
785 [48.0]	182,2 [7.18]	154,4 [6.08]
940 [57.4]	196,1 [7.72]	168,1 [6.62]

VIS 40 Series

Installation Information

Bearingless



Spline Pitch	10/20
Pressure Angle	30°
Number of teeth	16
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 40,640000 [1.6000000] H H H
Base Diameter	Ref. 35,195272 [1.3856406]
Major Diameter	43,56 [1.715] Max. 43,18 [1.700]
Min. Minor Diameter	36,83 -37,08 [1.450 -1.460]
Form Diameter, Min.	42.47 [1.672]
Fillet Radius	0,64 -0,76 [0.025 -0.030]
Tip Radius	0,25 -0,51 [0.010 -0.020]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+0.0000 -0.0010]
Total Index Variation	0,040 [0.0016]
Lead Variation	0,013 [0.0005]
Circular Space Width:	
Maximum Actual	4.105 [0.1616]
Minimum Effective	3.995 [0.1573]
Maximum Effective	Ref. 4,056 [0.1597]
Minimum Actual	Ref. 4,081 [0.1582]
Dimension Between Two Pins	Ref. 34,272 -34,450 [1.3493 -1.3563]
Pin Diameter	4,389 [0.1728]

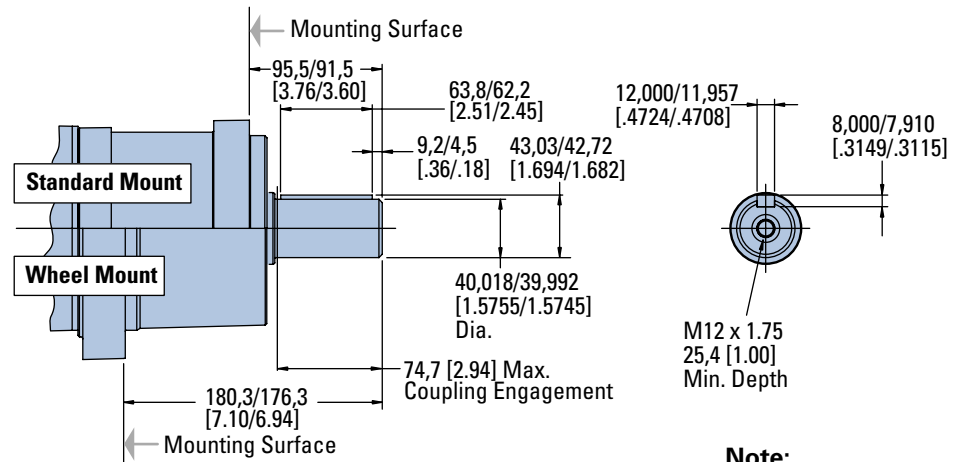
- 1 Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 -1,27 [0.030 -0.050]. Dimensions apply after heat treat.
- 2 Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
- 3 Seal to be furnished with motor for proper oil circulation thru splines.
- 4 Similar to SAE "C" Four Bolt Flange.

VIS 40 Series

Dimensions Shafts

SAE

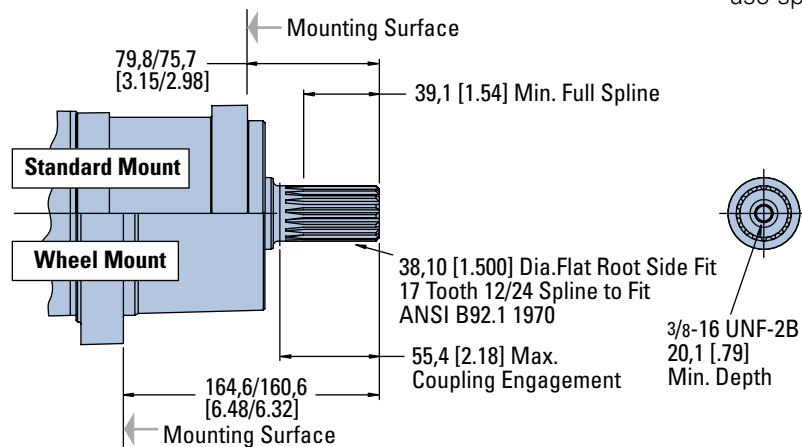
40 mm Straight



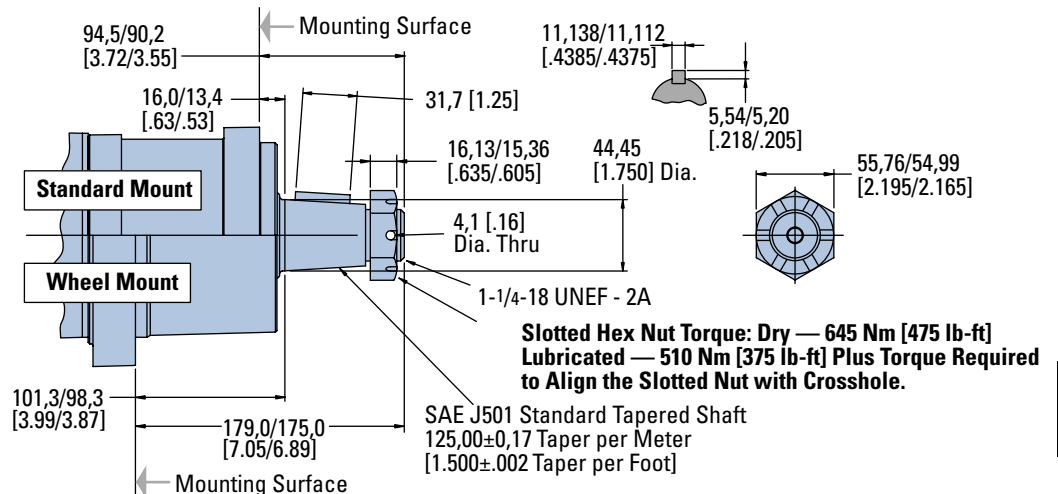
Note:

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

1-1/2 Inch 17 Tooth Splined



1-3/4 Inch Tapered



VIS 40 Series

Side Load Capacity

SAE

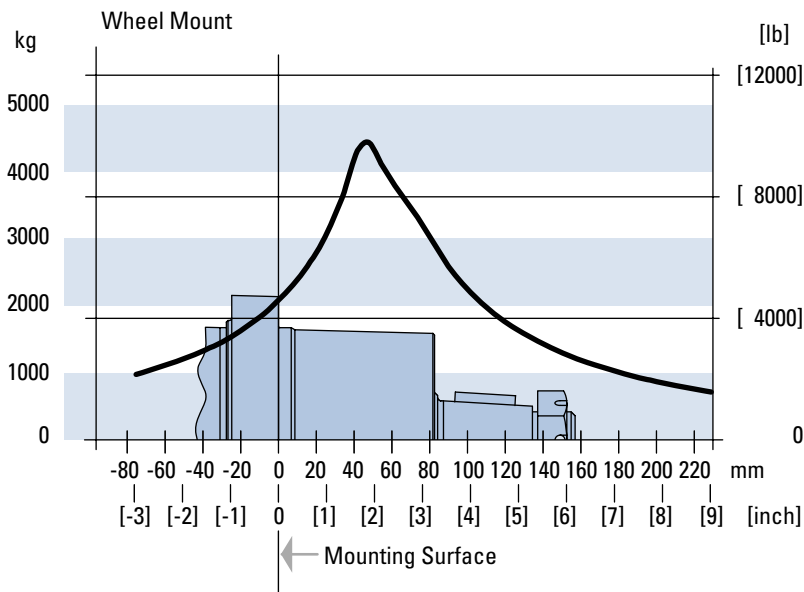
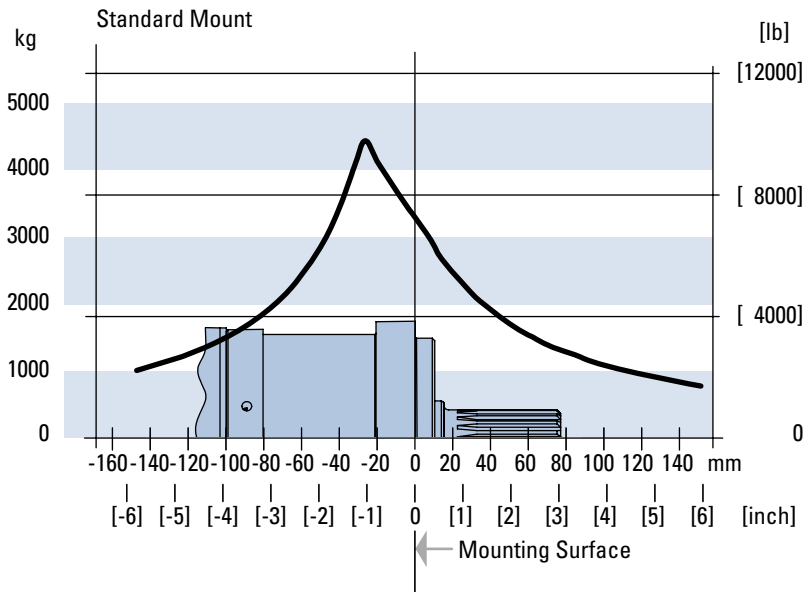
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

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

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

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

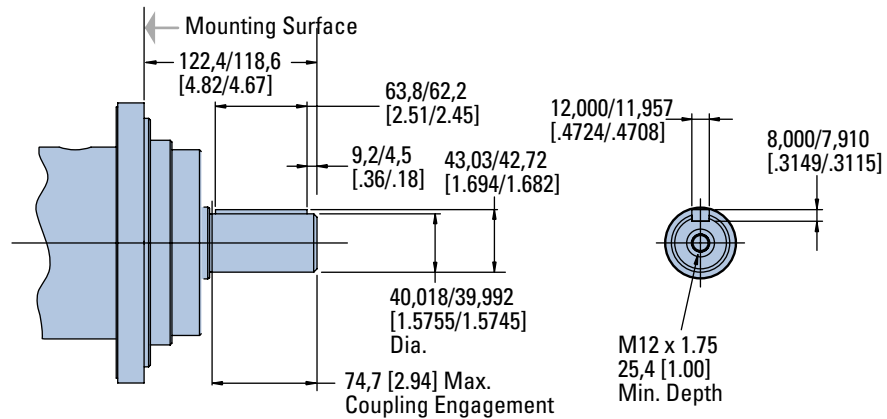


VIS 40 Series

Dimensions Shafts

Oversize Flange
224,0 [8.82] B.C.

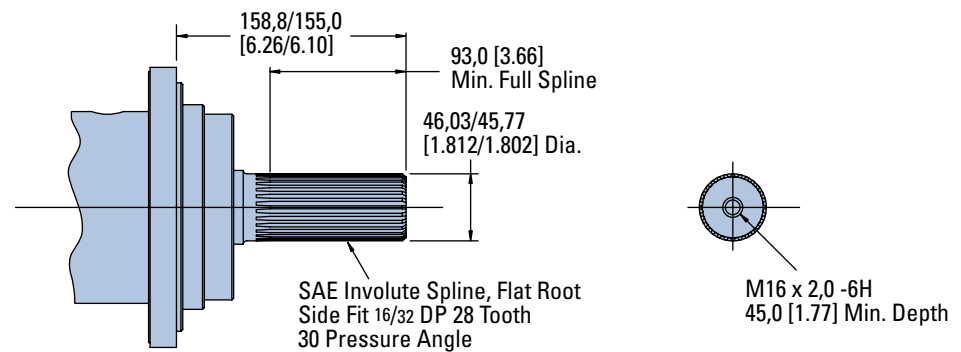
40 mm Straight



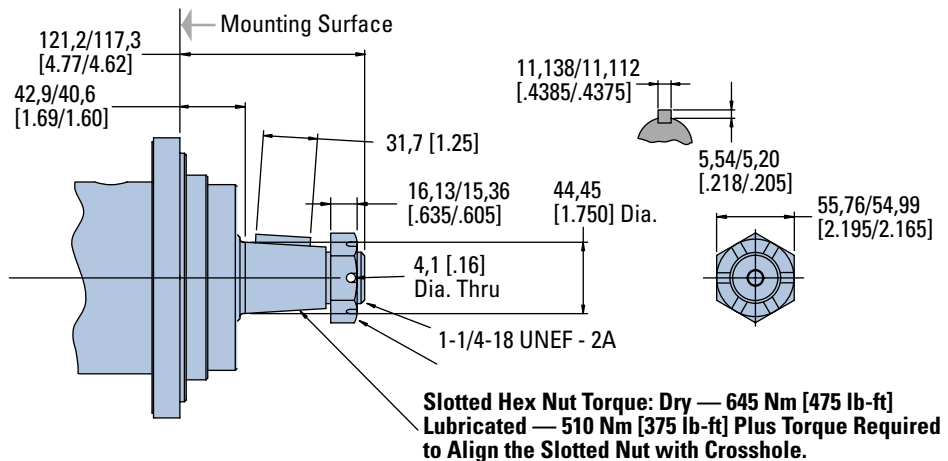
Note:

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

46 mm 28 Tooth Splined



1-3/4 Inch Tapered



SAE J501 Standard Tapered Shaft
125,00±0,17 Taper per Meter
[1.500±.002 Taper per Foot]

VIS 40 Series

Side Load Capacity

Oversize Flange
224,0 [8.82] B.C.

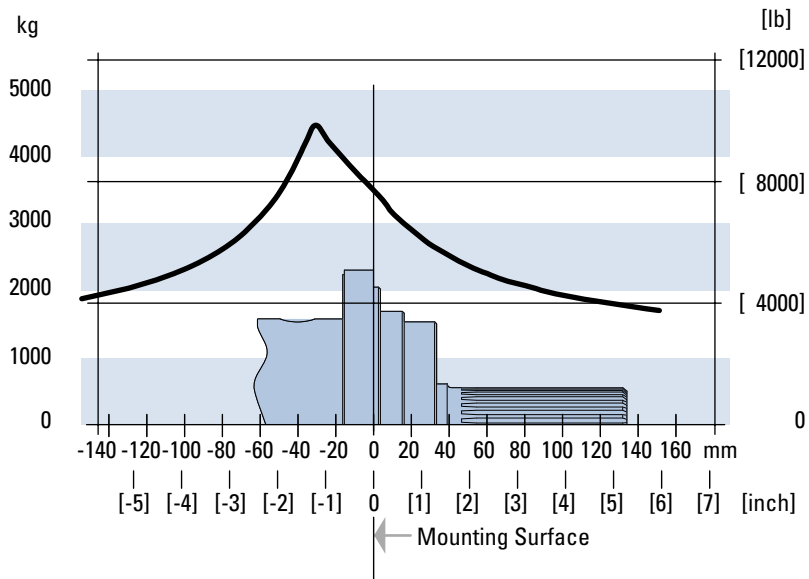
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

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

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

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

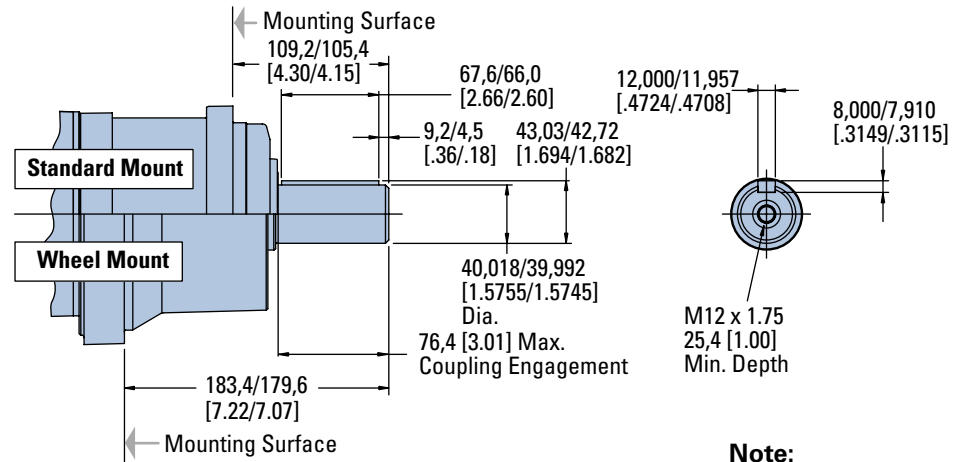


VIS 40 Series

Dimensions Shafts

ISO

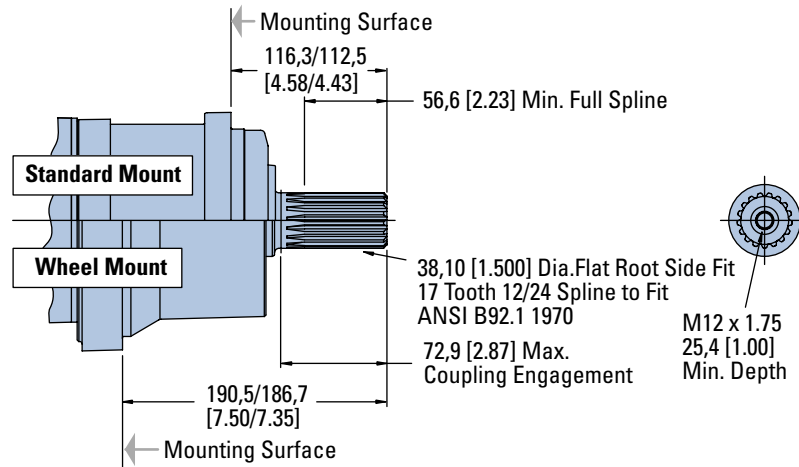
40 mm Straight



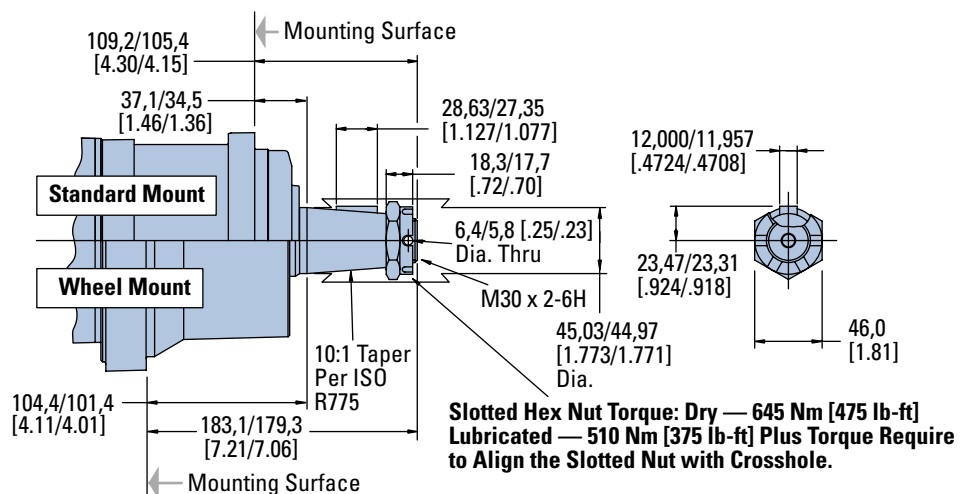
Note:

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

38,1 mm [1-1/2 inch] 17 Tooth Splined



45 mm Tapered



VIS 40 Series

Side Load Capacity

ISO

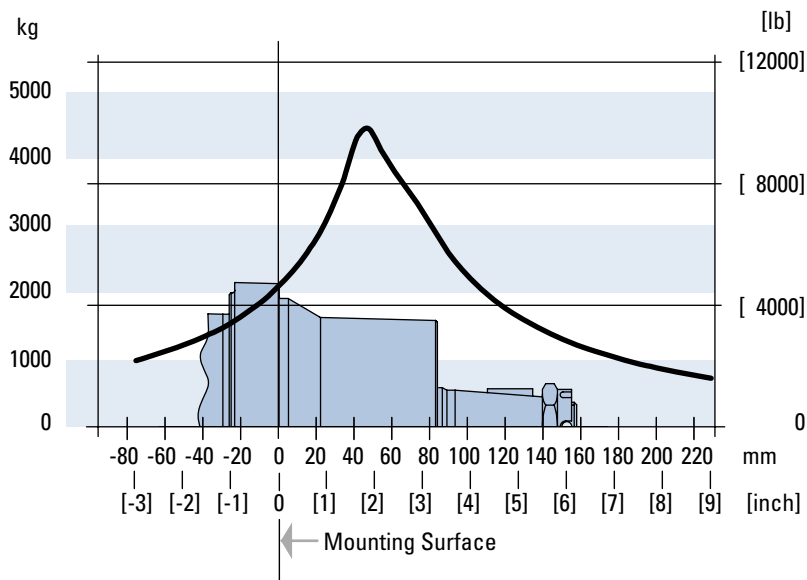
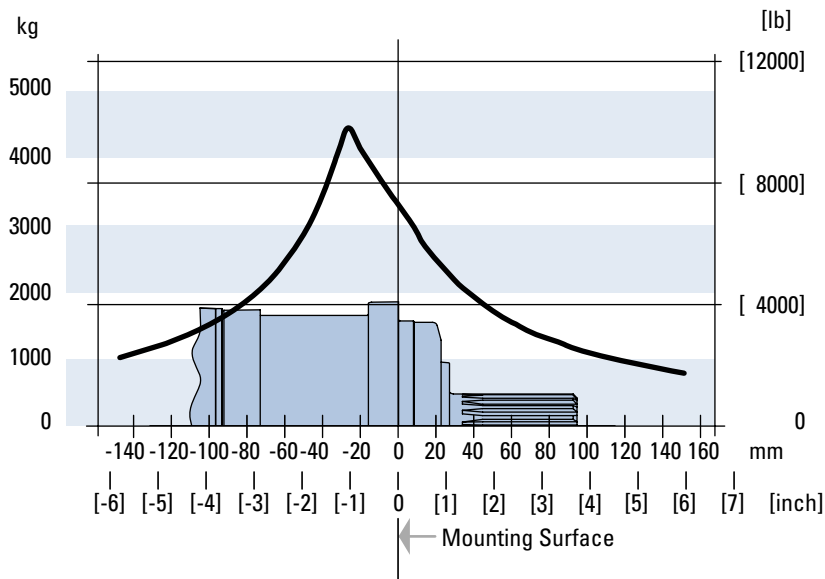
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

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

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

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



VIS 40 Series

Product Numbers

Closed Loop

Use digit prefix —
168-, 177-, or 180- plus four
digit number from charts for
complete product number—
Example: 168-0018.

**Orders will not be accepted
without three digit prefix.**

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0032	-0022	-0033	-0034	-0035	-0036
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0024	-0026	-0037	-0038	-0039	-0040
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0041	-0042	-0043	-0044	-0045	-0046
Wheel	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0007	-0008	-0009	-0010	-0011	-0012
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0013	-0014	-0015	-0016	-0017	-0018
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0019	-0020	-0021	-0022	-0023	-0024
Bearingless		1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	168-0015	-0016	-0017	-0018	-0019	-0020

168-0018

Oversize

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0047	-0048	-0049	-0050	-0051	-0052
	46 mm 28 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0053	-0054	-0055	-0056	-0057	-0058
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0059	-0060	-0061	-0062	-0063	-0064

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0065	-0066	-0067	-0068	-0069	-0070
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0071	-0072	-0073	-0074	-0075	-0076
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0077	-0078	-0079	-0080	-0081	-0082
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0025	-0026	-0027	-0028	-0029	-0030
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0031	-0032	-0033	-0034	-0035	-0036
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0037	-0038	-0039	-0040	-0041	-0042
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	168-0021	-0022	-0023	-0024	-0025	-0026

168-0024

Note:

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

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

VIS 40 Series

Product Numbers

Open Loop

Use digit prefix —
168-, 177-, or 180- plus four
digit number from charts for
complete product number—
Example 168-0029.

**Orders will not be accepted
without three digit prefix.**

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0083	-0084	-0085	-0086	-0087	-0088
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0089	-0090	-0091	-0092	-0093	-0094
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0095	-0096	-0097	-0098	-0099	-0100
Wheel	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0043	-0044	-0045	-0046	-0047	-0048
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0049	-0050	-0051	-0052	-0053	-0054
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0055	-0056	-0006	-0057	-0058	-0059
Bearingless		1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	168-0027	-0028	-0010	-0029	-0030	-0031

168-0029

Oversize

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0101	-0102	-0103	-0104	-0105	-0106
	46 mm 28 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0107	-0108	-0109	-0110	-0111	-0112
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0113	-0114	-0115	-0116	-0117	-0118

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0119	-0120	-0121	-0122	-0029	-0124
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0125	-0126	-0127	-0128	-0129	-0130
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0131	-0132	-0133	-0134	-0135	-0136
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0060	-0061	-0062	-0063	-0064	-0065
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0066	-0067	-0068	-0069	-0070	-0071
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0072	-0073	-0074	-0075	-0076	-0077
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	168-0032	-0033	-0034	-0035	-0036	-0037

168-0035

Note:

All product numbers in the charts (above) are for motors **without** a back-pressure relief valve. These motors would generally be used in open loop circuits.

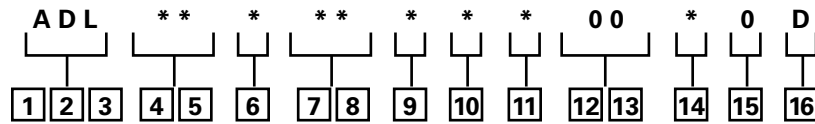
Note:

Case pressure for VIS motors must not exceed 50 psi. With an "Open Loop Option" VIS motor, a case drain is not required, except if the return pressure is greater than 50 psi.

VIS 40 Series

Model Code

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



1, 2, 3 Product Series

ADL – VIS 40 Motor

4, 5 Displacement

cm³/r [in³/r]

- 31** – 505 [30.7]
- 35** – 570 [34.9]
- 38** – 630 [38.5]
- 42** – 685 [41.7]
- 48** – 785 [48.0]
- 57** – 940 [57.4]

6 Mounting Type

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

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

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

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

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

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

7, 8 Output Shaft

- 00** – None (Bearingless)
- 01** – 45 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M30 x 2- 6H Threaded Shaft End, 12W x 8H X 28L [.472W x .313H x 1.102L] Key
- 02** – 1-3/4 inch Dia. .125:1 Tapered Shaft Per SAE J 501 with 1 1/4 - 18 UNEF - 2A Threaded Shaft End, 11,11 [.4375] Square x 31,8 [1.25] Straight Key
- 04** – 46 mm Dia. Flat Root Side Fit, 28 Tooth, 16/32 DP 30 Degree Involute Spline, 93,0 [3.66] Minimum Full Spline with M16 X 2,0-6H Thread in End
- 07** – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 63L [.472W x .313H x 2.480L] Key (SAE Compatible)
- 08** – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 39,1 [1.54] Minimum Full Spline with 3/8-16 UNC - 2B Thread in End (SAE Compatible)
- 09** – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 56,6 [2.23] Minimum Full Spline with M12 x 1.75 - 6H Thread in End (ISO Compatible)
- 10** – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 67L [.472W x .313H x 2.630L] Key (ISO Compatible)

9 Ports

- A** – 1-1/16-12 UN-2B Size 12 O-ring Port, Accepts Fittings for SAE J1926
- B** – G 3/4 (BSP) Straight Thread Port

10 Case Flow Options

- A** – Shuttle Valve with 9/16-18 UNF-2B, Size 6 O-ring Port Case Drain, Accepts Fittings for SAE J1926
- B** – Shuttle Valve with G 1/4 (BSP) Straight Thread Port Case Drain
- C** – Check valve with leakage orifice, no case drain (for Open Loop only)

11 Back-Pressure Relief

- 0** – None (for Open Loop Only)
- 1** – Set at 4,5 bar [65 PSI] (for Manual Pumps)
- 2** – Set at 15,2 bar [220 PSI] (for Servo Pumps)
- 4** – Set at 15,2 bar [300 PSI] (for high charge Servo Pumps)

12, 13 Special Features

- 00** – None

14 Paint/ Special Packaging

- 0** – No Paint, Individual Box
- A** – Painted Low Gloss Black, Individual Box
- B** – No Paint, Bulk Box Option
- C** – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

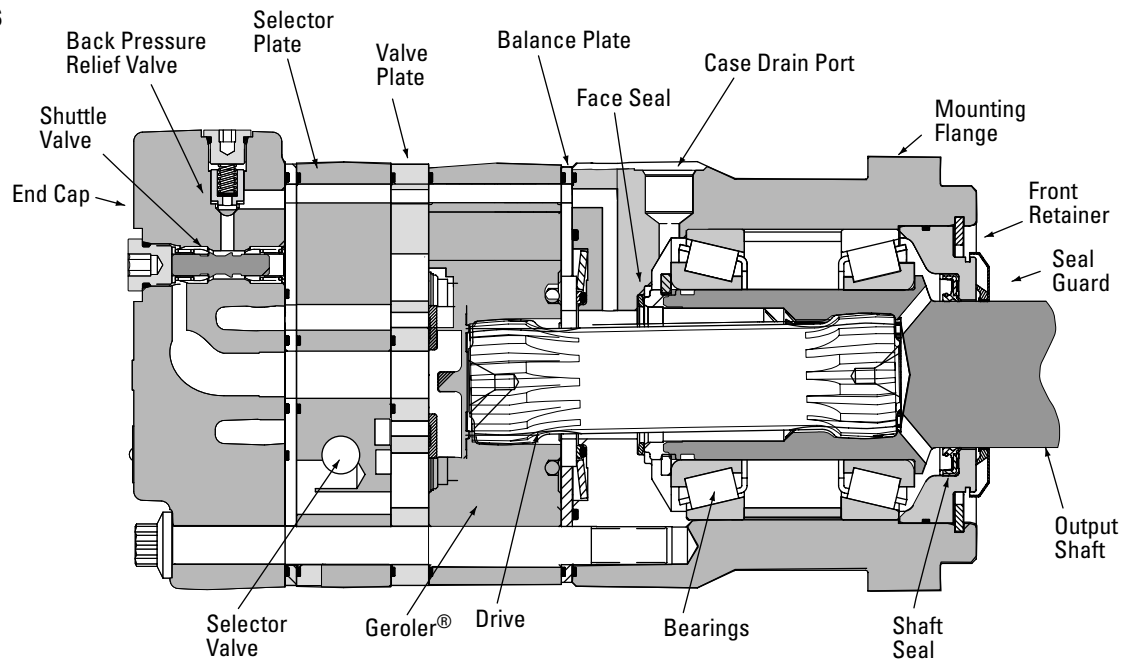
- 0** – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code

VIS 40 Series Two-speed

Specifications



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

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

The VIS 40 two-speed motor is bidirectional. It will function with equal shaft output in either rotation

direction (CW or CCW) in both LSHT and HSLT modes. Shift on the fly technology allows full-power operation throughout the full duration of the shift.

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

An integral selector valve shifts the motor from LSHT mode to HSLT mode. Initially, low pressure is supplied to the pilot port. The selector valve is biased to LSHT mode by a return spring. When pilot signal pressure is supplied to the

pilot port and 3,5 Δbar [50 PSI] is reached, the selector valve overcomes return spring force and the shifts the spool to select HSLT mode.

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

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

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

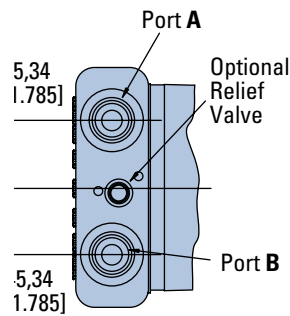
Performance Data

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

VIS 40 Series Two-speed

Dimensions

Standard and Wheel Mount
– SAE



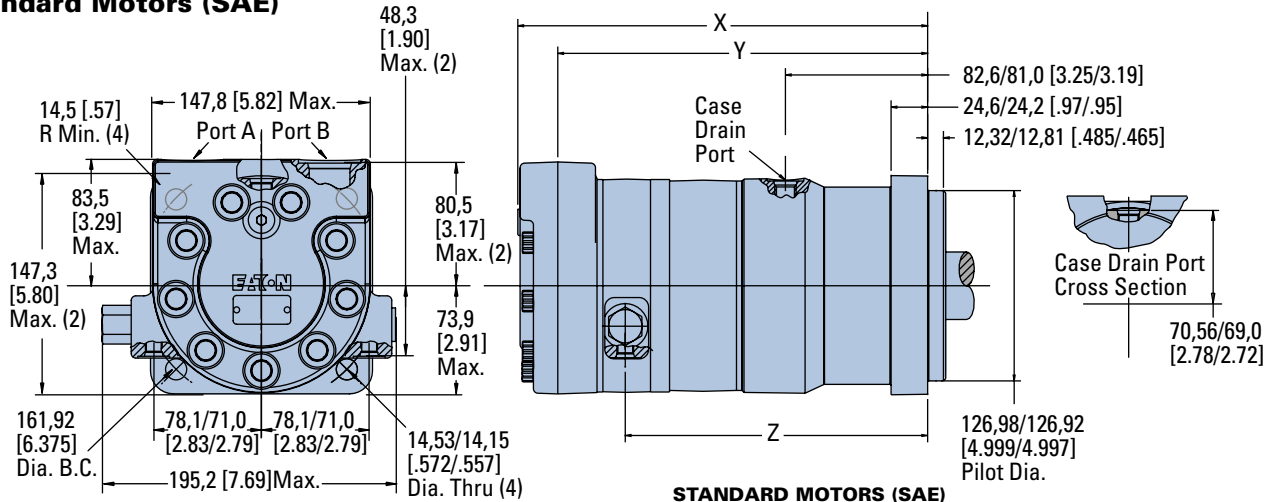
Ports

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

Standard Rotation Viewed from Shaft End

- Port A Pressurized — CW
- Port B Pressurized — CCW

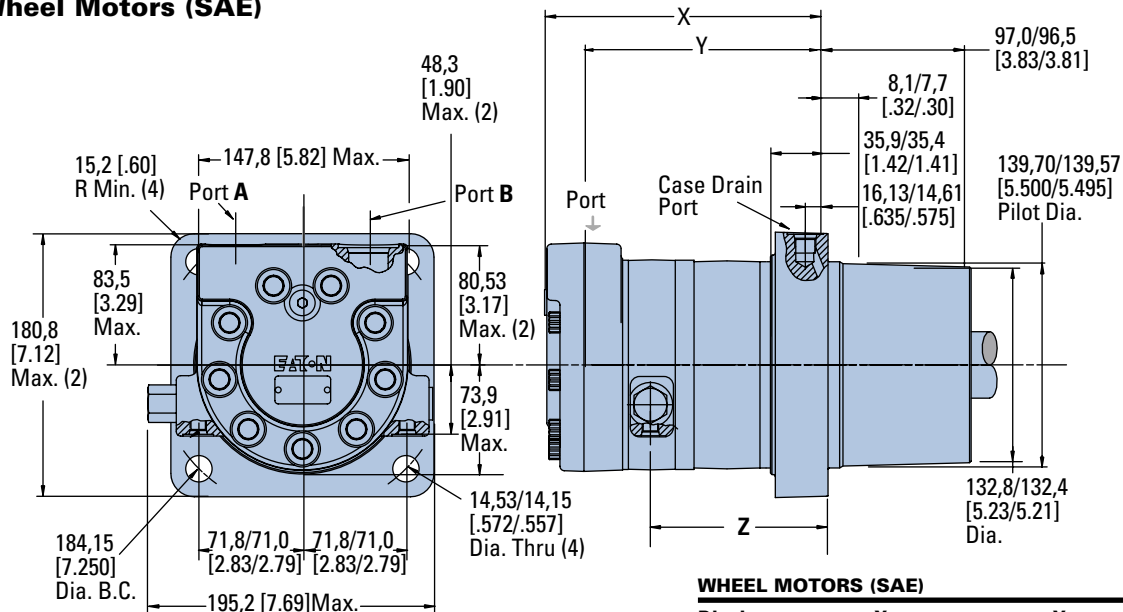
Standard Motors (SAE)



STANDARD MOTORS (SAE)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	275,1 [10.83]	246,9 [9.72]	201,7 [7.94]
570 [34.9]	281,2 [11.07]	253,0 [9.96]	208,0 [8.19]
630 [38.5]	286,3 [11.27]	258,3 [10.17]	213,4 [8.40]
685 [41.7]	290,8 [11.45]	262,9 [10.35]	217,7 [8.57]
785 [48.0]	300,2 [11.82]	272,3 [10.72]	227,3 [8.95]
940 [57.4]	313,9 [12.36]	286,0 [11.26]	241,0 [9.49]

Wheel Motors (SAE)



WHEEL MOTORS (SAE)

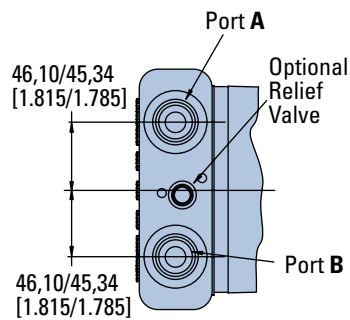
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	190,2 [7.49]	162,1 [6.38]	116,8 [4.60]
570 [34.9]	196,3 [7.73]	168,1 [6.62]	123,2 [4.85]
630 [38.5]	201,4 [7.93]	173,5 [6.83]	128,5 [5.06]
685 [41.7]	206,0 [8.11]	178,1 [7.01]	132,8 [5.23]
785 [48.0]	215,4 [8.48]	187,5 [7.38]	142,5 [5.61]
940 [57.4]	229,1 [9.02]	201,2 [7.92]	156,2 [6.15]

VIS 40 Series

Two-speed

Dimensions

Oversize Flange
224,0 [8.82] B.C.



Ports

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

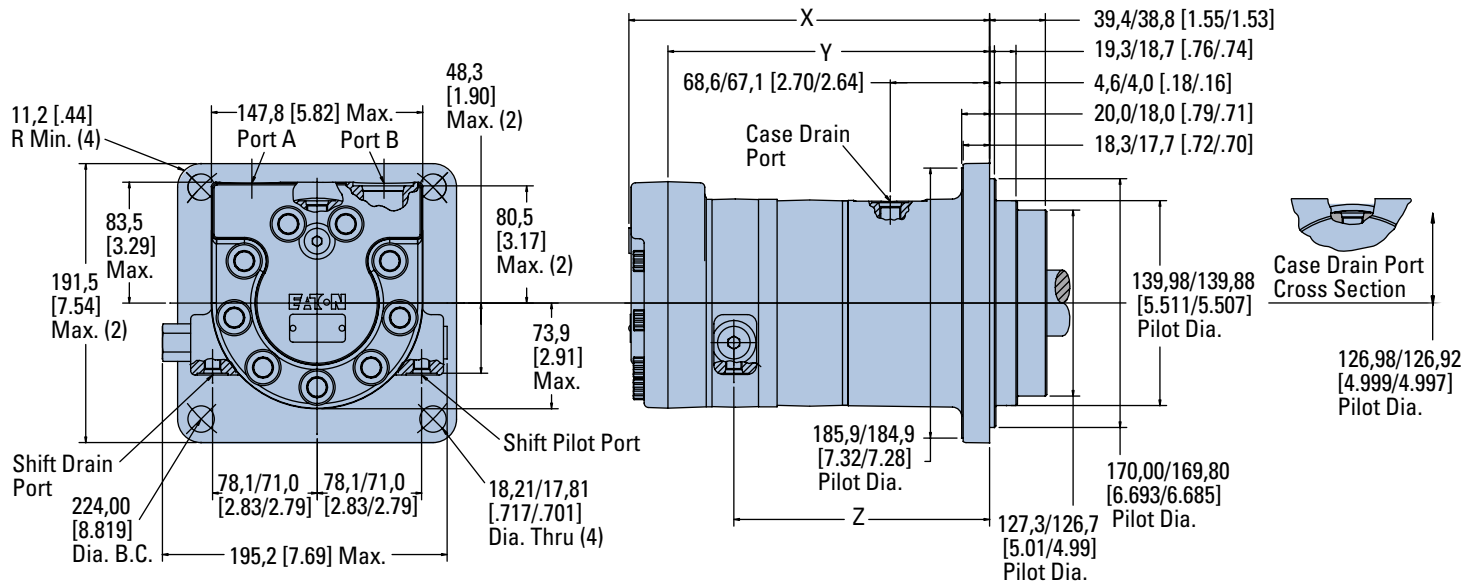
9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW



OVERSIZE MOTORS

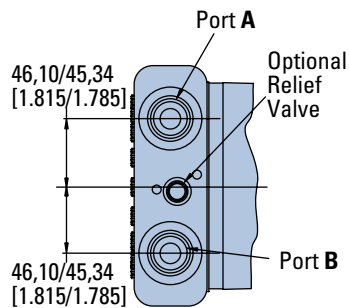
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	248,2 [9.77]	220,0 [8.66]	174,8 [6.88]
570 [34.9]	254,3 [10.01]	226,1 [8.90]	181,1 [7.13]
630 [38.5]	259,3 [10.21]	231,4 [9.11]	186,4 [7.34]
685 [41.7]	263,9 [10.39]	236,0 [9.29]	190,8 [7.51]
785 [48.0]	273,1 [10.75]	245,1 [9.65]	200,2 [7.88]
940 [57.4]	286,8 [11.29]	258,8 [10.19]	213,9 [8.42]

VIS 40 Series

Two-speed

Dimensions

Standard and Wheel Mount
– ISO



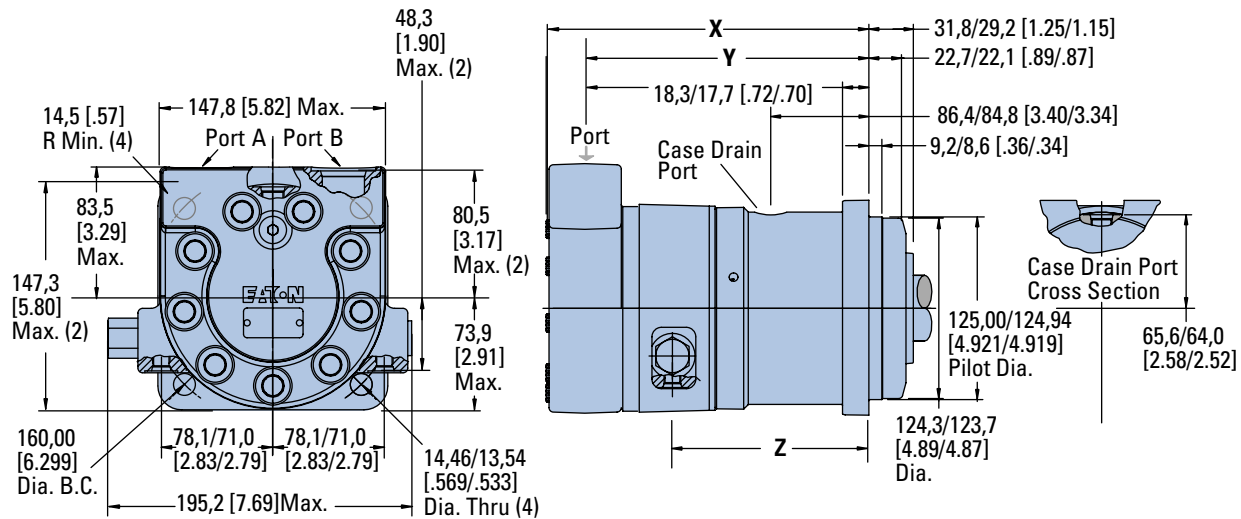
Ports

- G 3/4 (BSP) O-ring Ports (2)
- G 1/4 (BSP) O-ring Case Drain Port (1)
- 7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Shaft End

- Port A Pressurized — CW
- Port B Pressurized — CCW

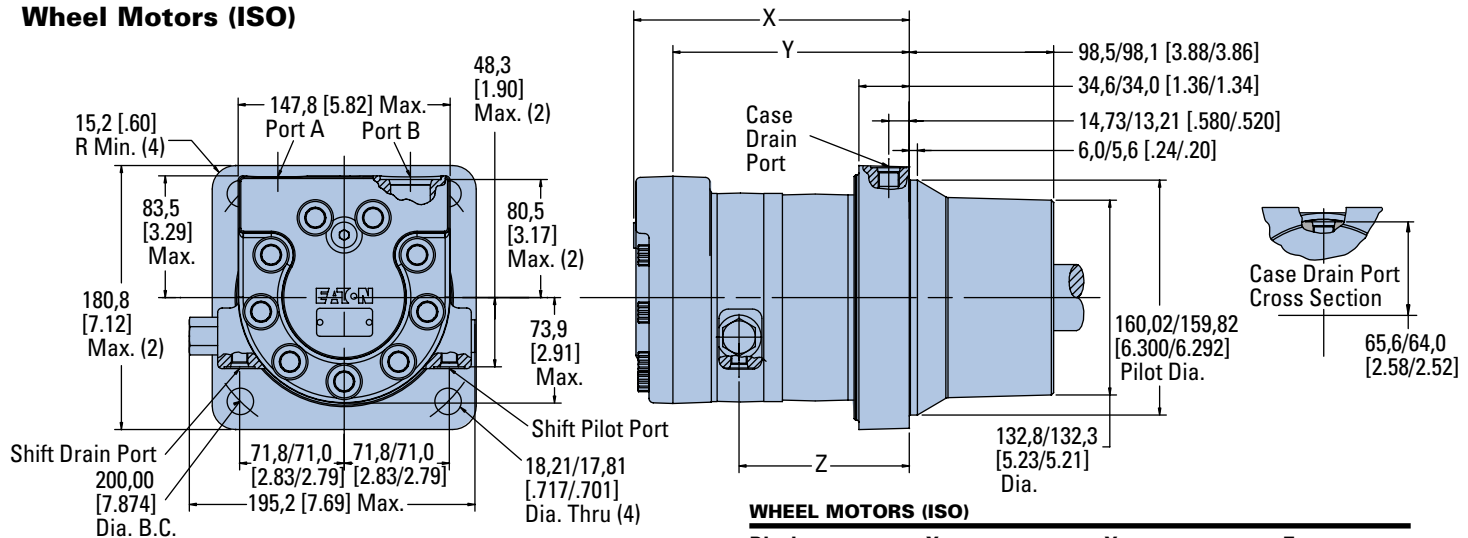
Standard Motors (ISO)



STANDARD MOTORS (ISO)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	263,1 [10.36]	235,0 [9.25]	189,7 [7.47]
570 [34.9]	269,2 [10.60]	241,0 [9.49]	196,1 [7.72]
630 [38.5]	274,3 [10.80]	246,4 [9.70]	201,4 [7.93]
685 [41.7]	278,9 [10.98]	251,0 [9.88]	205,7 [8.10]
785 [48.0]	288,0 [11.34]	260,1 [10.24]	215,1 [8.47]
940 [57.4]	301,8 [11.88]	273,8 [10.78]	228,9 [9.01]

Wheel Motors (ISO)



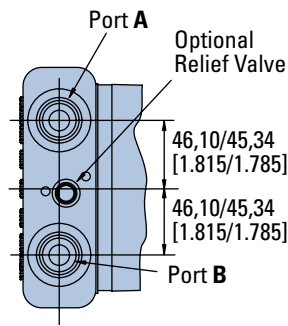
WHEEL MOTORS (ISO)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	189,0 [7.44]	160,8 [6.33]	115,6 [4.55]
570 [34.9]	195,1 [7.68]	166,9 [6.57]	121,9 [4.80]
630 [38.5]	200,2 [7.88]	172,2 [6.78]	127,3 [5.01]
685 [41.7]	204,7 [8.06]	176,8 [6.96]	131,6 [5.18]
785 [48.0]	213,9 [8.42]	185,9 [7.32]	141,0 [5.55]
940 [57.4]	227,6 [8.96]	199,6 [7.86]	154,7 [6.09]

VIS 40 Series Two-speed

Dimensions

Bearingless



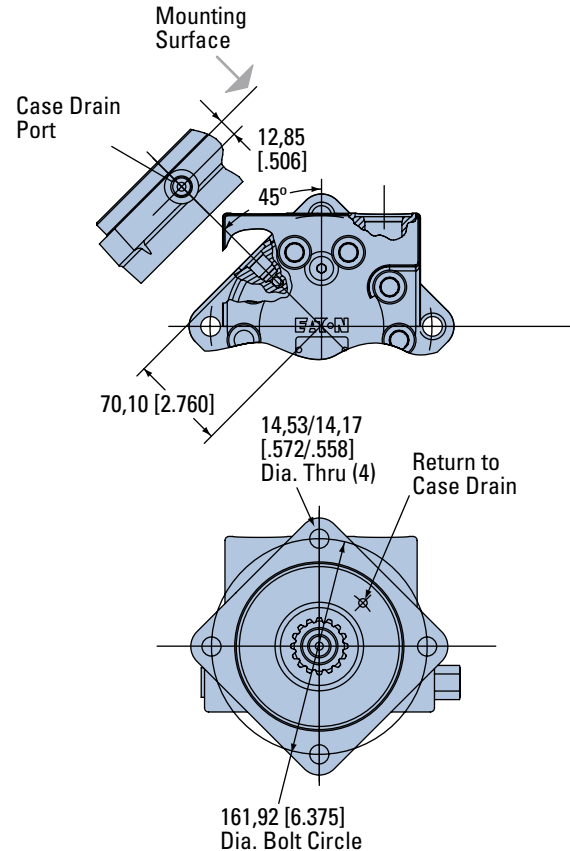
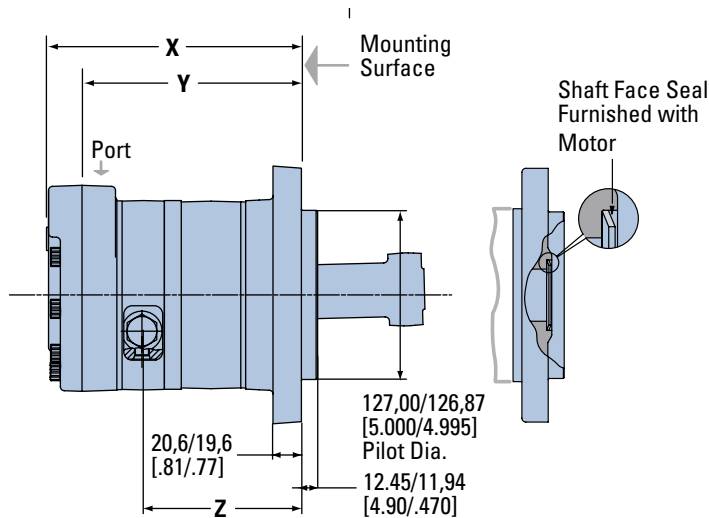
Ports

- 1-1/16-12 UN-2B SAE O-ring Ports (2)
- 9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
- 7/16 -20 UNF -2B SAE O-ring Shift Ports (2)
- or G 3/4 (BSP) O-ring Ports (2)
- G 1/4 (BSP) O-ring Case Drain Port (1)
- 7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Drive End

Port A Pressurized — CW

Port B Pressurized — CCW

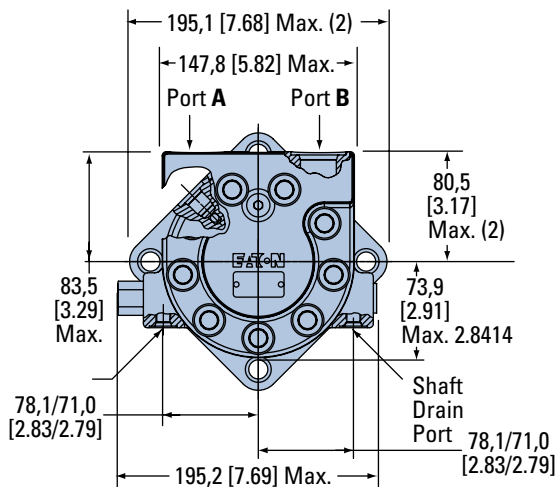
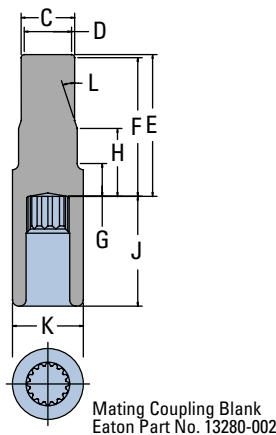


For VIS 40 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

C	59,94	[2.36]	Dia.
D	49,00	[1.93]	Dia.
E	155,86	[6.14]	Max.
F	150,88	[5.94]	Min.
			Full Form Dia.
G	26,92	[1.06]	
H	33,30	[1.21]	
J	106,43	[4.19]	
			Full Form Dia.
K	72,64	[2.86]	
L	15		



BEARINGLESS MOTORS

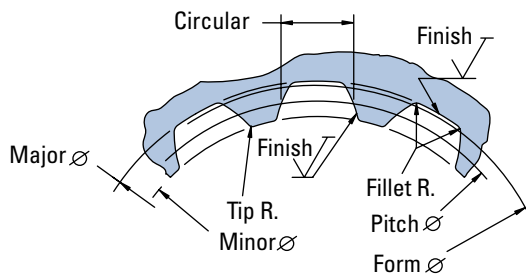
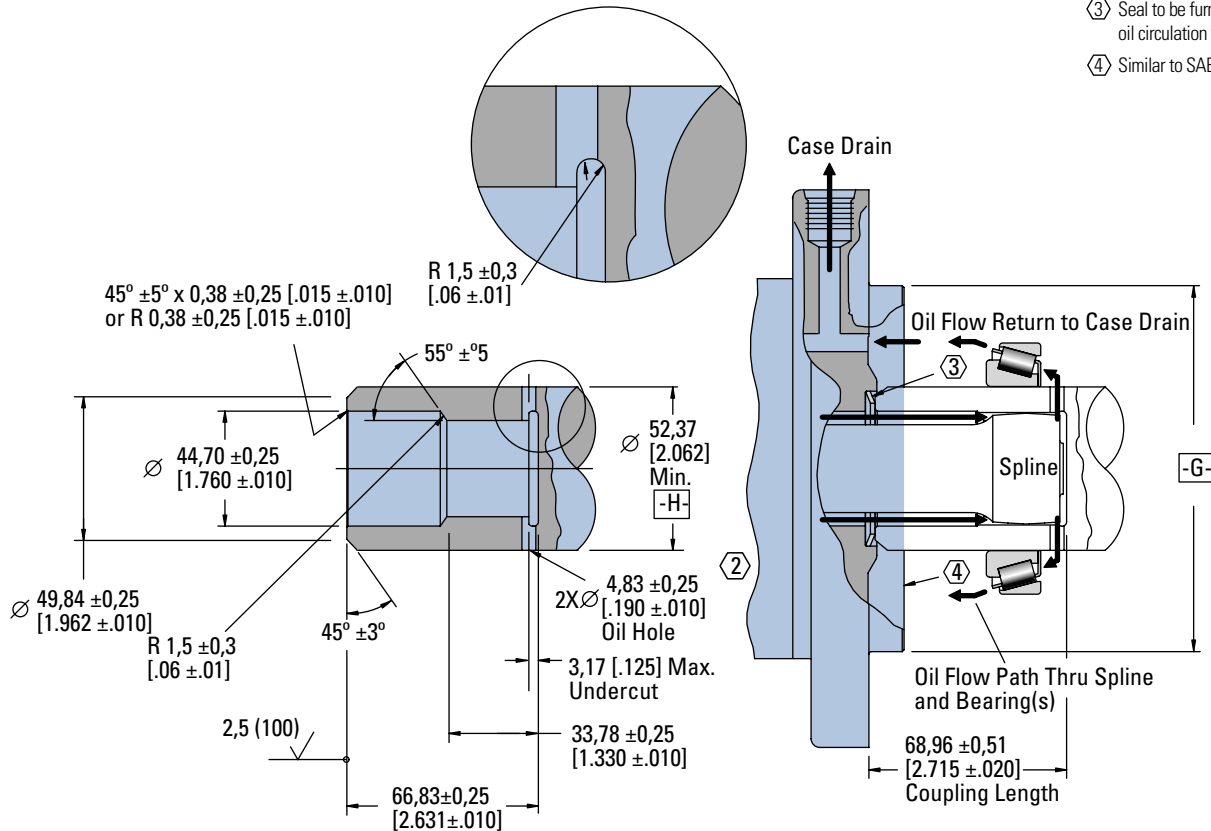
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	193,0 [7.60]	164,8 [6.49]	119,6 [4.71]
570 [34.9]	199,1 [7.84]	170,9 [6.73]	126,0 [4.96]
630 [38.5]	204,0 [8.03]	176,0 [6.93]	131,1 [5.16]
685 [41.7]	208,8 [8.22]	180,8 [7.12]	135,6 [5.34]
785 [48.0]	217,9 [8.58]	190,0 [7.48]	145,0 [5.71]
940 [57.4]	231,6 [9.12]	203,7 [8.02]	158,8 [6.25]

VIS 40 Series Two-speed

Installation Information

Bearingless

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



Spline Pitch	10/20
Pressure Angle	30°
Number of teeth	16
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 40,640000 [1.6000000] H
Base Diameter	Ref. 35,195272 [1.3856406]
Major Diameter	43,56 [1.715] Max. 43,18 [1.700]
Min. Minor Diameter	36,83 -37,08 [1.450 -1.460]
Form Diameter, Min.	42,47 [1.672]
Fillet Radius	0,64 -0,76 [.025 -.030]
Tip Radius	0,25 -0,51 [.010 -.020]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+ .0000 -.0010]
Total Index Variation	0,040 [.0016]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual	4.105 [.1616]
Minimum Effective	3,995 [.1573]
Maximum Effective	Ref. 4,056 [.1597]
Minimum Actual	Ref. 4,081 [.1582]
Dimension Between Two Pins	Ref. 34,272 -34,450 [1.3493 -1.3563]
Pin Diameter	4,389 [.1728]

VIS 40 Series Two-speed

Product Numbers

Closed Loop

Use digit prefix —
176-, 178-, or 182- plus four
digit number from charts for
complete product number—
Example 176-0022.

**Orders will not be accepted
without three digit prefix.**

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r[in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0021	-0022	-0023	-0024	-0025	-0026
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0027	-0028	-0029	-0030	-0031	-0032
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0033	-0034	-0035	-0036	-0037	-0038
Wheel	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	182-0002	-0003	-0004	-0005	-0006	-0007
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	182-0008	-0009	-0010	-0011	-0012	-0013
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	182-0014	-0015	-0016	-0017	-0018	-0019
Bearingless		1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	176-0019	-0020	-0021	-0022	-0023	-0024

176-0022

Oversize

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r[in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0039	-0040	-0041	-0042	-0043	-0044
	46 mm 28 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0045	-0046	-0047	-0048	-0049	-0050
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0051	-0052	-0053	-0054	-0055	-0056

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r[in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	178-0057	-0058	-0059	-0060	-0061	-0062
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	178-0069	-0070	-0071	-0072	-0073	-0074
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	178-0063	-0064	-0065	-0066	-0067	-0068
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	182-0020	-0021	-0022	-0023	-0024	-0025
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	182-0026	-0027	-0028	-0029	-0030	-0031
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	182-0032	-0033	-0034	-0035	-0036	-0037
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	176-0025	-0026	-0027	-0028	-0029	-0030

176-0028

Note:

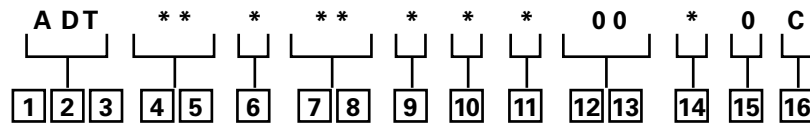
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

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

VIS 40 Series Two-speed

Model Code

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



1, 2, 3 Product Series
ADT – VIS 40- Two-speed Motor

4, 5 Displacement
 – cm³/r [in³/r]

20 – 325 [19.8]
31 – 505 [30.7]
35 – 570 [34.9]
38 – 630 [38.5]
42 – 685 [41.7]
48 – 785 [48.0]
57 – 940 [57.4]

6 Mounting Type

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

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

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

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

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

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

7, 8 Output Shaft

00 – None (Bearingless)

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

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

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

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

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

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

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

9 Ports

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

B – G 3/4 (BSP) Straight
 Thread Port

10 Case Flow Options

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

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

11 Back-Pressure Relief

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

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

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

12, 13 Special Features

00 – None

**14 _ Paint/ Special
Packaging**

0 – No Paint, Individual Box

A – Painted Low Gloss
 Black, Individual Box

B – No Paint, Bulk Box
 Option

C – Painted Low Gloss
 Black, Bulk Box Option

**15 _ Eaton Assigned
Code when Applicable**

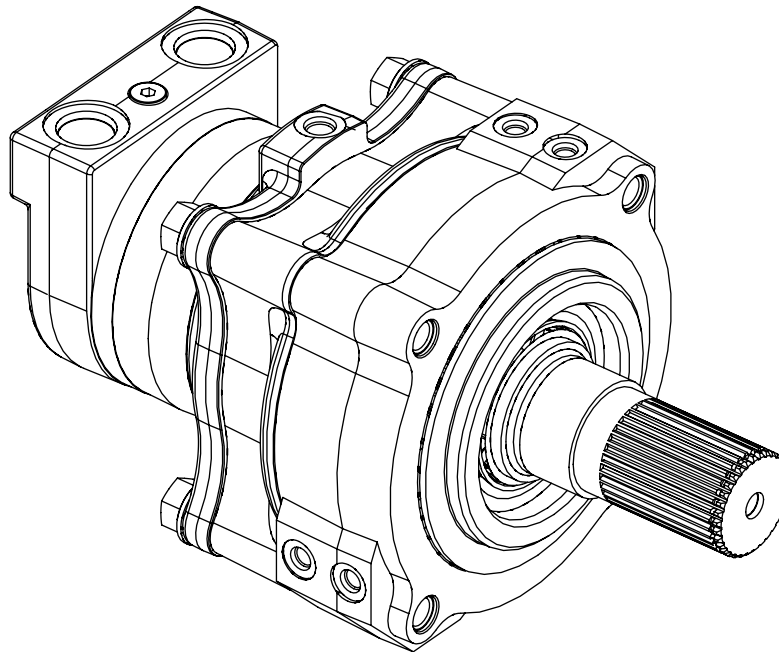
0 – Assigned Code

**16 _ Eaton Assigned
Design Code**

C – Assigned Design Code

VIS 40 Series

Brake Description



Features

- Spring-Applied/
Hydraulically Released
Multi-Disc Brake
- Spring automatically
applies brake when hydro-
static pressure is absent
- Environmentally Protected
- Integral Design –
Motor and brake as a sin-
gle package to minimize
length and cost.
- Infinite Braking –
Eliminates machine creep
associated with park pawl
mechanisms
- Boost Feature –
Increases holding capacity
to match full motor output
torque
- No adjustments needed
- Two Sets of Release
and Boost Ports –
Allows for multiple plumb-
ing options and facilitates
bleeding

Applications

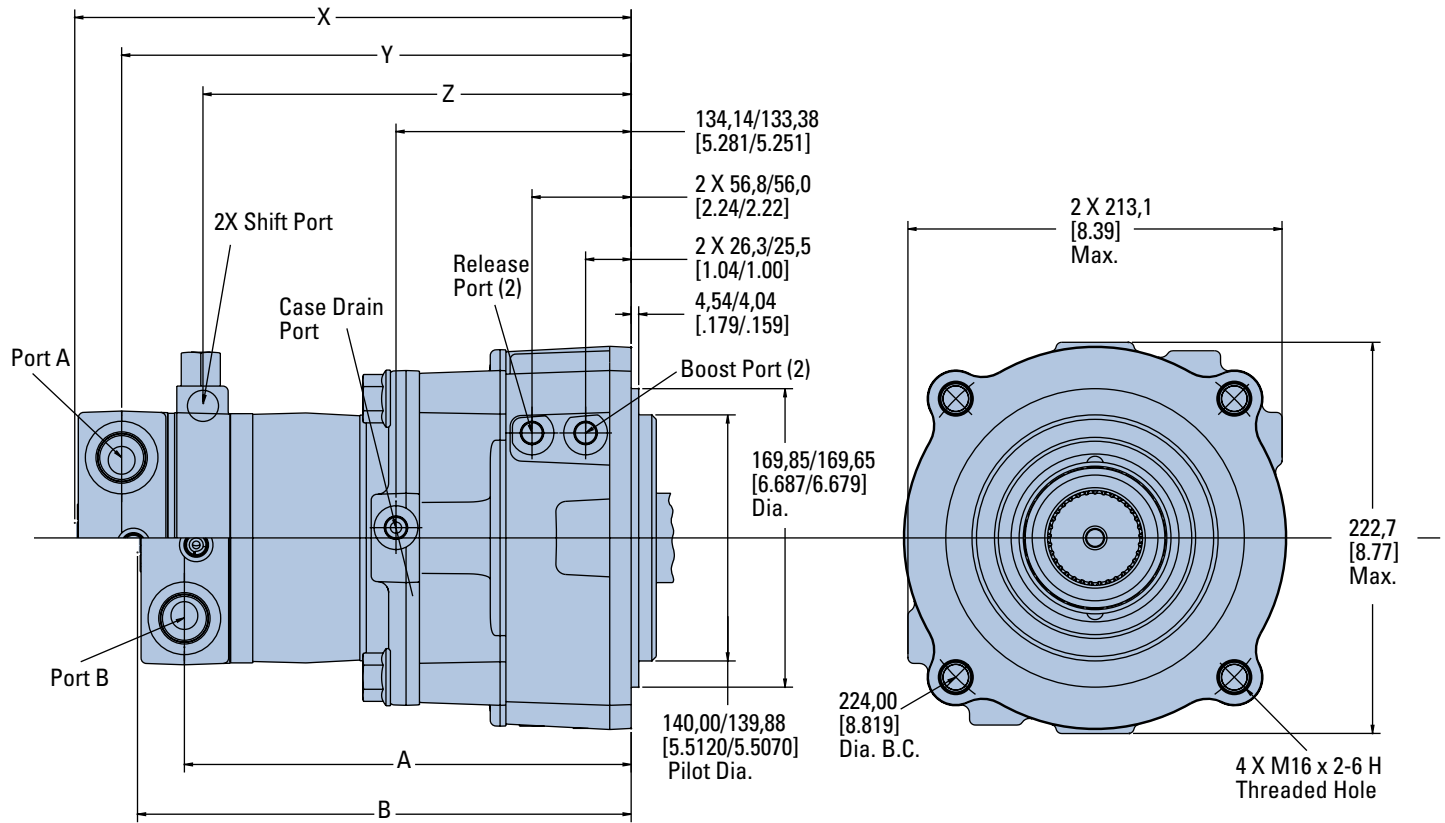
- Skid Steer Loaders
- Mini Excavators
- Trenchers
- Road Rollers
- Anywhere load-holding is
needed on a Low-Speed
High-Torque drive system

Specifications

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

VIS 40 Series

Brake Dimensions



BRAKE MOTORS (SINGLE-SPEED)

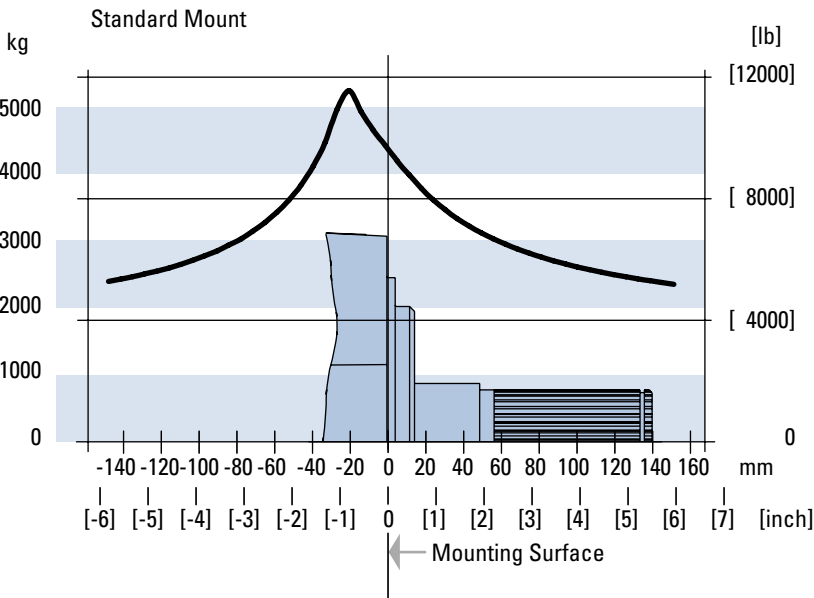
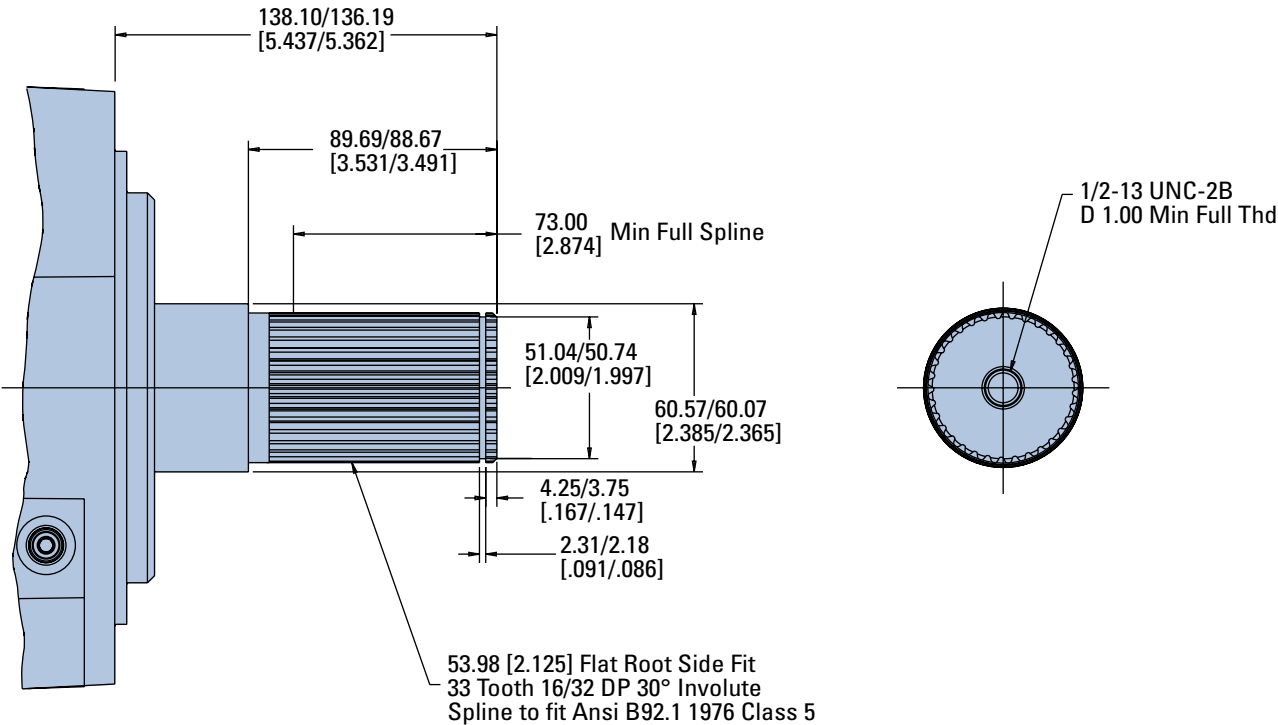
Displacement cm ³ /r [in ³ /r]	A mm [inch]	B mm [inch]
505 [30.7]	238,7 [9.40]	265,9 [10.47]
570 [34.9]	244,9 [9.64]	272,1 [10.71]
630 [38.5]	250,1 [9.85]	277,3 [10.92]
685 [41.7]	254,7 [10.04]	281,9 [11.10]
785 [48.0]	264,0 [10.40]	291,2 [11.46]
940 [57.4]	277,7 [10.94]	304,9 [12.00]

BRAKE MOTORS (TWO-SPEED)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	301,9 [11.88]	274,7 [10.82]	229,3 [9.03]
570 [34.9]	308,0 [12.12]	280,9 [11.06]	235,5 [9.27]
630 [38.5]	313,1 [12.32]	285,9 [11.27]	238,5 [9.27]
685 [41.7]	317,9 [12.52]	290,7 [11.45]	245,3 [9.66]
785 [48.0]	327,0 [12.88]	300,0 [11.80]	254,6 [10.02]
940 [57.4]	340,7 [13.42]	313,7 [12.35]	268,3 [10.56]

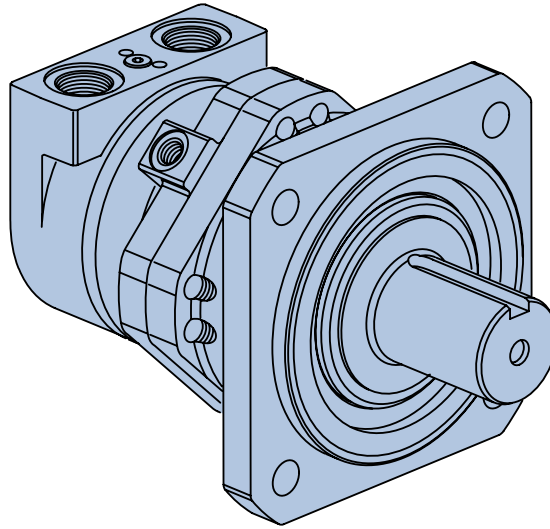
VIS 40 Series

Brake Shaft
Dimensions/
Sideload Curves



VIS 45 Series

Highlights



Description

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

VIS 45 Motors

Geroler Element	5 Displacements
Flow l/min [GPM]	170 [45] Continuous***
	189 [50] Intermittent**
Speed	Up to 284 RPM
Pressure bar [PSI]	310 [4500] Cont.***
	345 [5000] Inter.**
	380 [5500] Peak*
Torque Nm [lb - in]	4520 [40000] Cont.***
	5650 [50000] Inter.**

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

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

* Peak—(Peak) Peak operation, 1% of every minute.

Features

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

Benefits

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

Applications

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



Auger



Skid Steer



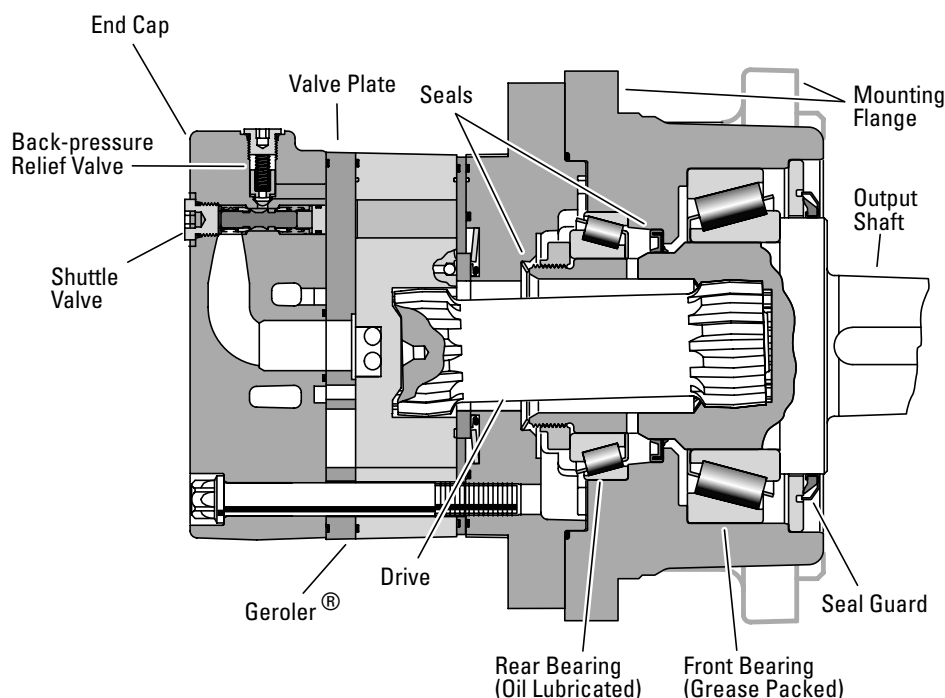
Injector



Port Equipment

VIS 45 Series

Specifications



SPECIFICATION DATA — VIS 45 SERIES MOTORS

Displ. cm ³ /r [in ³ /r]		630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Max. Speed (RPM) @ Flow	Continuous	256	198	164	129	104
	Intermittent	284	220	183	143	115
Flow l/min [GPM]	Continuous	170 [45]	170 [45]	170 [45]	170 [45]	170 [45]
	Intermittent	189 [50]	189 [50]	189 [50]	189 [50]	189 [50]
Torque Nm [lb-in]	Continuous	2963 [26080]	3555 [31460]	4052 [35860]	4520 [40000]	4520 [40000]
	Intermittent	3111 [27530]	3722 [32940]	4549 [40269]	5376 [47592]	5650 [50000]
Pressure Δ bar [Δ PSI]	Continuous	310 [4500]	310 [4500]	258 [3740]	205 [2975]	164 [2380]
	Intermittent	345 [5000]	345 [5000]	322 [4675]	256 [3720]	205 [2975]
	Peak	379 [5500]	379 [5500]	379 [5500]	308 [4465]	246 [3570]
Weight kg [lb]	Standard or Wheel Mount	53,8 [118.7]	55,2 [121.6]	56,7 [125.0]	58,7 [129.4]	61,2 [134.9]
	Bearingless	28,3 [62.3]	29,6 [65.2]	31,1 [68.6]	33,1 [73.0]	35,6 [78.5]
Weight kg [lb]	Two-speed Standard or Wheel Mount	58,5 [128.9]	59,8 [131.8]	61,3 [135.2]	63,3 [139.6]	65,8 [145.1]
	Two-speed Bearingless	32,9 [72.5]	34,2 [75.4]	35,7 [78.8]	37,7 [83.2]	40,2 [88.7]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

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

Return Pressure (Back-Pressure):

Minimum – 3,5 bar [50 PSI]
Maximum – 21 bar [300 PSI]

Note:

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

Δ Pressure:

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

Case Pressure:

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

Note:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

Shuttle:

Standard

Back-Pressure Relief Valve:

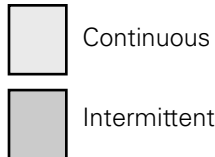
Required for closed loop circuit.

VIS 45 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 120 SUS. Actual data may vary slightly from unit to unit in production.



805 cm³/r [48.6 in³/r]
Δ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
	15	35	70	105	140	170	205	240	275	310	345
4	1600	3350	7180	10670	13480	16640	19680	21740	25860	28500	31720
15	181	379	811	1206	1523	1880	2224	2457	2922	3221	3584
8	1620	3380	7240	10730	13740	16920	19950	22160	25920	28970	32200
30	183	382	818	1212	1553	1912	2254	2504	2929	3274	3639
12	1640	3310	7180	10770	14170	17290	20730	23270	26340	29420	32470
45	185	374	811	1217	1601	1954	2342	2630	2976	3324	3669
16	1660	3220	7010	10680	14290	17710	21240	24170	26830	30340	32940
61	188	364	792	1207	1615	2001	2400	2731	3032	3428	3722
20	1600	3110	6840	10380	14000	17290	20990	24490	27270	31390	
76	181	351	773	1173	1582	1954	2372	2767	3082	3547	
24	1560	3030	6750	10250	13830	17340	21110	24450	27620	31460	
91	176	342	763	1158	1563	1959	2385	2763	3121	3555	
28		2720	6560	10190	13780	17390	21090	24360	27420	31238	
106		307	741	1151	1557	1965	2383	2753	3098	3529	
32		2620	6330	10000	13480	17070	20730	24180	27270	31064	
121		296	715	1130	1523	1929	2342	2732	3082	3509	
36		2620	5910	9480	13140	16640	20200	23570	26910	30646	
136		296	668	1071	1485	1880	2283	2663	3041	3462	
40			5390	9220	12790	16120	19700	23080	26343	30019	
151			609	1042	1445	1822	2226	2608	2976	3391	
45			5150	8970	12450	15780	19420	22650	25848	29462	
170			582	1014	1407	1783	2194	2559	2920	3328	
50			4770	8610	12140	15380	19180	22440			
189			539	973	1372	1738	2167	2536			
			220	217	215	215	212	212			

630 cm³/r [38.6 in³/r]
Δ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
	15	35	70	105	140	170	205	240	275	310	345
4	1270	2710	5530	8250	10300	12900	15540	17720	20820	23640	25740
15	144	306	625	932	1164	1458	1756	2002	2353	2671	2909
8	1290	2720	5580	8290	10490	13110	15760	18070	21000	24100	26070
30	146	307	631	937	1185	1481	1781	2042	2373	2723	2946
12	1310	2670	5440	8320	10820	13400	16370	18970	21230	24540	26840
45	148	302	615	940	1223	1514	1850	2144	2399	2773	3033
16	1320	2600	5400	8250	10910	13730	16780	19710	21970	24870	27530
61	149	294	610	932	1233	1551	1896	2227	2483	2810	3111
20	1290	2500	5270	8020	10690	13400	16730	20020	22320	25420	
76	146	283	596	906	1208	1514	1890	2262	2522	2872	
24	1240	2440	5200	7920	10560	13430	16700	19970	22610	25730	
91	140	276	588	895	1193	1518	1887	2257	2555	2907	
28		2190	5050	7870	10520	13480	16660	19860	22450	26080	
106		247	571	889	1189	1523	1883	2244	2537	2963	
32		2110	4870	7720	10300	13230	16370	19720	22320	25986	
121		238	550	872	1164	1495	1850	2228	2522	2936	
36		2090	4550	7330	10030	12890	15960	19220	22040	25655	
136		236	514	828	1133	1457	1803	2172	2491	2898	
40			4150	7120	9760	12490	15560	18820	21600	25185	
151			469	805	1103	1411	1758	2127	2441	2845	
45			3970	6930	9500	12230	15340	18470	21207	24742	
170			449	783	1074	1382	1733	2087	2396	2795	
50			3680	6660	9270	11920	15150	18300			
189			416	753	1048	1347	1712	2068			
			284	280	280	276	268	259			

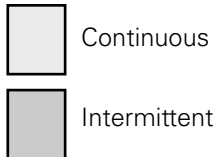
[9270]
1048 } Torque [lb-in]
280 } Nm
Speed RPM

VIS 45 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 120 SUS. Actual data may vary slightly from unit to unit in production.



1245 cm³/r [76.0 in³/r]
Δ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4250
	15	35	70	105	140	170	205	240	275	295
4	2160	4800	9960	15150	20200	26450	30670	39180	42800	43220
15	244	542	1125	1712	2283	2989	3466	4427	4836	4884
8	2250	4830	10370	15760	22010	27180	33330	39840	43660	44400
30	254	546	1172	1781	2487	3071	3766	4502	4934	5017
12	2400	5390	10910	17290	22780	28470	34170	40140	44160	47220
45	271	609	1233	1954	2574	3217	3861	4536	4990	5336
16	2410	5150	10930	16970	22880	28600	33900	39500	44510	47592
61	272	582	1235	1918	2585	3232	3831	4464	5030	5376
20	2350	4890	10650	16470	21960	27450	33130	37710	43890	46933
76	266	553	1203	1861	2481	3102	3744	4261	4960	5302
24	2190	4760	10460	15920	21230	26530	32320	37680	42670	45673
91	247	538	1182	1799	2399	2998	3652	4258	4822	5156
28	1990	4260	10070	15860	21200	26420	32480	37500	42464	45418
106	225	481	1138	1792	2396	2985	3670	4238	4797	5131
32		4100	9770	15410	20770	26300	31920	37240	42167	45103
121		463	1104	1741	2347	2972	3607	4208	4764	5095
36		4090	9060	14650	20060	25670	31110	36295	41087	43955
136		462	1024	1655	2267	2901	3515	4100	4642	4966
40			8300	14150	19570	24900	30320	35373	40034	42836
151			938	1599	2211	2814	3426	3996	4523	4839
45			8100	13970	19310	24610	29972	34967	39570	42343
170			915	1579	2182	2781	3686	3950	4470	4783
50			7900	13790	19050	24310				
189			893	1558	2153	2747				

990 cm³/r [60.5 in³/r]
Δ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	4750
	15	35	70	105	140	170	205	240	275	310	330
4	2000	4100	8630	12620	16050	20080	24150	28320	32590	35150	37040
15	226	463	975	1426	1814	2269	2729	3200	3683	3972	4186
8	2020	4130	8700	12740	16350	20420	24480	28400	32850	35670	37250
30	228	467	983	1440	1848	2307	2766	3209	3712	4031	4209
12	2050	4050	8630	12780	16870	20860	25440	28550	32920	35860	37630
45	232	458	975	1444	1906	2357	2875	3226	3720	4052	4252
16	2070	3940	8420	12680	17010	21380	26070	29660	33020	36620	38439
61	234	445	951	1433	1922	2416	2946	3352	3731	4138	4342
20	2000	3800	8220	12330	16660	20860	25760	30060	33550	37880	39766
76	226	429	929	1393	1883	2357	2911	3397	3791	4280	4492
24	1950	3700	8120	12180	16460	20890	25820	30090	33990	38366	40269
91	220	418	918	1376	1860	2361	2918	3400	3841	4334	4549
28		3320	7880	12100	16400	20990	25890	29900	33750	39106	39995
106		375	890	1367	1853	2372	2926	3379	3814	4280	4518
32		3210	7610	11870	16050	20600	25440	29680	33550	37890	39766
121		363	860	1341	1814	2328	2875	3354	3791	4280	4492
36		3200	7100	11260	15640	20080	24800	28930	32716	36936	38759
136		362	802	1272	1767	2269	2802	3269	3696	4173	4379
40			6480	10950	15220	19460	24170	28330	32023	36155	37935
151			732	1237	1720	2199	2731	3201	3618	4084	4286
45			6190	10650	14810	19040	23830	27952	31599	35679	37432
170			699	1203	1674	2152	2693	3158	3570	4031	4229
50			5740	10230	14450	18570	23540				
189			649	1156	1633	2098	2660				

[18570] Torque [lb-in]
2098 } Nm
178 Speed RPM

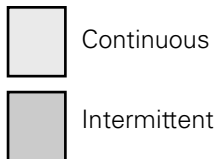
VIS 45 Series

1560 cm³/r [95.0 in³/r]

Performance Data

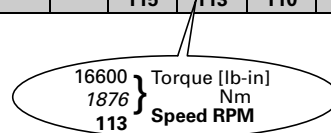
Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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



Δ Pressure Bar [PSI]

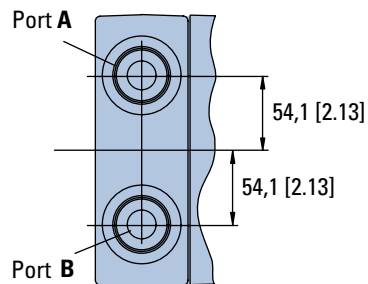
	250	500	1000	1500	2000	2500	3000	3500	4000
	15	35	70	105	140	170	205	240	275
4	2700	5670	11910	18520	24910	30860	37610	42320	48366
15	305	641	1346	2093	2815	3487	4250	4782	5464
8	2810	5910	12400	19260	25590	31740	39310	44150	50457
30	318	668	1401	2176	2892	3587	4442	4989	5700
12	3010	6300	13040	20490	26600	33070	39880	46670	53337
45	340	712	1474	2315	3006	3737	4506	5274	6025
16	3020	6300	13360	20740	27270	33950	40450	48630	55577
61	341	712	1510	2344	3082	3836	4571	5495	6279
20	2930	6150	13200	20490	27110	34830	39820	47662	54470
76	331	695	1492	2315	3063	3936	4500	5384	6154
24	2780	5910	12880	19750	26930	34390	39310	47300	54057
91	314	668	1455	2232	3043	3886	4442	5343	6107
28		5310	12500	19630	26600	33950	38740	46635	53297
106		600	1413	2218	3006	3836	4378	5268	6021
32		5120	12070	19260	26260	33510	38180	45982	52550
121		579	1364	2176	2967	3787	4314	5195	5937
36		5100	11270	18270	25590	33070	37652	45366	
136		576	1274	2065	2892	3737	4254	5125	
40			10280	17760	24910	32630	37124	44750	
151			1162	2007	2815	3687	4194	5055	
45			9820	17280	24240	31793	36119	43577	
170			1110	1953	2739	3592	4080	4923	
50			9100	16600	23650				
189			1028	1876	2672				
			115	113	110				



VIS 45 Series

Dimensions

Standard Mount



Ports

1-5/16-12 UN-2B SAE O-ring Ports (2)

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

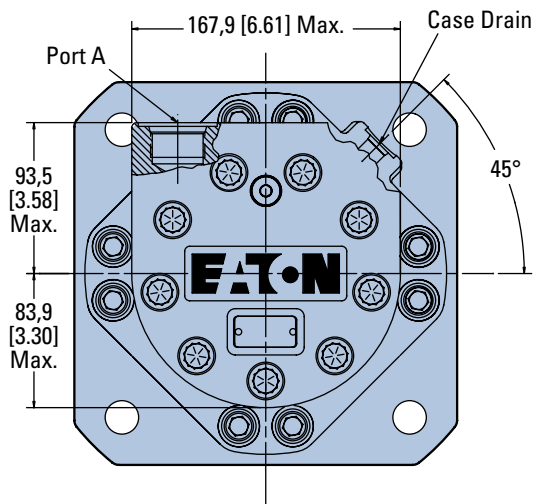
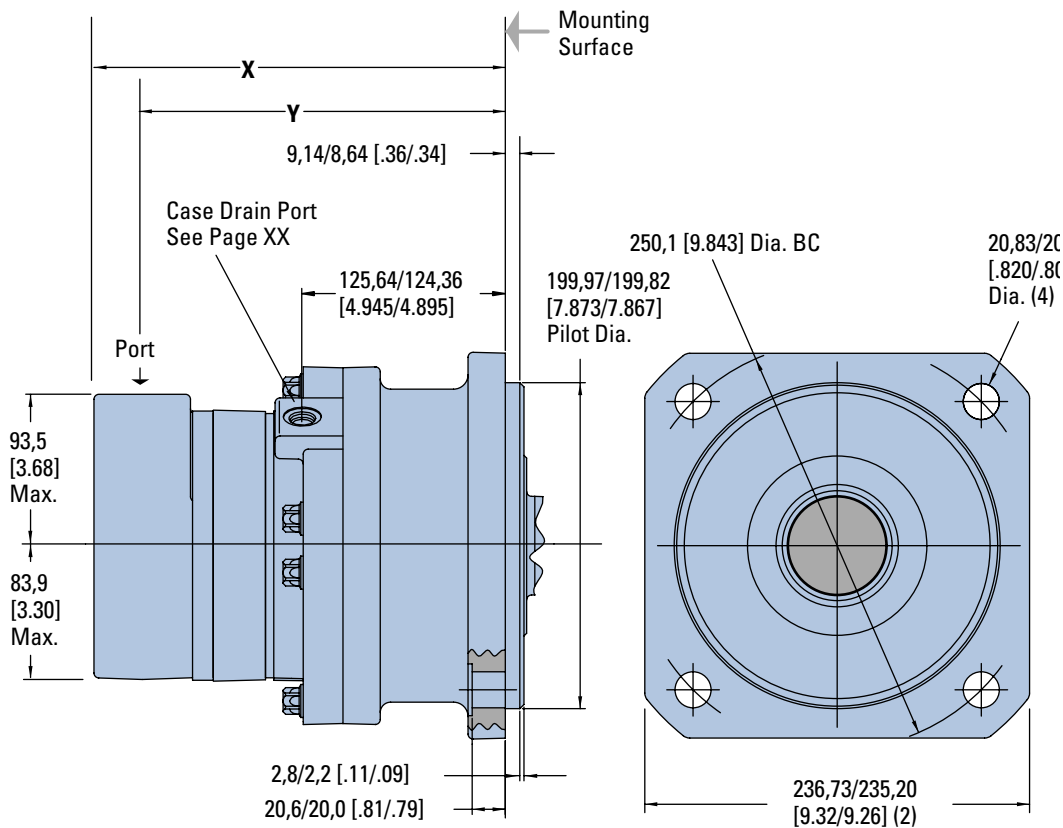
Or G 1 (BSP) O-ring Ports (2)

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW



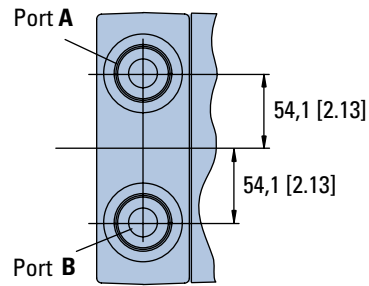
STANDARD MOTORS

Displacement cm ³ /r [in ³ /r]	X Max. mm [inch]	Y mm [inch]
630 [38.6]	260,9 [10.27]	228,6 [9.00]
805 [48.6]	271,3 [10.68]	239,0 [9.41]
990 [60.5]	283,7 [11.17]	251,5 [9.90]
1245 [76.0]	299,7 [11.80]	267,7 [10.54]
1560 [95.0]	319,5 [12.58]	287,5 [11.32]

VIS 45 Series

Dimensions

Wheel Mount



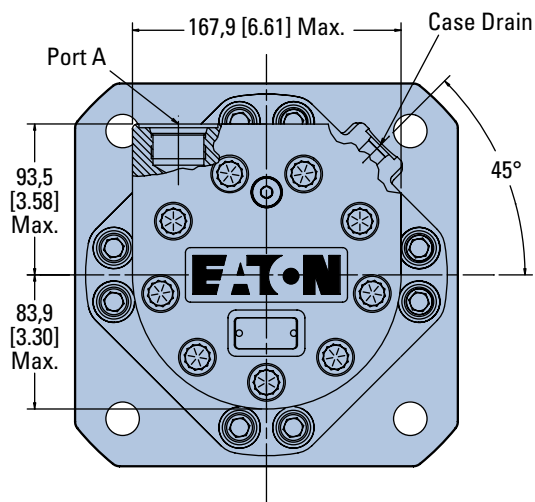
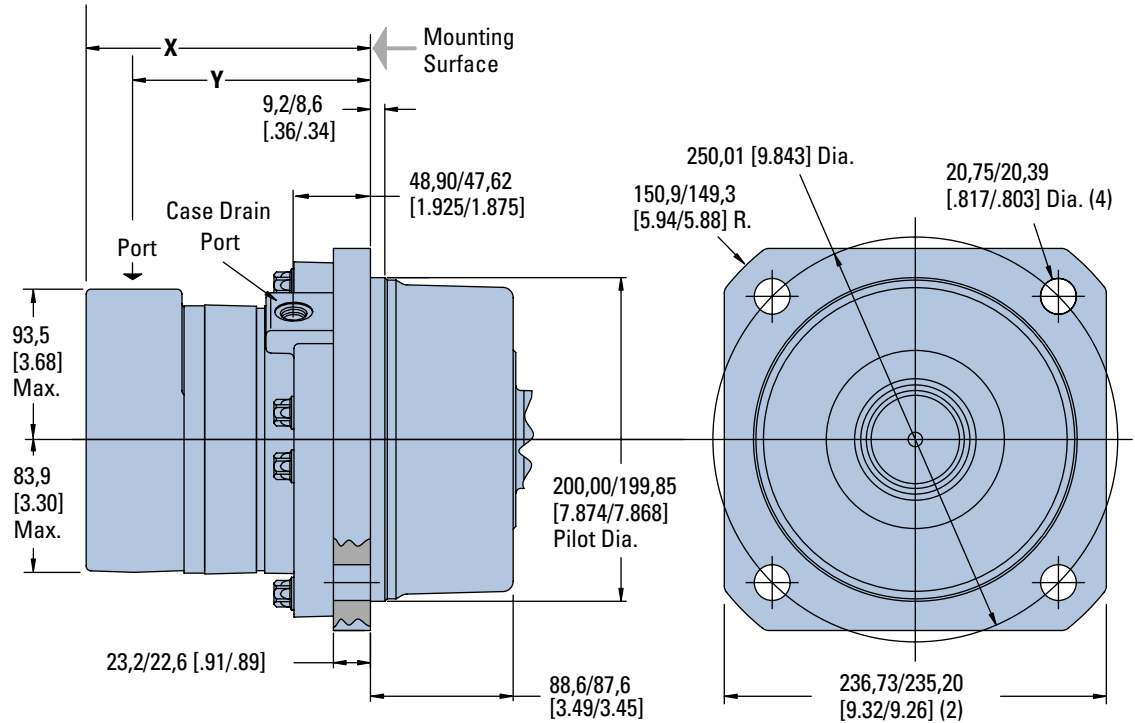
Ports

- 1-5/16-12 UN-2B SAE O-ring Ports (2)
- 9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
- Or G 1 (BSP) O-ring Ports (2)
- G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW



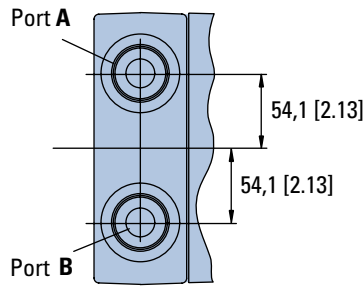
WHEEL MOTORS

Displacement cm ³ /r [in ³ /r]	X Max. mm [inch]	Y mm [inch]
630 [38.6]	184,2 [7.25]	151,9 [5.98]
805 [48.6]	194,6 [7.66]	162,3 [6.39]
990 [60.5]	207,0 [8.15]	174,8 [6.88]
1245 [76.0]	223,0 [8.78]	191,0 [7.52]
1560 [95.0]	242,8 [9.56]	210,8 [8.30]

VIS 45 Series

Dimensions

Bearingless



Ports

1-5/16-12 UN-2B SAE O-ring Ports (2)

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

Or G 1 (BSP) O-ring Ports (2)

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

Standard Rotation Viewed from Drive End

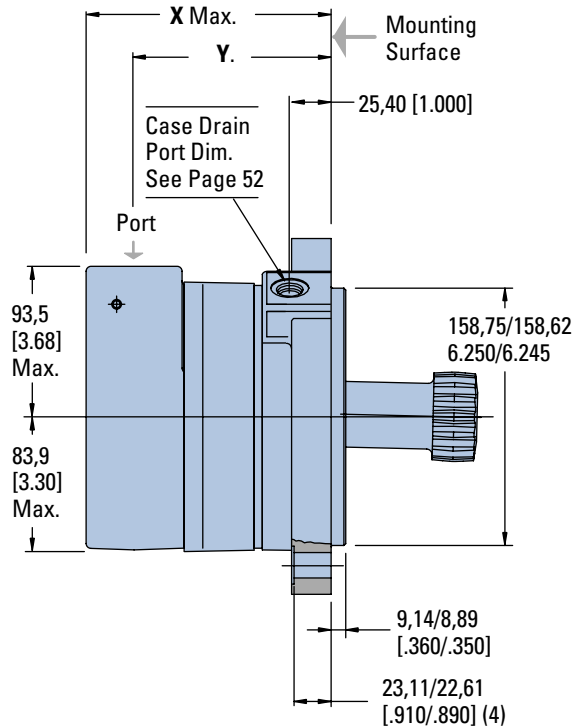
Port A Pressurized — CW

Port B Pressurized — CCW

For VIS 45 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

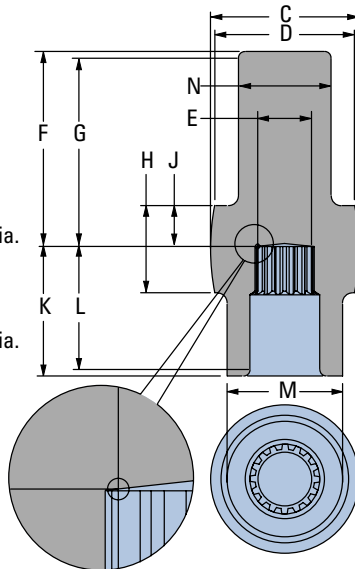
Note:

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



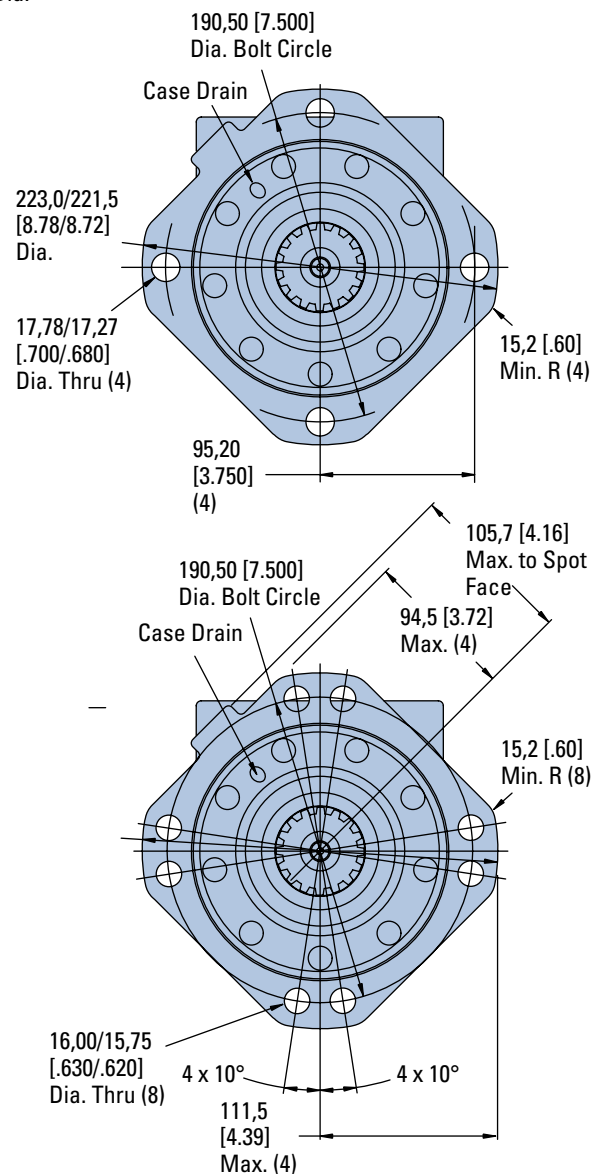
Mating Coupling Blank
Eaton Part No. 13521-003

C	116,3 [4.58] Dia. Max.
D	111,8 [4.40] Dia. Min.
E	37,64 [1.482] Dia.
F	136,7 [5.38] Max.
G	131,6 [5.18] Min. Full Form Dia.
H	64,8 [2.55]
J	26,4 [1.04]
K	109,7 [4.32] Max.
L	104,6 [4.12] Min. Full Form Dia.
M	92,58 [3.645] Dia.
N	73,28 [2.885] Dia.



BEARINGLESS MOTORS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
630 [38.6]	161,5 [6.36]	130,3 [5.13]
805 [48.6]	172,5 [6.79]	141,2 [5.56]
990 [60.5]	184,4 [7.26]	153,4 [6.04]
1245 [76.0]	200,7 [7.90]	169,7 [6.68]
1560 [95.0]	220,5 [8.68]	189,5 [7.46]

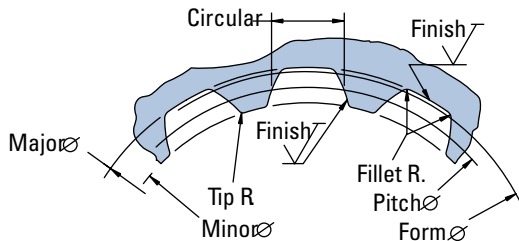
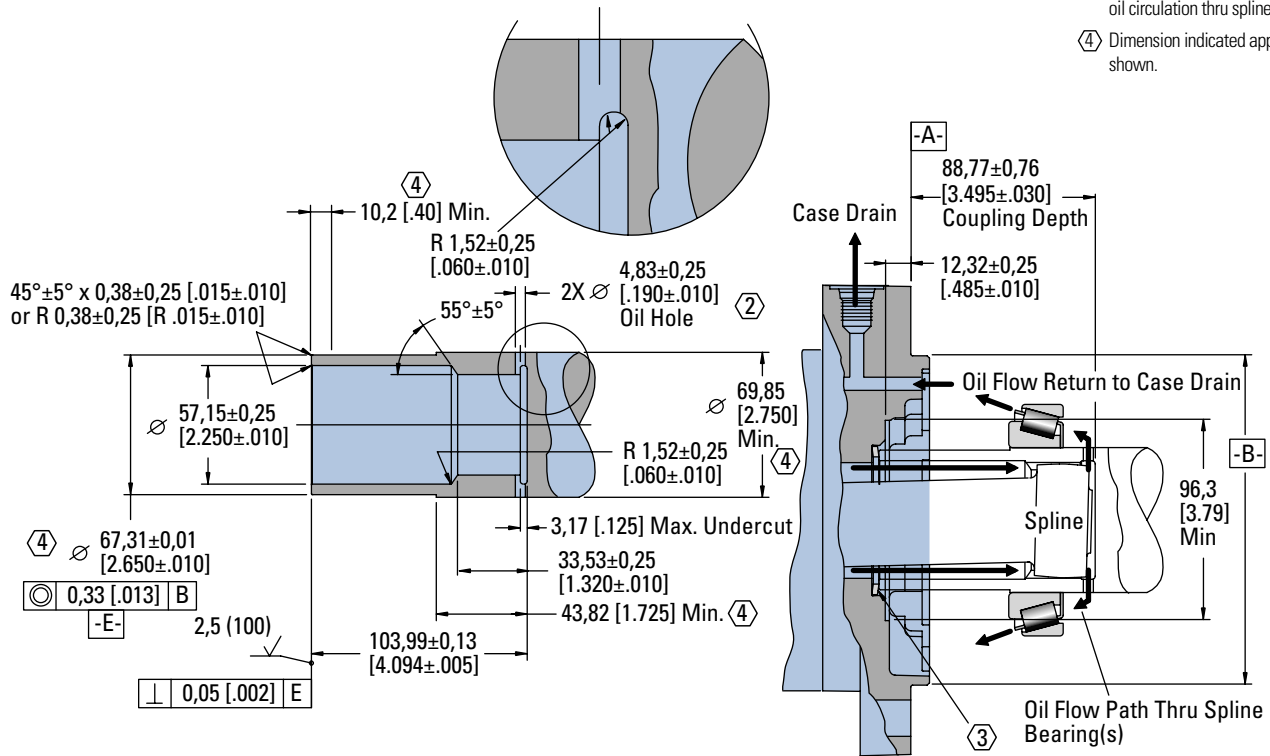


VIS 45 Series

Installation Information

Bearingless

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



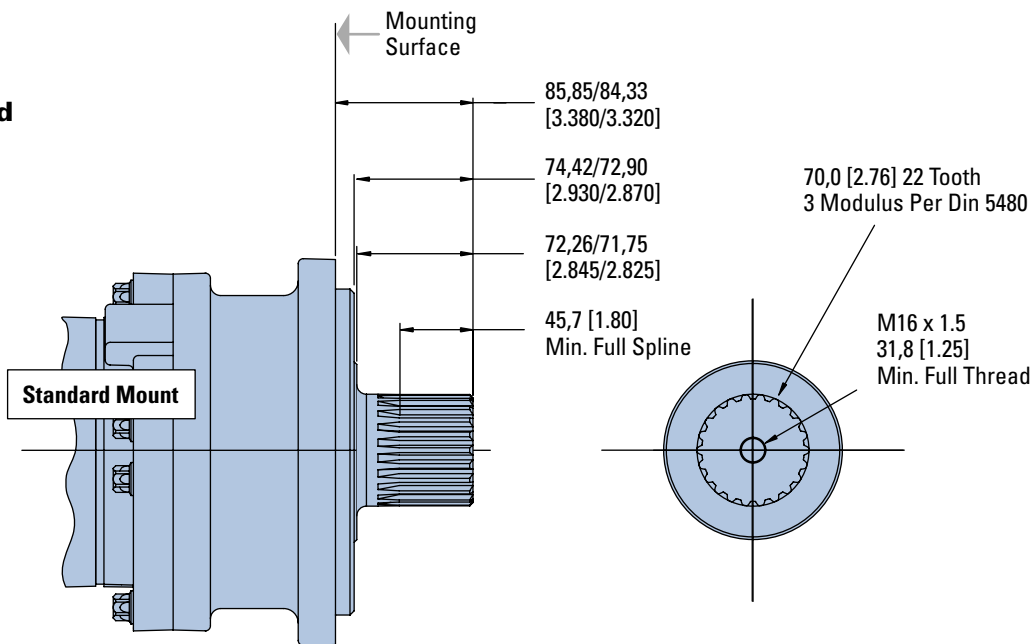
Spline Pitch	8/16
Pressure Angle	30°
Number of teeth	16
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 50,80000 [2.0000000] $\text{Ⓢ} 0,33 [0.013] B$
Base Diameter	Ref. 43,994090032 [1.7320508]
Major Diameter	56,34±0,15 [2.218±.006]
Min. Minor Diameter	48,44±0,08 [1.907±.003]
Form Diameter, Min.	55,22 [2.174]
Fillet Radius	1,02±0,25 [.040±.010]
Tip Radius	0,38±0,13 [.015±.005]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+ .0000 -.0010]
Total Index Variation	0,041 [.0016]
Lead Variation	0,015 [.0006]
Circular Space Width:	
Maximum Actual	6,180 [.2433]
Minimum Effective	6,048 [.2381]
Maximum Effective	Ref. 6,099 [.2401]
Minimum Actual	Ref. 6,114 [.2407]
Dimension Between Two Pins	Ref. 42,659 ±0,05 [1.6795±.0020]
Pin Diameter	6,223 [.2450]

VIS 45 Series

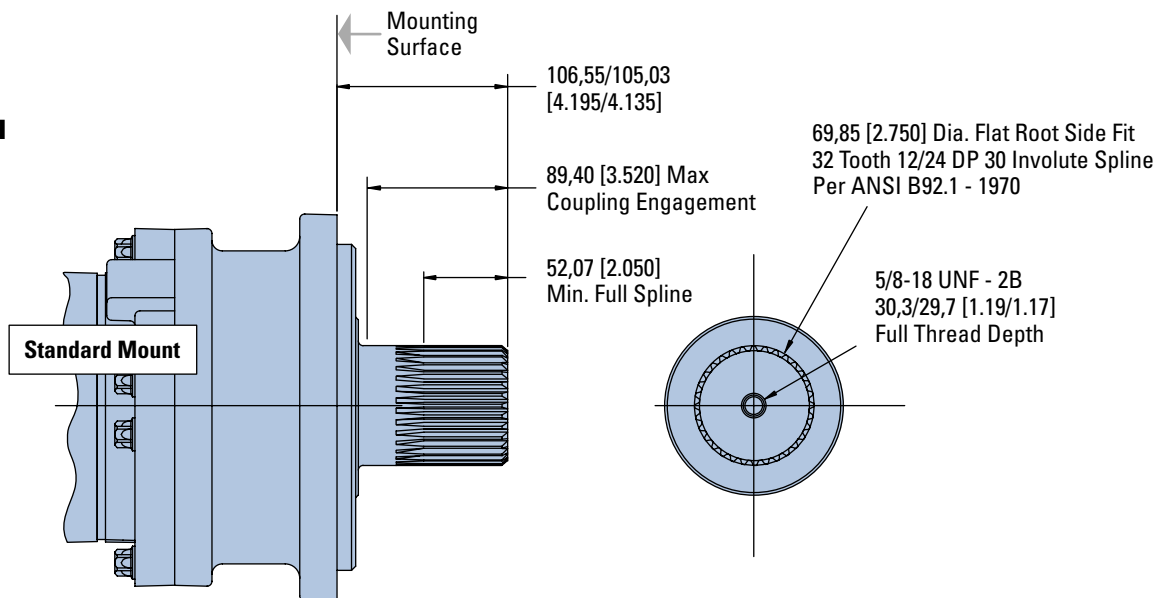
Dimensions Shafts

Splined

70 mm 22 Tooth Splined



2-3/4 Inch 32 Tooth Splined

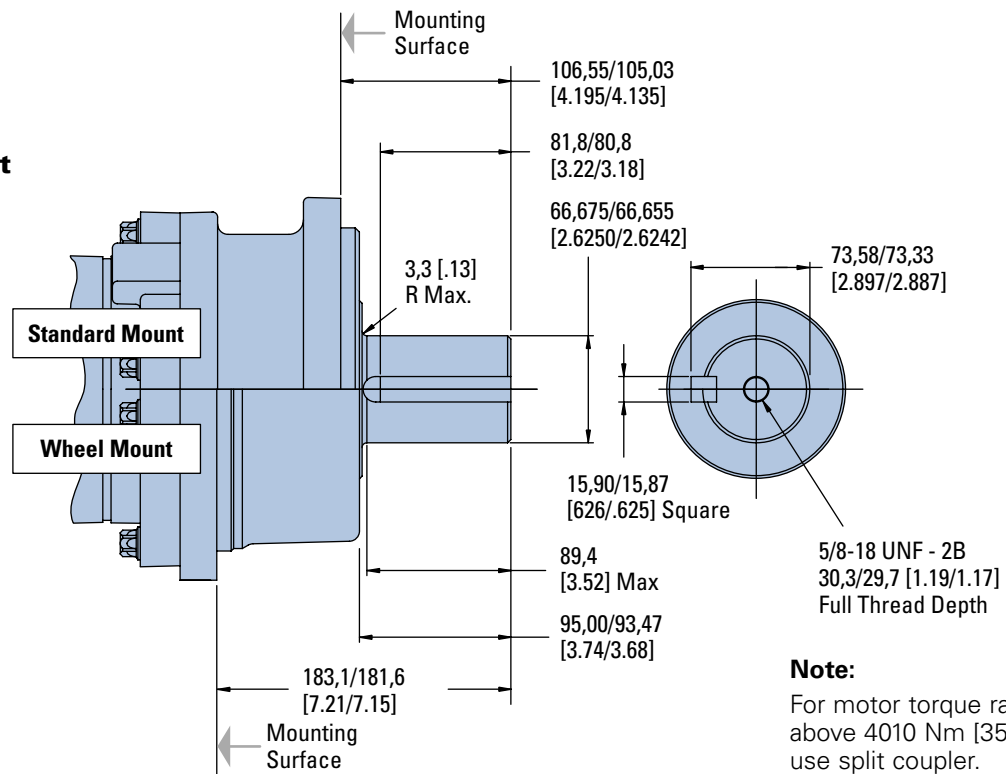


VIS 45 Series

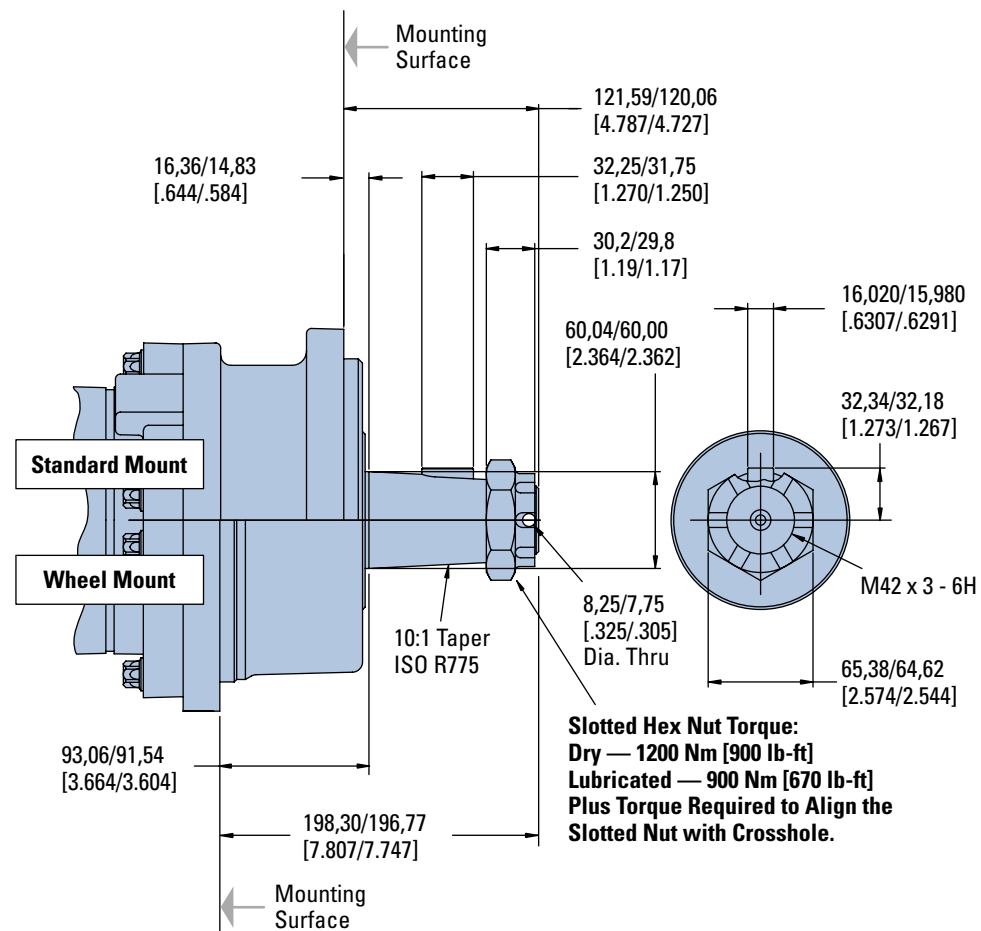
Dimensions Shafts

Keyed

2-5/8 Inch Straight



60 mm Tapered



VIS 45 Series

Side Load Capacity

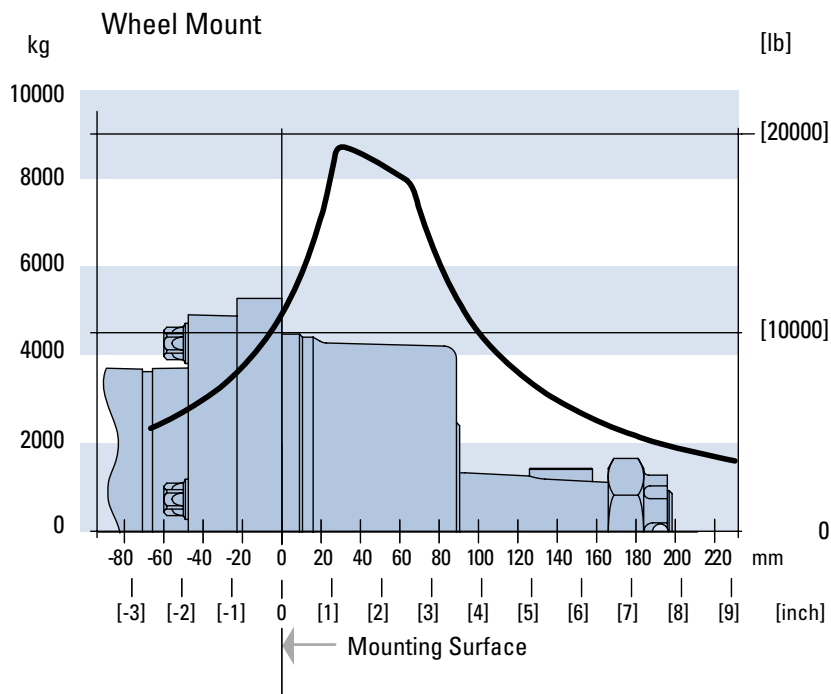
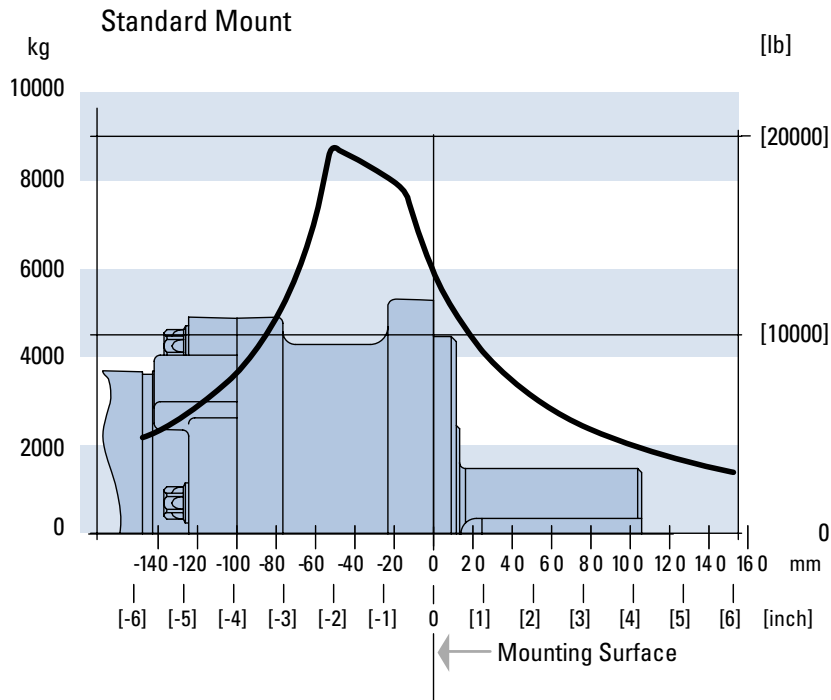
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

The curve is based on B 10 bearing life (2000 hours or 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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

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

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



VIS 45 Series

Product Numbers

Closed Loop

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

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

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0107	-0108	-0109	-0110	-0111
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0114	-0115	-0116	-0117	-0118
	70 mm 22 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0121	-0122	-0123	-0124	-0125
	2-3/4 inch 32 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0128	-0085	-0129	-0130	-0131
Wheel	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	156-0039	-0040	-0041	-0042	-0043
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	156-0046	-0047	-0048	-0049	-0050
Bearingless	(8 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	157-0066	-0067	-0068	-0069	-0070
	(4 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	157-0004	-	-	-	-

157-0004

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0134	-0135	-0136	-0137	-0138
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0141	-0142	-0143	-0144	-0145
	70 mm 22 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0148	-0149	-0150	-0151	-0152
	2-3/4 inch 32 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0155	-0156	-0157	-0158	-0159
Wheel	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0053	-0054	-0055	-0056	-0057
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0060	-0061	-0062	-0063	-0064
Bearingless	(8 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	157-0074	-0075	-0076	-0077	-0078
	(4 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	157-0081	-	-	-	-

157-0081

Note:

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

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

VIS 45 Series

Product Numbers

Open Loop

Use three-digit prefix (155-, 156-, or 157-) plus four-digit number from charts for complete product number (ex: 157-0038).

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0029	-0030	-0031	-0032	-0033
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0043	-0044	-0045	-0046	-0047
	70 mm 22 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0014	-0057	-0058	-0059	-0060
	2-3/4 inch 32 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0070	-0071	-0072	-0073	-0074
Wheel	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	156-0011	-0012	-0013	-0014	-0015
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0025	-0026	-0027	-0028	-0029
Bearingless	(8 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	157-0050	-0040	-0042	-0044	-0046
	(4 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	157-0038	-	-	-	-

157-0038

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0036	-0037	-0038	-0039	-0040
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0050	-0051	-0052	-0053	-0054
	70 mm 22 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0063	-0064	-0065	-0066	-0067
	2-3/4 inch 32 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0077	-0078	-0079	-0080	-0081
Wheel	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0018	-0019	-0020	-0021	-0022
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0032	-0033	-0034	-0035	-0036
Bearingless	(8 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	157-0053	-0041	-0043	-0045	-0047
	(4 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	157-0039	-0036	-0037	-0078	

157-0036

Note:

All product numbers in the charts (above) are for motors **without** a back-pressure relief valve. These motors would generally be used in open loop circuits.

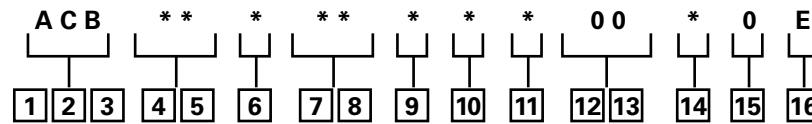
Note:

Case pressure for VIS motors must not exceed 50 psi. With an "Open Loop Option" VIS motor, a case drain is not required, except if the return pressure is greater than 50 psi.

VIS 45 Series

Model Code

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



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

4, 5 Displacement
cm³/r [in³/r]

32 – 520 [31.7]*
35 – 572 [34.9]*
39 – 630 [38.6]
44 – 720 [43.9]*
49 – 805 [48.6]
60 – 990 [60.5]
76 – 1245 [76.0]
95 – 1560 [95.0]

* For performance and dimension data contact your Eaton Hydraulics representative.

6 Mounting Type

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

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

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

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

7, 8 Output Shaft

00 – None (Bearingless)

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

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

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

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

9 Ports

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

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

10 Case Flow Options

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

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

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

11 Back-Pressure Relief

0 – None (for Open Loop
 Only)

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

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

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

12, 13 Special Features

00 – None

**14 Paint/ Special
 Packaging**

0 – No Paint, Individual Box

A – Painted Low Gloss
 Black, Individual Box

B – No Paint, Bulk Box
 Option

C – Painted Low Gloss
 Black, Bulk Box Option

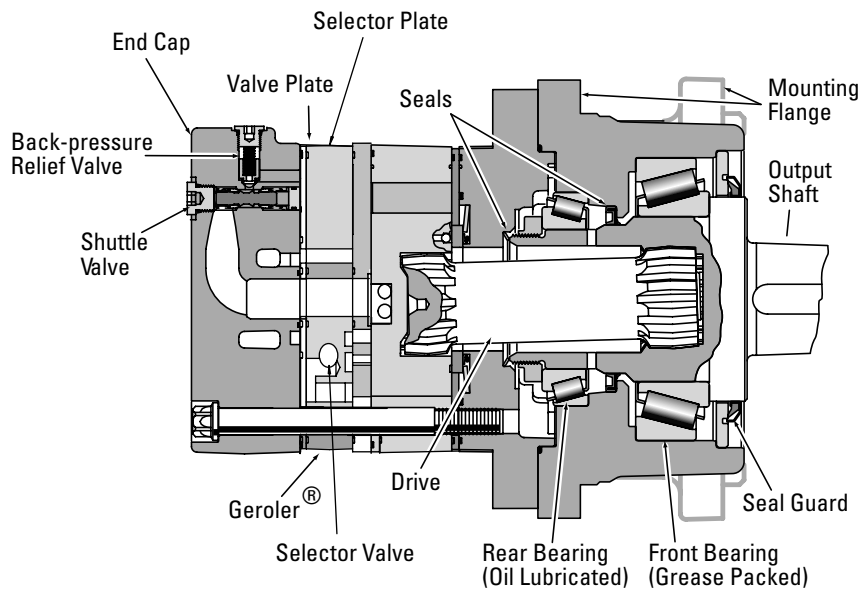
**15 Eaton Assigned
 Code when Applicable**

0 – Assigned Code

**16 Eaton Assigned
 Design Code**

E – Assigned Design Code

VIS 45 Series Two-speed



Specifications

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

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

is removed from the pilot port, the pressure in the pilot end of the spool valve is relieved and drained back through the control valve and the return spring forces the spool valve to LSHT position.

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

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

Performance Data

In the LSHT mode, torque and speed values are equal to those of the conventional VIS 45 motor. In the HSLT mode, rotation speed is increased by fifty percent and torque output is reduced by one third.

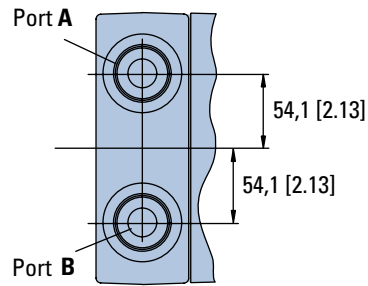
The VIS 45 two speed motor will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes.

VIS 45 Series

Two-speed

Dimensions

Standard Mount

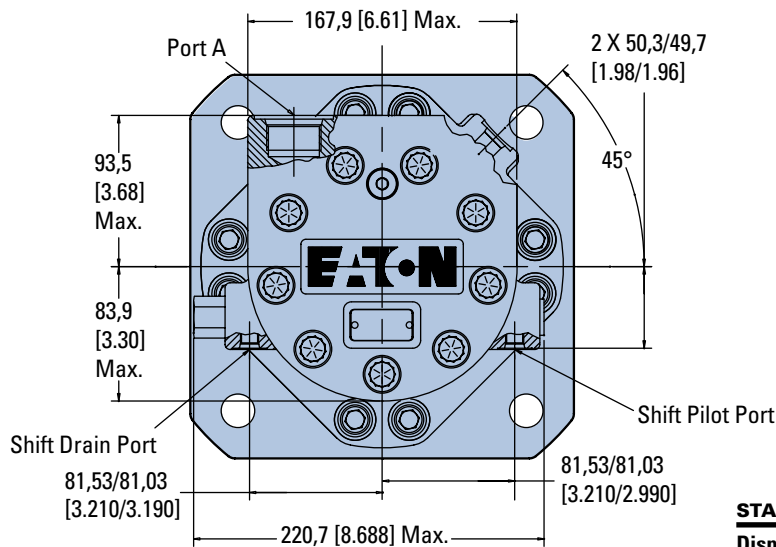
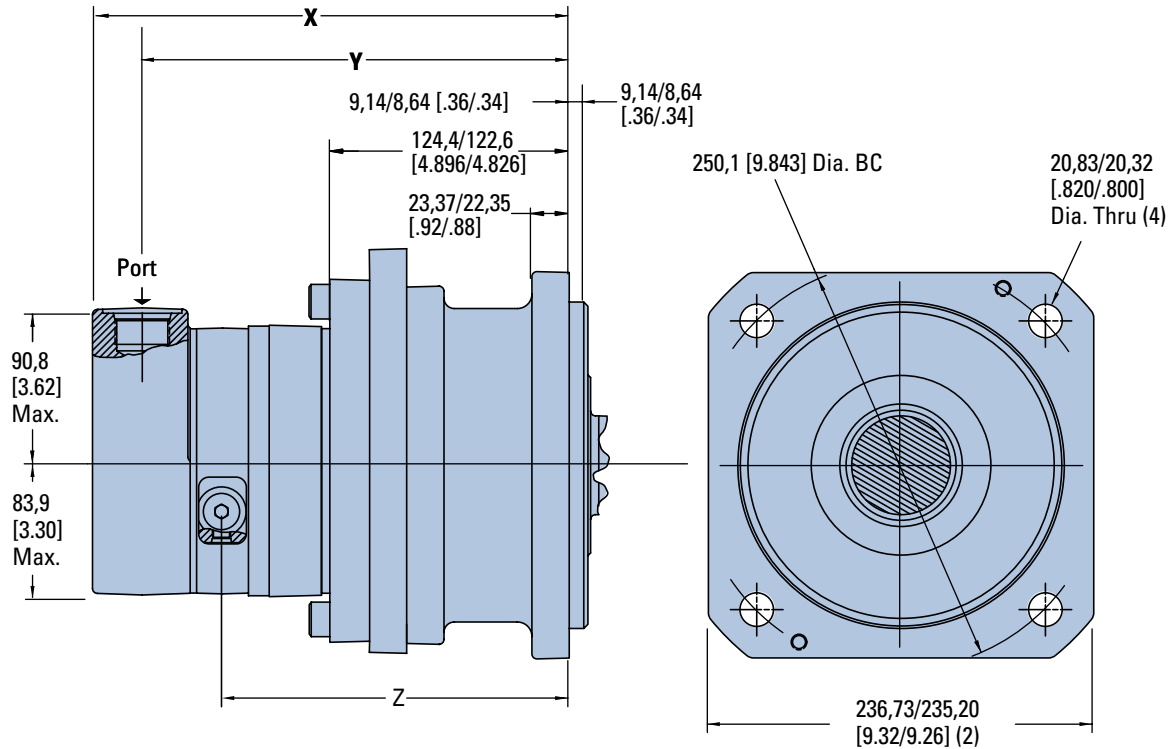


Ports

- 1-5/16-12 UN-2B SAE O-ring Ports (2)
- 9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
- 7/16-20 UNF -2B SAE O-ring Shift Ports (2)
- or
- G 1 (BSP) O-ring Ports (2)
- G 1/4 (BSP) O-ring Case Drain Port (1)
- 7/16-20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Shaft End

- Port A Pressurized — CW
- Port B Pressurized — CCW



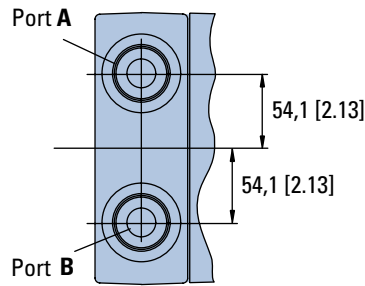
STANDARD MOUNT

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
630 [38.6]	295,5 [11.63]	263,2 [10.36]	216,3 [8.51]
805 [48.6]	305,9 [12.04]	273,6 [10.77]	226,7 [8.92]
990 [60.5]	318,3 [12.53]	286,0 [11.26]	239,1 [9.41]
1245 [76.0]	334,3 [13.16]	302,0 [11.89]	255,1 [10.04]
1560 [95.0]	353,3 [13.94]	321,0 [12.67]	274,1 [10.82]

VIS 45 Series Two-speed

Dimensions

Wheel Mount

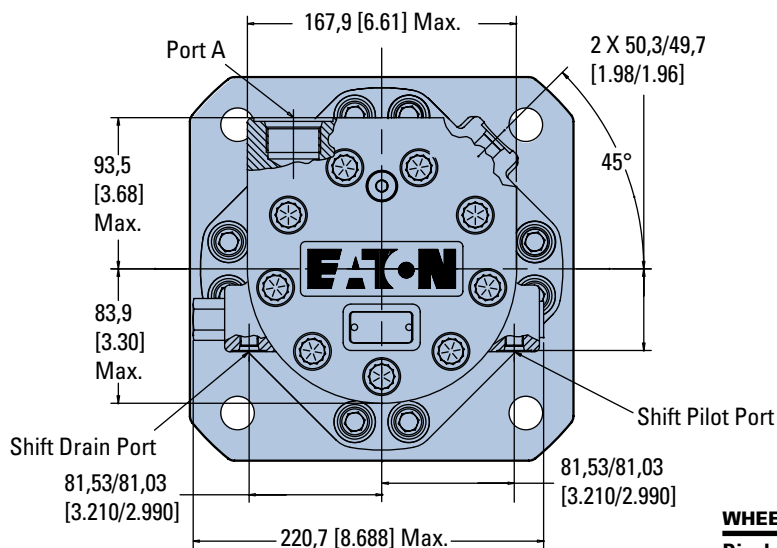
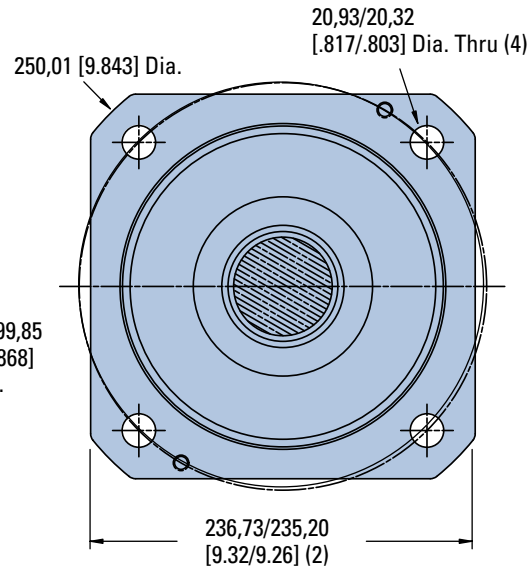
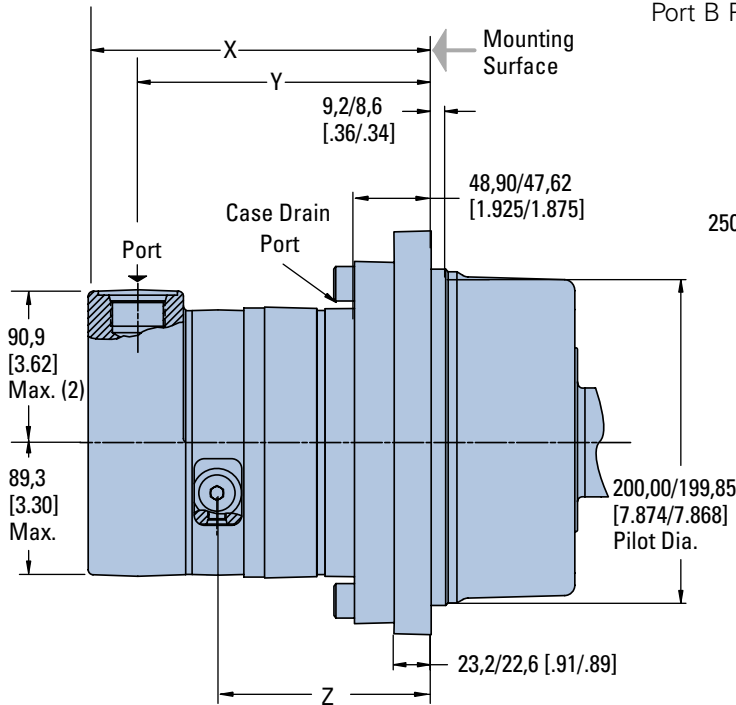


Ports

1-5/16-12 UN-2B SAE O-ring Ports (2)
 9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
 7/16-20 UNF -2B SAE O-ring Shift Ports (2)
 or
 G 1 (BSP) O-ring Ports (2)
 G 1/4 (BSP) O-ring Case Drain Port (1)
 7/16-20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
 Port B Pressurized — CCW



WHEEL MOUNT

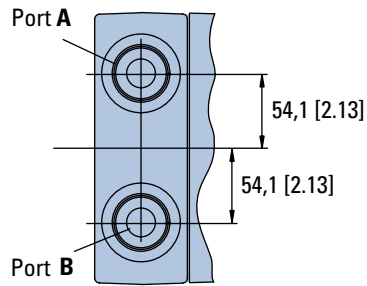
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
630 [38.6]	218,8 [8.61]	186,5 [7.34]	139,6 [5.49]
805 [48.6]	229,2 [9.02]	196,9 [7.75]	150,0 [5.90]
990 [60.5]	241,6 [9.51]	209,4 [8.24]	162,4 [6.39]
1245 [76.0]	257,6 [10.14]	225,6 [8.88]	178,4 [7.02]
1560 [95.0]	276,6 [10.92]	245,4 [9.66]	197,4 [7.80]

VIS 45 Series

Two-speed

Dimensions

Bearingless



Ports

1-1/16-12 UN-2B SAE O-ring Ports (2)
 9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
 7/16-20 UNF -2B SAE O-ring Shift Ports (2)
 Or
 G 3/4 (BSP) O-ring Ports (2)
 G 1/4 (BSP) O-ring Case Drain Port (1)
 7/16-20 UNF -2B SAE O-ring Shift Ports (2)

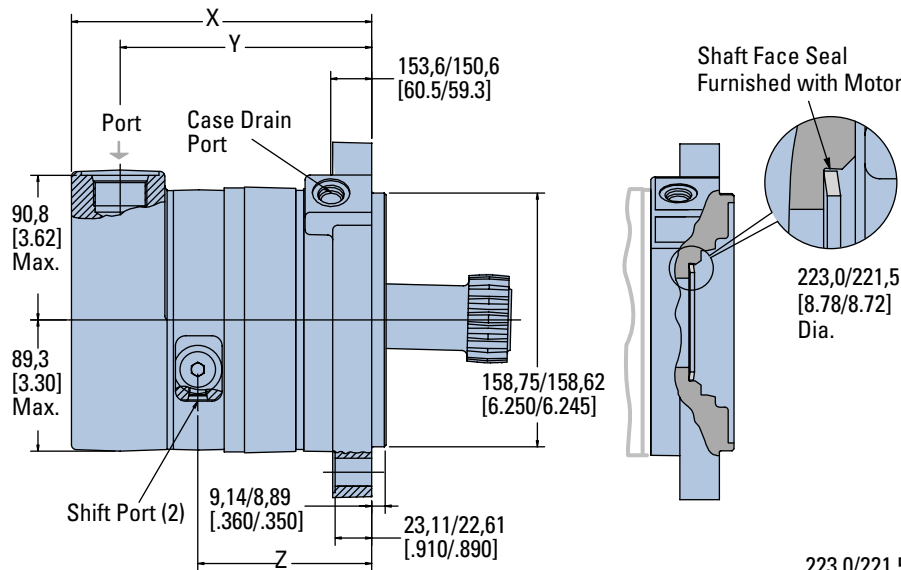
Standard Rotation Viewed from Drive End

Port A Pressurized — CW
 Port B Pressurized — CCW

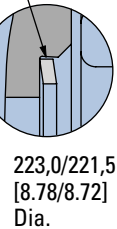
For VIS 45 two-speed bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

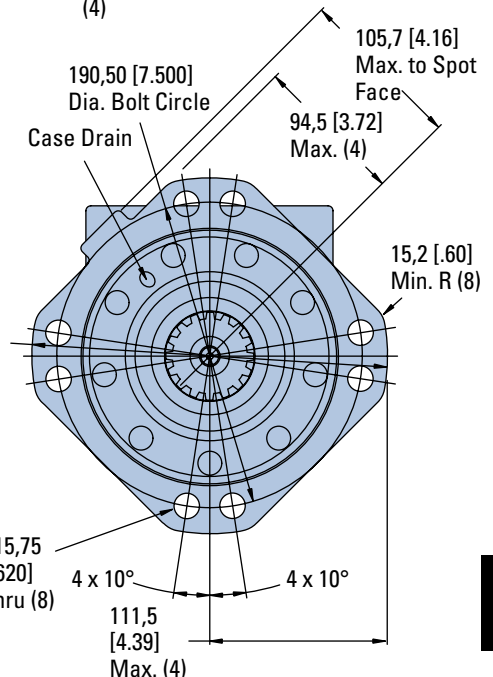
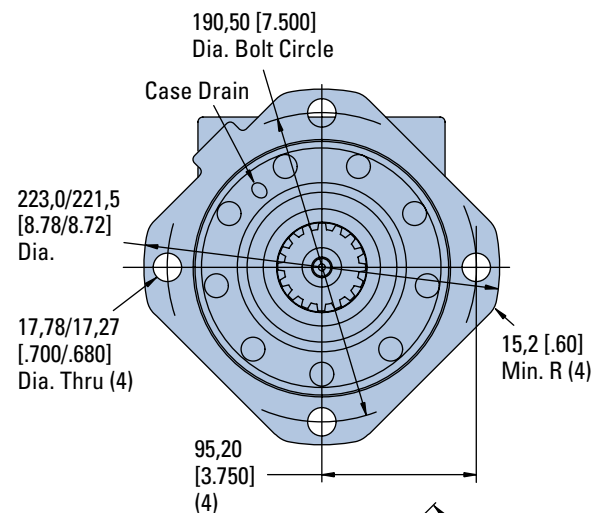
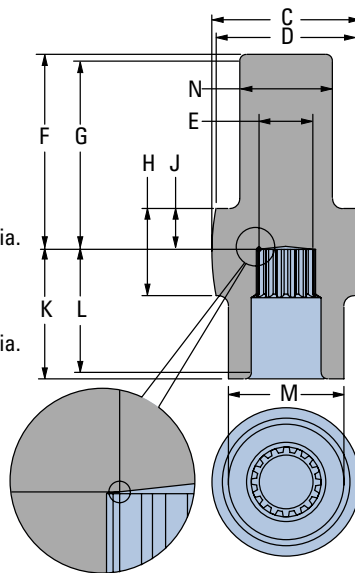


Shaft Face Seal
 Furnished with Motor



Mating Coupling Blank
 Eaton Part No. 13521-003

C	116,3	[4.58]	Dia. Max.
D	111,8	[4.40]	Dia. Min.
E	37,64	[1.482]	Dia.
F	136,7	[5.38]	Max.
G	131,6	[5.18]	Min. Full Form Dia.
H	64,8	[2.55]	
J	26,4	[1.04]	
K	109,7	[4.32]	Max.
L	104,6	[4.12]	Min. Full Form Dia.
M	92,58	[3.645]	Dia.
N	73,28	[2.885]	Dia.



BEARINGLESS MOTORS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
630 [38.6]	196,1 [7.72]	165,9 [6.53]	116,9 [4.60]
805 [48.6]	206,5 [8.13]	176,3 [6.94]	127,3 [5.01]
990 [60.5]	218,9 [8.62]	188,8 [7.43]	139,7 [5.50]
1245 [76.0]	235,2 [9.26]	205,0 [8.07]	156,0 [6.14]
1560 [95.0]	255,0 [10.04]	224,8 [8.85]	175,8 [6.92]

VIS 45 Series Two-speed

Product Numbers

(Closed Loop)

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

Example: 173-0013.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0006	-0007	-0008	-0009	-0010
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0011	-0012	-0013	-0014	-0015
	70 mm 22 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0016	-0017	-0018	-0019	-0020
Wheel	2-3/4 inch 32 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0021	-0022	-0023	-0024	-0025
	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	183-0006	-0007	-0008	-0009	-0010
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	183-0011	-0012	-0013	-0014	-0015
Bearingless	(8 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	173-0008	-0009	-0010	-0011	-0012
	(4 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	173-0013	-	-	-	-

173-0013

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0026	-0027	-0028	-0029	-0030
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0031	-0032	-0033	-0034	-0035
	70 mm 22 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0036	-0037	-0038	-0039	-0040
Wheel	2-3/4 inch 32 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0041	-0042	-0043	-0044	-0045
	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	183-0016	-0017	-0018	-0019	-0020
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	183-0021	-0022	-0023	-0024	-0025
Bearingless	(8 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	173-0014	-0015	-0016	-0017	-0018
	(4 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	173-0019	-	-	-	-

173-0019

Note:

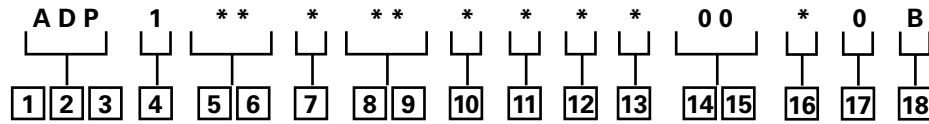
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 15,2 bar [220 PSI].

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

VIS 45 Series Two-speed

Model Code

The following 18-digit coding system has been developed to identify all of the configuration options for the VIS 45 Two-Speed motor. Use this model code to specify a motor with the desired features. All 18 digits of the code must be present when ordering. You may want to photocopy the matrix below to endure that each number is entered in the correct box.



1, 2, 3 Product Series
ADP – VIS 45 Two-speed Motor

4 Eaton Assigned Code
1 – Assigned Code

5, 6 Displacement
cm³/r [in³/r]

32 – 520 [31.7]*

35 – 572 [34.9]*

39 – 630 [38.6]

44 – 720 [43.9]*

49 – 805 [48.6]

60 – 990 [60.5]

76 – 1245 [76.0]

95 – 1560 [95.0]

* For performance and dimension data, contact your Eaton Hydraulics representative.

7 Mounting Type

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

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

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

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

8, 9 Output Shaft

00 – None (Bearingless)

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

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

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

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

10 Ports

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

B – G 1 (BSP) Straight
Thread Ports

11 Case Flow Options

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

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

12 Back-Pressure Relief

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

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

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

13 Eaton Assigned Code

0 – Assigned Code

14, 15 Special Features

00 – None

**16 Paint/ Special
Packaging**

0 – No Paint, Individual Box

A – Painted Low Gloss
Black, Individual Box

B – No Paint, Bulk Box
Option

C – Painted Low Gloss
Black, Bulk Box Option

**17 Eaton Assigned
Code when Applicable**

0 – Assigned Code

**18 Eaton Assigned
Design Code**

B – Assigned Design Code

The Eaton Advantage

Whether your products move, turn, shape, mold, lift, dig, or haul, you can depend on Eaton's hydraulics products to deliver the performance you need to stay competitive. Eaton's unwavering dedication to leadership in mobile and industrial applications has made Eaton one of the world's preferred suppliers of hydraulic solutions.

When The Job Calls For Hydraulic Muscle.

Eaton® hydraulic components, fluid conveyance and systems keep our customers one step ahead of the competition. On-road, off-road, agriculture, mining, marine, industrial, even on the lawn and in the garden — when the task requires reliable, efficient, cost-effective hydraulic muscle, Eaton's hydraulics deliver engineered solutions you can count on, backed by service designed to ensure your complete satisfaction.

Call On the ACE Team for Custom Solutions.

Eaton's Application and Commercial Engineering (ACE) team is a unique resource that works with your engineers to optimize a hydraulic solution with the exact flow, displacement, pressure, torque, speed, and control software required to meet your needs. From a single component to a complete system solution, Eaton and the ACE Team are ready to help you get the job done right the first time and every time.

Engineered Products Address Unique Needs.

When the need goes beyond our wide range of standard product offerings, Eaton can offer OEMs a customized solution with world-class global engineering centers.

Global Distribution Means Global Support.

Eaton supports your products with more than 12,000 distributor locations worldwide. Service, parts, experienced technicians, and instant access to Eaton's hydraulic knowledge base and manufacturing resources are all as close as your local Eaton Hydraulics distributor.

Authentic Remanufactured Products.

Eaton Remanufactured parts and components meet the same exacting standards as the original products they replace. Insist on **authentic**:

- Eaton brand medium-duty and heavy-duty piston pumps and motors
- Vickers brand vane cartridge kits for pumps and motors
- Vickers brand piston rotating groups and complete units

They all come from our ISO 9001:2000 certified Reman facility. Before, during, and after the sale, Eaton's Hydraulics Business stands ready to meet all of your product, service and support needs.

World-Class Product Brands

You recognize the names because they are world-class leaders in their own right and integral parts of Eaton's Hydraulics Business worldwide reputation for quality and performance in hydraulic components, systems, fluid conveyance, service, and support.

Aeroquip®

Hose, fittings, adapters, couplings and fluid connectors for all pressures in industrial, aerospace, and automotive applications.

Boston®

Industrial hoses available in sizes 1/4" to 8" I.D. for chemical, petroleum, material handling, and food industry applications.

Char-Lynn®

Hydraulic steering units, general purpose motors, spool and disc valves, and Valve-In-Star™ (VIS) motors for both mobile and industrial applications.

Eaton®

Hydrostatic transmissions, valves, piston and gear pumps, and Valve-In-Star™ motors primarily focused on mobile equipment applications.

Hydro-Line®

Industrial cylinders in a range of sizes to meet the motion control needs of machine and equipment builders for products ranging from automobile production to large hydro-electric and off-shore drilling applications.

Synflex®

Lightweight, high pressure, abrasion and chemical resistant thermoplastic hoses and tubing for a range of industries including transportation, beverage dispensing, fluid power and specialty applications.

Vickers®

Vane and piston pumps, valves, cylinders and filtration products for industrial, aerospace, marine and defense applications.

Walterscheid®

Hydraulic tube connectors and fittings for the mobile and stationary markets.

Weatherhead®

Hydraulic hose, hose ends, assembly equipment, tube fittings, couplings and support accessories for construction, mining, agriculture, truck and bus applications.

Focus on Sustainability

Sustainability has always been at the heart of Eaton's products.

That heritage has become an advantage as customers seek to partner with us to develop more efficient – and innovative – products and services.

Solutions For Mobile and Industrial Applications That Have To Work

Eaton pumps, motors, transmissions, valves, cylinders, controls, hose and fittings offer a unique combination of proven technology and innovative design that translates directly into reliable performance and enhanced uptime.

Whether you need a single component, a custom-engineered solution, or anything in between, Eaton is the partner of choice for mobile and industrial applications that simply have to work.

Mobile Applications



Agricultural

Eaton has provided the technology to power agricultural equipment for over fifty years covering all types of machines and all types of functions. From innovative steering and sophisticated electro-hydraulic valves, tough hoses and fittings, to efficient pumps and motors, Eaton provides a full range of products to meet this market's needs.

Construction

Eaton's products provide compact, powerful products to meet the demanding needs of the construction market.

Components with fast, accurate response help meet the challenges for this market.

Earthmoving

Eaton's compact, powerful components help put the power where it's needed.

From propel motors and swing drives to auxiliary work systems, Eaton has many solutions to the demanding requirements of earthmoving applications.

Forestry

Eaton provides rugged, long life hydraulic components for the demanding needs of the forestry market. Compact, powerful components help put the power where it's needed.



Material Handling

Eaton's product range for the material handling market is second to none. Whether for propel circuits, steering functions, or auxiliary work circuits, Eaton provides a full range of products to meet the demanding needs for these machines.

Truck and Bus

Eaton hose and fittings, fan drive systems and HLA® systems (a leader in hybrid power train solutions) set a standard for truck and bus applications.

Utility/Vocational

Versatile, complete system solutions are available with the broad product range that Eaton provides. From innovative steering and sophisticated electro-hydraulic valves, tough hoses and fittings, to efficient pumps and motors, Eaton provides a full range of products to meet this market's system needs.

Mining

Eaton is the preferred choice for many of the auxiliary systems on mining equipment. Eaton products can handle the harsh environments and the rigorous duty cycles, and can survive the tough applications.

Industrial Applications



Automotive

Eaton products are trusted and specified by the world's leading automakers.

You can count on Eaton aftermarket support anywhere in the world.

Machine Tools

Eaton products enable machinery to deliver high productivity and consistent accuracy for metal cutting machinery.

High pressure and flow components – piston pumps, cylinders and cartridge valves, provide the muscle and control required for metal forming machinery.

Molding

Strong application support coupled with a full range of hydraulic products – wide range of cylinders, vane and piston pumps, cartridge valves and manifolds – provides you with a single source solution.

Oil and Gas

Eaton offers the most robust line of customized hydraulic solutions for both land and sea based oil and gas exploration, production and refinement platforms starting with our specialized rod coatings on large



cylinders, heavy duty pumps, high pressure hose for subsea production and no leak tube fittings. From motion compensation systems, jack pumps, to top drives, blow out preventers, iron roughnecks, winches and crane systems when you need reliable performance, count on Eaton hydraulic systems.

Port Machinery

Eaton understands the fast paced action of dockyards. You can rely on Eaton components to provide high productivity with maximum efficiency.

Power Generation

Eaton provides the complete, rugged and customized hydraulic control systems for power generation plants of all platforms including wind power, hydropower and thermal power. Eaton has the specific solutions for the renewable energy industry that are environmentally friendly.

Primary Metals

Eaton high pressure pumps, cylinders and valves are the ideal components for delivering the muscle required in these rugged applications. We can handle the heat and provide long life in mill environments.

Motors



Spool Valve Hydraulic Motors

Spool valve motors are typically used where compact, economical solutions are most needed in low pressure applications. Spool valve motors use a spool to precisely time and control flow through the orbit gear set (Geroter 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.

Applications: Harvesters, augers.

Specifications: Rated Speed: Up to 1,000 rpm. Torque Range: Up to 565 Nm (5,000 lb-in). Options: Variety of optional shafts, ports, mountings and displacements. Output Shafts: Straight with woodruff key, splined, tapered or straight with cross holes.

Delta Wheel Motors

The Char-Lynn® Delta wheel motor is designed to be an easy drop-in replacement for competitive wheel motors and offers several benefits. Char-Lynn's all new Delta Wheel motor will fill the growing need for a 4,000 psi intermittent pressure wheel motor. The Delta wheel motor's performance is based on proven disc valve technology with higher efficiencies and longer life through lower temperature operation.

Applications: Lawn and turf equipment, sweepers and scissor lifts.

Specifications: Size Range: 6.9 – 46 cid.



Motors



Disc Valve Hydraulic Motors

The Disc valve motors include the 2,000 series, 4,000 series, 4,000 compact series, 6,000 series and the 10,000 series. They all come with standard mount, wheel mount or bearingless. The Char-Lynn range offers many displacements, output shafts, port configurations and a multitude of special options that makes this product line the most flexible product to apply in the industry. The Eaton quality continues to be unrivaled and our plants consistently deliver excellent products on time.

Applications: Swing motor, brush cutters and mowers.

Specifications: Rated Speed: Up to 900 rpm. Torque Range: Up to 3,390 Nm (30,000 lb-in). Options: Wide variety of optional shafts, mountings, ports, displacements, speed sensors- and bolt-on valves. 2-Speed Models: Available in series 2,000 and 10,000.

HP30 Series Hydraulic Motors

The Char-Lynn® HP30 disc valve motor targets mobile off-highway applications requiring up to 3,389 Nm of intermittent torque and continuous operation with flow of 170 lpm at 310 bar, intermittent operation at 265 lpm and 345 bar and maximum inlet pressure of 400 bar.

Applications: Mobile off-highway vehicles.

Specifications: Efficiencies of the Char-Lynn valving system include: Rated Pressure: Up to 420 bar (6,000 psi) intermittent, 30,000 in-lbs of torque. Highest starting torque, even compared to cam lobe motors, smooth two speed option with integrated shift under load (1:1.5 ratio) and and integrated hydraulic brake option.



Motors



Valve-In-Star™ (VIS) Hydraulic Motors

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

Applications: Skid steer loaders, specialty harvesting, compactors, augers, forestry equipment, road rollers, sprayers and trenchers.

Specifications: Rated Speed: Up to 500 rpm. Torque Range: Up to 5,085 Nm (45,000 lb-in).

ME Series Hydraulic Motors

These double swash plate, opposed-piston, low-speed, high-torque hydraulic motors operate smoothly at low speed within the maximum ratings and cause very little torque ripple.

Applications: Swing drives, winches, top head drives, directional drilling machines and propel drives for large vehicles.

Specifications: Rated Pressure: 248 and 276 bar (3,600 and 4,000 psi). Torque Range: Up to 16,136 Nm (11,900 lb-in).



Motors



Hydrokraft Axial Piston Motors

Vickers Hydrokraft™ axial piston motors are ideally suited for the most demanding industrial type applications, including the harsh environment found in the offshore and oilfield markets. These motors are designed with the largest shaft bearings available for full thru-drive capability and long life required for industrial applications. These motors are available with a wide range of controls for the variable displacement versions including full over-center capability. Hydrokraft products are able to operate on a wide range of fluids including water-glycol.

Applications: Steel mills and marine applications.

Specifications: Displacement: 66 cc–750 cc. Rated Pressure: Up to 350 bar (5,000 psi); intermittent to 420 bar (6,000 psi). Rated Speed (Max.): 2,800–1,800 rpm.

Vane Motors

Vane motors are used in industrial and mobile applications. The proven reliability and the available cartridge kit designs make for uptime and easy serviceability. Additionally, a low break out force smooths out the start-up speed allowing for vane motors to be more forgiving to system pressure spikes. Vane motors offer an economical, efficient and economical means of applying variable speed, rotary hydraulic power and offer variable horsepower (constant torque) characteristics. They can be stalled under load without damage when protected by a relief valve.

Applications: Plastic injection molding and conveyors.

Specifications: Displacement: 1.32 in³/rev (21.6 cc/rev)–19.35 in³/rev (317.1 cc/rev). Rated Pressure: Up to 175 bar (2,500 psi) (size dependent). Rated Speed: Up to 4,000 rpm. Torque Range: Up to 119–847 Nm (1,050 to 7,500 lb-in). Heavy duty shaft bearing is also available.



Steering Control Units



Series 5

The Series 5 Steering Control Units (SCU) are designed for low flow, low pressure applications. The Series 5 units are available in two compact designs: Square housing (mount) unit with side ports and round housing (mount) unit with end ports. In addition to the installation flexibility, this new family of products has best-in-class steering feel and provides crisp centering. These units also have better efficiency (lower pressure drop) than competitive units.

Applications: Lawn, garden and turf equipment, lift trucks, marine and compact utility tractors.

Specifications: Displacement: 31.5 (1.92 in³/rev)–120 cm³/r (7.33 in³/rev). Rated Flow: 11–19 lpm (3–5 gpm). Rated Pressure (Max.): 140 bar (2,030 psi).

Series 10

Eaton's Series 10 Steering Control Unit (SCU) facilitates hydraulic fluid flow like no other unit on the market. This highly-engineered product is the ultimate SCU for mid-range flow applications. The Series 10 SCU has an unprecedented, continuous pressure rating of 275 bar (4,000 psi), making it ideal for heavy-duty equipment, such as construction and agricultural machinery. Its high-pressure rating reduces overall equipment costs, since smaller cylinder sizes can be assigned into the system. The Series 10 can incorporate proven Eaton technologies, including Q-Amp, Wide Angle, Versa Steer and Two-speed Steering.

Applications: Heavy-duty equipment, such as construction, forestry and agricultural vehicles.

Specifications: Displacement: 60–739 cm³/r (3.6–45.1 in³/rev). Rated Flow: 3.8–45 or 8.0–76 (Q-Amp) lpm (1–16 or 2–20 gpm). Rated Pressure (Max.): 275 bar (4,000 psi).



Steering Control Units



Series 20

The Series 20 Steering Control Unit (SCU) continues Eaton's tradition of innovative design and high quality. The Series 20 SCU provides much smoother steering function with Eaton's patented wide-angle feature, minimizing jerk motion on articulated vehicles. The seal and centering spring designs provide positive, low-effort steering feel to ensure excellent vehicle control, an important feature for the vehicles for which these steering control units were designed.

Applications: Articulated vehicles, such as wheel loaders, forestry equipment and dump trucks.

Specifications: Displacement: 60–985 cm³/r (3.6–60 in³/rev). Rated Flow: 38–125 lpm (10–33 gpm). Rated Pressure (Max.): 241 bar (3,500 psi).

Series 25

The Series 25 Steering Control Unit (SCU) includes two patented designs (Balanced Architecture and Wide Angle) that make it even more responsive, reliable and cost effective. Symmetrical valving provides passageways and valving that are equal in both directions and pressure areas that are staged for minimum leakage. Progressive valving makes it possible to produce the spool/sleeve valve in a way that assures reliability and reduces costs. Eaton's high capacity gerotor assembly provides a lot of capacity in a small package.

Applications: Large articulated vehicles such as, loaders, mining trucks, graders, scrapers, haulers and transporters.

Specifications: Displacement: 490–1,230 cm³/r (30–75 in³/rev). Rated Flow: 95–151 lpm (25–40 gpm). Rated Pressure (Max.): 241 bar (3,500 psi).



Steering Control Units



Series 40

The Series 40 Steering Control Units (SCU) is designed for the highest flow, highest pressure applications, and is the most capable steering control unit on the market. This SCU features patented Eaton technology and has design attributes that result in responsive, smooth, stable and cost effective steering.

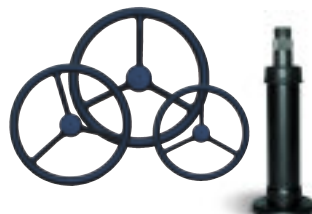
Applications: Large articulated and fixed frame vehicles.

Specifications: Displacement: 1,230 (75 in³/rev)–3,030 cm³/r (185 in³/rev). Rated Flow: 151–227 lpm (40–60 gpm). Rated Pressure (Max.): 241 bar (3,500 psi).

Steering Accessories

Eaton offers a complete line of steering columns and wheels to fit every need. Fixed and tilt columns feature a sturdy weldment design and are phosphate coated to maintain corrosion resistance. Columns are available with multiple jacket types and various horn wire configurations. Lengths from 2.2" to 33" will ensure that these columns can be customized for any application.

Eaton also offers steering wheels with added features like soft touch feel, spinner knobs and horn buttons. Wheels come in a standard 3-spoke design with size from 14" to 17".



Vane Pumps



VMQ Pumps

The Vickers VMQ is the world leader in pressure capacity and noise levels and is available in a complete range of singles, doubles, triples and thru-drives. The unique wafer plate design of the VMQ allows for the increase in viscosity and pressure rise during cold start-up – something that competitors do not have. The Vickers VMQ 32nd design is the highest pressure, lowest noise fixed vane pump available.

Applications: Marine and railway winches, oil field and drilling equipment, earthmoving and construction equipment, high-pressure plastic injection molding machines, large press machines, trash compactors and large balers.

Specifications: Displacements: .60 in³/rev (10 cc/rev)–28.2 in³/rev (463 cc/rev) Using single; double and triple pump combined flow. Rated Pressure: Up to 293 bar (4,250 psi). Rated Speed: Up to 3,000 rpm.

V/VQ Pumps

The V series pumps are designed for medium pressure industrial applications. Its industry-first intra-vane cartridge design provides long operating life, outstanding volumetric efficiency and excellent serviceability. The super-quiet 12-vane system is ideal for the indoor industrial environment. The 22nd design is well known for reliability and versatility, and is extensively used in industrial machinery all over the world.

Applications: V Series – General industrial applications such as plastic injection molding machines, presses, material handling machines, industrial power units, aerial booms.

VQ Series – General mobile applications such as wheel loaders.

Specifications: Displacement: .45 in³/rev–20.61 in³/rev (7.4–337.8 cc/rev). Using single; double and triple pump combined flow. Rated Pressure (Max.): Up to 210 bar (3,000 psi) continuous. Rated Speed: Up to 2,700 rpm.



Vane Pumps



V10/V20 Pumps

The V10 and V20 pumps are designed for medium to low-pressure mobile and industrial applications. Time proven dependable, durable, quiet and most economical vane pumps. They are the premium fixed pump choice as the main system pumps for small industrial and mobile equipment or as pilot and auxiliary pumps for complex systems. They are also the standard steering pump technology for heavy-duty trucks and interstate buses. Optional integrated flow control valves simplify system design and installation.

Applications: Use in less demanding applications. Power units, power steering, skid steerers, lift trucks and balers.

Specifications: Displacement: 0.2 in³/rev (3.3 cc/rev)–5.18 in³/rev (84.8 cc/rev). Using single and double pump combined flow. Rated Pressure (Max.): Up to 175 bar (2,500 psi) continuous. Rated Speed: Up to 4,800 rpm.

VVS/VVP Pumps

The VVS and VVP series variable vane pumps are cost effective solutions for low to medium pressure industrial applications where a flexible flow and low noise is required. A full range of control options are available from basic pressure compensator to load sensing, torque limiting control. The pumps are designed for long operating life thanks to hydrodynamic lubrication of bearings.

Applications: These pumps have a large displacement capability and typically have low maximum pressures similar to the V10/V20. VVS/VVP are used on numerous industrial applications with low-pressure needs. Machine tools.

Specifications: Displacement: .37 in³/rev (6.0 cc/rev) – 6.1 in³/rev (100.0 cc/rev). Rated Pressure (Max.): Up to 160 bar (2,300 psi) continuous. Rated Speed: Up to 1,800 rpm.



Vane Pumps



VQ(H) Pumps

The VQ series pumps are designed for medium pressure mobile applications. Its 10-vane system is well tuned for higher pressure and higher speed mobile requirements. It has the industry-first intra-vane cartridge design that provides long operating life, outstanding volumetric efficiency and excellent serviceability. The design is widely adopted by world's leading mobile equipment manufacturers.

The VQH series pumps are the higher pressure and higher performance version of VQ series pumps. The new rotor design reduces internal leakage and enhances rotor rigidity. VQH pump uses strong ductile iron housing and has the same envelope size as VQ pump.

Applications: Wheel loaders, lift trucks, refuse trucks.

Specifications: Displacement: 2.45 in³/rev (40.2 cc/rev)–19.22 in³/rev (315 cc/rev). Using single and double pump combined flow. Rated Pressure (Max.): Up to 262 bar (3,800 psi) continuous. Rated Speed: Up to 2,700 rpm.



Open Circuit Piston Pumps



420

420 series mobile pumps are open circuit, axial piston designs. A variety of controls provide the ability to match the pumps to each application. Efficiency of the pump controls allows downsizing of systems cooling needs, allowing a smaller and less expensive design to be used. Alternatively, cooling capacity could be kept the same and the flow capability of the system increased, thus improving performance and customer satisfaction.

Applications: Refuse and utility boom trucks, ag. tractors, skid steer loaders, rough terrain fork lifts, wheel loaders, backhoe loaders, earth moving equipment, generator drives, fan drive systems.

Specifications: Displacements: 41 cc, 49 cc, 62 cc and 80 cc. Rated Pressure: 280 bar (4,060 psi) continuous, 320 bar (4,640 psi) intermittent. Rated Speed: Up to 2,650 rpm.

PVB

One of the most widely known industrial open circuit piston pumps on the market. The large number of control options provides for extreme flexibility in applications.

Applications: Factory automation, hydraulic power supplies, and small mobile equipment auxiliary circuits.

Specifications: Displacement: 10 cc – 94 cc. Rated Pressure: Up to 210 bar (3,000 psi). Rated Speed: 1,800 rpm maximum.



Open Circuit Piston Pumps



PVQ

Based on the industrial versions of PVB and PVE open circuit piston pumps, the Q Series greatly improves operating noise levels. The design of the PVQ reduces sound levels by 4 dBA. The large number of control options provides for extreme flexibility in applications.

Applications: Factory automation, hydraulic power supplies, food processing machines and machine tools.

Specifications: Displacement: 10 cc – 45 cc. Rated Pressure: Up to 210 bar (3,000 psi). Rated Speed: 1,800 rpm maximum.

PVE

Eaton PVE piston pumps are inline, variable displacement pumps that are available in three displacement sizes. An assortment of optional controls offers maximum operating flexibility.

Pump displacement is varied by means of pressure and/or flow compensator controls. Aluminum die cast housing allows low unit weight for unsupported PTO drive applications. Mobile pressure compensated, pressure and flow compensated and remote pressure control options are in wide use.

Applications: Farm tractors, agriculture equipment, utility vehicles, construction equipment and many other mobile applications.

Specifications: Displacement: 25 cc – 45 cc. Rated Pressure: Up to 210 bar (3,000 psi). Rated Speed: 3,000 rpm maximum.



Open Circuit Piston Pumps



PVH

PVH high flow, high performance pumps are a family of variable displacement, inline piston units that incorporate the proven design, quality manufacturing techniques and operating features of other Vickers® piston pumps, but in a smaller, lighter package. The PVH series has been specially designed to meet the 250 bar (3,625 psi) continuous duty performance requirements of new generation mobile machines.

Applications: Mobile: wheel loaders, graders, scrapers, utility vehicles, dozers, forestry harvesting machines, and rock drills.

Industrial: metal-forming equipment, hydraulic power supplies, press, factory automation and machine tools.

Specifications: Displacement: 57 cc–141 cc. Rated Pressure: Up to 250 bar (3,600 psi) continuous. Rated Speed: Up to 2,600 rpm.

PVM

One of the quietest medium pressure pumps available on the market, with up to 10 dBA quieter than most dual usage pump products. Noise levels significantly lower than other pump brands. Reduces need for expensive sound enclosures or inline pulsation dampers. Features like gauge ports and adjustable displacement come standard with each pump.

Applications: Metal forming, tube bending, machine tools, precision sawing, factory automation, press, and hydraulic power supplies.

Specifications: Displacement: 18 cc to 141 cc. Rated Pressure: Full 280 bar (4,000 psi) continuous, 320 bar (4,600 psi) intermittent. Pressure compensation and pressure/flow compensation controls. Electric motor speeds. Mineral-oil-based and fire-resistant fluid compatibility.



Open Circuit Piston Pumps



PVXS

The Hydrokraft™ PVXS design pumps are high pressure (350 bar) axial piston pumps designed for industrial markets. The PVXS pumps are widely used where their range of specialized pump controls can optimize circuits.

Applications: Metal forming, tube bending, press, marine and off-shore winches, chemical mixing grinding/shredding and hydraulic power supplies.

Specifications: Displacement: 66 cc (4.0 in³)–250 cc (15/2 in³). Rated Pressure: Full 350 bar (5,000 psi) continuous. Electric Motor Speeds. Mineral oil based and fire resistant fluid compatibility.

PVWS

The Hydrokraft™ PVWS design pumps are high pressure (350 bar) axial piston pumps. These products are designed for industrial markets and have a perpendicular style control mechanism allowing tandem pump combinations with short lengths. These high displacement pumps have a very long list of optimized control options that allow operation in many unique customer applications.

Applications: Metal forming, tube bending, press, marine and off-shore winches, chemical mixing grinding/shredding and hydraulic power supplies.

Specifications: Displacement: 250 cc (15.2 in³)–750 cc (45.7 in³). Rated Pressure: Full 350 bar (5,000 psi) continuous. Electric Motor Speeds. Mineral oil based and fire resistant fluid compatibility.



Closed Circuit Piston Pumps and Motors



Heavy Duty Series 1 Axial Piston Pumps

Series 1 offers durability and high power density, plus a variety of options and controls.

Applications: Agricultural, transit mixer drum drives, industrial applications, lift trucks, timber harvesters, road rollers, wheel loaders and construction equipment.

Specifications: Displacements (five): 64 cc/r (3.9 cir)–125 cc/r (7.62 cir). Rated Pressure: Up to 430 bar (6,250 psi). Rated Speed: Up to 4,160 rpm.

Heavy Duty Series 2 Axial Piston Pumps

Series 2 pump meets the market's demands for compact, quiet hydrostatic power. The power-dense, axial-piston design and wide range of controls are suited for mobile and industrial applications. Series 2 offers durability and high power density, plus a variety of options and controls.

Applications: Agricultural, crop sprayers, lift trucks, timber harvesters, road rollers, wheel loaders, road building, construction equipment and industrial applications.

Specifications: Displacements (four): 64–105 cc. Rated Pressure: 430 bar (6,250 psi). Rated Speed: Up to 4,510 rpm. Integral charge pumps. A, B, B-B, C auxiliary through-drives.



Closed Circuit Piston Pumps and Motors



Bent Axis Motors – Fixed and Variable

Our heavy duty Eaton® Model Series 1 fixed displacement piston motors and heavy duty Eaton® Model Series 1 variable displacement piston motors are well known for exceptional quality and longevity. With many mounting options and control features, we have a heavy duty motor for your most demanding applications.

Applications: Earthmoving machines and construction equipment, agricultural and forestry vehicles, marine and off-shore equipment, industrial conveying, mixing and other stationary in-plant uses.

Specifications: Displacement: Eleven fixed displacement options: 11 cc (.66 cir)–225 cc (13.73 cir); Five variable displacement options: 55 cc (3.34 cir)–225 cc (13.73 cir). Rated Pressure 350 bar (5,100 psi), peak pressure to 450 bar (6,500 psi). Rated Speed: Up to 5,590 rpm.

Heavy Duty Axial Piston Motors – Fixed and Variable

Our heavy duty Eaton® Model Series 1 fixed displacement piston motors and heavy duty Eaton® Model Series 1 variable displacement piston motors are well known for exceptional quality and longevity. With many mounting options and control features, we have a heavy duty motor for your most demanding applications.

Applications: Agricultural, construction, lawn and turf, utility equipment.

Specifications: Displacements (six): 64 cc/r (3.9 cir)–125 cc/r (7.62 cir). Rated Pressure: Up to 430 bar (6,250 psi). Rated Speed: Up to 4,160 rpm.



Closed Circuit Piston Pumps and Motors



Medium Duty Axial Piston Manual Pumps

Different valve plate options provide a range of control efforts that can closely match your application needs. A square control shaft reduces control linkage wear. A flexible pump design, with single, tandem, and back-to-back versions available.

Applications: Agricultural, construction, lawn and turf, utility equipment.

Specifications: Model 70160 – Displacement (Max.): 23.6 cc (1.44 cid). Rated Pressure (Max.): 345 bar (5,000 psi) intermittent; 210 bar (3,000 psi) continuous. Rated Speed (Max.): 3,600 rpm. Model 70360 – Displacement (Max.): 40.6 cc (2.48 cid). Rated Pressure (Max.): 345 bar (5,000 psi) intermittent. Rated Pressure: 210 bar (3,000 psi) continuous. Rated Speed (Max.): 3,600 rpm.

Hydrokraft Axial Piston Pumps

Closed circuit X/W series pumps are closed loop axial piston pumps. Rated 350 bar continuous, 420 bar peak with advanced control options and through-drive for all heavy duty industrial and mobile applications.

Hydrokraft TVX variable open circuit piston pumps: The TVX product line is available from 66 cc to 90 cc at pressures up to 350 bar.

Hydrokraft TVW variable open circuit piston pumps: The TVW product line is available from 130 cc to 750 cc at pressures up to 350 bar.

Applications: Heavy duty industrial and mobile equipment.

Specifications: Displacement: 66 cc to 750 cc. Rated Pressure: Up to 350 bar (5,000 psi); intermittent to 420 bar (6,000 psi). Rated Speed (Max.): 2,600–1,800 rpm.



Light Duty Hydrostatics



Light Duty Transaxles

The Model 751, 771, 781 and 851 Hydrostatic transaxles use time proven ball piston design for both pumps and motors. The model 751 and 851 use one ball piston pump and two ball piston motors to provide the speed and torque required to propel vehicles of many different sizes. The 771 is an assembly of one pump and one motor. The 781 is two units similar to the 771 joined together to make one assembly.

Applications: Lawn and turf tractors, utility vehicles and ZTR mowers.

Specifications: Output Speed (Max.): Model 751–110 rpm (3,600 rpm Input), Model 771–153 rpm (3,600 rpm Input), Model 778–121 rpm (3,600 rpm Input), Model 851–112 rpm (at 3,200 rpm input).

Medium Duty Axial Piston Servo Pumps

For ease of operation or electronic pump controls this product is the choice. A versatile, pump with many features and options. For example, five different charge pump displacements are available. A flexible design configured to meet your needs with many features and options.

Applications: Agricultural, construction, lawn and turf, utility equipment.

Specifications: Displacement (Max.): 49 cc (3.00 cid). Rated Pressure: 210 bar (3,000 psi) continuous. Pressure (Max.): 379 bar (5,500 psi) intermittent. Rated Speed (Max.): 3,600 rpm.



Medium Duty Hydrostatics



Eaton 350 Series

The 350 Series mobile pump is an advanced, closed circuit, servo controlled, axial piston design offered as a dual pump (two pumps in one housing) for medium duty hydrostatic circuits. The pumps offer the latest design in Eaton technologies for closed circuit piston pumps along with a wide variety of responsive controls. These controls include mechanically or electrically-actuated feedback controls, hydraulic or electronic proportional controls and a three position (Forward-Neutral-Reverse) electric control.

Applications: Agricultural, construction and utility equipment.

Specifications: Displacements: 49 cc (3.00 cid), 62 cc (3.8 cid). Rated Pressure: 380 bar (5,500 psi). Rated Pressure: 280 bar (4,000 psi) continuous.

Medium Duty Axial Piston Motors – Fixed and Variable

Match these motors up with the appropriate pump for a robust hydrostatic transmission. They offer opposite, same and rear port configurations with many optional spline and keyed shafts. Available with shuttle valve, back pressure valve for improved loop cooling and flushing. Also offer speed sensors and a through-shaft option for brake mounts. Variable motors are available with hydraulic destroke or servo control.

Applications: Agricultural, construction, lawn and turf, utility equipment.

Specifications: Displacements: 1.50, 1.80, 2.01, 2.48, 3.02 cu. in. Rated Pressure: 210 bar (3,000 psi) continuous. Pressure (Max.): 370 bar (5,400 psi) intermittent. Rated Speed (Max.): 3,600 rpm.



Transmissions



Light Duty Transmissions

The Model 6, 7 and 11 hydrostatic transmission consists of a variable displacement pump, a fixed radial ball piston hydraulic motor and a system of valves, all contained in one housing.

Applications: Lawn tractors (8-20 HP) and seeders, commercial mowers, golf course maintenance equipment, concrete saws, utility trucks, garden tractors and ZTR (zero-turn radius) mowers.

Specifications: Models 6 and 7 – Speed (Max.): Input 3,600 rpm, Output 2,150 rpm. Torque output: 14 Nm (120 lb-in) continuous; 20 Nm (180 lb-in) intermittent; 27 Nm (240 lb-in) peak.

Model 11– Speed (Max.): Input 3,600 rpm, Output 0–1,950 rpm. Torque Output: 41 Nm (360 lb-in) continuous; 61 Nm (540 lb-in) intermittent; 81 Nm (720 lb-in) peak.

Medium Duty Transmissions

These transmissions combine a variable displacement piston pump and either a fixed displacement or variable displacement hydraulic motor.

Applications: Skid steer loaders, trenchers, golf course maintenance equipment, commercial mowers, pavers, compact wheel loaders, telehandlers, rough terrain fork lifts, aerial work platforms, windrowers, road rollers, boring machines and directional drills, crawlers, small sprayers, tub grinders, mini-backhoes, sweepers, special purpose vehicles.

Specifications: Displacement – Pumps: 20 cc's (1.24 cid) – 49 cc's (3.00 cid).

Displacement – Motors: 12 cc's (0.75 cid) – 82.6 cc's (5.04 cid).

Rated Pressure (Max.): 350 bar (5,000 psi). Input Rated Speed (Max.): 3,600 rpm.



Gear Products



GGP Pumps

Gear pumps made of floating bushing, pressure balanced design, with an extruded body in high strength aluminum alloy and endcover and flange in cast iron. The wide choice of shafts, flanges and ports, in compliance with all international standards (SAE, DIN and EUROPEAN).

Applications: Garden and utility tractors, backhoes, lift trucks, combines, road graders, fan drive systems, agriculture tractors and harvesters and industrial power units.

Specifications: Displacement: 0.8 in³/rev (1.3 cm³/rev)–2.04 in³/rev (33.4 cm³/rev). Rated Pressure: 280 bar (4,000 psi). Max. Pressure: Up to 305 bar (4,425 psi). Rated Speed (Max.): 4,000 rpm.

S26/L2 Pumps and S26 Motors

SAE A and B mount aluminum pumps with many shaft and porting options. Meets SAE and Metric standards. Single and multiple sections available. Optional integral relief and flow valves simplify system design and installation. Easy field reversibility.

SAE A Bi-directional gear motors made of a fixed bushing, pressure balanced die cast aluminum design. A rigid and compact structure that makes it possible to incorporate a number of functions in a limited space.

Applications: Garden and utility tractors, backhoes, combines, road graders, hay swathers, fan drive systems, vibratory machines and industrial power units.

Specifications: Displacement: 0.43 in³/rev (7 cc/rev)–1.94 in³/rev (31.8 cc). Rated Pressure (Max): 207 bar (3,000 psi). Rated Speed (Max.): 4,000 rpm.



Power Units



Power Units

The most complete line of industrial power units in the marketplace, including verticals, horizontal, L's, over-heads, JIC and custom configurations. We offer one of the industry's leading ways to buy power units with the most flexible range of standard configurations. Eaton standard system products include simple power units, bar manifolds and pump/motor groups that are configurable with Eaton's Packaged Systems Configurator (PSC2.0). In addition to engineered standards, Eaton's Application and Commercial Engineering (ACE) Group can design, manage and help install custom power units for special applications. Eaton has a network of approved integrators specializing in different applications and requirements for Custom Systems. The network allows Eaton to provide the highest quality at minimal cost.

Applications: Civil projects, primary metals, metal forming, automotive, pulp and paper, wind power, entertainment and food and beverage.



Valves



Proportional Control Valves

Eaton's Vickers® proportional valves have both product breadth and width consisting of onboard electronics (OBE) and non-OBE, full functionality, complete sizes, different performance levels to meet various customer demands in Industrial and Mobile markets. The KB family of proportional valves have integrated OBE with superior reliability and durability featuring digital electronics, IP658L, IP67 environmental protection, reduced power consumption, valve enable and ramp adjustment.

Applications: Metal forming, plastic machinery, wind power, primary metals, plus more.

Specifications: Rated Flow: Up to 700 lpm (185 gpm). Rated Pressure: Up to 350 bar (5,000 psi). Function: Direction, pressure, flow. Size: NG6-32 (D03-10).

Flange Valves

Flange mounted valves are ruggedly designed for direct mounting to pump flange, which reduces potential leak resistance, improve shock resistance, reliability and life.

Applications: Industrial balers, die casting, steel mills, plus other industrial applications.

Specifications: Rated Flow: Up to 750 lpm (200 gpm). Rated Pressure: 350 bar (5,000 psi). Size: SAE 3/4"–1-1/2".



Valves



Directional Control Valves

Eaton's Vickers® DG valves mount on industry standard surfaces and provide 3 or 4-way control in a broad range of applications, industrial and mobile. Their primary function is to direct fluid flow to a cylinder or to control the direction of rotation of a hydraulic motor. These valves can be actuated by solenoid, hydraulic or pneumatic pilot, lever, or mechanically. A full range of complementary pressure, flow and check valve functions are available in the Eaton SystemStak™ family of sandwich mounted valves. Eaton DG valves are available in 10 different frame sizes.

Applications: Multiple industrial applications.

Specifications: Rated Flow: Up to 1,100 lpm (290 gpm). Rated Pressure: Up to 350 bar (5,000 psi). Size: NG4-32 (D02-10).

Flow Controls – Adjustable

Temperature and pressure-compensated flow controls allow precise volumetric control. Suitable for pressures up to 3,600 psi, flow controls are available with (bypass type) or without (restrictor type) integral relief valves. Adjustable flow control valves are suited for applications requiring flow regulation without pressure compensation.

Applications: Multiple industrial applications.

Specifications: Rated Flow: Up to 106 lpm (28 gpm). Rated Pressure: Up to 250 bar (3,600 psi).



Valves



SystemStak™ Modular Valves

These compact hydraulic systems feature modular valves that are "sandwich" mounted between a directional control valve and a standard mounting surface. These valves provide a compact hydraulic circuit at a reduced cost, eliminating interconnecting piping. Each valve "stack" can be configured to provide the specific system functions.

Applications: Machine tool and multiple industrial applications.

Specifications: Rated Flow: Up to 340 lpm (90 gpm). Rated Pressure: Up to 315 bar (4,500 psi). Function: Relief, reducing, sequence, check, PO check, throttle, counterbalance. Size: NG4-25 (D02-08).

Pressure Control Valves

Pressure control valves perform pressure relieving, reducing, sequencing and unloading control. Both subplate and in-line mounting types are available with various control types including remote, multiple pressure and venting.

Applications: Multiple industrial applications.

Specifications: Rated Flow: Up to 680 lpm (180 gpm). Rated Pressure: Up to 350 bar (5,000 psi).



Valves



Servo Valves

These two-stage, four-way, flap-per nozzle valves provide system closed loop control with exact positional accuracy, repeatable velocity and predictable force (torque regulation).

Compared to Vickers® SM4 servo valves, the SX4 offers extended frequency response for more demanding close loop applications. Eaton also offers a servo trade up program with incentives for replacing competitors valves.

Applications: Test and simulation equipment, plastic blow molding, sawmills and other industrial applications.

Specifications: Rated Flow: Up to 151 lpm (40 gpm). Rated Pressure: Up to 350 bar (5,000 psi). Function: Positioning, speed and pressure control. Size: SM4/10-40; SX4/20

Slip-in Cartridge Valves

Typically associated with relatively high flows, i.e., 40 gpm (150 lpm) or higher, slip-in cartridge valves are targeted at more efficient, faster and more compact hydraulic systems. Eaton's cartridge valve system technology meets the changing needs of new generations of hydraulically operated machinery and equipment. Today's machines need controls that are exceptionally cost effective and energy efficient. Vickers® cartridge valves fulfill these needs.

Applications: Metal forming, plastics machinery, primary metal, die casting machine.

Specifications: Rated Flow: 75 lpm (20 gpm). Rated Pressure: 240 bar (3,500 psi).



Valves



Ultronics® Valve System – Twin Spool

The Ultronics® ZTS16's open architecture and patented twin spool design enables exciting new functionality and advanced control options for many applications and end-users. The valve features a J1939 or CANOpen CAN interface which allows system developers to apply a complete Eaton control system or simply a standalone valve. Each valve section has twin independent metering for system functionality, flow and pressure control. Open architecture allows users to develop their own application level programs using Eaton's Control F(x)™ software and EFX controllers, or their own controller and associated software.

Applications: Mini-excavator, forestry, backhoe loaders, telehandlers, utility vehicles, cranes.

Specifications: Work Section Flow: 130 lpm (34 gpm). Rated Pressure (NFPA): 300 bar (4,350 psi).



Valves



Screw-in Cartridge Valves

For over seventy years the Vickers® brand has been providing customers with quality products and innovative solutions for all of their power and motion control needs with the very best in screw-in cartridge valve technology. Eaton is committed to maintaining this position by offering the most comprehensive range of cartridge valves for on/off highway and stationary equipment.

Applications: Harvesters, refuse haulers, mobile and industrial applications.

Specifications: Rated Flow: Up to 560 lpm (150 gpm). Rated Pressure: Up to 420 bar (6,000 psi).

MDG Mobile Valves

The Eaton MDG mobile directional control valve is a versatile and modular design based upon the proven, industry-leading Vickers® DG design. The MDG valve design is a closed center, parallel or series circuit that can also function as an open center circuit through the use of unloading inlet options. The MDG valve offers versatility and flexibility in system applications through a sectional design, allowing the use of up to six sections per bank assembly. The MDG valve can be configured to create custom, multi-functional circuits through the use of optional banking functions such as inlet and work port options.

Applications: Skid steer, excavators, tractors, harvesters, transit mixers, telehandlers.

Specifications: Rated Flow: 60 lpm (15.8 gpm), on/off 20 lpm (5.3 gpm). Rated Pressure: 350 bar (5,000 psi) proportional.



Valves



Monoblocks – 5 and 15 gpm

Excellent monoblock design results in fewer leakage paths. Hardened and plated spools provide superior impact and corrosion resistance. Two-point mounting prevents spool binding.

Applications: Trenchers, sweepers/scrubbers, stand-up lift trucks, aerial work platforms, small ag loaders, garden tractors, golf course maintenance equipment and highway mowers.

Specifications: Rated Flow: 19 and 56 lpm (5 and 15 gpm). Rated Pressure: 172-207 bar (2,500-3,000 psi).

Self-Leveling Valves

These linear flow divider valves are used on skid steer or agricultural loaders, for automatic leveling of bucket or attachments. Available in single directions (raise only) or dual direction.

Applications: Skid steers, front end loaders.

Specifications: Rated Flow: Up to 75 lpm (20 gpm). Rated Pressure: 240 bar (3,500 psi).



Valves



CMX Sectional Valves

CMX sectional valves provide hydraulic or electrical actuation, allowing generous flexibility for location and installation in a vehicle. Phasing between meter-out and meter-in can be pre-selected to easily match valve metering to type of load and cylinder area ratio and permit lowering without using pump flow. Pressure compensated meter-in provides good metering when two or more functions are operated simultaneously and permits priority to be accomplished in pilot circuit.

Applications: Forestry equipment, wheel loaders, rough terrain lift trucks and boom man lifts.

Specifications: Rated Flow: 98 and 159 lpm (26 and 42 gpm). Rated Pressure: Up to 350 bar (5,075 psi) depending on port configuration.

Flow Divider Valves

Eaton's flow dividers are available in priority, proportional, variable and load sensing versions with a wide range of standard flow ratings and relief settings. Eaton load sensing priority valves provide dependable flow on demand for load sensing steering, braking or other priority functions while allowing excess flow to be used for auxiliary functions.

Applications: Tractors, motor graders, lift trucks, and backhoe/loaders.

Specifications: Priority Flow Rate: 96 lpm (25 gpm), Rated Pressure: 172 bar (2,500 psi); Proportional 113 lpm (30 gpm), 172 bar (2,500 psi); Variable Priority: 76 lpm (20 gpm), 172 bar (2,500 psi); Priority: 175 lpm (45 gpm), 195 bar (2,800 psi); Load Sensing Priority Valve: 240 lpm (63 gpm), 297 bar (4,300 psi).



Cylinders



Heavy Duty Welded

Eaton's Vickers® and Hydro-Line® W-Series heavy duty welded cylinders are industrial grade products for the toughest applications. This robust product line has been designed to ensure the longest duty life and features an innovative sealing system design that eliminates leakage.

Applications: Huge range of applications including machine tools, balers, trash compactors, stationary material handling, and other general machinery.

Specifications: Rated Pressure: Up to 207 bar (3,000 psi) for Hydraulic; 17 bar (250 psi) for Pneumatic standard products (higher capability in custom cylinders). Available standard sizes: 102-305 mm (4-12") bore, to 7,620 mm (300") stroke, custom cylinders available.

Threaded

Eaton's Vickers® and Hydro-Line® T-Series threaded cylinders have been designed to provide robust capability in a compact envelope. These cylinders, ranging in size from 3/4" (20 mm) to 8" (200 mm) bore and to 180" (4.5M) stroke lengths, are sold to markets like waste processing and material handling.

Applications: Huge range of applications including machine tools, balers, trash compactors, stationary material handling, and other general machinery plus more.

Specifications: Rated Pressure: Up to 70 bar (1,000 psi) for Hydraulic and 17 bar (250 psi) for Pneumatic standard products (higher capability in custom cylinders). Available standard sizes: 19-203 mm (3/4-8") bore, to 4,572 mm (180") stroke, custom cylinders available.



Cylinders



Mill (Flanged)

Eaton's Vickers® and Hydro-Line® M-Series mill duty cylinders are designed to meet the tough demands of primary metals customers. These cylinders, ranging in size from 2" (50 mm) – 16" (400 mm) bore and to 300" (8m) stroke, are sold into arc furnaces, slab casters, rolling mills, and coating lines. Our robust product design is more than tough enough to last in these demanding applications.

Applications: Primary focus is steel mill and other primary metals/heavy industry applications.

Specifications: Rated Pressure: Up to 207 bar (3,000 psi) for Hydraulic and 17 bar (250 psi) for Pneumatic standard products (higher capability in custom cylinders). Available standard sizes: 51-406 mm (2-16") bore, to 7,620 mm (300") stroke, custom cylinders available.

Tie Rod

Eaton's Vickers® and Hydro-Line® G, N, I, and L-Series are a broad range of NFPA and ISO hydraulic, pneumatic, and electrohydraulic cylinders focused on industrial markets. This comprehensive line features a proven design coupled with the Eaton SureSeal™ system for improved performance and better service-ability. This line offers virtually unlimited options.

Applications: Presses, plastic blow and injection molding equipment, machine tools, packaging and material handling equipment, and food processing plus more.

Specifications: Rated Pressure: Up to 207 bar (3,000 psi) for Hydraulic and 17 bar (250 psi) for Pneumatic standard products (higher capability in custom cylinders). Available standard sizes: 19-763 mm (3/4-30") bore, to 7,620 mm (300") stroke.



For complete specifications, view literature online: hydraulics.eaton.com/products/menu_main.htm
Specifications are subject to change. Consult an Eaton Customer Representative for latest information.

Cylinders



Custom

From very small to extra-large scale (Hydrowa® XL-Series), Eaton offers the broadest range in the industry of custom cylinders. World-class base designs, advanced technology capability in coatings and seal systems, best-in-class simulation/modeling tools and processes, and decades of broad application expertise serve as the foundation for the custom cylinder business.

Applications: Huge range of applications varying from plastic molding equipment, presses, machine tools, primary metals, packaging and material handling, food processing, offshore, civil engineering and marine.

Specifications: Rated Pressure: Up to 690 bar (10,000 psi) for Hydraulic and 17 bar (250 psi) for Pneumatic products. Available sizes: to 1,200 mm (47") bore, to 22,000 mm (866") stroke.



Hose and Fittings



High Pressure Spiral Hose and Fittings

Eaton offers a wide variety of spiral hose constructions for all types of applications. These 4 and 6-wire hoses are well suited for a vast array of both industrial-stationary and on-off highway mobile applications. Our Spiral hoses are designed to meet the most demanding applications providing maximum durability and long-lasting performance.

Applications: Hydrostatic drives, oil rigs, construction equipment, mobile and industrial systems.

Specifications: Available in a broad range of cover materials and sizes that work in a variety of applications. Our hoses meet or exceed EN/DIN, Mil-spec and SAE specifications.

Medium Pressure Braided Hose and Fittings

Medium pressure braided hose and fittings represent the largest market and widest variety of hydraulic applications.

Applications: General hydraulic systems, mobile equipment, industrial equipment.

Specifications: A range of hose styles and sizes that meet a variety of EN/DIN, Mil-spec and SAE specifications. Certifications include ABS, DNV, MSHA, DOT/FMVSS and many more.



Hose and Fittings



Low Pressure Hose

Choose from a full range of low pressure hose including high-temperature AQP, abrasion resistant covers for demanding service life and color covered hose for installation identification. Use with Eaton's "Socketless hose fittings".

Applications: Size Range: 1/4" I.D. through 3/4" I.D. (Not recommended for hydraulic impulse applications). Ranging from low pressure machine tools, fuel, oil, air and water.

Thermoplastic

The versatility of thermoplastic and the experience of Synflex® combine to offer the best hoses for hydraulic, truck, sub-sea and specialty applications.

Applications: Off-shore oil and gas drilling, forklifts and agricultural equipment.

Specifications: Hose with I.D.'s that range from 1/8" thru 1". Rated Pressure: Up to 690 bar (10,000 psi).



Specialty Hose and Fitting Products



Industrial Hose

From low pressure air and water to hazardous chemical transfer, Eaton offers a variety of hoses to meet the exact needs of an application. These products range from 1/4" to 8" I.D. in size and many are available in either spiral or braided construction.

Applications: Air, water, cleaning, material handling, food, chemical, petroleum, steam hoses and specialty service.

Specifications: RMA Class A tube and cover materials, MSHA approved covers, FDA approved and NSF-51 certified food and beverage products.

Teflon® Hose

Teflon® hose for very high temperature applications as well as low temperature where a broad range of chemical resistance, low coefficient of friction, flexibility and non-aging is required. A broad range of hose and matched fittings are available for use in a wide variety of applications.

Applications: Truck, chemical, hot melt, paper and pulp, hot presses, steam, packaging, paint and machinery.

Specifications: Meet SAE 100R14A and B specifications. Rated Pressure: Up to 350 bar (5,000 psi).

Teflon® is a registered trademark of DuPont.



Specialty Hose and Fitting Products



A/C and Transportation Products

Engineered components and assemblies for a wide range of A/C and refrigeration systems. Hose materials range from barrier to nylon veneer. Hoses such as GH134 "Refresh" offering the lowest permeation for a multi-refrigerant hose, to reduce greenhouse emissions.

Applications: Hose and fittings for air conditioning and refrigeration. Truck, bus, agriculture and construction.

Specifications: Products are tested to SAE J2064.

Performance Products

High performing hose, fittings and adapters for motorsport enthusiasts and professionals around the world. Aeroquip® Performance Products...There is a difference!

Applications: Fuel, A/C, lube, oil, coolant, gauge, air tools and brake lines.

Specifications: Engineers and manufactures its own hose and fittings. State-of-the-art testing capabilities and ISO 9001 and QS 9000 quality certified facilities are Eaton hallmarks.



Specialty Hose and Fitting Products



Marine/Military

Wide variety of hose, fittings and adapters that meet many marine, military and government specifications. Aeroquip Marine/Military...there is no equal!

Applications: Hydraulics.

Specifications: A detailed catalog specifically listing the Mil Spec part numbers is available for the customer's use.

Quick Disconnect Couplings

A broad range of products encompassing the simple, air couplings, to the complex, hydraulic applications, to the most complex, self contained breathing apparatuses (SCBA).

Applications: Hydraulic attachments, SCBA.

Specifications: Full range of pneumatic, hydraulic, fluid transfer and DOT fittings. Couplings meet a variety of SAE and ISO specifications.



Specialty Hose and Fitting Products



Adapters and Tube Fittings

Offering a variety of standard and non-standard configurations to meet every need. Available in steel, brass and stainless steel. Tube fittings are designed for both inch and metric tubing. Numerous end-styles are available – ISO, SAE, BSP, DIN and NPT to name a few popular standards.

Applications: In-plant industrial equipment, mobile on/off highway equipment and general hydraulic system use.

Specifications: Sizes: 4 mm to 42 mm and 1/8" to 2". Additional sizes available upon request. SAE J512, J513, J518, J1926, J1453, DIN 2353, ISO 8434, ISO 6162 and others.

Metric Tube Fittings

Walterscheid™ tube fittings are available in a multiple of sizes and configurations. Eaton's Walterscheid tube fitting systems consist of the following:

- WALPro®
- WALForm®
- Flared Flange
- WALRing
- Flared

Across the globe, Eaton's Walterscheid tube fitting systems offer superior performance, as well as lower assembly and operating costs.

Applications: In-plant industrial equipment, mobile on/off highway equipment and general hydraulic system use.

Specifications: Sizes: 4 mm to 42 mm. Additional sizes available upon request. ISO 8434-1/DIN 2353/ISO 6162, DIN 3949, DIN 912 and others.



Specialty Hose and Fitting Products



STC®

The broadest range of threadless connectors in the industry! Eaton patented technology has been extremely successful in various rigorous mobile applications.

Applications: Truck/bus platforms and construction/agricultural equipment.

Specifications: Connections are offered in 3/8" up to 1". Rated Pressure: Up to 345 bar (5,000 psi).

STC® EZ-Torque

Eaton's STC® EZ-Torque is the solution to simplifying your fluid conveyance connections. STC EZ-Torque eliminates the need for port adapters while minimizing operator-dependent leak paths. This next generation connector also reduces hose installation time with a simple "push and torque" assembly feature. STC EZ-Torque opens opportunities for both mobile and stationary applications.

STC EZ-Torque will be available for connection with SAE, Metric and BSP ports in sizes -6 to -16.

Applications: General hydraulic systems, mobile equipment, industrial equipment.

Specifications: A variety of connections are offered in 3/8" up to 1".



Specialty Hose and Fitting Products



Swivels

Offering compact and robust designs while offering a wide variety of end configurations with the flexibility to perform in many dynamic hydraulic applications.

Applications: Hose reels, scissor lifts.

Specifications: Can be used in a full range of pneumatic, hydraulic and fluid transfer applications.

Quick-Connect Air Brake™

Leave air leaks behind with Eaton's 217 series, composite Quick-Connect Air Brake (Q-CAB) fittings. To reduce vehicle weight, many OEM's are replacing all brass-air connections with a combination brass and composite design.

Even though lighter, the Eaton® composite Q-CAB fittings, meet and exceed all of the industry requirements called out in D.O.T.

Applications: Medium and heavy duty truck, bus and mobile off-highway, and air brake systems.

Specifications: FMVSS 571.106-106, SAE J1131 and SAE J2494-3. A full line of brass Q-CAB is also available.



Specialty Hose and Fitting Products



E-Z Clip™ – Field Assembly

Eaton's patented E-Z Clip connector system, used with GH134 and GH134W hose, offers our customers the best value in assemblies for A/C and refrigeration systems, in the most demanding applications. In addition, the E-Z Clip system is qualified with a wide variety of refrigerants. Trust Eaton experience, with more than 4 Million E-Z Clip connections already used.

Applications: This connection is common to air conditioning systems, both in vehicle and commercial applications.

Specifications: E-Z Clip exceeds the performance requirements of SAE J2064.

Portable Crimp

Make factory-type hose assemblies anywhere-anytime! Versatile and portable, the portable crimp machines offer the ease of use you are looking for in a Coll-O-Crimp® hose assembly system. The Coll-O-Crimp press packages are offered with a multitude of options. Press/power unit packages are also available.

Applications: Ease of portability allows transporting the machine to the mobile applications.

Specifications: Size: 12-1/2" high, 8-1/2" wide, 5-1/2" deep. Capacity: 3/16" I.D. 1 fiber braid through 1-3/8" I.D. 2 wire hose.



Specialty Hose and Fitting Products



Production Crimp

A wide variety of crimp machines are available for every requirement (low and high volume hose assembly), for both distributors and OEMs. Select from a complete line of popular crimp machines.

Applications: Crimp machines for virtually any area of the shop.

Specifications: Ability to crimp hose of all sizes (1/8" up to 1-1/4").



Accessories



Accessories

Eaton offers a world-class range of clamps, protective sleeves and hose cleaning services that are compatible with hose and metal products of all sizes.

Applications: Wide range of applications and markets, such as: construction, forestry, lift trucks, utility vehicles, agriculture, truck and bus.

Specifications: Able to be used with all sizes of hose and metal products.

Bundling Sleeves

Eaton's bundling sleeve is designed to protect hydraulic hoses from abrasion and still allows enough flexibility for normal operation. The sleeves can be easily installed and removed to allow easy access to the individual hoses for repair.

The bundling sleeve increases productivity in assembly and reassembly of hose bundles. Save time and money on field repairs by replacing inefficient bundling methods and line damaging cable ties.

Applications: Case IH Patriot Sprayer SPX 4260 uses bundling sleeves to protect hydraulic and brake hoses. Champion Road Machinery Sales uses bundling sleeves to protect hydraulic lines. Rosco Manufacturing Company uses bundling sleeves on Model RA-200 Pothole Filler.

Specifications: 1,050 Ballistic Nylon, 0.71 mm thickness. Ambient Operating Temperature Range: 175° F.



Filtration



Filtration Products

Desired hydraulic system cleanliness can be achieved by incorporating Eaton's "Systemic Contamination Control" process. This process is based on proper selection of Eaton filters to meet the targeted cleanliness level and periodic sampling of fluid cleanliness to ensure compliance to the target. Eaton offers a full range of Vickers® hydraulic filters for industrial and mobile applications with flows to 1,700 lpm (450 gpm) and pressures to 420 bar (6,000 psi).

High-Performance Hydraulic Fluid

Why trust the lifeblood of your hydraulic systems to anything less than the best? Protect your investment in equipment and machinery with Eaton's high-performance hydraulic fluid. This specially-formulated hydraulic fluid offers advanced oxidative, thermal and hydrolytic stability to yield peak operating performance from today's high-speed, high-temperature and high-pressure systems — and that means uptime.

This proprietary fluid is also designed to maximize the long-term return on your investment. The formulation will provide extended service-life intervals compared to standard hydraulic fluids, thereby reducing preventive maintenance costs over the life of the equipment. And with its superior anti-wear properties, it extends the operating life and potential resale value of your equipment.



Filtration



Target Pro®

Eaton's® Target-Pro 2 Portable Particle Counter gives you laboratory quality particle count results in the field. It combines state-of-the-art laser particle counting technology with a user-friendly interface and compact size. It allows you to monitor the fluid cleanliness of hydraulic and lubrication systems and take action if necessary.

Target-Pro 2 software for Windows®, included with the analyzer, allows you to download test results and analyze cleanliness trends over time.

Windows® is a registered trademark of Microsoft® Corporation

Accumulators

Eaton offers bladder, piston and diaphragm-type accumulators in a wide range of sizes, bladder materials, port configurations and pressure ratings to provide optimum design flexibility. Eaton also offers a complete line of accessories needed for proper installation and maintenance, including safety shut-off blocks, clamps, repair kits and charging and gauging units.

Applications: Energy storage, pulsation dampening, surge control, shock absorption.

Specifications: From 1 to 54 liters (1 US qt. to 15 US gal.) Rated Pressures: 210 bar (3,000 psi) and 345 bar (5,000 psi)



Electronics and Software



CONTROL F(x)® Programming Software

Eaton CONTROL F(x) software allows you to develop programs for controlling electro-hydraulic components and systems. Eaton provides control function libraries based on the IEC 61131-3 standard that reduce application development time. With the CONTROL F(x) graphical interface, you can create, debug, and monitor the control logic. This gives customers a reliable system that can be rapidly developed, tested, implemented and maintained.

Applications: Excavators, forestry, telehandlers, utility vehicles, cranes, ag machinery and paving.

Specifications: A Windows-based software development environment with function libraries for electronic and electro-hydraulic components and systems. Six different programming languages. Full debugging and visualization capabilities.

VFX Display Controllers and LCD's

Eaton's VFX controllers provide an operator interface solution for electro-hydraulic systems. The VFX 1000 controller is used for dedicated display control, while the VFX 2000 also provides digital IO for additional controls. The VFX controllers are built for the harsh mobile and industrial application environment and are programmed and configured using the intuitive CONTROL F(x) programming software. There are two LCD display options available for use in conjunction with the VFX controllers.

Applications: Excavators, forestry, telehandlers, utility vehicles, cranes, ag machinery, and paving.

Specifications: VFX 1000 and 2000 are used for electronic display control and networked via CAN into electro-hydraulic systems. The VFX 2000 provides an additional 50 digital IO. Two LCD displays, 6.5 in and 10.4 in, used in conjunction with either of the VFX controllers.



Electronics and Software



EFX Electronic Controllers and IO Modules

Eaton EFX electronic controllers and IO modules provide a full range of electronic control solutions. With an array of controller options and IO modules, an EFX system can be created to address any application need. All EFX products are IP67 rated and are built for the harsh mobile and industrial application environment. The EFX line is programmed and configured using the intuitive CONTROL F(x) programming software.

Applications: Excavators, forestry, telehandlers, utility vehicles, cranes, ag machinery, and paving.

Specifications: 4 different EFX controllers and 3 IO expansion modules provide analog, digital, and frequency inputs as well as digital, PWM, and current-controlled outputs. Each EFX controller has both CANopen and J1939 interfaces.

SFX High Performance Controllers

The SFX 2000 high performance controller is designed to address applications where control loop times are critical. Whether it's a precise closed-loop control or a safety-critical application, the SFX 2000 controller is built to address the demands of complex applications. The SFX 2000 controller is built for the harsh mobile and industrial application environment and is programmed and configured using the intuitive CONTROL F(x) programming software.

Applications: Excavators, forestry, telehandlers, utility vehicles, cranes, ag machinery, and paving.

Specifications: The SFX 2000 has 69 total IO for analog, digital, and frequency inputs, and digital, PWM, and analog outputs. It also contains a 32 bit processor, two CAN ports and a Time-Triggered Protocol controller for safety-critical applications.



System Solutions



Electronic Transmission Automotive Control (ETAC)

Electronic Transmission Automotive Control (ETAC) systems provide many cost and operating benefits. Within the ETAC system, the electronic controller is integrated with the engine throttle management system, as well as a closed circuit pump. It drives high performance proportional valves and uses electronic swashplate feedback to provide precise, dynamic system control.

Automotive style control of a hydrostatic drive allows large vehicles to be operated in a way similar to a standard automobile with an automotive transmission. A single throttle pedal controls the engine and transmission, giving output speed and torque as needed for vehicle operating systems.

Applications: Lift trucks, telehandlers, railway maintenance equipment, utility vehicles, and compact wheel loaders.

System Solutions



Hydraulic Launch Assist™ (HLA® System)

High-Power, High-Value Hydraulic Hybrid™

Ideally suited for refuse and other applications that require repeated starts and stops and frequent engine-off power-take-off (ePTO) operations at the worksite.

Some highlights include: Fuel Economy Improvement: 25%, Launch Improvement: 0-30 mph in 30% less time. Emission Reductions: 20% CO₂, 17% NO_x, Brake Energy Savings: 96%.

Specifications: Mass of HLA System: 1,000 lb. Pressure (Max.): 350 bar (5,000 psi). Active Rated Speed: Up to 25 mph. Torque: 1,000 ft-lbs. Total System Oil Volume: 79 liters (21 US gal.).

System Solutions



Fan Drive Solutions

The Electro-hydraulics (EH) Fan Drive System cools your engine and vehicle sub-systems by controlling a hydraulic pump and motor with a digitally programmable controller. Benefits include: Flexible installation for optimum fan location, elimination of belt maintenance, more accurate control of charge air temperature which can help reduce engine emissions, improved fuel economy, increased power output and a choice of variable or fixed-displacement systems.

Applications: On-highway vehicles such as buses and recreational vehicles, Construction machinery such as excavators, loaders, cranes and forklifts and Agriculture machinery such as tractors and forest machinery.

System Solutions



Steering Solutions

Eaton's complete steering system solutions including Char-Lynn® steering control units, priority valves, and Eaton® Gear or Piston pumps to provide completely fluid-linked power steering for off-highway vehicles. As innovators of gerotor power steering, Eaton features patented technologies such as Q-Amp™, Wide Angle, and VersaSteer™. Eaton's innovative Balanced Architecture and progressive valve design deliver low pressure drop for fuel efficiency.

Specifications: Displacements: 59 cc to 3030 cc (2 in³/rev to 185 in³/rev); Flow range: 6 lpm to 227 lpm (2 GPM to 60 GPM),

Applications: Off-highway and marine vehicles including; lawn and garden, ag tractors and combines, construction, forestry and mining equipment, lift trucks, front end loaders, and large speedboats and yachts.

World-Class Brands. Worldwide Presence.



Eaton Services

Authentic Remanufactured Products

You choose Eaton brand products because you want your customers to experience the quality, reliability, and performance that have made them the industry's benchmarks for more than 80 years. When those products reach the end of their useful life, it makes sense to repair or replace them with parts and components that deliver the same level of quality, reliability, and performance.

That's why you should insist on authentic Eaton remanufactured parts from Eaton and nothing else. They are the only replacements guaranteed to meet the same exacting standards found in original Eaton medium and heavy-duty pumps and motors



and Vickers vane cartridge kits, piston units, and rotating groups.

Authentic Eaton Remanufactured products are produced in a dedicated facility in Memphis, Tennessee, a location chosen for its easy access to one of the



world's largest overnight shipping networks. There, experienced technicians remanufacture Eaton and Vickers products to match original tolerances and quality specifications. The facility is ISO 9001-2000 certified, and the entire remanufacturing operation is focused on meeting your needs for both quality and rapid response.

Fluid Analysis

70 – 90% of all hydraulic system failures are directly attributable to fluid contamination, and the Vickers Fluid Analysis Service is a great resource to help you avoid contamination failures.



Eaton's Fluid Analysis Laboratories provide on-demand testing and diagnosis of fluids and lubricants to customers worldwide.

Including an exclusive Fluid Analysis Kit developed by Eaton, the process follows simple step-by-step instructions to fill the ultra-clean container provided in the kit with hydraulic oil from your machine and send it to one of the Eaton labs. Highly-trained technicians

analyze the sample using laboratory-grade diagnostic equipment and sophisticated computer programs to determine the health of the hydraulic system.

Within 24 hours of receipt by the lab, you will receive a detailed report including photos of the contaminants in an easily understood format, plus tips on improving and maintaining the health of the fluid. The tests performed include: particle count, viscosity, water content,

photomicrography, spectrometric analysis and energy dispersive x-ray fluorescence.

For additional information on Vickers Fluid Analysis Service, or fluid analysis kits, contact an Eaton distributor near you or go to www.eaton.com/hydraulics/fluid_analysis

Cylinder Repair

There's a reason why Eaton is one of the largest industrial cylinder manufacturers in the world ... we have unmatched quality, manufacturing capability, and application experience.

These core competencies are exactly why cylinders repaired by Eaton can give you greater assurance in performance, reliability, and overall lifetime of your cylinder. Even in the world's most rigorous applications.



Application and Engineering Expertise

We understand what it takes to do everything from standard, fast repair to turn-key projects with maintenance down-times. Eaton uses world class simulation tools, comprehensive 3D drawing capability, and finite element analysis expertise for failure mode determination, prediction of future failure analysis, and recommendation of general product improvements for optimum performance and reliability.

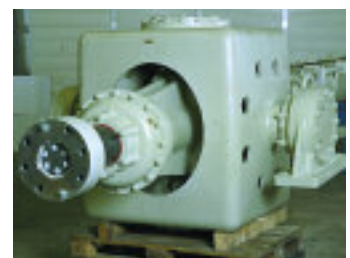
Decades of application experience coupled with these cutting edge tools translates to better recommendations and ultimately, better repairs.

Systems and Processes

Quality is an area that we excel in, and it is demonstrated every day in the new cylinders we manufacture. Besides the facility ISO certifications, we provide comprehensive quality reviews and customer reporting documentation. We've set the industry standard in detailed inspection reports, documentation logs, and customer communication processes which can save you a lot of time and money.



Old



Repaired

Eaton Services

Application and Commercial Engineering (ACE)

World-class products and systems need world-class design and engineering support, which is exactly what the Eaton Application and Commercial Engineering (ACE) teams deliver.

Working with your engineers and designers, an ACE team augments the technical capabilities of Eaton's distribution and OEM partners to provide assistance in:

- Product selection for complex applications

- System architecture definition and design
- Prototype technical support
- New product launches
- Development of application aids and education

Recognizing the unique needs of our customers and applications, the ACE teams are specialized by:

- The ACE Industrial team specializes in the automotive, primary metals, metal form-

ing, civil, and marine/off-shore sectors as well as electro-hydraulics and project-based power unit solutions.

- The ACE Mobile team focuses on off-road mobile applications with additional technical expertise in hydrostatics, work circuits, fan drives, steering and electro-hydraulics.

For more information on how to put an ACE team to work meeting your challenges, contact your Eaton sales representative.



Eaton's Hydraulics Training Services

At Eaton, we don't just talk about training, we deliver. With over 30 technical and product courses, we also offer numerous training aids including manuals, multimedia, and hands-on equipment. The investment made in training today can pay off with significant results for the future.



Experience

For over 60 years, with a combined 140 years in fluid power and

education experience, our instructors have made Eaton's Hydraulics Training Services the educational standard for the industry. We are the first choice of many customers for their fluid power training needs.

Eaton's Hydraulics Training Services offers both product and technology courses that cover a wide array of fluid power related topics. Our courses suit the needs of anyone involved in the industry, from newcomers to application specialists.

Improve Productivity

Whether for hydraulic repair personnel, supervisors, engineers, sales or purchasing, Eaton's Hydraulics Training will solidify hydraulic knowledge and aid increased job performance. Our technical training instructors are Fluid Power Society

Certified, Fluid Power Specialists and Fluid Power Accredited Instructors, ensuring a consistent and high quality experience for our students.

Facilities

Located in Maumee, Ohio (Toledo area) is our state-of-the-art training facility. The 18,000 square foot facility can accommodate all training offerings. Along with the Eaton training facility in Eden Prairie, Minnesota, both sites are fully equipped to serve training classes.

Customized On-site Training

Eaton's Hydraulics Training Services offers specialized, custom-tailored training at one of our facilities or your location. We provide simulators, cut-aways, take-aparts and other training materials that may be required. On-site training is quoted individu-

ally and based on the number of course days, lab exercises and number of students.

Contact Information

Call us at 800-413-8809 to obtain additional information or a quote.

hydraulicstraining@eaton.com

Register for courses or order training products on-line at: www.eatonhydraulics.com/training



Field Services

Application of Eaton products, even by well trained users can sometimes result in unexpected and unplanned results, or system performance. On these occasions, Eaton's highly experienced Field Service staff is available for onsite support and system problem resolution.



Field Service provides onsite support, which can include:

- System Start Up
 - PID Loop tuning
 - Hydraulic pump set up
- Machine or System Diagnostics
 - Optimize circuit performance
 - Shock and pressure spike reduction or elimination
 - Address repeated component failure
- Prototype and new application
 - Full evaluation of Eaton product in a new system or application

- Utilization of the most up-to-date instrumentation equipment
 - Up to ten channels of high speed data acquisition
 - Monitor pressure, flow, temperature, current, and voltage
 - PC based data capture, transferable for Engineering analysis
- System maintenance and other consulting services

Eaton Hydraulics Field Service Technicians have vast product and application experience, with a history of solving the most complex system problems.

Field Service is a one stop support on all hydraulic and electrohydraulic product issues. As part of Technical Services organization that includes the ACE group, Field Service works directly with the ACE and Product Engineers to get, or keep, a hydraulic based machine or system running.

Contact your Eaton sales representative to discuss how you can best utilize Eaton Hydraulics Field Service staff with your system and application requirements.

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