

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 40, and VIS 45 Series



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

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

Understanding and helping our customers succeed

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

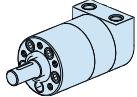
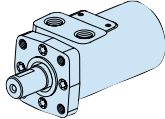
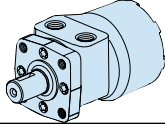
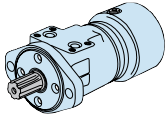
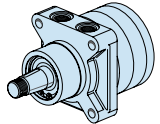
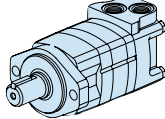
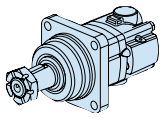
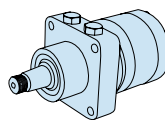
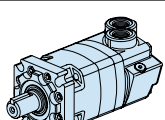
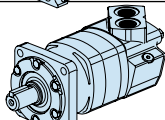
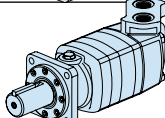
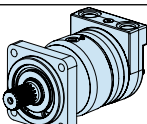
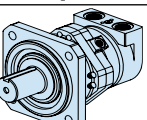
Knowing what's important to our customers and integrating that knowledge into the fabric of our business

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

Our strength is global reach with local responsiveness and support

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

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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

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.

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

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.

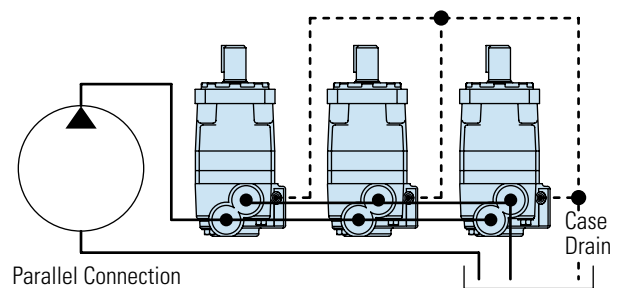
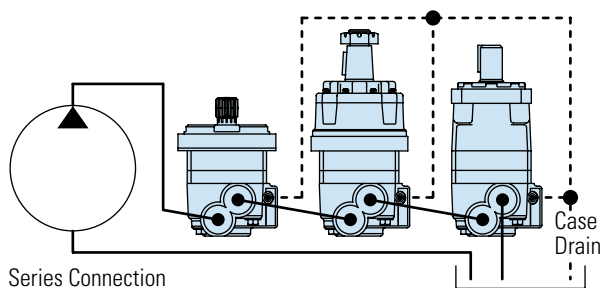
High Efficiencies

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.

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

Step Three – Tractive Effort to Ascend Grade

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

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

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:

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

FA = Acceleration Force (Newton)

t = Time (Seconds)

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

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.

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

\swarrow \swarrow \swarrow \swarrow
 Force required to overcome rolling resistance Force required to climb a grade Force required to accelerate Drawbar pull desired

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.

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

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

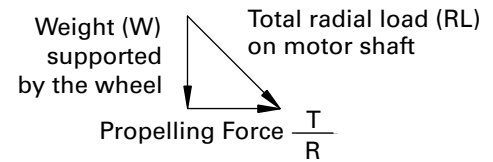
Where: f = coefficient of friction
W = loaded vehicle weight over drive wheel

	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)

$$T = \frac{q \times DP}{2 \times p}$$

$$\frac{\text{bar} \times \text{cm}^3/\text{rev}}{62.8} = \text{Nm}$$

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

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)

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

Power (out of motor)

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

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 Nickel Plated Body	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
ATEX	Certifies motor to be used in explosive environments

TYPICAL APPLICATIONS*

OPTIONAL FEATURES	WINCH	SWING DRIVES	SWEEPER BRUSH DRIVES	AUGER	INDUSTRIAL CONVEYOR	CAR WASH	TURF PROPEL	IRRIGATION REELS	MIXERS/GRINDERS	PLASTIC INJECTION MOLDING	TRACTION DRIVES	TRENCHER CHAIN DRIVES	SALT SAND SPREADER	MARINE WINCHES
2 Speed Motors	x			x				x			x			x
Seal Guard			x				x		x			x		
Viton Seals					x					x				
High Pressure Shaft Seal	x								x					
Environmental protection					x	x							x	x
Nickel Plated Shaft					x	x							x	x
Nickel Plated Body					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.

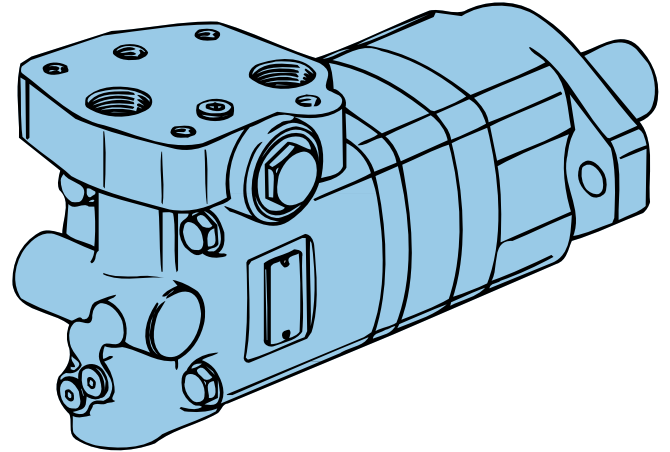
Optional Features

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 40	VIS 45
2 Speed motors	A-11	—	—	—	—	—	0	—	—	—	0	0	0
Seal Guard	A-12	—	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
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
Nickel Plating Options	A-20	0	0	0	0	0	0	0	0	0	0	—	—
Integrated Parking Brake	A-14	—	—	—	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
Speed sensors	A-16	0	0	0	0		0	0	0	0	0	—	—
Shuttle valve	A-17					0	0	0	0	0	—	0	0
Case port	A-18	0	0	0	0	0	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
Reverse Rotation	—	0	0	0	0	0	0	0	0	0	0	0	0
ATEX Certification			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 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:

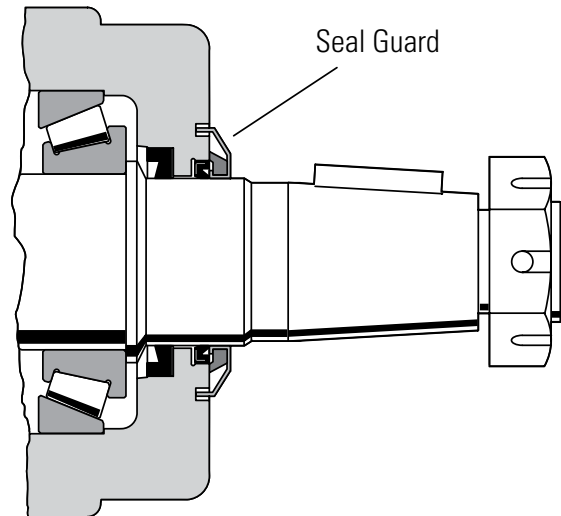
- Two operating speeds and torque levels with one motor
- Two selectable performance ranges in one motor package

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 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
- Operating Temperature Range of -25°C to 200°C [-13°F to 392°F]

Applications:

- Industrial conveyors
- Plastic injection molding

Note: Minimum Viscosity Levels must still be maintained

High Pressure Seals

This option is available on H, S, T 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 (2000 PSI) 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 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.
- Operating Temperature -40°C to 150°C [-40°F to 300°F]

Special Notes:

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

Applications:

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

Part Numbers:

H Series – Kit No. 60572-000

S Series – Kit No. 60578-000

T Series – Kit No. 60579-000

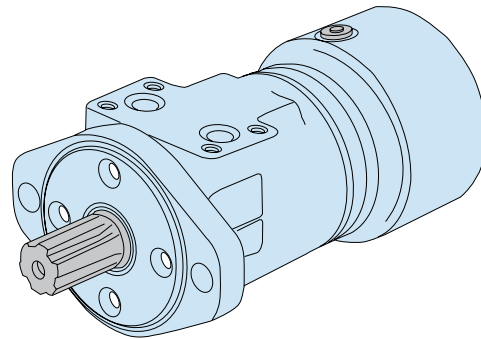
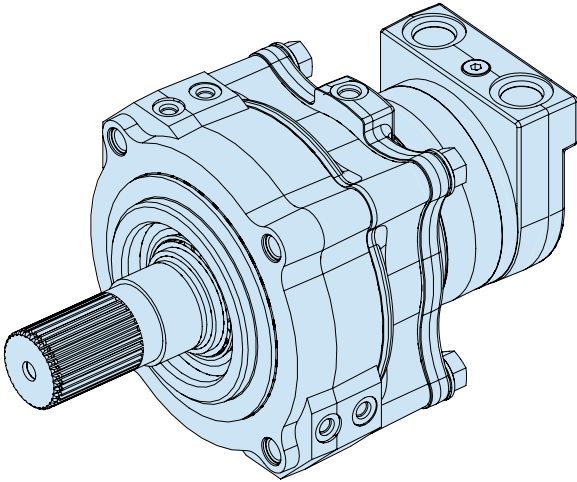
Shaft Seal – Part No. 14778-001

2000 Series – Kit No. 61329-000.

Shaft Seal – No. 14857-001

Brake Solutions

Integrated brake options are available for all T, W, 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

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.

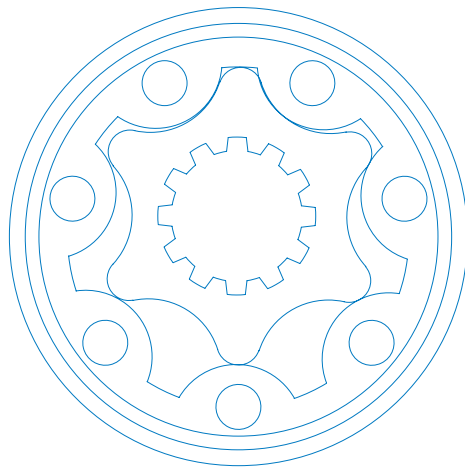
- Also suited for applications with high-pressure spikes from rapid reversals.

Applications:

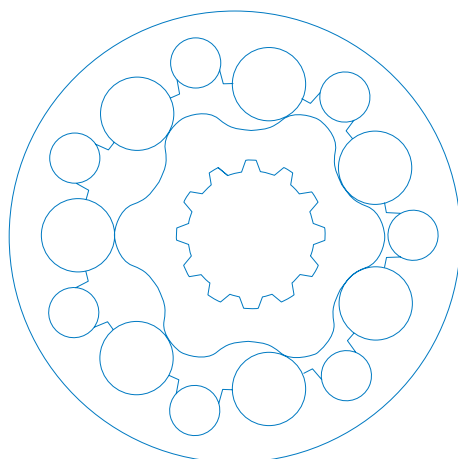
- Harvesters
- Stump Grinders
- Skid Steer Loader Attachments
- Machine Tools
- Especially suited for continuous high speed/high flow applications.

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

RPM = speed of output shaft in revolutions per minute

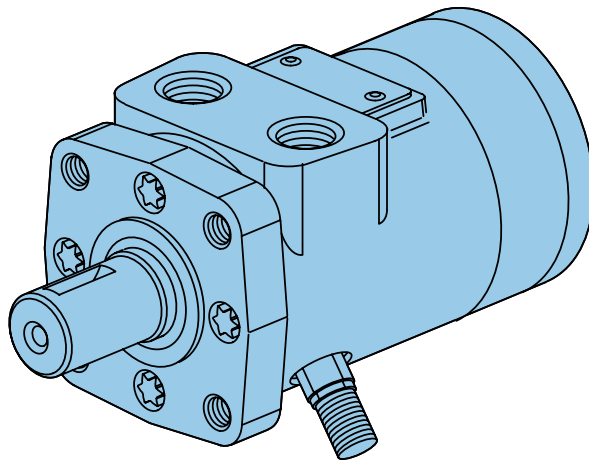
SUS = minimum viscosity measured in SUS.

The recommended viscosity limits are as follows:

- 1) A Gerotor Orbit gear set requires a minimum fluid viscosity of 100 SUS or the value calculated by the formula $20 \text{ psi/RPM} = \text{SUS}$.
- 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.

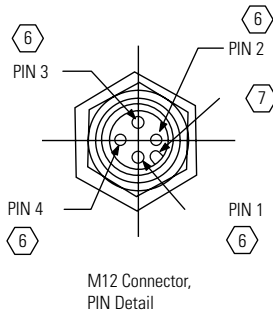
Speed Sensors



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.

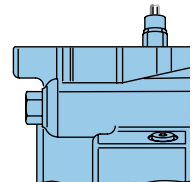
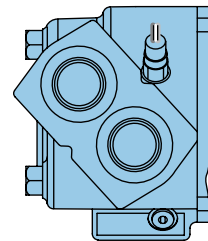
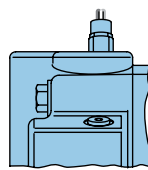
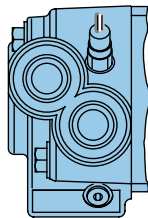
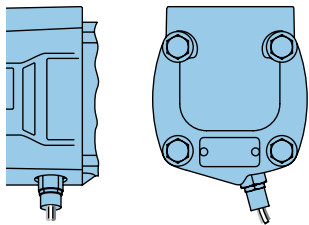
- The first version speed sensor has two output signals 90° out of phase. Each output provides one pulse per target.
- The second version has a speed signal that is twice the output pulses per revolution and it also has a direction signal. (Direction not available on spool motors)

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

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.

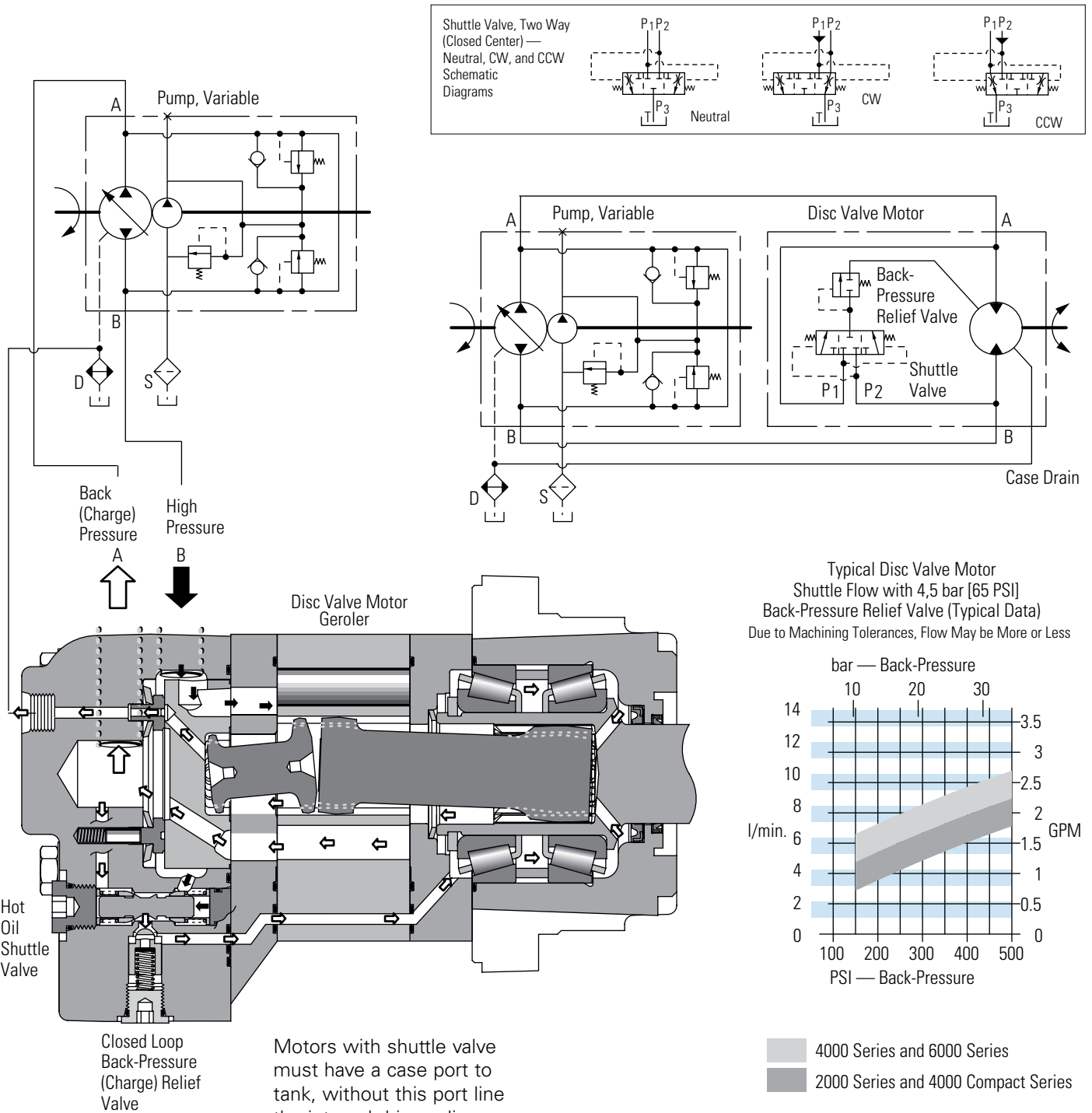
Benefits

- Flushing
- Cooling
- Longer system life

Applications

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

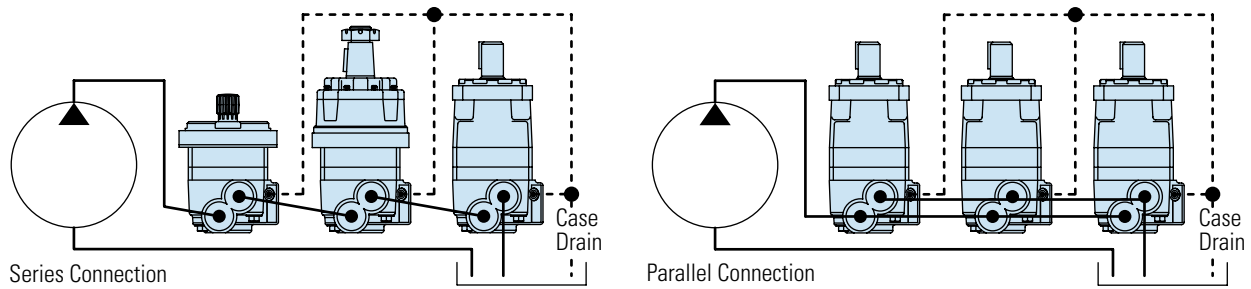
Closed Loop Circuit



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

Case Porting

This option is available on all Char-Lynn Motors.



Features:

This feature provides for connection of a port line connected to the motor case.

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

Benefits:

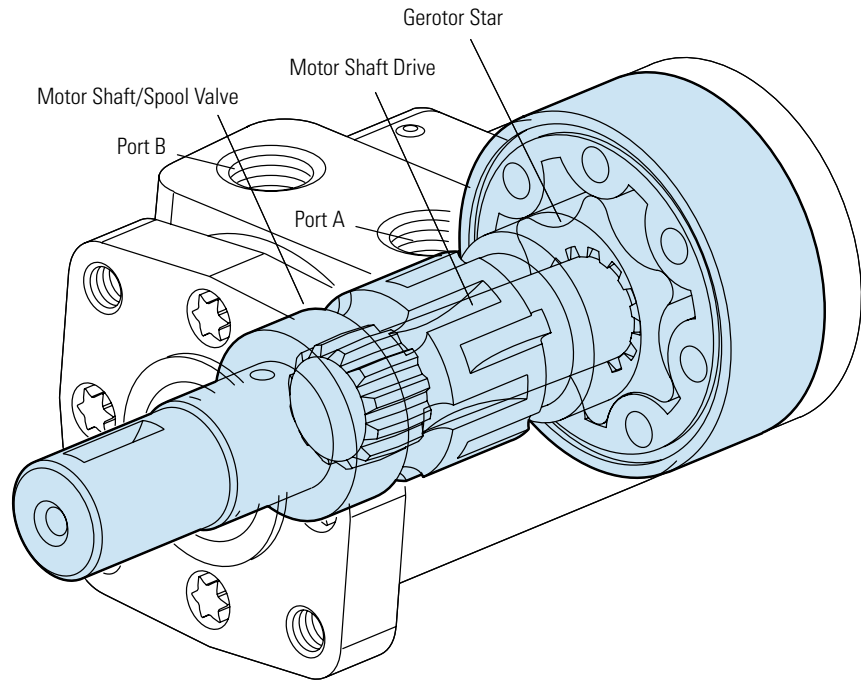
- Extends shaft seal life
- Extends thrust bearing life
- Reduces shaft seal leakage problems
- Improves flushing of the circuit to reduce system contaminates and cooling the system.

Applications:

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

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 (A minimum of 300 psi delta must be maintained between A port pressure and case pressure)

Nickel Plating Options

Full Body Nickel Plating

This option is available on H, S, T, 2K, 4K, 6K motors.

Features:

Eaton is offering full body nickel plating for Char Lynn Motors for protection against wash down environments (Note: this does not offer protection against salt water environments and the recommended option for that is epoxy paint). In order to meet the different requirements, Eaton is now offering two different nickel plating options shown below:

Benefits:

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

Applications:

- Food Processing: Industrial Conveyors

Choosing the options in the model code:

- H, S, T Motors - Choose Option Y in Paint / Packaging Options
- 2000, 4000, 6000 Series - Choose Option

OPTION	DESCRIPTION	APPLICATIONS
Electroless Nickel Plating (AMS 2404D specification)	Premium process offering extremely high quality corrosion resistance	Where water contact is extremely high ⁺
Electrolytic Nickel Plating (AMS-QQ-N-290 specification)	Good quality process offering standard corrosion resistance	Where water contact is minimal ⁺

+ Washdown applications only – does not include salt water applications

Nickel Plated Shafts

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

Features:

Eaton is offering Electroless nickel plating on the shafts alone for corrosion protection primarily in wash down environments.

Benefits:

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

Applications:

- Car Washes
- Fishing Winches / Marine applications

Environmental Protection

(epoxy paint)
(plated shafts)

This option is available on all Char-Lynn motors.

Features:

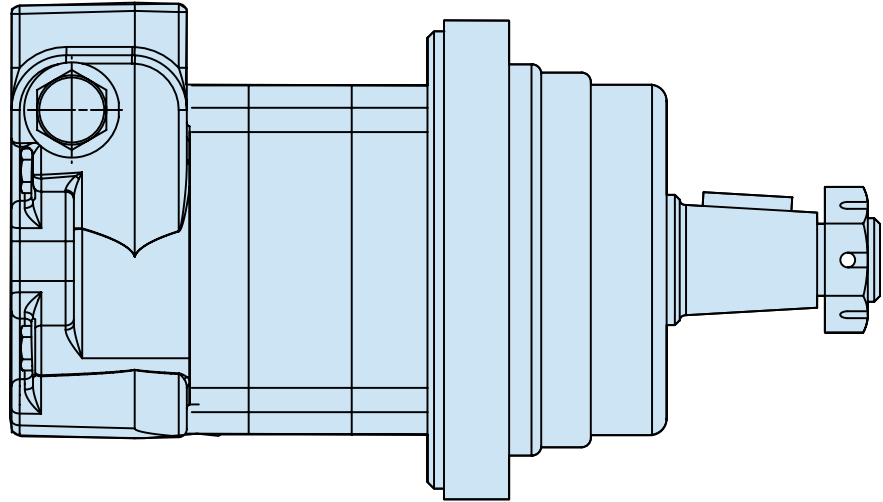
All motors are available with a corrosion resistant coating for use in hostile environments. The Char-Lynn line is also available with the output shaft plated, or with plated shaft and entire motor exterior coating.

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



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

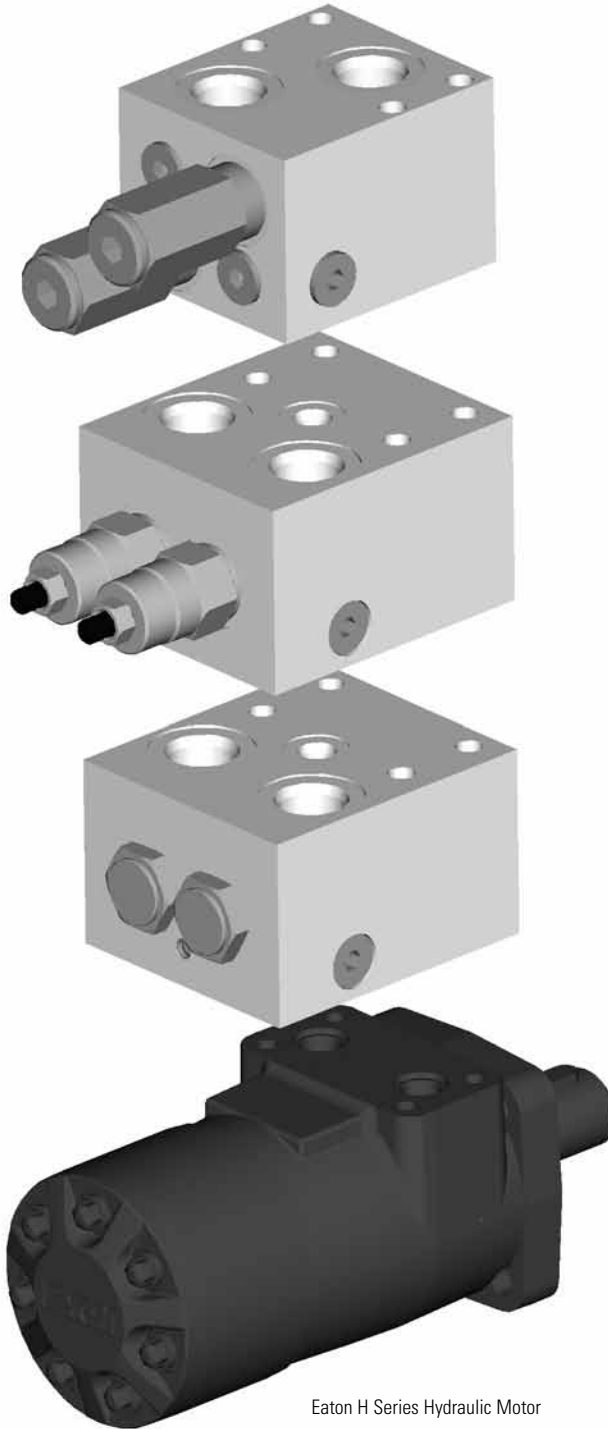
Item part #	Item desc.	Relief valve setting
02-199291	RV5A-10-F-0-35/15	1500 PSI
02-199292	RV5A-10-F-0-35/17.5	1750 PSI
02-199293	RV5A-10-F-0-35/20	2000 PSI
02-199295	RV5A-10-F-0-35/22.5	2250 PSI
02-198563	RV5A-10-F-0-35/25	2500 PSI
02-199294	RV5A-10-F-0-35/27.5	2750 PSI
02-199296	RV5A-10-F-0-35/30	3000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



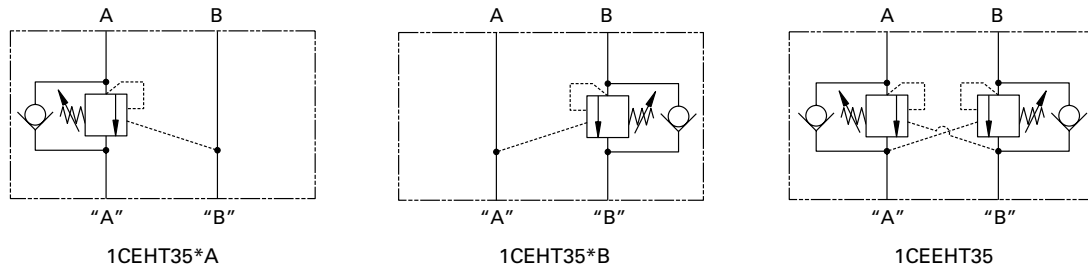
Features

- 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

Eaton H Series Hydraulic Motor

ICEHT35/ICEEHT35 - Motor Mounted Valves

H & T Mounting Pattern Single and Dual Overcenter Valves



Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid. The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator.

The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directional for motor applications or for cylinders going over center.

Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{(\text{Relief Setting}) - (\text{Load Pressure})}{\text{Pilot Ratio}}$$

Pilot Ratios

- 2.5:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.
- 5:1 Best suited for applications where load varies (Standard) and machine structure can induce instability
- 10:1 Best suited for applications where the load remains relatively constant.

Performance Data

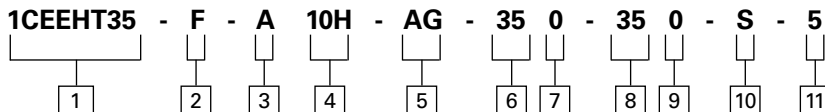
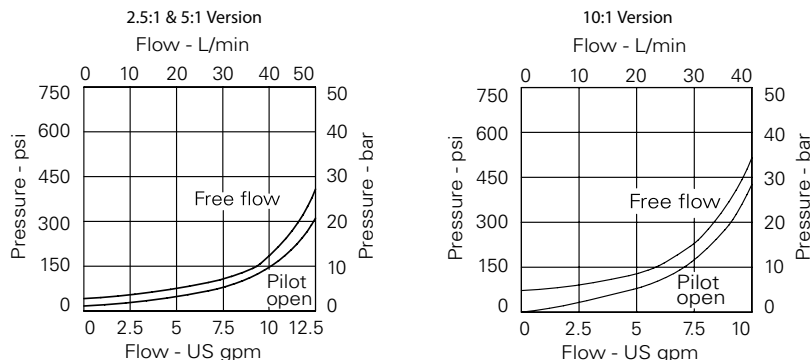
Ratings and Specifications

Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)

Rated flow	30 L/min (8 USgpm)		
Max setting	Max load induced		
	Pressure:	270 bar (4000 psi)	
	Relief setting:	350 bar (5000 psi)	
Cartridge material	Working parts hardened & ground steel External surface zinc plated		
Body material	Standard aluminium (up to 210 bar*) Steel (up to 350 bar)		
Mounting position	Unrestricted		
Cavity Number	A6610 (See section M)		
Torque cartridge into cavity	45 Nm (33 lbs ft)		
Weight (inc cartridges)	1CEOMP35	1.6 kg	(3.52 lbs)
	1CEEOMP35	1.66 kg	(3.65 lbs)
Seal kit number	1CEHT35	9900834-000 (Buna-N)	9900835-000 (Viton)
	1CEEHT35	9900836-000 (Buna-N)	9900837-000 (Viton)
Recommended filtration level	BS5540/4 Class 18/13 (25 micron nominal)		
Operating Temp	-30°C to +90°C (-22° to 194°F)		
Leakage	0.3 milliL/min nominal (5 dpm)		
Nominal viscosity range	5 to 500 cSt		
Installation Kit (includes cap screws, washers, and o-rings)	9900828-000 (Buna-N) 9900829-000 (Viton)		

ICEHT35/ICEHT35 - Motor Mounted Valves

H & T Mounting Pattern Single and Dual Overcenter Valves



1 Basic Code

1CEEHT35 - Double Cartridge and Body
 1CEEHT35*A - Single overcenter in line A-"A"
 1CEEHT35*B - Single overcenter in line B-"B"

2 Adjustment Means

F - Screw Adjustment

3 Housing Material

A - Aluminum
 S - Steel

4

Code	Port Size "A" & "B"	Dual Housing Number	
		Aluminum	Steel
4W	1/2" BSP	6024221-001	6024221-003
10H	SAE 10	6024221-002	
10T	SAE 10		6024221-04

5 Port Acted Upon

A - A Port
 B - B Port
 AB - A & B Ports (dual)

6 Pressure Range (Cart A)

Note: Code Based on pressure in bar.

20 - (2.5:1 and 5:1): 70-210 bar. Std setting 100 bar.
 (10:1): 100-210 bar. Std setting 100 bar.

35 - (2.5:1 and 5:1): 100-350 bar. Std setting 210 bar.
 (10:1): 120-350 bar. Std setting 210 bar.

7 Pressure Setting (Cart A)

0 - Std factory setting
 1500 - 1500 psi

8 Pressure Range (Cart B)

Note: Code Based on pressure in bar.

20 - (2.5:1 and 5:1): 70-210 bar. Std setting 100 bar.
 (10:1): 100-210 bar. Std setting 100 bar.

35 - (2.5:1 and 5:1): 100-350 bar. Std setting 210 bar.
 (10:1): 120-350 bar. Std setting 210 bar.

9 Pressure Setting (Cart B)

0 - Std factory setting
 1500 - 1500 psi

10 Seals

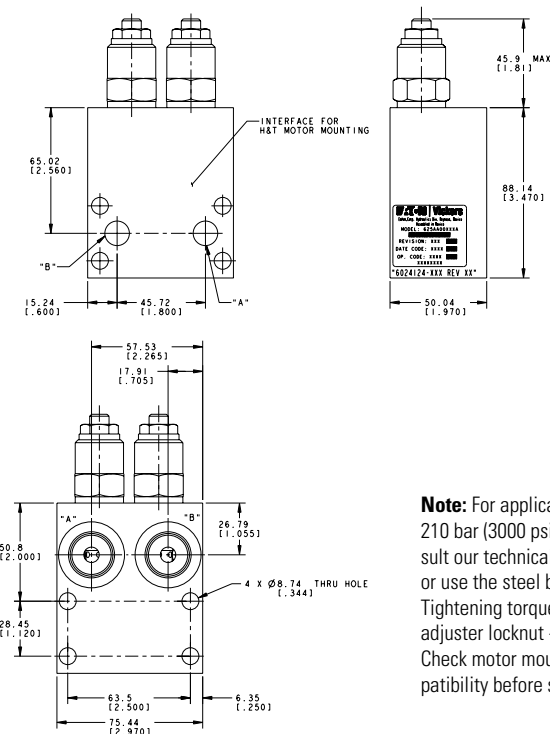
S - Buna-N
 SV - Viton

11 Pilot Ratio

2 - 2.5:1
 5 - 5:1
 10 - 10:1

Cavity plug part number

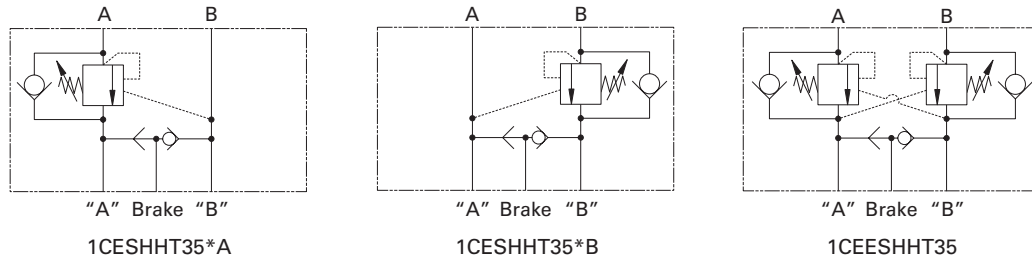
Nitrile - AXP13032-01-N
 Viton - AXP13032-01-V



Note: For applications over 210 bar (3000 psi), please consult our technical department or use the steel body option. Tightening torque of "F" adjuster locknut - 20 to 25 Nm. Check motor mounting compatibility before specifying.

ICESHHT35/ICEESHHT35 - Motor Mounted Valves

H & T Mounting Pattern Single and Dual Overcenter Valve with Brake Release Shuttle



Description

Overcenter Valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

These dual overcenter valves also contain a brake release shuttle valve which ensures that pressure is applied to a brake release circuit regardless of whether pressure is applied to ports "A" or "B". These multifunction valves are normally used for the static and dynamic control of systems using motors or semi-rotary-actuators.

Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{(\text{Relief Setting}) - (\text{Load Pressure})}{\text{Pilot Ratio}}$$

Pilot Ratios

- 2.5:1 Best suited for extremely unstable applications such as long booms or flexible frameworks.
- 5:1 Best suited for applications where load varies (Standard) and machine structure can induce instability
- 10:1 Best suited for applications where the load remains relatively constant.

Performance Data

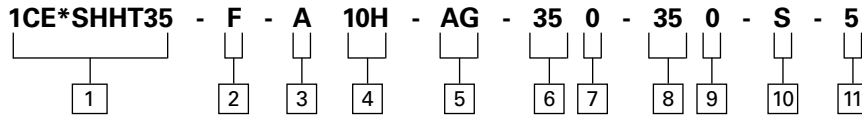
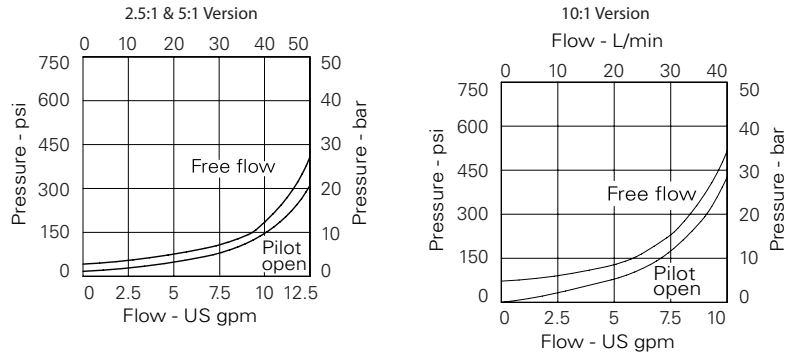
Ratings and Specifications

Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)

Rated flow	30 L/min (8 USgpm)		
Max setting	Max load induced		
	Pressure:	270 bar (4000 psi)	
	Relief setting:	350 bar (5000 psi)	
Cartridge material	Working parts hardened & ground steel External surface zinc plated		
Body material	Standard aluminium (up to 210 bar*) Steel (up to 350 bar)		
Mounting position	Unrestricted		
Cavity Number	A6610 (See section M)		
Torque cartridge into cavity	45 Nm (33 lbs ft)		
Weight	1CESHHT35	2.29 kg	(5.04 lbs)
(inc cartridges)	1CEESHHT35	2.34 kg	(5.15 lbs)
Seal kit number	1CESHHT35	9900834-000 (Buna-N)	9900835-000 (Viton)
	1CEESHHT35	9900836-000 (Buna-N)	9900837-000 (Viton)
Recommended filtration level	BS5540/4 Class 18/13 (25 micron nominal)		
Operating Temp	-30°C to +90°C (-22° to 194°F)		
Leakage	0.3 milliL/min nominal (5 dpm)		
Nominal viscosity range	5 to 500 cSt		
Installation Kit (includes cap screws, washers, and o-rings)	9900828-000 (Buna-N) 9900829-000 (Viton)		

ICESHHT35/ICEESHHT35 - Motor Mounted Valves

H & T Mounting Pattern Single and Dual Overcenter Valve with Brake Release Shuttle



1 Basic Code

1CEESHHT35 – Double Cartridge and Body
 1CESHHT35*A – Single overcenter in line A-“A”
 1CESHHT35*B – Single overcenter in line B-“B”

2 Adjustment Means

F – Screw Adjustment

3 Housing Material

A – Aluminum
 S – Steel

4

Code	Port Size		Dual Housing Number	
	“A” & “B”	Brake	Aluminum	Steel
4W	1/2” BSP	1/4” BSP	6025216-001	6025216-003
10H	SAE 10	SAE 4	6025216-002	
10T	SAE 10	SAE 4		6025216-004

5 Port Acted Upon

A – A Port
 B – B Port
 AB – A & B Ports (dual)

6 Pressure Range (Cart A)

Note: Code Based on pressure in bar.

20 – (2.5:1 and 5:1): 70-210 bar. Std setting 100 bar.
 (10:1): 100-210 bar. Std setting 100 bar.

35 – (2.5:1 and 5:1): 100-350 bar. Std setting 210 bar.
 (10:1): 120-350 bar. Std setting 210 bar.

7 Pressure Setting (Cart A)

0 – Std factory setting
 1500 – 1500 psi

8 Pressure Range (Cart B)

Note: Code Based on pressure in bar.

20 – (2.5:1 and 5:1): 70-210 bar. Std setting 100 bar.
 (10:1): 100-210 bar. Std setting 100 bar.

35 – (2.5:1 and 5:1): 100-350 bar. Std setting 210 bar.
 (10:1): 120-350 bar. Std setting 210 bar.

9 Pressure Setting (Cart B)

0 – Std factory setting
 1500 – 1500 psi

10 Seals

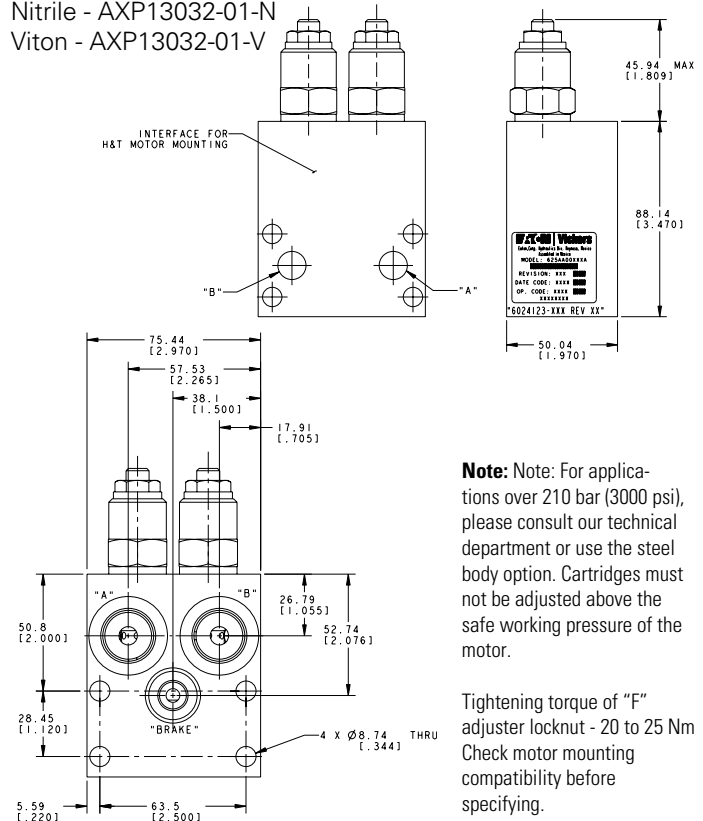
S – Buna-N
 SV – Viton

11 Pilot Ratio

2 – 2.5:1
 5 – 5:1
 10 – 10:1

Cavity plug part number

Nitrile - AXP13032-01-N
 Viton - AXP13032-01-V



Note: Note: For applications over 210 bar (3000 psi), please consult our technical department or use the steel body option. Cartridges should not be adjusted above the safe working pressure of the motor.

Tightening torque of “F” adjuster locknut - 20 to 25 Nm
 Check motor mounting compatibility before specifying.

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.

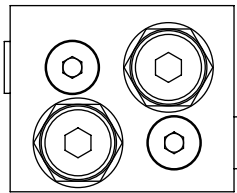
RATINGS AND SPECIFICATIONS

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)

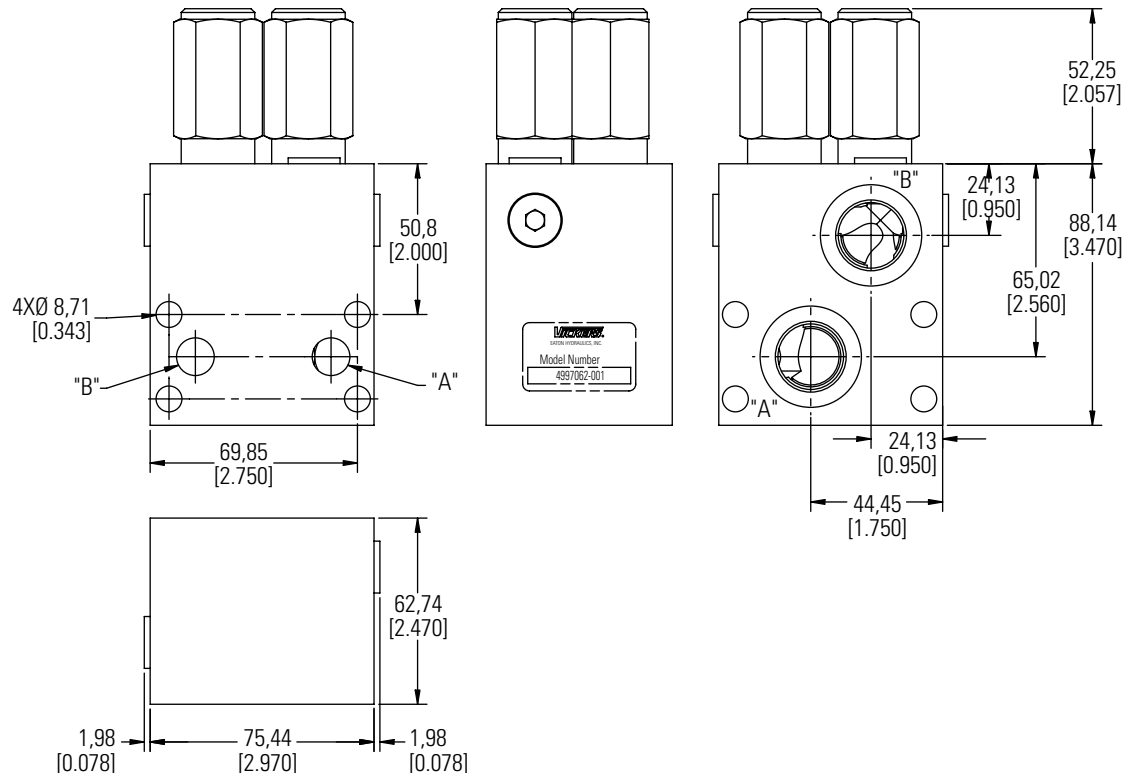
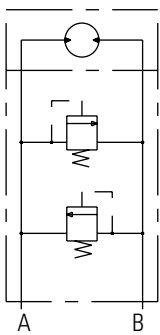


Port Sizes

"A", "B" – SAE10

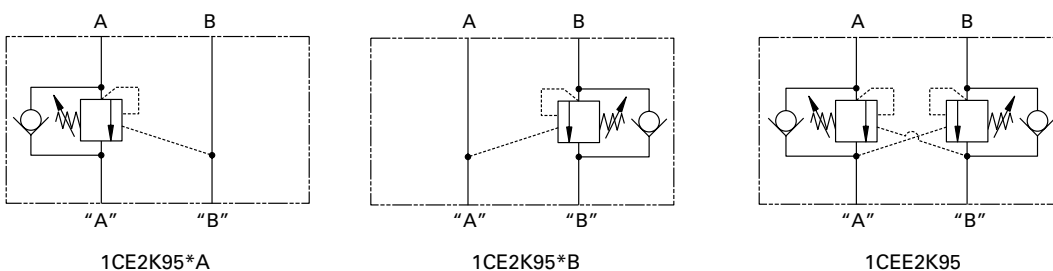
"Brake" – SAE4

Functional Symbol



1CE2K95/1CEE2K95 - Motor Mounted Valves

2K Mounting Pattern Single and Dual Overcenter Valves



Description

Overcenter valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

The overcenter cartridge is ideal for mounting directly into a cavity machined in the body of the cylinder, motor or rotary actuator. The cartridge can also be mounted directly to the ports via a specifically machined body as part of a Hydraulic Integrated Circuit or single unit, or contained within one of our standard line bodies.

Single overcenter valves are normally used when the load is unidirectional, for example an aerial platform or crane and dual overcenter valves are used for controlling loads in both directions for motor applications or for cylinders going over center.

Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

Performance Data

Ratings and Specifications

Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)

Rated flow	90 L/min (23 USgpm)	
Max setting	Max load induced	
	Pressure:	270 bar (4000 psi)
	Relief setting:	350 bar (5000 psi)
Cartridge material	Working parts hardened & ground steel External surface zinc plated	
Body material	Standard aluminium (up to 210 bar*) Steel (up to 350 bar)	
Mounting position	Unrestricted	
Cavity Number	A12336 (See section M)	
Torque cartridge into cavity	60 Nm (44 lbs ft)	
Weight	1CE2K95	2.16 kg (4.75 lbs)
(inc cartridges)	1CEE2K95	2.26 kg (4.97 lbs)
Seal kit number	1CE2K95	9900830-000 (Buna-N) 9900831-000 (Viton)
	1CEE2K95	9900832-000 (Buna-N) 9900833-000 (Viton)
Recommended filtration level	BS5540/4 Class 18/13 (25 micron nominal)	
Operating Temp	-30°C to +90°C (-22° to 194°F)	
Leakage	0.3 milliL/min nominal (5 dpm)	
Nominal viscosity range	5 to 500 cSt	
Installation Kit (includes cap screws, washers, and o-rings)	9900826-000 (Buna-N) 9900827-000 (Viton)	

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{(\text{Relief Setting}) - (\text{Load Pressure})}{\text{Pilot Ratio}}$$

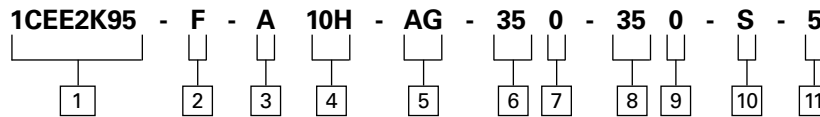
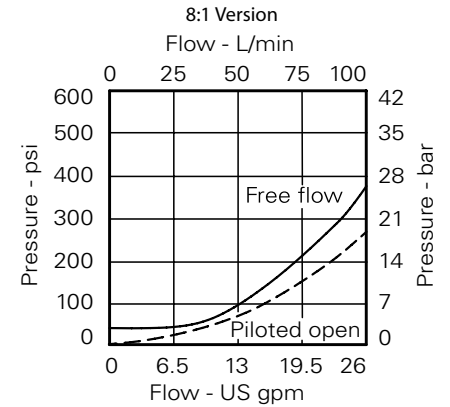
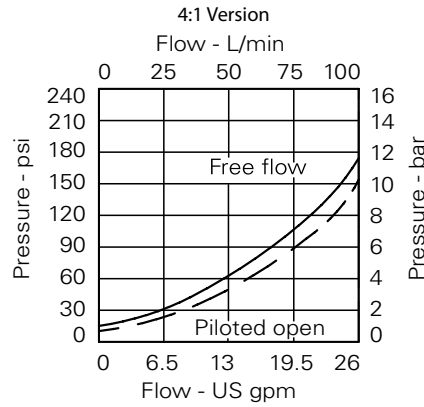
Pilot Ratios

- 4:1 Best suited for applications where load varies and machine structure can induce instability
- 8:1 Best suited for applications where the load remains relatively constant.

Other ratios available upon request

1CE2K95/1CEE2K95 Motor Mounted Valves

2K Mounting Pattern Single and Dual Overcenter Valves



1 Basic Code

1CEE2K95 Double Cartridge and Body
 1CE2K95*A Single overcenter in line A-"A"
 1CE2K95*B Single overcenter in line B-"B"

2 Adjustment Means

F – Screw Adjustment

3 Housing Material

A – Aluminum
 S – Steel

4

Code	Port Size "A" & "B"	Dual Housing Number	
		Aluminum	Steel
4W	1/2" BSP	6025185-001	6025185-003
10H	SAE 10	6025185-002	
10T	SAE 10		6025185-004

5 Port Acted Upon

A – A Port
 B – B Port
 AB – A & B Ports (dual)

6 Pressure Range (Cart A)

Note: Code Based on pressure in bar.

20 – 70-225 bar. Std setting 100 bar.
 35 – 200-350 bar. Std setting 210 bar.

7 Pressure Setting (Cart A)

0 – Std factory setting
 1500 – 1500 psi

8 Pressure Range (Cart B)

Note: Code Based on pressure in bar.

20 – 70-225 bar. Std setting 100 bar.
 35 – 200-350 bar. Std setting 210 bar.

9 Pressure Setting (Cart B)

0 – Std factory setting
 1500 – 1500 psi

10 Seals

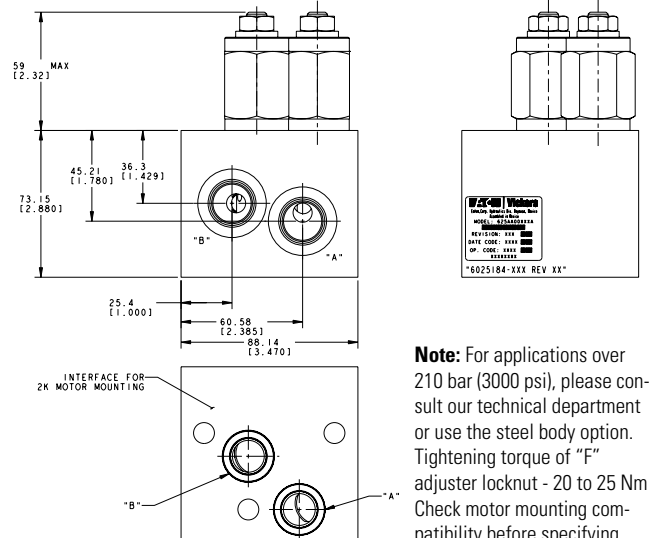
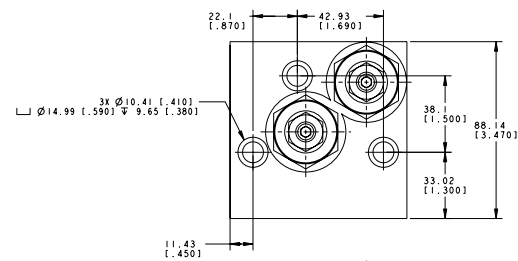
S – Buna-N
 SV – Viton

11 Pilot Ratio

4 – 4:1
 8 – 8:1

Cavity plug part number

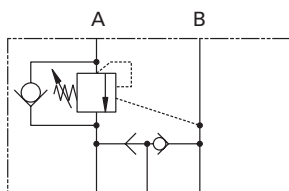
Nitrile - AXP14434-02-N
 Viton - AXP14434-02-V



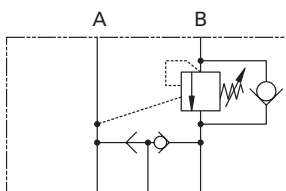
Note: For applications over 210 bar (3000 psi), please consult our technical department or use the steel body option. Tightening torque of "F" adjuster locknut - 20 to 25 Nm. Check motor mounting compatibility before specifying.

ICESH2K95/ICEESH2K95 - Motor Mounted Valves

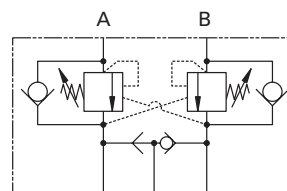
2K Mounting Pattern Single and Dual Overcenter Valves with Brake Release Shuttle



"A" Brake "B"
1CESH2K95*A



"A" Brake "B"
1CESH2K95*B



"A" Brake "B"
1CEESH2K95

Description

Overcenter Valves give static and dynamic control of loads by regulating the flow into and out of hydraulic actuators. When installed close to or within an actuator, the overcenter valve will stop runaway in the event of hose burst and if open center directional control valves are used, will allow thermal expansion relief of the hydraulic fluid.

These dual overcenter valves also contain a brake release shuttle valve which ensures that pressure is applied to a brake release circuit regardless of whether pressure is applied to ports "A" or "B". These multifunction valves are normally used for the static and dynamic control of systems using motors or semi-rotary actuators.

Operation

The check section allows free flow into the actuator then holds and locks the load against movement. The pilot assisted relief valve section will give controlled movement when pilot pressure is applied. The relief section is normally set to open at a pressure at least 1.3 times the maximum load induced pressure but the pressure required to open the valve and allow movement depends on the pilot ratio of the valve. For optimization of load control and energy usage, a choice of pilot ratios is available.

The pressure required to open the valve and start actuator movement can be calculated as follows:

$$\text{Pilot Pressure} = \frac{(\text{Relief Setting}) - (\text{Load Pressure})}{\text{Pilot Ratio}}$$

Pilot Ratios

- 4:1 Best suited for applications where load varies and machine structure can induce instability
- 8:1 Best suited for applications where the load remains relatively constant.

Other ratios available upon request

Performance Data

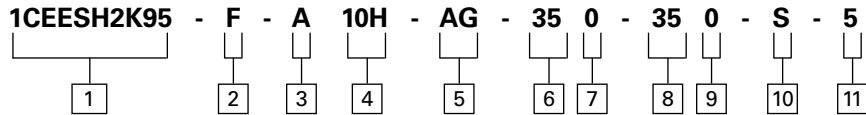
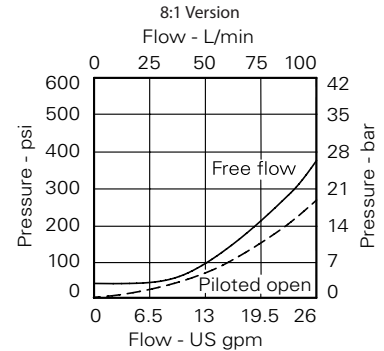
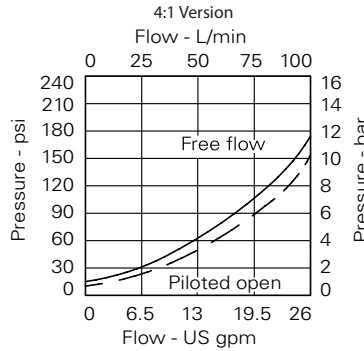
Ratings and Specifications

Figures based on: Oil Temp = 40°C Viscosity = 32 cSt (150 SUS)

Rated flow	90 L/min (23 USgpm)		
Max setting	Max load induced		
	Pressure:	270 bar (4000 psi)	
	Relief setting:	350 bar (5000 psi)	
Cartridge material	Working parts hardened & ground steel External surface zinc plated		
Body material	Standard aluminium (up to 210 bar*) Steel (up to 350 bar)		
Mounting position	Unrestricted		
Cavity Number	A12336 (See section M)		
Torque cartridge into cavity	60 Nm (44 lbs ft)		
Weight	1CESH2K95	2.32 kg	(5.10 lbs)
(inc cartridges)	1CEESH2K95	2.42 kg	(5.32 lbs)
Seal kit number	1CESH2K95 9900834-000 (Buna-N)	9900835-000 (Viton)	
	1CEESH2K95 9900836-000 (Buna-N)	9900837-000 (Viton)	
Recommended filtration level	BS5540/4 Class 18/13 (25 micron nominal)		
Operating Temp	-30°C to +90°C (-22° to 194°F)		
Leakage	0.3 milliL/min nominal (5 dpm)		
Nominal viscosity range	5 to 500 cSt		
Installation Kit (includes cap screws, washers, and o-rings)	9900828-000 (Buna-N) 9900829-000 (Viton)		

ICESH2K95/ICEESH2K95 - Motor Mounted Valves

2K Mounting Pattern Single and Dual Overcenter Valves with Brake Release Shuttle



1 Basic Code

1CEESH2K95 - Double Cartridge and Body
 1CESH2K95*A - Single overcenter in line A-"A"
 1CESH2K95*B - Single overcenter in line B-"B"

2 Adjustment Means

F - Screw Adjustment

3 Housing Material

A - Aluminum
 S - Steel

4

Code	Port Size "A" & "B"		Dual Housing Number	
	"A"	"B"	Aluminum	Steel
4W	1/2" BSP	1/4" BSP	6025134-001	6025134-003
10H	SAE 10	SAE 4	6025134-003	
10T	SAE 10	SAE 4		6025134-004

5 Port Acted Upon

A - A Port
 B - B Port
 AB - A & B Ports (dual)

6 Pressure Range (Cart A)

Note: Code Based on pressure in bar.

20 - 70-225 bar. Std setting 100 bar.
 35 - 200-350 bar. Std setting 210 bar.

7 Pressure Setting (Cart A)

0 - Std factory setting
 1500 - 1500 psi

8 Pressure Range (Cart B)

Note: Code Based on pressure in bar.

20 - 70-225 bar. Std setting 100 bar.
 35 - 200-350 bar. Std setting 210 bar.

9 Pressure Setting (Cart B)

0 - Std factory setting
 1500 - 1500 psi

10 Seals

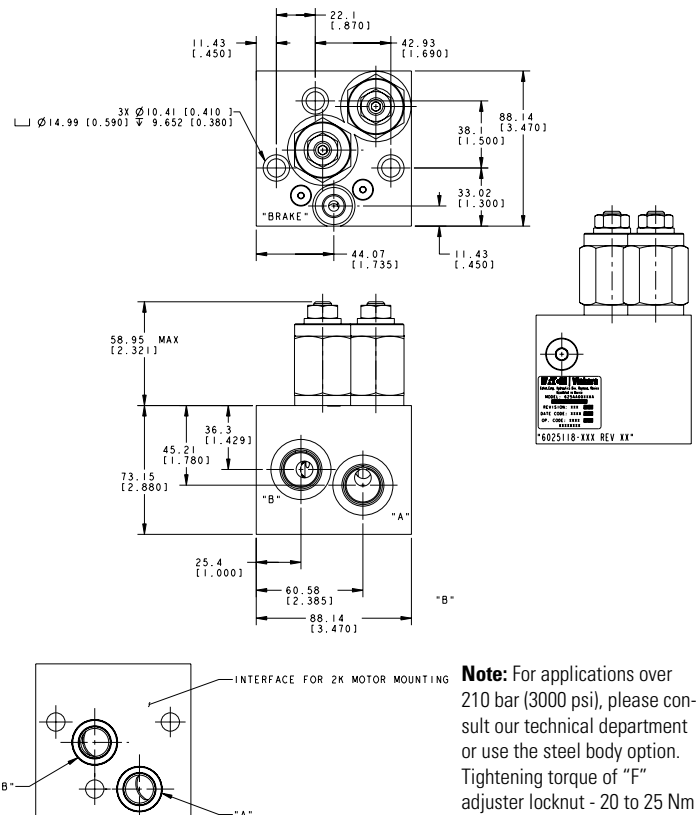
S - Buna-N
 SV - VitoN

11 Pilot Ratio

4 - 4:1
 8 - 8:1

Cavity plug part number

Nitrile - AXP13032-01-N
 Viton - AXP13032-01-V



Note: For applications over 210 bar (3000 psi), please consult our technical department or use the steel body option. Tightening torque of "F" adjuster locknut - 20 to 25 Nm. Check motor mounting compatibility before specifying.

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

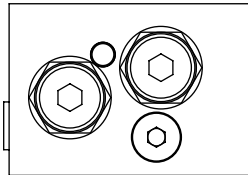
RATINGS AND SPECIFICATIONS

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

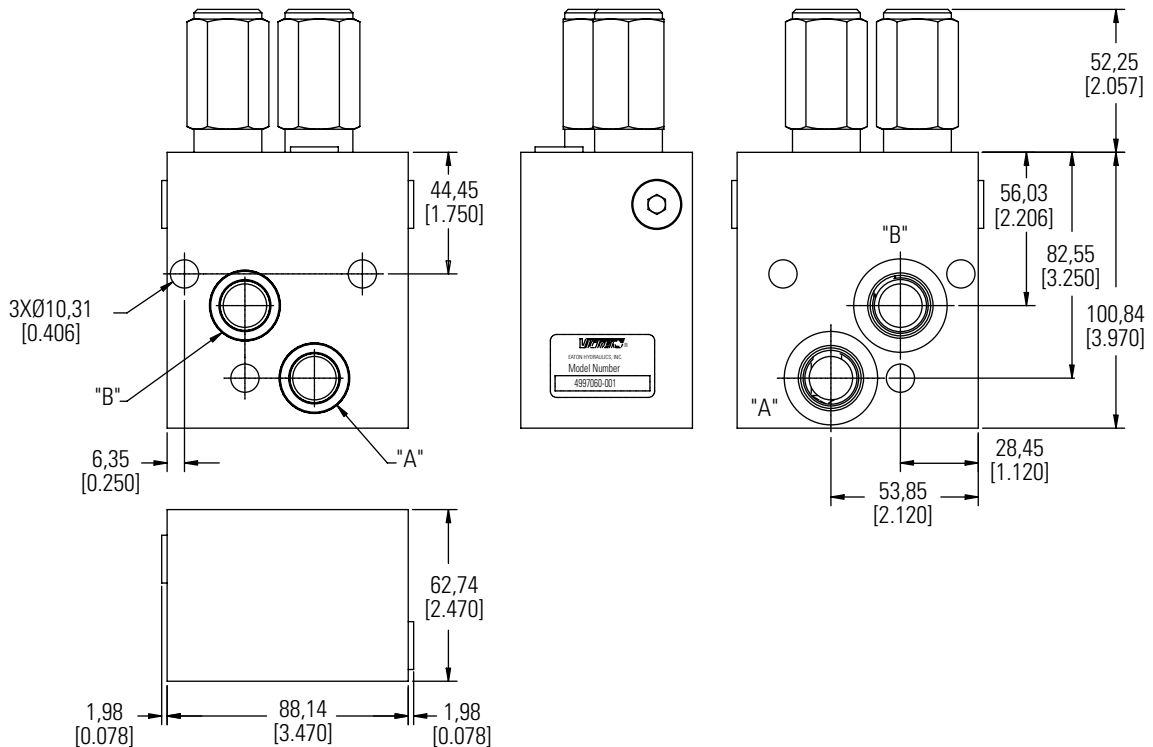
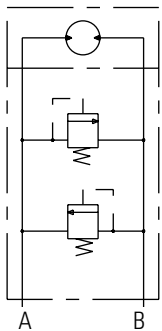
"A", "B" – SAE10
"Brake" – SAE4



Warning

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

Functional Symbol



ATEX Certification

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



What is ATEX Certification?

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

Benefits

ATEX certification on our motors allows our motors to be used in certain types of explosive environments. When you order an ATEX certified motor, you receive:

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

Applications

As mentioned above, it can be any application that operates in explosive environments. Typically, this includes Oil and Gas applications, Mining applications and applications in the rubber industry.

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

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

Fluids 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 Values 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

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

Viscosity and Temperature

Viscosity is the measure of a fluid's resistance to flow. The most important characteristic to consider when choosing a fluid to be used in a hydraulic system is viscosity. The fluid must be thin enough to flow easily but thick enough to maintain adequate lubricating film between component and to maintain proper sealing at the operating temperatures of the hydraulic system. For viscosity requirements see table. Viscosity of any fluid is relative to temperature, as the fluid warms the viscosity decreases and vice versa. When choosing a fluid, it is important to consider the start-up and operating temperatures of the hydraulic system. A high VI fluid shows relatively small change of viscosity with temperature. Lubricants used for hydraulic applications may contain viscosity index improvers (VII). They refer to these fluids as viscosity index improved, or multi-viscosity fluids. The viscosity of these fluids may drop down in use due to the shearing of VI improvers used in the

formulations. Anti-wear hydraulic oils containing polymeric thickeners (Viscosity Index Improvers [VII]) are generally used for wide band operating temperature applications. These fluids experience temporary and permanent viscosity loss during use in hydraulic system. Check the extent of viscosity loss (shear stability) to avoid hydraulic service below the recommended minimum viscosity. Oil with good shear stability is recommended for wide band temperature applications. Multi-grade engine oils, ATFs, UTTOs, etc., also contain VIIs, and viscosity loss will be encountered during use.

Cleanliness

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

Fluid Maintenance

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

Fluid Selection

Premium grade anti-wear (AW) petroleum based hydraulic fluids will provide the best performance in Eaton hydraulic components. Lubricants that pass Eaton Vickers® 35VQ25A high-pressure vane pump test (Eaton ATS-373 test procedure, ASTM Specification D-6973) are considered good quality, anti-wear hydraulic fluids. Automotive crankcase oils with American Petroleum Institute (API) letter designation SE, SF, SG, SH, or higher per SAE J183 classes of oils are recommended for applications using Eaton GG motors. Automotive crankcase oils generally exhibit less shear stability compared to industrial anti-wear hydraulic fluids, which can result in higher loss of viscosity during service life. Other mineral oil-based lubricants commonly used in hydraulic systems are automatic transmission fluids (ATFs) and universal tractor transmission oils (UTTOs). Synthetic hydrocarbon base stocks, such as polyalphaolefins (PAOs), are also

used to formulate hydraulic fluids, engine oils, ATFs and UTTOs. Alternative fluids are recommended when specific properties, such as fire resistance, biodegradability, etc., are necessary for the application. Keep in mind that alternative fluids may differ from AW petroleum fluids in properties such as pressure viscosity coefficient, specific gravity, lubricity, etc. Hence, GG motors may need to be derated, some can be operated under full ratings, and other are not rated.

Additional Notes:

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

Contact your Eaton representative if you have specific questions about the fluid requirements of Eaton hydraulic components.

B-1

B-2

B-3

B-4

B-5



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

Spool Valve Motors

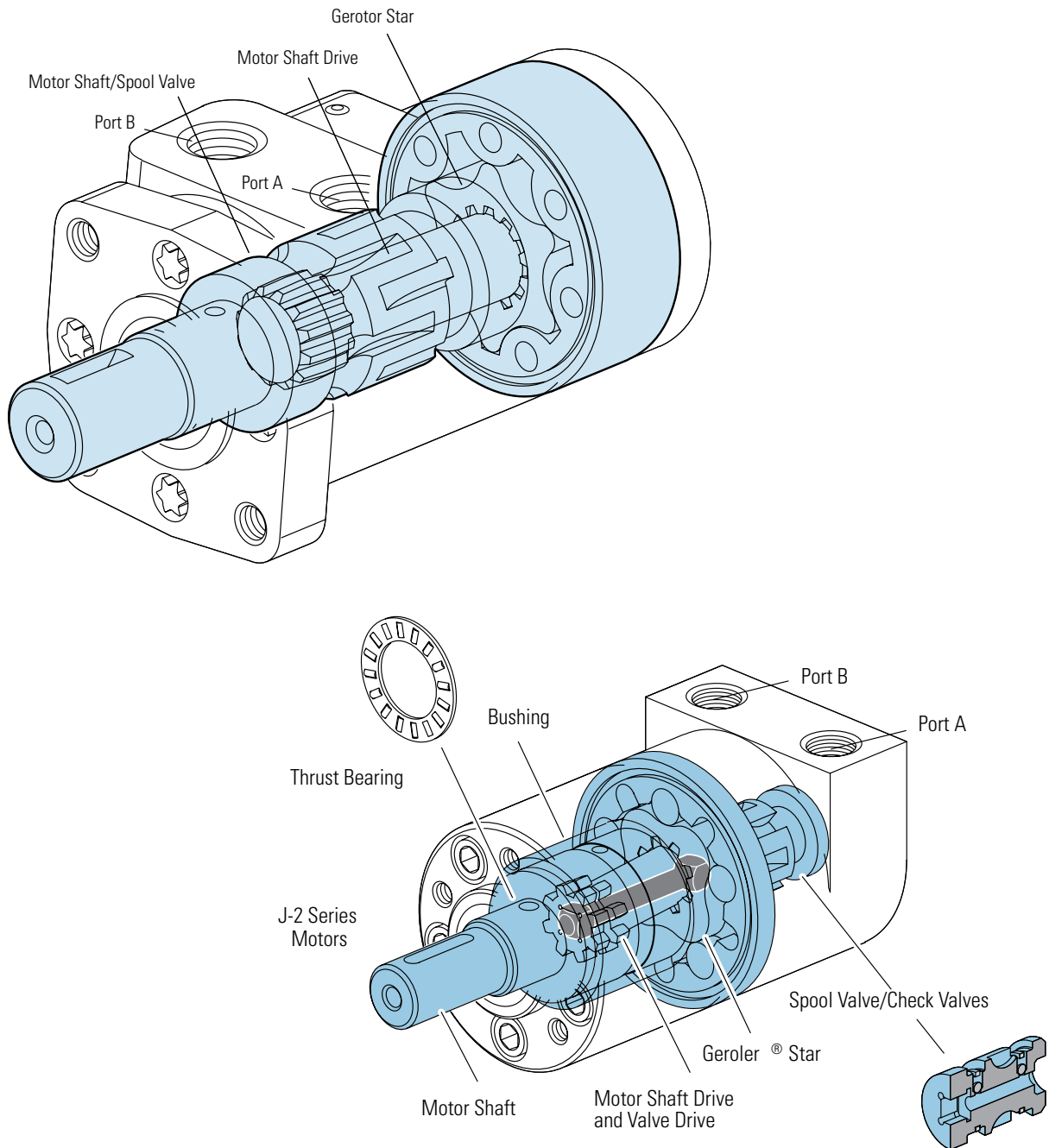
Highlights

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

B-1

B-2

B-3

B-4

B-5

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-)

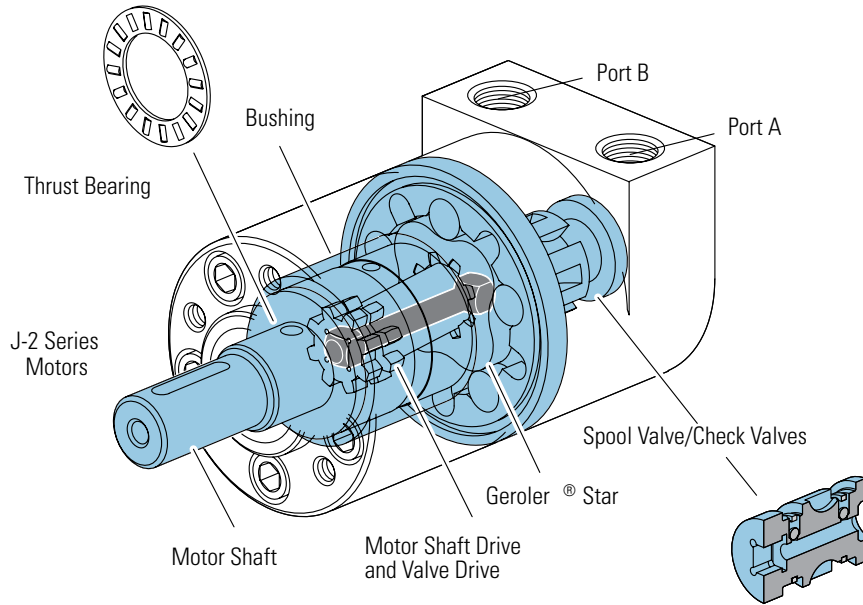
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W Series with Parking Brake (162-)

Dimensions	B-5-9
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J Series (129-)

Highlights



Description

Char-Lynn J Series motors provide a lot of power from a very small package. Up to 5 kW [6 1/2 HP] of power. These motors are 61 mm [2.4 in] in diameter and 104 to 130 mm [4.1 to 5.1 in] in length.

The J Series motor shaft and seal allows high case pressure up to 76 bar [1100 PSI] return line pressure without case drain line. When a case drain line is used a 220 bar [3190 PSI] peak pressure is allowed in the return line.

Specifications

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

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

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

Features:

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

Benefits:

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

Applications:

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

B-1



Plastic Injection



Metal Forming



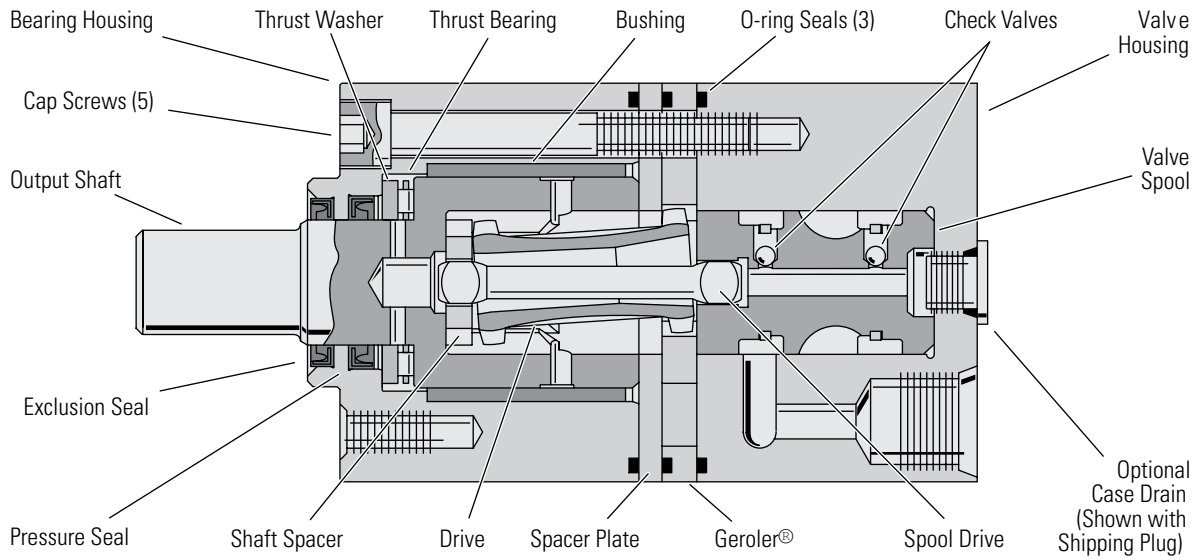
Food Processing



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]

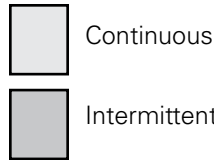
D Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

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



12,9 cm ³/r [0.79 in ³/r]

D Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

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

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

J Series (129-)

Performance Data

Motors run with high efficiency in all areas designated with a number for torque and speed. 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 cm³/r [1.21 in³/r]

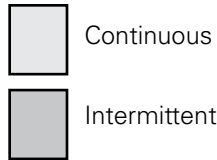
D Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

		[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
Flow LPM [GPM]	[1] 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] 7,6	[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
	[3] 11,4	[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] 37 484	[405] 46 459
	[4] 15,1	[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] 36 656	[382] 43 628
Max. Continuous	[5.5] 20,8	[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] 24,6	[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	



31.6 cm³/r [1.93 in³/r]

D Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

		[200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1400] 97	[1450] 100	[1500] 103	[1750] 121	[2175] 150
Flow LPM [GPM]	[1] 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] 7,6	[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
	[3] 11,4	[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
	[4] 15,1	[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
Max. Continuous	[5.5] 20,8	[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] 24,6	[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 cm³/r [3.00 in³/r]

D Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

		[200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1100] 76	[1200] 83	[1300] 90	[1400] 97	[2030] 140
Flow LPM [GPM]	[1] 3,8	[82] 9 75	[167] 19 72	[211] 24 72									
	[2] 7,6	[70] 8 149	[156] 18 147	[201] 23 145	[243] 28 144	[286] 32 143	[327] 37 142						
	[3] 11,4	[53] 6 221	[140] 16 220	[184] 21 218	[227] 26 217	[271] 31 215	[311] 35 213	[396] 45 209	[441] 50 205	[484] 55 201	[521] 59 200	[549] 62 191	
	[4] 15,1	[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
Max. Continuous	[5.5] 20,8	[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] 24,6	[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
393 } Torque (lb-in)
Nm
Speed RPM

J Series (129-)

Dimensions

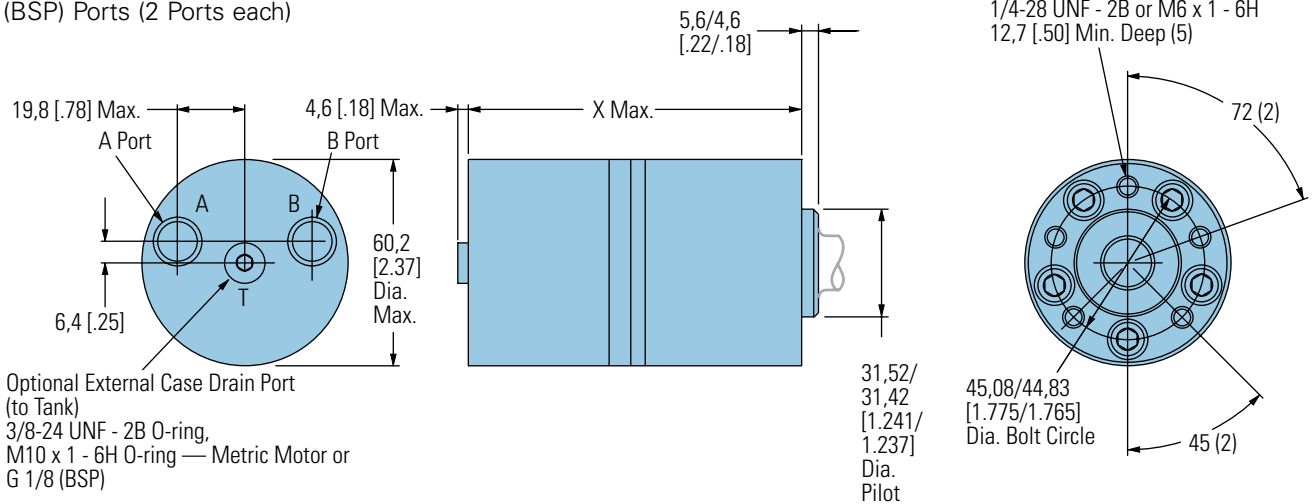
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

9/16 Inch End Port

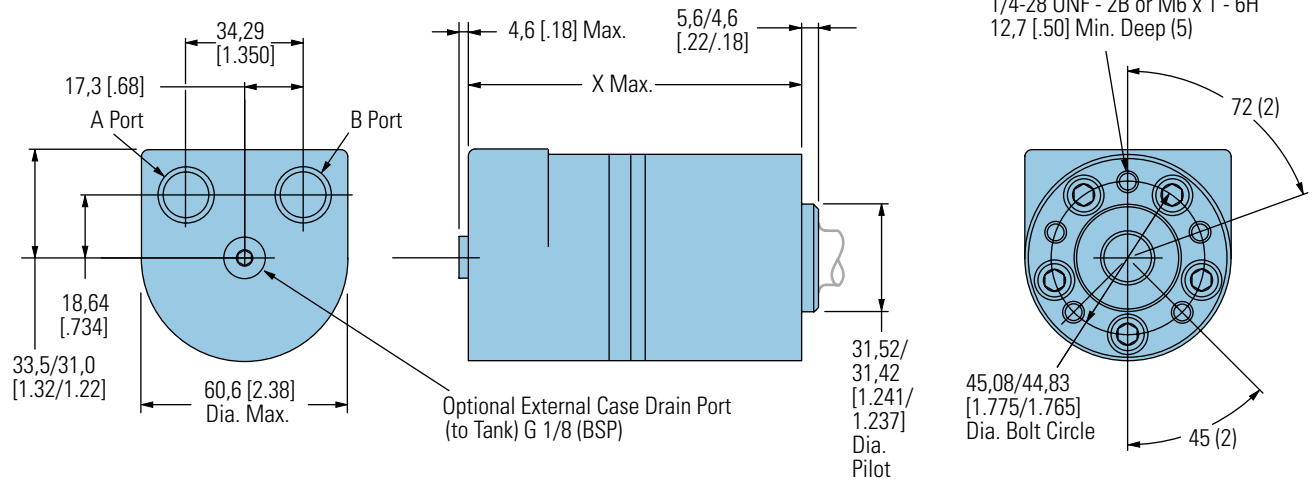
9/16 -18 UNF - 2B O-Ring Ports, M14 x 1,5
- 6H O-Ring Ports — Metric Motor or
G 1/4 (BSP) Ports (2 Ports each)



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

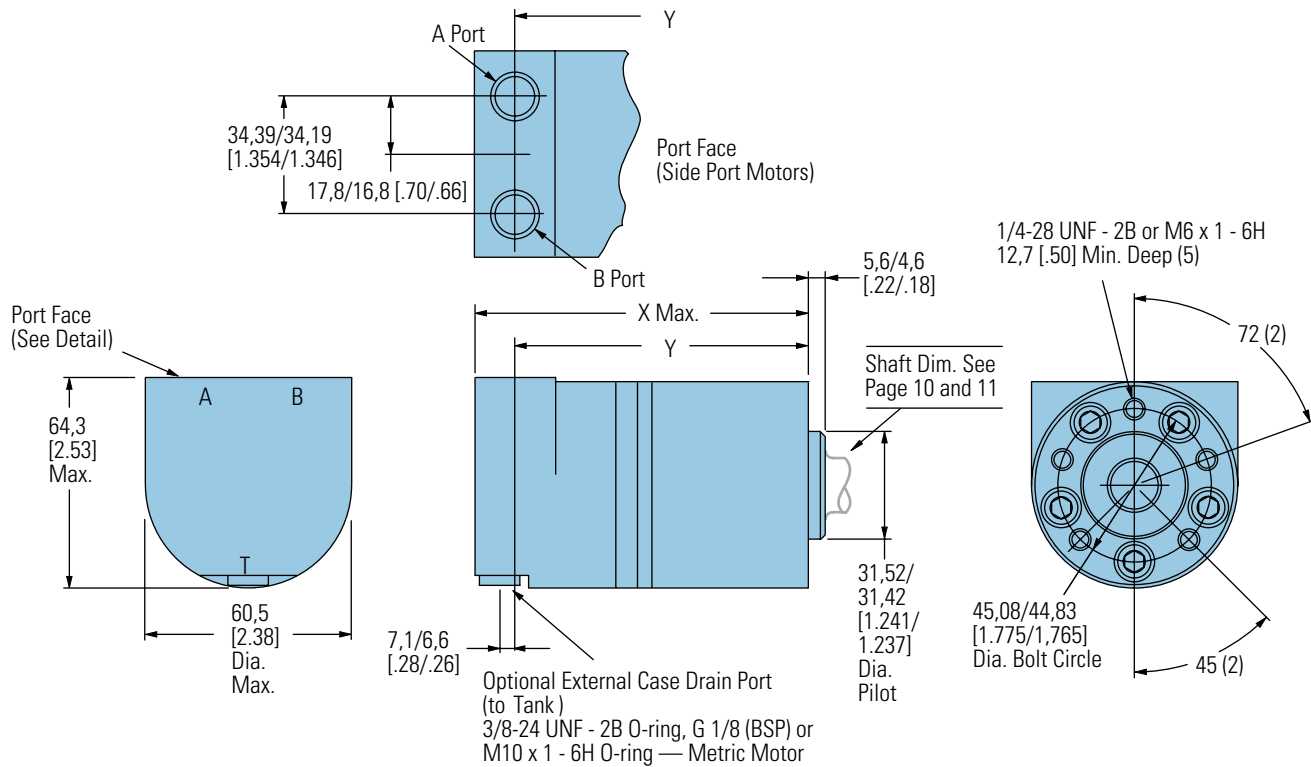
Ports

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

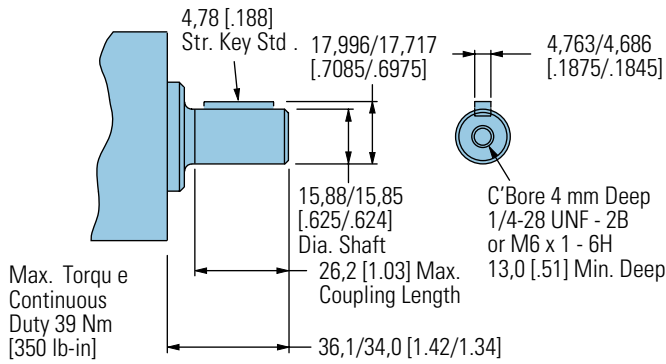
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
8,2 [.50]	103,9 [4.09]	89,4/ 87,4 [3.52/3.44]
12,9 [.79]	106,9 [4.21]	92,5/ 90,4 [3.64/3.56]
19,8 [1.21]	112,5 [4.38]	96,8/ 94,7 [3.81/3.73]
31,6 [1.93]	118,9 [4.68]	104,4/102,4 [4.11/4.03]
50,0 [3.00]	130,0 [5.12]	115,7/113,9 [4.56/4.48]

J Series (129-)

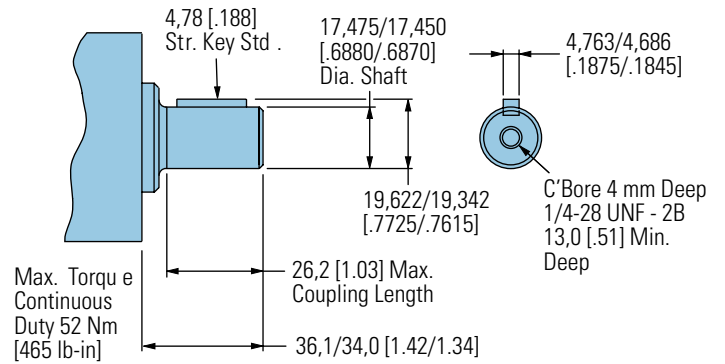
Dimensions

Shafts

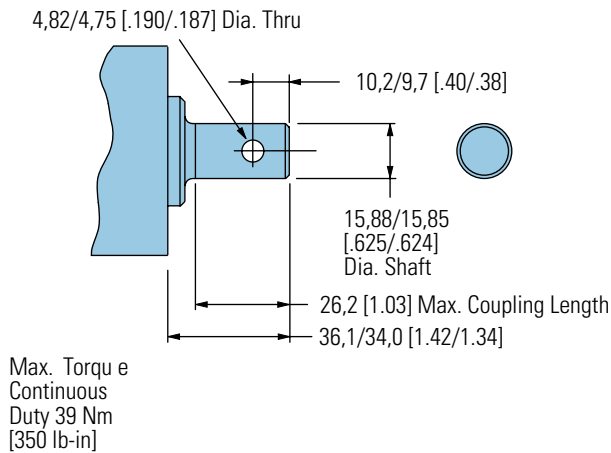
5/8 Inch Straight Keyed



11/16 Inch Straight Keyed



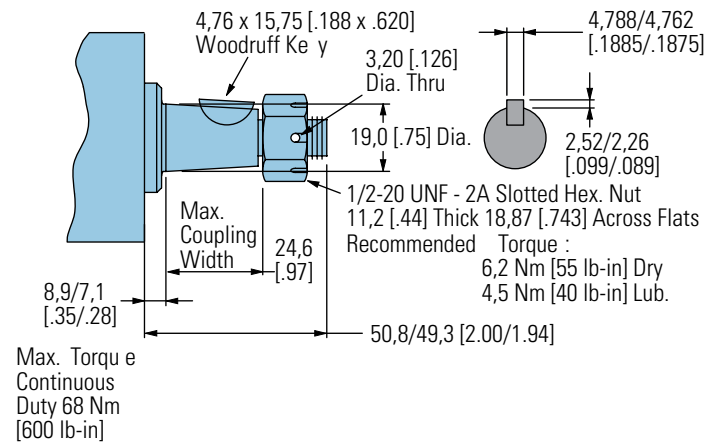
5/8 Inch Straight Keyed w/ Crosshole



3/4 Inch Tapered

(Tapered Shaft End Per SAE J744)

Except as Specified — 1.5 : 12 Ratio)

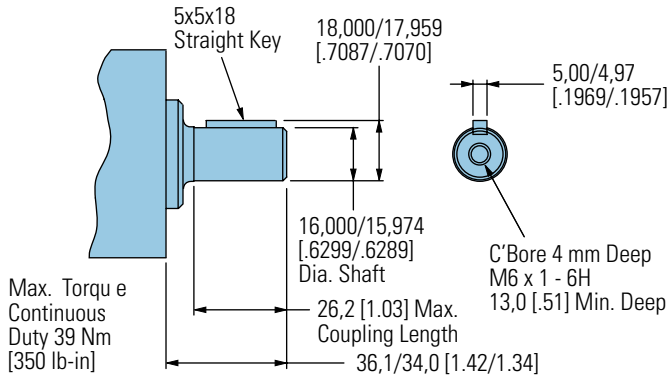


J Series (129-)

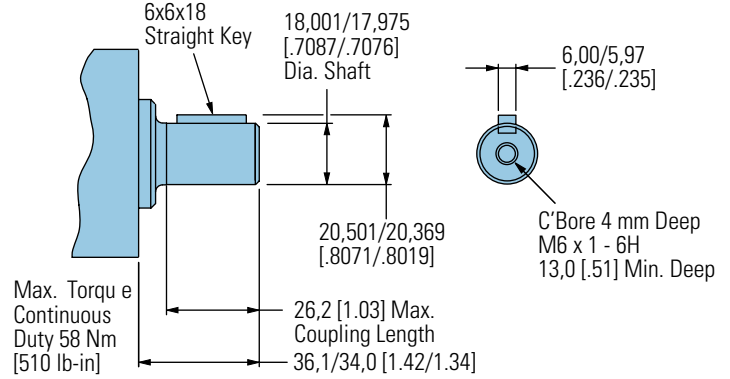
Dimensions

Shafts and Flange Kit

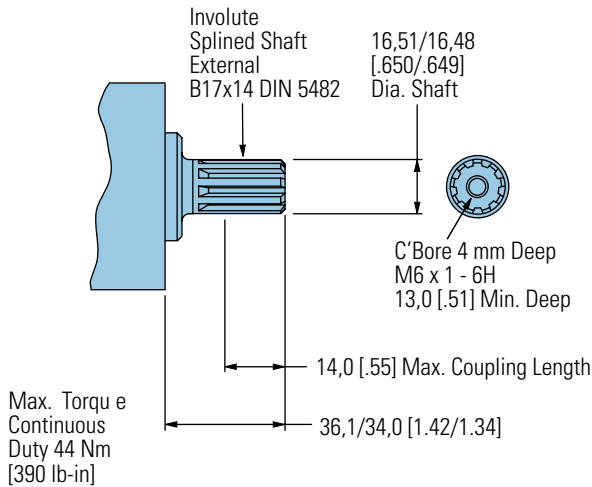
16 mm Straight Keyed



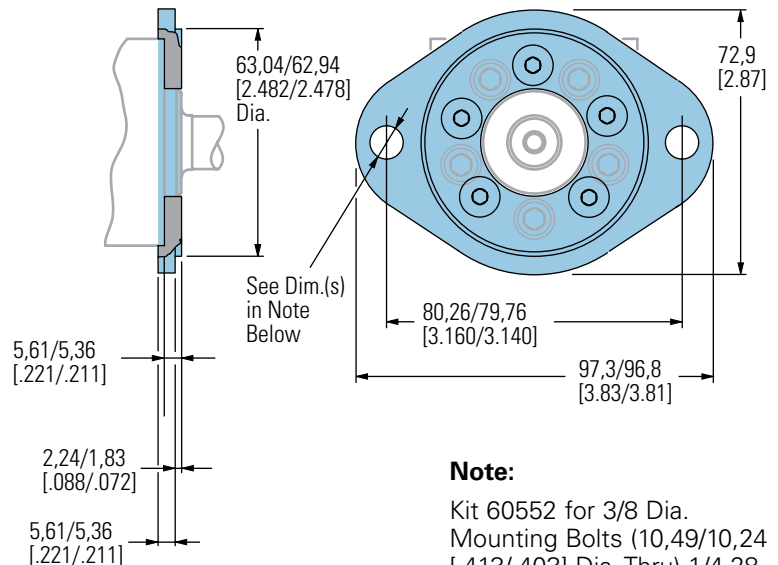
18 mm Straight Keyed



Involute 9T Splined – Metric



2 Bolt Flange Kits (2)



Note:

Kit 60552 for 3/8 Dia. Mounting Bolts (10,49/10,24 [0.413/0.403] Dia. Thru) 1/4-28 UNF screws for attaching flange to motor (5)

Kit 60553 for M8 Dia. Mounting Bolts (9,12/8,86 [0.359/0.349] 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.**

B-1

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		129-0291	-0292	-0293	-0294	-0458
	11/16 inch Straight	9/16 -18 UNF 2B O-Ring (2)	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		129-0327	-0328	-0329	-0330	-0467
	18 mm Straight	G 3/8 (BSP) (2)*	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		129-0339	-0340	-0341	-0342	-0470
	11/16 inch Straight	9/16 -18 UNF 2B O-Ring (2)	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		129-0375	-0376	-0377	-0378	-0478
	18 mm Straight	G 3/8 (BSP) (2)	129-0375	-0376	-0377	-0378	-0478
Splined — Metric	129-0379		-0380	-0381	-0382	-0479	

Two Bolt Mounting Flange Kit (for 3/8 inch Mounting Bolts) — Kit Number 60552 (includes 5 screws — 1/4 -28 UNF-2B)

Two Bolt Mounting Flange Kit (for M8 Mounting Bolts) — Kit Number 60553 (includes 5 screws — M6 x 1-6H)

J Series (129-)

Shaft Side Load Capacity

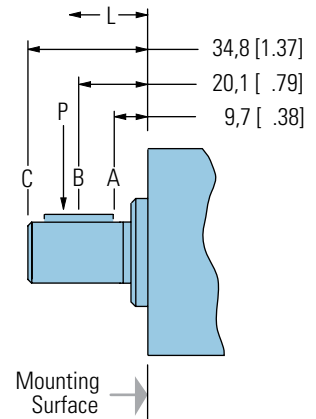
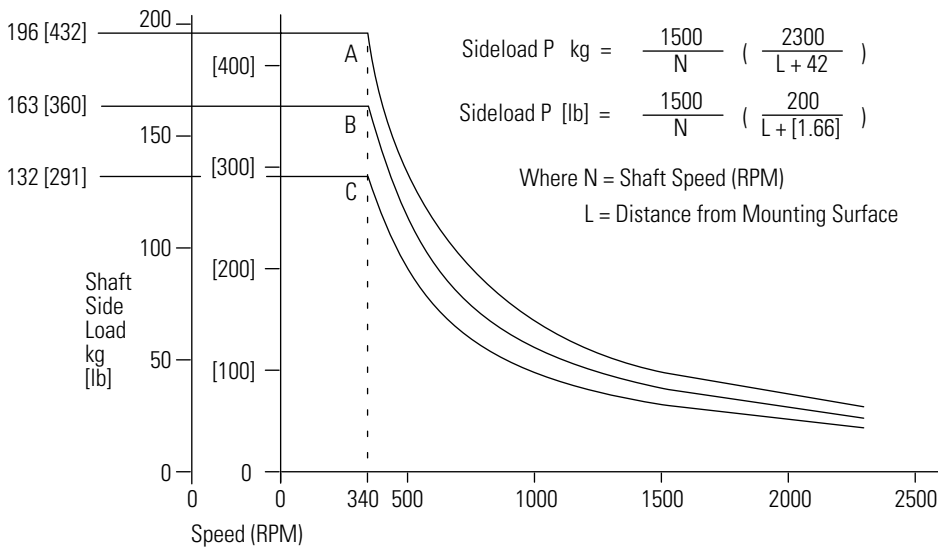
The hydrodynamic bearing has infinite life when shaft load ratings are not exceeded. Hence, the shaft side load capacity is more than adequate to handle most externally applied loads (such as belts, chains, etc.), providing the motor to shaft size is applied within its torque rating.

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.

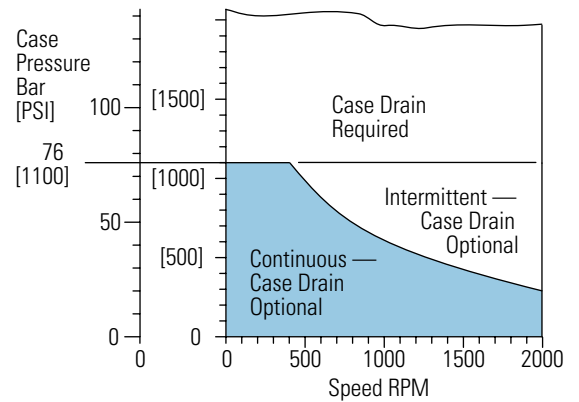
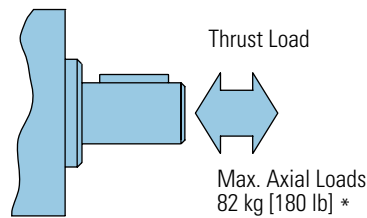
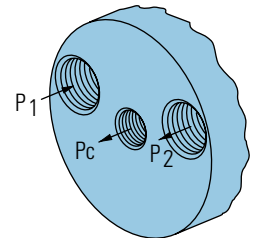
Example:

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.

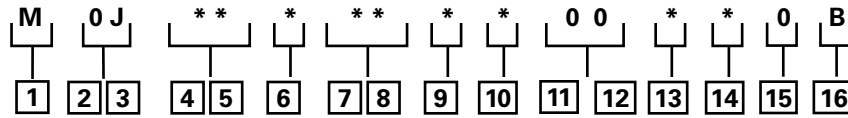
Case pressure will add to the allowable compressive thrust load. Case pressure will push outward on the shaft at 20 kg/7 Bar [44 lb/100 PSI].



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 – Low Gloss Black Primer, Individual Box

B – No Paint, Bulk Box Option

15 Eaton Assigned Code when Applicable

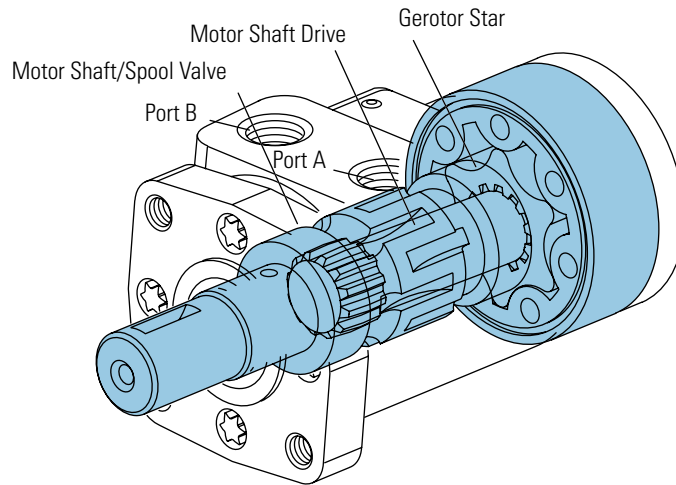
0 – Assigned Code

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

B-2



Conveyer



Combine



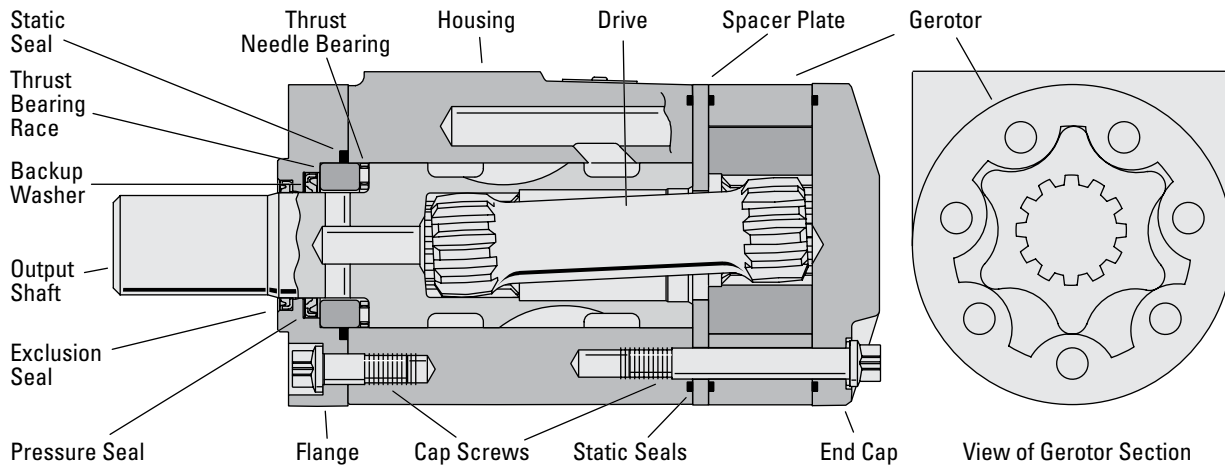
Sweeper



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 @ Int. Pressure	@ 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:

$$100 \text{ SUS or } \left[\frac{300 \times \text{Bar}}{\text{RPM}} = \text{SUS} \right]$$

$$\frac{20 \times \text{PSI}}{\text{RPM}} = \text{SUS} \right]$$

Recommended System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:



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

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

36 cm³/r [2.2 in³/r]
Δ Pressure Bar [PSI]
Continuous

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	Max. Continuous	Max. Intermittent
		14	28	41	55	69	83	97	110	124	[2400]	165
Flow LPM [GPM]	[2]	[49]	[103]	[162]	[189]	[270]	[325]	[379]	[432]	[489]	[650]	73
	7.6	6 204	12 201	18 198	21 194	31 189	37 184	43 177	49 170	55 162	75 122	122
	[4]	[47]	[106]	[160]	[191]	[274]	[327]	[384]	[439]	[495]	[654]	74
	15.1	5 408	12 407	18 402	22 399	31 394	37 387	43 381	50 373	56 365	75 323	323
	[6]	[44]	[102]	[158]	[188]	[272]	[328]	[383]	[440]	[496]	[661]	75
22.7	5 613	12 612	18 609	21 604	31 599	37 591	43 586	50 576	56 565	75 523	523	
[8]	[40]	[97]	[153]	[184]	[270]	[326]	[383]	[440]	[497]	[668]	75	
30.3	5 817	11 817	17 814	21 807	31 799	37 793	43 785	50 776	56 762	75 721	721	
[10]	[36]	[90]	[148]	[180]	[265]	[322]	[380]	[438]	[495]	[664]	75	
37.9	4 1021	10 1021	17 1015	20 1008	30 1001	36 991	43 981	49 969	56 959	75 920	920	



46 cm³/r [2.8 in³/r]
Δ Pressure Bar [PSI]
Continuous

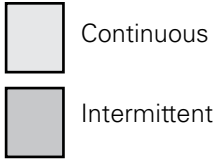
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	Max. Continuous	Max. Intermittent
		14	28	41	55	69	83	97	110	124	[2400]	165
Flow LPM [GPM]	[2]	[64]	[136]	[212]	[284]	[355]	[426]	[497]	[567]	[641]	[852]	96
	7.6	7 161	15 158	24 156	32 153	40 148	48 145	56 139	64 133	72 127	95	95
	[4]	[61]	[139]	[209]	[286]	[359]	[429]	[503]	[576]	[649]	[857]	97
	15.1	7 323	16 320	24 316	32 314	41 310	48 304	57 300	65 293	73 287	97 253	253
	[6]	[58]	[134]	[207]	[282]	[356]	[430]	[502]	[577]	[650]	[867]	98
22.7	7 486	15 481	23 479	32 475	40 471	49 464	57 461	65 453	73 444	98 410	410	
[8]	[52]	[128]	[200]	[276]	[354]	[428]	[502]	[577]	[651]	[876]	99	
30.3	6 648	14 643	23 640	31 635	40 628	48 623	57 617	65 610	74 599	99 566	566	
[10]	[47]	[118]	[194]	[269]	[347]	[423]	[498]	[575]	[649]	[871]	98	
37.9	5 808	13 803	22 798	30 793	39 787	48 779	56 771	65 761	73 753	98 722	722	
[12]	[36]	[109]	[188]	[260]	[340]	[417]	[492]	[567]	[643]	[864]	98	
45.4	4 969	12 964	21 960	29 952	38 946	47 938	56 931	64 922	73 914	98 877	877	
Max. Intermittent	[14]	[25]	[98]	[175]	[249]	[327]	[404]	[484]	[559]	[634]		
	53.0	3 1127	11 1123	20 1115	28 1108	37 1100	46 1093	55 1086	63 1079	72 1068		

H Series (101-)

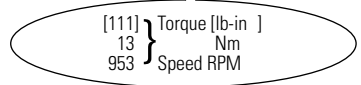
Performance Data

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





		74 cm ³ /r [4.5 in ³ /r]										
		Δ Pressure Bar [PSI]										
		Continuous										
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2400]	
		14	28	41	55	69	83	97	110	124	165	
Flow LPM [GPM]	[2]	[103]	[220]	[339]	[454]	[569]	[685]	[801]	[916]	[1036]	[1373]	
	7,6	12 101	25 99	38 98	51 96	64 93	77 90	91 86	103 81	117 76	155 51	
	[4]	[99]	[219]	[335]	[457]	[574]	[689]	[808]	[925]	[1042]	[1386]	
	15,1	11 203	25 201	38 199	52 197	65 194	78 191	91 187	105 182	118 177	157 153	
	[6]	[94]	[210]	[328]	[451]	[571]	[689]	[805]	[924]	[1044]	[1392]	
	22,7	11 305	24 303	37 301	51 298	65 296	78 292	91 288	104 283	118 276	157 252	
	[8]	[86]	[196]	[319]	[438]	[558]	[676]	[793]	[913]	[1033]	[1401]	
	30,3	10 406	22 404	36 402	49 399	63 396	76 393	90 388	103 383	117 377	158 352	
	[10]	[74]	[183]	[310]	[422]	[545]	[667]	[784]	[903]	[1024]	[1394]	
	37,9	8 507	21 505	35 502	48 499	62 496	75 492	89 486	102 482	116 476	158 452	
	[12]	[58]	[171]	[295]	[408]	[533]	[657]	[773]	[891]	[1013]	[1377]	
	45,4	7 608	19 606	33 603	46 600	60 596	74 591	87 587	101 581	114 576	156 549	
	[14]	[43]	[154]	[277]	[396]	[515]	[640]	[760]	[880]	[1002]	[1374]	
	53,0	5 709	17 706	31 702	45 698	58 694	72 691	86 686	99 681	113 674	155 643	
	[15]	[36]	[145]	[268]	[387]	[506]	[632]	[750]	[873]	[996]	[1373]	
56,8	4 760	16 757	30 753	44 749	57 744	71 740	85 735	99 729	113 723	155 690		
Max. Continuous	[20]	[14]	[121]	[233]	[351]	[482]	[609]	[725]	[856]	[981]		
Max. Intermittent	75,7	2 904	14 902	26 898	40 895	54 891	69 887	82 882	97 877	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 cm ³ /r [5.9 in ³ /r] Δ Pressure Bar [PSI] Continuous								Max. Continuous	Max. Intermittent
		[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. Continuous 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. Intermittent 75,7	[25] 3 701	[157] 18 700	[311] 35 697	[455] 51 694	[625] 71 691	[790] 89 688	[941] 106 684	[1110] 125 681	[1272] 144 674	

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



		120 cm ³ /r [7.3 in ³ /r] Δ Pressure Bar [PSI] Continuous								Max. Continuous	Max. Intermittent
		[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. Continuous 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. Intermittent 75,7	[20] 2 626	[202] 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.

 Continuous
 Intermittent

146 cm³/r [8.9 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

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

159 cm³/r [9.7 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1650]	[2250]
		14	28	41	55	69	83	97	110	134	155
Flow LPM [GPM]	[2]	[209]	[465]	[715]	[973]	[1228]	[1478]	[1724]	[1981]	[2046]	[2764]
	7,6	24 47	53 46	81 46	110 45	139 44	167 42	195 40	224 38	231 37	312 23
	[4]	[210]	[460]	[710]	[971]	[1229]	[1480]	[1745]	[1996]	[2059]	[2813]
	15,1	24 94	52 94	80 93	110 91	139 91	167 90	197 89	226 87	233 87	318 76
	[6]	[205]	[454]	[704]	[965]	[1216]	[1477]	[1738]	[1991]	[2055]	[2824]
	22,7	23 141	51 141	80 140	109 139	137 138	167 136	196 134	225 132	232 132	319 119
	[8]	[186]	[440]	[693]	[951]	[1205]	[1461]	[1716]	[1973]	[2038]	[2808]
	30,3	21 188	50 188	78 187	107 186	136 185	165 183	194 181	223 179	230 178	317 166
	[10]	[164]	[422]	[671]	[930]	[1189]	[1451]	[1702]	[1965]	[2032]	[2789]
	37,9	19 235	48 234	76 234	105 232	134 232	164 230	192 228	219 226	230 225	315 213
[12]	[144]	[404]	[652]	[900]	[1163]	[1421]	[1674]	[1937]	[2004]	[2770]	
45,4	16 282	46 281	74 281	102 279	131 279	161 277	189 275	219 273	226 272	313 260	
[14]	[109]	[374]	[623]	[883]	[1140]	[1396]	[1653]	[1900]	[1963]	[2727]	
53,0	12 330	42 329	70 328	100 327	129 325	158 323	187 322	215 319	222 319	308 306	
Max. Continuous	[15]	[92]	[359]	[612]	[861]	[1123]	[1381]	[1633]	[1886]	[1950]	[2712]
56,8	10 353	41 352	69 351	97 350	127 348	156 347	185 345	213 343	220 342	306 330	
Max. Intermittent	[20]	[26]	[268]	[510]	[772]	[1034]	[1290]	[1553]	[1802]	[1865]	
75,7	3 471	30 470	58 467	87 465	117 464	146 462	175 460	204 458	211 458		

[359] } Torque [lb-in]
 41 } Nm
 352 } 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. Continuous

Max. Intermittent

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[2150]
		14	28	41	55	69	83	97	110	148
Flow LPM [GPM]	[2]	[257]	[554]	[847]	[1150]	[1447]	[1739]	[2035]	[2320]	[3103]
	7,6	29 40	63 40	96 39	130 38	163 37	196 36	230 33	262 29	351 12
	[4]	[254]	[546]	[845]	[1145]	[1448]	[1744]	[2049]	[2343]	[3147]
	15,1	29 81	62 81	95 80	129 79	164 78	197 77	232 76	265 74	356 63
	[6]	[246]	[540]	[834]	[1137]	[1434]	[1736]	[2036]	[2337]	[3151]
	22,7	28 121	61 121	94 120	128 120	162 119	196 117	230 115	264 112	356 100
	[8]	[224]	[520]	[820]	[1117]	[1414]	[1716]	[2014]	[2315]	[3133]
	30,3	25 162	59 162	93 161	126 160	160 159	194 157	228 155	262 152	354 140
	[10]	[202]	[499]	[793]	[1095]	[1394]	[1699]	[1997]	[2299]	[3112]
	37,9	23 202	56 202	90 201	124 201	158 200	192 198	226 196	260 193	352 181
[12]	[176]	[475]	[767]	[1063]	[1368]	[1664]	[1969]	[2268]	[3088]	
45,4	20 243	54 242	87 242	120 241	155 240	188 240	222 236	256 234	349 222	
[14]	[140]	[443]	[735]	[1035]	[1340]	[1637]	[1936]	[2227]	[3051]	
53,0	16 283	50 283	83 282	117 281	151 280	185 279	219 277	252 274	345 262	
Max. Continuous	[15]	[120]	[425]	[719]	[1014]	[1320]	[1618]	[1914]	[2205]	[3023]
56,8	14 304	48 303	81 302	115 301	149 300	183 299	216 297	249 294	342 283	
Max. Intermittent	[20]	[27]	[321]	[612]	[911]	[1211]	[1504]	[1795]		
75,7	3 405	36 404	69 402	103 401	137 400	170 398	203 397			

231 cm³/r [14.1 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1450]	[2000]
		14	28	41	55	69	83	97	100	138
Flow LPM [GPM]	[2]	[338]	[707]	[1074]	[1456]	[1827]	[2192]	[2572]	[2657]	
	7,6	38 32	80 32	121 31	165 30	206 30	248 28	291 26	300 25	
	[4]	[328]	[695]	[1076]	[1447]	[1827]	[2201]	[2577]	[2669]	[3671]
	15,1	37 65	79 65	122 64	163 63	206 62	249 62	291 60	302 60	415 50
	[6]	[317]	[687]	[1057]	[1434]	[1811]	[2186]	[2555]	[2650]	[3668]
	22,7	36 97	78 97	119 97	162 96	205 95	247 94	289 92	299 91	414 80
	[8]	[289]	[659]	[1038]	[1406]	[1777]	[2160]	[2531]	[2625]	[3644]
	30,3	33 130	74 130	117 130	159 129	201 128	244 127	286 124	297 124	412 112
	[10]	[265]	[631]	[1004]	[1381]	[1751]	[2131]	[2510]	[2602]	[3608]
	37,9	30 162	71 162	113 162	156 162	198 160	241 158	284 156	294 156	408 145
[12]	[230]	[599]	[968]	[1345]	[1722]	[2088]	[2480]	[2571]	[3571]	
45,4	26 195	68 195	109 194	152 194	195 193	236 192	280 189	290 189	403 178	
[14]	[191]	[563]	[927]	[1299]	[1686]	[2058]	[2428]	[2519]	[3532]	
53,0	22 227	64 227	105 227	147 226	190 226	233 224	274 222	285 221	399 212	
Max. Continuous	[15]	[167]	[538]	[904]	[1279]	[1661]	[2030]	[2404]	[2493]	[3488]
56,8	19 243	61 243	102 243	145 242	188 242	229 240	272 238	282 238	394 229	
Max. Intermittent	[20]	[29]	[411]	[785]	[1152]	[1520]	[1877]	[2222]	[2318]	
75,7	3 324	46 324	89 323	130 322	172 322	212 320	251 319	262 318		

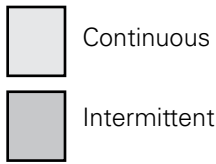


H Series (101-)

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

		370 cm ³ /r [22.6 in ³ /r]									739 cm ³ /r [45.1 in ³ /r]					
		Δ Pressure Bar [PSI]							Max. Continuous	Max. Intermittent	Δ Pressure Bar [PSI]				Max. Continuous	Max. Intermittent
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1250]	[1500]	[200]	[400]	[600]	[800]			
		14	28	41	55	69	83	86	103	14	28	41	55			
Flow LPM [GPM]	[2] 7,6	[537] 61 20	[1121] 127 20	[1715] 194 20	[2285] 258 19	[2862] 323 16				[2] 7,6	[1080] 122 10	[2250] 254 10	[3440] 389 10	[4570] 516 9		
	[4] 15,1	[532] 60 40	[1123] 127 40	[1715] 194 40	[2308] 261 39	[2893] 327 38	[3467] 392 36	[3604] 407 35	[4274] 483 27	[4] 15,1	[1070] 121 20	[2250] 254 20	[3440] 389 19	[4600] 520 18		
	[6] 22,7	[508] 57 61	[1100] 124 61	[1693] 191 61	[2294] 259 60	[2884] 326 58	[3458] 391 55	[3598] 407 53	[4283] 484 47	[6] 22,7	[1020] 115 30	[2200] 249 30	[3390] 383 29	[4590] 519 27		
	[8] 30,3	[463] 52 81	[1060] 120 81	[1661] 188 81	[2255] 255 80	[2840] 321 79	[3414] 386 76	[3557] 402 74	[4254] 481 68	[8] 30,3	[945] 107 40	[2135] 241 40	[3330] 376 39	[4515] 510 37		
	[10] 37,9	[414] 47 101	[1017] 115 101	[1613] 182 101	[2203] 249 101	[2788] 315 99	[3363] 380 96	[3506] 396 94	[4212] 476 88	[10] 37,9	[840] 95 50	[2050] 232 50	[3250] 367 48	[4430] 501 46		
	[12] 45,4	[363] 41 121	[960] 108 121	[1553] 175 121	[2152] 243 121	[2737] 309 119	[3305] 373 116	[3446] 389 115	[4152] 469 109	[12] 45,4	[740] 84 60	[1945] 220 59	[3130] 354 58	[4320] 488 55		
	[14] 53,0	[303] 34 142	[897] 101 142	[1484] 168 142	[2086] 236 142	[2667] 301 140	[3246] 367 137	[3386] 383 136	[4092] 462 130	[14] 53,0	[630] 71 69	[1820] 206 68	[3005] 340 68	[4195] 474 66		
	Max. Continuous 56,8	[266] 30 152	[862] 97 152	[1452] 164 152	[2050] 232 152	[2630] 297 150	[3206] 362 148	[3347] 378 147	[4054] 458 140	Max. Continuous 56,8	[540] 61 74	[1735] 196 74	[2905] 328 73	[4130] 467 72		
	Max. Intermittent 75,7	[20] 7 202	[61] 76 202	[1269] 143 202	[1847] 209 202	[2410] 272 202	[2987] 337 199	[3119] 352 198		Max. Intermittent 75,7	[143] 16 99	[1350] 153 98	[2565] 290 97	[3705] 419 96		



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

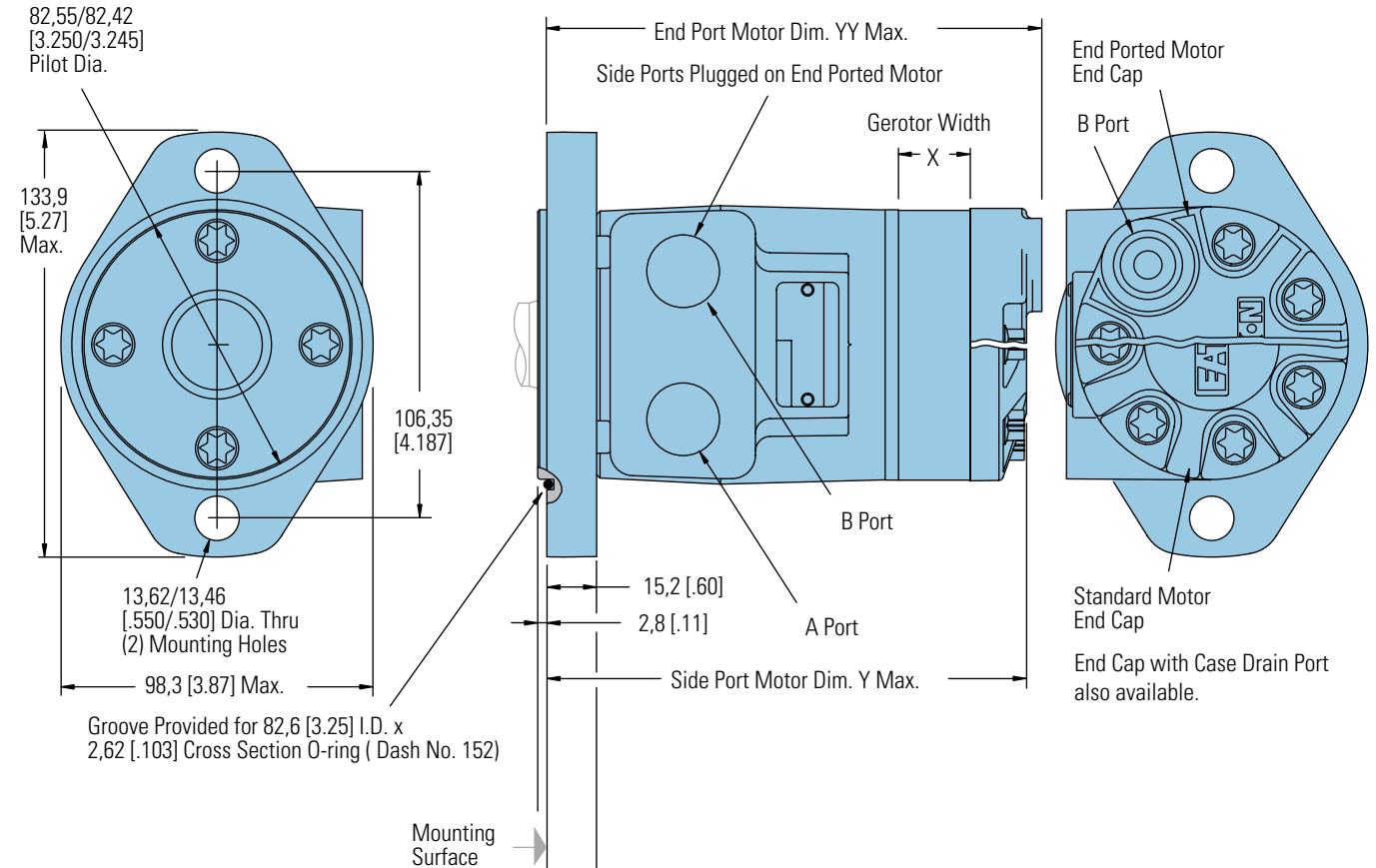
Note:

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

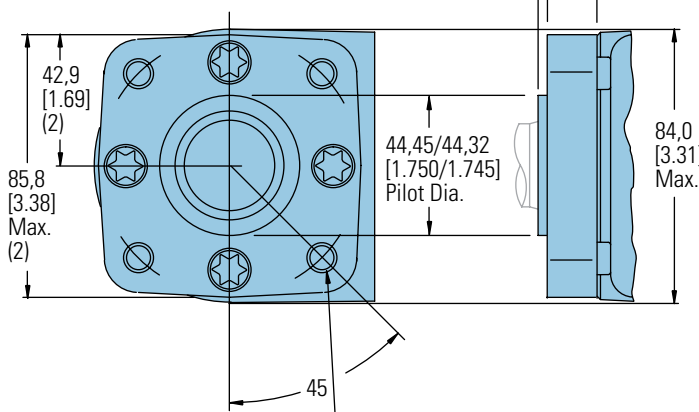
Note:

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 O-Ring	7/8-14 O-Ring	101-1749	-1009	-1750	-1010	-1011	-1751	-1752	-1012	-1013	-1014	-1015	-1016	—	
	1/2 NPTF	101-1753	-1001	-1754	-1002	-1003	-1755	-1756	-1004	-1005	-1006	-1007	-1008	—	
	Manifold*	101-1757	-1017	-1758	-1018	-1019	-1759	-1760	-1020	-1021	-1022	-1023	-1024	—	
1 in. SAE 6B Splined	7/8-14 O-Ring	101-1761	-1057	-1762	-1058	-1059	-1872	-1763	-1060	-1061	-1062	-1063	-1064	—	
	1/2 NPTF	101-1764	-1049	-1765	-1050	-1051	-1766	-1767	-1052	-1053	-1054	-1055	-1056	—	
	Manifold*	101-1768	-1065	-1769	-1066	-1067	-1770	-1771	-1068	-1069	-1070	-1071	-1072	—	
1 in. Straight w/ .31 Dia. Crosshole	7/8-14 O-Ring	101-1835	-1836	-1837	-1838	-1839	-1840	-1841	-1842	—	—	—	—	—	
	1/2 NPTF	101-1843	-1497	-1844	-1449	-1352	-1845	-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				

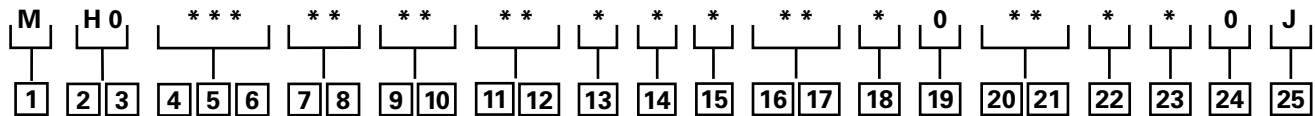
*Manifold product numbers shown are for motors with four 5/16-18 port face mounting threads. Manifold, manifold mounting O-Rings and bolts are NOT included.

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.



B-2

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 [.120] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C.

BA - 4 Bolt (Standard)
44.40 [1.748] Dia. x 3.05 [.120] Pilot, .375-16 UNC-2B Mounting Holes on 82.55 [3.250] Dia. B.C.

CA - 2 Bolt (Standard)
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 (Standard)
101.60 [4.000] Dia. x 6.10 [.240] Pilot, 14.35 [.565] Dia. Mounting Holes on 146.05 [5.750] Dia. B.C. (SAE B)

FA - 4 Bolt (Standard)
44.40 [1.748] Dia. x 3.05 [.120] Pilot, M10 x 1.5-6H Mounting Holes on 82.55 [3.250] Dia. B.C.

GA - 4 Bolt (Round) 82.50 [3.248] Dia. x 6.35 [.250] Pilot, 19.05 [.750] Dia. Mounting Holes on 109.48 [4.310] Dia. B.C.

MA - 2 Bolt (Standard)
82.50 [3.248] Dia. x 8.13 [.320] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C., w/o O-ring Groove

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. Cross Hole 11.2 [.44] from End, 5.6 [.22] Extra Length

08 - 25.4 [1.00] Dia. Straight, 10.31 [.406] Dia. Cross Hole 15.7 [.62] from End, .250-20 UNC-2B Hole in Shaft End

16 - 22.22 [.875] Dia. SAE 13 Tooth Spline (SAE B)

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

39 - 25.00 [.984] Dia. Straight (k6), 8.00 [.315] Key, M8 x 1.25-6H Hole in Shaft End

11, 12 Ports

AA - .875-14 UNF-2B SAE O-Ring Ports

AB - .500-14 NPTF Dry Seal Pipe Thread Ports

AC - Manifold Ports (.3125-18 UNC-2B Mounting Holes)

AD - Manifold Ports (M8 x 1.25-6H Mounting Holes)

AF - G 1/2 BSP Straight Thread Ports

EB†† - End Ports: .750-16 UNF-2B SAE O-Ring Ports

EC†† - End Ports: G 1/2 BSP Straight Thread Ports

†† 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 - Low Gloss Black Primer

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)

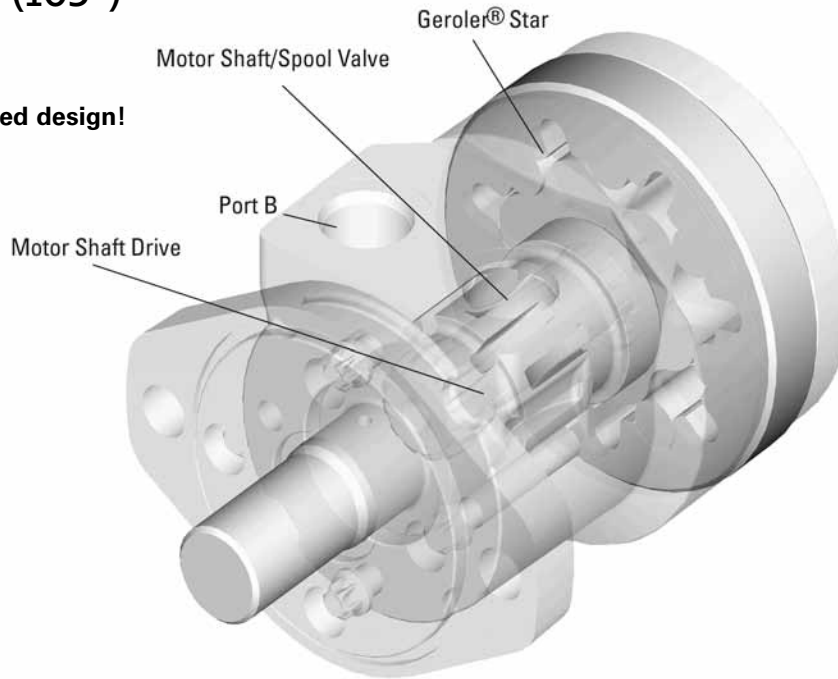
Feature in **bold** are preferred and allow for shorter lead time.

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

B-3



Conveyor



Casting



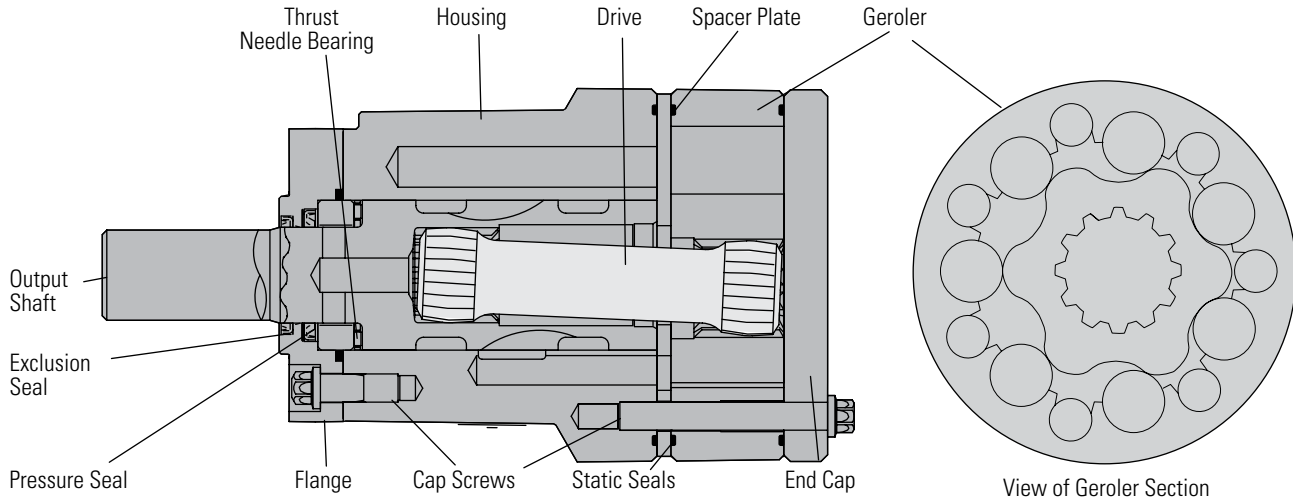
Amusement ride



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 Δ Bar [Δ PSI]	Continuous	138 [2000]	138 [2000]	138 [2000]	138 [2000]	131 [1900]	131 [1900]	128 [1850]	117 [1700]	103 [1500]	90 [1300]
	Intermittent	172 [2500]	172 [2500]	172 [2500]	172 [2500]	162 [2350]	159 [2300]	155 [2250]	141 [2050]	124 [1800]	103 [1500]

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 System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

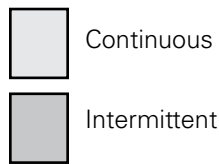
per ISO Cleanliness Code 4406, level 20/18/13

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] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2500] 172
[2]	86	190	292	390	484	578	662	729	764	803	
7,6	10	22	33	44	55	65	75	82	86	91	
	126	121	115	107	97	85	75	63	45	24	
[4]	79	185	289	395	498	600	702	804	903	998	1156
15,1	9	21	33	45	56	68	79	91	102	113	131
	256	250	243	235	224	212	199	183	166	147	89
[6]	71	177	280	387	495	602	704	808	909	1011	1257
22,7	8	20	32	44	56	68	80	91	103	114	142
	383	377	369	360	349	336	320	302	284	266	207
[8]	62	166	274	379	488	594	699	806	907	1007	1264
30,3	7	19	31	43	55	67	79	91	102	114	143
	514	508	500	490	477	464	448	430	409	390	333
[10]	52	155	264	369	475	583	686	793	897	1000	1257
37,9	6	17	30	42	54	66	78	90	101	113	142
	642	635	628	617	605	591	575	557	538	517	461
[12]	38	141	248	354	462	568	674	777	884	987	1244
45,4	4	16	28	40	52	64	76	88	100	111	141
	772	764	757	747	736	722	706	687	670	648	592
[14]	21	125	231	337	445	551	658	763	868	972	1233
53,0	2	14	26	38	50	62	74	86	98	110	139
	900	893	885	876	866	852	836	819	798	778	721
[15]	8	116	223	328	434	543	648	756	862	965	1225
56,8	1	13	25	37	49	61	73	85	97	109	138
	482	958	949	940	929	915	900	882	863	842	784
[18]		86	191	296	403	511	617	726	831	935	1195
68,1		10	22	33	46	58	70	82	94	106	135
		1151	1139	1128	1117	1105	1090	1074	1054	1033	977

S Motor 75 cm³/r [4.6 in³/r]

Δ Pressure Bar [PSI]

	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2500] 172
[2]	91	218	343	467	590	708	815	900	981	1086	
7,6	10	25	39	53	67	80	92	102	111	123	
	93	89	81	75	66	59	43	21	23	16	
[4]	87	217	352	484	616	748	874	1001	1123	1236	1472
15,1	10	25	40	55	70	85	99	113	127	140	166
	193	188	181	173	163	150	139	125	107	89	37
[6]	82	219	355	492	627	763	898	1027	1155	1284	1590
22,7	9	25	40	56	71	86	101	116	131	145	180
	292	286	277	269	258	244	228	214	202	186	140
[8]	69	202	341	481	619	761	896	1032	1165	1296	1618
30,3	8	23	38	54	70	86	101	117	132	146	183
	390	384	375	364	355	342	326	309	295	276	230
[10]	56	193	330	471	610	751	887	1025	1162	1297	1628
37,9	6	22	37	53	69	85	100	116	131	147	184
	489	484	476	467	457	444	431	416	399	381	336
[12]	39	175	315	453	595	736	873	1011	1148	1284	1617
45,4	4	20	36	51	67	83	99	114	130	145	183
	587	582	573	564	552	540	526	510	494	476	427
[14]	12	153	290	431	571	716	856	993	1129	1265	1605
53,0	1	17	33	49	65	81	97	112	128	143	181
	343	680	673	665	654	641	628	613	594	578	533
[15]	9	143	281	424	567	708	846	985	1121	1259	1599
56,8	1	16	32	48	64	80	96	111	127	142	181
	491	729	723	714	704	690	675	661	644	628	580
[20]		82	220	362	505	645	784	922	1061	1200	1545
75,7		9	25	41	57	73	89	104	120	136	175
		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] } Torque [lb-in]
 30 } Nm
 465 } 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 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	49	45	40	34	29	21	17	13	14	14	
[4]	217	475	728	987	1237	1488	1727	1957	2181	2292	2310
15,1	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	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	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	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	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	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	389	386	380	372	364	355	344	336	323	317	289
[20]		200	460	726	987	1251	1512	1770	2025	2153	2724
75,7		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	43	39	35	30	27	21	16	13	13		
[4]	247	544	838	1129	1418	1707	1988	2255	2514	2641	3116
15,1	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	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	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	220	222	217	210	203	194	185	175	165	160	136
[12]	136	436	737	1037	1335	1636	1928	2217	2509	2651	3210
45,4	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	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	341	338	333	326	319	309	300	290	280	274	253
[20]		227	527	829	1128	1430	1724	2020	2313	2457	3030
75,7		452	449	443	435	426	417	407	396	390	366



[371] } Torque [lb-in]
 42 } Nm
 338 } 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		
7,6	34	71	107	141	173	204	229	254	280		
	37	34	31	25	22	18	10	9	7		
[4]	298	640	969	1291	1607	1919	2219	2511	2799	2869	3411
15,1	34	72	109	146	182	217	251	284	316	324	385
	78	75	70	65	60	53	47	41	35	33	19
[6]	279	621	953	1283	1608	1930	2243	2551	2850	2922	3502
22,7	32	70	108	145	182	218	253	288	322	330	396
	119	115	110	104	97	89	82	74	66	64	50
[8]	252	593	928	1257	1579	1905	2224	2542	2855	2932	3539
30,3	28	67	105	142	178	215	251	287	323	331	400
	160	156	151	144	137	129	120	110	101	99	78
[10]	211	555	888	1217	1546	1872	2193	2516	2831	2909	3518
37,9	24	63	100	138	175	211	248	284	320	329	397
	201	198	193	187	180	173	164	154	143	141	114
[12]	162	502	835	1164	1490	1818	2139	2463	2780	2857	3476
45,4	18	57	94	131	168	205	242	278	314	323	393
	243	240	235	229	222	214	206	196	184	181	154
[14]	118	452	786	1117	1443	1772	2095	2417	2736	2814	3438
53,0	13	51	89	126	163	200	237	273	309	318	388
	283	280	276	270	262	254	245	235	224	221	194
[15]	91	425	759	1089	1418	1747	2068	2389	2708	2786	3410
56,8	10	48	86	123	160	197	234	270	306	315	385
	304	301	296	290	283	274	265	256	243	240	214
[20]		259	590	925	1255	1585	1907	2229	2552	2633	3265
75,7		29	67	105	142	179	216	252	288	297	369
		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	
7,6	40	86	129	169	208	244	280	309	327	
	32	29	27	23	20	16	12	10	8	
[4]	367	774	1177	1577	1956	2325	2680	3022	3191	3753
15,1	41	87	133	178	221	263	303	341	361	424
	66	63	60	55	50	46	40	34	31	23
[6]	348	758	1161	1567	1960	2344	2716	3083	3264	3863
22,7	39	86	131	177	221	265	307	348	369	437
	99	96	92	88	82	76	70	63	59	45
[8]	313	721	1124	1529	1921	2312	2696	3073	3265	3894
30,3	35	81	127	173	217	261	305	347	369	440
	133	132	127	123	117	111	104	96	92	76
[10]	262	669	1069	1473	1859	2247	2627	2997	3184	3810
37,9	30	76	121	166	210	254	297	339	360	430
	167	165	161	157	152	146	139	130	126	107
[12]	203	609	1006	1400	1782	2160	2531	2912	3098	3721
45,4	23	69	114	158	201	244	286	329	350	420
	202	199	196	191	186	180	173	165	160	141
[14]	143	544	938	1324	1700	2079	2452	2824	3008	3639
53,0	16	62	106	150	192	235	277	319	340	411
	236	233	230	225	219	214	207	199	194	177
[15]	106	504	897	1281	1653	2027	2393	2761	2944	3576
56,8	12	57	101	145	187	229	270	312	333	404
	253	251	248	243	237	231	224	215	211	192
[20]		303	697	1091	1477	1854	2214	2581	2765	3399
75,7		34	79	123	167	210	250	292	312	384
		336	334	330	325	318	312	304	298	282



[504] } Torque [lb-in]
 57 } Nm
 251 } 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 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
7,6	55	114	170	225	278	331	380	404	465
	24	22	20	18	17	14	11	10	8
[4]	498	1043	1576	2093	2597	3087	3567	3798	4500
15,1	56	118	178	236	293	349	403	429	508
	49	47	45	41	38	34	31	29	25
[6]	470	1017	1552	2080	2594	3097	3594	3835	4536
22,7	53	115	175	235	293	350	406	433	513
	74	72	69	66	62	57	52	49	42
[8]	423	967	1502	2031	2549	3062	3563	3807	4526
30,3	48	109	170	229	288	346	403	430	511
	100	98	95	92	88	83	77	73	64
[10]	357	901	1433	1961	2477	2989	3486	3730	4456
37,9	40	102	162	222	280	338	394	421	504
	126	124	121	118	113	108	101	97	87
[12]	287	826	1357	1884	2402	2917	3410	3652	4363
45,4	32	93	153	213	271	330	385	413	493
	152	150	147	144	140	134	126	121	109
[14]	199	733	1261	1786	2303	2818	3316	3561	4276
53,0	22	83	142	202	260	318	375	402	483
	177	176	173	170	165	160	152	147	134
[15]	154	688	1218	1742	2258	2771	3273	3518	4241
56,8	17	78	138	197	255	313	370	398	479
	190	189	186	183	178	173	165	160	146
[20]		418	945	1471	1986	2502	3004	3253	3997
75,7		47	107	166	224	283	339	368	452
		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
7,6	71	145	215	283	346	409	439	494
	19	18	16	14	13	11	9	7
[4]	628	1304	1962	2600	3206	3799	4082	4642
15,1	71	147	222	294	362	429	461	525
	40	38	36	34	30	27	25	23
[6]	587	1261	1926	2578	3203	3813	4112	4687
22,7	66	142	218	291	362	431	465	530
	60	59	56	54	50	45	43	38
[8]	529	1201	1867	2518	3148	3769	4072	4657
30,3	60	136	211	285	356	426	460	526
	81	79	77	75	71	66	64	58
[10]	451	1124	1779	2429	3056	3678	3983	4583
37,9	51	127	201	274	345	416	450	518
	102	100	98	96	92	86	84	78
[12]	359	1030	1688	2333	2963	3587	3889	4482
45,4	41	116	191	264	335	405	439	506
	122	121	119	117	113	107	104	98
[14]	256	922	1577	2226	2864	3487	3787	4381
53,0	29	104	178	252	324	394	428	495
	143	142	140	137	134	128	126	119
[15]	199	862	1514	2167	2797	3424	3727	4322
56,8	22	97	171	245	316	387	421	488
	153	152	150	148	144	138	135	129
[20]		534	1187	1832	2470	3093	3402	4004
75,7		60	134	207	279	349	384	452
		204	202	200	197	192	189	183

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

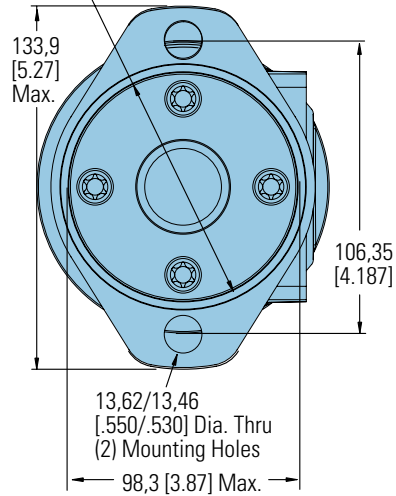
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

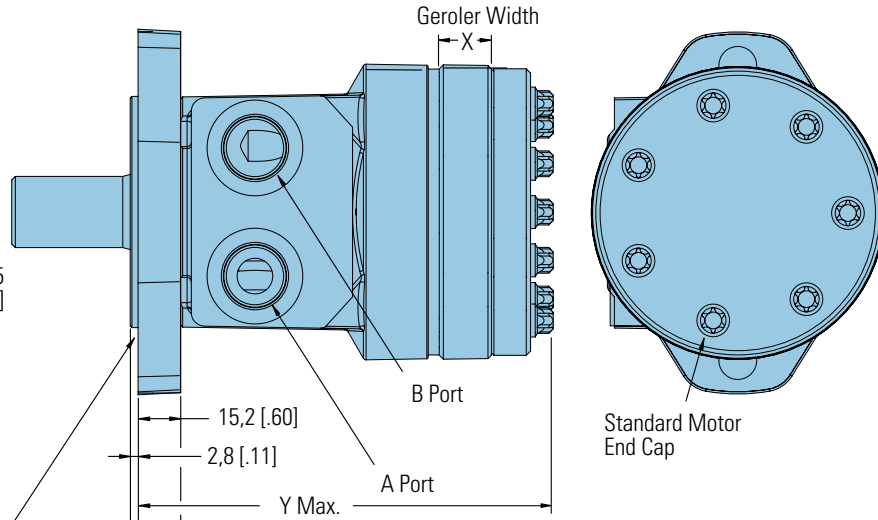
Port B Pressurized — CCW

2 Bolt Flange

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

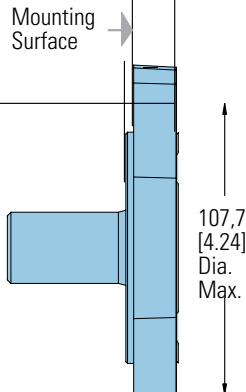
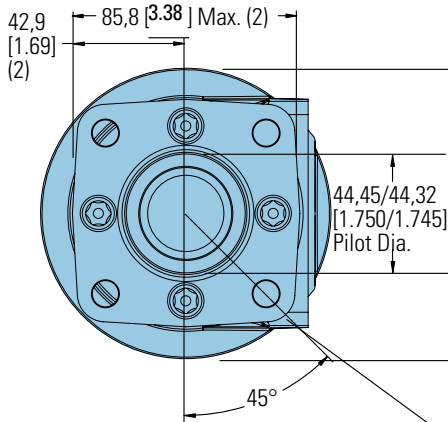


Groove Provided for 82,6 [3.25] I.D. x 2,62 [1.03] Cross Section O-ring (Dash No. 152)



Standard Motor End Cap

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

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]

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.

B-3

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. 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	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 (A minimum of 300 psi delta must be maintained between A port pressure and case pressure). Shaft side / radial load ratings are not affected by this valving.

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

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

2 Bolt Flange

SHAFT	PORT SIZE	DISPL. 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

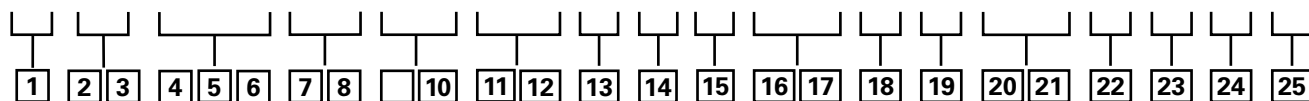
*Manifold product numbers shown are for motors with four 5/16 -18 port face mounting threads. Manifold, manifold mounting O-Rings and bolts are NOT included.

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.



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 [1.20] 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 [1.20] 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 [1.20] 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 [1.20]

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 [1.20] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C.

MA - 2 Bolt (Standard) 82.50 [3.248] Dia. x 8.13 [.320] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C., w/o O-ring Groove

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

39 - 25.00 [.984] Dia. Straight (k6), 8.00 [.315] Key, M8 x 1.25-6H Hole in Shaft End

11, 12 Port Type

AA – .875-14 UNF-2B SAE O-Ring Ports

AB – .500-14 NPTF Dryseal Pipe Thread Ports

AC – Manifold Ports (.3125-18 UNC-2B Mounting Holes)

AD – Manifold Ports (M8 x 1.25-6H Mounting Holes)

AF – G 1/2 BSP Straight Thread Ports

13 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 – Low Gloss Black Primer

D – Environmental Coated Gloss White

F – Environmental Coated Black

24 Eaton Assigned Code When Applicable

0 – Assigned Code

25 Eaton Assigned Design Code

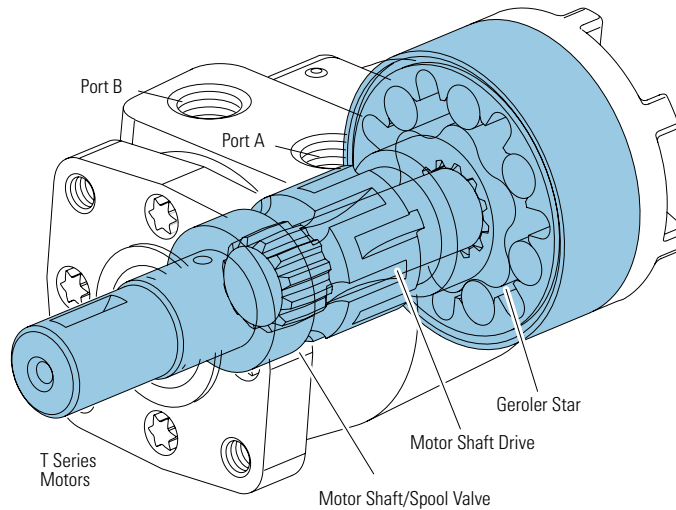
M – Twelve (12)

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

B-4



Crane (winch)



Paving



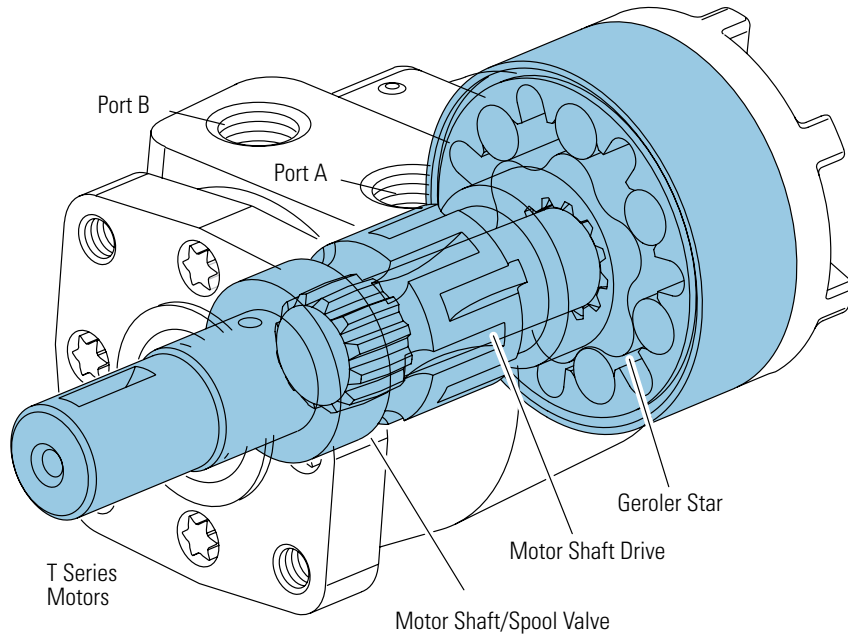
Harvester



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 Intermittent	38 [10] 38 [10]	45 [12] 57 [15]	57 [15] 68 [18]	57 [15] 76 [20]	57 [15] 76 [20]	57 [15] 76 [20]	57 [15] 76 [20]	57 [15] 76 [20]	57 [15] 76 [20]	57 [15] 76 [20]	57 [15] 76 [20]
Torque Nm [lb-in]	Continuous Intermittent **	76 [672]	105 [928]	138 [1222]	174 [1541]	219 [1936]	251 [2226]	297 [2628]	359 [3178]	410 [3633]	441 [3905]	430 [3811]
		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* Intermittent**	155 [2250]	155 [2250]	155 [2250]	155 [2250]	155 [2250]	138 [2000]	138 [2000]	138 [2000]	127 [1850]	110 [1600]	90 [1300]
		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 [D 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 System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

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

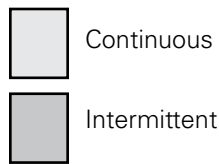
T Series

(158-, 185-)

Performance Data

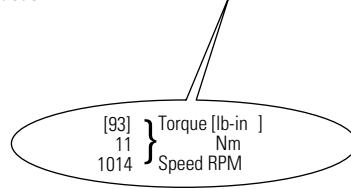
Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	Max. Continuous	Max. Intermittent
		14	28	41	55	69	83	97	110	124	138	152	155		
Flow LPM [GPM]	[2]	[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]	[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]	[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]	[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	
	Max. Continuous	[10] 3 37,9	[93] 11 1021	[155] 18 1014	[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. Intermittent														[2750] 190



49 cm³/r [3.0 in³/r]
Δ Pressure Bar [PSI]
Continuous

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	Max. Continuous	Max. Intermittent	
		14	28	41	55	69	83	97	110	124	138	152	155			
Flow LPM [GPM]	[2]	[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]	[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]	[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]	[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		
	Max. Continuous	[10] 4 37,9	[39] 14 755	[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. Intermittent	[12] 4 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	

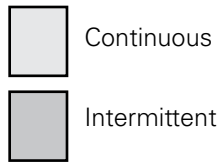
T Series

(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]										Max. Continuous	Max. Intermittent		
		Δ Pressure Bar [PSI]													
		Continuous													
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	[2750]	
		14	28	41	55	69	83	97	110	124	138	152	155	190	
Flow LPM [GPM]	[2]	[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]	[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]	[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]	[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]	[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]	[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]	[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. Continuous	[15] 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. Intermittent	[18] 68,1	[107] 12 1006	[215] 24 1003	[326] 37 998	[442] 50 988	[555] 63 976	[669] 76 975	[786] 89 965	[900] 102 952	[1016] 115 940	[1123] 127 924	[1152] 130 919		

		80 cm ³ /r [4.9 in ³ /r]										Max. Continuous	Max. Intermittent		
		Δ Pressure Bar [PSI]													
		Continuous													
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	[2750]	
		14	28	41	55	69	83	97	110	124	138	152	155	190	
Flow LPM [GPM]	[2]	[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]	[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]	[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]	[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]	[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]	[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]	[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. Continuous	[15] 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. Intermittent	[20] 75,7	[160] 18 916	[305] 34 910	[455] 51 893	[578] 65 893	[737] 83 875	[857] 97 866	[968] 109 877	[1144] 129 843	[1277] 144 833	[1412] 160 839	[1446] 163 836		



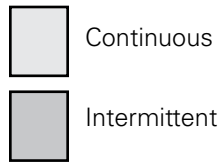
T Series

(158-, 185-)

Performance Data

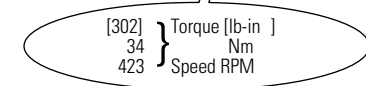
Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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



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

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



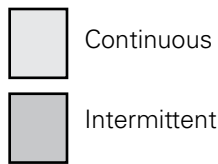
T Series

(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. Continuous
Max. Intermittent

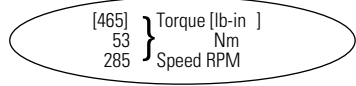
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
		14	28	41	55	69	83	97	110	124	138	172
Flow LPM [GPM]	[2]	[264]	[541]	[819]	[1092]	[1357]	[1605]	[1847]	[2084]	[2311]	[1858]	
	7.6	30 47	61 45	93 44	123 42	153 40	181 37	209 34	235 30	261 25	210 16	
	[4]	[259]	[541]	[822]	[1101]	[1373]	[1638]	[1890]	[2145]	[2383]	[2613]	[3063]
	15.1	29 96	61 95	93 92	124 91	155 90	185 88	214 85	242 82	269 78	295 73	346 60
	[6]	[241]	[526]	[808]	[1090]	[1368]	[1638]	[1900]	[2150]	[2399]	[2628]	[3169]
	22.7	27 142	59 140	91 138	123 136	155 134	185 132	215 129	243 125	271 121	297 114	358 99
	[8]	[219]	[506]	[789]	[1068]	[1348]	[1625]	[1885]	[2140]	[2388]	[2619]	[3178]
	30.3	25 189	57 187	89 185	121 183	152 181	184 178	213 175	242 172	270 166	296 159	359 140
	[10]	[180]	[472]	[759]	[1037]	[1319]	[1590]	[1853]	[2111]	[2355]	[2594]	[3170]
	37.9	20 237	53 234	86 232	117 230	149 227	180 224	209 222	239 218	266 211	293 203	358 183
[12]	[141]	[436]	[728]	[1010]	[1292]	[1561]	[1821]	[2079]	[2331]	[2573]	[3162]	
45.4	16 284	49 282	82 279	114 277	146 274	176 272	206 269	235 265	263 257	291 248	357 225	
[14]	[101]	[397]	[687]	[969]	[1252]	[1519]	[1778]	[2040]	[2295]	[2539]	[3147]	
53.0	11 332	45 329	78 326	109 323	141 321	172 319	201 316	230 311	259 305	287 296	356 274	
Max. Continuous	[15]	[81]	[367]	[665]	[944]	[1231]	[1497]	[1755]	[2018]	[2273]	[2512]	[3136]
	56.8	9 355	41 353	75 350	107 347	139 344	169 342	198 339	228 334	257 327	284 318	354 300
Max. Intermittent	[20]		[221]	[519]	[814]	[1095]	[1368]	[1631]	[1891]	[2149]	[2396]	
	75.7		25 472	59 467	92 464	124 462	155 459	184 455	214 450	243 443	271 433	

195 cm³/r [11.9 in³/r]

Δ Pressure Bar [PSI]
Continuous

Max. Continuous
Max. Intermittent

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1750]	[1800]	[2000]	[2500]
		14	28	41	55	69	83	97	110	121	125	138	172
Flow LPM [GPM]	[2]	[330]	[671]	[1016]	[1345]	[1654]	[1969]	[2242]	[2507]	[2689]	[2748]	[2973]	
	7.6	37 38	76 36	115 34	152 33	187 31	222 28	253 25	283 20	304 16	310 14	336 8	
	[4]	[328]	[675]	[1026]	[1366]	[1692]	[2010]	[2289]	[2586]	[2799]	[2867]	[3144]	[3797]
	15.1	37 77	76 77	116 75	154 73	191 73	227 71	259 68	292 65	316 62	324 61	355 55	429 40
	[6]	[306]	[658]	[1011]	[1360]	[1698]	[2021]	[2324]	[2604]	[2829]	[2901]	[3178]	[3831]
	22.7	35 115	74 113	114 111	154 110	192 109	228 107	263 104	294 100	320 97	328 95	359 87	433 68
	[8]	[272]	[634]	[980]	[1331]	[1675]	[2003]	[2300]	[2592]	[2815]	[2888]	[3174]	[3864]
	30.3	31 153	72 151	111 150	150 148	189 146	226 144	260 142	293 139	318 134	326 132	359 123	437 99
	[10]	[238]	[596]	[945]	[1296]	[1637]	[1960]	[2255]	[2565]	[2786]	[2857]	[3140]	[3816]
	37.9	27 192	67 189	107 188	146 186	185 184	221 183	255 181	290 176	315 168	323 166	355 156	431 133
[12]	[181]	[545]	[908]	[1260]	[1607]	[1924]	[2223]	[2529]	[2759]	[2836]	[3121]	[3807]	
45.4	20 230	62 228	103 226	142 224	182 222	217 221	251 219	286 213	312 207	320 204	353 192	430 160	
[14]	[154]	[500]	[860]	[1211]	[1556]	[1869]	[2175]	[2483]	[2713]	[2792]	[3080]	[3778]	
53.0	17 268	56 266	97 264	137 261	176 259	211 259	246 256	281 251	307 244	315 242	348 229	427 199	
[15]	[140]	[465]	[832]	[1179]	[1525]	[1835]	[2144]	[2459]	[2693]	[2768]	[3061]	[3764]	
Max. Continuous	56.8	16 287	53 285	94 283	133 281	172 279	207 278	242 275	278 269	304 262	313 260	346 247	425 220
Max. Intermittent	[20]		[291]	[653]	[1013]	[1366]	[1689]	[1987]	[2298]	[2540]	[2622]	[2928]	
	75.7		33 382	74 378	114 375	154 373	191 372	225 368	260 363	287 356	296 353	331 342	



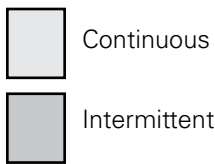
T Series

(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]

Δ Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1850]	[2250]
		14	28	41	55	69	83	97	110	114	125	155
Flow LPM [GPM]	[2]	[406]	[833]	[1260]	[1655]	[2038]	[2403]	[2707]	[2597]	[2552]	[2373]	[2299]
	7.6	46 30	94 29	142 27	187 26	230 24	272 22	306 17	293 12	288 11	268 7	260 6
	[4]	[404]	[843]	[1277]	[1695]	[2083]	[2468]	[2820]	[3177]	[3261]	[3509]	[3589]
	15.1	46 62	95 62	144 60	192 59	235 59	279 57	319 55	359 50	368 49	396 46	406 44
	[6]	[382]	[823]	[1261]	[1687]	[2088]	[2477]	[2843]	[3196]	[3285]	[3547]	[3633]
	22.7	43 92	93 91	142 90	191 89	236 88	280 86	321 82	361 78	371 76	401 72	410 71
	[8]	[341]	[787]	[1220]	[1651]	[2059]	[2454]	[2820]	[3177]	[3265]	[3530]	[3615]
	30.3	39 123	89 122	138 121	187 120	233 119	277 116	319 113	359 108	369 106	399 101	408 99
	[10]	[297]	[744]	[1177]	[1611]	[2017]	[2412]	[2774]	[3151]	[3241]	[3504]	[3593]
	37.9	34 154	84 152	133 151	182 150	228 148	273 146	313 143	356 136	366 134	396 127	406 125
[12]	[225]	[687]	[1132]	[1553]	[1967]	[2360]	[2734]	[3105]	[3194]	[3466]	[3554]	
45.4	25 184	78 183	128 181	175 180	222 179	267 177	309 173	351 166	361 163	392 156	402 153	
[14]	[154]	[628]	[1072]	[1498]	[1910]	[2298]	[2674]	[3052]	[3148]	[3419]	[3510]	
53.0	17 214	71 213	121 212	169 211	216 209	260 207	302 202	345 195	356 193	386 186	397 182	
[15]	[119]	[586]	[1035]	[1458]	[1872]	[2261]	[2637]	[3022]	[3116]	[3389]	[3488]	
Max. Continuous	56.8	13 229	66 228	117 227	165 226	212 224	255 222	298 217	341 209	352 200	383 200	394 197
Max. Intermittent	[20]	[372]	[816]	[1251]	[1663]	[2067]	[2448]	[2832]	[2928]	[3214]	[3312]	
	75.7	42 305	92 303	141 301	188 300	234 297	277 292	320 284	331 281	363 273	374 270	

306 cm³/r [18.7 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1500]	[1600]	[1800]
		14	28	41	55	69	83	97	103	110	124
Flow LPM [GPM]	[2]	[499]	[1035]	[1560]	[2034]	[2501]	[2912]	[3239]	[2859]	[2400]	
	7.6	56 24	117 23	176 22	230 21	283 19	329 16	366 11	323 8	271 5	
	[4]	[497]	[1052]	[1590]	[2101]	[2561]	[3023]	[3464]	[3680]	[3886]	[4221]
	15.1	56 49	119 49	180 48	237 48	289 47	342 47	391 44	416 41	439 38	477 30
	[6]	[480]	[1031]	[1578]	[2096]	[2564]	[3023]	[3464]	[3689]	[3905]	[4275]
	22.7	54 74	116 74	178 72	237 72	290 71	342 69	391 64	417 62	441 60	483 51
	[8]	[427]	[975]	[1520]	[2051]	[2525]	[2998]	[3448]	[3667]	[3881]	[4264]
	30.3	48 99	110 98	172 97	232 97	285 96	339 94	390 89	414 86	438 83	482 73
	[10]	[370]	[930]	[1467]	[2001]	[2477]	[2955]	[3406]	[3631]	[3852]	[4264]
	37.9	42 123	105 122	166 121	226 120	280 120	334 117	385 112	410 108	435 104	482 92
[12]	[281]	[871]	[1410]	[1908]	[2400]	[2887]	[3352]	[3573]	[3790]	[4189]	
45.4	32 147	98 146	159 145	216 145	271 145	326 142	379 136	404 131	428 127	473 112	
[14]	[192]	[791]	[1338]	[1851]	[2338]	[2816]	[3281]	[3511]	[3743]	[4135]	
53.0	22 171	89 171	151 170	209 170	264 169	318 165	371 159	397 154	423 150	467 133	
[15]	[148]	[738]	[1288]	[1803]	[2287]	[2773]	[3243]	[3475]	[3705]	[4098]	
Max. Continuous	56.8	17 183	83 183	146 182	204 182	258 181	313 177	366 171	393 165	419 160	463 146
Max. Intermittent	[20]	[476]	[1020]	[1544]	[2010]	[2519]	[3010]	[3243]	[3495]		
	75.7	54 243	115 242	174 242	227 241	285 238	340 231	366 226	395 209		

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

370 cm³/r [22.6 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

		[200]	[400]	[600]	[800]	[1000]	[1200]	[1300]	[1500]
		14	28	41	55	69	83	90	103
Flow LPM [GPM]	[2]	[590]	[1237]	[1858]	[2406]	[2953]	[3388]	[3586]	
	7.6	67 20	140 19	210 18	272 17	334 15	383 12	405 11	
	[4]	[588]	[1263]	[1906]	[2506]	[3029]	[3557]	[3811]	[4252]
	15.1	66 41	143 41	215 40	283 40	342 39	402 38	431 37	480 36
	[6]	[580]	[1245]	[1899]	[2506]	[3029]	[3544]	[3788]	[4300]
	22.7	66 61	141 60	215 60	283 59	342 58	400 57	428 56	486 54
	[8]	[514]	[1164]	[1824]	[2452]	[2975]	[3518]	[3783]	[4294]
	30.3	58 82	132 81	206 80	277 79	336 78	397 77	427 77	484 75
	[10]	[444]	[1119]	[1759]	[2391]	[2928]	[3479]	[3750]	[4275]
	37.9	50 102	126 102	199 101	270 101	331 100	393 97	424 96	483 93
[12]	[337]	[1062]	[1690]	[2256]	[2813]	[3393]	[3685]	[4273]	
45.4	38 122	120 121	191 120	255 119	318 119	383 118	416 116	483 112	
[14]	[231]	[958]	[1608]	[2201]	[2748]	[3319]	[3610]	[4198]	
53.0	26 142	108 141	182 140	249 139	310 138	375 137	408 134	474 129	
[15]	[178]	[896]	[1543]	[2147]	[2683]	[3272]	[3572]	[4187]	
Max. Continuous	56.8	20 152	101 152	174 151	243 150	303 149	370 147	404 146	473 140
Max. Intermittent	[20]	[587]	[1228]	[1833]	[2331]	[2948]	[3273]		
	75.7	66 202	139 201	207 201	263 200	333 198	370 196		

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)

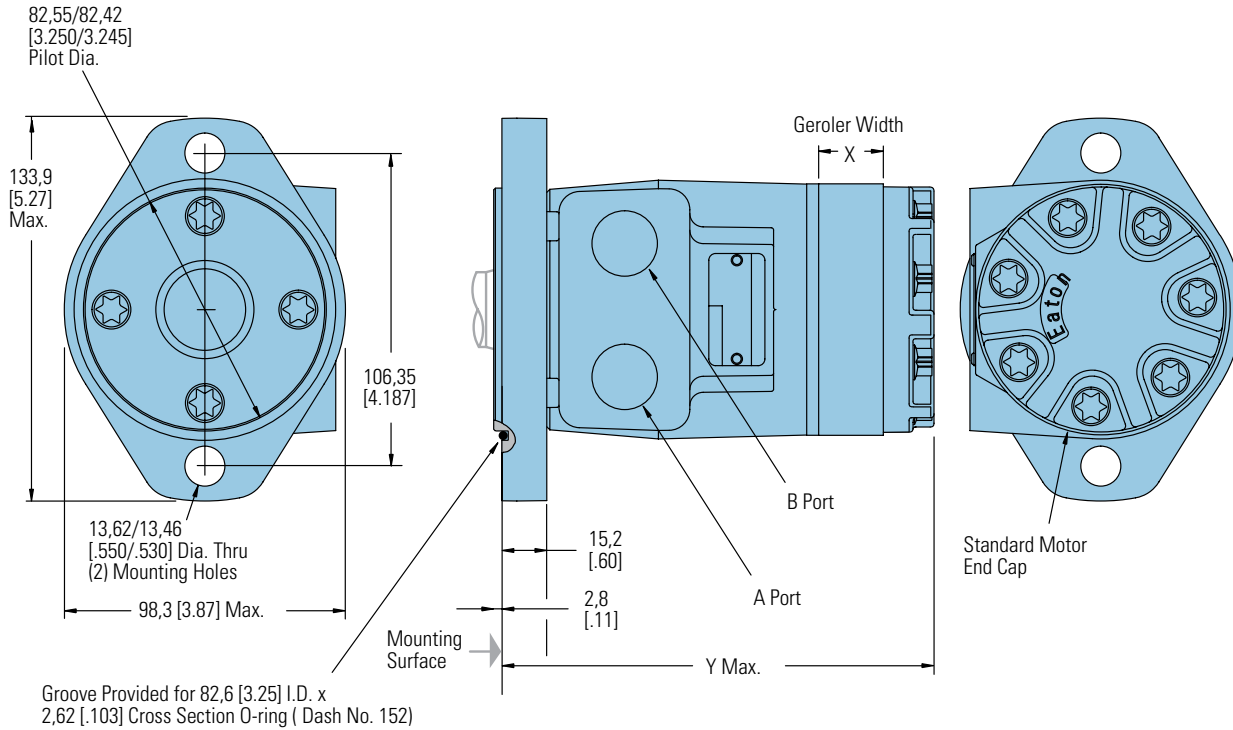
Note:

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

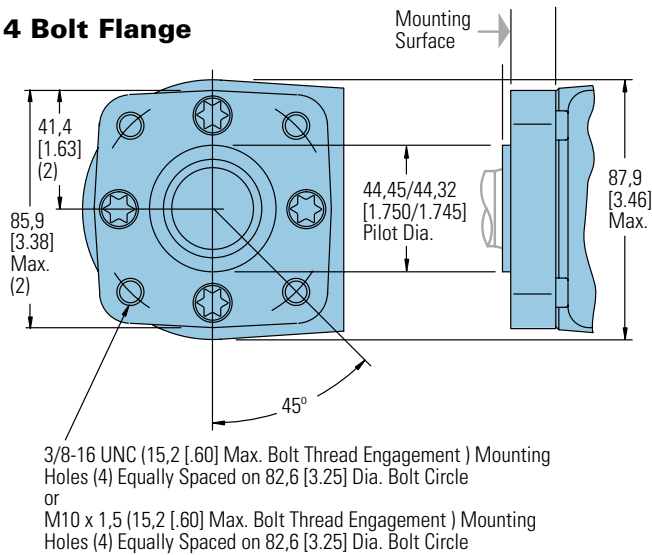
Standard Rotation Viewed from Shaft End

- 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. 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-	—	—	-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	—	-1621

158-1620

T Series Motors with Low Speed Valving

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-	—	—	—	-1427	-1428	—	—	-1430	-1431	-1432	-1433
		1/2 NPTF	158-	—	—	—	-1419	-1420	—	—	-1422	-1423	-1424	-1425
		Manifold*	158-	—	—	—	—	—	—	—	—	—	—	—
4 Bolt Flange	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

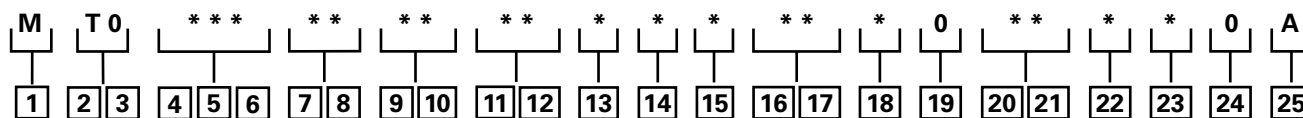
*Manifold product numbers shown are for motors with four 5/16-18 port face mounting threads. Manifold, manifold mounting O-Rings and bolts are NOT included.

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.



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 [1.20] pilot, 13,59 [5.35] Dia. Mounting Holes 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 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 106,35 [4.187] Dia. B.C. (SAE A)

DD – 2 Bolt (Std.) 101,60 [4.000] Dia. x 6,10 [2.40] pilot, 14,35 [5.665] 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 [1.20] Pilot, 13,59 [5.35] Dia. Mounting Holes 106,35 [4.187] Dia. B.C.

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.

MA - 2 Bolt (Standard)
82,50 [3.248] Dia. x 8.13 [3.20] Pilot, 13,59 [5.35] Dia. Mounting Holes on 106,35 [4.187] Dia. B.C., w/o O-ring Groove

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 [3.16] Dia. Crosshole 11,2 [4.44] from End, 5,6 [2.2] Extra Length

08 – 25,4 [1.00] Dia. Straight, 10,31 [4.06] Dia. Crosshole 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] Straight Dia. 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, 8.0 [3.15] Key, MB x 1.25-6H Hole in Shaft End

39 - 25.00 [9.84] Dia. Straight (k6), 8.00 [3.15] Key, M8 x 1.25-6H Hole in Shaft End

11, 12 Port Type

AA – .875-14 UNF-2B SAE O-Ring Ports
AB – .500-14 NPTF Dryseal Pipe Thread Ports

AC – Manifold (.3125-18 UNC-2B Mounting Holes)

AD – Manifold Ports (MB x 1.25-6H Mounting Holes)

AF – G 1/2 BSP Straight Thread Ports

13 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 – Viton Seals

04 – Viton 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

0 – 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 – Low Gloss Black Primer

D – Environmental Coated Gloss White

24 Customer ID/ Nameplate Options

0 – None Specified

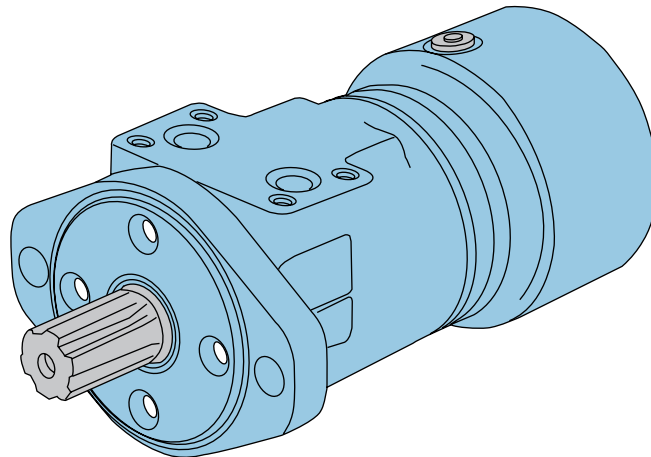
25 Design Code

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.

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 overriding 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

B-4



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:

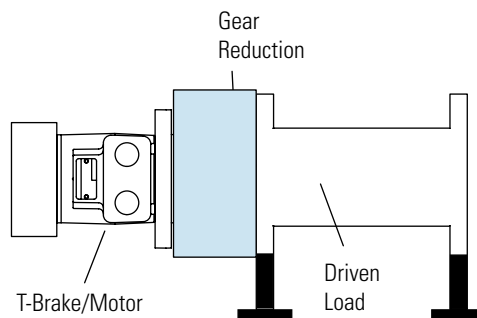
Special attention should be given to system back pressure. System back pressure directly affects brake release pressure and can cause the brake to release at undesired conditions.

Note:

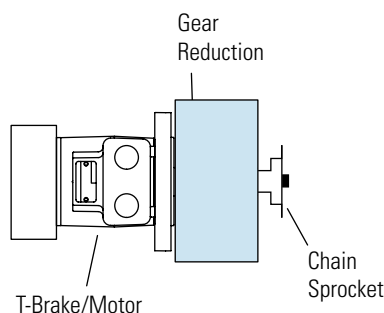
The T Series with parking brake is not compatible with water based fluids.

Typical Applications

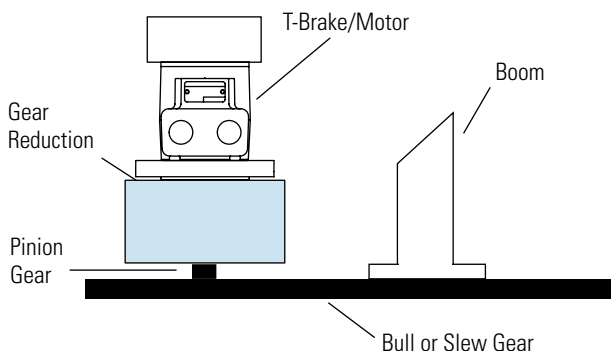
Winch



Machine Drive

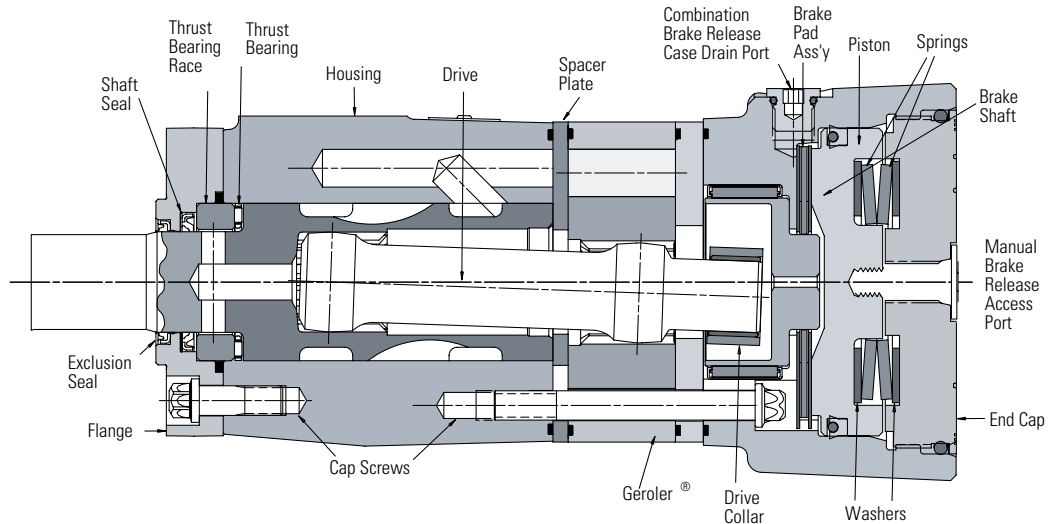


Swing Boom



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	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	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	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. Average Static torque may vary +/- 14% from rated values.

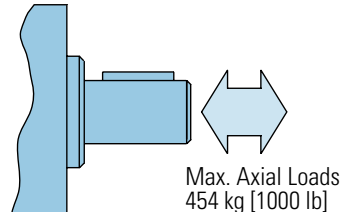
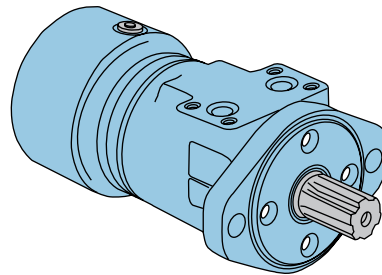
T Series with Parking Brake (185-)

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.

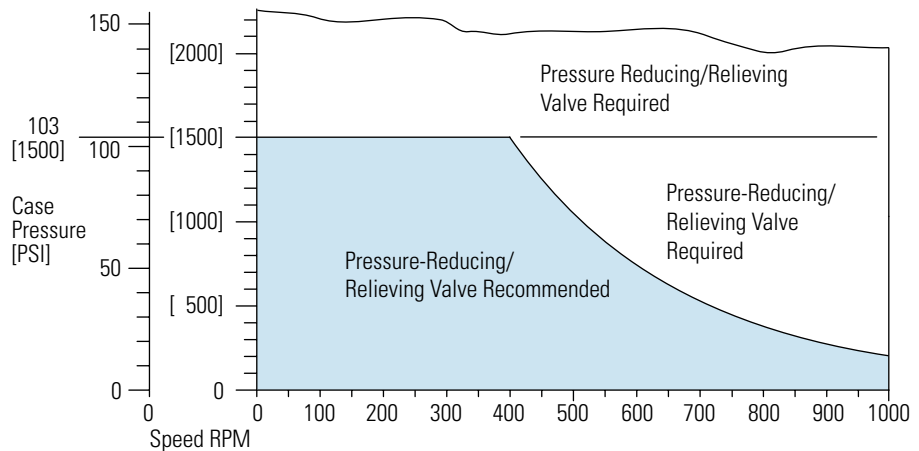
B-4



$$P_C \approx 6 DP + P_2$$

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
	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
	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
	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
	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
	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
	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 (A minimum of 300 psi delta must be maintained between A port pressure and case pressure).

Shaft side / radial load ratings are not affected by

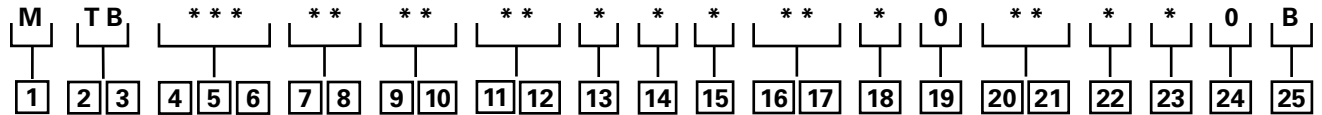
this valving.

For a T Series motor with parking brake configuration not shown in the charts above use the model code system on page B-4-17 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.



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 – Viton 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

0 – 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 – Low Gloss Black Primer

24 Customer ID/ Nameplate Options

0 – None Specified

25 Design Code

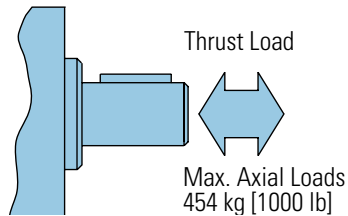
B – Two (2)

B-4

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

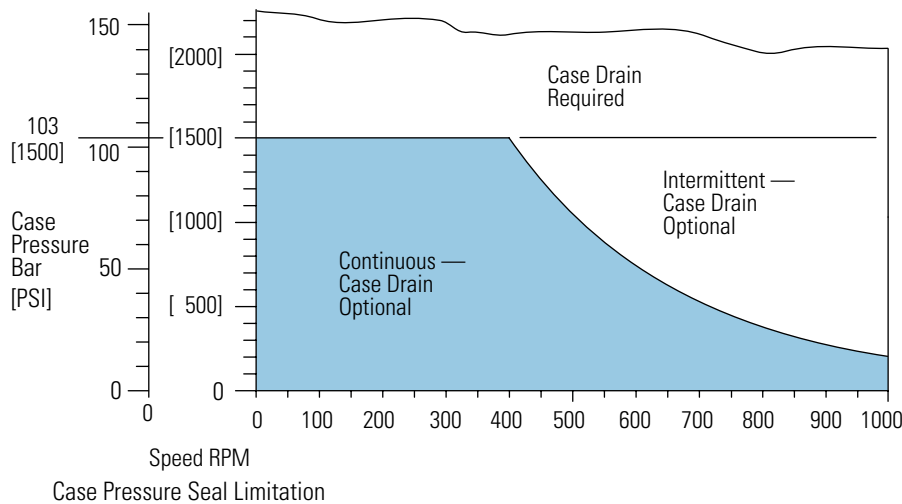
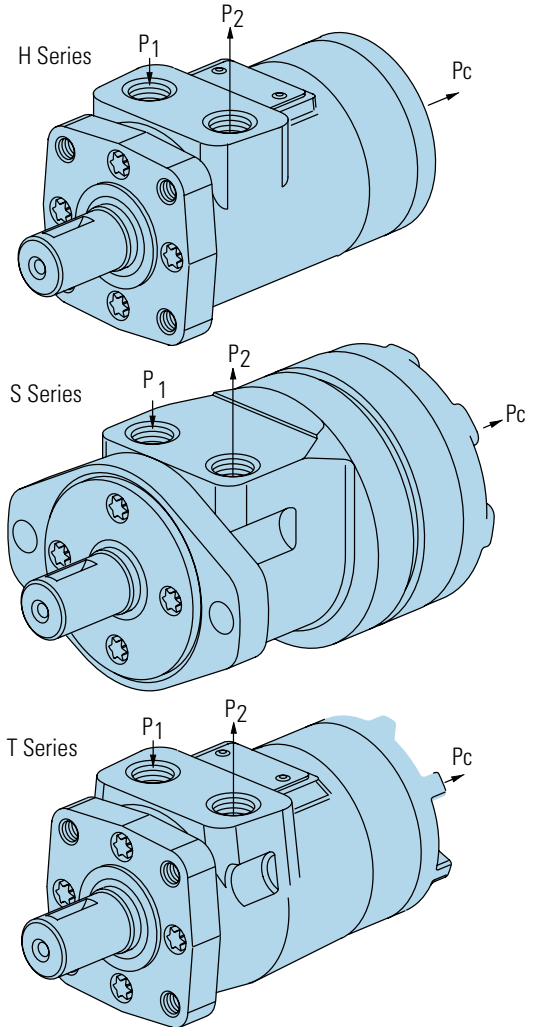
Char-Lynn H Series, S Series and T Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with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



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

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



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%.

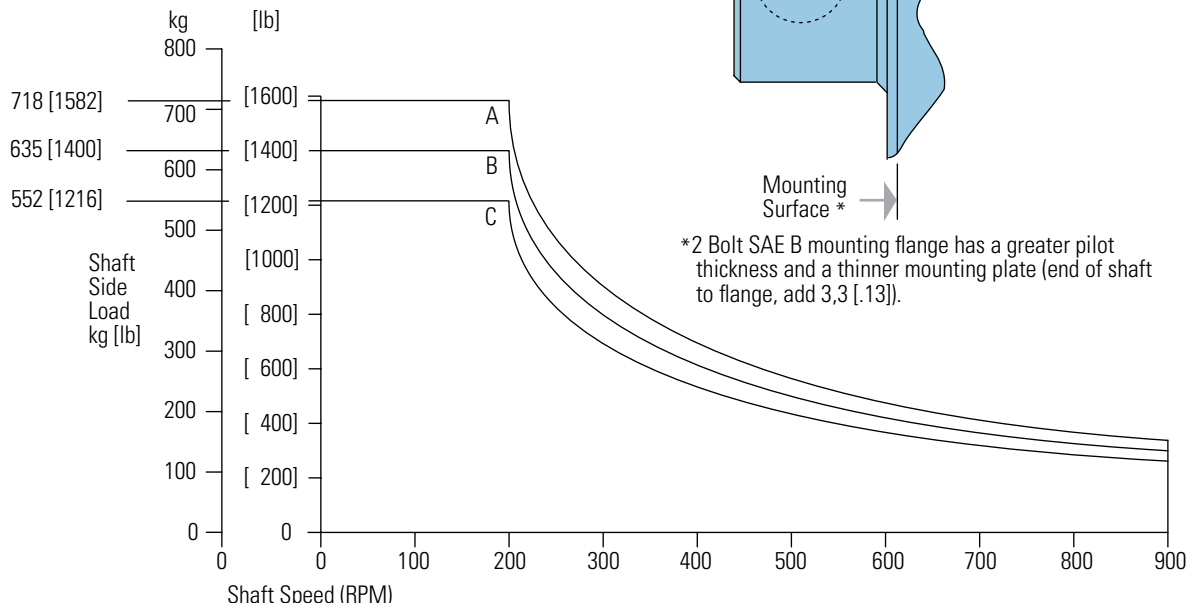
RPM	ALLOWABLE SHAFT SIDE LOAD – KG [LB]		
	A	B	C
900	154 [339]	136 [300]	118 [261]
625	205 [452]	181 [400]	158 [348]
500	256 [565]	227 [500]	197 [435]
400	307 [678]	272 [600]	237 [522]
300	410 [904]	363 [800]	316 [696]
200	718 [1582]	635 [1400]	552 [1216]

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

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

Where N = Shaft Speed (RPM)

L = Distance from Mounting Surface

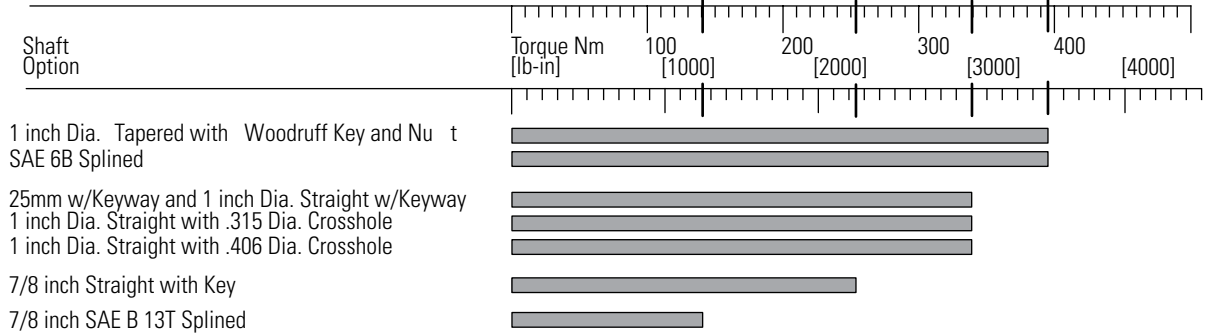


H, S and T Series (101, 103- 158, 185)

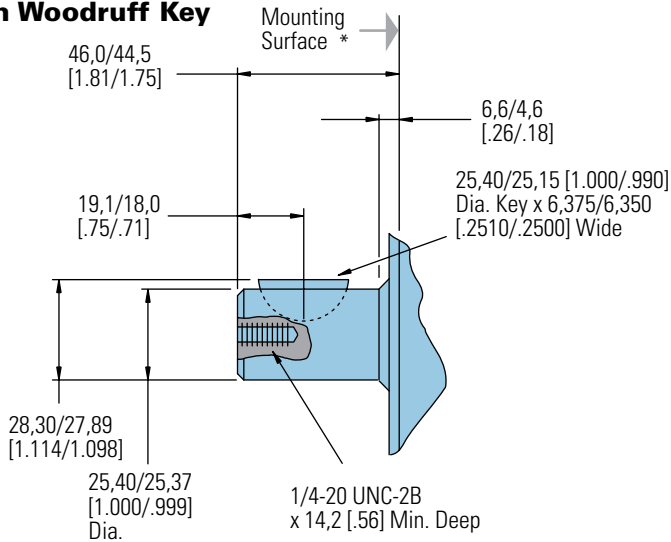
Dimensions

Shafts

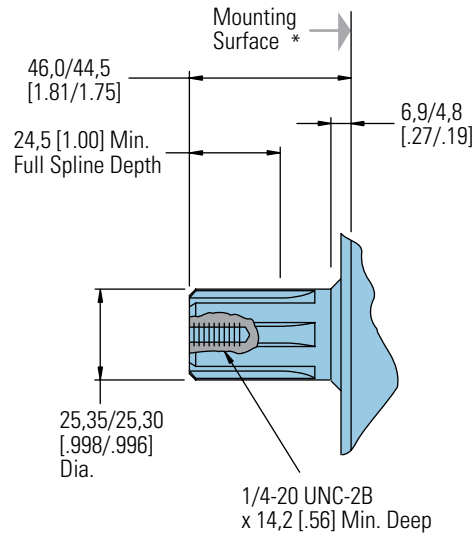
Shaft Size Motor Torque Combination Limit Guide



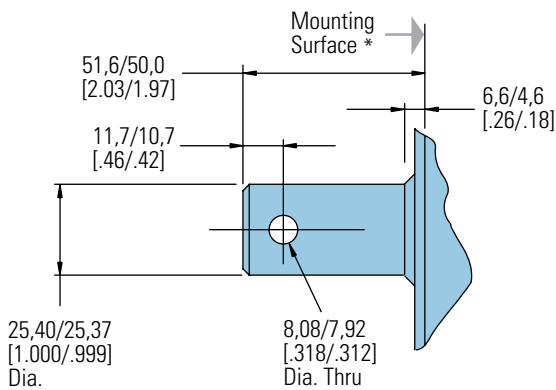
1 in. Dia. Straight with Woodruff Key



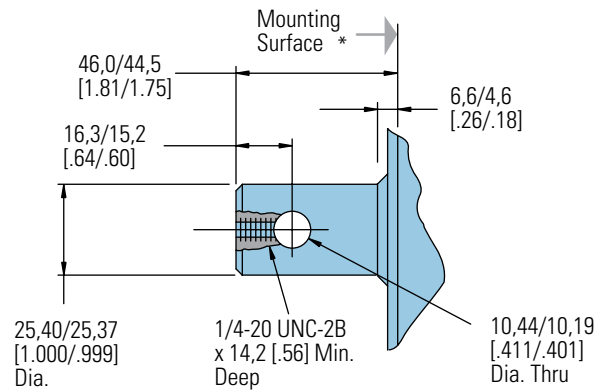
SAE 6B Splined Shaft



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



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



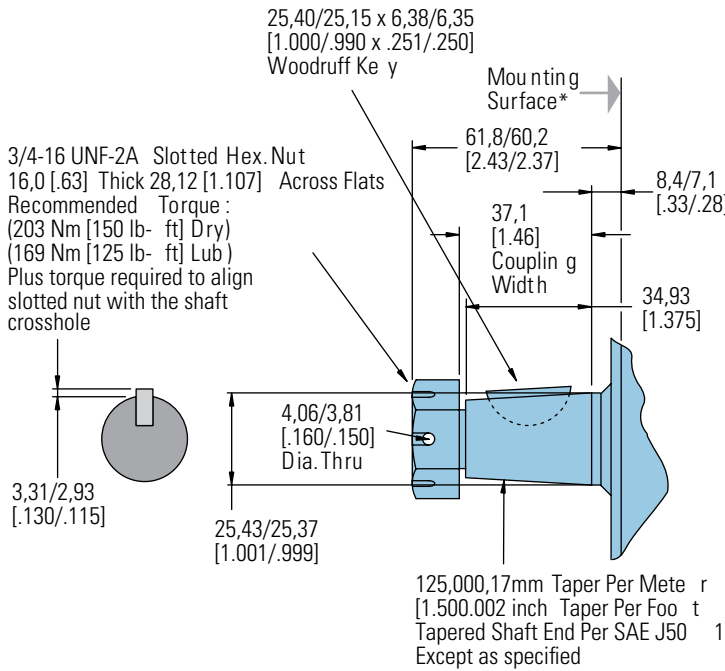
* 2 Bolt SAE B mounting flange has a greater pilot thickness and a thinner mounting plate (end of shaft to flange, add 3,3 [.13]).

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

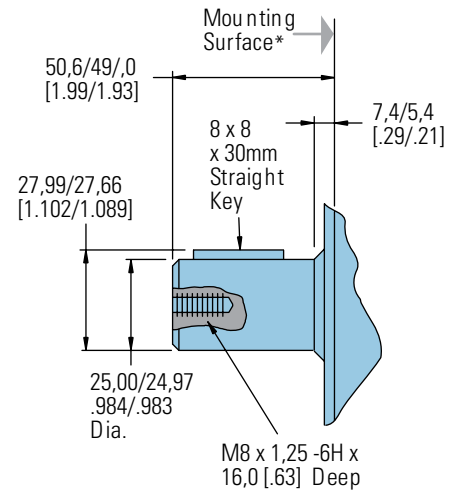
Dimensions

Shafts

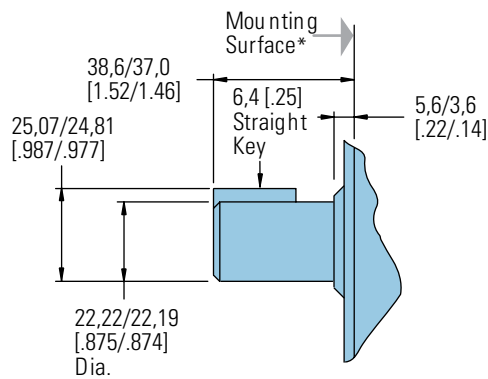
1 in. Dia. Tapered Shaft with Woodruff Key and Nut



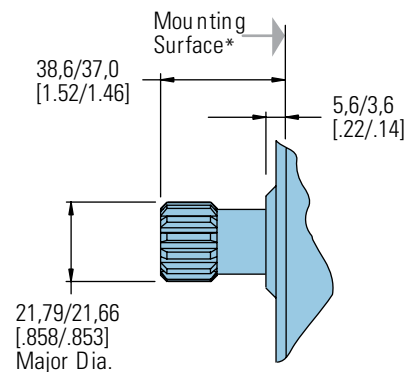
25mm Dia. Straight Shaft with 8mm Keyway



7/8 in. Dia. Straight Shaft with Key



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



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

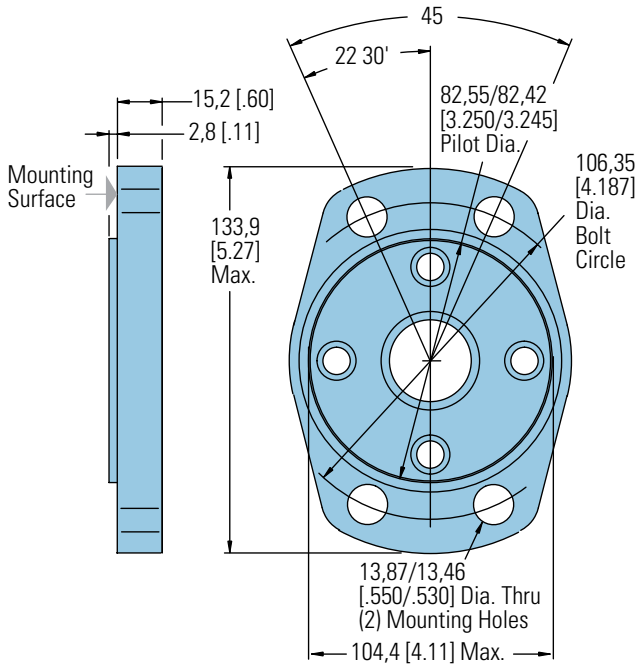
H, S and T Series (101-, 103- 158-, 185-)

Mounting Options

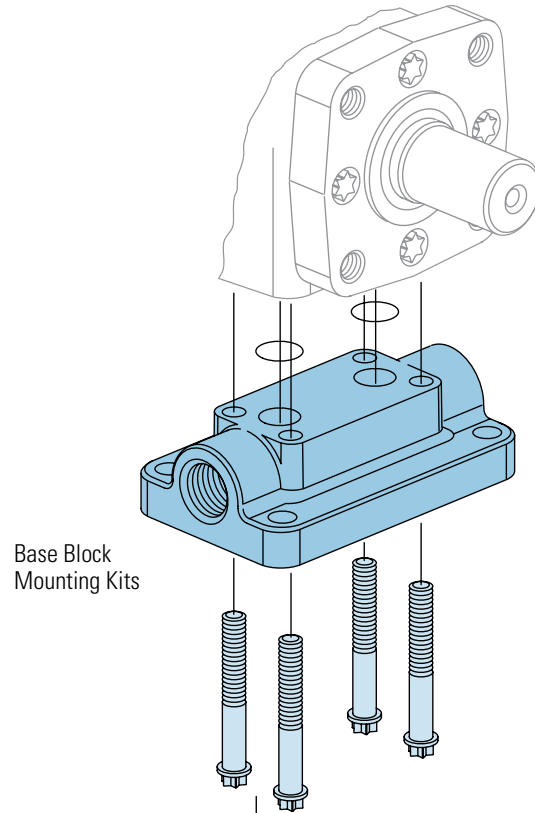
Note:

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

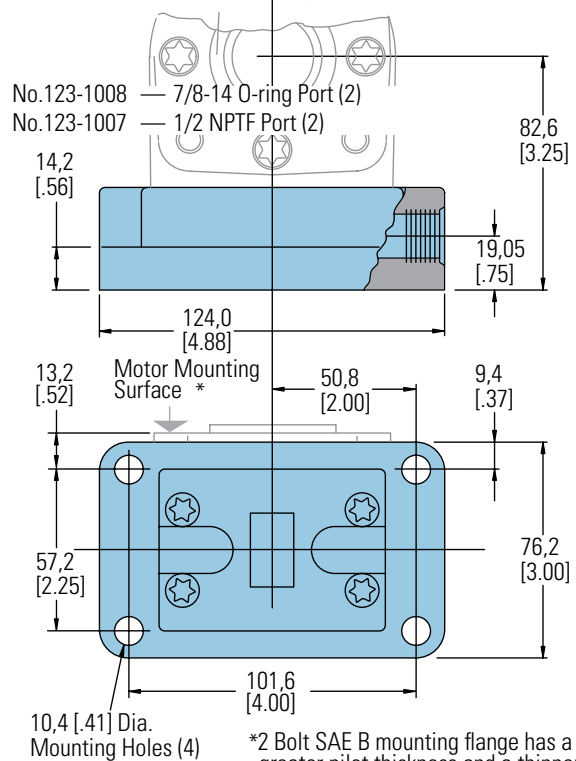
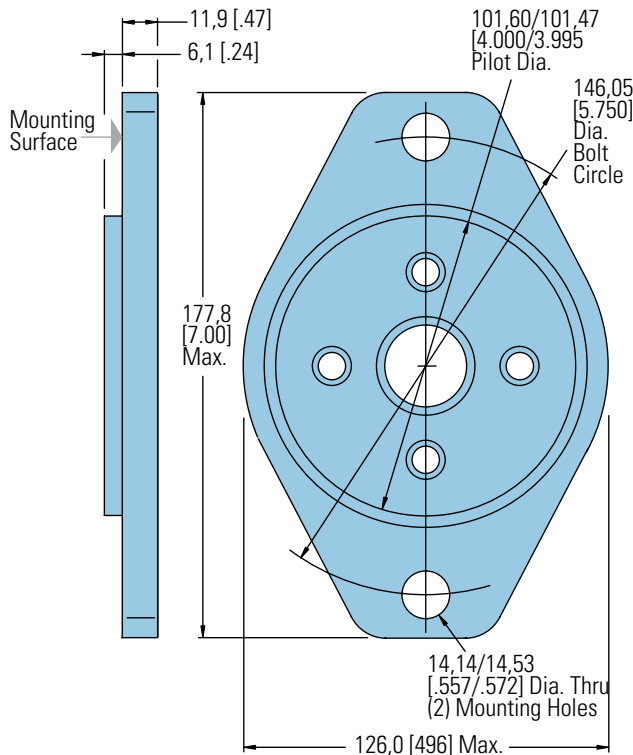
4 Bolt Magneto



Base Block Mounting Kits



2 Bolt SAE B



*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

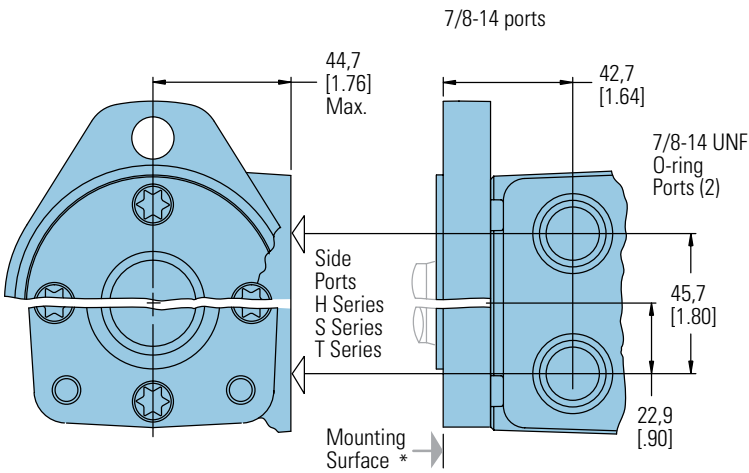
End Ports — H Series only
G 1/2 (BSP) (2)
or 3/4-16 O-Ring (2)

Standard Rotation Viewed from Drive End

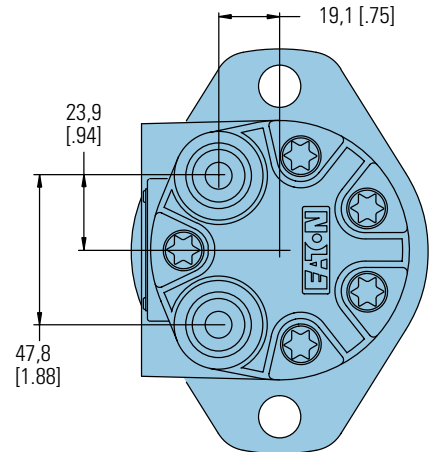
Port A Pressurized — CW
Port B Pressurized — CCW

Note:

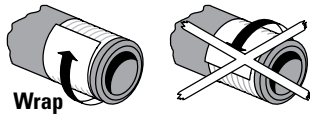
End ported motor pressure is derated. Reference page B-2-2 for ratings.



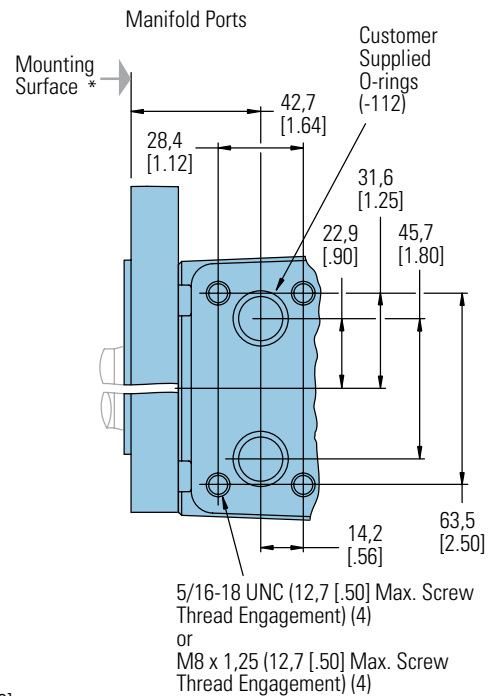
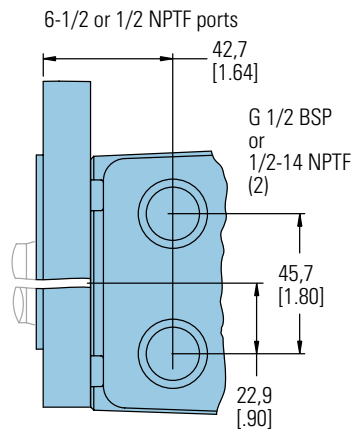
End Ports (H Series only)



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

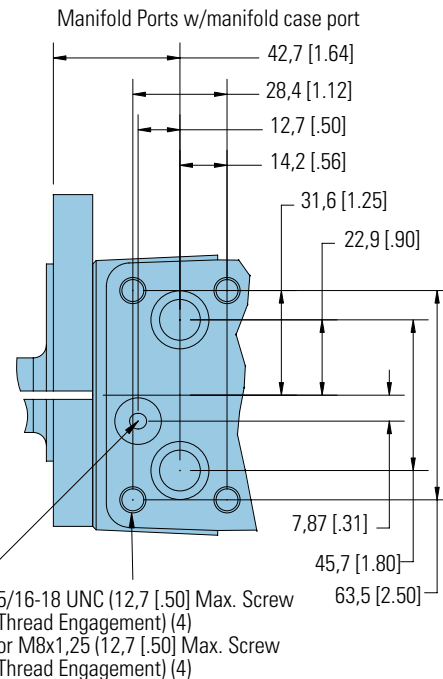


When using fittings with Teflon tape, be careful when taping and tightening. Over tightening or improperly taped fittings can cause damage to housing or leakage.



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.



Note:

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

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

B-2

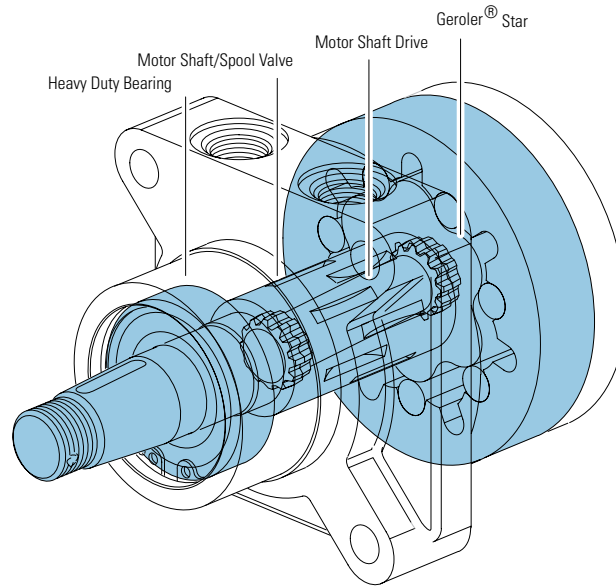
B-3

B-4

Notes

W Series (162-)

Highlights



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

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.



Scissor Lift



Sweeper



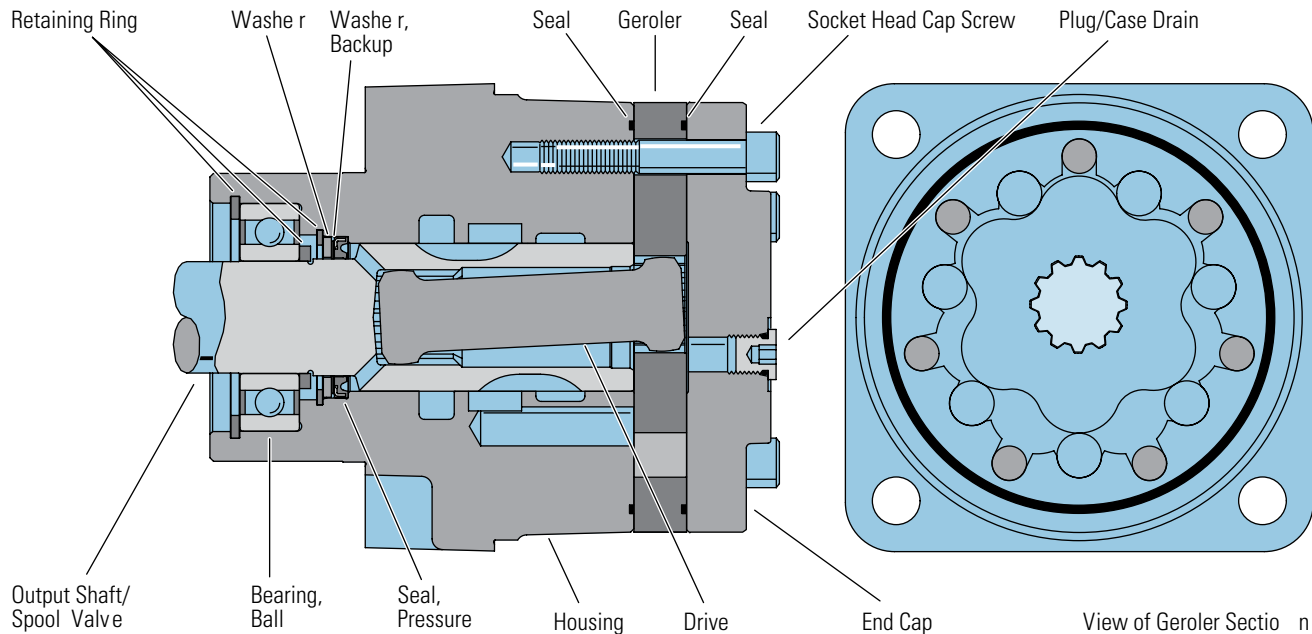
Trencher



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 System Operating Temp.:

-34°C to 82°C [-30°F to 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.

 Continuous
 Intermittent

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 93	38 89	54 86	69 84	85 83	100 79	115 73	130 69	145 69	160 61	174 56	182 39
	[4]	[223]	[357]	[489]	[627]	[769]	[902]	[1035]	[1169]	[1295]	[1424]	[1555]	[1676]
	15.1	25 178	40 172	55 170	71 168	87 165	102 159	117 157	132 154	146 146	161 142	176 131	189 117
[6]	[255]	[342]	[477]	[612]	[749]	[879]	[1014]	[1154]	[1286]	[1408]	[1533]	[1648]	
22.7	29 267	39 265	54 262	69 258	85 257	99 252	115 248	130 241	145 235	159 229	173 219	186 206	

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 58	68 56	92 55	117 51	141 49	164 45	187 43	211 41	234 33	253 32	273 26	284 17
	[4]	[382]	[605]	[817]	[1036]	[1252]	[1463]	[1694]	[1908]	[2113]	[2306]	[2470]	[2640]
	15.1	43 113	68 106	92 106	117 104	141 93	165 91	191 97	216 88	239 82	261 79	279 77	298 60
[6]	[367]	[587]	[802]	[1017]	[1236]	[1444]	[1668]	[1882]	[2091]	[2284]	[2459]	[2637]	
22.7	41 172	66 167	91 164	115 161	140 156	163 152	188 147	213 141	236 134	258 130	278 128	298 103	
[8]	[346]	[561]	[769]	[981]	[1203]	[1419]	[1634]	[1849]	[2039]	[2217]	[2432]	[2633]	
30.3	39 228	63 225	87 220	111 216	136 213	160 208	185 201	209 195	230 188	250 174	275 163	297 149	

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 47	82 47	112 46	141 44	171 40	200 39	228 36	256 33	283 30	307 27	328 19	341 10
	[4]	[470]	[737]	[1009]	[1276]	[1540]	[1802]	[2064]	[2323]	[2570]	[2813]	[3019]	[3242]
	15.1	53 94	83 93	114 90	144 89	174 87	204 84	233 81	262 78	290 73	318 67	341 65	366 52
[6]	[435]	[715]	[984]	[1252]	[1513]	[1787]	[2020]	[2274]	[2521]	[2812]	[3042]	[3301]	
22.7	49 143	81 140	111 138	141 137	171 134	202 131	228 128	257 124	285 117	318 112	344 103	373 91	
[8]	[407]	[677]	[945]	[1214]	[1477]	[1740]	[2005]	[2260]	[2503]	[2735]	[2964]	[3206]	
30.3	46 190	76 188	107 186	137 184	167 182	197 179	227 176	255 171	283 166	309 158	335 148	362 137	
[9]	[380]	[648]	[914]	[1183]	[1452]	[1714]	[1981]	[2243]	[2499]	[2733]	[2964]	[3195]	
34	43 214	73 212	103 210	134 207	164 206	194 202	224 200	253 196	282 191	309 182	335 173	361 162	

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 38	93 38	132 37	171 36	208 35	243 34	277 34	311 30	342 29	370 26	397 22	415 16
	[4]	[515]	[872]	[1220]	[1558]	[1886]	[2206]	[2518]	[2816]	[3107]	[3382]	[3647]	[3882]
	15.1	58 75	99 73	138 73	176 71	213 70	249 69	284 66	318 64	351 62	382 56	412 52	439 44
[6]	[524]	[878]	[1214]	[1551]	[1875]	[2199]	[2518]	[2824]	[3113]	[3389]	[3666]		
22.7	59 114	99 111	137 110	175 110	212 108	248 106	284 105	319 103	352 99	383 95	414 91		
[8]	[518]	[856]	[1187]	[1524]	[1861]	[2187]	[2499]	[2782]	[3064]	[3334]			
30.3	59 151	97 150	134 150	172 149	210 147	247 145	282 144	314 143	346 141	377 136			
[10]	[462]	[797]	[1133]	[1468]	[1799]	[2118]	[2442]	[2739]	[3023]	[3281]			
38	52 190	90 188	128 187	166 186	203 184	239 184	276 182	309 179	342 176	371 160			

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

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.

251 cm³/r [15.3 in³/r]

Δ Pressure bar [PSI]



Continuous

	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2400]
	28	41	55	69	83	97	110	124	140	152	165
[2]	[759]	[1194]	[1683]	[2122]	[2535]	[2928]	[3319]	[3634]	[3946]	[4242]	[4553]
7.6	86 30	135 29	190 29	240 28	286 27	331 27	375 25	411 22	446 17	479 15	514 14
[4]	[806]	[1257]	[1691]	[2130]	[2563]	[2988]	[3381]	[3799]	[4147]	[4515]	[4849]
15.1	91 59	142 58	191 58	241 56	290 55	338 55	382 52	429 48	469 47	510 41	548 40
[6]	[780]	[1219]	[1646]	[2084]	[2515]	[2933]	[3336]	[3716]			
22.7	88 90	138 88	186 87	235 86	284 85	331 83	377 83	420 79			
[8]	[720]	[1148]	[1590]	[2029]	[2449]	[2861]	[3236]	[3627]			
30.3	81 120	130 118	180 117	229 117	277 114	323 112	366 111	410 108			
[10]	[645]	[1080]	[1513]	[1947]	[2371]	[2779]	[3151]	[3515]			
37.9	73 148	122 147	171 147	220 145	268 145	314 143	356 141	397 137			
[12]	[557]	[992]	[1428]	[1864]	[2292]	[2697]	[3087]				
45.4	63 178	112 177	161 176	211 174	259 174	305 172	349 169				
[14]	[460]	[888]	[1330]	[1761]	[2191]	[2615]	[3035]				
53.0	52 208	100 206	150 206	199 203	248 202	295 200	343 197				

303 cm³/r [18.5 in³/r]

Δ Pressure bar [PSI]

Continuous

 Continuous
 Intermittent

	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]
	28	41	55	69	83	97	110	124	140
[2]	[920]	[1454]	[1974]	[2480]	[2969]	[3429]	[3859]	[4230]	[4583]
7.6	104 24	164 24	223 24	280 23	335 22	387 22	436 20	478 18	518 16
[4]	[960]	[1487]	[2007]	[2513]	[3006]	[3457]	[3905]	[4338]	[4769]
15.1	108 49	168 49	227 47	284 47	340 46	391 45	441 44	490 41	539 39
[6]	[911]	[1445]	[1961]	[2473]	[2952]	[3411]	[3842]	[4276]	
22.7	103 73	163 73	222 72	279 72	334 71	385 69	434 68	483 66	
[8]	[843]	[1375]	[1888]	[2393]	[2886]	[3350]	[3763]		
30.3	95 99	155 98	213 97	270 96	326 95	379 94	425 93		
[10]	[752]	[1274]	[1789]	[2303]	[2792]	[3274]	[3650]		
37.9	85 123	144 122	202 122	260 120	316 119	370 119	412 118		
[12]	[652]	[1170]	[1691]	[2199]	[2691]	[3123]			
45	74 148	132 147	191 146	248 145	304 145	353 144			
[14]	[526]	[1039]	[1560]	[2064]	[2548]	[2999]			
53	59 172	117 172	176 171	233 170	288 169	339 168			
[16.5]	[353]	[864]	[1367]	[1876]	[2369]				
62	40 203	98 203	154 201	212 200	268 200				

[4583]
518 } Torque [lb-in]
16 } Nm
Speed RPM

374 cm³/r [22.8 in³/r]

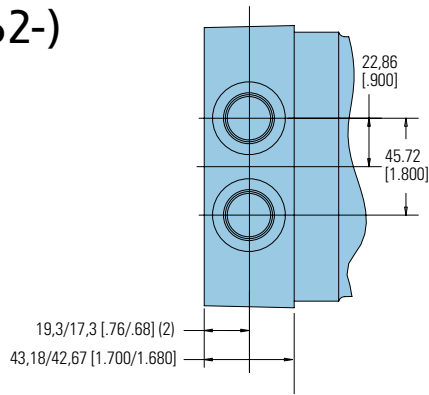
Δ Pressure bar [PSI]

Continuous

	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]
	28	41	55	69	83	97	110	124
[2]	[1086]	[1753]	[2365]	[2960]	[3533]	[4025]	[4484]	[4970]
7.6	123 20	198 19	267 17	334 16	399 14	455 12	507 12	562 11
[4]	[1152]	[1797]	[2431]	[3048]	[3624]	[4129]	[4599]	
15.1	130 39	203 39	275 38	344 36	409 34	467 33	520 31	
[6]	[1099]	[1749]	[2377]	[2996]	[3557]	[4077]		
22.7	124 60	198 58	269 57	339 56	402 54	461 53		
[8]	[1018]	[1662]	[2290]	[2894]	[3440]	[3952]		
30.3	115 80	188 79	259 78	327 76	389 75	447 74		
[10]	[940]	[1582]	[2210]	[2812]	[3346]	[3816]		
37.9	106 100	179 99	250 97	318 96	378 95	431 95		
[12]	[809]	[1454]	[2077]	[2677]	[3216]			
45.4	91 120	164 119	235 117	302 116	363 115			
[14]	[648]	[1284]	[1907]	[2506]	[3033]			
53.0	73 141	145 139	215 138	283 137	343 137			
[16]	[485]	[1107]	[1722]	[2315]	[2838]			
60.6	55 160	125 159	195 157	262 157	321 157			
[18]	[307]	[930]	[1543]	[2133]				
68.1	35 180	105 179	174 178	241 178				
[20]	[111]	[730]	[1342]	[1939]				
75.7	13 201	82 199	152 198	219 197				

W Series (162-)

Dimensions



Ports

7/8-14 SAE O-Ring Ports

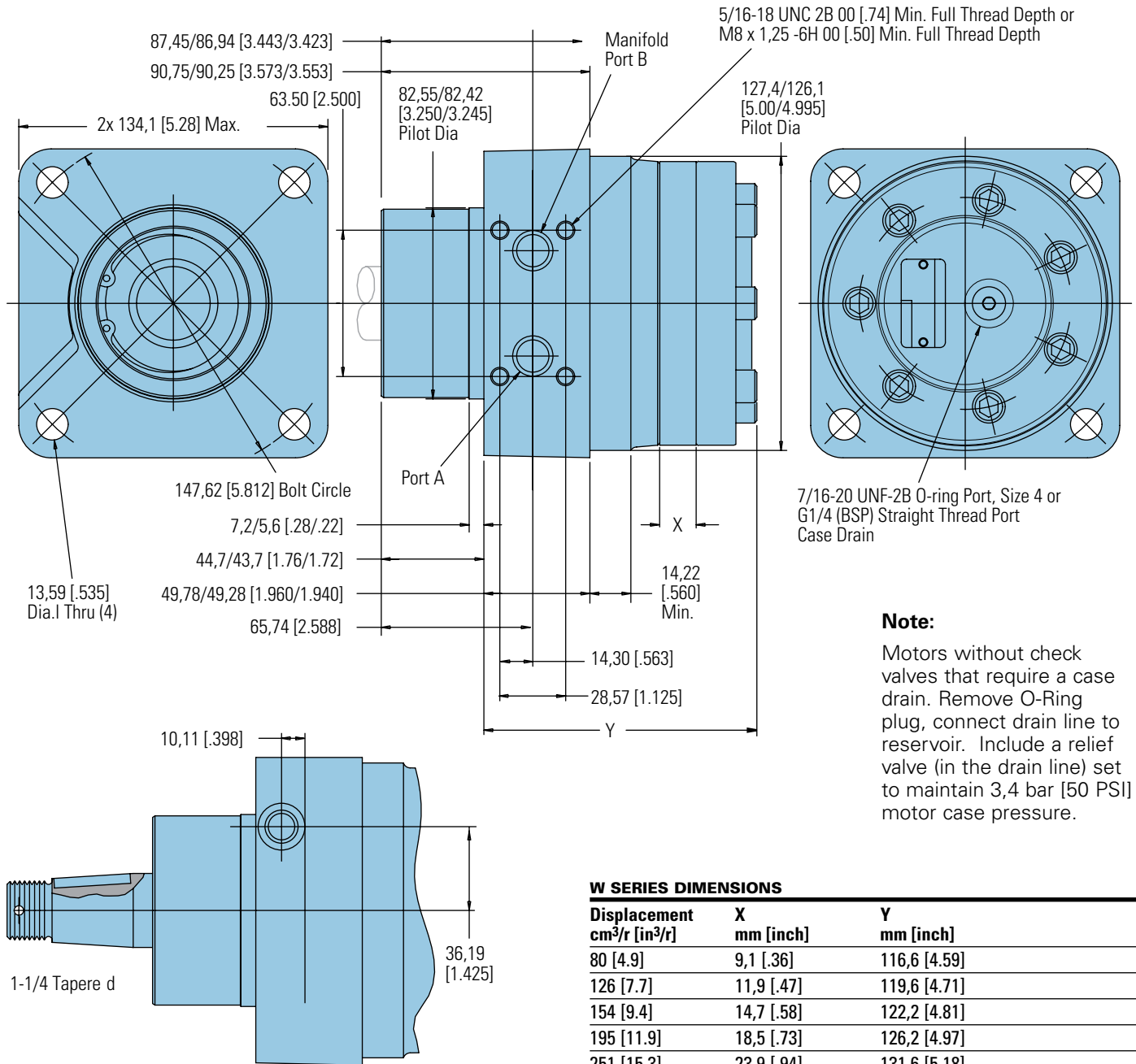
G1/2 BSP Straight Thread Port

Manifold (15/16-18 Mounting Threads)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW



5/16-18 UNC 2B 00 [.74] Min. Full Thread Depth or M8 x 1,25 -6H 00 [.50] Min. Full Thread Depth

7/16-20 UNF-2B O-ring Port, Size 4 or G1/4 (BSP) Straight Thread Port Case Drain

Note:

Motors without check valves that require a case drain. Remove O-Ring plug, connect drain line to reservoir. Include a relief valve (in the drain line) set to maintain 3,4 bar [50 PSI] motor case pressure.

W SERIES DIMENSIONS

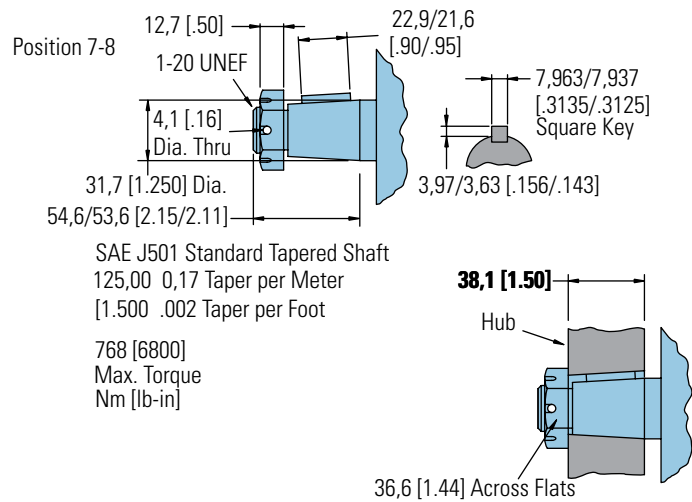
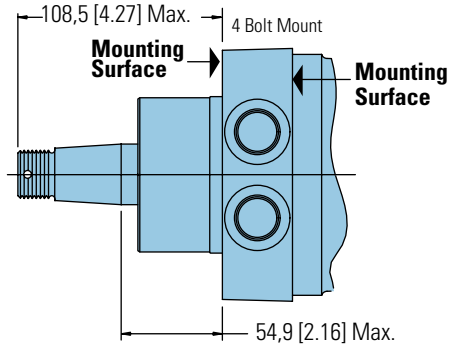
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
80 [4.9]	9,1 [.36]	116,6 [4.59]
126 [7.7]	11,9 [.47]	119,6 [4.71]
154 [9.4]	14,7 [.58]	122,2 [4.81]
195 [11.9]	18,5 [.73]	126,2 [4.97]
251 [15.3]	23,9 [.94]	131,6 [5.18]
303 [18.5]	29,0 [1.14]	136,4 [5.37]
374 [22.8]	35,6 [1.40]	143,3 [5.64]

W Series (162-)

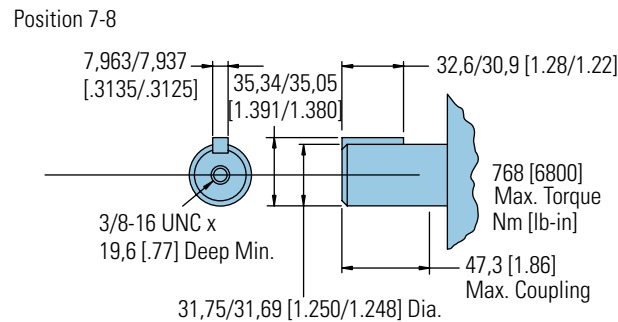
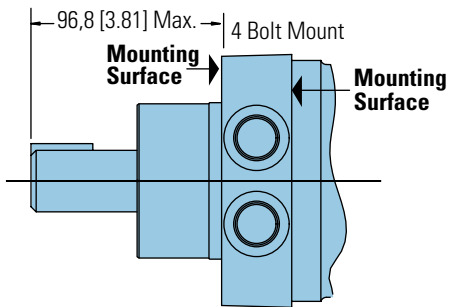
Dimensions Shafts

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.

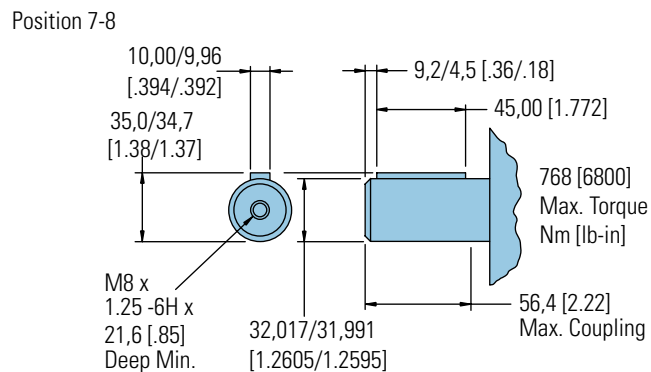
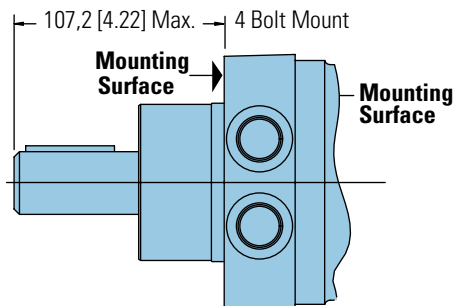
1 1/4 Tapered



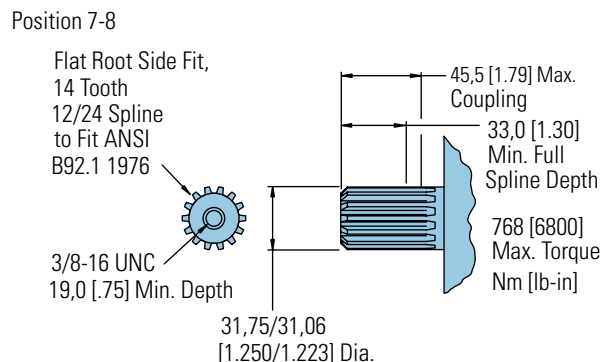
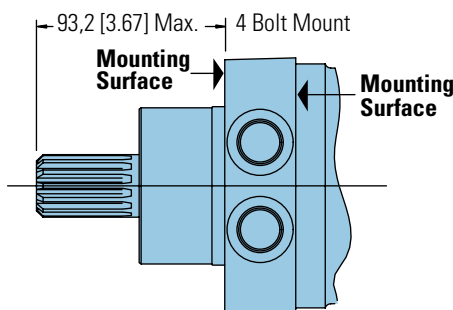
1 1/4 Inch Straight



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 sideload 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:

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

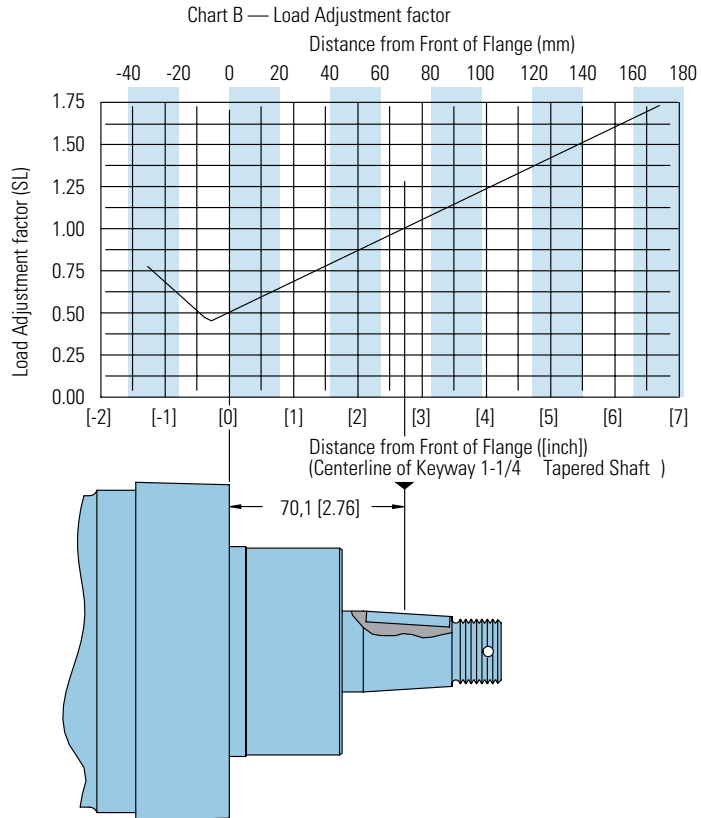


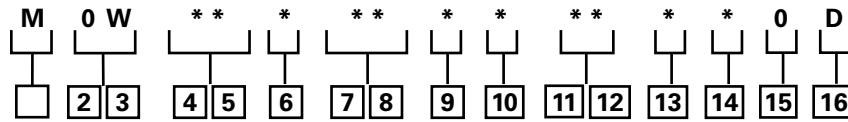
CHART A – EXPECTED B10 LIFE (HOURS) OF BEARING UNDER VARIOUS LOADS

Axial Thrust		Radial Load at Centerline of keyway at 100 RPM									
		1110 [250]	2225 [500]	3335 [750]	4450 [1000]	4560 [1250]	6670 [1500]	7785 [1750]	8895 [2000]	11120 N [2500lbf]	13345 N [3000lbf]
N	lbf]										
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 – Low Gloss Black Primer, Bulk Box Option

15 Eaton Assigned Code when Applicable

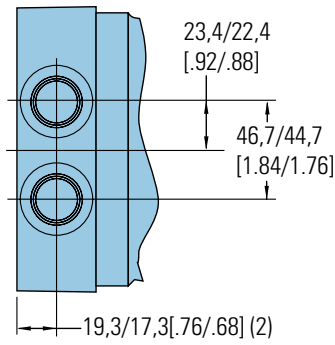
0 – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code

W Series with Parking Brake (162-)

Dimensions



Ports

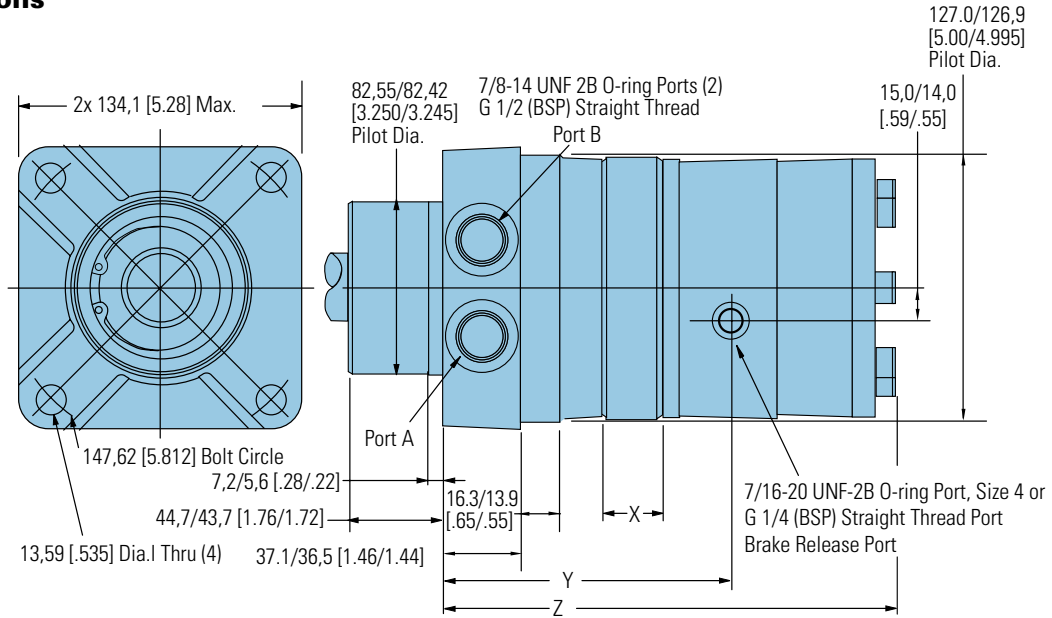
7/8 -14 UNF 2B SAE O-Ring Ports (2) or G 1/2 (BSP) Straight Thread

Standard Rotation Viewed from Shaft End

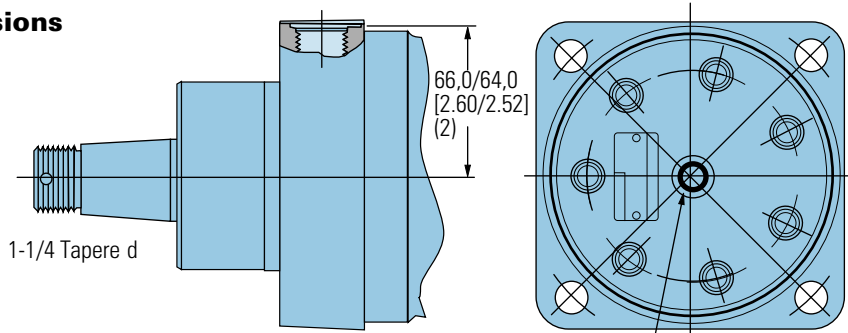
Port A Pressurized — CW

Port B Pressurized — CCW

Port Dimensions



Mounting Dimensions



7/16-20 UNF-2B O-ring Port, Size 4 or G 1/4 (BSP) Straight Thread Port— Manual Brake Release Access Port. Tighten plug to manually release brake.

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:

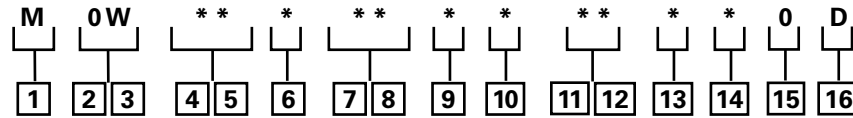
All above motors have
1-1/4 inch tapered output
shaft, 7/8 inch O-Ring Ports,
internal check valves.

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 – Low Gloss Black Primer - Individual Box

15 Eaton Assigned Code when Applicable

0 – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code

B-5



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

C-1

C-2

C-3

C-4

C-5

C-6

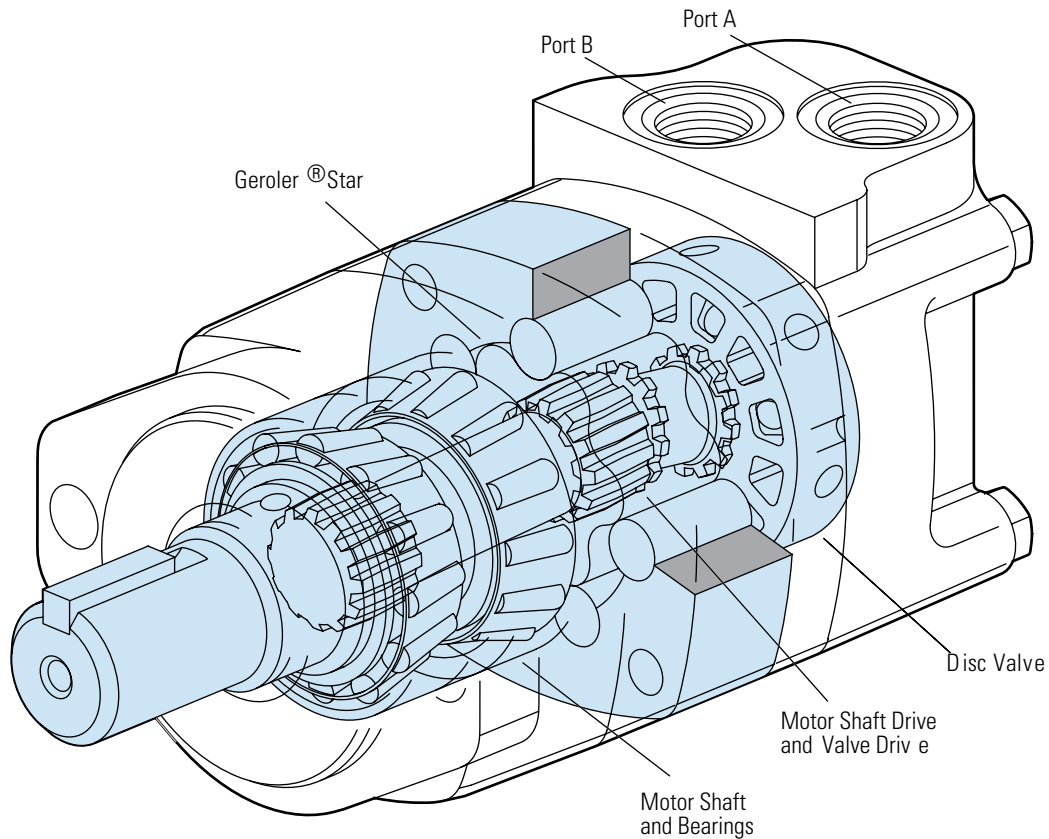
Disc Valve Hydraulic Motors

Highlights

Product Description

In the late 1950's the original low speed, high torque hydraulic motor was developed from a pump Geroter 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:

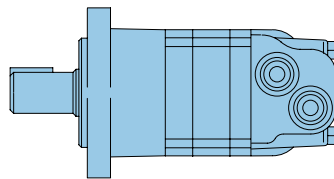
- Displacement (Geroler size)
- Output Shaft
- No Shaft and Bearing Assembly (Bearingless Motor)
- Port Configuration
- Mounting Flange
- Other Special Features

Benefits

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

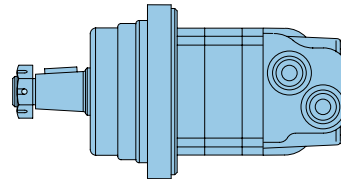
Applications

- 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



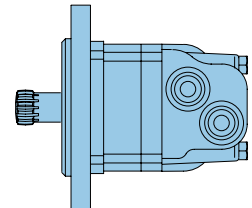
Standard Motor

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.

C-1

C-2

C-3

C-4

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C-6

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6000 Series

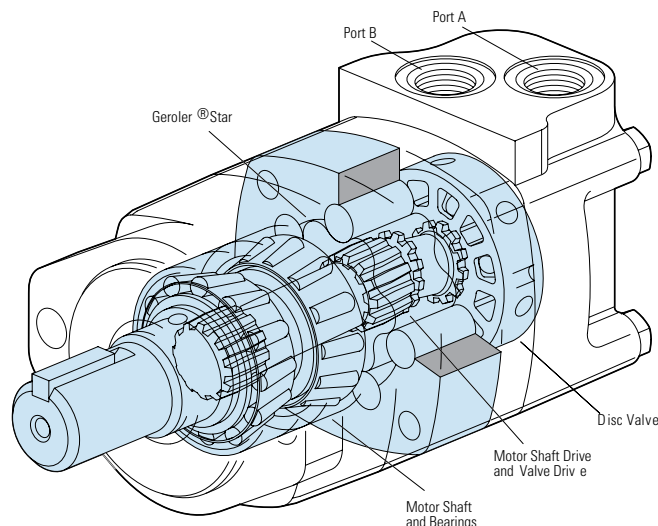
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2000 Series

Highlights



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

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.



Auger



Boring



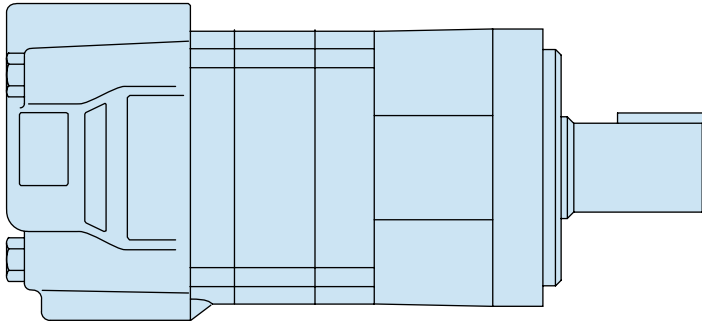
Plastic Injection



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)	Continuous	908	836	742	576	477	385	308	246	191	153
	Intermittent	908	1042	924	720	713	577	462	365	287	230
@ Flow											
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 [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]	240 [3500]	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 System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

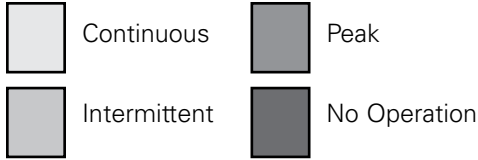
per ISO Cleanliness Code, 4406: 20/18/13

2000 Series

Performance Data

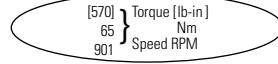
Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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



80 cm³/r [4.9 in³/r]
ΔPressure Bar [PSI]

	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.25] .95	[210] 25 3	[420] 45 1							
[.5] 1.9	[250] 30 17	[500] 50 8	[740] 85 3						
[1] 3.8	[330] 35 44	[670] 75 40	[990] 110 37	[1300] 145 34	[1550] 175 28	[1800] 205 22	[1950] 220 14	[2110] 240 2	
[2] 7.5	[330] 35 90	[670] 75 85	[995] 110 81	[1310] 150 78	[1580] 180 72	[1840] 210 65	[2100] 235 57	[2365] 265 49	[2630] 295 42
[4] 15	[325] 35 182	[670] 75 176	[1005] 115 170	[1330] 150 166	[1620] 185 159	[1920] 215 152	[2200] 250 140	[2480] 280 128	[2765] 310 117
[6] 23	[320] 35 273	[665] 75 267	[1010] 115 259	[1340] 150 254	[1655] 185 246	[1975] 225 238	[2270] 255 223	[2570] 290 207	[2880] 325 192
[8] 30	[310] 35 365	[660] 75 375	[1015] 115 349	[1345] 150 341	[1685] 190 333	[2020] 230 325	[2330] 265 306	[2640] 300 286	[2960] 335 266
[10] 38	[300] 35 456	[650] 75 448	[1010] 115 439	[1350] 155 429	[1700] 190 420	[2050] 230 411	[2370] 270 388	[2690] 305 364	[3010] 340 341
[12] 45	[285] 30 547	[640] 70 537	[1005] 115 530	[1350] 155 516	[1705] 195 507	[2065] 235 497	[2390] 270 470	[2715] 305 442	[3035] 345 415
[14] 53	[270] 30 638	[625] 70 629	[990] 110 622	[1340] 150 603	[1705] 195 593	[2065] 235 584	[2395] 270 553	[2720] 305 521	[3030] 340 490
[16] 61	[255] 30 729	[610] 70 720	[975] 110 714	[1330] 150 689	[1690] 190 679	[2055] 230 670	[2385] 270 635	[2700] 305 599	[2995] 340 564
[18] 68	[230] 25 818	[590] 65 810	[955] 110 795	[1310] 150 775	[1680] 190 765	[2025] 230 756	[2355] 265 717	[2660] 300 677	[2935] 330 638
[20] 76	[210] 25 908	[570] 65 901	[930] 105 880	[1290] 145 861	[1645] 185 851	[1985] 225 842	[2305] 260 799	[2600] 295 755	[2845] 320 712



90 cm³/r [5.5 in³/r]
ΔPressure Bar [PSI]





	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.25] .95	[124] 14 5	[233] 26 2	[471] 53 1							
[.5] 1.9	[133] 15 15	[273] 31 13	[555] 63 6	[832] 94 2						
[1] 3.8	[151] 17 39	[358] 40 39	[744] 84 35	[1091] 123 32	[1424] 161 28	[1697] 192 21	[1952] 221 13	[2189] 247 12	[2368] 268 2	
[2] 7.5	[151] 17 82	[358] 40 80	[744] 84 76	[1099] 124 72	[1439] 163 68	[1737] 196 61	[2015] 228 50	[2293] 259 38	[2570] 290 29	[2855] 323 20
[4] 15	[151] 17 167	[350] 40 163	[899] 102 158	[1113] 126 152	[1473] 166 148	[1800] 203 139	[2132] 241 126	[2454] 277 115	[2775] 314 102	[3100] 350 90
[6] 23	[142] 16 250	[348] 39 245	[736] 83 240	[613] 69 233	[1492] 169 227	[1851] 209 218	[2208] 249 203	[2552] 288 191	[2898] 327 176	[3249] 367 161
[8] 30	[133] 15 35	[338] 38 328	[729] 82 329	[1128] 127 314	[1509] 170 306	[1890] 214 295	[2269] 256 281	[2635] 298 266	[3000] 339 249	[3367] 380 231
[10] 38	[124] 14 418	[331] 37 410	[724] 82 404	[1130] 128 395	[1521] 172 385	[1912] 216 373	[2309] 261 361	[2670] 302 342	[3036] 343 322	[3398] 384 302
[12] 45	[106] 12 502	[315] 36 493	[714] 81 485	[1127] 127 477	[1525] 172 464	[1924] 217 451	[2326] 263 441	[2704] 306 417	[3082] 348 394	[3458] 391 372
[14] 53	[98] 11 585	[298] 34 575	[706] 80 567	[1115] 126 559	[1525] 172 543	[1924] 217 529	[2326] 263 521	[2707] 306 493	[3080] 348 467	[3450] 390 431
[16] 61	[80] 9 670	[285] 32 658	[688] 78 650	[1107] 125 641	[1510] 171 622	[1907] 215 607	[2311] 261 610	[2697] 305 568	[3070] 347 541	[3432] 388 513
[18] 68	[62] 7 753	[262] 30 740	[673] 76 732	[1087] 123 719	[1490] 168 701	[1892] 214 685	[2281] 258 680	[2662] 301 643	[3030] 342 613	[3381] 382 583
[20] 76	[53] 6 836	[242] 27 822	[644] 73 814	[1045] 118 796	[1447] 163 780	[1850] 209 765	[2246] 254 748	[2617] 296 719	[2988] 338 686	[3301] 373 653
[22] 83	[35] 4 920	[231] 26 916	[639] 72 907	[1047] 118 895	[1437] 162 876	[1836] 207 854	[2218] 251 749	[2599] 294 803	[2981] 337 774	
[24] 91	[18] 2 1003	[204] 23 1000	[612] 69 991	[1011] 114 978	[1366] 154 960	[1792] 202 940	[2182] 247 918	[2573] 291 882	[2963] 335 850	
[25] 95		[195] 22 1042	[594] 67 1033	[994] 112 1020	[1384] 156 1003	[1765] 199 984	[2173] 246 954	[2564] 290 921		

2000 Series

Performance Data

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

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

	Continuous		Peak
	Intermittent		No Operation

100 c3m/r [6.3/2r] in
ΔPressure 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] 340 300	[3440] 390 283	[3850] 435 266
[12] 45	[120] 15 445	[350] 40 442	[800] 90 436	[1270] 145 427	[1730] 195 415	[2180] 245 399	[2630] 295 389	[3070] 345 369	[3510] 395 350	[3950] 445 332
[14] 53	[110] 10 519	[330] 35 516	[800] 90 509	[1260] 140 500	[1740] 195 486	[2180] 245 469	[2630] 295 463	[3070] 345 437	[3500] 395 417	[3940] 445 378
[16] 61	[90] 10 594	[320] 35 591	[780] 90 583	[1260] 140 573	[1720] 195 558	[2160] 245 540	[2610] 295 537	[3060] 345 506	[3500] 395 485	[3940] 445 463
[18] 68	[70] 10 668	[300] 35 665	[770] 85 657	[1240] 140 646	[1700] 190 630	[2140] 240 611	[2580] 290 609	[3020] 340 574	[3460] 390 552	[3900] 440 529
[20] 76	[60] 5 742	[280] 30 739	[730] 80 731	[1180] 135 715	[1630] 185 703	[2090] 235 684	[2550] 290 662	[2980] 335 643	[3440] 390 619	[3830] 435 595
[22] 83	[40] 5 816	[260] 30 813	[720] 80 805	[1180] 135 794	[1620] 185 777	[2070] 235 758	[2500] 280 749	[2930] 330 712	[3360] 380 687	
[24] 91	[20] 1.0 890	[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		

130 c3m/r [8.3/0r] in
ΔPressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
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	[170] 20 3									
[.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 92	[3100] 350 92	[3540] 400 85	[3980] 450 77	[4420] 500 70
[6] 23	[220] 25 172	[490] 55 171	[1080] 120 169	[1640] 185 161	[2190] 245 153	[2740] 310 149	[3260] 370 146	[3770] 425 132	[4280] 485 118	[4800] 540 104
[8] 30	[200] 25 230	[480] 55 224	[1080] 120 222	[1650] 185 219	[2220] 250 210	[2780] 315 204	[3310] 375 201	[3840] 435 192	[4360] 495 184	[4890] 550 175
[10] 38	[180] 20 287	[470] 55 286	[1070] 120 282	[1650] 185 276	[2230] 250 269	[2800] 315 261	[3420] 385 255	[3940] 445 243	[4450] 505 231	[4970] 560 219
[12] 45	[160] 20 345	[460] 50 344	[1060] 120 338	[1640] 185 333	[2230] 250 327	[2800] 315 317	[3350] 380 307	[3910] 440 295	[4440] 500 284	[4960] 560 272
[14] 53	[150] 15 403	[440] 50 402	[1030] 115 395	[1620] 185 391	[2220] 250 385	[3000] 340 373	[3350] 380 360	[3910] 440 348	[4440] 500 336	
[16] 61	[130] 15 461	[420] 45 460	[1010] 115 452	[1600] 180 447	[2200] 250 443	[2780] 315 430	[3330] 375 411	[3890] 440 397	[4440] 500 384	
[18] 68	[110] 10 518	[400] 45 517	[990] 110 509	[1580] 180 504	[2160] 245 500	[2750] 310 484	[3300] 375 471	[3860] 435 456	[4410] 500 440	
[20] 76	[90] 10 576	[380] 45 575	[960] 110 568	[1550] 175 560	[2130] 240 551	[2710] 305 539	[3280] 370 524	[3840] 435 508		
[22] 83	[60] 5 634	[350] 40 633	[940] 105 624	[1520] 170 619	[2100] 235 604	[2680] 305 597	[3250] 365 579	[3820] 430 560		
[24] 91	[40] 5 692	[325] 35 691	[920] 105 682	[1490] 170 676	[2070] 235 665	[2650] 300 651	[3220] 365 633	[3780] 425 616		
[25] 95	[20] 1.0 720	[310] 35 719	[900] 100 712	[1480] 165 705	[2050] 230 692	[2630] 295 679	[3200] 360 682	[3700] 420 656		



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

160 c3m/r [9.3/6r]in
ΔPressure Bar [PSI]

	[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[3750]
	15	35	70	105	140	170	205	240	260
[.25]	[200]								
.95	25								
	3								
[.5]	[240]	[490]	[990]	[1570]	[2140]				
1.9	25	55	110	175	240				
	9	7	5	3	1				
[1]	[280]	[590]	[1170]	[1730]	[2290]	[2830]	[3330]	[3820]	[4070]
3.8	30	65	130	195	260	320	375	430	460
	23	21	19	17	13	8	3	2	1
[2]	[300]	[610]	[1210]	[1790]	[2350]	[2920]	[3480]	[4050]	[4330]
7.5	35	70	135	200	265	330	395	460	490
	46	45	42	39	35	34	33	28	22
[4]	[320]	[630]	[1260]	[1890]	[2530]	[3170]	[3820]	[4460]	[4780]
15	35	70	140	215	285	360	430	505	540
	93	92	89	85	79	77	75	59	43
[6]	[320]	[650]	[1300]	[1960]	[2620]	[3280]	[3940]	[4600]	[4930]
23	35	75	145	220	295	370	445	520	560
	142	140	137	131	124	118	113	104	96
[8]	[310]	[650]	[1330]	[2010]	[2670]	[3330]	[4000]	[4660]	[4990]
30	35	75	150	225	300	375	450	525	565
	190	187	184	178	170	166	164	153	142
[10]	[290]	[640]	[1340]	[2030]	[2650]	[3310]	[4030]	[4700]	[5030]
38	35	70	150	230	305	385	455	530	570
	237	235	231	226	217	212	207	193	187
[12]	[270]	[620]	[1320]	[2030]	[2700]	[3370]	[4040]	[4710]	[5040]
45	30	70	150	230	305	380	455	530	570
	286	283	279	274	265	254	246	235	224
[14]	[240]	[650]	[1300]	[2020]	[2690]	[3360]	[4030]	[4700]	
53	25	65	145	230	305	380	455	530	
	334	331	326	322	312	305	297	286	
[16]	[220]	[570]	[1270]	[1980]	[2660]	[3330]	[4010]	[4680]	
61	25	65	145	225	300	375	450	525	
	382	378	374	369	360	349	339	326	
[18]	[190]	[540]	[1240]	[1960]	[2640]	[3320]	[3990]		
68	20	60	140	220	300	375	450		
	429	426	422	416	407	394	387		
[20]	[170]	[510]	[1210]	[1920]	[2630]	[3310]	[3940]		
76	20	60	135	215	300	375	445		
	477	474	469	462	451	440	430		
[22]	[150]	[480]	[1170]	[1880]	[2600]	[3290]	[3920]		
83	15	55	130	210	295	370	445		
	525	522	517	510	501	484	473		
[24]	[120]	[450]	[1150]	[1860]	[2570]	[3260]	[3900]		
91	15	50	130	210	290	370	440		
	572	569	564	556	546	531	522		
[25]	[90]	[440]	[1140]	[1840]	[2560]	[3230]	[3880]		
95	10	50	130	210	290	365	440		
	596	593	587	580	566	553	544		
[30]		[330]	[1040]	[1750]	[2470]	[3140]	[3800]		
114		35	120	200	280	355	430		
		713	706	696	682	672	658		

Flow LPM [GPM]

C-1

195 c3m/r [11.3/9r]in
ΔPressure Bar [PSI]

	[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
	155	35	50	70	85	105	120	140	155	170	190	205	225	240	260
[.25]	[240]	[590]													
.95	25	65													
	4	2													
[.5]	[290]	[640]	[990]	[1340]											
1.9	35	70	110	150											
	8	6	5	2											
[1]	[380]	[730]	[1100]	[1430]	[1790]	[2120]	[2450]	[2720]	[2990]	[3260]	[3540]	[3810]	[4080]	[4350]	[4620]
3.8	45	80	125	160	200	200	275	305	340	370	400	430	460	490	520
	17	16	15	14	13	11	9	7	5	4	3	2	2	1	1
[2]	[390]	[755]	[1135]	[1470]	[1860]	[2195]	[2535]	[2880]	[3120]	[3680]	[4090]	[4500]	[4800]	[5100]	[5400]
7.5	45	85	130	165	210	250	285	325	355	415	460	510	540	575	610
	37	35	34	33	32	31	28	26	24	21	20	19	17	14	14
[4]	[405]	[795]	[1185]	[1540]	[1970]	[2310]	[2675]	[3040]	[3420]	[3790]	[4160]	[4520]	[4890]	[5260]	[5630]
15	45	90	135	175	225	260	300	345	385	430	470	510	550	595	635
	76	74	73	72	71	70	66	64	62	61	59	57	55	51	45
[6]	[405]	[815]	[1220]	[1590]	[2035]	[2395]	[2780]	[3170]	[3560]	[3940]	[4320]	[4700]	[5070]	[5450]	[5830]
23	45	90	140	180	230	270	315	360	400	445	490	530	570	615	660
	115	113	111	110	109	108	104	102	100	99	96	94	91	87	81
[8]	[400]	[820]	[1230]	[1625]	[2065]	[2450]	[2850]	[3260]	[3670]	[4040]	[4410]	[4780]	[5150]	[5520]	[5890]
30	45	90	140	185	235	275	320	370	415	455	500	540	580	625	665
	154	151	149	148	147	146	143	140	137	135	132	130	127	123	117
[10]	[380]	[810]	[1230]	[1645]	[2095]	[2480]	[2895]	[3310]	[3730]	[4100]	[4470]	[4840]	[5210]	[5590]	
38	45	95	140	185	235	280	325	375	420	465	505	545	590	630	
	193	190	188	187	186	184	181	177	175	173	170	168	164	160	
[12]	[355]	[790]	[1215]	[1650]	[2100]	[2485]	[2915]	[3340]	[3760]	[4120]	[4480]	[4850]			
45	40	90	135	185	235	280	330	375	425	465	505	550			
	231	229	227	226	224	221	219	218	215	211	208	204			
[14]	[320]	[765]	[1190]	[1645]	[2090]	[2475]	[2915]	[3350]	[3770]	[4130]	[4480]	[4860]			
53	35	85	135	185	235	280	330	380	425	465	505	550			
	269	267	267	264	261	260	257	254	250	248	245	241			
[16]	[290]	[730]	[1160]	[1625]	[2070]	[2455]	[2900]	[3340]	[3760]	[4130]	[4490]	[4860]			
61	30	80	130	185	235	275	330	375	425	465	505	550			
	308	306	305	303	299	296	294	290	286	283	279	276			
[18]	[290]	[690]	[1120]	[1590]	[2035]	[2420]	[2870]	[3310]	[3730]	[4100]	[4480]				
68	30	80	125	180	230	270	325	375	420	465	505				
	346	345	345	342	337	334	333	327	321	315	308				
[20]	[210]	[650]	[1080]	[1550]	[1995]	[2380]	[2830]	[3270]	[3690]	[4070]	[4450]				
76	25	75	120	175	225	270	320	370	415	460	500				
	385	384	383	380	375	372	371	367	363	359	355				
[22]	[170]	[610]	[1040]	[1500]	[1955]	[2340]	[2785]	[3220]	[3640]	[4050]					
83	20	70	120	170	220	265	315	365	410	460					
	424	423	422	418	414	410	408	404	399	395					
[24]	[135]	[570]	[1000]	[1440]	[1910]	[2300]	[3170]	[3590]	[3980]	[3980]					
91	15	65	115	165	215	260	360	405	450	450					
	462	461	460	457	453	449	441	436	432	432					
[25]	[120]	[550]	[980]	[1410]	[1890]	[2280]	[3150]	[3570]	[3960]	[3960]					
95	15	60	110	160	215	260	355	405	445	445					
	484	482	479	476	473	469	459	454	449	449					
[30]		[420]	[860]	[1290]	[1700]	[2120]	[2530]	[2940]	[3400]						
114		45	95	145	190	240	285	330	385						
		577	575	571	567	562	556	550	542						





330 } Torque [lb-in]
35 } Nm
713 } 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

245 c3m/r [14.3/9r] in

ΔPressure Bar [PSI]

	[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
	155	35	50	70	85	105	120	140	155	170	190	205	225	240	260
[.5]	[410]	[850]													
1.9	45	95													
[1]	[450]	[930]	[1420]	[1850]	[2320]	[2780]	[3250]	[3650]	[4100]	[4540]	[4980]	[5430]	[5870]	[6310]	[6950]
3.8	50	105	160	210	260	315	365	410	465	515	560	615	665	715	785
[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]	[780
23	50	115	175	230	290	350	405	465	515	570	625	675	730	780	850
[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	590	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	588					
[22]	[200]	[710]	[1300]	[1870]	[2390]	[2940]	[3560]	[4010]	[4510]						
83	25	80	145	210	270	330	400	455	510	578					
[24]	[150]	[670]	[1240]	[1790]	[2330]	[2880]	[3460]	[3960]	[4460]						
91	15	75	140	200	265	325	390	445	505	575					
[25]	[120]	[660]	[1210]	[1750]	[2300]	[2860]	[3410]	[3950]	[4470]						
95	15	75	135	200	260	325	385	445	505	575					
[30]	[50]	[1080]	[1620]	[2120]	[2720]	[3260]	[3790]								
114	60	120	185	245	305	370	430								
	462	460	458	456	453	450	447								

305 c3m/r [18.3/7r] in

ΔPressure Bar [PSI]

	[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]
	155	35	50	70	85	105	120	140	155	170	190	205	225	240
[.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	935
[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								
	365	362	360	357	356	352								

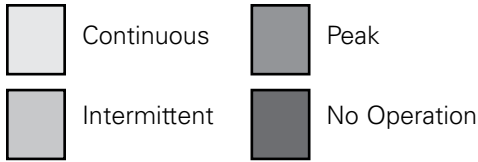
[3260] } Torque [lb-in]
 370 } Nm
 450 } Speed RPM

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.

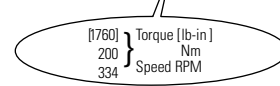


490 c3m/r [29.3/8r jin]
ΔPressure Bar [PSI]

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

395 c3m/r [24.3/0r jin]
ΔPressure Bar [PSI]

	[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]
	155	35	50	70	85	105	120	140	155	170	190
[.5]	[560]	[1310]									
1.9	65 4	150 3									
[1]	[770]	[1540]	[2290]	[3080]	[3780]	[4480]	[5170]	[5880]	[6580]	[7270]	[7980]
3.8	85 9	175 9	260 9	350 8	430 8	505 7	585 7	665 6	745 5	820 4	900 3
[2]	[790]	[1580]	[2360]	[3180]	[3930]	[4680]	[5430]	[6180]	[6840]	[7500]	[8170]
7.5	90 18	180 18	265 18	360 17	445 17	530 16	615 15	700 14	775 13	845 11	925 10
[4]	[810]	[1660]	[2480]	[3320]	[4130]	[4940]	[5740]	[6550]	[7230]	[7880]	
15	90 37	190 37	280 37	375 36	465 36	560 35	650 34	740 33	815 31	890 28	
[6]	[820]	[1700]	[2550]	[3420]	[4250]	[5080]	[5920]	[6750]	[7420]	[8000]	
23	90 57	190 56	290 56	385 55	480 54	575 52	670 50	765 49	840 47	905 45	
[8]	[820]	[1700]	[2580]	[3460]	[4300]	[5130]	[5960]	[6800]			
30	90 76	190 75	290 75	390 74	485 73	580 71	675 69	770 68			
[10]	[800]	[1700]	[2590]	[3480]	[4320]	[5160]	[6000]	[6840]			
38	90 95	190 94	295 94	395 93	490 92	585 90	680 88	775 86			
[12]	[770]	[1680]	[2570]	[3470]	[4310]	[5150]	[5990]	[6830]			
45	85 114	190 113	290 113	390 112	485 111	580 109	675 106	770 103			
[14]	[740]	[1640]	[2530]	[3430]	[4280]	[5120]	[5960]				
53	85 133	185 132	285 132	390 131	485 129	580 127	675 124				
[16]	[690]	[1590]	[2480]	[3370]	[4220]	[5060]	[5910]				
61	80 153	180 152	280 152	380 150	475 149	570 146	670 144				
[18]	[640]	[1530]	[2420]	[3310]	[4160]	[5010]	[5870]				
68	70 172	170 171	275 171	375 170	470 169	565 167	665 164				
[20]	[580]	[1470]	[2370]	[3260]	[4110]	[4960]	[5820]				
76	65 191	165 190	270 190	370 189	465 188	560 186	660 184				
[22]	[510]	[1390]	[2290]	[3170]	[4030]	[4880]					
83	60 210	155 209	260 209	360 208	455 207	550 206					
[24]	[440]	[1330]	[2220]	[3100]	[3950]	[4800]					
91	50 230	150 229	250 228	350 227	445 225	540 224					
[26]	[350]	[1240]	[2130]	[3020]	[3880]	[4730]					
98	40 249	140 248	240 247	340 246	440 244	535 242					
[28]	[270]	[1150]	[2050]	[2930]	[3790]	[4650]					
106	30 268	130 267	230 265	330 264	430 261	525 259					
[30]	[180]	[1060]	[1960]	[2850]	[3710]	[4570]					
114	20 287	120 286	220 284	320 283	420 281	515 277					
[35]		[840]	[1760]	[2640]	[3480]						
132		95 335	200 334	300 333	395 332						



2000 Series

Dimensions

Standard Mount

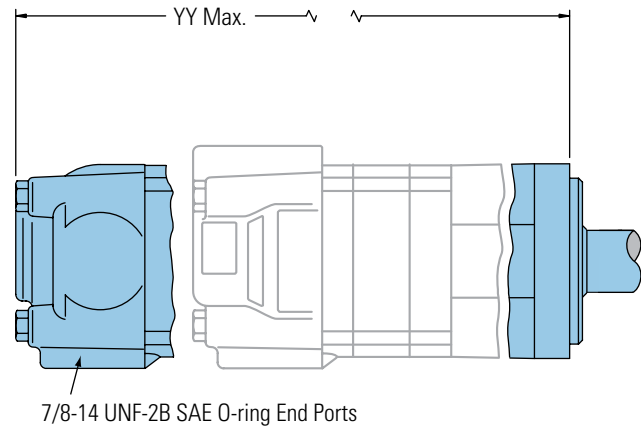
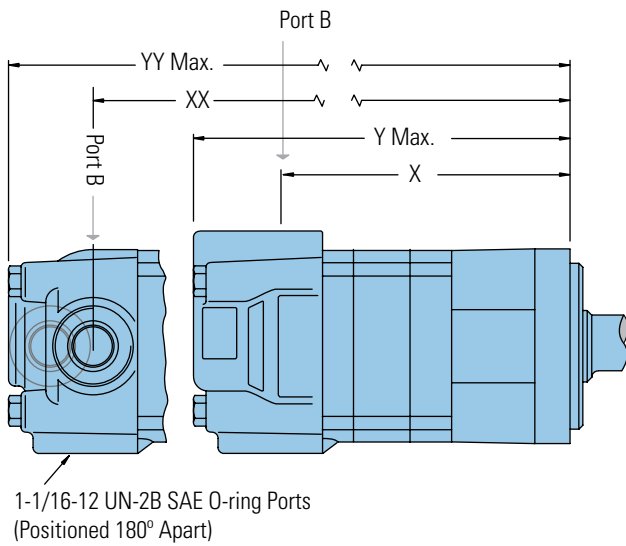
Ports

- 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 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

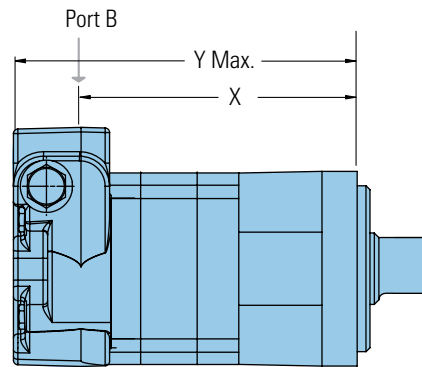
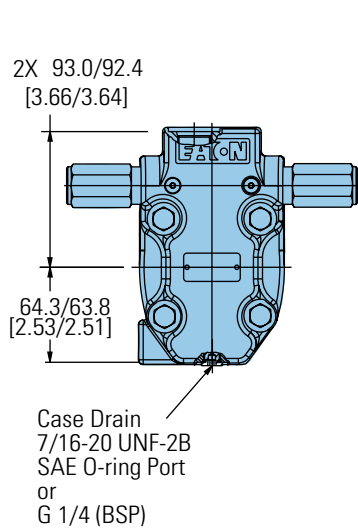
Ports

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]

C-1

2000 Series

Dimensions

Wheel Mount

Ports

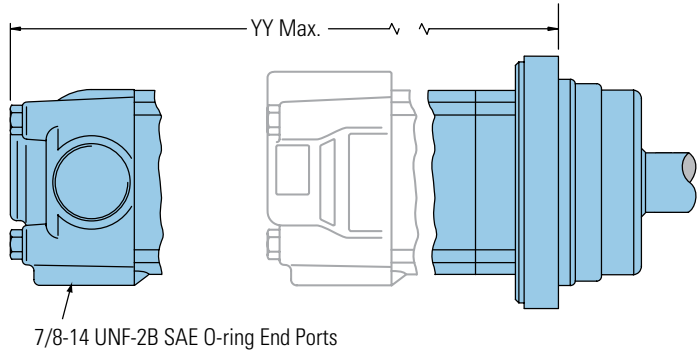
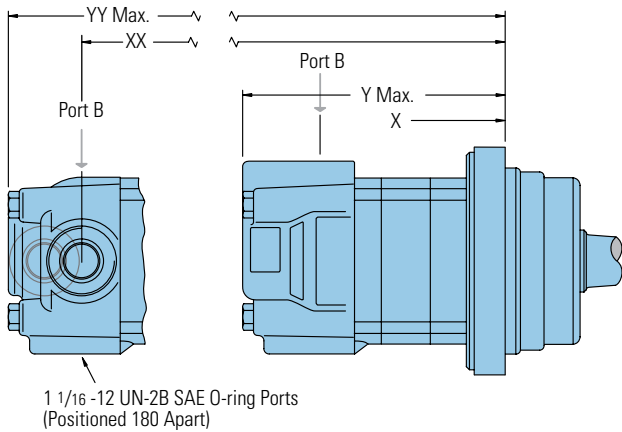
- 7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 1 1/16 -12 UN-2B SAE O-ring Ports (Positioned 180° Apart) (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 7/8 -14 UNF-2B SAE O-ring End Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port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

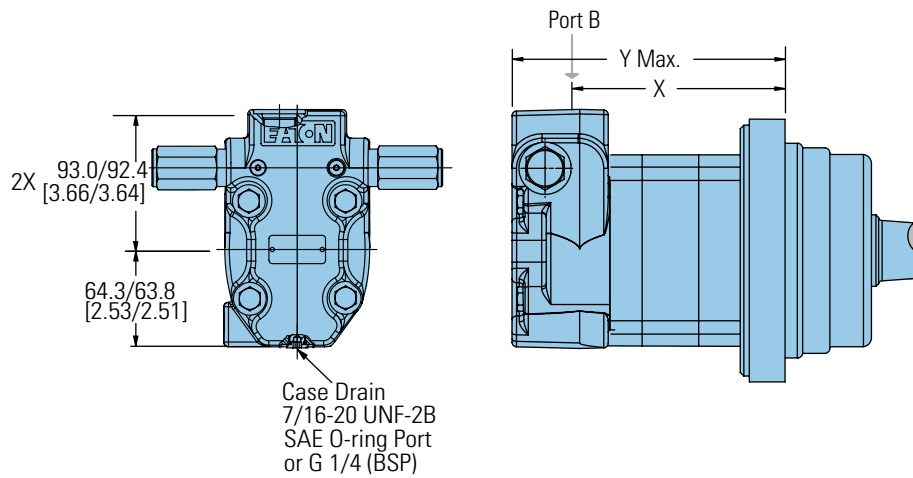
Ports

- 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]

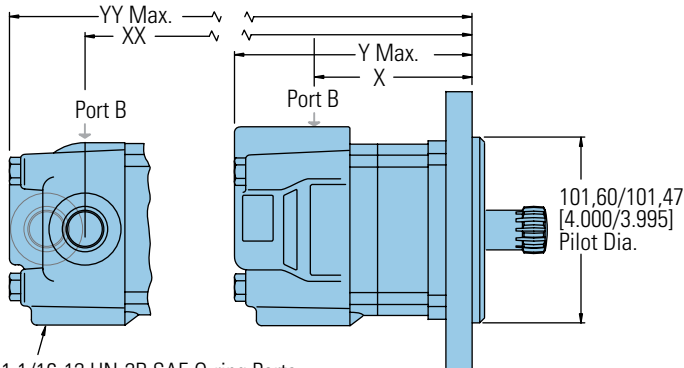
C-1

2000 Series

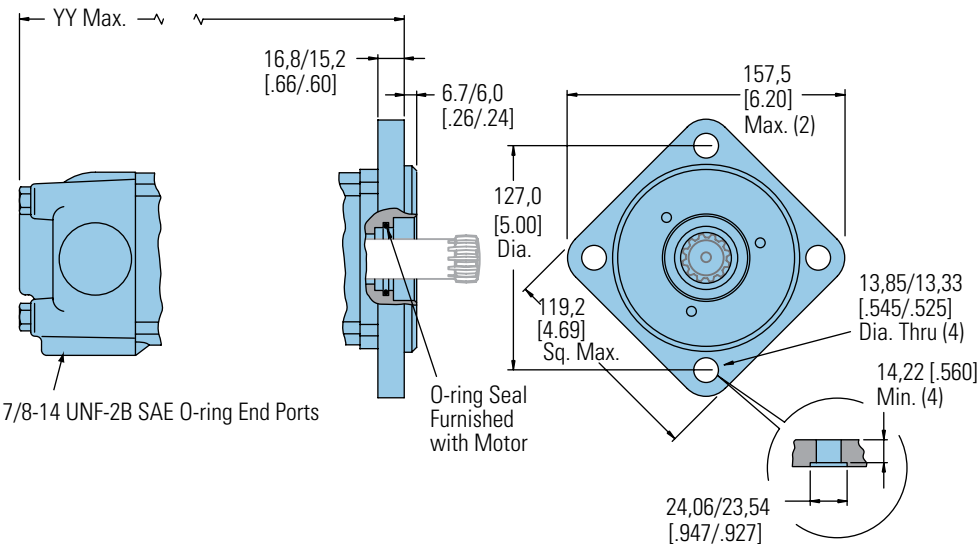
Dimensions

Bearingless

Bearingless



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



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

Ports

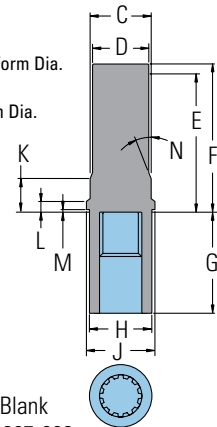
- 7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 1 1/16 -12 UN-2B SAE O-ring Ports (Positioned 180° Apart) (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 7/8 -14 UNF-2B SAE O-ring End Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (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 [0.325]
- M 0,89 [0.035]
- 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

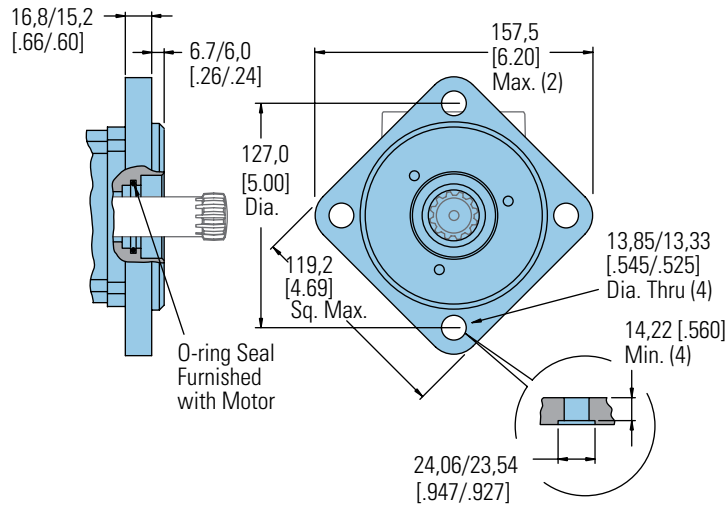
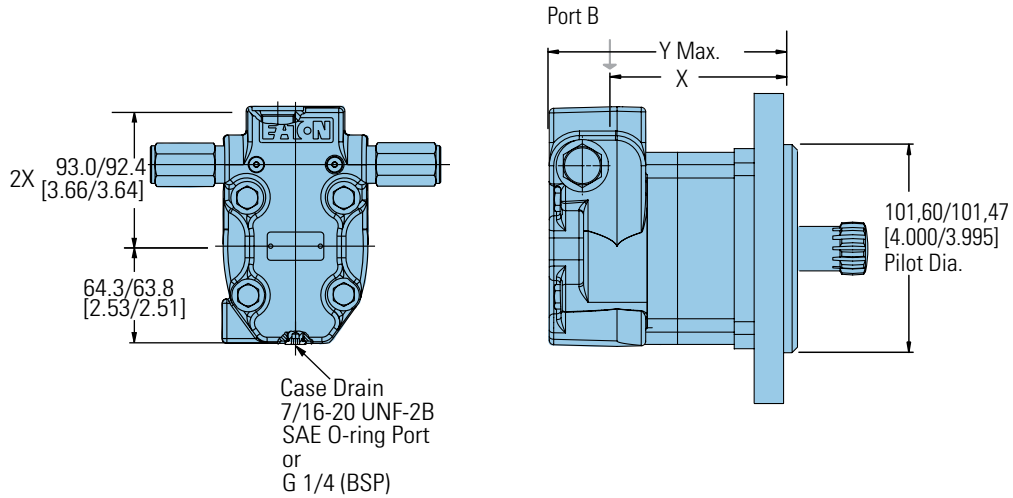
Ports

- 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



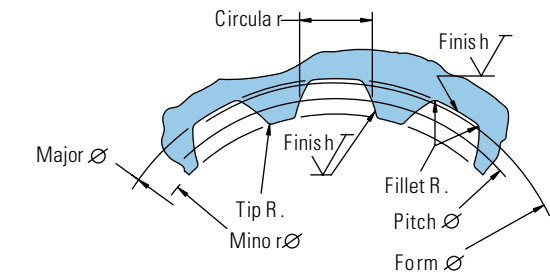
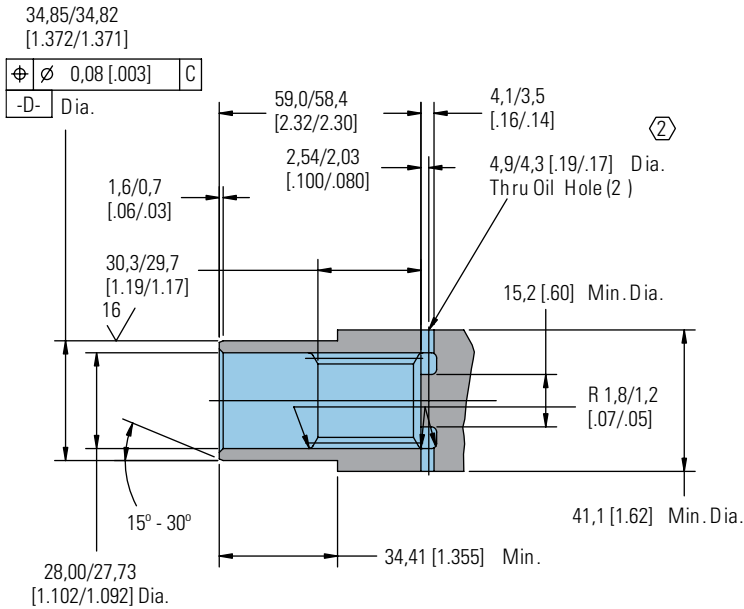
BEARINGLESS MOTORS DIMENSIONS

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]

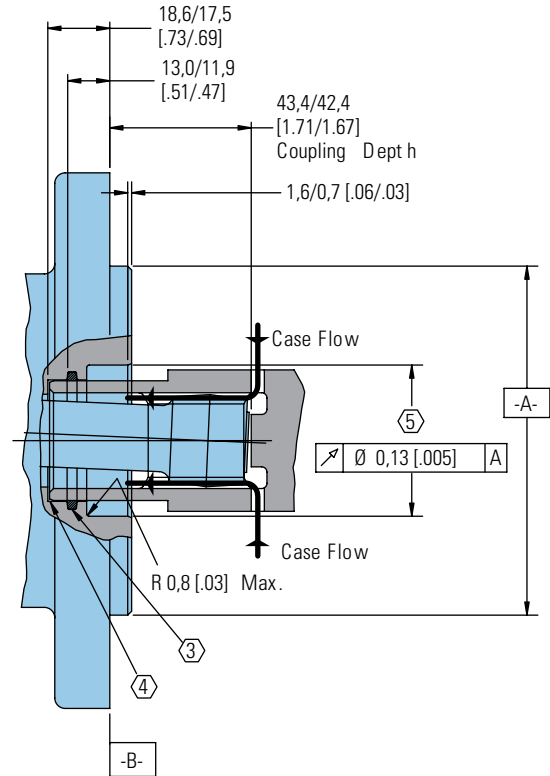
2000 Series

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).



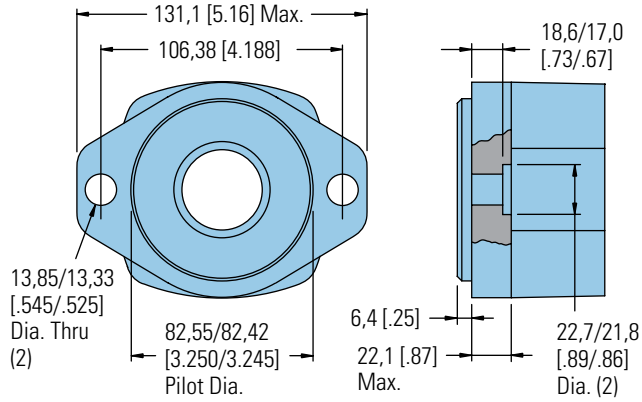
Spline Pitch.....	12/24
Pressure Angle.....	30°
Number of teeth.....	12
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Side Pitch Diameter.....	Ref. 25,400000 [1.0000000]
Base Diameter.....	Ref. 21,997045 [.8660254] $\text{C} \varnothing$ 0,21 [.008] D
Major Diameter.....	(27,74 [1.092] Max. 27,59 [1.086] 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

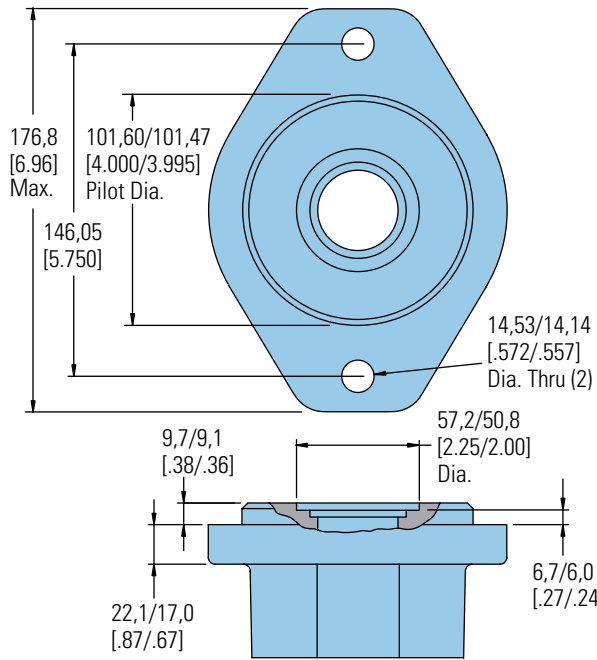
Dimensions

Mounting Options

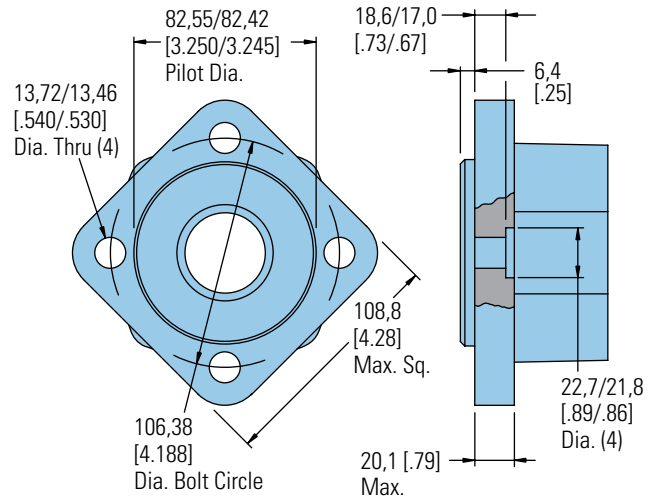
SAE A – Two Bolt (Standard Motor)



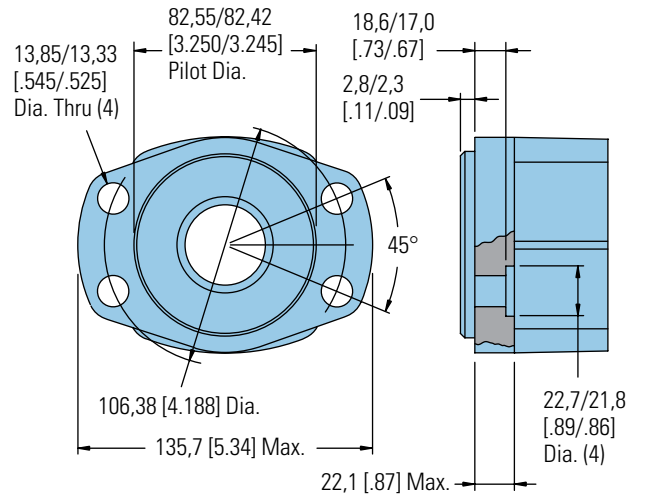
SAE B – Two Bolt



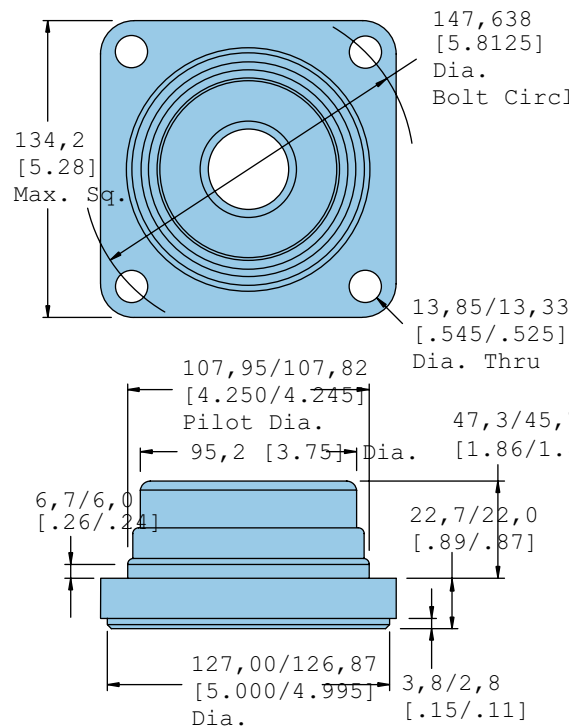
Four Bolt



Four Bolt Magneto



Four Bolt (Wheel Motor)



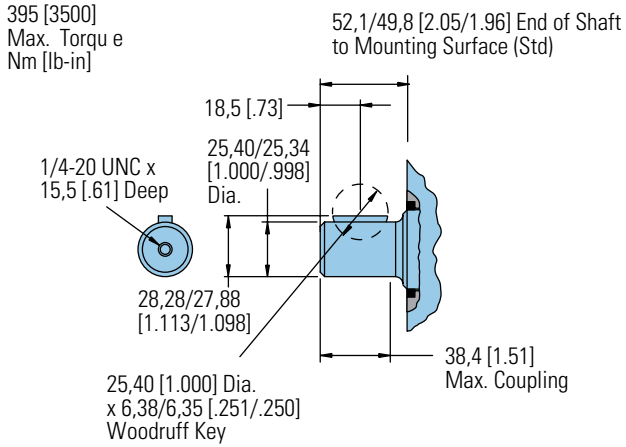
C-1

2000 Series

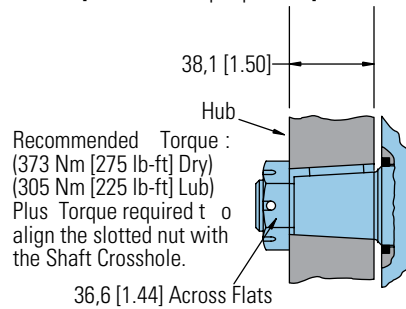
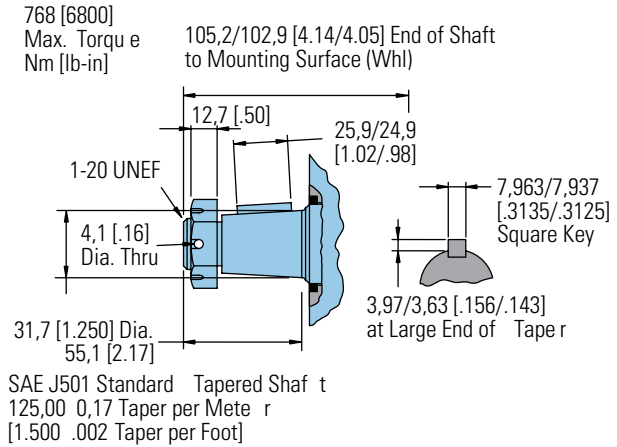
Dimensions

Shafts

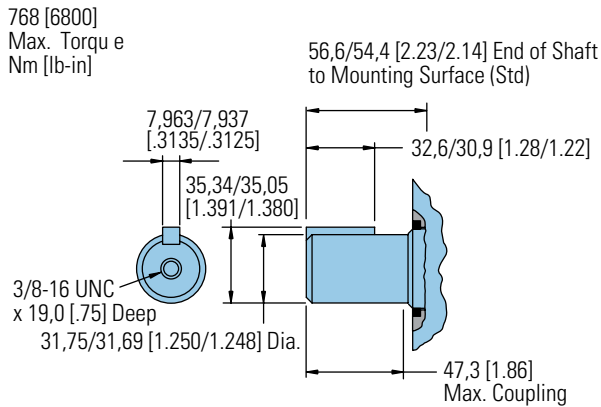
1 Inch Straight



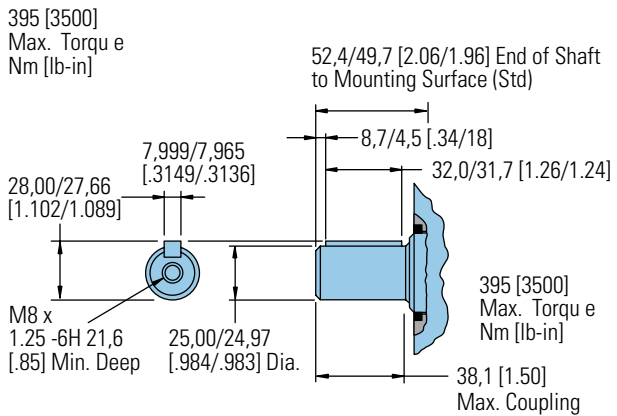
1 1/4 Inch Tapered



1 1/4 Inch Straight



25 mm Straight



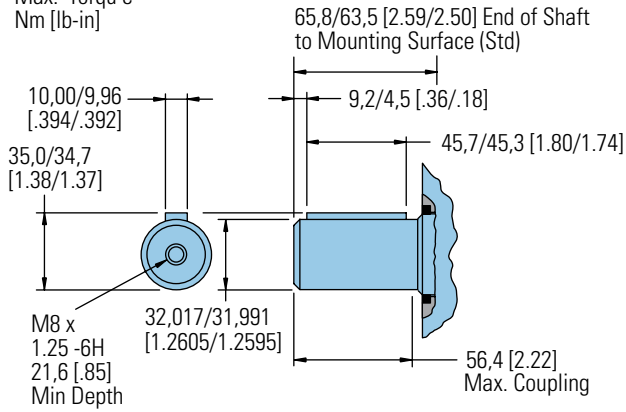
2000 Series

Dimensions

Shafts

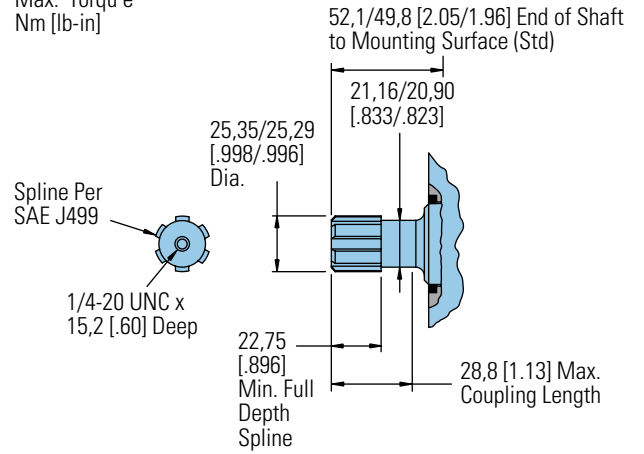
32 mm Straight

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



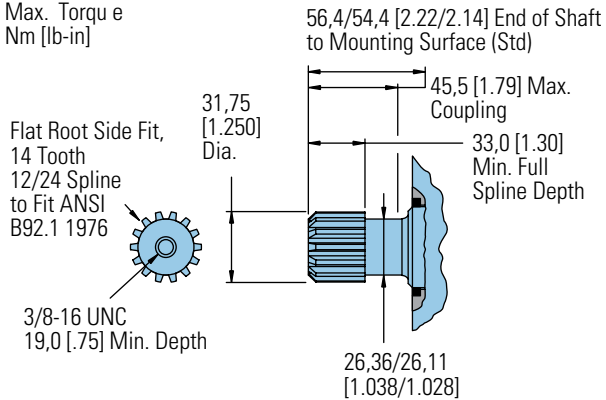
SAE 6B Splined

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



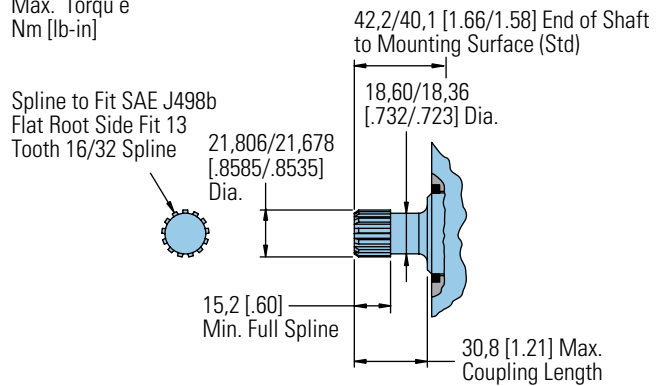
1 1/4 -14 Tooth Splined

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



13 Tooth Splined

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



C-1

2000 Series

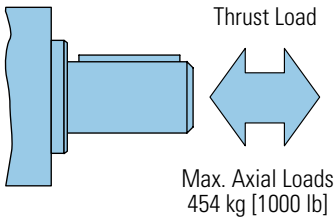
Shaft Side Load Capacity

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



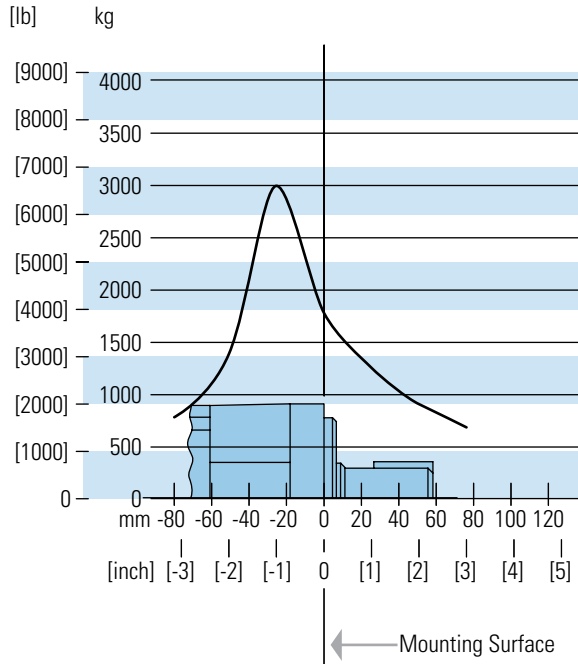
hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

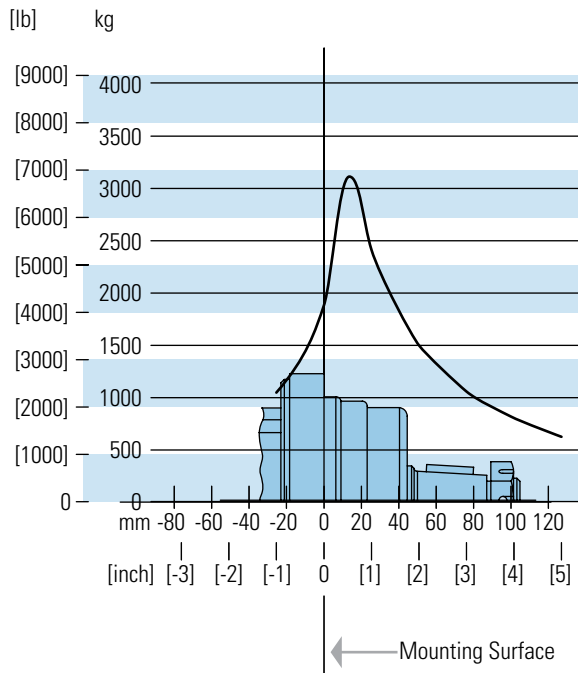
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



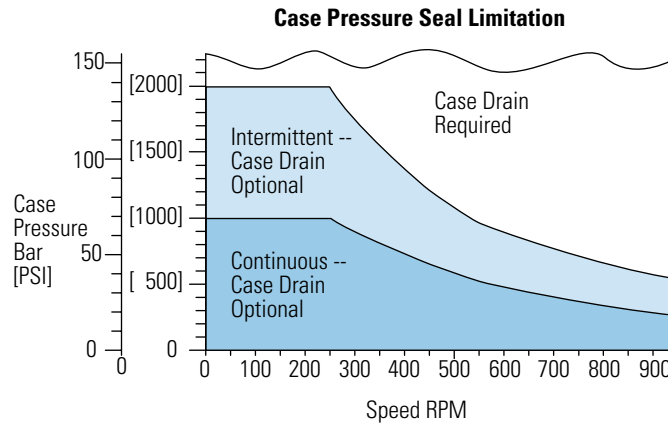
Wheel Motor
Tapered Shaft



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.

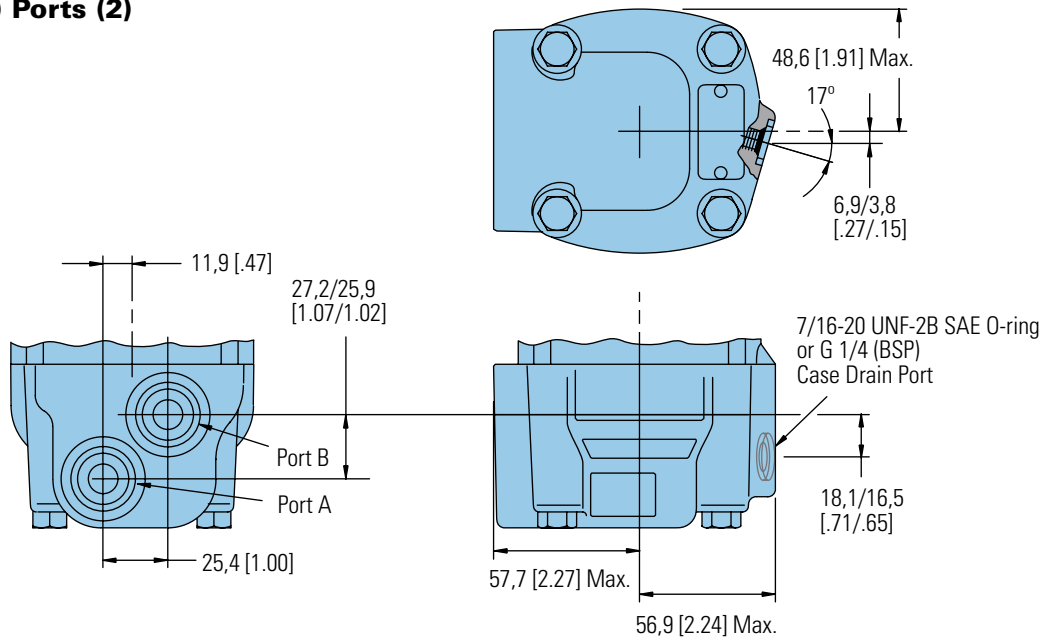
Extend Motor Seal Life — maintain low case pressure with a preset restriction in the case drain line.

2000 Series

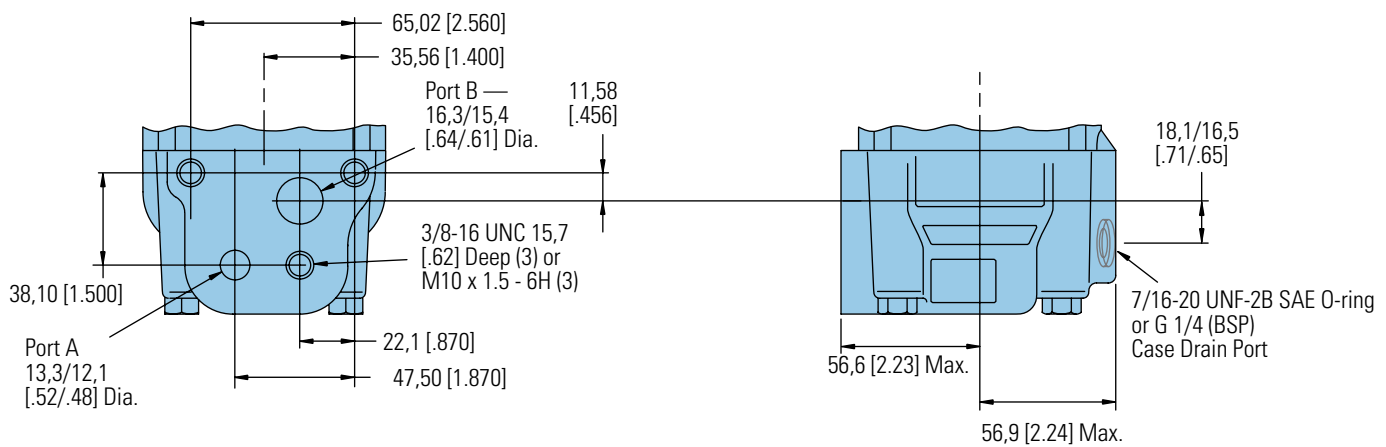
Dimensions

Ports

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



Manifold Mount

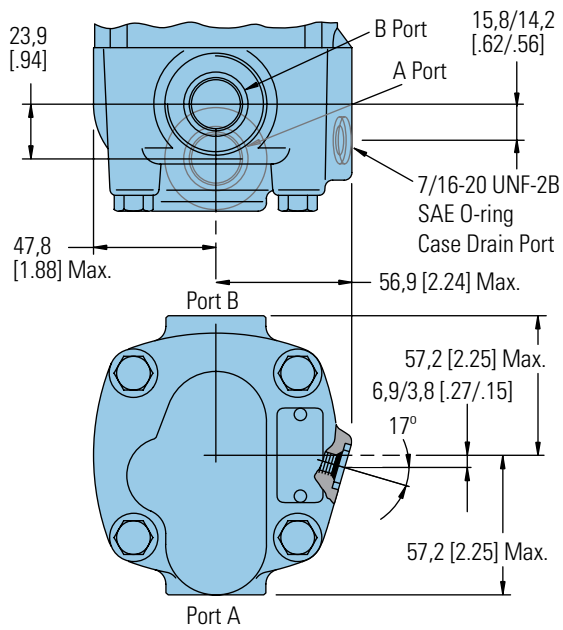


2000 Series

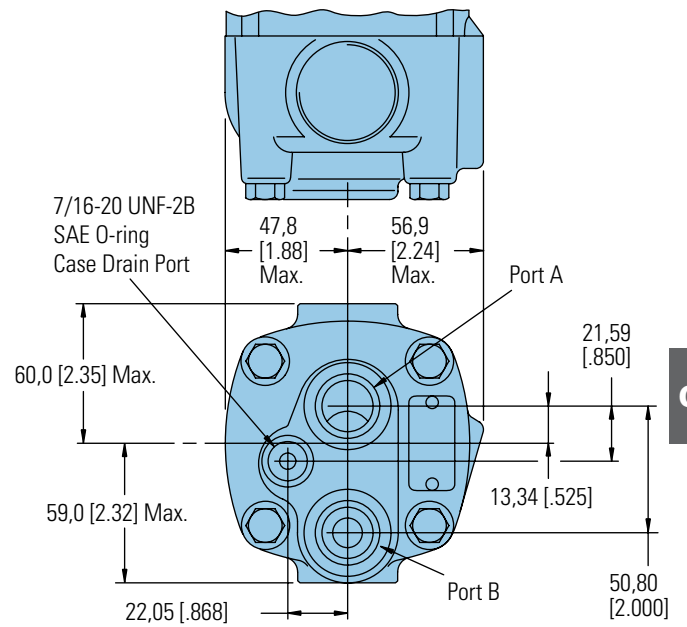
Dimensions

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)



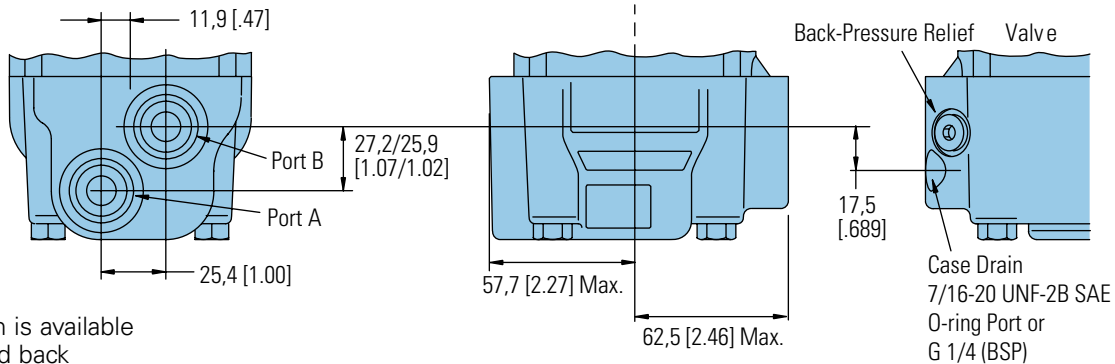
C-1

2000 Series

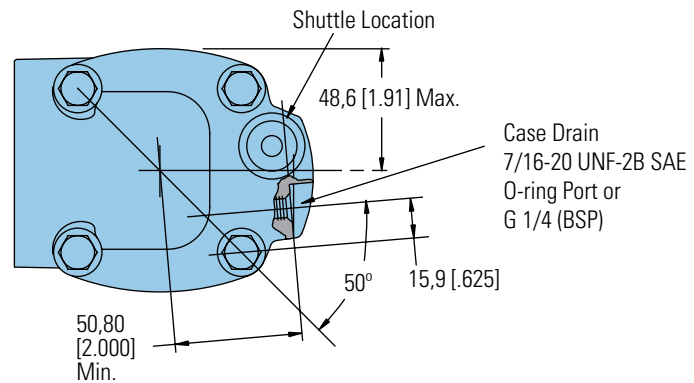
Dimensions

Ports with Shuttle

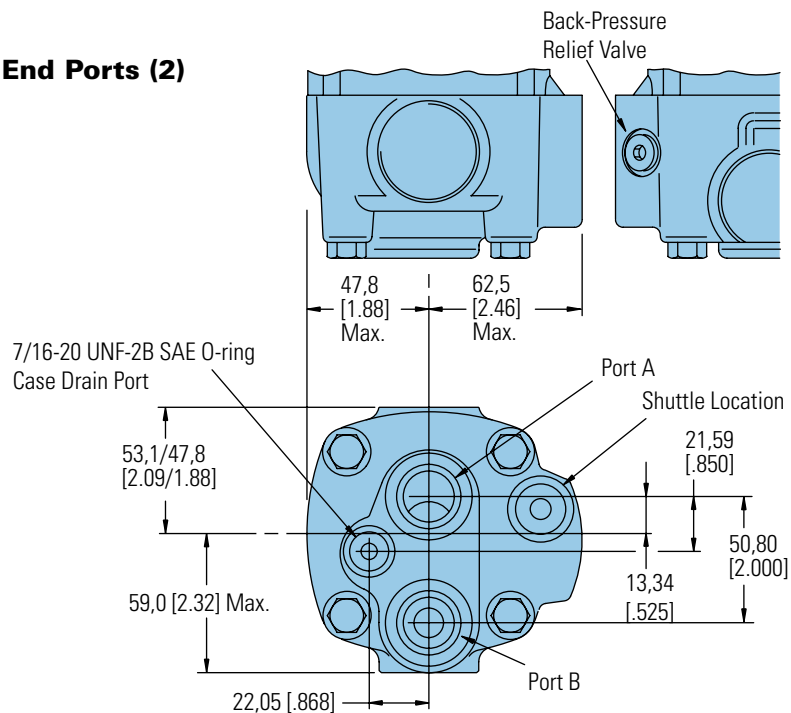
7/8 -14 UNF-2B SAE O-ring Ports (2) or G 1/2 (BSP) Ports (2)



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	G 1/2 (BSP)	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

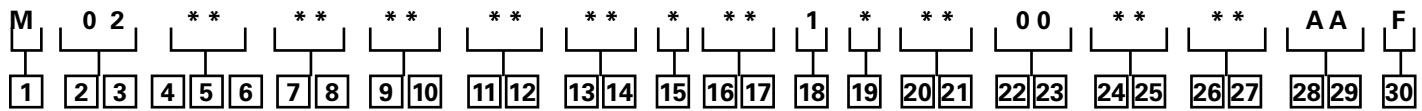
Motors with Corrosion Protection

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



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.

1 Product

M – 2000 Series Motor

2, 3 Product Series

02 – 2000 Series Motor

4, 5, 6 Displacement

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 [5.35] Dia. Holes on 127.0 [5.00] Dia. Bolt Circle

AF – Standard, 2 Bolt: 101.6 [4.00] Pilot Dia. 14.35 [5.65] Dia. Holes on 146.0 [5.75] Dia. Bolt Circle. SAE B

AH – Standard, 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [5.35] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle

AJ – Standard (Magneto), 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [5.35] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. 2.79 [1.10] Pilot Length

AL - Wheel (European), 4 Bolt: 125 [4.92] Pilot Dia. 13.79 [5.43] Dia. Holes on 159.99 [6.299] Dia. Bolt Circle
 AP – Wheel, 4 Bolt: 108.0 [4.25] Pilot Dia. 13.59 [5.35] 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 [4.3] Dia. Holes on 125.0 [4.92] Dia Bolt Circle (European)

9, 10 Output Shaft

00 – None (Bearingless)
01 – 25.40 [1.000] Dia. Straight Shaft with 1/4-20UNC-2B Thread in End, 6.35 [1.250] 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 [3.125] 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 [3.125] 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 [8.96] Min. Full Spline Length
07 – 22.22 [8.75] Dia. Flat Root Side Fit, 13 Tooth, 16/32 DP 30° SAE B Involute Spline, 15.2 [6.0] Min. Full Spline Length
16 – 32.00 [1.260] Dia. Straight Shaft with M8 x 1.25-6H Thread in End, 9.982 [3.930] W x 7.995 [3.132] 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 [3.125] 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 [3.125] 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 [3.142] W x 6.954 [2.738] 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)
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
 AE – Flange Rotated 45 Degrees

26, 27 Paint/Packaging
AA – No Paint, Indiv. Box
AB – Low Gloss Black Primer, 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!

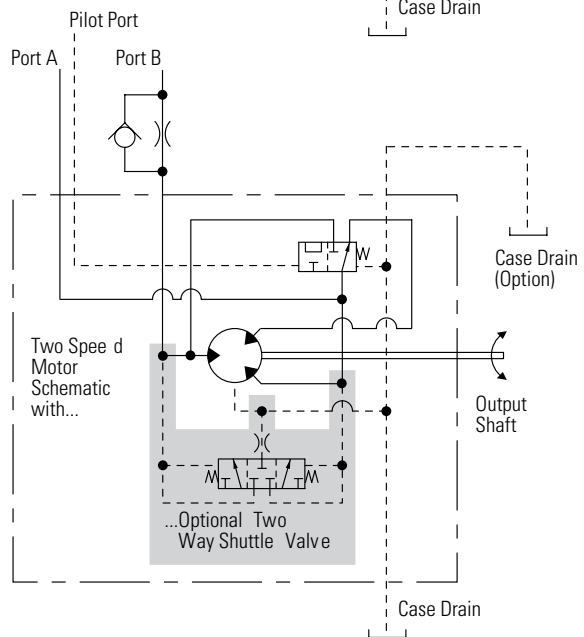
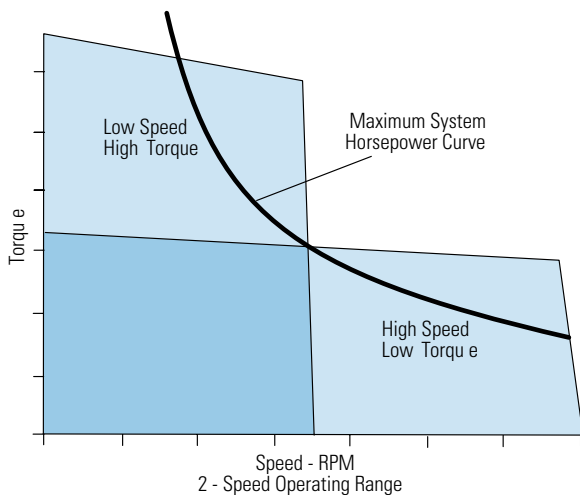
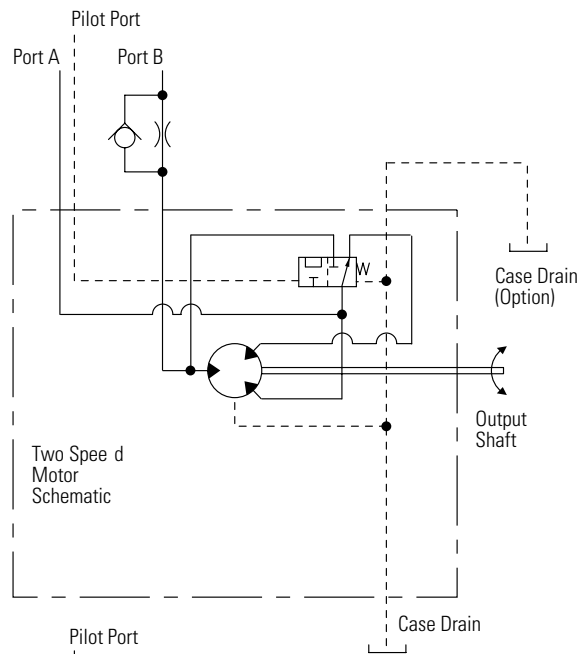
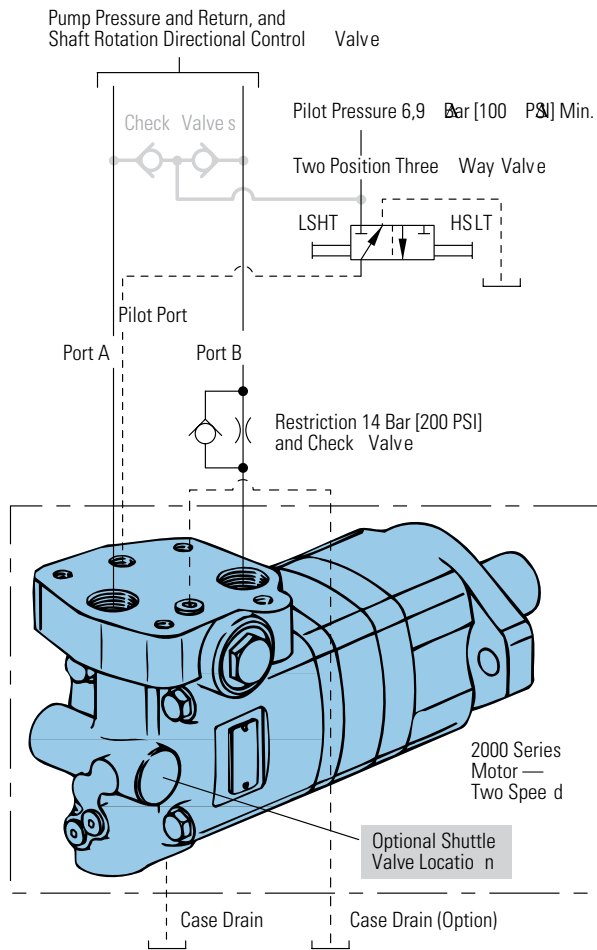
Due to potential problems in maintaining charge pump pressure at port B for uninterrupted back pressure during dynamic braking, Eaton does not recommend the two speed motor where overrunning conditions may exist.

2000 Series Two-Speed

Typical Hydraulic Circuit

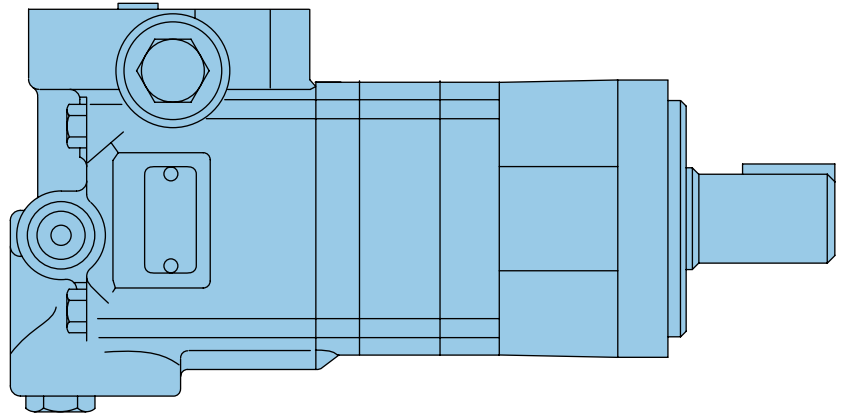
Note:

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



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) @ Continuous Flow	High Speed Mode	1000	1000	990	860	700	560	450	350	230
	Low Speed Mode	500	500	495	430	350	280	225	175	115
Flow l/min [GPM]	High Speed Mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Low Speed Mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
Torque* Nm [lb-in]	High Speed Mode									
	Continuous	100 [880]	125 [1115]	165 [1450]	195 [1725]	240 [2150]	300 [2675]	380 [3350]	365 [3225]	448 [3970]
	Intermittent	145 [1300]	185 [1660]	240 [2150]	240 [2150]	300 [2650]	375 [3330]	440 [3900]	445 [3940]	486 [4300]
Torque* Nm [lb-in]	Low Speed Mode									
	Continuous	235 [2065]	295 [2630]	385 [3420]	455 [4040]	540 [4780]	660 [5850]	765 [6750]	775 [6840]	845 [7470]
	Intermittent	345 [3035]	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]	155 [2250]	120 [1750]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	240 [3500]	190 [2750]	140 [2000]
Weight kg [lb]	Standard or Wheel Mount	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]
	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 System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

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

2000 Series Two-Speed

Dimensions

Standard and Wheel

Ports

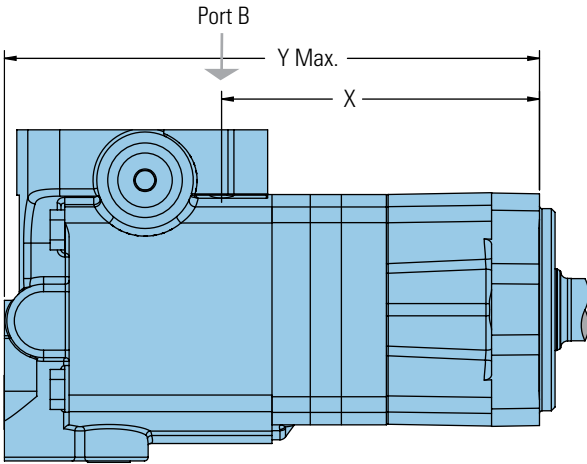
7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
 9/16 -18 UNF-2B SAE O-ring Case Drain Port (1)
 7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1) or

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

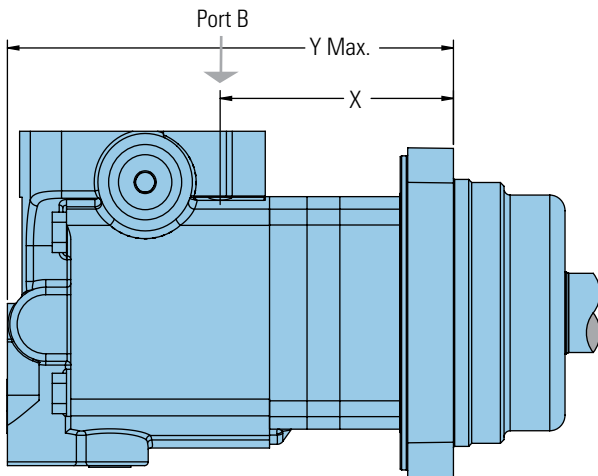
Two-Speed Standard Motors



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

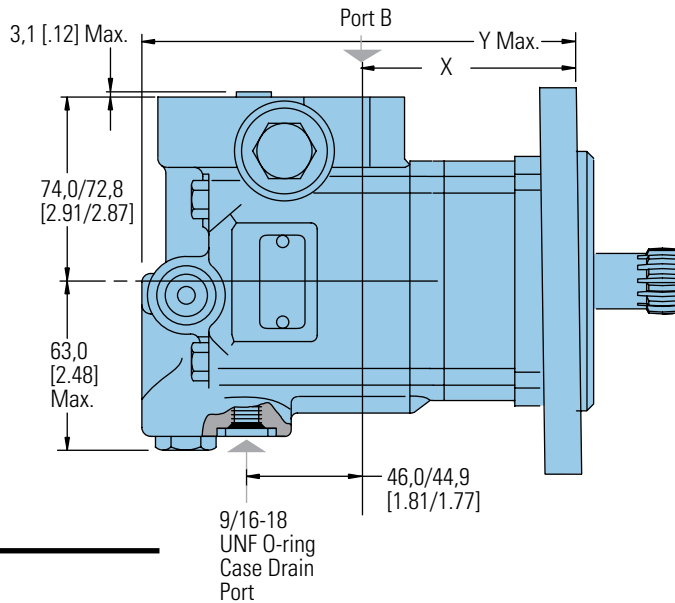
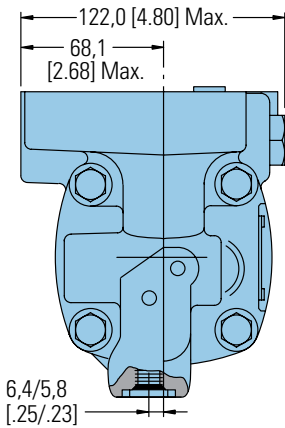
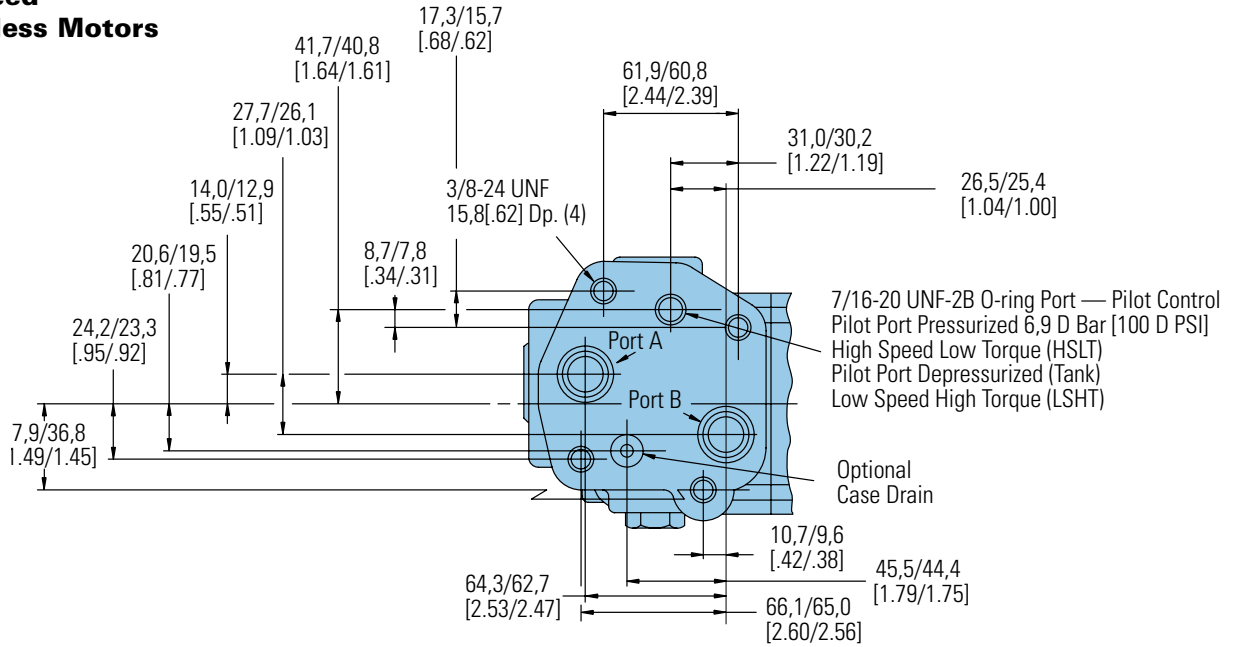
Ports

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

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	193-0002-001	-0003	-0004	-0005	-0006	-0007	-0008	-0009	—
	1 1/4 Inch Straight	7/8 -14 O-ring Staggered	193-0010-001	-0011	-0012	-0013	-0014	-0015	-0016	-0017	-0070
	1 1/4 Inch 14 T Splined	7/8 -14 O-ring Staggered	193-0018-001	-0019	-0020	-0021	-0022	-0023	-0024	-0025	—
Wheel Motor	1 1/4 Inch Tapered	7/8 -14 O-ring Staggered	193-0222-001	-0223	-0224	-0225	-0226	-0227	-0228	-0229	—
	1 1/4 Inch 14 T Splined	7/8 -14 O-ring Staggered	193-0230-001	-0231	-0232	-0233	-0234	-0235	-0236	-0237	—
Bearingless		7/8 -14 O-ring Staggered	193-0282-001	-0283	-0234	-0285	-0286	-0287	-0288	-0289	—

193-0288-001

2000 Series Two-Speed

Model Code (193-)

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.

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

1 Product

M – Motor

2, 3 Series

22 – 2000 2 Speed Series
(1:2 Ratio)

4, 5, 6 Displacement

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

7, 8 Mounting

Description

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
 AE – Bearingless (w/ Leakage Slots), 4 Bolt: 101.6 [4.00] Pilot Dia. 13.59 [.535] Dia. Holes on 127.0 [5.00] Dia. Bolt Circle
 AF – Standard, 2 Bolt: 101.6 [4.00] Pilot Dia. 14.35 [.565] Dia. Holes on 146.0 [5.75] Dia. Bolt Circle. SAE B
 Dia Bolt Circle (European)

9, 10 Output Shaft Description

00 – None (Bearingless)

01 – 25.40 [1.000] Dia. Straight Shaft with 1/4-20UNC-2B Thread in End, 6.35 [.250] Wide x 25.40 [1.000] Dia. Woodruff Key

02 – 31.75 [1.250] Dia. Straight Shaft with .375-16UNC-2B Thread in End, 7.938 [.3125] Sq x 31.75 [1.250] Straight Key

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

11, 12 Ports Description

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

13, 14 Case Flow Options / Selector Valve

01 – .5625-10 UNF-2B SAE O-Ring Case Drain Port, .4375-20 UNF-2B SAE O-Ring Pilot Control Port, Optional .4375-20 UNF-2B SAE Case Drain Port for Pilot Operated Normally Low Speed

15 Shuttle Valve / Low Pressure Relief

0 – NONE

16, 17 Pressure / Flow Option

00 – NONE

18 Geroler Option

1 – STANDARD

19 Seal Option

0 – STANDARD

20, 21 Accessories

00 – NONE

22, 23 Special Features (Hardware)

00 – NONE

24, 25 Special Features (Assembly)

00 – NONE

26, 27 Paint / Packaging

AA – No Paint, Individual Box
 AB – Low Gloss Black Primer, Individual Box

28, 29 Customer Identification

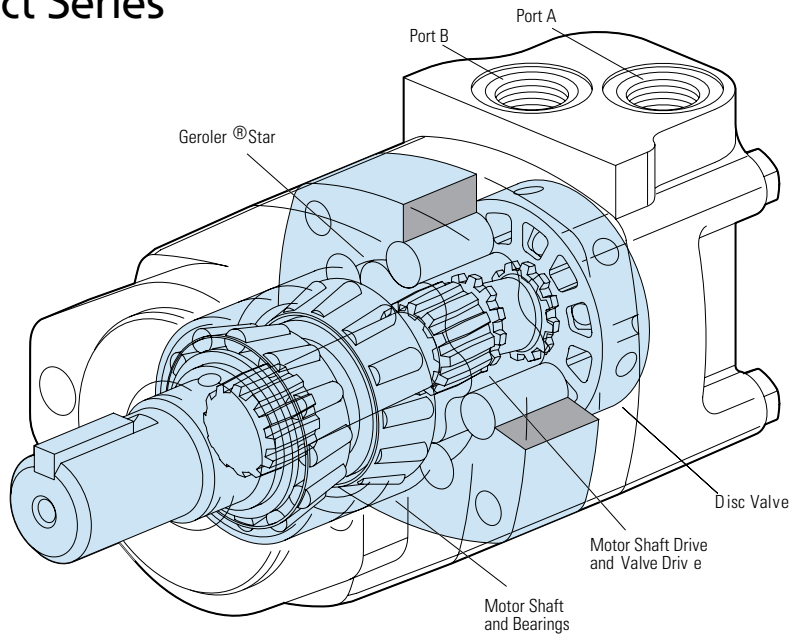
AA – NONE

30 Design Code

A – FIRST

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 of 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



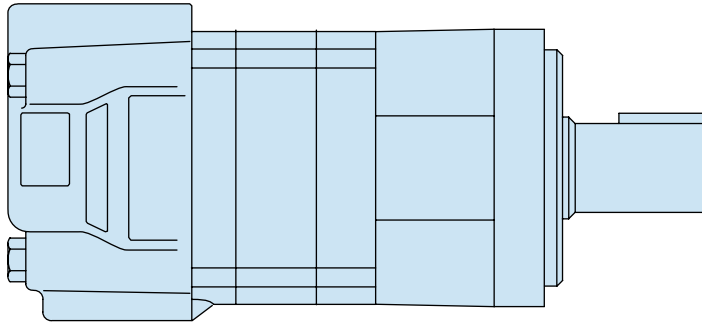
Boom Lift



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 System Operating Temp.:

-34°C to 82°C [-30°F to 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 30	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 499 214	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
648 } Torque [lb-in]
Nm
Speed RPM

C-2





4000 Compact Series

Performance Data

200 cm³/r [12.3 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]	115	504															
0.95	13	57															
[0.5]	4	3															
1.9	268	584	963	1274													
[1]	30	66	109	144													
3.8	8	7	4	3													
[2]	306	721	1104	1516	1913	2243	2397	2772									
7.5	35	81	125	171	216	253	271	313									
[4]	402	841	1218	1647	2107	2478	2826	3238	3954	4451	4755	5127	5407	5569	5855		
15	45	95	138	186	238	280	319	366	447	503	537	579	611	629	662		
[6]	35	34	32	31	30	28	27	24	29	26	23	21	17	11	8		
23	403	896	1361	1780	2247	2649	3068	3513	3947	4367	4710	5125	5509	5880	6249	6547	6753
[8]	46	101	154	201	254	299	347	397	446	493	532	579	622	664	706	740	763
30	72	70	69	68	66	65	62	60	56	53	50	46	42	37	31	24	19
[10]	385	863	1354	1785	2260	2657	3087	3547	3965	4389	4793	5218	5610	6015	6408	6754	7436
38	44	98	153	202	255	300	349	401	448	496	542	590	634	680	724	763	840
[12]	109	107	106	104	102	100	97	93	90	86	81	77	72	66	60	52	47
45	368	831	1347	1790	2273	2665	3106	3581	3982		4876	5311	5712	6151	6567	6961	7334
[14]	42	94	152	202	257	301	351	405	450	498	551	600	645	695	742	786	829
53	147	146	144	142	140	137	134	130	127	122	117	113	108	103	98	91	83
[16]	353	822	1319	1774	2212	2642	3086	3556	3974	4410	4839	5297	5715	6147	6563		
61	40	93	149	200	250	299	349	402	449	498	547	598	646	695	742		
[18]	185	184	181	179	177	174	170	165	161	156	151	146	140	134	129		
68	339	813	1291	1758	2151	2620	3067	3530	3965	4408	4802	5283	5718	6144	6568		
[20]	38	92	146	199	243	296	346	399	448	498	543	597	646	694	742		
76	223	222	219	217	214	211	207	202	197	192	186	180	174	167	164		
[22]	282	762	1237	1693	2121	2601	2968	3504	3953	4368	4832	5261	5690				
83	32	86	140	191	240	294	335	396	447	493	546	594	643				
[24]	261	260	257	255	252	248	244	238	233	227	221	214	208				
91	224	712	1183	1629	2091	2581	2870	3477	3940	4328	4861	5240	5661				
[25]	25	80	134	184	236	292	324	393	445	489	549	592	640				
95	299	298	296	293	290	286	282	275	269	263	256	249	243				
[30]	200	667	1148	1619	2053	2520	2899	3442	3906	4337	4819	5245	5644				
114	23	75	130	183	232	285	328	389	441	490	544	593	638				
[30]	337	336	334	331	328	324	320	314	307	301	293	285	278				
[30]	176	623	1112	1609	2014	2458	2929	3407	3872	4347	4777	5250	5627				
[30]	20	70	126	182	228	278	331	385	437	491	540	593	636				
[30]	375	374	372	369	366	363	358	353	346	339	331	322	315				
[30]		565	1053	1530	1934	2387	2868	3347	3804	4254	4698						
[30]		64	119	173	219	270	324	378	430	481	531						
[30]		412	410	407	404	401	396	390	383	375	367						
[30]		507	994	1450	1855	2316	2806	3287	3737	4162	4618						
[30]		57	112	164	210	262	317	371	422	470	522						
[30]		449	448	446	443	439	434	427	420	412	403						
[30]		465	950	1411	1820	2276	2768	3233	3688	4116	4493						
[30]		53	107	159	206	257	313	365	417	465	508						
[30]		468	467	464	462	458	453	446	439	431	423						
[30]		259	726	1214	1645	2072	2577	2961	3443	3889	3866						
[30]		29	82	137	186	234	291	335	389	439	437						
[30]		562	563	559	555	556	550	545	536	527	521						

[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

250 cm³/r [15.4 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
[0.5]	384	833													
1,9	43	94													
[1]	6	5													
3,8	438	904	1403	1887	2359	2798	3221	3657	3822	4326					
[2]	49	102	158	213	267	316	364	413	432	489					
7,5	14	14	13	12	11	9	8	7	4	3					
[4]	492	1054	1563	2081	2623	3160	3717	4147	4585	5070	5470	5721	5962		
15	56	119	177	235	296	357	420	469	518	573	618	646	674		
[6]	28	27	26	25	24	23	21	17	16	13	9	7	5		
23	603	1183	1771	2275	2817	3364	3895	4495	5005	5496	5982	6500	7054	7519	7941
[8]	68	134	200	257	318	380	440	508	565	621	676	734	797	850	897
30	58	56	55	54	52	50	47	44	42	38	35	32	28	24	17
[10]	587	1159	1741	2329	2815	3369	3951	4483	5021	5555	6068	6557	7131	7641	8107
38	66	131	197	263	318	381	446	506	567	628	686	741	806	863	916
[12]	88	86	84	82	80	77	74	71	67	63	59	55	50	45	38
45	571	1135	1710	2384	2813	3375	4008	4471	5038	5613	6154	6614	7209	7763	8272
[14]	65	128	193	269	318	381	453	505	569	634	695	747	815	877	935
53	118	116	114	112	110	107	103	100	96	92	87	83	78	73	67
[16]	552	1138	1671	2304	2804	3361	3950	4452	5006	5587	6123	6612	7201		
61	62	129	189	260	317	380	446	503	566	631	692	747	814		
[18]	148	146	144	142	139	136	131	127	123	119	113	109	102		
68	532	1140	1631	2224	2796	3347	3892	4434	4974	5561	6093	6610	7193		
[20]	60	129	184	251	316	378	440	501	562	628	688	747	813		
76	178	177	175	173	170	166	161	157	151	146	141	136	129		
[22]	441	1072	1600	2207	2754	3320	3888	4433	4958	5529	6066	6590			
83	50	121	181	249	311	375	439	501	560	625	685	745			
[24]	209	207	205	202	199	195	190	185	179	174	168	162			
91	349	1003	1568	2190	2711	3292	3884	4431	4941	5496	6039	6570			
[25]	39	113	177	247	306	372	439	501	558	621	682	742			
95	239	237	235	233	229	225	220	214	208	202	195	189			
[30]	306	940	1513	2114	2653	3251	3830	4380	4904	5446	5984	6518			
114	35	106	171	239	300	367	433	495	554	615	676	736			
[20]	263	876	1458	2038	2595	3210	3777	4328	4867	5395	5928	6471			
[22]	30	99	165	230	293	363	427	489	550	610	670	731			
[24]	300	298	296	293	290	285	280	272	265	259	251	241			
[25]		826	1414	1991	2528	3144	3709	4262	4806	5354	5915				
[30]		93	160	225	286	355	419	482	543	605	668				
[24]		328	326	323	320	315	309	302	295	288	279				
[25]		776	1370	1945	2462	3079	3642	4196	4745	5313	5901				
[30]		88	155	220	278	348	411	474	536	600	667				
[25]		359	356	354	350	345	339	332	325	317	308				
[30]		732	1322	1959	2426	3026	3594	4153	4696	5152					
[30]		83	149	221	274	342	406	469	531	582					
[30]		374	371	369	365	360	354	347	340	333					
[30]		509	1082	2029	2246	2761	3358	3939	4450	4347					
[30]		57	122	229	254	312	379	445	503	491					
[30]		450	449	445	442	437	430	423	414	413					

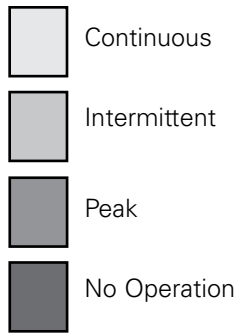
[2246]
254
442 } Torque [lb-in]
Nm
Speed RPM

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.



	[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
342 } 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

405 cm³/r [24.6 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
[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			



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
[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

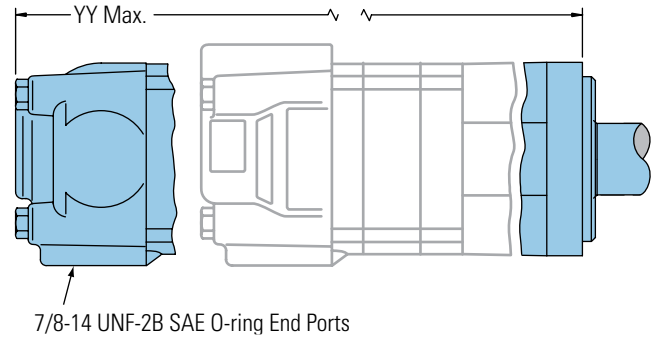
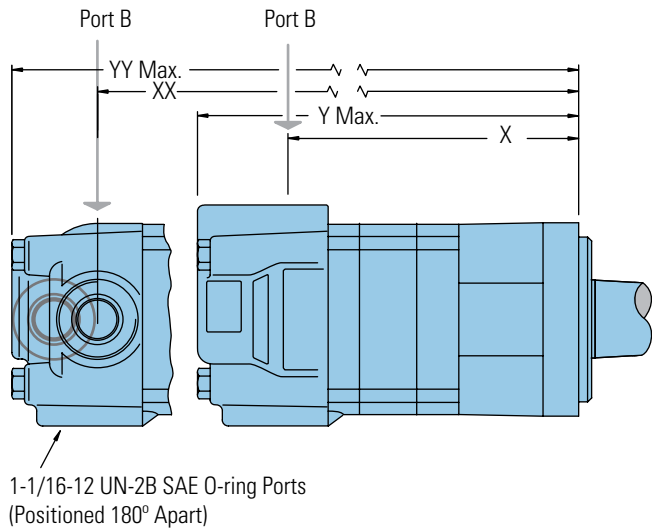
Ports

- 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



C-2

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

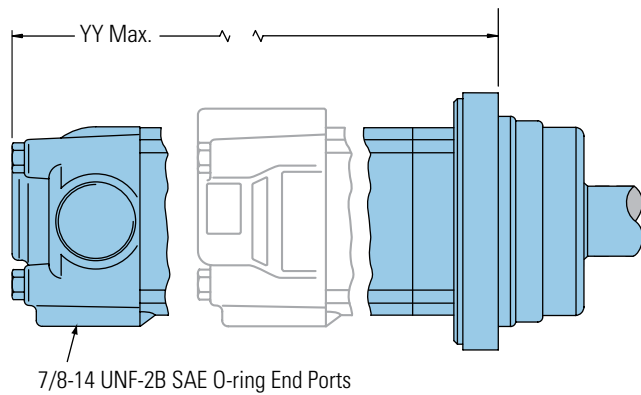
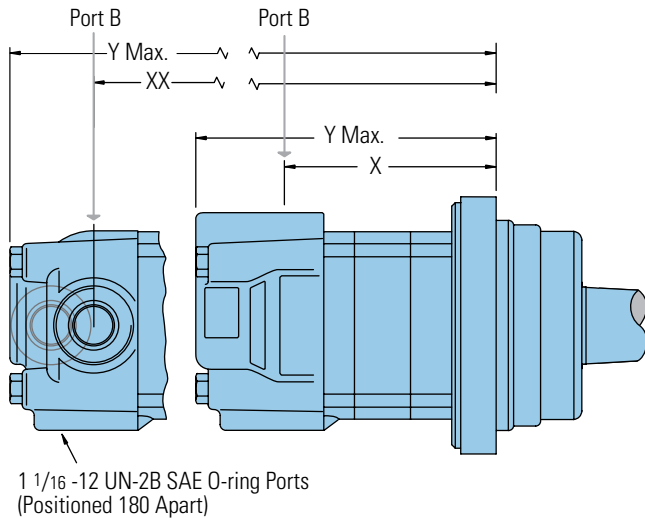
Ports

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]
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

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

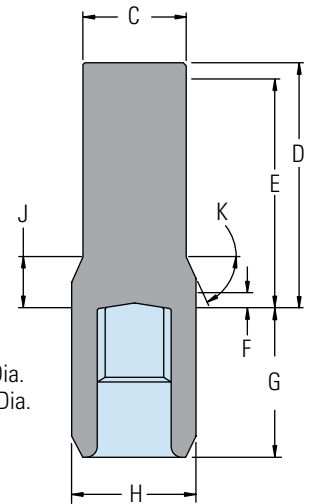
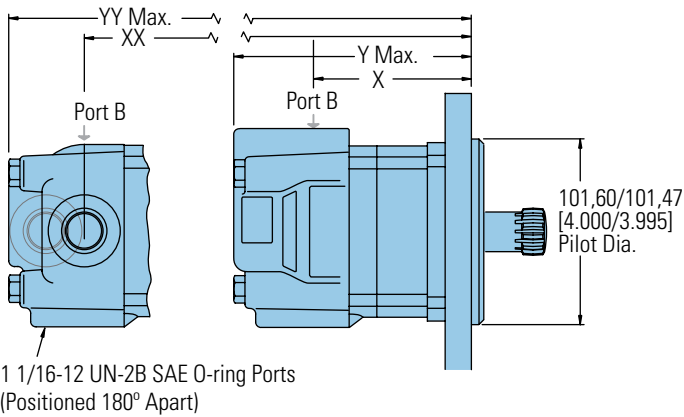
- Port A Pressurized — CW
- Port B Pressurized — CCW

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

Note:

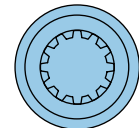
After machining blank, part must be hardened per Eaton specification.

Bearingless

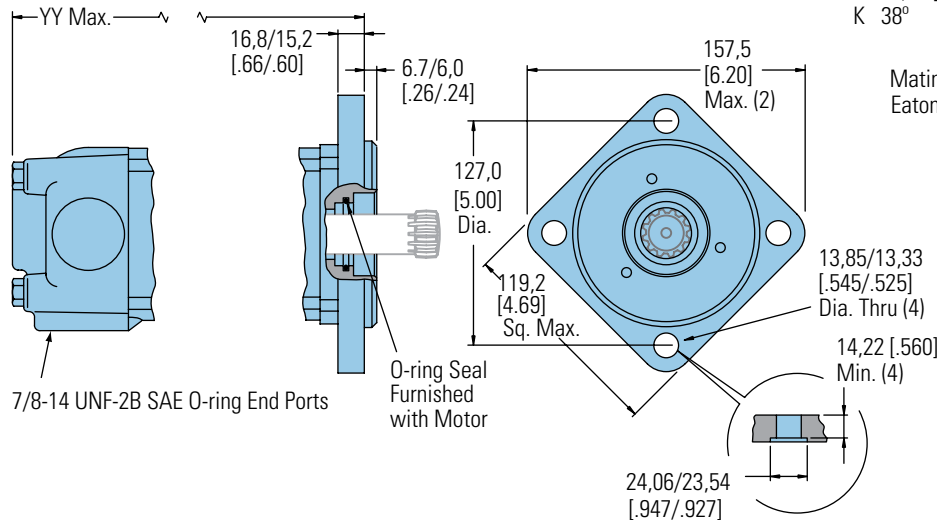


- C 47,2 [1.86] Dia.
- D 112,5 [4.43] Max.
- E 107,4 [4.23] Full Form Dia.
- F 7,4 [.29] Min. Full Form Dia.
- G 68,8 [2.71] Max.
- H 56,9 [2.24] Dia.
- J 18,29 [.720]
- K 38°

Mating Coupling Blank
Eaton Part No. 12745-003



C-2



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.

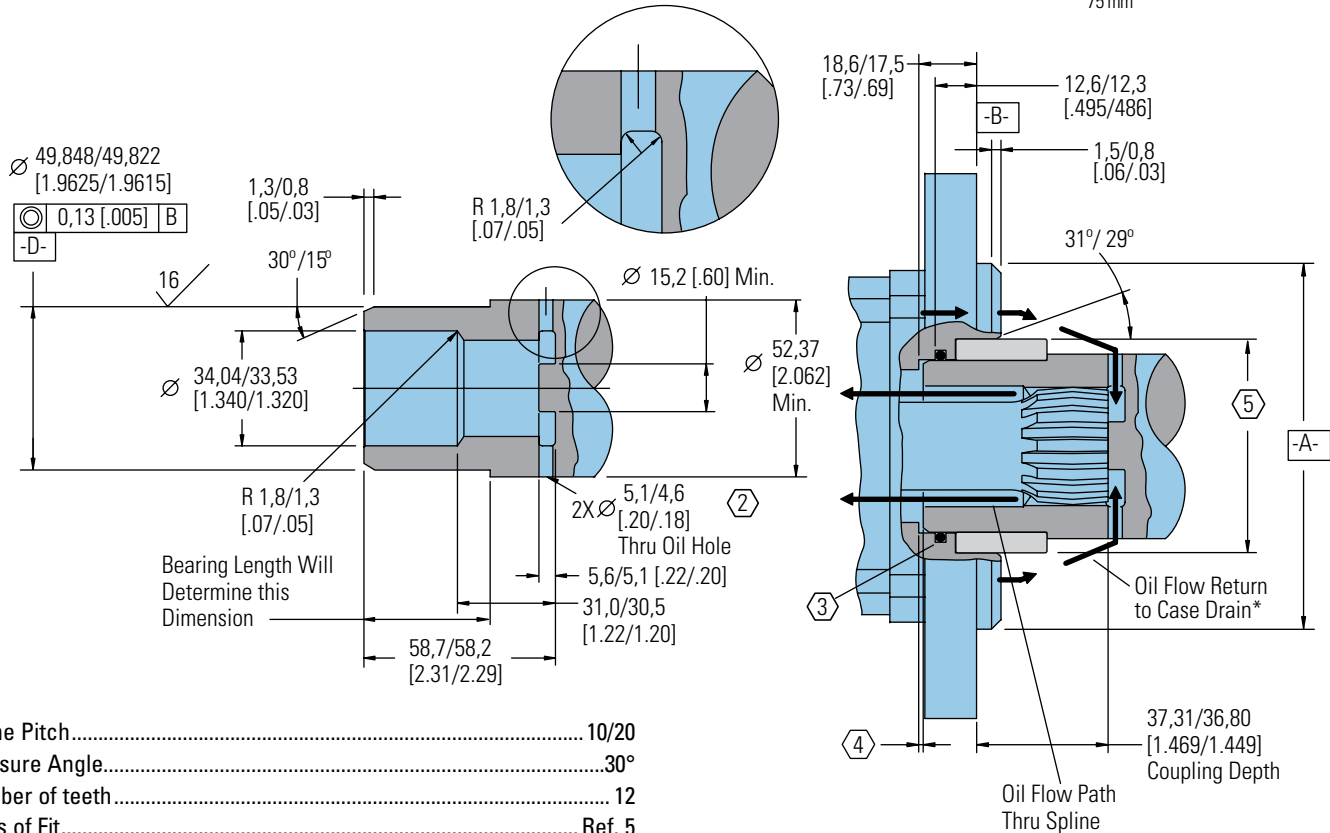
3 Seal to be furnished with motor for proper oil circulation thru splines.

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.

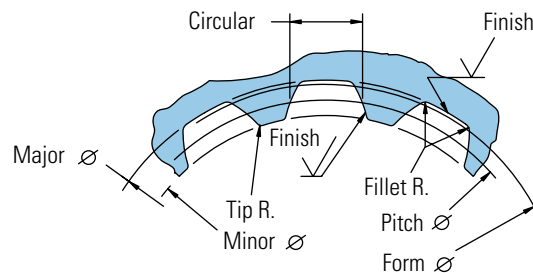
Stock Bearing Lengths:

- 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] \nearrow 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 -0.0010]
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

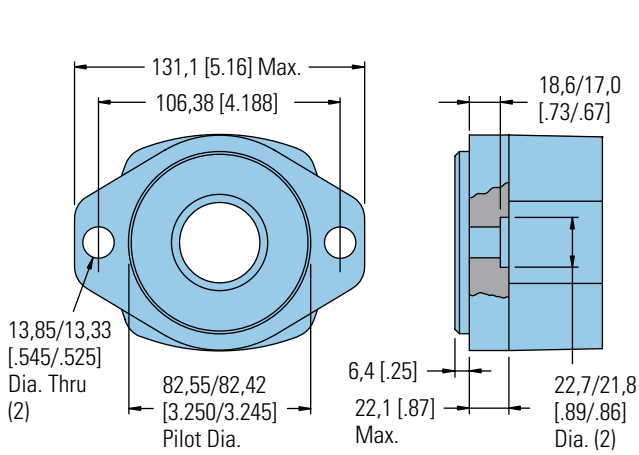


4000 Compact Series

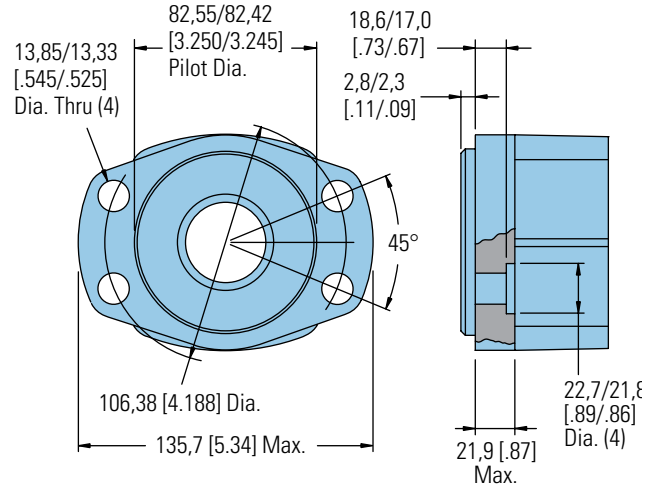
Dimensions

Mounting Options

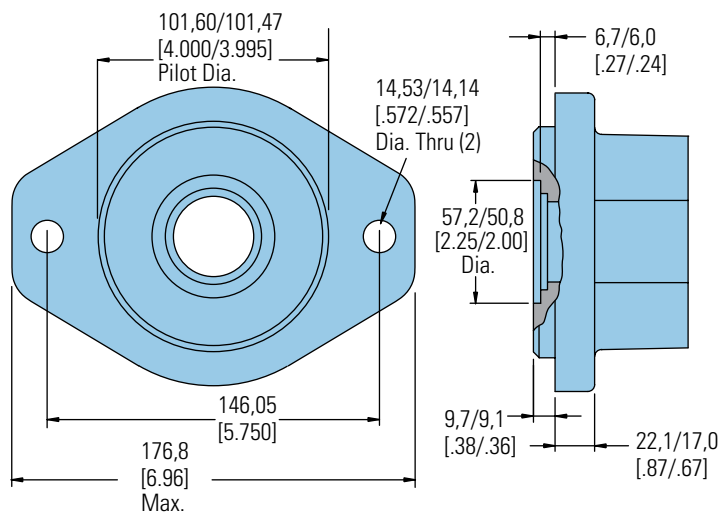
SAE A – Two Bolt (Standard Motor)



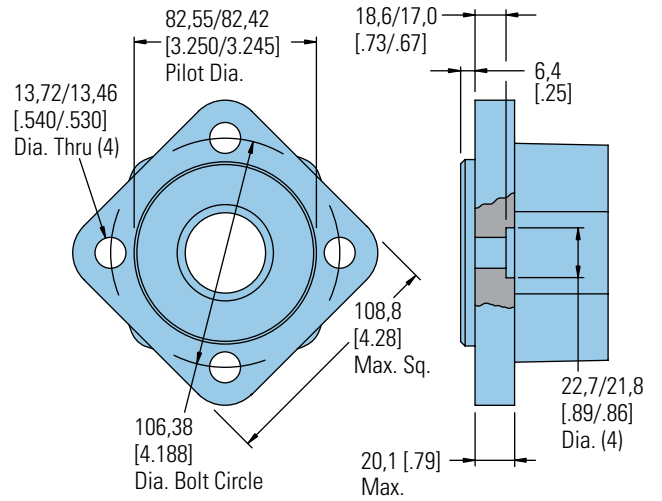
Four Bolt Magneto



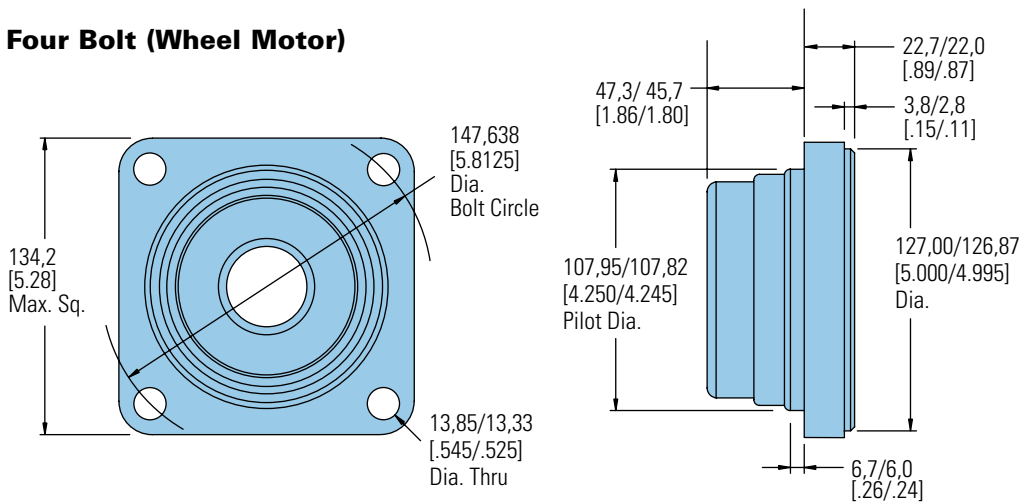
Two Bolt SAE B



Four Bolt



Four Bolt (Wheel Motor)



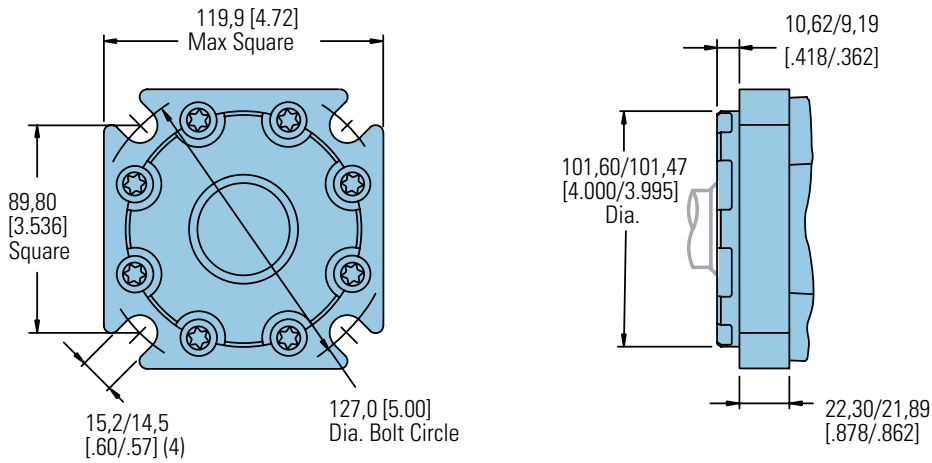
C-2

4000 Compact Series

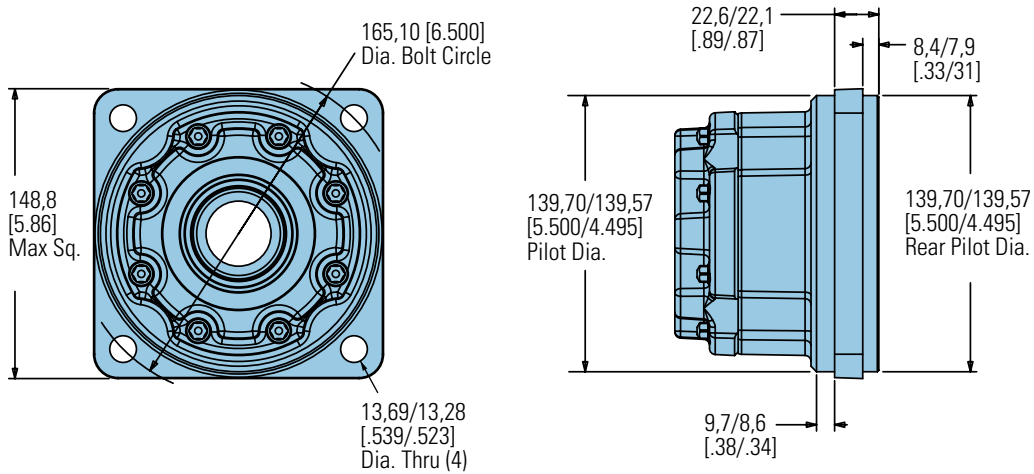
Dimensions

Mounting Options for use with Enhanced Bearings

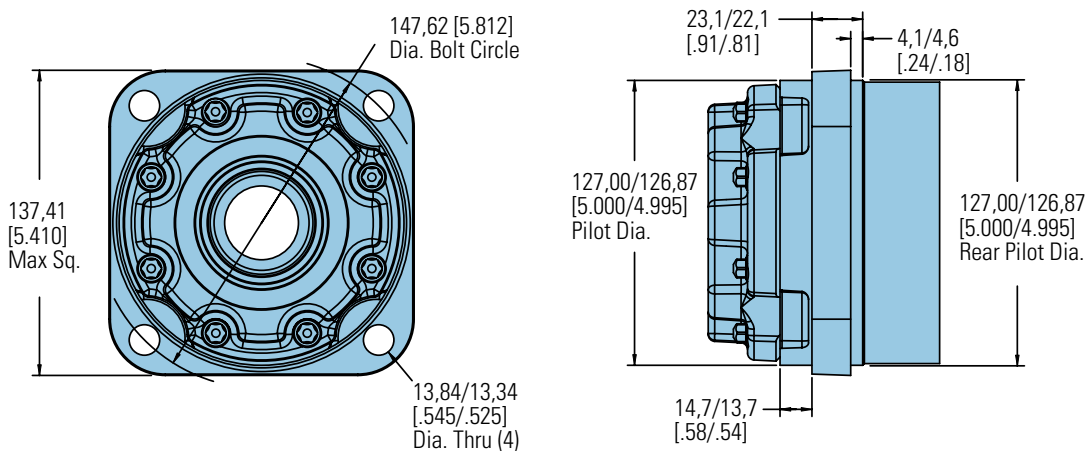
Standard Flange- Similar to SAE B type



Four Bolt (Wheel Motor)



Four Bolt (Wheel Motor- Short)

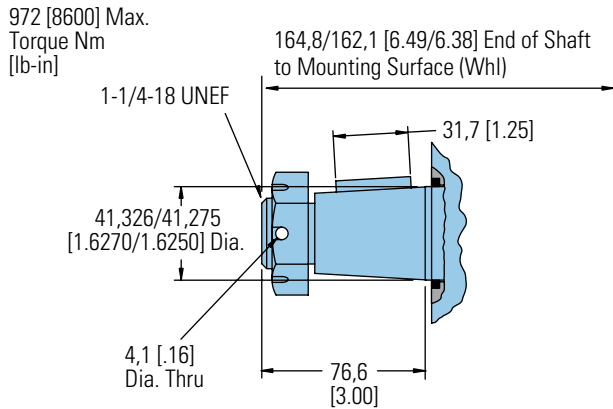


4000 Compact Series

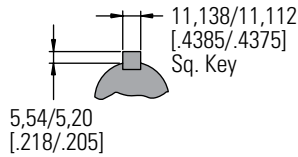
Dimensions

Shafts

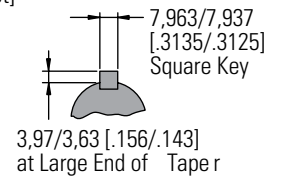
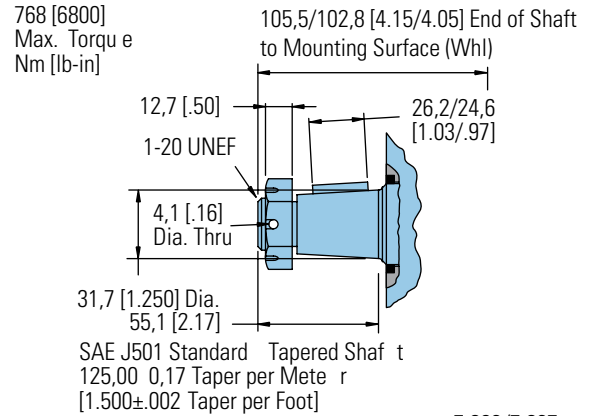
1-5/8 Inch Tapered



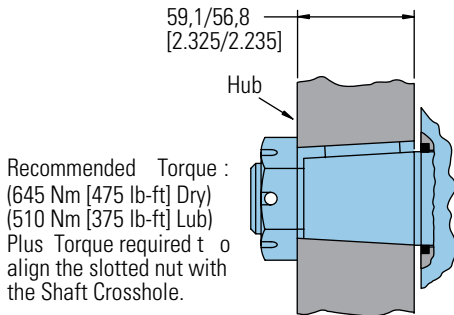
SAE J501 Standard Tapered Shaft
125,00 0,17 Taper per Meter
[1.500±.002 Taper per Foot]



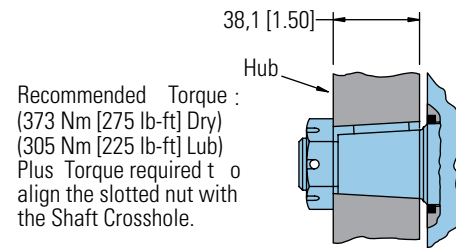
1-1/4 Inch Tapered



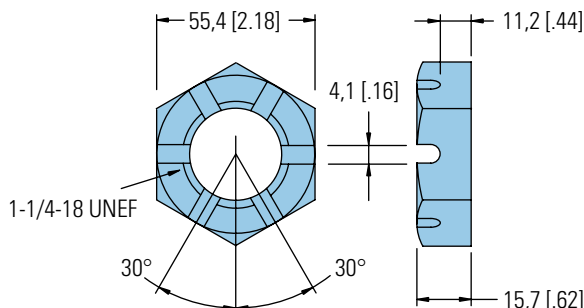
Tapered Shaft Hub Data



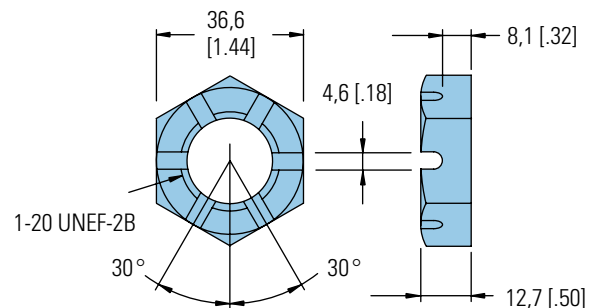
Tapered Shaft Hub Data



Slotted Hexagon Nut



Slotted Hexagon Nut

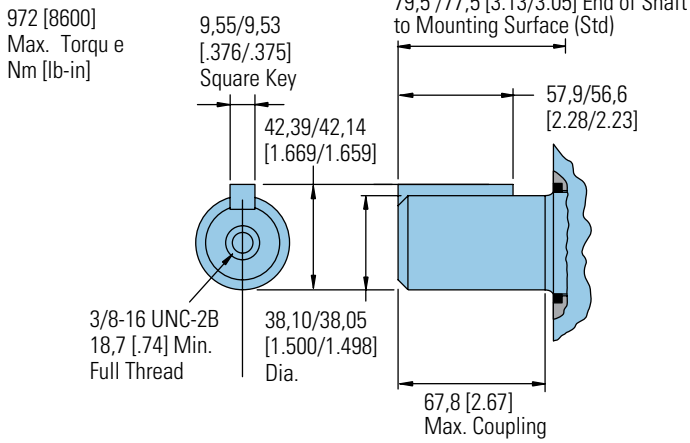


4000 Compact Series

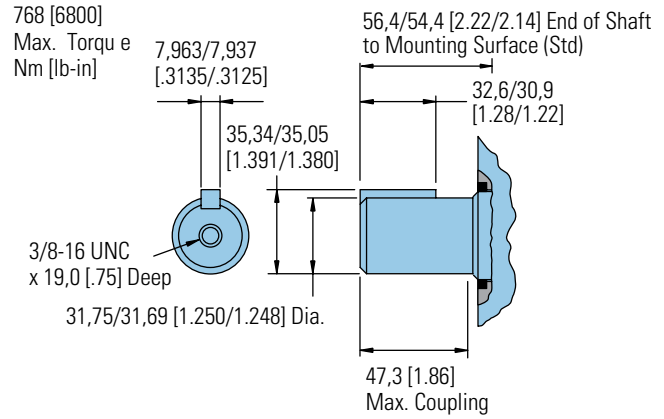
Dimensions

Shafts

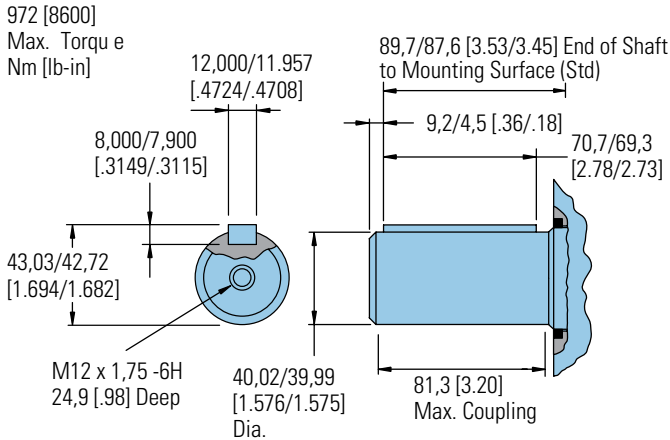
1-1/2 Inch Straight



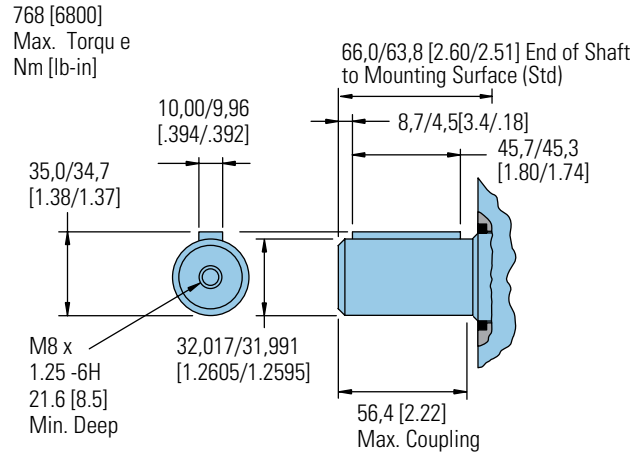
1-1/4 Inch Straight



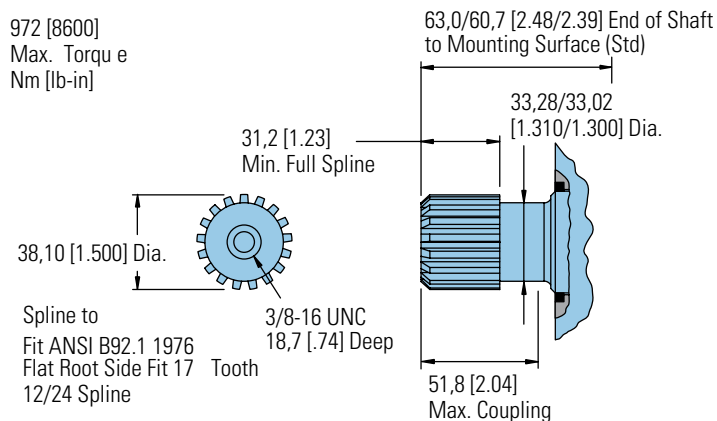
40 mm Straight



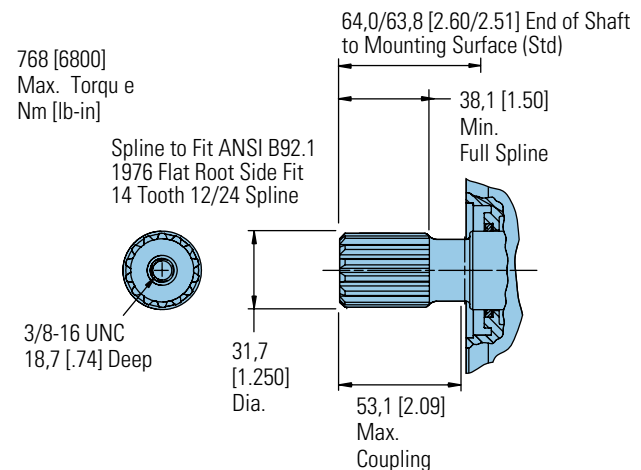
32 mm Straight



1-1/2 Inch 17 Tooth Straight



1-1/4 Inch 14 Tooth Splined



4000 Compact Series

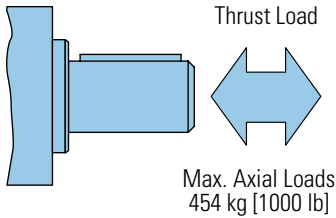
Shaft Side Load Capacity

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



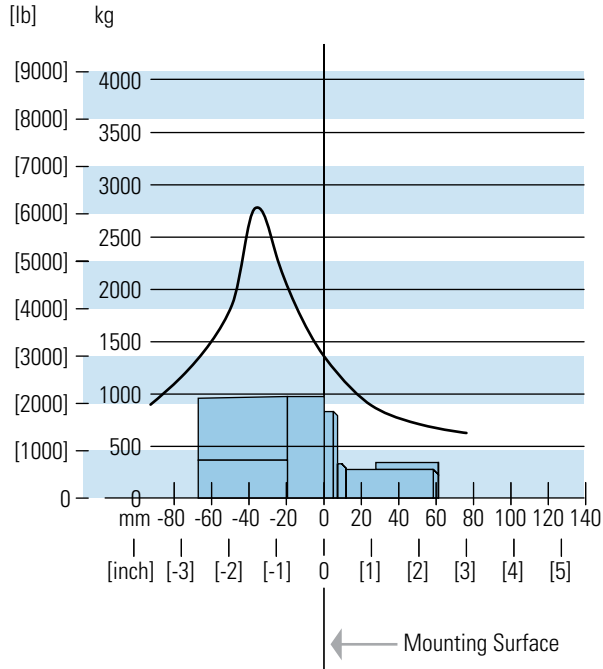
hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

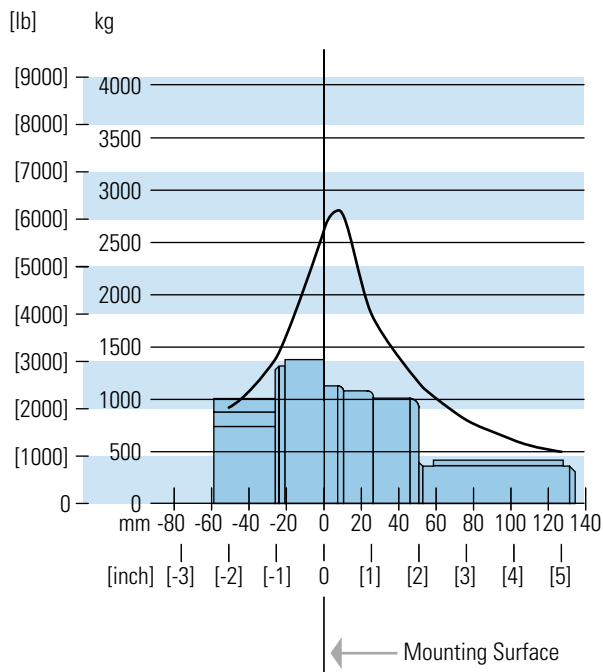
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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



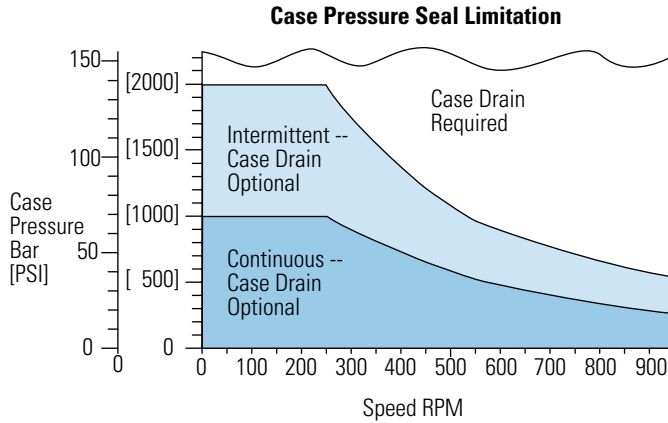
Wheel Mount- All shaft options 1-1/4 inch and larger



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.



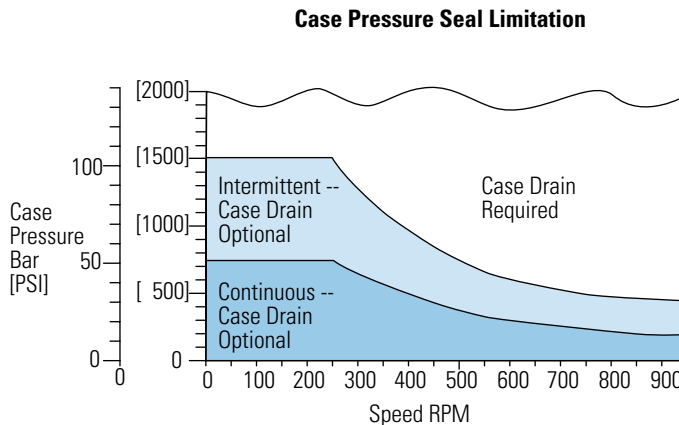
All Shaft options 1-1/4 inch and smaller.

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.



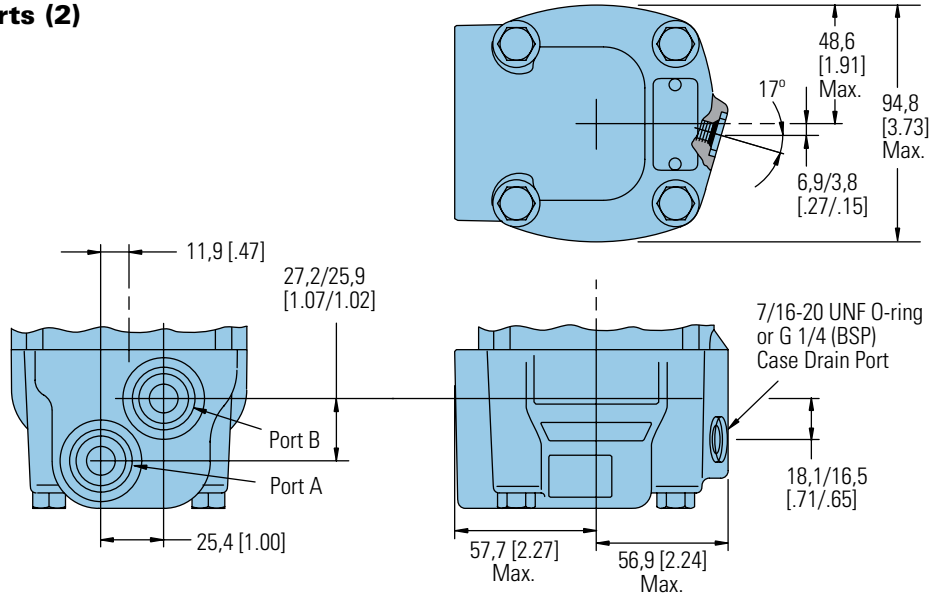
All Shaft options larger than 1-1/4 inch.

4000 Compact Series

Dimensions

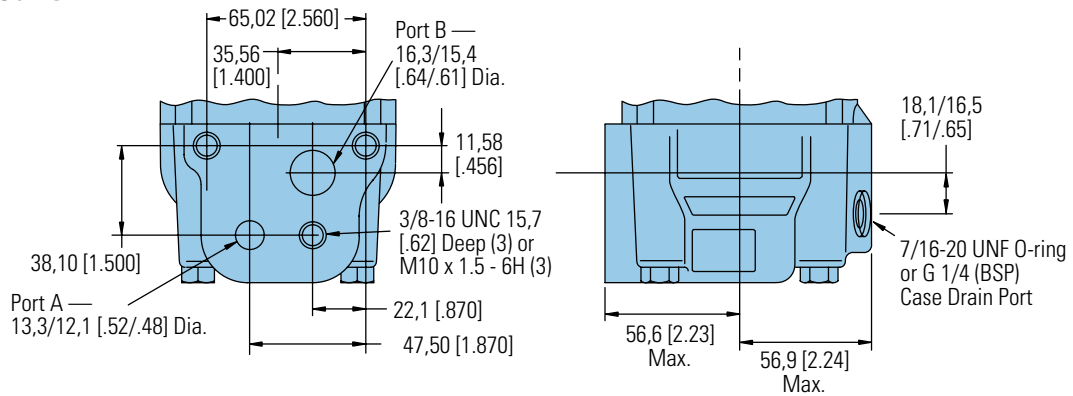
Ports

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



C-2

Manifold Mount

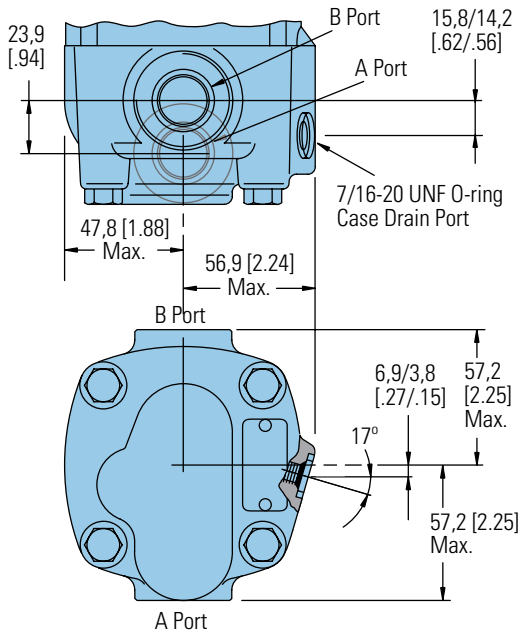


4000 Compact Series

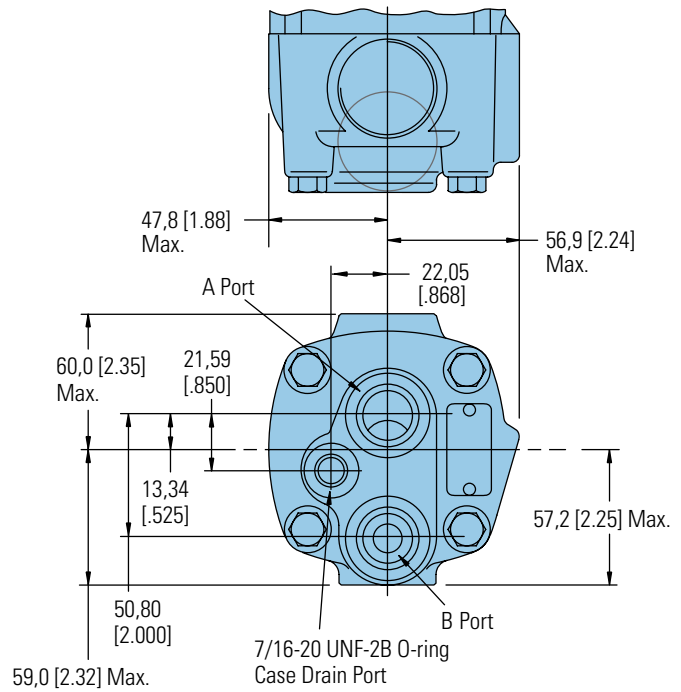
Dimensions

Ports

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



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

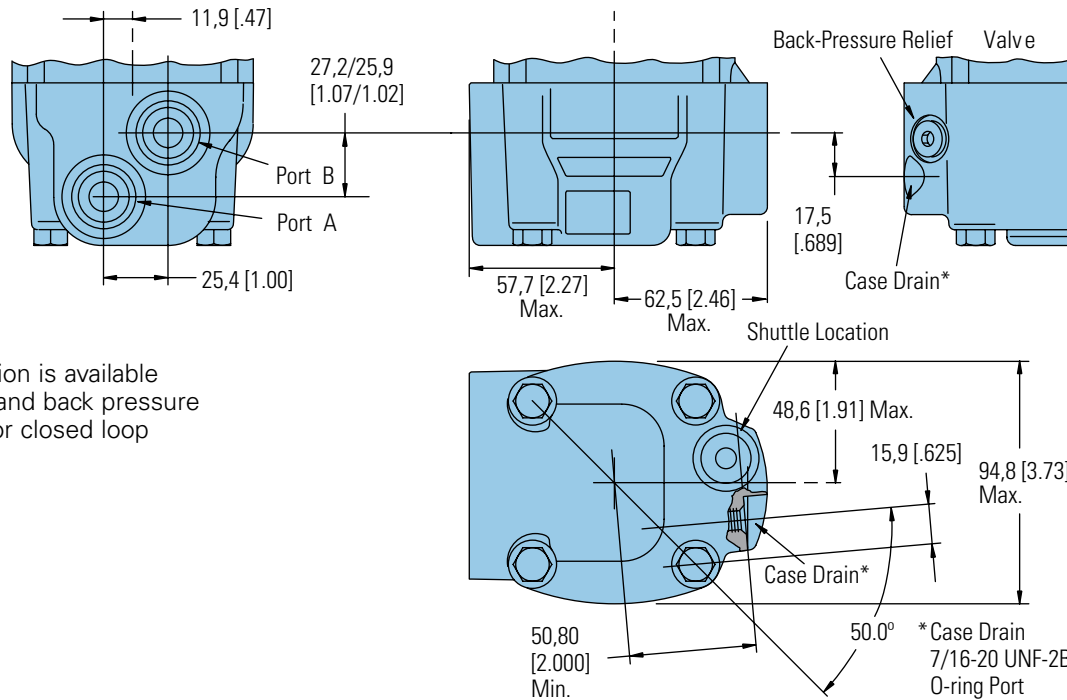


4000 Compact Series

Dimensions

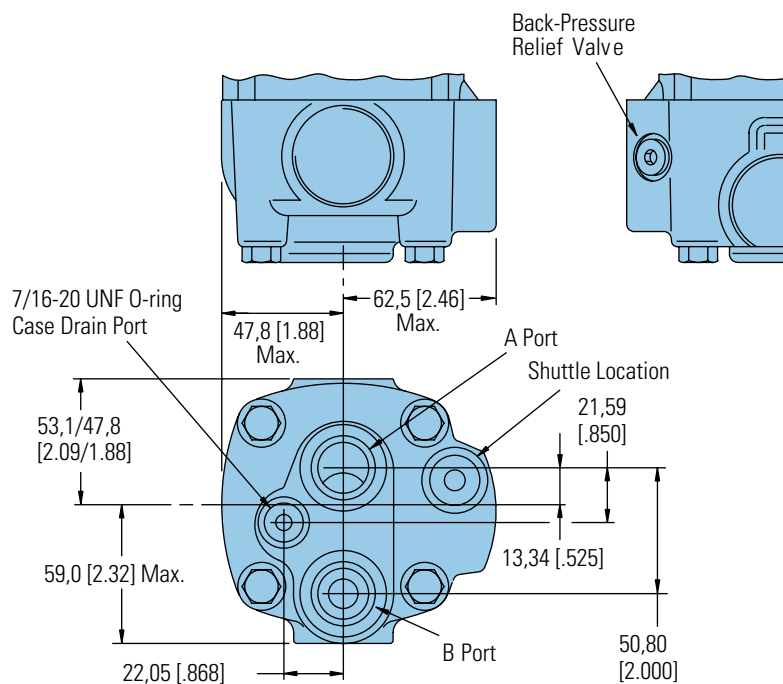
Ports with Shuttle

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)

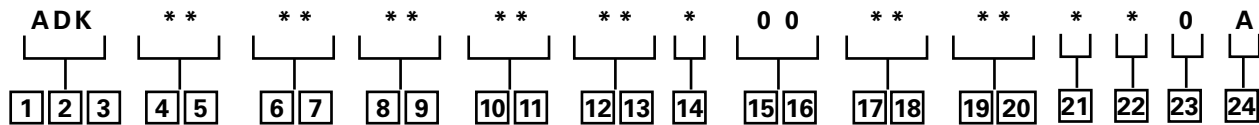


This port option is available with shuttle and back pressure relief valve for closed loop applications.

4000 Compact Series

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.

Model Code



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 [5.35] 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 [5.35] Dia. Mtg. Holes on 106,4 [4.19] Dia. B.C.

AE – 4 Bolt (Bearingless) 101,6 [4.00] Pilot Dia. and 13,59 [5.35] 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 [5.65] Dia. Mtg. Holes on 146,0 [5.75] Dia. B.C.

AH – 4 Bolt (Standard) 82,5 [3.25] Pilot Dia. and 14,59 [5.35] 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 [5.35] 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 [5.35] 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 [5.65] 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 [5.35] 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 [5.8] 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 [5.31] 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 [5.35] 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 [3.125] 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 [3.125] 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

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 – Low Gloss Black Primer, 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 11,500 in-lbs. Eaton has packed this motor with many “best in class” features: the optimized geroler profile ensures smooth operation; the disc valve technology has the best performance and the bearing capacity is the highest in the industry for very demanding applications.

Delta Series

Geroler Element	12 Displacements
Flow l/min [GPM]	75 [20] Continuous**
	115 [30] Intermittent*
Speed RPM	670 Cont.**
	837 Inter.*
Pressure bar [PSI]	200 [3000] Cont.**
	275 [4000] Inter.*
Torque Nm [lb-in]	1015 [9000] Cont**.
	1185 [10500] 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 10,500 lb-in intermittent duty / Flow up to 30 GPM intermittent
- 12 displacements available from 6.9 to 46 CID
- Shaft sizes up to 1-5/8 inch
- 3-1/4 inch front pilot and 5 inch rear pilot
- STC ports available

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 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



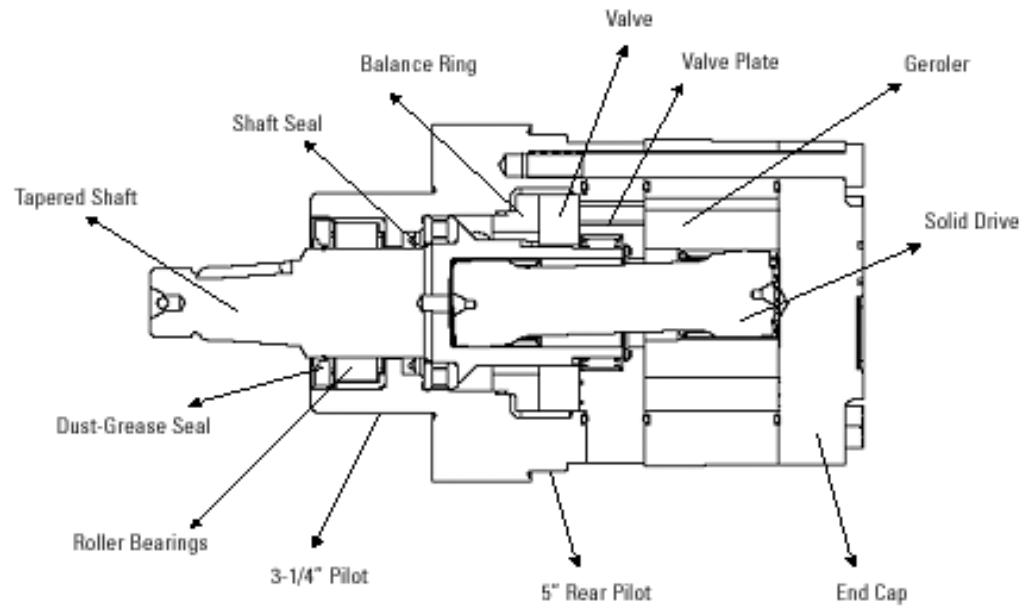
Sweeper



Mower

Delta Series

Specifications



DELTA SERIES MOTORS

Displ. cm ³ /r (in ³ /rev)		113 [6.9]	146 [8.9]	198 [12.1]	234 [14.3]	252 [15.4]	300 [18.3]	347 [21.2]	395 [24.1]	470 [28.7]	542 [33.1]	649 [39.6]	754 [46.0]
Max Speed (RPM)	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													
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.

When pressurizing B port, all displacements have a continuous rating of 2000 psi.

Maximum Inlet Pressure:

310 bars (4500 PSI)

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

Recommended Fluids:

Premium quality, anti wear type hydraulic oil with a viscosity of no 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: 20/18/13

Delta Series

113 cm³/r [6.9 in³/r]

Δ Pressure Bar [PSI]

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

	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	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
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
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
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
10	160	407	659	901	1149	1398	1650	1894	2134	2370	2601	2823	3044	3258	3457	3654
38	18	46	74	101	130	158	186	214	241	268	294	319	344	368	390	413
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
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
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
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
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
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
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
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

114 } Torque [lb-in]
13 } Nm
778 } Speed RPM

146 cm³/r [8.9 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	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
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
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
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
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
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
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
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
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
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
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
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
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		404	904	1402	1901	2399	2898	3397	3897	4397	4897	5397	5897	6397	6897	7397
114		171	700	1297	1735	2226	2718	3204	3689	4162	4623	5079	5519	5959	6377	6781
		19	79	146	196	251	307	362	417	470	522	573	623	673	720	766
		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	5066	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	330	330	330	328	327	324	322	320	316	314	313	314	316	318	320	320
95		425	967	1508	2042	2574	3093	3605	4110	4602	5084	5561	6028	6482	6899	7316
30		48	109	170	231	291	349	407	464	520	574	628	681	732	779	826
114		375	375	374	372	369	366	364	361	358	357	356	358	361	364	364
	179	20	450	450	1800	2330	2852	3364	3868	4368	4856	5338	5811	6269	6701	7096
		20	82	143	203	263	322	380	437	493	548	603	656	708	757	801
		450	450	450	449	447	443	439	436	433	430	430	431	434	437	438

Flow LPM [GPM]

179 } Torque lb-in
20 } Nm
450 } Speed RPM

300 cm³/r [18.3 in³/r]

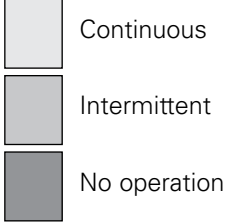
Δ Pressure Bar [PSI]

	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	278	278	278	277	274	272	269	267	265	264	263	265	269	273	275	275
95		553	1208	1851	2489	3114	3726	4335	4930	5523	6108	6670	7220	7783	8298	8777
30		62	136	209	281	352	421	489	557	624	690	753	815	879	937	991
114		316	316	316	313	310	307	303	301	299	298	298	301	306	310	312
	233	941	1539	2179	2811	3430	4028	4625	5217	5802	6385	6957	7522	8060	8565	
	26	106	174	246	317	387	455	522	589	655	721	785	849	910	967	
	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]

	17 250	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	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
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
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
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
10	550	1295	2041	2765	3488	4188	4891	5585	6264	6899	7505	8091	8672	9238	9885	10488
38	62	146	230	312	394	473	552	631	707	779	847	913	979	1048	1116	1184
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
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
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
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
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
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
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
30		272	272	272	272	272	269	266	263	261	259	259	261	265	270	272
114		152	1072	1749	2434	3123	3802	4468	5114	5763	6400	7018	7633	8232	8819	8997
		327	327	327	327	327	323	319	315	314	313	315	319	323	327	327

152 } Torque lb-in
17 } Nm
327 } Speed RPM

395 cm³/r [24.1 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
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
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
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
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
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
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
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
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
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
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
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
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
30		240	240	240	240	238	235	232	229	227	227	228	233	240
114		211	1079	1903	2725	3526	4311	5079	5824	6547	7240	7921	8577	9228
		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]

Continuous
 Intermittent
 No operation

	17 250	34 500	52 750	69 1000	86 1250	103 1500	121 1750	138 2000	155 2250	172 2500	190 2750	207 3000
2	925	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
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
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
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
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
12	699	1709	2711	3661	4597	5508	6403	7258	8101	8916	9719	10506
45	79	193	306	413	519	622	723	819	915	1007	1097	1186
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
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
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
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
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
25	833	1816	2765	3680	4575	5455	6313	7133	7928	8691	9436	10165
95	94	205	312	415	517	616	713	805	895	981	1065	1149
30	491	1318	2295	3232	4142	5022	5881	6721	7522	8300	9057	9820
114	55	149	259	365	468	567	664	759	849	937	1025	1112
	241	241	241	241	241	240	237	236	236	233	232	227

491 } Torque lb-in
 55 } Nm
 241 } Speed RPM

542 cm³/r [33.1 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
2	1131	2304	3433	4558	5668	6725	7732	8683	9645	10457
7.6	128	260	388	515	640	759	873	980	1089	1181
4	1139	2352	3515	4638	5735	6781	7819	8809	9752	10644
15	129	266	397	524	648	766	883	994	1101	1202
6	1063	2267	3433	4549	5645	6694	7697	8675	9630	10557
23	120	256	388	514	637	756	869	979	1087	1192
8	992	2186	3354	4475	5578	6646	7665	8608	9535	10449
30	112	247	379	505	630	750	865	972	1076	1180
10	897	2090	3259	4378	5482	6555	7602	8578	9482	10343
38	101	236	368	494	619	740	858	968	1071	1168
12	807	1980	3138	4256	5365	6440	7494	8481	9403	10275
45	91	224	354	481	606	727	846	957	1062	1160
14	693	1873	3028	4138	5218	6268	7318	8304	9235	10105
53	78	211	342	467	589	708	826	937	1043	1141
16	554	1732	2882	3993	5083	6107	7118	8089	9032	9928
61	63	196	325	451	574	689	804	913	1020	1121
18	409	1582	2738	3844	4924	5952	6956	7928	8874	9772
68	46	179	309	434	556	672	785	895	1002	1103
20	355	1428	2587	3696	4767	5804	6813	7786	8732	9624
76	40	161	292	417	538	655	769	879	986	1087
22	310	1259	2412	3518	4595	5619	6618	7589	8536	9438
83	35	142	272	397	519	634	747	857	964	1065
25	958	2107	3215	4281	5310	6305	7264	8204	9110	10000
95	108	238	363	483	599	712	820	926	1029	1129
30	521	1599	2696	3769	4804	5809	6776	7705	8617	9520
114	59	181	304	425	542	656	765	870	973	1073
	209	209	209	209	209	208	207	205	205	205




Delta Series

Performance Data

649 cm³/r [39.6 in³/r]

Δ Pressure Bar [PSI]

	17 250	34 500	52 750	69 1000	86 1250	103 1500	121 1750	138 2000	155 2250
2	1365	2787	4156	5488	6775	7949	9102	10174	11100
7.6	154 10	315 10	469 10	620 9	765 9	897 8	1028 7	1149 6	1253 3
4	1326	2770	4113	5400	6632	7819	8973	10030	11015
15	150 22	313 22	464 21	610 20	749 21	883 20	1013 19	1132 19	1244 18
6	1258	2663	3998	5270	6521	7692	8774	9808	10809
23	142 35	301 34	451 33	595 32	736 32	868 32	991 32	1107 32	1220 31
8	1154	2558	3902	5195	6455	7659	8775	9770	10708
30	130 47	289 46	441 45	587 44	729 42	865 42	991 42	1103 43	1209 43
10	1045	2442	3787	5076	6331	7541	8691	9685	10573
38	118 58	276 58	428 57	573 56	715 55	851 53	981 53	1093 54	1194 55
12	928	2321	3662	4939	6193	7385	8536	9577	10469
45	105 70	262 70	413 70	558 68	699 67	834 66	964 65	1081 65	1182 66
14	740	2127	3469	4746	5989	7188	8352	9433	10439
53	84 82	240 82	392 82	536 81	676 80	812 79	943 77	1065 76	1179 76
16	614	1990	3318	4588	5795	6942	8081	9154	10141
61	69 93	225 93	375 93	518 93	654 92	784 91	912 90	1033 89	1145 90
18	448	1830	3158	4414	5619	6754	7853	8890	9873
68	51 105	207 105	356 105	498 105	634 104	763 103	887 102	1004 102	1115 104
20	281	1618	2944	4198	5410	6551	7653	8689	9676
76	32 117	183 117	332 117	474 117	611 117	740 116	864 114	981 114	1092 115
22	276	1518	2842	4099	5313	6453	7554	8596	9576
83	31 128	171 128	321 128	463 128	600 128	728 128	853 126	970 125	1081 126
25		1079	2393	3646	4834	5969	7071	8112	9105
95		122 146	270 146	412 146	546 146	674 146	798 145	916 144	1028 144
30		436	1747	3013	4225	5356	6454	7489	8479
114		49 175	197 175	340 175	477 175	605 175	729 174	845 174	957 175

-  Continuous
-  Intermittent
-  No operation

754 cm³/r [46.0 in³/r]

Δ Pressure Bar [PSI]

8479
957
175 } Torque lb-in
Nm
Speed RPM

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

Delta Series

Dimensions

Wheel Mount

Ports

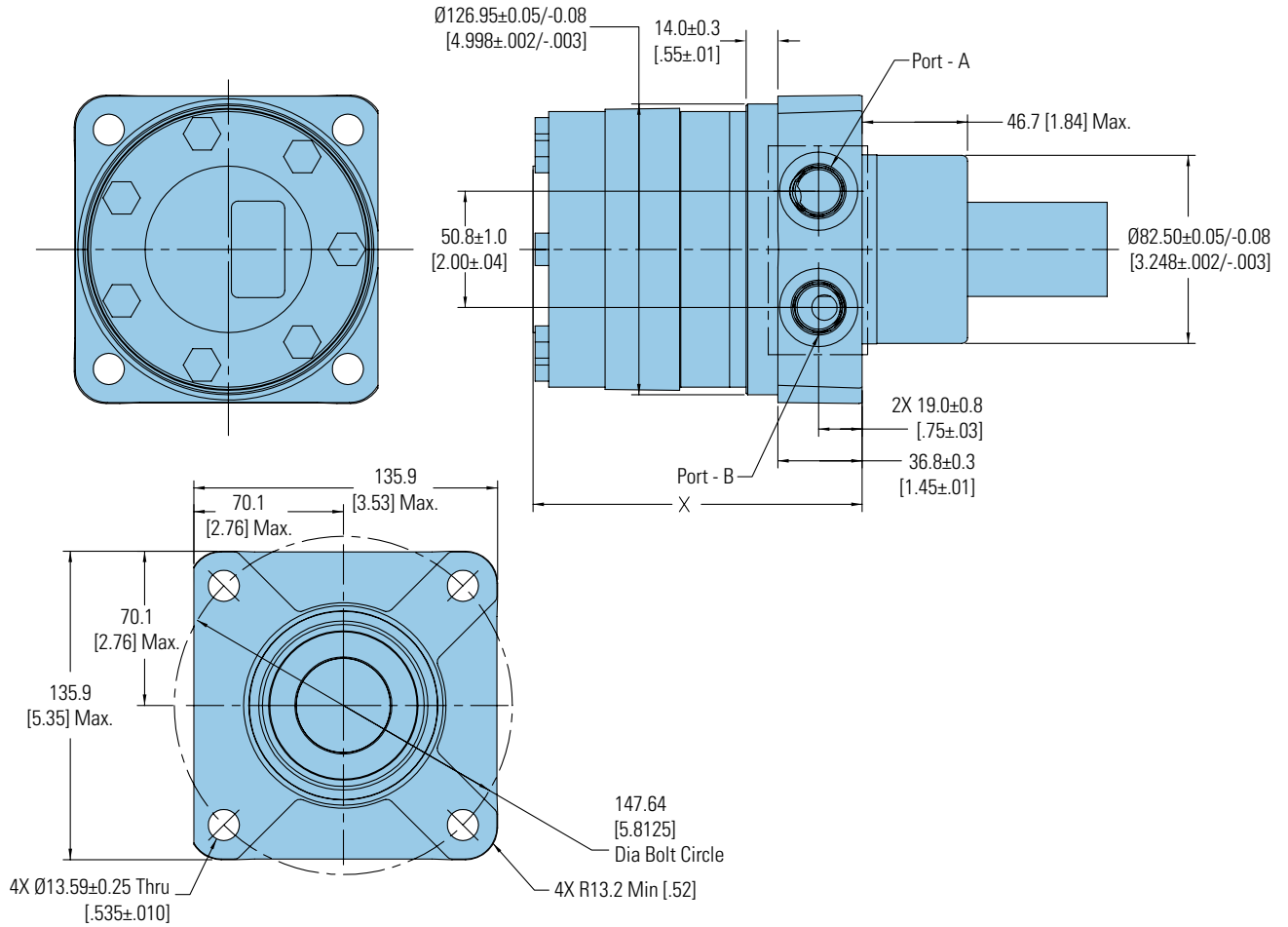
7/8 -14 UNF-2B SAE O-ring Ports

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]

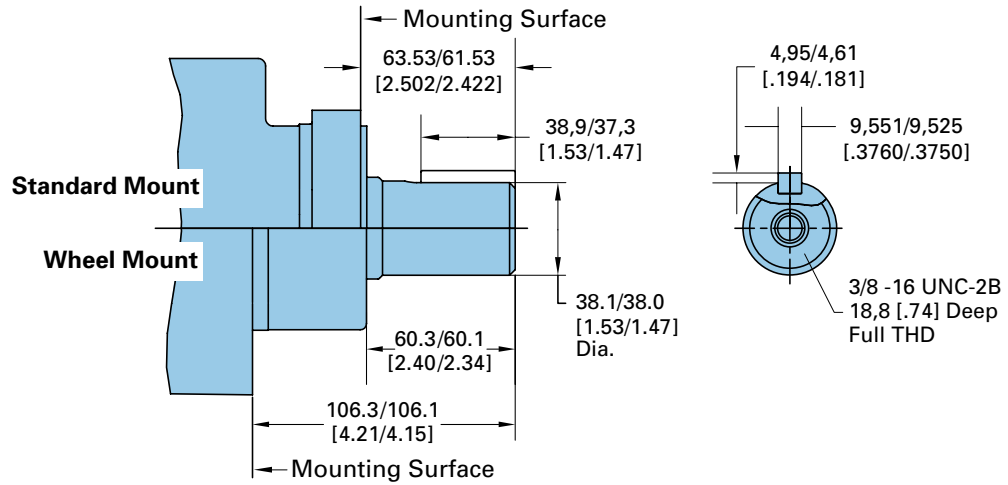
C-3

Delta Series

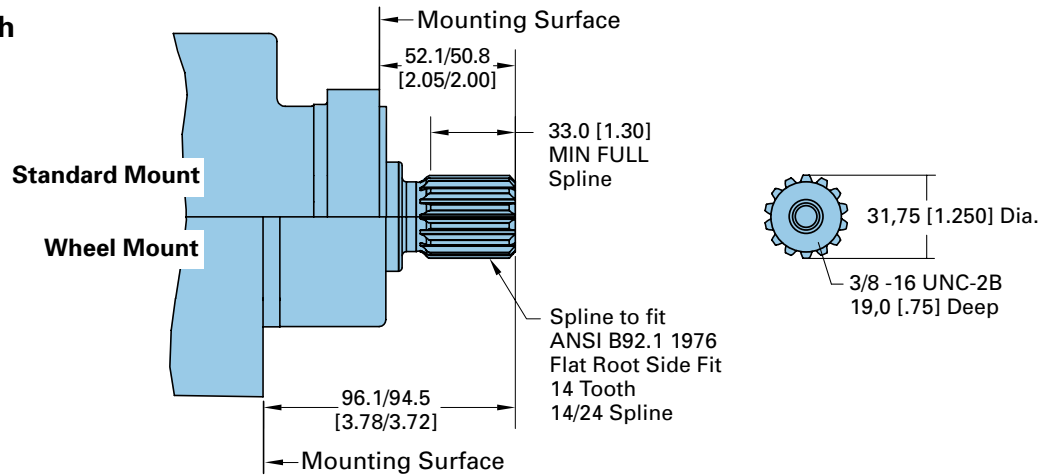
Dimensions

Shafts

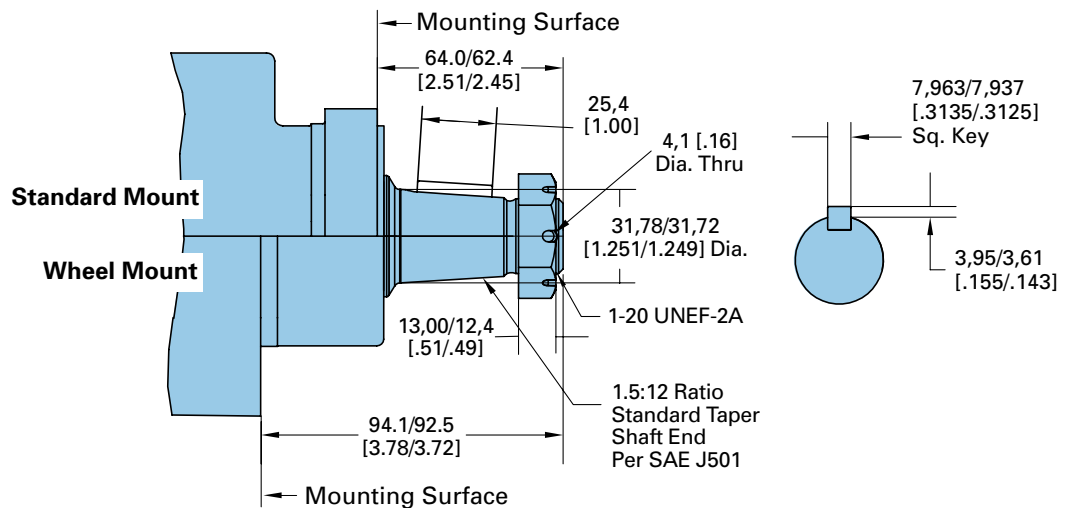
1 1/2 Inch Straight



1 1/4 Inch 14 Tooth Splined



1 1/4 Inch Tapered



Delta Series

Shaft Side Load Capacity

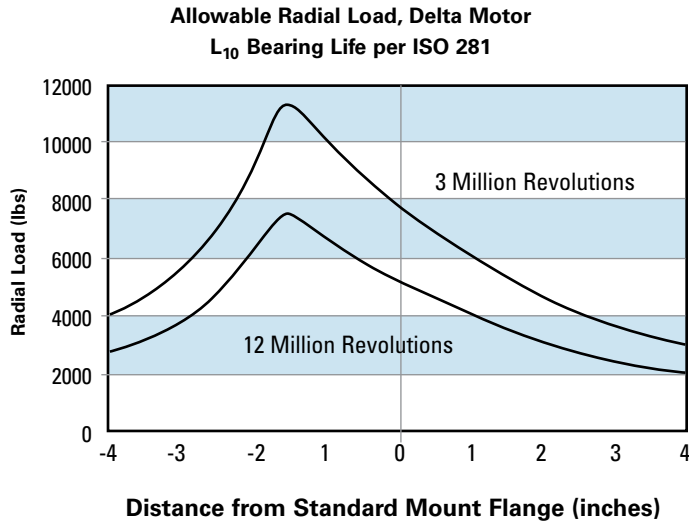
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

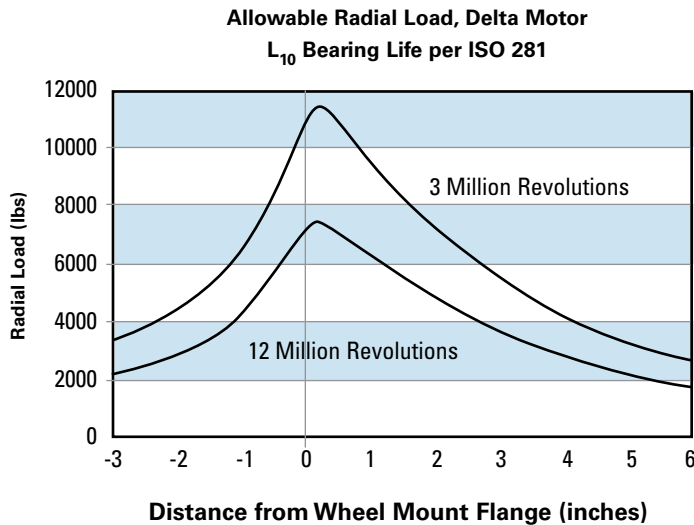
To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

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:

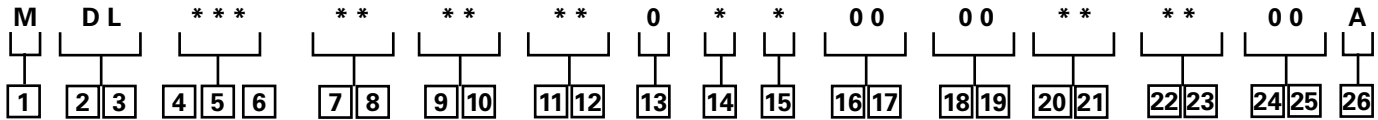
For Delta Series Motors with a configuration **Not Shown** in the charts below contact your Eaton Representative.

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 Tapered	7/8" O-ring	Standard -CCW	184-0005-002	184-0006-002	184-0002-002	184-0001-002		
			Standard -CW	184-0025-002	184-0026-002	184-0027-002	184-0028-002		
	1-1/2 Inch 17 T Splined	7/8" O-ring	Standard -CCW	184-0013-002	184-0014-002	184-0015-002	184-0016-002		
			Standard -CW	184-0037-002	184-0038-002	184-0039-002	184-0040-002		
	Wheel Motor	1-1/4 Inch Tapered	7/8" O-ring	Standard -CCW	184-0003-002	184-0004-002	184-0007-002	184-0008-002	
				Standard -CW	184-0029-002	184-0030-002	184-0031-002	184-0032-002	
		1-1/2 Inch 17 T Splined	7/8" O-ring	Standard -CCW	184-0017-002	184-0018-002	184-0019-002	184-0020-002	
				Standard -CW	184-0041-002	184-0042-002	184-0043-002	184-0044-002	
		Wheel Motor	1-1/4 Inch Tapered	7/8" O-ring	Standard -CCW	184-0009-002	184-0010-002	184-0011-002	184-0012-002
					Standard -CW	184-0033-002	184-0034-002	184-0035-002	184-0036-002
			1-1/2 Inch 17 T Splined	7/8" O-ring	Standard -CCW	184-0021-002	184-0022-002	184-0023-002	184-0024-002
					Standard -CW	184-0045-002	184-0046-002	184-0047-002	184-0048-002

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.



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 1.000-20 UNEF-2A Thread in End, 7.938 [.3125] Sq x 31.75 [1.250] Key

11, 12 Ports

AA – .875-14 UNF-2B SAE O-Ring

AC – G 1/2 BSP Straight Thread

13 Pressure/Flow Option

0 – None

14 Geroler Option

0 – Standard

B – Tight Fitting Geroler

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 - Low Gloss Black Primer, Individual Box

AC - Epoxy Coated (Frost Gray), Individual Box

AE - No Paint, Bulk Box

AF - Low Gloss Black Primer, Bulk Box

24, 25 Customer Identification

00 – None

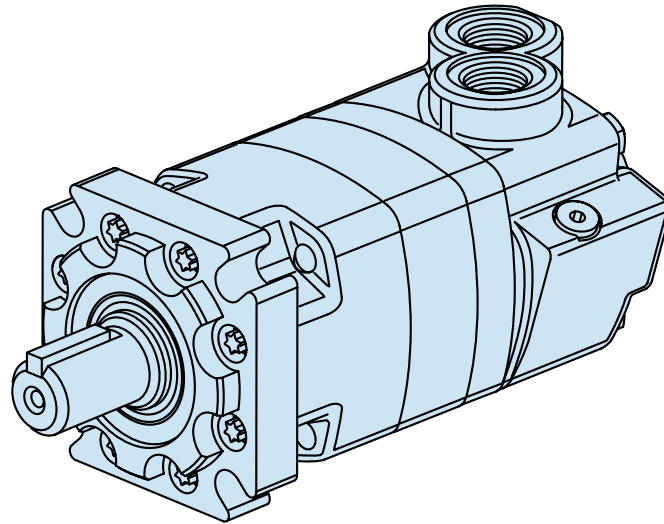
26 Design Code

B – Two (2)

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

- Flexibility 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.

C-4



Mowing



Snow Removal



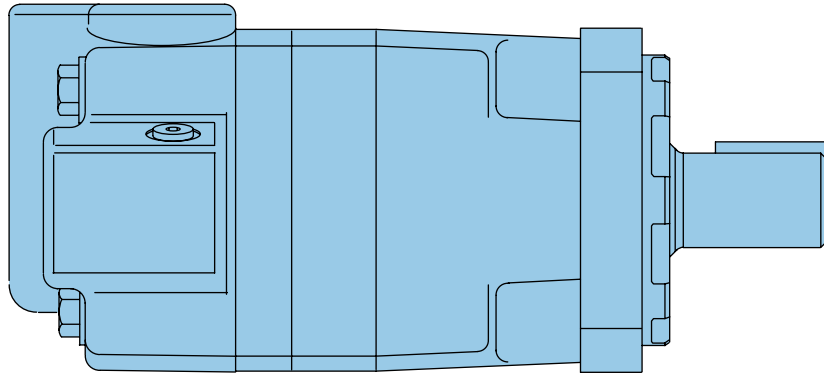
Sprayer



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 @ Flow	868	862	693	546	532	488	422	376	305	241
Flow l/min [GPM]	Continuous	75 [20]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]
	Intermittent	95 [25]	115 [30]	115 [30]	115 [30]	130 [35]	130 [35]	130 [35]	150 [40]	150 [40]	150 [40]
Torque* Nm [lb-in]	Continuous	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]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	295 [4250]	230 [3300]	180 [2600]
Weight kg [lb]	Standard or Wheel Mount	17.9 [39.5]	18.1 [40.0]	18.1 [40.0]	18.4 [40.5]	18.6 [41.0]	19.1 [42.0]	19.5 [43.0]	20.4 [45.0]	21.8 [48.0]	23.1 [51.0]
	Bearingless	14.1 [31.0]	14.3 [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 System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

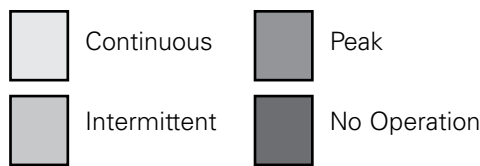
per ISO Cleanliness Code, 4406: 20/18/13

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.



**110 c3m/r [6.3/7r]in
ΔPressure Bar [PSI]**

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
155	35	70	105	140	170	205	240	275	310

[.5]	[150]	[390]	[850]	[1290]					
1.9	15 14	45 10	95 5	145 2					
[1]	[170]	[440]	[900]	[1380]	[1860]	[2270]	[2680]	[3110]	
3.8	20 34	50 33	100 31	155 28	210 25	255 22	305 18	350 11	
[2]	[180]	[450]	[910]	[1390]	[1860]	[2280]	[2700]	[3120]	[3450]
7.5	20 68	50 67	105 56	155 56	210 50	260 44	305 36	355 28	390 18
[4]	[190]	[460]	[940]	[1400]	[1870]	[2310]	[2730]	[3140]	[3560]
15	20 138	50 136	105 123	160 110	210 97	260 84	310 70	355 56	400 42
[6]	[200]	[470]	[960]	[1420]	[1880]	[2320]	[2760]	[3200]	[3640]
23	25 207	55 204	110 200	160 193	210 184	260 174	310 163	360 150	410 136
[8]	[190]	[460]	[950]	[1420]	[1880]	[2340]	[2790]	[3230]	[3670]
30	20 277	50 274	105 270	160 262	210 253	265 241	315 228	365 213	415 196
[10]	[180]	[460]	[950]	[1420]	[1890]	[2350]	[2820]	[3260]	[3700]
38	20 347	50 344	105 340	160 331	215 322	265 308	320 292	370 274	420 255
[12]	[160]	[450]	[940]	[1420]	[1880]	[2350]	[2820]	[3260]	[3710]
45	20 417	50 414	105 410	160 400	210 390	265 374	320 355	370 335	420 313
[14]	[140]	[440]	[930]	[1420]	[1880]	[2350]	[2830]	[3280]	[3730]
53	15 487	50 484	105 480	160 469	210 458	265 440	320 419	370 446	420 471
[16]	[130]	[440]	[920]	[1410]	[1870]	[2350]	[2840]	[3300]	[3750]
61	15 556	50 553	105 549	160 537	210 525	265 505	320 482	375 455	425 428
[18]	[100]	[440]	[910]	[1400]	[1870]	[2350]	[2840]	[3300]	[3770]
68	10 626	50 622	105 618	160 606	210 593	265 570	320 545	375 516	425 485
[20]	[80]	[430]	[900]	[1370]	[1860]	[2350]	[2850]	[3320]	[3790]
76	10 697	50 694	100 690	155 677	210 664	265 638	320 611	375 579	430 545
[25]									
95									

Flow LPM [GPM]



**130 c3m/r [7.3/9r]in
ΔPressure Bar [PSI]**

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
155	35	70	105	140	170	205	240	275	310

[.5]	[310]	[510]	[1060]	[1590]					
1.9	35 12	60 9	120 5	180 2					
[1]	[290]	[530]	[1080]	[1600]	[2110]	[2640]	[3060]	[3450]	
3.8	35 30	60 28	120 25	180 19	240 14	300 13	345 12	390 4	
[2]	[280]	[530]	[1100]	[1620]	[2140]	[2660]	[3180]	[3600]	[4080]
7.5	30 57	60 56	125 53	185 47	240 42	300 40	360 38	405 29	455 20
[4]	[260]	[520]	[1100]	[1650]	[2200]	[2700]	[3210]	[3660]	[4100]
15	30 116	60 114	125 111	185 105	250 100	305 95	365 90	415 70	465 50
[6]	[240]	[510]	[1100]	[1650]	[2200]	[2720]	[3240]	[3710]	[4180]
23	25 173	60 170	125 167	185 161	250 156	305 149	365 142	420 123	470 104
[8]	[230]	[510]	[1080]	[1640]	[2210]	[2740]	[3270]	[3770]	[4270]
30	25 228	60 225	120 222	185 216	250 210	310 202	370 194	425 176	480 158
[10]	[210]	[510]	[1080]	[1640]	[2210]	[2750]	[3300]	[3820]	[4350]
38	25 283	60 225	120 278	185 272	250 266	310 256	375 246	430 229	490 212
[12]	[200]	[500]	[1070]	[1640]	[2220]	[2750]	[3300]	[3840]	[4370]
45	25 341	55 338	120 335	185 329	250 323	310 312	375 300	435 282	495 263
[14]	[180]	[490]	[1060]	[1640]	[2220]	[2750]	[3310]	[3860]	[4390]
53	20 400	55 396	120 392	185 386	250 380	310 368	375 355	435 335	495 366
[16]	[160]	[490]	[1050]	[1630]	[2220]	[2760]	[3310]	[3860]	[4400]
61	20 457	55 453	120 449	185 443	250 437	310 424	375 410	435 388	495 366
[18]	[130]	[480]	[1050]	[1630]	[2220]	[2760]	[3320]	[3870]	[4420]
68	15 516	55 511	120 506	185 500	250 494	310 480	375 465	435 442	495 418
[20]	[110]	[470]	[1040]	[1620]	[2210]	[2760]	[3330]	[3890]	[4440]
76	10 574	55 569	120 564	185 559	250 551	310 536	375 520	440 495	500 470
[22]	[70]	[450]	[1020]	[1610]	[2190]	[2750]	[3320]	[3880]	[4440]
83	10 633	50 628	115 624	180 615	245 606	310 590	375 573	440 547	500 520
[25]	[50]	[430]	[1000]	[1580]	[2160]	[2720]	[3300]	[3860]	[4430]
95	5 722	50 718	115 714	180 702	245 690	305 672	375 653	435 625	500 595
[30]		[400]	[940]	[1500]	[2080]	[2670]	[3200]	[3740]	
114		45 862	105 855	170 842	235 827	300 806	360 783	425 749	

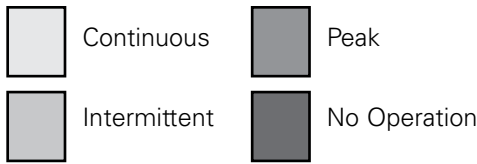
4000 Series

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

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.

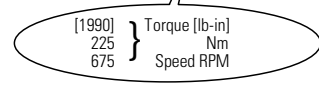


205 cm³/r [12.5 in³/r]
 Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5]	[400] 45 8	[810] 90 5	[1500] 170 1							
[1]	[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]	[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]	[430] 50 73	[870] 100 73	[1770] 200 71	[2590] 295 70	[3140] 385 68	[4260] 480 61	[5040] 570 57	[5730] 645 45	[6340] 715 35	[6740] 760 23
[6]	[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]	[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]	[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]	[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]	[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]	[290] 35 291	[820] 95 290	[1770] 200 289	[2650] 300 284	[3540] 400 280	[4410] 500 272	[5280] 600 264	[6120] 690 253		
[18]	[270] 30 329	[810] 90 327	[1750] 200 325	[2640] 300 321	[3520] 400 316	[4400] 500 308	[5270] 600 298	[6120] 690 287		
[20]	[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]	[190] 20 402	[780] 90 400	[1690] 190 398	[2600] 295 394	[3500] 395 389	[4370] 495 380	[5260] 595 368			
[25]	[150] 15 459	[750] 85 456	[1640] 185 453	[2560] 290 448	[3480] 395 442	[4360] 495 434	[5240] 590 421			
[30]		[710] 80 546	[1540] 175 542	[2510] 285 537	[3350] 380 529	[4190] 475 520	[5030] 570 504			
[30]										
11.4										

Flow LPM [GPM]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5]	[300] 35 8	[680] 75 7	[1320] 150 5	[2050] 230 3	[2750] 310 1					
[1]	[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]	[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]	[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]	[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]	[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]	[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]	[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]	[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]	[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]	[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]	[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]	[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]	[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]		[560] 65 693	[1280] 145 687	[1990] 225 675	[2700] 305 661	[3430] 390 647	[3970] 450 630	[4640] 525 600		

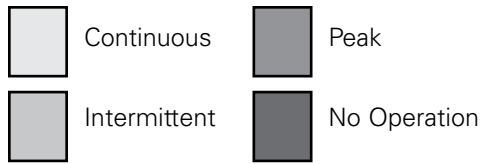


4000 Series

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.

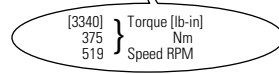


245 cm³/r [15.0 in³/r] Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 15	[2500] 170	[2750] 190	[3000] 205	[3250] 225	[3500] 240	[3750] 260
[5] 1.9	[460] 50 5	[980] 110 2													
[1] 3.8	[480] 55 14	[990] 110 14	[1490] 170 14	[1990] 225 13	[2480] 280 13	[2970] 335 12	[3400] 385 12	[3830] 435 11	[4250] 480 11	[4680] 530 10	[5020] 565 4				
[2] 7.5	[500] 55 30	[1000] 115 30	[1520] 170 29	[2040] 230 29	[2540] 285 28	[3050] 345 27	[3420] 385 26	[3930] 445 24	[4440] 500 23	[4900] 555 22	[5320] 600 20	[5740] 650 18	[6160] 695 16	[6640] 750 14	[7150] 810 11
[4] 15	[510] 60 61	[1030] 115 61	[1560] 175 60	[2080] 235 60	[2600] 295 59	[3130] 355 59	[3630] 410 58	[4130] 465 56	[4630] 525 49	[5120] 580 47	[5570] 630 47	[6030] 680 44	[6480] 730 42	[6870] 775 39	[7340] 830 36
[6] 23	[510] 60 91	[1040] 120 90	[1570] 175 90	[2100] 235 89	[2620] 295 88	[3160] 355 88	[3660] 415 86	[4200] 475 83	[4710] 530 80	[5220] 590 75	[5690] 645 72	[6140] 695 70	[6620] 750 67	[7050] 795 63	[7430] 840 59
[8] 30	[500] 55 121	[1020] 115 121	[1560] 175 120	[2110] 240 119	[2630] 295 118	[3150] 355 117	[3680] 415 115	[4210] 475 113	[4740] 535 111	[5250] 595 106	[5720] 645 104	[6200] 700 99	[6670] 755 95	[7090] 800 91	[7470] 845 87
[10] 38	[470] 55 152	[1000] 115 151	[1540] 175 150	[2100] 235 148	[2620] 295 148	[3150] 355 147	[3690] 415 145	[4230] 480 143	[4770] 540 141	[5290] 600 137	[5760] 650 133	[6240] 705 129	[6710] 760 125	[7140] 805 120	
[12] 45	[450] 50 183	[980] 110 182	[1530] 175 180	[2080] 235 179	[2610] 295 178	[3140] 355 178	[3680] 415 176	[4220] 475 173	[4760] 530 170	[5280] 595 166	[5690] 650 161	[6140] 705 157	[6620] 755 152		
[14] 53	[420] 45 213	[960] 110 212	[1520] 170 211	[2060] 235 210	[2600] 295 209	[3130] 355 208	[3670] 415 206	[4200] 475 203	[4740] 535 200	[5260] 595 195	[5740] 650 190	[6220] 705 185			
[16] 61	[400] 45 244	[950] 105 243	[1500] 170 242	[2040] 230 241	[2580] 290 240	[3120] 355 239	[3660] 415 236	[4190] 475 232	[4730] 535 229	[5250] 595 225	[5730] 650 219	[6210] 700 213			
[18] 68	[380] 45 275	[930] 105 274	[1480] 165 273	[2020] 230 272	[2560] 290 270	[3110] 350 269	[3650] 415 266	[4180] 470 262	[4710] 530 259	[5230] 590 254	[5720] 645 248	[6200] 700 241			
[20] 76	[350] 40 305	[910] 105 305	[1460] 165 304	[2000] 225 303	[2550] 290 302	[3100] 350 300	[3640] 410 296	[4170] 470 292	[4700] 530 288	[5220] 590 283	[5710] 645 276	[6200] 700 265			
[22] 83	[310] 35 337	[870] 100 336	[1420] 160 335	[1970] 225 334	[2500] 280 332	[3050] 345 330	[3590] 405 326	[4140] 465 323	[4680] 530 319	[5200] 590 313	[5680] 650 306				
[25] 95	[260] 30 383	[820] 95 382	[1380] 155 381	[1920] 220 380	[2460] 280 378	[2980] 335 376	[3540] 400 372	[4090] 460 369	[4640] 525 365	[5180] 585 357					
[30] 114		[680] 75 457	[1250] 140 456	[1860] 210 455	[2390] 270 453	[2900] 330 450	[3430] 390 445	[3960] 445 442	[4460] 505 437	[4950] 560 427					
[35] 132			[1110] 125 532	[1740] 195 531	[2270] 255 528	[2790] 315 525	[3340] 375 519	[3910] 440 515	[4400] 495 509						

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 4	[1074] 121 2													
[1] 3.8	[553] 62 12	[1136] 128 12	[1714] 194 12	[2287] 258 11	[2841] 321 11	[3394] 384 11	[3868] 437 10	[4389] 496 10	[4895] 553 10	[6080] 685 8	[5870] 663 6	[6811] 770 6	[7239] 818 5	[7654] 865 4	
[2] 7.5	[568] 64 26	[1146] 130 26	[1740] 197 25	[2328] 263 25	[2902] 328 24	[3461] 391 24	[3955] 447 23	[4524] 511 22	[5222] 597 21	[6300] 713 20	[6146] 694 19	[6666] 753 17	[7191] 813 17	[7749] 876 15	[8323] 940 13
[4] 15	[579] 65 53	[1167] 132 53	[1771] 200 52	[2374] 268 52	[2962] 335 51	[3557] 402 51	[4139] 468 50	[4712] 532 49	[5285] 597 47	[6395] 722 45	[6350] 712 44	[6946] 785 42	[7502] 848 41	[8020] 906 40	[8471] 957 38
[6] 23	[583] 66 79	[1177] 133 79	[1781] 201 78	[2395] 271 78	[2987] 338 77	[3601] 407 77	[4193] 474 76	[4793] 542 74	[5376] 607 72	[6521] 737 67	[7082] 800 66	[7607] 859 65	[8097] 915 64		
[8] 30	[573] 65 106	[1167] 132 106	[1780] 201 105	[2404] 272 105	[3007] 340 104	[3610] 408 104	[4218] 477 102	[4812] 544 101	[5411] 611 99	[6594] 741 96	[7022] 793 94	[7518] 849 92	[8020] 906 90		
[10] 38	[547] 62 134	[1146] 130 133	[1765] 199 133	[2395] 271 131	[2997] 339 131	[3629] 410 130	[4238] 479 129	[4837] 547 127	[5442] 615 126	[6635] 746 122	[6601] 746 119	[7022] 793 115	[7518] 849 111		
[12] 45	[527] 60 161	[1126] 127 160	[1745] 197 186	[2369] 268 158	[2991] 338 157	[3609] 408 157	[4228] 478 154	[4832] 546 152	[5441] 615 152	[6634] 744 148	[6586] 744 144	[6940] 784 141			
[14] 53	[497] 56 187	[1106] 125 187	[1730] 195 186	[2344] 265 186	[2972] 336 185	[3585] 405 184	[4213] 476 182	[4816] 544 180	[5430] 614 178	[6628] 736 174	[6511] 736 170	[6940] 784 166			
[16] 61	[472] 53 214	[1096] 124 214	[1715] 194 213	[2324] 263 212	[2947] 333 211	[3565] 403 210	[4203] 475 208	[4811] 544 206	[5420] 612 203	[6619] 727 199	[6436] 727 195				
[18] 68	[437] 39 241	[1075] 121 241	[1690] 191 240	[2299] 260 239	[2917] 330 237	[3541] 400 236	[4188] 473 234	[4801] 542 231	[5400] 610 229	[6619] 719 224	[6362] 719 219				
[20] 76	[402] 45 268	[1055] 119 268	[1669] 189 268	[2274] 257 267	[2898] 327 266	[3521] 398 264	[4178] 472 261	[4791] 541 258	[5394] 609 255	[6551] 661 249					
[22] 83	[366] 41 296	[1005] 114 295	[1629] 184 295	[2257] 255 294	[2856] 323 292	[3480] 393 290	[4136] 467 288	[4756] 537 285	[5205] 588 279						
[25] 95	[301] 34 336	[940] 106 336	[1588] 179 335	[2231] 252 334	[2825] 319 333	[3419] 386 331	[4086] 462 328	[4710] 532 325	[5205] 588 314						
[30] 114		[845] 96 402	[1480] 167 401	[2151] 243 400	[2759] 312 398	[3328] 376 396	[3984] 450 392	[4573] 517 389	[5021] 567 377						
[35] 132			[1348] 152 468	[2057] 232 466	[2623] 296 464	[3183] 360 463	[3883] 439 457	[4354] 492 449							







4000 Series

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

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

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

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] 1.9	[700] 80 4	[1340] 150 2												
[1] 3.8	[750] 85 9	[1430] 160 9	[2110] 240 8	[2770] 315 8	[3460] 390 8	[4170] 470 7	[4890] 550 7	[5610] 635 7	[6310] 715 5	[7010] 790 4	[7700] 870 2			
[2] 7.5	[800] 90 18	[1500] 170 18	[2290] 260 17	[3030] 340 16	[3850] 435 16	[4620] 520 15	[5310] 600 15	[6000] 680 14	[6750] 765 13	[7490] 845 13	[8240] 930 12	[8990] 1015 11	[9730] 1100 10	[10470] 1185 8
[4] 15	[860] 95 38	[1630] 185 38	[2470] 280 37	[3310] 375 36	[4120] 465 36	[4900] 555 35	[5640] 635 34	[6390] 720 34	[7190] 810 33	[7990] 890 33	[8780] 990 32			
[6] 23	[860] 95 57	[1690] 190 57	[2540] 285 56	[3410] 385 55	[4180] 470 54	[4980] 565 53	[5780] 655 52	[6580] 745 50	[7400] 835 49	[8220] 930 47				
[8] 30	[840] 95 76	[1680] 190 76	[2550] 290 75	[3400] 385 74	[4260] 480 73	[5090] 575 72	[5870] 665 70	[6650] 750 68	[7480] 845 66					
[10] 38	[800] 90 95	[1680] 190 95	[2550] 290 94	[3400] 385 93	[4260] 480 92	[5100] 575 91	[5920] 670 89	[6730] 760 86	[7560] 855 84					
[12] 45	[760] 85 114	[1660] 190 114	[2520] 285 113	[3380] 380 112	[4270] 480 111	[5110] 575 110	[5900] 665 108	[6690] 755 105						
[14] 53	[740] 85 133	[1640] 185 133	[2490] 280 132	[3370] 380 131	[4260] 480 130	[5100] 575 129	[5880] 665 127	[6650] 750 124						
[16] 61	[710] 80 153	[1620] 185 153	[2460] 280 152	[3350] 380 151	[4240] 480 149	[5080] 575 147	[5840] 660 145							
[18] 68	[680] 75 172	[1600] 180 172	[2430] 275 171	[3340] 375 170	[4220] 475 168	[5060] 570 166	[5810] 655 164							
[20] 76	[610] 70 192	[1580] 180 191	[2400] 270 190	[3320] 375 189	[4210] 475 187	[5040] 570 185	[5780] 655 183							
[22] 83	[570] 65 211	[1490] 170 210	[2340] 265 209	[3220] 365 208	[4160] 470 206	[5010] 565 204	[5740] 650 201							
[25] 95	[490] 55 239	[1350] 155 238	[2250] 255 237	[3080] 350 236	[4070] 460 235	[4960] 560 233	[5700] 645 230							
[30] 114		[1080] 120 285	[1650] 185 284	[2270] 255 282	[3020] 340 281	[3850] 435 279								
[35] 132			[1520] 170 331	[2120] 240 330	[2870] 325 328	[3760] 425 325								
[40] 151				[2050] 230 376	[2790] 315 374	[3620] 410 371								

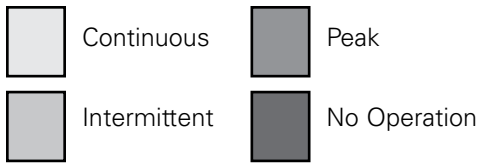
[4390]
495
413 } Torque [lb-in]
Nm
Speed RPM

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.



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 2									
[1] 3.8	[1080] 120 5	[2340] 265 5	[3600] 405 5	[4850] 550 4	[6100] 690 4	[7350] 830 3	[7820] 885 3	[8290] 935 2	[8760] 990 2	
[2] 7.5	[1085] 125 14	[2380] 270 14	[3675] 415 14	[5010] 565 13	[6350] 715 12	[7625] 860 11	[8115] 915 10	[8605] 970 9	[9095] 1030 8	[10075] 1140 7
[4] 15	[1090] 125 23	[2420] 275 23	[3750] 425 23	[5175] 585 22	[6600] 745 21	[7900] 895 19	[8410] 950 18	[9000] 1015 17	[9590] 1085 16	[10450] 1180 14
[6] 23	[1095] 125 35	[2460] 280 35	[3825] 430 35	[5270] 590 34	[6620] 750 33	[7950] 900 31	[8430] 950 30	[8910] 1005 29	[9490] 1070 28	
[8] 30	[1100] 125 48	[2500] 280 48	[3900] 440 47	[5270] 595 46	[6640] 750 45	[7990] 905 43	[8460] 955 43	[8925] 1010 42		
[10] 38	[1130] 130 60	[2550] 290 60	[3975] 450 59	[5320] 600 58	[6670] 755 57	[8045] 910 54	[8595] 970 53	[9150] 1035 52		
[12] 45	[1160] 130 72	[2600] 295 72	[4050] 460 71	[5375] 605 70	[6700] 755 69	[8100] 915 65	[8660] 980 64			
[14] 53	[1105] 125 84	[2535] 285 84	[3965] 450 83	[5325] 600 82	[6685] 755 81	[8065] 910 77	[8620] 975 76			
[16] 61	[1050] 120 96	[2465] 280 95	[3880] 440 95	[5275] 595 94	[6670] 755 93	[8035] 910 89	[8580] 970 88			
[18] 68	[990] 110 108	[2405] 270 107	[3825] 430 107	[5240] 590 105	[6655] 750 104	[7345] 830 100				
[20] 76	[930] 105 121	[2350] 265 120	[3770] 425 120	[5205] 590 118	[6640] 750 116					
[25] 95	[750] 85 151	[2175] 245 150	[3600] 405 149	[5000] 565 147	[6400] 725 146					
[30] 114	[550] 60 181	[1975] 225 180	[3400] 385 179	[4800] 530 177	[6200] 700 176					
[35] 132			[3125] 355 210	[4545] 515 208						
[40] 151			[2850] 320 241	[4295] 485 239						

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 3	[1750] 200 1								
[1] 3.8	[880] 100 7	[1875] 210 6	[2875] 325 6	[3825] 430 5	[4775] 540 4	[5720] 645 3	[6670] 755 2	[7600] 860 1		
[2] 7.5	[905] 100 18	[1940] 220 17	[2975] 335 17	[3990] 450 16	[5010] 565 15	[6010] 680 12	[7010] 790 11	[8000] 905 10	[8980] 1015 8	
[4] 15	[935] 105 30	[2005] 225 29	[3075] 345 28	[4160] 470 27	[5245] 595 26	[6300] 710 23	[7355] 830 21	[8375] 945 19	[9400] 1060 17	[10350] 1170 14
[6] 23	[920] 105 45	[2010] 225 44	[3100] 350 43	[4185] 475 42	[5265] 595 40	[6345] 715 37	[7420] 840 35	[8445] 955 32	[9465] 1070 30	
[8] 30	[905] 100 61	[2015] 230 60	[3125] 355 59	[4205] 475 57	[5290] 600 55	[6385] 720 52	[7485] 845 49	[8510] 960 46		
[10] 38	[880] 100 76	[1995] 225 75	[3095] 350 74	[4205] 475 72	[5295] 600 70	[6390] 720 66	[7480] 845 63	[8525] 960 59		
[12] 45	[860] 95 91	[1975] 225 90	[3095] 350 89	[4200] 475 87	[5305] 600 85	[6390] 720 81	[7475] 845 77			
[14] 53	[830] 95 106	[1945] 220 105	[3055] 345 104	[4165] 470 102	[5275] 595 100	[6360] 720 96	[7445] 840 92			
[16] 61	[805] 90 122	[1910] 215 120	[3020] 340 119	[4130] 465 117	[5245] 595 115	[6330] 715 111	[7420] 840 107			
[18] 68	[740] 85 137	[1860] 210 136	[2980] 335 134	[4105] 465 132	[5235] 590 130	[6305] 715 125	[7380] 835 121			
[20] 76	[680] 75 153	[1810] 205 152	[2940] 330 150	[4085] 460 147	[5225] 590 145	[6285] 710 140				
[25] 95	[570] 65 191	[1665] 190 189	[2800] 315 187	[4005] 455 184	[5210] 590 182	[6135] 695 177				
[30] 114		[1520] 170 228	[2645] 300 226	[3765] 425 223	[4885] 550 220	[5985] 675 215				
[35] 132			[2400] 270 265	[3510] 395 263						
[40] 151			[2155] 245 305	[3260] 370 303						



4000 Series

Dimensions

Standard Mount

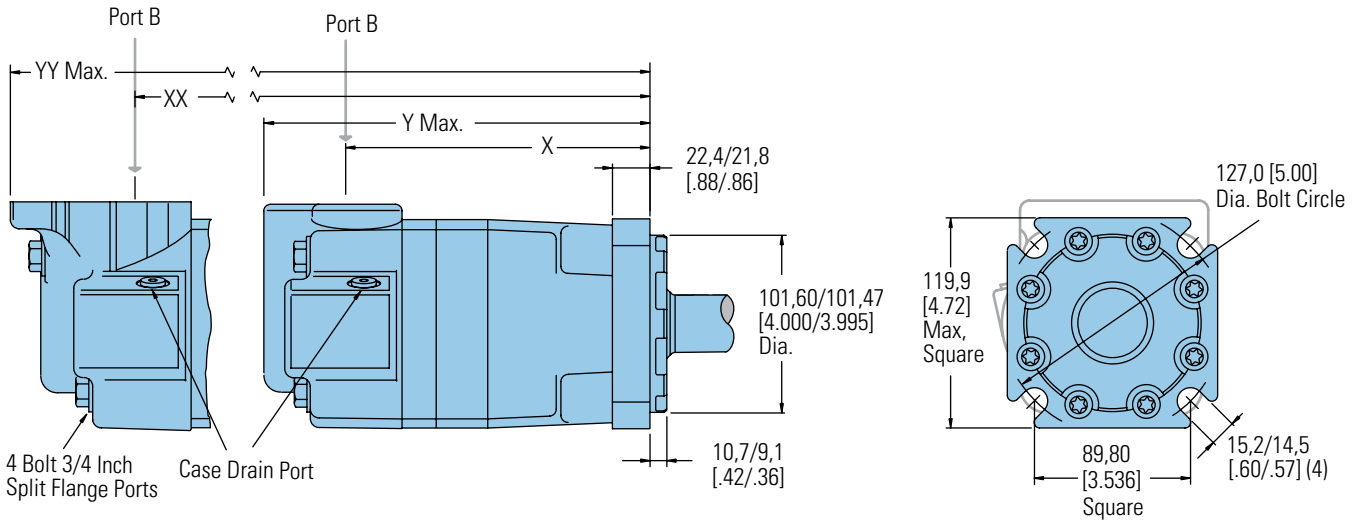
Ports

- 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)

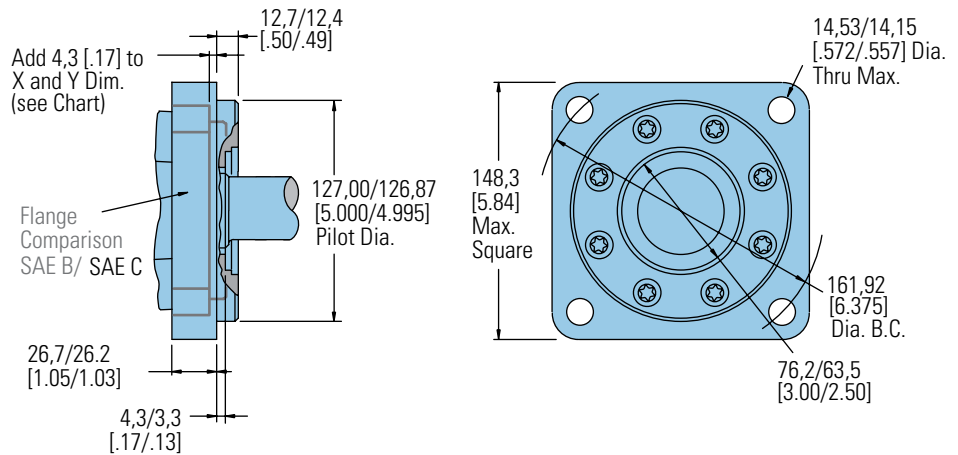
Standard Rotation Viewed from Shaft End

- 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

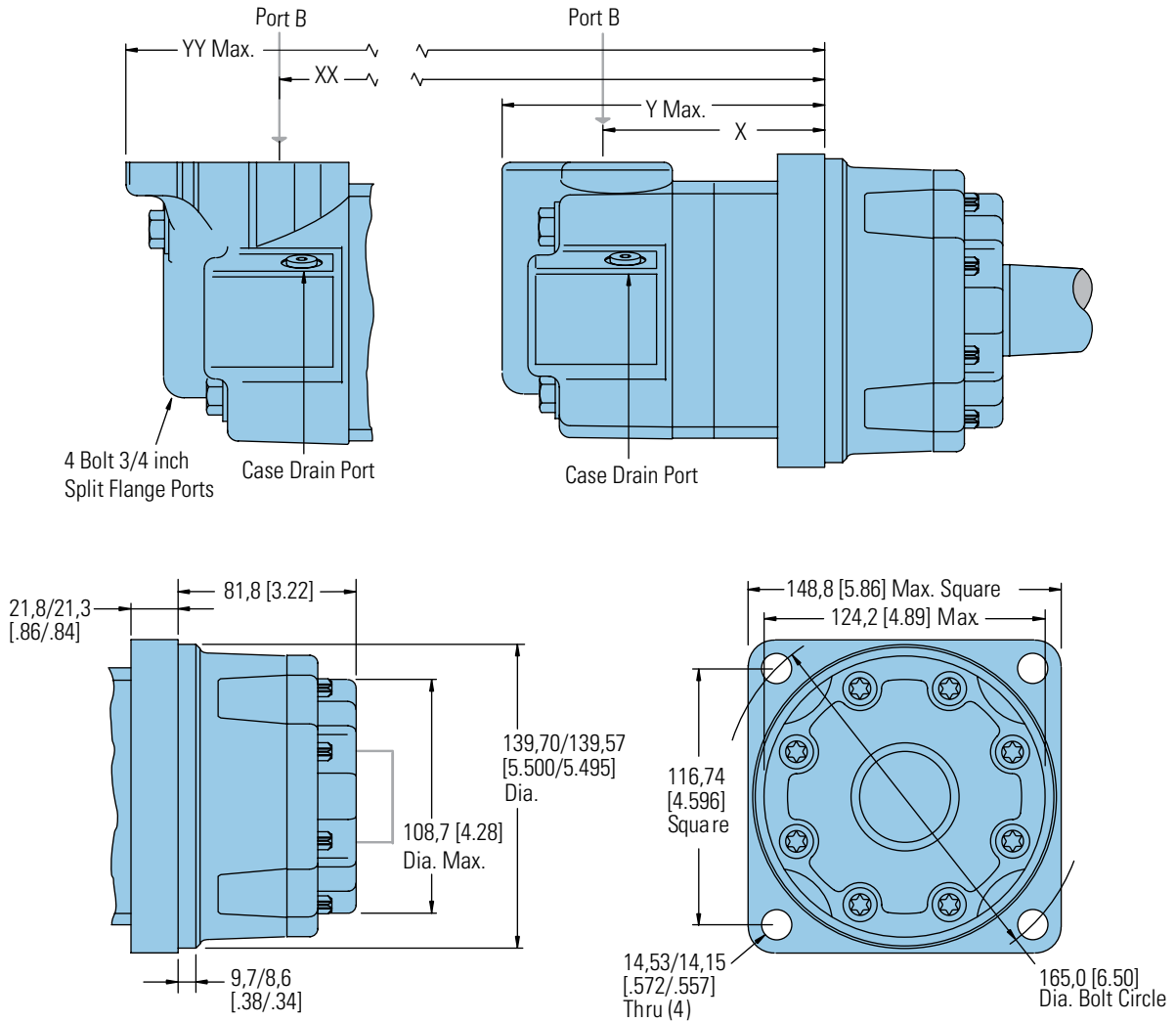
Wheel Mount

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

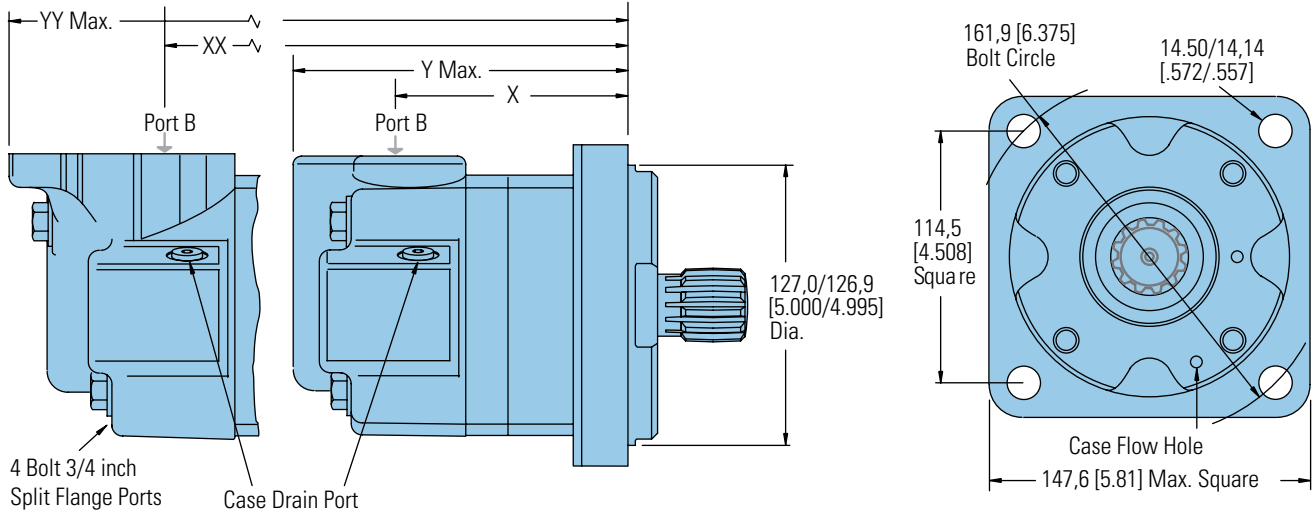
Ports

- 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

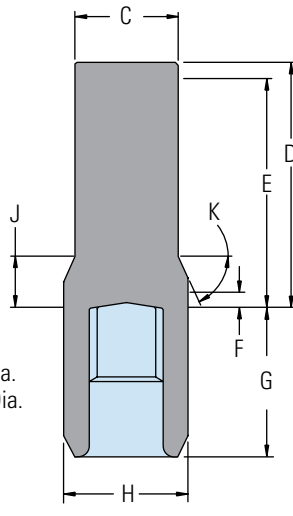
Bearingless



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

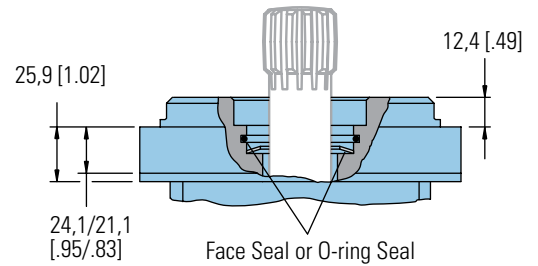
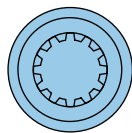
Note:

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



- 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

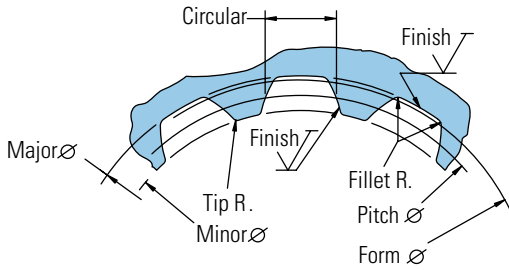
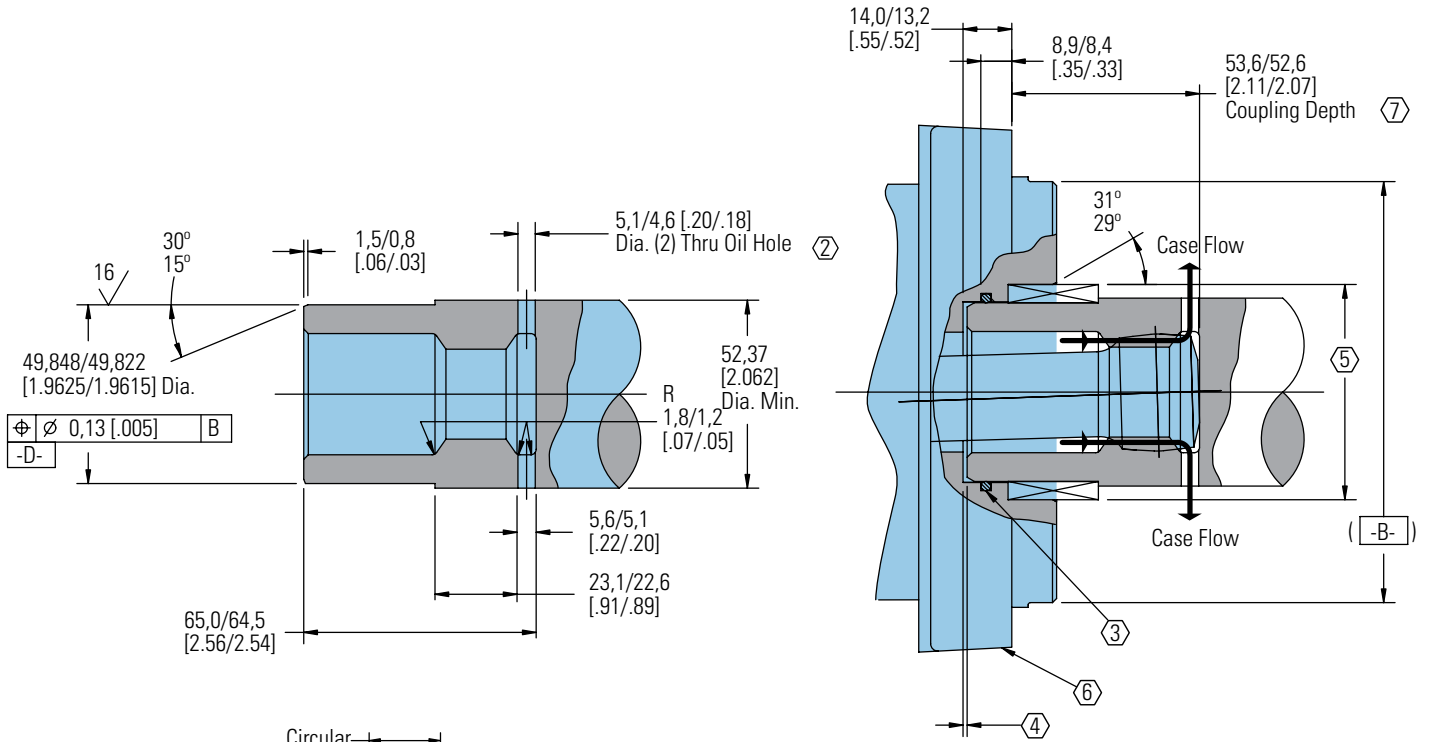
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	91,0 [3.58]	146,8 [5.78]	100,1 [3.94]	178,8 [7.04]
130 [7.9]	95,0 [3.74]	150,8 [5.94]	104,1 [4.10]	182,9 [7.20]
160 [9.9]	101,4 [4.00]	157,1 [6.19]	110,5 [4.35]	189,2 [7.45]
205 [12.5]	109,9 [4.33]	165,7 [6.52]	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] $\begin{matrix} \nearrow \\ \searrow \end{matrix}$ 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

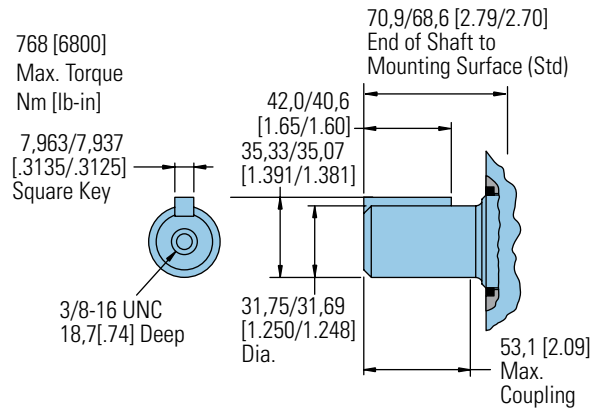
C-4

4000 Series

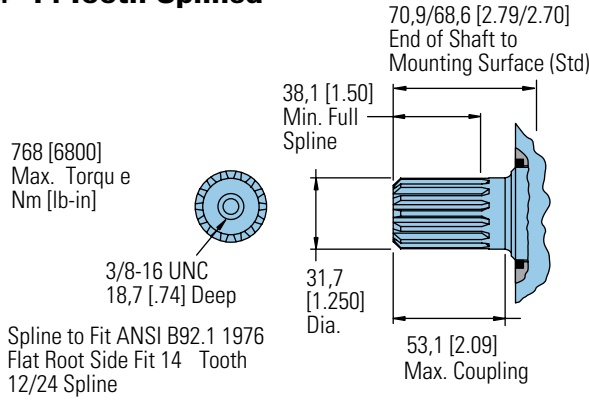
Dimensions

Shafts

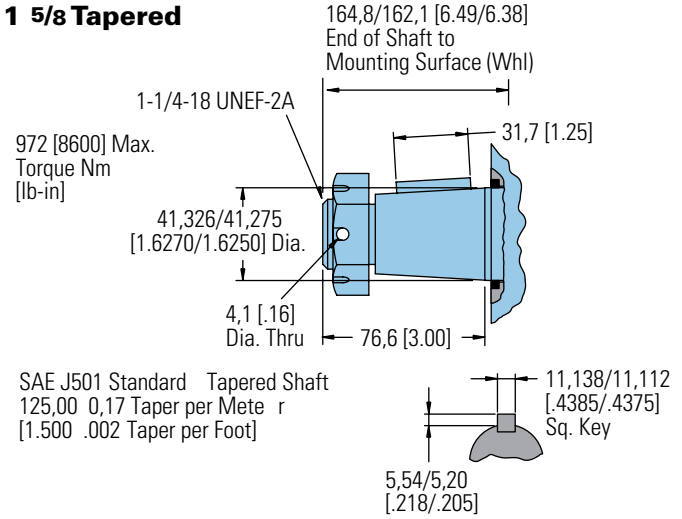
1 1/4 Inch Straight



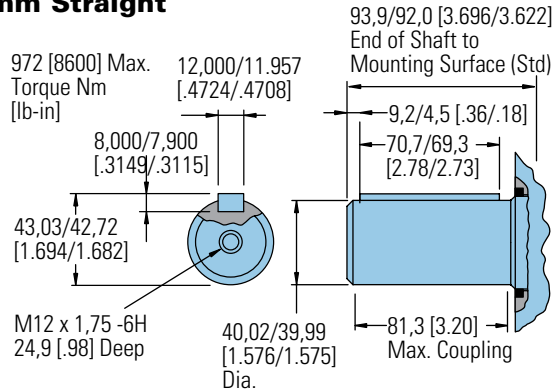
1 1/4 -14 Tooth Splined



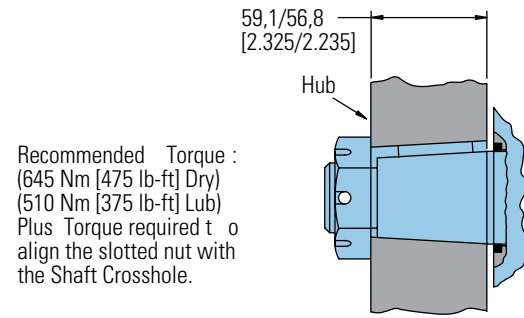
1 5/8 Tapered



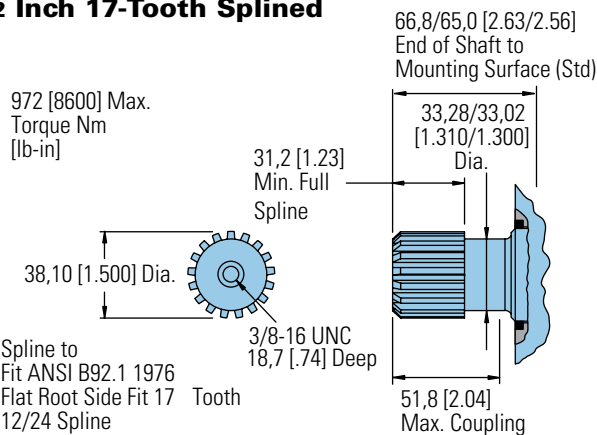
40 mm Straight



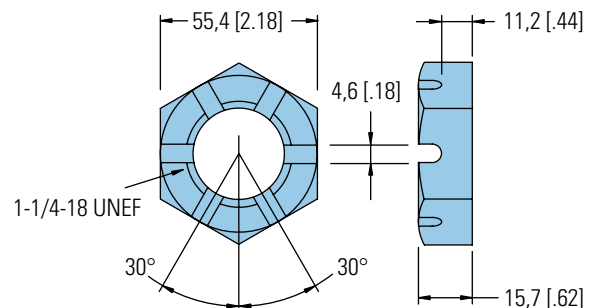
Tapered Shaft Hub Data



1 1/2 Inch 17-Tooth Splined



Slotted Hexagon Nut



4000 Series

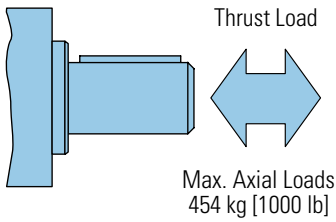
Shaft Side Load Capacity

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



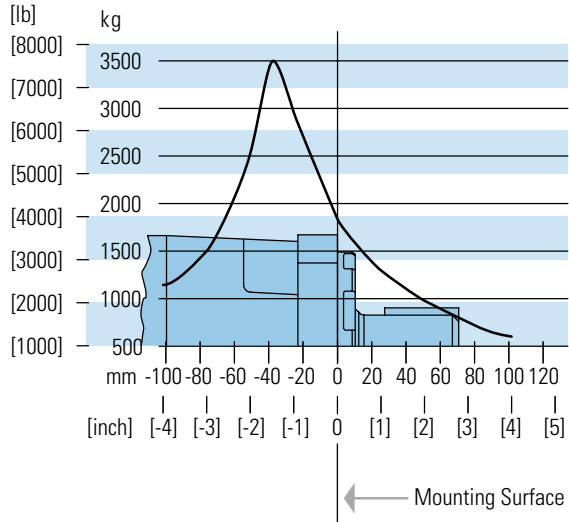
B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

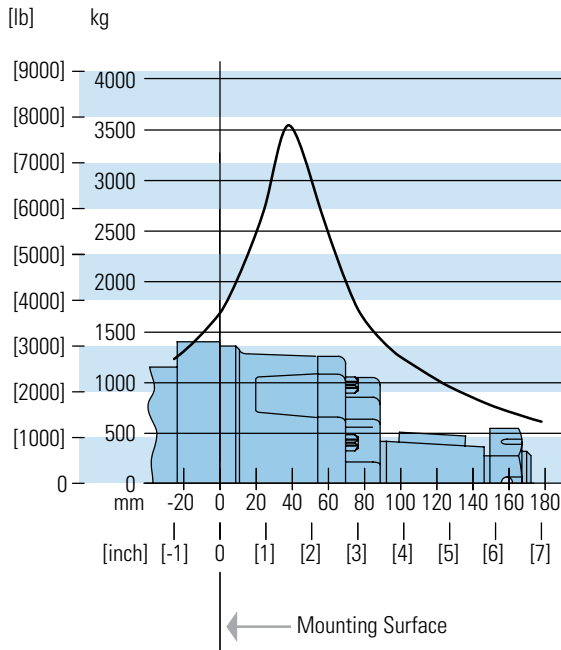
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

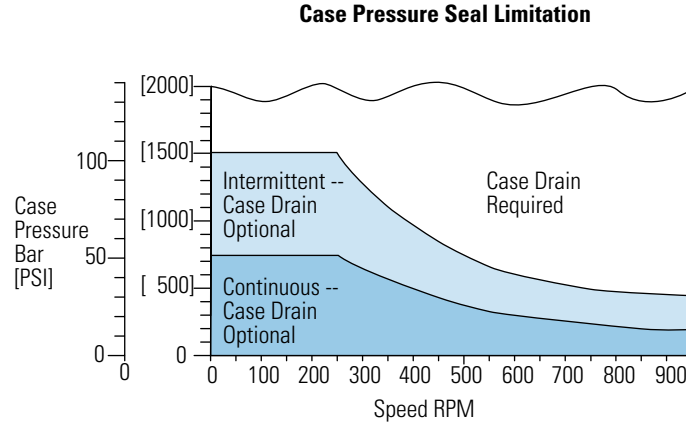
Char-Lynn 4000 Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine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

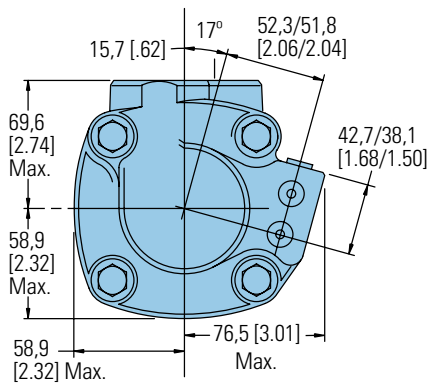
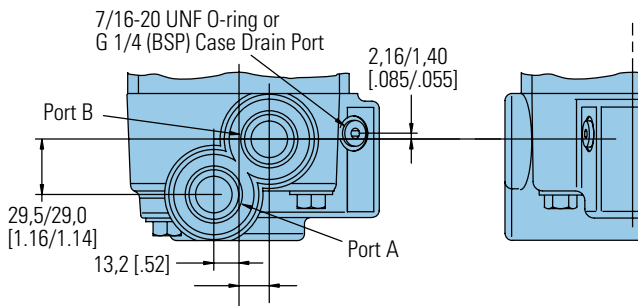


4000 Series

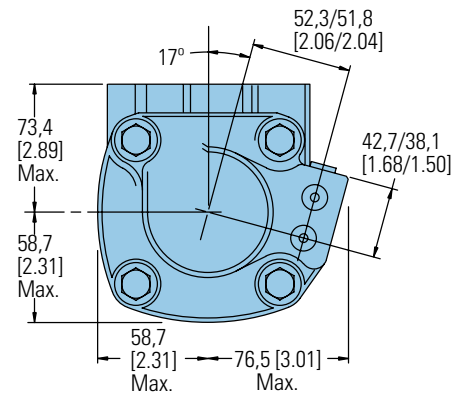
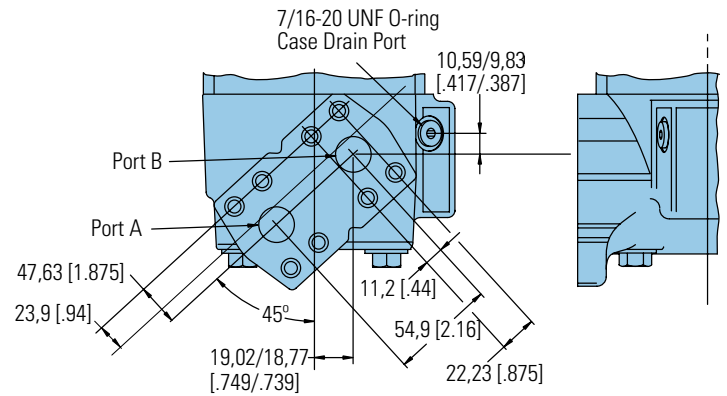
Dimensions

Ports

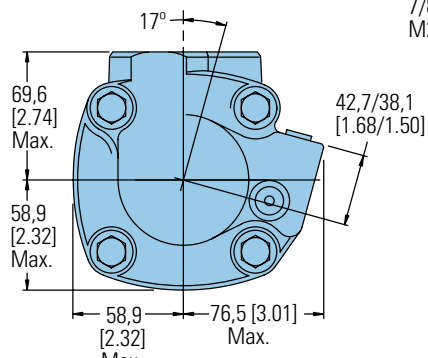
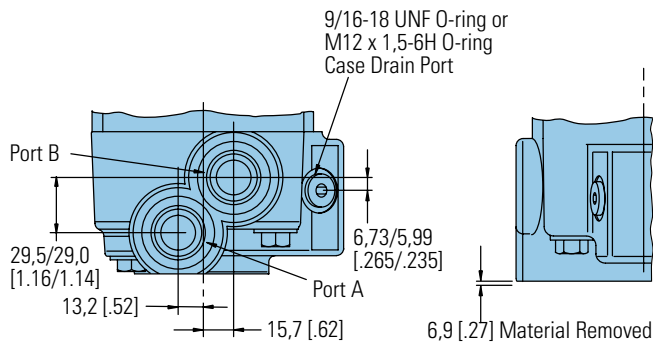
1-1/16-12 O-ring Ports (2) or G 3/4 (BSP) Ports (2)



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)



C-4

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 1/4 Inch Straight	1 1/16 O-ring	111-1033	-1034	-1035	-1036	-1037	—	-1038	-1039	-1062
3/4 inch Split Flange			111-1044	-1015	-1045	-1046	-1016	—	-1017	-1018	—	—
40 mm Straight		G 3/4 (BSP)	111-1052	-1053	-1054	-1055	-1056	—	-1057	-1058	—	—

* New Release

111-1057

4000 Series

Model Code

The following 30-digit coding system has been developed to identify all of the configuration options for the 4000 Series motor. Use this model code to specify a motor with the desired features. All 30 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

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

1 Product
M - Motor

2, 3 Series
04 - 4000 Series

4, 5, 6 Displacement
cm³/r [in³/r]

067 - 109.8 cm³/r [6.70 in³/r]
080 - 130.3 cm³/r [7.95 in³/r]
099 - 162.2 cm³/r [9.90 in³/r]
125 - 205.5 cm³/r [12.54 in³/r]
150 - 246.3 cm³/r [15.03 in³/r]
 171 - 280.1 cm³/r [17.09 in³/r]
190 - 311.8 cm³/r [19.03 in³/r]
 225 - 369.0 cm³/r [22.52 in³/r]
240 - 393.9 cm³/r [24.04 in³/r]
301 - 492.6 cm³/r [30.06 in³/r]
 342 - 560.2 cm³/r [34.18 in³/r]
 381 - 623.9 cm³/r [38.07 in³/r]

7, 8 Mounting Type
AA - Bearingless, 4 Bolt: 127.00 [5.000] Pilot Dia. 14.27 [.562] Dia. Holes on 161.92 [6.375] Dia. Bolt Circle
AB - Standard, 4 Bolt: 101.60 [4.000] Pilot Dia. 14.7 [.58] Slots on 127.00 [5.000] Dia. Bolt Circle. (SAE B)
AC - Wheel, 4 Bolt: 139.70 [5.500] Pilot Dia. 14.27 [.562] Dia. Holes on 165.10 [6.500] Dia. Bolt Circle.

AD - Wheel, 4 Bolt: 127.00 [5.000] Pilot Dia. .500-13 UNC-2B Threaded Holes on 147.62 [5.812] Dia. Bolt circle.

AF - Standard, 4 Bolt: 127.00 [5.000] Pilot Dia. 14.27 [.562] Dia. Holes on 161.92 [6.375] Dia. Bolt Circle. (SAE C)

AH - Standard: ISO Flange 125 B4hw (ISO 3019/2) 124.97 [4.920] Pilot Dia. 14.27 [.562] Dia. Holes on 160.00 [6.299] Dia. Bolt Circle

AP - Wheel, 4 Bolt: 160.0 [6.30] Pilot Dia. with 5.8 [.23] Pilot Length and 18.00 [.709] Dia Holes on 200.00 [7.874] Bolt Circle (ISO Compatible)

9, 10 Output Shaft
00 - None (Bearingless)
01 - 31.75 [1.250] Dia. Straight With .375-16UNC-2B Thread, 53.1 [2.09] Max Coupling Length, 7.938 [.3125] Sq x 41.27 [1.625] Straight Key

02 - 41.28 [1.625] Dia. Tapered with 11.112 [.4375] Sq x 31.75 [1.250] Straight Key, 1.250-18UNEF-2A Thread with Slotted Hex Nut

03 - 31.75 [1.250] Dia. Flat Root Side Fit, 14 Tooth, 12/24 DP 30° Involute Spline, 38.1 [1.50] Minimum Full Spline Length with .375-16UNC-2B Thread

10 - 38.10 [1.500] Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30°. Involute Spline, 31.2 [1.23] Minimum Full Spline Length, with .375-16 UNC-2B Thread in End

11 - 40.00 [1.575] Dia. Straight with M12 x 1.75-6H Thread, 7.955 [.3132] x 11.979 [.4716] Wide X 69.98 [2.755] Straight Key

21 - 40.00 [1.575] Dia. 10:1 Tapered Shaft per ISO R775 with .750-16 UNF-2B Threaded in End, 12W x 8H 70L [.472W x .313H x 2.76L] Key

22 - None (Bearingless) European Spline

25 - 42.00 [1.654] Dia. 10:1 Tapered Shaft per ISO R775 with .750-16 UNF-2B Thread in End, 12W x 8H X 63L [.472W X .313H X 2.48L] Key

11, 12 Ports
AA - .875-14 UNF-2B SAE O-Ring Ports - Staggered Ports

AB - 1.0625-12 UN-2B SAE O-Ring Ports - Staggered Ports

AC - G 3/4 Ports - Staggered Ports

AD - 19.05 [.750] 4 Bolt Split Flange Staggered Ports Standard Pressure Series (Code 61)

AE - M22 X 1.5-6H O-Ring Port - Staggered Ports

AG - 12.70 [.500] Dia. Manifold Ports

AJ - Dash 12 Stc Type II+ (Snap to Connect) Ports - Staggered Ports

13, 14 Case Flow Options
00 - None

01 - .5625-18 UNF-2B SAE O-Ring Port with Shuttle

02 - .4375-20 UNF-2B SAE O-ring Port with Check Valve

03 - G 1/4 BSP Straight Thread with Check Valve

06 - .4375-20 UNF-2B SAE O-ring Port with Reverse Flow Shuttle

10 - Dash 6 Stc Type II+ (Snap to Connect) Port

15 Low Pressure Relief
0 - None

A - Set at 4.5 Bar [65 lbf/in²]

B - Set at 15.2 Bar [220 lbf/in²]

16, 17 Pressure/Flow Option
00 - None

18 Geroler Option
0 - Standard

19 Seal Option
0 - Standard
 1 - Viton
4 - Seal Guard

20, 21 Accessories
00 - None

AC - M 12 Threaded Connector, Long Body Digital Speed and Direction Pickup (Two 36 Pulse Signals in Quadrature per Revolution Pin 1=Power Supply, Pin 2=Output Signal 1, Pin 3=Common, Pin 4=Output Signal 2)

AD - M 12 Threaded Connector, Digital Speed And Direction Pickup (One 72 Pulse per Rev Speed Signal and One Directional Signal (Pin 1=Power, Pin 2=Direction, Pin 2=Common, Pin 4=Speed))

22, 23 Special Features (Hardware)

00 - None
 17 - Low Noise Valve Plate

24, 25 Special Features (Assembly)

00 - None

26, 27 Paint/Packaging
00 - No Paint, Individual Box

AA - Low Gloss Black Primer, Individual Box
 AB - Epoxy Coated (Frost Gray), Individual Box

28, 29 Customer Identification

00 - None

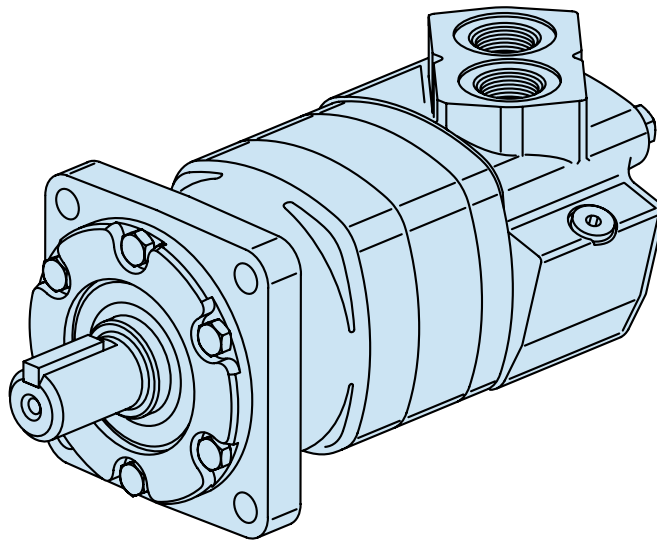
30 Design Code
F - Sixth

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

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
- Spayer, 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.

C-5



Mowing



Snow Removal



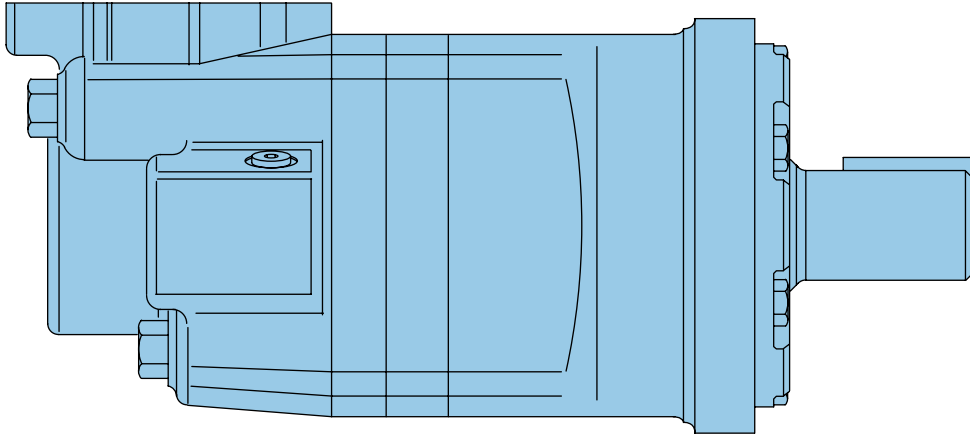
Sprayer



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 System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

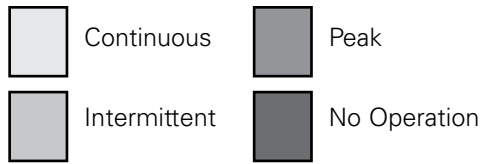
per ISO Cleanliness Code, 4406: 20/18/13

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.

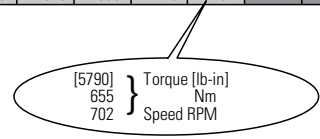


195 cm³/r [11.9 in³/r]
 Δ Pressure Bar [PSI]

	[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 9	[650] 75 7	[1450] 165 5	[2290] 260 2						
[2] 7,5	[290] 35 38	[680] 75 37	[1500] 170 35	[2340] 265 34	[3100] 350 30	[3880] 440 26	[4140] 470 18			
[4] 15	[300] 35 77	[710] 80 76	[1500] 175 74	[2390] 270 72	[3200] 365 66	[4030] 455 62	[4600] 520 46	[5200] 590 32	[5790] 655 18	
[8] 30	[310] 35 154	[740] 85 153	[1590] 180 148	[2450] 275 144	[3280] 370 131	[4120] 465 119	[4810] 545 116	[5530] 625 99	[6250] 705 83	[6900] 780 65
[12] 45	[320] 35 232	[750] 85 230	[1610] 180 225	[2480] 280 221	[3330] 375 212	[4190] 475 203	[4990] 565 186	[5810] 655 167	[6630] 750 148	[7320] 825 118
[16] 61	[300] 35 309	[730] 80 307	[1600] 180 303	[2470] 280 300	[3340] 375 291	[4210] 475 283	[5090] 575 258	[5900] 665 236	[6710] 760 214	[7470] 845 181
[20] 76	[270] 30 387	[720] 80 384	[1590] 180 379	[2460] 280 374	[3350] 380 365	[4240] 480 356	[5100] 575 332	[5950] 670 306	[6800] 770 280	[7620] 860 247
[24] 91	[240] 25 465	[700] 80 462	[1570] 175 456	[2440] 275 450	[3330] 375 440	[4220] 475 429	[5080] 575 413	[5940] 670 388	[6810] 770 363	
[28] 106	[190] 20 542	[660] 75 539	[1530] 175 532	[2400] 270 526	[3300] 375 514	[4200] 475 502	[5060] 570 476	[5940] 670 448	[6810] 770 421	
[32] 121	[160] 20 620	[630] 70 617	[1500] 170 609	[2370] 270 602	[3270] 370 589	[4160] 470 576	[5040] 570 542	[5920] 670 511	[6790] 765 480	
[36] 136	[120] 15 697	[620] 70 692	[1480] 165 683	[2350] 265 674	[3240] 365 659	[4130] 465 645	[5000] 565 601	[5880] 665 564	[6760] 765 527	
[40] 151	[80] 10 775	[610] 70 770	[1450] 165 759	[2320] 260 749	[3210] 365 733	[4100] 465 718	[4960] 560 666	[5840] 660 624		
[45] 170		[590] 65 866	[1410] 160 854	[2280] 260 843	[3170] 360 825	[4060] 460 808	[4920] 555 749	[5790] 655 702		

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

	[250] 15	[500] 35	[1000] 70	[1000] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] 1,9	[430] 50 7	[860] 95 4	[1890] 215 1							
[2] 7,5	[440] 50 30	[900] 100 29	[1940] 220 26	[2990] 340 24	[3960] 445 21	[4920] 555 17	[5040] 570 11	[5930] 670 6		
[4] 15	[460] 50 61	[940] 105 60	[2000] 225 56	[3060] 345 54	[4080] 460 48	[5090] 575 42	[5680] 640 39	[6630] 750 30	[7570] 855 12	[8520] 965 6
[8] 30	[470] 55 122	[960] 110 120	[2060] 235 116	[3150] 355 113	[4210] 475 104	[5260] 595 95	[6180] 700 81	[7100] 800 67	[8020] 905 53	[9020] 1020 37
[12] 45	[480] 55 183	[970] 110 182	[2080] 235 178	[3180] 360 174	[4270] 480 165	[5360] 605 157	[6390] 720 141	[7420] 840 125	[8450] 955 109	[9510] 1075 92
[16] 61	[450] 50 245	[960] 110 244	[2070] 235 240	[3180] 360 236	[4290] 485 228	[5420] 610 221	[6480] 730 202	[7490] 845 184	[8480] 960 165	[9540] 1180 145
[20] 76	[420] 45 307	[940] 105 306	[2050] 230 301	[3160] 355 358	[4290] 485 287	[5440] 615 277	[6510] 735 257	[7580] 855 238	[8660] 980 218	[9740] 1100 197
[24] 91	[380] 45 368	[920] 105 365	[2020] 230 361	[3120] 355 358	[4260] 480 348	[5400] 610 338	[6490] 735 316	[7590] 860 294	[8680] 980 271	
[28] 106	[330] 35 430	[870] 100 426	[1980] 225 421	[3100] 350 416	[4240] 480 404	[5380] 610 376	[6480] 730 358	[7580] 855 340	[8670] 980 322	
[32] 121	[290] 35 491	[800] 90 489	[1920] 215 481	[3050] 345 475	[4170] 470 461	[5290] 600 448	[6410] 725 423	[7520] 850 398	[8640] 975 373	
[36] 136	[250] 30 556	[730] 80 549	[1850] 210 543	[2980] 335 537	[4060] 460 524	[5150] 580 509	[6300] 710 482	[7440] 840 456		
[40] 151	[200] 25 615	[690] 80 612	[1790] 200 606	[2940] 330 599	[4010] 455 585	[5130] 580 570	[6190] 700 540	[7100] 800 510		
[45] 170		[570] 65 688	[1760] 200 682	[2860] 325 674	[3960] 445 658	[5070] 575 641	[6080] 685 608	[6990] 755 574		
[50] 189			[1720] 195 758	[2800] 315 749	[3890] 440 731	[4920] 555 712	[5940] 670 676			
[55] 208			[1670] 190 834	[2740] 310 824	[3820] 430 804	[4890] 550 783	[5880] 665 744			

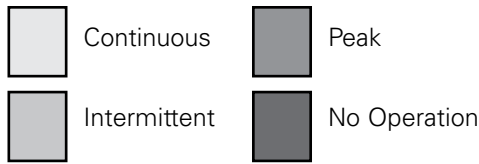


6000 Series

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.



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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
15	35	70	105	140	170	205	240	275	310

[5]	[530]	[1120]	[2440]						
1,9	60 6	125 4	275 1						
[2]	[540]	[1150]	[2460]	[3620]	[4780]	[5690]	[6670]	[7780]	
7,5	60 24	130 23	280 22	410 20	540 17	645 14	755 10	880 4	
[4]	[550]	[1180]	[2560]	[3800]	[5030]	[6050]	[7070]	[8260]	[9070]
15	60 48	135 47	290 45	430 42	570 38	685 32	800 24	935 17	1025 10
[8]	[560]	[1250]	[2650]	[3970]	[5280]	[6480]	[7710]	[8740]	[9770]
30	65 96	140 95	300 91	450 87	595 81	730 73	870 64	985 55	1105 46
[12]	[570]	[1260]	[2690]	[4050]	[5420]	[6730]	[8040]	[9260]	[10490]
45	65 144	140 143	305 140	460 135	610 129	760 121	910 111	1045 99	1185 88
[16]	[540]	[1230]	[2660]	[4060]	[5450]	[6800]	[8150]	[9400]	[10660]
61	60 193	140 192	300 188	460 184	615 178	770 167	920 156	1060 141	1205 126
[20]	[510]	[1200]	[2630]	[4040]	[5450]	[6820]	[8190]	[9520]	[10840]
76	60 242	135 241	295 232	455 232	615 226	770 216	925 201	1075 184	1225 167
[24]	[480]	[1160]	[260]	[4020]	[5440]	[6840]	[8230]	[9560]	[10900]
91	55 290	130 289	295 282	455 279	615 273	775 260	930 248	1080 232	1230 215
[28]	[420]	[1130]	[2570]	[3990]	[5420]	[6820]	[8220]	[9520]	[10840]
106	45 339	130 336	290 333	450 328	610 320	770 308	930 295	1075 276	1225 257
[32]	[360]	[1100]	[2510]	[3920]	[5330]	[6750]	[8170]	[9440]	
121	40 388	125 384	285 381	445 375	600 368	765 354	920 341	1065 320	
[36]	[300]	[1060]	[2440]	[3830]	[5220]	[6660]	[8100]	[9330]	
136	35 436	120 430	275 421	435 416	590 410	750 396	915 383	1055 360	
[40]	[270]	[1020]	[2400]	[3780]	[5150]	[6580]	[8020]	[9220]	
151	30 485	115 478	270 466	425 461	580 456	745 441	905 427	1040 403	
[50]		[982]	[2180]	[3420]	[4660]	[6050]	[7440]		
189		110 597	245 582	385 576	525 570	685 551	840 534		
[60]			[1960]	[3250]	[4540]	[5750]	[7080]		
227			220 698	365 691	515 684	650 661	800 641		

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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
15	35	70	105	140	170	205	240	275	310

[1]	[760]	[1570]	[3230]						
3,8	85 4	175 2	365 1						
[2]	[780]	[1610]	[3270]	[4910]	[6440]	[7760]	[9080]	[10590]	
7,5	90 19	180 18	370 17	555 16	730 14	875 12	1025 9	1195 4	
[4]	[800]	[1640]	[3300]	[4970]	[6570]	[8160]	[9570]	[11270]	[12120]
15	90 38	185 38	375 37	560 35	740 33	920 29	1080 22	1275 14	1370 5
[8]	[810]	[1650]	[3370]	[5080]	[6740]	[8430]	[10050]	[11620]	[12880]
30	90 77	185 76	380 74	575 72	760 68	950 65	1135 55	1315 45	1455 33
[12]	[800]	[1620]	[3390]	[5130]	[6810]	[8520]	[10190]	[11860]	[13640]
45	90 115	185 115	385 112	580 109	770 105	965 100	1150 91	1340 81	1540 79
[16]	[750]	[1600]	[3380]	[5120]	[6820]	[8560]	[10230]	[11920]	
61	85 154	180 154	380 151	580 147	770 143	965 132	1155 126	1345 116	
[20]	[680]	[1580]	[3360]	[5120]	[6840]	[8590]	[10280]	[11980]	
76	75 193	180 193	380 189	580 187	775 182	970 175	1160 162	1355 152	
[24]	[620]	[1520]	[3280]	[5060]	[6780]	[8530]	[10240]		
91	70 232	170 230	370 229	570 225	765 220	965 212	1155 204		
[28]	[570]	[1460]	[3210]	[5000]	[6730]	[8480]	[10200]		
106	65 270	165 268	365 266	565 261	760 256	960 248	1150 236		
[32]	[530]	[1420]	[3140]	[4930]	[6640]	[8380]	[10120]		
121	60 309	160 306	355 304	555 299	750 292	945 282	1145 269		
[36]	[450]	[1370]	[3010]	[4840]	[6500]	[8250]	[10000]		
136	50 348	155 346	340 340	545 336	730 329	930 317	1130 301		
[40]	[380]	[1320]	[2880]	[4740]	[6460]	[8120]			
151	45 387	150 386	325 380	535 375	730 368	915 359			
[50]		[1140]	[2650]	[4540]	[6440]	[8050]			
189		130 482	300 475	515 469	730 460	910 449			
[60]			[2460]	[4430]	[6360]	[7860]			
227			280 570	500 562	720 552	890 538			

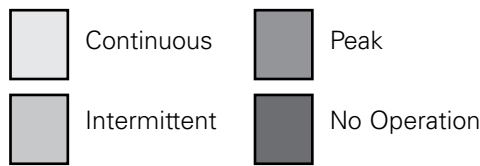


6000 Series

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.

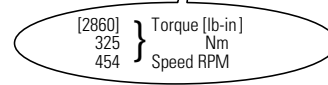


490 cm³/r [30.0 in³/r]
 Δ Pressure Bar [PSI]

	[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				

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				







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

735 cm³/r [45.0 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
[1] 3,8	[1311] 148 4	[2775] 314 4	[4200] 475 3	[5480] 619 3	[7000] 791 2					
[2] 7,5	[1340] 151 10	[2856] 323 10	[4535] 512 10	[5809] 656 10	[7551] 853 9	[8685] 981 7	[10182] 1150 6	[11121] 1257 5		
[4] 15	[1253] 142 20	[2854] 322 20	[4363] 493 19	[5813] 657 18	[7272] 822 17	[8714] 985 16	[10135] 1145 14	[11537] 1303 13	[12970] 1465 11	[15040] 1699 11
[8] 30	[1290] 146 40	[2889] 326 39	[4540] 513 38	[6130] 693 38	[7703] 870 37	[9202] 1040 37	[10666] 1205 35	[12192] 1378 33	[13713] 1549 32	
[12] 45	[1277] 144 61	[2821] 319 60	[4528] 512 59	[6180] 698 58	[7795] 881 57	[9338] 1055 56	[10877] 1229 54	[12419] 1403 52		
[16] 61	[1196] 135 82	[2753] 311 80	[4478] 506 79	[6148] 695 78	[7768] 878 77	[9376] 1059 76	[10984] 1241 74			
[20] 76	[1092] 123 102	[2794] 316 101	[4320] 488 101	[6021] 680 99	[7697] 870 97	[9311] 1052 96	[10907] 1232 93			
[24] 91	[1206] 136 123	[2556] 289 122	[4162] 470 120	[5871] 663 119	[7564] 855 118	[9289] 1049 116				
[28] 106	[1083] 122 145	[2338] 264 142	[4040] 456 141	[5666] 640 139	[7365] 832 137	[9022] 1019 135				
[32] 121	[950] 107 163	[2110] 238 162	[3795] 429 162	[5457] 617 159	[7122] 805 159	[8828] 997 156				
[36] 136	[726] 82 184	[1845] 208 183	[3517] 397 182	[5223] 590 181	[6853] 774 179					
[40] 151	[515] 58 203	[2227] 252 202	[3270] 369 202	[4965] 561 201	[6672] 754 199					
[50] 189			[3869] 437 254	[4148] 469 252	[5850] 661 250					
[60] 227				[4856] 549 303	[6604] 746 301					

805 cm³/r [49.0 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
[1] 3,8	[1455] 164 4	[3100] 350 4	[4680] 529 2	[6031] 681 2	[7799] 881 1					
[2] 7,5	[1483] 168 9	[3173] 359 9	[5121] 579 9	[6432] 727 8	[8510] 961 7	[9633] 1088 6	[11319] 1279 5	[12127] 1370 5		
[4] 15	[1547] 175 19	[3331] 376 19	[5292] 598 18	[6744] 762 17	[8714] 984 16	[10075] 1138 15	[11352] 1283 14	[12539] 1417 12	[14564] 1645 11	[16377] 1850 10
[8] 30	[1599] 181 35	[3473] 392 35	[5415] 612 34	[7039] 795 33	[8934] 1009 32	[10629] 1201 31	[11842] 1338 29	[14004] 1582 29	[15441] 1745 28	
[12] 45	[1599] 181 56	[3469] 392 56	[5415] 612 55	[7093] 801 53	[9024] 1020 53	[10658] 1204 52	[12283] 1388 50	[13726] 1551 50		
[16] 61	[1543] 174 73	[3395] 384 73	[5357] 605 72	[7032] 794 70	[8983] 1015 69	[10640] 1202 68	[12010] 1357 67			
[20] 76	[1457] 165 93	[3312] 374 92	[5292] 598 91	[6968] 787 89	[8943] 1010 88	[10583] 1196 87	[12146] 1372 86			
[24] 91	[1352] 153 112	[3183] 360 112	[5088] 575 111	[6811] 769 110	[8812] 996 108	[10411] 1176 106				
[28] 106	[1213] 137 131	[3055] 345 131	[5047] 570 131	[6713] 758 129	[8681] 981 128	[10411] 1176 127				
[32] 121	[1075] 121 150	[2907] 328 149	[4884] 552 149	[6546] 740 146	[8395] 949 145	[10060] 1137 144				
[36] 136	[823] 93 168	[2692] 304 168	[4663] 527 168	[6320] 714 167	[8118] 917 165					
[40] 151	[592] 67 187	[2477] 280 186	[4426] 500 186	[6085] 688 185	[7832] 885 184					
[50] 189		[2730] 308 234	[4214] 476 233	[5849] 661 231	[7603] 859 230					
[60] 227			[3806] 430 280	[5459] 617 277	[7407] 837 275					

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

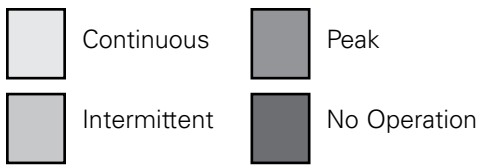
6000 Series

985 cm³/r [60.0 in³/r]
D Pressure Bar [PSI]

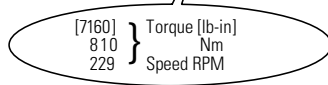
Performance Data

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.



	[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			



6000 Series

Dimensions

Standard Mount

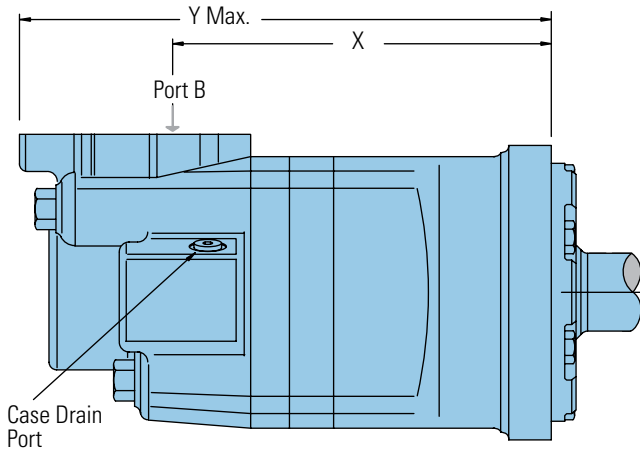
Ports

- 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)

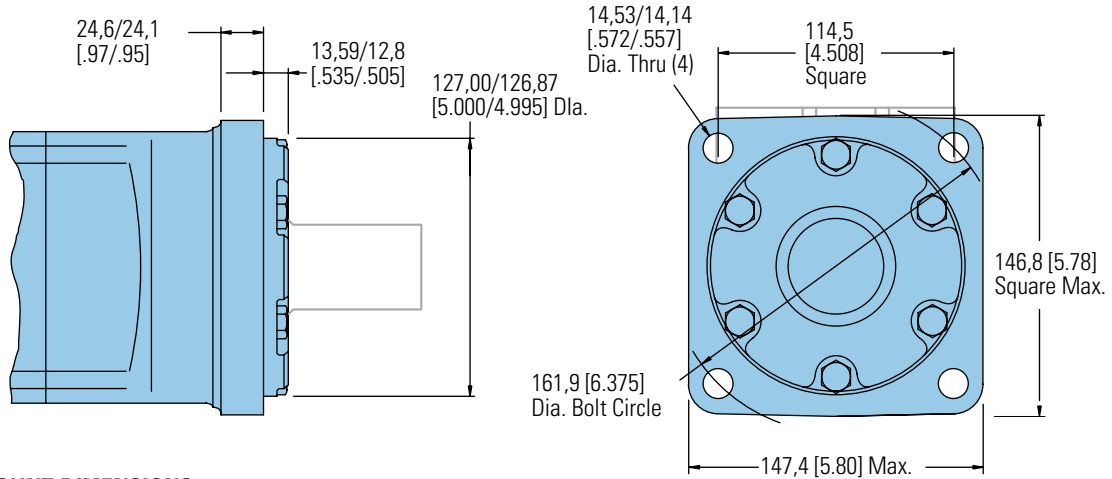
Standard Rotation Viewed from Shaft End

- 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

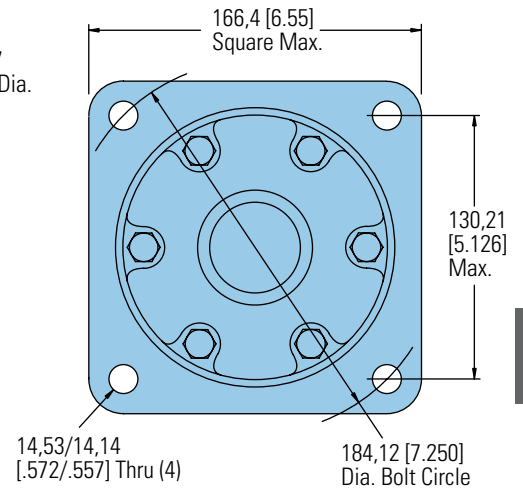
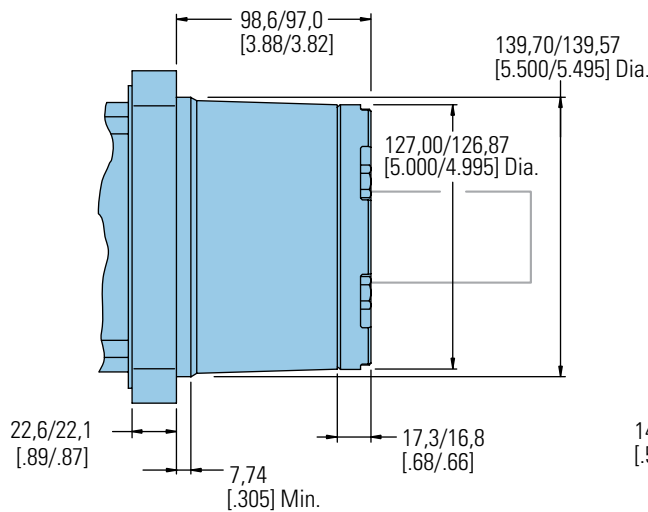
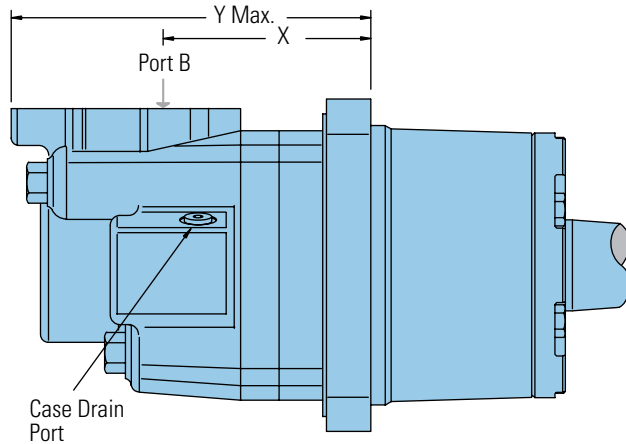
Ports

- 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



C-5

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)

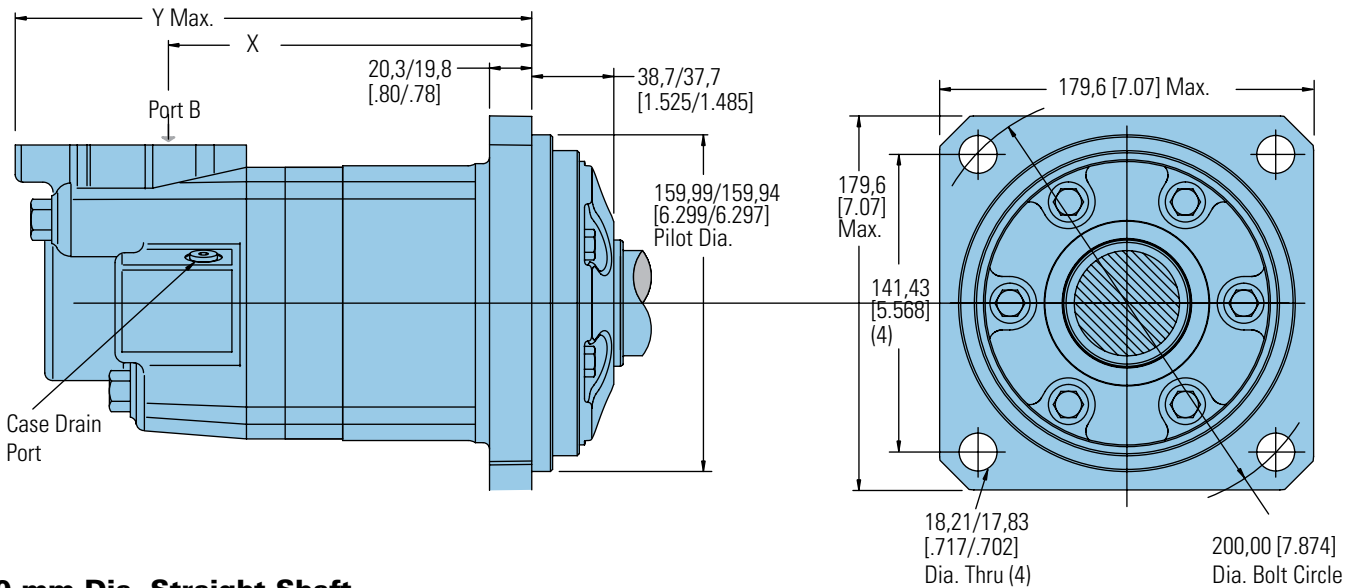
Ports

- 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)

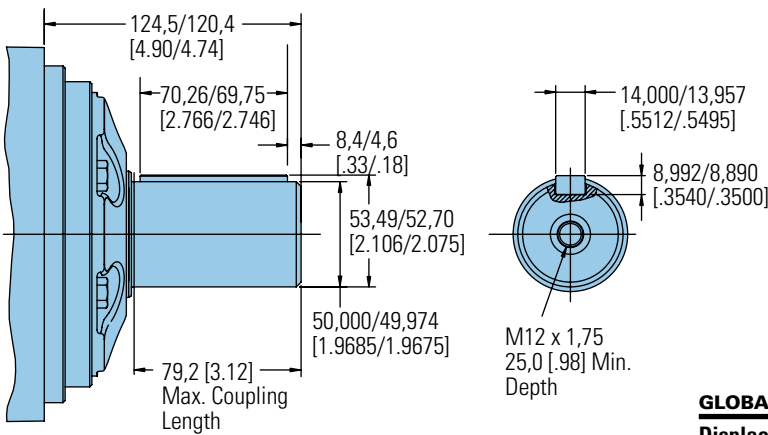
Standard Rotation Viewed from Shaft End

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

Global Mount (ISO)



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

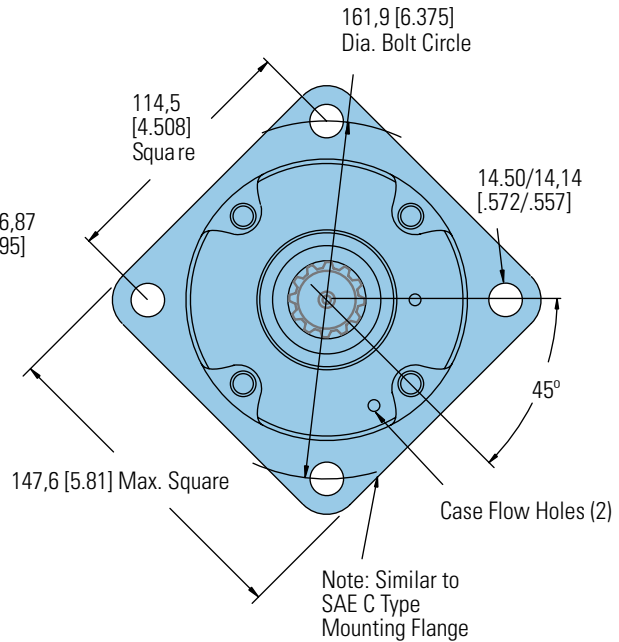
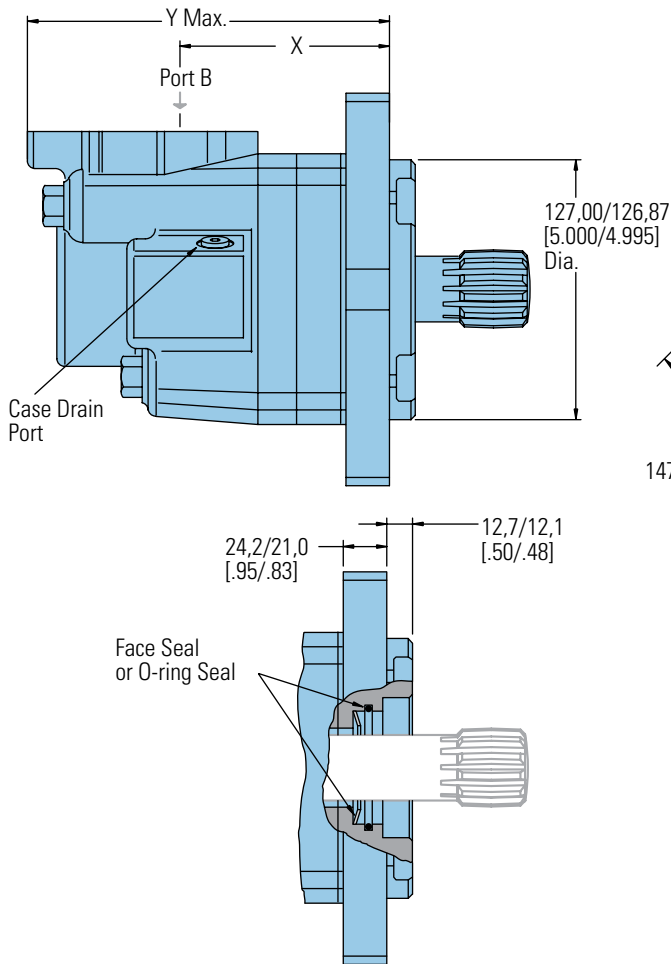
Ports

- 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)

Bearingless

Standard Rotation Viewed from Shaft End

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

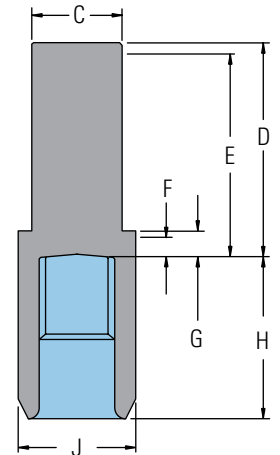


For 6000 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

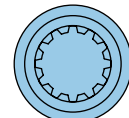
Note:

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]

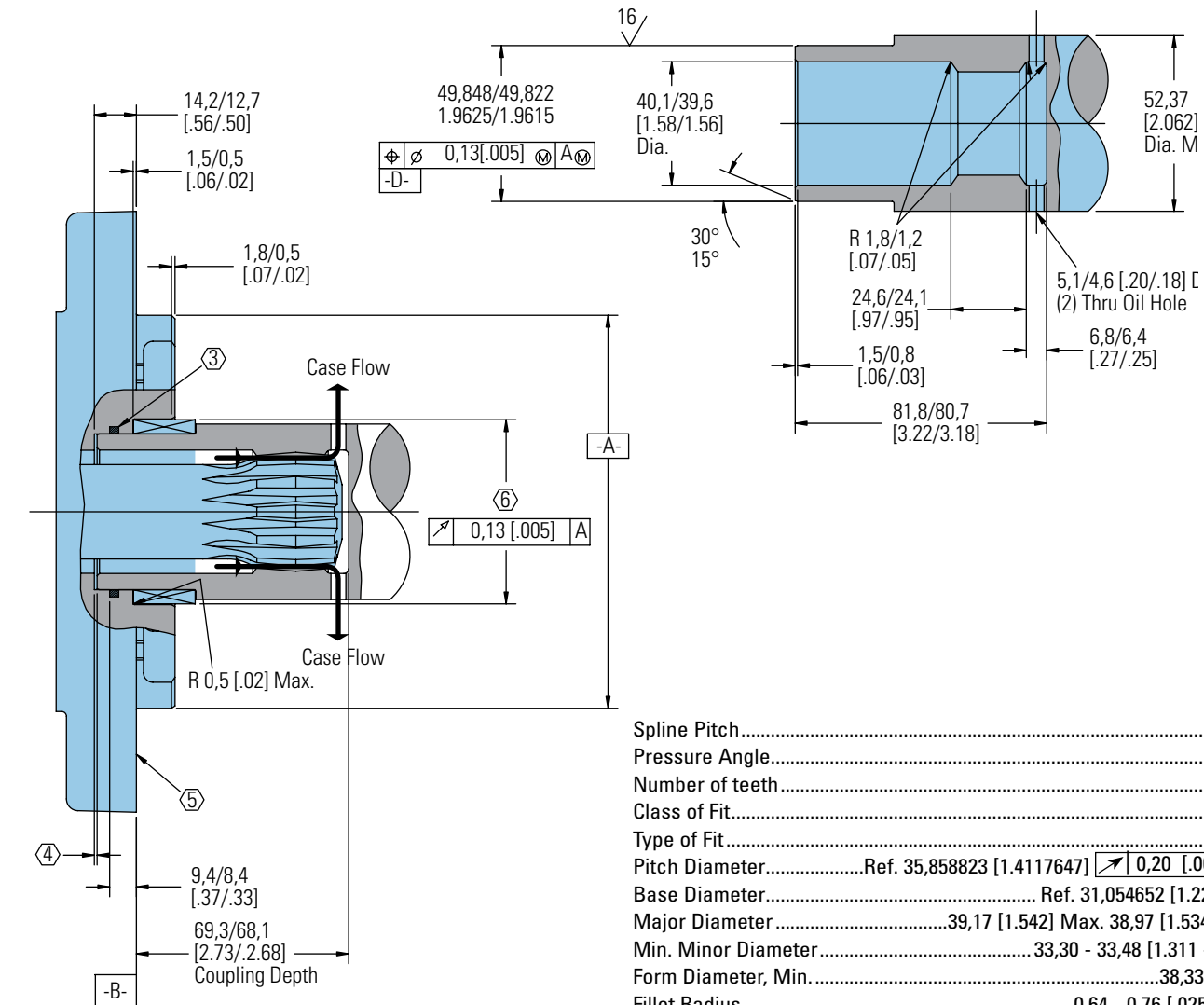
C-5

6000 Series

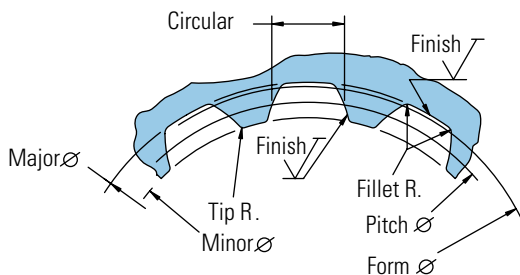
Installation Information

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] $\begin{matrix} \nearrow & 0,20 & [.008] & & D \end{matrix}$
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 [+0.0000 -0.0010]
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

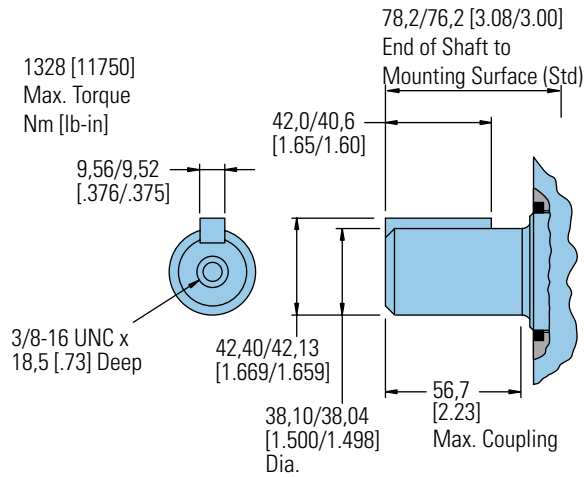


6000 Series

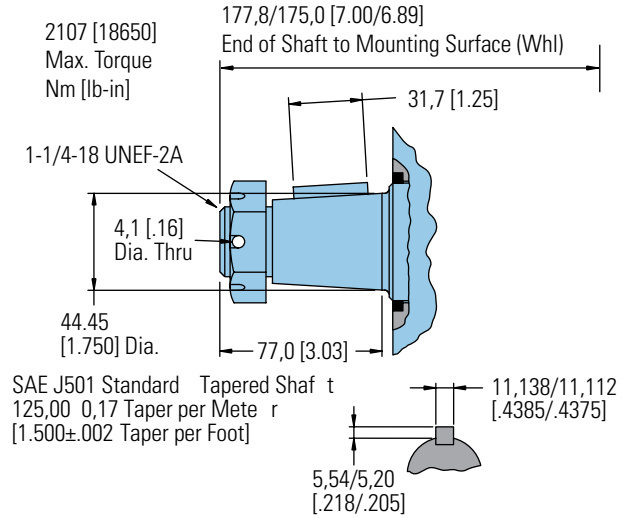
Dimensions

Shafts Splined

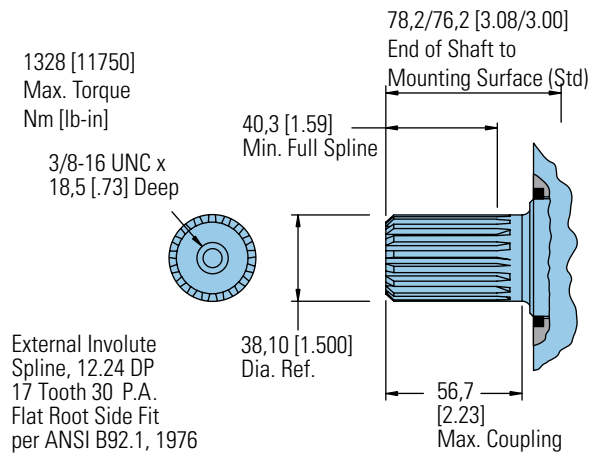
1 1/2 Inch Straight



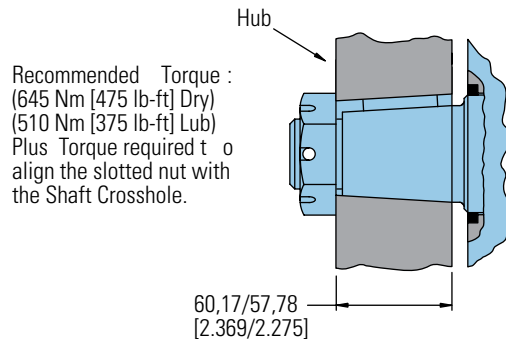
1 3/4 Inch Tapered



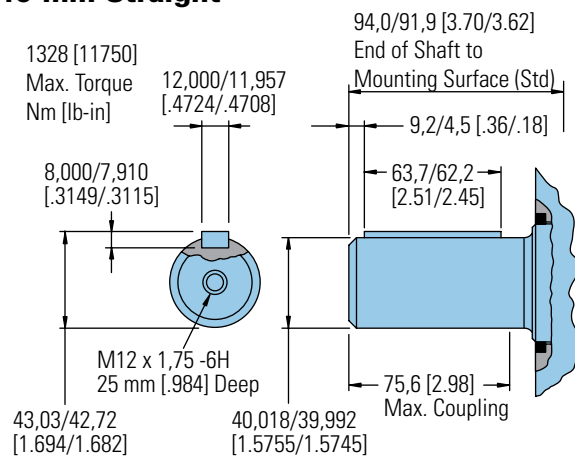
1 1/2 Inch 17 Tooth Splined



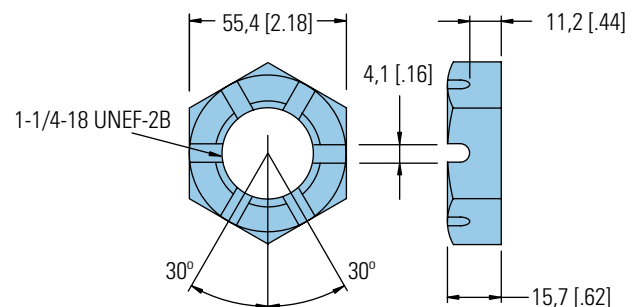
Tapered Shaft Hub Data



40 mm Straight



Slotted Hexagon Nut



6000 Series

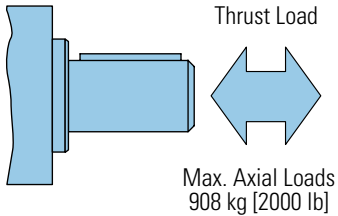
Shaft Side Load Capacity

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



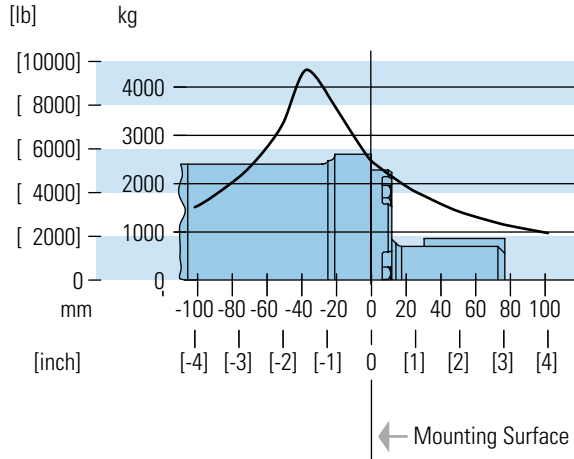
B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

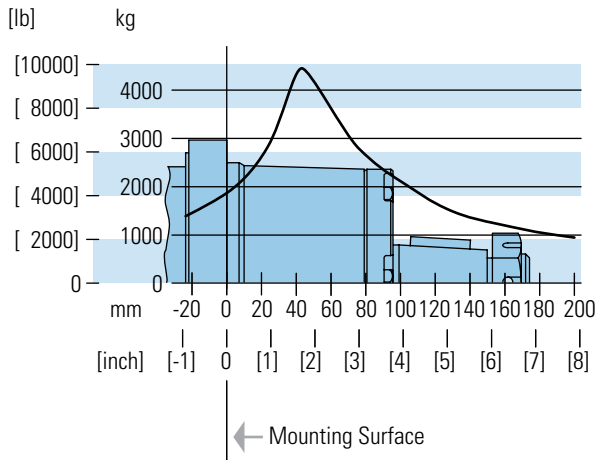
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



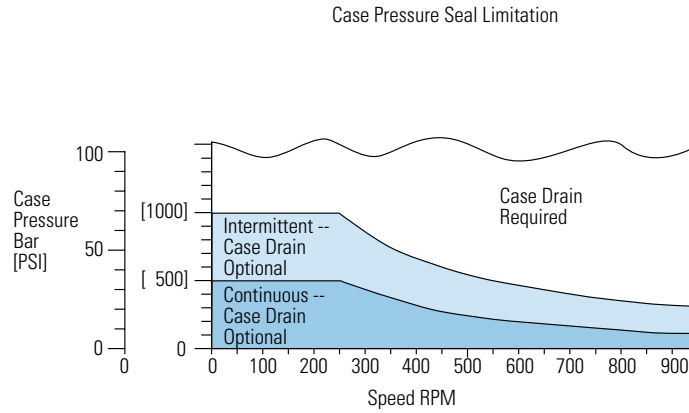
Wheel Motor Tapered Shaft



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.

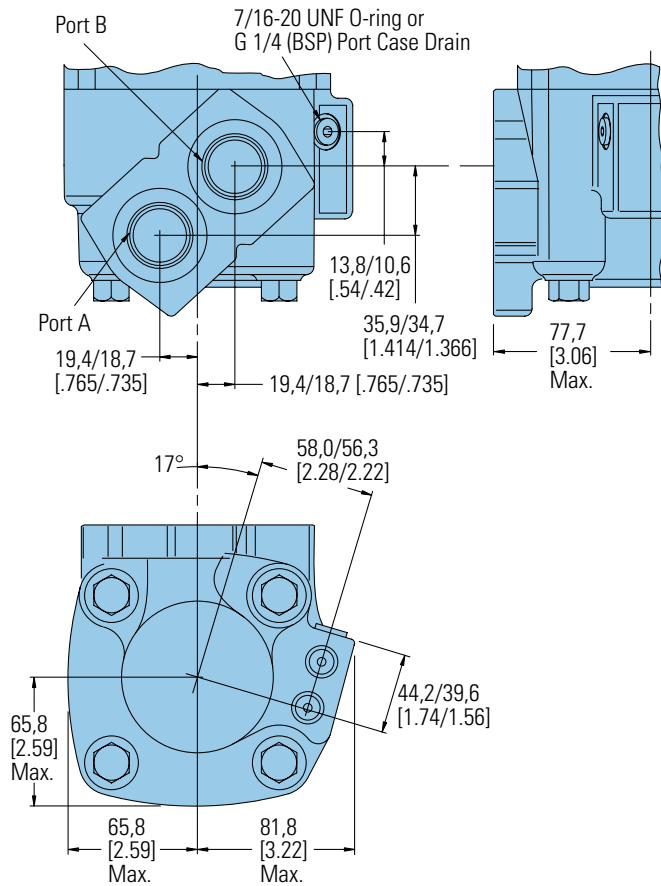
Extend Motor Seal Life — maintain low case pressure with a preset restriction in the case drain line.

6000 Series

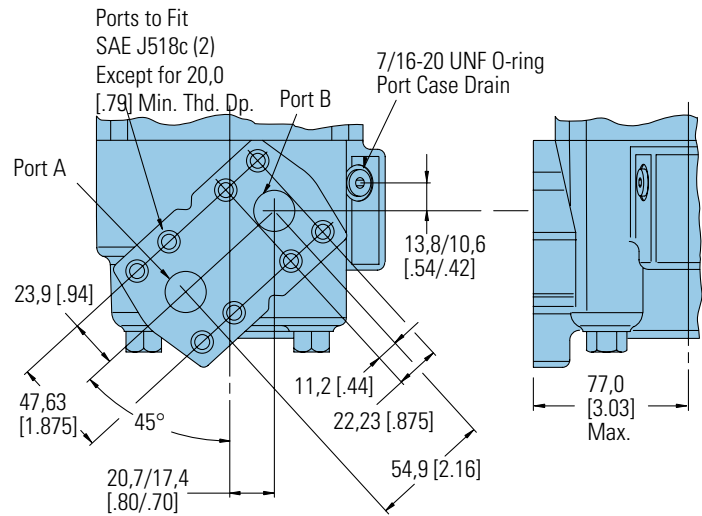
Dimensions

Ports

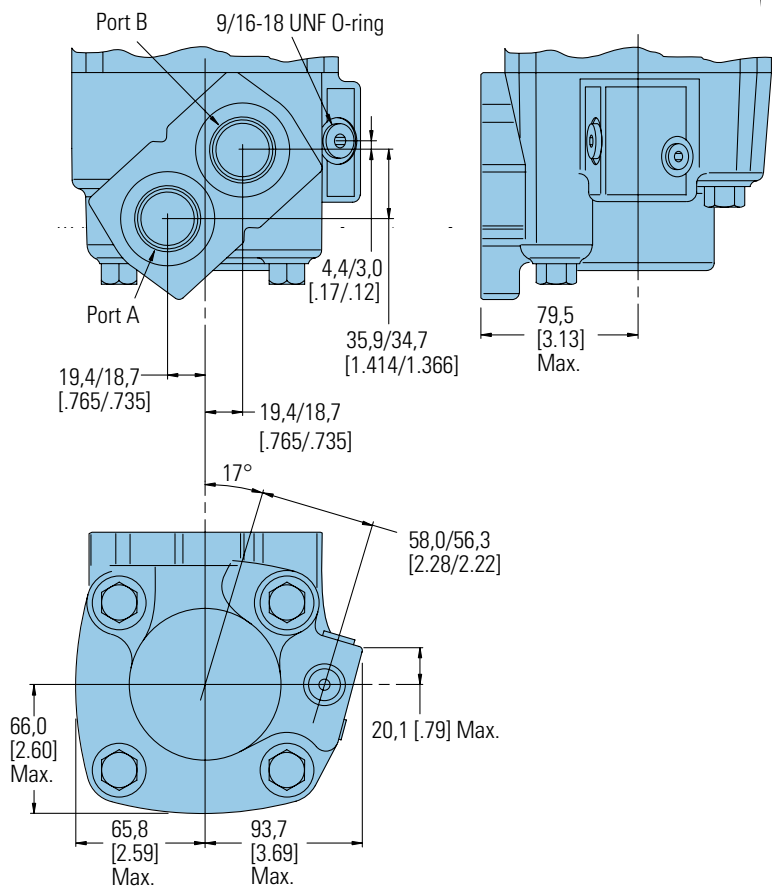
1 5/16 -12 O-ring Ports (2) or G 1 (BSP) Ports (2)



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.

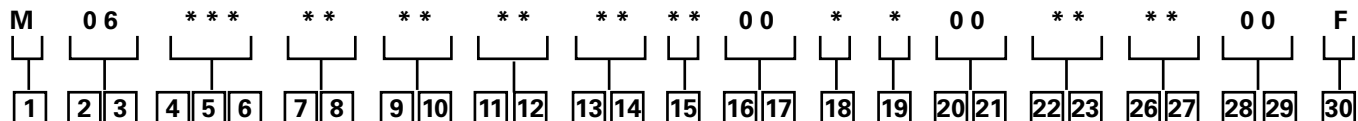
MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER						
			310 [19.0]	390 [23.9]	490 [30.0]	625 [38.0]	735 [45.0]	805 [49.0]	985 [60.0]
Standard	50 mm Straight	G 1 (BSP)	112-1217	-1218	-1215	-1216	-1247	-1219	-1220

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.



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.

AL - Wheel, 4 Bolt: 160,0
[6.30] Pilot Dia. with 5,8 [.23]
Pilot Length and 18,00 [.709]
Dia. Holes on 200,0 [7.874]
Bolt Circle (ISO Compatible)

9, **10** Output Shaft
Description
00 – None (Bearingless)
01 – 38,10 [1.50] Dia.
Straight Shaft with .375-16
UNC-2B Thread in End, 9,52
[.375] Sq. x 41,28 [1.625]
Straight Key

02 – 44,45 [1.75] Dia. .125:1
Tapered Shaft per SAE
J501 with 1.25-18 UNEF-2A
Threaded Shaft End, 11,11
[.4375] Sq. x 31,8 [1.25]
Straight Key

03 – 38,10 [1.50] Dia. Flat
Root Side Fit, 17 Tooth,
12/24 DP 30 DEG. Involute
Spline with .375-16 UNC-2B
Thread in end 40,4 [1.59]
Minimum Full Spline
Length

04 – 40,00 [1.575] Dia.
Straight Shaft with M12 x
1.75-6H Thread in End, 12W
x 8H x 63L [.472W x .313H x
2.480L] Key
12 – 49,99 [1.968] Dia.
Straight Shaft with M12 x
1.75-6H Thread in End, 14W
x 9H x 70L [.550W x .354H x
2.756L] Key

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 – Low Gloss Black
Primer
AD – No Paint, Bulk Box
Option
AE – Low Gloss Black
Primer, Bulk Box
Option

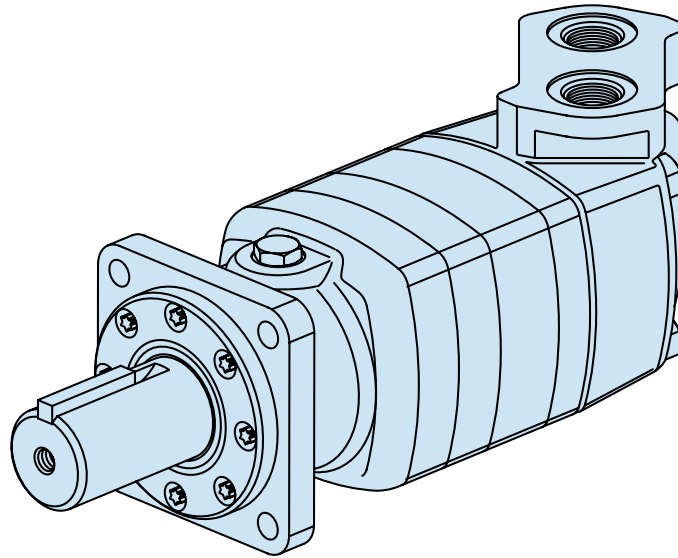
28, **29** Customer ID
00 – None

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



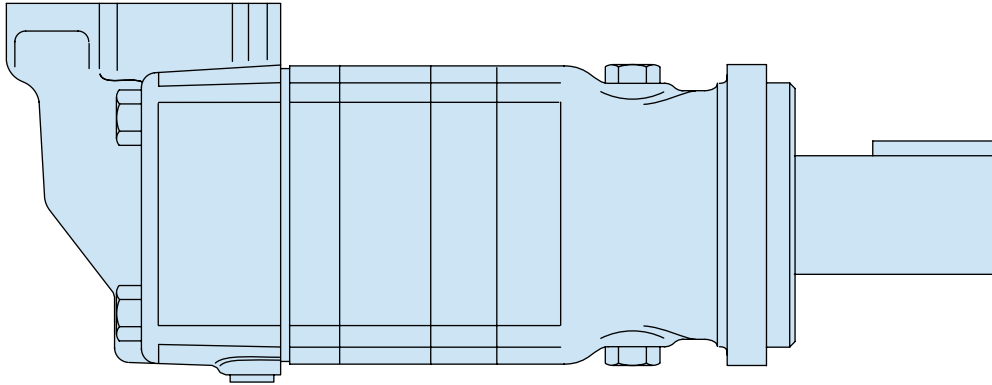
Metal Forming



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 System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

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

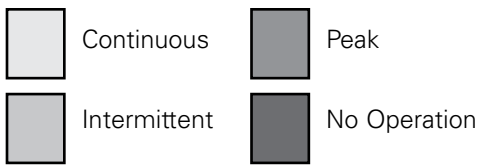
10,000 Series

345 cm³/r [21.0 in³/r]
 Δ Pressure Bar [PSI]

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.

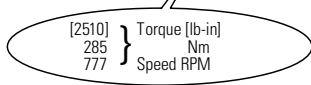
Performance data is typical at 120 SUS. Actual data may vary slightly from unit to unit in production.



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		

	[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] 1385 145
[20] 76	[660] 75 221	[1430] 160 220	[2970] 335 217	[4520] 510 212	[6060] 685 207	[7600] 860 202	[9150] 1035 198	[10690] 1205 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		

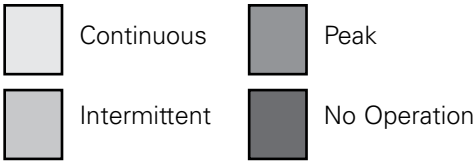


10,000 Series

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.



665 cm³/r [40.6 in³/r] 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
[1] 3.8	[1470] 165 4	[3010] 340 3	[4550] 515 3	[6100] 690 2	[7630] 860 1										
[2] 7.5	[1480] 165 10	[3020] 340 9	[4560] 515 8	[6110] 690 7	[7650] 865 7	[9200] 1040 6	[10740] 1215 5	[12280] 1385 4	[13830] 1565 3	[15370] 1735 2	[16910] 1910 1				
[4] 15	[1470] 165 22	[3010] 340 21	[4550] 515 20	[6100] 690 19	[7640] 865 18	[9190] 1040 17	[10730] 1210 16	[12270] 1385 15	[13820] 1560 14	[15360] 1730 13	[16900] 1910 12	[18450] 2085 11	[19990] 2260 10	[21540] 2435 9	[23080] 2610 8
[8] 30	[1440] 165 44	[2980] 335 43	[4530] 510 42	[6070] 685 41	[7610] 860 40	[9160] 1035 39	[10700] 1210 38	[12250] 1385 37	[13790] 1560 36	[15330] 1730 35	[16880] 1905 34	[18420] 2080 33	[19960] 2255 32	[21510] 2430 31	[23050] 2605 30
[12] 45	[1400] 160 67	[2950] 335 66	[4490] 505 65	[6040] 680 64	[7580] 855 63	[9120] 1030 62	[10670] 1205 61	[12210] 1380 60	[13750] 1555 59	[15300] 1730 58	[16840] 1905 57	[18380] 2075 56	[19930] 2250 55	[21470] 2425 54	[23020] 2600 53
[16] 61	[1360] 155 89	[2910] 330 88	[4450] 505 87	[5990] 675 86	[7530] 850 85	[9080] 1025 84	[10620] 1200 83	[12170] 1375 82	[13710] 1550 81	[15260] 1725 80	[16800] 1900 79	[18340] 2070 78	[19890] 2245 77	[21440] 2420 76	
[20] 76	[1310] 150 112	[2860] 375 111	[4400] 495 110	[5940] 670 109	[7490] 845 108	[9030] 1020 107	[10580] 1195 106	[12120] 1370 105	[13660] 1545 104	[15210] 1720 103	[16750] 1890 102	[18300] 2070 101	[19840] 2240 99	[21400] 2420 98	
[24] 91	[1260] 140 135	[2800] 315 134	[4350] 490 132	[5890] 665 131	[7440] 840 130	[8980] 1015 129	[10520] 1190 128	[12070] 1365 127	[13610] 1540 126	[15150] 1710 125	[16700] 1885 123	[18240] 2060 122			
[28] 106	[1200] 135 157	[2750] 310 156	[4290] 485 155	[5840] 660 154	[7380] 835 153	[8920] 1010 151	[10470] 1185 150	[12010] 1355 149	[13550] 1530 148	[15100] 1705 147	[16640] 1880 146				
[32] 121	[1140] 130 180	[2690] 305 179	[4230] 480 177	[5770] 650 176	[7320] 825 175	[8860] 1000 174	[10400] 1175 173	[11950] 1350 172	[13490] 1525 170	[15040] 1700 169	[16580] 1875 168				
[36] 136	[1080] 120 202	[2620] 295 201	[4160] 470 200	[5710] 645 199	[7250] 820 198	[8800] 995 196	[10340] 1170 195	[11880] 1340 194	[13430] 1515 193	[14970] 1690 191	[16510] 1865 189				
[40] 151	[1010] 115 225	[2550] 290 224	[4100] 465 222	[5640] 635 221	[7180] 810 220	[8730] 985 219	[10270] 1160 217	[11810] 1355 216	[13360] 1510 215	[14900] 1685 214	[16440] 1855 212				
[45] 170	[920] 105 254	[2460] 280 252	[4000] 450 251	[5550] 625 249	[7090] 800 248	[8630] 975 247	[10180] 1150 245	[11720] 1325 244	[13260] 1500 243	[14810] 1675 242					
[60] 227	[610] 70 338	[2150] 245 336	[3700] 420 335	[5240] 590 334	[6780] 765 332	[8330] 940 331	[9870] 1115 329	[11420] 1290 328	[12960] 1465 327						
[70] 265	[380] 45 396	[1930] 220 393	[3470] 390 391	[5010] 565 390	[6560] 740 388	[8100] 915 387	[9640] 1090 385	[11190] 1265 384							



940 cm³/r [57.4 in³/r] 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
[1] 3.8	[2080] 235 3	[4260] 480 2	[6440] 730 1											
[2] 7.5	[2090] 235 7	[4270] 480 6	[6450] 730 5	[8640] 975 4	[10820] 1220 3	[13000] 1470 2	[15190] 1715 1	[17370] 1965 1						
[4] 15	[2080] 235 15	[4260] 480 14	[6440] 730 13	[8620] 975 12	[10810] 1220 11	[12990] 1470 10	[15170] 1715 9	[17360] 1960 8	[19540] 2210 7	[21720] 2455 6	[23910] 2700 5	[26090] 2950 4	[28270] 3195 3	[30460] 3440 2
[8] 30	[2040] 230 31	[4220] 475 30	[6400] 725 29	[8590] 970 28	[10770] 1215 27	[12950] 1465 26	[15140] 1710 25	[17320] 1955 24	[19500] 2200 23	[21690] 2450 22	[23870] 2695 21			
[12] 45	[1990] 225 47	[4170] 470 46	[6350] 715 45	[8540] 965 44	[10720] 1210 43	[12900] 1460 43	[15090] 1705 42	[17270] 1950 41	[19450] 2200 40	[21640] 2445 39				
[16] 61	[1930] 220 63	[4110] 465 62	[6290] 710 61	[8480] 960 60	[10660] 1205 59	[12840] 1450 58	[15030] 1700 57	[17210] 1945 56	[19390] 2190 55					
[20] 76	[1860] 210 79	[4040] 455 78	[6220] 705 77	[8410] 950 76	[10590] 1195 75	[12770] 1445 74	[14960] 1690 73	[17140] 1935 72	[19320] 2185 71					
[24] 91	[1780] 200 95	[3970] 450 94	[6150] 695 93	[8330] 940 92	[10520] 1190 91	[12700] 1435 90	[14880] 1680 89	[17070] 1930 88						
[28] 106	[1700] 190 111	[3890] 440 110	[6070] 685 109	[8250] 930 108	[10440] 1180 107	[12620] 1425 106	[14800] 1675 105	[16990] 1920 104						
[32] 121	[1620] 185 127	[3800] 430 126	[5980] 675 125	[8160] 920 124	[10350] 1170 123	[12530] 1415 122	[14720] 1665 121							
[36] 136	[1520] 170 143	[3710] 420 142	[5890] 665 141	[8070] 910 140	[10260] 1160 139	[12440] 1405 138	[14620] 1650 137							
[40] 151	[1420] 160 159	[3610] 410 158	[5790] 655 157	[7970] 900 156	[10160] 1150 155	[12340] 1395 154	[14520] 1640 153							
[45] 170	[1290] 145 179	[3480] 395 178	[5660] 640 177	[7840] 885 176	[10020] 1130 174	[12210] 1380 173	[14400] 1625 172							
[60] 227	[860] 95 239	[3040] 345 238	[5230] 590 236	[7410] 835 235	[9600] 1085 234	[11780] 1330 233								
[70] 265	[540] 60 279	[2720] 305 278	[4910] 555 276	[7090] 800 275	[9270] 1045 274	[11460] 1295 273								

10,000 Series

Dimensions

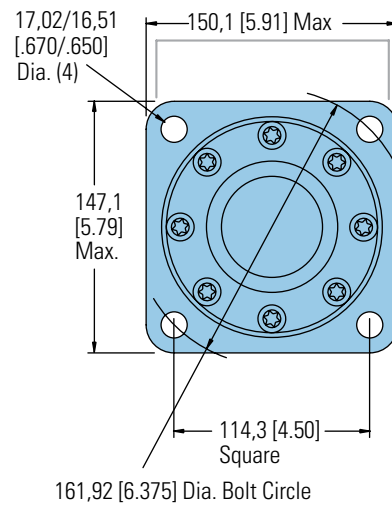
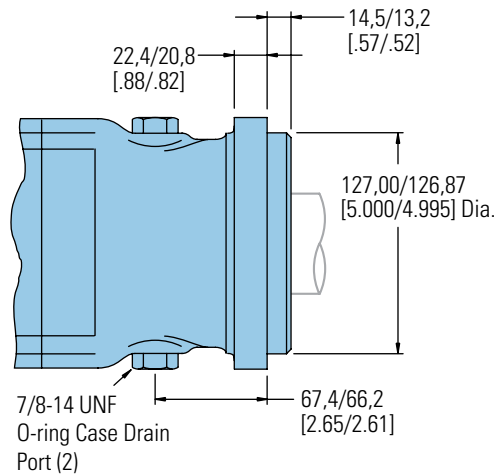
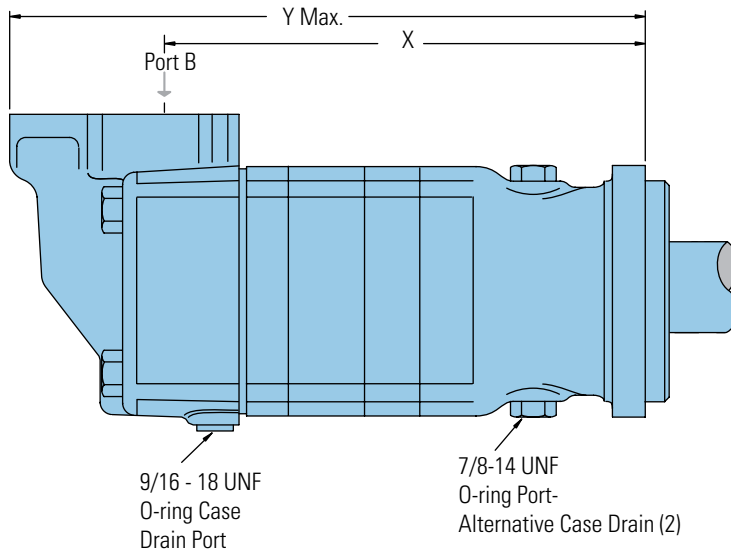
Ports

- 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

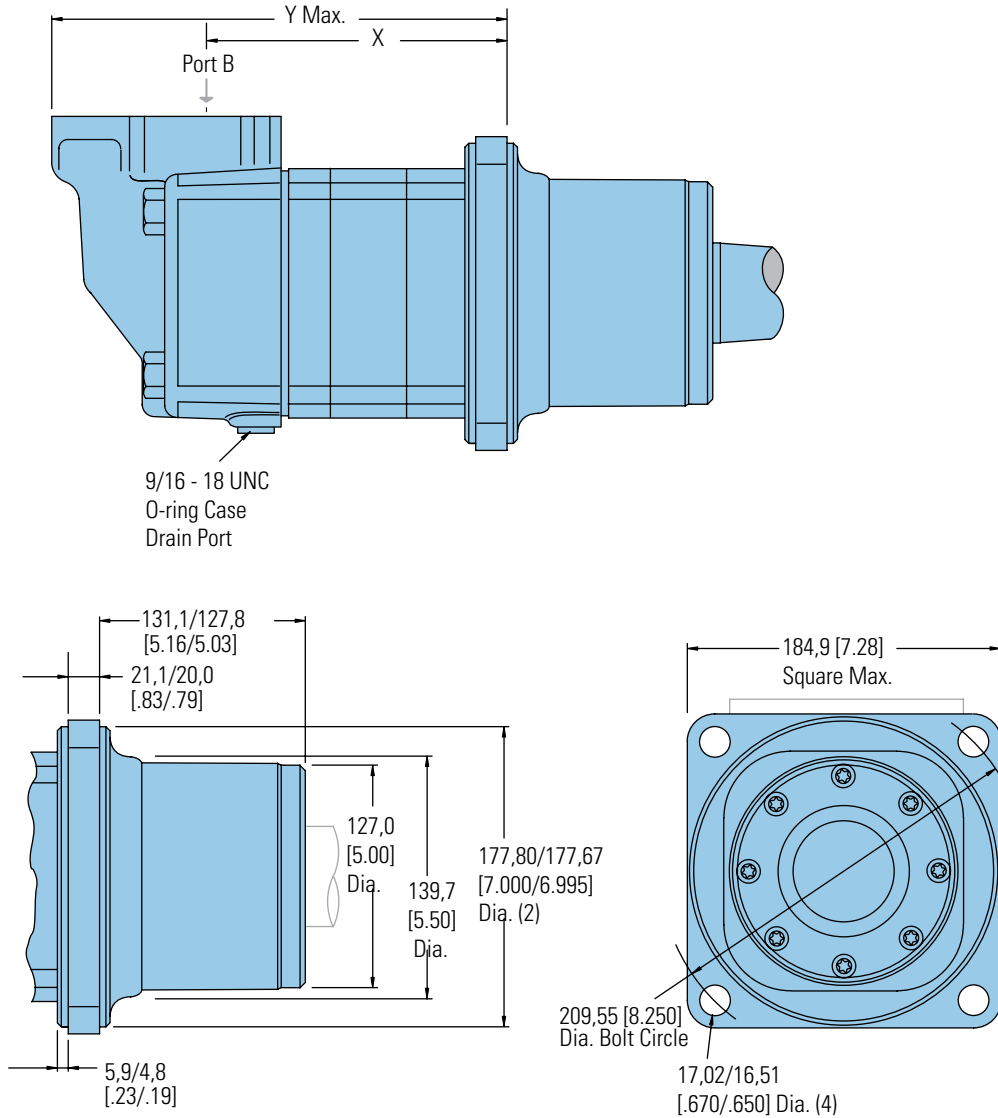
Ports

- 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

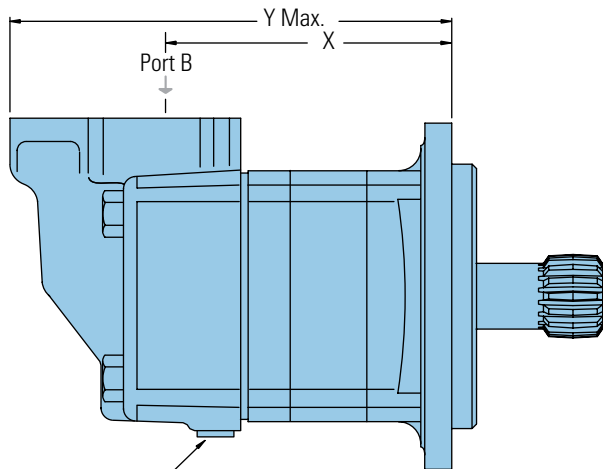
Ports

- 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)

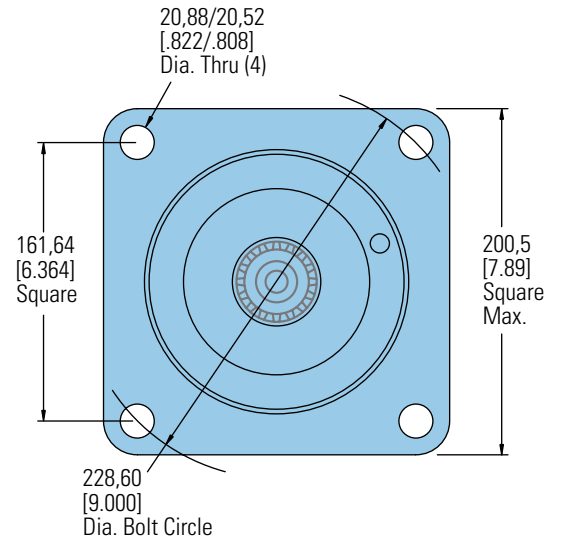
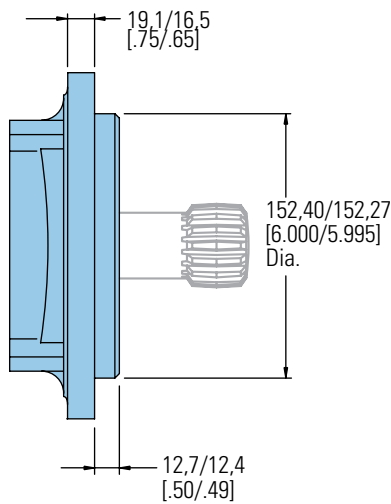
Standard Rotation Viewed from Shaft End

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

Bearingless



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



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

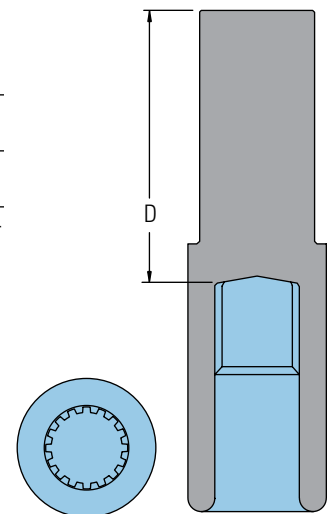
Dimension D mm [inch]
Eaton Part No.

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.

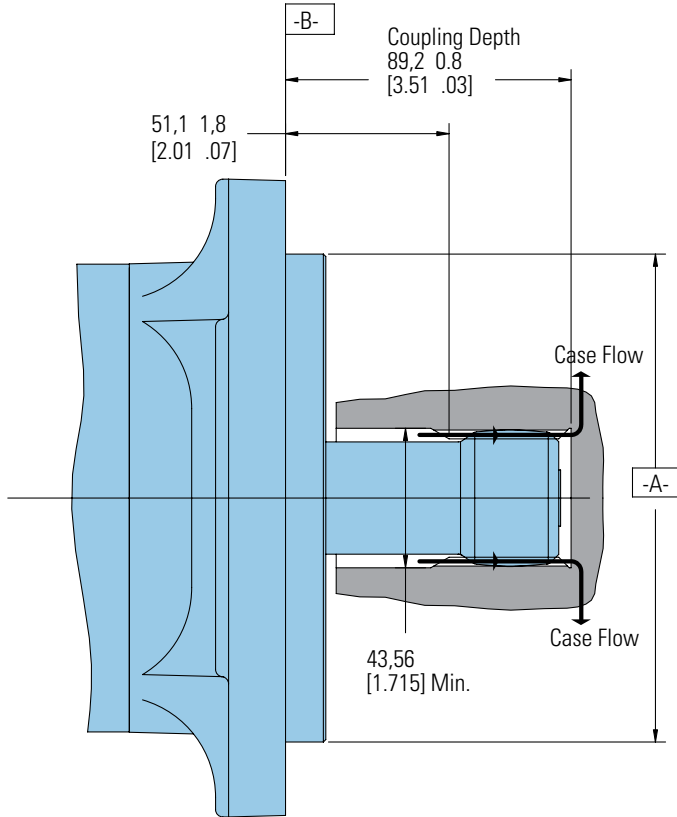


C-6

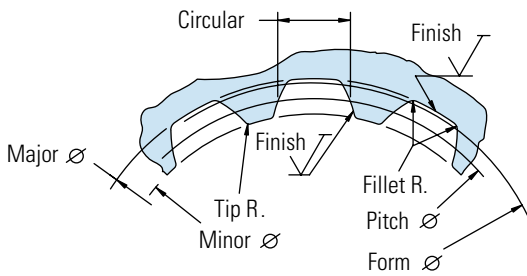
10,000 Series

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).



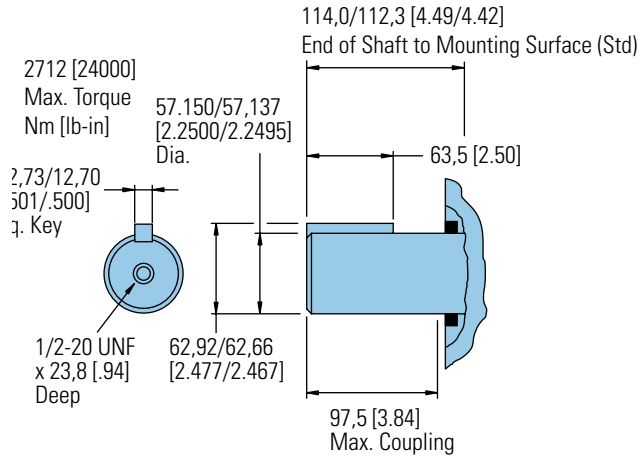
Spline Pitch.....	10/20
Pressure Angle.....	.30°
Number of teeth.....	16
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter	Ref. 40,640000 [1.600000] $\text{Ⓢ} 0,25 [0.010] \text{D}$
Base Diameter.....	Ref. 35,195272 [1.3856406]
Major Diameter.....	43,56 [1.715] Max. 43,18 [1.700] Min.
Min. Minor Diameter.....	36,83 - 37,08 [1.450 - 1.460]
Form Diameter, Min.....	42,47 [1.672]
Fillet Radius.....	0,64 - 0,76 [0.025 - .030]
Tip Radius.....	0,25 - 0,51 [0.010 - .020]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,028 [+0.0000 - .0011]
Total Index Variation	0,041 [0.016]
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. 4,018 [0.1582]
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

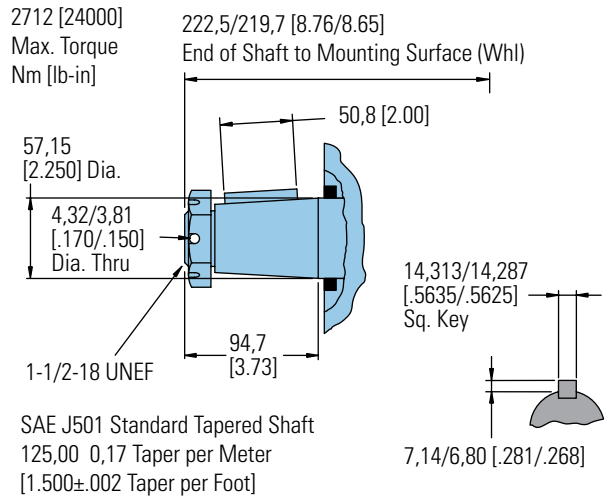
Dimensions

Shafts

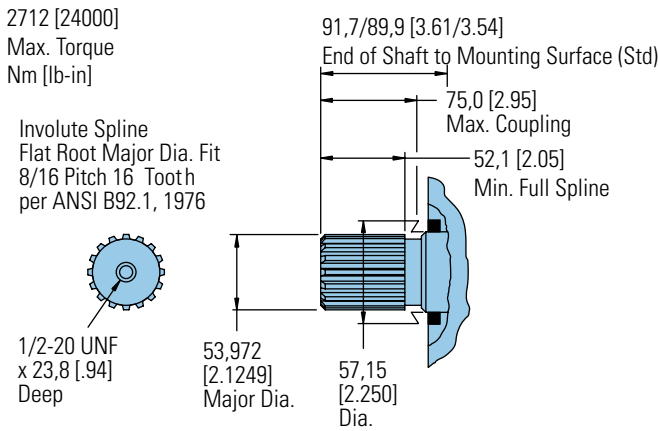
2 1/4 Inch Straight



2 1/4 Inch Tapered

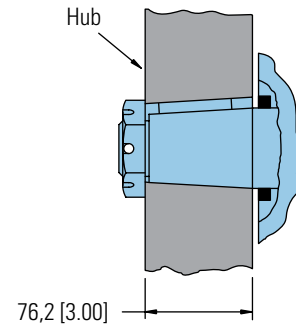


2 1/8 Inch 16 Tooth Splined

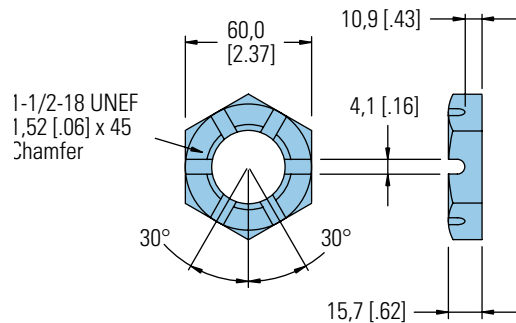


Tapered Shaft Hub Data

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

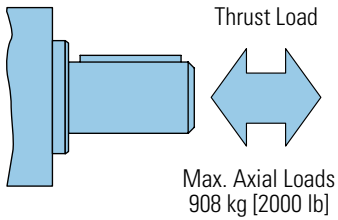
Side Shaft Load Capacity

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

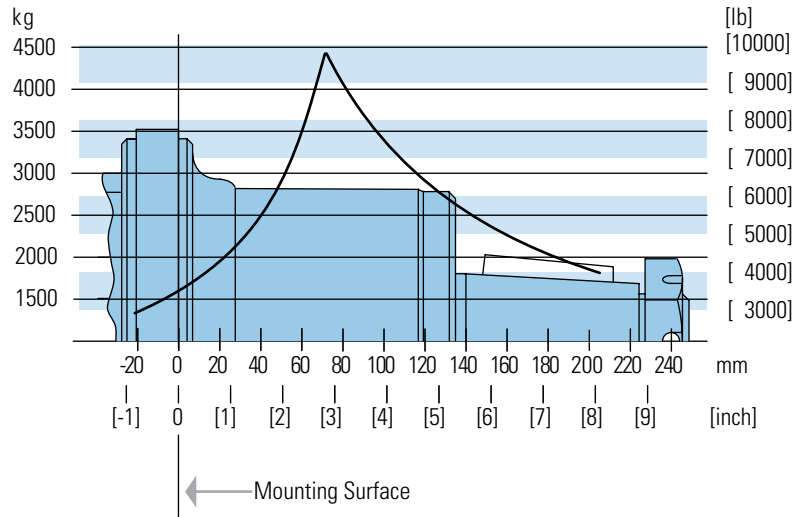
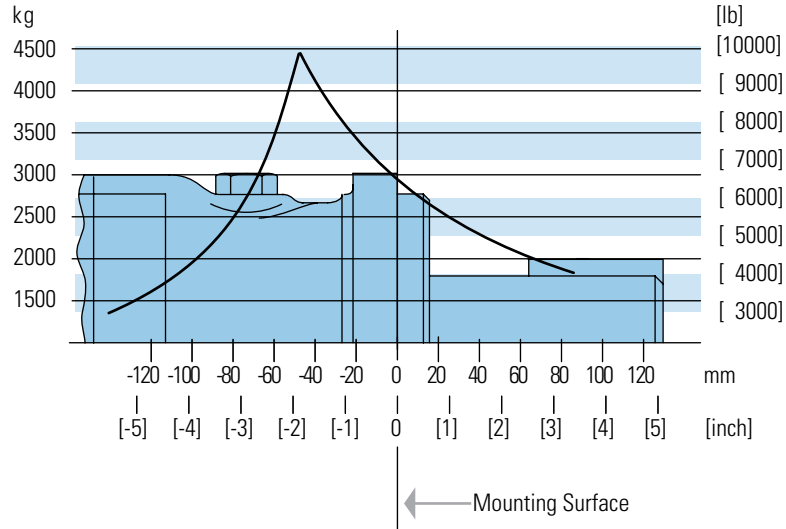


B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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%.

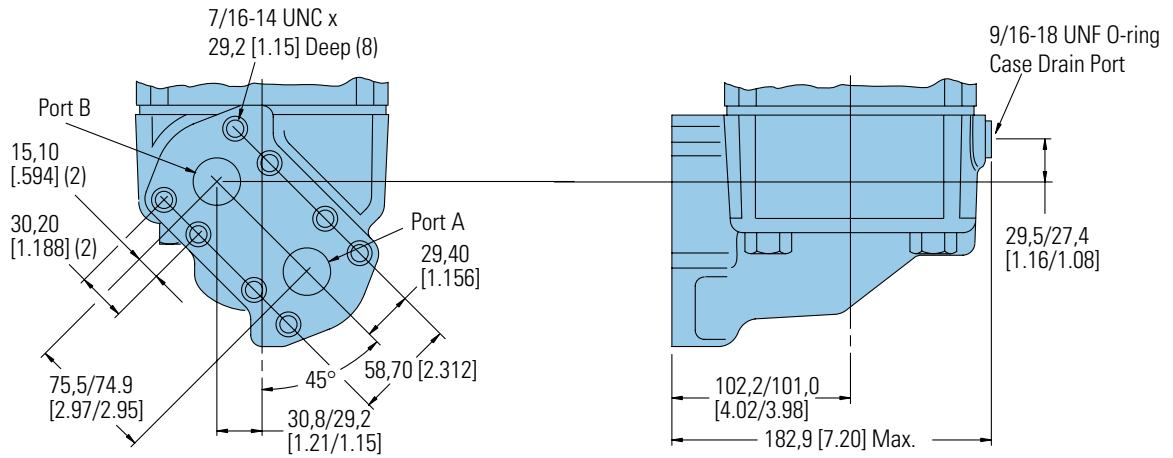


10,000 Series

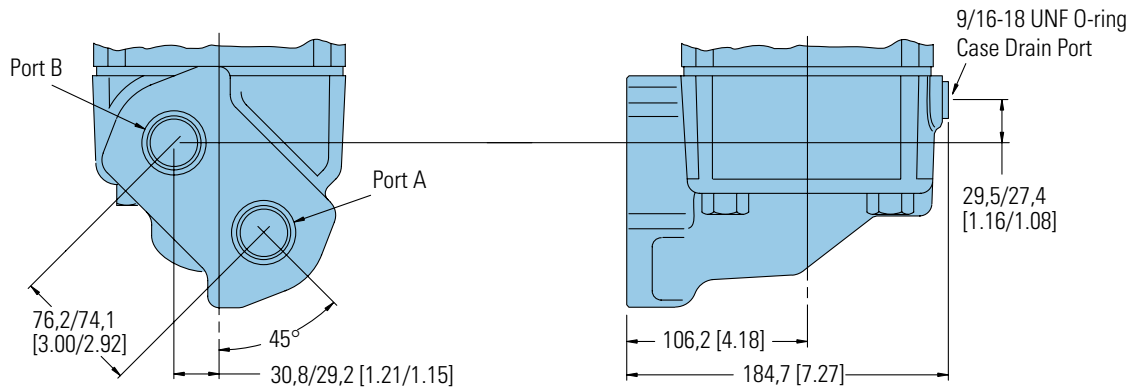
Dimensions

Ports

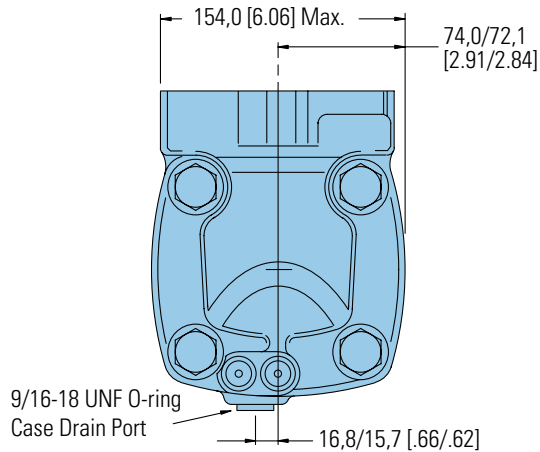
1 1/4 Inch Split Flange Ports (2)



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



End View Common Dimensions



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.

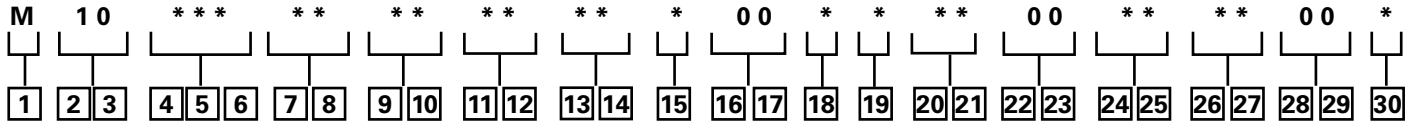
MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER			
			345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]
Standard SAE C-Mount	2 1/4 Inch Straight	1 5/16 O-ring	119-1028	-1029	-1030	-1031
		1 1/4 inch Split Flange	119-1040	-1041	-1042	-1043
	2 1/8 Inch 16 T Splined	1 5/16 O-ring	119-1032	-1033	-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.



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

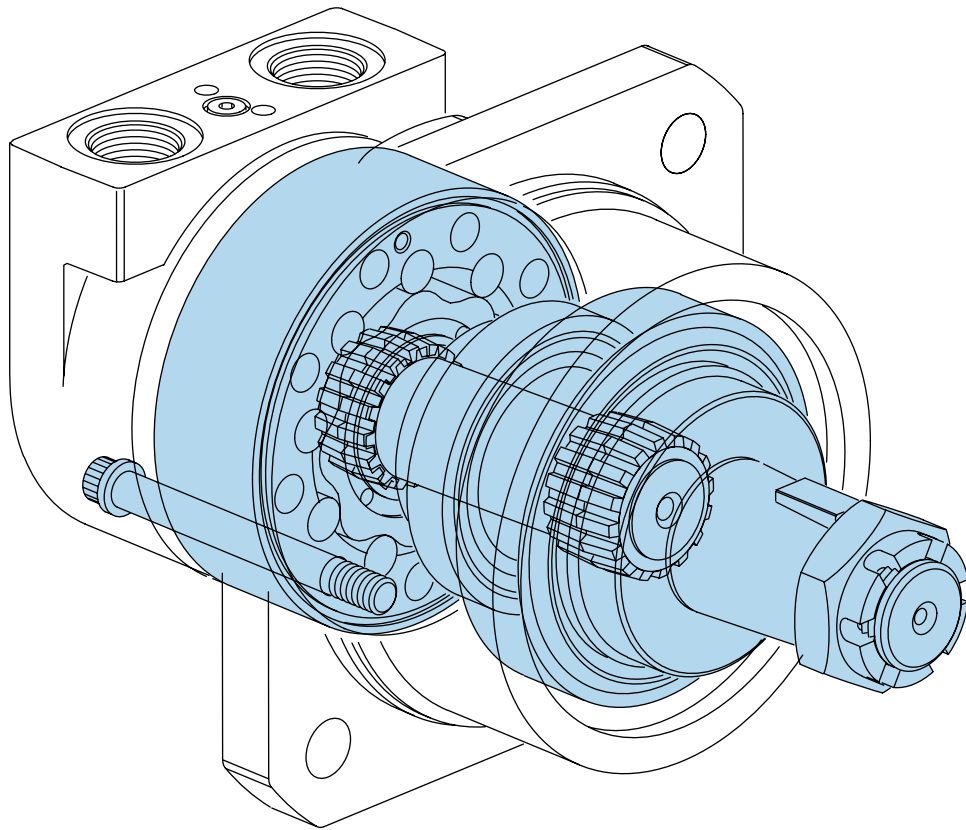
26, **27** Paint / Packaging
00 – None
AA – Low Gloss Black
Primer

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.

Notes



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

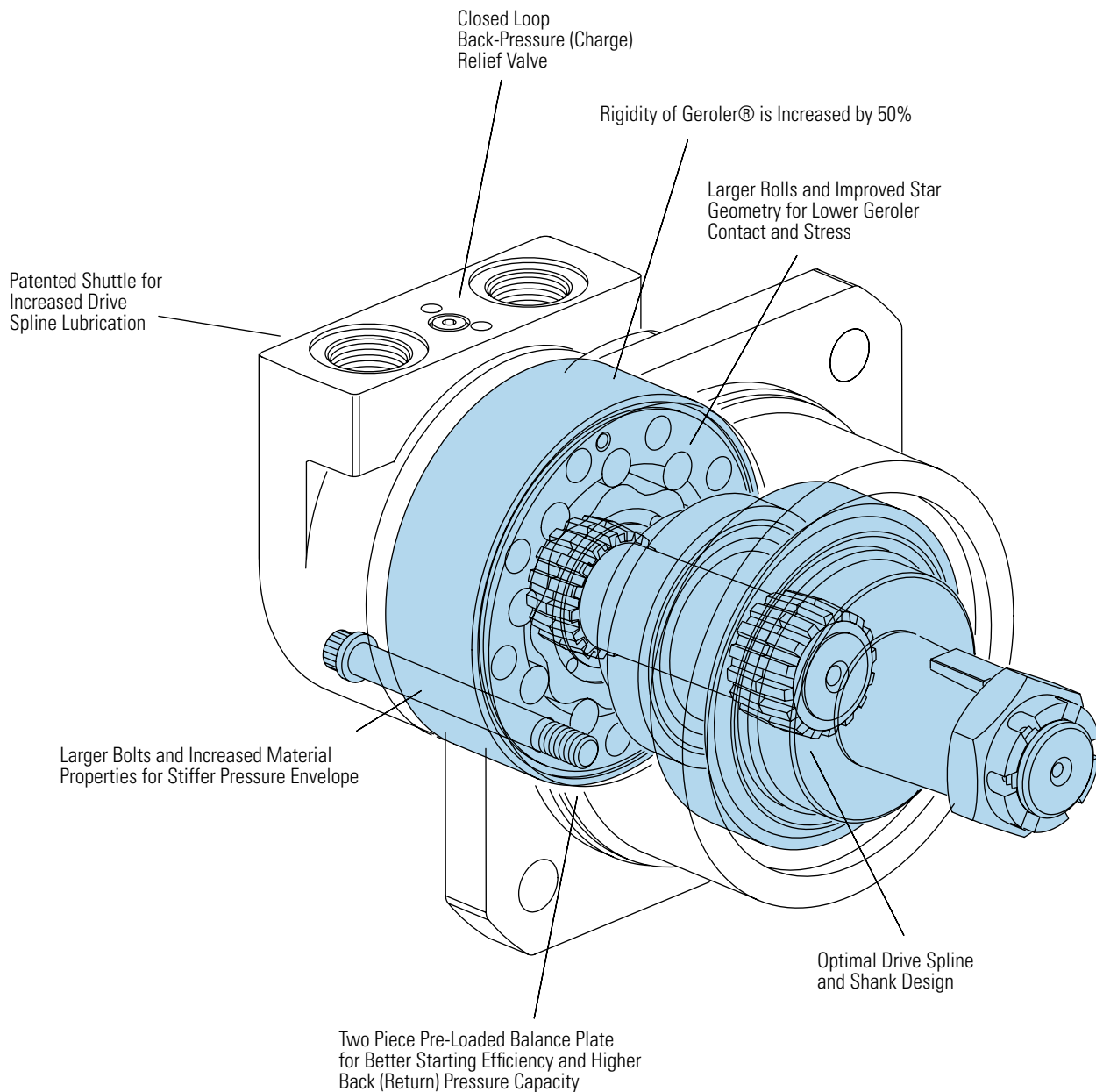
VIS Motors

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

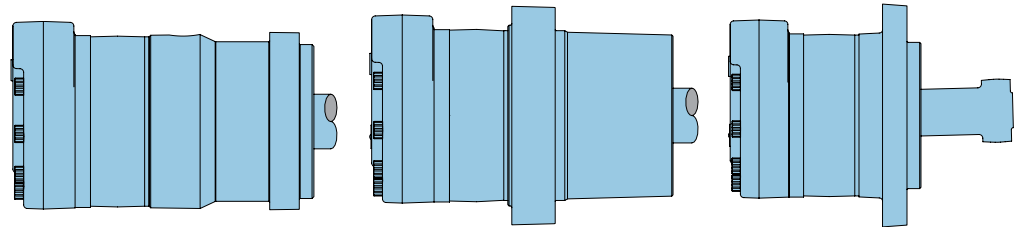
Applications

- 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.

D-1

D-2

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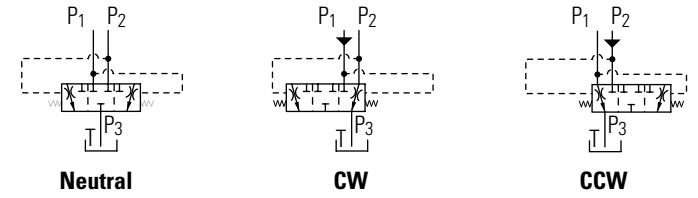
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Side Load Capacity	D-3-12		

Typical Hydraulic Circuit

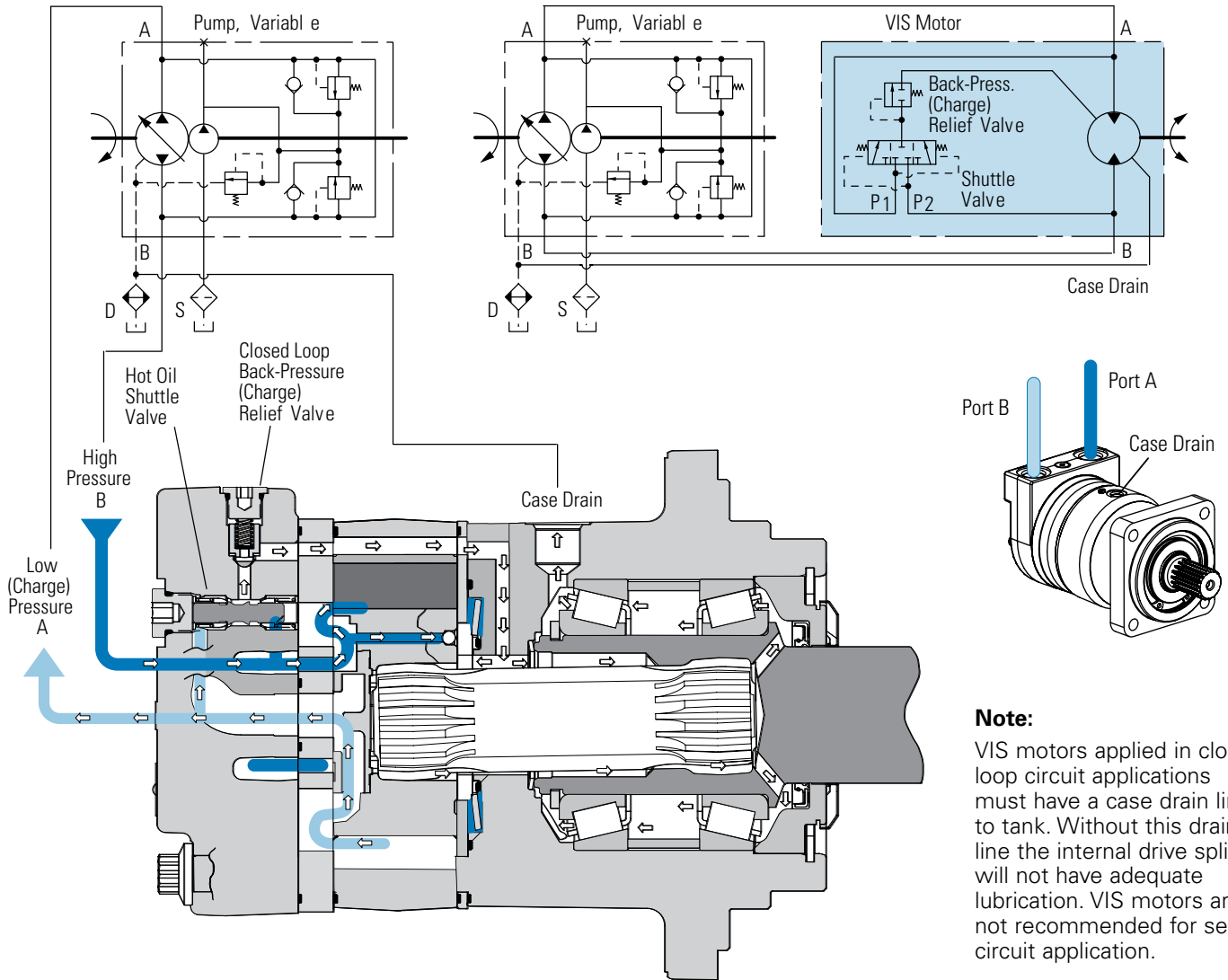
VIS 40 and 45 Series

Shuttle Valve, Two Way (Closed Center) –

Schematic Diagrams

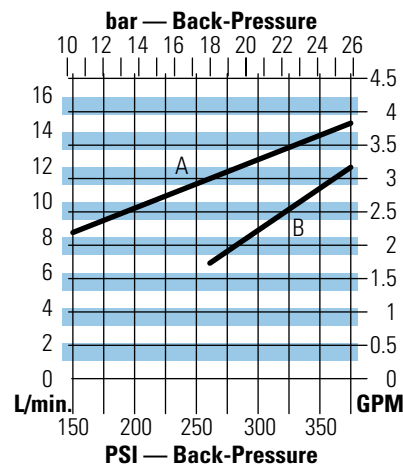


Closed Loop Circuit



Note:
VIS motors applied in closed loop circuit applications must have a case drain line to tank. Without this drain line the internal drive spline will not have adequate lubrication. VIS motors are not recommended for series circuit application.

VIS 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

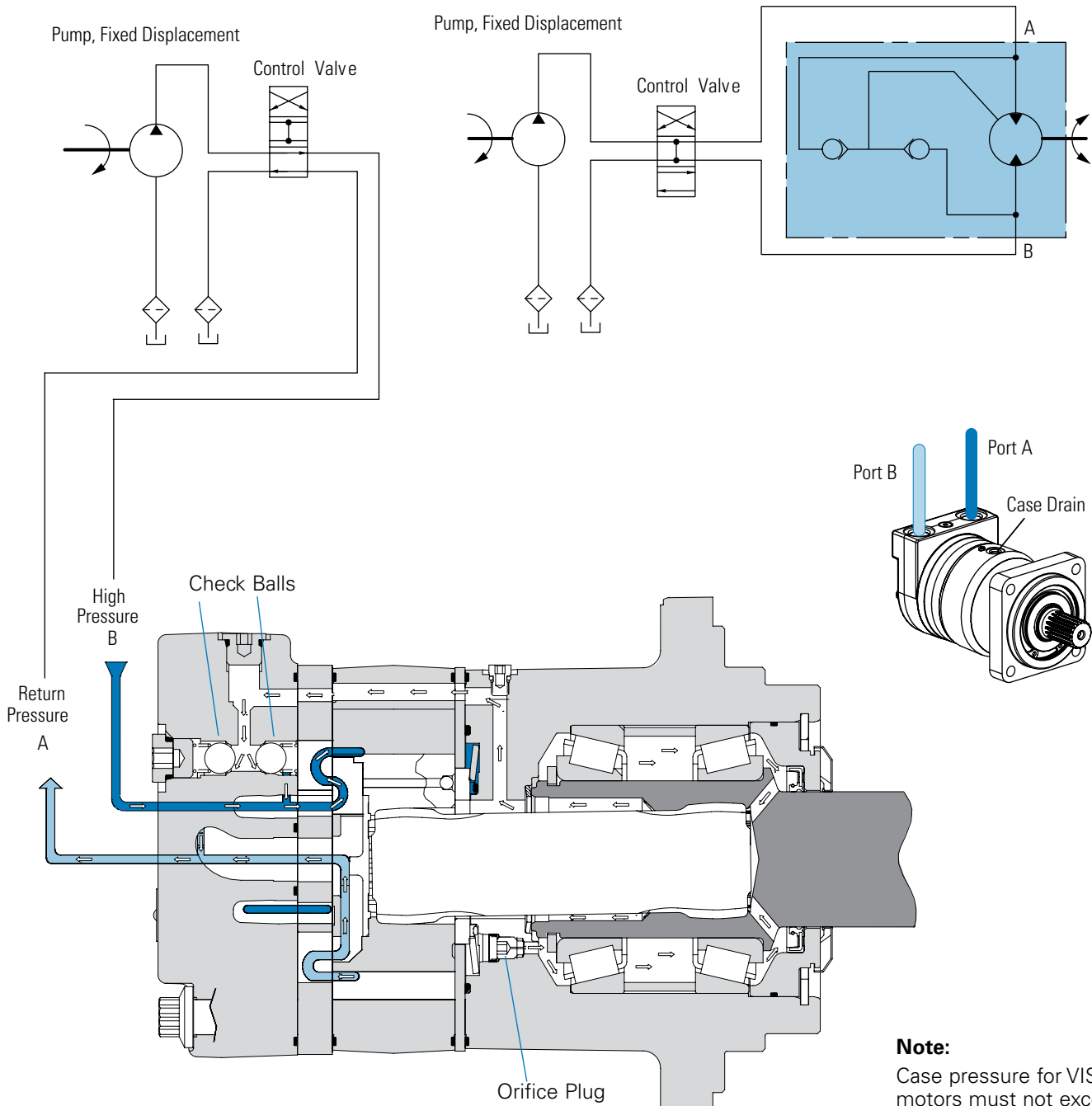
D-1

D-2

Typical Hydraulic Circuit

VIS 40 and
45 Series

Open Loop Circuit



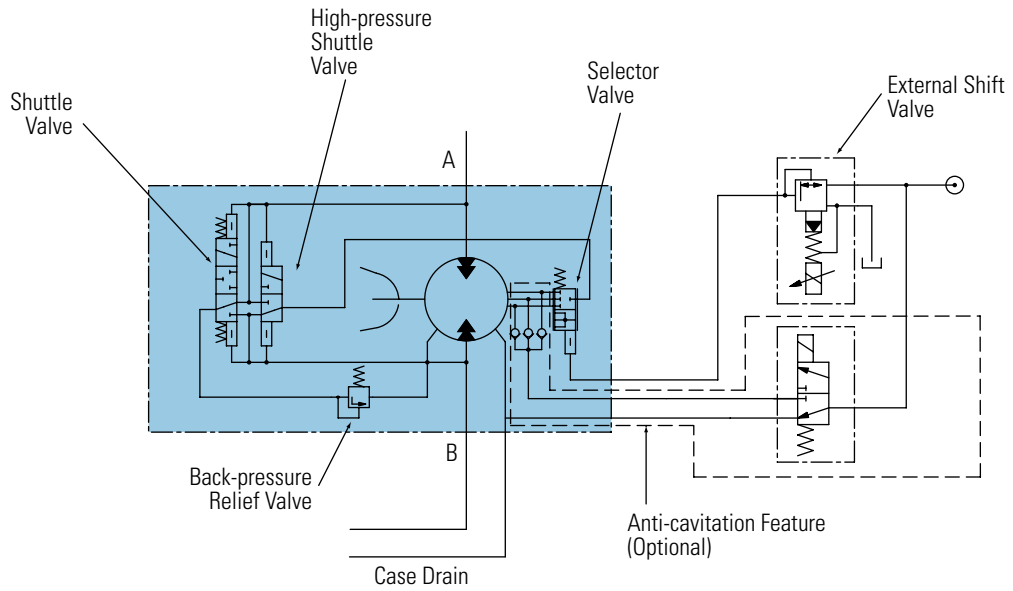
Note:

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.

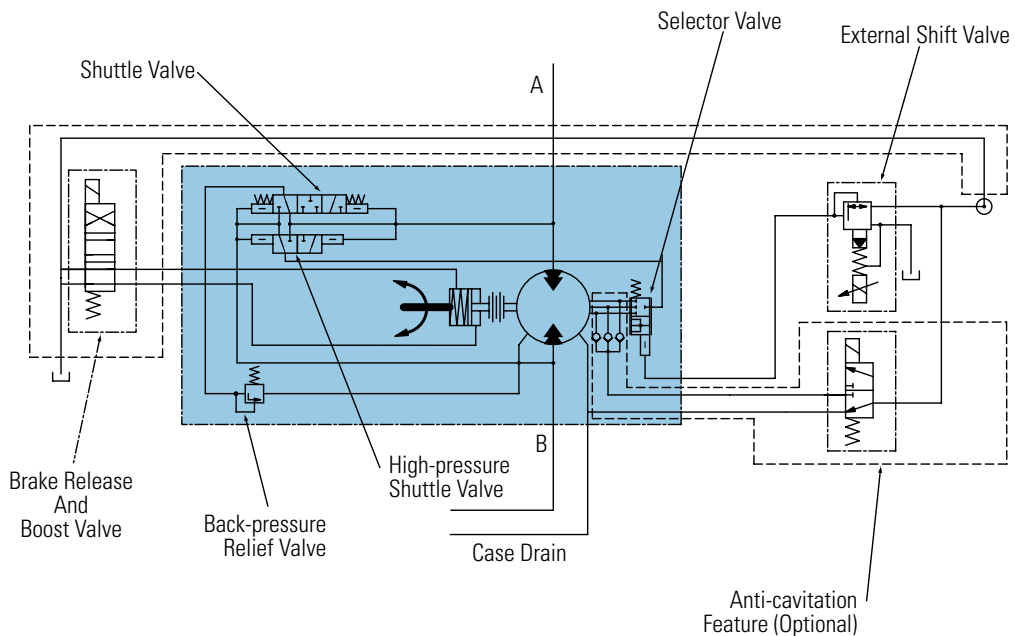
Typical Hydraulic Circuit

VIS 40 and
45 Series

Two-speed Circuit



Two-Speed Brake Motor Circuit



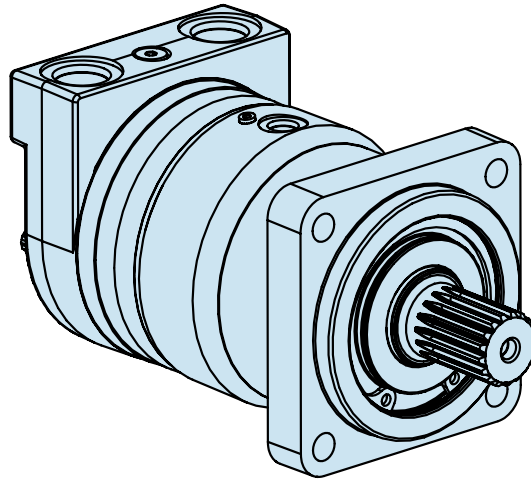
D-1

D-2

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	8 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]	2531 [22400] Cont. 3165 [28000] Inter.

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



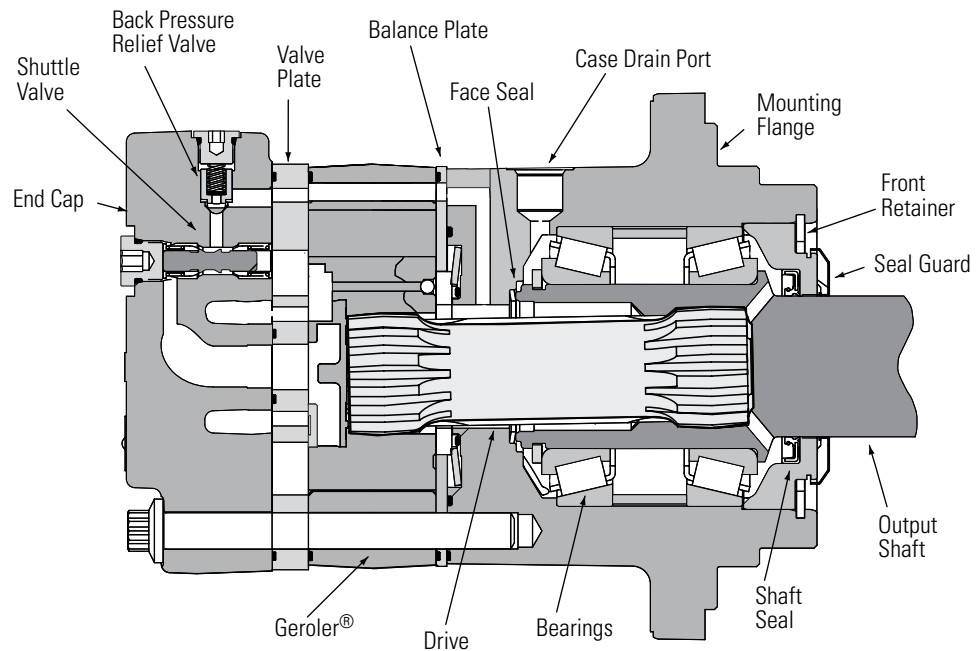
Digger



Port Equipment

VIS 40 Series

Specifications



SPECIFICATION DATA – VIS 40 MOTORS

Displ. cm ³ /r [in ³ /r]		325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Max. Speed (RPM) @ Flow	Continuous	440	357	279	244	221	204	177	148
	Intermittent	454	368	293	257	233	215	187	148
Flow l/min [GPM]	Continuous	151 [40]	151 [40]	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]	170 [45]	170 [45]
Torque Nm [lb - in]	Continuous	1445 [12789]	1781 [15760]	2240 [19829]	2531 [22400]	2531 [22400]	2531 [22400]	2531 [22400]	2531 [22400]
	Intermittent	1986 [17421]	1597 [14137]	2746 [21919]	2815 [24918]	3165 [28000]	3165 [28000]	3165 [28000]	3165 [28000]
Pressure Δ bar [Δ PSI]	Continuous	310 [4500]	310 [4500]	310 [4500]	279 [4040]	254 [3686]	235 [3389]	208 [3012]	171 [2489]
	Intermittent	345 [5000]	345 [5000]	345 [5000]	309 [4486]	315 [4574]	290 [4212]	254 [3682]	214 [3100]
	Peak	380 [5500]	380 [5500]	380 [5500]	380 [5500]	380 [5500]	380 [5500]	300 [4355]	250 [3621]
Weight kg [lb]	Standard or Wheel Mount	28,5 [62.9]	29,1 [64.2]	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	16,3 [36.0]	16,9 [37.3]	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	32,1 [70.8]	32,7 [72.1]	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	19,9 [43.9]	20,5 [45.2]	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 System Operating Temp.:

-34°C to 82°C [-30°F to 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.

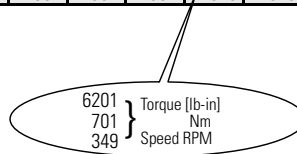
-  Continuous
-  Intermittent
-  Will Operate at Reduced Life

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	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
	30	93	91	90	87	85	84	83	81	78	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
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	166	166	161	154
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
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	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
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	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

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
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
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	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
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
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	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
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






VIS 40 Series

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

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.

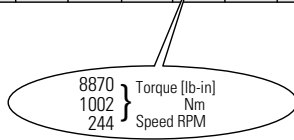
Performance data is typical at 120 SUS. Actual data may vary slightly from unit to unit in production.

-  Continuous
-  Intermittent
-  Will Operate at Reduced Life

	250 15	500 35	1000 70	1500 105	2000 140	2500 170	3000 205	3500 240	4000 275	4500 310	5000 345	5500 380
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	23010
	119	249	502	754	1000	1248	1494	1730	1974	2183	2414	2600
	30	60	59	58	56	55	54	53	52	50	48	45
12	1003	2190	4464	6730	8944	11155	13364	15520	17614	19648	21753	23640
	113	247	504	760	1011	1260	1510	1754	1990	2220	2458	2671
	45	90	88	86	85	83	83	83	82	81	80	73
16	1069	2202	4422	6692	8901	11150	13367	15527	17694	19747	21833	23932
	121	249	500	756	1006	1260	1510	1754	1999	2231	2467	2704
	61	120	118	117	115	112	110	108	108	107	104	100
20	1019	1938	4301	6833	8830	11117	13552	15431	17663	19829	21919	23783
	115	219	486	772	998	1256	1531	1743	1996	2240	2476	2687
	76	150	148	145	144	140	138	136	135	134	131	129
25	843	1963	4363	6440	9083	11194	13207	15406	17473	19620	21765	23775
	95	222	493	728	1026	1265	1492	1741	1974	2217	2459	2686
	95	188	185	183	180	179	173	172	171	168	165	164
30	226	1824	4039	6153	8375	10670	12892	15006	17199	19437	21645	23756
	26	206	456	695	946	1206	1457	1695	1943	2196	2446	2684
	114	220	223	219	217	215	210	208	206	204	201	198
35	176	1774	3926	6140	8252	10494	12763	14868	17086	18959	20619	23294
	20	200	444	694	932	1186	1442	1680	1930	2142	2330	2632
	132	255	259	255	253	250	244	243	240	238	234	228
40	142	864	3174	5542	7803	10089	12317	14391	16570	18779	20837	23162
	16	98	359	626	882	1140	1392	1626	1872	2122	2354	2617
	151	293	292	284	279	277	277	276	274	271	267	263

570 c m³/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	5000 345	5500 380
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	22	21	20	
8	1199	2501	5053	7584	10067	12560	15034	17408	19864	21962	24292	26158
	135	283	571	857	1137	1419	1699	1967	2244	2481	2745	2955
	30	52	52	51	50	48	48	47	46	44	42	40
12	1140	2489	5074	7650	10167	12681	15193	17644	20024	22336	24729	26874
	129	281	573	864	1149	1433	1717	1993	2262	2524	2794	3036
	45	79	78	76	75	73	73	72	71	71	64	62
16	1216	2503	5027	7608	10119	12675	15195	17652	20115	22449	24820	27206
	137	283	568	860	1143	1432	1717	1994	2273	2536	2804	3074
	61	106	104	103	101	99	96	95	95	94	92	88
20	1159	2203	4890	7768	10038	12638	15407	17542	20080	22542	24918	27037
	131	249	552	878	1134	1428	1741	1982	2269	2547	2815	3055
	76	132	130	128	127	123	121	120	119	118	115	114
25	958	2231	4960	7321	10325	12725	15014	17513	19863	22305	24743	27027
	108	252	560	827	1167	1438	1696	1979	2244	2520	2796	3054
	95	165	163	161	159	157	152	151	150	148	145	144
30	257	2074	4591	6994	9520	12130	14656	17059	19552	22096	24606	27006
	29	234	519	790	1076	1370	1656	1927	2209	2496	2780	3051
	114	193	196	193	191	189	184	183	181	179	177	174
35	200	2017	4463	6980	9381	11930	14509	16902	19423	21553	23440	26481
	23	228	504	789	1060	1348	1639	1910	2195	2435	2648	2992
	132	225	228	224	222	220	214	214	211	209	206	201
40	162	983	3608	6300	8870	11469	14002	16360	18837	21348	23688	2633
	18	111	408	712	1002	1296	1582	1848	2128	2412	2676	2975
	151	257	257	249	246	244	243	244	243	241	238	234






VIS 40 Series

630 cm³/r [38.5 in³/r]
 Δ Pressure Bar [PSI]

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

	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	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	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	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
16	1341	2761	5546	8393	11163	13982	16763	19472	22190	24765	27381	30012
	152	312	627	948	1261	1580	1894	2200	2507	2798	3094	3391
	61	96	94	93	92	89	87	86	86	86	83	79
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
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
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
	114	175	177	175	173	171	167	166	164	163	160	158
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
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	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
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	
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
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
16	1453	2991	6007	9090	12090	15145	18156	21091	24034	26823	29656	32506
	164	338	679	1027	1366	1711	2051	2383	2715	3031	3351	3673
	61	88	87	86	85	83	81	80	80	79	77	73
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	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
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
	114	162	164	161	160	158	154	153	152	150	148	146
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
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	194




10598 } Torque [lb-in]
 1197 } Nm
 204 } 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]

Flow LPM [GPM]	785 cm³/r [48.0 in³/r]											
	250 15	500 35	1000 70	1500 105	2000 140	2500 170	3000 205	3500 240	4000 275	4500 310	5000 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	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	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	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	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	106	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	127
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	146
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]

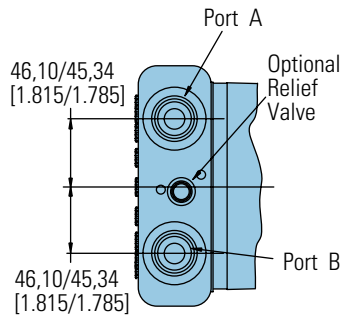
Flow LPM [GPM]	940 cm³/r [57.4 in³/r]									
	250 15	500 35	1000 70	1500 105	2000 140	2500 170	3000 205	3500 240	4000 275	
4	1935	4056	8216	12325	16185	20071	23940	27620	30111	
	219	458	928	1393	1829	2268	2705	3121	3402	
	15	16	16	16	15	15	14	14	14	14
8	1972	4114	8311	12473	16557	20658	24727	28631	32670	
	223	465	939	1409	1871	2334	2794	3235	3691	
	30	32	31	31	30	29	29	28	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	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	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	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	90
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	109
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	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	148	147

5934 } Torque [lb-in]
670 } Nm
152 } Speed RPM

VIS 40 Series

Dimensions

Standard and Wheel Mount
– SAE



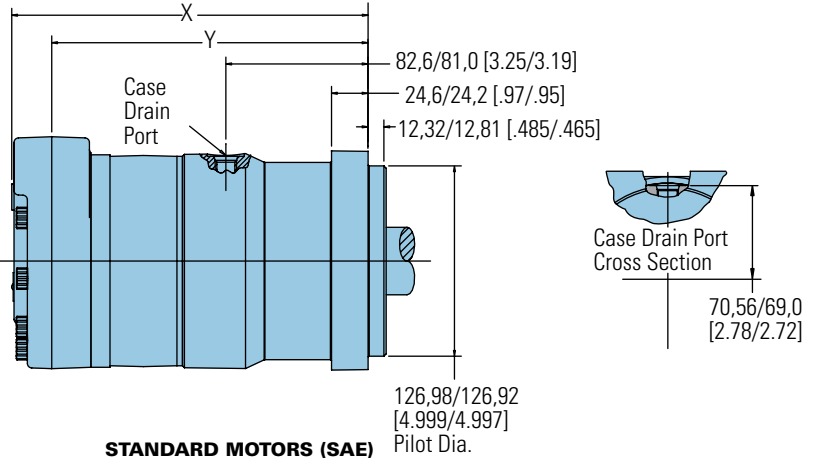
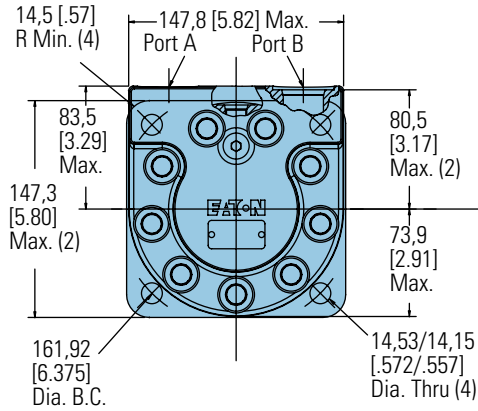
Ports

- 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

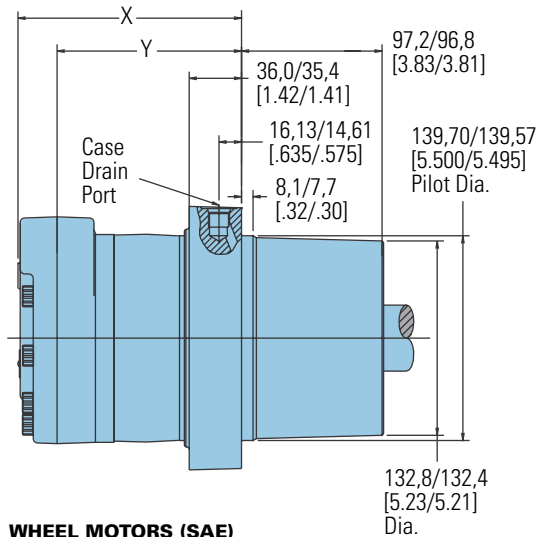
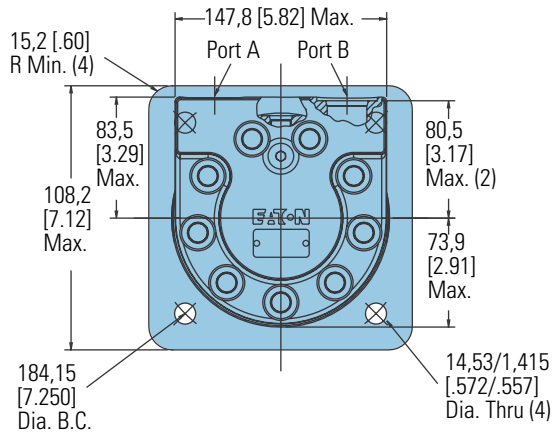
Standard Motors (SAE)



STANDARD MOTORS (SAE)

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



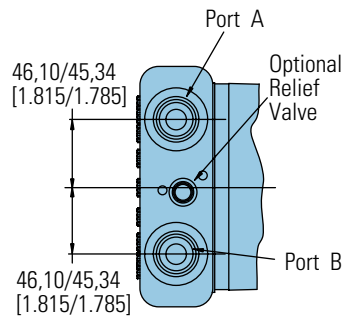
WHEEL MOTORS (SAE)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
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]	154,4 [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

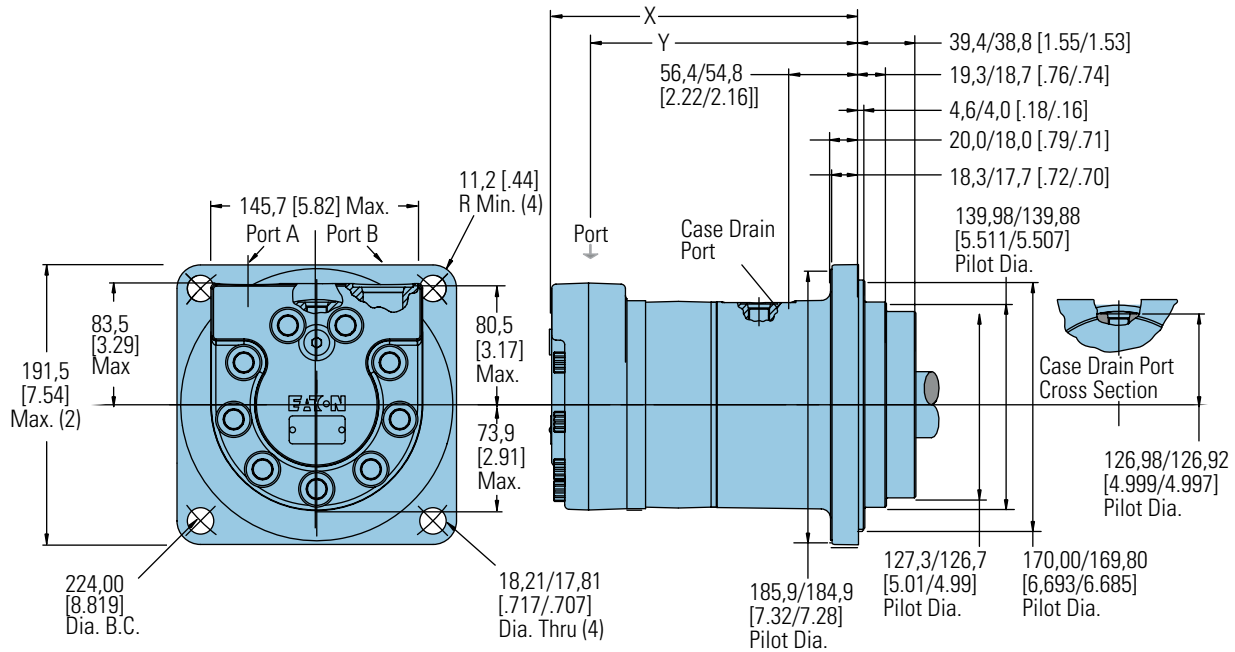
1-1/16-12 UN-2B SAE O-ring Ports (2)

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



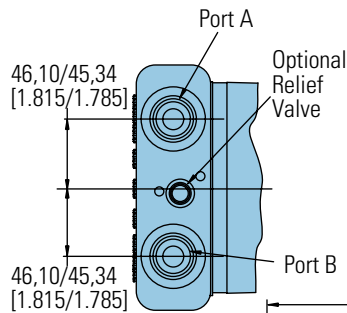
STANDARD MOTORS (OVERSIZE)

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
325 [19.8]	196,6 [7.74]	168,1 [6.62]
400 [24.4]	203,2 [8.00]	175,0 [6.89]
505 [30.7]	181,4 [8.36]	183,9 [7.24]
570 [34.9]	187,4 [8.60]	190,2 [7.49]
630 [38.5]	192,5 [8.81]	195,3 [7.69]
685 [41.7]	197,6 [8.99]	199,9 [7.87]
785 [48.0]	206,8 [9.35]	209,3 [8.24]
940 [57.4]	220,5 [9.89]	223,0 [8.78]

VIS 40 Series

Dimensions

Standard and Wheel Mount
– ISO



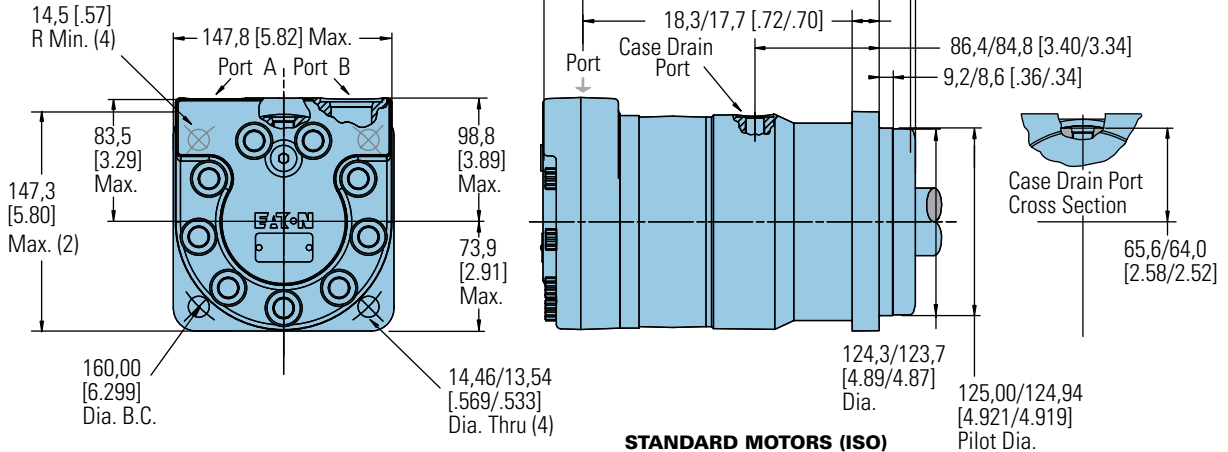
Ports

- 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

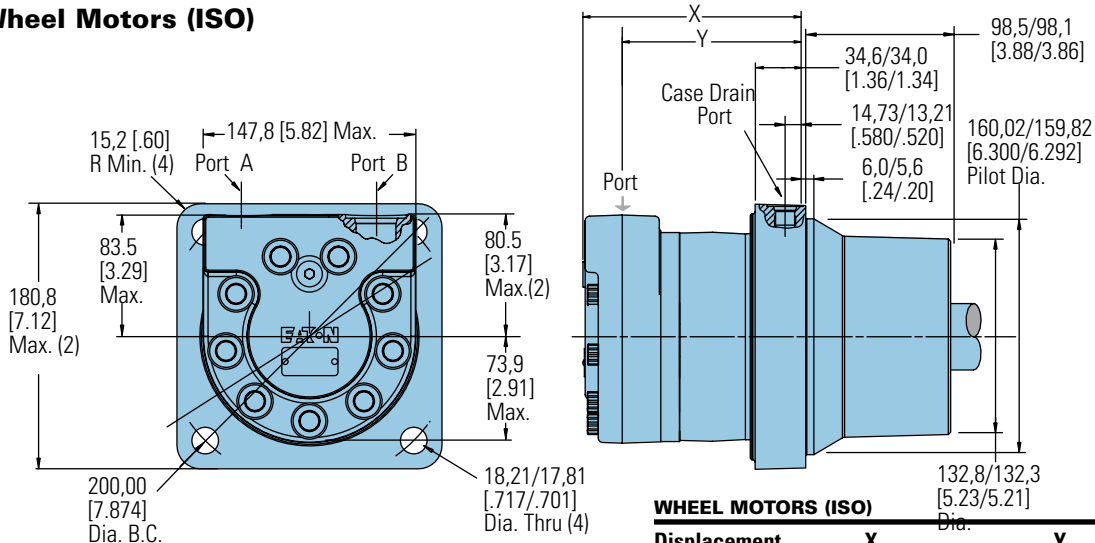
Standard Motors (ISO)



STANDARD MOTORS (ISO)

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



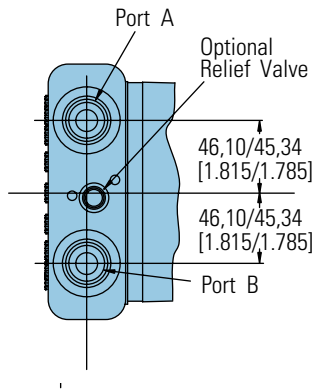
WHEEL MOTORS (ISO)

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

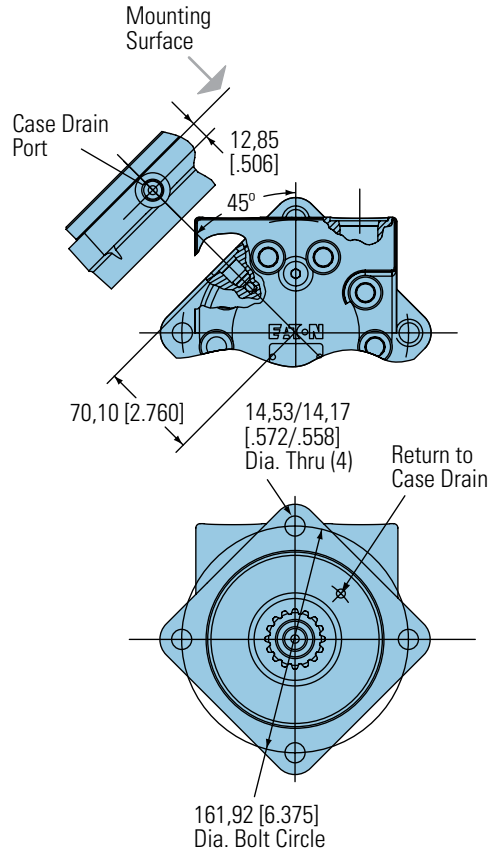
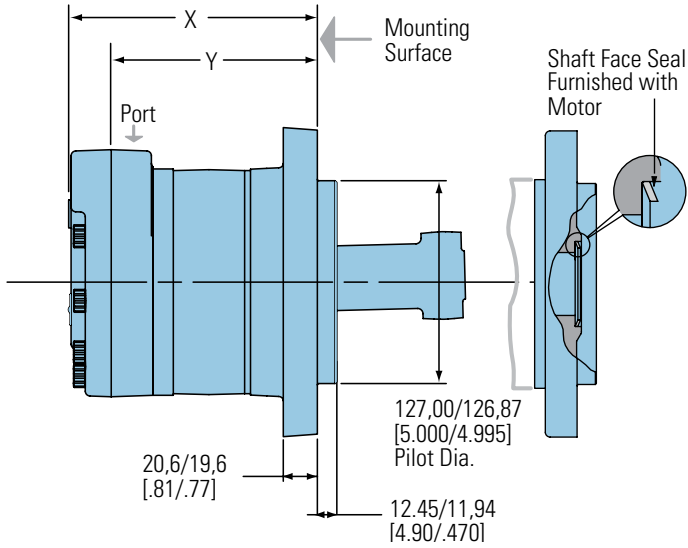


Ports

- 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)

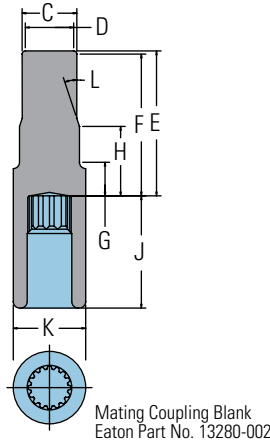
Standard Rotation Viewed from Drive End

- 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).

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		

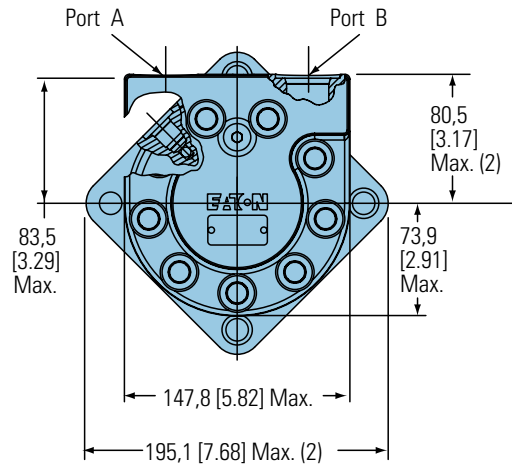


Note:

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

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]
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]

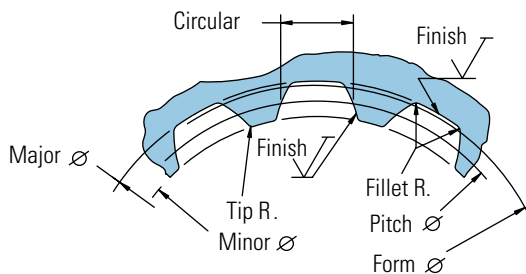
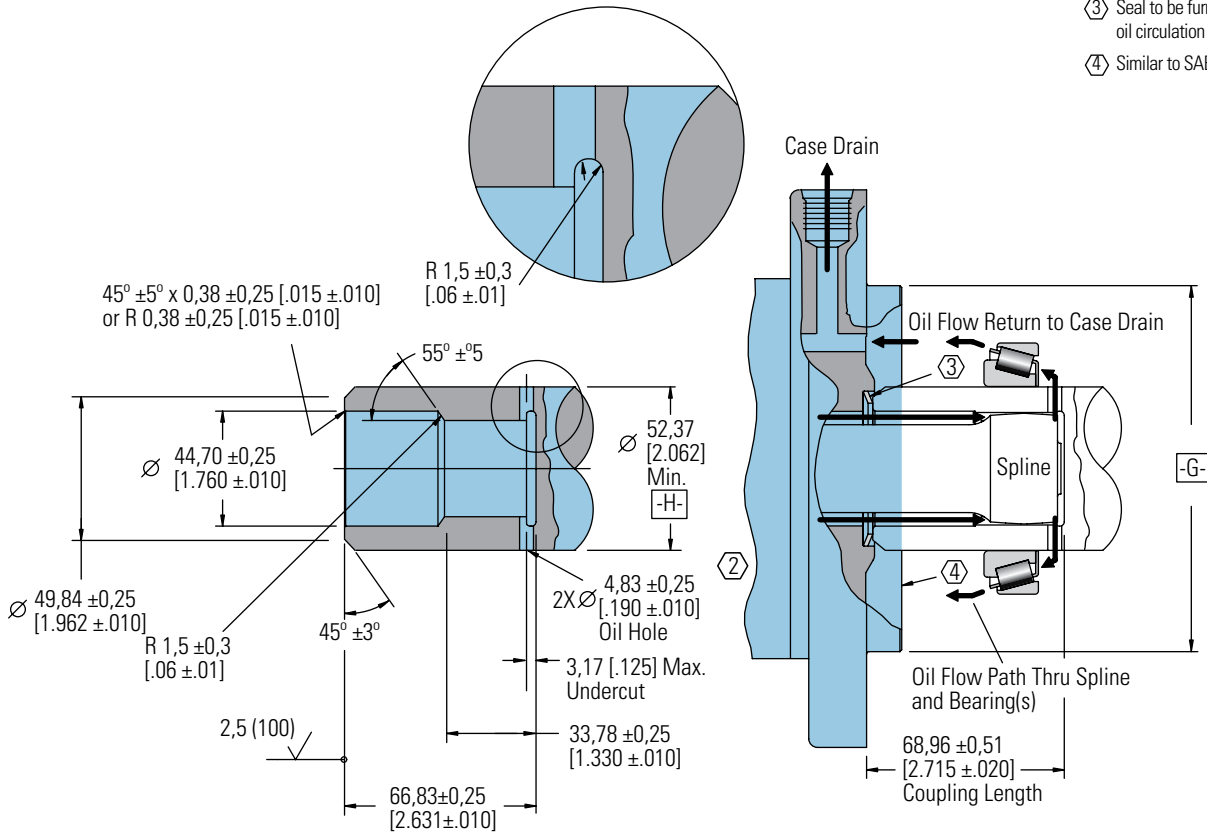


VIS 40 Series

Installation Information

Bearingless

- 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.



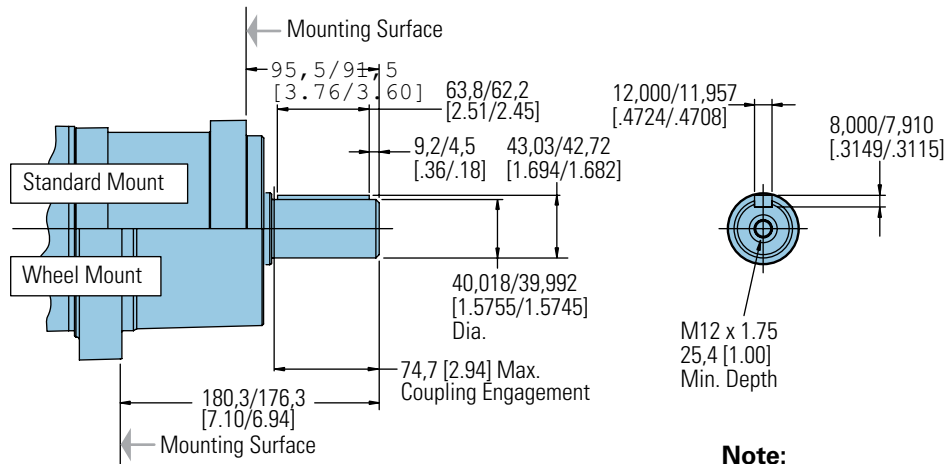
Spline Pitch.....	10/20
Pressure Angle.....	30°
Number of teeth.....	16
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter.....	Ref. 40,640000 [1.6000000] $\text{Ⓞ} 0,20$ [.008] H
Base Diameter.....	Ref. 35,195272 [1.3856406]
Major Diameter.....	43,56 [1.715] Max. 43,18 [1.700]
Min. Minor Diameter.....	36,83 -37,08 [1.450 -1.460]
Form Diameter, Min.....	42,47 [1.672]
Fillet Radius.....	0,64 -0,76 [.025 -0.030]
Tip Radius.....	0,25 -0,51 [.010 -0.020]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,025 [+0.000 -0.010]
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

Dimensions Shafts

SAE

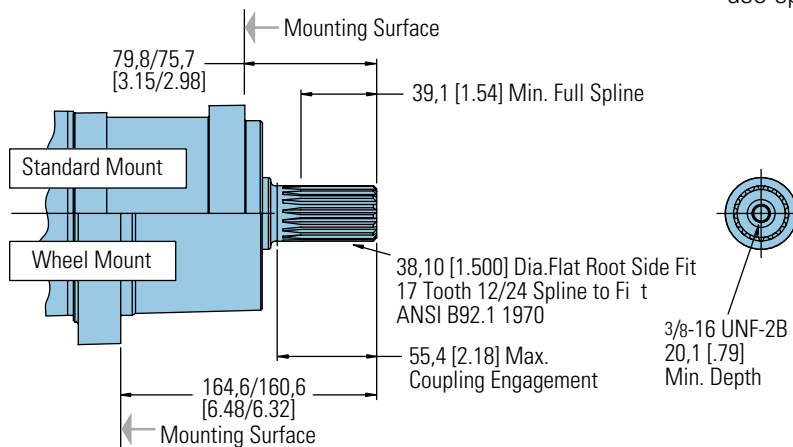
40 mm Straight



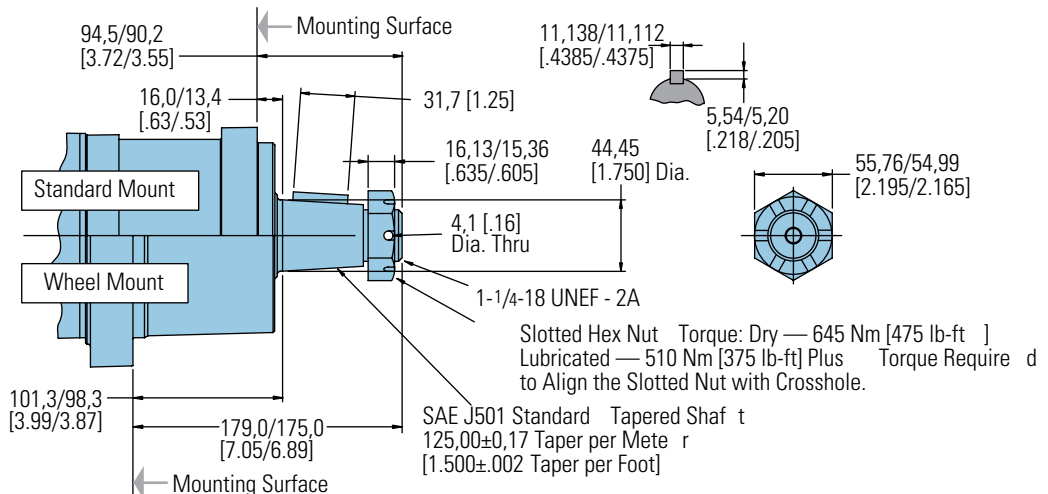
Note:

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

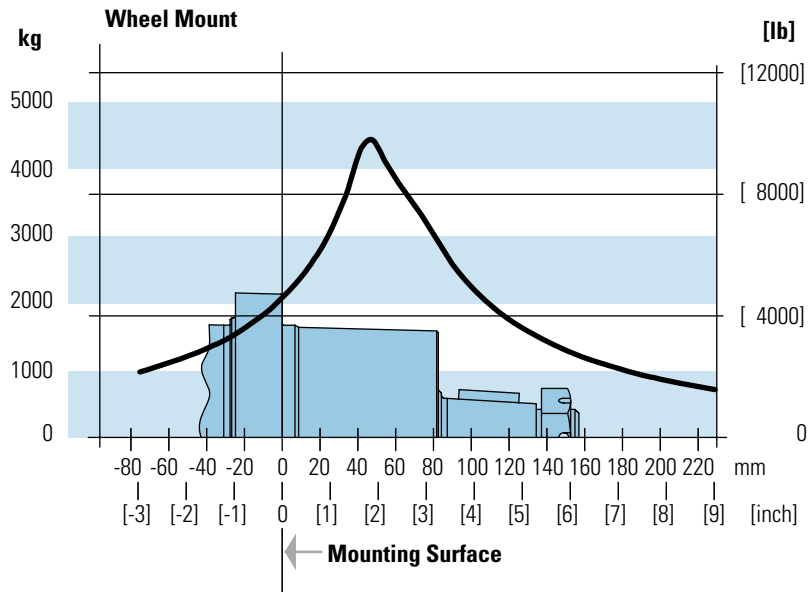
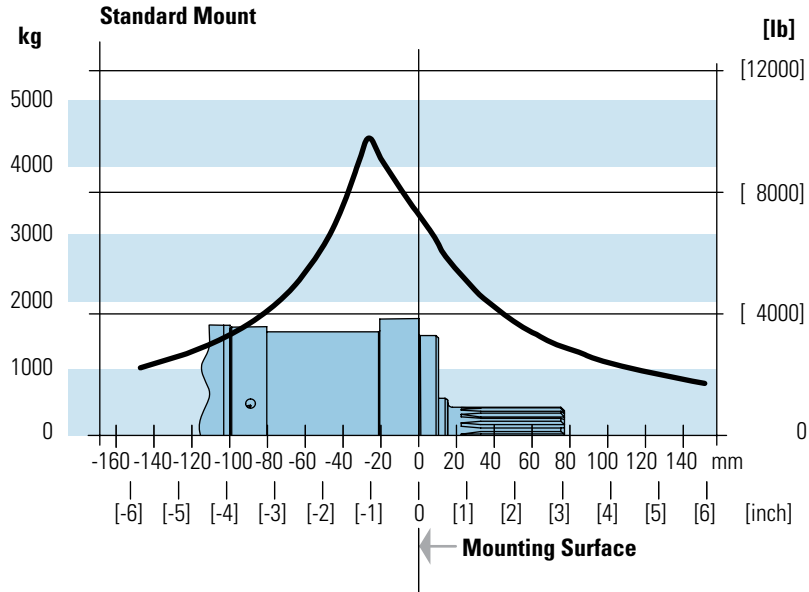
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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%.

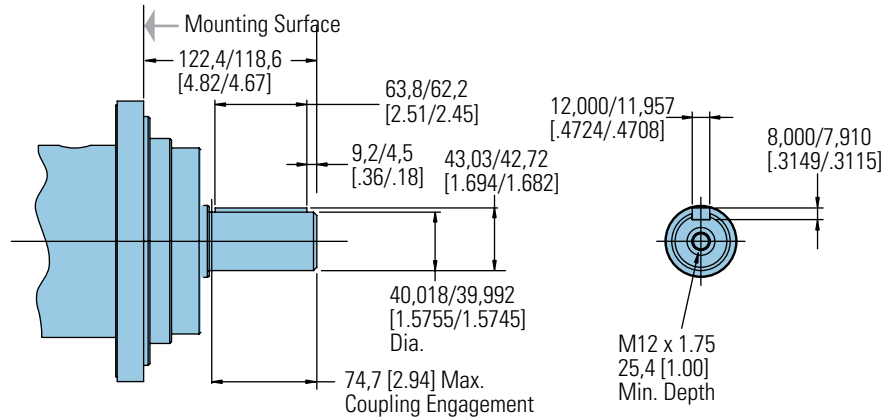


VIS 40 Series

Dimensions Shafts

Oversize Flange
224,0 [8.82] B.C.

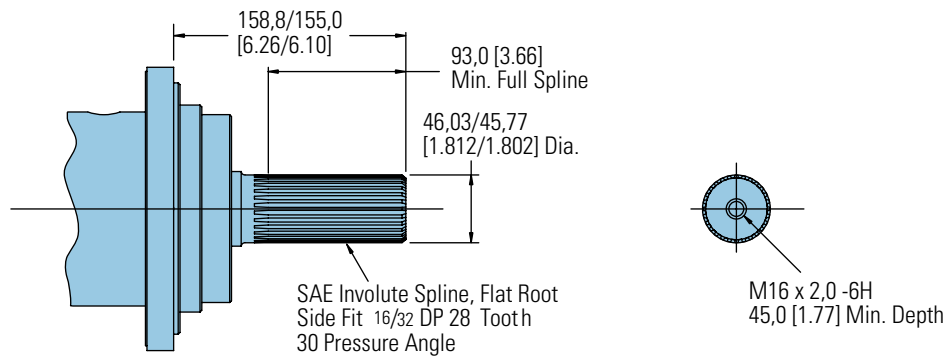
40 mm Straight



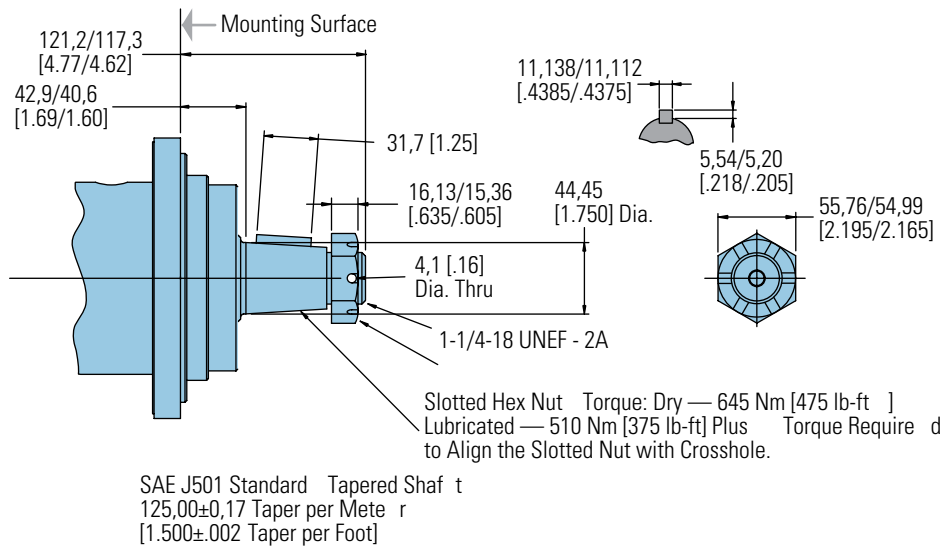
Note:

For motor torque ratings above 875 Nm [7750 lb - in] use split coupler.

46 mm 28 Tooth Splined



1-3/4 Inch Tapered



VIS 40 Series

Side Load Capacity

Oversize Flange
224,0 [8.82] B.C.

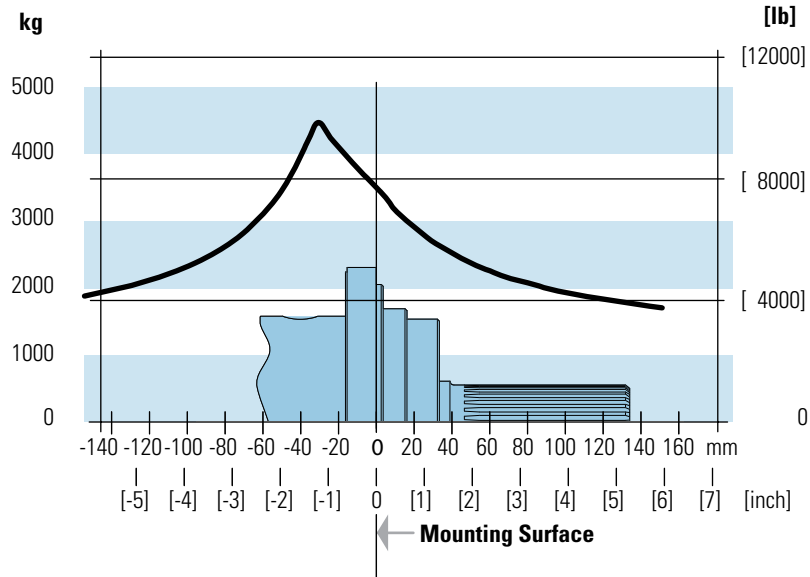
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

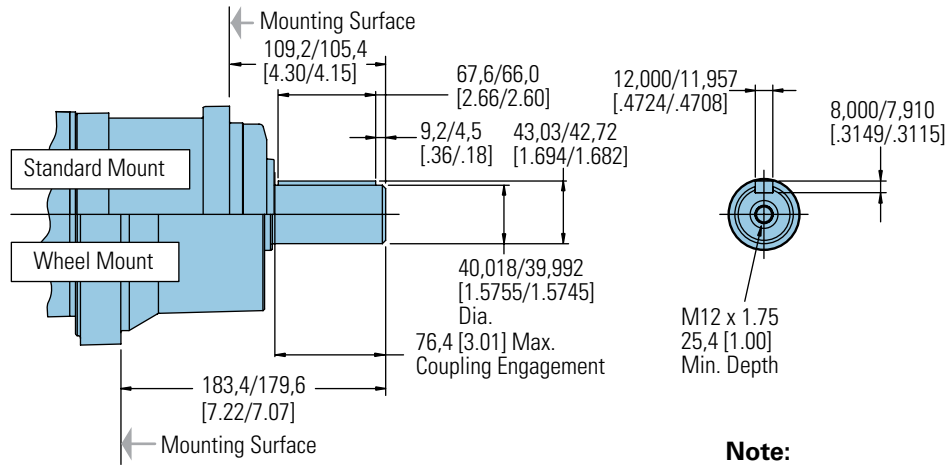
For 3,000,000 shaft revolutions or 500 hours — Increase these shaft loads 52%.



VIS 40 Series

Dimensions
Shafts
ISO

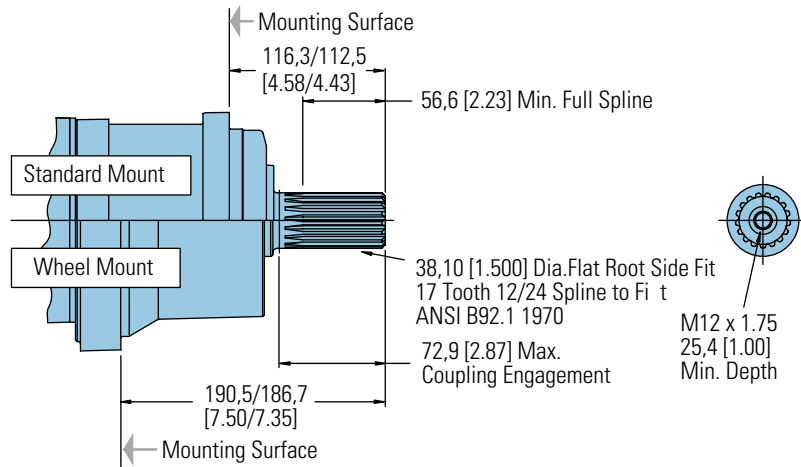
40 mm Straight



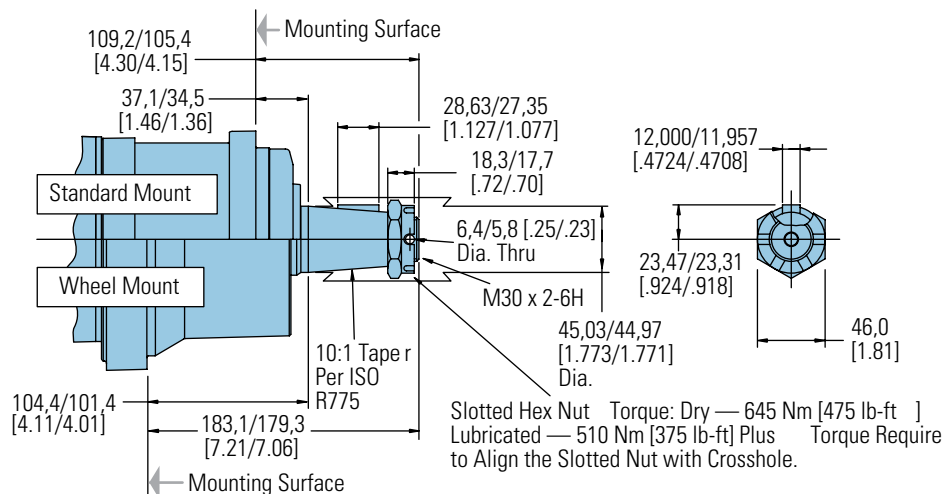
Note:

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

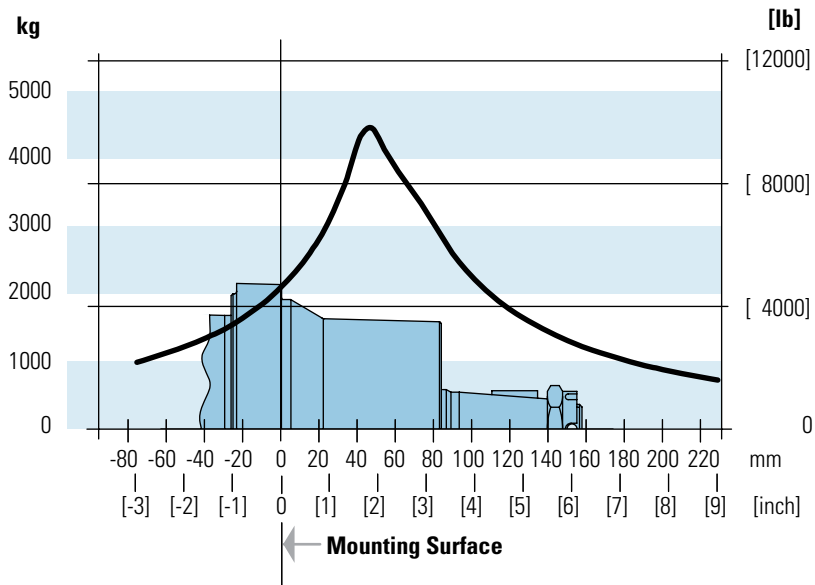
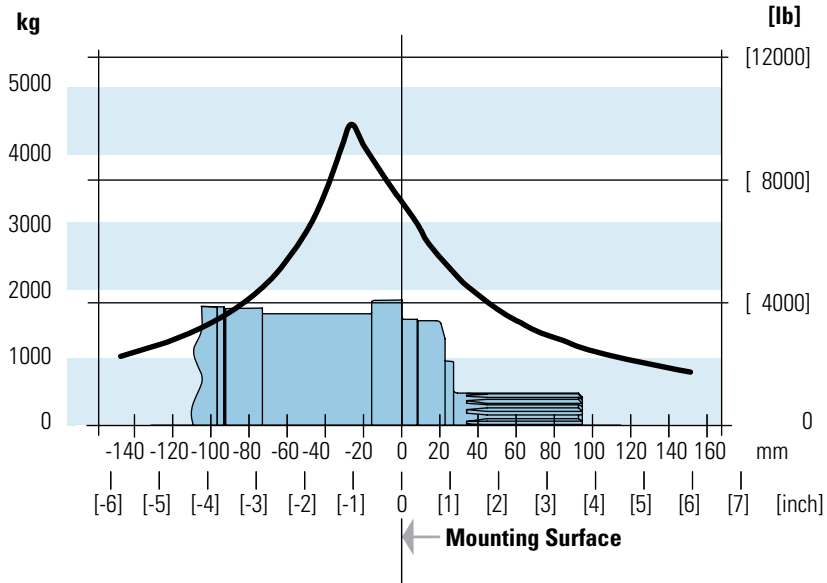
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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								
			325 [19.8]	400 [24.4]	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)	177-0220	-0218	-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)	177-0221	—	-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)	—	—	-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)	—	—	-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)	—	—	-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)	—	180-0088	-0019	-0020	-0021	-0022	-0023	-0024	
Bearingless		1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	—	—	-0015	-0016	-0017	-0018	-0019	-0020	

168-0018

Overize

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]	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	—	—	—	—	
	46 mm 28 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	—	—	177-0053	-0054	—	—	—	—	
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	—	—	177-0059	-0060	—	—	—	—	

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]	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)	—	—	-0065	-0066	-0067	-0068	-0069	-0070	
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0223	-0224	-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)	—	—	-0077	-0078	-0079	-0080	-0081	-0082	
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	—	—	-0025	-0026	-0027	-0028	-0029	-0030	
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	—	—	-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)	—	—	-0037	-0038	-0039	-0040	-0041	-0042	
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	—	—	-0021	-0022	-0023	-0024	-0025	-0026	

168-0024

Note:

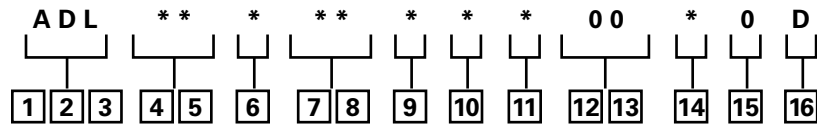
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

- 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

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]

- 20** – 325 [19.8]
- 24** – 400 [24.4]
- 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)
- M** – Standard, 4 Bolt: 169,75 [6.683] Pilot Dia. with 4,3 [.17] Pilot Length and M16 X 2 -6H Threaded Holes on 224,00 [8.819] Dia. Bolt Circle (To be selected for Brake Option)

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
- 08** – Spring Applied Hydraulic Release Wet Brake with Brake Capacity of 20,000 lbf-in Static and 150 lbf/in² release pressure

14 Paint/ Special Packaging

- 0** – Primer, Individual Box
- A** – Low Gloss Black Primer, Individual Box
- B** – No Paint, Bulk Box

Option

- C** – Low Gloss Black Primer, Bulk Box Option

15 Eaton Assigned Code when Applicable

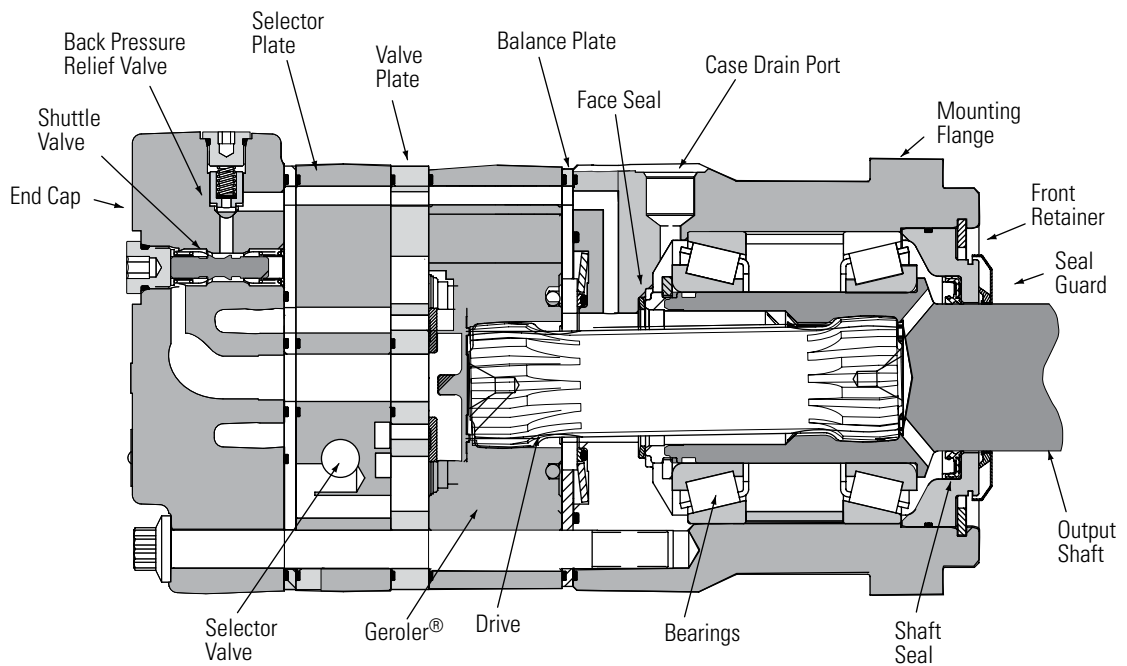
- 0** – Assigned Code

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

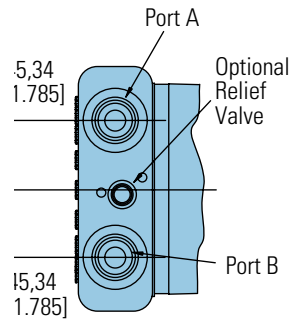
In the LSHT mode, torque and speed values are equal to those of the conventional VIS 40 motor. In the HSLT mode, rotation speed is increased by fifty percent and torque output is reduced by one third. The VIS 40 two-speed motor will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes.

VIS 40 Series

Two-speed

Dimensions

Standard and Wheel Mount
– SAE



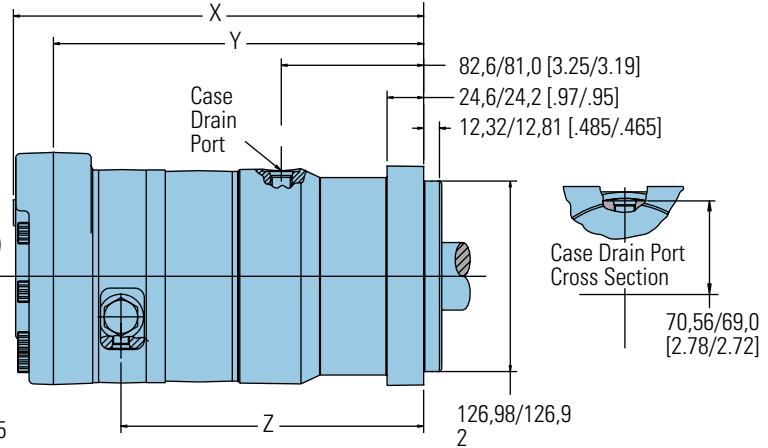
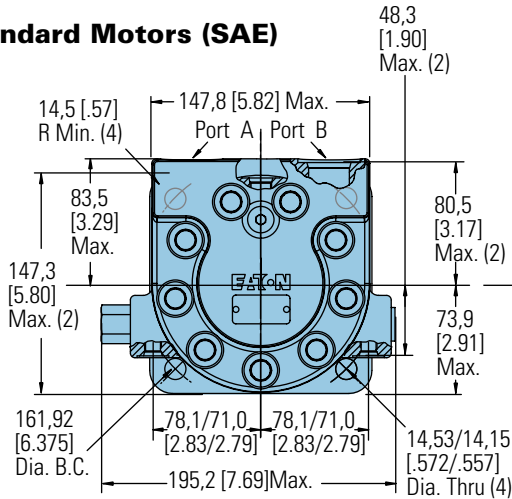
Ports

- 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

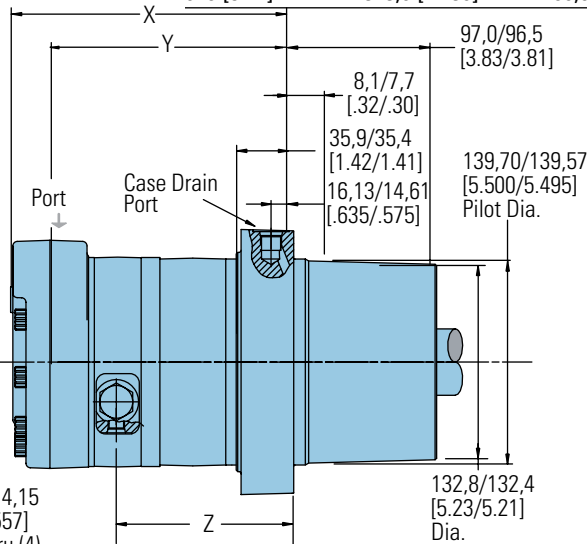
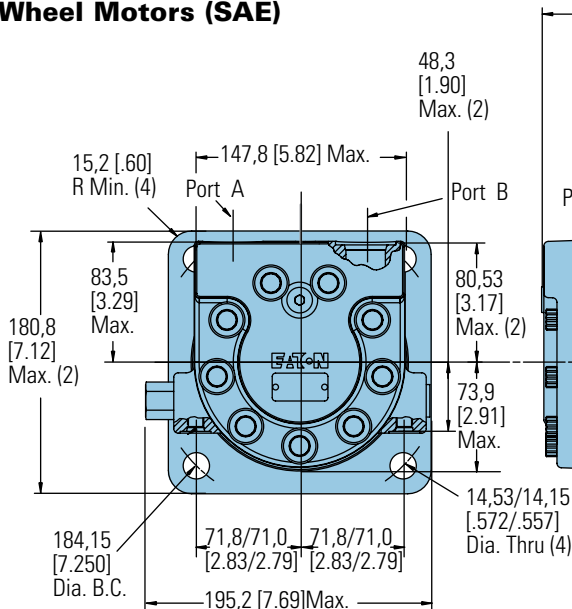
Standard Motors (SAE)



STANDARD MOTORS (SAE)

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

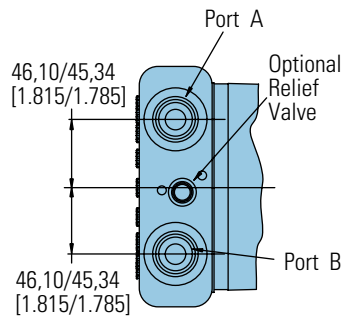
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
325 [19.8]	174,5 [6.87]	146,6 [5.77]	101,3 [3.99]
400 [24.4]	181,1 [7.13]	153,2 [6.03]	108,2 [4.26]
505 [30.7]	190,2 [7.49]	162,1 [6.38]	116,8 [4.60]
570 [34.9]	196,3 [7.73]	168,1 [6.62]	123,2 [4.85]
630 [38.5]	201,4 [7.93]	173,5 [6.83]	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.

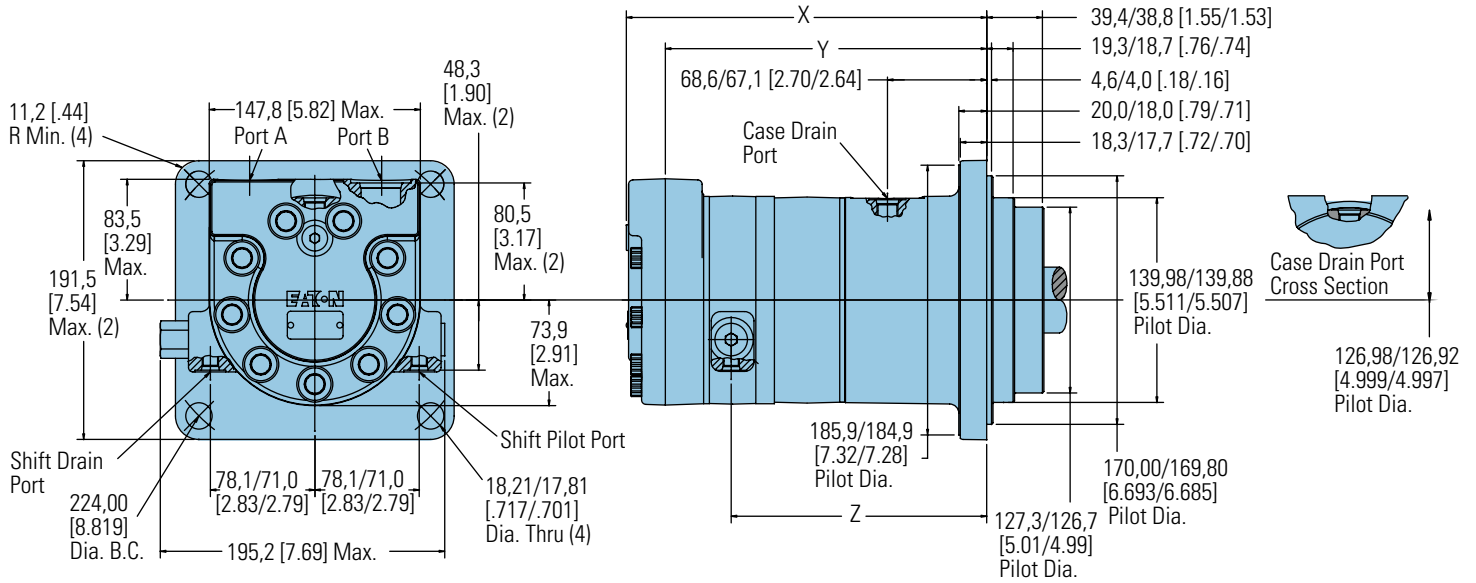


Ports

- 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

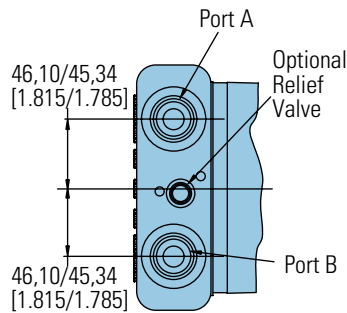
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
325 [19.8]	232,4 [9.15]	204,0 [8.03]	159,0 [6.26]
400 [24.4]	239,3 [9.42]	210,6 [8.29]	165,6 [6.52]
505 [30.7]	248,2 [9.77]	220,0 [8.66]	174,8 [6.88]
570 [34.9]	254,3 [10.01]	226,1 [8.90]	181,1 [7.13]
630 [38.5]	259,3 [10.21]	231,4 [9.11]	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



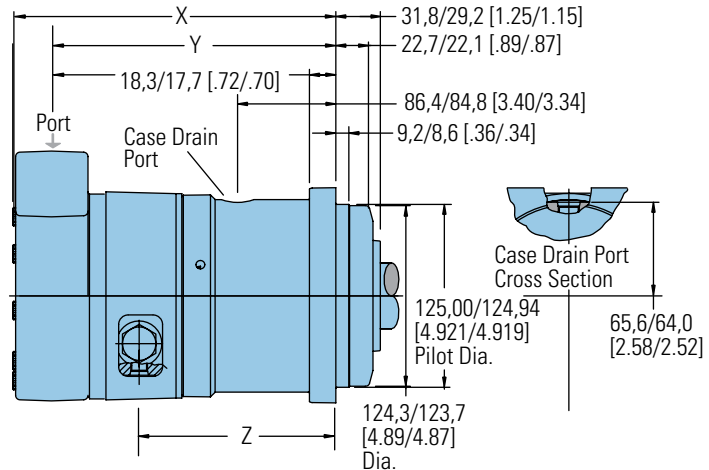
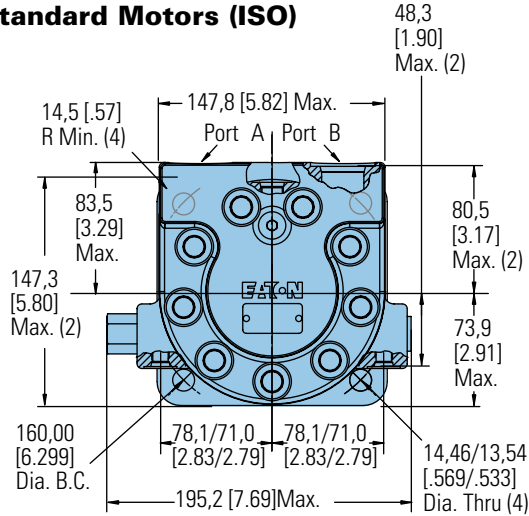
Ports

- 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

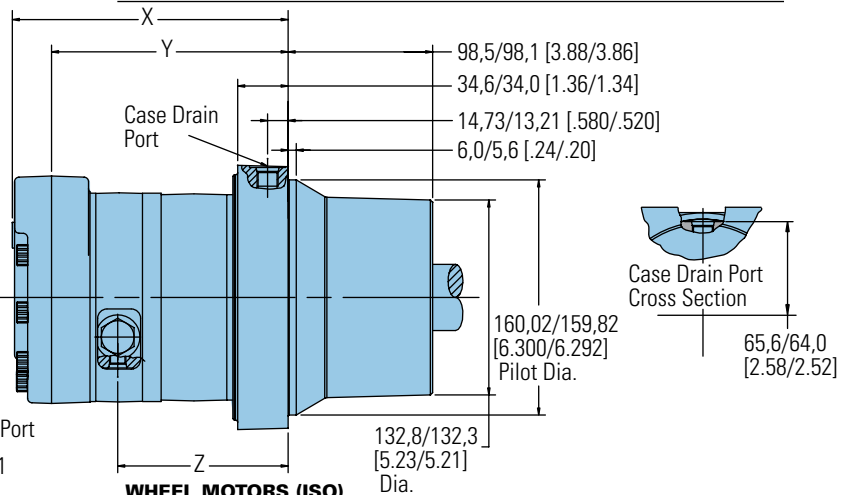
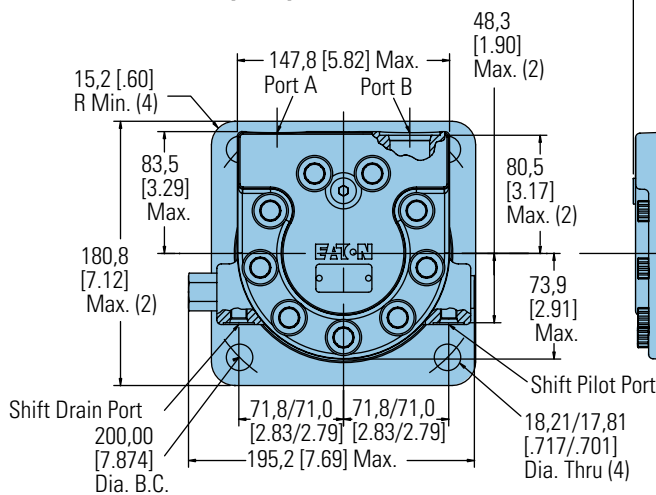
Standard Motors (ISO)



STANDARD MOTORS (ISO)

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

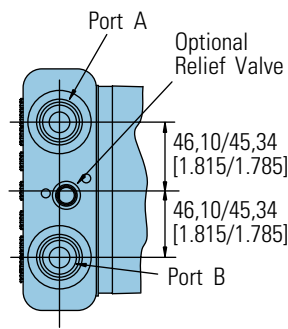
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
325 [19.8]	173,2 [6.82]	145,3 [5.72]	100,1 [3.94]
400 [24.4]	179,6 [7.07]	151,6 [5.97]	106,7 [4.20]
505 [30.7]	189,0 [7.44]	160,8 [6.33]	115,6 [4.55]
570 [34.9]	195,1 [7.68]	166,9 [6.57]	121,9 [4.80]
630 [38.5]	200,2 [7.88]	172,2 [6.78]	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

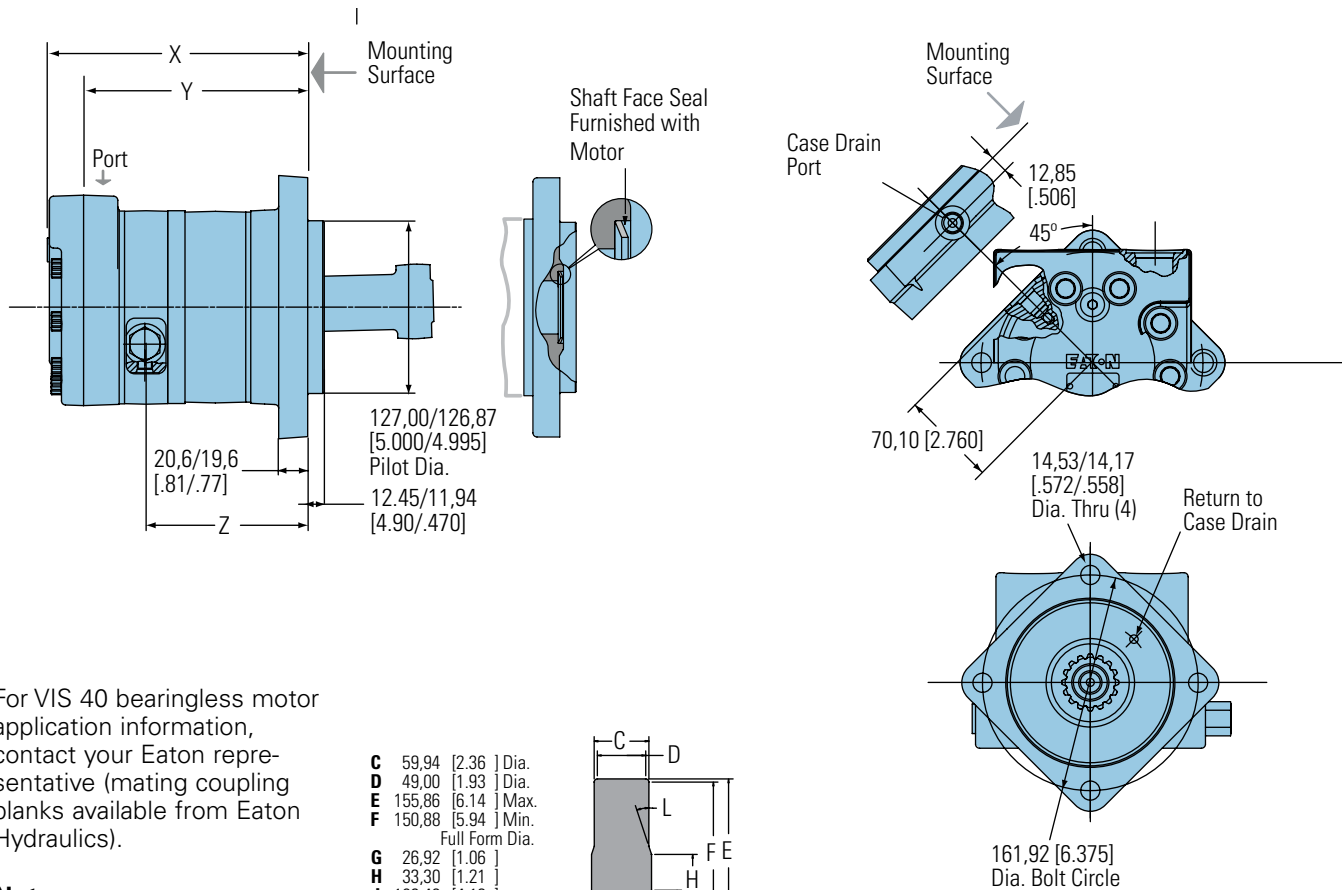


Ports

- 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

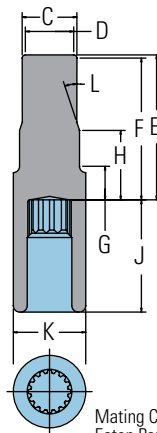


For VIS 40 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

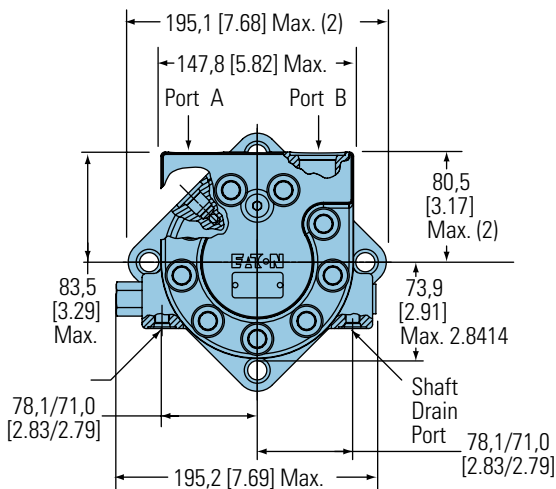
Note:

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.
- G** 26,92 [1.06] Full Form Dia.
- H** 33,30 [1.21]
- J** 106,43 [4.19] Full Form Dia.
- K** 72,64 [2.86]
- L** 15



Mating Coupling Blank
Eaton Part No. 13280-002



BEARINGLESS MOTORS

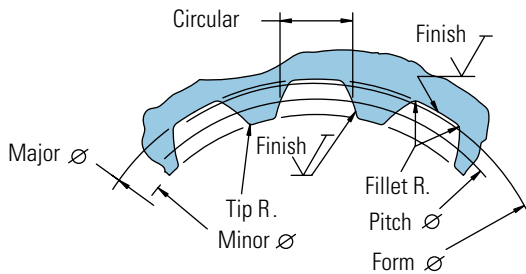
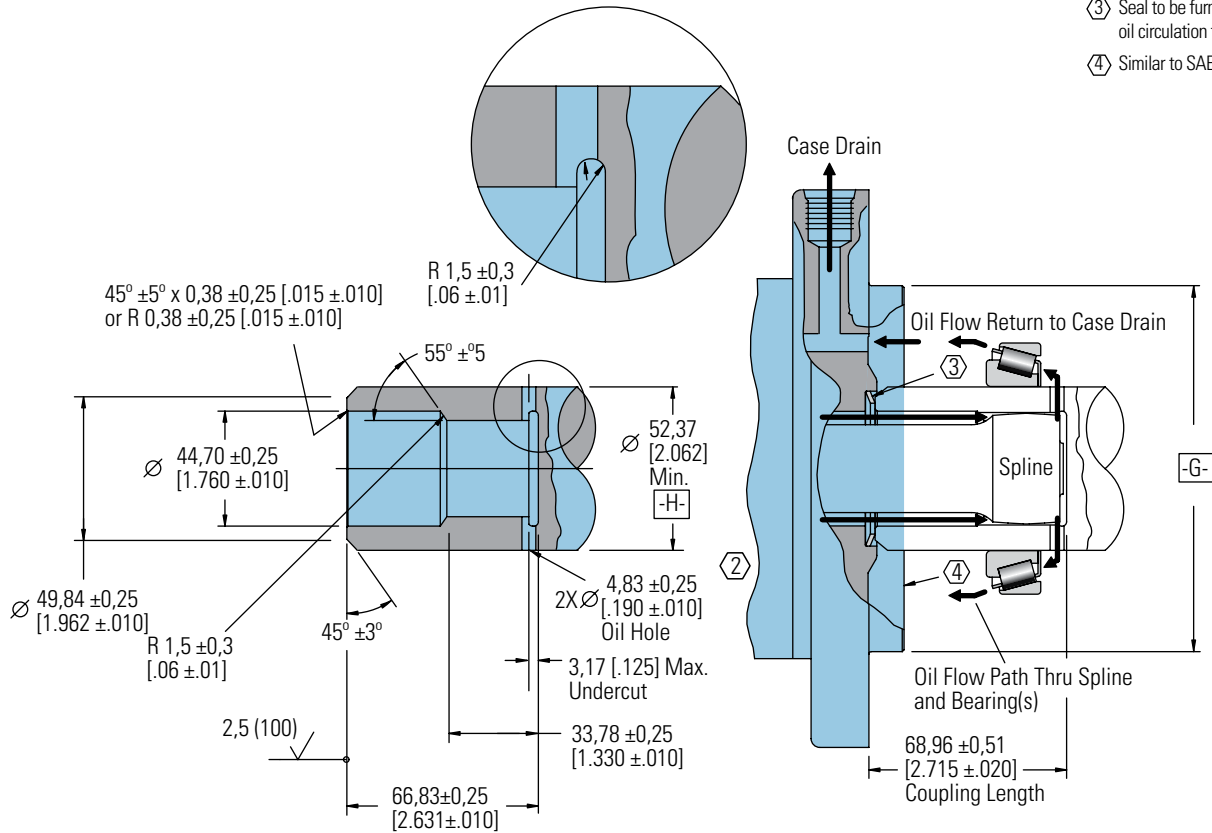
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
325 [19.8]	177,0 [6.97]	149,1 [5.87]	103,9 [4.09]
400 [24.4]	183,6 [7.23]	155,7 [6.13]	110,7 [4.36]
505 [30.7]	193,0 [7.60]	164,8 [6.49]	119,6 [4.71]
570 [34.9]	199,1 [7.84]	170,9 [6.73]	126,0 [4.96]
630 [38.5]	204,0 [8.03]	176,0 [6.93]	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] $\text{Ⓢ} 0,20 [0.008] H$
Base Diameter.....	Ref. 35,195272 [1.3856406]
Major Diameter.....	43,56 [1.715] Max. 43,18 [1.700]
Min. Minor Diameter.....	36,83 -37,08 [1.450 -1.460]
Form Diameter, Min.....	42,47 [1.672]
Fillet Radius.....	0,64 -0,76 [.025 -.030]
Tip Radius.....	0,25 -0,51 [.010 -.020]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,025 [+0.0000 -0.0010]
Total Index Variation.....	0,040 [0.0016]
Lead Variation.....	0,013 [0.0005]
Circular Space Width:	
Maximum Actual.....	4,105 [1.6116]
Minimum Effective.....	3,995 [1.573]
Maximum Effective.....	Ref. 4,056 [1.597]
Minimum Actual.....	Ref. 4,081 [1.582]
Dimension Between Two Pins.....	Ref. 34,272 -34,450 [1.3493 -1.3563]
Pin Diameter.....	4,389 [1.728]

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							
			325 [19.8]	400 [24.4]	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)	—	-0106	-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)	178-0108	-0109	-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)	—	-0128	-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)	—	—	-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)	—	—	-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)	—	182-0041	-0014	-0015	-0016	-0017	-0018	-0019
Bearingless		1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	176-0037	—	-0019	-0020	-0021	-0022	-0023	-0024

176-0022

Oversize

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]	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	—	—	—	—
	46 mm 28 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	—	—	178-0045	-0046	—	—	—	—
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	—	—	178-0051	-0052	—	—	—	—

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]	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)	178-0110	-0111	-0057	-0058	-0059	-0060	-0061	-0062
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	178-0095	—	-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)	—	—	-0063	-0064	-0065	-0066	-0067	-0068
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	182-0042	—	-0020	-0021	-0022	-0023	-0024	-0025
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	—	—	-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)	—	—	-0032	-0033	-0034	-0035	-0036	-0037
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	—	—	-0025	-0026	-0027	-0028	-0029	-0030

176-0028

Note:

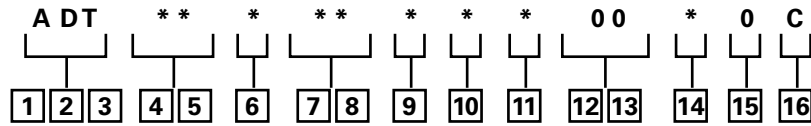
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

- 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]
- 24** – 400 [24.4]
- 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. Holes on 160,00 [6.299] Dia. Bolt Circle (ISO Compatible)

M – Standard, 4 Bolt: 169,75 [6.683] Pilot Dia. With 4.3 [.17] Pilot Length and M16 X 2 -6H Threaded Holes on 224,00 [8.819] Dia. Bolt Circle (To be selected for Brake Option)

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 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

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

08 – Spring Applied Hydraulic Release Wet Brake With Brake Capacity of 20,000 lbf-in Static and 150 lbf/in² release pressure

14 _ Paint/ Special Packaging

0 – Primer, Individual Box

A – Low Gloss Black Primer, Individual Box

B – No Paint, Bulk Box Option

C – Low Gloss Black Primer, Bulk Box Option

15 _ Eaton Assigned Code when Applicable

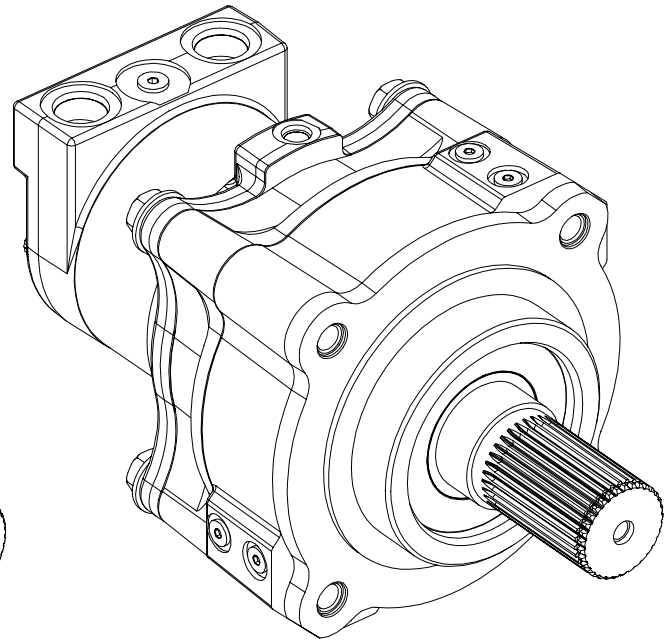
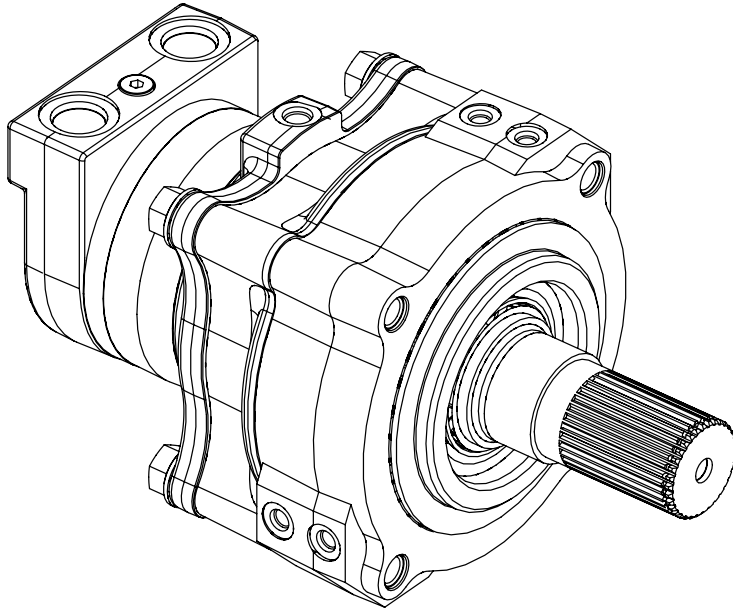
0 – Assigned Code

16 _ Eaton Assigned Design Code

C – Assigned Design Code

VIS 40 Series

Brake Description



Brake Motor WITH Outer Grease Seal

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
- Outer Grease Seal -
optional feature that
encloses the front bearing
protecting it from external
contamination

Applications

- Skid Steer Loaders
- Mini Excavators
- Trenchers
- Road Rollers
- Anywhere load-holding
is needed on a Low-
Speed High-Torque drive
system

Specifications

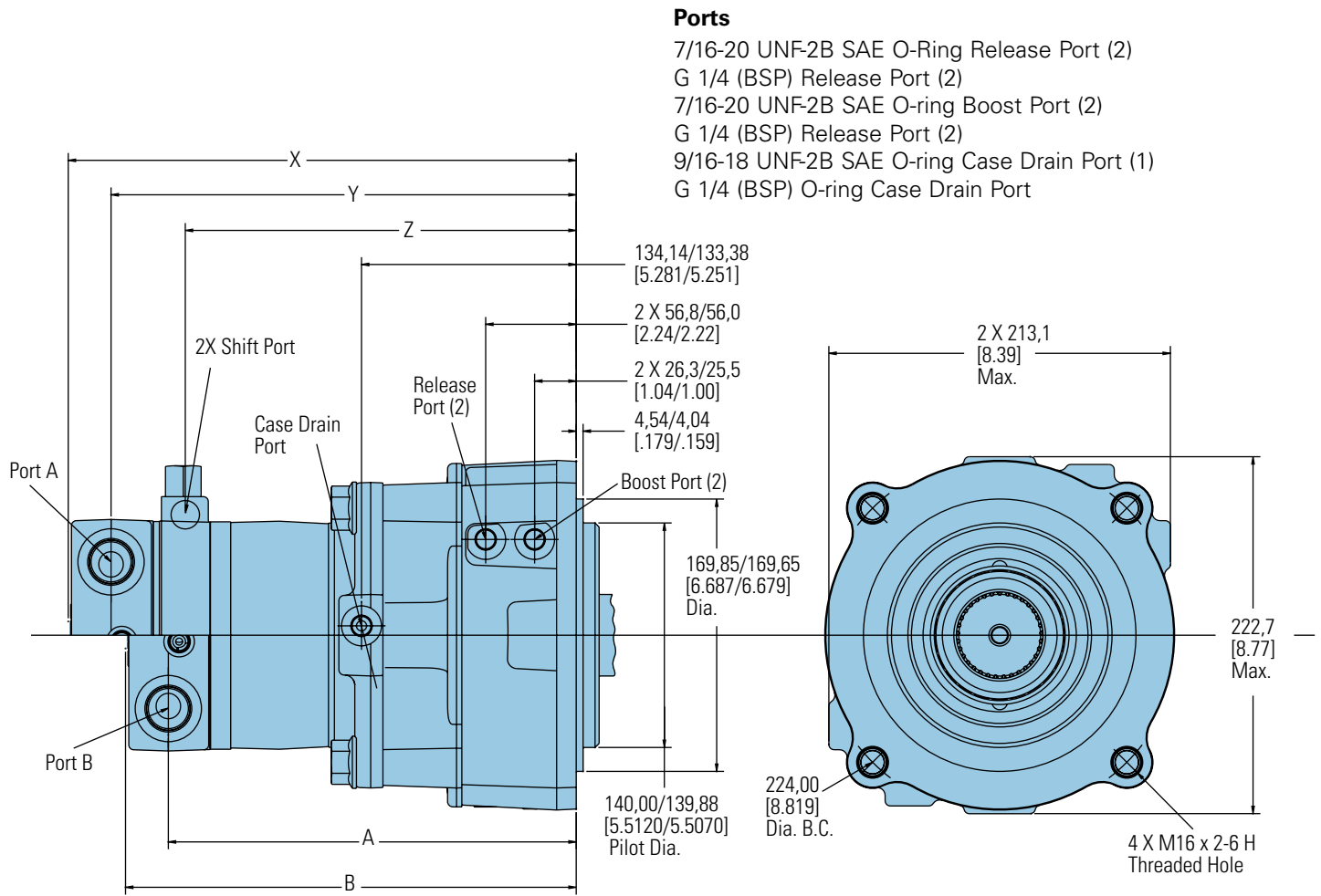
- Static Holding Torque – 780 N-m [6900 lb-in] minimum
(spring only - no boost)
2621 N-m [23200 lb-in] minimum
(@ 10,3 bar [150 PSI] boost)
3570 N-m [31600 lb-in] minimum
(@ 15,2 bar [220 PSI] boost)
- Release Pressure – 10,3 bar [150 PSI] minimum
for full release
68,9 bar [1000 PSI] maximum
allowed 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

Model Code Selection:

To add a brake to the motor, select Mounting Option 'M' from Mounting Options and select Brake Option from Special Features.

VIS 40 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]
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]

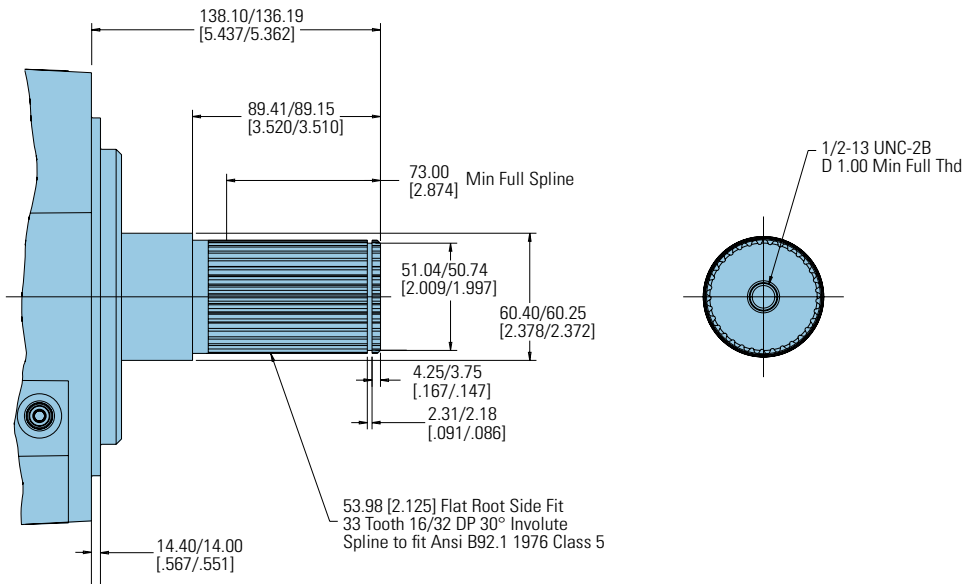
BRAKE MOTORS (TWO-SPEED)

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

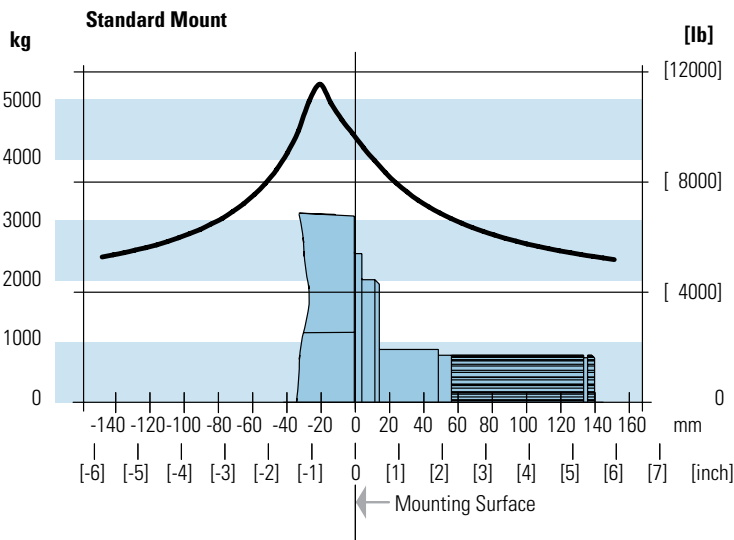
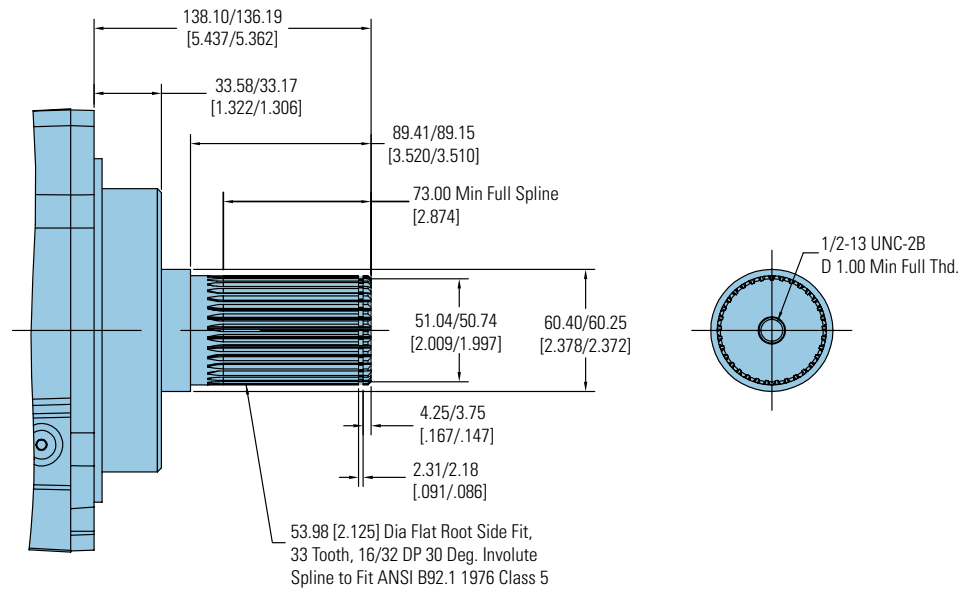
VIS 40 Series

Brake Shaft Dimensions/ Sideload Curves

Standard Brake

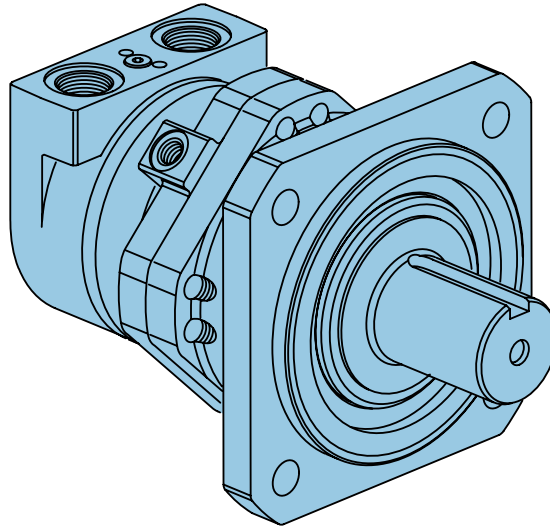


Brake with Outer Grease Seal



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.

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



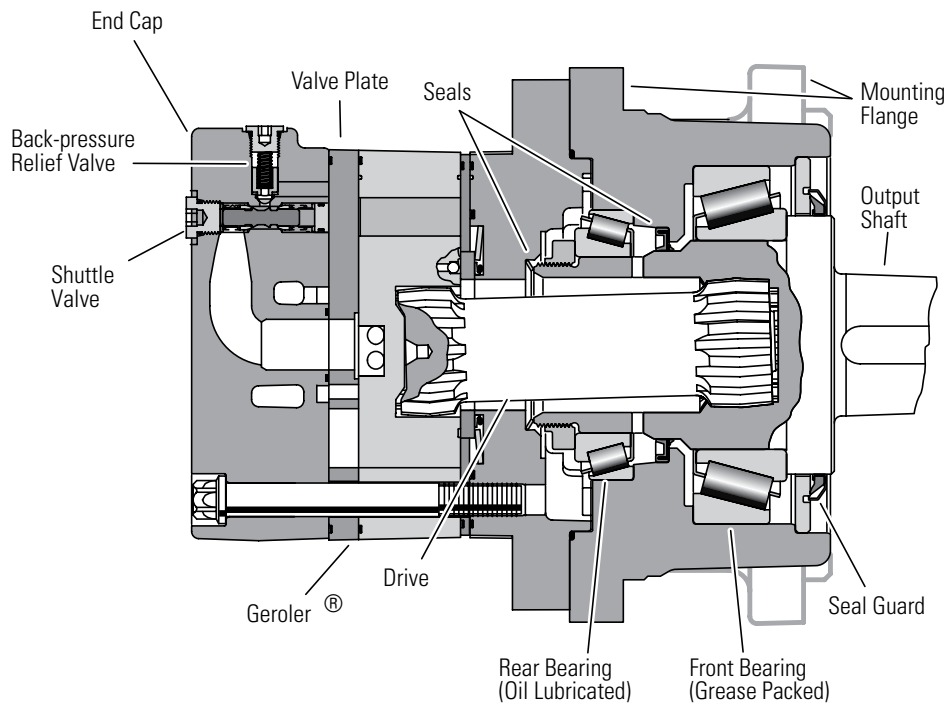
Injector



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 Bearingless	53,8 [118.7]	55,2 [121.6]	56,7 [125.0]	58,7 [129.4]	61,2 [134.9]
	Two-speed Standard or Wheel Mount Two-speed 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 System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

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

Shuttle:

Standard

Back-Pressure Relief Valve:

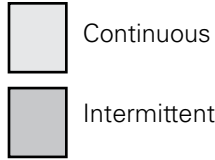
Required for closed loop circuit.

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.



630 cm³/r [38.6 in³/r]

□ 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	1270 144	2710 306	5530 625	8250 932	10300 1164	12900 1458	15540 1756	17720 2002	20820 2353	23640 2671	25740 2909
15	23 23	23 23	23 23	22 22	21 21	20 20	19 19	18 18	17 17	15 15	
8	1290 146	2720 307	5580 631	8290 937	10490 1185	13110 1481	15760 1781	18070 2042	21000 2373	24100 2723	26070 2946
30	47 47	45 45	45 45	45 45	44 44	43 43	41 41	38 38	36 36	34 34	
12	1310 148	2670 302	5440 615	8320 940	10820 1223	13400 1514	16370 1850	18970 2144	21230 2399	24540 2773	26840 3033
45	71 71	68 68	68 68	67 67	67 67	66 66	64 64	62 62	61 61	58 58	54 54
16	1320 149	2600 294	5400 610	8250 932	10910 1233	13730 1551	16780 1896	19710 2227	21970 2483	24870 2810	27530 3111
61	95 95	91 91	91 91	89 89	89 89	88 88	85 85	83 83	81 81	77 77	72 72
20	1290 146	2500 283	5270 596	8020 906	10690 1208	13400 1514	16730 1890	20020 2262	22320 2522	25420 2872	
76	119 119	114 114	114 114	113 113	113 113	111 111	108 108	104 104	103 103	97 97	
24	1240 140	2440 276	5200 588	7920 895	10560 1193	13430 1518	16700 1887	19970 2257	22610 2555	25730 2907	
91	143 143	137 137	137 137	135 135	135 135	133 133	129 129	125 125	123 123	117 117	
28		2190 247	5050 571	7870 889	10520 1189	13480 1523	16660 1883	19860 2244	22450 2537	26080 2963	
106		160 160	160 160	157 157	157 157	155 155	150 150	146 146	143 143	136 136	
32		2110 238	4870 550	7720 872	10300 1164	13230 1495	16370 1850	19720 2228	22320 2522	25986 2936	
121		182 182	182 182	180 180	180 180	177 177	172 172	166 166	164 164	156 156	
36		2090 236	4550 514	7330 828	10030 1133	12890 1457	15960 1803	19220 2172	22040 2491	25655 2898	
136		205 205	205 205	202 202	202 202	199 199	193 193	187 187	184 184	175 175	
40			4150 469	7120 805	9760 1103	12490 1411	15560 1758	18820 2127	21600 2441	25185 2845	
151			228 228	224 224	224 224	221 221	214 214	208 208	204 204	194 194	
45			3970 449	6930 783	9500 1074	12230 1382	15340 1733	18470 2087	21207 2396	24742 2795	
170			256 256	252 252	249 249	241 241	234 234	229 229	218 218		
50			3680 416	6660 753	9270 1048	11920 1347	15150 1712	18300 2068			
189			284 284	280 280	280 280	276 276	268 268	259 259			

Flow LPM [GPM]

805 cm³/r [48.6 in³/r]

□ 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	1600 181	3350 379	7180 811	10670 1206	13480 1523	16640 1880	19680 2224	21740 2457	25860 2922	28500 3221	31720 3584
15	19 19	18 18	17 17	17 17	17 17	17 17	16 16	15 15	14 14	13 13	12 12
8	1620 183	3380 382	7240 818	10730 1212	13740 1553	16920 1912	19950 2254	22160 2504	25920 2929	28970 3274	32200 3639
30	38 38	36 36	35 35	34 34	34 34	34 34	34 34	34 34	32 32	31 31	29 29
12	1640 185	3310 374	7180 811	10770 1217	14170 1601	17290 1954	20730 2342	23270 2630	26340 2976	29420 3324	32470 3669
45	56 56	55 55	52 52	52 52	51 51	51 51	50 50	50 50	49 49	47 47	45 45
16	1660 188	3220 364	7010 792	10680 1207	14290 1615	17710 2001	21240 2400	24170 2731	26830 3032	30340 3428	32940 3722
61	76 76	74 74	71 71	70 70	69 69	69 69	68 68	68 68	67 67	64 64	60 60
20	1600 181	3110 351	6840 773	10380 1173	14000 1582	17290 1954	20990 2372	24490 2767	27270 3082	31390 3547	
76	95 95	92 92	88 88	87 87	86 86	85 85	85 85	85 85	84 84	80 80	
24	1560 176	3030 342	6750 763	10250 1158	13830 1563	17340 1959	21110 2385	24450 2763	27620 3121	31460 3555	
91	114 114	110 110	105 105	104 104	103 103	103 103	102 102	102 102	101 101	96 96	
28		2720 307	6560 741	10190 1151	13780 1557	17390 1965	21090 2383	24360 2753	27420 3098	31238 3529	
106		128 128	123 123	121 121	120 120	119 119	119 119	117 117	111 111		
32		2620 296	6330 715	10000 1130	13480 1523	17070 1929	20730 2342	24180 2732	27270 3082	31064 3509	
121		147 147	140 140	139 139	137 137	137 137	135 135	135 135	134 134	127 127	
36		2620 296	5910 668	9480 1071	13140 1485	16640 1880	20200 2283	23570 2663	26910 3041	30646 3462	
136		165 165	158 158	156 156	154 154	154 154	152 152	152 152	150 150	143 143	
40			5390 609	9220 1042	12790 1445	16120 1822	19700 2226	23080 2608	26343 2976	30019 3391	
151			175 175	173 173	171 171	171 171	169 169	169 169	167 167	159 159	
45			5150 582	8970 1014	12450 1407	15780 1783	19420 2194	22650 2559	25848 2920	29462 3328	
170			198 198	196 196	193 193	193 193	191 191	191 191	189 189	179 179	
50			4770 539	8610 973	12140 1372	15380 1738	19180 2167	22440 2536			
189			220 220	217 217	215 215	215 215	212 212	212 212			

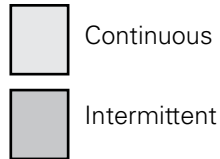
9270 } Torque [lb-in]
1048 } Nm
280 } Speed RPM

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]
□ 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	3386	3950	4470	4783
50			7900	13790	19050	24310				
189			893	1558	2153	2747				

990 cm³/r [60.5 in³/r]
□ 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		105	102	102	101	99	97	97	95	92	90
121		3210	7610	11870	16050	20600	25440	29680	33550	37890	39766
36		363	860	1341	1814	2328	2875	3354	3791	4280	4492
136		120	117	117	115	114	110	110	109	106	103
40		3200	7100	11260	15640	20080	24800	28930	32716	36936	38759
151		362	802	1272	1767	2269	2802	3269	3696	4173	4379
45		135	131	131	130	128	124	124	123	119	116
170			6480	10950	15220	19460	24170	28330	32023	36155	37935
50			732	1237	1720	2199	2731	3201	3618	4084	4286
189			146	146	144	142	138	138	137	133	130
			6190	10650	14810	19040	23830	27952	31599	35679	37432
			699	1203	1674	2152	2693	3158	3570	4031	4229
			164	164	162	160	155	155	154	149	145
			5740	10230	14450	18570	23540				
			649	1156	1633	2098	2660				
			183	183	180	178	173				

[18570] Torque [lb-in]
2098 } Nm
178 Speed RPM

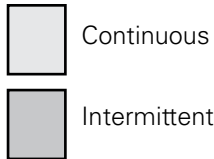
VIS 45 Series

1560 cm³/r [95.0 in³/r]

Performance Data

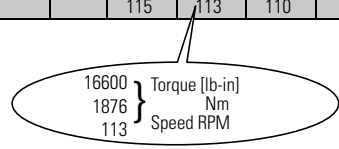
Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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



□ Pressure Bar [PSI]

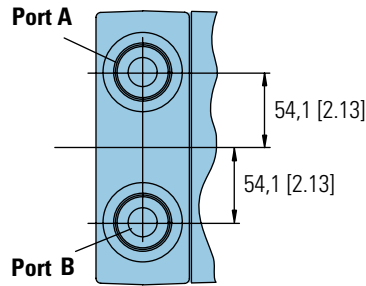
Flow LPM [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000
	15	35	70	105	140	170	205	240	275
4	2700	5670	11910	18520	24910	30860	37610	42320	48366
15	305	641	1346	2093	2815	3487	4250	4782	5464
8	2810	5910	12400	19260	25590	31740	39310	44150	50457
30	318	668	1401	2176	2892	3587	4442	4989	5700
12	3010	6300	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	58	56	55	54	53	50	47	44	44
106		5310	12500	19630	26600	33950	38740	46635	53297
		600	1413	2218	3006	3836	4378	5268	6021
		66	64	63	62	59	55	52	52
32		5120	12070	19260	26260	33510	38180	45982	52550
121		579	1364	2176	2967	3787	4314	5195	5937
		75	74	72	70	67	62	58	58
36		5100	11270	18270	25590	33070	37652	45366	
136		576	1274	2065	2892	3737	4254	5125	
		85	83	81	79	76	70	66	
40			10280	17760	24910	32630	37124	44750	
151			1162	2007	2815	3687	4194	5055	
			92	90	88	84	78	73	
45			9820	17280	24240	31793	36119	43577	
170			1110	1953	2739	3592	4080	4923	
			104	101	99	95	87	82	
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)

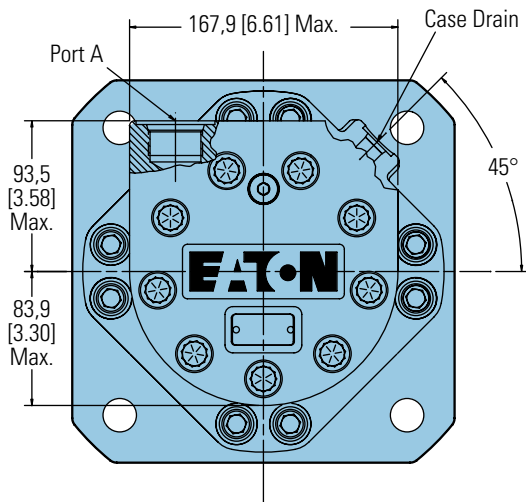
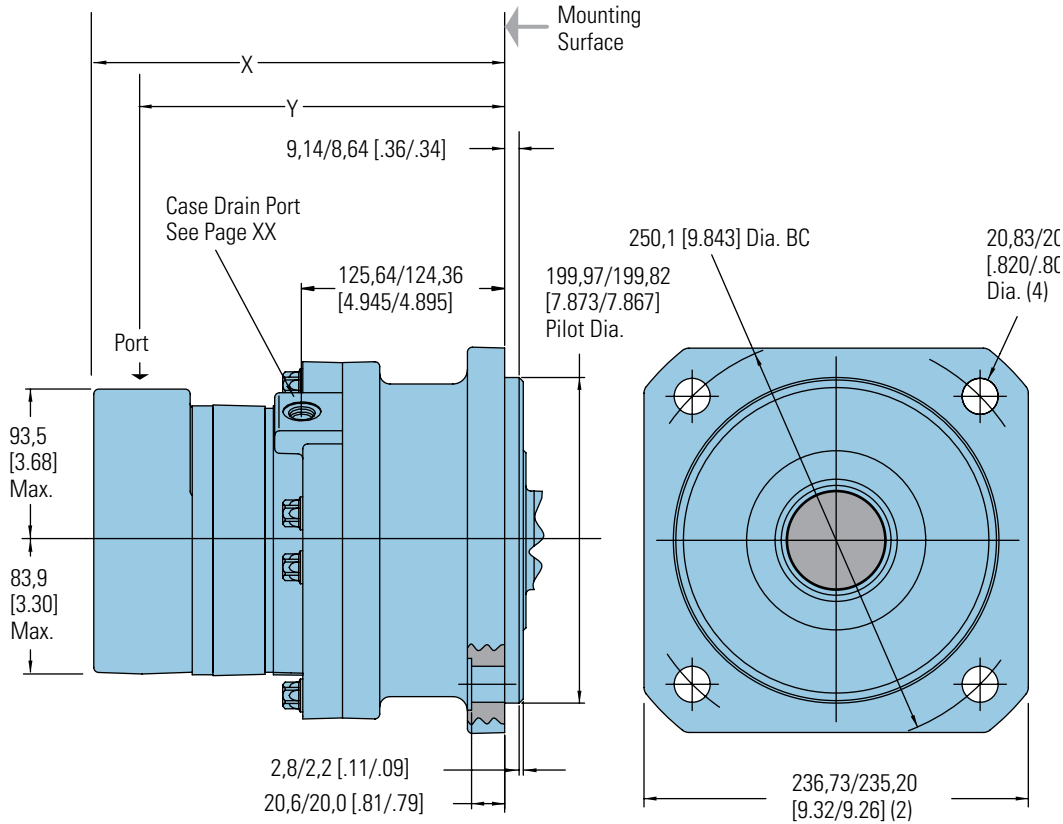
Or G 1 (BSP) O-ring Ports (2)

G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW



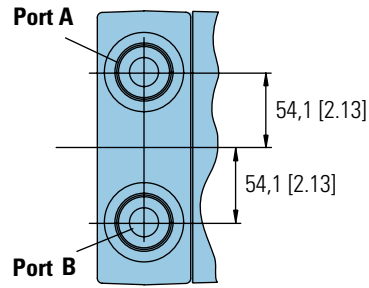
STANDARD MOTORS

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

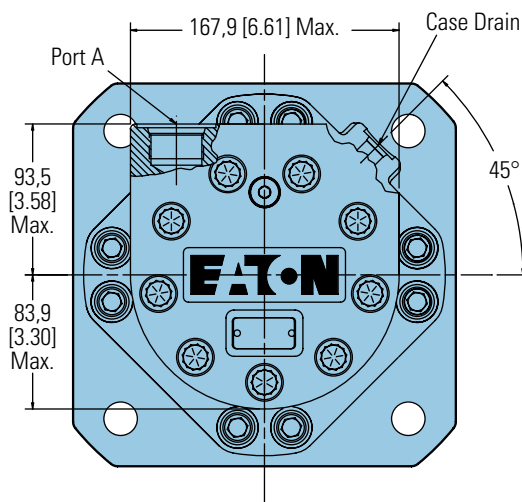
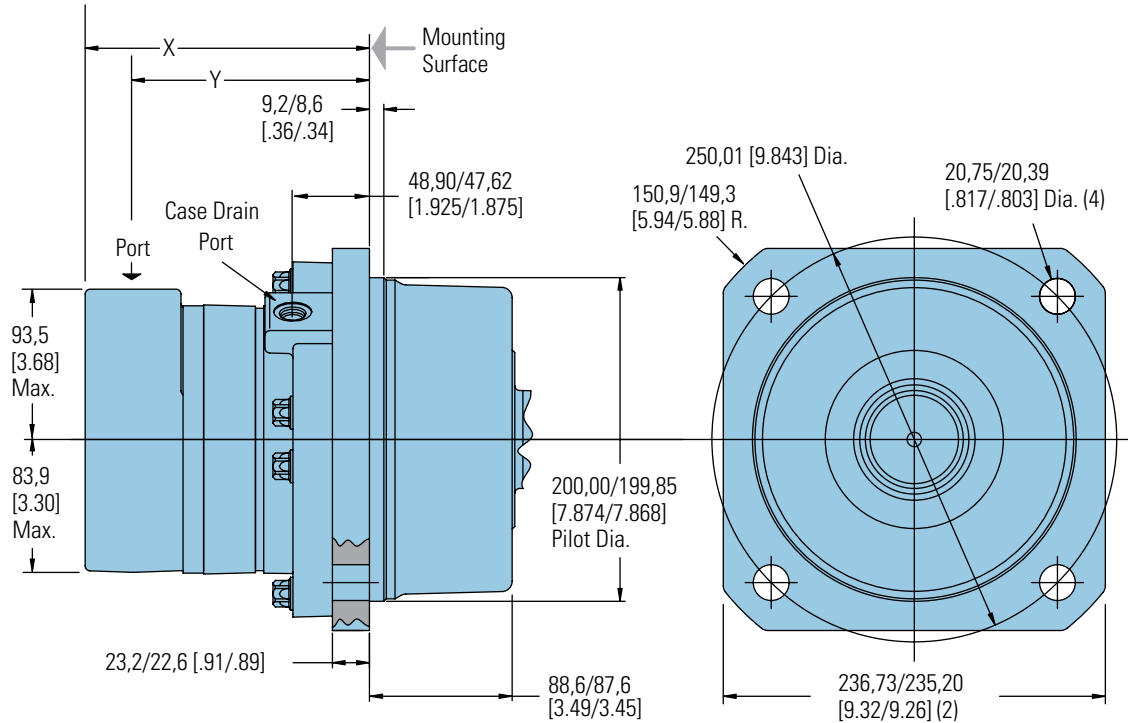


Ports

- 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



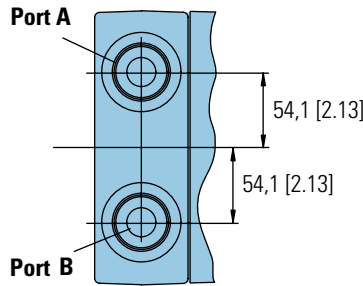
WHEEL MOTORS

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

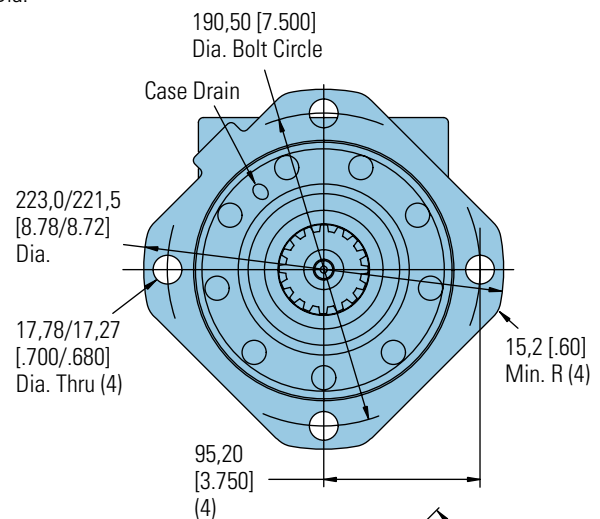
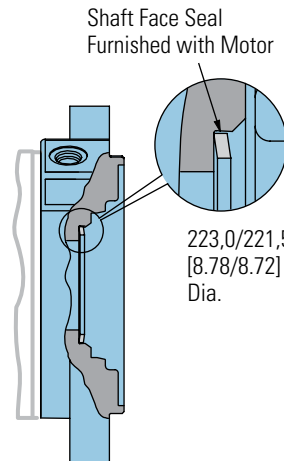
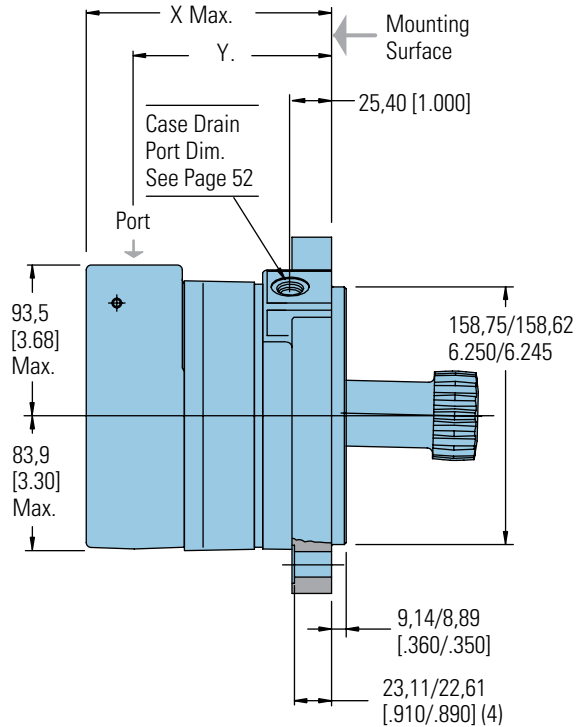
Port A Pressurized — CW

Port B Pressurized — CCW

For VIS 45 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

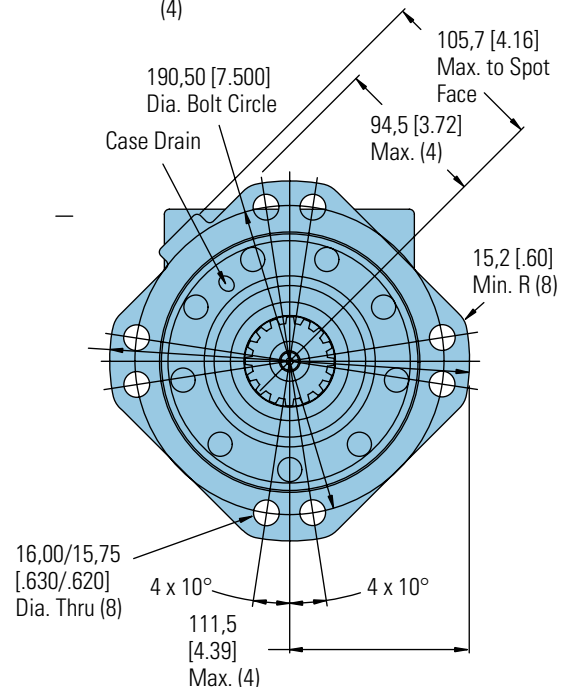
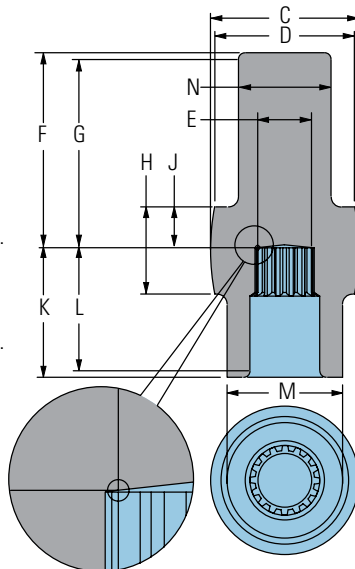
Note:

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

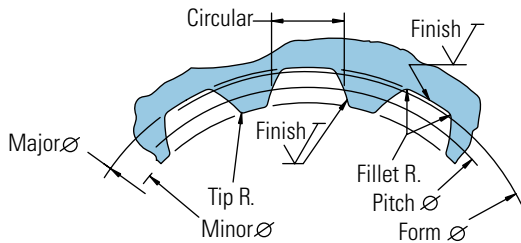
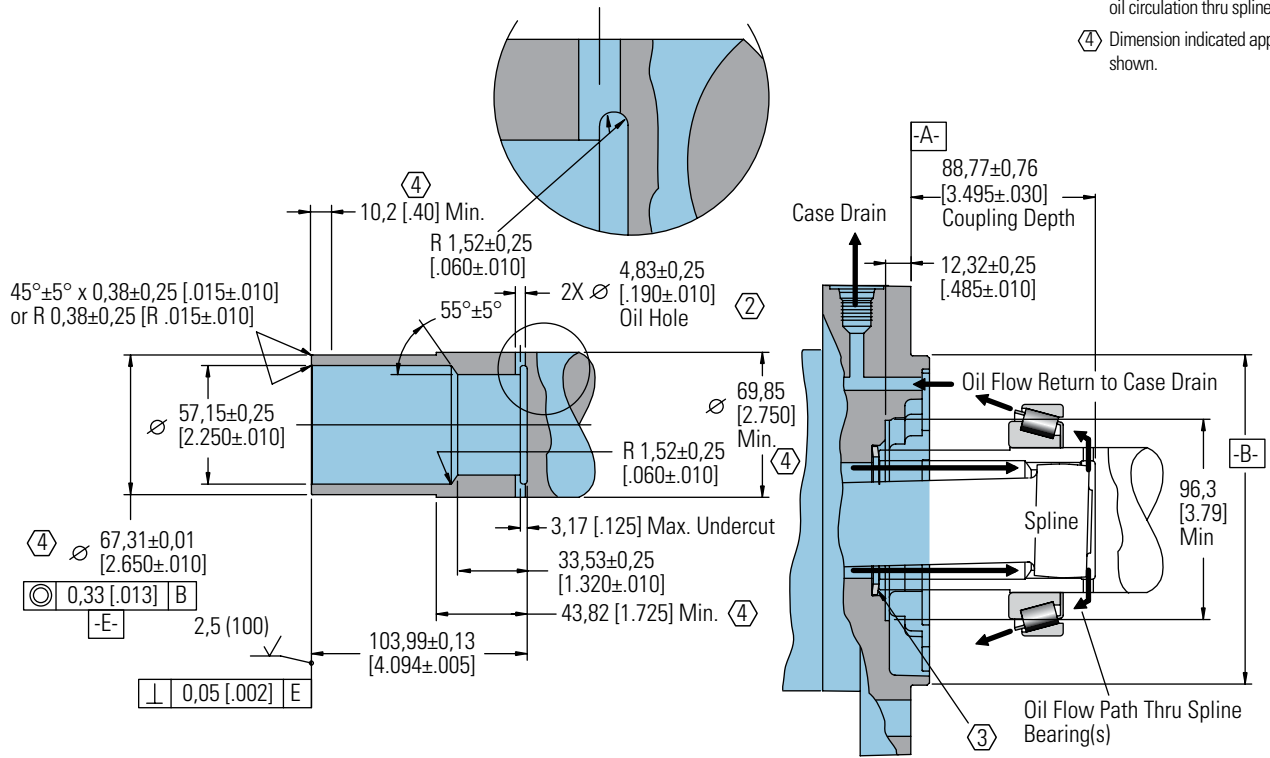
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
630 [38.6]	161,5 [6.36]	130,3 [5.13]
805 [48.6]	172,5 [6.79]	141,2 [5.56]
990 [60.5]	184,4 [7.26]	153,4 [6.04]
1245 [76.0]	200,7 [7.90]	169,7 [6.68]
1560 [95.0]	220,5 [8.68]	189,5 [7.46]

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.



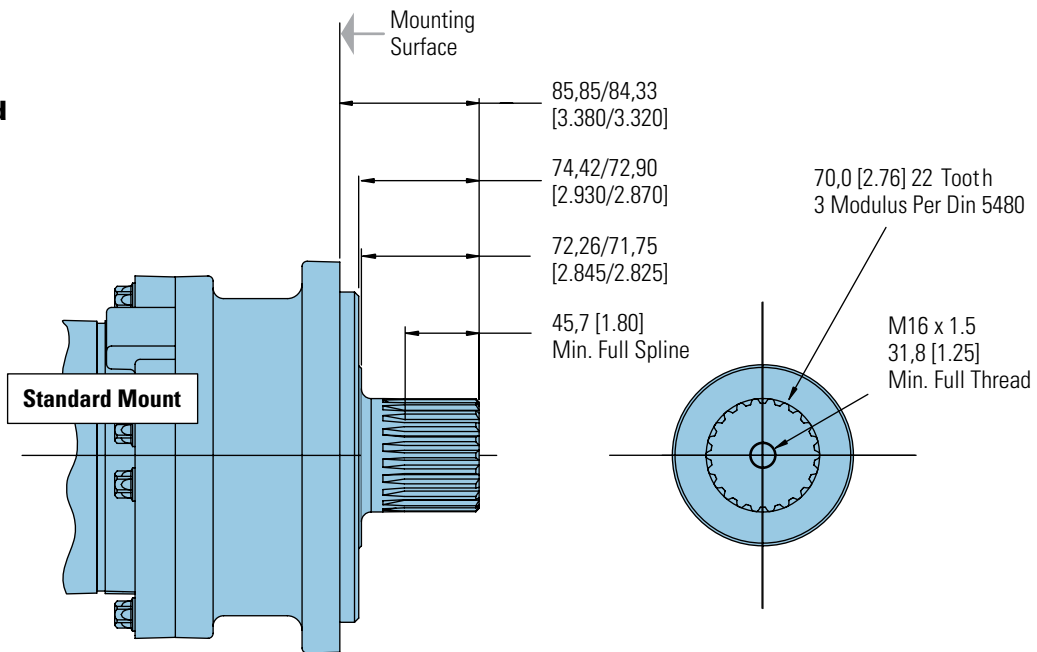
Spline Pitch.....	8/16
Pressure Angle.....	30°
Number of teeth.....	16
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter.....	Ref. 50,80000 [2.0000000] $\text{Ⓢ} 0,33 [0,013] B$
Base Diameter.....	Ref. 43,994090032 [1.7320508]
Major Diameter.....	56,34±0,15 [2.218±.006]
Min. Minor Diameter.....	48,44±0,08 [1.907±.003]
Form Diameter, Min.....	55,22 [2.174]
Fillet Radius.....	1,02±0,25 [0.40±.010]
Tip Radius.....	0,38±0,13 [0.15±.005]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,025 [+0.0000 -0.0010]
Total Index Variation.....	0,041 [0.0016]
Lead Variation.....	0,015 [0.0006]
Circular Space Width:	
Maximum Actual.....	6,180 [2.433]
Minimum Effective.....	6,048 [2.381]
Maximum Effective.....	Ref. 6,099 [2.401]
Minimum Actual.....	Ref. 6,114 [2.407]
Dimension Between Two Pins.....	Ref. 42,659 ±0,05 [1.6795±.0020]
Pin Diameter.....	6,223 [2.450]

VIS 45 Series

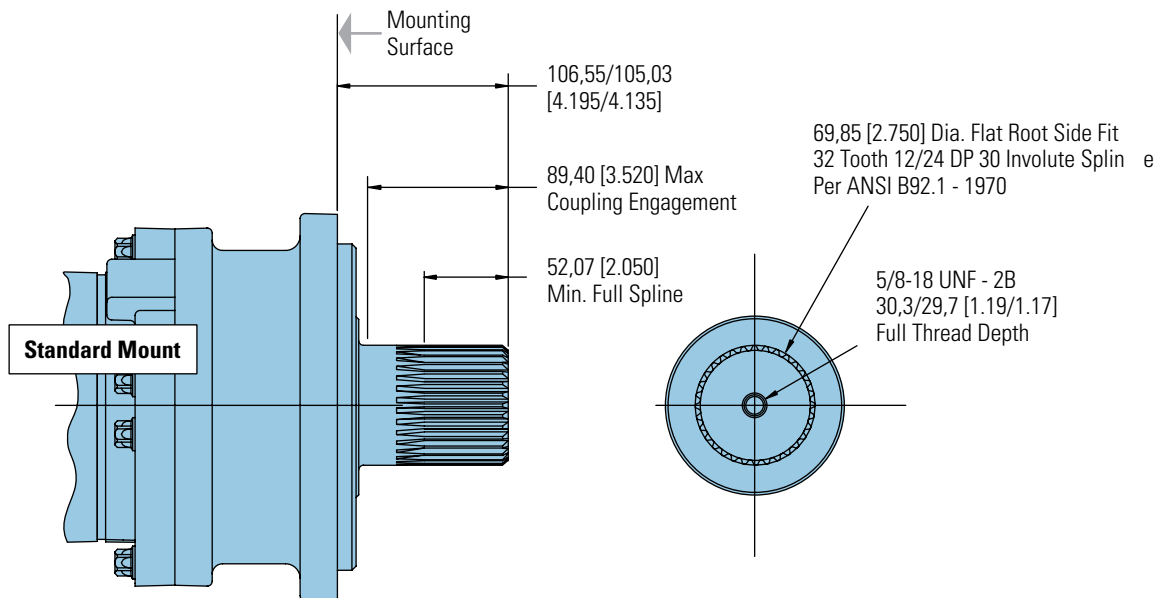
Dimensions Shafts

Splined

70 mm 22 Tooth Splined



2-3/4 Inch 32 Tooth Splined

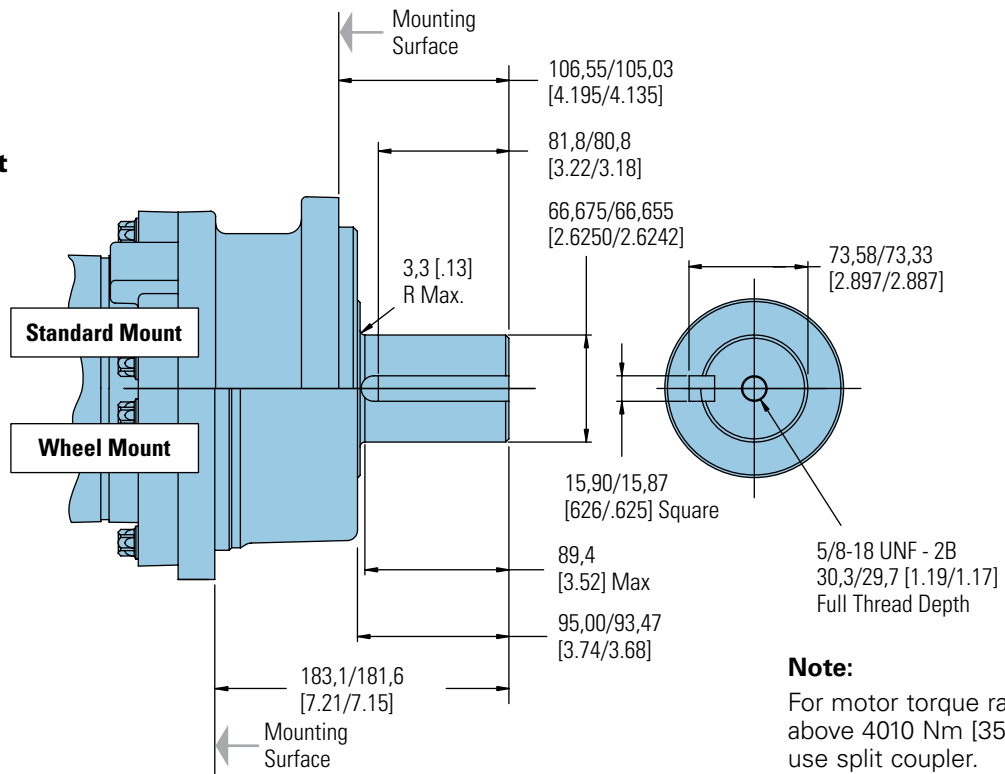


VIS 45 Series

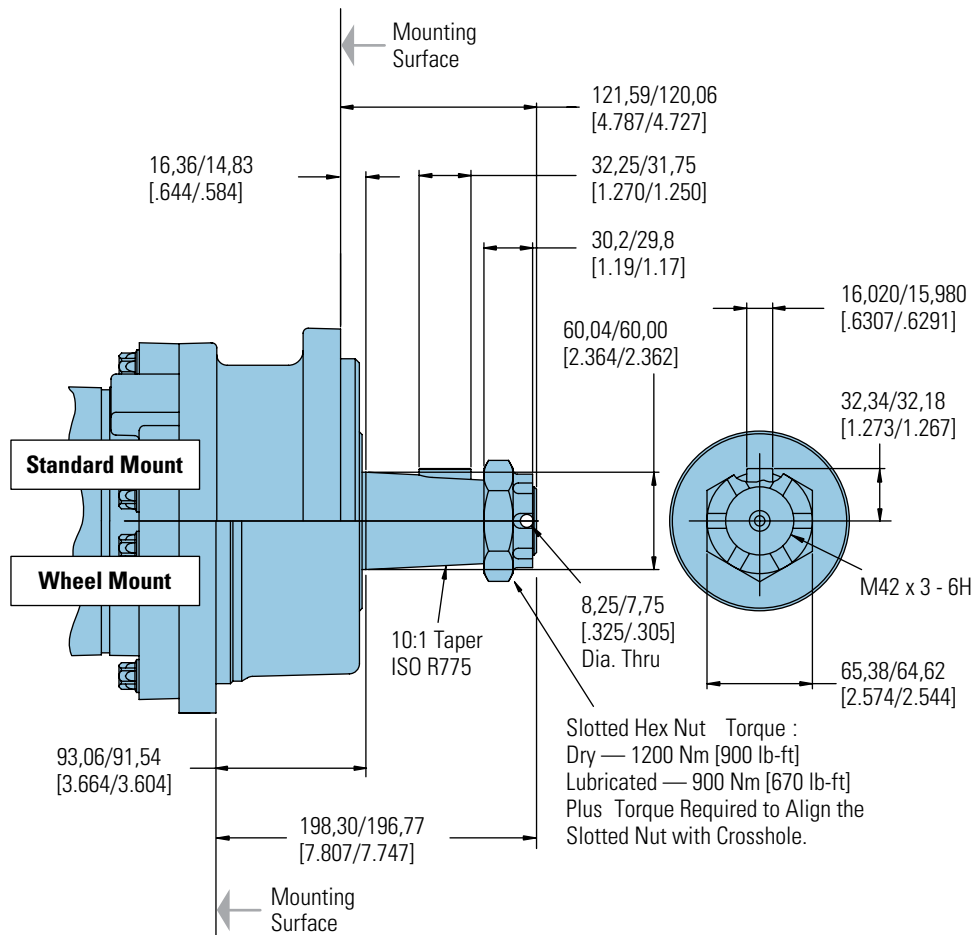
Dimensions Shafts

Keyed

2-5/8 Inch Straight



60 mm Tapered



VIS 45 Series

Side Load Capacity

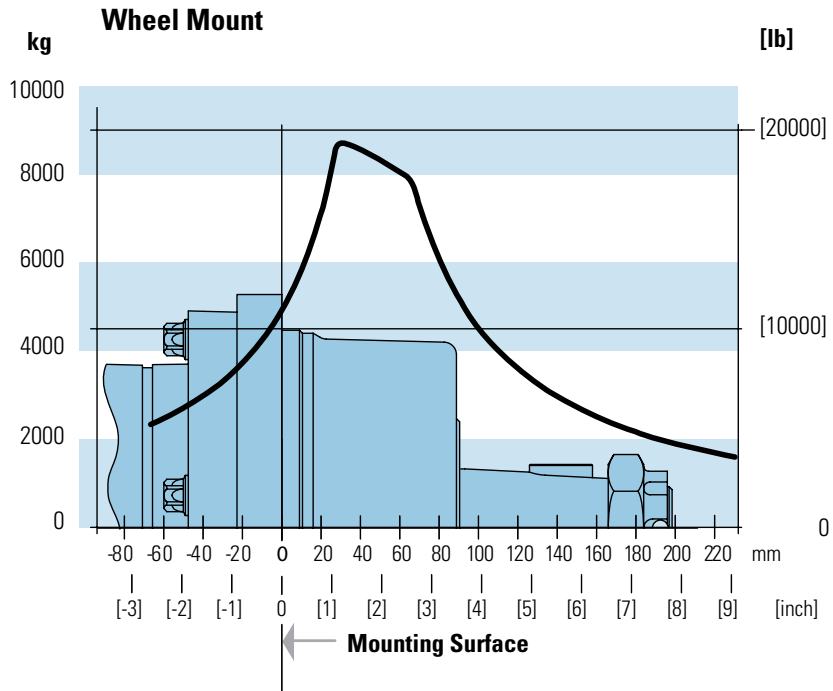
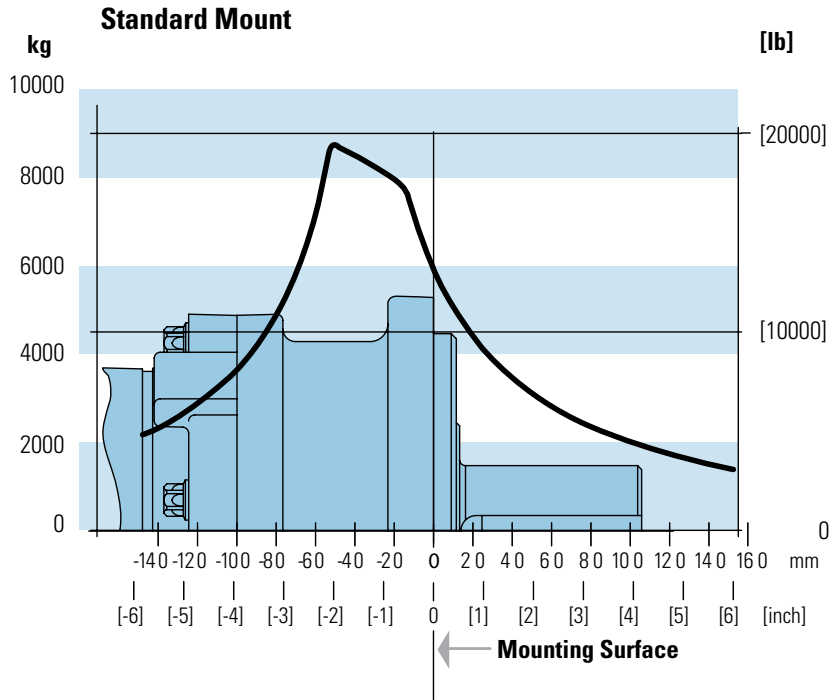
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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:

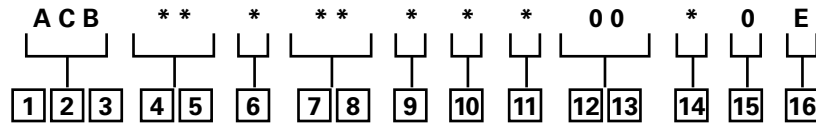
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 15,2 bar [220 PSI].

- 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

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]

39 – 630 [38.6]

49 – 805 [48.6]

60 – 990 [60.5]

76 – 1245 [76.0]

95 – 1500 [95.0]

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 – Primer, Individual Box

A – Low Gloss Black Primer,
 Individual Box

B – No Paint, Bulk Box
 Option

C – Low Gloss Black Primer,
 Bulk Box Option

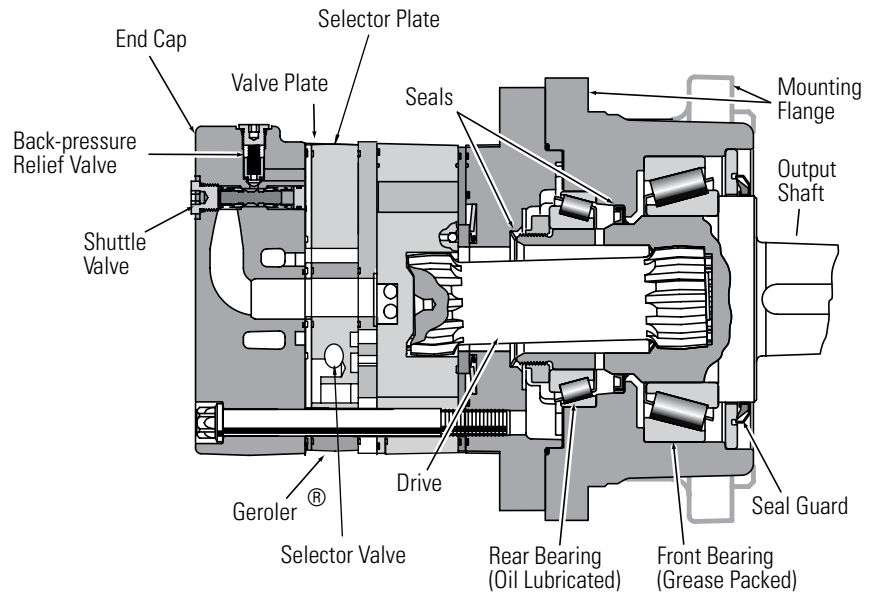
**15 Eaton Assigned
 Code when Applicable**

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 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 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.

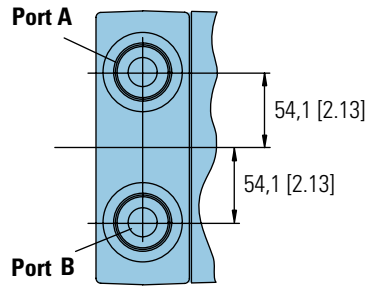
The VIS 45 two speed motor will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes.

VIS 45 Series

Two-speed

Dimensions

Standard Mount

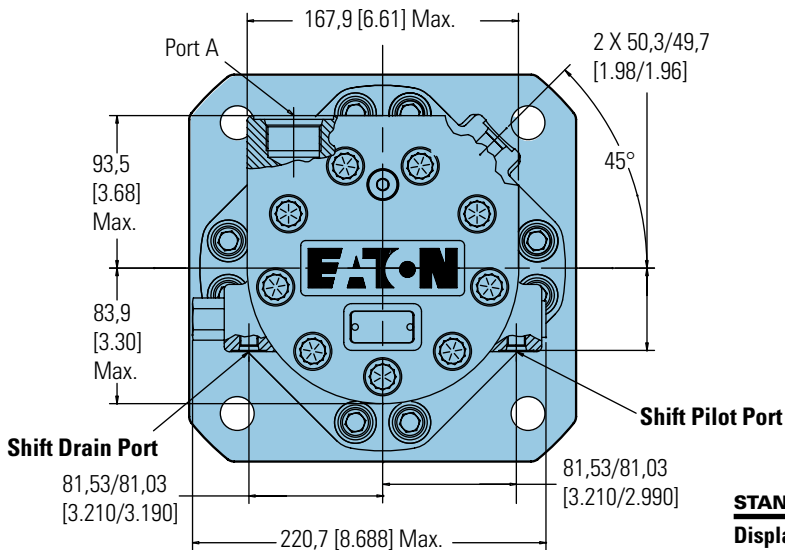
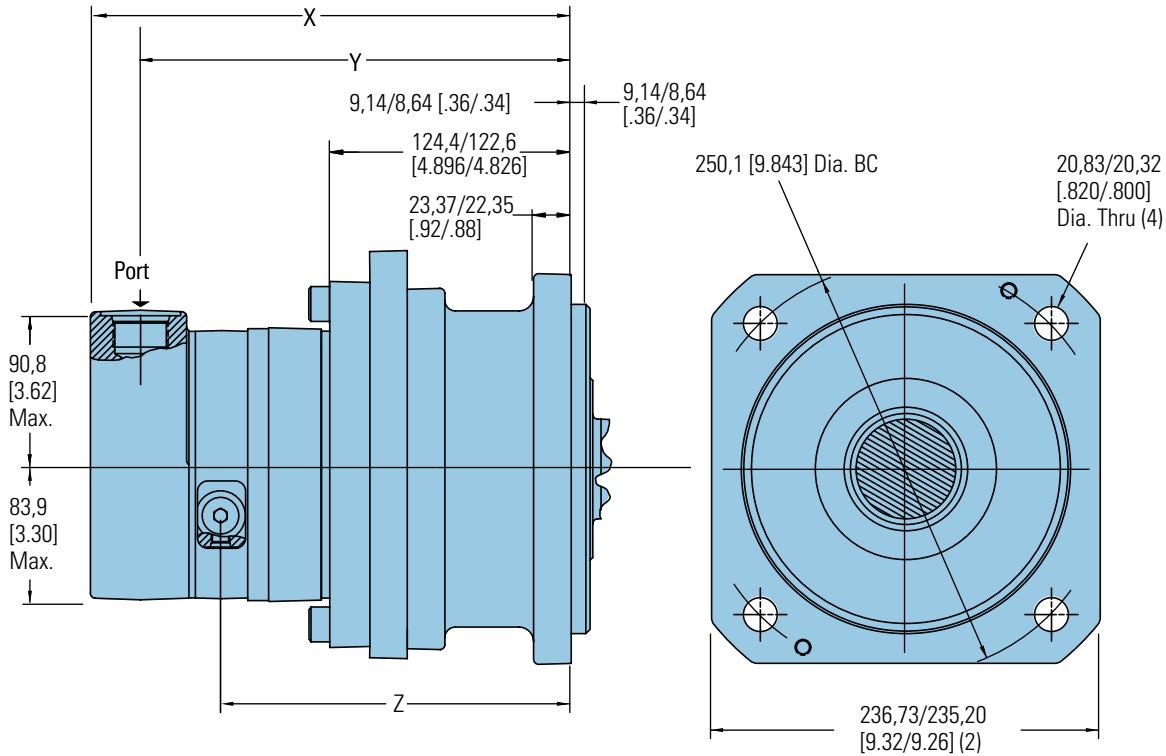


Ports

- 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

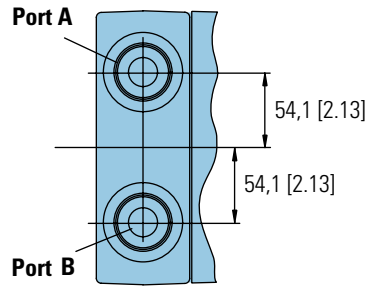
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
630 [38.6]	295,5 [11.63]	263,2 [10.36]	216,3 [8.51]
805 [48.6]	305,9 [12.04]	273,6 [10.77]	226,7 [8.92]
990 [60.5]	318,3 [12.53]	286,0 [11.26]	239,1 [9.41]
1245 [76.0]	334,3 [13.16]	302,0 [11.89]	255,1 [10.04]
1560 [95.0]	353,3 [13.94]	321,0 [12.67]	274,1 [10.82]

VIS 45 Series

Two-speed

Dimensions

Wheel Mount

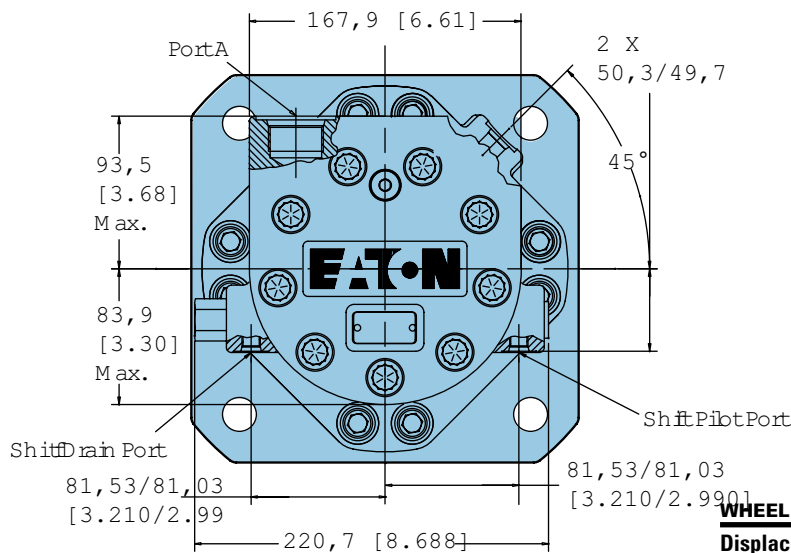
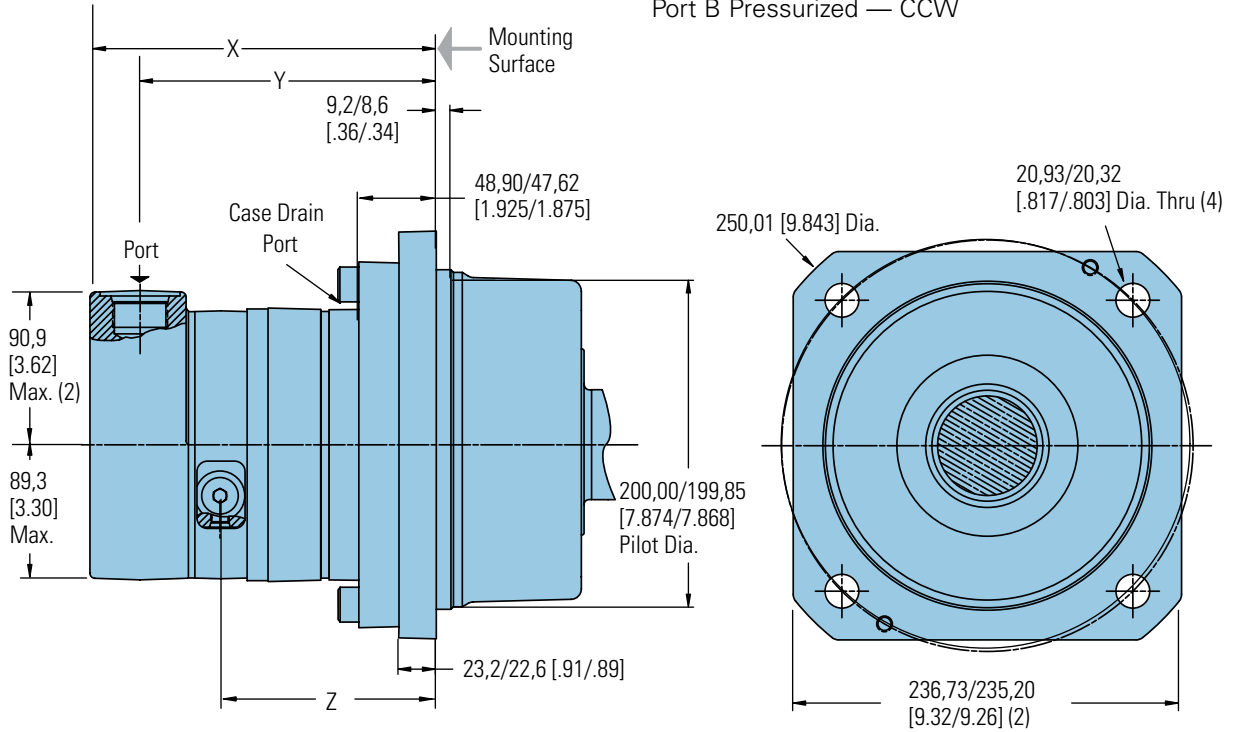


Ports

- 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

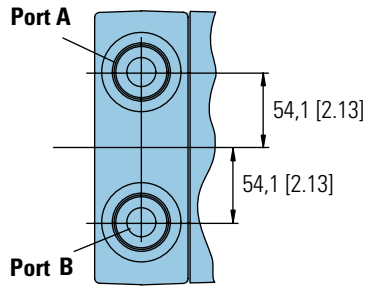
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
630 [38.6]	218,8 [8.61]	186,5 [7.34]	139,6 [5.49]
805 [48.6]	229,2 [9.02]	196,9 [7.75]	150,0 [5.90]
990 [60.5]	241,6 [9.51]	209,4 [8.24]	162,4 [6.39]
1245 [76.0]	257,6 [10.14]	225,6 [8.88]	178,4 [7.02]
1560 [95.0]	276,6 [10.92]	245,4 [9.66]	197,4 [7.80]

D-2

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)

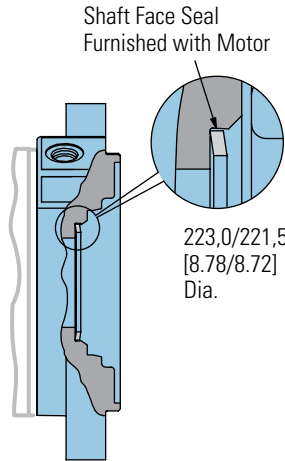
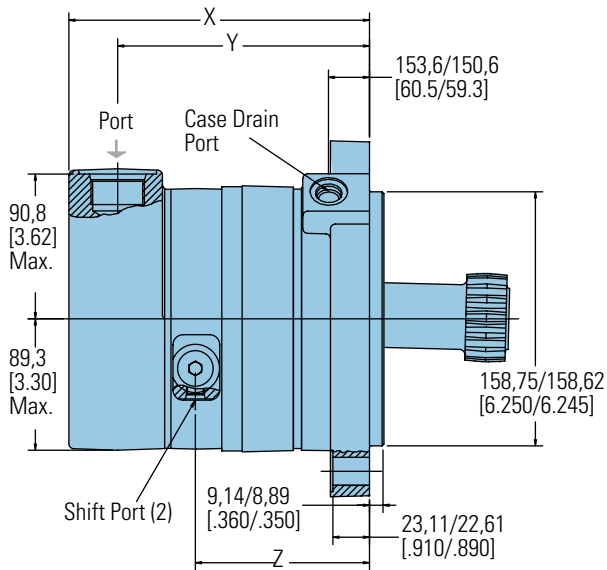
Standard Rotation Viewed from Drive End

- 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).

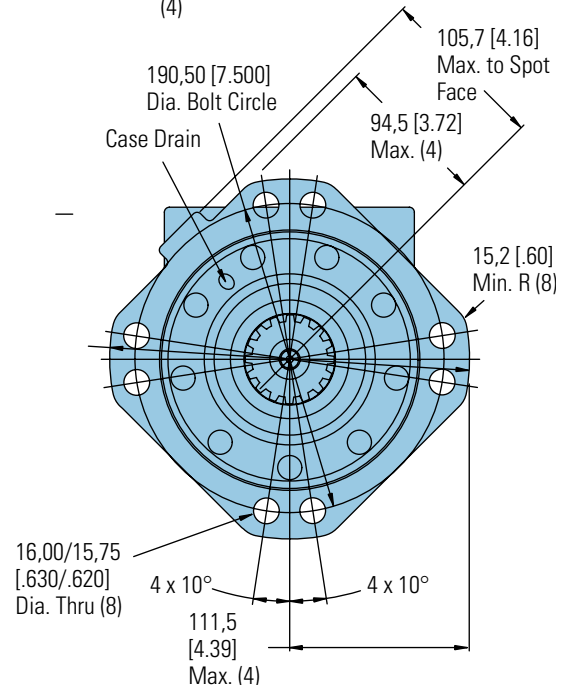
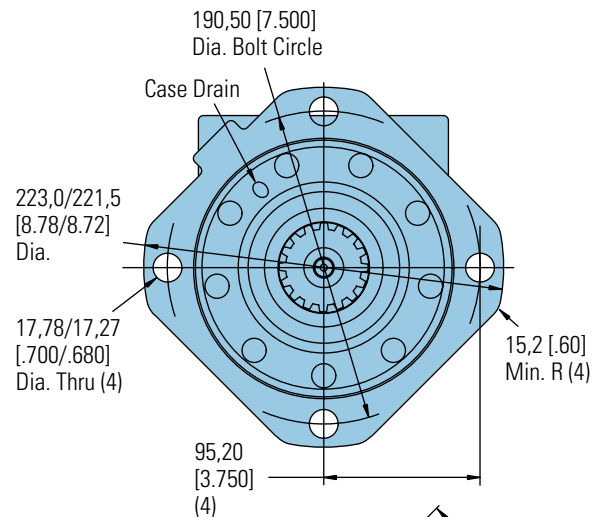
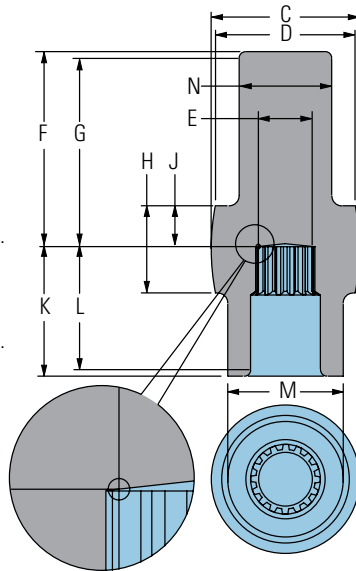
Note:

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



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:

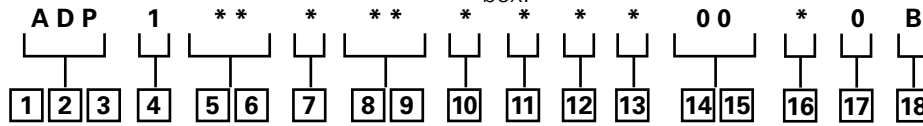
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 15,2 bar [220 PSI].

- 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 ensure 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]

- 49** – 805 [48.6]
- 60** – 990 [60.5]
- 76** – 1245 [76.0]
- 95** – 1560 [95.0]

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** – Primer, Individual Box
- A** – Low Gloss Black Primer, Individual Box
- B** – No Paint, Bulk Box Option
- C** – Low Gloss Black Primer, Bulk Box Option

17 Eaton Assigned Code when Applicable

0 – Assigned Code

18 Eaton Assigned Design Code

B – Assigned Design Code

Notes

Eaton
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14615 Lone Oak Road
Eden Prairie, MN 55344
USA
Tel: 952-937-9800
Fax: 952-294-7722
www.eaton.com/hydraulics

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Fax: (+86 21) 5200 0400