

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

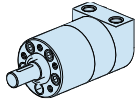
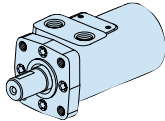
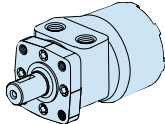
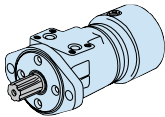
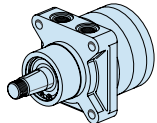
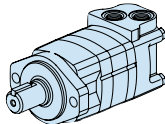
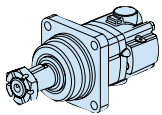
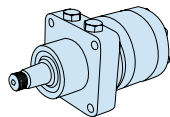
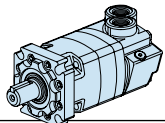
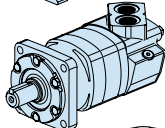
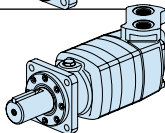
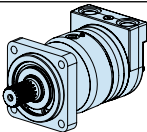
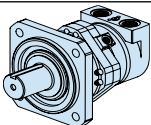


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Introduction

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]

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.

Durability

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

Performance Rating

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

Controllable Speeds

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

Dependable Performance

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

Reliability

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

High Efficiencies

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

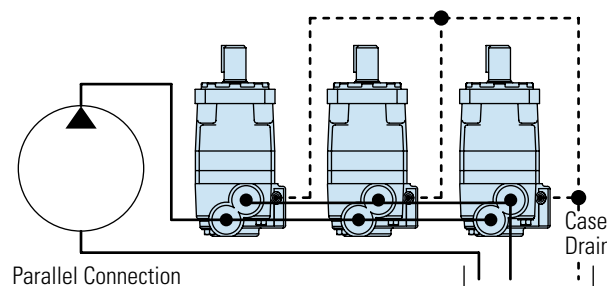
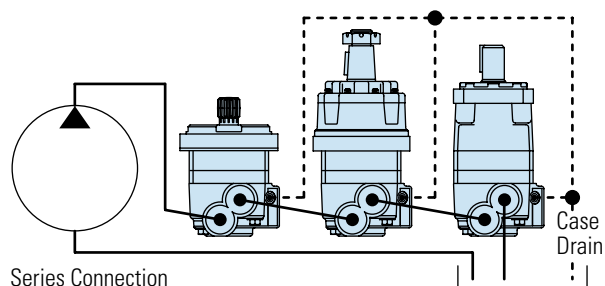
Case Drain and Shuttle Valve Options

Many hydraulic systems can benefit from the use of a system case drain. Char-Lynn motors provide this feature built in. One

of the advantages for case drain flow is that contamination is flushed from the system. This flushing also aids in cooling the system and lowering the case pressure which will

extend motor seal life. With a case drain line in place, oil pressure in the gear box (Bearingless motor applications) can also be controlled. In applications where more system cooling

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



Motor Application Information

Vehicle Drive Calculations

Step One — Calculate Motor Speed (RPM)

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

where KPH = vehicle speed (kilometers per hour)

where MPH = vehicle speed (miles per hour)

R_m = rolling radius of tires (meter)

R_i = rolling radius of tires (inch)

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

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

Step Two — Determine Rolling Resistance

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

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

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

ρ = value from Table 1

TABLE 1- ROLLING RESISTANCE COEFFICIENTS FOR RUBBERTIRES 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:

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

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

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

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

Step Five — Determine Drawbar Pull

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

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

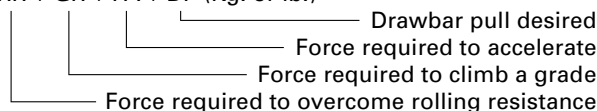
Motor Application Information

Vehicle Drive Calculations

Step Six — Total Tractive Effort

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

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



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

Step Seven — Calculate Hydraulic Motor Torque (T)

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

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

Where: N = number of driving motors
E_g = 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.

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

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

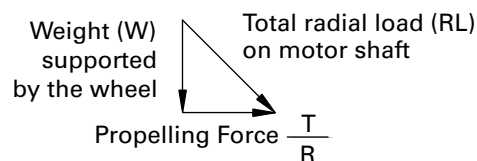
Where: f = coefficient of friction
W = loaded vehicle weight over drive wheel

	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)

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

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)

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

Power (out of motor)

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

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

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

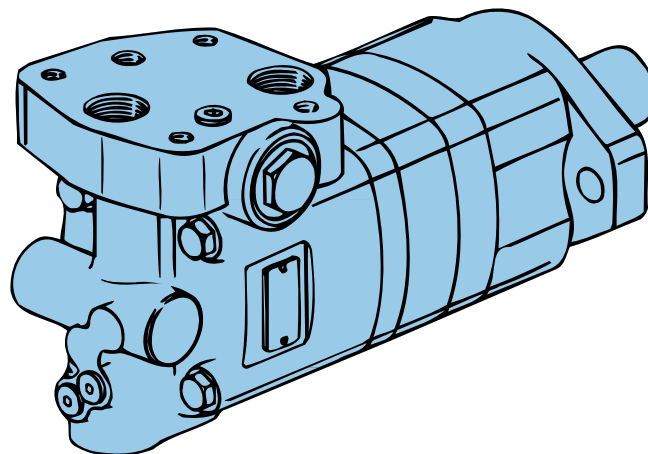
Optional Features

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

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:

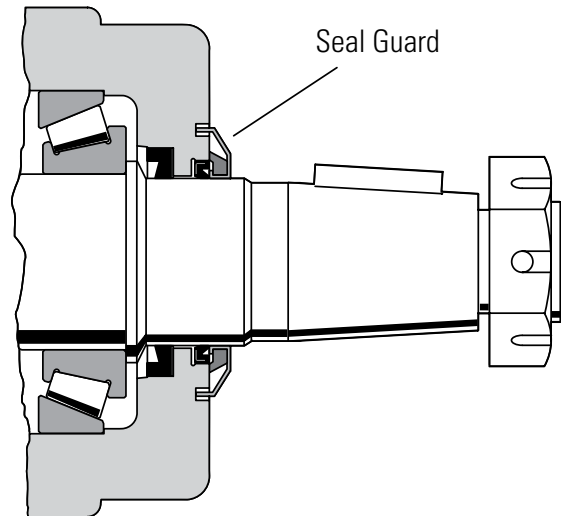
- Two operating speeds and torque levels with one motor
- Two selectable performance ranges in one motor package

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

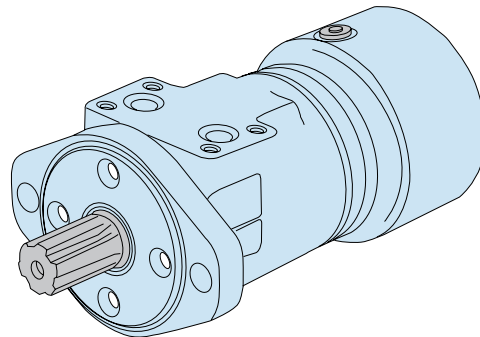
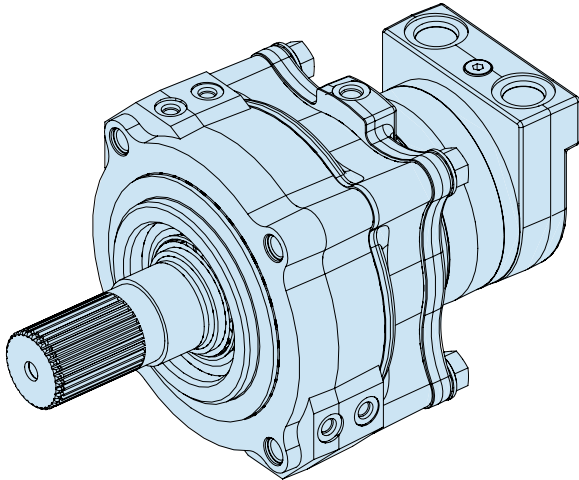
Shaft Seal –
Part No. 14778-001

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.

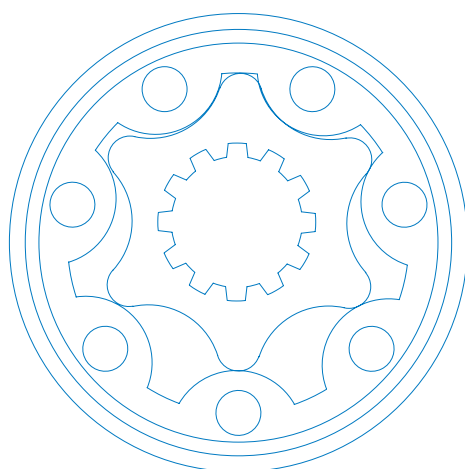
Applications:

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

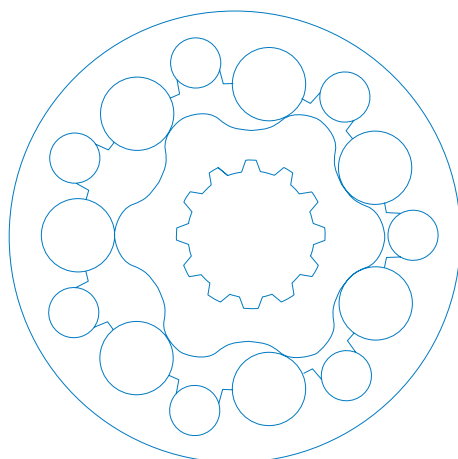
- Also suited for applications with high-pressure spikes from rapid reversals.

Special Notes:

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



Gerotor



Geroler

Gerotor or Geroler?

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

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

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

RPM = speed of output shaft in revolutions per minute

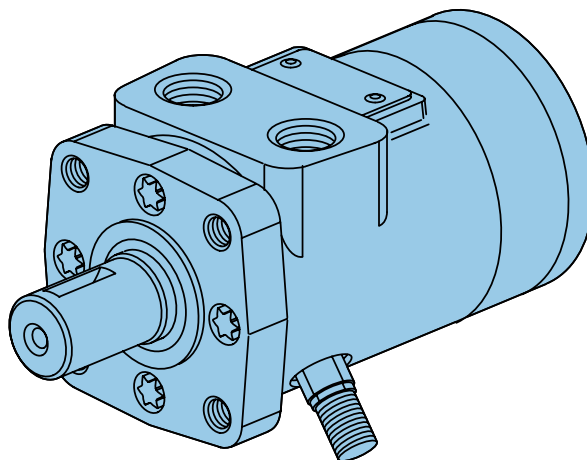
SUS = minimum viscosity measured in SUS.

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.

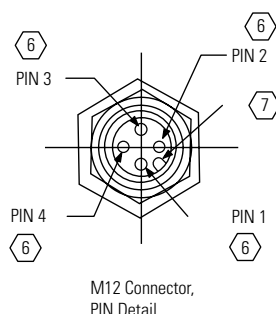
Speed Sensors



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.

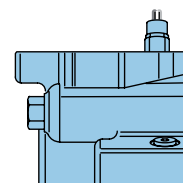
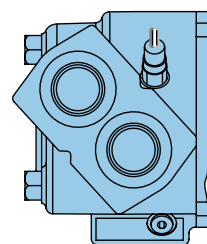
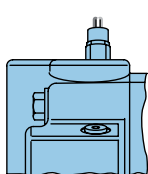
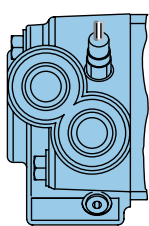
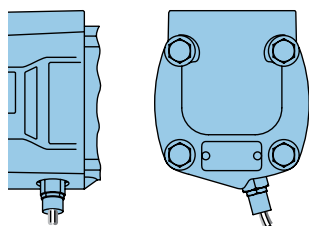
- The first version speed sensor has two output signals 90° out of phase. Each output provides one pulse per target.
- The second version has a speed signal that is twice the output pulses per revolution and it also has a direction signal. (Direction not available on spool motors)

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.

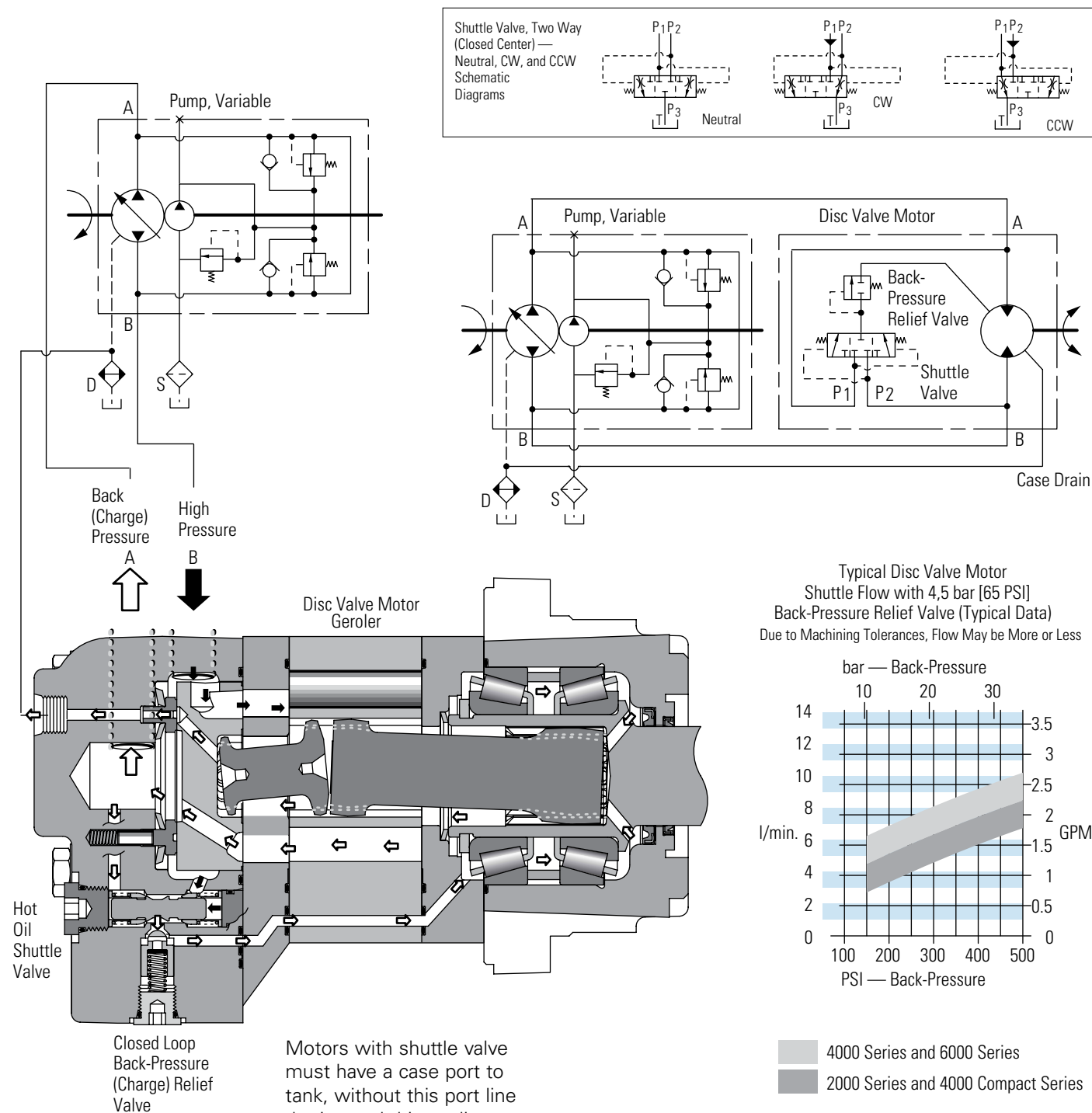
Benefits

- Flushing
- Cooling
- Longer system life

Applications

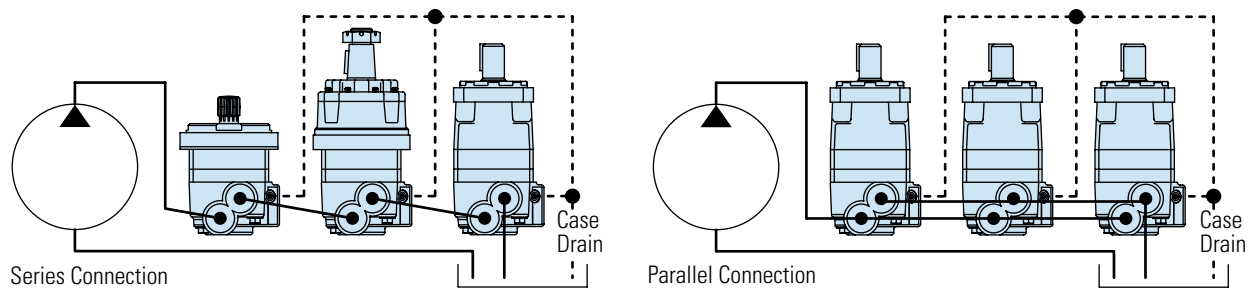
- Turf Propel
- Mixers/Grinders
- Traction drives
- Trencher chain drives

Closed Loop Circuit



Case Porting

This option is available on all Char-Lynn Motors.



Features:

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

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

Benefits:

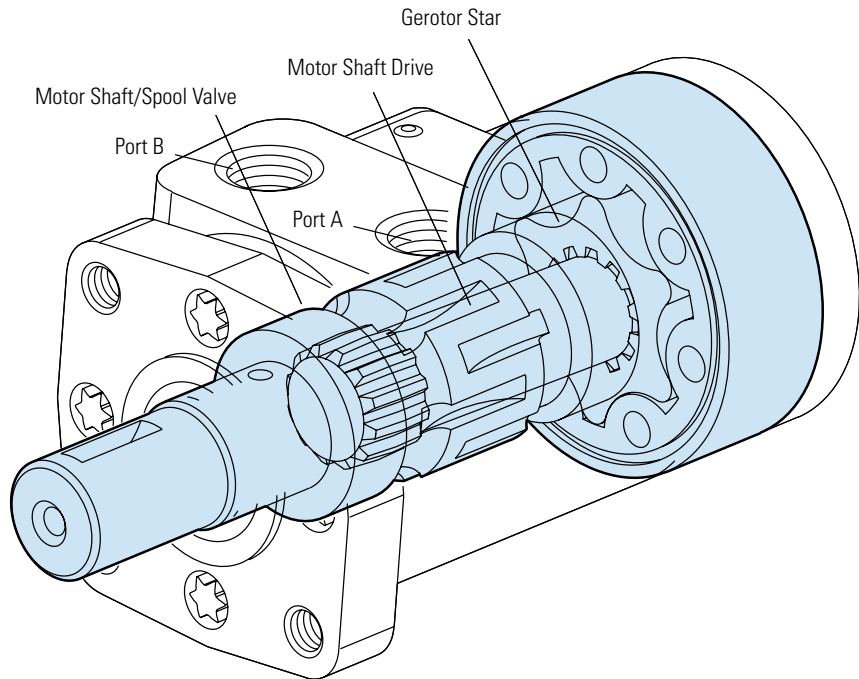
- Extends shaft seal life
- Extends thrust bearing life
- Reduces shaft seal leakage problems
- Improves flushing of the circuit to reduce system contaminants and cooling the system.

Applications:

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

Low Speed Valving

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



Features:

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

Benefits:

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

Applications:

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

Notes:

Motors with this valving are not intended for low pressure applications (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:

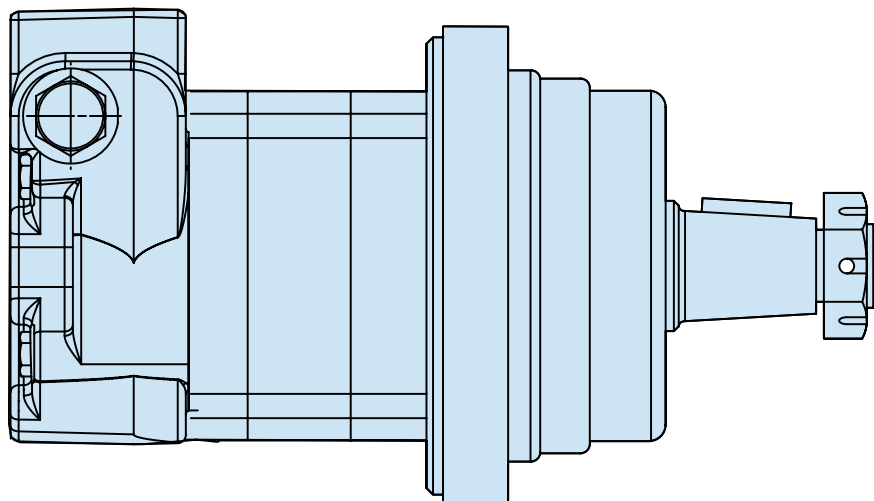
All motors are available with a corrosion resistant coating for use in hostile environments. The Char-Lynn line is also available with the output shaft plated, or with plated shaft and entire motor exterior coating.

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

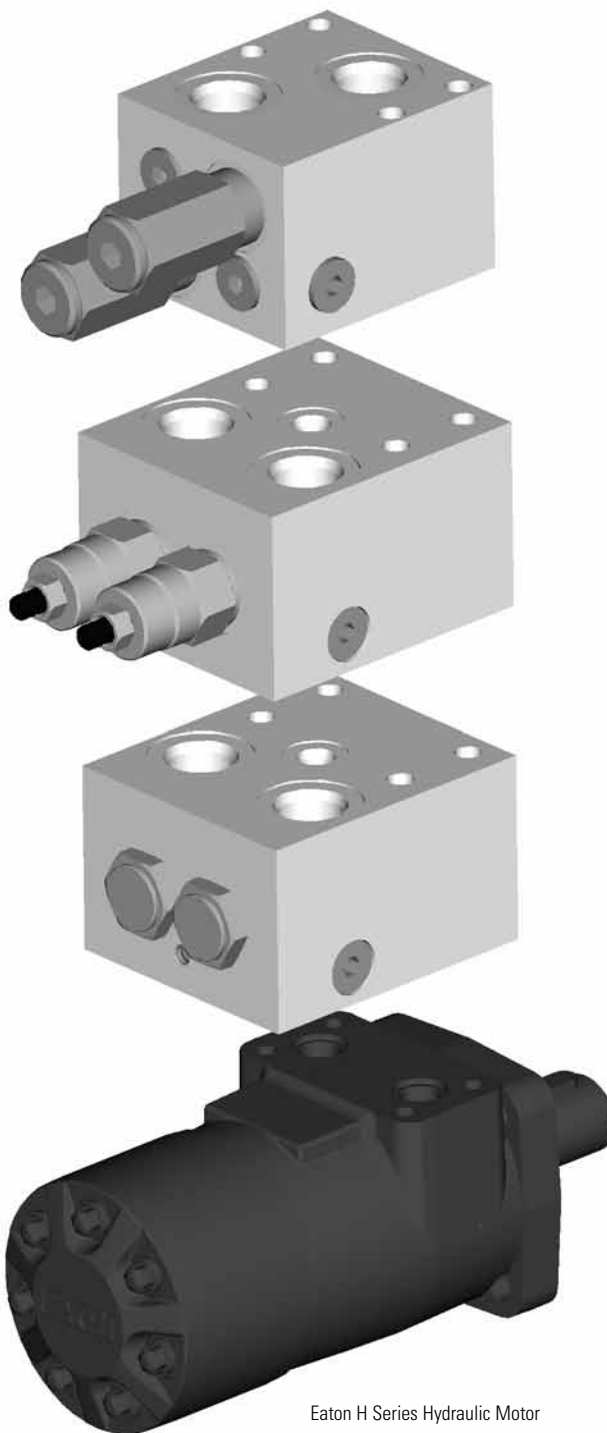
Item part #	Item desc.	Relief valve setting
02-199291	RV5A-10-F-0-35/15	1500 PSI
02-199292	RV5A-10-F-0-35/17.5	1750 PSI
02-199293	RV5A-10-F-0-35/20	2000 PSI
02-199295	RV5A-10-F-0-35/22.5	2250 PSI
02-198563	RV5A-10-F-0-35/25	2500 PSI
02-199294	RV5A-10-F-0-35/27.5	2750 PSI
02-199296	RV5A-10-F-0-35/30	3000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

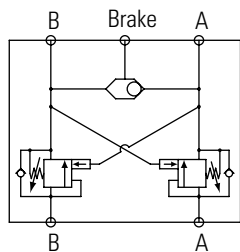
Dual CBV Package for H & T Series Motors

Cartridge valves & manifolds for spool valve motors

Dual Counterbalance Valve Assembly with Brake Release Shuttle

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

Functional Symbol



How to Order

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

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

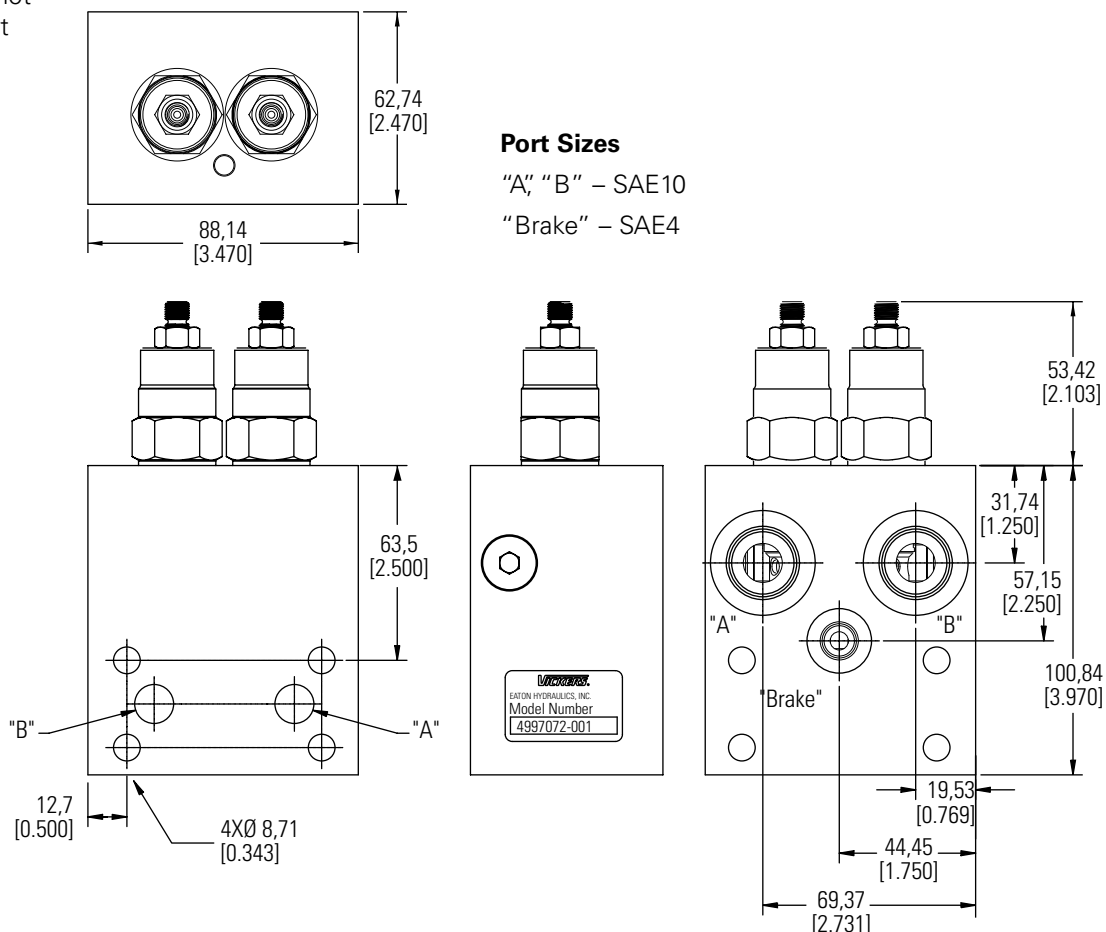
RATINGS AND SPECIFICATIONS

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

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

Dimensions

mm (inch)



Dual POC Package for H & T Series Motors

Cartridge valves and manifolds for spool valve motors

Dual Pilot Operated Check Valve Assembly

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

How to Order

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

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

RATINGS AND SPECIFICATIONS

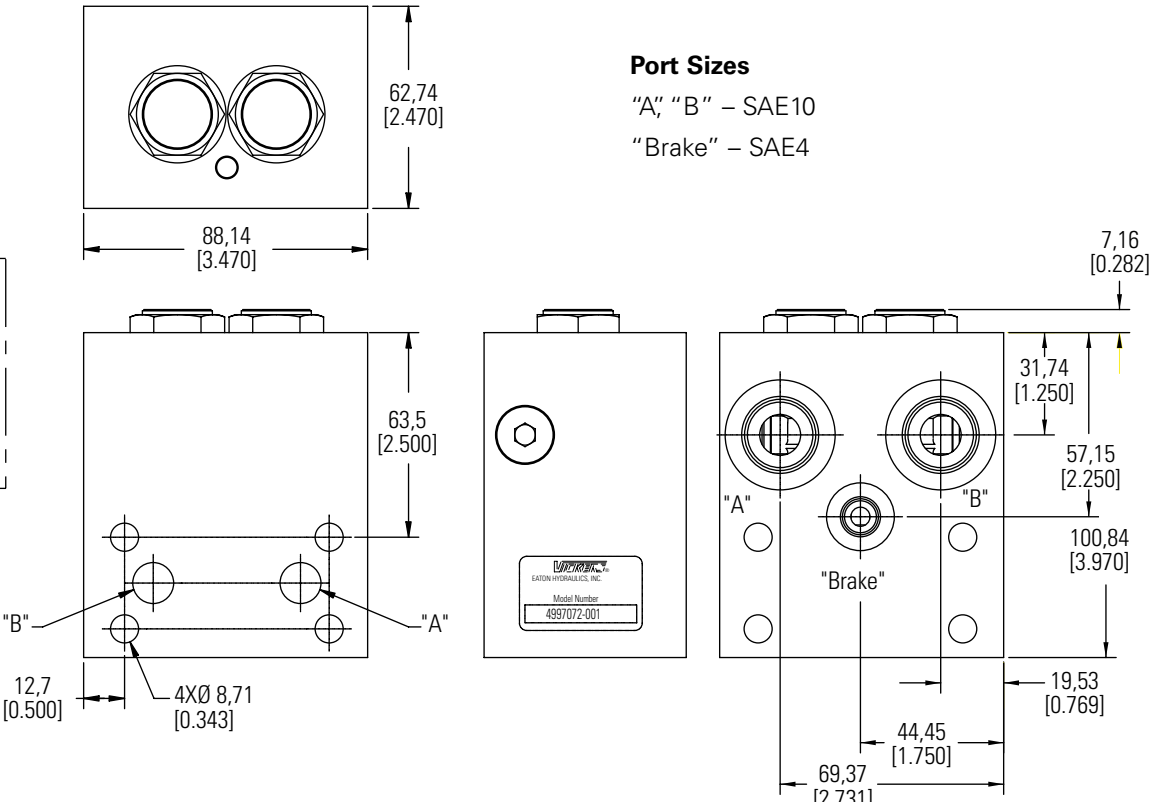
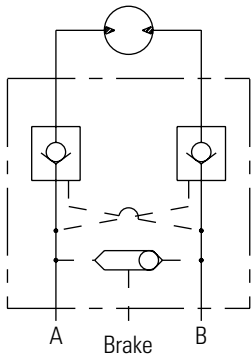
Rated flow	60L/min(15USgpm)
Rated pressure	210 bar(3000psi)
Internal leakage (maximum)	less than 5 drops/min @ 3000psi
Pilot ratio	3:1
Manifold sub-assembly	4997072-001
Installation kit (includes cap screws, washers and o-rings)	4997242-001

For detailed specifications refer to the POC1-10 data sheet

Dimensions

mm (inch)

Functional Symbol



Port Sizes

"A", "B" – SAE10

"Brake" – SAE4

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

Cartridge valves & manifolds for spool valve motors

Dual Crossover Relief Valve Assembly

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

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

How to Order

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

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

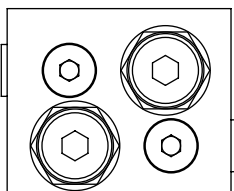
RATINGS AND SPECIFICATIONS

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

For detailed specifications refer to the RV3A-10 data sheet

Dimensions

mm (inch)

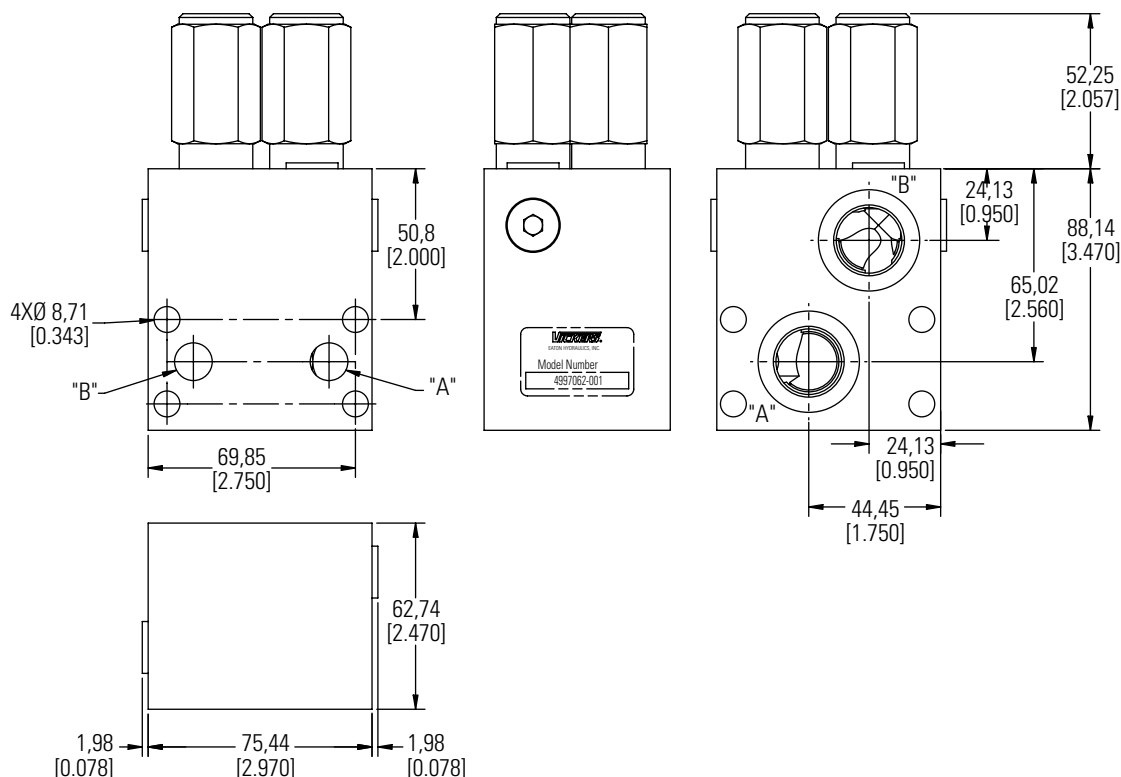
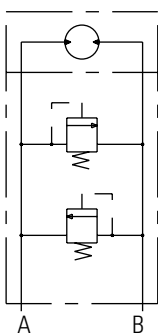


Port Sizes

"A", "B" – SAE10

"Brake" – SAE4

Functional Symbol



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

Cartridge valves & manifolds for disc valve motors

Dual Crossover Relief Valve Assembly

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

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

How to Order

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

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

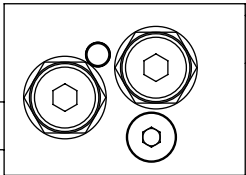
RATINGS AND SPECIFICATIONS

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

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

Dimensions

mm (inch)



Port Sizes

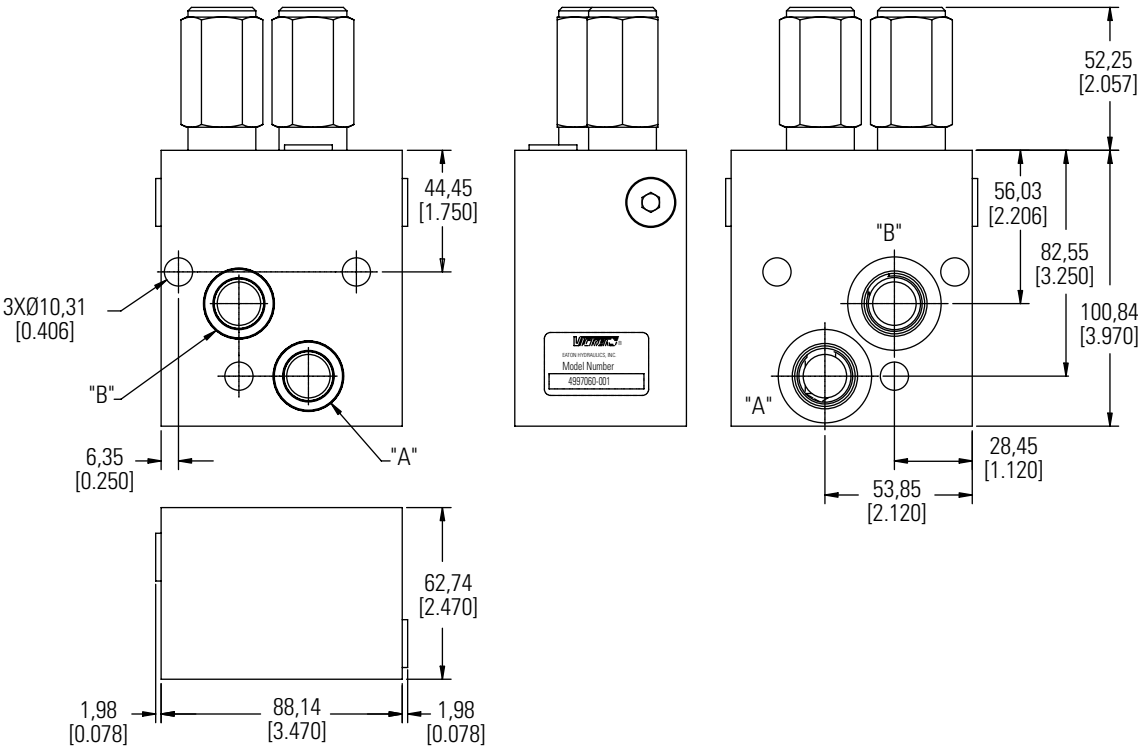
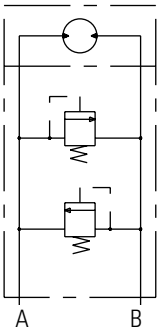
"A", "B" – SAE10
"Brake" – SAE4



Warning

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

Functional Symbol



Dual CBV Package for 2000 Series Disc Valve Motors

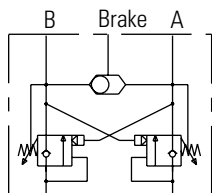
Cartridge valves & manifolds for disc valve motors

Dual Counterbalance Valve Assembly

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

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

Functional Symbol



How to Order

Complete pre-assembled packages are specified using the CBV*-10 model code, position 6 of the model code

is "2K". To order the manifold sub-assembly, without the two CBV valves, but with integral shuttle valve order 4997070-001.

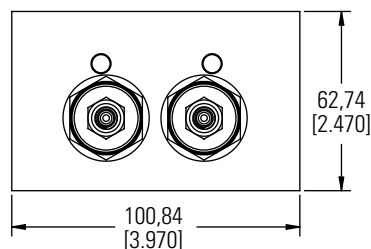
RATINGS AND SPECIFICATIONS

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

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

Dimensions

mm (inch)



Port Sizes

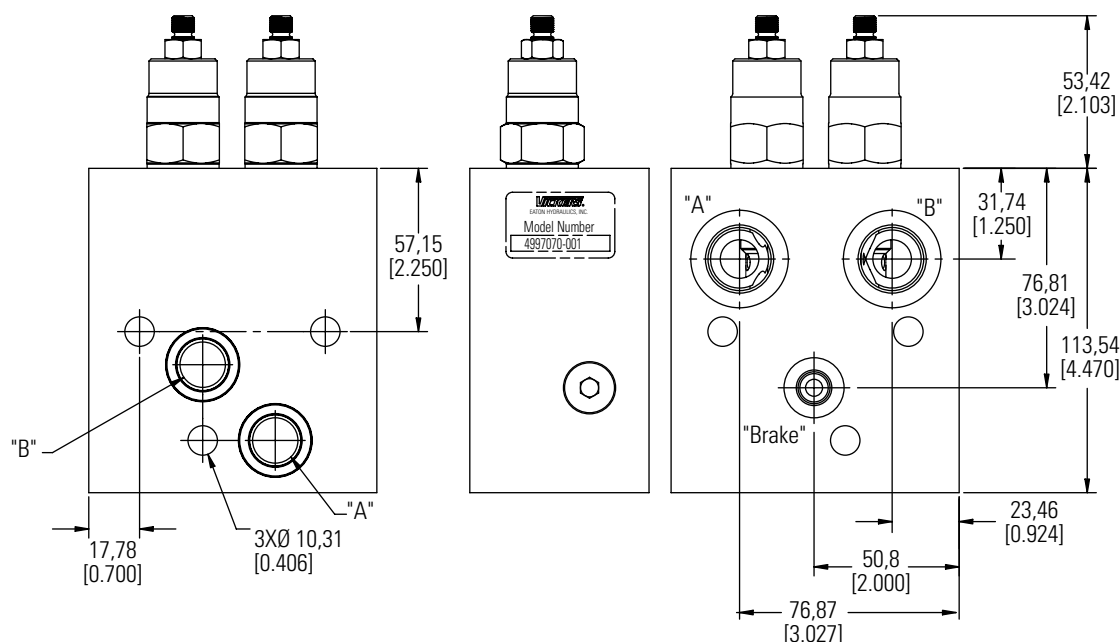
"A", "B" – SAE10

"Brake" – SAE4



Warning

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



Dual POC Package for 2000 Series Disc Valve Motors

Cartridge valves & manifolds for disc valve motors

Dual Pilot Operated Check Valve Assembly

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

How to Order

Complete pre-assembled packages are specified using the POC1-10 model code, position 6 of the model code

is "2K". To order the manifold sub-assembly, without the two POC1 valves, but with integral shuttle valve order 4997070-001.

RATINGS AND SPECIFICATIONS

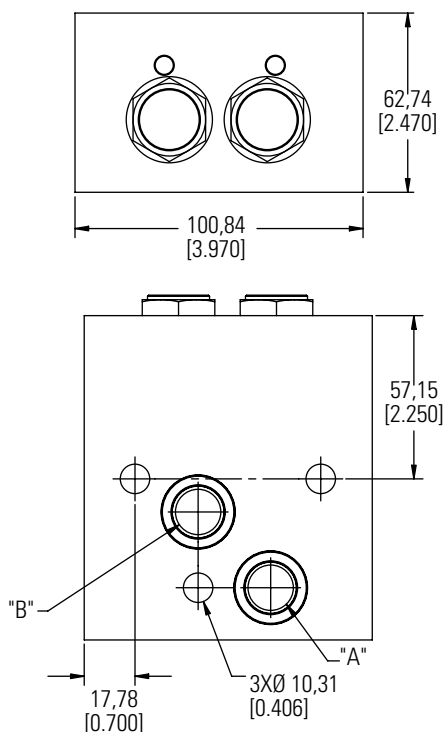
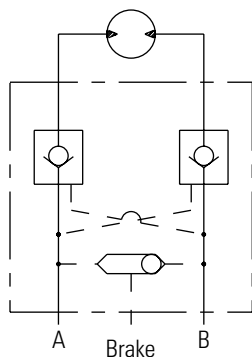
Rated flow	60L/min(15USgpm)
Rated pressure	210 bar(3000psi)
Internal leakage (maximum)	less than 5 drops/min @ 3000psi
Pilot ratio	3:1
Manifold sub-assembly only	4997070-001
Installation kit (includes cap screws, washers and o-rings)	02-372492

For detailed specifications refer to the POC1-10 data sheet

Dimensions

mm (inch)

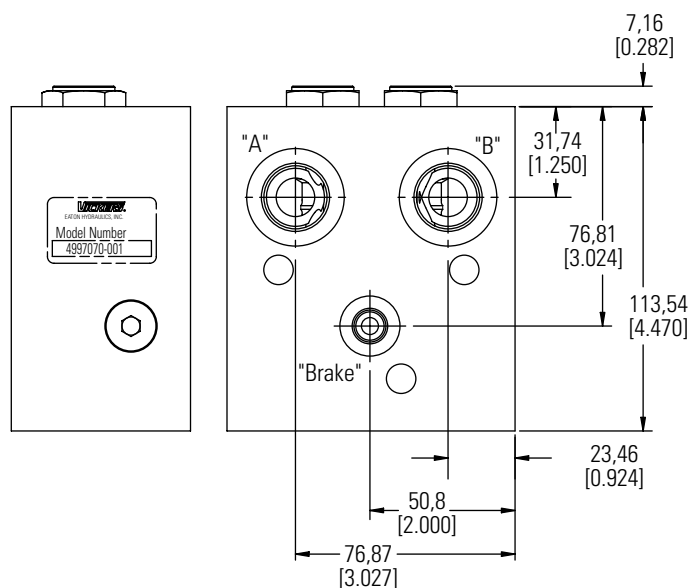
Functional Symbol



Port Sizes

"A", "B" – SAE10

"Brake" – SAE4



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

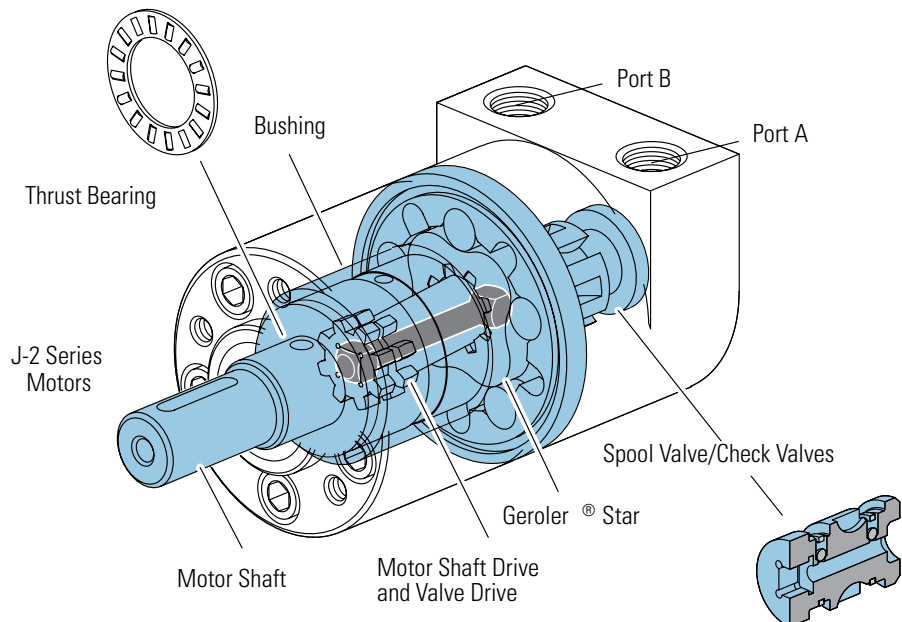
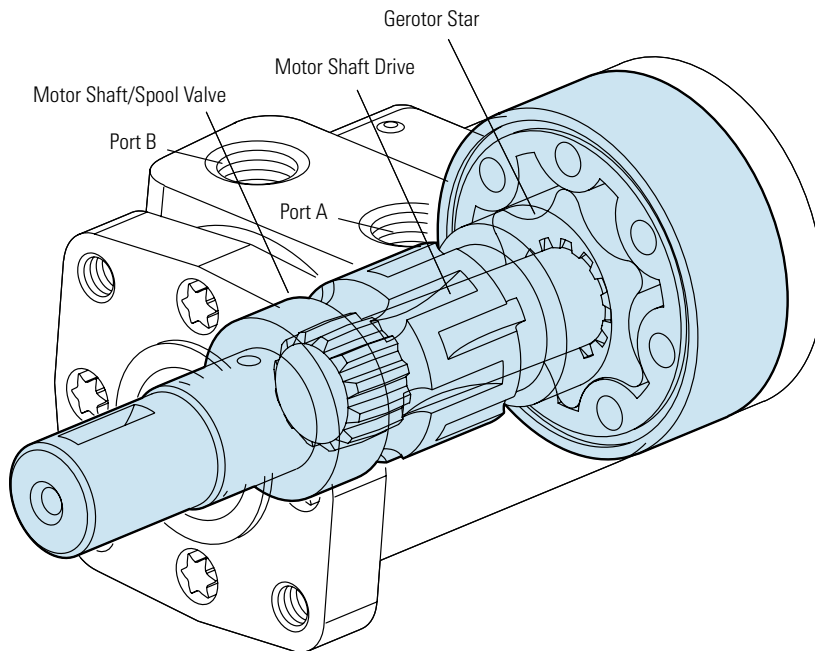
Highlights

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 Series (101-)

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

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W Series (162-)

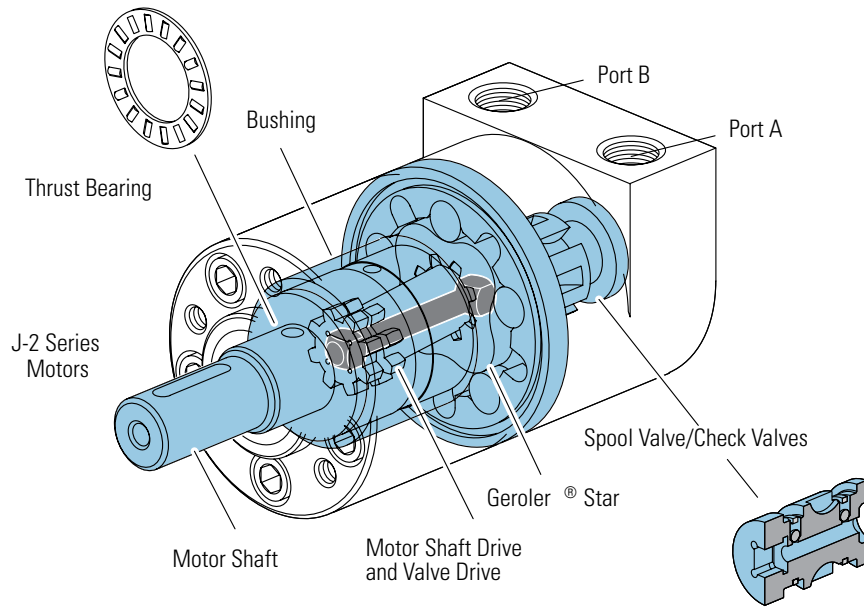
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W Series with Parking Brake (162-)

Dimensions	B-5-9
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Model Code	B-5-11

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



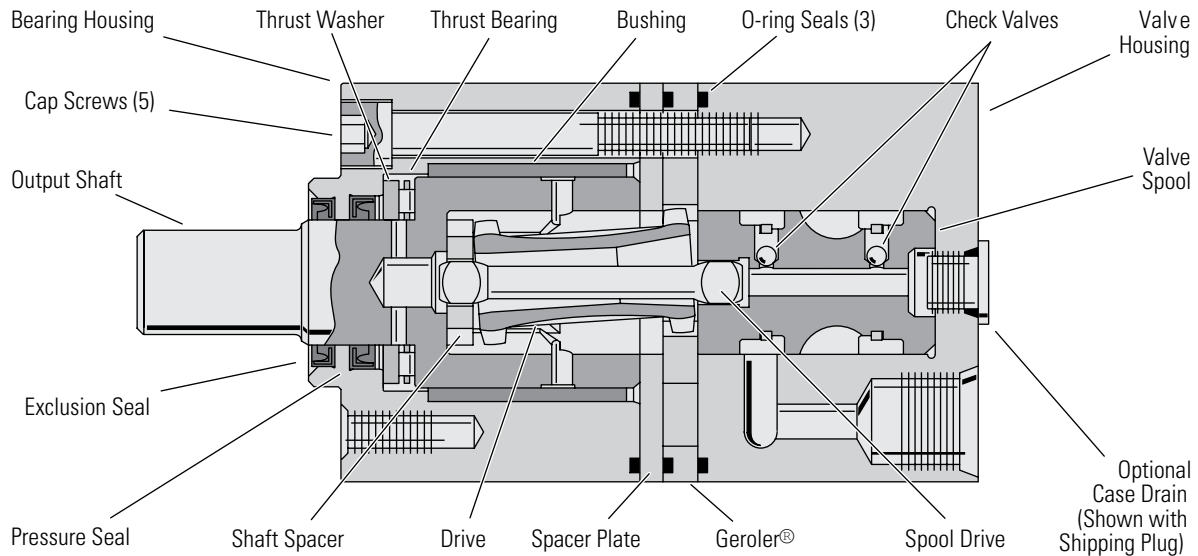
Food Processing



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. Contin- uous	Max. Inter- mittent
		[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. Inter- mittent 20,8		[5.5]	[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

	Continuous
	Intermittent

		12,9 cm ³ /r [0.79 in ³ /r] D Pressure Bar [PSI] Continuous												Max. Contin- uous	Max. Inter- mittent
		[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] 19 496	[165] 20 490	[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] 19 763	[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. Contin- uous	[5.5] 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] 28 1330	
Max. Inter- mittent	[6.5] 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
1556

Torque [lb-in]
Nm
Speed RPM

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

J Series (129-)

Performance Data

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

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

19.8 cfm [1.27 m³/min]

□ Pressure Bar [PSI]

Continuous

Max. Max.
Contin- Inte-
uous mitte-

		[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. Contin- uous	[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. Inter- mittent	[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 cfm [1.93 m³/min]

□ Pressure Bar [PSI]

Continuous

Max. Max.
Contin- Inte-
uous mitte-

		[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. Contin- uous	[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. Inter- mittent	[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 cfm [3.07 m³/min]

□ Pressure Bar [PSI]

Continuous

Max. Max.
Contin- Inte-
uous mitte-

		[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. Contin- uous	[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. Inter- mittent	[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 } Torque [lb-in] Nm
393 } Speed RPM

J Series (129-)

Dimensions

Standard Rotation Viewed from Shaft End

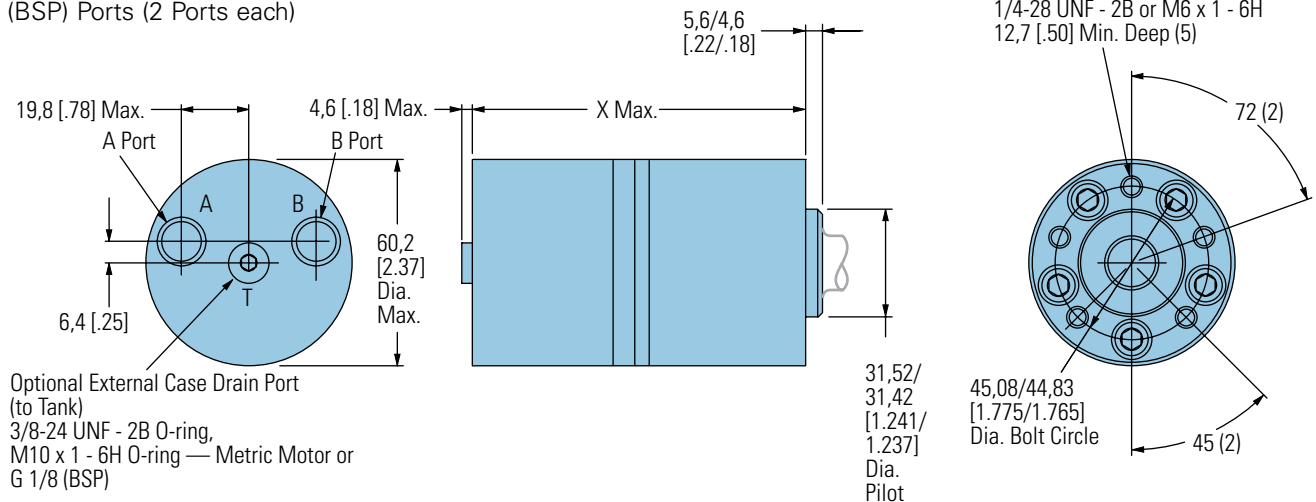
Port A Pressurized — CW

Port B Pressurized — CCW

B-1

9/16 Inch End Port

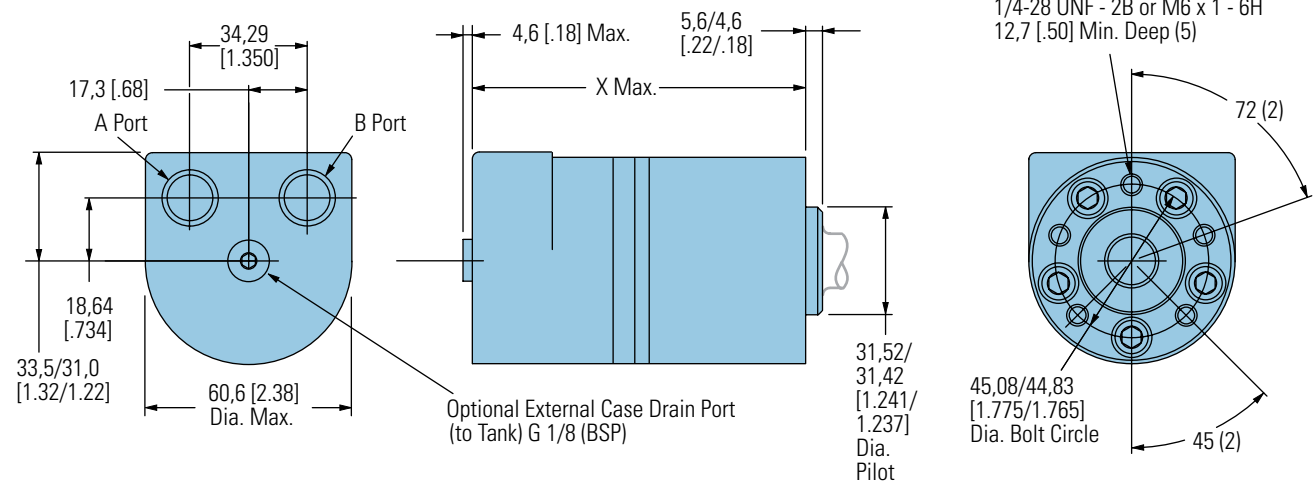
9/16 -18 UNF - 2B O-Ring Ports, M14 x 1,5
- 6H O-Ring Ports — Metric Motor or
G 1/4 (BSP) Ports (2 Ports each)



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

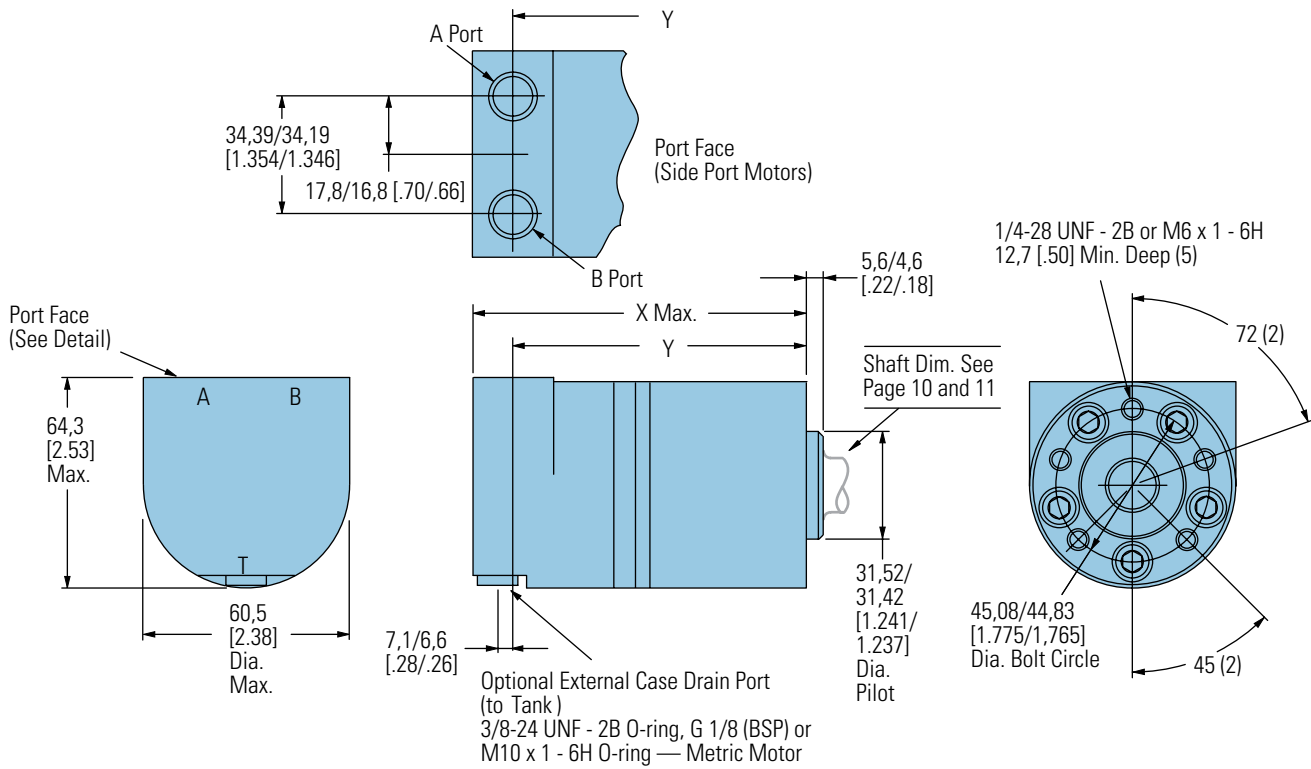
Ports

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]

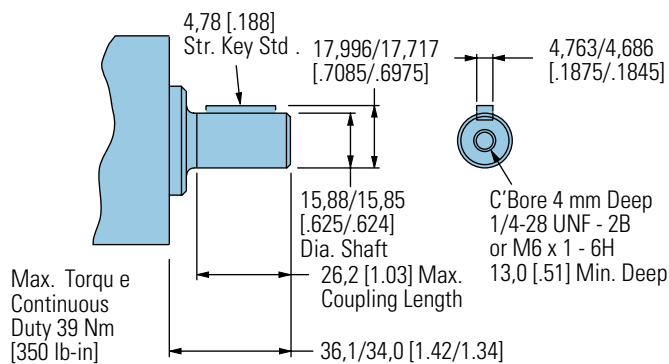
J Series (129-)

Dimensions

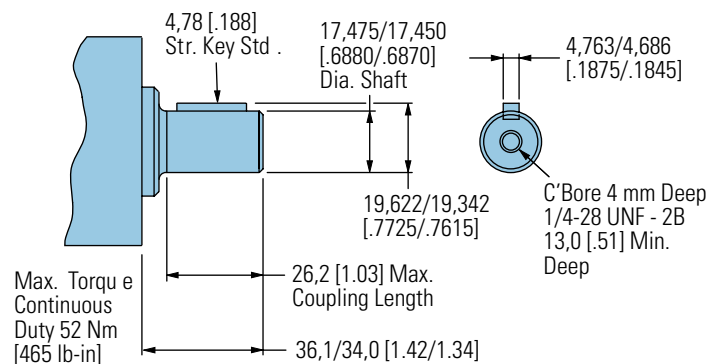
Shafts

B-1

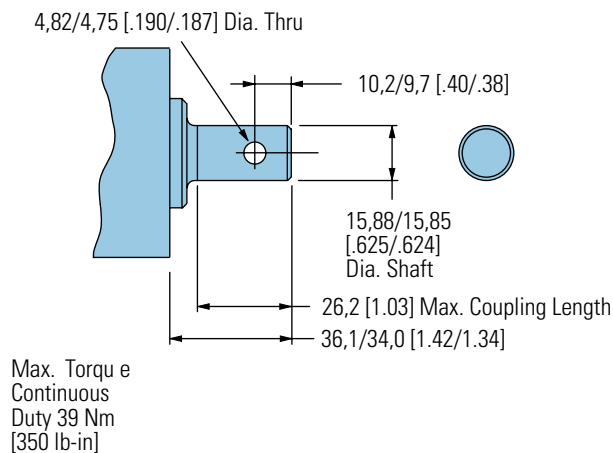
5/8 Inch Straight Keyed



11/16 Inch Straight Keyed



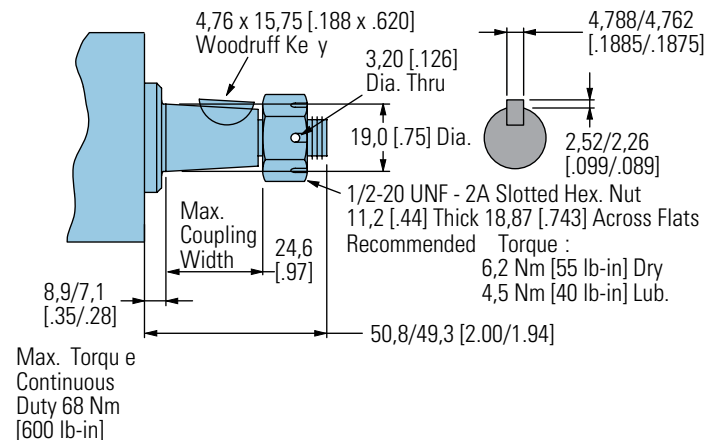
5/8 Inch Straight Keyed w/ Crosshole



3/4 Inch Tapered

(Tapered Shaft End Per SAE J744)

Except as Specified — 1.5 : 12 Ratio)

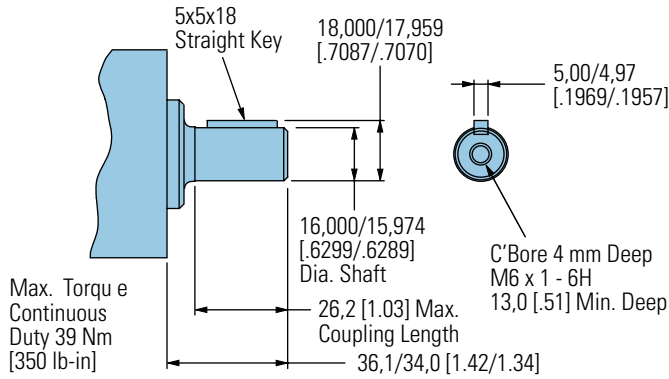


J Series (129-)

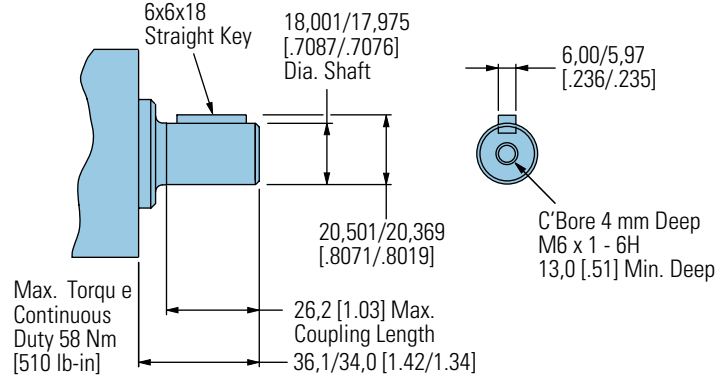
Dimensions

Shafts and Flange Kit

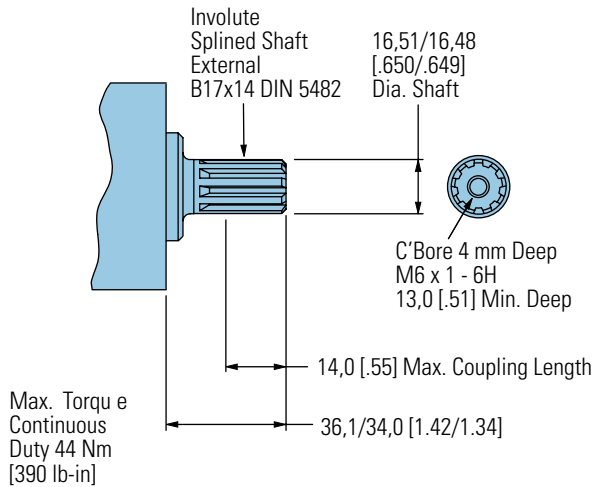
16 mm Straight Keyed



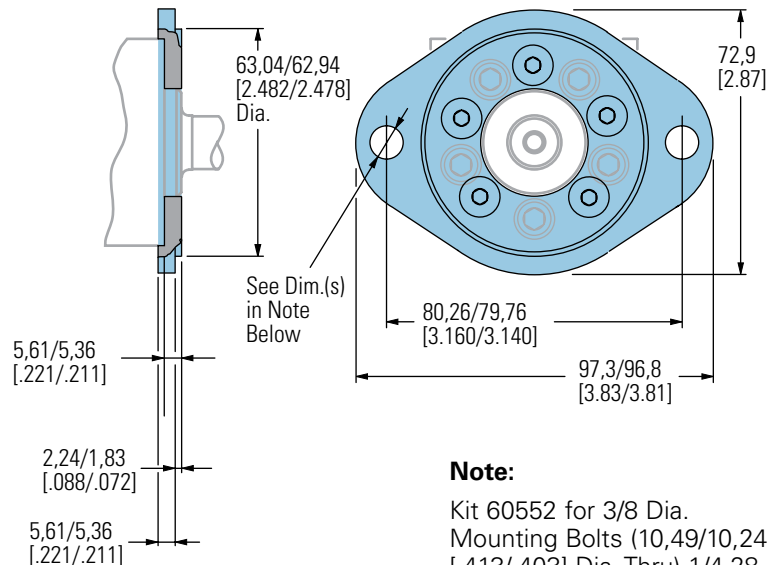
18 mm Straight Keyed



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

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

129-0336

Side Port

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			8,2 [.50]	12,9 [.79]	19,8 [1.21]	31,6 [1.93]	50,0 [3.00]
1/4-28 UNF 2B	5/8 inch Straight	9/16 -18 UNF 2B O-Ring (2)	129-0339	-0340	-0341	-0342	-0470
	11/16 inch Straight		129-0343	-0344	-0345	-0346	-0471
	Splined — Metric		129-0347	-0348	-0349	-0350	-0472
	3/4 inch Tapered		129-0481				
M6 x 1 - 6H	16 mm Straight	M14 x 1,5 - 6H O-Ring (2)	129-0351	-0352	-0353	-0354	-0473
	18 mm Straight		129-0355	-0356	-0357	-0358	-0474
	Splined — Metric		129-0359	-0360	-0361	-0362	-0475
	16 mm Straight	G 1/4 (BSP) (2)	129-0363	-0364	-0365	-0366	-0476
	18 mm Straight						
	Splined — Metric		129-0367	-0368	-0369	-0370	-0477
	16 mm Straight	G 3/8 (BSP) (2)	129-0371	-0372	-0373	-0374	-0403
	18 mm Straight		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-)

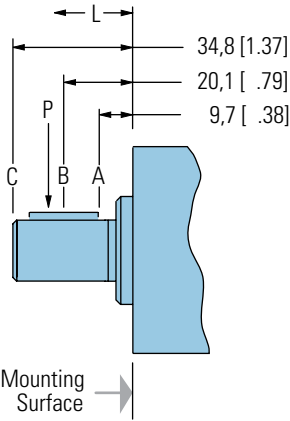
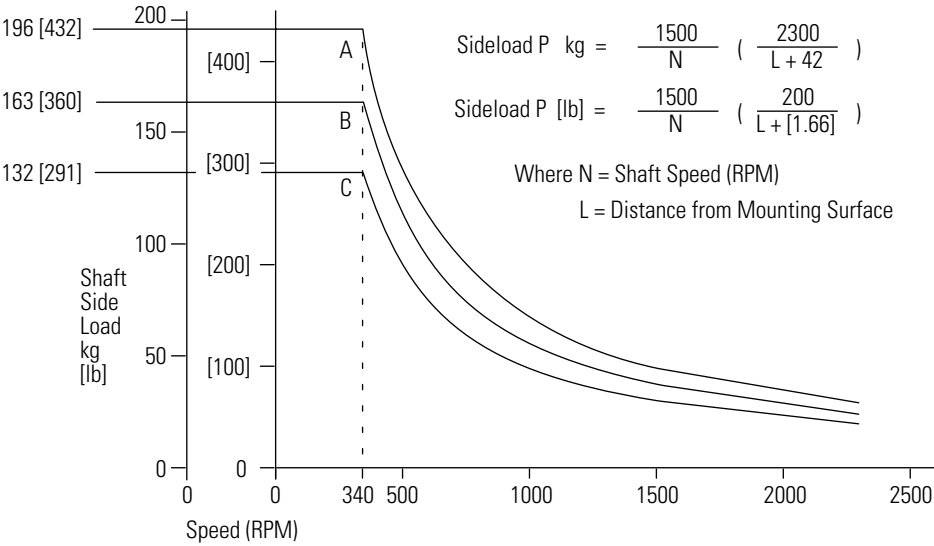
Shaft Side Load Capacity

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

B-1

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.

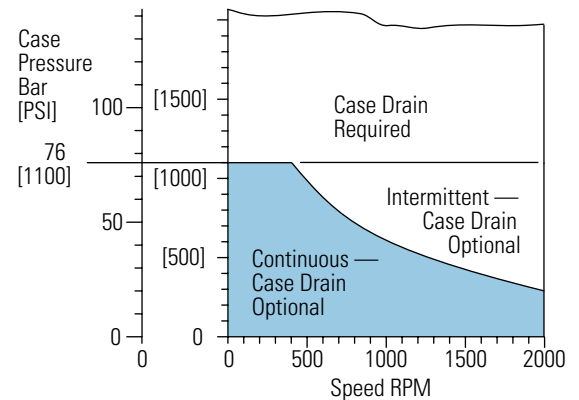
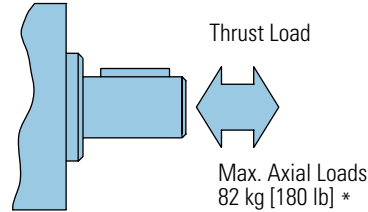
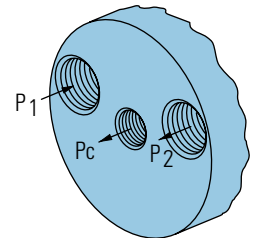
Example:

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].

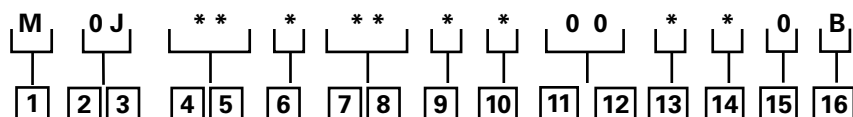


Case Pressure Seal Limitation

J Series (129-)

Model Code

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



1 Product

M – Motor

2, 3 Series

0J – J Series

4, 5 Displacement cm³/r [in³/r]

05 – 8,2 [.50]

08 – 12,9 [.79]

12 – 19,8 [1.21]

19 – 31,6 [1.93]

30 – 50,0 [3.00]

6 Mounting Type

A – 5 Bolt: Dia. 31,47 [1.239] x 5,1 [.20] Pilot 1/4-28 UNF 2B Mounting Holes on 45 [1.77] Dia. Bolt Circle

B – 5 Bolt: Dia. 31,47 [1.239] x 5,1 [.20] Pilot M6 x 1- 6H Mounting Holes on 45 [1.77] Dia. Bolt Circle

C – 2 Bolt: Dia. 62,99 [2.480] x 2,0 [.08] Pilot 10,36[.408] Mounting Holes on 80,0 [3.150] Dia. Bolt Circle

D – 2 Bolt: Dia. 62,99 [2.480] x 2,0 [.08] Pilot 9,0 [.354] Mounting Holes on 80,0 [3.150] Dia. Bolt Circle

7, 8 Output Shaft

01 – 5/8 inch Dia. Straight with 4,72 [.186] Square Key and 1/4-28 UNF - 2B Threaded Hole

02 – 16 mm Dia. Straight with 5,00 [.197] Square Key with M6 x 1 - 6H Threaded Hole

04 – 11/16 inch Dia. Straight with 4,72 [.186] Square Key and 1/4-28 UNF - 2B Threaded Hole

05 – 18 mm Dia. Straight with 5,92 [.233] Square Key with M6 x 1 - 6H Threaded Hole

06 – Involute Splined 9T—Metric 16,50 [.650] Dia. (B17 x 14 DIN 5482) M6 x 1 - 6H Threaded Hole

07 – 5/8 inch Dia. Straight with 4,75 [.187] Dia. Crosshole

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

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

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

9 Ports

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

B – G 1/4 (BSP) End Ported

C – M14 x 1,5 - 6H O-Ring Port, End Ported

D – 9/16 -18 UNF - 2B O-Ring Side Ported

E – G 3/8 (BSP) Side Ported

F – G 1/4 (BSP) Side Ported

H – G 3/8 (BSP) End Ported

10 Case Flow Options

0 – No Case Drain

1 – 3/8 -24 UNF - 2B O-Ring

2 – G 1/8 (BSP)

3 – M10 x 1 - 6H O-Ring

11, 12 Special Features (Hardware)

00 – None

13 Special Features (Assembly)

0 – None

1 – Reverse Rotation

14 Paint/Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

15 Eaton Assigned Code when Applicable

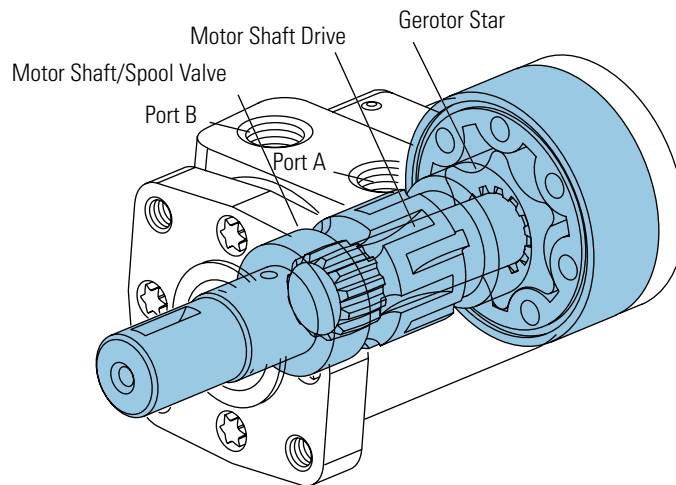
0 – Assigned Code

16 Eaton Assigned Design Code

B – Assigned Design Code

H Series (101-)

Highlights



Description

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

Specifications

Gerotor Element	13 Displacements
Flow l/min [GPM]	57 [15] Continuous***
	76 [20] Intermittent**
Speed	Up to 1100 RPM
Pressure bar [PSI]	125 [1800] Cont.***
	165 [2400] Inter.**
Torque Nm [lb-in]	407 [3604] Cont.***
	520 [4600] Inter.**

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

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

Features:

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

Benefits:

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

Applications:

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

B-2



Conveyer



Combine



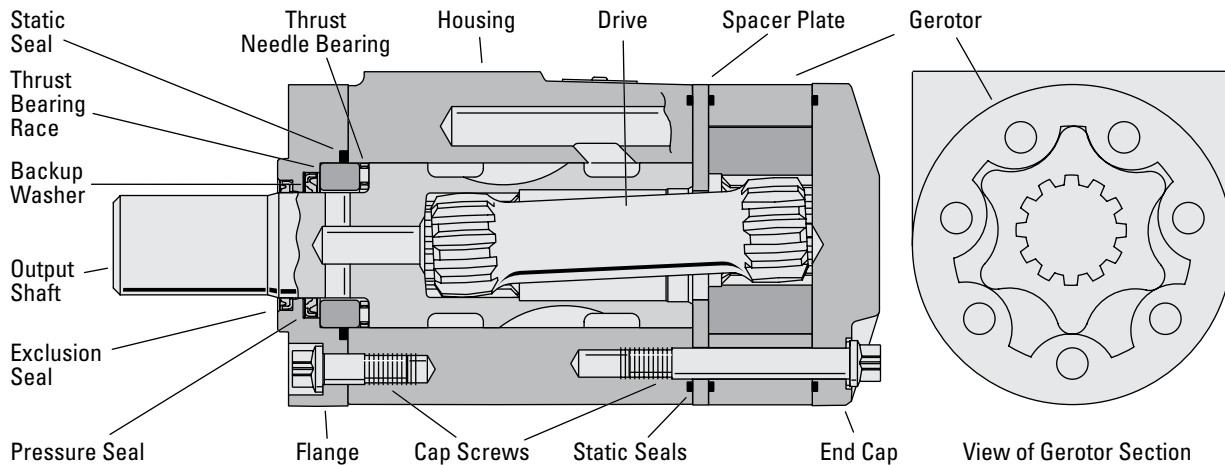
Sweeper



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 Nm [lb-in]	@ 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:

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

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

Recommended System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

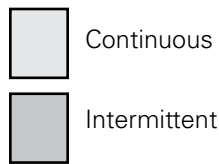
per ISO Cleanliness Code 4406, level 20/18/13

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.



		36 cm ³ /r [2.2 in ³ /r]										Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]											
		Continuous											
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]			
		14	28	41	55	69	83	97	110	124			[2400] 165
Flow LPM [GPM]	[2]	[49]	[103]	[162]	[189]	[270]	[325]	[379]	[432]	[489]			[650] 73
	7.6	6	12	18	21	31	37	43	49	55			122
		204	201	198	194	189	184	177	170	162			
	[4]	[47]	[106]	[160]	[191]	[274]	[327]	[384]	[439]	[495]			[654] 74
	15.1	5	12	18	22	31	37	43	50	56			323
		408	407	402	399	394	387	381	373	365			
Max. Continuous	[6]	[44]	[102]	[158]	[188]	[272]	[328]	[383]	[440]	[496]			[661] 75
	22.7	5	12	18	21	31	37	43	50	56			523
		613	612	609	604	599	591	586	576	565			
Max. Continuous	[8]	[40]	[97]	[153]	[184]	[270]	[326]	[383]	[440]	[497]			[668] 75
	30.3	5	11	17	21	31	37	43	50	56			721
		817	817	814	807	799	793	785	776	762			
Max. Continuous	[10]	[36]	[90]	[148]	[180]	[265]	[322]	[380]	[438]	[495]			[664] 75
	37.9	4	10	17	20	30	36	43	49	56			920
		1021	1021	1015	1008	1001	991	981	969	959			

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

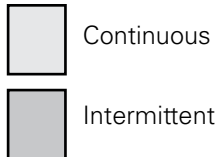
		46 cm ³ /r [2.8 in ³ /r]										Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]											
		Continuous											
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]			
		14	28	41	55	69	83	97	110	124			[2400] 165
Flow LPM [GPM]	[2]	[64]	[136]	[212]	[284]	[355]	[426]	[497]	[567]	[641]			[852] 96
	7.6	7	15	24	32	40	48	56	64	72			95
		161	158	156	153	148	145	139	133	127			
	[4]	[61]	[139]	[209]	[286]	[359]	[429]	[503]	[576]	[649]			[857] 97
	15.1	7	16	24	32	41	48	57	65	73			253
		323	320	316	314	310	304	300	293	287			
Max. Continuous	[6]	[58]	[134]	[207]	[282]	[356]	[430]	[502]	[577]	[650]			[867] 98
	22.7	7	15	23	32	40	49	57	65	73			410
		486	481	479	475	471	464	461	453	444			
Max. Continuous	[8]	[52]	[128]	[200]	[276]	[354]	[428]	[502]	[577]	[651]			[876] 99
	30.3	6	14	23	31	40	48	57	65	74			566
		648	643	640	635	628	623	617	610	599			
Max. Continuous	[10]	[47]	[118]	[194]	[269]	[347]	[423]	[498]	[575]	[649]			[871] 98
	37.9	5	13	22	30	39	48	56	65	73			722
		808	803	798	793	787	779	771	761	753			
Max. Intermittent	[12]	[36]	[109]	[188]	[260]	[340]	[417]	[492]	[567]	[643]			[864] 98
	45.4	4	12	21	29	38	47	56	64	73			877
		969	964	960	952	946	938	931	922	914			
Max. Intermittent	[14]	[25]	[98]	[175]	[249]	[327]	[404]	[484]	[559]	[634]			
	53.0	3	11	20	28	37	46	55	63	72			
		1127	1123	1115	1108	1100	1093	1086	1079	1068			

H Series (101-)

Performance Data

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

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



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

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

H Series (101-)

Performance Data

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

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

	Continuous
	Intermittent

		97 cm ³ /r [5.9 in ³ /r] Δ Pressure Bar [PSI] Continuous								Max. Contin- uous	Max. Inter- mittent
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2400]
		14	28	41	55	69	83	97	110	124	165
Flow LPM [GPM]	[2]	[134]	[292]	[442]	[593]	[746]	[899]	[1054]	[1209]	[1365]	[1806]
	7,6	15 78	33 76	50 75	67 73	84 71	102 68	119 65	137 61	154 55	204 33
	[4]	[131]	[281]	[436]	[596]	[750]	[903]	[1059]	[1212]	[1367]	[1828]
	15,1	15 156	32 155	49 153	67 151	85 149	102 147	120 143	137 139	154 134	207 113
	[6]	[126]	[269]	[425]	[588]	[747]	[900]	[1054]	[1206]	[1368]	[1823]
	22,7	14 234	30 233	48 231	66 230	84 228	102 224	119 221	136 217	155 210	206 189
	[8]	[110]	[246]	[408]	[566]	[718]	[873]	[1023]	[1177]	[1339]	[1829]
	30,3	12 312	28 311	46 310	64 308	81 305	99 303	116 300	133 295	151 291	207 269
	[10]	[96]	[231]	[392]	[539]	[699]	[859]	[1005]	[1156]	[1318]	[1821]
	37,9	11 390	26 389	44 387	61 385	79 383	97 380	114 376	131 373	149 368	206 346
Max. Contin- uous	[12]	[77]	[218]	[378]	[522]	[681]	[844]	[990]	[1142]	[1301]	[1792]
	45,4	9 468	25 467	43 465	59 463	77 460	95 457	112 453	129 449	147 445	202 421
Max. Inter- mittent	[14]	[60]	[197]	[358]	[513]	[662]	[828]	[973]	[1131]	[1293]	[1776]
	53,0	7 546	22 544	40 542	58 539	75 537	94 535	110 531	128 526	146 521	201 499
Max. Inter- mittent	[15]	[52]	[189]	[346]	[495]	[651]	[819]	[963]	[1126]	[1286]	[1778]
	56,8	6 585	21 583	39 581	56 578	74 575	93 573	109 569	127 564	145 559	201 536
Max. Inter- mittent	[20]	[25]	[157]	[311]	[455]	[625]	[790]	[941]	[1110]	[1272]	
	75,7	3 701	18 700	35 697	51 694	71 691	89 688	106 684	125 681	144 674	

[189]
21
583

Torque [lb-in]
Nm
Speed RPM

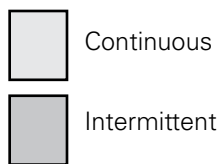
		120 cm ³ /r [7.3 in ³ /r] Δ Pressure Bar [PSI] Continuous								Max. Contin- uous	Max. Inter- mittent
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2400]
		14	28	41	55	69	83	97	110	124	165
Flow LPM [GPM]	[2]	[162]	[357]	[544]	[736]	[927]	[1116]	[1305]	[1498]	[1687]	[2231]
	7,6	18 62	40 61	61 61	83 59	105 58	126 55	147 53	169 49	191 45	252 26
	[4]	[160]	[348]	[539]	[736]	[930]	[1119]	[1316]	[1506]	[1698]	[2268]
	15,1	18 125	39 124	61 123	83 121	105 120	126 119	149 116	170 114	192 110	256 90
	[6]	[155]	[338]	[530]	[729]	[923]	[1116]	[1310]	[1500]	[1699]	[2271]
	22,7	18 188	38 187	60 186	82 185	104 183	126 180	148 178	169 175	192 170	257 152
	[8]	[139]	[319]	[515]	[710]	[901]	[1094]	[1283]	[1476]	[1673]	[2278]
	30,3	16 250	36 250	58 249	80 247	102 245	124 243	145 241	167 237	189 233	257 216
	[10]	[121]	[303]	[497]	[686]	[883]	[1081]	[1267]	[1460]	[1655]	[2268]
	37,9	14 313	34 312	56 311	78 309	100 308	122 306	143 302	165 300	187 296	256 278
Max. Contin- uous	[12]	[102]	[288]	[480]	[664]	[862]	[1060]	[1246]	[1440]	[1640]	[2232]
	45,4	12 375	33 374	54 373	75 371	97 370	120 367	141 365	163 361	185 358	252 338
Max. Contin- uous	[14]	[78]	[263]	[458]	[652]	[841]	[1041]	[1228]	[1420]	[1616]	[2213]
	53,0	9 438	30 437	52 435	74 433	95 431	118 430	139 427	160 423	183 419	250 401
Max. Inter- mittent	[15]	[67]	[253]	[446]	[632]	[828]	[1030]	[1214]	[1411]	[1608]	[2205]
	56,8	8 469	29 468	50 466	71 464	94 462	116 460	137 458	159 454	182 450	249 430
Max. Inter- mittent	[20]	[20]	[202]	[384]	[581]	[778]	[971]	[1169]	[1356]	[1559]	
	75,7	2 626	23 624	43 621	66 618	88 617	110 614	132 611	153 609	176 606	

H Series (101-)

Performance Data

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

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



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

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

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

H Series (101-)

Performance Data

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

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

	Continuous
	Intermittent

185 cm³/r [11.3 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

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

231 cm³/r [14.1 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

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

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

H Series (101-)

Performance Data

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

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

	Continuous
	Intermittent

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

		370 cm ³ /r [22.6 in ³ /r]							Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]								
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1250]		
		14	28	41	55	69	83	86		
Flow LPM [GPM]	[2]	[537]	[1121]	[1715]	[2285]	[2862]				
	7,6	61	127	194	258	323				
		20	20	20	19	16				
	[4]	[532]	[1123]	[1715]	[2308]	[2893]	[3467]	[3604]	[4274]	
	15,1	60	127	194	261	327	392	407	483	
		40	40	40	39	38	36	35	27	
	[6]	[508]	[1100]	[1693]	[2294]	[2884]	[3458]	[3598]	[4283]	
	22,7	57	124	191	259	326	391	407	484	
		61	61	61	60	58	55	53	47	
	[8]	[463]	[1060]	[1661]	[2255]	[2840]	[3414]	[3557]	[4254]	
	30,3	52	120	188	255	321	386	402	481	
		81	81	81	80	79	76	74	68	
	[10]	[414]	[1017]	[1613]	[2203]	[2788]	[3363]	[3506]	[4212]	
	37,9	47	115	182	249	315	380	396	476	
		101	101	101	101	99	96	94	88	
	[12]	[363]	[960]	[1553]	[2152]	[2737]	[3305]	[3446]	[4152]	
	45,4	41	108	175	243	309	373	389	469	
		121	121	121	121	119	116	115	109	
	[14]	[303]	[897]	[1484]	[2086]	[2667]	[3246]	[3386]	[4092]	
	53,0	34	101	168	236	301	367	383	462	
		142	142	142	142	140	137	136	130	
	[15]	[266]	[862]	[1452]	[2050]	[2630]	[3206]	[3347]	[4054]	
	Max. Continuous	56,8	30	97	164	232	297	362	458	
			152	152	152	150	148	147	140	
	Max. Intermittent	[20]	[61]	[671]	[1269]	[1847]	[2410]	[2987]	[3119]	
		75,7	7	76	143	209	272	337	352	
			202	202	202	202	202	199	198	

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

[862]

97

152

Torque [lb-in]

Nm

Speed RPM

H Series (101-)

Dimensions

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

Note:

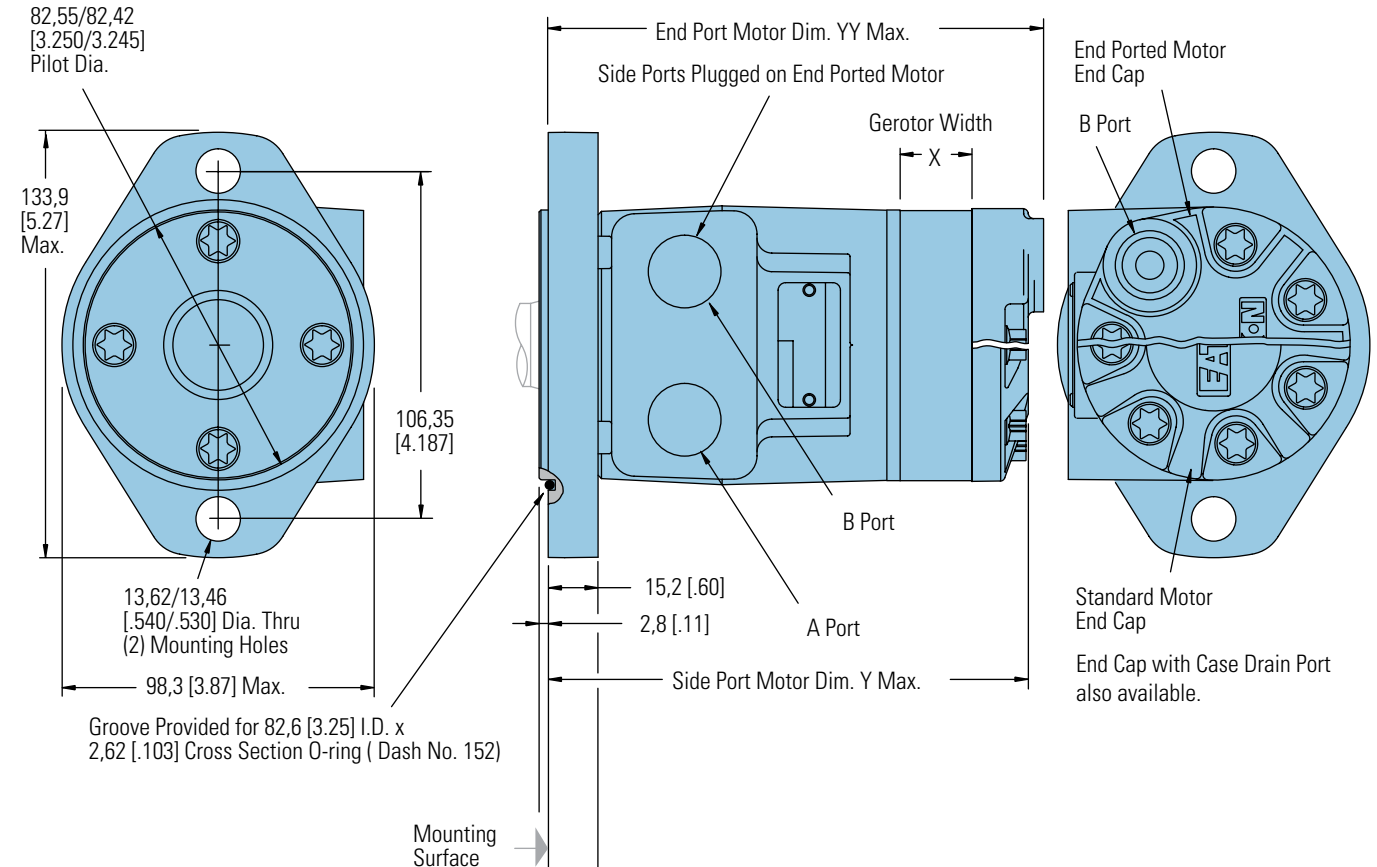
Mounting surface flatness requirement is ∇ , 13 mm [.005 inch] Max.

Note:

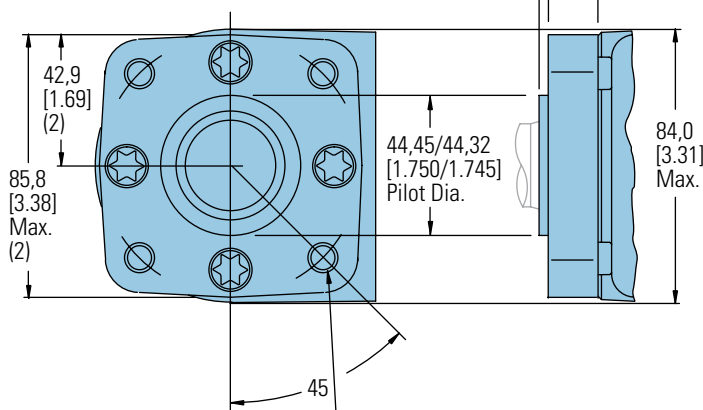
End ported motor pressure is derated. Reference page B-2-2 for ratings.

B-2

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.

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

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.

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

11, 12 Ports

AA – .875-14 UNF-2B SAE
O-Ring Ports

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

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

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

AF – G 1/2 BSP Straight Thread Ports

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

EC†† – End Ports: G 1/2
BSP Straight Thread Ports
†† Note: End ported
motor pressure is derated.
Reference page B-2-2 for
ratings.

13 Case Flow Options

0 – None

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

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

A – Internal Check Valves

14 Gerotor Options

0 – None

A – Free Running

15 Shaft Options

0 – None

N – Electroless Nickel Plated

16, 17 Seal Options

00 – Standard Seals

02 – Seal Guard

03 – Viton Seals

04 – Viton Shaft Seal

05 – Vented Two-Stage Seal

07 – High Pressure
Shaft Seal

18 Speed Sensor Options

0 – None

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

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

19 Manifold Block Options

0 – None

* – Contact your Eaton
Sales Representative
for available options.

20, 21 Special Features (Hardware)

00 – None

AB – Low Speed Valving

SS – Stainless Steel
Flange Bolts

22 Special Features (Assembly)

0 – None

1 – Reverse Rotation

2 – Flange Rotated 90°

23 Paint/ Special Packaging

0 – No Paint

A – Painted Low Gloss
Black

D – Environmental Coated
Gloss White

F – Environmental
Coated Black

24 Eaton Assigned Code when Applicable

0 – Assigned Code

25 Eaton Assigned Design Code

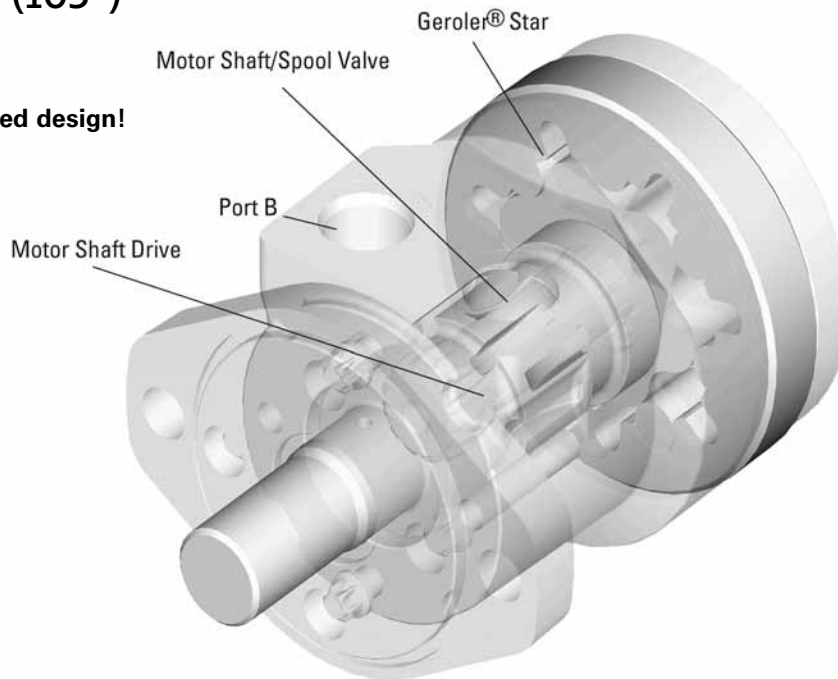
J – Nine (9)

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

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



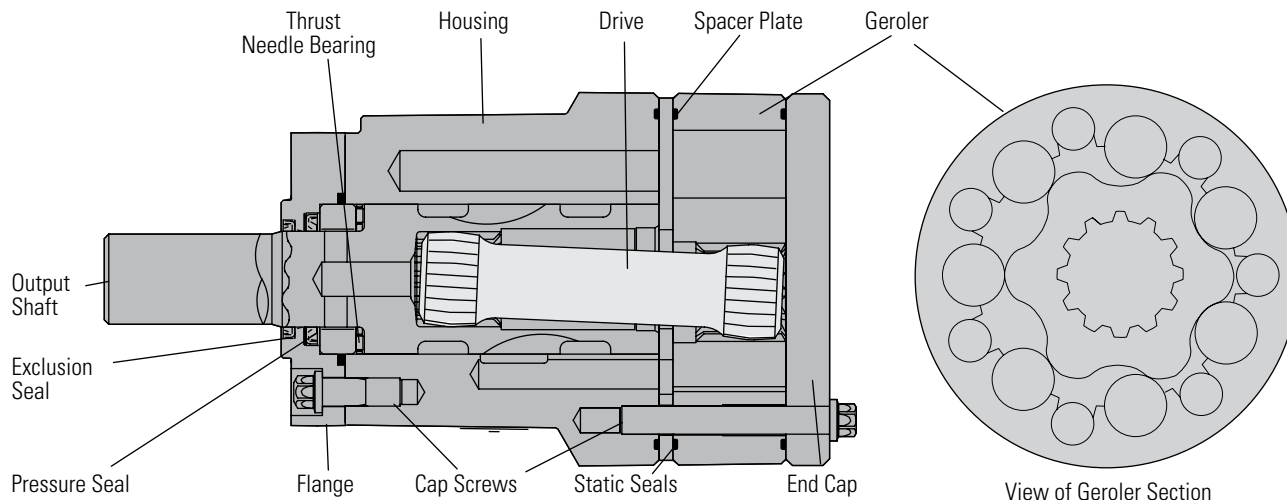
Amusement ride



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:

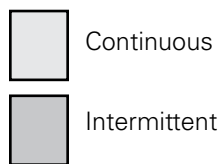
per ISO Cleanliness Code 4406, level 20/18/13

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

S Motor 75 cm³/r [4.6 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	28	41	55	69	83	97	110	124	138	172
[2]	91	218	343	467	590	708	815	900	981	1086	
	10	25	39	53	67	80	92	102	111	123	
7,6	93	89	81	75	66	59	43	21	23	16	
[4]	87	217	352	484	616	748	874	1001	1123	1236	1472
	10	25	40	55	70	85	99	113	127	140	166
15,1	193	188	181	173	163	150	139	125	107	89	37
[6]	82	219	355	492	627	763	898	1027	1155	1284	1590
	9	25	40	56	71	86	101	116	131	145	180
22,7	292	286	277	269	258	244	228	214	202	186	140
[8]	69	202	341	481	619	761	896	1032	1165	1296	1618
	8	23	38	54	70	86	101	117	132	146	183
30,3	390	384	375	364	355	342	326	309	295	276	230
[10]	56	193	330	471	610	751	887	1025	1162	1297	1628
	6	22	37	53	69	85	100	116	131	147	184
37,9	489	484	476	467	457	444	431	416	399	381	336
[12]	39	175	315	453	595	736	873	1011	1148	1284	1617
	4	20	36	51	67	83	99	114	130	145	183
45,4	587	582	573	564	552	540	526	510	494	476	427
[14]	12	153	290	431	571	716	856	993	1129	1265	1605
	1	17	33	49	65	81	97	112	128	143	181
53,0	343	680	673	665	654	641	628	613	594	578	533
[15]	9	143	281	424	567	708	846	985	1121	1259	1599
	1	16	32	48	64	80	96	111	127	142	181
56,8	491	729	723	714	704	690	675	661	644	628	580
[20]		82	220	362	505	645	784	922	1061	1200	1545
		9	25	41	57	73	89	104	120	136	175
75,7		970	963	957	948	935	921	906	888	871	825

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

S Series (103-)

Performance Data

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

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

Continuous

Intermittent

S Motor 93 cm³/r [5.7 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	28	41	55	69	83	97	110	124	138	172
[2]	146	308	466	620	771	913	1031	1086	1176	1281	
	16	35	53	70	87	103	116	123	133	145	
7,6	76	72	64	55	48	34	22	7	4	1	
[4]	136	301	466	633	797	959	1116	1275	1430	1570	1798
	15	34	53	72	90	108	126	144	162	177	203
15,1	158	153	146	138	126	115	103	90	77	59	17
[6]	113	278	446	616	786	952	1116	1280	1444	1603	1971
	13	31	50	70	89	108	126	145	163	181	223
22,7	238	232	225	215	206	191	175	161	145	129	87
[8]	98	262	431	604	777	947	1112	1279	1446	1610	2006
	11	30	49	68	88	107	126	144	163	182	227
30,3	319	313	306	296	284	270	255	240	224	208	165
[10]	81	246	415	590	763	935	1100	1271	1439	1604	2012
	9	28	47	67	86	106	124	144	163	181	227
37,9	400	394	388	378	366	353	340	324	306	288	244
[12]	65	232	401	574	746	916	1081	1255	1425	1591	2001
	7	26	45	65	84	103	122	142	161	180	226
45,4	481	476	469	460	448	435	423	408	394	374	326
[14]	42	207	376	552	721	893	1064	1235	1405	1570	1983
	5	23	43	62	81	101	120	140	159	177	224
53,0	561	557	549	541	531	519	504	489	470	455	412
[15]	31	196	364	538	708	881	1052	1223	1391	1560	1974
	4	22	41	61	80	100	119	138	157	176	223
56,8	602	597	591	582	571	559	546	530	514	498	453
[20]		119	290	461	633	807	976	1145	1315	1485	1904
		13	33	52	72	91	110	129	149	168	215
75,7		799	792	785	775	762	748	734	717	702	660

S Motor 120 cm³/r [7.3 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	28	41	55	69	83	97	110	124	138	172
[2]	191	403	605	801	978	1146	1288	1440	1552	1679	
	22	46	68	91	110	129	146	163	175	190	
7,6	60	56	50	43	36	29	19	15	8	6	
[4]	188	403	617	829	1031	1236	1438	1632	1816	1990	1914
	21	46	70	94	117	140	162	184	205	225	216
15,1	122	118	112	106	98	87	78	67	56	49	16
[6]	172	391	607	821	1030	1241	1449	1654	1858	2056	2522
	19	44	69	93	116	140	164	187	210	232	285
22,7	186	180	175	167	159	149	137	126	114	103	73
[8]	156	375	593	807	1015	1229	1439	1648	1855	2059	2557
	18	42	67	91	115	139	163	186	210	233	289
30,3	249	244	237	229	220	210	199	185	174	162	128
[10]	130	349	567	785	995	1210	1420	1630	1838	2045	2559
	15	39	64	89	112	137	160	184	208	231	289
37,9	311	307	301	293	286	275	264	252	239	227	193
[12]	103	320	539	756	965	1175	1383	1593	1799	2003	2500
	12	36	61	85	109	133	156	180	203	226	282
45,4	374	369	363	355	346	336	327	314	303	288	253
[14]	70	285	502	715	923	1131	1335	1540	1745	1948	2452
	8	32	57	81	104	128	151	174	197	220	277
53,0	437	433	427	419	411	402	391	379	369	355	322
[15]	54	267	485	705	913	1122	1329	1540	1746	1947	2441
	6	30	55	80	103	127	150	174	197	220	276
56,8	469	465	459	452	444	433	423	411	400	386	349
[20]		159	377	600	815	1026	1232	1444	1651	1859	2383
		18	43	68	92	116	139	163	186	210	269
75,7		621	618	612	603	594	583	571	560	549	515

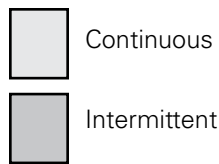
[267]
30 } Torque [lb-in]
465 } Nm
Speed RPM

S Series (103-)

Performance Data

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

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



S Motor 144 cm³/r [8.8 in³/r]

Δ Pressure Bar [PSI]

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

S Motor 166 cm³/r [10.1 in³/r]

Δ Pressure Bar [PSI]

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

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

S Series (103-)

Performance Data

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

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

Continuous

Intermittent

S Motor 187 cm³/r [11.4 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1850]	[2250]
	14	28	41	55	69	83	97	110	124	138	172
[2]	298	627	944	1244	1532	1805	2030	2250	2478		
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]

57

251

Torque [lb-in]

Nm

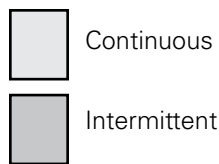
Speed RPM

S Series (103-)

Performance Data

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

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



S Motor 298 cm³/r [18.2 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1500]	[1800]
	14	28	41	55	69	83	97	110	124
[2]	487	1009	1509	1991	2460	2931	3360	3577	4113
	55	114	170	225	278	331	380	404	465
7,6	24	22	20	18	17	14	11	10	8
[4]	498	1043	1576	2093	2597	3087	3567	3798	4500
	56	118	178	236	293	349	403	429	508
15,1	49	47	45	41	38	34	31	29	25
[6]	470	1017	1552	2080	2594	3097	3594	3835	4536
	53	115	175	235	293	350	406	433	513
22,7	74	72	69	66	62	57	52	49	42
[8]	423	967	1502	2031	2549	3062	3563	3807	4526
	48	109	170	229	288	346	403	430	511
30,3	100	98	95	92	88	83	77	73	64
[10]	357	901	1433	1961	2477	2989	3486	3730	4456
	40	102	162	222	280	338	394	421	504
37,9	126	124	121	118	113	108	101	97	87
[12]	287	826	1357	1884	2402	2917	3410	3652	4363
	32	93	153	213	271	330	385	413	493
45,4	152	150	147	144	140	134	126	121	109
[14]	199	733	1261	1786	2303	2818	3316	3561	4276
	22	83	142	202	260	318	375	402	483
53,0	177	176	173	170	165	160	152	147	134
[15]	154	688	1218	1742	2258	2771	3273	3518	4241
	17	78	138	197	255	313	370	398	479
56,8	190	189	186	183	178	173	165	160	146
[20]		418	945	1471	1986	2502	3004	3253	3997
		47	107	166	224	283	339	368	452
75,7		253	251	248	244	239	231	226	212

S Motor 372 cm³/r [22.7 in³/r]

Δ Pressure Bar [PSI]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1500]
	14	28	41	55	69	83	97	110
[2]	629	1287	1905	2501	3066	3624	3886	4370
	71	145	215	283	346	409	439	494
7,6	19	18	16	14	13	11	9	7
[4]	628	1304	1962	2600	3206	3799	4082	4642
	71	147	222	294	362	429	461	525
15,1	40	38	36	34	30	27	25	23
[6]	587	1261	1926	2578	3203	3813	4112	4687
	66	142	218	291	362	431	465	530
22,7	60	59	56	54	50	45	43	38
[8]	529	1201	1867	2518	3148	3769	4072	4657
	60	136	211	285	356	426	460	526
30,3	81	79	77	75	71	66	64	58
[10]	451	1124	1779	2429	3056	3678	3983	4583
	51	127	201	274	345	416	450	518
37,9	102	100	98	96	92	86	84	78
[12]	359	1030	1688	2333	2963	3587	3889	4482
	41	116	191	264	335	405	439	506
45,4	122	121	119	117	113	107	104	98
[14]	256	922	1577	2226	2864	3487	3787	4381
	29	104	178	252	324	394	428	495
53,0	143	142	140	137	134	128	126	119
[15]	199	862	1514	2167	2797	3424	3727	4322
	22	97	171	245	316	387	421	488
56,8	153	152	150	148	144	138	135	129
[20]		534	1187	1832	2470	3093	3402	4004
		60	134	207	279	349	384	452
75,7		204	202	200	197	192	189	183

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

S Series (103-)

Dimensions

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

Ports

7/8-14 SAE O-Ring

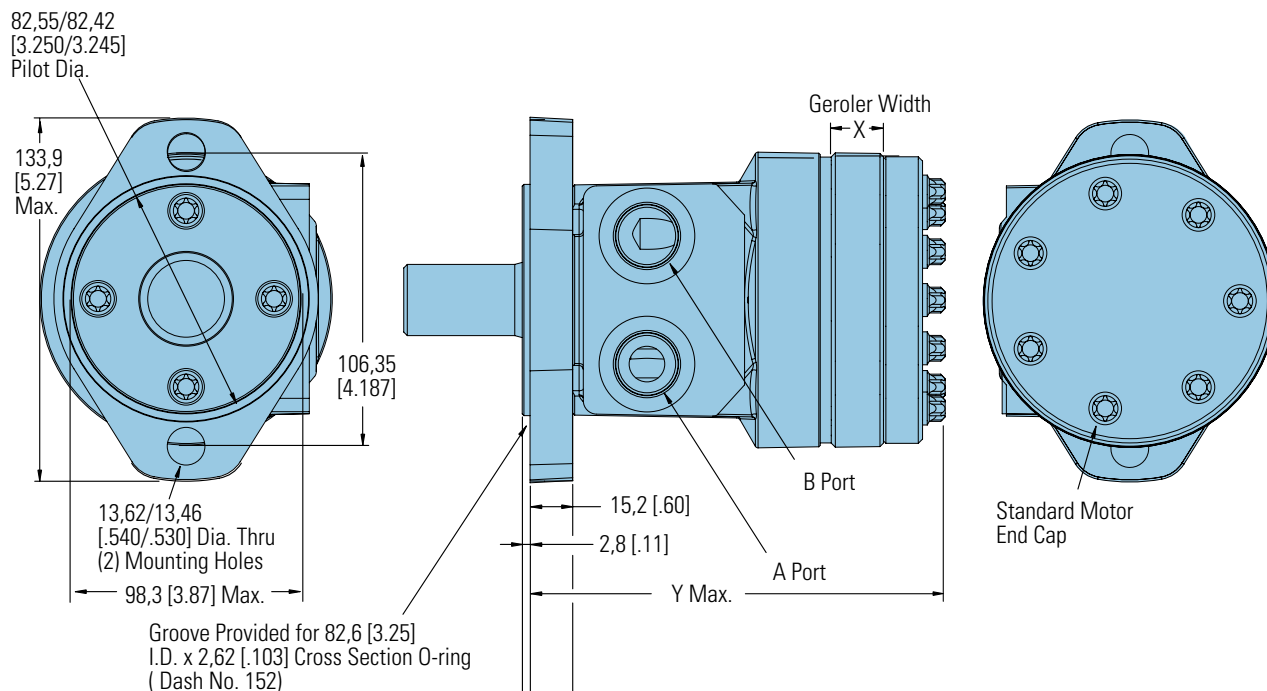
6-1/2 (BSP) Straight thread manifold

Standard Rotation Viewed from Shaft End

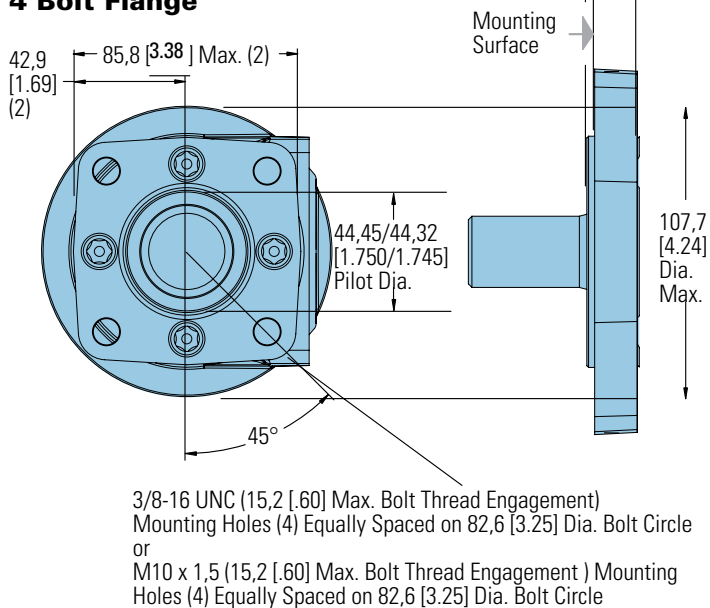
Port A Pressurized — CW

Port B Pressurized — CCW

2 Bolt Flange



4 Bolt Flange



Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
58 [3.6]	7,5 [.30]	138,0 [5.43]
76 [4.6]	9,8 [.39]	140,3 [5.52]
93 [5.7]	12,0 [.47]	142,5 [5.61]
120 [7.3]	15,5 [.61]	146,0 [5.75]
144 [8.8]	18,6 [.73]	149,1 [5.87]
165 [10.1]	21,3 [.84]	151,8 [5.98]
186 [11.4]	24,0 [.94]	154,5 [6.08]
225 [13.7]	28,9 [1.14]	159,4 [6.28]
299 [18.2]	38,5 [1.52]	169,0 [6.66]
371 [22.7]	47,9 [1.88]	178,4 [7.02]

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

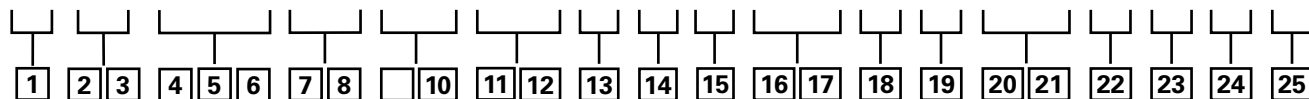
103-1527

*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.

Model Code

B-3

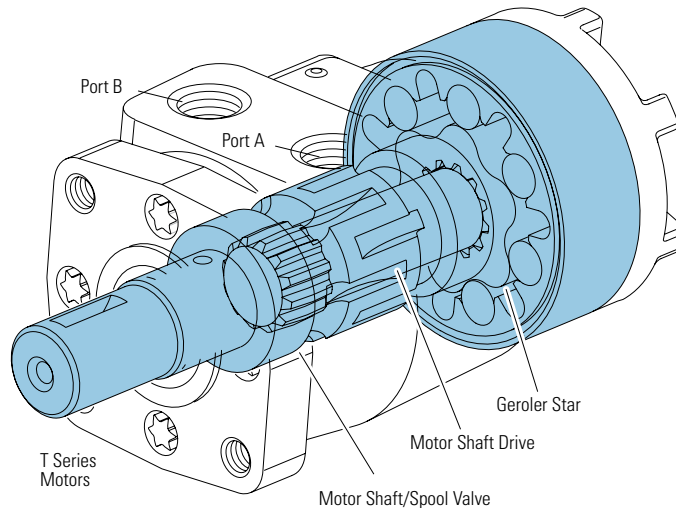


M – Twelve (12)

B-3-11

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



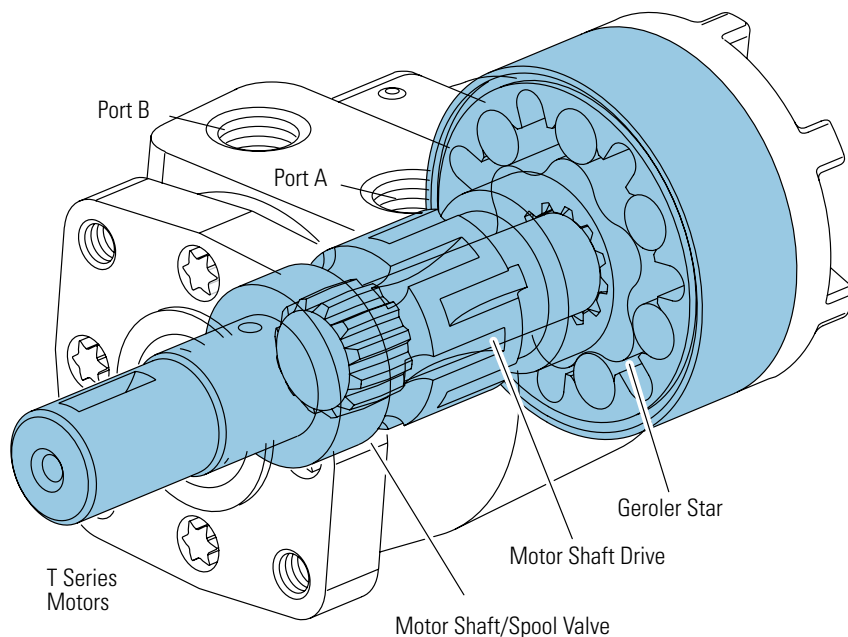
Harvester



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	38 [10]	45 [12]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]
	Intermittent	38 [10]	57 [15]	68 [18]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	76 [672]	105 [928]	138 [1222]	174 [1541]	219 [1936]	251 [2226]	297 [2628]	359 [3178]	410 [3633]	441 [3905]	430 [3811]
	Intermittent **	93 [824]	118 [1131]	168 [1488]	212 [1872]	264 [2339]	307 [2718]	359 [3178]	437 [3864]	485 [4290]	483 [4275]	486 [4300]
Pressure Δ Bar Δ PSI]	Continuous*	155 [2250]	155 [2250]	155 [2250]	155 [2250]	155 [2250]	138 [2000]	138 [2000]	138 [2000]	127 [1850]	110 [1600]	90 [1300]
	Intermittent**	190 [2750]	190 [2750]	190 [2750]	190 [2750]	190 [2750]	172 [2500]	172 [2500]	172 [2500]	155 [2250]	124 [1800]	103 [1500]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

190 Bar [2750 PSI] without regard to Δ Bar [Δ PSI] and/or back pressure ratings or combination thereof.

6B splined or Tapered shafts are recommended whenever operation above 282 NM [2500 lb-in] of torque, especially for those applications subject to frequent reversals.

Δ Pressure:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Recommended Fluids:

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

Recommended System Operating Temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended Filtration:

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

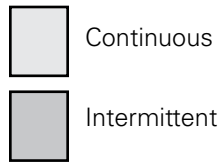
T Series

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

[93]
11
1014

Torque [lb-in]
Nm
Speed RPM

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

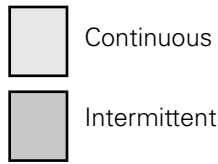
T Series

(158-, 185-)

Performance Data

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

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



		66 cm ³ /r [4.0 in ³ /r]												Max. Continuous	Max. Intermittent
		Δ Pressure Bar [PSI]													
		Continuous													
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]		
		14	28	41	55	69	83	97	110	124	138	152	155		190
Flow LPM [GPM]	[2]	[78]	[191]	[303]	[414]	[522]	[625]	[706]	[804]	[898]	[991]	[1081]	[1103]	[1318]	
	7,6	9	22	34	47	59	71	80	91	101	112	122	125	149	
		114	111	110	107	105	101	96	92	87	81	73	72	48	
	[4]	[97]	[209]	[325]	[441]	[548]	[657]	[766]	[873]	[972]	[1077]	[1181]	[1205]	[1437]	
	15,1	11	24	37	50	62	74	87	99	110	122	133	136	162	
		229	229	217	216	212	205	194	190	186	183	181	178	170	
	[6]	[79]	[192]	[309]	[426]	[534]	[649]	[760]	[874]	[984]	[1090]	[1190]	[1218]	[1488]	
	22,7	9	22	35	48	60	73	86	99	111	123	134	138	168	
		344	343	335	334	321	320	319	315	291	288	279	276	270	
	[8]	[75]	[191]	[304]	[419]	[532]	[645]	[759]	[871]	[982]	[1092]	[1197]	[1222]	[1458]	
	30,3	8	22	34	47	60	73	86	98	111	123	135	138	165	
		456	451	447	442	431	426	419	415	412	401	391	386	339	
	[10]	[49]	[163]	[283]	[398]	[509]	[623]	[742]	[856]	[971]	[1080]	[1186]	[1209]	[1425]	
	37,9	6	18	32	45	58	70	84	97	110	122	134	137	161	
		569	565	560	552	547	541	532	525	512	504	498	496	475	
	[12]	[24]	[156]	[270]	[385]	[502]	[614]	[729]	[845]	[963]	[1067]	[1182]	[1209]	[1472]	
	45,4	3	18	31	43	57	69	82	95	109	121	134	137	166	
		681	678	671	665	658	651	641	635	623	612	604	601	571	
	[14]	[19]	[143]	[261]	[370]	[485]	[602]	[718]	[837]	[948]	[1064]	[1175]	[1199]	[1436]	
	53,0	2	16	29	42	55	68	81	95	107	120	133	135	162	
		793	788	787	778	771	762	753	746	737	723	715	711	677	
	[15]	[13]	[120]	[236]	[352]	[471]	[590]	[707]	[823]	[939]	[1052]	[1165]	[1192]	[1462]	
	56,8	1	14	27	40	53	67	80	93	106	119	132	135	165	
		849	844	839	832	826	819	806	800	786	779	770	766	725	
Max. Continuous															
Max. Intermittent	[18]		[107]	[215]	[326]	[442]	[555]	[669]	[786]	[900]	[1016]	[1123]	[1152]		
	68,1		12	24	37	50	63	76	89	102	115	127	130		
			1006	1003	998	988	976	975	965	952	940	924	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]		190
		14	28	41	55	69	83	97	110	124	138	152	155		
Flow LPM [GPM]	[2]	[123]	[265]	[405]	[544]	[680]	[804]	[934]	[1052]	[1181]	[1079]	[937]	[895]		
	7,6	14	30	46	61	77	91	106	119	133	122	106	101		
		93	90	86	83	80	75	70	63	57	43	24	20		
	[4]	[120]	[264]	[406]	[551]	[689]	[828]	[965]	[1101]	[1237]	[1369]	[1505]	[1537]	[1857]	
	15,1	14	30	46	62	78	94	109	124	140	155	170	174	210	
		187	185	183	179	175	171	166	162	156	150	142	140	121	
	[6]	[113]	[255]	[398]	[542]	[682]	[823]	[963]	[1101]	[1239]	[1373]	[1508]	[1541]	[1868]	
	22,7	13	29	45	61	77	93	109	124	140	155	170	174	211	
		279	275	271	267	265	258	253	248	240	232	223	221	198	
	[8]	[99]	[243]	[386]	[528]	[669]	[812]	[954]	[1094]	[1233]	[1368]	[1503]	[1537]	[1872]	
	30,3	11	27	44	60	76	92	108	124	139	155	170	174	212	
		372	367	364	359	354	351	343	338	333	324	315	313	289	
	[10]	[84]	[228]	[371]	[514]	[655]	[798]	[941]	[1080]	[1219]	[1357]	[1496]	[1530]	[1870]	
	37,9	9	26	42	58	74	90	106	122	138	153	169	173	211	
		463	460	456	450	446	441	435	428	420	412	403	399	368	
	[12]	[63]	[209]	[354]	[498]	[638]	[782]	[926]	[1067]	[1208]	[1346]	[1484]	[1520]	[1864]	
	45,4	7	24	40	56	72	88	105	121	136	152	168	172	211	
		557	552	547	543	537	530	523	515	509	500	489	487	470	
	[14]	[55]	[185]	[331]	[476]	[620]	[762]	[904]	[1046]	[1188]	[1327]	[1467]	[1502]	[1842]	
	53,0	6	21	37	54	70	86	102	118	134	150	166	170	208	
		649	646	642	635	630	622	616	609	599	592	581	578	550	
	[15]	[51]	[176]	[316]	[463]	[609]	[748]	[891]	[1037]	[1177]	[1316]	[1457]	[1491]	[1844]	
	56,8	6	20	36	52	69	85	101	117	133	149	165	168	208	
		694	691	687	680	673	668	660	650	642	634	622	619	598	
Max. Continuous															
Max. Intermittent	[20]		[160]	[305]	[455]	[578]	[737]	[857]	[968]	[1144]	[1277]	[1412]	[1446]		
	75,7		18	34	51	65	83	97	109	129	144	160	163		
			916	910	893	893	875	866	877	843	833	839	836		

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

T Series

(158-, 185-)

Performance Data

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

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

	Continuous
	Intermittent

		102 cm³/r [6.2 in³/r]											Max. Contin-uous	Max. Inter-mittent
		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	193 323	212 318	217 315	263 287
Max. Contin-uous	[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
Max. Inter-mittent	[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
Max. Contin-uous	[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. Inter-mittent	[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 cm³/r [8.0 in³/r]											Max. Contin-uous	Max. Inter-mittent
		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		
Max. Contin-uous	[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		
Max. Inter-mittent	[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		
Max. Contin-uous	[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. Inter-mittent	[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			

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

T Series
(158-, 185-)

Performance Data

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

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

Continuous

Intermittent

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

195 cm³/r [11.9 in³/r]

Δ Pressure Bar [PSI]

Continuous

Max. Continuous

Max. Intermittent

Flow LPM [GPM]

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

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

T Series

(158-, 185-)

Performance Data

Motors run with high efficiency in all areas designated with a number for torque and speed. 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

244 cm³/r [14.9 in³/r]

Δ Pressure Bar [PSI]
Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 125	[2000] 140	[2200] 155
[2]	[406] 46 30	[833] 94 29	[1260] 142 27	[1655] 187 26	[2038] 230 24	[2403] 272 22	[2707] 306 17	[2997] 339 12	[3273] 368 7	[3539] 396 4	[3795] 424 1
[4]	[404] 46 62	[843] 95 62	[1277] 144 60	[1695] 192 59	[2083] 235 59	[2468] 279 57	[2820] 319 55	[3177] 359 50	[3509] 396 49	[3829] 424 44	[4135] 452 39
[6]	[382] 43 92	[823] 93 91	[1261] 142 90	[1687] 191 89	[2088] 236 88	[2477] 280 86	[2843] 321 82	[3196] 361 78	[3547] 401 72	[3893] 428 66	[4225] 465 60
[8]	[341] 39 123	[787] 89 122	[1220] 138 121	[1651] 187 120	[2059] 233 119	[2454] 277 116	[2820] 319 113	[3177] 359 108	[3530] 399 101	[3875] 428 99	[4205] 457 93
[10]	[297] 34 154	[744] 84 152	[1177] 133 151	[1611] 182 150	[2017] 228 148	[2412] 273 146	[2774] 313 143	[3151] 356 136	[3541] 396 134	[3933] 432 125	[4305] 469 117
[12]	[225] 25 184	[687] 78 183	[1132] 128 181	[1553] 175 180	[1967] 222 179	[2360] 267 177	[2734] 309 173	[3105] 351 166	[3494] 392 163	[3893] 432 156	[4275] 469 143
[14]	[154] 17 214	[628] 71 213	[1072] 121 212	[1498] 169 211	[1910] 216 209	[2298] 260 207	[2674] 302 202	[3052] 345 195	[3448] 386 193	[3851] 424 185	[4225] 469 161
[15]	[119] 13 229	[586] 66 228	[1035] 117 227	[1458] 165 211	[1872] 212 224	[2261] 255 222	[2637] 298 217	[3022] 341 209	[3416] 383 207	[3829] 424 200	[4220] 469 177
Max. Continuous	[20]	[372] 42 305	[816] 92 303	[1251] 141 301	[1663] 188 300	[2067] 234 297	[2448] 277 292	[2832] 320 284	[3228] 363 281	[3634] 402 273	[4050] 441 270
Max. Intermittent	[20]										

306 cm³/r [18.7 in³/r]

Δ Pressure Bar [PSI]
Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 125
[2]	[499] 56 24	[1035] 117 23	[1560] 176 22	[2034] 230 21	[2501] 283 19	[2912] 329 16	[3239] 366 11	[2859] 323 8	[2400] 271 5
[4]	[497] 56 49	[1052] 119 49	[1590] 180 48	[2101] 237 48	[2561] 289 47	[3023] 342 47	[3464] 391 44	[3680] 416 41	[3886] 439 38
[6]	[480] 54 74	[1031] 116 74	[1578] 178 72	[2096] 237 72	[2564] 290 71	[3023] 342 69	[3464] 391 64	[3689] 417 62	[3905] 441 60
[8]	[427] 48 99	[975] 110 98	[1520] 172 97	[2051] 232 97	[2525] 285 96	[2998] 339 94	[3448] 390 89	[3667] 414 86	[3881] 438 83
[10]	[370] 42 123	[930] 105 122	[1467] 166 121	[2001] 226 120	[2477] 280 120	[2955] 334 117	[3406] 385 112	[3631] 410 108	[3852] 435 104
[12]	[281] 32 147	[871] 98 146	[1410] 159 145	[1908] 216 145	[2400] 271 145	[2887] 326 142	[3352] 379 136	[3573] 404 131	[3790] 428 127
[14]	[192] 22 171	[791] 89 171	[1338] 151 170	[1851] 209 170	[2338] 264 169	[2816] 318 165	[3281] 371 159	[3511] 397 154	[3743] 423 150
[15]	[148] 17 183	[738] 83 183	[1288] 146 182	[1803] 204 182	[2287] 258 181	[2773] 313 177	[3243] 366 171	[3475] 393 165	[3705] 419 160
Max. Continuous	[20]	[476] 54 243	[1020] 115 242	[1544] 174 242	[2010] 227 241	[2519] 285 238	[3010] 340 231	[3243] 366 226	[3495] 395 209
Max. Intermittent	[20]								

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

370 cm³/r [22.6 in³/r]

Δ Pressure Bar [PSI]
Continuous

Max.
Contin-
uous

Max.
Inter-
mittent

	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 125
[2]	[590] 67 20	[1237] 140 19	[1858] 210 18	[2406] 272 17	[2953] 334 15	[3388] 383 12	[3586] 405 11		
[4]	[588] 66 41	[1263] 143 41	[1906] 215 40	[2506] 283 40	[3029] 342 39	[3557] 402 38	[3811] 431 37		
[6]	[580] 66 61	[1245] 141 60	[1899] 215 59	[2506] 283 58	[3029] 342 57	[3544] 400 56	[3788] 428 54		
[8]	[514] 58 82	[1164] 132 81	[1824] 206 80	[2452] 277 79	[2975] 336 78	[3518] 397 77	[3783] 427 75		
[10]	[444] 50 102	[1119] 126 102	[1759] 199 101	[2391] 270 101	[2928] 331 100	[3479] 393 97	[3750] 424 96		
[12]	[337] 38 122	[1062] 120 121	[1690] 191 120	[2256] 255 119	[2813] 318 119	[3393] 383 118	[3685] 416 116		
[14]	[231] 26 142	[958] 108 141	[1608] 182 140	[2201] 249 139	[2748] 310 138	[3319] 375 137	[3610] 408 134		
[15]	[178] 20 152	[896] 101 152	[1543] 174 151	[2147] 243 150	[2683] 303 149	[3272] 370 147	[3572] 404 146		
Max. Continuous	[20]	[587] 66 202	[1228] 139 201	[1833] 207 201	[2331] 263 200	[2948] 333 198	[3273] 370 196		
Max. Intermittent	[20]								

T Series (158-)

Dimensions

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

Ports

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

1/2 -14 NPTF (2)

G 1/2 BSP (2)

Manifold Ports (5/16-18 mounting threads)

Note:

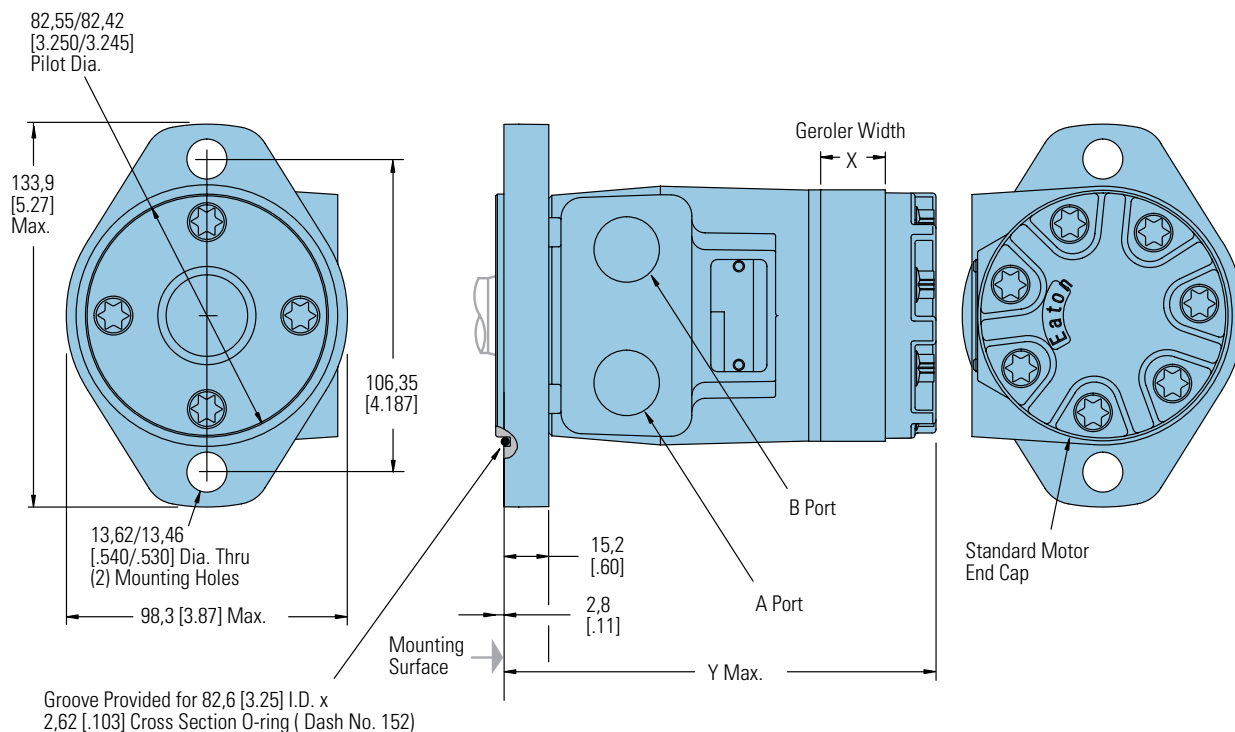
Mounting Surface Flatness Requirement is ∇ , 13 mm [.005 inch] Max.

Standard Rotation Viewed from Shaft End

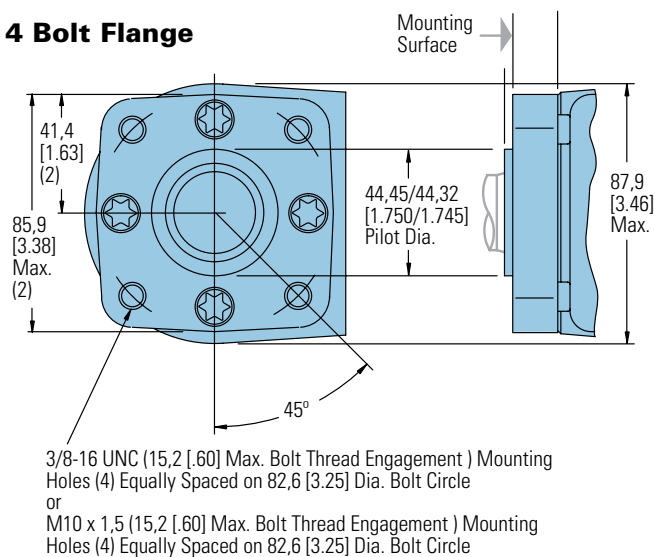
Port A Pressurized — CW

Port B Pressurized — CCW

2 Bolt Flange



4 Bolt Flange



2 AND 4 BOLT FLANGE PORT DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
36 [2.2]	6,6 [.26]	132,2 [5.21]
49 [3.0]	9,1 [.36]	134,6 [5.30]
66 [4.0]	12,2 [.48]	137,7 [5.42]
80 [4.9]	14,7 [.58]	140,3 [5.53]
102 [6.2]	18,5 [.73]	144,3 [5.68]
131 [8.0]	24,1 [.95]	149,6 [5.89]
157 [9.6]	29,0 [1.14]	154,5 [6.09]
195 [11.9]	35,6 [1.40]	161,3 [6.35]
244 [14.9]	44,7 [1.76]	170,3 [6.71]
306 [18.7]	56,1 [2.21]	181,6 [7.16]
370 [22.6]	72,1 [2.84]	197,9 [7.79]

T Series (158-)

Product Numbers

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

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

Standard

MOUNTING	SHAFT	PORT SIZE	DISPL. 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	—

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-	—	—	—	—	—	—	—	—	—	—	—
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158-	—	—	—	-1525	—	—	—	—	-1675	—	—
		1/2 NPTF	158-	—	—	—	—	-1634	—	—	—	—	—	—
		Manifold*	158-	—	—	—	-1522	-2678	—	—	—	—	—	-1527
4 Bolt Flange	1 in. Straight w/ Woodruff Key	7/8 -14 O-Ring	158-	—	—	-1625	-1410	-1411	-1626	-1412	-1413	-1414	-1415	-1416
		1/2 NPTF	158-	—	—	-1644	-1402	-1403	—	-1404	-1405	-1406	-1407	-1408

158-1403

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

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

T Series (158-)

Model Code

The following 25-digit coding system has been developed to identify all of the configuration options for the T motor. Use this model code to specify a motor with the desired features. All 25-digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

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

1 Product

M – Motor

2, 3 Product Series

T0 – T Series

4, 5, 6 Displacement cm³/r [in³/r]

022 – 35 [2.2]

030 – 49 [3.0]

040 – 65 [4.0]

049 – 80 [4.9]

062 – 102 [6.2]

080 – 131 [8.0]

096 – 158 [9.6]

119 – 195 [11.9]

149 – 244 [14.9]

187 – 306 [18.7]

226 – 370 [22.6]

7, 8 Mounting Type

AA – 2 Bolt (Standard)
82,6 [3.248] Dia. and 3,05 [.120] pilot, 13,59 [.535] Dia. Mounting Holes 106,35 [4.187] Dia. B.C.

BA – 4 Bolt (Standard)
44,40 [1.748] Dia. x 3,05 [.120] pilot, .375-16 UNC-2B Mounting Holes 82,55 [3.250] Dia. B.C.

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

DD – 2 Bolt (Std.) 101,60 [4.000] Dia. x 6,10 [.240] pilot, 14,35 [.565] Dia. Mounting Holes 146,05 [5.750] Dia. B.C. (SAE B) (Ductile)

EA – 4 Bolt Magneto 82,50 [3.248] Dia. x 3,05 [.120] Pilot, 13,59 [.535] Dia. Mounting Holes 106,35 [4.187] Dia. B.C.

FA – 4 Bolt (Standard)
44,40 [1.748] Dia. x 3,05 [.120] pilot, M10 x 1.5-6H Mounting Holes on 82,55 [3.250] Dia. B.C.

9, 10 Output Shaft Description

01 – 25,4 [1.00] Dia. Straight, Woodruff Key, .250-20 UNC-2B Hole in Shaft End

02 – 25,4 [1.00] Dia. SAE 6B Spline, .25-20 UNC-2B Hole in Shaft End

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

08 – 25,4 [1.00] Dia. Straight, 10,31 [.406] Dia. Crosshole 15,7 [.62] from End, .250-20 UNC-2B Hole in Shaft End

16 – 22,22 [.875] Dia. SAE 13 Tooth Spline (SAE B)

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

18 – 25,4 [1.00] Dia. Tapered, Woodruff Key and Nut, 34,92 [1.375] Taper Length

24 – 25.00 [.984] Dia. Straight, 8.0 [.315] Key, MB x 1.25-6H Hole in Shaft End

11, 12 Port Type

AA – .875-14 UNF-2B SAE O-Ring Ports

AB – .500-14 NPTF Dryseal Pipe Thread Ports

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

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

AF – G 1/2 BSP Straight Thread Ports

13 Case Flow Options

0 – None Specified

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

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

A – Internal Check Valves

14 Geroler Options

0 – None

A – Free Running

15 Shaft Options

0 – None

N – Electroless Nickel Plated

16, 17 Seal Options

00 – Standard Seals

02 – Seal Guard

03 – 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 – Painted Low Gloss Black

D – Environmental Coated Gloss White

24 Customer ID/ Nameplate Options

0 – None Specified

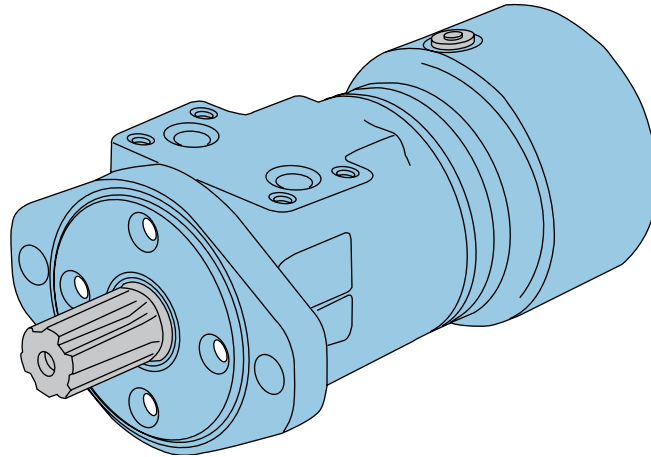
25 Design Code

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 over-riding brake in the event of loss of release pressure.)

Benefits

- Cost-effective Packaged System Solution
- Simplifies ordering and inventory requirements
- Reduces assembly labor
- Design Flexibility
- Wet brake is environmentally protected and provides long life

Applications

- Truck-Mounted Equipment (boom rotate and winch)
- Conveyors – Positioners – Indexers
- Marine Cranes (boom rotate and winch)
- Fishing Winches
- Recycling and Refuse Equipment
- Vehicle Recovery Winches
- Mining Equipment
- Specialty Utility Vehicles/ Machines
- Forestry Grapples
- Agricultural Equipment
- Railroad Equipment
- Airport Support Vehicles
- Lawn & Turf Equipment
- Anywhere Load-Holding is Needed in a Low-Speed High-Torque Drive System

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:

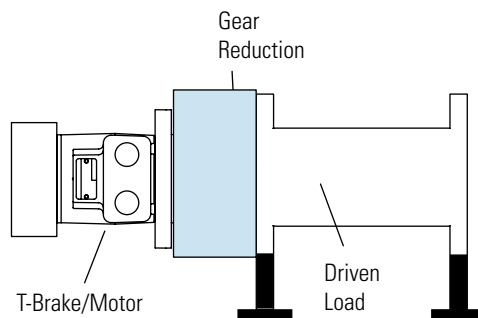
Special attention should be given to system back pressure. System back pressure directly affects brake release pressure and can cause the brake to release at undesired conditions.

Note:

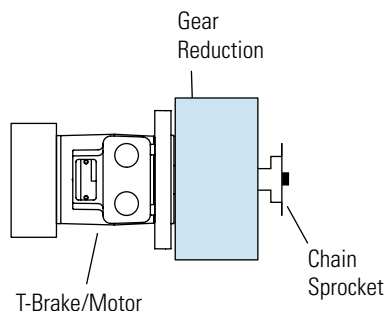
The T Series with parking brake is not compatible with water based fluids.

Typical Applications

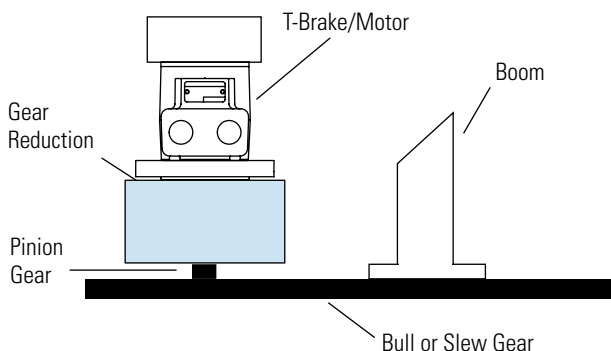
Winch



Machine Drive

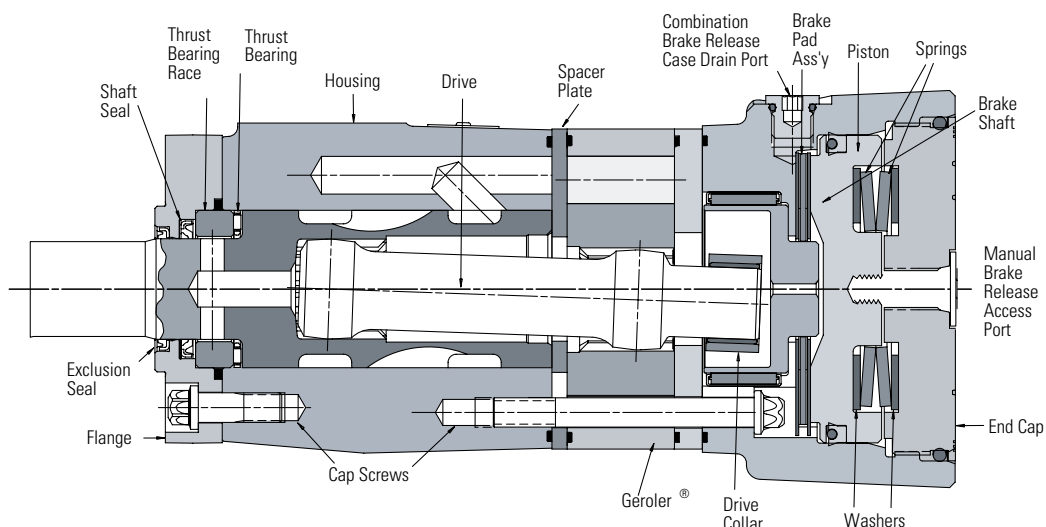


Swing Boom



T Series with Parking Brake (185-)

Specifications



B-4

SPECIFICATION DATA – T SERIES WITH PARKING BRAKE MOTORS

Displ. cm ³ /r [in ³ /r]		36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
Max. Speed (RPM) @ Continuous Flow		1021	906	849	694	550	426	355	287	229	183	152
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]
	Intermittent	38 [10]	57 [15]	68 [18]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	76 [672]	105 [928]	138 [1222]	174 [1541]	219 [1936]	251 [2226]	297 [2628]	359 [3178]	410 [3633]	441 [3905]	430 [3811]
	Intermittent **	93 [824]	118 [1131]	168 [1488]	212 [1872]	264 [2339]	307 [2718]	359 [3178]	437 [3864]	485 [4290]	483 [4275]	486 [4300]
Pressure Δ Bar [Δ PSI]	Continuous *	155 [2250]	155 [2250]	155 [2250]	155 [2250]	155 [2250]	138 [2000]	138 [2000]	138 [2000]	127 [1850]	110 [1600]	90 [1300]
	Intermittent * **	190 [2750]	190 [2750]	190 [2750]	190 [2750]	190 [2750]	172 [2500]	172 [2500]	172 [2500]	155 [2250]	124 [1800]	103 [1500]

Note:

See page B-4-2 for additional motor specification notes and definitions. The T Series with Parking Brake performance is similar to the standard T Series motor. High speed conditions may reduce performance on T Series with Parking Brake.

T SERIES BRAKE HOLDING TORQUE SETTINGS:

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

in-lbs Full Capacity Brake

in-lbs Limited Capacity Brake

Note:

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

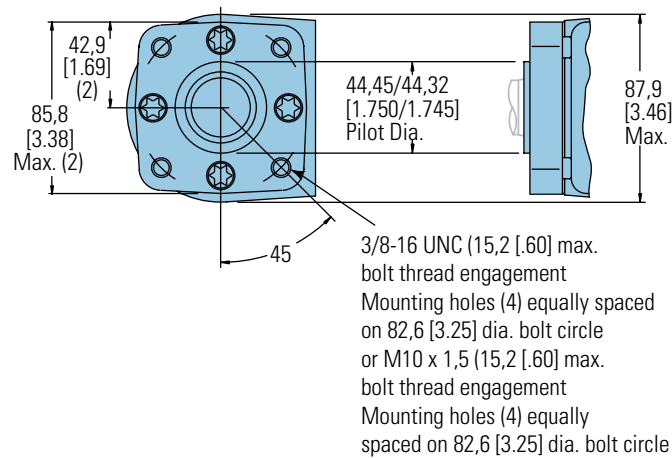
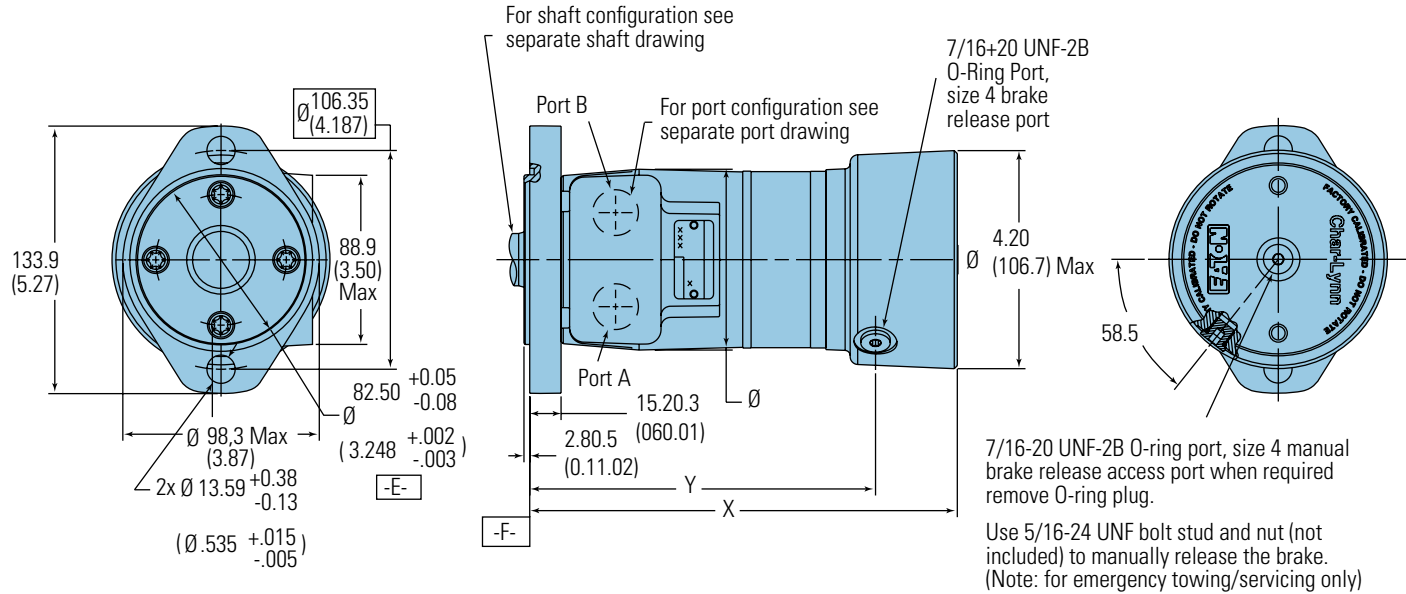
T Series with Parking Brake (185-)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Dimensions

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



T-SERIES WITH PARKING BRAKE DIMENSIONS

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

Note:

Standard Rotation

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

Reverse Rotation

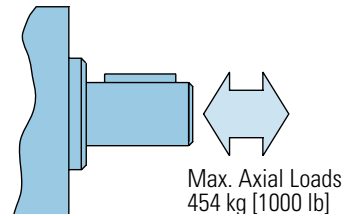
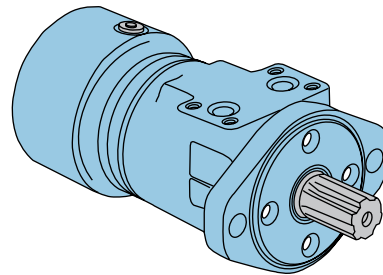
When facing shaft end of motor shaft will rotate clockwise when port "B" is pressurized, counterclockwise when port "A" is pressurized

T Series with Parking Brake (185-)

Brake Release and Motor Case Pressure

The T Series Motor with Parking Brake is durable and has long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Motor life will be shortened if case pressure exceeds recommended ratings (acceptability may vary with application).

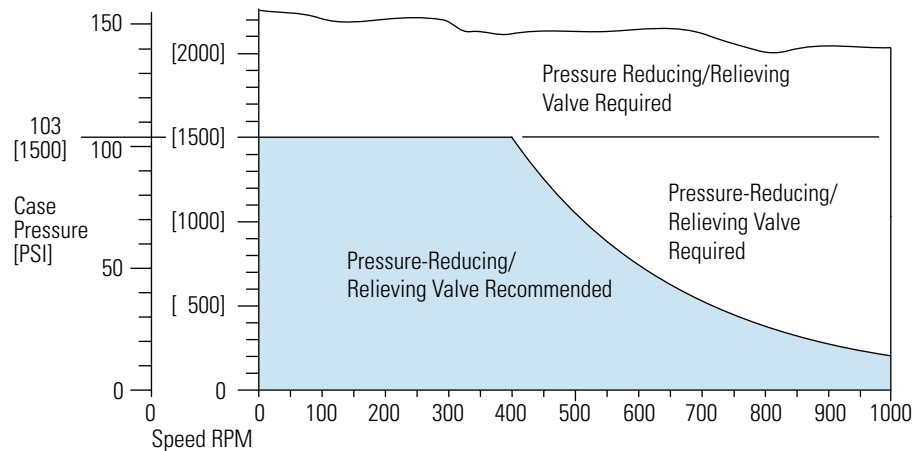
Refer to the Case Pressure/ Shaft Seal chart below. This chart is based on case pressure and motor shaft speed. A minimum release pressure of 17 Bar [250 PSI] must be maintained to fully release the brake.



$$P_C \approx 6 DP + P_2$$

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

Case Pressure/Shaft Seal



T Series with Parking Brake (185-)

Product Numbers

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

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

Standard Valving

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER									
			3.0	4.0	4.9	6.2	8.0	9.6	11.9	14.9	18.7	22.6
2-Bolt	1 Keyed	7/8-14 O-Ring Manifold	185-2000 185-2010	2001 2011	2002 2012	2003 2013	2004 2014	2005 2015	2006 2016	2007 2017	2008 2018	2009 2019
	6B Splined	7/8-14 O-Ring Manifold	185-2020 185-2030	2021 2031	2022 2032	2023 2033	2024 2034	2025 2035	2026 2036	2027 2037	2028 2038	2029 2039
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2040 185-2050	2041 2051	2042 2052	2043 2053	2044 2054	2045 2055	2046 2056	2047 2057	2048 2058	2049 2059
4-Bolt	1 Keyed	7/8-14 O-Ring Manifold	185-2060 185-2070	2061 2071	2062 2072	2063 2073	2064 2074	2065 2075	2066 2076	2067 2077	2068 2078	2069 2079
	6B Splined	7/8-14 O-Ring Manifold	185-2080 185-2090	2081 2091	2082 2092	2083 2093	2084 2094	2085 2095	2086 2096	2087 2097	2088 2098	2089 2099
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2100 185-2110	2101 2111	2102 2112	2103 2113	2104 2114	2105 2115	2106 2116	2107 2117	2108 2118	2109 2119
2-Bolt SAE B	1 Keyed	7/8-14 O-Ring Manifold	185-2120 185-2130	2121 2131	2122 2132	2123 2133	2124 2134	2125 2135	2126 2136	2127 2137	2128 2138	2129 2139
	6B Splined	7/8-14 O-Ring Manifold	185-2140 185-2150	2141 2151	2142 2152	2143 2153	2144 2154	2145 2155	2146 2156	2147 2157	2148 2158	2149 2159
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2160 185-2170	2161 2171	2162 2172	2163 2173	2164 2174	2165 2175	2166 2176	2167 2177	2168 2178	2169 2179

Low Speed Valving

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER									
			3.0	4.0	4.9	6.2	8.0	9.6	11.9	14.9	18.7	22.6
2-Bolt	1 Keyed	7/8-14 O-Ring Manifold	185-2180 185-2190	2181 2191	2182 2192	2183 2193	2184 2194	2185 2195	2186 2196	2187 2197	2188 2198	2189 2199
	6B Splined	7/8-14 O-Ring Manifold	185-2200 185-2210	2201 2211	2202 2212	2203 2213	2204 2214	2205 2215	2206 2216	2207 2217	2208 2218	2209 2219
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2220 185-2230	2221 2231	2222 2232	2223 2233	2224 2234	2225 2235	2226 2236	2227 2237	2228 2238	2229 2239
4-Bolt	1 Keyed	7/8-14 O-Ring Manifold	185-2240 185-2250	2241 2251	2242 2252	2243 2253	2244 2254	2245 2255	2246 2256	2247 2257	2248 2258	2249 2259
	6B Splined	7/8-14 O-Ring Manifold	185-2260 185-2270	2261 2271	2262 2272	2263 2273	2264 2274	2265 2275	2266 2276	2267 2277	2268 2278	2269 2279
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2280 185-2290	2281 2291	2282 2292	2283 2293	2284 2294	2285 2295	2286 2296	2287 2297	2288 2298	2289 2299
2-Bolt SAE B	1 Keyed	7/8-14 O-Ring Manifold	185-2300 185-2310	2301 2311	2302 2312	2303 2313	2304 2314	2305 2315	2306 2316	2307 2317	2308 2318	2309 2319
	6B Splined	7/8-14 O-Ring Manifold	185-2320 185-2330	2321 2331	2322 2332	2323 2333	2324 2334	2325 2335	2326 2336	2327 2337	2328 2338	2329 2339
	13T Splined 16/32 pitch	7/8-14 O-Ring Manifold	185-2340 185-2350	2341 2351	2342 2352	2343 2353	2344 2354	2345 2355	2346 2356	2347 2357	2348 2358	2349 2359

185-2357

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

Designed to run continuously at up to 200 RPM at standard rated pressures and reduced

flows, this option provides smooth operation at low speeds. Furthermore, they resist slippage and have more momentary load holding ability than the standard motors.

Motors with this valving are not intended for low pressure applications (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.

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

1 Product

M – Motor

2, 3 Series

T B – T Series Motor with Parking Brake

4, 5, 6 Displacement cm³/r [in³/r]

022 – 36 [2.2]

030 – 49 [3.0]

040 – 66 [4.0]

049 – 80 [4.9]

062 – 102 [6.2]

080 – 131 [8.0]

096 – 157 [9.6]

119 – 195 [11.9]

149 – 244 [14.9]

187 – 306 [18.7]

226 – 370 [22.6]

7, 8 Mounting Type

AA – 2 Bolt (Standard)
82,5 [3.248] Dia. and 3,05
[.120] pilot, 13,59 [.535]
Dia. Mounting Holes 106,35
[4.187] Dia. B.C.

BA – 4 Bolt (Standard)
44,40 [1.748] Dia. x 3,05
[.120] pilot, .375-16 UNC-2B
Mounting Holes 82,55
[3.250] Dia. B.C.

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

DA – 2 Bolt (Std.) 101,60
[4.000] Dia. x 6,10 [.240]
pilot, 14,35 [.565] Dia.
Mounting Holes 146,05
[5.750] Dia. B.C. (SAE B)

EA – 4 Bolt Magneto 82,50
[3.248] Dia. x 3,05 [.120]
Pilot, 13,59 [.535] Dia.
Mounting Holes 106,35
[4.187] Dia. B.C.

FA – 4 Bolt (Standard)
44,40 [1.748] Dia. x 3,05
[.120] pilot, M10 x 1.5-6H
Mounting Holes on 82,55
[3.250] Dia. B.C.

9, 10 Output Shaft Description

01 – 25,4 [1.00] Dia. Straight,
Woodruff Key, .250-20
UNC-2B Hole in Shaft End

02 – 25,4 [1.00] Dia. SAE 6B
Spline, .25-20 UNC-2B Hole
in Shaft End

16 – SAE 13 Tooth Spline,
16/32 Pitch, 21,74 (.856) Dia.
(SAE B)

18 – 25,4 [1.00] Dia. Tapered,
Woodruff Key
and Nut, 34,92 [1.375]
Taper Length

24 – 25,00 [.984] Dia.
Straight, 8,0 [.315] Key,
MB x 1.25-6H Hole in
Shaft End

11, 12 Port Type

AA – .875-14 UNF-2B SAE
O-Ring Ports

AB – .500-14 NPTF Dryseal
Pipe Thread Ports

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

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

13 Case Flow Options

0 – None Specified

3 – Manifold Case Drain

14 Geroler Options

A – Standard

B – Free Running

15 Shaft Options

0 – None

N – Electroless Nickel Plated

16, 17 Seal Options

00 – Standard Seals

03 – 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 – Painted Low Gloss Black

24 Customer ID/ Nameplate Options

0 – None Specified

25 Design Code

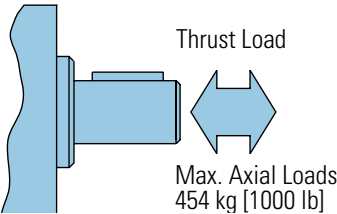
B – Two (2)

B-4

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

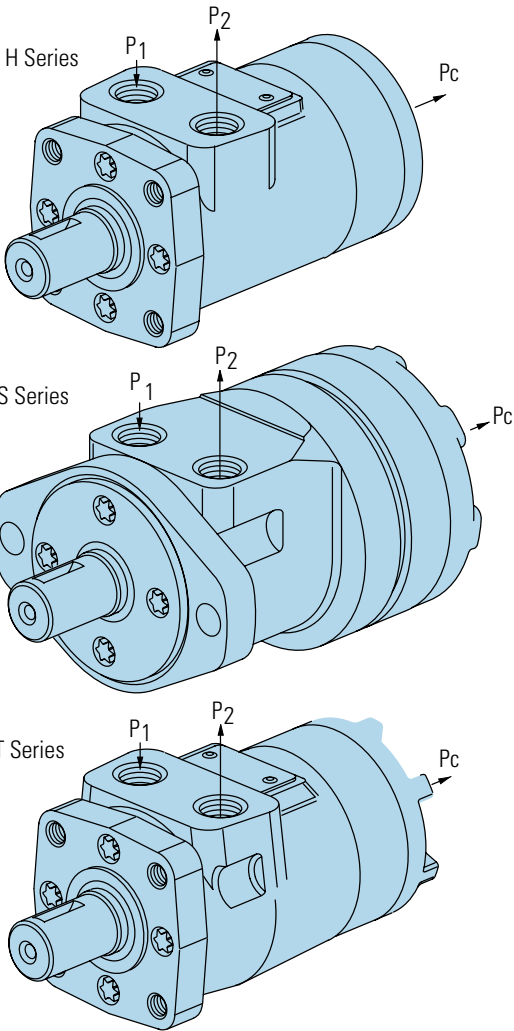
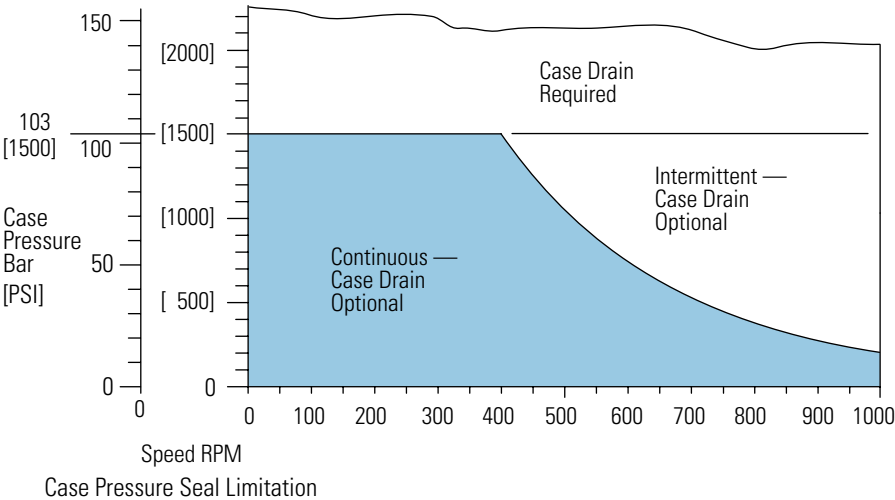
Char-Lynn H Series, S Series and T Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with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

B-2

B-3

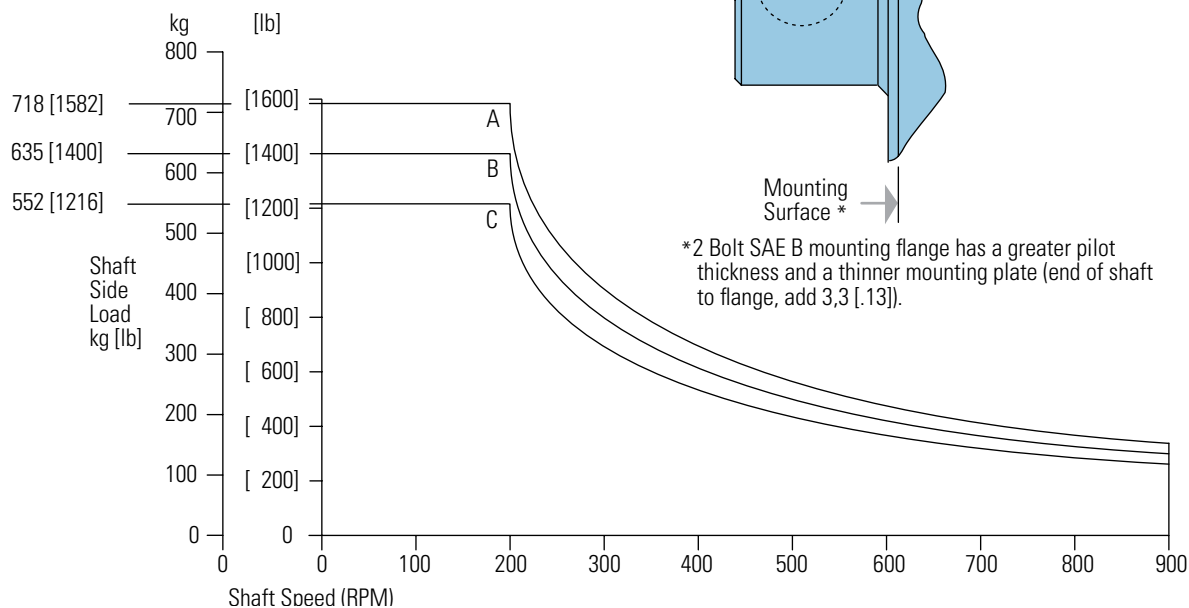
B-4

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

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

Where N = Shaft Speed (RPM)

L = Distance from Mounting Surface

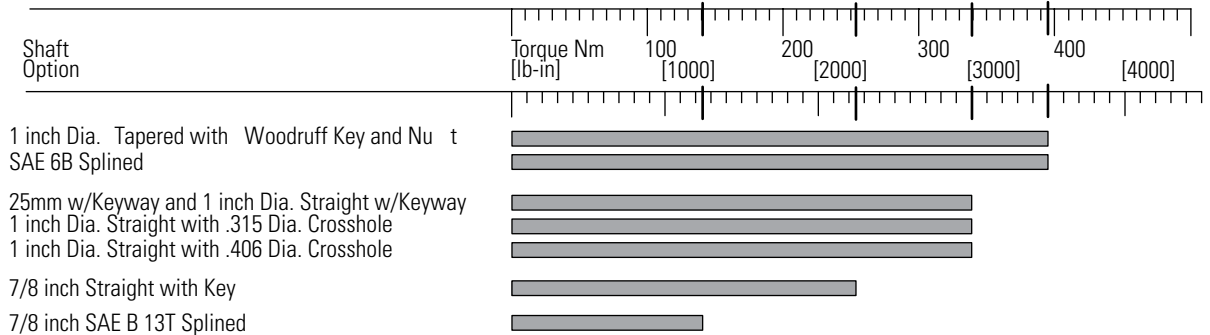


H, S and T Series (101, 103- 158, 185)

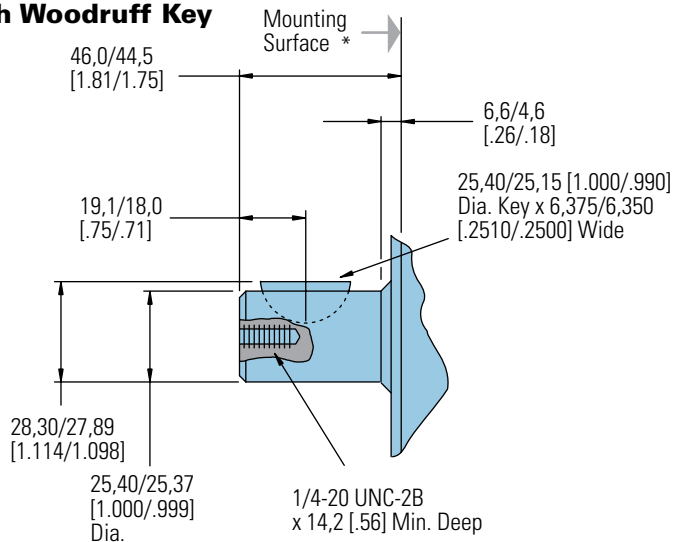
Dimensions

Shafts

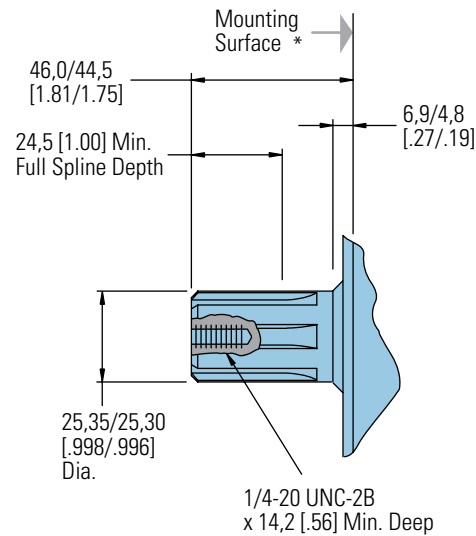
Shaft Size Motor Torque Combination Limit Guide



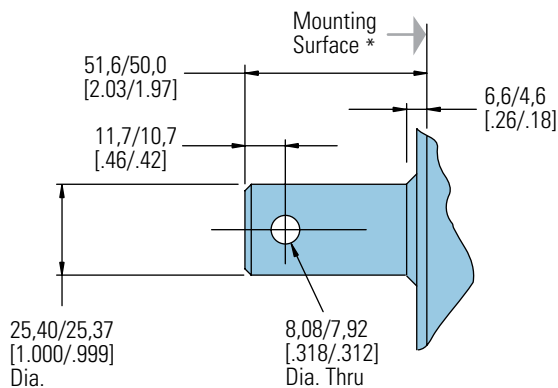
1 in. Dia. Straight with Woodruff Key



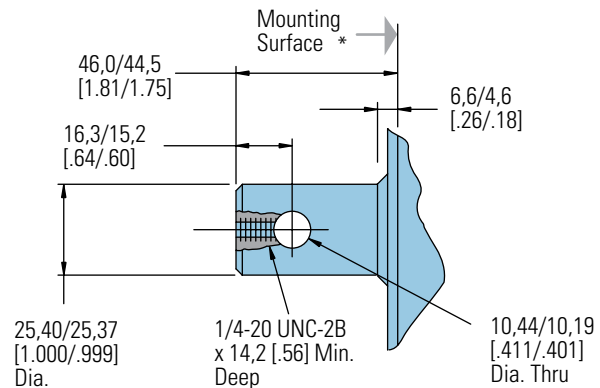
SAE 6B Splined Shaft



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



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



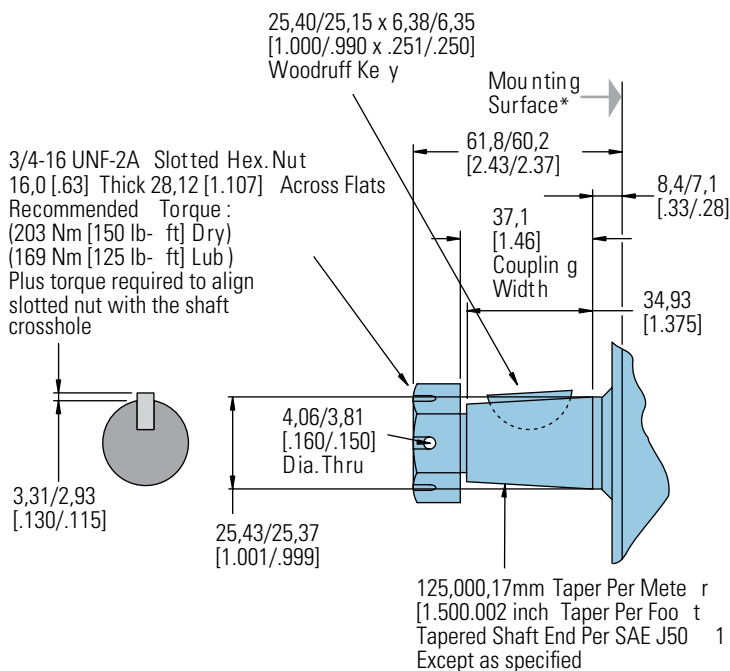
* 2 Bolt SAE B mounting flange has a greater pilot thickness and a thinner mounting plate (end of shaft to flange, add 3,3 [.13]).

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

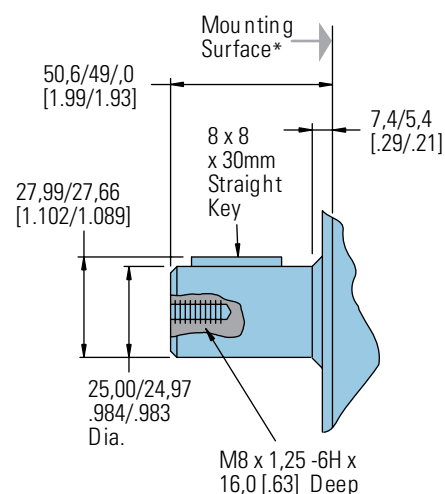
Dimensions

Shafts

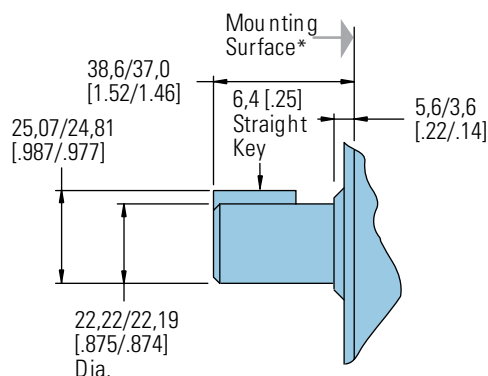
1 in. Dia. Tapered Shaft with Woodruff Key and Nut



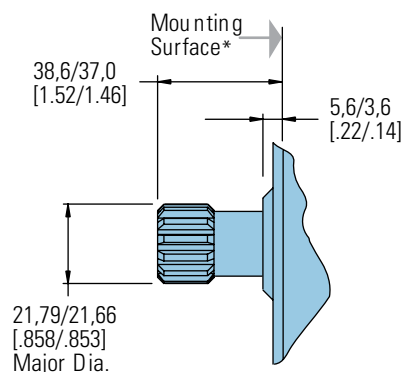
25mm Dia. Straight Shaft with 8mm Keyway



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]).

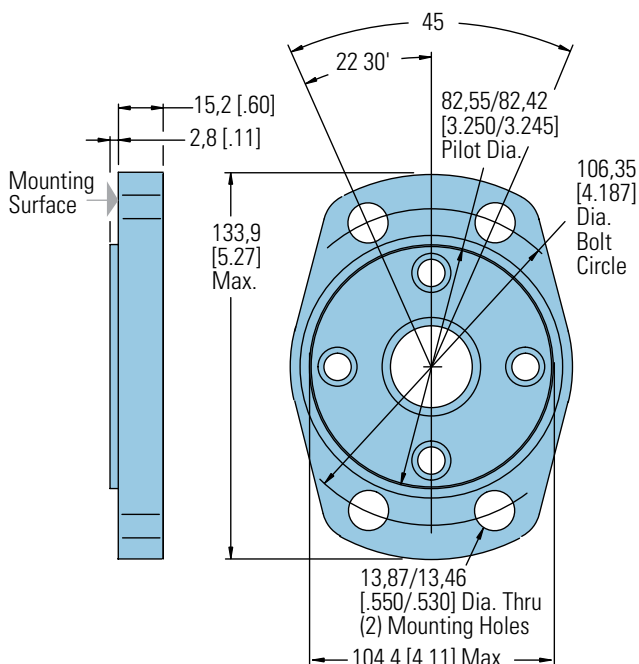
H, S and T Series (101-, 103- 158-, 185-)

Mounting Options

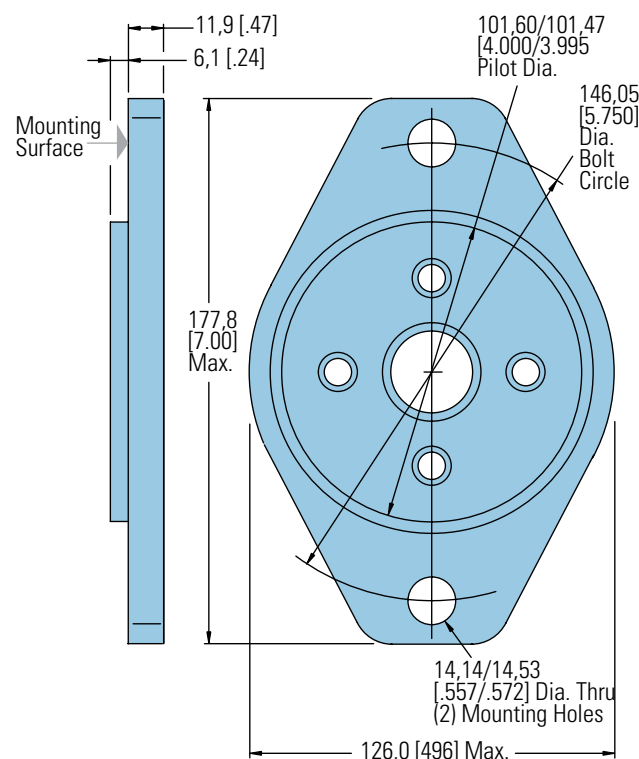
Note:

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

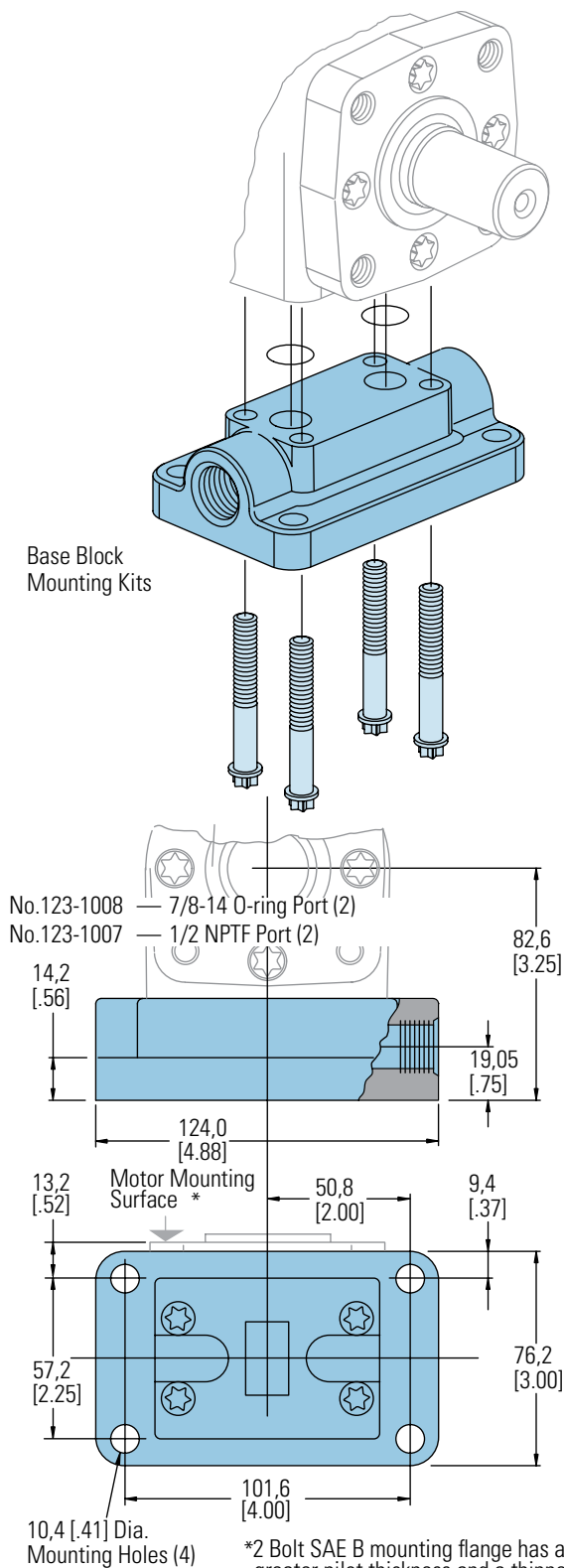
4 Bolt Magneto



2 Bolt SAE B



Base Block Mounting Kits



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

Dimensions

Ports

Ports

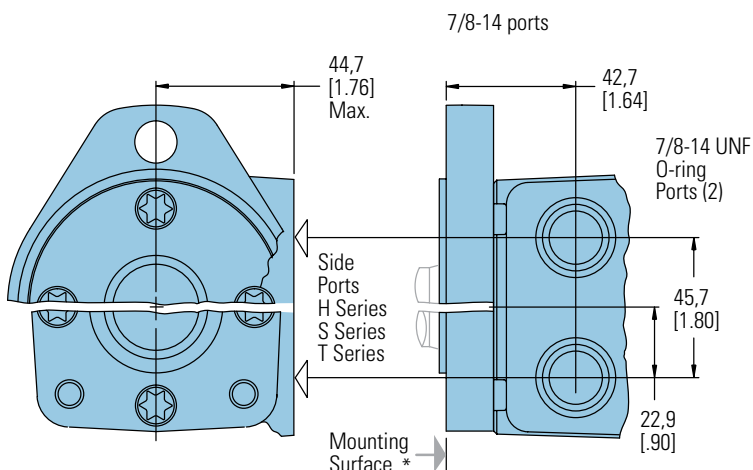
End Ports — H Series only
G 1/2 (BSP) (2)
or 3/4-16 O-Ring (2)

Standard Rotation Viewed from Drive End

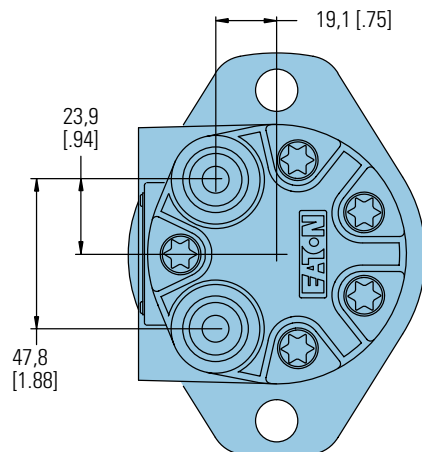
Port A Pressurized — CW
Port B Pressurized — CCW

Note:

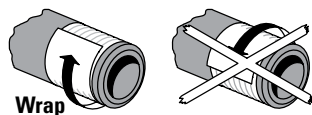
End ported motor pressure is derated. Reference page B-2-2 for ratings.



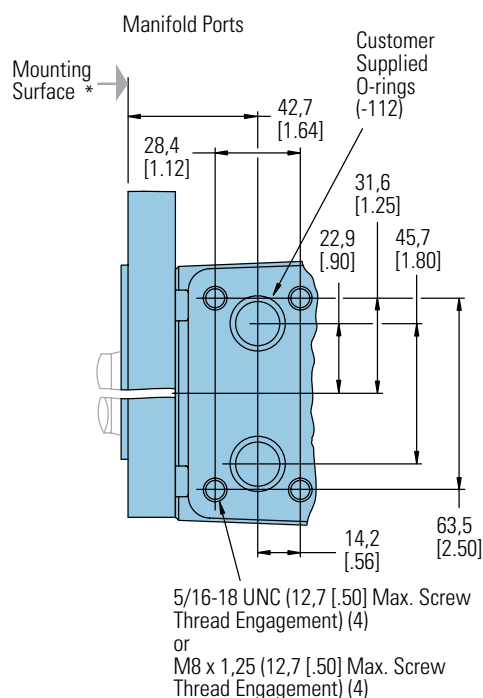
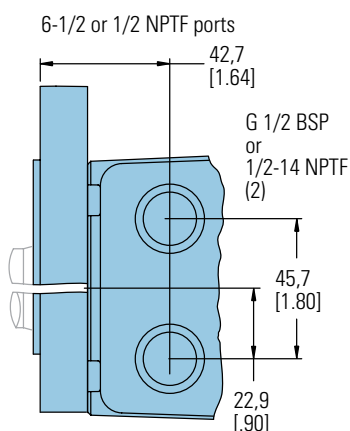
End Ports (H Series only)



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

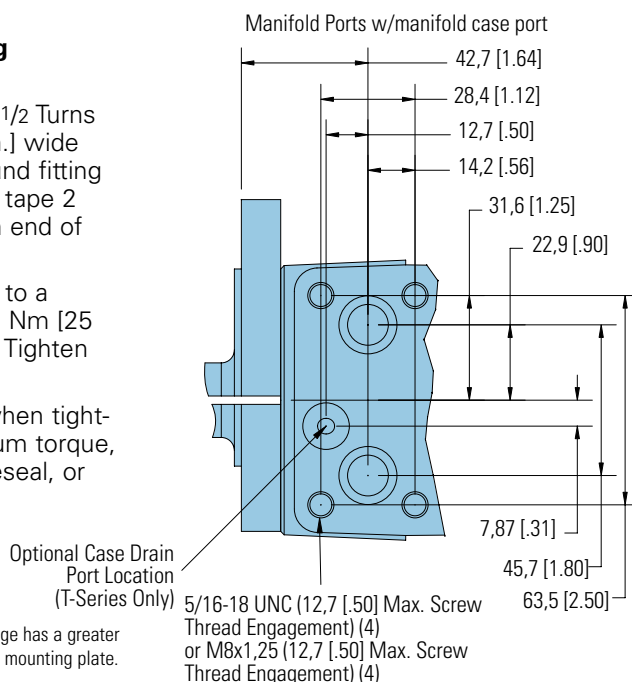


When using fittings with Teflon tape, be careful when taping and tightening. Over tightening or improperly taped fittings can cause damage to housing or leakage.



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.



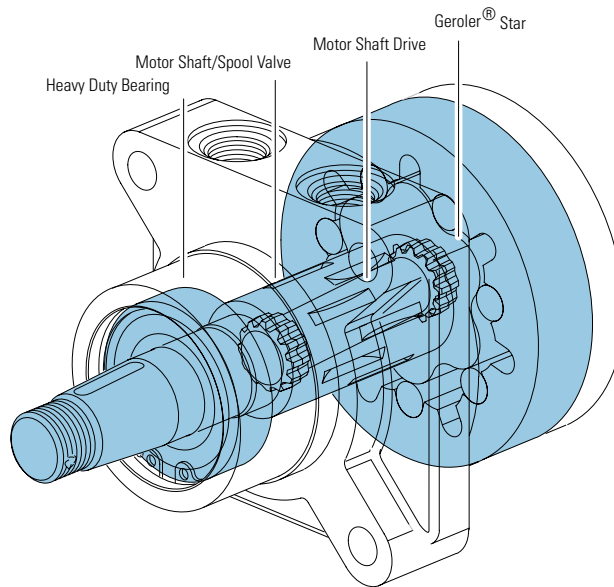
Note:

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.

W Series (162-)

Highlights



Description

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

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

W Series Motors

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

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

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

Features:

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

Benefits:

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

Applications:

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

B-5



Scissor Lift



Sweeper



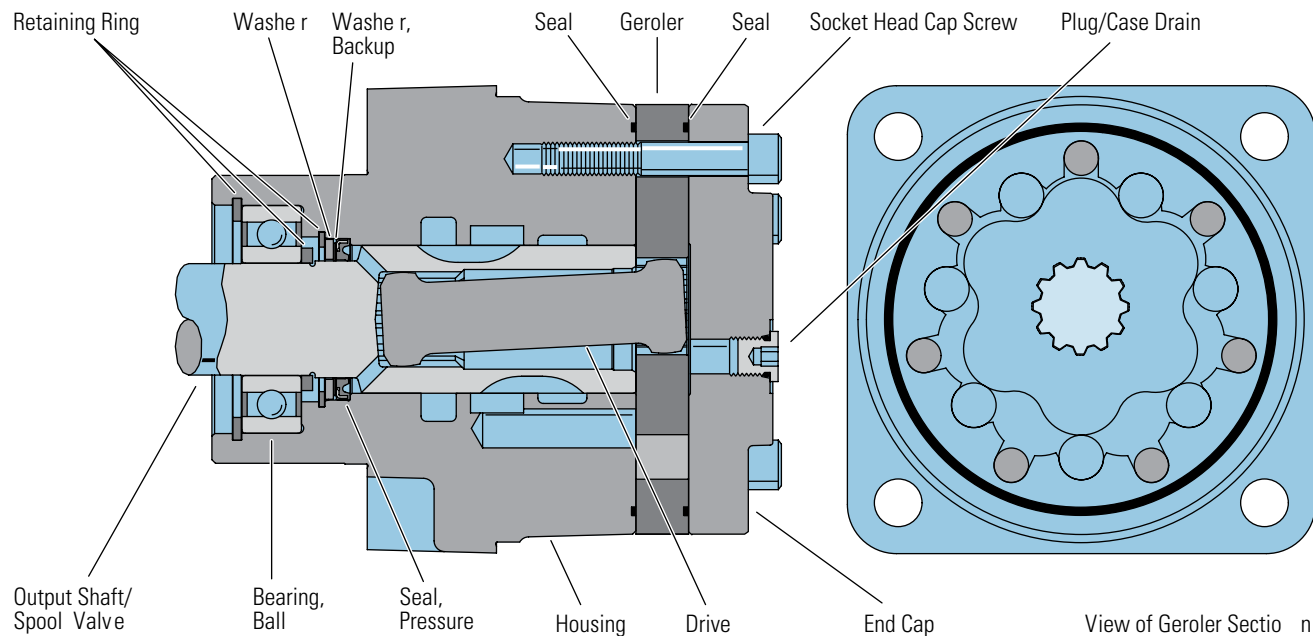
Trencher



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 Δ bar [Δ PSI]	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	38	54	69	85	100	115	130	145	160	174	182
	93	89	88	84	83	79	73	69	69	61	56	39
[4]	[223]	[357]	[489]	[627]	[769]	[902]	[1035]	[1169]	[1295]	[1424]	[1555]	[1676]
15.1	25	40	55	71	87	102	117	132	146	161	176	189
	178	172	170	168	165	159	157	154	146	142	131	117
[6]	[255]	[342]	[477]	[612]	[749]	[879]	[1014]	[1154]	[1286]	[1408]	[1533]	[1648]
22.7	29	39	54	69	85	99	115	130	145	159	173	186
	267	265	262	258	257	252	248	241	235	229	219	206

126 cm³/r [7.7 in³/r]

Δ Pressure bar [PSI]

Continuous

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

154 cm³/r [9.4 in³/r]

Δ Pressure bar [PSI]

Continuous

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

195 cm³/r [11.9 in³/r]

Δ Pressure bar [PSI]

Continuous

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

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

W Series (162-)

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

251 cm³/r [15.3 in³/r] Δ Pressure bar [PSI] Continuous												
	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 140	[2200] 152	[2400] 165	
Flow l/min [GPM]	[2] 7,6	[759] 86 30	[1194] 135 29	[1683] 190 29	[2122] 240 28	[2535] 286 27	[2928] 331 27	[3319] 375 25	[3634] 411 22	[3946] 446 17	[4242] 479 15	[4553] 514 14
	[4] 15,1	[806] 91 59	[1257] 142 58	[1691] 191 58	[2130] 241 56	[2563] 290 55	[2988] 338 55	[3381] 382 52	[3799] 429 48	[4147] 469 47	[4515] 510 41	[4849] 548 40
	[6] 22,7	[780] 88 90	[1219] 138 88	[1646] 186 87	[2084] 235 86	[2515] 284 85	[2933] 331 83	[3336] 377 83	[3716] 420 79			
	[8] 30,3	[720] 81 120	[1148] 130 118	[1590] 180 117	[2029] 229 117	[2449] 277 114	[2861] 323 112	[3236] 366 111	[3627] 410 108			
	[10] 37,9	[645] 73 148	[1080] 122 147	[1513] 171 147	[1947] 220 145	[2371] 268 145	[2779] 314 143	[3151] 356 141	[3515] 397 137			
	[12] 45,4	[557] 63 178	[992] 112 177	[1428] 161 176	[1864] 211 174	[2292] 259 174	[2697] 305 172	[3087] 349 169				
	[14] 53,0	[460] 52 208	[888] 100 206	[1330] 150 206	[1761] 199 203	[2191] 248 202	[2615] 295 200	[3035] 343 197				

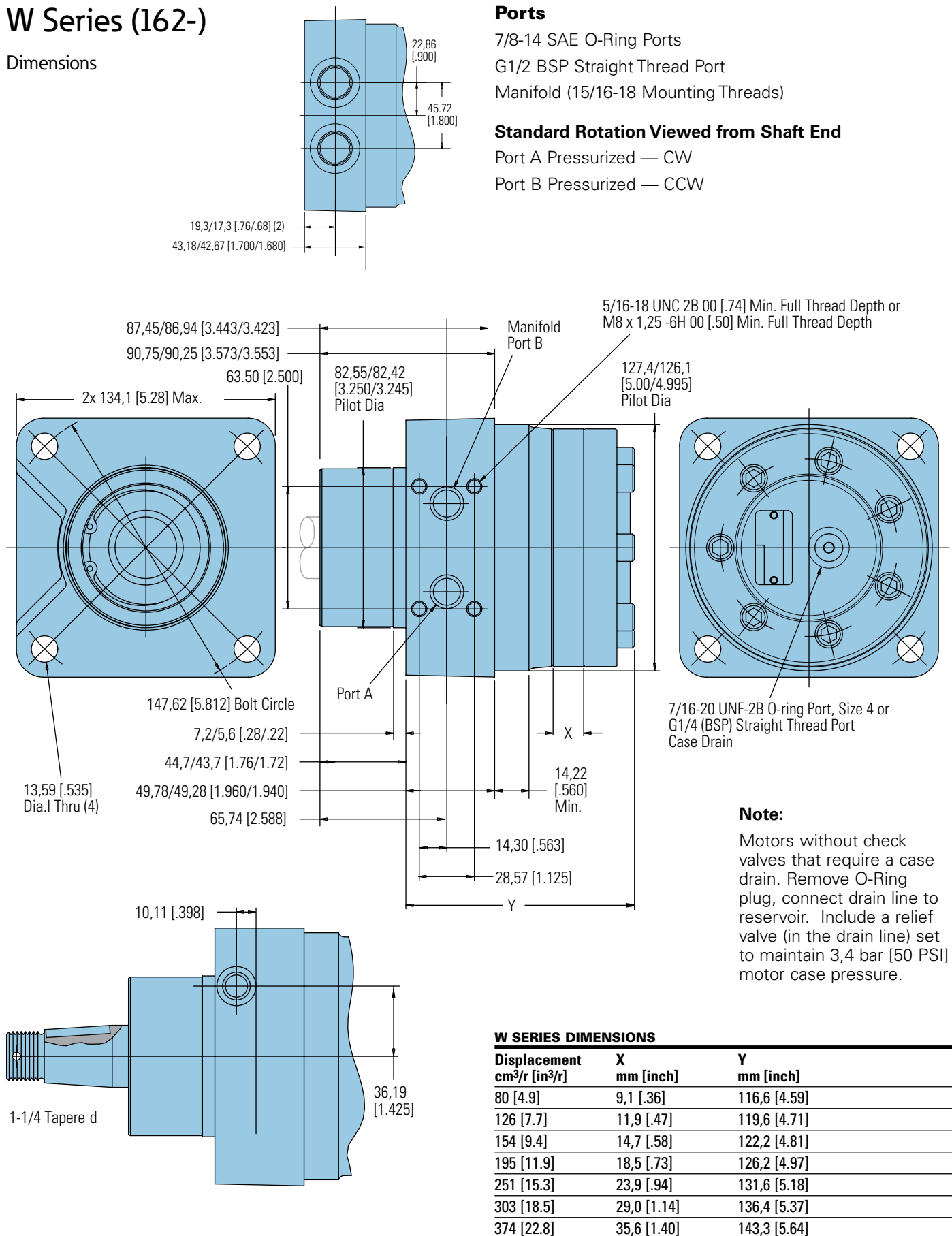
303 cm³/r [18.5 in³/r] Δ Pressure bar [PSI] Continuous										
		[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 140
Flow l/min [GPM]	[2] 7.6	[920] 104 24	[1454] 164 24	[1974] 223 24	[2480] 280 23	[2969] 335 22	[3429] 387 22	[3859] 436 20	[4230] 478 18	[4583] 518 16
	[4] 15.1	[960] 108 49	[1487] 168 49	[2007] 227 47	[2513] 284 47	[3006] 340 46	[3457] 391 45	[3905] 441 44	[4338] 490 41	[4769] 539 39
	[6] 22.7	[911] 103 73	[1445] 163 73	[1961] 222 72	[2473] 279 72	[2952] 334 71	[3411] 385 69	[3842] 434 68	[4276] 483 66	
	[8] 30.3	[843] 95 99	[1375] 155 98	[1888] 213 97	[2393] 270 96	[2886] 326 95	[3350] 379 94	[3763] 425 93		
	[10] 37.9	[752] 85 123	[1274] 144 122	[1789] 202 122	[2303] 260 120	[2792] 316 119	[3274] 370 119	[3650] 412 118		
	[12] 45	[652] 74 148	[1170] 132 147	[1691] 191 146	[2199] 248 145	[2691] 304 145	[3123] 353 144			
	[14] 53	[526] 59 172	[1039] 117 172	[1560] 176 171	[2064] 233 170	[2548] 288 169	[2999] 339 168			
	[16.5] 62	[353] 40 203	[864] 98 203	[1367] 154 201	[1876] 212 200	[2369] 268 200				

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

374 cm³/r [22.8 in³/r] Δ Pressure bar [PSI] Continuous									
	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	
Flow l/min [GPM]	[2] 7.6	[1086] 123 20	[1753] 198 19	[2365] 267 17	[2960] 334 16	[3533] 399 14	[4025] 455 12	[4484] 507 12	[4970] 562 11
	[4] 15.1	[1152] 130 39	[1797] 203 39	[2431] 275 38	[3048] 344 36	[3624] 409 34	[4129] 467 33	[4599] 520 31	
	[6] 22.7	[1099] 124 60	[1749] 198 58	[2377] 269 57	[2996] 339 56	[3557] 402 54	[4077] 461 53		
	[8] 30.3	[1018] 115 80	[1662] 188 79	[2290] 259 78	[2894] 327 76	[3440] 389 75	[3952] 447 74		
	[10] 37.9	[940] 106 100	[1582] 179 99	[2210] 250 97	[2812] 318 96	[3346] 378 95	[3816] 431 95		
	[12] 45.4	[809] 91 120	[1454] 164 119	[2077] 235 117	[2677] 302 116	[3216] 363 115			
	[14] 53.0	[648] 73 141	[1284] 145 139	[1907] 215 138	[2506] 283 137	[3033] 343 137			
	[16] 60.6	[485] 55 160	[1107] 125 159	[1722] 195 157	[2315] 262 157	[2838] 321 157			
	[18] 68.1	[307] 35 180	[930] 105 179	[1543] 174 178	[2133] 241 178				
	[20] 75.7	[111] 13 201	[730] 82 199	[1342] 152 198	[1939] 219 197				

W Series (162-)

Dimensions



W Series (162-)

Dimensions Shafts

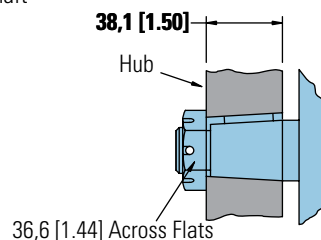
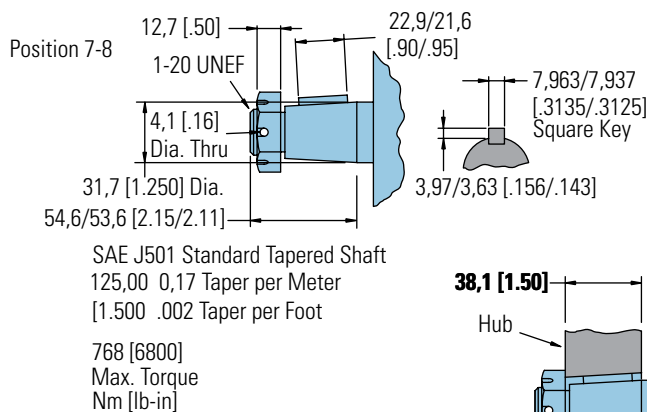
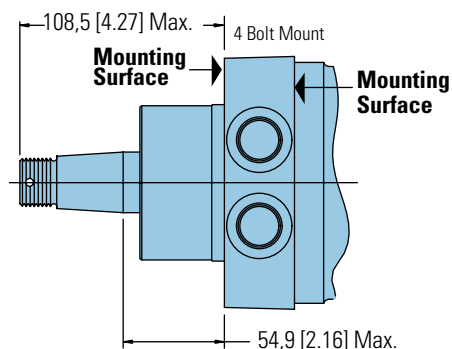
Recommended Torque:

(373 Nm [275 lb-ft] Dry)

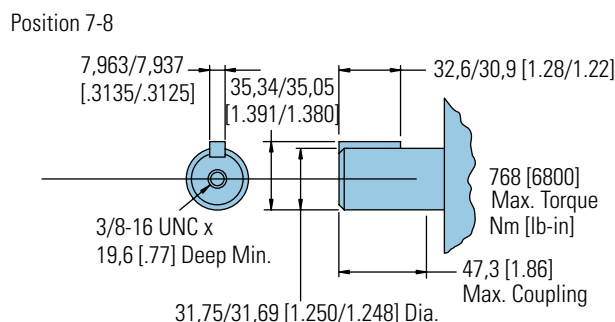
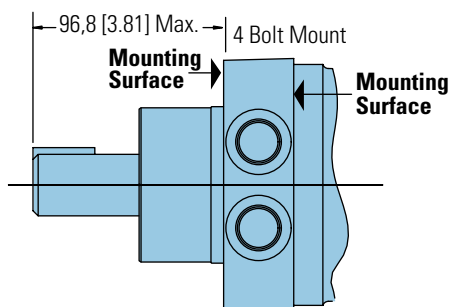
(305 Nm [225 lb-ft] Lub) Plus

Torque required to align the
slotted nut with the Shaft
Crosshole.

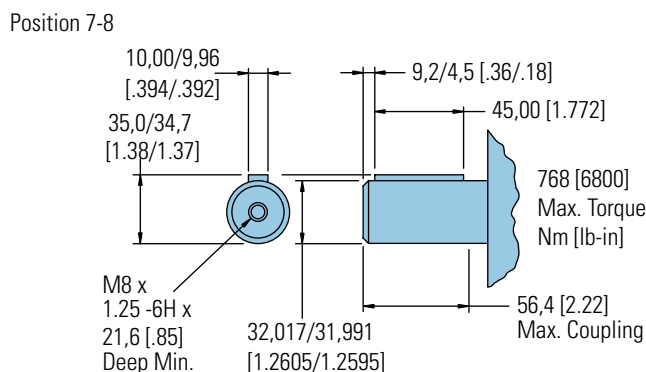
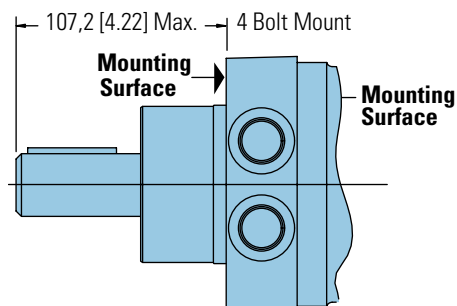
1 1/4 Tapered



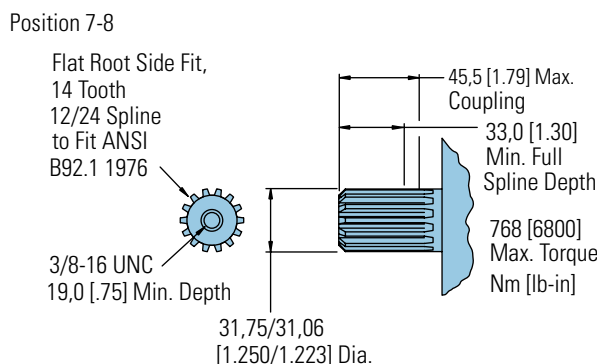
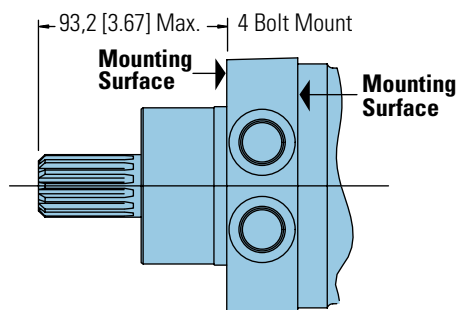
1 1/4 Inch Straight



32 mm Straight



1 1/4 14 Tooth Splined



W Series (162-)

Shaft Side Load Capacity

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

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

Example:

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

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

Case Pressure: 66 bar [960 PSI].

Average Speed: 150 rpm.

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

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

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

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

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

Life = 1800 Hours

Speed Adjustment for over 100 rpm:

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

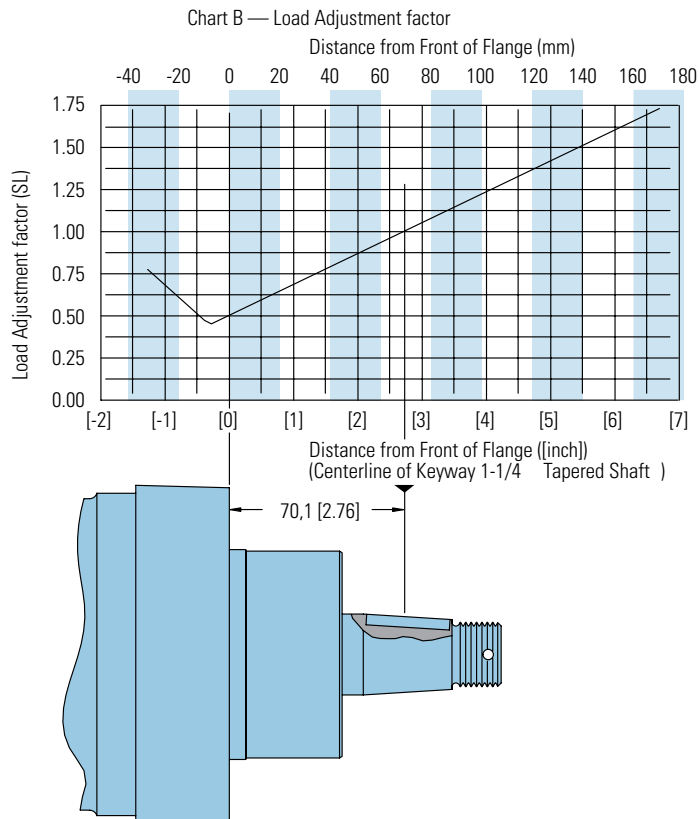


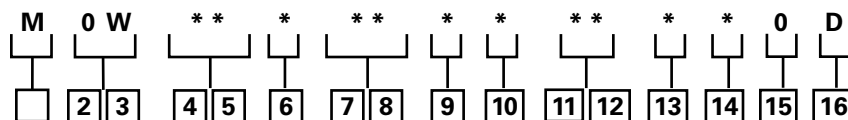
CHART A — EXPECTED B10 LIFE (HOURS) OF BEARING UNDER VARIOUS LOADS

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

W Series (162-)

Model Code

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



1 Product

M – Motor

2, 3 Series

0W – W Series

4, 5 Displacement cm³/r [in³/r]

05 – 30 [4.9]

08 – 126 [7.7]

09 – 154 [9.4]

12 – 195 [11.9]

15 – 251 [15.3]

19 – 303 [18.5]

23 – 374 [22.8]

6 Mounting Type

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

7, 8 Output Shaft

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

03 – 1 1/4 inch Dia. .125:1 Tapered Shaft Per SAE J501 with 1– 20 UNEF -2A Threaded Shaft End and Slotted Hex Nut, 7,938 [.3125] Square x 22,22 [.875] Straight Key

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

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

9 Ports

A – 7/8 -14 UNF - 2B SAE O-Ring Port

B – G 1/2 (BSP) Straight Thread Port

10 Case Flow Options

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

B – G 1/4 (BSP) Straight Thread Port

C – Internal Check Valve

11, 12 Special Features (Hardware)

00 – None

01 – Viton Seals

13 Special Features (Assembly)

0 – None

1 – Reverse Rotation

14 Paint/Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

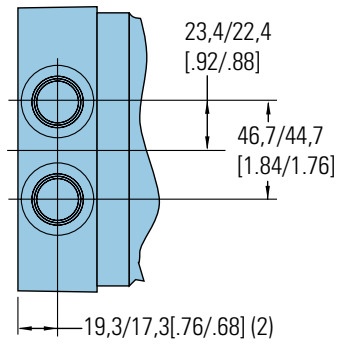
0 – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code

W Series with Parking Brake (162-)

Dimensions



Ports

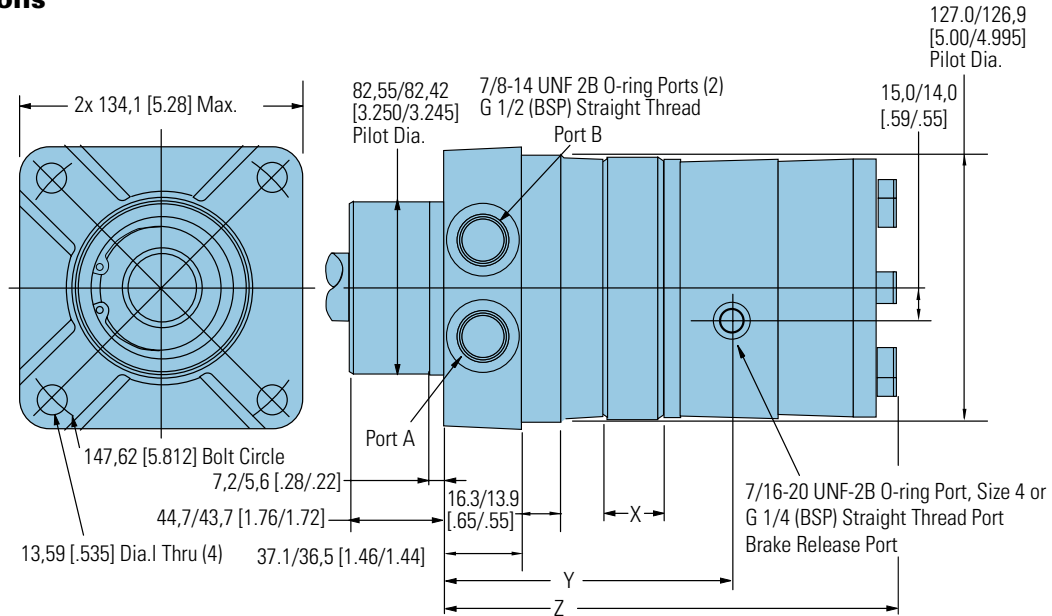
7/8 -14 UNF 2B SAE O-Ring Ports (2) or
G 1/2 (BSP) Straight Thread

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

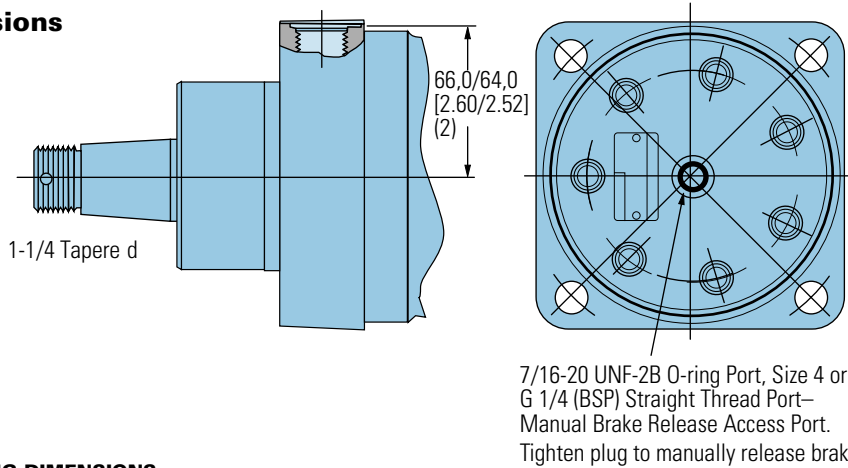
Port B Pressurized — CCW

Port Dimensions



B-5

Mounting Dimensions



PORTING AND MOUNTING DIMENSIONS

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

SPECIFICATIONS

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

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

Product Numbers

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

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

Standard

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

162-1009

W Series with Parking Brake

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

162-1146

Note:

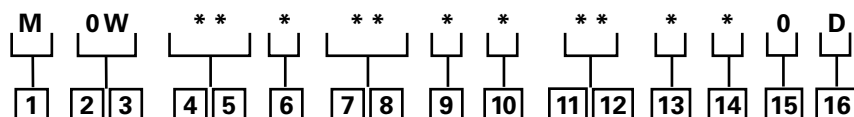
All above motors have
1-1/4 inch tapered output
shaft, 7/8 inch O-Ring Ports,
internal check valves.

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

W Series with Parking Brake (162-)

Model Code

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



1 Product

M – Motor

2, **3** Series

0W – W Series with Parking Brake

4, **5** Displacement cm³/r [in³/r]

05 – 30 [4.9]

08 – 126 [7.7]

09 – 154 [9.4]

12 – 195 [11.9]

15 – 251 [15.3]

19 – 303 [18.5]

23 – 374 [22.8]

6 Mounting Type

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

7, **8** Output Shaft

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

03 – 1 1/4 inch Dia. .125:1 Tapered Shaft Per SAE J501 with 1– 20 UNEF -2A Threaded Shaft End and Slotted Hex Nut, 7,938 [.3125] Square x 22,22 [.875] Straight Key

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

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

9 Ports

A – 7/8 -14 UNF - 2B SAE O-Ring Port

B – G 1/2 (BSP) Straight Thread Port

10 Case Flow Options

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

B – G 1/4 (BSP) Straight Thread Port

C – Internal Check Valve

11, **12** Special Features (Hardware)

00 – None

01 – Viton Seals

11 – Spring-applied hydraulic-release brake

13 Special Features (Assembly)

0 – None

1 – Reverse Rotation

14 Paint/Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black - Individual Box

15 Eaton Assigned Code when Applicable

0 – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code

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



Powering Business Worldwide

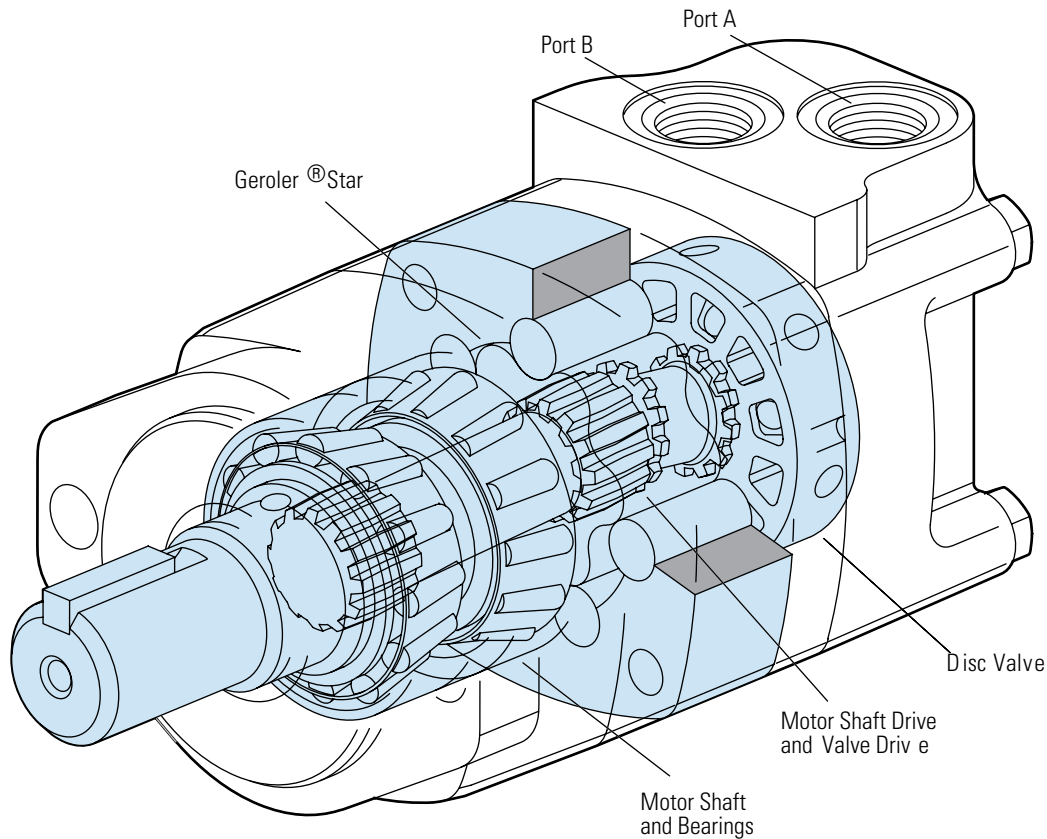
Disc Valve Hydraulic Motors

Highlights

Product Description

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

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



Features, Benefits, and Applications

Features

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

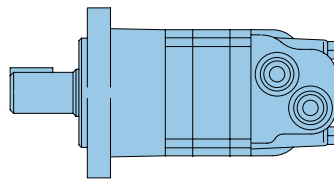
- Displacement (Geroler size)
- Output Shaft
- No Shaft and Bearing Assembly (Bearingless Motor)
- Port Configuration
- Mounting Flange
- Other Special Features

Benefits

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

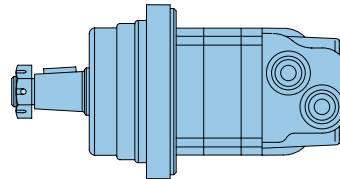
Applications

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



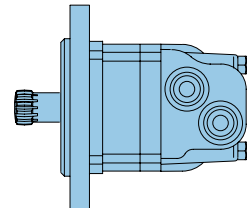
Standard Motor

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



Wheel Motor

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



Bearingless Motor

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

C-1

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10,000 Series

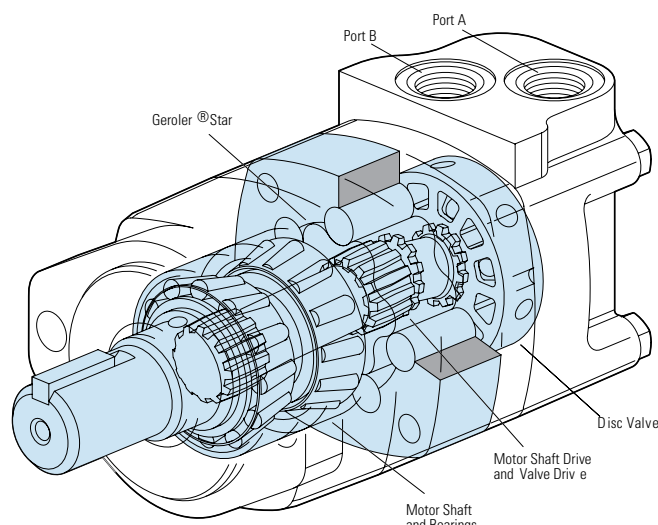
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2000 Series

Highlights



Description

The popular 2000 Series provides torque up to 7500 lb-in. This proven design is reliable and durable. Eaton has added options that make the motor more flexible to use in a wide variety of applications. The integral cross-over relief valve is the latest innovation in the 2000 series motors.

2000 Series

Geroler Element	10 Displacements
Flow l/min [GPM]	75 [20] Continuous**
	115 [30] Intermittent*
Speed RPM	908 Cont.**
	1042 Inter.*
Pressure bar [PSI]	200 [3000] Cont.**
	300 [4500] Inter.*
Torque Nm [lb-in]	845 [7470] Cont.**
	930 [8225] Inter.*

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

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

Features

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

Benefits

- Easy to design in a system
- Reliability and performance in tough application
- Compact design of the integrated cross-over relief valve option

Applications

- Skid Steer Attachments
- Swing Motor
- Brush Cutters & Mowers
- Harvesting Equipment
- Directional Boring any place pressure relief protection is optimal for system or motor performance and life
- Turf equipment

C-1



Auger



Boring



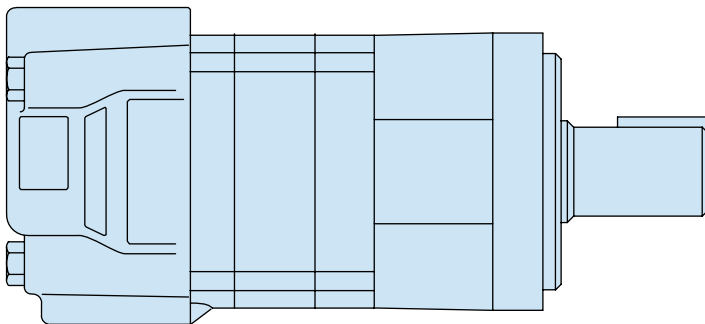
Plastic Injection



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 [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	155 [2250]	120 [1750]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	260 [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.

	Continuous		Peak
	Intermittent		No Operation

90 cm³/r [5.5 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
Flow LPM [GPM]										
[.25]	[124]	[233]	[471]							
.95	14	26	53							
	5	2	1							
[.5]	[133]	[273]	[555]	[832]						
1.9	15	31	63	94						
	15	13	6	2						
[1]	[151]	[358]	[744]	[1091]	[1424]	[1697]	[1952]	[2189]	[2368]	
3.8	17	40	84	123	161	192	221	247	268	
	39	39	35	32	28	21	13	12	2	
[2]	[151]	[358]	[744]	[1099]	[1439]	[1737]	[2015]	[2293]	[2570]	[2855]
7.5	17	40	84	124	163	196	228	259	290	323
	82	80	76	72	68	61	50	38	29	20
[4]	[151]	[350]	[899]	[1113]	[1473]	[1800]	[2132]	[2454]	[2775]	[3100]
15	17	40	102	126	166	203	241	277	314	350
	167	163	158	152	148	139	126	115	102	90
[6]	[142]	[348]	[736]	[1091]	[1492]	[1851]	[2208]	[2552]	[2898]	[3249]
23	16	39	83	69	169	209	249	288	327	367
	250	245	240	233	227	218	203	191	176	161
[8]	[133]	[338]	[729]	[1128]	[1509]	[1890]	[2269]	[2635]	[3000]	[3367]
30	15	38	82	127	170	214	256	298	339	380
	35	328	329	314	306	295	281	266	249	231
[10]	[124]	[331]	[724]	[1130]	[1521]	[1912]	[2309]	[2670]	[3036]	[3398]
38	14	37	82	128	172	216	261	302	343	384
	418	410	404	395	385	373	361	342	322	302
[12]	[106]	[315]	[714]	[1127]	[1525]	[1924]	[2326]	[2704]	[3082]	[3458]
45	12	36	81	127	172	217	263	306	348	391
	502	493	485	477	464	451	441	417	394	372
[14]	[98]	[298]	[706]	[1115]	[1525]	[1924]	[2326]	[2707]	[3080]	[3450]
53	11	34	80	126	172	217	263	306	348	390
	585	575	567	559	543	529	521	493	467	431
[16]	[80]	[285]	[688]	[1107]	[1510]	[1907]	[2311]	[2697]	[3070]	[3432]
61	9	32	78	125	171	215	261	305	347	388
	670	658	650	641	622	607	610	568	541	513
[18]	[62]	[262]	[673]	[1087]	[1490]	[1892]	[2281]	[2662]	[3030]	[3381]
68	7	30	76	123	168	214	258	301	342	382
	753	740	732	719	701	685	680	643	613	583
[20]	[53]	[242]	[644]	[1045]	[1447]	[1850]	[2246]	[2617]	[2988]	[3301]
76	6	27	73	118	163	209	254	296	338	373
	836	822	814	796	780	765	748	719	686	653
[22]	[35]	[231]	[639]	[1047]	[1437]	[1836]	[2218]	[2599]	[2981]	
83	4	26	72	118	162	207	251	294	337	
	920	916	907	895	876	854	834	803	774	
[24]	[18]	[204]	[612]	[1011]	[1366]	[1792]	[2182]	[2573]	[2963]	
91	2	23	69	114	154	202	247	291	335	
	1003	1000	991	978	960	940	918	882	850	
[25]		[195]	[594]	[994]	[1384]	[1765]	[2173]	[2564]		
95		22	67	112	156	207	246	290		
		104	103	102	1003	984	954	921		

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

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

[570]
65 } Torque [lb-in]
901 } Nm
Speed RPM

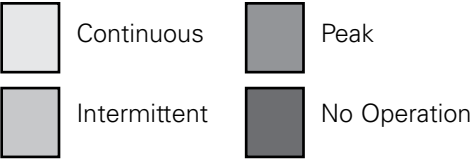
C-1

2000 Series

Performance Data

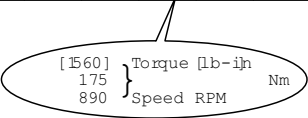
Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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



100 cfm [6.32 in
Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[25] 95	[140] 15 4	[260] 30 2								
[5] 19	[150] 15 13	[300] 35 9	[620] 70 5	[940] 105 2						
[1] 38	[170] 20 35	[390] 45 34	[830] 95 31	[1210] 135 28	[1570] 175 23	[1870] 210 15	[2130] 240 6			
[2] 75	[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] 10 890	[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] 180 890	[1990] 225 873	[2450] 275 846	[2890] 325 817		



130 cfm [8.90 in
Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[25] 95	[170] 20 3									
[5] 19	[190] 20 12	[410] 45 8	[870] 100 2							
[1] 38	[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] 75	[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	[2100] 245 97	[2600] 300 95	[3100] 350 92	[3540] 400 85	[3980] 450 77	[4420] 500 70
[6] 23	[220] 25 172	[490] 55 171	[1080] 120 169	[1640] 185 161	[2110] 245 153	[2610] 310 149	[3110] 370 146	[3550] 425 132	[3990] 485 118	[4430] 540 104
[8] 30	[200] 25 230	[480] 55 224	[1080] 120 222	[1650] 185 219	[2220] 250 210	[2720] 315 204	[3210] 375 201	[3640] 435 192	[4080] 495 184	[4520] 550 175
[10] 38	[180] 20 287	[470] 55 286	[1070] 120 282	[1650] 185 276	[2230] 250 269	[2730] 315 261	[3220] 385 255	[3650] 445 243	[4090] 505 231	[4530] 560 219
[12] 45	[160] 20 345	[460] 50 344	[1060] 120 338	[1640] 185 333	[2240] 250 327	[2740] 315 317	[3230] 380 307	[3660] 440 295	[4100] 500 284	[4540] 560 272
[14] 53	[150] 15 403	[440] 50 402	[1050] 115 395	[1620] 185 391	[2250] 250 385	[2750] 340 373	[3240] 380 360	[3670] 440 348	[4110] 500 336	
[16] 61	[130] 15 461	[420] 45 460	[1040] 115 452	[1600] 180 447	[2260] 250 443	[2760] 315 430	[3250] 375 411	[3680] 440 397	[4120] 500 384	
[18] 68	[110] 10 518	[400] 45 517	[990] 110 509	[1580] 180 504	[2270] 245 500	[2770] 310 484	[3260] 375 471	[3690] 435 456	[4130] 500 440	
[20] 76	[90] 10 576	[380] 45 575	[960] 110 568	[1550] 175 560	[2280] 240 551	[2780] 305 539	[3270] 370 524	[3700] 435 508		
[22] 83	[60] 5 634	[350] 40 633	[940] 105 624	[1520] 170 619	[2290] 235 604	[2790] 305 597	[3280] 365 579	[3710] 430 560		
[24] 91	[40] 5 692	[325] 35 691	[920] 105 682	[1490] 170 676	[2300] 235 665	[2800] 300 651	[3290] 365 633	[3720] 425 616		
[25] 95	[20] 10 720	[310] 35 719	[900] 100 712	[1480] 165 705	[2310] 230 692	[2810] 295 679	[3300] 360 682	[3730] 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 cfm [9.36 in
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
[25] 95	[240] 25	[300] 65													
[5] 19	[290] 35	[640] 110	[990] 150												
[1] 38	[300] 45	[730] 80	[1100] 125	[1430] 160	[1790] 200	[2120] 275	[2450] 305	[2790] 340	[3160] 370	[3500] 400	[3800] 430	[4080] 460	[4350] 490	[4620] 520	
[2] 75	[300] 35	[755] 130	[1135] 165	[1470] 210	[1860] 250	[2195] 285	[2535] 325	[2880] 355	[3120] 385	[3680] 430	[4090] 470	[4500] 510	[4800] 550	[5100] 595	[5400] 635
[4] 15	[405] 45	[795] 140	[1185] 185	[1540] 235	[1970] 275	[2310] 300	[2675] 345	[3040] 385	[3320] 430	[3790] 470	[4160] 510	[4520] 550	[4890] 595	[5260] 635	[5630] 675
[6] 23	[405] 45	[815] 140	[1220] 180	[1590] 230	[2035] 270	[2395] 315	[2780] 360	[3170] 400	[3560] 445	[3940] 490	[4320] 530	[4700] 570	[5080] 615	[5450] 660	[5830] 705
[8] 30	[400] 45	[820] 140	[1230] 185	[1625] 235	[2065] 275	[2450] 320	[2850] 370	[3260] 415	[3670] 455	[4040] 500	[4410] 540	[4780] 580	[5150] 625	[5520] 665	[5890] 710
[10] 38	[300] 45	[810] 140	[1230] 185	[1645] 235	[2095] 280	[2480] 325	[2895] 375	[3310] 420	[3730] 465	[4100] 505	[4470] 545	[4840] 585	[5210] 625	[5590] 665	
[12] 45	[355] 40	[790] 135	[1215] 185	[1650] 235	[2100] 280	[2485] 330	[2915] 375	[3340] 425	[3760] 465	[4120] 505	[4480] 545	[4850] 585			
[14] 53	[300] 35	[765] 135	[1190] 185	[1645] 235	[2090] 280	[2475] 330	[2915] 380	[3350] 425	[3770] 465	[4130] 505	[4490] 545	[4860] 585			
[16] 61	[290] 30	[730] 130	[1160] 185	[1625] 235	[2070] 275	[2455] 330	[2900] 375	[3340] 425	[3760] 465	[4130] 505	[4490] 545	[4860] 585			
[18] 68	[290] 30	[690] 125	[1120] 180	[1590] 230	[2035] 270	[2420] 325	[2870] 375	[3310] 420	[3730] 465	[4100] 505	[4480] 545				
[20] 76	[210] 25	[650] 120	[1080] 175	[1550] 225	[1995] 270	[2380] 320	[2830] 370	[3270] 415	[3690] 460	[4070] 500	[4450] 540				
[22] 83	[170] 20	[610] 120	[1040] 170	[1500] 220	[1955] 265	[2340] 315	[2785] 365	[3220] 410	[3640] 460	[4050] 500					
[24] 91	[135] 15	[570] 115	[1000] 165	[1440] 215	[1910] 260	[2300] 310	[2740] 360	[3170] 405	[3590] 450	[3980] 500					
[25] 95	[120] 15	[550] 110	[980] 160	[1410] 215	[1890] 260	[2280] 305	[2720] 355	[3150] 405	[3570] 445	[3960] 500					
[30] 114		[420] 45	[860] 145	[1290] 190	[1700] 240	[2120] 285	[2530] 330	[2940] 385	[3300] 430						

160 cfm [9.36 in
Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[3750] 260
[25] 95	[200] 25								
[5] 19	[240] 25	[490] 55	[990] 110	[1570] 175	[2140] 240				
[1] 38	[280] 30	[590] 65	[1170] 130	[1730] 195	[2290] 260	[2830] 320	[3330] 375	[3820] 430	[4070] 460
[2] 75	[300] 35	[610] 70	[1210] 135	[1790] 200	[2350] 265	[2920] 330	[3480] 395	[4050] 460	[4330] 490
[4] 15	[320] 35	[630] 70	[1260] 140	[1890] 215	[2530] 285	[3170] 360	[3820] 430	[4460] 505	[4780] 540
[6] 23	[320] 35	[650] 75	[1300] 145	[1960] 220	[2620] 295	[3280] 370	[3940] 445	[4600] 520	[4930] 560
[8] 30	[310] 35	[650] 75	[1300] 150	[2010] 225	[2670] 300	[3330] 375	[4000] 450	[4660] 525	[4990] 565
[10] 38	[290] 35	[640] 70	[1340] 150	[2030] 230	[2850] 320	[3410] 385	[4030] 455	[4700] 530	[5030] 570
[12] 45	[270] 30	[620] 70	[1320] 150	[2030] 230	[2700] 305	[3370] 380	[4040] 455	[4710] 530	[5040] 570
[14] 53	[240] 25	[590] 65	[1300] 145	[2020] 230	[2690] 305	[3360] 380	[4030] 455	[4700] 530	
[16] 61	[220] 25	[570] 65	[1270] 145	[1980] 225	[2660] 300	[3330] 375	[4010] 455	[4680] 530	
[18] 68	[190] 20	[540] 60	[1240] 140	[1960] 220	[2640] 300	[3320] 375	[4000] 450		
[20] 76	[170] 20	[510] 60	[1210] 135	[1920] 215	[2630] 300	[3300] 375	[4000] 445		
[22] 83	[150] 15	[480] 55	[1180] 130	[1880] 210	[2570] 295	[3260] 370	[4000] 445		
[24] 91	[120] 15	[450] 50	[1150] 130	[1860] 210	[2550] 290	[3240] 370	[4000] 440		
[25] 95	[90] 10	[440] 50	[1140] 130	[1840] 210	[2560] 290	[3230] 365	[4000] 440		
[30] 114		[330] 35	[1040] 120	[1750] 200	[2470] 280	[3140] 355	[3800] 430		

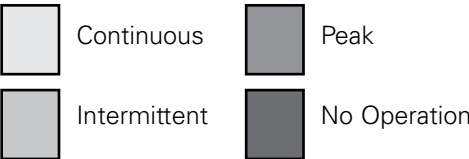
[330]
35
713 } Torque [lb-in
Speed RPM Nm

2000 Series

Performance Data

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

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



245 cfm [14.3 m³/min]
Δ Pressure Bar [PSI]

		[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
		15	35	50	70	85	105	120	140	155	170	190	205	225	240	260
Flow LFM [GPM]	[5]	[40]	[850]													
	1.9	45	95													
	[1]	[450]	[930]	[1420]	[1850]	[2320]	[2780]	[3250]	[3650]	[4000]	[4540]	[4980]	[5480]	[5970]	[6310]	
	3.8	50	105	160	210	260	315	365	410	465	515	560	615	665	715	
	[2]	[460]	[960]	[1460]	[1900]	[2400]	[2860]	[3340]	[3780]	[4200]	[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]	[4200]	[4780]	[5050]	[5520]	[5980]	[6440]	[6910]	
	23	50	115	175	230	290	350	405	465	515	570	625	675	730	780	
	[8]	[460]	[1010]	[1500]	[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]	[4780]	[5210]	[5720]	[6230]			
	38	50	115	175	240	300	360	420	480	535	560	645	705			

		[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]
		15	35	50	70	85	105	120	140	155	170	190	205	225	240
Flow LFM [GPM]	[5]	[50]	[1050]												
	1.9	55	120												
	[1]	[610]	[1180]	[1750]	[2330]	[2870]	[3440]	[3930]	[4400]	[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]	[5400]	[5980]	[6550]	[7120]	[7690]	
	15	75	140	210	280	355	415	480	545	610	675	740	805	870	
	[6]	[620]	[1270]	[1920]	[2560]	[3230]	[3810]	[4390]	[4970]	[5550]	[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				

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

2000 Series

Performance Data

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

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

	Continuous		Peak
	Intermittent		No Operation

		490 cfm [293.0] in Δ Pressure Bar [PSI]							
		[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140
Flow LFMGPM]	[5] 1.9	[670] 75	[1600] 180						
	[1] 3.8	[90] 105	[2000] 225	[2990] 340	[3900] 440	[4880] 550			
	[2] 7.5	[950] 105	[2060] 235	[3110] 350	[4080] 460	[5110] 575	[6320] 715		
	[4] 15	[980] 110	[2130] 240	[3230] 365	[4270] 480	[5350] 605	[6370] 720	[7380] 835	[7980] 900
	[6] 23	[980] 110	[2120] 240	[3230] 365	[4300] 485	[5370] 605	[6420] 725	[7470] 845	[8225] 930
	[8] 30	[980] 110	[2110] 240	[3220] 365	[4330] 490	[5400] 610	[6470] 730	[7550] 855	
	[10] 38	[90] 105	[2050] 230	[3170] 360	[4300] 485	[5390] 610	[6460] 730	[7550] 855	
	[12] 45	[860] 95	[1990] 225	[3120] 355	[4260] 480	[5370] 605	[6460] 730	[7560] 855	
	[14] 53	[790] 90	[1930] 220	[3055] 345	[4185] 475	[5300] 600	[6400] 725		
	[16] 61	[720] 80	[1870] 210	[2990] 340	[4110] 465	[5230] 590	[6340] 715		
	[18] 68	[630] 70	[1770] 200	[2890] 325	[4020] 455	[5140] 580	[6260] 705		
	[20] 76	[550] 60	[1670] 190	[2800] 315	[3940] 445	[5060] 570	[6180] 700		
	[22] 83	[450] 50	[1570] 175	[2700] 305	[3830] 435	[4960] 560	[6070] 685		
	[24] 91	[360] 40	[1480] 165	[2600] 295	[3730] 420	[4860] 550	[5970] 675		
	[26] 98	[270] 30	[1390] 155	[2510] 285	[3640] 410	[4770] 540			
	[28] 106		[1260] 140	[2370] 270	[3520] 400	[4630] 525			
	[30] 114		[1130] 125	[2240] 255	[3400] 385	[4500] 510			

		395 cfm [243.0] in 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
Flow LFMGPM]	[5] 1.9	[560] 65 4	[1310] 150 3									
	[1] 3.8	[770] 85 9	[1540] 175 9	[2290] 260 9	[3080] 350 8	[3780] 430 8	[4480] 505 7	[5170] 585 7	[5880] 665 6	[6580] 745 5	[7270] 820 4	[7980] 900 3
	[2] 7.5	[790] 90 18	[1580] 180 18	[2360] 265 18	[3180] 360 17	[3930] 445 17	[4680] 530 16	[5430] 615 15	[6180] 700 14	[6840] 775 13	[7500] 845 11	[8170] 925 10
	[4] 15	[800] 90 37	[1660] 190 37	[2480] 280 37	[3320] 375 36	[4130] 465 36	[4940] 560 35	[5740] 650 34	[6550] 740 33	[7230] 815 31	[7880] 890 28	
	[6] 23	[820] 90 57	[1700] 190 56	[2550] 290 56	[3420] 385 55	[4250] 480 54	[5080] 575 52	[5920] 670 50	[6750] 765 49	[7420] 840 47	[8000] 905 45	
	[8] 30	[820] 90 76	[1700] 190 75	[2580] 290 75	[3460] 390 74	[4300] 485 73	[5130] 580 71	[5960] 675 69	[6800] 770 68			
	[10] 38	[800] 90 95	[1700] 190 94	[2590] 295 94	[3480] 395 93	[4320] 490 92	[5160] 585 90	[6000] 680 88	[6840] 775 86			
	[12] 45	[770] 85 114	[1680] 190 113	[2570] 290 113	[3470] 390 112	[4310] 485 111	[5150] 580 109	[5990] 675 106	[6830] 770 103			
	[14] 53	[740] 85 133	[1640] 185 132	[2530] 285 132	[3430] 390 131	[4280] 485 129	[5120] 580 127	[5960] 675 124				
	[16] 61	[690] 80 153	[1590] 180 152	[2480] 280 152	[3370] 380 150	[4220] 475 149	[5060] 570 146	[5910] 670 144				
	[18] 68	[640] 70 172	[1530] 170 171	[2420] 275 171	[3310] 375 170	[4160] 470 169	[5010] 565 167	[5870] 665 164				
	[20] 76	[580] 65 191	[1470] 165 190	[2370] 270 190	[3260] 370 189	[4110] 465 188	[4960] 560 186	[5820] 660 184				
	[22] 83	[510] 60 210	[1390] 155 209	[2290] 260 209	[3170] 360 208	[4030] 455 207	[4880] 550 206					
	[24] 91	[440] 50 230	[1330] 150 229	[2220] 250 228	[3100] 350 227	[3950] 445 225	[4800] 540 224					
	[26] 98	[350] 40 249	[1240] 140 248	[2130] 240 247	[3020] 340 246	[3880] 440 244	[4730] 535 242					
[28] 106	[270] 30 268	[1150] 130 267	[2050] 230 265	[2930] 330 264	[3790] 430 261	[4650] 525 259						
[30] 114	[180] 20 287	[1060] 120 286	[1960] 220 284	[2850] 320 283	[3710] 420 281	[4570] 515 277						
[35] 132		[840] 95 335	[1760] 200 334	[2640] 300 333	[3480] 395 332							

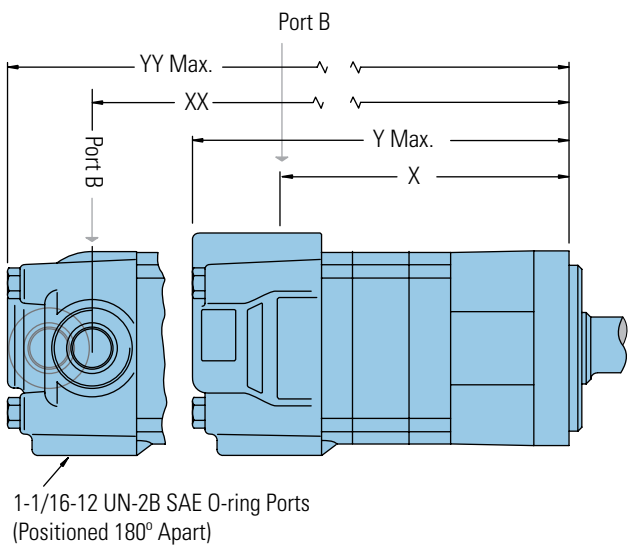
[1760]
200
334 } Torque [lb-in] Nm
Speed RPM

2000 Series

Dimensions

Standard Mount

Standard Mount

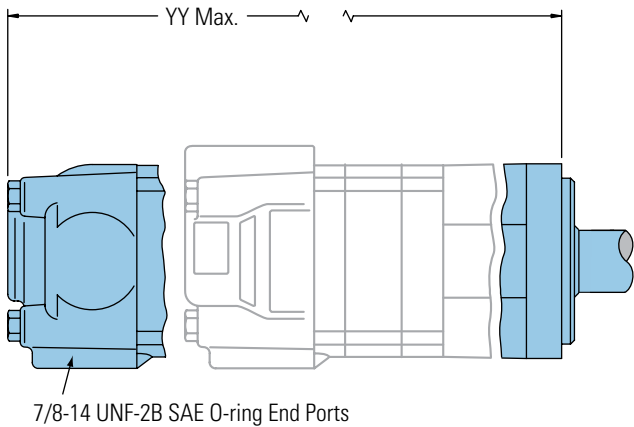


Ports

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

Standard Rotation Viewed from Shaft End

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



STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
80 [4.9]	136,9 [5.39]	184,2 [7.25]	139,2 [5.48]	185,4 [7.30]
100 [6.2]	141,5 [5.57]	189,0 [7.44]	143,8 [5.66]	190,3 [7.49]
130 [8.0]	147,9 [5.83]	195,4 [7.69]	150,2 [5.92]	196,6 [7.74]
160 [9.6]	147,9 [5.83]	195,4 [7.69]	150,2 [5.92]	196,6 [7.74]
195 [11.9]	154,7 [6.09]	202,2 [7.96]	157,0 [6.18]	203,2 [8.00]
245 [14.9]	163,7 [6.45]	211,1 [8.31]	166,0 [6.54]	212,4 [8.36]
305 [18.7]	175,1 [6.90]	222,3 [8.75]	177,4 [6.99]	223,5 [8.80]
395 [24.0]	191,0 [7.52]	238,6 [9.39]	193,3 [7.61]	239,8 [9.44]
490 [29.8]	208,4 [8.21]	255,8 [10.07]	210,7 [8.30]	270,1 [10.12]

2000 Series

Dimensions

Standard Mount with
Integral Relief Valve

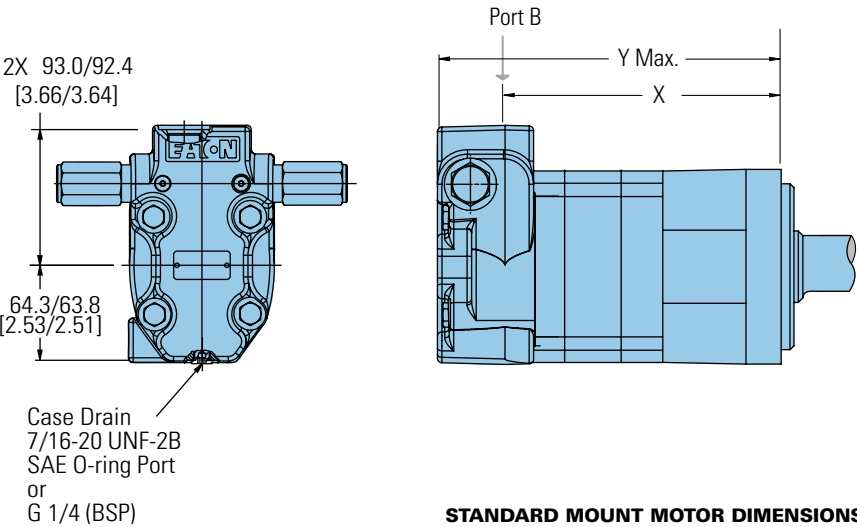
Ports

- 7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- G 1/2 (BSP) Staggered Ports (2)
- G 1/4 (BSP) Case Drain Port (1)

Standard Rotation Viewed from Shaft End

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

Standard Mount with Integral Relief Valve



STANDARD MOUNT MOTOR DIMENSIONS		
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
80 [4.9]	137,0 [5.40]	184,5 [7.26]
100 [6.2]	141,6 [5.58]	189,0 [7.44]
130 [8.0]	147,9 [5.83]	195,4 [7.69]
160 [9.6]	147,9 [5.83]	195,4 [7.69]
195 [11.9]	154,8 [6.10]	202,2 [7.96]
245 [14.9]	163,7 [6.45]	211,1 [8.31]
305 [18.7]	175,1 [6.90]	222,6 [8.76]
395 [24.0]	191,1 [7.53]	238,6 [9.39]
490 [29.8]	208,4 [8.21]	255,8 [10.07]

C-1

2000 Series

Dimensions

Wheel Mount

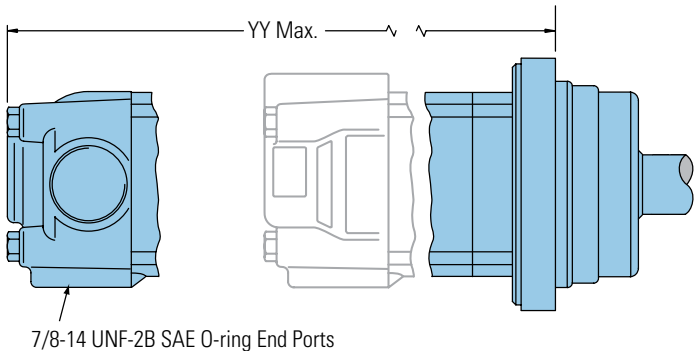
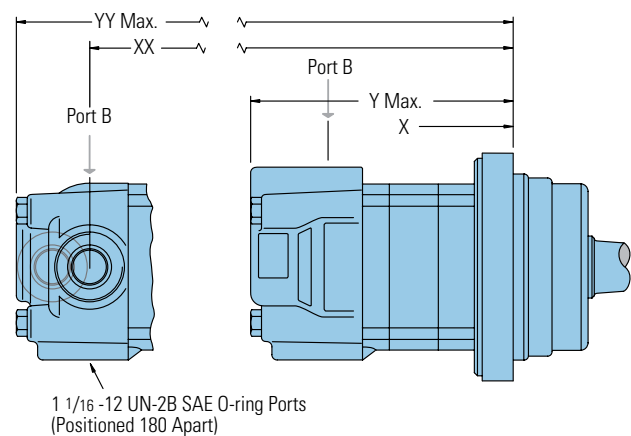
Ports

- 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

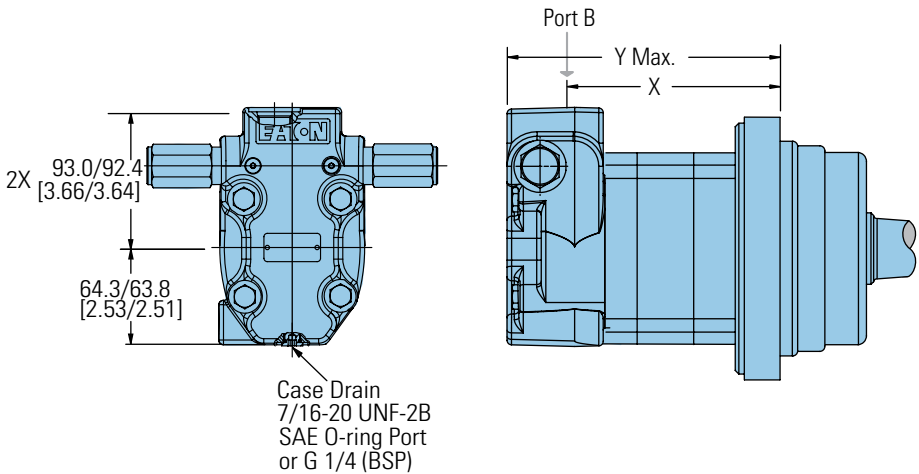
Ports

- 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



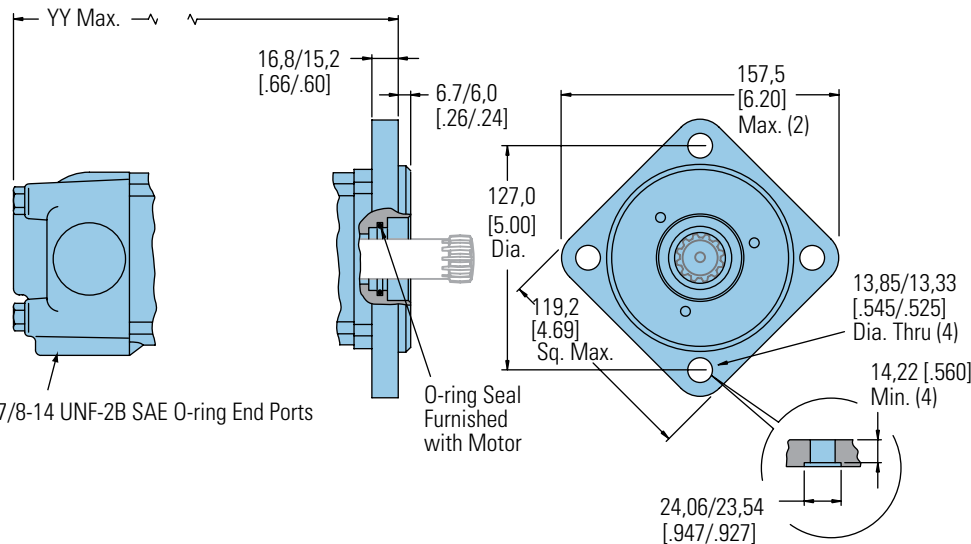
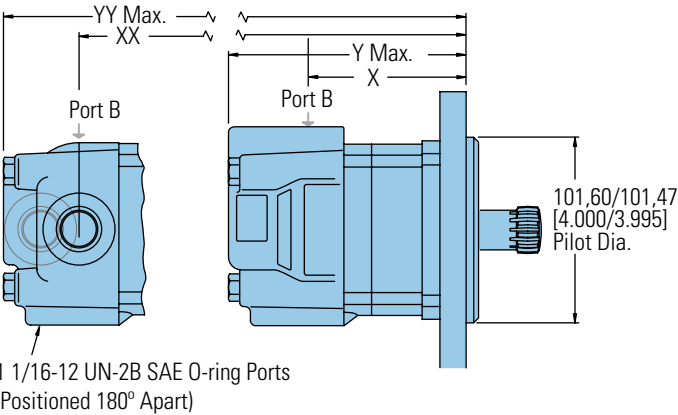
WHEEL MOUNT MOTOR DIMENSIONS

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]

2000 Series

Dimensions
Bearingless

Bearingless



Ports

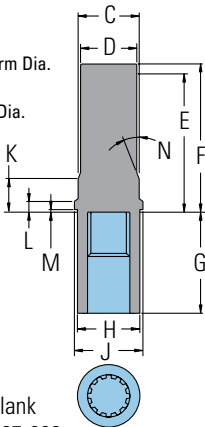
7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
1 1/16 -12 UN-2B SAE O-ring Ports (Positioned 180° Apart) (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
7/8 -14 UNF-2B SAE O-ring End Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
G 1/2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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

MAT'L

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



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

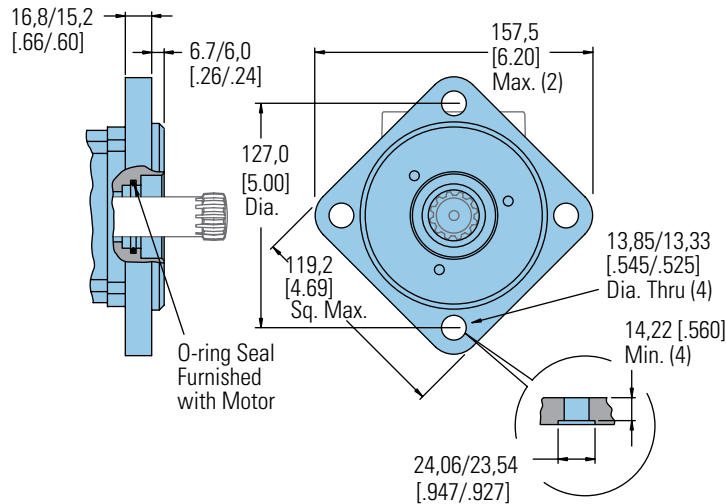
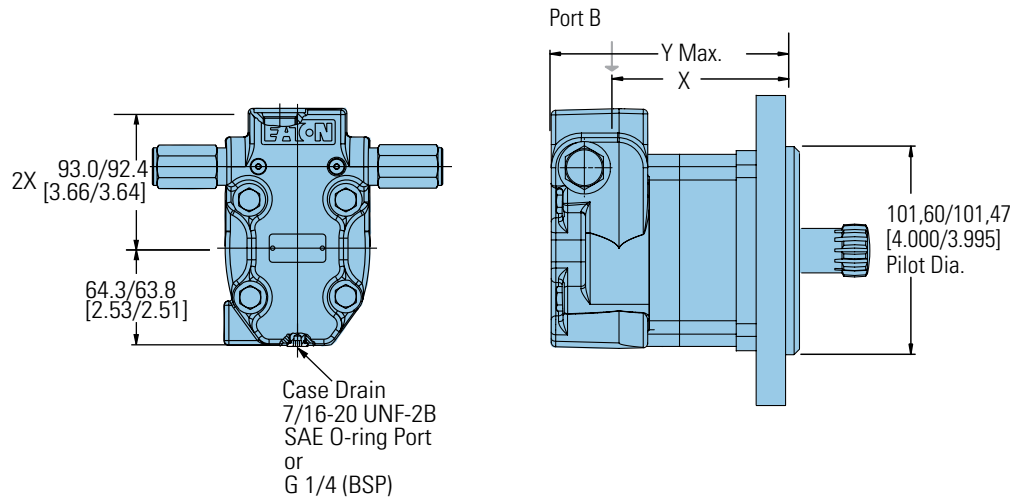
Ports

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



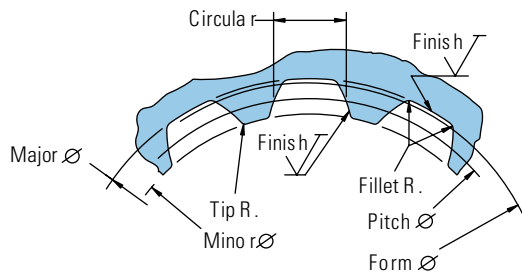
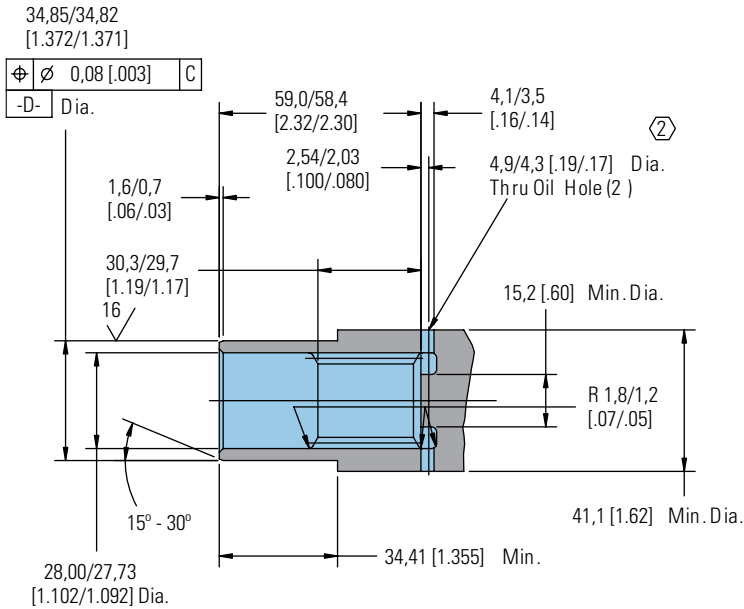
BEARINGLESS MOTORS DIMENSIONS

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]

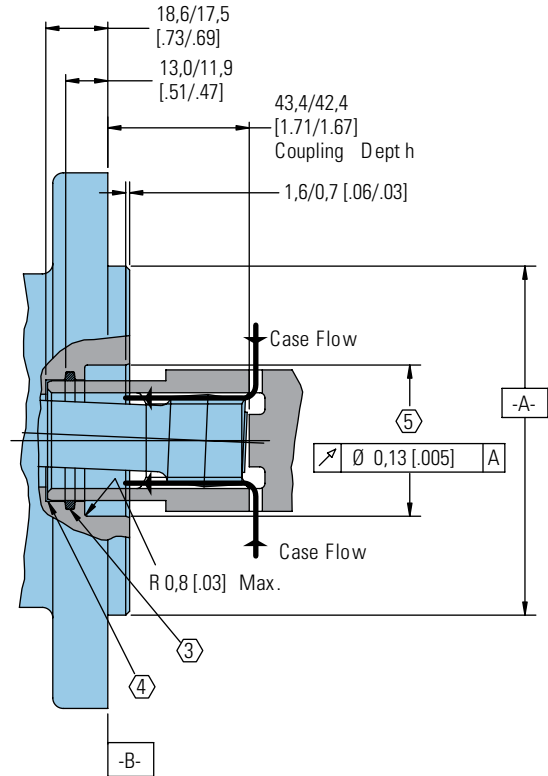
2000 Series

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 [0.030 -0.040]. 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).



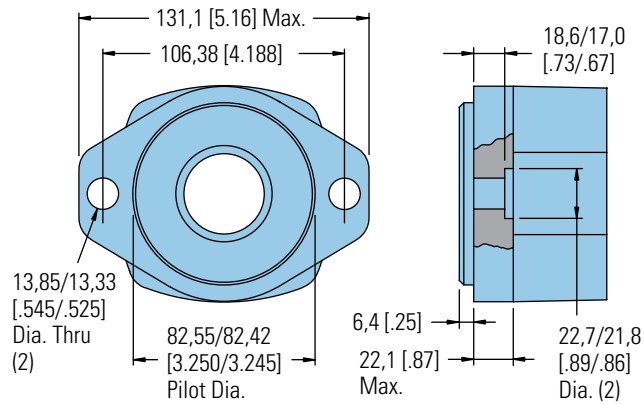
Spline Pitch.....	12/24
Pressure Angle.....	30°
Number of teeth.....	12
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter.....	Ref. 25,400000 [1.0000000]
Base Diameter.....	Ref. 21,997045 [0.8660254] 0,21 [0.008] D
Major Diameter.....	(27,74 [1.092] Max. 27,59 [1.086] Min.)
Minor Diameter.....	23,097 - 23,224 [0.9093 - .9143]
Form Diameter, Min.	29,93 [1.060]
Fillet Radius.....	0,64 - 0,76 [0.025 - .030]
Tip Radius.....	0,25 - 0,38 [0.010 - .015]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,025 [+0.0000 -0.0010]
Total Index Variation	0,038 [0.0015]
Lead Variation	0,013 [0.0005]
Circular Space Width:	
Maximum Actual.....	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 [0.7488 - .7555]
Pin Diameter	4,496 [1.770] Pins to Have 3,38 [1.33]
Wide Flat for Root Clearance	

2000 Series

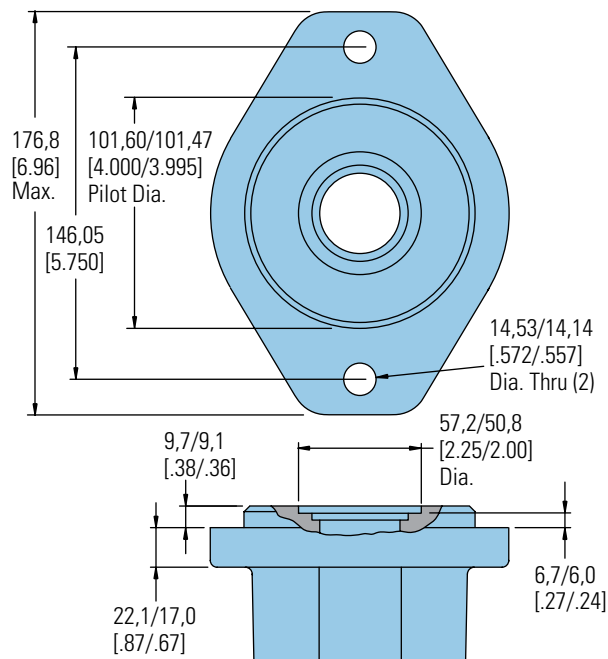
Dimensions

Mounting Options

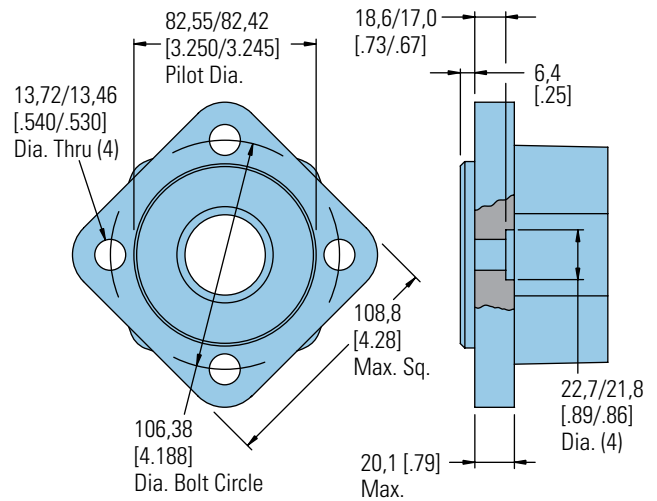
SAE A – Two Bolt (Standard Motor)



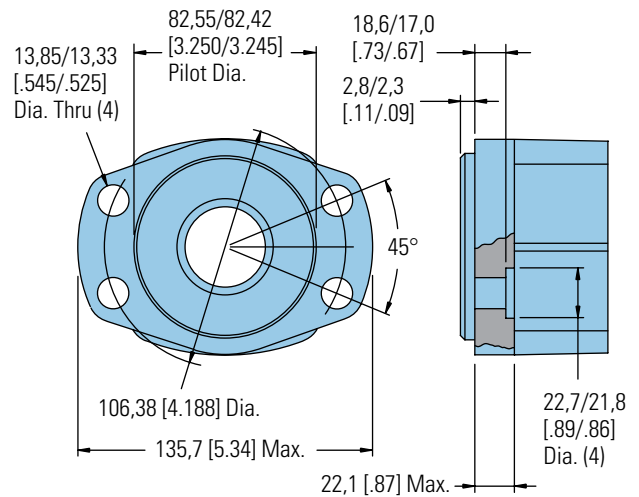
SAE B – Two Bolt



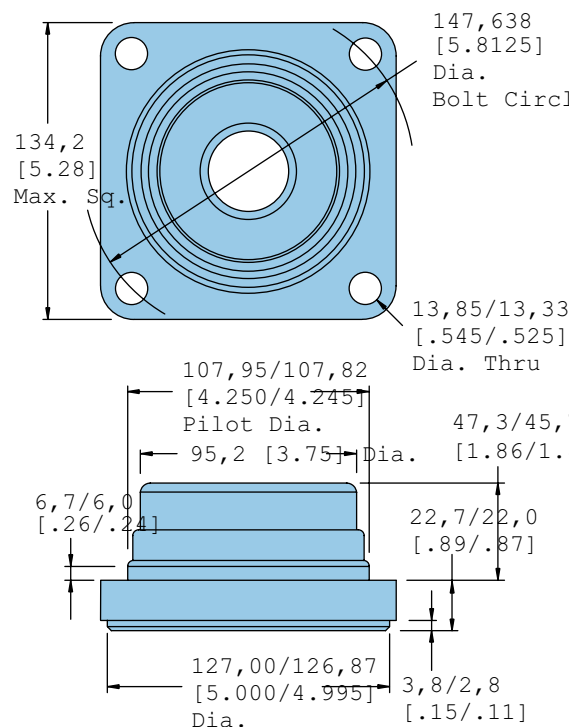
Four Bolt



Four Bolt Magneto



Four Bolt (Wheel Motor)

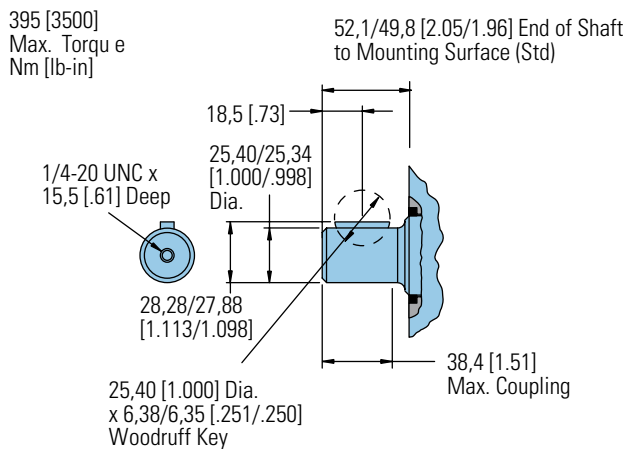


2000 Series

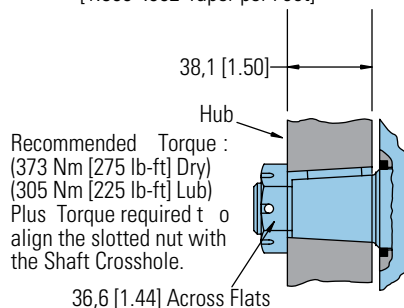
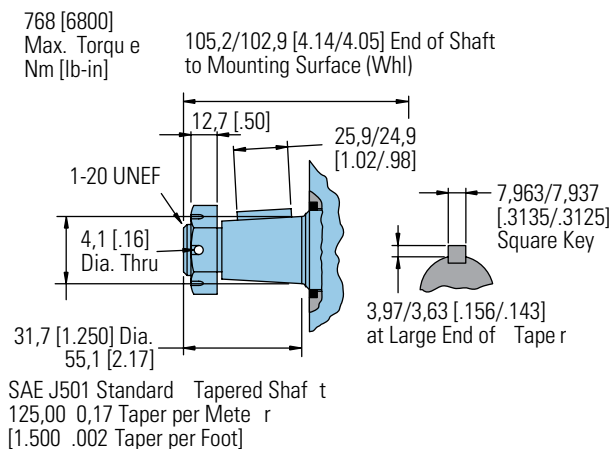
Dimensions

Shafts

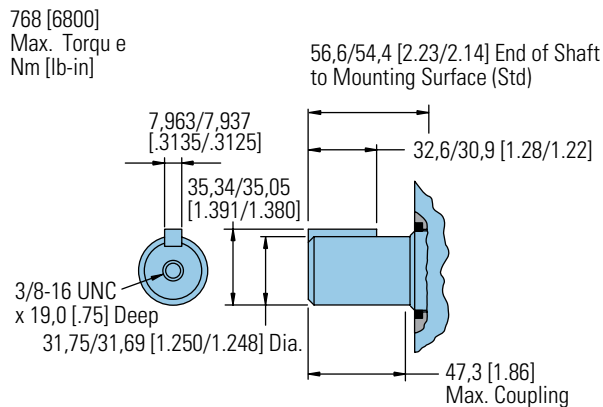
1 Inch Straight



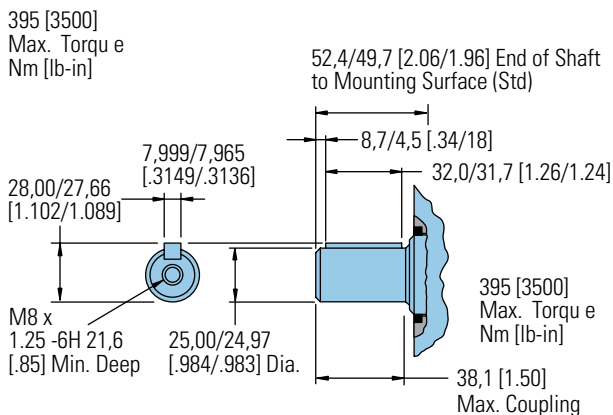
1 1/4 Inch Tapered



1 1/4 Inch Straight



25 mm Straight

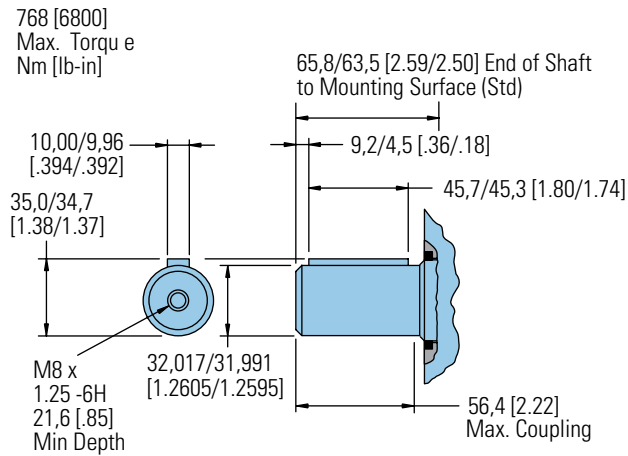


2000 Series

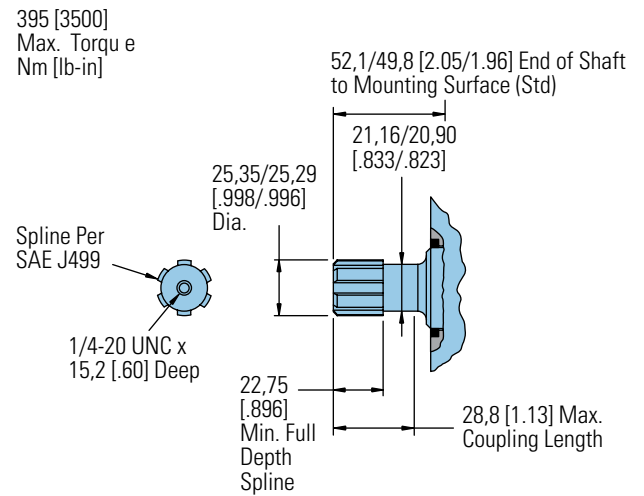
Dimensions

Shafts

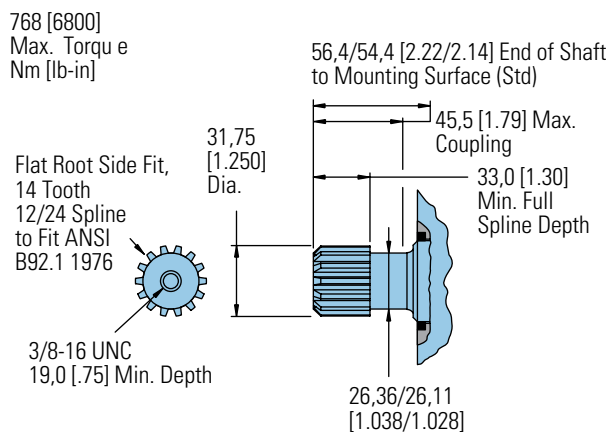
32 mm Straight



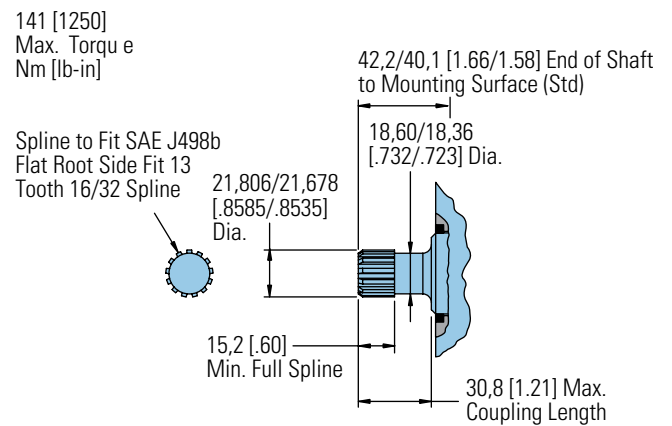
SAE 6B Splined



1 1/4 -14 Tooth Splined



13 Tooth Splined



2000 Series

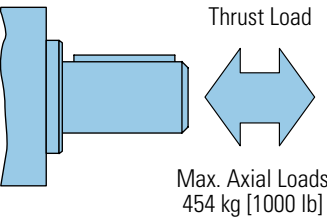
Shaft Side Load Capacity

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



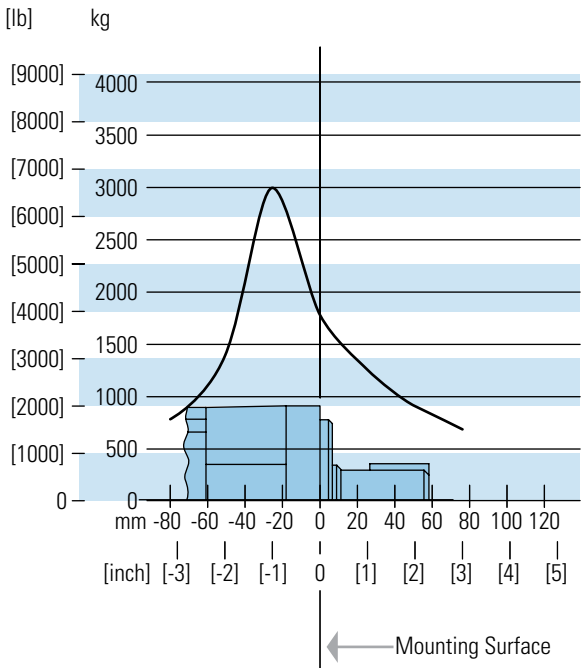
hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

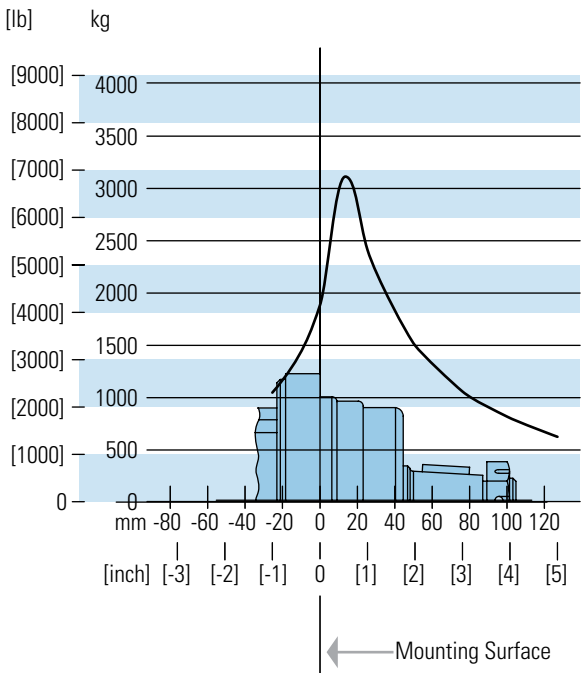
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



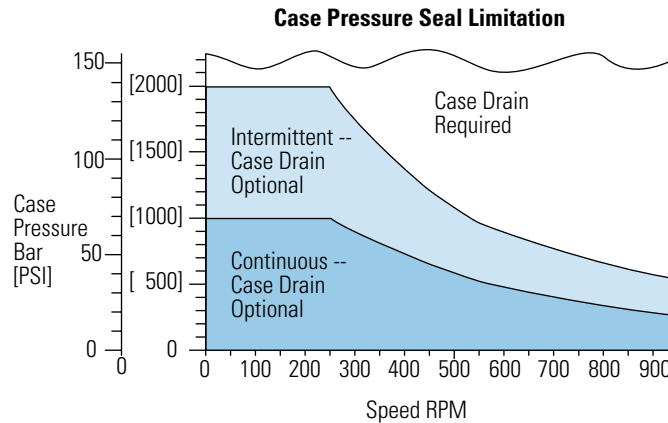
Wheel Motor
Tapered Shaft



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.

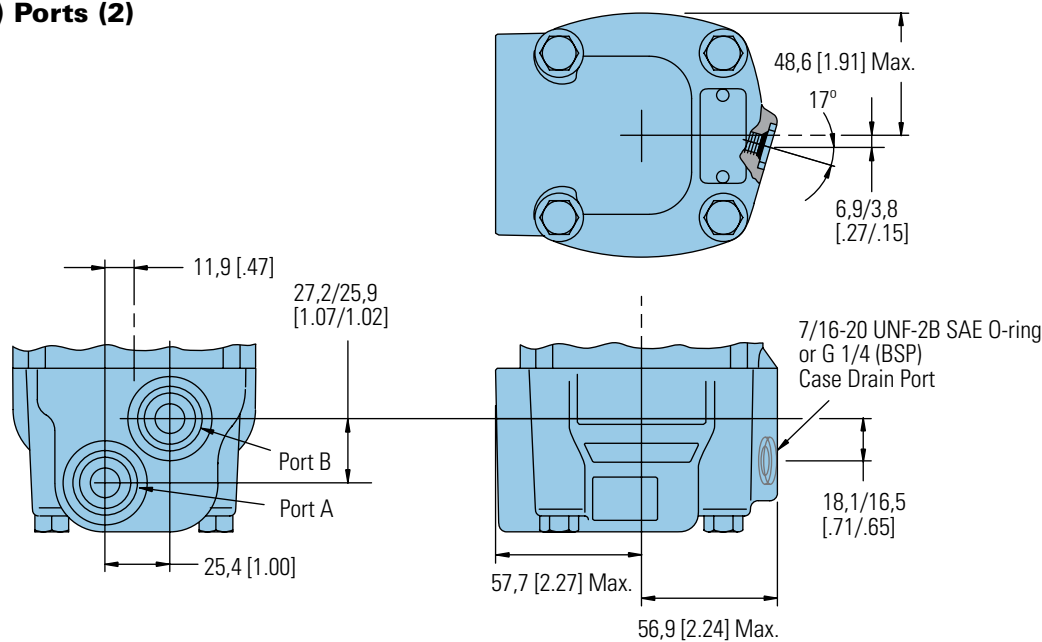
Cooler Motor — exiting oil draws motor heat away.

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

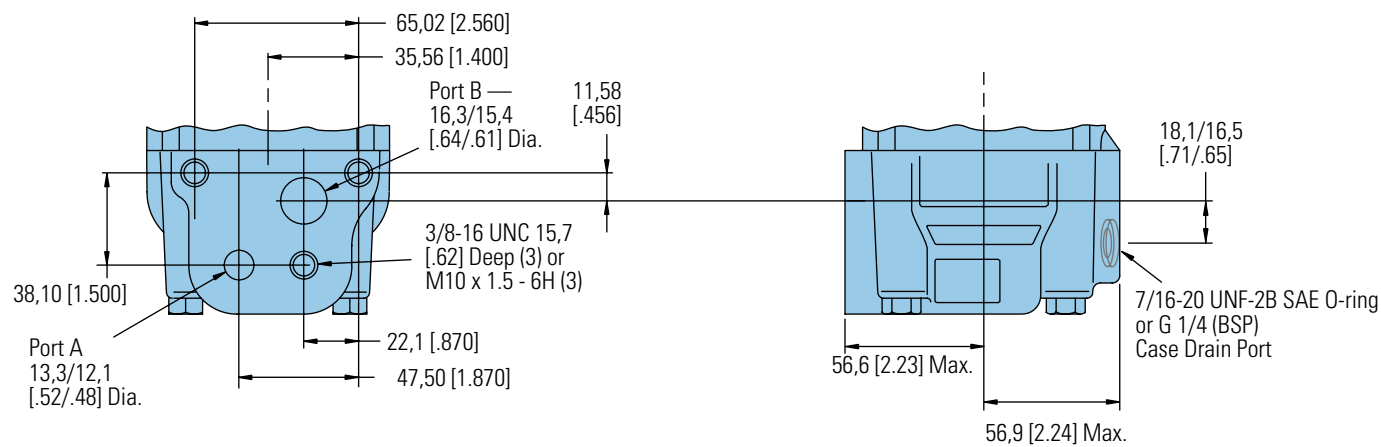
2000 Series

Dimensions
Ports

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



Manifold Mount

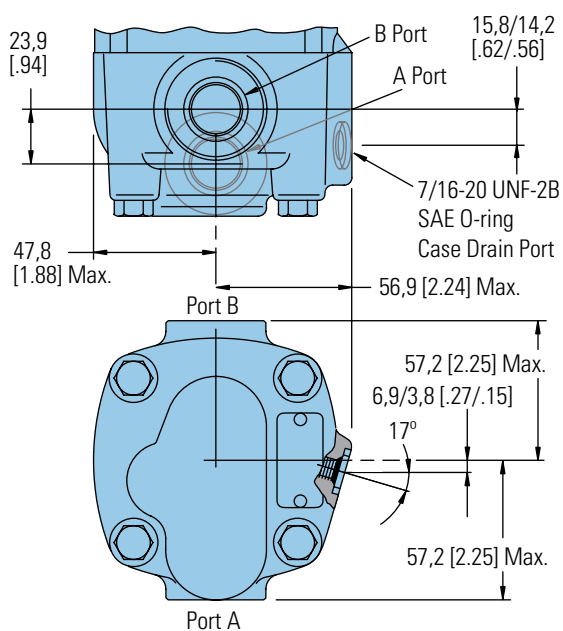


2000 Series

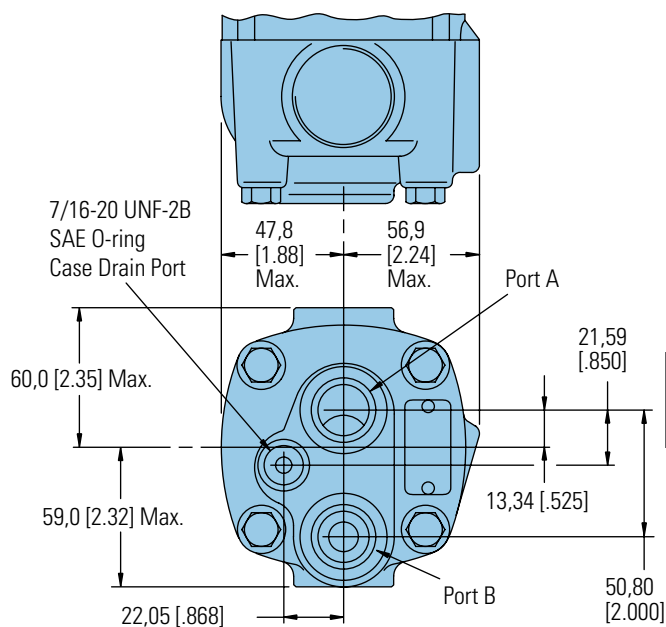
Dimensions

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)



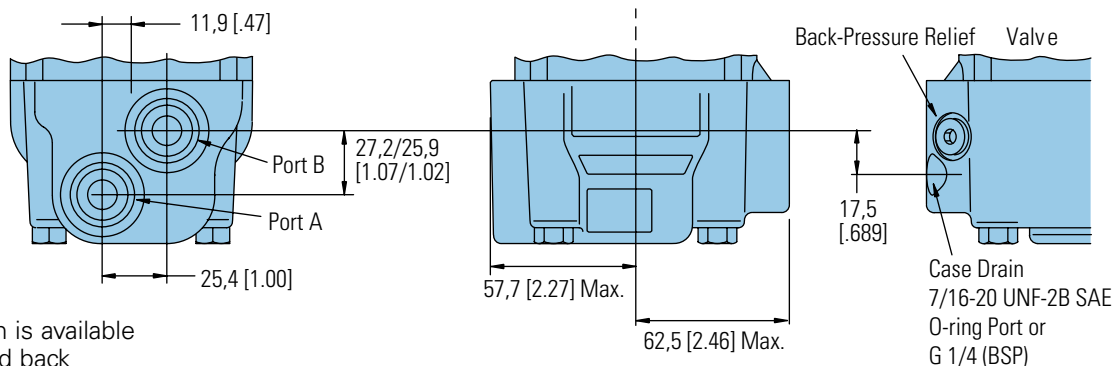
C-1

2000 Series

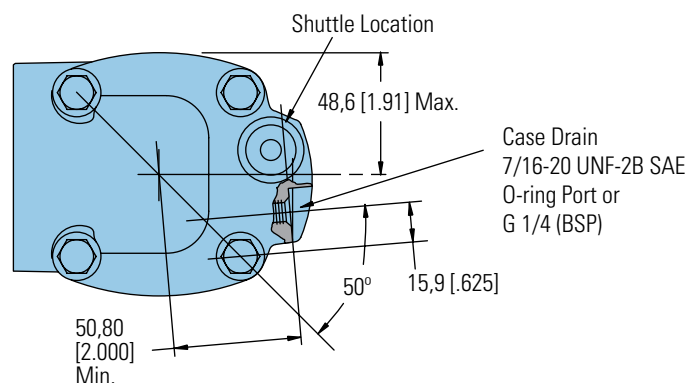
Dimensions

Ports with Shuttle

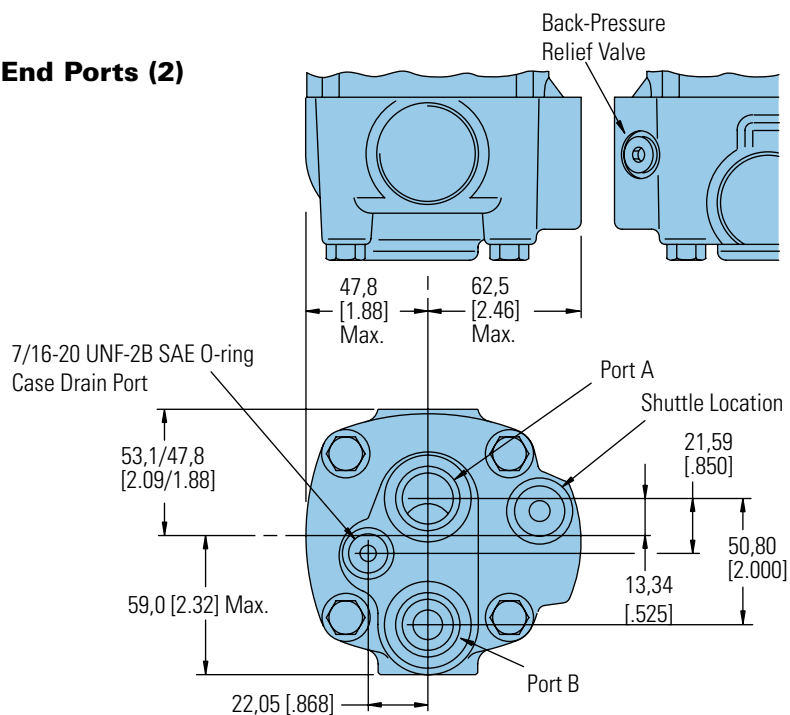
7/8 -14 UNF-2B SAE O-ring Ports (2) or G 1/2 (BSP) Ports (2)



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		7/8 -14 O-ring Staggered	106-1008	—	-1009	-1010	-1011	-1012	-1013	-1014	-1015	-1047
		G 1/2 (BSP)	106-1038	—	-1039	-1040	-1041	-1042	-1043	-1044	-1045	—

*New Release

106-1044

Motors with Corrosion Protection

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER									
			80 [4.9]	90* [5.5]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
2 Bolt SAE A Flange	1 inch Straight	7/8 -14 O-ring Staggered	104-1528	—	-1529	-1530	-1531	-1532	-1533	-1534	-1519	-1535
	1 1/4 Inch Straight	7/8 -14 O-ring	104-1516	—	-1536	-1537	-1538	-1539	-1452	-1479	-1509	-1489

*New Release

2000 Series

Model Code

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

[1] Product
M – 2000 Series Motor

[2], [3] Product Series
02 – 2000 Series Motor

[4], [5], [6] Displacement
cm³/r [in³/r]
049 – 80.6 cm³/r [4.92]
055 – 90.6 cm³/r [5.53 in³/r]
062 – 101.6 cm³/r [6.20 in³/r]
080 – 130.6 cm³/r [7.97 in³/r]
096 – 158.1 cm³/r [9.65 in³/r]
119 – 194.8 cm³/r [11.89 in³/r]
149 – 244.3 cm³/r [14.91 in³/r]
187 – 306.6 cm³/r [18.71 in³/r]
240 – 393.8 cm³/r [24.03 in³/r]
298 – 489.0 cm³/r [29.84 in³/r]

[7], [8] Mounting Type
AB – Wheel, 4 Bolt: 108.0
[4.25] Pilot Dia. 13.59 [.535]
Dia. Holes on 147.6 [5.81]
Dia. Bolt Circle. 127.0 [5.00]
Dia. Rear Mount Pilot
AC – Standard, 2 Bolt: 82.6
[3.25] Pilot Dia. 13.59 [.535]
Dia. Holes on 106.4 [4.19]
Dia. Bolt Circle. SAE A
AD – Bearingless (w/ Leakage Slots), 4 Bolt: 101.6 [4.00] Pilot Dia. 13.59 [.535] Dia. Holes on 127.0 [5.00] Dia. Bolt Circle

AF – Standard, 2 Bolt: 101.6 [4.00] Pilot Dia. 14.35 [.565] Dia. Holes on 146.0 [5.75] Dia. Bolt Circle. SAE B

AH – Standard, 4 Bolt: 82.6
[3.25] Pilot Dia. 13.59 [.535]
Dia. Holes on 106.4 [4.19]
Dia. Bolt Circle

AJ – Standard (Magnet), 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. 2.79 [1.10] Pilot Length

AP – Wheel, 4 Bolt: 108.0 [4.25] Pilot Dia. 13.59 [.535] Dia. Holes on 147.6 [5.81] Dia. Bolt Circle. 127.0 [5.00] Dia. Rear Mount Pilot. Spigot Reduced to 88.9 [3.50] Dia. by 25.4 [1.00] Depth.

AZ – Bearingless (w/ Leakage Slots), 4 Bolt: 100.0 [3.94] Pilot Dia. 11.0 [.43] Dia. Holes on 125.0 [4.92] Dia Bolt Circle (European)

[9], [10] Output Shaft
00 – None (Bearingless)

The following 30-digit coding system has been developed to identify all of the configuration options for the 2000 Series motor. Use this model code to specify a motor with the desired features. All 30 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

01 – 25.40 [1.000] Dia. Straight Shaft with 1/4-20UNC-2B Thread in End, 6.35 [.250] Wide x 25.40 [1.000] Dia. Woodruff Key
02 – 31.75 [1.250] Dia. Straight Shaft with .375-16UNC-2B Thread in End, 7.938 [.3125] Sq x 31.75 [1.250] Straight Key
03 – 31.75 [1.250] Dia. .125:1 Tapered Shaft per SAE J501 with/1.000-20 UNEF-2A Threaded Shaft End and Slotted Hex Nut, 7.938 [.3125] Sq x 25.40 [1.0] Straight Key
04 – 31.75 [1.250] Dia. Flat Root Side Fit, 14 Tooth, 12/24 DP 30° Involute Spline w/ .375-16UNC-2B Thread in End, 33.0 [1.30] Min. Full Spline Length

05 – 25.40 [1.000] Dia. 6B Spline per SAE J499 with .250-20UNC-2B Thread in End, 22.76 [.896] Min. Full Spline Length
07 – 22.22 [.875] Dia. Flat Root Side Fit, 13 Tooth, 16/32 DP 30° SAE B Involute Spline, 15.2 [.60] Min. Full Spline Length

16 – 32.00 [1.260] Dia. Straight Shaft with M8 x 1.25-6H Thread in End, 9.982 [.3930] W x 7.995 [.3132] H x 45.00 [1.772] L Key

17 – 31.75 [1.250] Dia. Straight Shaft With 3/8-16 UNC-2B Thread in End, 7.938 [.3125] Sq x 31.75 [1.250] Straight Key, Corrosion Resistant (Seal area to shaft end)

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

19 – 25.00 [.984] Dia. Straight Shaft with M8 x 1.25-6H Thread in End, 7.982 [.3142] W x 6.954 [.2738] H x 31.82 [1.254] L Key

28 – 32.00 [1.260] Dia. 10:1 Tapered Shaft Per ISO R775 with M10 X 1.50-6H Thread in End, 6.00 [.236] Sq. x 50.00 [1.968] Key

39 – None (Bearingless)

European Spline

41 – 35.00 [1.378] Dia. 10:1 Tapered Shaft Per ISO R775 with M20 x 1.5-6g Threaded Shaft End and Slotted Hex Nut, 6.00 [.236] Sq. X 20.00 [.787] Key

42 – 35.00 [1.378] Dia. Straight Shaft with M8 x 1.25-6H Thread in End, 9.982 [.3930] W x 7.995 [.3132] H x 45.00 [1.772] L Key

[11], [12] Ports

AA – .875-14 UNF-2B SAE O-ring Ports - Staggered Ports

AB – 12.70 [.500] and 15.88 [.625] Dia. Manifold Ports with 3 x .375-16 UNC-2B Port Block Mounting Holes

AC – .875-14 UNF-2B SAE O-ring Ports - Ports Oriented 180° to each other

AE – 12.70 [.500] And 15.88 [.625] Dia. Manifold Ports with 3 x M10 x 1.5-6H Port Block Mounting Holes

AF – 1.0625-12 UN-2B SAE O-ring Ports - Ports Oriented 180° to each other

AG – G-1/2 BSP Straight THD Ports - Staggered Ports

AN – G-1/2 BSP Straight THD Ports - End Ported

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

AS – G-1/2 Bsp Straight THD Ports - Staggered Port with 2 x M10 x 1.5-6H Port Block Mounting Holes - European

[13], [14] Case Flow Options
Shuttles available with port code AA only)

01 – .4375-20 UNF-2B SAE O-Ring Port

02 – G 1/4 BSP Straight THD Port

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

13 – Reverse Flow Shuttle Valve w/ .4375-20 UNF-2B SAE O-Ring Port, .062 Dia. Shuttle Flow Orifice

[15] Low Pressure Relief
0 – None

A – Set at 4.5 bar [65 lbf/in²]

B – Set at 15.2 bar [220 lbf/in²]

C – Set at 20.7 bar [300 lbf/in²]

E – Set at 11.03 bar [160 lbf/in²]

[16], [17] Pressure/Flow Option

Integral Cross-Over Relief Valve:

00 – None

30 – Set at 103.4 bar [1500 lbf/in²]

31 – Set at 120.6 bar [1750 lbf/in²]

32 – Set at 137.9 bar [2000 lbf/in²]

33 – Set at 155.1 bar [2250 lbf/in²]

34 – Set at 172.4 bar [2500 lbf/in²]

35 – Set at 189.6 bar [2750 lbf/in²]

36 – Set at 206.8 bar [3000 lbf/in²]

[18] Geroler Option
1 – Standard

[19] Seal Options
0 – Standard

1 – Viton

2 – Viton Shaft Seal

4 – Seal Guard

[20], [21] Accessories
00 – None

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

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

[22], [23] Special Features (Hardware)
00 – None

[24], [25] Special Features (Assembly)
00 – None

AB – Reverse Rotation

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

AC – Epoxy Coated (Frost Gray) Indiv. Box

[28], [29] Customer ID
AA – None

[30] Design Code
F – Sixth

2000 Series Two-Speed

Description

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

An external two position three way valve is required for shifting the pilot pressure port between signal pressure (HSLT) and low pressure (LSHT)

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

When pilot pressure is removed from the pilot port the pressure in the pilot end of the spool valve is relieved and drained back through this three way valve,

the spring force returns the spool valve to LSHT position. Pilot pressure may come from any source that will provide uninterrupted pressure during the high speed mode operation. Pilot pressure 6.9 Δ Bar [100 Δ PSI] minimum, up to the full operating pressure of the motor.

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

However, to prevent cavitation in the HSLT mode, the preferred direction of shaft rotation is counter clockwise (port B pressurized). This unique disc valve is not symmetrical in porting the fluid for the HSLT mode. Consequently, when the pressure is reversed for HSLT CW rotation, cavitation

can occur. Installing a restriction (200 psi or more depending on flow) in the hydraulic line that connects port B will prevent cavitation.

If you are operating in a critical area and a restriction in the hydraulic line causes concern, these two speed motors can be ordered timed with CW preferred HSLT shaft rotation. Hence, with this option port B will have to be pressurized for CW preferred HSLT shaft rotation. The restriction recommended for the line connecting port B remains unchanged.

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

C-1

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!

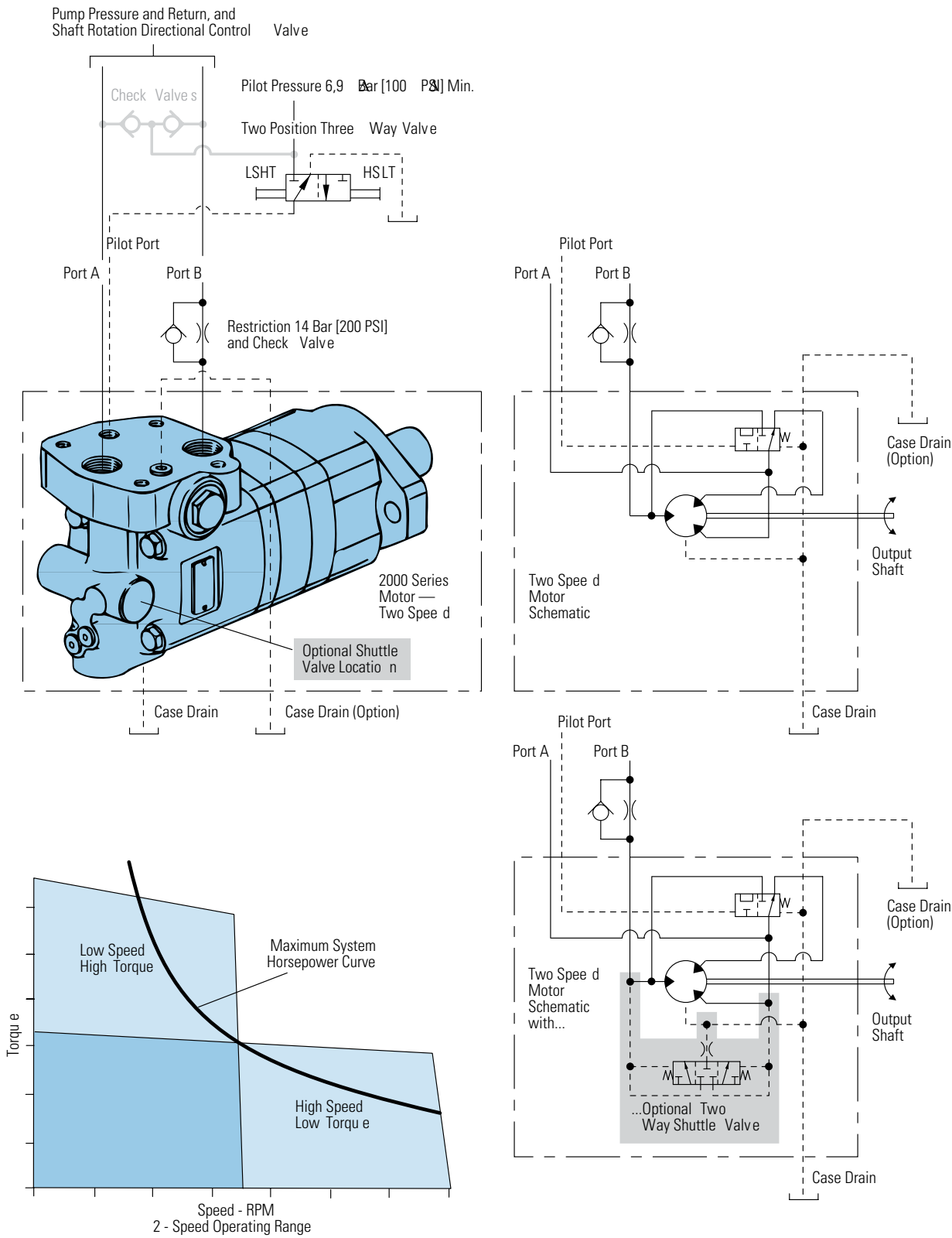
Due to potential problems in maintaining charge pump pressure at port B for uninterrupted back pressure during dynamic braking, Eaton does not recommend the two speed motor where overrunning conditions may exist.

2000 Series Two-Speed

Typical Hydraulic Circuit

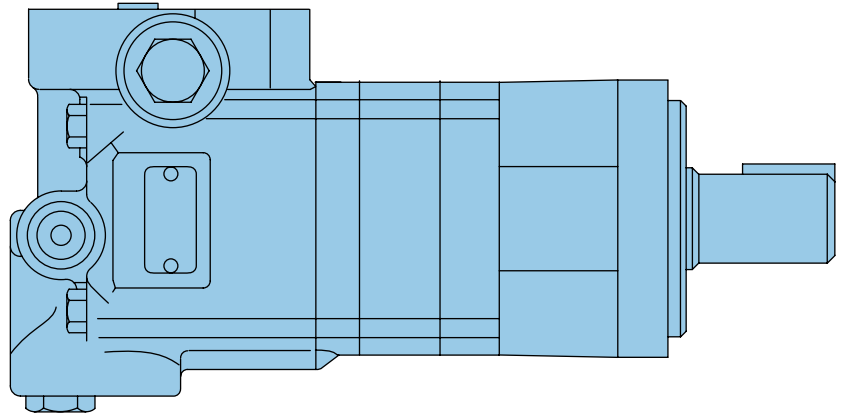
Note:

This is the low speed biased motor circuit. For the high speed biased motor 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)	High Speed Mode	1000	1000	990	860	700	560	450	350	230
@ Continuous Flow	Low Speed Mode	500	500	495	430	350	280	225	175	115
Flow l/min [GPM]	High Speed Mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Low Speed Mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
Torque*	High Speed Mode									
Nm	Continuous	100 [880]	125 [1115]	165 [1450]	195 [1725]	240 [2150]	300 [2675]	380 [3350]	365 [3225]	448 [3970]
[lb-in]	Intermittent	145 [1300]	185 [1660]	240 [2150]	240 [2150]	300 [2650]	375 [3330]	440 [3900]	445 [3940]	486 [4300]
Torque*	Low Speed Mode									
Nm	Continuous	235 [2065]	295 [2630]	385 [3420]	455 [4040]	540 [4780]	660 [5850]	765 [6750]	775 [6840]	845 [7470]
[lb-in]	Intermittent	345 [3035]	445 [3950]	560 [4970]	570 [5040]	665 [5890]	820 [7250]	885 [7820]	925 [8170]	930 [8225]
Pressure	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	155 [2250]	120 [1750]
Δ bar [Δ PSI]	Intermittent	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	260 [3750]	190 [2750]	140 [2000]
Weight	Standard or	13,8 [30.5]	14,1 [31.0]	14,3 [31.5]	14,5 [32.0]	15,0 [33.0]	15,4 [34.0]	15,9 [35.0]	16,3 [36.0]	16,8 [37.0]
kg [lb]	Wheel Mount									
	Bearingless	11,8 [26.0]	12,0 [26.5]	12,2 [27.0]	12,5 [27.5]	12,9 [28.5]	13,4 [29.5]	13,8 [30.5]	14,3 [31.5]	14,7 [32.5]

Maximum Case Pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

Note:

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

High Speed Mode

(Reduced Motor Displacement)

Low Speed Mode

(Full Motor Displacement)

Maximum Inlet Pressure:

310 bar [4500 PSI]

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

Maximum Return Pressure:

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

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

Δ bar [Δ PSI] :

The true pressure difference between inlet port and outlet port

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended 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

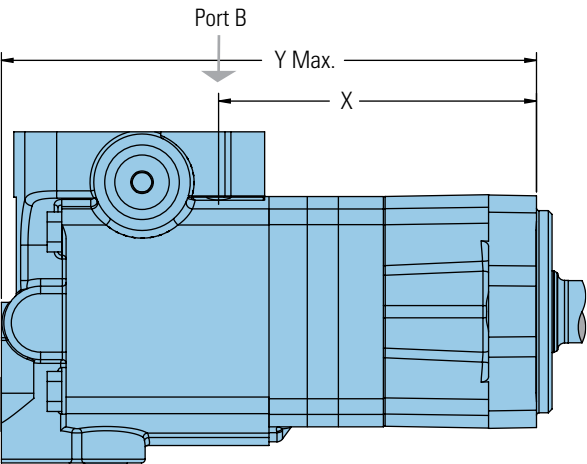
Ports

- 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

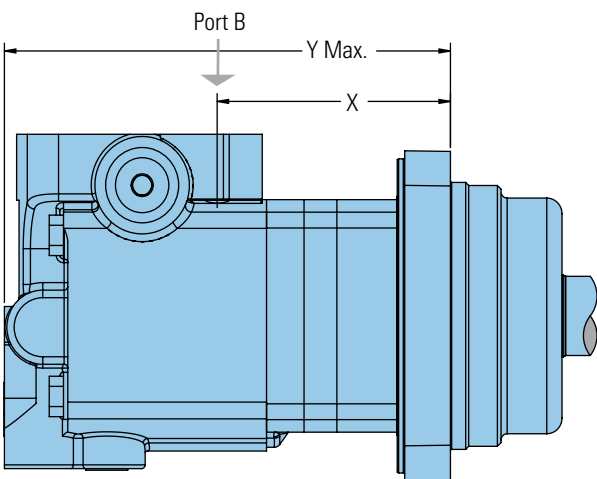
Two-Speed Standard Motors



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

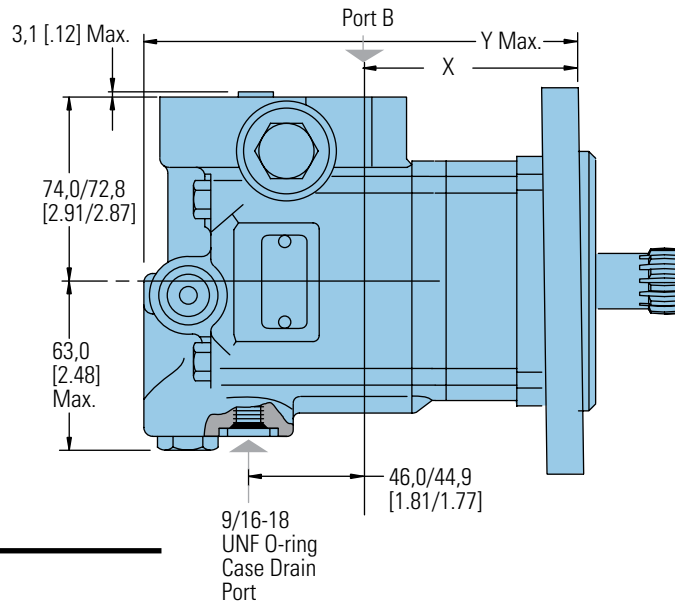
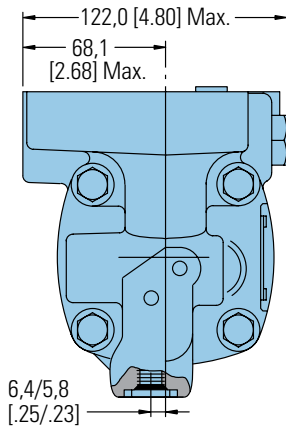
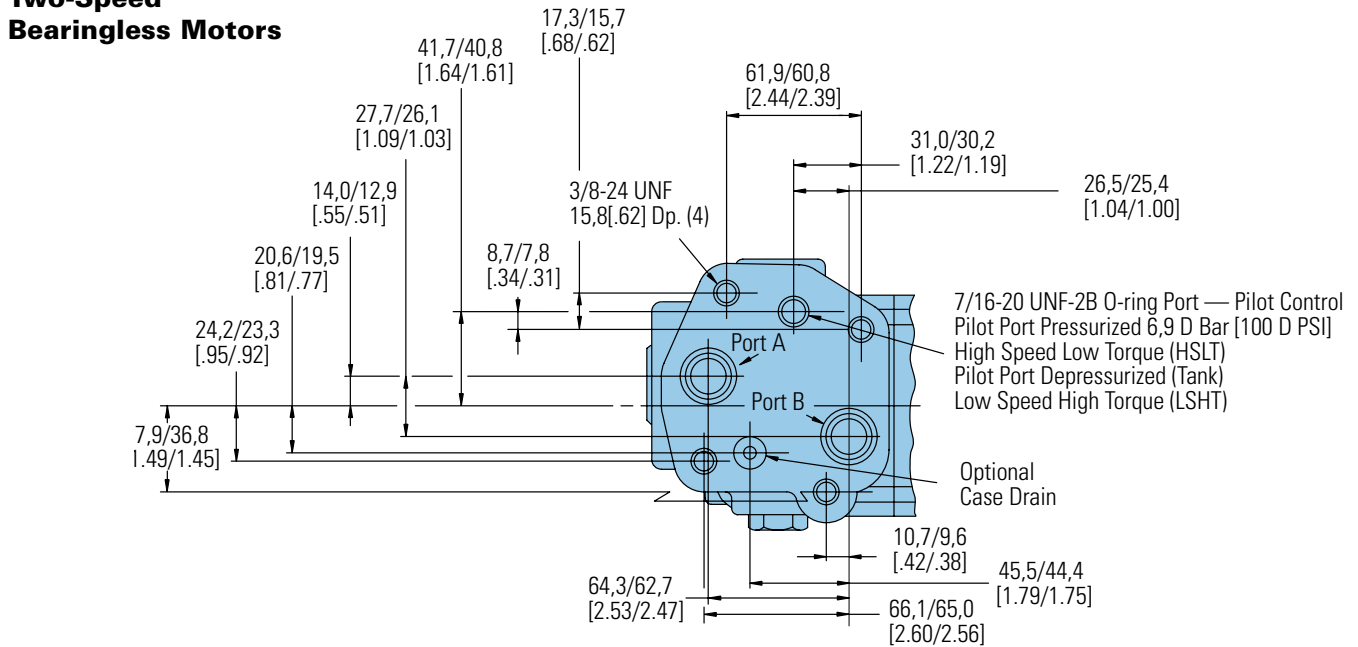
7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
 9/16 -18 UNF-2B SAE O-ring Case Drain Port (1)
 7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1) or
 G 1/2 (BSP) Staggered Ports (2)
 G 1/4 (BSP) Case Drain Port (1)
 G 1/4 (BSP) Pilot Control Port (1)

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 106-2007.

Orders will not be accepted without three digit prefix.

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER									
			80 [4.9]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]	
2 Bolt SAE A Flange	1 Inch Straight	7/8 -14 O-ring Staggered	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	*	* *		0 0		* *		* *		A A		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 – .Painted Low Gloss
Black, Individual Box

28, 29 Customer Identification

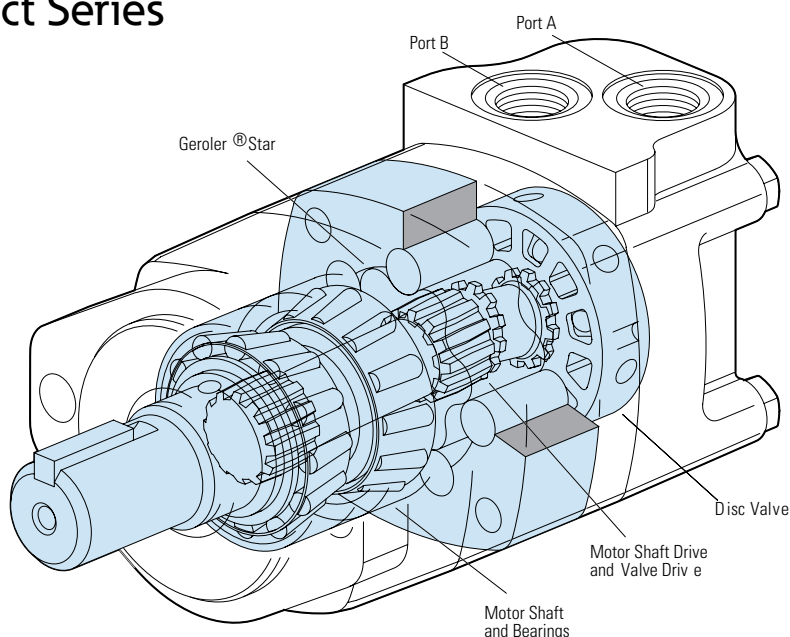
AA – .NONE

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



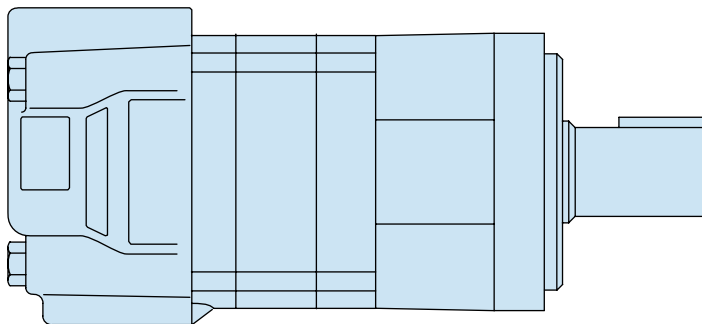
Boom Lift



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

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170	[2750] 190	[3000] 205	[3250] 225	[3500] 240	[3750] 260	[4000] 275	[4250] 295
[0.25] 0.95	244 28 4	543 61 3															
[0.5] 1.9	274 31 10	554 63 8	854 96 7														
[1] 3.8	274 31 22	593 67 21	899 102 20	1210 137 19	1513 171 17	1816 205 14	2092 236 12	2361 267 10	2621 296 9	2874 325 7	3088 349 6						
[2] 7.5	301 34 40	623 70 39	940 106 38	1261 143 36	1579 178 35	1898 214 33	2197 248 31	2492 282 28	2766 313 24	3033 343 20	3270 369 17	3496 395 14	3761 425 10	4022 454 6			
[4] 15	305 34 87	662 75 85	1004 113 83	1354 153 81	1699 192 79	2046 231 77	2386 270 74	2725 308 72	3049 344 67	3368 381 63	3693 417 59	4016 454 55	4319 488 49	4618 522 44	4828 545 35	5022 567 27	
[6] 23	293 33 133	659 74 131	1003 113 129	1357 153 127	1705 193 124	2056 232 121	2399 271 118	2741 310 114	3074 347 109	3405 385 104	3751 424 99	4098 463 93	4417 499 87	4732 535 80	5023 568 71	5308 600 63	
[8] 30	280 32 181	656 74 179	1002 113 177	1360 154 175	1711 193 172	2066 233 169	2412 273 166	2758 312 157	3100 350 152	3442 389 145	3809 430 139	4180 472 133	4514 510 127	4846 548 120	5218 590 113	5593 632 104	5856 662 104
[10] 38	259 29 228	630 71 225	978 110 223	1348 152 220	1701 192 217	2061 233 213	2408 272 209	2755 311 204	3102 351 199	3450 390 193	3806 430 186	4163 470 179	4500 508 172	4835 546 165	5191 586 157	5547 627 150	5784 653 141
[12] 45	238 27 275	604 68 272	954 108 269	1336 151 266	1692 191 262	2056 232 258	2403 272 253	2752 311 247	3105 351 241	3458 391 235	3802 430 229	4146 468 223	4485 507 214	4824 545 205	5163 583 197	5501 622 189	
[14] 53	210 24 322	577 65 319	923 104 316	1308 148 313	1665 188 308	2034 230 304	2385 269 298	2739 310 293	3092 349 286	3447 390 279	3796 429 272	4144 468 265	4487 507 256	4830 546 247			
[16] 61	182 21 370	550 62 367	893 101 363	1280 145 360	1638 185 356	2012 227 351	2367 267 345	2727 308 339	3080 348 332	3436 388 324	3789 428 317	4143 468 309	4489 507 301	4836 546 292			
[18] 68	143 16 417	514 58 414	853 96 410	1247 141 406	1601 181 401	1973 223 397	2329 263 390	2692 304 383	3045 344 375	3401 384 366	3756 424 358	4114 465 350					
[20] 76	105 12 464	478 54 461	814 92 457	1213 137 453	1564 177 448	1935 219 442	2291 259 435	2658 300 428	3010 340 418	3366 380 409	3724 421 400	4085 462 390					
[22] 83		433 49 508	762 86 504	1167 132 500	1518 172 495	1893 214 489	2252 254 482	2623 296 474	2973 336 465	3328 376 456	3682 416 446	4040 456 436					
[24] 91		387 44 556	711 80 552	1121 127 548	1472 166 542	1851 209 537	2212 250 529	2589 292 521	2937 332 513	3291 372 504	3641 411 493	3995 451 483					
[25] 95		363 41 580	683 77 576	1095 124 572	1445 163 566	1824 206 560	2184 247 552	2561 289 544	2910 329 535	3266 369 526							
[30] 114		244 28 699	546 62 695	967 109 692	1308 148 685	1689 191 678	2045 231 669	2421 274 660	2777 314 648	3144 355 637							

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

C-2

4000 Compact Series

Performance Data

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

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

Continuous

Intermittent

Peak

No Operation

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

	[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]	[4000]	[4250]
	15	35	50	70	85	105	120	140	155	170	190	205	225	240	260	275	295
[0.25]	115	504															
0,95	13	57															
[0.5]	268	584	963	1274													
1,9	30	66	109	144													
[1]	8	7	4	3													
3,8	306	721	1104	1516	1913	2243	2397	2772									
[2]	35	81	125	171	216	253	271	313									
7,5	17	16	14	13	12	10	9	6									
[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	622	664	706		
[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
61	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		
68	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		
76	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		
[22]	223	222	219	217	214	211	207	202	197	192	186	180	174	167	164		
83	282	762	1237	1693	2121	2601	2968	3504	3953	4368	4832	5261	5690				
[24]	32	86	140	191	240	294	335	396	447	493	546	594	643				
91	261	260	257	255	252	248	244	238	233	227	221	214	208				
[25]	224	712	1183	1629	2091	2581	2870	3477	3940	4328	4861	5240	5661				
95	25	80	134	184	236	292	324	393	445	489	549	592	640				
[30]	299	298	296	293	290	286	282	275	269	263	256	249	243				
114	200	667	1148	1619	2053	2520	2899	3442	3906	4337	4819	5245	5644				
	23	75	130	183	232	285	328	389	441	490	544	593	638				
	337	336	334	331	328	324	320	314	307	301	293	285	278				
	176	623	1112	1609	2014	2458	2929	3407	3872	4347	4777	5250	5627				
	20	70	126	182	228	278	331	385	437	491	540	593	636				
	375	374	372	369	366	363	358	353	346	339	331	322	315				
		565	1053	1530	1934	2387	2868	3347	3804	4254	4698						
		64	119	173	219	270	324	378	430	481	531						
		412	410	407	404	401	396	390	383	375	367						
		507	994	1450	1855	2316	2806	3287	3737	4162	4618						
		57	112	164	210	262	317	371	422	470	522						
		449	448	446	443	439	434	427	420	412	403						
		465	950	1411	1820	2276	2768	3233	3688	4116	4493						
		53	107	159	206	257	313	365	417	465	508						
		468	467	464	462	458	453	446	439	431	423						
		259	726	1214	1645	2072	2577	2961	3443	3889	3866						
		29	82	137	186	234	291	335	389	439	437						
		562	563	559	555	556	550	545	536	527	521						

[2072]
234
556 } 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

Flow LPM [GPM]

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														
	6	5														
[1]	438	904	1403	1887	2359	2798	3221	3657	3822	4326						
3.8	49	102	158	213	267	316	364	413	432	489						
	14	14	13	12	11	9	8	7	4	3						
[2]	492	1054	1563	2081	2623	3160	3717	4147	4585	5070	5470	5721	5962			
7.5	56	119	177	235	296	357	420	469	518	573	618	646	674			
	28	27	26	25	24	23	21	17	16	13	9	7	5			
[4]	603	1183	1771	2275	2817	3364	3895	4495	5005	5496	5982	6500	7054	7519	7941	
15	68	134	200	257	318	380	440	508	565	621	676	734	797	850	897	
	58	56	55	54	52	50	47	44	42	38	35	32	28	24	17	
[6]	587	1159	1741	2329	2815	3369	3951	4483	5021	5555	6068	6557	7131	7641	8107	
23	66	131	197	263	318	381	446	506	567	628	686	741	806	863	916	
	88	86	84	82	80	77	74	71	67	63	59	55	50	45	38	
[8]	571	1135	1710	2384	2813	3375	4008	4471	5038	5613	6154	6614	7209	7763	8272	
30	65	128	193	269	318	381	453	505	569	634	695	747	815	877	935	
	118	116	114	112	110	107	103	100	96	92	87	83	78	73	67	
[10]	552	1138	1671	2304	2804	3361	3950	4452	5006	5587	6123	6612	7201			
38	62	129	189	260	317	380	446	503	566	631	692	747	814			
	148	146	144	142	139	136	131	127	123	119	113	109	102			
[12]	532	1140	1631	2224	2796	3347	3892	4434	4974	5561	6093	6610	7193			
45	60	129	184	251	316	378	440	501	562	628	688	747	813			
	178	177	175	173	170	166	161	157	151	146	141	136	129			
[14]	441	1072	1600	2207	2754	3320	3888	4433	4958	5529	6066	6590				
53	50	121	181	249	311	375	439	501	560	625	685	745				
	209	207	205	202	199	195	190	185	179	174	168	162				
[16]	349	1003	1568	2190	2711	3292	3884	4431	4941	5496	6039	6570				
61	39	113	177	247	306	372	439	501	558	621	682	742				
	239	237	235	233	229	225	220	214	208	202	195	189				
[18]	306	940	1513	2114	2653	3251	3830	4380	4904	5446	5984	6518				
68	35	106	171	239	300	367	433	495	554	615	676	736				
	269	267	265	263	259	255	250	243	236	230	223	214				
[20]	263	876	1458	2038	2595	3210	3777	4328	4867	5395	5928	6471				
76	30	99	165	230	293	363	427	489	550	610	670	731				
	300	298	296	293	290	285	280	272	265	259	251	241				
[22]		826	1414	1991	2528	3144	3709	4262	4806	5354	5915					
83		93	160	225	286	355	419	482	543	605	668					
		328	326	323	320	315	309	302	295	288	279					
[24]		776	1370	1945	2462	3079	3642	4196	4745	5313	5901					
91		88	155	220	278	348	411	474	536	600	667					
		359	356	354	350	345	339	332	325	317	308					
[25]		732	1322	1959	2426	3026	3594	4153	4696	5152						
95		83	149	221	274	342	406	469	531	582						
		374	371	369	365	360	354	347	340	333						
[30]		509	1082	2029	2246	2761	3358	3939	4450	4347						
114		57	122	229	254	312	379	445	503	491						
		450	449	445	442	437	430	423	414	413						

[2246]
254
442 } 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

325 cm³/r [19.8 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	[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 125 210	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

Flow LPM [GPM]

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

[2655]
 300
 227

} Torque [lb-in]
 Nm
 Speed RPM

4000 Compact Series

Performance Data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area. Performance data is typical at 120 SUS. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No Operation

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

		[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170
Flow LPM [GPM]	[0.5] 1.9	375 42 3	1669 189 3								
	[1] 3.8	525 59 7	1762 199 7	2945 333 6	3965 448 6	5099 576 6	5926 670 5	6715 759 4	7503 848 3		
	[2] 7.5	639 72 14	2108 238 14	3287 371 13	4169 471 13	5416 612 11	6570 742 11	7188 812 9	8295 937 6	8959 1012 5	
	[4] 15	981 111 30	2201 249 29	3333 377 29	4574 517 28	5558 628 27	6634 750 26	7694 869 24	8627 975 21	9567 1081 18	10399 1175 13
	[6] 23	1049 119 45	2218 251 45	3332 376 44	4584 518 43	5604 633 42	6670 754 40	7711 871 38	8713 984 35	9698 1096 31	10588 1196 26
	[8] 30	1118 126 61	2236 253 60	3331 376 60	4593 519 59	5650 638 58	6705 758 56	7727 873 54	8798 994 51	9828 1110 48	10778 1218 44
	[10] 38	1060 120 76	2230 252 76	3304 373 75	4503 509 75	5607 633 73	6693 756 72	7721 872 69	8836 998 66		
	[12] 45	1003 113 92	2223 251 91	3276 370 91	4413 499 90	5564 629 89	6680 755 88	7715 872 85	8874 1003 82		
	[14] 53	858 97 108	2127 240 107	3136 354 107	4320 488 106	5496 621 105	6542 739 103	7653 865 100			
	[16] 61	713 81 124	2030 229 123	2997 339 122	4226 477 122	5428 613 121	6403 723 119	7590 858 115			
	[18] 68	631 71 139	1907 215 139	2935 332 138	4133 467 137	5330 602 136	6339 716 134	7431 840 130			
	[20] 76	548 62 155	1784 202 154	2872 325 153	4041 457 153	5232 591 152	6275 709 150	7362 832 148			
	[22] 83		1669 189 170	2704 306 169	3928 444 169	5048 570 168	6124 692 166	7208 814 164			
	[24] 91		1553 175 186	2536 287 185	3816 431 185	4864 550 184	5972 675 182	7055 797 179			
	[25] 95		1469 166 193	2475 280 193	3737 422 193	4810 543 192	5909 668 190	6959 786 187			
	[30] 114		1047 118 232	2172 245 232	3341 378 232	4538 513 231	5592 632 229	6482 732 227			

[3341]
378
232

} Torque [lb-in
Nm
Speed RPM

4000 Compact Series

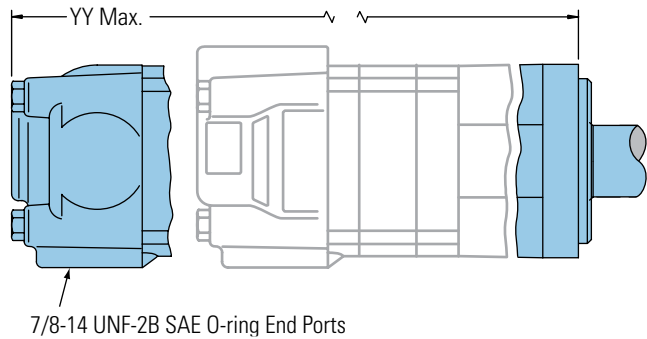
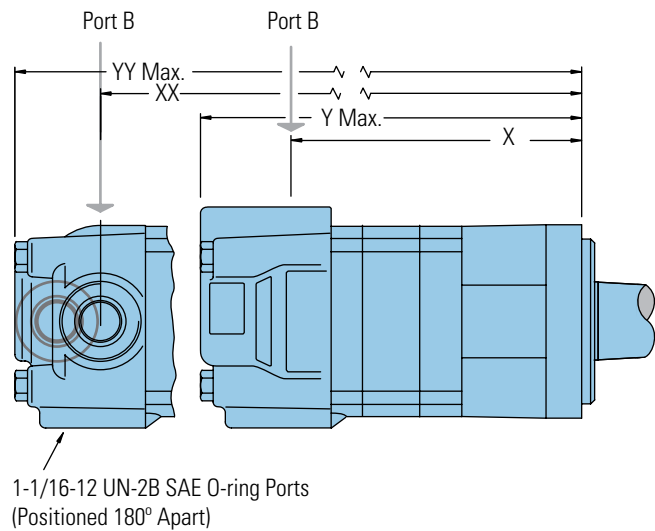
Dimensions
Standard Mount

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

Standard Rotation Viewed from Shaft End

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

Standard Mount



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

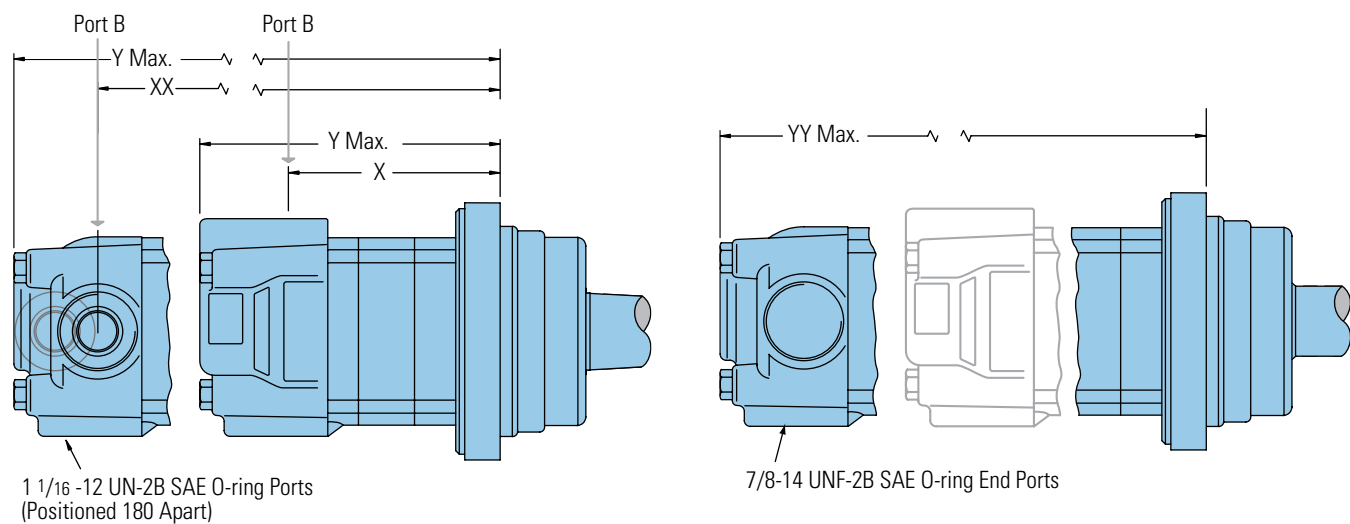
Ports

- 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

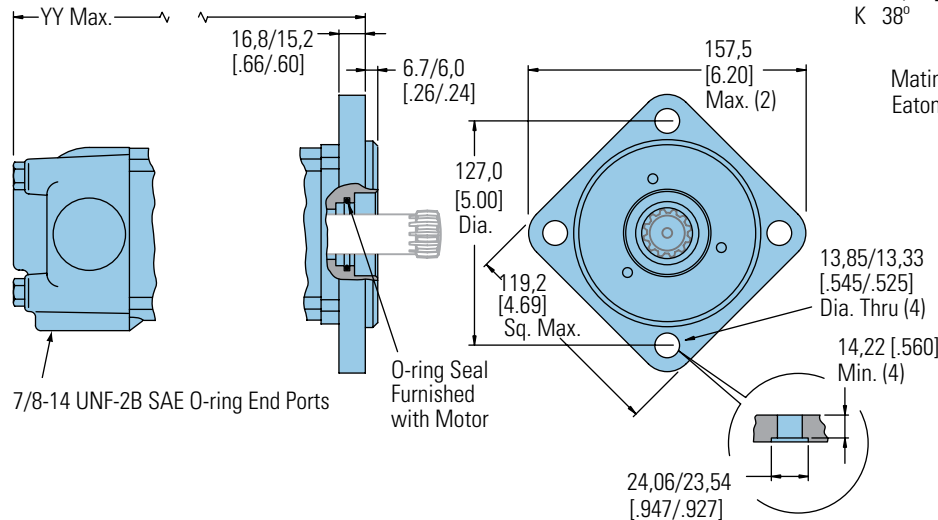
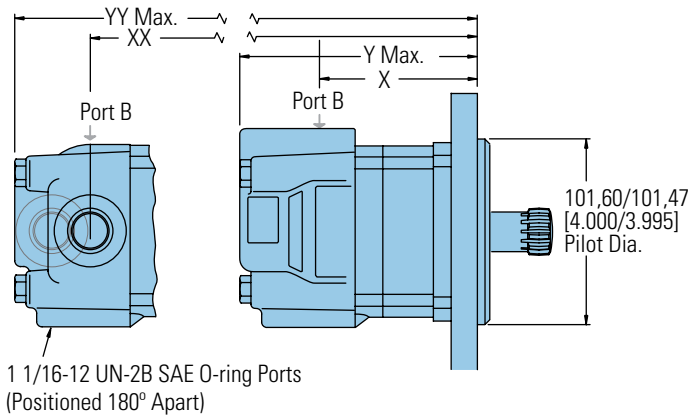
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
160 [9.8]	114,6 [4.51]	161,8 [6.37]	114,6 [4.51]	161,8 [6.37]
200 [12.3]	123,7 [4.87]	170,9 [6.73]	123,7 [4.87]	170,9 [6.73]
250 [15.4]	135,1 [5.32]	182,4 [7.18]	135,1 [5.32]	182,4 [7.18]
325 [19.8]	150,9 [5.94]	198,4 [7.81]	150,9 [5.94]	198,4 [7.81]
405 [24.6]	168,4 [6.63]	215,6 [8.49]	168,4 [6.63]	215,6 [8.49]
490 [29.8]	168,4 [6.63]	215,6 [8.49]	168,4 [6.63]	215,6 [8.49]

4000 Compact Series

Dimensions

Bearingless

Bearingless



Ports

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
 Port B Pressurized — CCW

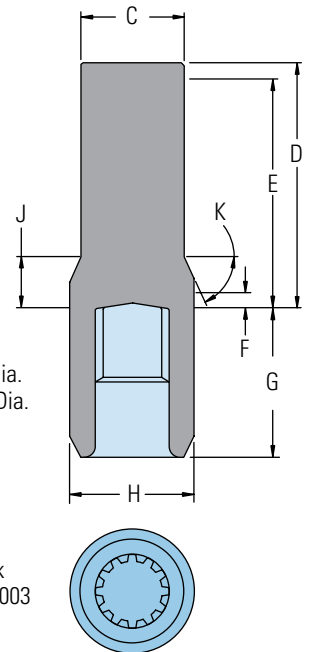
For 4000 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

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

Mating Coupling Blank
 Eaton Part No. 12745-003



C-2

BEARINGLESS MOTOR DIMENSIONS

Displacement X	Y	XX	YY
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]	mm [inch]
160 [9.8]	96,8 [3.81]	144,3 [5.68]	99,1 [3.90]
200 [12.3]	105,7 [4.16]	153,4 [6.04]	108,0 [4.25]
250 [15.4]	117,1 [4.61]	164,8 [6.49]	119,4 [4.70]
325 [19.8]	133,1 [5.24]	180,8 [7.12]	135,4 [5.33]
405 [24.6]	150,4 [5.92]	198,1 [7.80]	152,7 [6.01]
490 [29.8]	150,4 [5.92]	198,1 [7.80]	152,7 [6.01]

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.

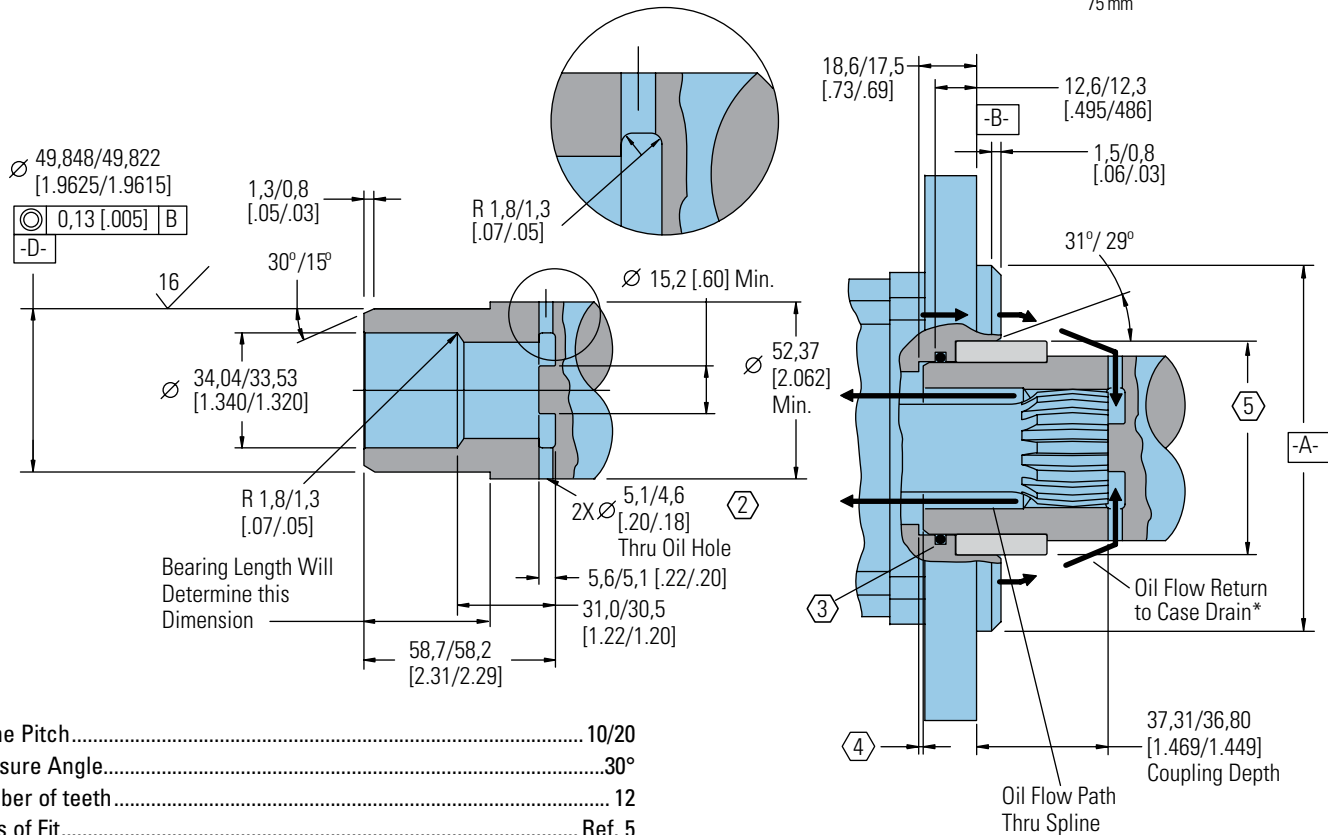
3 Seal to be furnished with motor for proper oil circulation thru splines.

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.

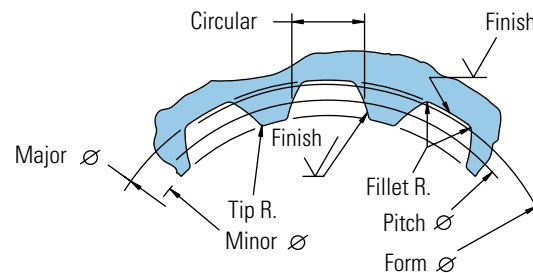
Stock Bearing Lengths:

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

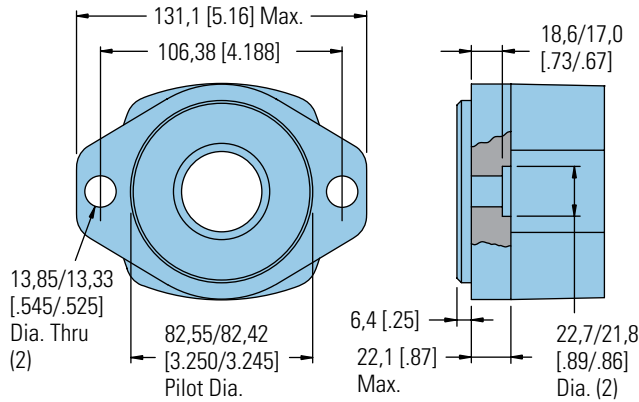


4000 Compact Series

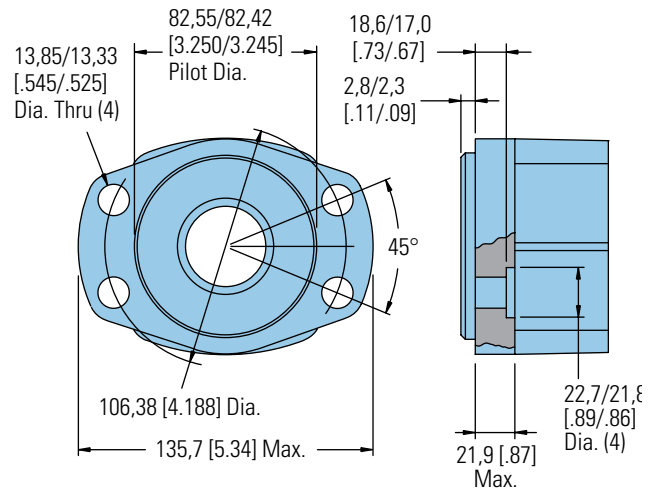
Dimensions

Mounting Options

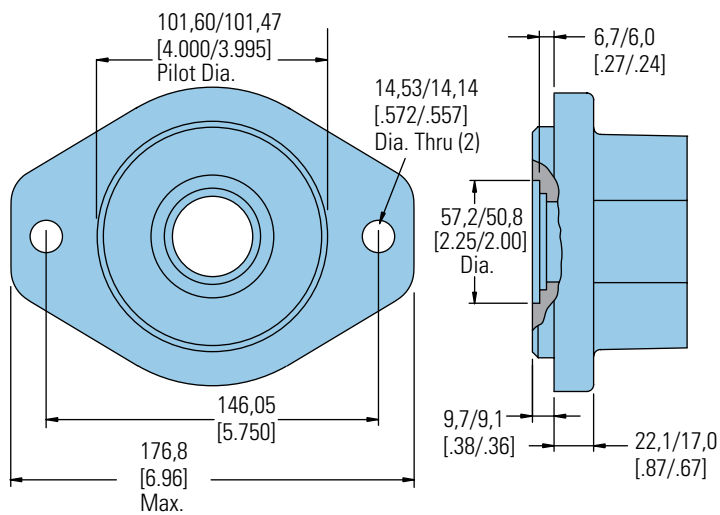
SAE A – Two Bolt (Standard Motor)



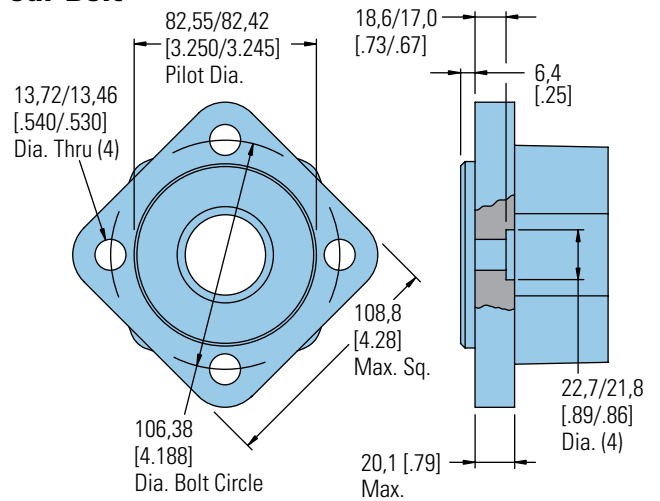
Four Bolt Magneto



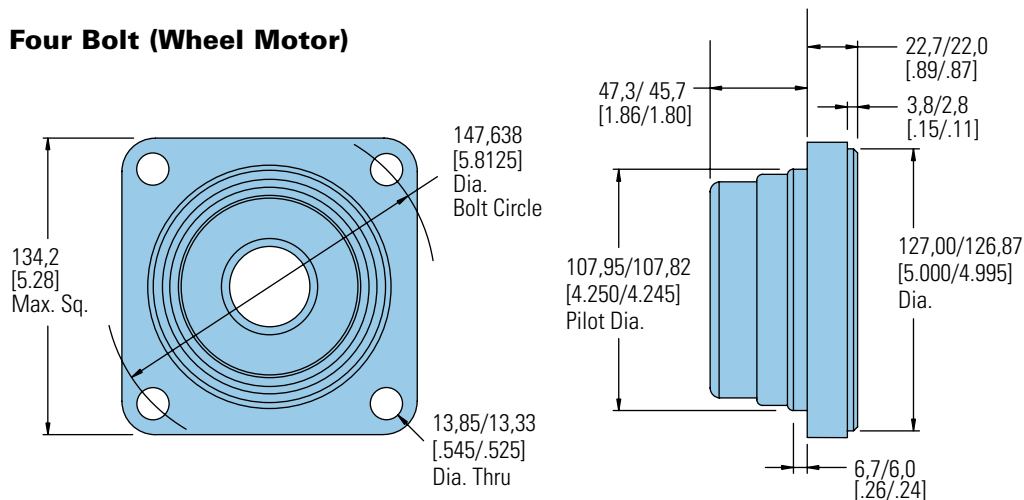
Two Bolt SAE B



Four Bolt



Four Bolt (Wheel Motor)

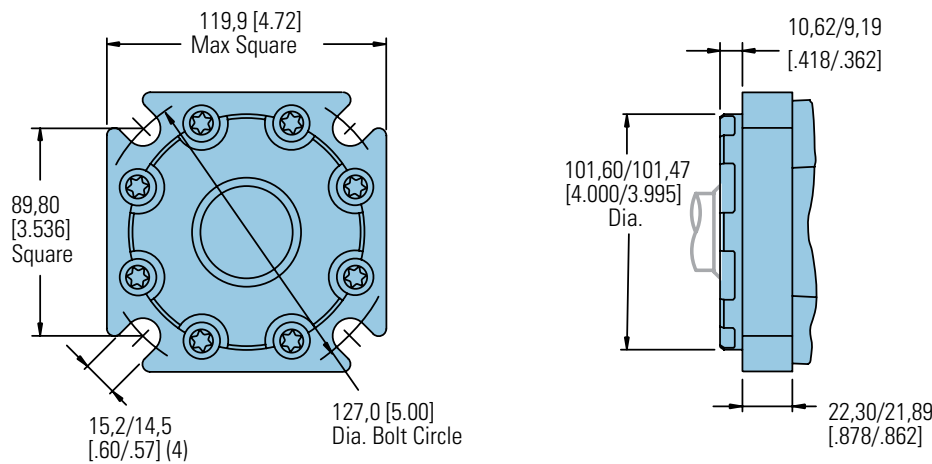


4000 Compact Series

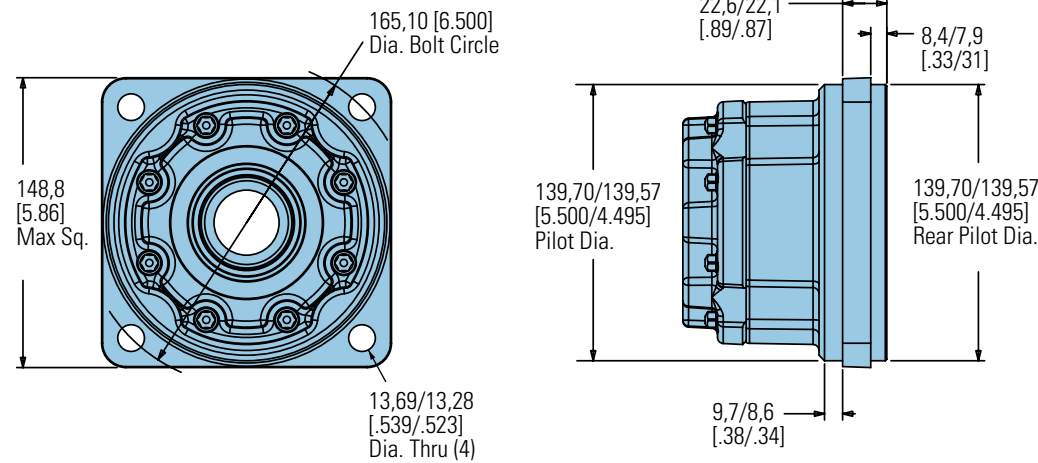
Dimensions

Mounting Options for use with Enhanced Bearings

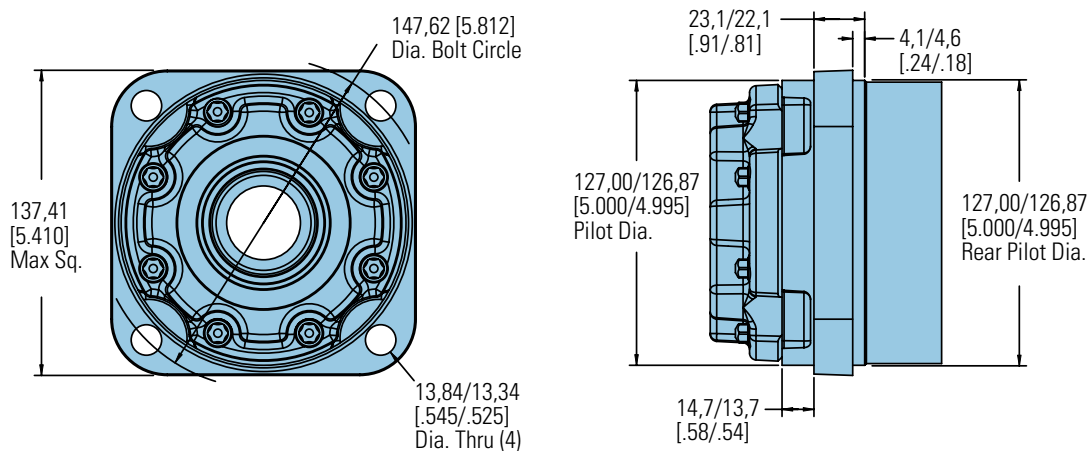
Standard Flange- Similar to SAE B type



Four Bolt (Wheel Motor)



Four Bolt (Wheel Motor- Short)

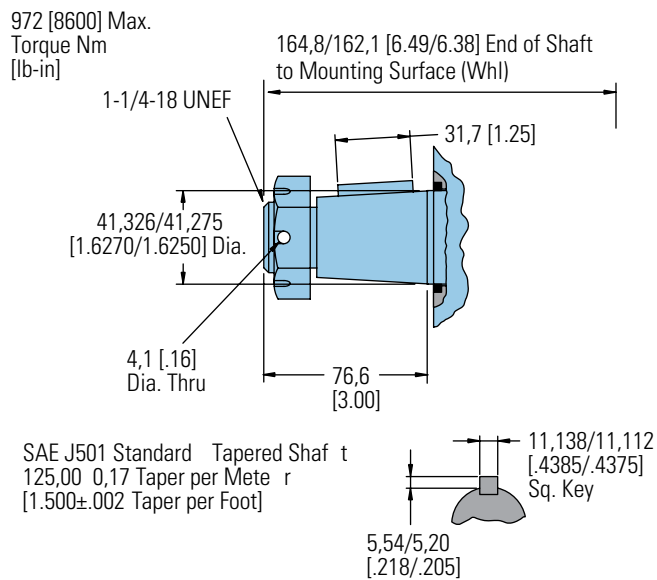


4000 Compact Series

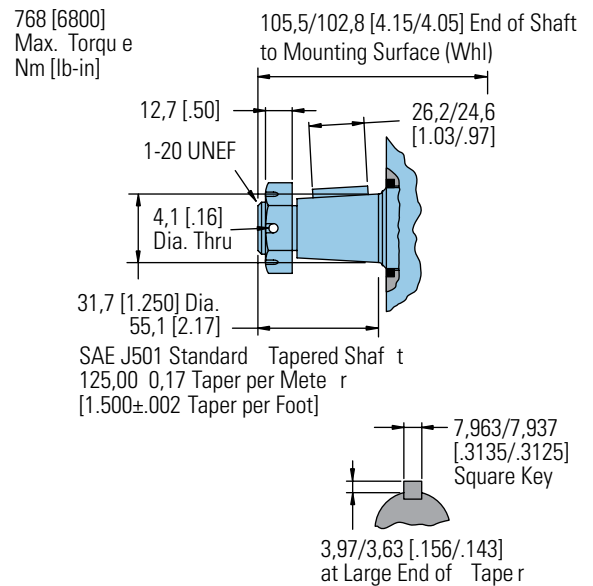
Dimensions

Shafts

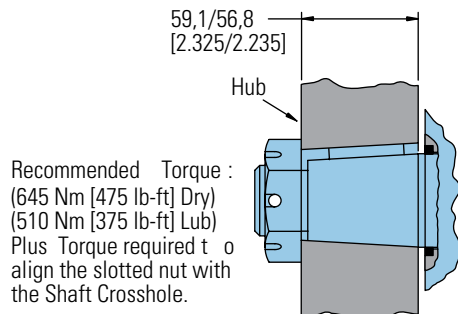
1-5/8 Inch Tapered



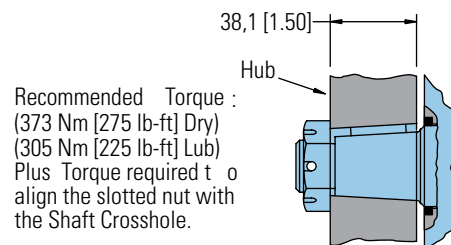
1-1/4 Inch Tapered



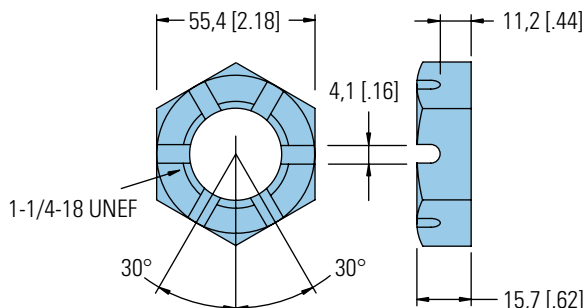
Tapered Shaft Hub Data



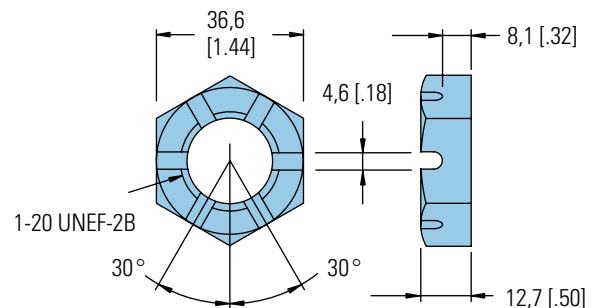
Tapered Shaft Hub Data



Slotted Hexagon Nut



Slotted Hexagon Nut

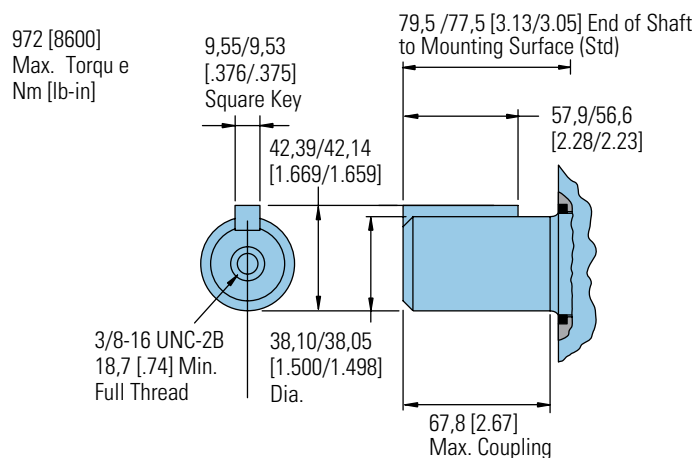


4000 Compact Series

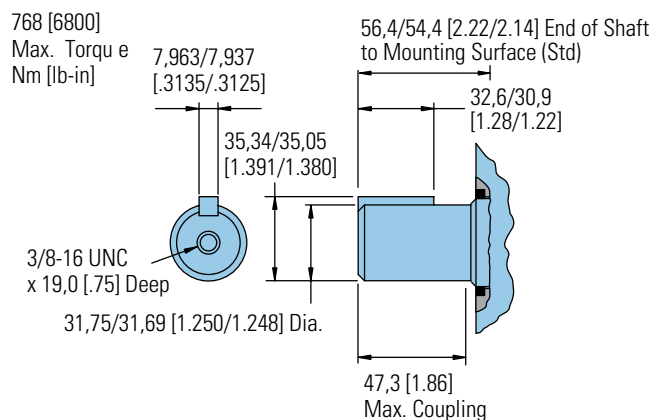
Dimensions

Shafts

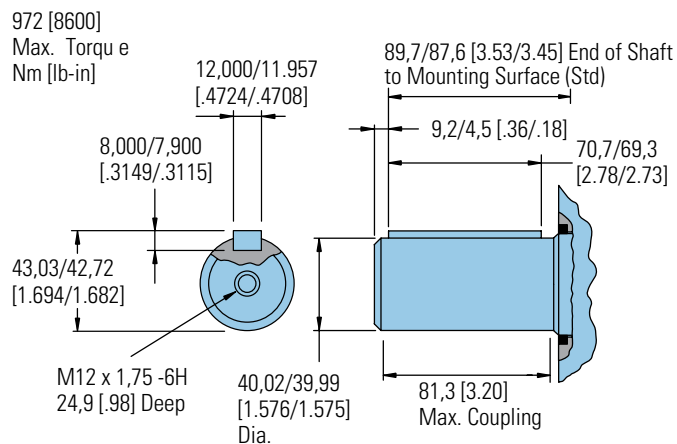
1-1/2 Inch Straight



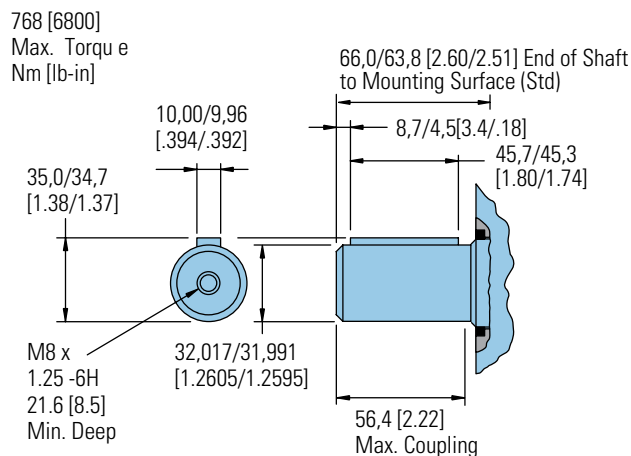
1-1/4 Inch Straight



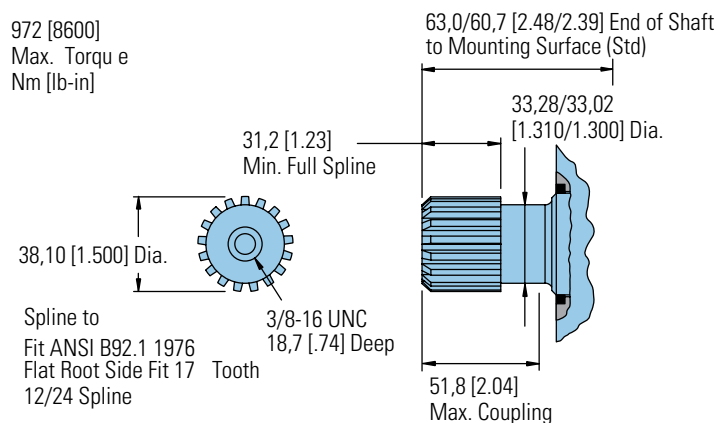
40 mm Straight



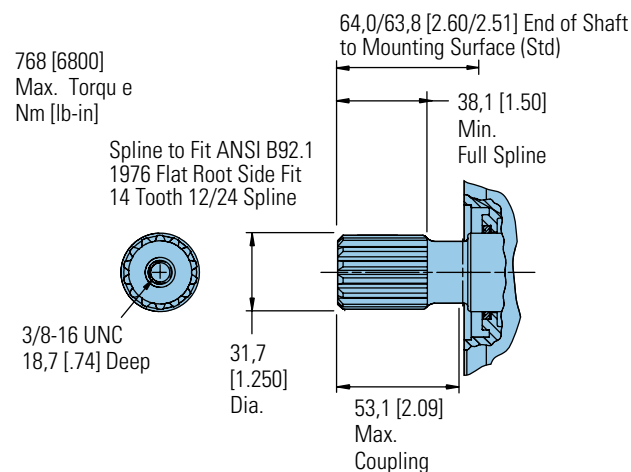
32 mm Straight



1-1/2 Inch 17 Tooth Straight



1-1/4 Inch 14 Tooth Splined



4000 Compact Series

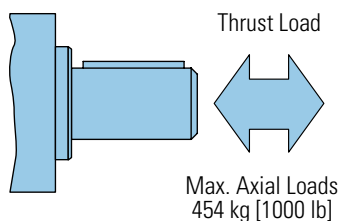
Shaft Side Load Capacity

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

Note:

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

Each curve is based on B 10 bearing life (2000



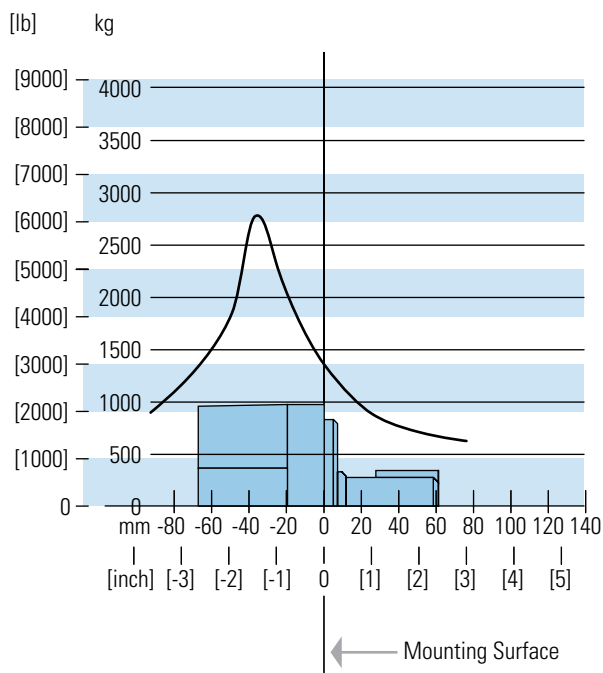
hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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

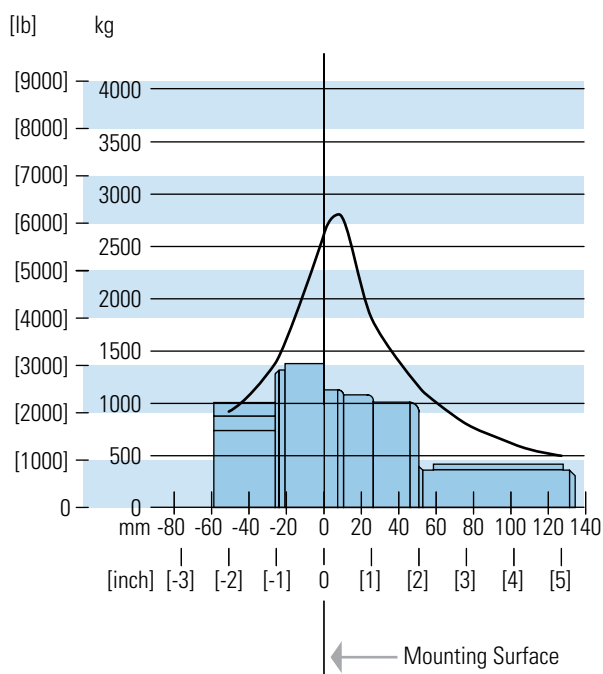
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

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



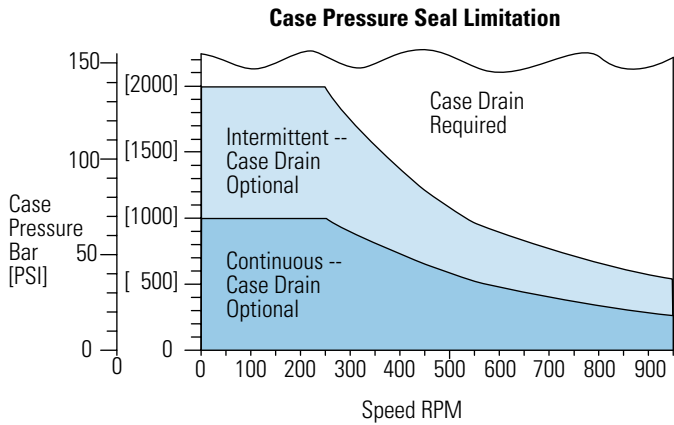
Wheel Mount- All shaft options 1-1/4 inch and larger



4000 Compact Series

Case Pressure and Case Port

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



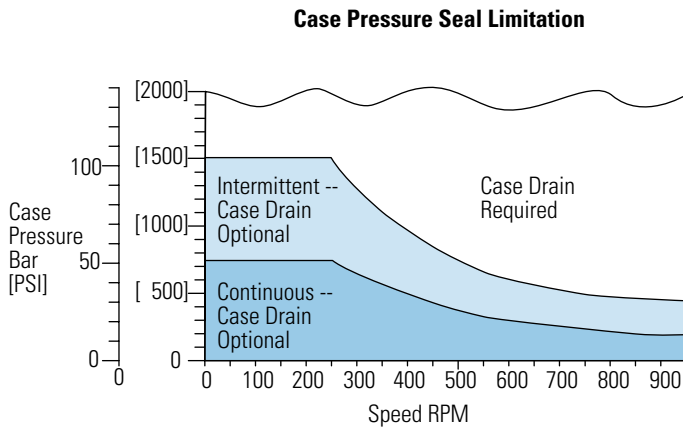
All Shaft options 1-1/4 inch and smaller.

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.



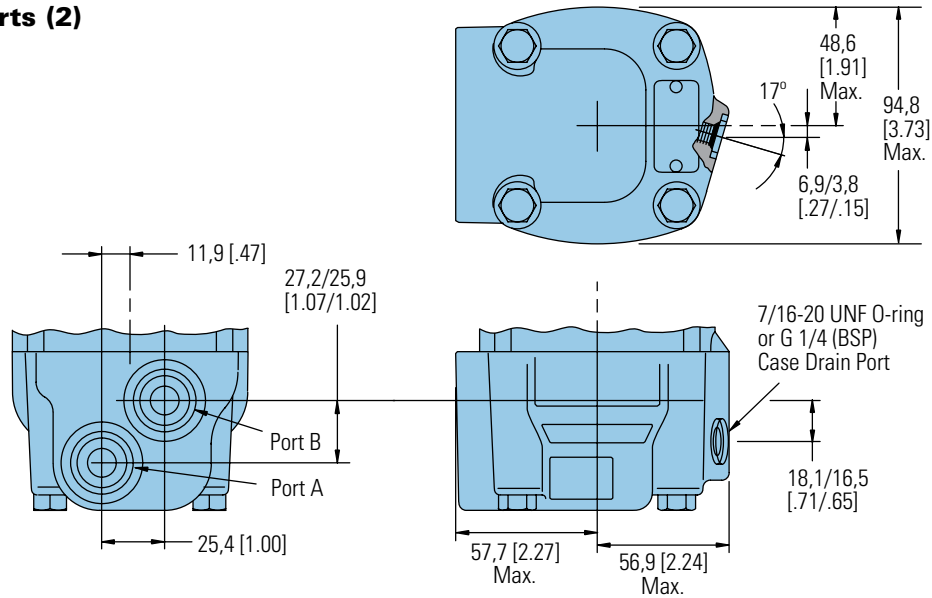
All Shaft options larger than 1-1/4 inch.

4000 Compact Series

Dimensions

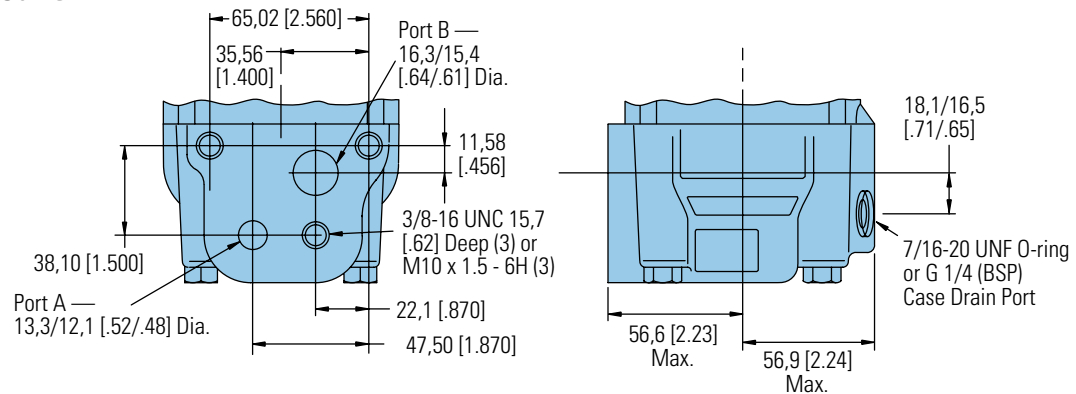
Ports

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



C-2

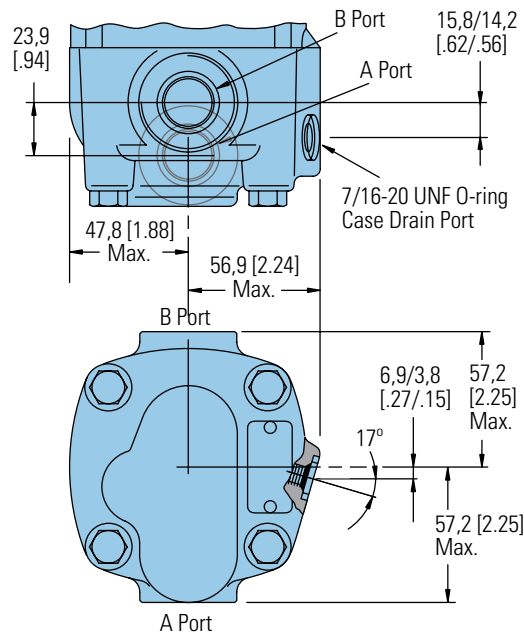
Manifold Mount



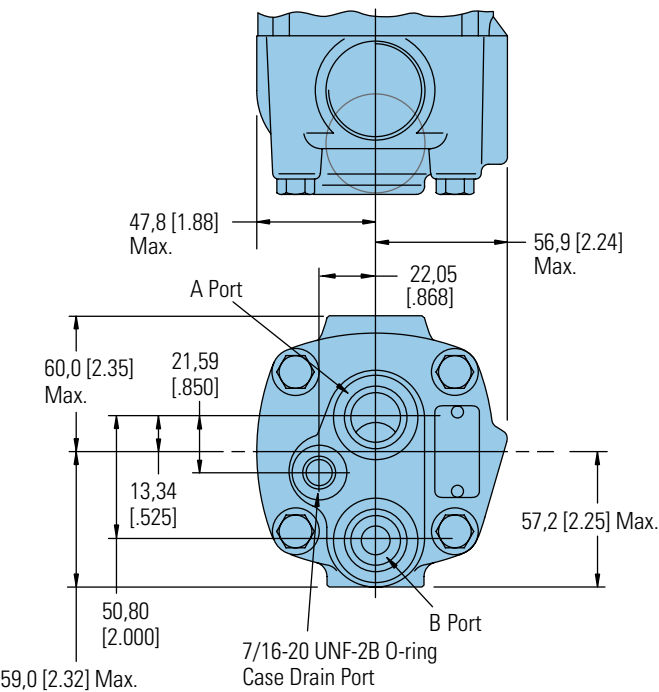
4000 Compact Series

Dimensions
Ports

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



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

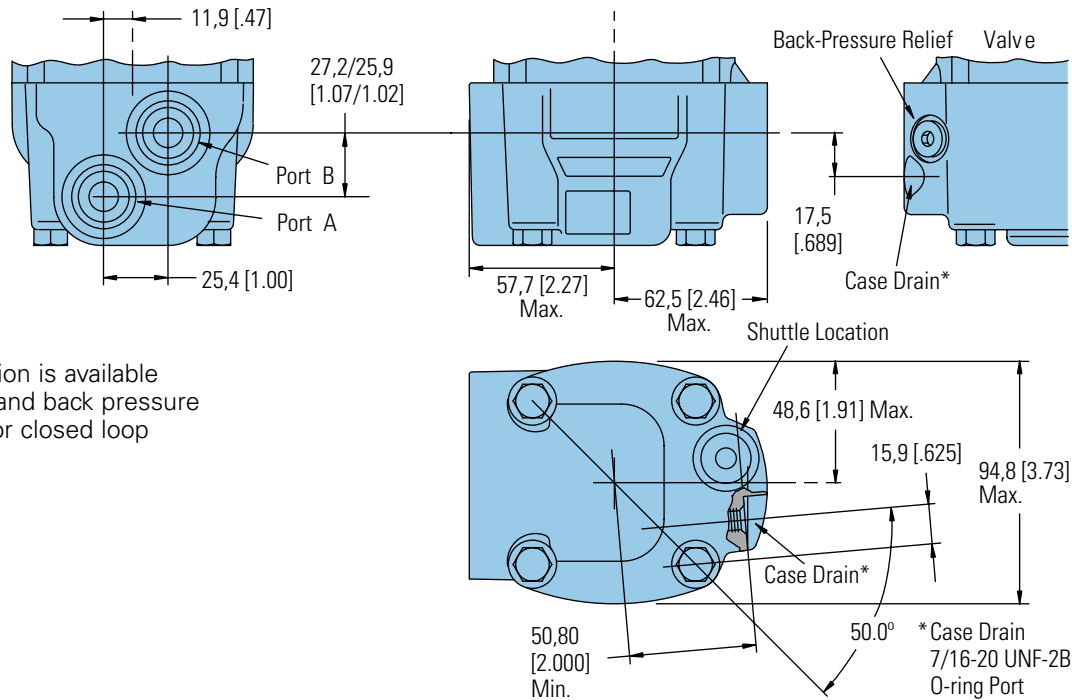


4000 Compact Series

Dimensions

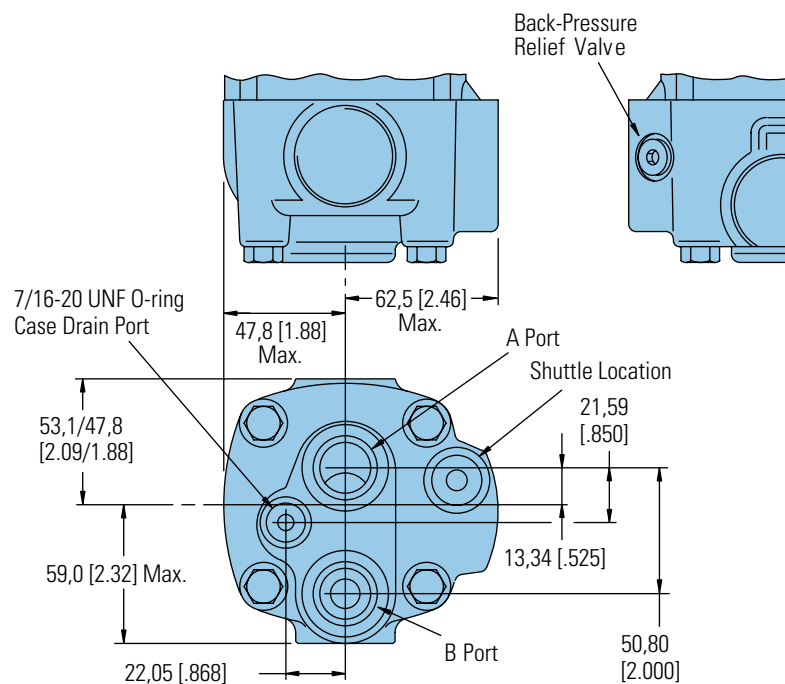
Ports with Shuttle

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

Model Code

The following 24-digit coding system has been developed to identify all of the configuration options for the 4000 Compact Series motor. Use this model code to specify a motor with the desired features. All 24 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

ADK			**		**		**		**		**		*	0 0		**		**		*	*	0	A
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

[1], [2], [3] Product Series
ADK – 4000 Compact Series Motor

[4], [5] Displacement
cm³/r [in³/r]

10 – 160 [9.8]
12 – 200 [12.3]
15 – 250 [15.4]
20 – 325 [19.8]
25 – 405 [24.6]
30 – 490 [29.8]

[6], [7] Mounting Type
AB – 4 Bolt (Wheel) 108,0 [4.25] Pilot Dia. and 13,59 [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 [5.81] 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

[10], [11] Ports

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

AB – 12,70 [.500] and 15,88 [.625] Dia. Ports (Manifold) and 3x 3/8 -16 UNC Port Block Mounting Holes

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

AE – 12,70 [.500] and 15,88 [.625] Dia. Ports (Manifold) and 3 x M10 x 1,5-6H Port Block Mounting Holes

AG – G 1/2 BSP Straight Thread ports (Staggered)

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

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

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

[12], [13] Case Flow Options

00 – None

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

02 – G 1/4 (BSP) Straight Thread Port (Case Drain)

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

[14] Back-Pressure Relief Valve

0 – None

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

[15], [16] Valve Options
00 – None

[17], [18] Accessories

00 – None

AA – Seal Guard

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

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

[19], [20] Special Features (Hardware)

00 – None

01 – Viton Seals

[21] Special Features (Assembly)

0 – None

A – Flange Rotated 90°

B – Reverse Rotation

[22] Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

[23] Eaton Assigned Code when Applicable

0 – None

[24] Eaton Assigned Design Code

A – First Code

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

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

Delta Series

Highlights



Description

This wheel motor is the latest addition to the Char Lynn product line. The Delta motor provides torques up to 11,500 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.*

Parker is a registered trademark of Parker Intangibles LLC.

White is a trademark of White Drive Products, Inc.

** 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

C-3

Applications:

- Scissor Lift
- Boom Lift
- Industrial Sweeper
- Mower



Boom Lift



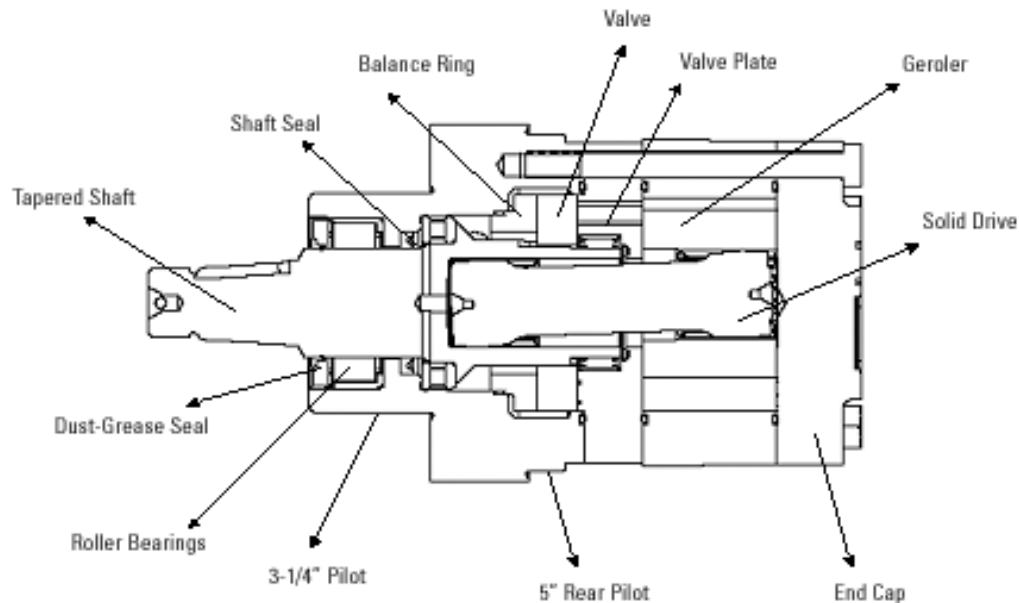
Sweeper



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

Performance Data

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

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

	Continuous
	Intermittent
	No operation

113 cm³/r [6.9 in³/r]

Δ Pressure Bar [PSI]

	17	34	52	69	86	103	121	138	155	172	190	207	224	241	259	276
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
2	204	450	686	915	1140	1355	1593	1814	2018	2197	2349	2573	2776	2975	3182	3362
7.6	23	51	77	103	129	153	180	205	228	248	265	290	313	336	359	380
	65	64	63	62	60	60	59	57	56	55	56	54	52	48	49	44
4	210	457	706	950	1194	1436	1677	1906	2129	2351	2571	2790	3010	3231	3454	3660
15	24	52	80	107	135	162	189	215	240	265	290	315	340	365	390	413
	132	131	130	129	128	127	126	125	123	122	120	118	115	113	112	110
6	196	445	696	942	1186	1432	1674	1914	2144	2367	2587	2805	3027	3252	3476	3695
23	22	50	79	106	134	162	189	216	242	267	292	317	342	367	392	417
	199	196	196	195	193	192	191	190	189	185	183	182	180	177	174	172
8	176	425	677	921	1168	1420	1666	1906	2152	2386	2616	2834	3051	3265	3481	3697
30	20	48	76	104	132	160	188	215	243	269	295	320	344	369	393	417
	266	264	263	261	261	259	257	257	255	252	250	248	246	244	241	237
10	160	407	659	901	1149	1398	1650	1894	2134	2370	2601	2823	3044	3258	3457	3654
38	18	46	74	102	130	158	186	214	241	268	294	319	344	368	390	413
	333	333	329	326	324	323	321	320	318	314	312	309	306	303	301	295
12	134	382	632	876	1122	1372	1621	1868	2111	2353	2589	2821	3046	3270	3479	3680
45	15	43	71	99	127	155	183	211	238	266	292	319	344	369	393	415
	399	398	396	393	392	389	387	386	383	381	377	374	372	370	367	364
14	111	357	608	855	1102	1350	1599	1847	2090	2330	2569	2800	3024	3250	3455	3614
53	13	40	69	97	124	152	181	208	236	263	290	316	341	367	390	408
	466	465	462	460	457	455	453	451	449	446	442	438	436	433	429	415
16	81	325	577	822	1071	1321	1572	1817	2063	2307	2549	2781	3011	3237	3436	3578
61	9	37	65	93	121	149	177	205	233	260	288	314	340	365	388	404
	533	532	529	527	524	522	520	517	516	513	509	506	503	500	496	477
18	48	295	543	790	1036	1283	1535	1781	2027	2271	2512	2751	2984	3214	3431	3597
68	5	33	61	89	117	145	173	201	229	256	284	311	337	363	387	406
	601	600	597	593	591	587	586	583	581	577	573	570	568	564	559	542
20	14	263	510	758	1005	1249	1499	1746	1988	2231	2474	2712	2945	3176	3395	3597
76	2	30	58	86	113	141	169	197	224	252	279	306	332	359	383	406
	668	666	664	661	658	654	652	649	646	644	640	637	634	630	628	621
22		228	477	725	972	1218	1468	1712	1957	2201	2447	2686	2917	3149	3350	3523
83		26	54	82	110	138	166	193	221	249	276	303	329	355	378	398
		733	731	728	724	721	718	715	713	710	705	704	700	697	688	664
25		170	416	663	913	1153	1402	1646	1891	2136	2382	2622	2856	3081	3273	3452
95		19	47	75	103	130	158	186	214	241	269	296	322	348	369	390
		831	829	827	825	821	818	815	812	809	805	803	800	794	776	745
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
13
778 } Torque lb-in
Nm
Speed RPM

146 cm³/r [8.9 in³/r]

Δ Pressure Bar [PSI]

	17	34	52	69	86	103	121	138	155	172	190	207	224	241	259	276
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
2	288	596	907	1184	1445	1718	1992	2247	2537	2810	3039	3290	3595	3846	3996	4265
7.6	32	67	102	134	163	194	225	254	286	317	343	371	406	434	451	482
	50	48	46	42	44	43	40	39	38	37	36	34	32	31	25	28
4	289	619	947	1267	1593	1914	2227	2482	2755	3042	3295	3615	3916	4135	4456	4680
15	33	70	107	143	180	216	251	280	311	343	372	408	442	467	503	528
	102	100	98	96	95	95	94	93	91	88	84	81	79	76	74	70
6	275	604	934	1259	1588	1908	2232	2552	2869	3181	3497	3800	4102	4397	4680	4955
23	31	68	105	142	179	215	252	288	324	359	395	429	463	496	528	559
	154	151	149	148	146	145	144	143	141	137	135	133	130	128	125	123
8	256	580	909	1235	1566	1887	2209	2528	2845	3160	3475	3783	4091	4397	4692	4984
30	29	66	103	139	177	213	249	285	321	357	392	427	462	496	530	563
	206	204	201	200	198	198	196	195	190	187	185	182	179	179	176	173
10	227	553	879	1204	1535	1861	2184	2504	2820	3133	3447	3757	4061	4369	4667	4963
38	26	62	99	136	173	210	247	283	318	354	389	424	459	493	527	560
	258	256	253	251	250	249	248	246	241	238	236	233	231	229	228	225
12	199	521	850	1172	1501	1825	2148	2469	2780	3091	3402	3714	4017	4324	4627	4922
45	23	59	96	132	170	206	243	279	314	349	384	419	454	488	522	556
	310	308	305	303	301	300	299	297	292	290	287	284	282	281	278	276
14	157	480	809	1130	1458	1784	2104	2426	2743	3057	3369	3679	3983	4291	4593	4892
53	18	54	91	128	165	201	238	274	310	345	380	415	450	484	519	552
	362	360	356	354	353	352	351	346	344	341	339	337	335	332	331	329
16	132	457	780	1102	1429	1753	2081	2397	2714	3025	3335	3645	3947	4255	4558	4857
61	15	52	88	124	161	198	235	271	306	342	377	412	446	480	515	548
	414	412	408	406	405	403	402	398	395	392	389	387	384	382	380	377
18	98	414	742	1065	1390	1715	2039	2360	2675	2986	3295	3605	3906	4213	4518	4817
68	11	47	84	120	157	194	230	266	302	337	372	407	441	476	510	544
	467	465	461	459	457	456	453	450	447	444	442	439	437	435	432	430
20	42	373	700	1020	1347	1670	1989	2308	2628	2944	3255	3568	3866	4172	4475	4774
76	5	42	79	115	152	189	225	261	297	332	368	403	436	471	505	539
	519	517	514	511	509	507	503	500	498	495	492	489	488	485	484	482
22	16	328	659	978	1306	1628	1950	2268	2586	2900	3211	3522	3823	4128	4429	4732
83	2	37	74	110	147	184	220	256	292	327	362	398	432	466	500	534
	571	569	565	562	559	559	555	552	549	546	544	541	538	536	534	531
25		253	576	899	1221	1544	1864	2179	2500	2811	3120	3433	3736	4036	4337	4639
95		29	65	102	138	174	210	246	282	317	352	388	422	456	490	524
		647	645	641	639	637	633	629	626	624	621	618	616	613	612	609
30		114	429	755	1076	1400	1725	2047	2368	2687	3003	3323	3635	3942	4249	4552
114		13	48	85	122	158	195	231	267	303	339	375	410	445	480	514
		778	777	773	770	765	759	756	753	749	746	744	742	740	737	735

Delta Series

Performance Data

198 cm³/r [12.1 in³/r]															
Δ Pressure Bar [PSI]															
	17	34	52	69	86	103	121	138	155	172	190	207	224	241	259
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
2	313	732	1113	1480	1870	2249	2668	3059	3447	3822	4189	4544	4875	5194	5508
7.6	35	83	126	167	211	254	301	345	389	432	473	513	550	586	622
	36	35	34	32	31	30	29	27	27	26	24	22	21	18	17
4	367	809	1228	1640	2038	2437	2844	3234	3623	4010	4398	4779	5164	5545	5917
15	41	91	139	185	230	275	321	365	409	453	497	540	583	626	668
	75	74	72	71	69	68	67	65	63	62	61	58	56	56	54
6	365	799	1231	1654	2066	2473	2878	3270	3665	4056	4446	4833	5215	5598	5975
23	41	90	139	187	233	279	325	369	414	458	502	546	589	632	675
	112	111	110	109	107	106	104	102	101	99	98	96	95	93	91
8	343	782	1219	1648	2069	2484	2898	3300	3702	4093	4482	4865	5237	5607	5976
30	39	88	138	186	234	280	327	373	418	462	506	549	591	633	675
	151	150	149	147	146	145	143	142	140	138	135	134	133	131	129
10	322	759	1201	1633	2063	2483	2904	3316	3726	4125	4515	4904	5290	5672	6048
38	36	86	136	184	233	280	328	374	421	466	510	554	597	640	683
	190	188	187	186	185	182	181	178	177	174	173	171	169	168	166
12	283	719	1158	1590	2020	2448	2868	3279	3691	4096	4492	4883	5265	5644	6015
45	32	81	131	180	228	276	324	370	417	462	507	551	594	637	679
	229	227	226	224	223	221	220	218	216	215	212	211	209	206	205
14	238	671	1110	1538	1970	2396	2816	3228	3644	4050	4451	4846	5231	5613	5982
53	27	76	125	174	222	271	318	364	411	457	503	547	591	634	675
	267	266	264	262	261	259	257	255	253	251	249	246	244	242	240
16	191	625	1063	1493	1923	2345	2768	3182	3596	4003	4403	4801	5191	5576	5947
61	22	71	120	169	217	265	312	359	406	452	497	542	586	630	671
	305	304	303	301	300	298	296	295	293	291	289	287	285	284	281
18	139	567	1006	1438	1871	2299	2720	3133	3547	3956	4359	4760	5128	5492	5871
68	16	64	114	162	211	260	307	353	400	447	492	537	579	620	663
	342	341	340	339	337	335	333	331	330	328	326	324	322	321	319
20	99	457	886	1315	1745	2168	2590	3006	3418	3822	4224	4622	5018	5418	5816
76	11	52	100	148	197	245	292	339	386	432	477	522	567	612	657
	382	380	378	377	375	373	371	369	366	364	362	359	358	356	354
22	15	383	810	1243	1676	2096	2520	2938	3351	3759	4161	4558	4953	5339	5722
83	2	43	91	140	189	237	284	332	378	424	470	515	559	603	646
	420	417	416	415	413	411	409	407	405	403	401	399	397	395	392
25		272	700	1131	1559	1985	2408	2823	3231	3639	4042	4443	4842	5229	5617
95		31	79	128	176	224	272	319	365	411	456	502	547	590	634
		476	475	474	472	470	468	466	465	463	461	459	457	455	453
30		163	600	1037	1474	1902	2315	2723	3134	3536	3933	4338	4737	5125	5516
114		18	68	117	166	215	261	307	354	399	444	490	535	579	623
		516	506	494	487	484	488	494	501	506	511	514	515	516	515

163 } Torque lb-in
18 } N/m
516 } Speed RPM

234 cm³/r [14.3 in³/r]															
Δ Pressure Bar [PSI]															
	17	34	52	69	86	103	121	138	155	172	190	207	224	241	259
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
2	470	971	1457	1921	2414	2877	3348	3821	4275	4730	5164	5597	6046	6466	6863
7.6	53	110	164	217	273	325	378	431	483	534	583	636	677	728	775
	31	30	29	28	26	25	25	25	24	23	22	21	19	20	19
4	468	988	1504	1989	2482	2964	3447	3916	4384	4843	5302	5763	6213	6668	7113
15	53	112	170	225	280	335	389	442	495	547	599	651	701	753	803
	64	62	61	60	59	58	57	56	56	55	55	54	52	51	50
6	449	966	1484	1980	2470	2953	3445	3922	4397	4851	5304	5750	6197	6643	7085
23	51	109	168	224	279	333	389	443	496	548	599	649	700	750	800
	96	95	93	92	92	91	90	89	88	88	88	87	86	86	84
8	416	931	1446	1954	2458	2948	3438	3909	4381	4835	5280	5714	6150	6584	7015
30	47	105	163	221	277	333	388	441	495	546	596	645	694	743	792
	129	128	126	125	124	123	123	121	121	120	120	119	119	118	117
10	380	896	1410	1917	2425	2919	3412	3890	4373	4831	5280	5716	6148	6586	7017
38	43	101	159	216	274	330	385	439	494	545	596	645	694	744	792
	161	160	158	157	156	155	154	153	153	152	151	150	149	148	147
12	341	856	1366	1876	2384	2880	3370	3843	4319	4782	5229	5665	6102	6537	6962
45	39	97	154	212	269	325	380	434	488	540	590	640	689	738	786
	194	193	191	190	189	188	187	186	185	185	184	183	182	181	180
14	290	804	1312	1813	2320	2821	3315	3793	4268	4732	5181	5623	6057	6485	6907
53	33	91	148	205	262	318	374	428	482	534	585	635	684	732	780
	226	225	224	222	221	220	219	218	217	216	216	215	214	212	211
16	239	743	1249	1756	2264	2759	3255	3735	4207	4669	5122	5568	6004	6432	6845
61	27	84	141	198	256	312	367	422	475	527	578	629	678	726	773
	258	258	257	255	254	253	252	251	251	250	249	247	246	245	244
18	176	688	1187	1694	2203	2698	3195	3676	4146	4603	5055	5497	5930	6358	6774
68	20	78	134	191	249	305	361	415	468	520	571	621	669	718	765
	291	291	289	287	286	285	284	283	282	281	279	278	277	276	275
20	108	614	1121	1623	2124	2620	3118	3603	4077	4541	4990	5430	5865	6301	6720
76	12	69	127	183	240	296	352	407	460	513	563	613	662	711	759
	323	323	322	320	319	317	317	316	314	312	311	310	310	310	309
22	28	535	1081	1582	2082	2579	3071	3550	4018	4483	4943	5406	5855	6300	6723
83	3	60	122	179	235	291	347	401	454	506	558	610	661	711	759
	355	355	355	352	351	350	349	348	345	343	342	341	341	341	341
25		410	956	1460	1959	2454	2941	3419	3892	4356	4806	5251	5683	6117	6531
95		46	108	165	221	277	332	386	439	492	543	593	642	691	737
		404	404	402	401	399	398	397	394	392	391	390	390	389	389
30		171	700	1297	1735	2226	2718	3204	3689	4162	4623	5079	5519	5959	6377
114		19	79	146	196	251	307	362	417	470	522	573	623	673	720
		485	485	485	483	481	480	478	476	474	472	472	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	4222	4726	5215	5706	6194	6678	7161	7628	8076
30	51	114	177	239	301	360	420	477	533	589	644	699	754	808	861	912
10	398	957	1516	2063	2609	3137	3668	4181	4678	5157	5636	6116	6589	7059	7522	7974
38	45	108	171	233	295	354	414	472	528	582	636	690	744	797	849	900
12	370	914	1468	2011	2557	3085	3614	4125	4622	5102	5577	6059	6538	7017	7497	7966
45	42	103	166	227	289	348	408	466	522	576	630	684	738	792	846	899
14	290	842	1399	1948	2496	3024	3552	4065	4571	5056	5525	5987	6445	6905	7359	7813
53	33	95	158	220	282	341	401	459	516	571	624	676	728	780	831	882
16	239	795	1346	1891	2434	2962	3494	4003	4511	4995	5461	5919	6382	6841	7292	7743
61	27	90	152	213	275	334	395	452	509	564	616	668	720	772	823	874
18	157	716	1265	1810	2355	2881	3408	3921	4431	4924	5401	5860	6310	6749	7184	7627
68	18	81	143	204	266	325	385	443	500	556	610	662	712	762	811	861
20	96	650	1203	1750	2294	2820	3345	3857	4366	4865	5340	5801	6242	6686	7122	7553
76	11	73	136	198	259	318	378	435	493	549	603	655	705	755	804	853
22	26	569	1111	1656	2195	2725	3250	3763	4268	4769	5259	5733	6182	6609	7030	7459
83	3	64	125	187	248	308	367	425	482	538	594	647	698	746	794	842
25	425	967	1508	2042	2574	3093	3605	4110	4602	5084	5561	6028	6482	6899	7316	7731
95	48	109	170	231	291	349	407	464	520	574	628	681	732	779	826	873
30	179	723	1266	1800	2330	2852	3364	3868	4368	4856	5338	5811	6269	6701	7096	7501
114	20	82	143	203	263	322	380	437	493	548	603	656	708	757	801	848
	450	450	450	450	449	447	443	439	436	433	430	430	431	434	437	438

Flow LPM [GPM]

179
20
450 } Torque lb-in
Nm
Speed RPM

300 cm³/r [18.3 in³/r]

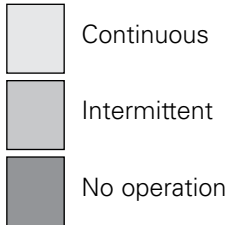
Δ Pressure Bar [PSI]

	17	34	52	69	86	103	121	138	155	172	190	207	224	241	259	276
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
2	608	1257	1919	2553	3196	3824	4475	5087	5707	6307	6901	7472	8015	8484	8962	9413
7.6	69	142	217	288	361	432	505	574	644	712	779	844	905	958	1012	1063
4	612	1283	1940	2587	3227	3856	4483	5094	5693	6293	6881	7462	8024	8574	9113	9629
15	69	145	219	292	364	435	506	575	643	710	777	842	906	968	1029	1087
6	570	1248	1906	2547	3178	3800	4420	5025	5619	6203	6773	7345	7899	8449	8992	9525
23	64	141	215	288	359	429	499	567	634	700	765	829	892	954	1015	1075
8	540	1210	1871	2522	3152	3781	4404	5008	5607	6186	6749	7319	7879	8433	8977	9512
30	61	137	211	285	356	427	497	565	633	698	762	826	890	952	1013	1074
10	496	1161	1825	2471	3110	3733	4362	4968	5574	6157	6721	7274	7811	8356	8887	9416
38	56	131	206	279	351	421	492	561	629	695	759	821	882	943	1003	1063
12	443	1108	1768	2418	3059	3688	4307	4918	5526	6114	6681	7239	7786	8338	8876	9411
45	50	125	200	273	345	416	486	555	624	690	754	817	879	941	1002	1062
14	387	1034	1701	2346	2985	3610	4227	4839	5452	6050	6622	7184	7723	8269	8816	9362
53	44	117	192	265	337	408	477	546	615	683	748	811	872	934	995	1057
16	366	961	1620	2264	2903	3530	4147	4753	5366	5960	6540	7098	7642	8189	8685	9211
61	41	109	183	256	328	399	468	537	606	673	738	801	863	922	980	1040
18	291	893	1546	2187	2829	3450	4067	4678	5283	5873	6451	7005	7537	8064	8580	9103
68	33	101	175	247	319	390	459	528	596	663	728	791	851	910	969	1028
20	204	797	1444	2094	2736	3361	3974	4585	5184	5775	6353	6907	7448	7974	8489	8992
76	23	90	163	236	309	380	449	518	585	652	717	780	841	900	958	1015
22	102	710	1366	2013	2651	3270	3885	4496	5096	5689	6271	6831	7362	7877	8375	8880
83	12	80	154	227	299	369	439	508	575	642	708	771	831	889	945	1003
25	553	1208	1851	2489	3114	3726	4335	4930	5523	6108	6670	7220	7763	8298	8777	9271
95	62	136	209	281	352	421	489	557	624	690	753	815	879	937	991	1048
30	233	941	1539	2179	2811	3430	4028	4625	5217	5802	6385	6957	7522	8060	8565	9077
114	26	106	174	246	317	387	455	522	589	655	721	785	849	910	967	1027
	379	379	379	379	377	374	371	367	365	363	362	361	364	368	374	376

Flow LPM [GPM]

Delta Series

Performance Data

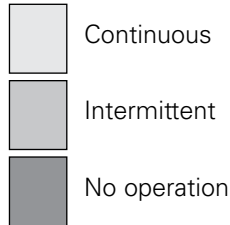


		347 cm³/r [21.2 in³/r]															
		Δ Pressure Bar [PSI]															
		17	34	52	69	86	103	121	138	155	172	190	207	224	241	259	276
		250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
2		687	1415	2128	2824	3532	4248	4947	5633	6298	6964	7575	8182	8743	9209	9624	10081
7.6		78	160	240	319	399	480	558	636	711	786	855	924	987	1040	1087	1138
		20	19	18	18	17	17	17	17	16	15	14	13	12	9	8	4
4		689	1443	2179	2891	3606	4302	4986	5653	6316	6965	7615	8260	8891	9515	10120	10698
15		78	163	246	326	407	486	563	638	713	786	860	933	1004	1074	1143	1208
		42	41	41	40	39	37	38	38	39	38	38	37	37	35	33	31
6		648	1406	2154	2866	3580	4276	4970	5641	6290	6921	7563	8190	8812	9427	10029	10630
23		73	159	243	324	404	483	561	637	710	781	854	925	995	1064	1132	1200
		64	64	63	61	60	58	57	57	59	60	60	59	58	57	56	55
8		606	1356	2105	2825	3545	4241	4943	5621	6274	6899	7522	8144	8768	9388	9998	10598
30		68	153	238	319	400	479	558	635	708	779	849	919	990	1060	1129	1196
		87	86	85	84	82	81	79	78	79	81	82	81	81	80	78	77
10		550	1295	2041	2765	3488	4188	4891	5585	6264	6899	7505	8091	8672	9233	9885	10488
38		62	146	230	312	394	473	552	631	707	779	847	913	979	1048	1116	1184
		109	108	107	106	104	103	100	98	97	98	100	103	103	103	102	101
12		478	1227	1976	2698	3411	4108	4802	5479	6146	6782	7396	7992	8585	9176	9767	10345
45		54	139	223	305	385	464	542	619	694	766	835	902	969	1036	1103	1168
		131	130	130	129	127	125	122	119	117	115	115	119	123	125	125	124
14		409	1151	1896	2624	3344	4048	4742	5418	6083	6722	7339	7939	8541	9142	9738	10318
53		46	130	214	296	378	457	535	612	687	759	829	896	964	1032	1099	1165
		153	153	152	152	149	147	145	142	140	139	139	143	147	148	147	147
16		339	1033	1774	2494	3209	3907	4605	5296	5956	6610	7243	7850	8438	9014	9592	10166
61		38	117	200	282	362	441	520	598	672	746	818	886	953	1018	1083	1148
		174	174	174	174	172	169	166	164	162	159	159	160	165	168	170	170
18		245	943	1676	2401	3113	3809	4500	5175	5837	6477	7107	7711	8308	8895	9466	10040
68		28	106	189	271	351	430	508	584	659	731	802	871	938	1004	1069	1133
		196	196	196	195	193	192	189	187	185	183	181	182	185	188	192	193
20		143	832	1571	2290	3003	3697	4386	5050	5715	6351	6968	7569	8147	8721	9297	9855
76		16	94	177	259	339	417	495	570	645	717	787	855	920	985	1050	1113
		218	218	218	218	216	214	212	209	207	205	203	203	205	210	214	215
22		34	715	1454	2175	2896	3594	4280	4950	5602	6236	6854	7449	8027	8590	9150	9705
83		4	81	164	246	327	406	483	559	632	704	774	841	906	970	1033	1096
		240	240	240	240	240	238	236	233	230	228	226	226	228	231	237	240
25			523	1251	1969	2693	3395	4081	4756	5414	6057	6687	7296	7882	8457	9011	9534
95			59	141	222	304	383	461	537	611	684	755	824	890	955	1017	1076
			272	272	272	272	272	269	266	263	261	259	259	261	265	270	272
30			152	1072	1749	2434	3123	3802	4468	5114	5763	6400	7018	7633	8232	8819	9397
114			17	121	197	275	353	429	504	577	651	723	792	862	929	996	1061
			327	327	327	327	327	323	319	315	314	313	315	319	323	327	327

		Torque lb-in Nm Speed RPM															
		395 cm³/r [24.1 in³/r] Δ Pressure Bar [PSI]															
Flow LPM [GPM]		17	34	52	69	86	103	121	138	155	172	190	207	224	241		
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500			
	2	782	1622	2436	3237	4034	4837	5650	6428	7213	7911	8607	9235	9798	10439		
	7.6	88	183	275	365	455	546	638	726	814	893	972	1043	1106	1179		
		18	17	17	16	16	16	17	16	15	15	15	14	13	12		
	4	770	1643	2476	3287	4088	4860	5617	6357	7103	7838	8566	9285	9990	10684		
	15	87	186	280	371	462	549	634	718	802	885	967	1048	1128	1206		
		38	37	36	35	33	33	35	36	36	35	35	34	34	33		
	6	746	1609	2460	3280	4083	4867	5644	6384	7103	7811	8520	9232	9930	10616		
	23	84	182	278	370	461	549	637	721	802	882	962	1042	1121	1199		
		58	57	55	54	52	51	50	51	53	54	55	54	53	53		
	8	699	1561	2430	3249	4062	4852	5638	6398	7126	7820	8506	9198	9884	10565		
	30	79	176	274	367	459	548	637	722	805	883	960	1038	1116	1193		
		77	76	75	74	72	70	68	67	69	72	74	74	74	73		
	10	630	1489	2345	3180	4008	4819	5622	6397	7142	7856	8525	9142	9776	10438		
	38	71	168	265	359	453	544	635	722	806	887	962	1032	1104	1178		
		96	96	95	93	91	90	87	85	83	83	88	93	93	93		
	12	556	1412	2264	3090	3898	4689	5473	6225	6976	7710	8415	9081	9681	10304		
	45	63	159	256	349	440	529	618	703	788	870	950	1025	1093	1163		
		115	115	115	113	111	109	107	105	102	100	100	105	110	113		
14	469	1325	2178	2999	3819	4611	5391	6137	6867	7581	8270	8942	9598	10234			
53	53	150	246	339	431	521	609	693	775	856	934	1010	1084	1155			
	134	134	134	133	131	128	126	124	122	120	119	123	133	134			
16	360	1220	2069	2894	3715	4506	5290	6048	6782	7495	8190	8873	9534	10181			
61	41	138	234	327	419	509	597	683	766	846	925	1002	1076	1149			
	153	153	153	153	151	148	145	143	140	138	138	139	145	151			
18	334	1098	1951	2777	3591	4386	5172	5924	6665	7387	8087	8763	9418	10048			
68	38	124	220	314	405	495	584	669	752	834	913	989	1063	1134			
	173	173	173	173	171	169	166	162	161	159	157	158	162	169			
20	221	993	1837	2660	3479	4259	5030	5780	6518	7238	7939	8613	9258	9892			
76	25	112	207	300	393	481	568	653	736	817	896	972	1045	1117			
	192	192	192	192	191	189	186	183	181	179	177	178	182	188			
22	115	862	1698	2521	3337	4135	4895	5641	6366	7067	7752	8414	9062	9702			
83	13	97	192	285	377	467	553	637	719	798	875	950	1023	1095			
	211	211	211	211	211	209	206	203	201	200	199	200	204	209			
25		637	1473	2296	3117	3909	4687	5434	6163	6861	7536	8192	8829	9475			
95		72	166	259	352	441	529	613	696	775	851	925	997	1070			
		240	240	240	240	238	235	232	229	227	227	228	233	240			
30		211	1079	1903	2725	3526	4311	5079	5824	6547	7240	7921	8577	9228			
114		24	122	215	308	398	487	573	658	739	817	894	968	1042			
		288	288	288	288	288	286	283	280	277	274	273	275	280			

Delta Series

Performance Data



470 cm³/r [28.7 in³/r]

Δ Pressure Bar [PSI]

	17	34	52	69	86	103	121	138	155	172	190	207
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
2	925	1885	2820	3727	4639	5526	6404	7270	8129	8978	9794	10551
7.6	104	213	318	421	524	624	723	821	918	1014	1106	1191
	14	14	13	12	12	12	11	10	9	9	8	7
4	942	1942	2917	3849	4776	5692	6594	7488	8352	9199	10014	10824
15	106	219	329	435	539	643	744	845	943	1039	1131	1222
	31	30	29	29	28	27	27	26	25	24	23	23
6	906	1921	2892	3833	4772	5676	6572	7440	8309	9152	9974	10786
23	102	217	327	433	539	641	742	840	938	1033	1126	1218
	47	46	45	45	44	43	43	42	42	41	41	40
8	856	1866	2853	3795	4730	5634	6520	7379	8230	9075	9895	10693
30	97	211	322	428	534	636	736	833	929	1025	1117	1207
	63	62	62	61	60	58	57	57	56	55	54	53
10	780	1799	2800	3745	4685	5594	6479	7337	8177	9009	9843	10638
38	88	203	316	423	529	632	731	828	923	1017	1111	1201
	79	79	78	77	76	75	74	72	72	71	70	69
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
	96	95	94	93	92	91	90	89	89	88	87	86
14	596	1612	2609	3561	4490	5390	6268	7112	7941	8743	9519	10282
53	67	182	295	402	507	608	708	803	897	987	1075	1161
	112	111	111	110	109	107	106	104	103	101	102	104
16	467	1486	2480	3440	4371	5268	6152	6992	7810	8601	9370	10118
61	53	168	280	388	493	595	695	789	882	971	1058	1142
	129	128	127	126	125	123	122	120	119	117	116	116
18	332	1353	2357	3317	4256	5157	6043	6892	7713	8501	9270	10026
68	37	153	266	375	481	582	682	778	871	960	1047	1132
	145	145	144	143	142	140	138	136	135	134	132	133
20	304	1226	2218	3172	4102	4994	5873	6731	7557	8365	9147	9922
76	34	138	250	358	463	564	663	760	853	944	1033	1120
	161	161	160	159	158	157	155	153	152	150	149	150
22	137	1059	2048	3004	3945	4840	5727	6576	7399	8198	8967	9715
83	15	120	231	339	445	546	647	742	835	926	1012	1097
	177	177	177	176	175	174	172	170	169	167	166	166
25		833	1816	2765	3680	4575	5455	6313	7133	7928	8691	9436
95		94	205	312	415	517	616	713	805	895	981	1065
		201	201	201	200	198	196	194	193	191	191	192
30		491	1318	2295	3232	4142	5022	5881	6721	7522	8300	9320
114		55	149	259	365	468	567	664	759	849	937	1052
		241	241	241	241	240	237	236	236	233	232	227

491 } Torque lb-in
55 } N/m
241 } Speed RPM

542 cm³/r [33.1 in³/r]

Δ Pressure Bar [PSI]

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

Delta Series

Performance Data

649 cm³/r [39.6 in³/r]

Δ Pressure Bar [PSI]

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

	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 176	3128 353	4605 520	6014 679	7422 838	8721 985	9978 1127	10910 1232
7.6	9	8	8	8	7	7	6	5
4	1548 175	3142 355	4650 525	6029 681	7350 830	8605 971	9785 1105	10892 1230
15	19	18	18	18	18	18	17	17
6	1470 166	3084 348	4608 520	6022 680	7346 829	8555 966	9722 1098	10850 1225
23	30	29	28	27	27	27	27	27
8	1359 153	2975 336	4504 509	5925 669	7263 820	8488 958	9638 1088	10694 1207
30	40	39	38	38	37	36	37	38
10	1240 140	2844 321	4364 493	5815 656	7185 811	8458 955	9603 1084	10584 1195
38	50	50	49	48	47	46	46	47
12	1079 122	2686 303	4207 475	5641 637	7008 791	8248 931	9390 1060	10400 1174
45	60	60	60	59	58	57	57	57
14	932 105	2512 284	4038 456	5477 618	6850 773	8124 917	9274 1047	10286 1161
53	70	70	70	70	69	68	67	67
16	753 85	2328 263	3834 433	5246 592	6577 742	7831 884	8999 1016	10040 1133
61	80	80	80	80	80	79	78	78
18	547 62	2119 239	3632 410	5024 567	6320 714	7551 852	8706 983	9721 1097
68	90	90	90	90	90	90	90	90
20	310 35	1919 217	3430 387	4826 545	6126 692	7339 829	8466 956	9430 1065
76	100	100	100	100	100	100	100	100
22	248 28	1666 188	3172 358	4571 516	5878 664	7102 802	8254 932	9269 1046
83	110	110	110	110	110	110	110	110
25	1261 142	2784 314	4191 473	5504 621	6727 759	7873 889	8911 1006	9231 1029
95	126	126	126	126	126	126	126	126
30	545 62	2055 232	3474 392	4800 542	6036 681	7175 810	8231 929	8231 929
114	151	151	151	151	151	151	151	151

Delta Series

Dimensions

Wheel Mount

Ports

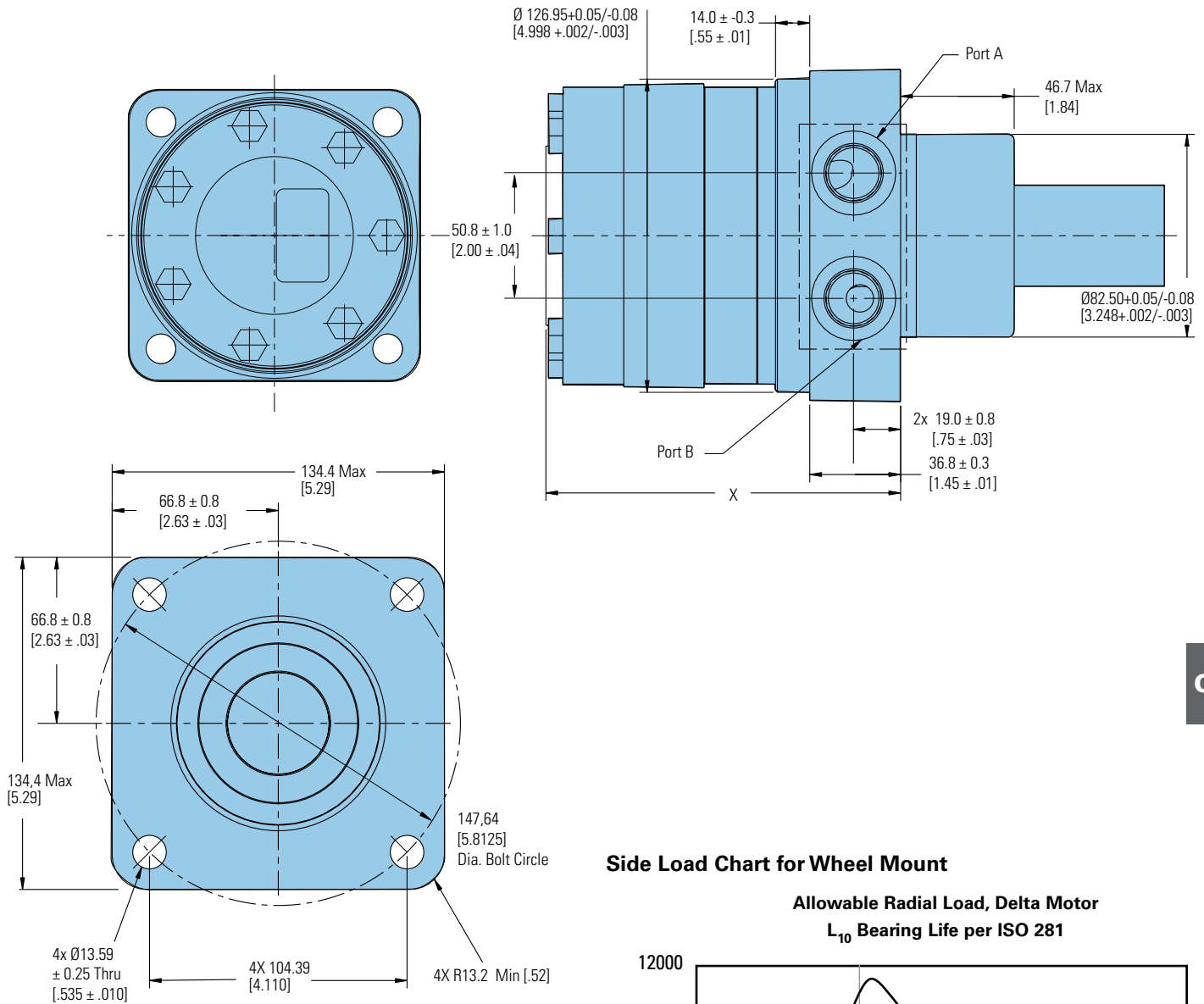
7/8 -14 UNF-2B SAE O-ring Ports

G 1/2 (BSP) Ports

Standard Rotation Viewed from Shaft End

Port A Pressurized — CCW

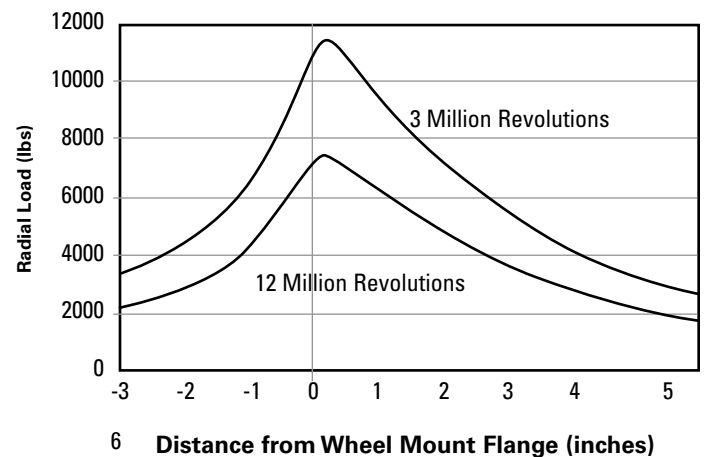
Port B Pressurized — CW



C-3

Side Load Chart for Wheel Mount

Allowable Radial Load, Delta Motor
L₁₀ Bearing Life per ISO 281



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

Delta Series

Dimensions

Standard Mount

Ports

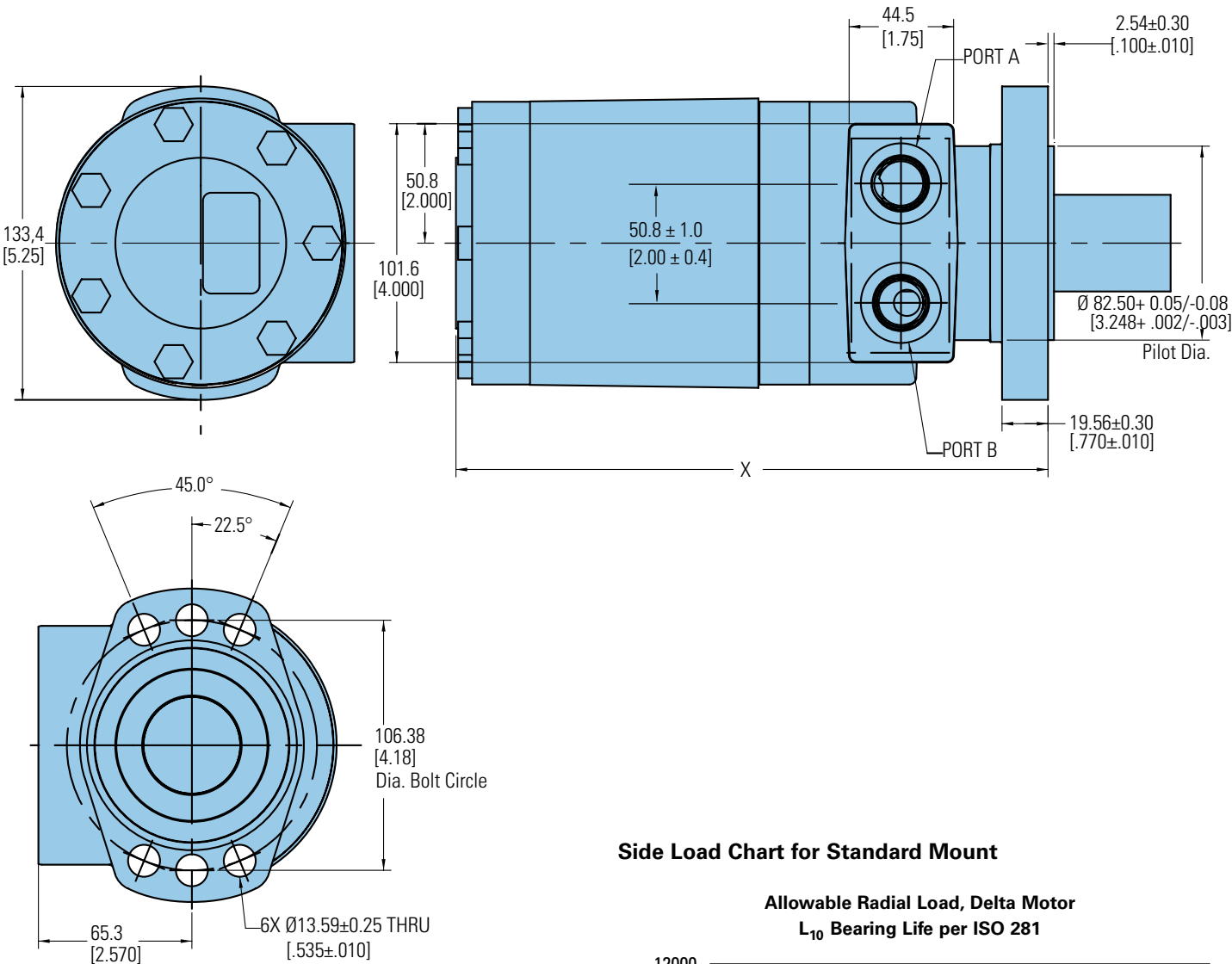
7/8 -14 UNF-2B SAE O-ring Ports

G 1/2 (BSP) Ports

Standard Rotation Viewed from Shaft End

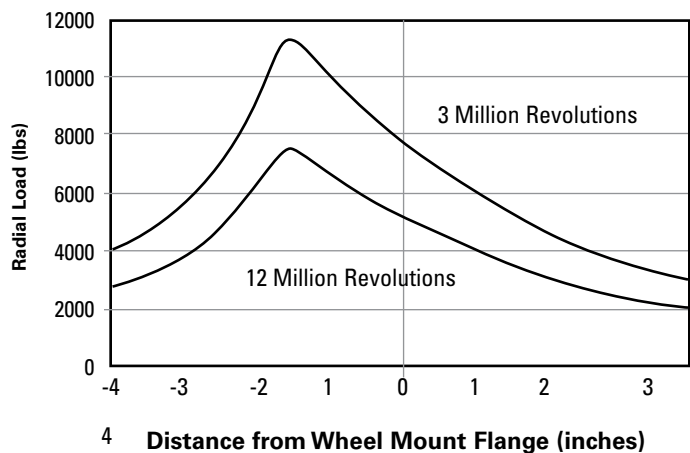
Port A Pressurized — CCW

Port B Pressurized — CW



Side Load Chart for Standard Mount

Allowable Radial Load, Delta Motor
L₁₀ Bearing Life per ISO 281



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

Delta Series

Model Code

The following 26-digit coding system has been developed to identify all of the configuration options for the Delta Low Speed High Torque motor. Use this model code to specify a motor with the desired features. All 26 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

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

1 Product

M – Motor

2, 3 Series

DL – Delta Series

4, 5, 6 Displacement cm³/r [in³/r]

069 – 113 [6.9]
089 – 146 [8.9]
121 – 198 [12.1]
143 – 234 [14.3]
154 – 252 [15.4]
183 – 300 [18.3]
212 – 347 [21.2]
241 – 395 [24.1]
287 – 470 [28.7]
331 – 542 [33.1]
396 – 649 [39.6]
460 – 754 [46.0]

7, 8 Mounting Type

AA – Wheel, 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes On 147.6 [5.81] Dia. Bolt Circle. 127.0 [5.00] Dia. Rear Mount Pilot

AB – Standard, 6 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. .100 [2.54] Pilot Length. Sae A, Magneto

AC – Standard, 6 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. .250 [6.35] Pilot Length. SAE A, Magneto

9, 10 Output Shaft

01 – 38.10 [1.500] Dia. Straight with .375-16 UNC-2B Thread, and 9.52 [.375] Sq x 25.40 [1.000] Straight Key

02 – 31.75 [1.250] Dia. .125:1 Tapered Shaft per SAE J501 with 1.000-20 UNEF-2A Threaded Shaft End and Slotted Hex Nut, 7.938 [.3125] Sq x 25.40 [1.000] Straight Key

03 – 41.30 [1.626] Dia. .125:1 Tapered Shaft per SAE J501 with 1.250-18 UNEF-2A Threaded Shaft End and Slotted Hex Nut, 11.125 [.4380] Sq x 34.04 [1.340] Straight Key

04 – 31.75 [1.250] Dia. Flat Root Side Fit, 14 Tooth, 12/24 DP 30 Deg. Involute Spline with .375-16 UNC-2B Thread in End, 33.0 [1.30] Minimum Full Spline Length

05 – 38.10 [1.500] Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Deg. Involute Spline, 31.8 [1.25] Minimum Full Spline Length, with .375-16 UNC-2B Thread in End

06 – 38.10 [1.500] Dia. Tapered Shaft per SAE J501 with 1.125-18 UNEF-2A Thread in End, 7.938 [.3125] Sq x 31.75 [1.250] Key

11, 12 Ports

AA – .875-14 UNF-2B SAE O-Ring

AC – G 1/2 BSP Straight Thread

13 Pressure/Flow Option

0 – None

14 Geroler Option

0 – Standard

B – Tight Fitting Geroler

15 Seal Option

0 – Standard

1 – Viton

4 – Seal Guard

16, 17 Accessories

00 – None

18, 19 Special Features (Hardware)

00 – None

20, 21 Special Features (Assembly)

00 – Standard Rotation - CCW

01 – Standard Rotation - CW

22, 23 Paint/Packaging

AA - No Paint, Individual Box

AB - Painted Low Gloss Black, Individual Box

AC - Epoxy Coated (Frost Gray), Individual Box

AE - No Paint, Bulk Box

AF - Painted Low Gloss Black, Bulk Box

24, 25 Customer Identification

00 – None

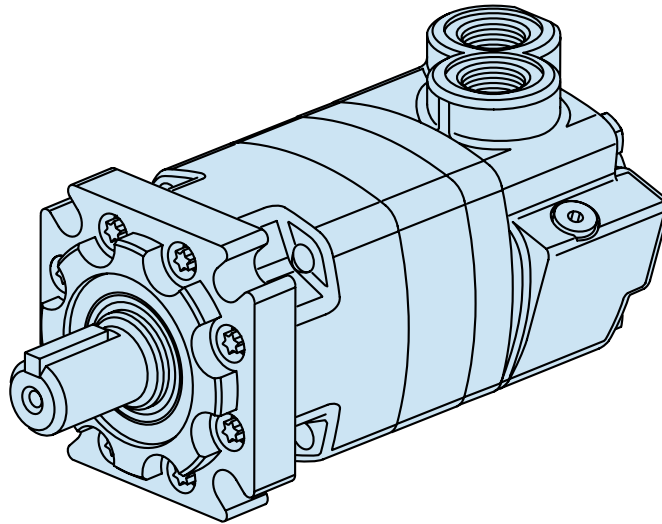
26 Design Code

A – One (1)

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

4000 Series

Highlights



Features

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

Benefits

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

Applications

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

Description

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

4000 Series Motors

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

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

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

C-4



Mowing



Snow Removal



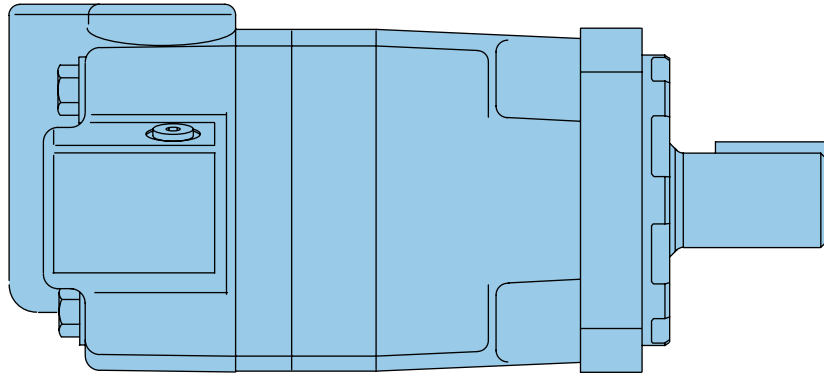
Sprayer



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	868	862	693	546	532	488	422	376	305	241
@ Flow											
Flow l/min [GPM]	Continuous	75 [20]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]
	Intermittent	95 [25]	115 [30]	115 [30]	115 [30]	130 [35]	130 [35]	130 [35]	150 [40]	150 [40]	150 [40]
Torque* Nm [lb-in]	Continuous	320 [2850]	375 [3330]	485 [4290]	600 [5300]	705 [6240]	753 [6666]	850 [7530]	930 [8240]	945 [8375]	970 [8605]
	Intermittent	470 [4160]	560 [4940]	705 [6240]	800 [7100]	845 [7470]	957 [8471]	1065 [9420]	1185 [10470]	1170 [10350]	1180 [10450]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	190 [2750]	140 [2000]	115 [1700]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	260 [3750]	310 [4500]	260 [3750]	260 [3750]	240 [3500]	170 [2500]	140 [2000]
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.

	Continuous		Peak
	Intermittent		No Operation

130 cfm [7.3 l/min]
Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[5] 1,9	[310] 35	[510] 60	[1060] 120	[1590] 180						
[1] 3,8	[290] 35	[530] 60	[1080] 120	[1600] 180	[2110] 240	[2640] 300	[3060] 345	[3450] 390		
[2] 7,5	[280] 30	[530] 60	[1100] 125	[1620] 185	[2140] 240	[2660] 300	[3180] 360	[3600] 405	[4020] 455	[4080] 460
[4] 15	[260] 30	[520] 60	[1100] 125	[1650] 185	[2200] 250	[2700] 305	[3210] 365	[3660] 415	[4100] 465	[4560] 515
[6] 23	[240] 25	[510] 60	[1100] 125	[1650] 185	[2200] 250	[2720] 305	[3240] 365	[3710] 420	[4180] 470	[4660] 525
[8] 30	[230] 25	[510] 60	[1100] 125	[1640] 185	[2210] 250	[2740] 310	[3270] 370	[3770] 425	[4270] 480	[4750] 535
[10] 38	[210] 25	[510] 60	[1100] 125	[1640] 185	[2210] 250	[2750] 310	[3300] 375	[3820] 430	[4350] 490	[4840] 545
[12] 45	[200] 25	[500] 55	[1100] 120	[1640] 185	[2220] 250	[2750] 310	[3300] 375	[3840] 435	[4370] 495	[4870] 550
[14] 53	[180] 20	[490] 55	[1100] 120	[1640] 185	[2220] 250	[2750] 310	[3310] 375	[3860] 435	[4390] 495	[4890] 550
[16] 61	[160] 20	[490] 55	[1100] 120	[1630] 185	[2220] 250	[2760] 310	[3310] 375	[3860] 435	[4400] 495	[4920] 555
[18] 68	[130] 15	[480] 55	[1100] 120	[1630] 185	[2220] 250	[2760] 310	[3320] 375	[3870] 435	[4420] 500	[4940] 560
[20] 76	[110] 10	[470] 55	[1100] 120	[1620] 185	[2210] 250	[2760] 310	[3330] 375	[3890] 440	[4440] 500	
[22] 83	[70] 10	[450] 50	[1100] 115	[1610] 180	[2190] 245	[2750] 310	[3320] 375	[3880] 440	[4440] 500	
[25] 95	[50] 5	[430] 50	[1100] 115	[1580] 180	[2160] 245	[2720] 305	[3300] 375	[3860] 435	[4430] 500	
[30] 114		[400] 45	[900] 105	[1500] 170	[2080] 235	[2670] 300	[3200] 360	[3740] 425		

110 cfm [6.3 l/min]
Pressure Bar [PSI]

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

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

4000 Series

Performance Data

Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area. Performance data is typical at 120 SUS. Actual data may vary slightly from unit to unit in production.

Continuous

Intermittent

Peak

No Operation

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

	[250] 15	[5 00] 35	[100 0] 70	[150 0] 105	[2 00 0] 140	[25 00] 170	[3 00 0] 205	[35 00] 240	[4 00 0] 275	[45 00] 310
[.5] 1.9	[4 00] 45 8	[8 10] 90 5	[150 0] 170 1							
[1] 3.8	[4 10] 45 17	[830] 95 17	[1590] 180 16	[2220] 250 15	[2860] 325 14	[3860] 435 12	[4560] 515 11	[5390] 610 9	[55 10] 625 3	
[2] 7.5	[420] 45 36	[850] 95 35	[1680] 190 34	[24 10] 270 32	[3 140] 355 29	[4060] 460 27	[48 00] 540 25	[5420] 610 22	[6 00 0] 680 16	[62 10] 700 8
[4] 15	[430] 50 73	[870] 100 73	[1770] 200 71	[2590] 295 70	[34 10] 385 68	[4260] 480 61	[5040] 570 57	[5730] 645 45	[6340] 715 35	[6 740] 760 23
[6] 23	[430] 50 107	[880] 100 106	[180 0] 205 105	[2620] 295 103	[3530] 400 101	[4370] 495 98	[5 170] 585 90	[59 00] 665 81	[6590] 745 74	[7 10 0] 800 65
[8] 30	[4 10] 45 144	[870] 100 143	[1820] 205 142	[2660] 300 138	[3560] 400 136	[44 10] 500 132	[5240] 590 125	[6020] 680 116	[6770] 765 109	
[10] 38	[390] 45 182	[860] 95 180	[1820] 205 179	[27 00] 305 174	[3580] 405 170	[4460] 505 166	[53 00] 600 160	[6 110] 690 152	[6890] 780 143	
[12] 45	[350] 40 217	[850] 95 216	[1810] 205 215	[2690] 305 211	[3570] 405 202	[4440] 500 200	[53 00] 600 194	[6 120] 690 185		
[14] 53	[330] 35 256	[840] 95 254	[1790] 200 252	[2670] 300 248	[3560] 400 243	[4430] 500 237	[5290] 600 229	[6 120] 690 219		
[16] 61	[290] 35 291	[820] 95 290	[1770] 200 289	[2650] 300 284	[3540] 400 280	[44 10] 500 272	[5280] 595 264	[6 120] 690 253		
[18] 68	[270] 30 329	[8 10] 90 327	[1750] 200 325	[2640] 300 321	[3520] 400 316	[44 00] 495 308	[5270] 595 298	[6 120] 690 287		
[20] 76	[230] 25 366	[8 00] 90 364	[1730] 195 362	[2620] 295 358	[35 10] 395 353	[4380] 495 345	[5270] 595 334	[6 120] 690 321		
[22] 83	[190] 20 402	[780] 90 400	[1690] 190 398	[26 00] 295 394	[35 00] 395 389	[4370] 495 380	[5260] 595 368			
[25] 95	[150] 15 459	[750] 85 456	[1640] 185 453	[2560] 290 448	[3480] 395 442	[4360] 495 434	[5240] 590 421			
[30] 114		[7 10] 80 546	[1540] 175 542	[25 10] 285 537	[3350] 380 529	[4 190] 475 520	[5030] 570 504			

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

	[250] 15	[5 00] 35	[100 0] 70	[150 0] 105	[2 00 0] 140	[25 00] 170	[3 00 0] 205	[35 00] 240	[4 00 0] 275	[45 00] 310
[.5] 1.9	[3 00] 35 8	[680] 75 7	[1320] 150 5	[2050] 230 3	[2750] 310 1					
[1] 3.8	[320] 35 23	[7 00] 80 22	[1350] 155 20	[2070] 235 19	[2780] 315 18	[33 00] 375 16	[3940] 445 15	[44 10] 500 8	[4950] 560 2	
[2] 7.5	[330] 35 46	[7 00] 80 45	[1360] 155 41	[2080] 235 40	[2790] 315 37	[3340] 375 32	[3970] 450 29	[4530] 510 27	[5090] 575 25	[5590] 630 13
[4] 15	[320] 35 93	[7 10] 80 92	[140 0] 160 90	[2 100] 240 88	[2820] 320 84	[3420] 385 76	[4020] 455 73	[4620] 520 62	[5220] 590 51	[5730] 645 35
[6] 23	[3 00] 35 137	[7 10] 80 135	[1420] 160 134	[2 140] 240 131	[2850] 320 126	[35 10] 395 120	[4 180] 470 114	[4 760] 540 90	[5340] 605 75	[5870] 665 57
[8] 30	[280] 30 184	[720] 80 182	[1450] 165 180	[2 180] 245 176	[29 00] 330 171	[3560] 400 163	[4230] 480 154	[4850] 550 138	[5470] 620 122	[6 010] 680 100
[10] 38	[260] 30 232	[720] 80 229	[1480] 165 226	[2220] 250 221	[2950] 335 216	[36 10] 410 206	[4290] 485 194	[4920] 555 182	[5560] 630 169	[6 160] 695 142
[12] 45	[240] 25 277	[7 00] 80 274	[1450] 165 272	[2 190] 245 266	[2920] 330 260	[3590] 405 250	[4280] 485 238	[4920] 555 224	[5570] 630 209	[6 180] 700 182
[14] 53	[220] 25 321	[680] 75 319	[1420] 160 318	[2 160] 245 311	[2890] 325 304	[3570] 405 294	[4270] 480 282	[4920] 555 266	[5580] 630 249	[62 00] 700 222
[16] 61	[2 00] 25 366	[670] 75 364	[140 0] 160 362	[2 130] 240 356	[2860] 325 348	[3550] 400 338	[4260] 480 326	[4920] 555 308	[5590] 630 289	[6220] 705 262
[18] 68	[180] 20 410	[650] 75 409	[1360] 155 407	[2 100] 235 401	[2830] 320 392	[3530] 400 382	[4250] 480 370	[49 10] 555 350	[56 00] 635 329	[6240] 705 302
[20] 76	[150] 15 460	[630] 70 458	[1340] 150 456	[2070] 235 448	[28 00] 315 440	[35 10] 395 429	[4240] 480 417	[49 10] 555 396	[56 10] 635 373	
[22] 83	[120] 15 509	[620] 70 506	[1330] 150 502	[2060] 235 494	[2790] 315 484	[35 00] 395 473	[4220] 475 461	[49 10] 555 438	[56 00] 635 413	
[25] 95	[70] 10 582	[6 00] 70 578	[1320] 150 573	[2050] 230 563	[2780] 315 552	[3480] 395 540	[42 10] 475 526	[49 00] 555 501	[5590] 630 474	
[30] 114		[560] 65 693	[1280] 145 687	[1990] 225 675	[27 00] 305 661	[3430] 390 647	[3970] 450 630	[4640] 525 600		

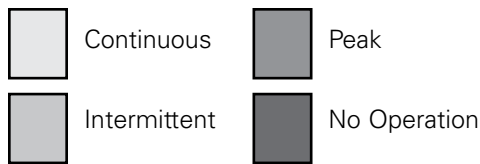
[1990]
225
675 } Torque [lb-in
Nm
Speed RPM

4000 Series

Performance Data

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

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



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

	[250] 15	[5 00] 35	[750] 50	[100 0] 70	[1250] 85	[1500] 105	[1750] 120	[2 00 0] 140	[2250] 155	[25 00] 170	[2750] 190	[3 00 0] 205	[3250] 225	[35 00] 240	[3750] 260
[5] 1.9	[460] 50	[980] 110													
[1] 3.8	[480] 55	[990] 110	[1 490] 14	[1990] 170	[2480] 225	[2970] 335	[34 00] 385	[3830] 435	[4250] 480	[4680] 530	[5020] 565				
[2] 7.5	[5 00] 55	[100 0] 115	[1520] 170	[2040] 230	[2540] 285	[3050] 345	[3420] 385	[3930] 445	[4440] 500	[49 00] 555	[5320] 600	[5 740] 650	[6 160] 695	[6640] 750	[7 150] 810
[4] 15	[5 10] 60	[1030] 115	[1560] 175	[2080] 235	[26 00] 295	[3130] 355	[3630] 410	[4130] 465	[4630] 525	[5 120] 580	[5570] 630	[6030] 680	[6480] 730	[6870] 775	[7340] 830
[6] 23	[5 10] 60	[1040] 120	[1570] 175	[2100] 235	[2620] 295	[3160] 355	[3660] 415	[42 00] 475	[47 10] 530	[5220] 590	[5690] 645	[6 150] 695	[6620] 750	[7050] 795	[7430] 840
[8] 30	[5 00] 55	[1020] 121	[1560] 175	[2110] 240	[2630] 295	[3150] 355	[3680] 415	[42 10] 475	[4740] 535	[5250] 595	[5720] 645	[62 00] 700	[6670] 755	[7090] 800	[7470] 845
[10] 38	[470] 55	[100 0] 115	[1540] 175	[2100] 235	[2620] 295	[3150] 355	[3690] 415	[4230] 480	[4770] 540	[5290] 600	[5 760] 650	[6240] 705	[67 10] 760	[7 140] 805	
[12] 45	[450] 50	[980] 110	[1530] 175	[2080] 235	[26 10] 295	[3140] 355	[3680] 415	[4220] 475	[4760] 540	[5280] 595	[5750] 650	[6230] 705	[67 00] 755		
[14] 53	[420] 45	[960] 110	[1520] 170	[2060] 235	[26 00] 295	[3130] 355	[3670] 415	[42 00] 475	[4740] 535	[5260] 595	[5 740] 650	[6220] 705			
[16] 61	[4 00] 45	[950] 105	[1500] 170	[2040] 230	[2580] 290	[3120] 355	[3660] 415	[4190] 475	[4730] 535	[5250] 595	[5730] 650	[62 10] 700			
[18] 68	[380] 45	[930] 105	[1480] 165	[2020] 230	[2560] 290	[3110] 350	[3650] 415	[4180] 470	[4710] 530	[5230] 590	[5720] 645	[62 00] 700			
[20] 76	[350] 40	[9 10] 105	[1460] 165	[2 00 0] 225	[2550] 290	[3100] 350	[3640] 410	[4170] 470	[47 00] 530	[5220] 590	[5 7 10] 645				
[22] 83	[3 10] 35	[870] 100	[1 420] 160	[1970] 225	[25 00] 280	[3050] 345	[3590] 405	[4140] 465	[4680] 530	[52 00] 590	[5680] 640				
[25] 95	[260] 30	[820] 95	[1 380] 155	[1930] 220	[2460] 280	[3030] 335	[3540] 400	[4090] 460	[4640] 525	[5180] 585					
[30] 114		[680] 75	[1 250] 140	[1860] 210	[2390] 270	[3030] 330	[3430] 390	[4000] 445	[4460] 505	[4950] 560					
[35] 132			[1110] 125	[1740] 195	[2270] 255	[2790] 315	[3340] 375	[39 10] 440	[44 00] 495						

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

	[250] 15	[5 00] 35	[750] 50	[100 0] 70	[1250] 85	[1500] 105	[1750] 120	[2 00 0] 140	[2250] 155	[25 00] 170	[2750] 190	[3 00 0] 205	[3250] 225	[35 00] 240	[3750] 260
[5] 1.9	[533] 60	[1074] 121													
[1] 3.8	[553] 62	[1136] 128	[1714] 194	[2287] 258	[2841] 321	[3394] 384	[3868] 437	[4389] 496	[4895] 553	[6080] 685	[5870] 663	[368] 720	[68 11] 770	[7239] 818	[7654] 865
[2] 7.5	[568] 64	[1146] 130	[1740] 197	[2328] 263	[2902] 328	[3461] 391	[3955] 447	[4524] 511	[5222] 597	[6360] 694	[6 146] 753	[6666] 813	[7 191] 876	[7 749] 940	[8323] 940
[4] 15	[579] 65	[1167] 132	[1771] 200	[23 74] 268	[2962] 335	[3557] 402	[4 139] 468	[47 12] 532	[5285] 597	[5848] 661	[6395] 722	[6946] 785	[7502] 848	[8020] 906	[8471] 957
[6] 23	[583] 66	[1177] 133	[1781] 201	[2395] 271	[2987] 338	[36 01] 407	[4 193] 474	[4793] 542	[53 76] 607	[5959] 673	[6521] 737	[7082] 800	[7607] 859	[8097] 915	
[8] 30	[573] 65	[1167] 132	[1780] 201	[2404] 272	[3 007] 340	[36 10] 408	[42 18] 477	[48 12] 544	[54 11] 611	[5994] 677	[6566] 741	[7022] 793	[75 18] 849		
[10] 38	[547] 62	[1146] 130	[1765] 199	[2395] 271	[2997] 339	[3629] 410	[4238] 479	[4837] 547	[5442] 615	[6035] 682	[66 01] 746	[7022] 793	[75 18] 849		
[12] 45	[527] 60	[1126] 127	[1745] 197	[2369] 268	[2991] 338	[3609] 408	[4228] 478	[4832] 546	[5441] 615	[6034] 682	[6586] 744	[6940] 784			
[14] 53	[497] 56	[1106] 125	[1730] 195	[2344] 265	[2972] 336	[3585] 405	[42 13] 476	[48 16] 544	[5430] 614	[6028] 681	[65 11] 736	[6940] 784			
[16] 61	[472] 53	[1096] 124	[1715] 194	[2324] 263	[2947] 333	[3565] 403	[4203] 475	[48 11] 544	[5420] 612	[59 19] 669	[6436] 727				
[18] 68	[437] 39	[1075] 121	[1690] 191	[2299] 260	[2917] 330	[3541] 400	[4188] 473	[48 01] 542	[54 00] 610	[59 19] 669	[6362] 719				
[20] 76	[402] 45	[1055] 119	[1669] 189	[22 74] 257	[2898] 327	[3521] 398	[4 178] 472	[4791] 541	[5394] 609	[5851] 661					
[22] 83	[366] 41	[1005] 114	[1629] 184	[2257] 255	[2856] 323	[3480] 393	[4 136] 467	[4756] 537	[5205] 588						
[25] 95	[3 01] 34	[940] 106	[1588] 179	[2231] 252	[2825] 319	[34 19] 386	[4086] 462	[47 10] 532	[5205] 588						
[30] 114		[845] 96	[1480] 167	[2 151] 243	[2759] 312	[3328] 376	[3984] 450	[4573] 517	[5021] 567						
[35] 132			[1348] 152	[2057] 232	[2623] 296	[3 183] 360	[3883] 439	[4354] 492							

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

4000 Series

Performance Data

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

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

Continuous

Intermittent

Peak

No Operation

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

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170	[2750] 190	[3000] 205	[3250] 225	[3500] 240	[3750] 260
[.5] 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 69	[3320] 375 69	[4000] 450 68	[4680] 530 67	[5330] 590 66	[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] 375 119	[4070] 460 118	[4740] 535 117	[5390] 610 116	[6050] 685 115	[6710] 760 112	[7370] 835 109				
[12] 45	[600] 70 145	[1260] 140 144	[1940] 220 144	[2630] 295 143	[3340] 375 142	[4040] 455 142	[4730] 530 141	[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] 450 166	[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 35	[6390] 720 34	[7190] 810 34	[7890] 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 94	[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] 140				[2050] 230 376	[2790] 315 374	[3620] 410 371								
[151]														

[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.

	Continuous		Peak
	Intermittent		No Operation

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

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1600] 100	[1700] 115	[1800] 125	[2000] 140
[.5]	[1000] 115 2									
[1]	[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]	[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]	[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]	[1095] 125 35	[2460] 280 35	[3825] 430 35	[5220] 590 34	[6620] 750 33	[7950] 900 31	[8430] 950 30	[8910] 1005 29	[9490] 1070 28	
[8]	[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]	[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]	[1160] 130 72	[2600] 295 72	[4050] 460 71	[5375] 605 70	[6700] 755 69	[8100] 915 65	[8660] 980 64			
[14]	[1105] 125 84	[2535] 285 84	[3965] 450 83	[5325] 600 82	[6685] 755 81	[8065] 910 77	[8620] 975 76			
[16]	[1050] 120 96	[2465] 280 95	[3880] 440 95	[5275] 595 94	[6670] 755 93	[8035] 910 89	[8580] 970 88			
[18]	[990] 110 108	[2405] 270 107	[3825] 430 107	[5240] 590 105	[6655] 750 104	[7345] 830 100				
[20]	[930] 105 121	[2350] 265 120	[3770] 425 120	[5205] 590 118	[6640] 750 116					
[25]	[750] 85 151	[2175] 245 150	[3600] 405 149	[5000] 565 147	[6400] 725 146					
[30]	[550] 60 181	[1975] 225 180	[3400] 385 179	[4800] 530 177	[6200] 700 176					
[35]			[3125] 355 210	[4545] 515 208						
[40]			[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]	[800] 90 3	[1750] 200 1								
[1]	[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]	[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]	[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]	[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]	[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]	[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]	[860] 95 91	[1975] 225 90	[3095] 350 89	[4200] 475 87	[5305] 600 85	[6390] 720 81	[7475] 845 77			
[14]	[830] 95 106	[1945] 220 105	[3055] 345 104	[4165] 470 102	[5275] 595 100	[6360] 720 96	[7445] 840 92			
[16]	[805] 90 122	[1910] 215 120	[3020] 340 119	[4130] 465 117	[5245] 595 115	[6330] 715 111	[7420] 840 107			
[18]	[740] 85 137	[1860] 210 136	[2980] 335 134	[4105] 465 132	[5235] 590 130	[6305] 715 125	[7380] 835 121			
[20]	[680] 75 153	[1810] 205 152	[2940] 330 150	[4085] 460 147	[5225] 590 145	[6285] 710 140				
[25]	[570] 65 191	[1665] 190 189	[2800] 315 187	[4005] 455 184	[5210] 590 182	[6135] 695 177				
[30]		[1520] 170 228	[2645] 300 226	[3765] 425 220	[4885] 550 220	[5985] 675 215				
[35]			[2400] 270 265	[3510] 395 263						
[40]			[2155] 245 305	[3260] 370 303						

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

4000 Series

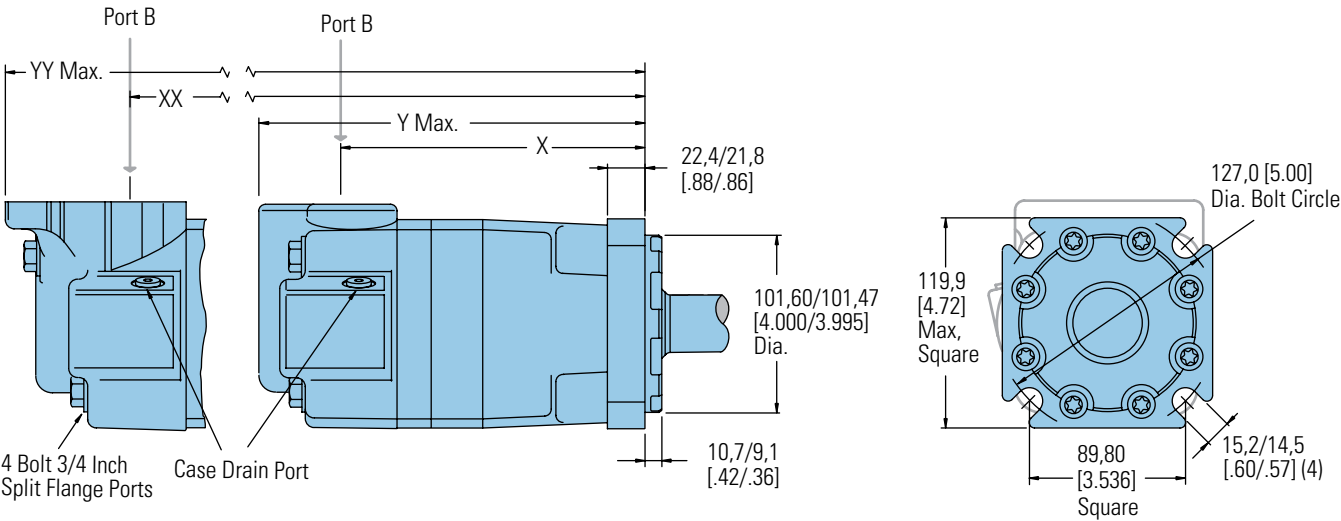
Dimensions
Standard Mount

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

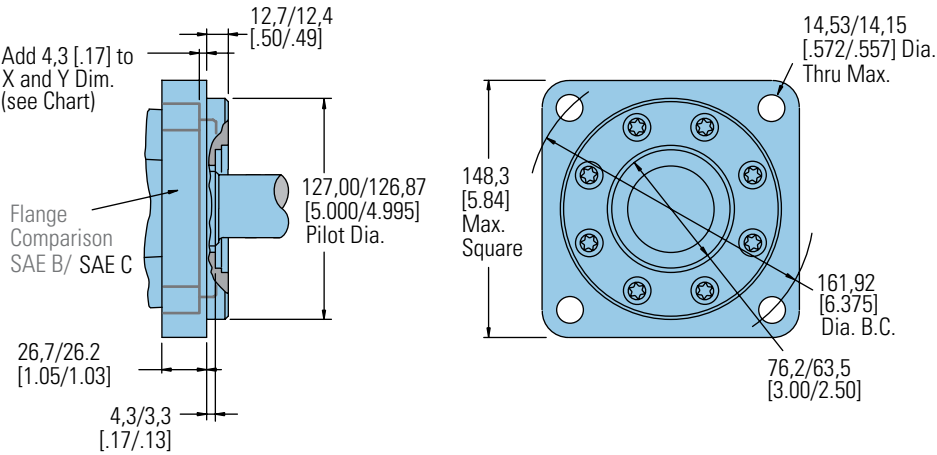
Standard Rotation Viewed from Shaft End

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

Standard Mount



SAE C Flange



STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	158,3 [6.23]	214,4 [8.44]	167,3 [6.59]	246,3 [9.70]
130 [7.9]	162,3 [6.39]	218,4 [8.60]	171,3 [6.75]	250,4 [9.86]
160 [9.9]	168,7 [6.64]	224,7 [8.85]	177,7 [7.00]	256,7 [10.11]
205 [12.5]	177,2 [6.98]	233,2 [9.18]	186,2 [7.33]	265,2 [10.44]
245 [15.0]	168,7 [6.64]	224,7 [8.85]	177,7 [7.00]	256,7 [10.11]
310 [19.0]	177,2 [6.98]	233,2 [9.18]	186,2 [7.33]	265,2 [10.44]
395 [24.0]	187,9 [7.40]	243,9 [9.60]	196,9 [7.75]	275,9 [10.86]
495 [30.0]	200,7 [7.90]	256,8 [10.11]	209,7 [8.26]	288,8 [11.37]
625 [38.0]	217,8 [8.58]	273,9 [10.78]	226,7 [8.93]	305,9 [12.04]

4000 Series

Dimensions
Wheel Mount

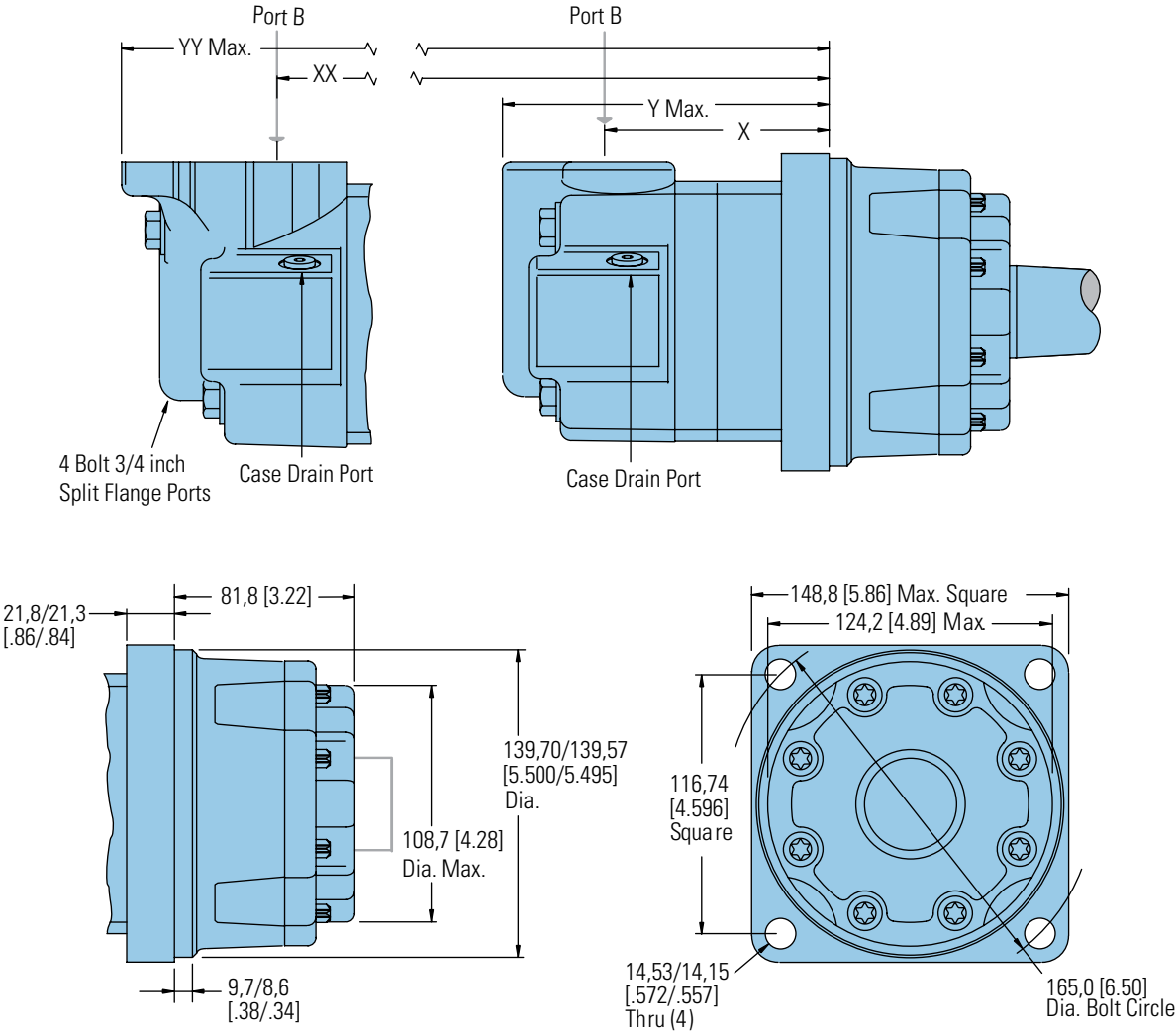
Wheel Mount

Ports

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

Standard Rotation Viewed from Shaft End

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



WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	87,5 [3.45]	143,3 [5.64]	96,4 [3.80]	175,3 [6.90]
130 [7.9]	91,6 [3.61]	147,3 [5.80]	100,5 [3.96]	179,3 [7.06]
160 [9.9]	97,8 [3.85]	153,7 [6.05]	106,8 [4.21]	185,7 [7.31]
205 [12.5]	106,4 [4.19]	162,3 [6.39]	115,4 [4.55]	194,3 [7.65]
245 [15.0]	97,8 [3.85]	153,7 [6.05]	106,8 [4.21]	185,7 [7.31]
310 [19.0]	106,4 [4.19]	162,3 [6.39]	115,4 [4.55]	194,3 [7.65]
395 [24.0]	117,1 [4.61]	173,0 [6.81]	126,1 [4.97]	205,0 [8.07]
495 [30.0]	129,9 [5.12]	185,7 [7.31]	138,8 [5.47]	217,7 [8.57]
625 [38.0]	146,9 [5.79]	202,9 [7.99]	156,0 [6.14]	235,0 [9.25]

4000 Series

Dimensions

Bearingless

Bearingless

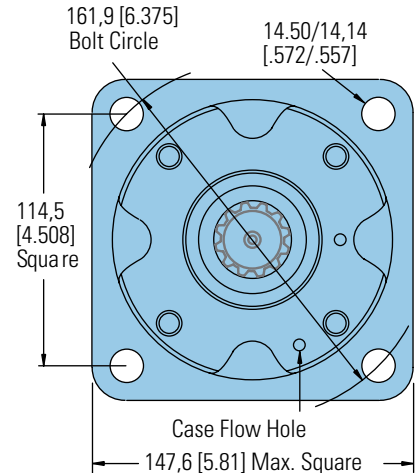
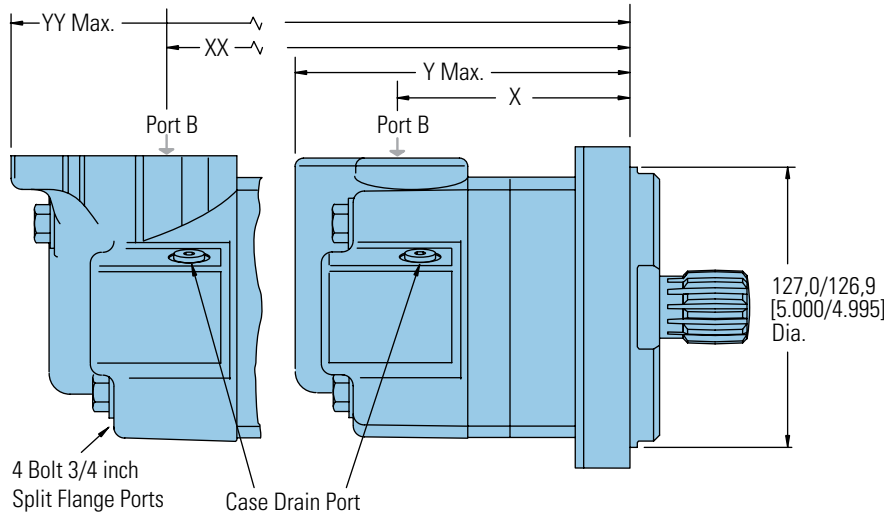
Ports

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

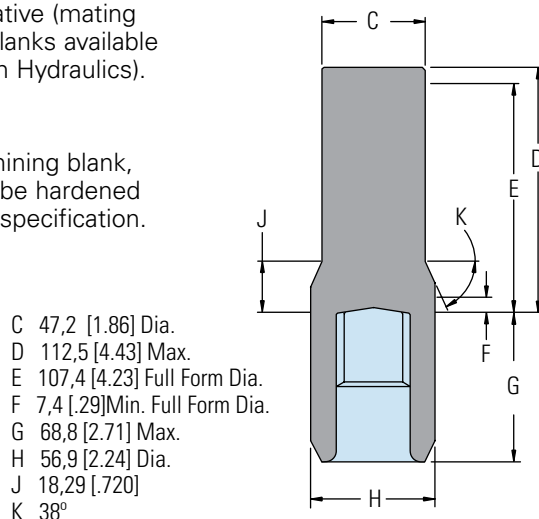
Port B Pressurized — CCW



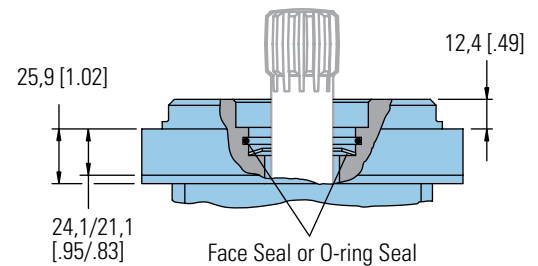
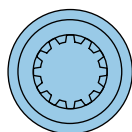
For 4000 Series Bearingless Motor application information contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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



Mating Coupling Blank
 Eaton Part No. 12745-003



BEARINGLESS MOTOR DIMENSIONS

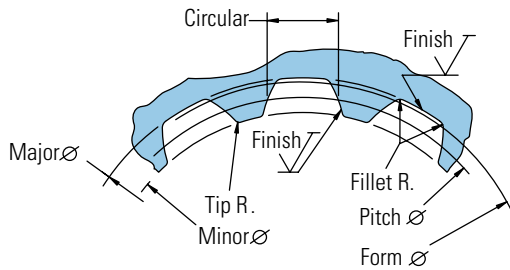
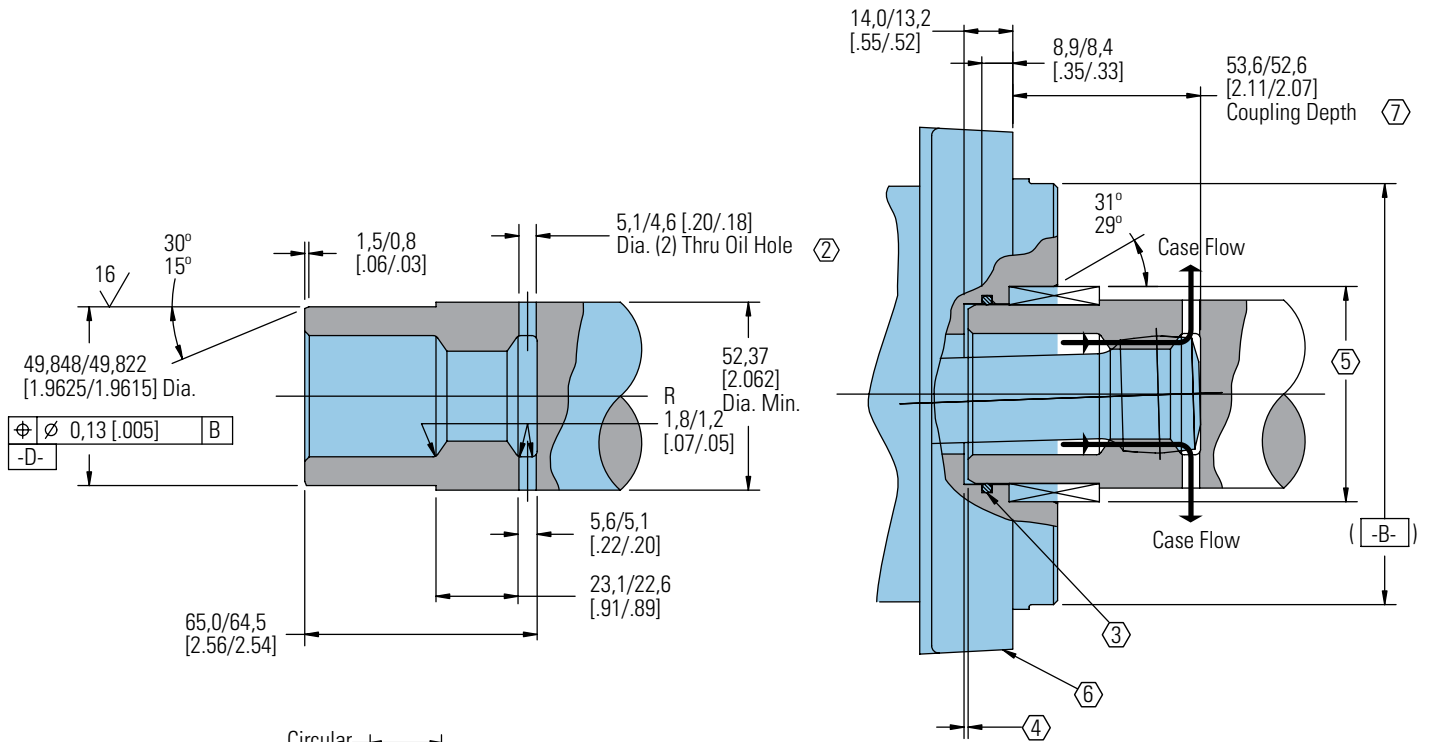
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	91,0 [3.58]	146,8 [5.78]	100,1 [3.94]	178,8 [7.04]
130 [7.9]	95,0 [3.74]	150,8 [5.94]	104,1 [4.10]	182,9 [7.20]
160 [9.9]	101,4 [4.00]	157,1 [6.19]	110,5 [4.35]	189,2 [7.45]
205 [12.5]	109,9 [4.33]	165,7 [6.52]	118,9 [4.68]	197,6 [7.78]
245 [15.0]	101,4 [4.00]	157,1 [6.19]	110,5 [4.35]	189,2 [7.45]
310 [19.0]	109,9 [4.33]	165,7 [6.52]	118,9 [4.68]	197,6 [7.78]
395 [24.0]	120,6 [4.75]	176,3 [6.94]	129,5 [5.10]	208,3 [8.20]
495 [30.0]	133,5 [5.26]	189,2 [7.45]	142,5 [5.61]	221,2 [8.71]
625 [38.0]	150,5 [5.93]	206,3 [8.12]	159,5 [6.28]	238,3 [9.38]

4000 Series

Installation Information

Bearingless

- 1 Internal spline in mating part to be as follows: Material to be ASTM A304, 8620H. Carbonize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 - 1,27 [.030 - .050] (dimensions apply after heat treat).
- 2 Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
- 3 Seal to be furnished with motor for proper oil circulation thru splines.
- 4 Some means of maintaining clearance between shaft and mounting flange must be provided.
- 5 Counterbore designed to adapt to a standard sleeve bearing 50,010 - 50,040 [1.9689 - 1.9700] ID by 60,050 - 60,080 [2.3642 - 2.3653] (Oilite bronze sleeve bearing).
- 6 Similar to SAE "C" Four Bolt Flange.
- 7 52,8 [2.08] Max. dimension to be maintained when assembling shipping and installing unit to insure valve drive engagement with valve (this is required on displacement code number 24 only).



Spline Pitch.....	10/20
Pressure Angle.....	30°
Number of teeth.....	12
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter.....	Ref. 30,480000 [1.2000000] ∇ 0,20 [.008] D
Base Diameter.....	Ref. 26,396455 [1.0392305]
Major Diameter.....	33,43 [1.316] Max. 33,23 [1.308] Min.
Min. Minor Diameter.....	28,40 - 28,58 [1.118 - 1.125]
Form Diameter, Min.	32,59 [1.283]
Fillet Radius.....	0,63 - 0,76 [.025 - .030]
Tip Radius.....	0,26 - 0,51 [.010 - .020]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,025 [+ .0000 - .0010]
Total Index Variation	0,038 [.0015]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual	5,045 [1.986]
Minimum Effective	4,995 [1.951]
Maximum Effective	Ref. 5,009 [1.972]
Minimum Actual	Ref. 4,986 [1.963]
Dimension Between Two Pins.....	Ref. 22,783 - 22,929 [.8970 - .9027]
Pin Diameter.....	5,334 [.2100] Pins to Have 3,73 [.147]
Wide Flat for Root Clearance	

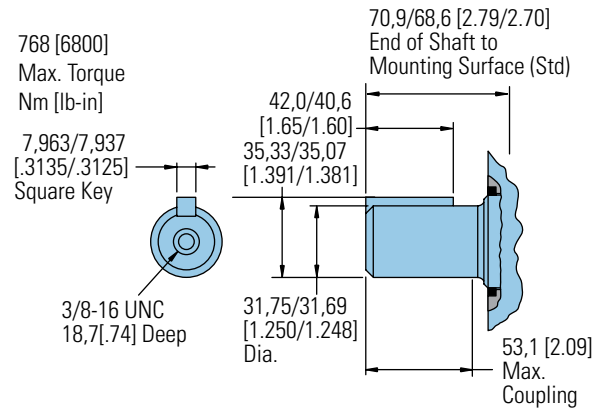
C-4

4000 Series

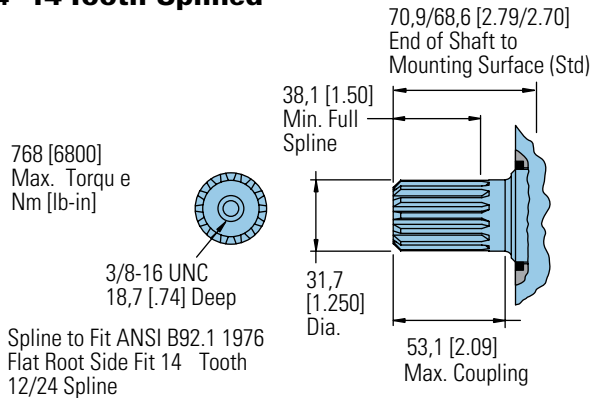
Dimensions

Shafts

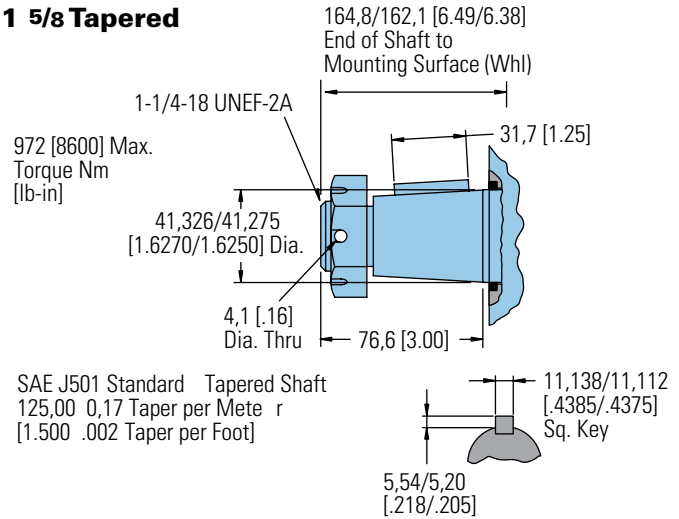
1 1/4 Inch Straight



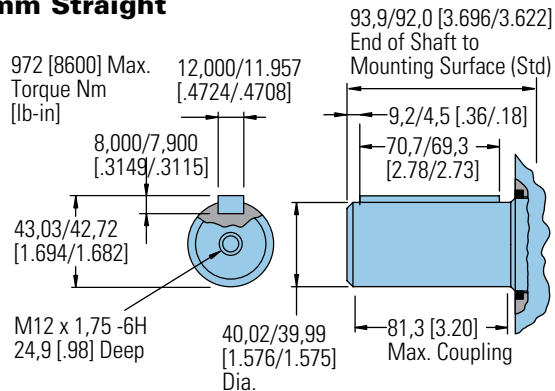
1 1/4 -14 Tooth Splined



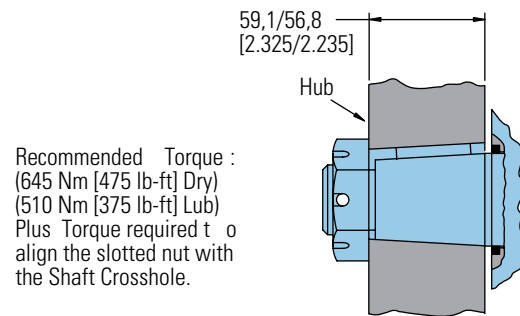
1 5/8 Tapered



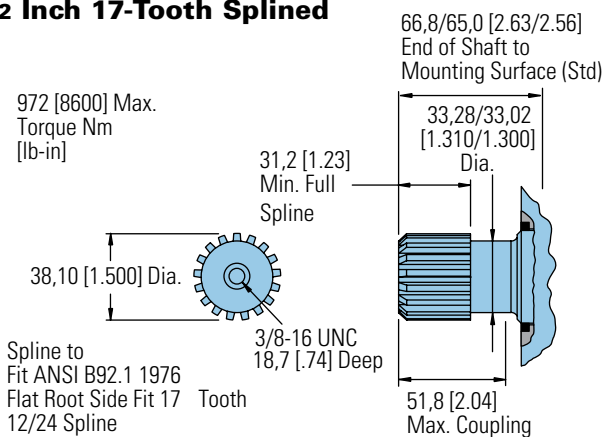
40 mm Straight



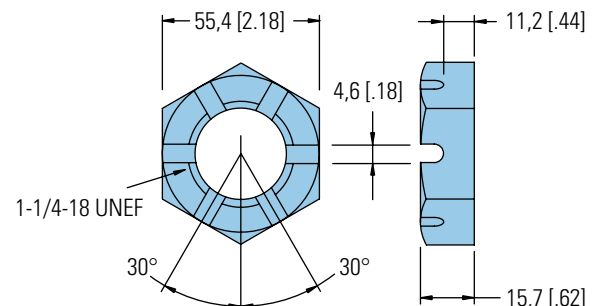
Tapered Shaft Hub Data



1 1/2 Inch 17-Tooth Splined



Slotted Hexagon Nut



4000 Series

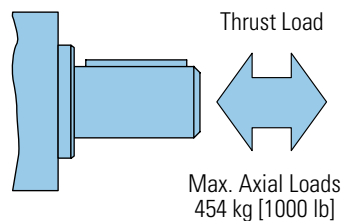
Shaft Side Load Capacity

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



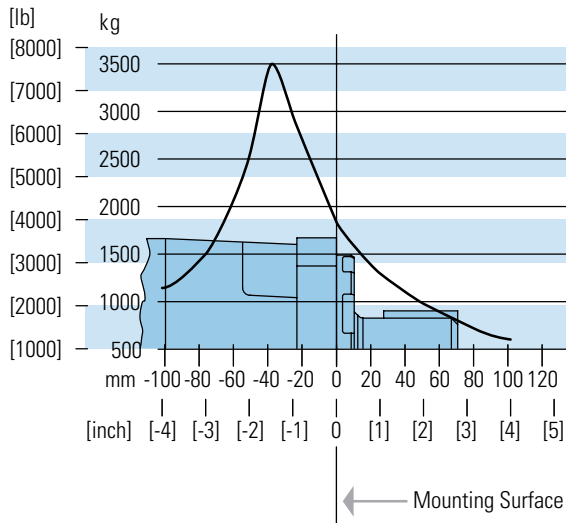
B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

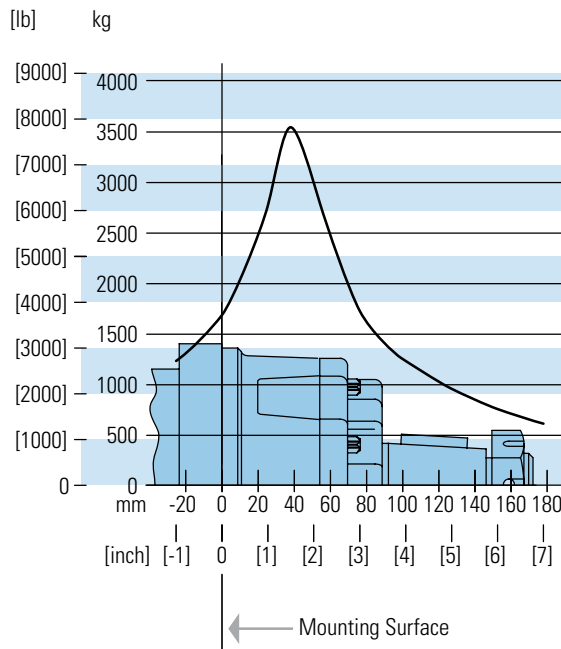
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

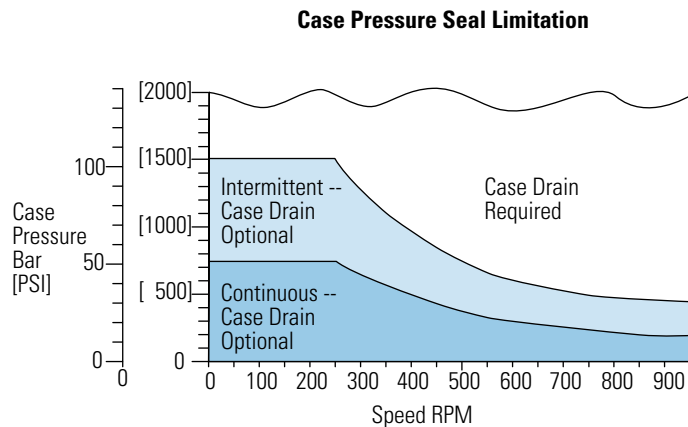
Char-Lynn 4000 Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine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

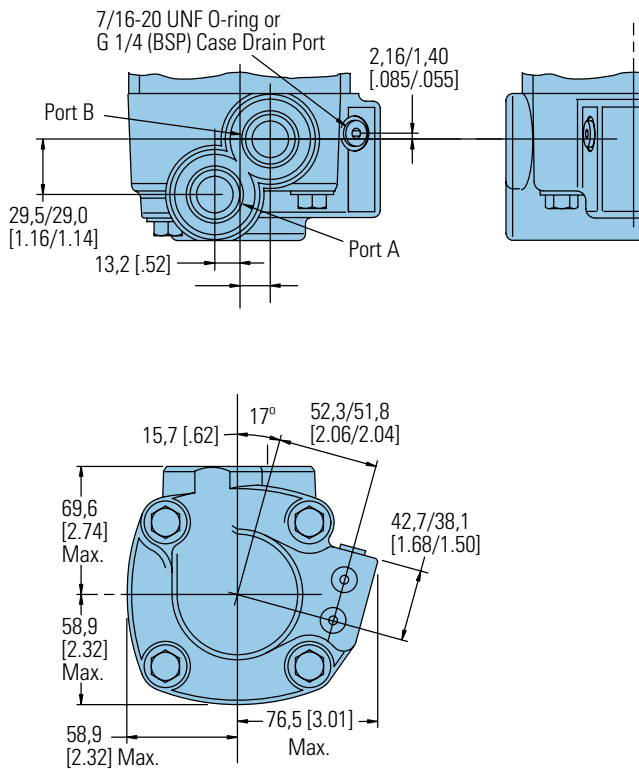


4000 Series

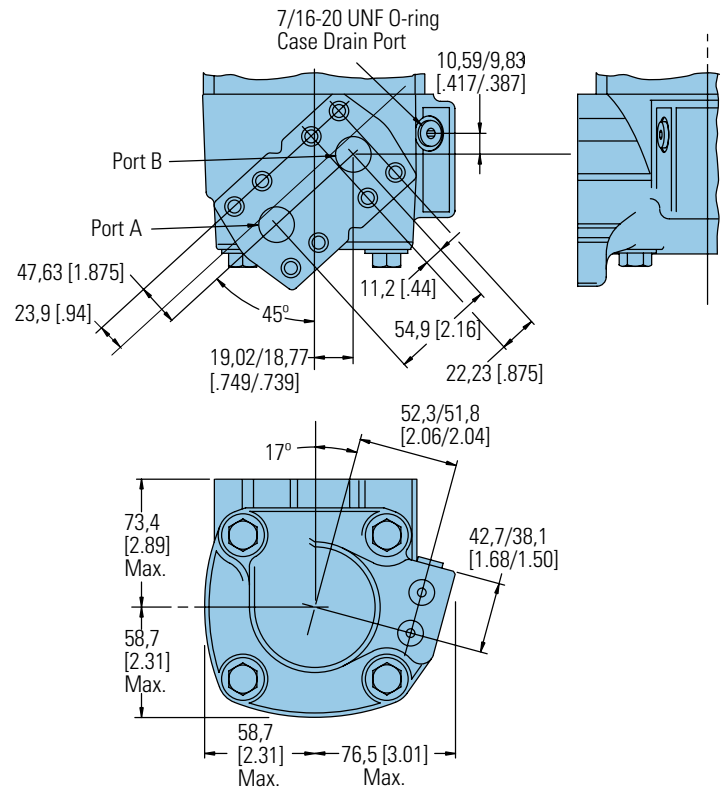
Dimensions

Ports

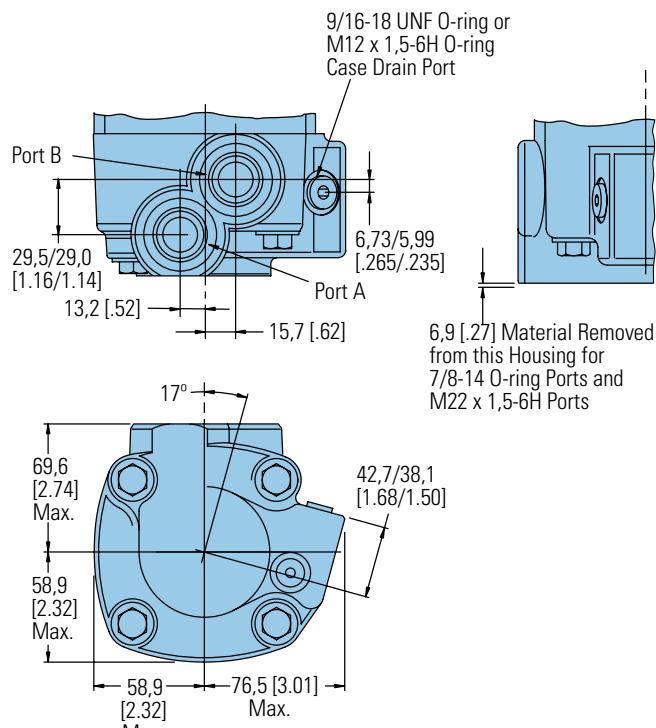
1-1/16-12 O-ring Ports (2) or G 3/4 (BSP) Ports (2)



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)



4000 Series

Product Numbers

Note:

For 4000 Series Motors with a configuration **Not Shown** in the charts below: Use model code number system on the next page to specify product in detail.

Use digit prefix —109-, 110-, or 111- plus four digit number from charts for complete product number— Example 111-1057.

Orders will not be accepted without three digit prefix.

MOUNTING		SHAFT	PORT SIZEDISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER									
			110 [6.7]	130 [7.9]	160 [9.9]	205 [12.5]	245 [15.0]	280* [17.1]	310 [19.0]	395 [24.0]	495 [30.0]	625 [38.0]
Standard SAE B-Mount	1 1/4 Inch Straight	1 1/16 O-ring	109-1100	-1101	-1102	-1103	-1104	-1094	-1105	-1106	-1212	-1215
		3/4 inch Split Flange	109-1001	-1054	-1002	-1003	-1055	—	-1056	-1057	—	—
	1 5/8 Inch Tapered	1 1/16 O-ring	109-1107	-1108	-1109	-1110	-1111	—	-1112	-1113	-1479	-1455
		3/4 inch Split Flange	109-1006	-1058	-1007	-1008	-1059	—	-1402	-1061	—	—
	1 1/4 Inch 14 T Splined	1 1/16 O-ring	109-1114	-1115	-1116	-1117	-1118	—	-1119	-1120	—	—
		3/4 inch Split Flange	109-1011	-1062	-1012	-1013	-1063	—	-1064	-1065	—	—
Standard SAE C-Mount	40 mm Straight	G 3/4 (BSP)	109-1184	-1185	-1227	-1224	-1225	—	-1189	-1190	—	—
	1 1/4 Inch 17 T Splined	G 3/4 (BSP)	109-1191	-1192	-1193	-1194	-1195	—	-1196	-1197	—	—
Wheel Motor	1 1/4 Inch Straight	1 1/16 O-ring	110-1074	-1075	-1076	-1077	-1078	—	-1079	-1080	—	-1122
		3/4 inch Split Flange	110-1001	-1040	-1002	-1003	-1041	—	-1042	-1043	—	—
	40 mm Straight	G 3/4 (BSP)	110-1108	-1109	-1110	-1111	-1112	—	-1113	-1125	—	—
	1 5/8 Inch Tapered	1 1/16 O-ring	110-1081	-1082	-1083	-1084	-1085	—	-1086	-1087	1116	-1117
		3/4 inch Split Flange	110-1006	-1044	-1007	-1008	-1045	—	-1046	-1047	—	—
	1 1/4 Inch 14 T Splined	1 1/16 O-ring	110-1088	-1089	-1090	-1091	-1092	—	-1093	-1094	—	—
3/4 inch Split Flange		110-1011	-1048	-1012	-1013	-1049	—	-1050	-1051	—	—	
Bearingless		1 1/16 O-ring	111-1033	-1034	-1035	-1036	-1037	—	-1038	-1039	-1062	-1063
		3/4 inch Split Flange	111-1044	-1015	-1045	-1046	-1016	—	-1017	-1018	—	—
		G 3/4 (BSP)	111-1052	-1053	-1054	-1055	-1056	—	-1057	-1058	—	—

* New Release

111-1057

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

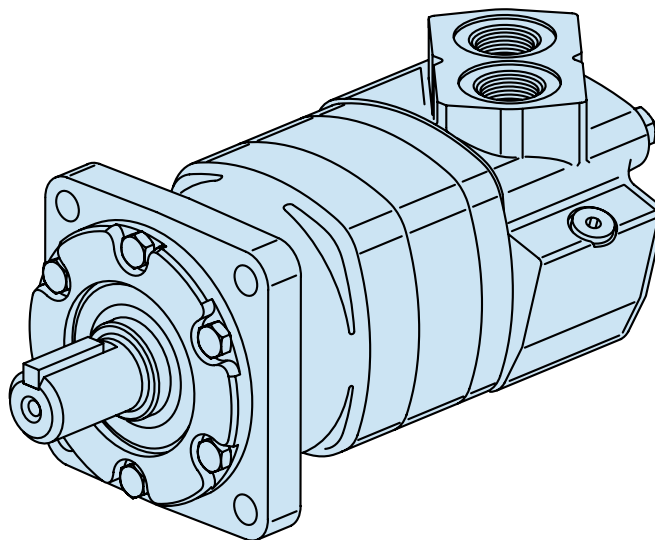
28, **29** Customer
Identification
00 - None

30 Design Code
F - Sixth

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

6000 Series

Highlights



Features

- 9 displacements available
- Presents a multitude of options that make this motor very “smart” and flexible to apply

Benefits

- Very tough motor for demanding applications
- Can be used in a multitude of industries
- Very easy/flexible to integrate in a system

Applications

- Mobile equipment
- Snow Removal, mowing
- Sprayer, trencher
- Wood products

Description

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

Specifications

Geroler Element	9 Displacements
Flow l/min [GPM]	150 [40] Continuous** 225 [60] Intermittent*
Speed RPM	775 Cont.** 866 Inter.*
Pressure bar [PSI]	200 [3000] Cont.** 300 [4500] Inter.*
Torque Nm [lb-in]	1685 [14920] Cont.** 1875 [16580] Inter.*

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

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

C-5



Mowing



Snow Removal



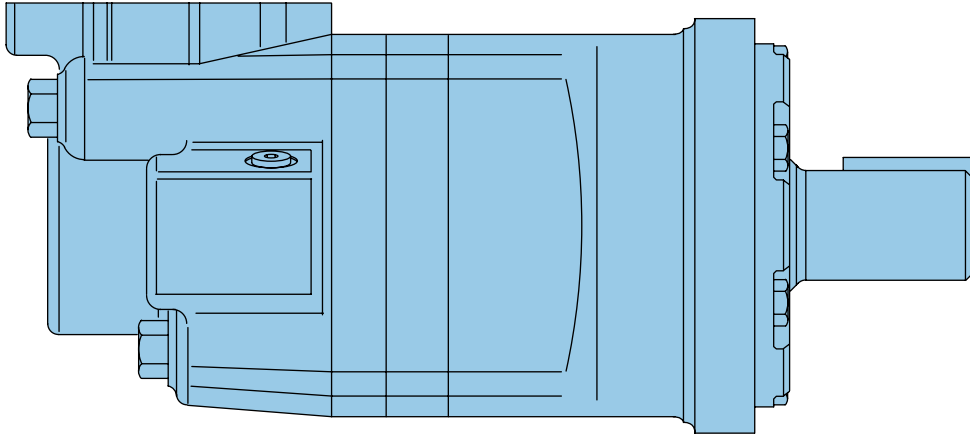
Sprayer



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.

	Continuous		Peak
	Intermittent		No Operation

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

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[5] 1.9	[280] 30	[650] 75	[1450] 165	[2290] 260						
[2] 7.5	[290] 35	[680] 75	[1500] 170	[2340] 265	[3100] 350	[3880] 440	[4140] 470			
[4] 15	[300] 35	[710] 80	[1500] 175	[2390] 270	[3210] 365	[4030] 455	[4600] 520	[5200] 590	[5790] 655	
[8] 30	[310] 35	[740] 85	[1590] 180	[2450] 275	[3280] 370	[4120] 465	[4810] 545	[5530] 625	[6250] 705	[6900] 780
[12] 45	[320] 35	[750] 85	[1610] 180	[2480] 280	[3330] 375	[4190] 475	[4990] 565	[5810] 655	[6630] 750	[7320] 825
[16] 61	[300] 35	[730] 80	[1600] 180	[2470] 280	[3340] 375	[4210] 475	[5090] 575	[5900] 665	[6710] 760	[7470] 845
[20] 76	[270] 30	[720] 80	[1590] 180	[2460] 280	[3350] 380	[4240] 480	[5100] 575	[5950] 670	[6800] 770	[7620] 860
[24] 91	[240] 25	[700] 80	[1570] 175	[2440] 275	[3330] 375	[4220] 475	[5080] 575	[5940] 670	[6810] 770	
[28] 106	[190] 20	[660] 75	[1530] 175	[2400] 270	[3300] 375	[4200] 475	[5060] 570	[5940] 670	[6810] 770	
[32] 121	[160] 20	[630] 70	[1500] 170	[2370] 270	[3270] 370	[4160] 470	[5040] 570	[5920] 670	[6790] 765	
[36] 136	[120] 15	[620] 70	[1480] 165	[2350] 265	[3240] 365	[4130] 465	[5000] 565	[5880] 665	[6760] 765	
[40] 151	[80] 10	[610] 70	[1450] 165	[2320] 260	[3210] 365	[4100] 465	[4960] 560	[5840] 660		
[45] 170		[590] 65	[1410] 160	[2280] 260	[3170] 360	[4060] 460	[4920] 555	[5790] 655		

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

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[5] 1.9	[430] 50	[860] 95	[1890] 215							
[2] 7.5	[440] 50	[900] 100	[1940] 220	[2990] 340	[3960] 445	[4920] 555	[5040] 570	[5930] 670		
[4] 15	[460] 50	[940] 105	[2000] 225	[3060] 345	[4080] 460	[5090] 575	[5680] 640	[6630] 750	[7570] 855	[8520] 965
[8] 30	[470] 55	[960] 110	[2060] 235	[3150] 355	[4210] 475	[5260] 595	[6180] 700	[7100] 800	[8020] 905	[9020] 1020
[12] 45	[480] 55	[970] 110	[2080] 235	[3180] 360	[4270] 480	[5360] 605	[6390] 720	[7420] 840	[8450] 955	[9510] 1075
[16] 61	[450] 50	[960] 110	[2070] 235	[3180] 360	[4290] 485	[5420] 610	[6480] 730	[7490] 845	[8480] 960	[9540] 1180
[20] 76	[420] 45	[940] 105	[2050] 230	[3160] 355	[4290] 485	[5440] 615	[6510] 735	[7580] 855	[8660] 980	[9740] 1100
[24] 91	[380] 45	[920] 105	[2020] 230	[3120] 355	[4260] 480	[5400] 610	[6490] 735	[7590] 860	[8680] 980	
[28] 106	[330] 35	[870] 100	[1980] 225	[3100] 350	[4240] 480	[5380] 610	[6480] 730	[7580] 855	[8670] 980	
[32] 121	[290] 35	[800] 90	[1920] 215	[3050] 345	[4170] 470	[5290] 600	[6410] 725	[7520] 850	[8640] 975	
[36] 136	[250] 30	[730] 80	[1850] 210	[2980] 335	[4060] 460	[5150] 580	[6300] 710	[7440] 840		
[40] 151	[200] 25	[690] 80	[1790] 200	[2940] 330	[4010] 455	[5130] 580	[6190] 700	[7300] 800		
[45] 170		[570] 65	[1760] 200	[2860] 325	[3960] 445	[5070] 575	[6080] 685	[6690] 755		
[50] 189			[1720] 195	[2800] 315	[3890] 440	[4920] 555	[5940] 670			
[55] 208			[1670] 190	[2740] 310	[3820] 430	[4890] 550	[5880] 665			

[5790]
655
702 } Torque [lb-in]
Nm
Speed RPM

6000 Series

Performance Data

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

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

Continuous

Intermittent

Peak

No Operation

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

		[250]	[5 00]	[100 0]	[1500]	[2 00 0]	[25 00]	[3 00 0]	[35 00]	[4 00 0]	[45 00]
		15	35	70	105	140	170	205	240	275	310
Flow LPM [GPM]	[.5]	[530]	[1120]	[2440]							
	1.9	60	125	275							
		6	4	1							
	[2]	[540]	[1150]	[2460]	[3620]	[4780]	[5690]	[6670]	[7780]		
	7.5	60	130	280	410	540	645	755	880		
		24	23	22	20	17	14	10	4		
	[4]	[550]	[1180]	[2560]	[38 0 0]	[5030]	[6050]	[7070]	[8260]	[9070]	[9530]
	15	60	135	290	430	570	685	800	935	102 5	107 5
		48	47	45	42	38	32	24	17	10	3
	[8]	[560]	[1250]	[2650]	[3970]	[5280]	[6480]	[77 10]	[8 740]	[9770]	[10990]
	30	65	140	300	450	595	730	870	985	1105	124 0
		96	95	91	87	81	73	64	55	46	35
	[12]	[570]	[1260]	[2690]	[4050]	[5420]	[6730]	[8040]	[9260]	[10490]	[11800]
	45	65	140	305	460	610	760	910	104 5	1185	133 5
		144	143	140	135	129	121	111	99	88	76
	[16]	[540]	[1230]	[2660]	[4060]	[5450]	[68 0 0]	[8 150]	[94 0 0]	[10660]	[11990]
	61	60	140	300	460	615	770	920	106 0	120 5	135 5
		193	192	188	184	178	167	156	141	126	109
	[20]	[5 10]	[1200]	[2630]	[4040]	[5450]	[6820]	[8 190]	[925]	[10840]	
	76	60	135	295	455	615	770	925	107 5	122 5	
		242	241	236	232	226	216	201	184	167	
	[24]	[480]	[1160]	[260]	[4020]	[5440]	[6840]	[8230]	[9560]	[109 0 0]	
	91	55	130	295	455	615	775	930	108 0	123 0	
		290	289	282	279	273	260	248	232	215	
	[28]	[420]	[1130]	[2570]	[3990]	[5420]	[6820]	[8220]	[9520]	[10840]	
	106	45	130	290	450	610	770	930	107 5	122 5	
		339	336	333	328	320	308	295	276	257	
	[32]	[360]	[110 0]	[25 10]	[3920]	[5330]	[6750]	[8 170]	[9440]		
	121	40	125	285	445	600	765	920	106 5		
		388	384	381	375	368	354	341	320		
	[36]	[3 0 0]	[1060]	[2440]	[3830]	[5220]	[6660]	[8 10 0]	[9330]		
	136	35	120	275	435	590	750	915	105 5		
		436	430	421	416	410	396	383	360		
	[40]	[270]	[1020]	[24 0 0]	[3780]	[5 150]	[6580]	[8020]	[9220]		
	151	30	115	270	425	580	745	905	104 0		
		485	478	466	461	456	441	427	403		
	[50]		[982]	[2 180]	[3420]	[4660]	[6050]	[7440]			
	189		110	245	385	525	685	840			
			597	582	576	570	551	534			
	[60]			[1960]	[3250]	[4540]	[5750]	[7080]			
	227			220	365	515	650	800			
				698	691	684	661	641			

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

		[250]	[5 00]	[100 0]	[1500]	[2 00 0]	[25 00]	[3 00 0]	[35 00]	[4 00 0]	[45 00]
		15	35	70	105	140	170	205	240	275	310
Flow LPM [GPM]	[1]	[760]	[1570]	[3230]							
	3.8	85	175	365							
		4	2	1							
	[2]	[780]	[1610]	[3270]	[49 10]	[6440]	[7 760]	[9080]	[10590]		
	7.5	90	180	370	555	730	875	102 5	1195		
		19	18	17	16	14	12	9	4		
	[4]	[8 0 0]	[1640]	[33 0 0]	[4970]	[6570]	[8 160]	[9570]	[11270]	[12120]	[14490]
	15	90	185	375	560	740	920	108 0	127 5	137 0	163 5
		38	38	37	35	33	29	22	14	5	1
	[8]	[8 10]	[1650]	[3370]	[5080]	[6 740]	[8430]	[10 050]	[11620]	[12880]	[14480]
	30	90	185	380	575	760	950	1135	1315	145 5	163 5
		77	76	74	72	68	65	55	45	33	21
	[12]	[8 0 0]	[1620]	[3390]	[5 130]	[68 10]	[8520]	[10 190]	[11860]	[13640]	
	45	90	185	385	580	770	965	1150	134 0	154 0	
		115	115	112	109	105	100	91	81	79	
	[16]	[750]	[160 0]	[3380]	[5 120]	[6820]	[8560]	[10230]	[11920]		
	61	85	180	380	580	770	965	1155	134 5		
		154	154	151	147	143	132	126	116		
	[20]	[680]	[1580]	[3360]	[5 120]	[6840]	[8590]	[10280]	[11980]		
	76	75	180	380	580	775	970	1160	135 5		
		193	193	189	187	182	175	162	152		
	[24]	[620]	[1520]	[3280]	[5060]	[6780]	[8530]	[10240]			
	91	70	170	370	570	765	965	1155			
		232	230	229	225	220	212	204			
	[28]	[570]	[1460]	[32 10]	[5 00 0]	[6730]	[8480]	[102 0 0]			
	106	65	165	365	565	760	960	1150			
		270	268	266	261	256	248	236			
	[32]	[530]	[1420]	[3 140]	[4930]	[6640]	[8380]	[10 120]			
	121	60	160	355	555	750	945	1145			
		309	306	304	299	292	282	269			
	[36]	[450]	[1370]	[3 010]	[4840]	[65 0 0]	[8250]	[1000 0]			
	136	50	155	340	545	730	930	1130			
		348	346	340	336	329	317	301			
	[40]	[380]	[1320]	[2880]	[4 740]	[6460]	[8 120]				
	151	45	150	325	535	730	915				
		387	386	380	375	368	359				
	[50]		[1140]	[2650]	[4540]	[6440]	[8050]				
	189		130	300	515	730	910				
			482	475	469	460	449				
	[60]			[2460]	[4430]	[6360]	[7860]				
	227			280	500	720	890				
				570	562	552	538				

[5750]

650

661

Torque [lb-in
Nm
Speed RPM

6000 Series

Performance Data

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

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

	Continuous		Peak
	Intermittent		No Operation

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

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3200] 221
[1] 3.8	[1060] 120 5	[2205] 250 5	[4515] 510 4	[6690] 755 2				
[2] 7.5	[1090] 125 12	[2300] 260 12	[4720] 535 13	[7025] 795 10	[9360] 1060 6			
[4] 15	[1145] 130 24	[2450] 275 24	[5052] 570 24	[7520] 850 21	[9410] 1065 16	[12700] 1434 13		
[8] 30	[1195] 135 45	[2600] 295 45	[5350] 605 44	[8195] 925 42	[11220] 1270 37	[13100] 1480 35	[15800] 1785 32	[16800] 1898 30
[12] 45	[1200] 135 72	[2600] 295 72	[5390] 610 71	[8145] 920 68	[11770] 1330 64	[13000] 1469 60	[15700] 1774 56	
[16] 61	[1120] 125 94	[2530] 285 94	[5340] 605 92	[8105] 915 89	[11740] 1325 85	[13000] 1469 83		
[20] 76	[1050] 120 120	[2465] 280 119	[5285] 595 117	[8080] 915 115	[11725] 1325 110			
[24] 91	[950] 105 144	[2365] 265 143	[5180] 585 140	[7990] 905 138	[11705] 1320 132			
[28] 106	[855] 95 169	[2255] 255 168	[5080] 575 165	[7915] 895 162	[11640] 1315 156			
[32] 121	[730] 80 193	[2140] 240 192	[4960] 560 188	[7775] 880 185	[11505] 1300 179			
[36] 136	[555] 65 217	[1965] 220 216	[4780] 540 213	[7585] 855 210				
[40] 151	[380] 45 241	[1790] 200 240	[4600] 520 238	[7395] 835 236				
[50] 189			[4180] 470 296	[6985] 790 290				
[60] 227			[3800] 430 353	[6600] 745 345				

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

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275
[1] 3.8	[1010] 115 7	[1200] 235 7	[4260] 480 5	[6140] 695 3					
[2] 7.5	[1020] 115 15	[2110] 240 14	[4270] 480 13	[6280] 710 12	[8350] 945 11	[10420] 1175 8	[12140] 1370 3		
[4] 15	[1030] 115 30	[2100] 235 30	[4280] 485 29	[6410] 725 28	[8500] 960 27	[10590] 1195 25	[12500] 1410 21	[14580] 1645 17	[16670] 1885 12
[8] 30	[1020] 115 60	[2090] 235 60	[4290] 485 59	[6490] 735 57	[8620] 975 54	[10740] 1215 51	[12800] 1445 45	[14930] 1685 38	
[12] 45	[1000] 115 91	[2080] 235 91	[4290] 485 89	[6500] 735 87	[8650] 975 84	[10800] 1220 79	[12890] 1455 71		
[16] 61	[110] 960 122	[2060] 235 122	[4260] 480 121	[6480] 730 118	[8650] 975 114	[10820] 1220 109	[12900] 1460 100		
[20] 76	[900] 100 153	[1980] 225 152	[4180] 470 150	[6420] 725 147	[8620] 975 144	[10820] 1220 139			
[24] 91	[850] 95 184	[1930] 220 184	[4150] 470 181	[6390] 720 180	[8580] 970 176	[10770] 1215 171			
[28] 106	[740] 85 215	[1840] 210 214	[4070] 460 211	[6290] 710 208	[8500] 960 204	[10720] 1210 198			
[32] 121	[690] 80 245	[1710] 195 244	[3970] 450 241	[6190] 700 237	[8420] 950 232	[10660] 1205 226			
[36] 136	[670] 75 276	[1560] 175 275	[3860] 435 272	[6080] 685 265	[8340] 940 260	[10420] 1175 255			
[40] 151	[570] 65 307	[1400] 160 306	[3750] 425 303	[5970] 675 295	[8140] 920 290	[10180] 1150 284			
[50] 189		[1140] 130 382	[3240] 365 379	[5220] 590 369	[7620] 860 362				
[60] 227			[2860] 325 454	[4860] 550 442	[7140] 805 435				

[2860]
325
454 } Torque [lb-in]
Nm
Speed RPM

6000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

735 cm ³/r [45.0 in ³/r]
Δ Pressure Bar [PSI]

	[250] 15	[5 00] 35	[750] 50	[100 0] 70	[1250] 85	[1500] 105	[1750] 120	[2 00 0] 140	[2250] 155	[25 00] 170
[1] 3.8	[1311] 148 4	[2775] 314 4	[42 00] 475 3	[5480] 619 3	[7 00 0] 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	[58 13] 657 18	[7272] 822 17	[87 14] 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	[6 130] 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	[6 180] 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	[6 148] 695 78	[7 768] 878 77	[93 76] 1059 76	[10984] 1241 74			
[20] 76	[1092] 123 102	[2794] 316 101	[4320] 488 101	[6021] 680 99	[7697] 870 97	[93 11] 1052 96	[10907] 1232 93			
[24] 91	[1206] 136 123	[2556] 289 122	[4 162] 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	[2 110] 238 162	[3795] 429 162	[5457] 617 159	[7 122] 805 159	[8828] 997 156				
[36] 136	[726] 82 184	[1845] 208 183	[35 17] 397 182	[5223] 590 181	[6853] 774 179					
[40] 151	[5 15] 58 203	[2227] 252 202	[3270] 369 202	[4965] 561 201	[6672] 754 199					
[50] 189			[3869] 437 254	[4 148] 469 252	[5850] 661 250					
[60] 227				[4856] 549 303	[6604] 746 301					

805 cm ³/r [49.0 in ³/r]
Δ Pressure Bar [PSI]

[6604]
746
301

Torque [lb-in]
Nm
Speed RPM

	[250] 15	[5 00] 35	[750] 50	[100 0] 70	[1250] 85	[1500] 105	[1750] 120	[2 00 0] 140	[2250] 155	[25 00] 170
[1] 3.8	[1455] 164 4	[3 100] 350 4	[4680] 529 2	[6031] 681 2	[7799] 881 1					
[2] 7.5	[1483] 168 9	[3 173] 359 9	[5 121] 579 9	[6432] 727 8	[85 10] 961 7	[9633] 1088 6	[11319] 1279 5	[12127] 1370 5		
[4] 15	[1547] 175 19	[3331] 376 19	[5292] 598 18	[6 744] 762 17	[87 14] 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	[54 15] 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	[54 15] 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	[33 12] 374 92	[5292] 598 91	[6968] 787 89	[8943] 1010 88	[10583] 1196 87	[12146] 1372 86			
[24] 91	[1352] 153 112	[3 183] 360 112	[5088] 575 111	[68 11] 769 110	[88 12] 996 108	[104 11] 1176 106				
[28] 106	[1213] 137 131	[3055] 345 131	[5047] 570 131	[67 13] 758 129	[8681] 981 128	[104 11] 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	[8 118] 917 165					
[40] 151	[592] 67 187	[2477] 280 186	[4426] 500 186	[6085] 688 185	[7832] 885 184					
[50] 189		[2730] 308 234	[42 14] 476 233	[5849] 661 231	[7603] 859 230					
[60] 227			[3806] 430 280	[5459] 617 277	[7407] 837 275					

6000 Series

Performance Data

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

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

	Continuous		Peak
	Intermittent		No Operation

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

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140
[1] 3.8	[1890] 215 3	[4110] 465 3	[5730] 645 2	[7640] 865 2	[9550] 1080 1			
[2] 7.5	[1910] 215 8	[4140] 470 8	[6270] 710 7	[8300] 940 7	[10420] 1175 6	[12500] 1410 5	[13860] 1565 4	[14920] 1685 3
[4] 15	[1980] 225 15	[4290] 485 15	[6480] 775 15	[8540] 965 14	[10670] 1205 14	[12800] 1445 13	[13900] 1570 13	[15850] 1790 12
[8] 30	[2030] 230 30	[4400] 495 30	[6630] 750 30	[8790] 995 29	[10940] 1235 28	[13090] 1480 27	[14500] 1640 26	[16580] 1875 25
[12] 45	[2020] 230 45	[4390] 495 45	[6630] 750 45	[8860] 1000 44	[11050] 1250 43	[13240] 1495 42	[15040] 1700 41	
[16] 61	[2010] 225 61	[4320] 490 61	[6560] 740 61	[8790] 995 60	[11000] 1245 59	[13260] 1500 58		
[20] 76	[1910] 215 77	[4220] 475 77	[6480] 730 76	[8720] 985 76	[10950] 1235 75	[13160] 1485 74		
[24] 91	[1810] 205 92	[4060] 460 92	[6230] 705 92	[8500] 960 91	[10790] 1220 90	[12990] 1470 89		
[28] 106	[1620] 185 107	[3920] 445 107	[6180] 700 107	[8420] 950 106	[10630] 1200 105	[12820] 1450 103		
[32] 121	[1480] 165 123	[3740] 425 123	[5980] 675 122	[8200] 925 121	[10280] 1160 120			
[36] 136	[1140] 130 138	[3490] 395 138	[5710] 645 138	[7930] 895 137	[9940] 1125 135			
[40] 151	[850] 95 153	[3240] 365 153	[5420] 610 152	[7640] 865 151	[9590] 1085 150			
[50] 189		[2960] 325 191	[5160] 585 190	[7350] 830 189	[9310] 1050 188			
[60] 227			[4660] 525 230	[7160] 810 229	[9070] 1025 226			

[7160]
810
229 } Torque [lb-in]
Nm
Speed RPM

6000 Series

Dimensions

Standard Mount

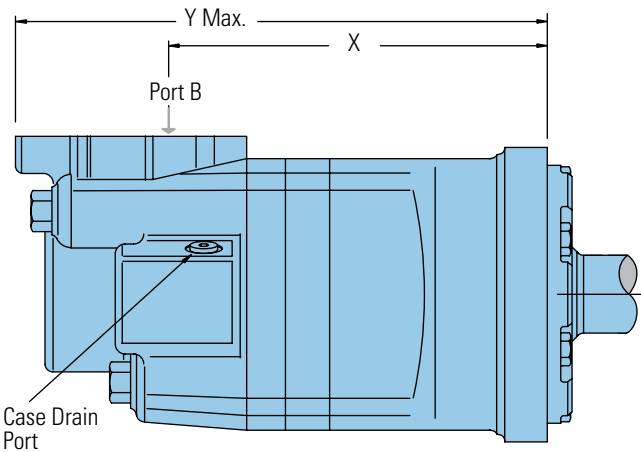
Ports

- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 3/4 inch Split Flange Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- G 1 (BSP) Staggered Ports (2)
- G 1/4 (BSP) Case Drain Port (1) or
- 1 5/16 UN-2B SAE O-ring Staggered Ports (2) with Shuttle
- 9/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

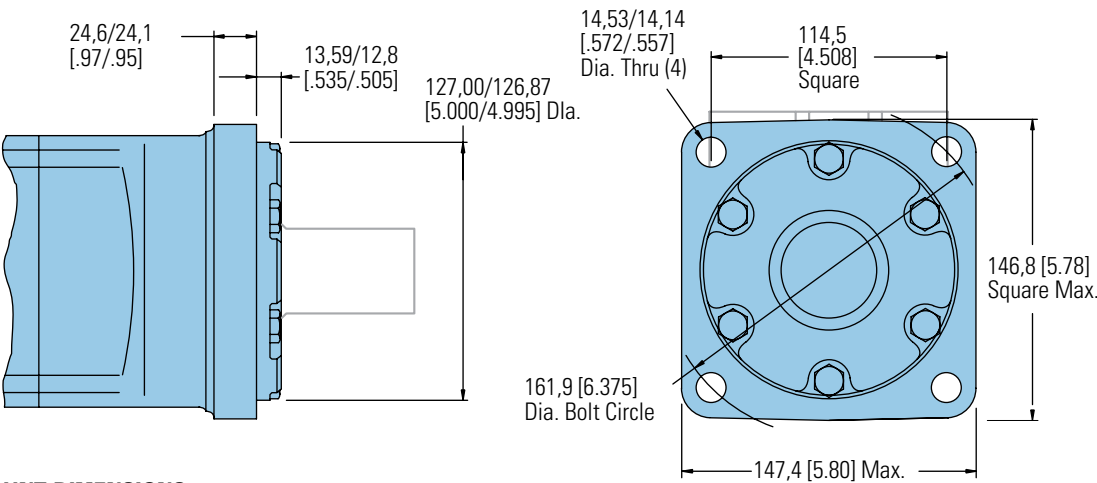
Standard Rotation Viewed from Shaft End

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

Standard Mount



Standard SAE CC Flange



STANDARD MOTOR MOUNT DIMENSIONS

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

6000 Series

Dimensions

Wheel Mount

Wheel Mount

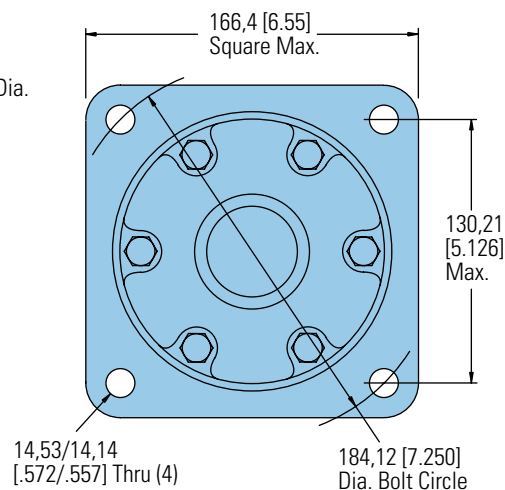
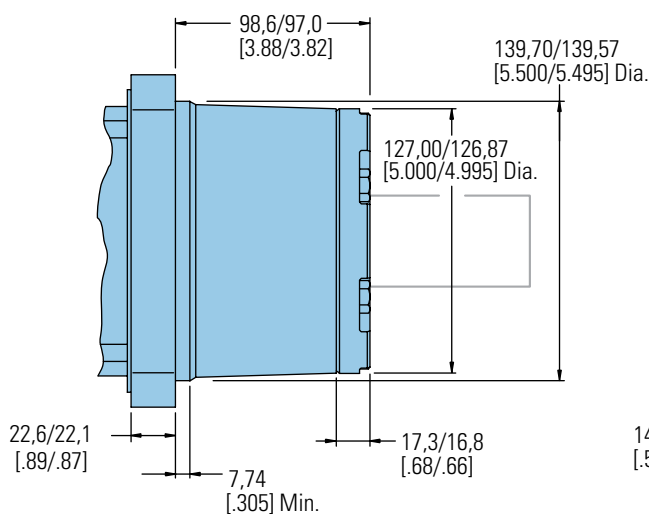
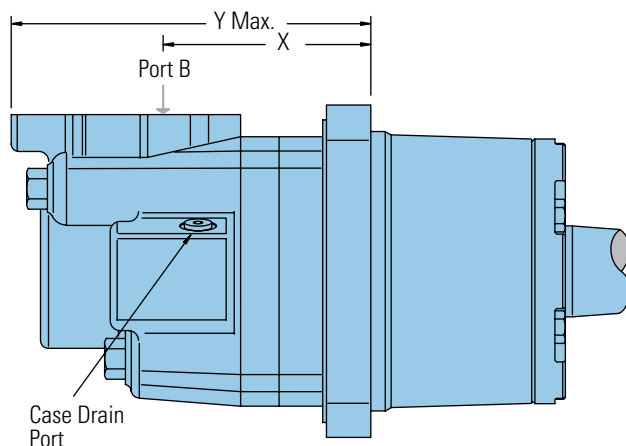
Ports

- 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



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)

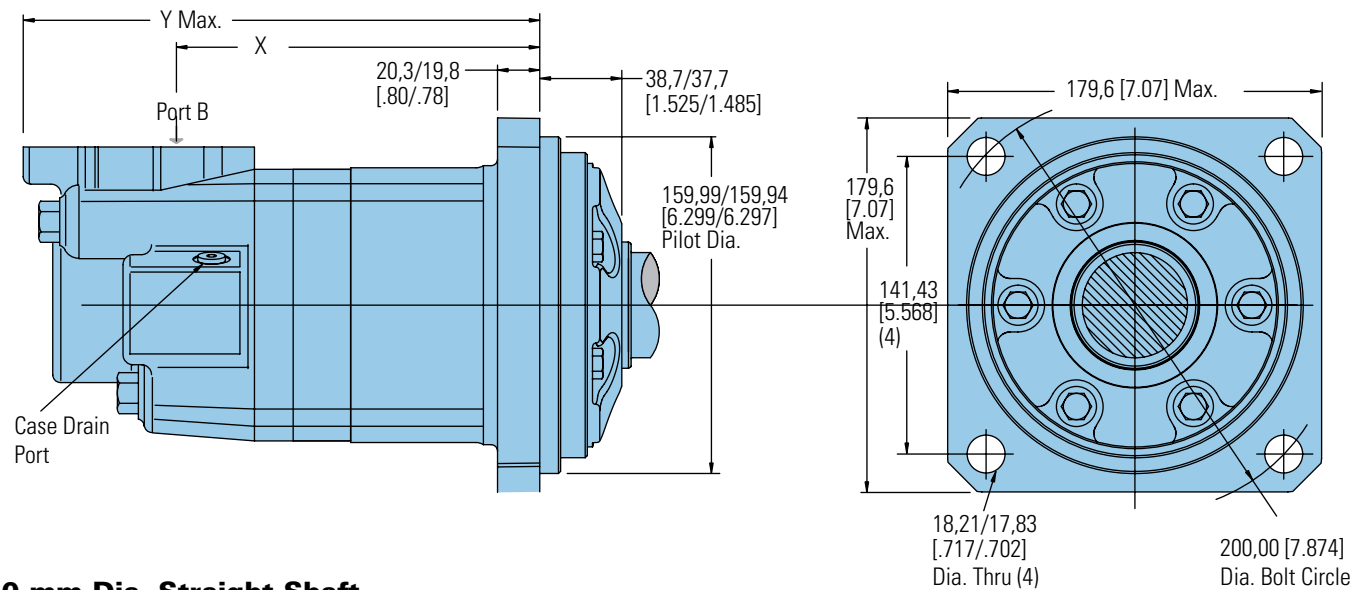
Ports

- 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)

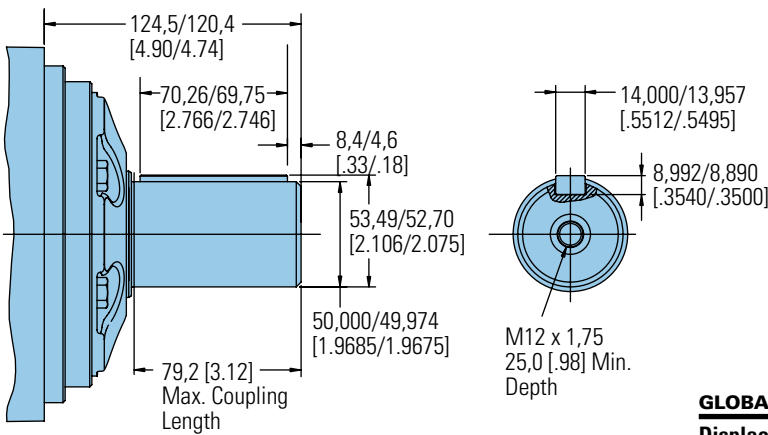
Standard Rotation Viewed from Shaft End

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

Global Mount (ISO)



50 mm Dia. Straight Shaft



GLOBAL MOUNT MOTOR DIMENSIONS

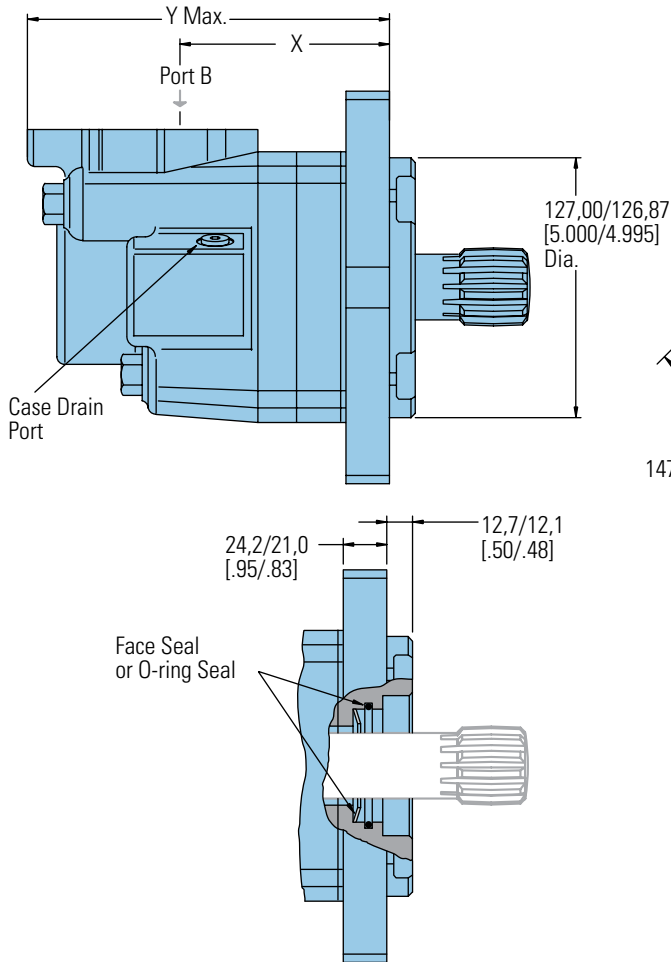
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
310 [19.0]	182,4 [7.18]	264,9 [10.43]
390 [24.0]	191,0 [7.52]	273,6 [10.77]
490 [30.0]	202,2 [7.96]	284,7 [11.21]
625 [38.0]	216,9 [8.54]	299,5 [11.79]
800 [45.0]	229,4 [9.03]	312,2 [12.29]
800 [49.0]	236,7 [9.32]	319,3 [12.57]
985 [60.0]	256,5 [10.10]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

6000 Series

Dimensions

Bearingless

Bearingless



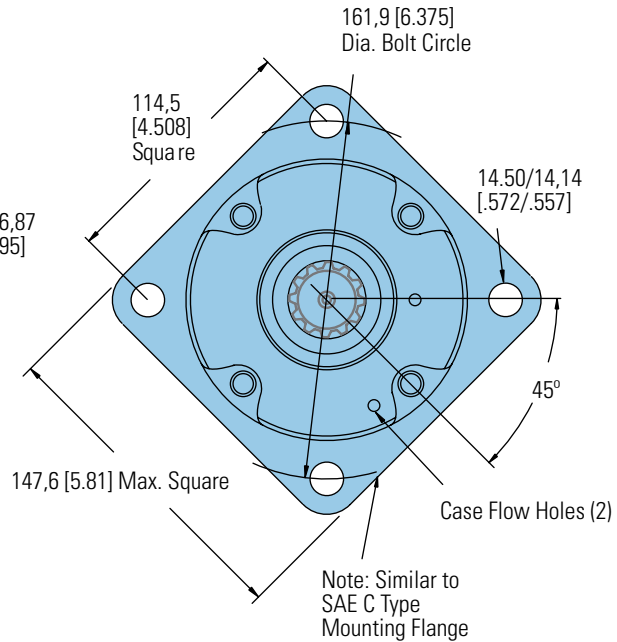
Ports

- 1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- 4 Bolt 3/4 inch Split Flange Ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
- G 1 (BSP) Staggered Ports (2)
- G 1/4 (BSP) Case Drain Port (1) or
- 1 5/16 UN-2B SAE O-ring Staggered Ports (2) with Shuttle
- 9/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

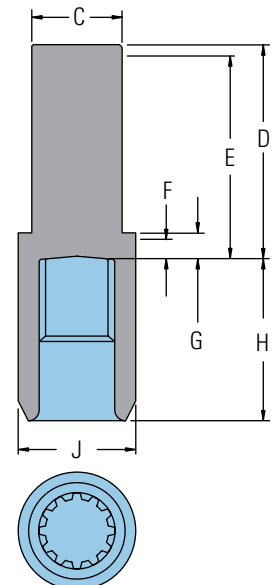


For 6000 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

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



Mating Coupling Blank
Eaton Part No. 12778-002

BEARINGLESS MOTOR DIMENSIONS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
195 [11.9]	105,4 [4.15]	188,0 [7.40]
245 [15.0]	111,0 [4.37]	193,5 [7.62]
310 [19.0]	118,4 [4.66]	200,9 [7.91]
390 [23.9]	127,3 [5.01]	209,6 [8.25]
490 [30.0]	138,2 [5.44]	220,7 [8.69]
625 [38.0]	152,9 [6.02]	235,5 [9.27]
985 [60.0]	192,8 [7.59]	275,1 [10.83]

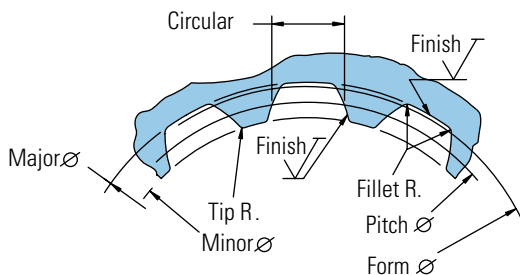
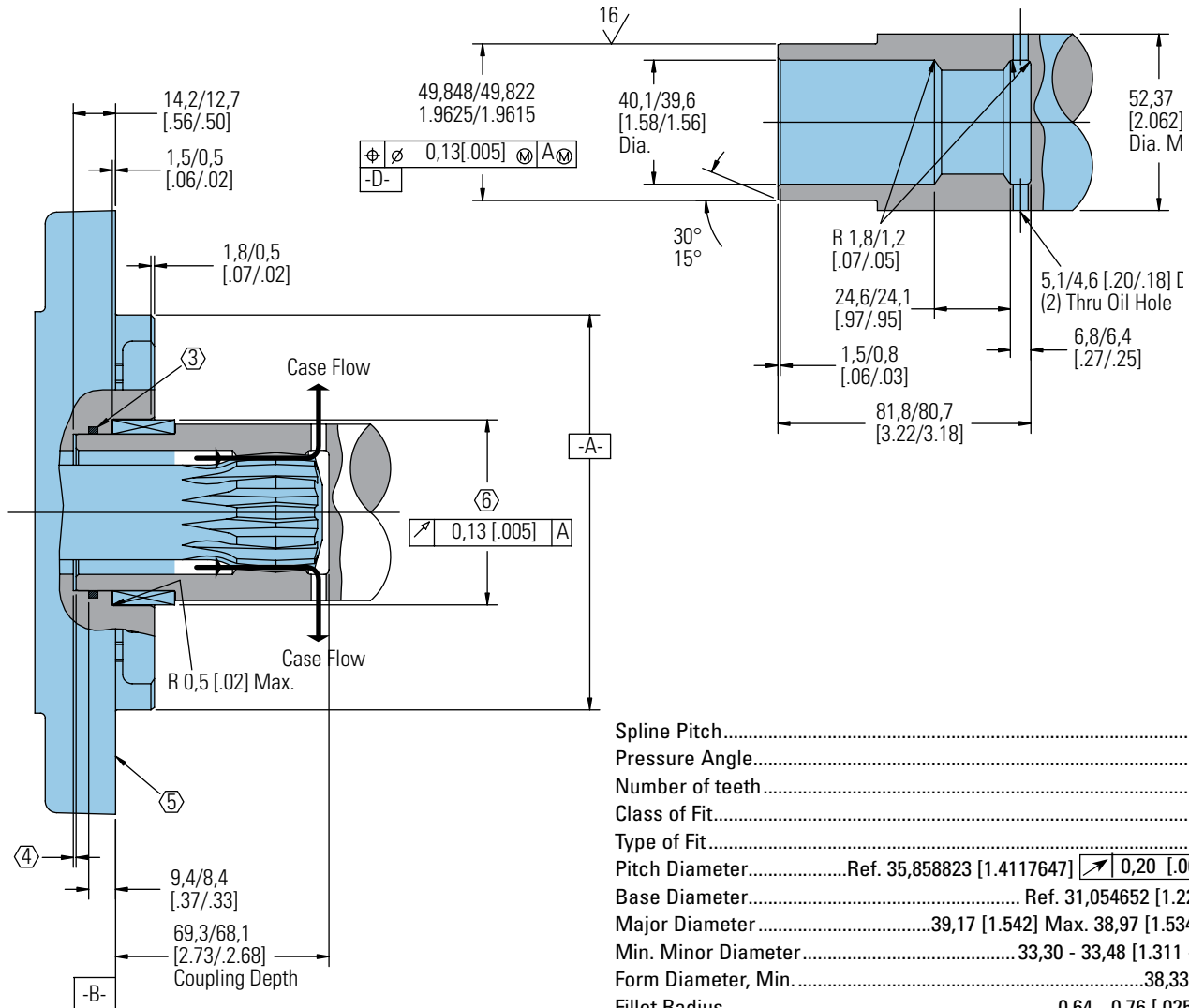
6000 Series

Installation Information

Bearingless

- ① Internal spline in mating part to be as follows: Material to be ASTM A304, 8620H. Carbonize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 - 1,02 [.030 - .040] (dimensions apply after heat treat).
- ② Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
- ③ Seal to be furnished with motor for proper oil circulation thru splines.

- ④ Some means of maintaining clearance between shaft and mounting flange must be provided.
- ⑤ Similar to SAE "C" Four Bolt Flange..
- ⑥ Counterbore designed to adapt to a standard sleeve bearing 50,010 - 50,038 [1.9689 - 1.9700] ID by 60,051 - 60,079 [2.3642 - 2.3653] O.D. (Oilite bronze sleeve bearing).



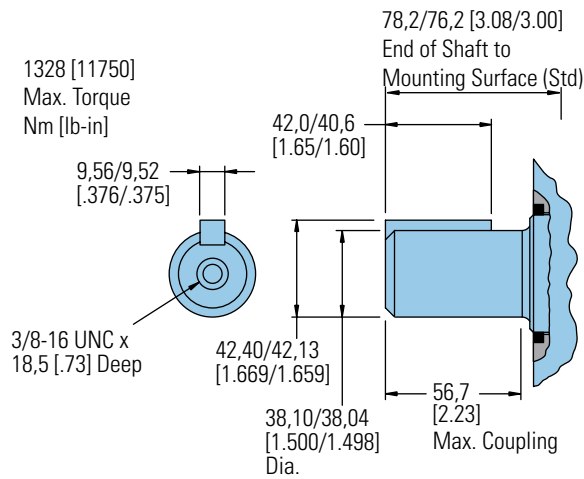
Spline Pitch.....	8.5/17
Pressure Angle.....	30°
Number of teeth.....	12
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter.....	Ref. 35,858823 [1.4117647] 0,20 [.008] D
Base Diameter.....	Ref. 31,054652 [1.2226241]
Major Diameter.....	39,17 [1.542] Max. 38,97 [1.534] Min..
Min. Minor Diameter.....	33,30 - 33,48 [1.311 - 1.318]
Form Diameter, Min.....	38,33 [1.509]
Fillet Radius.....	0,64 - 0,76 [.025 - .030]
Tip Radius.....	0,25 - 0,51 [.010 - .020]
Finish.....	1,6 (63)
Involute Profile Variation.....	+0,000 -0,025 [+0.0000 -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

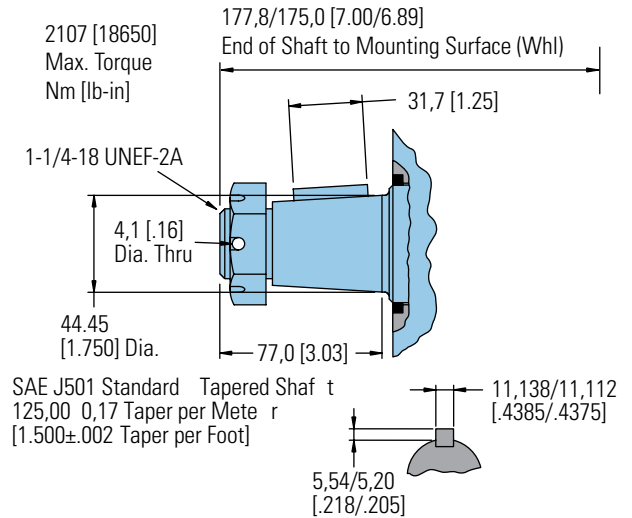
Dimensions

Shafts Splined

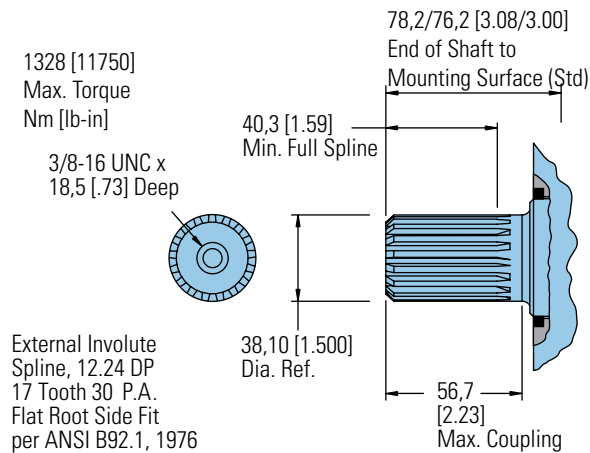
1 1/2 Inch Straight



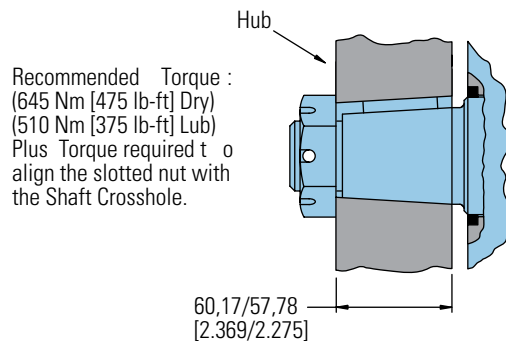
1 3/4 Inch Tapered



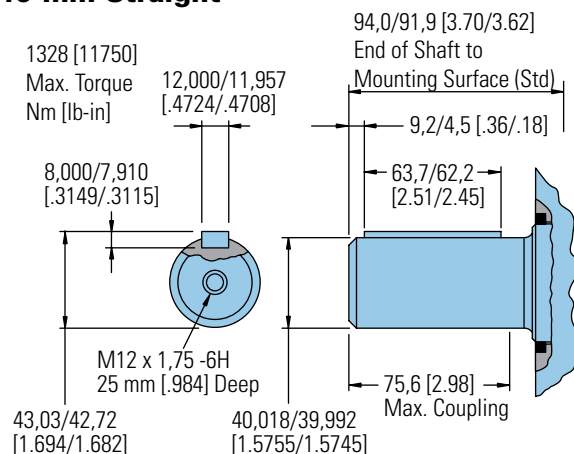
1 1/2 Inch 17 Tooth Splined



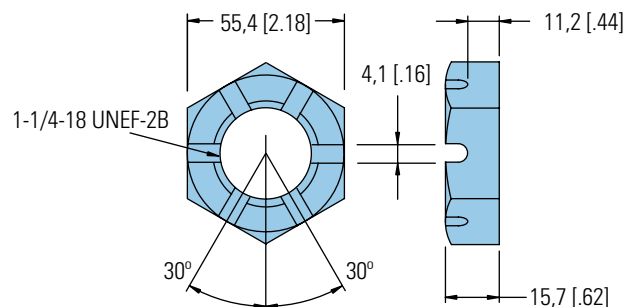
Tapered Shaft Hub Data



40 mm Straight



Slotted Hexagon Nut



6000 Series

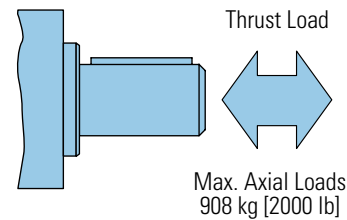
Shaft Side Load Capacity

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



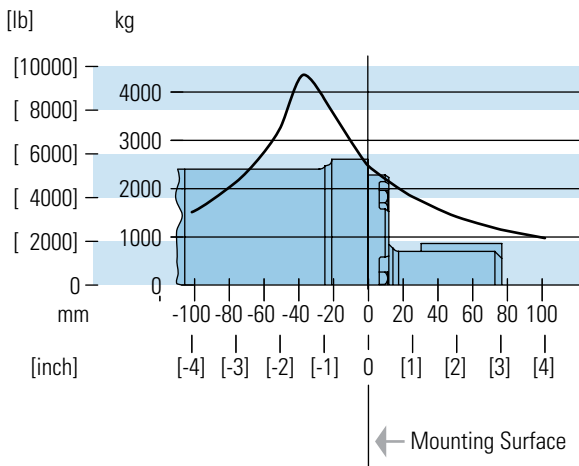
B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

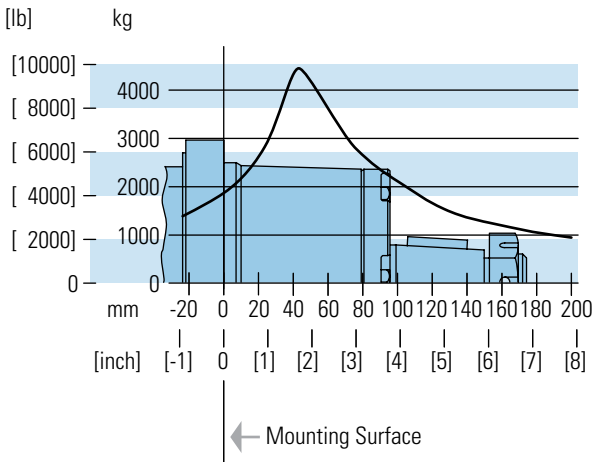
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

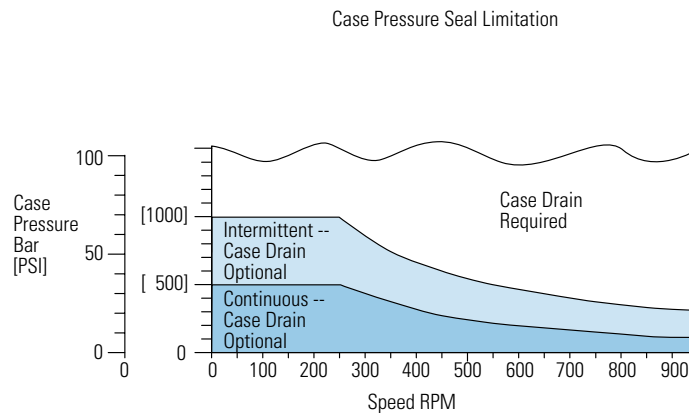
Char-Lynn 6000 Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine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

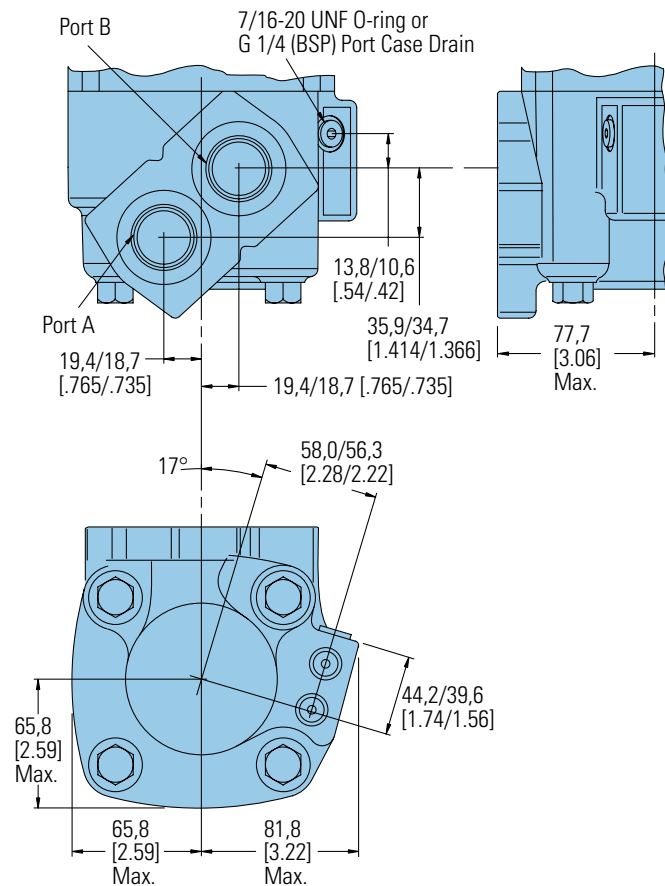


6000 Series

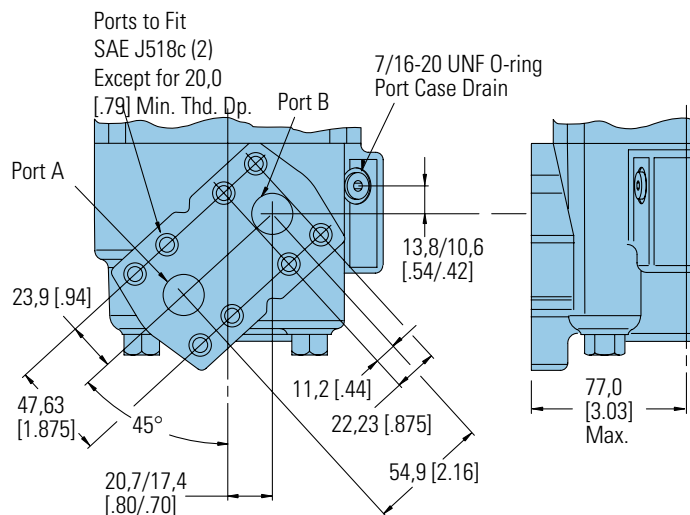
Dimensions

Ports

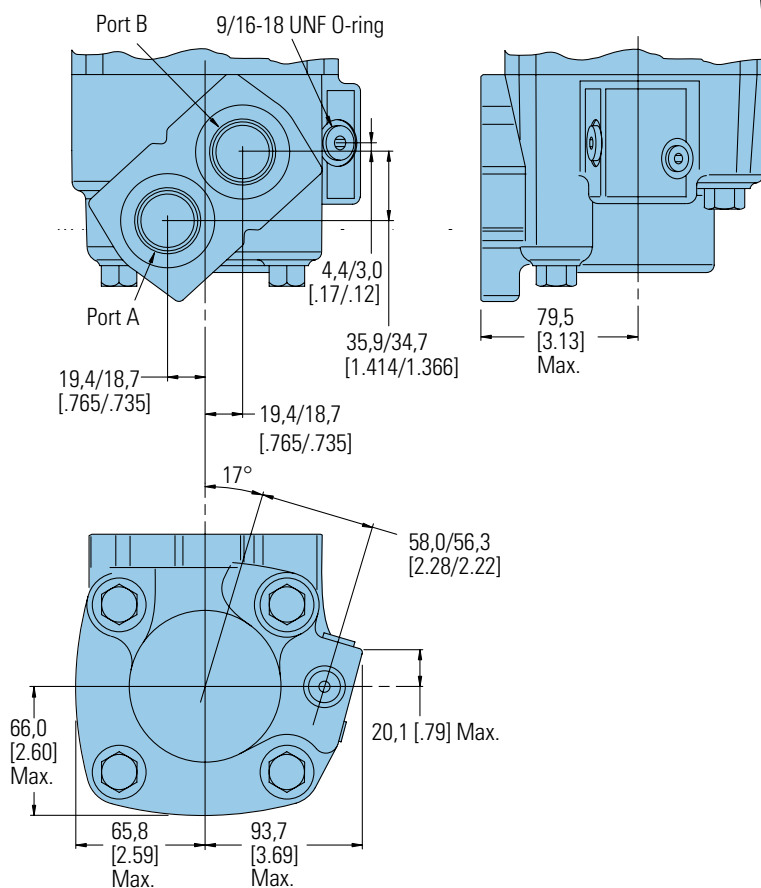
1 5/16 -12 O-ring Ports (2) or G 1 (BSP) Ports (2)



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

C-5

6000 Series

Model Code

The following 30-digit coding system has been developed to identify all of the configuration options for the 6000 Series motor. Use this model code to specify a motor with the desired features. All 30-digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.

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

1 Product M – Motor

2, 3 Series 06 – 6000 Series

4, 5, 6 Displacement cm³/r [in³/r]

120 – 195.8 [11.95]
150 – 246.5 [15.04]
190 – 312.0 [19.04]
239 – 391.7 [23.90]
300 – 491.4 [29.99]
381 – 624.2 [38.09]
450 – 737.4 [45.00]
490 – 803.4 [49.03]
600 – 982.7 [59.97]

7, 8 Mounting Type AA – Bearingless, 4 Bolt: 127,0 [5.00] Pilot Dia. and 14,35 [.565] Dia. Holes 162,0 [6.38] Dia. Bolt Circle AB – Standard, 4 Bolt (SAE CC): 127,0 [5.00] Pilot Dia. and 14,35 [.565] Dia. Holes on 162,0 [6.38] Dia. B.C. AC – Wheel, 4 Bolt 139,7 [5.50] Pilot Dia. and 14,35 [.565] Dia. Holes on 184,2 [7.25] Dia. Bolt Circle

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

9, 10 Output Shaft Description

00 – None (Bearingless)
01 – 38,10 [1.50] Dia.
Straight Shaft with .375-16
UNC-2B Thread in End, 9,52
[.375] Sq x 41,28 [1.625]
Straight Key
02 – 44,45 [1.75] Dia. .125:1
Tapered Shaft per SAE
J501 with 1.25-18 UNEF-2A
Threaded Shaft End, 11,11
[.4375] Sq. x 31,8 [1.25]
Straight Key
03 – 38,10 [1.50] Dia. Flat
Root Side Fit, 17 Tooth,
12/24 DP 30 DEG. Involute
Spline with .375-16 UNC-2B
Thread in end 40,4 [1.59]
Minimum Full Spline Length
04 – 40,00 [1.575] Dia.
Straight Shaft with M12 x
1.75-6H Thread in End, 12W
x 8H x 63L [.472W x .313H x
2.480L] Key
12 – 49,99 [1.968] Dia.
Straight Shaft with M12 x
1.75-6H Thread in End, 14W
x 9H x 70L [.550W x .354H x
2.756L] Key
15 – 60mm Dia. 10:1 Tapered
Shaft per ISO R775 with M42
x 3-6H Threaded Shaft End,
16W x 10H x 32L [.630W x
.394H x 1.26L] Key
16 – 53,98 [2.125] Dia. Flat
Root Side Fit, 16 Tooth, 8/16
DP 30 Deg. Involute Spline
with M12 x 1.75-6H Thread
in End, 55,9 [2.20] Min Full
Spline

11, 12 Port Description AA – 1,3125-12 UN-2B SAE O-Ring Ports–Staggered Ports AB – SAE 19.05 [.750] Dia. 4-Bolt Split Flange - Staggered Ports AC – G 1 Staggered Ports AG – .750-16 UNF-2B SAE O-ring Ports - Staggered

13, 14 Case Flow 02 – .4375-20 UNF-2B SAE O-Ring Port With Check Valve 03 – G 1/4 BSP Straight Thread Port with Check Valve 06 – .5625-18 UNF-2B SAE O-Ring Port with Shuttle Valve 10 – .750-16 UNF-2B SAE O-ring Ports, External Lubrication Circuit Requires Case Drain must be Connected, .063 Shuttle Flow Orifice

15 Low Pressure Relief 0 – None A – Set at 4.5 [65 lbf/in²] B – Set at 15.2 [220 lbf/in²]

16, 17 Pressure/Flow Option 00 – None

18 Geroler Option 0 – Standard 2 – Tight Fitting

19 Seal Option 0 – Standard 1 – Viton 3 – Seal Guard

20, 21 Accessories 00 – None

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

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

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

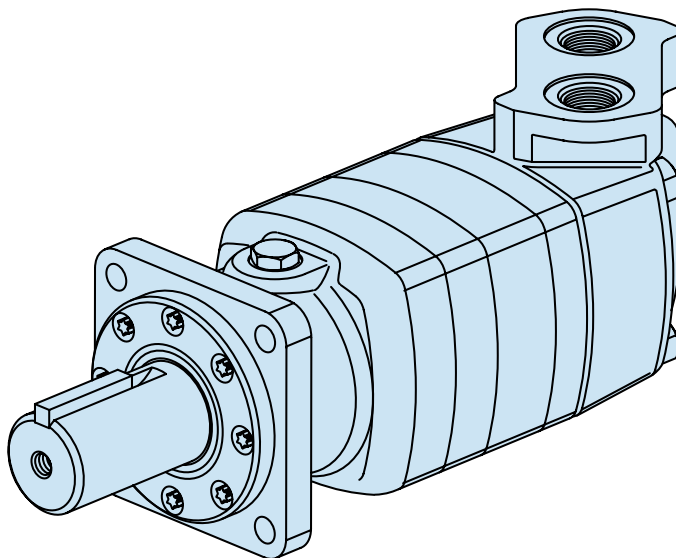
28, 29 Customer ID 00 – None

30 Design Code F – Sixth

Feature in bold are preferred
and allow for shorter lead time

10,000 Series

Highlights



Features

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

Benefits

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

Applications

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

Description

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

Specifications

Geroler Element	4 Displacements
Flow l/min [GPM]	170 [45] Continuous**
	265 [70] Intermittent*
Speed RPM	501 Cont.**
	784 Inter.*
Pressure bar [PSI]	200 [3000] Cont.**
	270 [4000] Inter.*
Torque Nm [lb-in]	2700 [23910] Cont.**
	3440 [30460] Inter.*

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

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

C-6



Boring



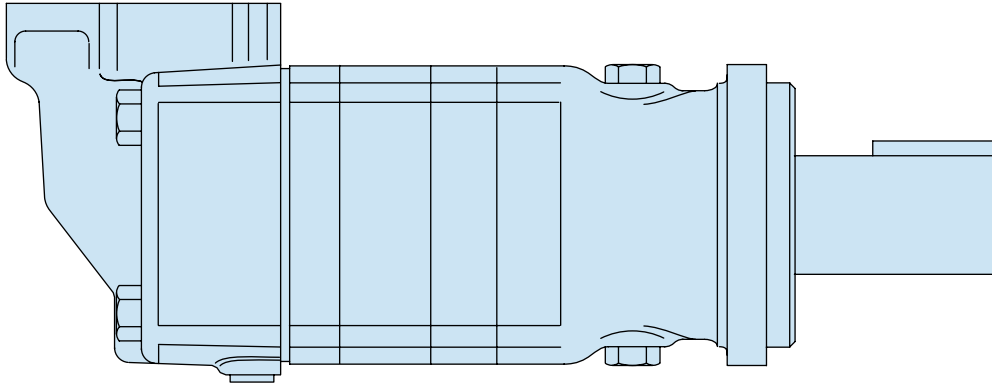
Metal Forming



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

Performance Data

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

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

	Continuous		Peak
	Intermittent		No Operation

480 cm³/r [29.3 in³/r]

Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275
[1] 3.8	[760] 85 6	[1540] 175 5	[3120] 355 4	[4640] 525 2					
[2] 7.5	[1040] 120 15	[2140] 240 13	[4320] 490 11	[6500] 735 8	[8690] 980 5	[10870] 1230 2			
[4] 15	[1040] 120 31	[2130] 240 29	[4310] 485 27	[6490] 735 24	[8680] 980 21	[10860] 1225 18	[13050] 1475 16	[15230] 1720 13	[17410] 1965 10
[8] 30	[1020] 115 62	[2110] 240 61	[4290] 485 58	[6480] 730 55	[8660] 980 53	[10840] 1225 50	[13030] 1470 47	[15210] 1720 44	[17390] 1965 42
[12] 45	[990] 110 94	[2080] 235 93	[4270] 480 90	[6450] 730 87	[8630] 975 84	[10820] 1220 81	[13000] 1470 78	[15180] 1715 75	[17370] 1965 73
[16] 61	[960] 110 125	[2060] 235 124	[4240] 480 122	[6420] 725 119	[8600] 970 116	[10790] 1220 113	[12970] 1465 110	[15150] 1710 107	[17340] 1960 104
[20] 76	[930] 105 157	[2020] 230 156	[4200] 475 154	[6390] 720 150	[8570] 970 147	[10750] 1215 144	[12940] 1460 141	[15120] 1710 138	[17300] 1955 135
[24] 91	[890] 100 189	[1980] 225 188	[4170] 470 185	[6350] 715 182	[8530] 965 179	[10720] 1210 175	[12900] 1460 172	[15080] 1705 169	
[28] 106	[850] 95 221	[1940] 220 220	[4130] 465 217	[6310] 715 214	[8490] 960 210	[10680] 1205 207	[12860] 1455 203	[15040] 1700 200	
[32] 121	[810] 90 252	[1900] 215 251	[4080] 460 249	[6270] 710 245	[8450] 955 242	[10630] 1200 238	[12820] 1450 235	[15000] 1695 231	
[36] 136	[760] 85 282	[1850] 210 281	[4040] 455 280	[6220] 705 277	[8400] 950 273	[10590] 1195 270	[12770] 1445 266		
[40] 151	[710] 80 318	[1800] 205 316	[3990] 450 312	[6170] 695 308	[8350] 945 305	[10540] 1190 301	[12720] 1440 297		
[45] 170	[647] 75 354	[1740] 195 353	[3920] 445 351	[6110] 690 348	[8290] 935 344	[10470] 1185 340	[12660] 1430 336		
[60] 227	[430] 50 474	[1520] 170 473	[3710] 420 471	[5890] 665 467	[8070] 910 462	[10260] 1160 458	[12440] 1405 454		
[70] 265		[1360] 155 552	[3540] 400 550	[5730] 645 546	[7910] 895 541	[10100] 1140 536	[12280] 1385 532		

345 cm³/r [21.0 in³/r]

Δ Pressure Bar [PSI]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275
[1] 3.8	[600] 70 3	[1310] 150 1							
[2] 7.5	[740] 85 21	[1510] 170 19	[3050] 345 15	[4600] 520 11	[6140] 695 8	[7680] 865 4			
[4] 15	[730] 80 43	[1500] 170 41	[3040] 345 37	[4590] 520 33	[6140] 695 30	[7680] 870 26	[9220] 1040 22	[10770] 1215 18	[12310] 1390 14
[8] 30	[720] 80 87	[1490] 170 86	[3030] 340 82	[4580] 515 78	[6120] 690 74	[7670] 865 70	[9210] 1040 66	[10760] 1215 62	[12300] 1390 58
[12] 45	[700] 80 131	[1470] 165 130	[3020] 340 127	[4560] 515 123	[6100] 690 118	[7650] 865 114	[9190] 1040 110	[10740] 1215 106	[12280] 1385 102
[16] 61	[680] 75 176	[1450] 165 175	[3000] 340 172	[4540] 515 167	[6080] 685 163	[7630] 860 158	[9170] 1035 154	[10720] 1210 149	[12260] 1385 145
[20] 76	[660] 75 221	[1430] 160 220	[2970] 335 217	[4520] 510 212	[6060] 685 207	[7600] 860 202	[9150] 1035 198	[10690] 1210 193	[12230] 1380 189
[24] 91	[630] 70 266	[1400] 160 265	[2950] 335 261	[4490] 505 256	[6030] 680 252	[7580] 855 246	[9120] 1030 242	[10660] 1210 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] 1210 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] 1210 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		

[25 10]
285
777 } Torque [lb-in]
Nm
Speed RPM

10,000 Series

Performance Data

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

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

Continuous

Intermittent

Peak

No Operation

		665 chr [403/Ar] lin Pressure [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]	
Flow L/PM	[1] 3.8	[140] 163 4	[3010] 340 3	[455] 515 3	[610] 690 2	[760] 860 1											
	[2] 7.5	[180] 163 10	[3020] 340 9	[456] 515 8	[6110] 690 7	[7650] 865 7	[920] 1040 6	[1040] 1215 5	[1220] 1385 4	[1385] 1565 3	[1570] 1735 2	[1810] 1910 1					
	[4] 15	[140] 163 22	[3010] 340 21	[4550] 515 20	[6100] 690 19	[7640] 865 18	[9190] 1040 17	[1030] 1210 16	[1220] 1385 15	[1385] 1560 14	[1570] 1735 13	[1800] 1910 12	[18450] 2085 11	[1995] 2250 10	[21540] 2435 9	[23080] 2610 8	
	[8] 30	[1440] 163 44	[2980] 335 43	[490] 510 42	[600] 685 41	[7610] 860 40	[9160] 1085 39	[1000] 1210 38	[1220] 1385 37	[1390] 1560 36	[1530] 1730 35	[1680] 1905 34	[1840] 2080 33	[1995] 2255 32	[21510] 2430 31	[23050] 2605 30	
	[2] 45	[1400] 160 67	[2950] 335 66	[490] 505 66	[6040] 680 64	[7580] 855 63	[9120] 1080 62	[1070] 1205 61	[1220] 1380 60	[13750] 1555 59	[1500] 1730 58	[1640] 1905 57	[1830] 2075 56	[1995] 2255 55	[21470] 2425 54	[2320] 2600 53	
	[16] 61	[1860] 153 89	[2910] 330 88	[445] 505 87	[590] 675 86	[7540] 850 85	[9080] 1025 84	[1020] 1200 83	[1170] 1375 82	[13710] 1550 81	[1560] 1725 80	[1800] 1905 79	[1940] 2070 78	[2185] 2285 77	[2430] 2420 76		
	[20] 76	[1810] 150 112	[2860] 375 111	[4400] 495 110	[5940] 670 109	[7490] 845 108	[9030] 1020 107	[1020] 1195 106	[1210] 1370 104	[13660] 1545 103	[1510] 1720 102	[1650] 1890 101	[1830] 2070 100	[1980] 2240 99			
	[24] 91	[1260] 140 135	[2800] 315 134	[450] 490 132	[590] 665 131	[7440] 840 130	[8980] 1015 129	[1020] 1190 128	[1200] 1365 127	[13610] 1540 126	[15150] 1710 124	[1660] 1885 123	[1840] 2060 122				
	[28] 106	[1200] 135 157	[2750] 310 156	[420] 485 155	[580] 660 154	[7380] 835 153	[8920] 1010 151	[1070] 1185 150	[1210] 1355 149	[13550] 1530 148	[15100] 1705 147	[16640] 1880 146					
	[32] 121	[1140] 130 180	[2690] 305 179	[420] 480 177	[570] 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	[180] 120 202	[2620] 295 201	[4160] 470 200	[570] 645 199	[7250] 820 198	[8800] 995 196	[1040] 1170 195	[1180] 1340 194	[13430] 1515 193	[15010] 1690 191	[16510] 1865 190					
	[40] 151	[1010] 115 225	[2550] 290 224	[4100] 465 222	[5640] 635 221	[7180] 810 220	[8730] 985 219	[1070] 1160 217	[1210] 1335 216	[1350] 1510 215	[15100] 1685 214	[16640] 1855 212					
	[45] 170	[920] 105 254	[2460] 280 252	[4000] 450 251	[5550] 625 249	[7090] 800 248	[8630] 975 247	[1030] 1155 245	[1120] 1325 244	[1260] 1500 243	[1410] 165 242						
	[60] 227	[610] 70 338	[2150] 245 336	[3700] 420 335	[5400] 590 334	[7080] 765 332	[8380] 940 331	[980] 1115 329	[1120] 1290 328	[1260] 1465 327							
	[70] 265	[380] 45 396	[230] 220 393	[3470] 390 391	[5010] 565 390	[6560] 740 388	[8100] 915 387	[9640] 1090 385	[1190] 1265 384								

940 chr [573/Ar] lin
Pressure [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]	
Flow Legend	[1] 3.8	[2080] 235 3	[260] 480 2	[6440] 730 1												
	[2] 7.5	[2090] 235 7	[270] 480 6	[6450] 730 5	[8640] 975 5	[11820] 1220 4	[13000] 1470 3	[1590] 1715 2	[17370] 1965 1							
	[4] 15	[2080] 235 15	[260] 480 15	[6440] 730 13	[8620] 975 13	[11810] 1220 12	[12990] 1470 11	[1570] 1715 10	[17360] 1960 9	[19540] 2220 8	[21720] 2455 7	[2390] 2700 6	[26090] 2900 5	[28270] 3195 4	[30460] 3440 4	
	[8] 30	[2040] 230 31	[220] 475 30	[6400] 725 29	[8590] 970 28	[1170] 1215 28	[12950] 1465 27	[15140] 1710 26	[17320] 1955 25	[19500] 2200 24	[21680] 2450 23	[23870] 2695 22				
	[16] 45	[1990] 225 47	[470] 470 46	[650] 715 45	[8540] 965 44	[11200] 1210 43	[12900] 1460 43	[1580] 1705 42	[17270] 1950 41	[19450] 2200 40	[21640] 2445 39					
	[16] 61	[1930] 220 63	[4110] 465 62	[620] 710 61	[8480] 960 60	[11060] 1205 59	[12800] 1450 58	[1530] 1700 58	[17210] 1945 57	[19390] 2190 56						
	[20] 76	[1860] 210 79	[4040] 455 78	[620] 705 77	[8410] 950 76	[11030] 1195 75	[12770] 1445 74	[1460] 1600 73	[17140] 1935 72	[19320] 2185 72						
	[24] 91	[1780] 200 95	[390] 450 94	[6150] 695 93	[8330] 940 92	[11020] 1190 91	[12700] 1435 90	[1480] 1600 89	[17070] 1930 88							
	[28] 106	[1700] 190 111	[3890] 440 110	[600] 685 109	[8250] 930 108	[11040] 1180 107	[12620] 1425 106	[14800] 1675 105	[1690] 1920 104							
	[32] 121	[180] 185 127	[3800] 430 126	[580] 675 125	[8160] 920 124	[11050] 1170 123	[12530] 1415 122	[1420] 1665 121								
	[36] 136	[180] 170 143	[3710] 420 142	[580] 665 141	[8070] 910 140	[11060] 1160 139	[12440] 1405 138	[1420] 1650 137								
	[40] 151	[180] 160 159	[3610] 410 158	[590] 655 157	[7970] 900 156	[11010] 1150 155	[12340] 1395 154	[1420] 1640 153								
	[45] 170	[1290] 145 179	[3480] 395 178	[5660] 640 177	[7840] 885 176	[11020] 1130 174	[12210] 1380 174	[14400] 1625 173								
	[60] 227	[960] 95 239	[3040] 345 238	[520] 590 236	[7410] 835 235	[9600] 1085 234	[1180] 1330 233									
	[70] 265	[540] 60 279	[2720] 305 278	[410] 555 276	[7090] 800 275	[9270] 1045 274	[11460] 1295 273									

10,000 Series

Dimensions

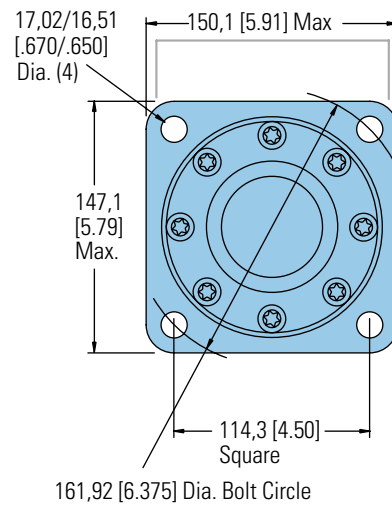
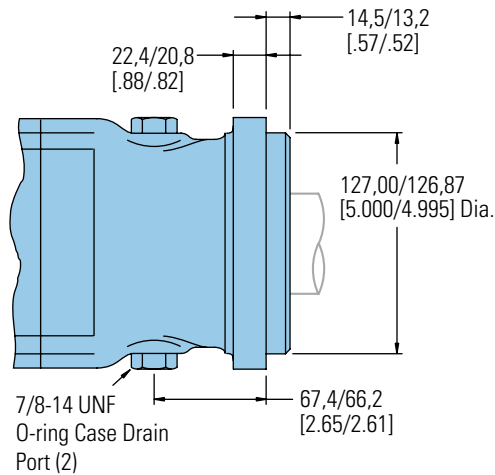
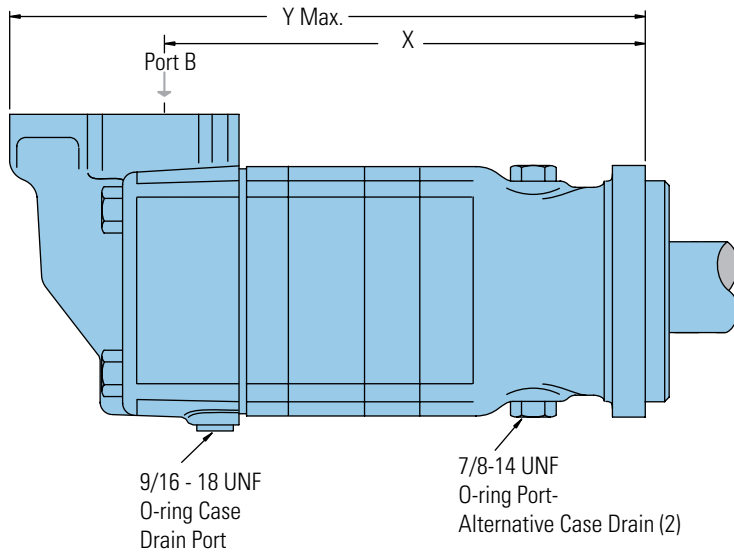
Ports

- 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

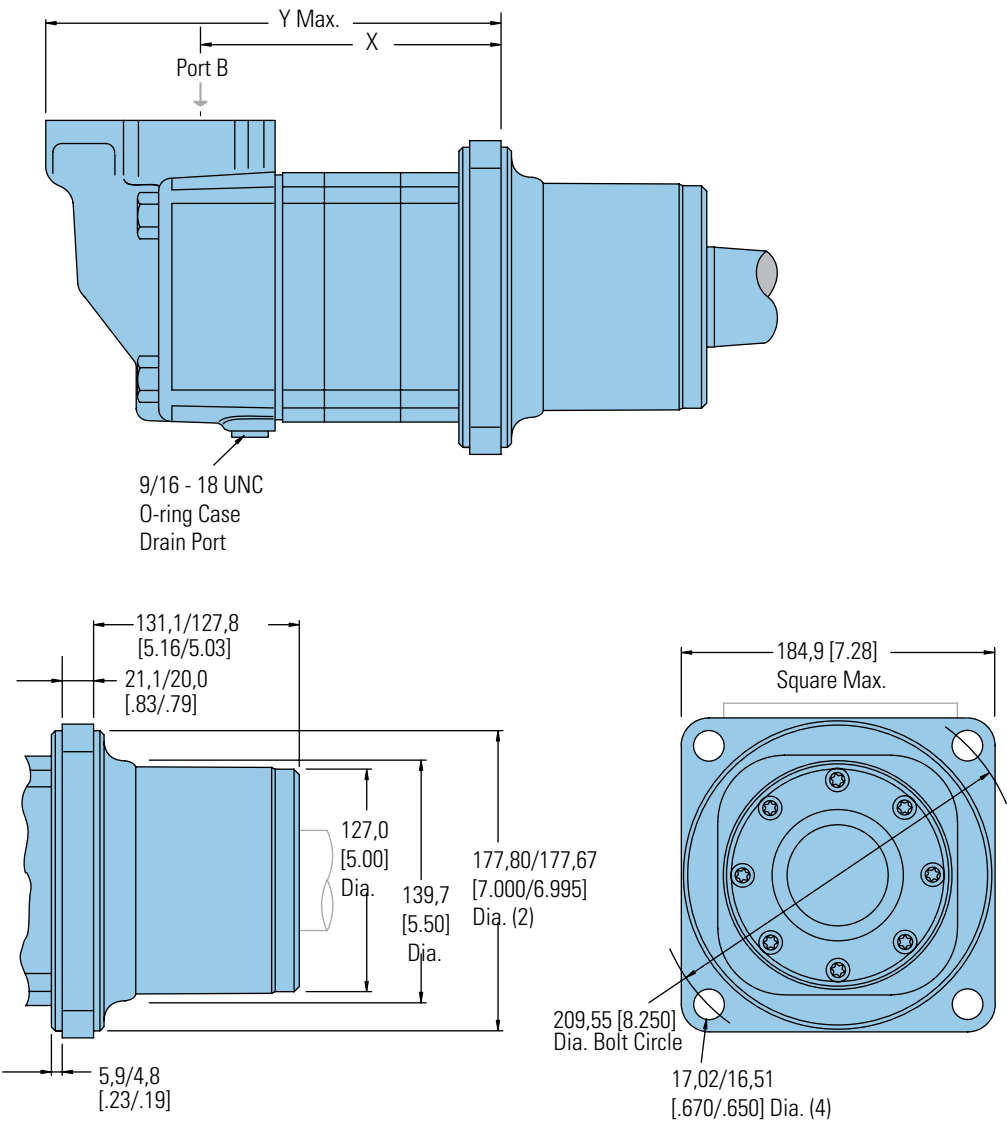
Ports

- 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

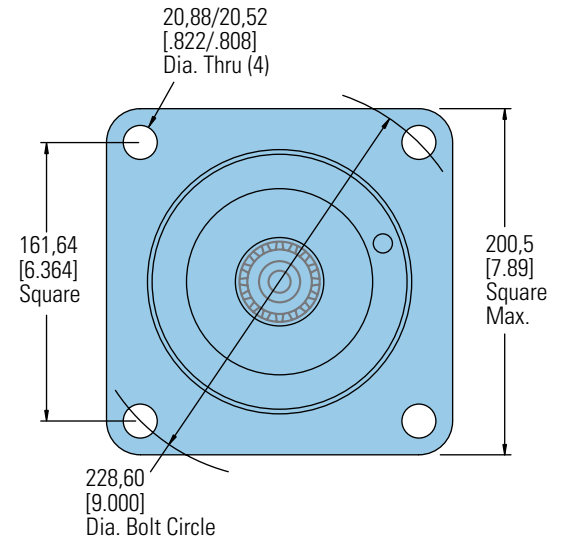
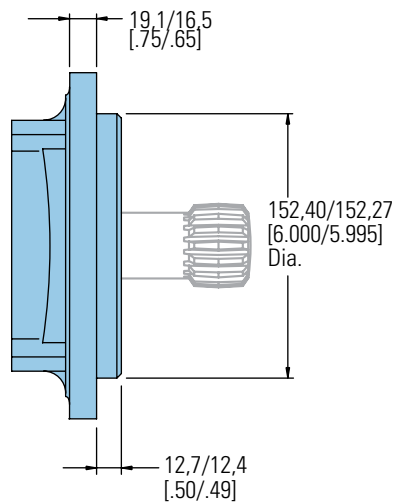
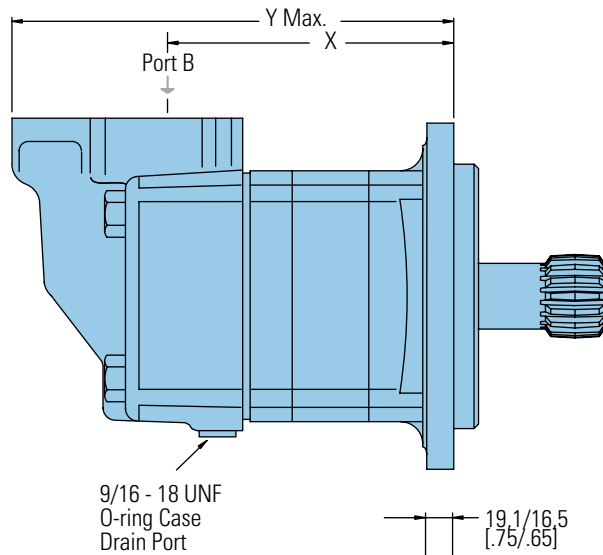
Ports

- 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



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

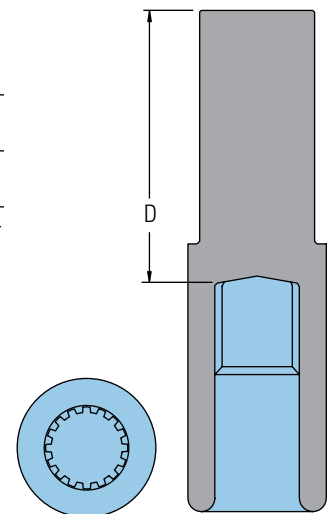
Dimension D mm [inch]
Eaton Part No.

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:

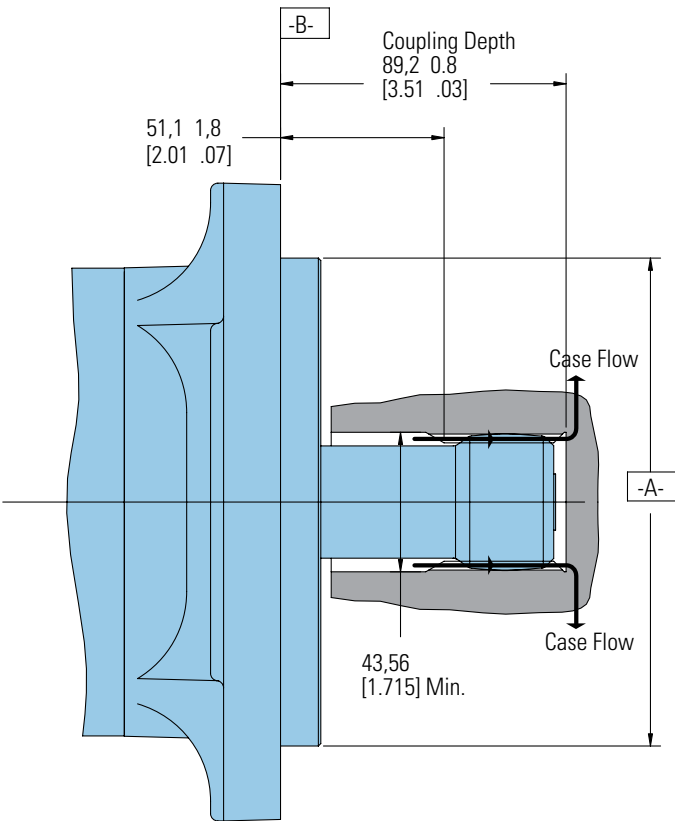
After machining blank, part must be hardened per Eaton specification.



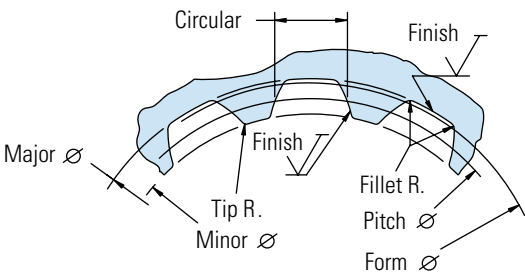
C-6

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).



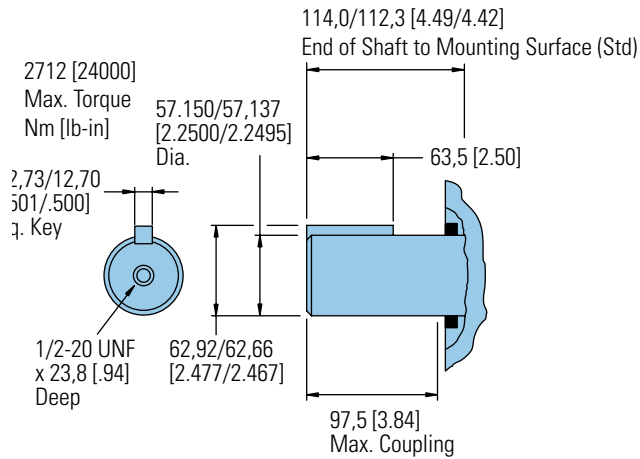
Spline Pitch.....	10/20
Pressure Angle.....	30°
Number of teeth.....	16
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter	Ref. 40,640000 [1.6000000]  0,25 [.010] D
Base Diameter.....	Ref. 35,195272 [1.3856406]
Major Diameter.....	43,56 [1.715] Max. 43,18 [1.700] Min.
Min. Minor Diameter.....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

10,000 Series

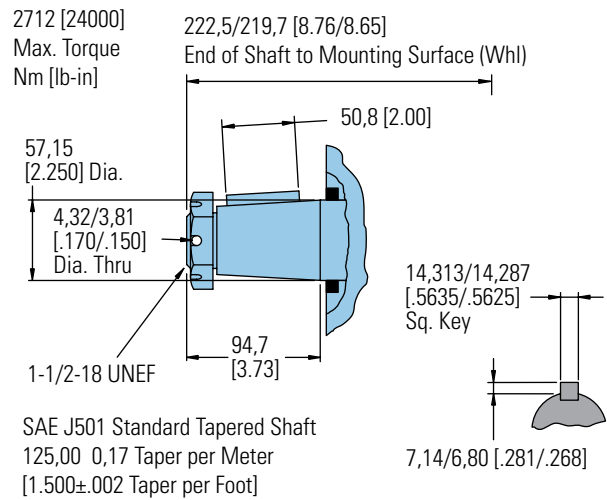
Dimensions

Shafts

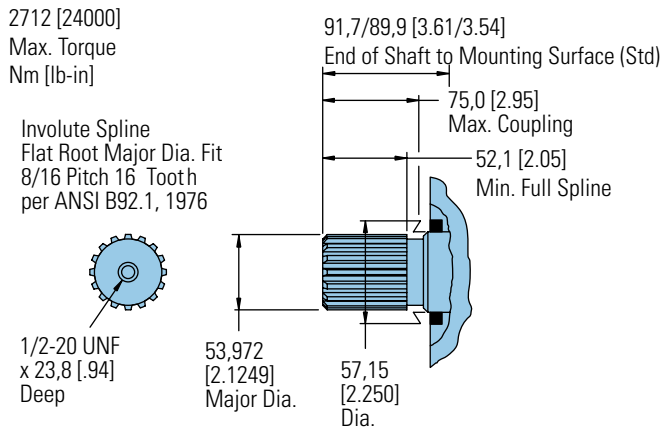
2 1/4 Inch Straight



2 1/4 Inch Tapered

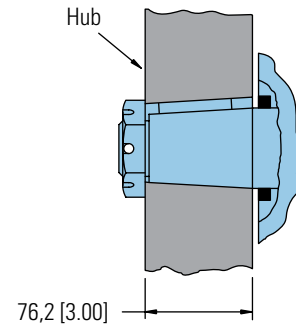


2 1/8 Inch 16 Tooth Splined

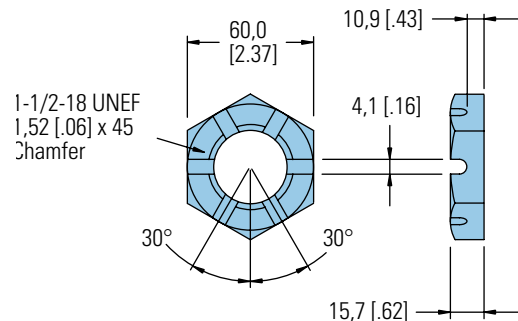


Tapered Shaft Hub Data

Recommended Torque:
(1150 Nm [850 lb-ft] Dry)
(880 Nm [650 lb-ft] Lub)
Plus Torque required to
align the slotted nut with
the Shaft Crosshole.



Slotted Hexagon Nut



10,000 Series

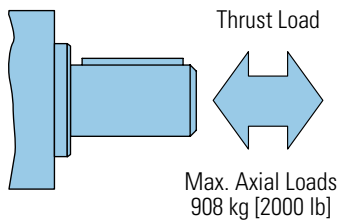
Side Shaft Load Capacity

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

Note:

Case pressure will increase the allowable inward thrust load and decrease the allowable outward thrust load. Case pressure will push outward on the shaft at 200 kg/7 Bar [441 lb/100 PSI].

Each curve is based on

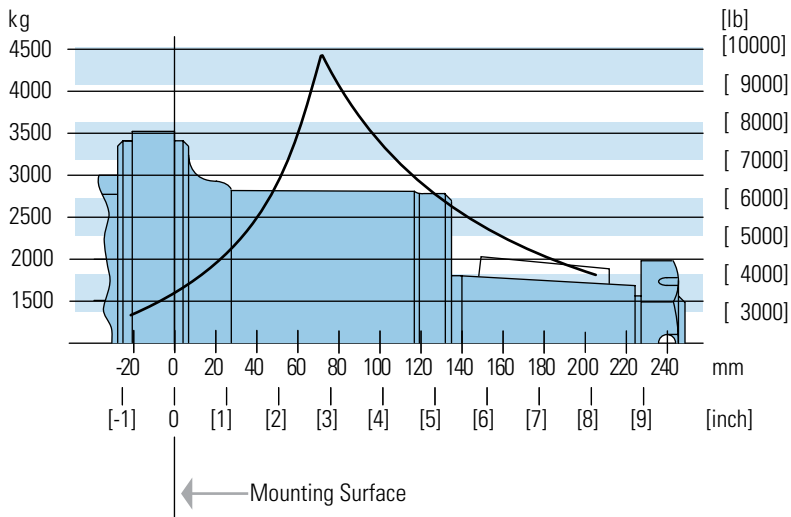
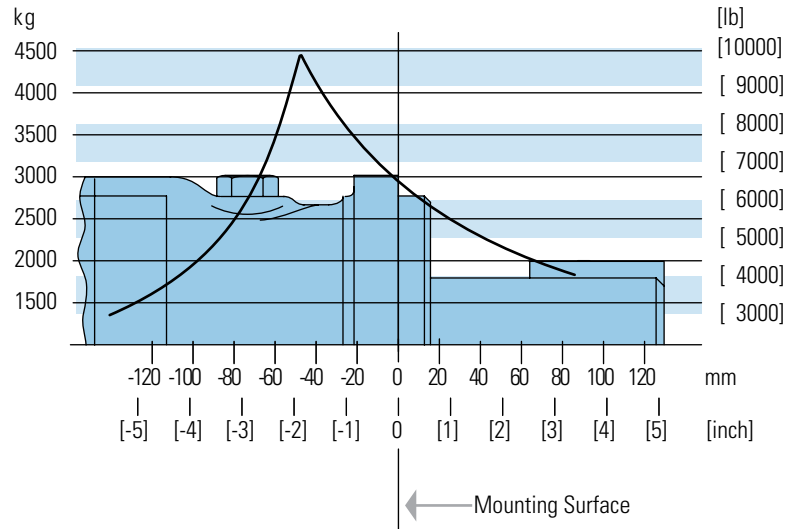


B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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

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

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

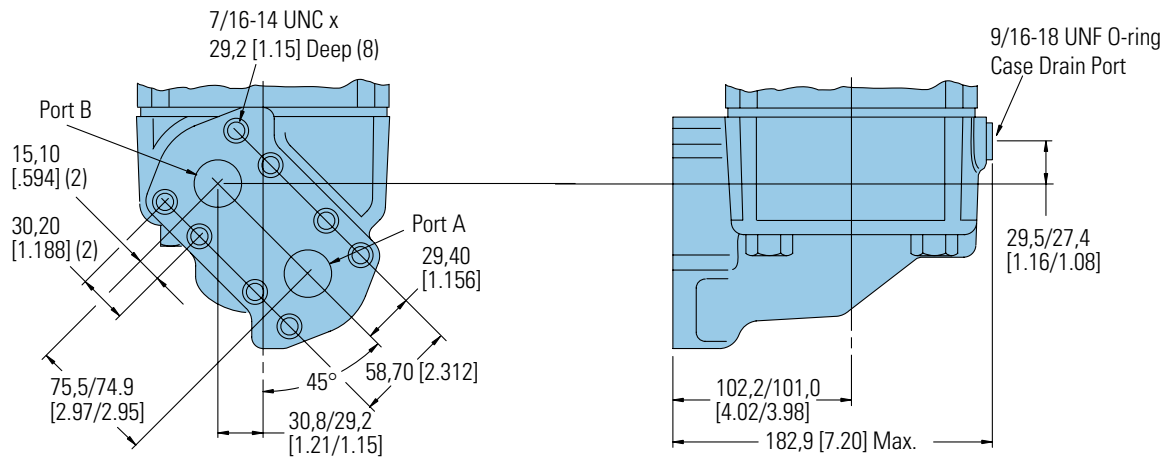


10,000 Series

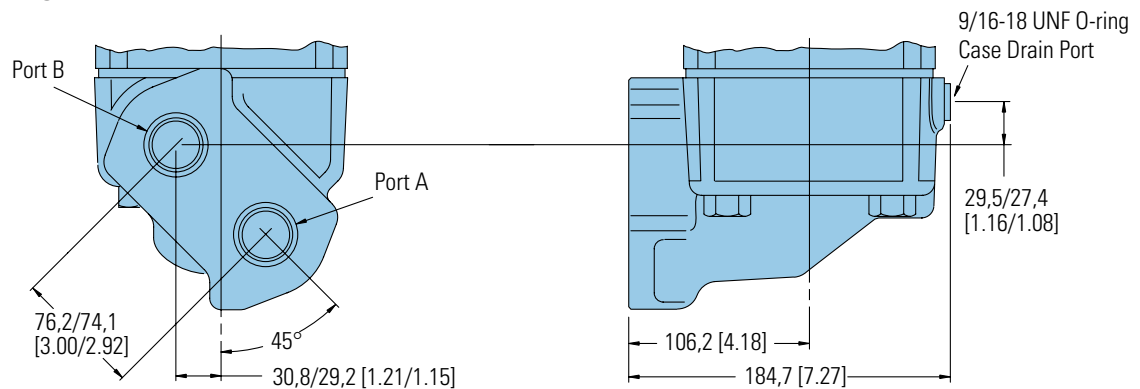
Dimensions

Ports

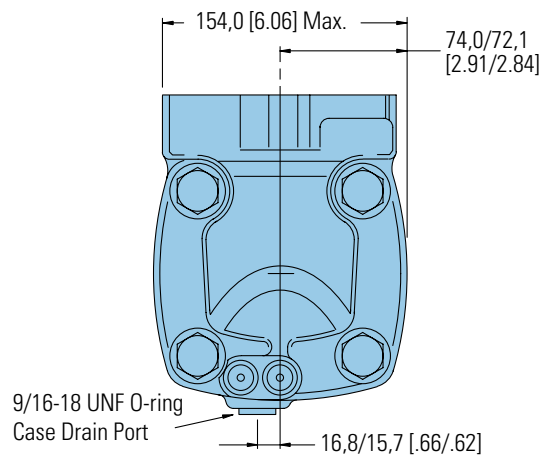
1 1/4 Inch Split Flange Ports (2)



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.

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

1 Product

M – Motor

2, 3 Series

10 – 10,000 Series

4, 5, 6 Displacement cm³/r [in³/r]

210 – 343.8 [20.98]

293 – 479.5 [29.26]

406 – 665.3 [40.60]

574 – 940.8 [57.41]

7, 8 Mounting Description

AA – Standard, 4 Bolt:
127,0 [5.00] Pilot Dia. 16,76
[.660] Dia. Holes on 161,92
[6.375] Dia. Bolt Circle

AB – Wheel, 4 Bolt: 16,76
[.660] Dia. Holes on 209,55
[8.250] Dia. Bolt Circle

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

9, 10 Output Shaft Description

00 – None (Bearingless)

01 – 57,15 [2.250] Dia.
Straight with .500-20
UNF-2B Thread in End,
12,7 [.50] Square x 63,5
[2.50] Straight End

02 – 57,15 [2.250] Dia.
.125:1 Tapered Shaft Per
SAE J512 with 1.500-18
UNEF-2A Threaded Shaft
End and Slotted Hex Nut,
14,288 [.5625] Square x
50,8 [2.00] Straight Key

03 – 53,98 [2.125] Dia. Flat
Root, Major Dia. Fit, 16
Tooth, 8/16 DP, 30 Degree
Involute Spline with
.500-20 UNF-20 Thread
in End. 52,07 [2.050]
Minimum Full Spline
Length

11, 12 Ports

AA – 1.3125 -12 UN O-Ring
Staggered Ports

AB – 31,75 [1.250] Dia.
4 Bolt Split Flange
Staggered Ports with
.4375-15 UNC-2B Tapped
Mounting Holes

13, 14 Case Flow Options

01 – .5625-18 UNF-2B Case
Drain SAE O-Ring Port

15 Low Pressure Relief

0 – None

16, 17 Pressure/Flow Option

00 – None

18 Geroler Option

0 – Standard

1 – Free Running

19 Seal Option

0 – Standard

4 – Seal Guard

20, 21 Accessories

00 – None

22, 23 Special Features (Hardware)

00 – None

24, 25 Special Features (Assembly)

00 – None

AA – Reverse Rotation

26, 27 Paint / Packaging

00 – None

AA – Painted Low Gloss
Black

28, 29 Customer Identification

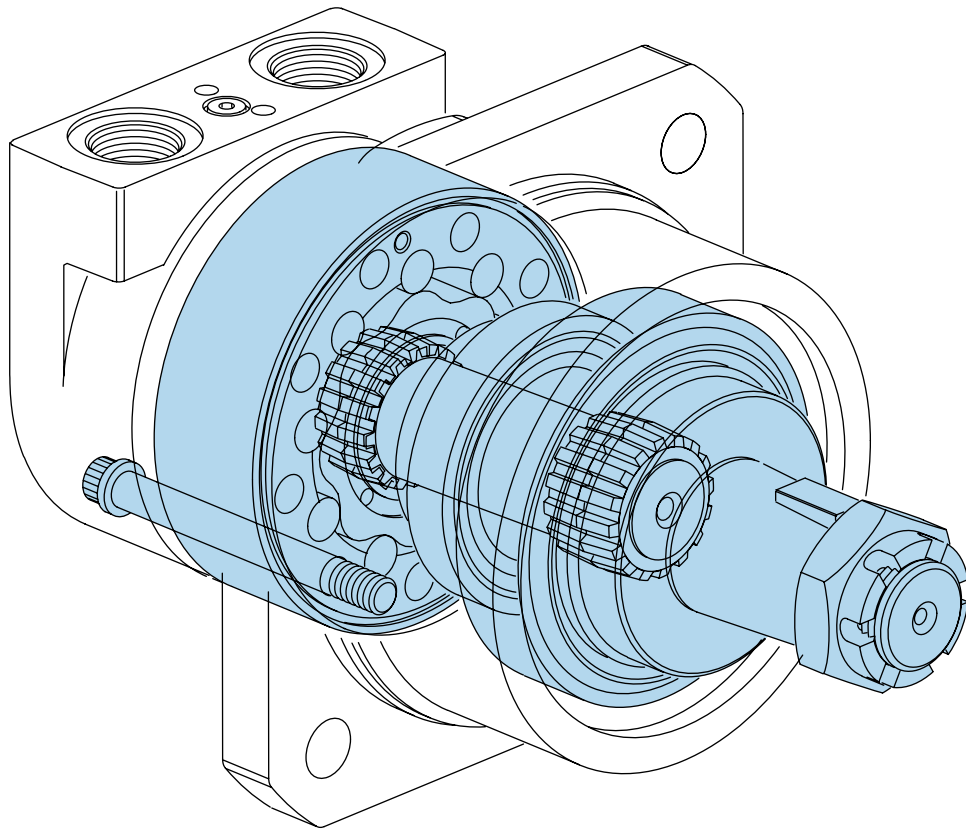
00 – None

30 Design Code

C – Third (Standard and
Wheel Mounts)

D – Fourth (Bearingless
Mount)

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



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

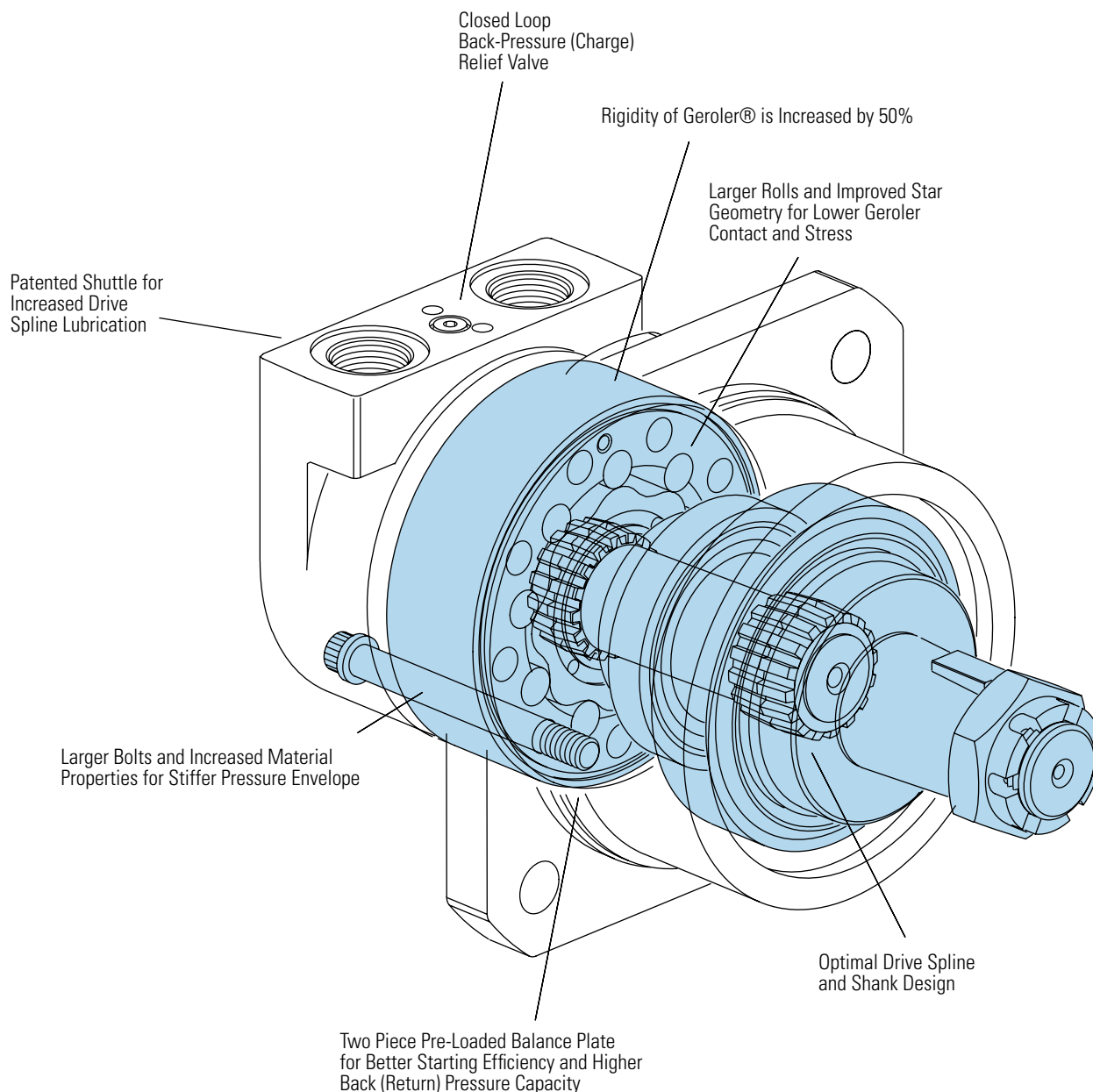
VIS Motors

Highlights

Product Description

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

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



Features, Benefits, and Applications

Features

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

Benefits

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

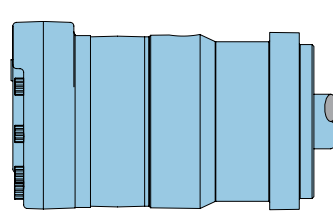
Applications

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

Design Features

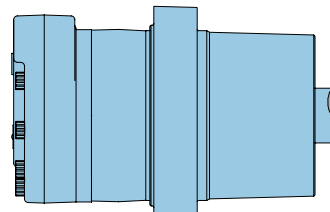
Eaton hydraulic motors provide design flexibility. All VIS motors are available with various configurations consisting of:

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



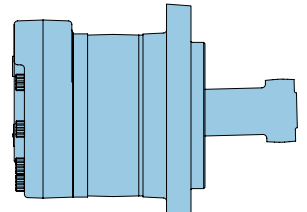
Standard Motor

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



Wheel Motor

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



Bearingless Motor

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

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VIS 40 Series

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VIS 40 Series Two-speed

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VIS 45 Series

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Side Load Capacity	D-3-12

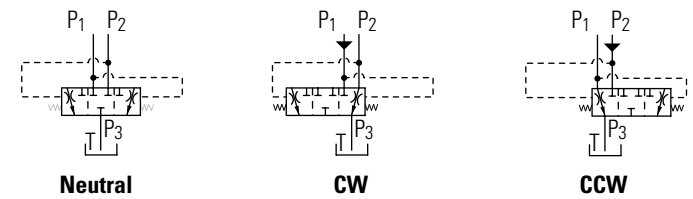
Product Numbers	D-3-13
Model Code	D-3-15
VIS 45 Series Two-speed	
Specifications	D-3-16
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Product Numbers	D-3-20
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Typical Hydraulic Circuit

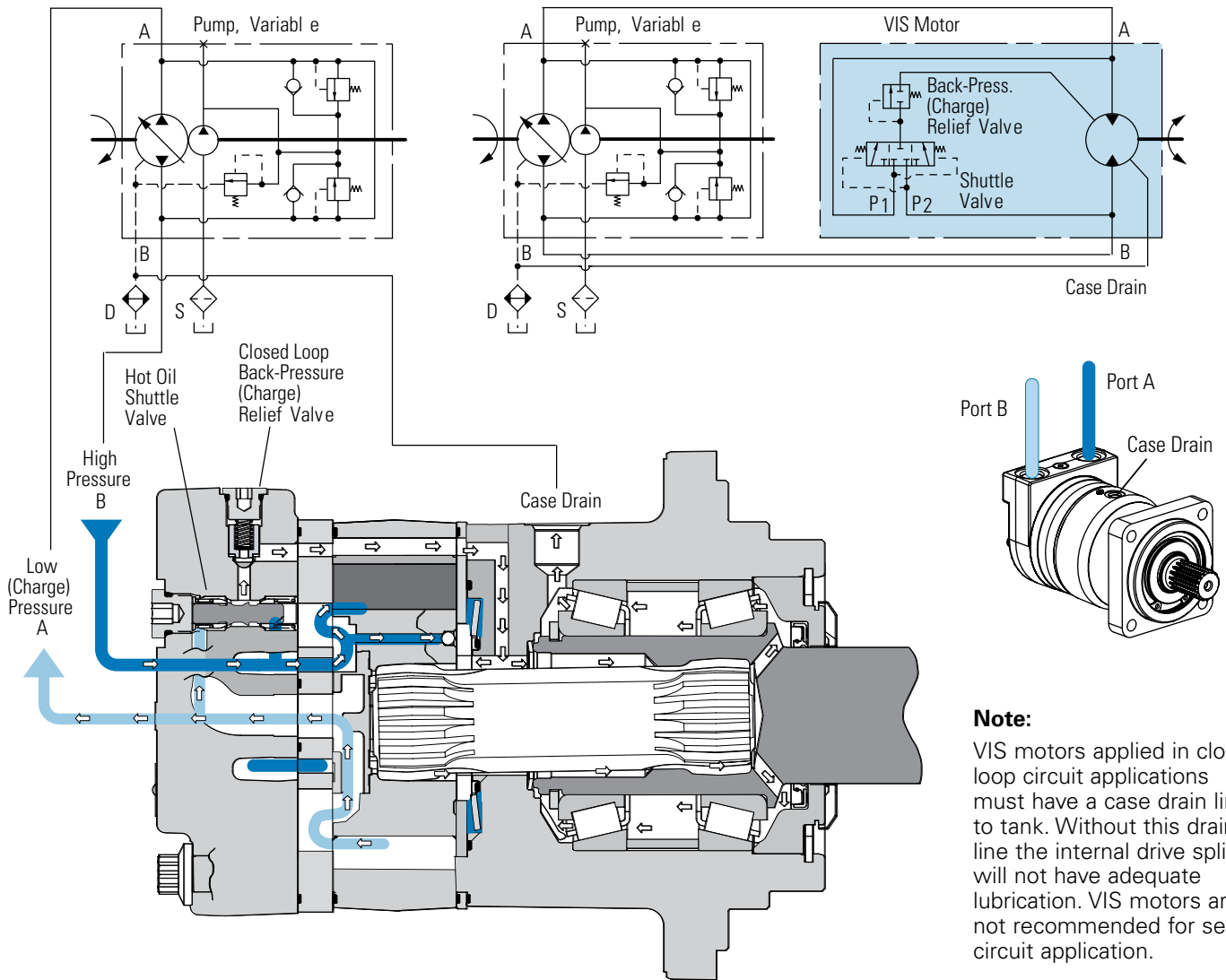
VIS 40 and 45 Series

Shuttle Valve, Two Way (Closed Center) —

Schematic Diagrams

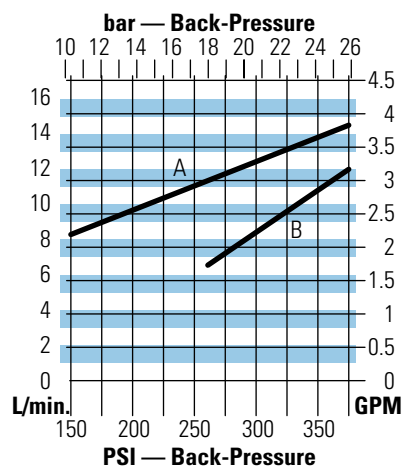


Closed Loop Circuit



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

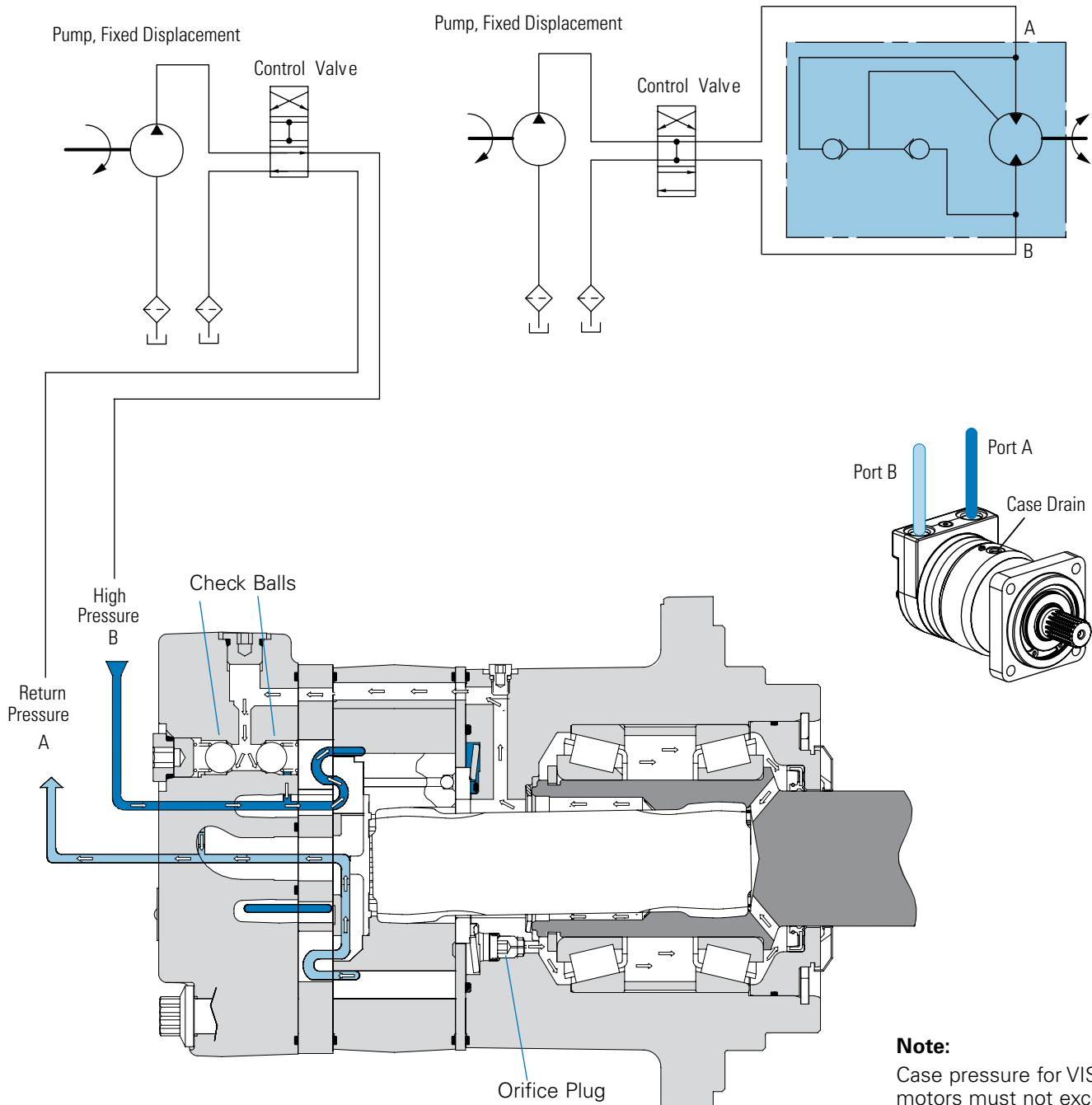
D-2

D-3

Typical Hydraulic Circuit

VIS 40 and
45 Series

Open Loop Circuit



Note:

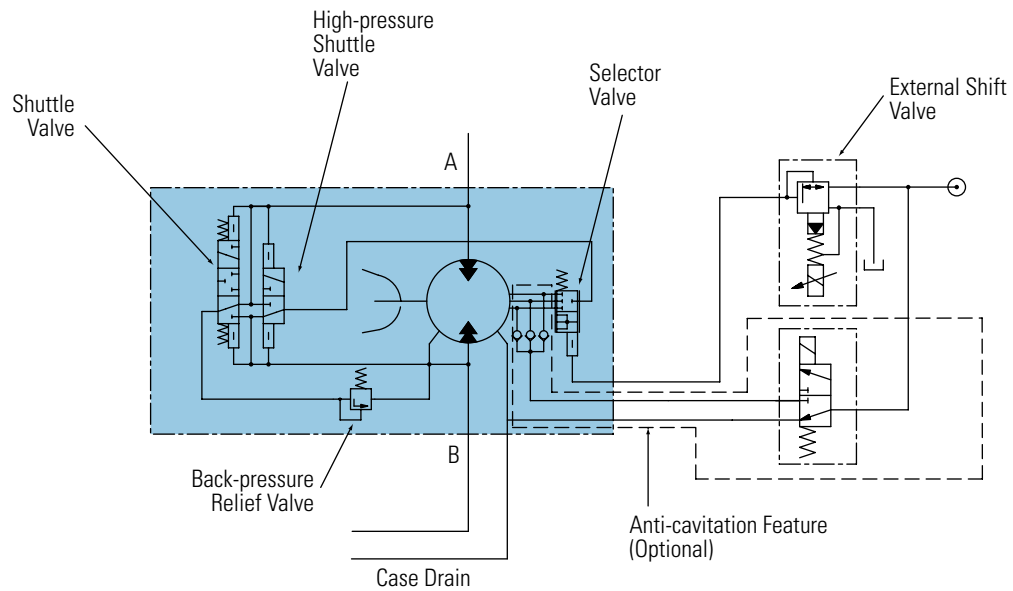
Case pressure for VIS motors must not exceed 50 psi. With an "Open Loop Option" VIS motor, a case drain is not required, except if the return pressure is greater than 50 psi.

Typical Hydraulic Circuit

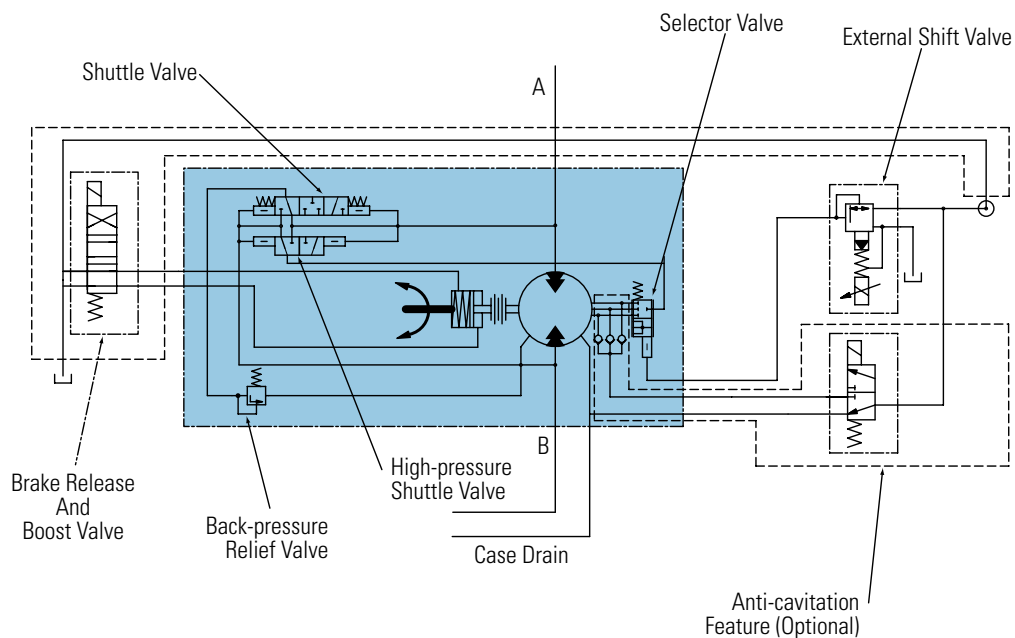
VIS 40 and

45 Series

Two-speed Circuit



Two-Speed Brake Motor Circuit



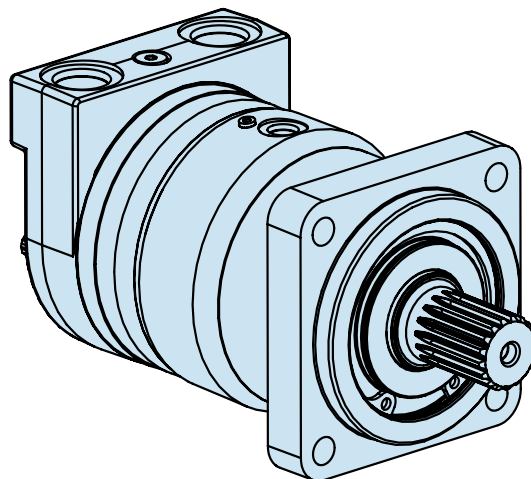
D-1

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VIS 40 Series

Highlights



Description

The VIS 40 Series is the newest addition to the VIS product line. The VIS 40 is very close in size to the VIS 30, but with increased drive train strength, it has even greater torque capability. Maximum continuous output torque capability is rated to 2531 Nm [22,400 lb-in] with a displacement range from 505cc to 940cc per revolution. VIS 40 motors can be run up to 151 LPM [40 GPM] with pressure capability up to 310 bar (4500 PSI). The motor utilizes patented VIS technology with improved high-strength Geroler, optimized drive geometry, and two-piece pre-loaded balance plate for increased starting efficiency, reduced leakage and higher back pressure capacity. A wide variety of options are available including two-speed option, brake options and case flow options for both closed-loop and open loop applications.

Specifications

Geroler Element	6 Displacements
Flow l/min [GPM]	151 [40] Continuous 170 [45] Intermittent
Speed	Up to 293 RPM
Pressure bar [PSI]	310 [4500] Cont. 345 [5000] Inter. 380 [5500] Peak.
Torque Nm [lb - in]	2531 [22400] Cont. 3165 [28000] Inter.

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.

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



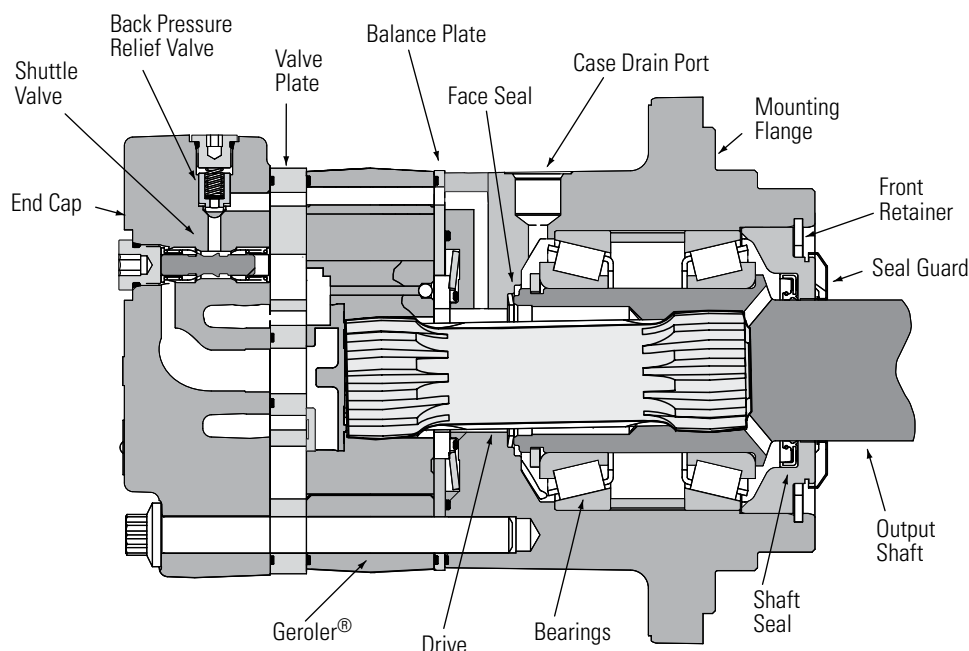
Digger



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]

□ Pressure Bar [PSI]

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

400 cm³/r [24.4 in³/r]

□ Pressure Bar [PSI]

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

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

VIS 40 Series

Performance Data

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

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

Continuous

Intermittent

Will Operate at Reduced Life

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

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	35	70	105	140	170	205	240	275	310	345	380
Flow LPM [GPM]	4	1035	2169	4395	6592	8656	10735	12804	14773	16105	18043	19628
	15	117	245	497	745	978	1213	1447	1669	1820	2039	2218
	8	1055	2200	4445	6671	8855	11049	13225	15313	17473	19319	21368
	30	119	249	502	754	1000	1248	1494	1730	1974	2183	2414
	12	1003	2190	4464	6730	8944	11155	13364	15520	17614	19648	21753
	45	113	247	504	760	1011	1260	1510	1754	1990	2220	2458
	16	1069	2202	4422	6692	8901	11150	13367	15527	17694	19747	21833
	61	121	249	500	756	1006	1260	1510	1754	1999	2231	2467
	20	1019	1938	4301	6833	8830	11117	13552	15431	17663	19829	21919
	76	115	219	486	772	998	1256	1531	1743	1996	2240	2476
	25	843	1963	4363	6440	9083	11194	13207	15406	17473	19620	21765
	95	95	222	493	728	1026	1265	1492	1741	1974	2217	2459

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

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	35	70	105	140	170	205	240	275	310	345	380
Flow LPM [GPM]	4	1177	2466	4996	7494	9841	12204	14556	16794	18308	20512	22313
	15	133	279	564	847	1112	1379	1645	1897	2069	2317	2521
	8	1199	2501	5053	7584	10067	12560	15034	17408	19862	21962	24292
	30	135	283	571	857	1137	1419	1699	1967	2244	2481	2745
	12	1140	2489	5074	7650	10161	12681	15191	17642	20022	22332	24722
	45	129	281	573	864	1149	1433	1717	1993	2262	2524	2794
	16	1216	2503	5027	7608	10119	12675	15195	17652	20113	22442	24820
	61	137	283	568	860	1143	1432	1717	1994	2273	2536	2804
	20	1159	2203	4890	7768	10038	12638	15401	17542	20088	22542	24918
	76	131	249	552	878	1134	1428	1741	1982	2269	2547	2815
	25	958	2231	4960	7321	10325	12725	15014	17513	19862	22302	24742
	95	108	252	560	827	1167	1438	1696	1979	2244	2520	2796

8870

1002

244

Torque [lb-in]

Nm

Speed RPM

VIS 40 Series

Performance Data

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

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

	Continuous
	Intermittent
	Will Operate at Reduced Life

630 cm³/r [38.5 in³/r]

□ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	35	70	105	140	170	205	240	275	310	345	380
Flow LPM [GPM]	4	1298	2720	5511	8267	10856	13463	16058	18526	20197	22627	24615
		147	307	623	934	1227	1521	1814	2093	2282	2556	2781
	15	23	23	23	23	22	22	22	22	20	19	18
	8	1323	2759	5575	8366	11105	13856	16585	19204	21913	24227	26797
		149	312	630	945	1255	1565	1874	2170	2476	2737	3028
	30	48	47	46	45	44	43	42	42	40	38	36
	12	1257	2746	5598	8439	11216	13990	16760	19464	22089	24640	27279
		142	310	632	954	1267	1581	1894	2199	2496	2784	3082
	45	72	70	68	68	67	67	67	65	65	64	58
	16	1341	2761	5546	8393	11163	13982	16763	19472	22190	24765	27381
		152	312	627	948	1261	1580	1894	2200	2507	2798	3094
	61	96	94	93	92	89	87	86	86	83	83	79
Flow LPM [GPM]	20	1278	2430	5394	8569	11073	13942	16996	19352	22151	24867	27488
		144	275	609	968	1251	1575	1920	2186	2503	2810	3106
	76	120	118	116	115	112	110	108	108	107	104	103
	25	1057	2461	5471	8076	11390	14038	16563	19320	21912	24605	27295
		119	278	618	912	1287	1586	1871	2183	2476	2780	3084
	95	150	148	146	144	143	138	137	136	134	132	130
	30	283	2288	5065	7716	10502	13381	16167	18819	21569	24375	27145
		32	258	572	872	1187	1512	1827	2126	2437	2754	3067
	114	175	177	175	173	171	167	166	164	163	160	158
	35	221	2225	4923	7700	10349	13160	16006	18646	21427	23776	25858
		25	251	556	870	1169	1487	1808	2107	2421	2686	2922
	132	204	207	203	202	199	194	194	191	190	187	182
Flow LPM [GPM]	40	178	1084	3980	6950	9785	12652	15446	18048	20780	23551	26132
		20	122	450	785	1106	1430	1745	2039	2348	2661	2952
	151	233	233	226	223	221	221	220	219	216	213	210

685 cm³/r [41.7 in³/r]

□ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	35	70	105	140	170	205	240	275	310	345	380
Flow LPM [GPM]	4	1406	2947	5969	8954	11758	14582	17392	20066	21875	24507	26661
		159	333	674	1012	1328	1647	1965	2267	2472	2769	3012
	15	22	22	22	21	20	20	20	20	19	18	17
	8	1433	2989	6038	9062	12028	15007	17964	20800	23734	26241	29025
		162	338	682	1024	1359	1696	2030	2350	2682	2965	3279
	30	44	43	43	42	40	40	39	39	37	35	33
	12	1362	2974	6063	9141	12148	15152	18153	21082	23925	26688	29547
		154	336	685	1033	1373	1712	2051	2382	2703	3015	3338
	45	66	65	63	63	61	61	61	60	60	59	54
	16	1453	2991	6007	9090	12090	15145	18156	21091	24034	26823	29656
		164	338	679	1027	1366	1711	2051	2383	2715	3031	3351
	61	88	87	86	85	83	81	80	80	79	77	73
Flow LPM [GPM]	20	1384	2632	5842	9281	11994	15100	18408	20960	23992	26934	29773
		156	297	660	1049	1355	1706	2080	2368	2711	3043	3364
	76	111	109	107	106	103	102	100	99	99	96	95
	25	1145	2666	5926	8748	12337	15205	17939	20926	23733	26650	29563
		129	301	670	988	1394	1718	2027	2364	2681	3011	3340
	95	138	136	135	133	132	128	126	126	124	122	120
	30	307	2478	5486	8357	11375	14493	17511	20383	23361	26401	29401
		35	280	620	944	1285	1637	1978	2303	2639	2983	3322
	114	162	164	161	160	158	154	153	152	150	148	144
	35	239	2410	5332	8340	11209	14254	17337	20196	23207	25752	28007
		27	272	602	942	1266	1610	1959	2282	2622	2910	3164
	132	188	191	188	186	184	179	179	177	175	172	168
Flow LPM [GPM]	40	193	1174	4311	7527	10598	13704	16730	19548	22507	25508	28304
		22	133	487	850	1197	1548	1890	2209	2543	2882	3198
	151	215	215	209	206	204	204	204	203	202	199	196

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

VIS 40 Series

Performance Data

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

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

	Continuous
	Intermittent
	Will Operate at Reduced Life

785 cm³/r [48.0 in³/r]

□ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
	15	35	70	105	140	170	205	240	275	310	345
4	1618	3392	6871	10306	13535	16784	20020	23097	25180	28210	30689
	183	383	776	1164	1529	1896	2262	2610	2845	3187	3467
	15	19	19	18	18	18	17	17	16	15	15
8	1649	3440	6950	10431	13845	17275	20678	23942	27320	30205	33410
	186	389	785	1178	1564	1952	2336	2705	3087	3413	3775
	30	38	38	37	36	35	34	34	32	31	29
12	1568	3423	6979	10522	13984	17441	20895	24267	27540	30720	34011
	177	387	789	1189	1580	1971	2361	2742	3112	3471	3843
	45	57	56	55	54	53	53	52	52	51	47
16	1672	3443	6914	10464	13917	17433	20899	24277	27665	30876	34137
	189	389	781	1182	1572	1970	2361	2743	3126	3488	3857
	61	77	76	75	74	72	70	69	69	67	64
20	1593	3030	6725	10683	13805	17382	21190	24127	27617	31003	34271
	180	342	760	1207	1560	1964	2394	2726	3120	3503	3872
	76	96	95	93	92	89	88	87	86	84	83
25	1318	3069	6821	10069	14201	17502	20649	24087	27319	30677	34030
	149	347	771	1138	1604	1977	2333	2721	3087	3466	3845
	95	120	118	117	115	114	111	110	109	107	105
30	353	2852	6315	9620	13094	16683	20157	23463	26891	30390	33843
	40	322	713	1087	1479	1885	2277	2651	3038	3434	3824
	114	141	142	140	139	137	134	133	132	130	129
35	275	2774	6138	9600	12903	16408	19956	23247	26714	29643	32238
	31	313	693	1085	1458	1854	2255	2627	3018	3349	3642
	132	163	166	163	162	160	156	155	154	152	150
40	222	1351	4962	8665	12200	15774	19257	22501	25908	29362	32580
	25	153	561	979	1378	1782	2176	2542	2927	3317	3681
	151	187	187	181	179	177	177	177	175	173	170

940 cm³/r [57.4 in³/r]

□ Pressure Bar [PSI]

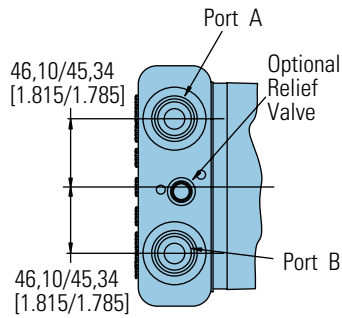
	250	500	1000	1500	2000	2500	3000	3500	4000
	15	35	70	105	140	170	205	240	275
4	1935	4056	8216	12325	16185	20071	23940	27620	30111
	219	458	928	1393	1829	2268	2705	3121	3402
	15	16	16	16	15	15	14	14	14
8	1972	4114	8311	12473	16557	20658	24727	28631	32670
	223	465	939	1409	1871	2334	2794	3235	3691
	30	32	31	31	30	29	29	28	27
12	1875	4094	8346	12582	16722	20857	24987	29019	32933
	212	463	943	1422	1889	2357	2823	3279	3721
	45	48	47	46	45	45	45	44	43
16	2000	4117	8268	12513	16642	20846	24992	29032	33083
	226	465	934	1414	1880	2355	2824	3280	3738
	61	64	63	62	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
25	1576	3670	8157	12041	16982	20929	24693	28804	32669
	178	415	922	1360	1919	2365	2790	3254	3691
	95	100	99	98	96	96	93	92	91
30	423	3411	7551	11504	15658	19950	24104	28057	32157
	48	385	853	1300	1769	2254	2723	3170	3633
	114	118	119	117	116	115	112	111	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	128	127
40	266	1616	5934	10361	14589	18863	23029	26907	30982
	30	183	670	1171	1648	2131	2602	3040	3500
	151	156	156	152	149	148	148	148	147

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

VIS 40 Series

Dimensions

Standard and Wheel Mount
– SAE



Ports

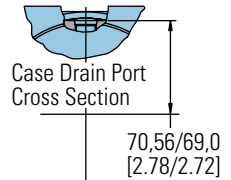
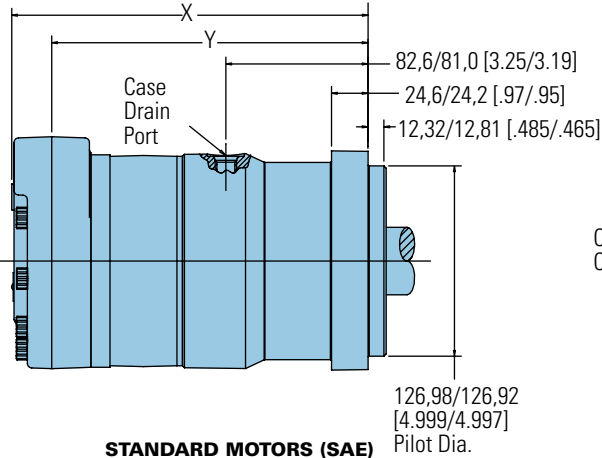
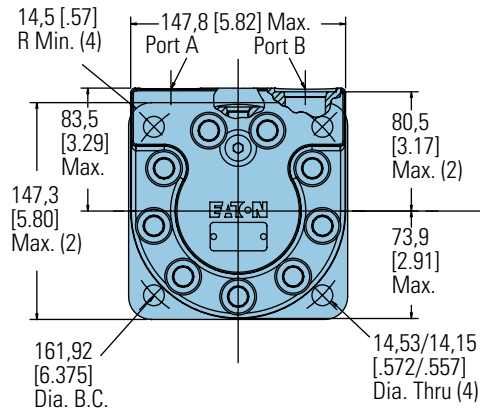
1–1/16-12 UN-2B SAE O-ring Ports (2)
9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

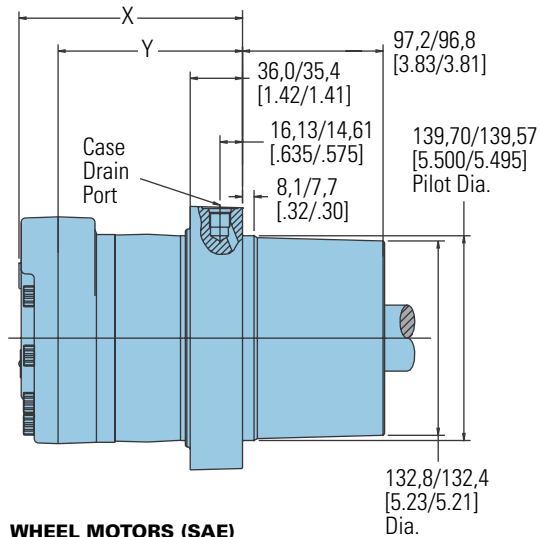
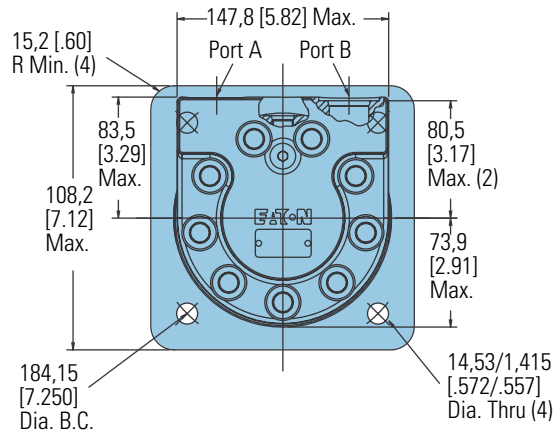
Standard Motors (SAE)



STANDARD MOTORS (SAE)

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



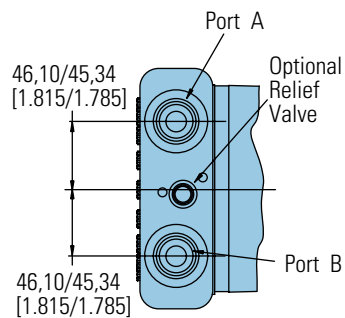
WHEEL MOTORS (SAE)

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

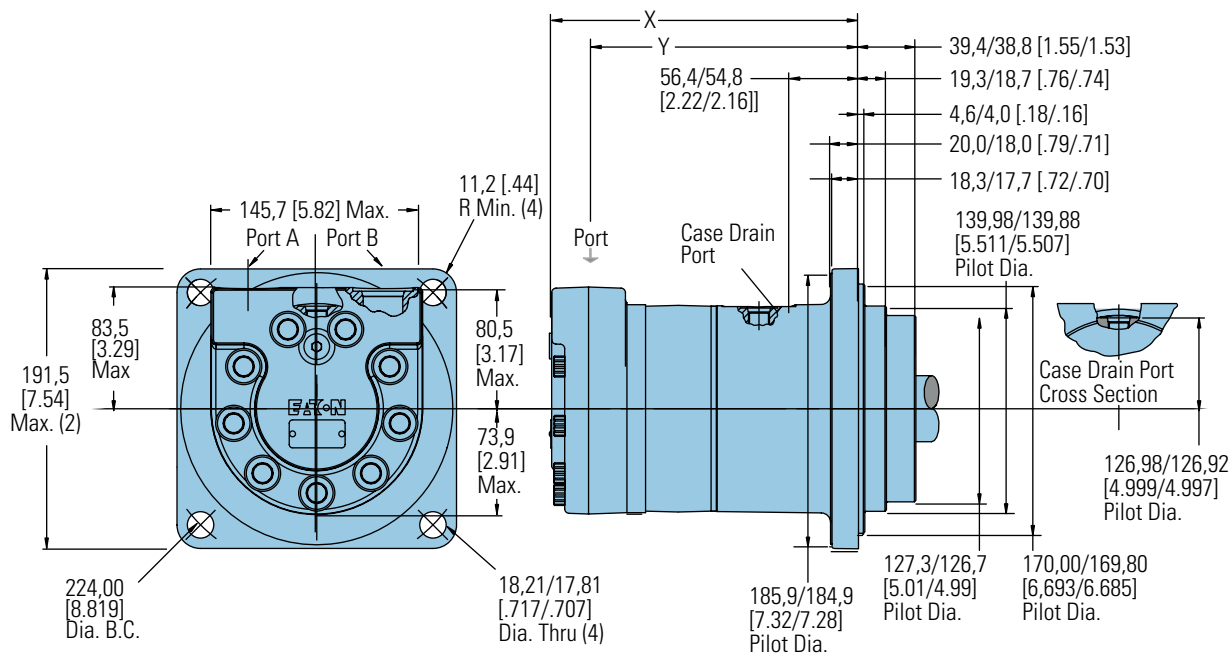
1-1/16-12 UN-2B SAE O-ring Ports (2)

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)

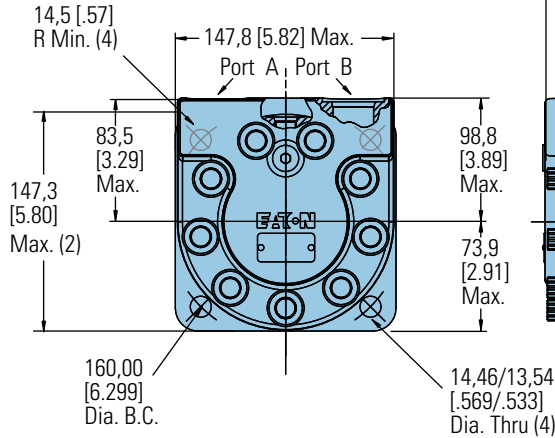
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
505 [30.7]	213,1 [8.39]	181,4 [8.36]
570 [34.9]	219,2 [8.63]	187,4 [8.60]
630 [38.5]	224,5 [8.84]	192,5 [8.81]
685 [41.7]	229,1 [9.02]	197,6 [8.99]
785 [48.0]	238,5 [9.39]	206,8 [9.35]
940 [57.4]	252,0 [9.92]	220,5 [9.89]

VIS 40 Series

Dimensions

Standard and Wheel Mount
– ISO

Standard Motors (ISO)



Ports

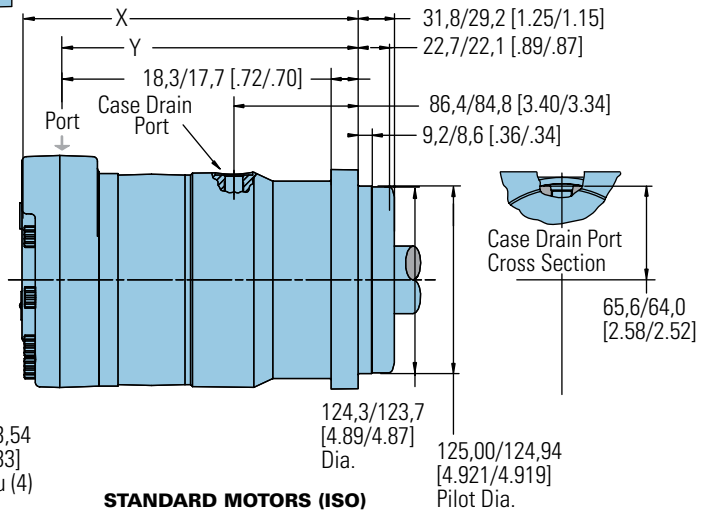
G 3/4 (BSP) O-ring Ports (2)

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

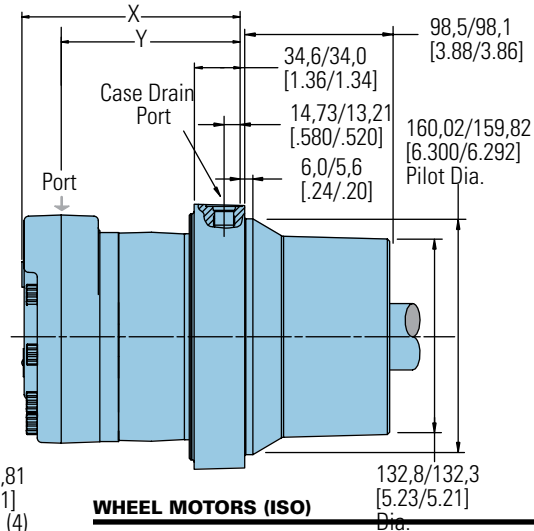
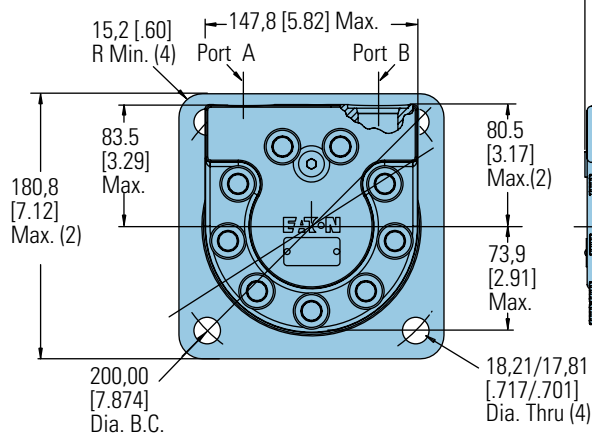
Port B Pressurized — CCW



STANDARD MOTORS (ISO)

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)



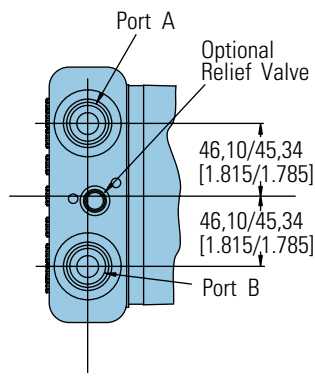
WHEEL MOTORS (ISO)

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

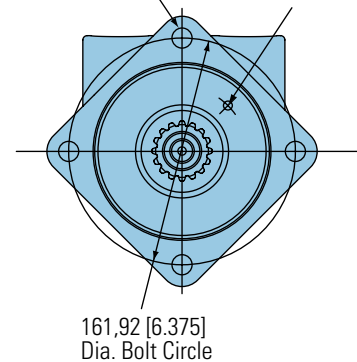
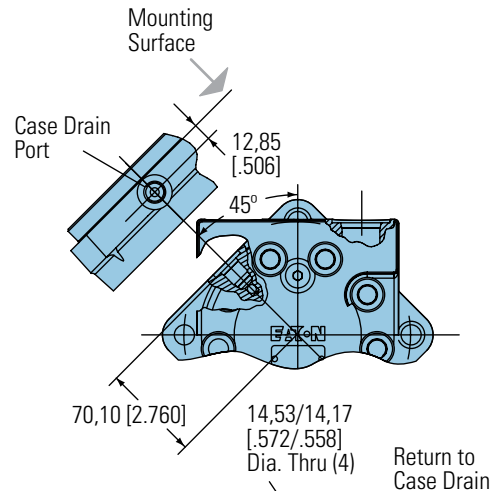
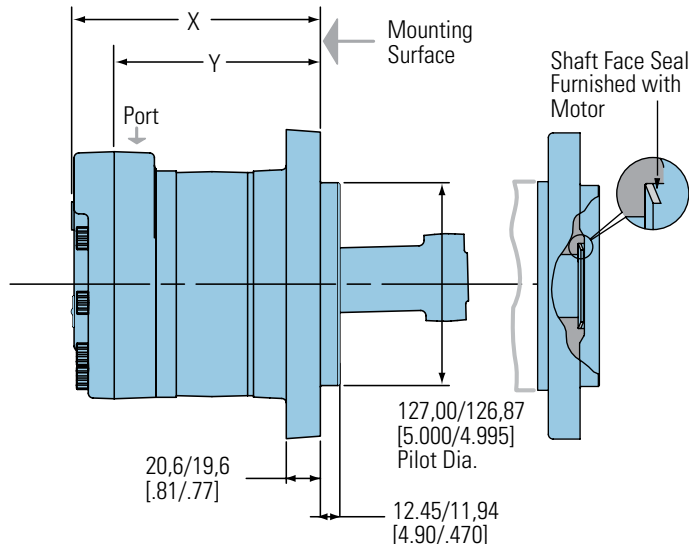
G 3/4 (BSP) O-ring Ports (2)

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

Standard Rotation Viewed from Drive End

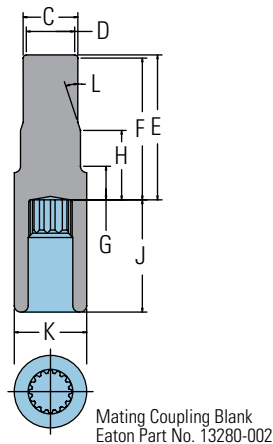
Port A Pressurized — CW

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		

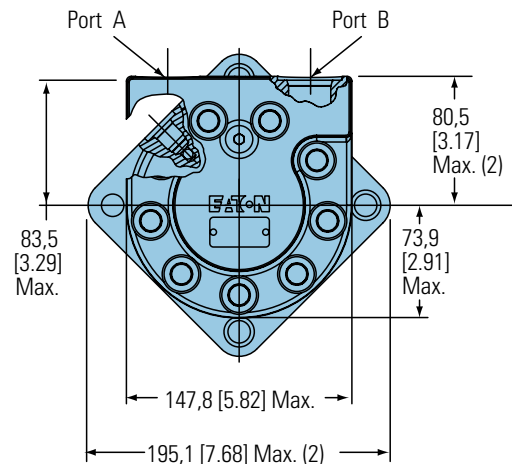


Note:

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]

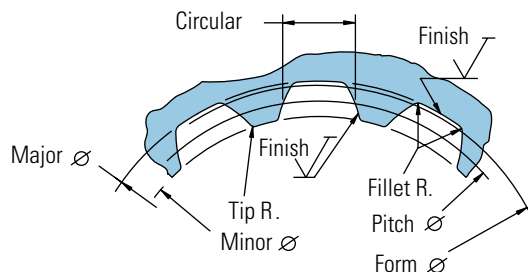
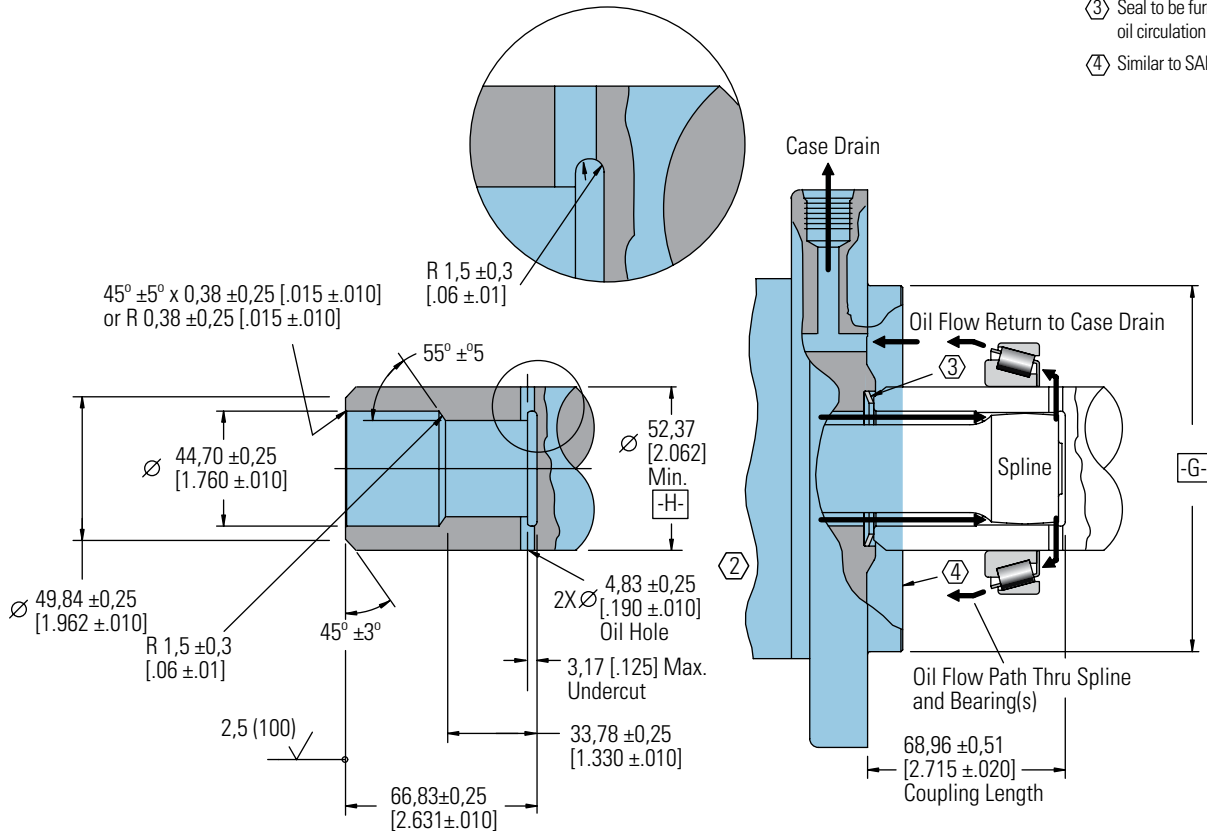


VIS 40 Series

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.



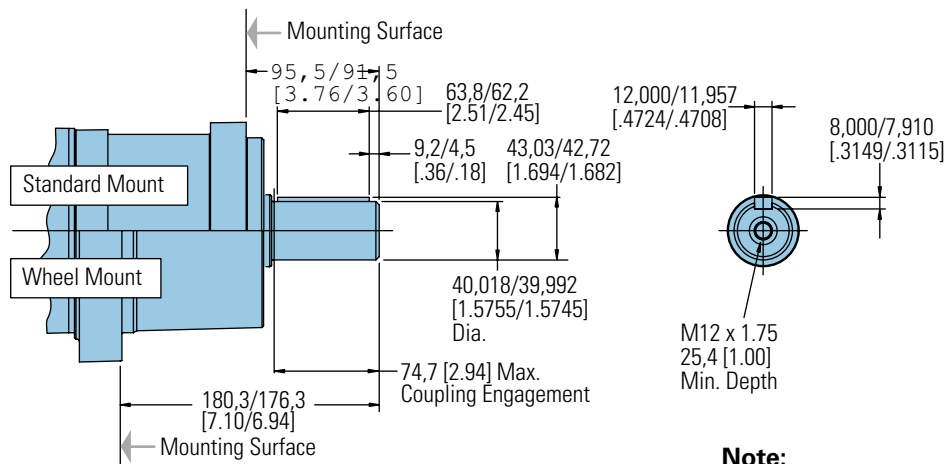
Spline Pitch.....	10/20
Pressure Angle.....	30°
Number of teeth.....	16
Class of Fit.....	Ref. 5
Type of Fit.....	Side
Pitch Diameter.....	Ref. 40,640000 [1.6000000] $\text{Ⓢ} \text{0,20} \text{ [0.008] } \text{H}$
Base Diameter.....	Ref. 35,195272 [1.3856406]
Major Diameter.....	43,56 [1.715] Max. 43,18 [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 -.0010]
Total Index Variation.....	0,040 [.0016]
Lead Variation.....	0,013 [.0005]
Circular Space Width:	
Maximum Actual.....	4,105 [.1616]
Minimum Effective.....	3,995 [.1573]
Maximum Effective.....	Ref. 4,056 [.1597]
Minimum Actual.....	Ref. 4,081 [.1582]
Dimension Between Two Pins.....	Ref. 34,272 -34,450 [1.3493 -1.3563]
Pin Diameter.....	4,389 [.1728]

VIS 40 Series

Dimensions Shafts

SAE

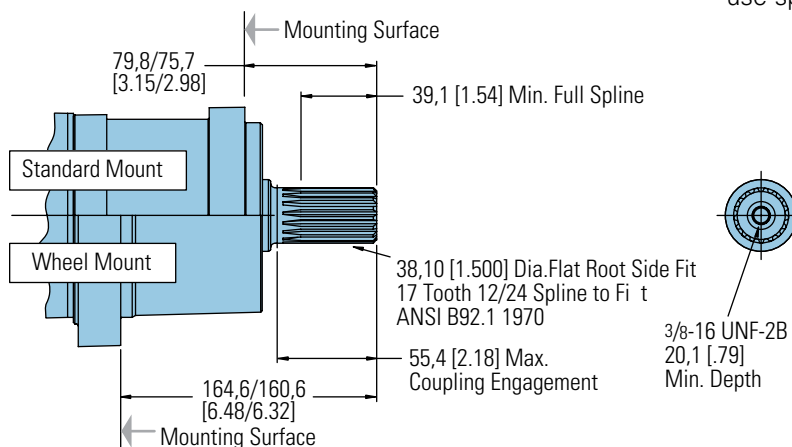
40 mm Straight



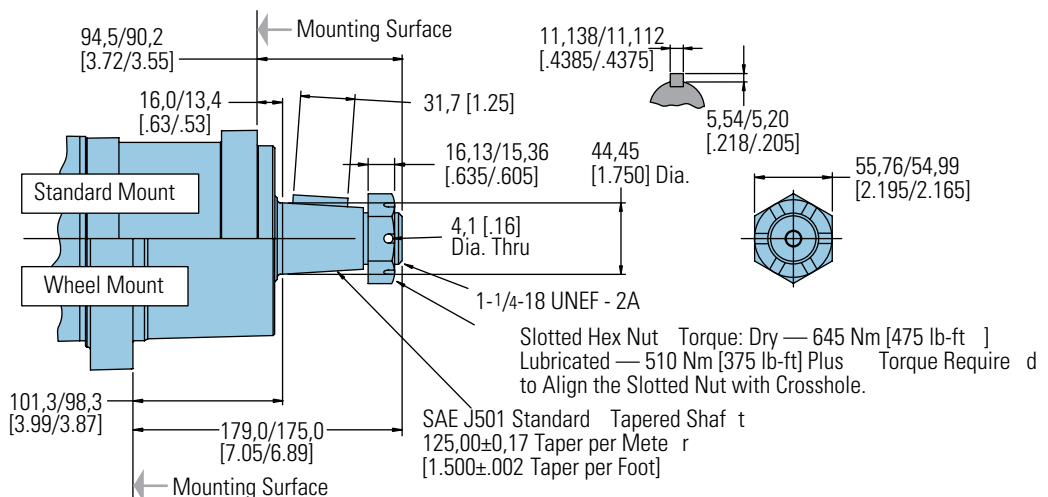
Note:

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

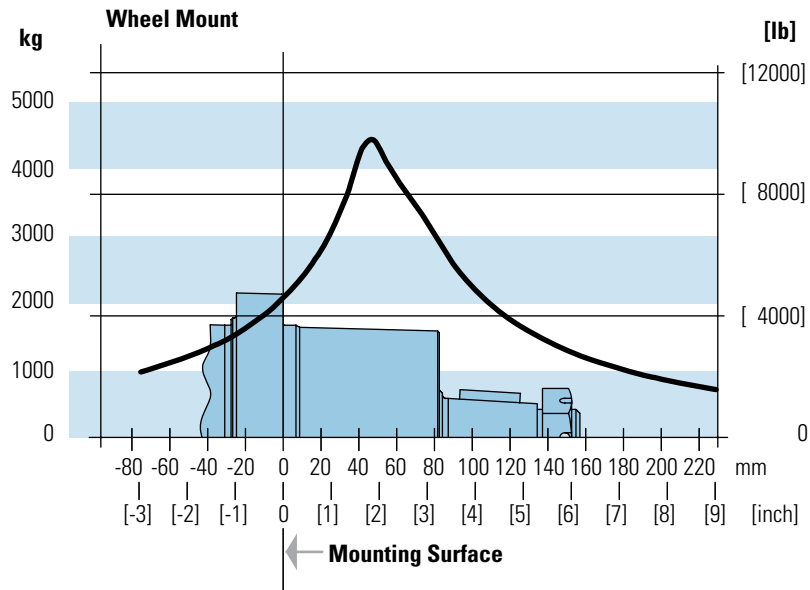
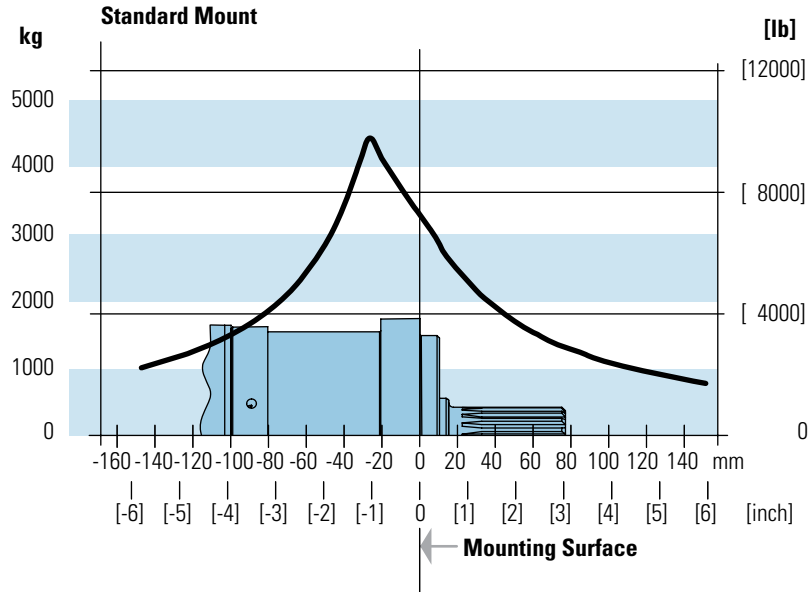
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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%.

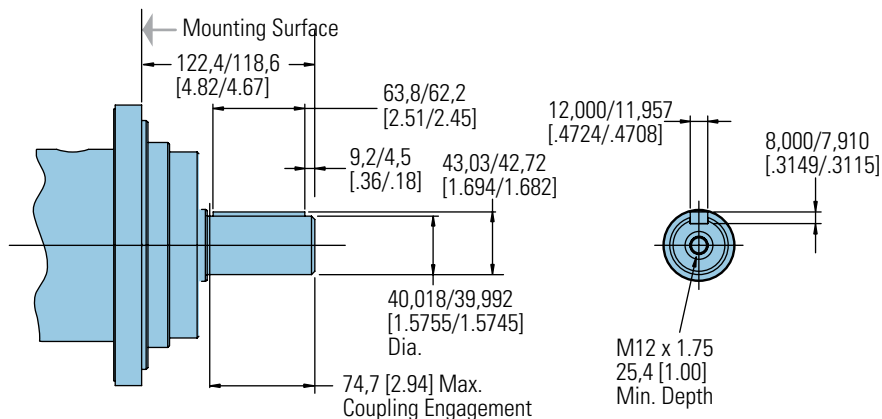


VIS 40 Series

Dimensions Shafts

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

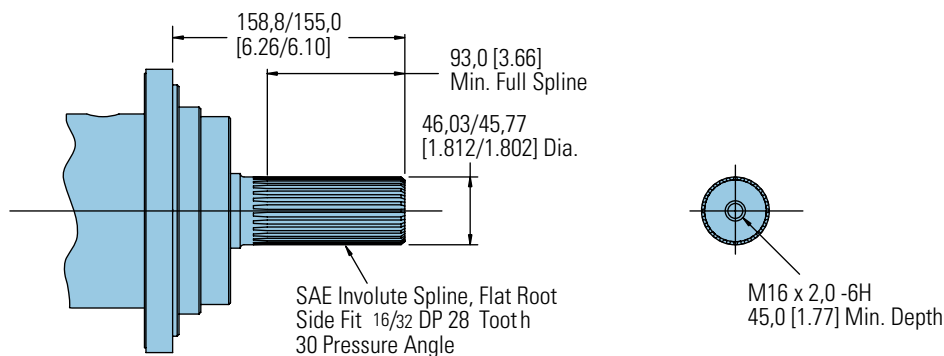
40 mm Straight



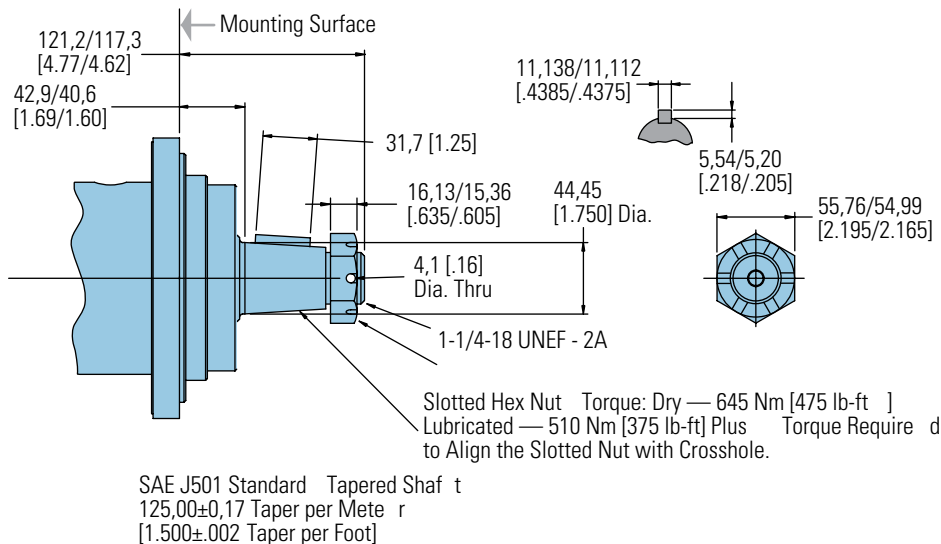
Note:

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.

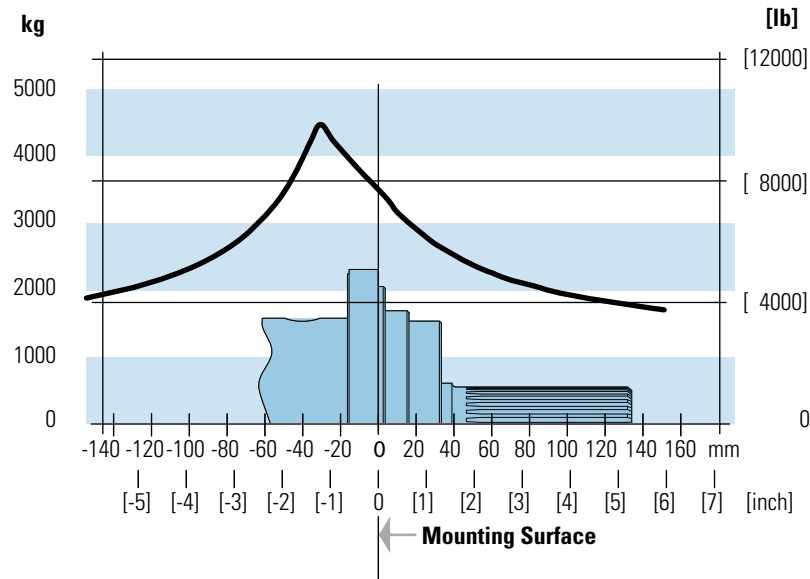
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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%.



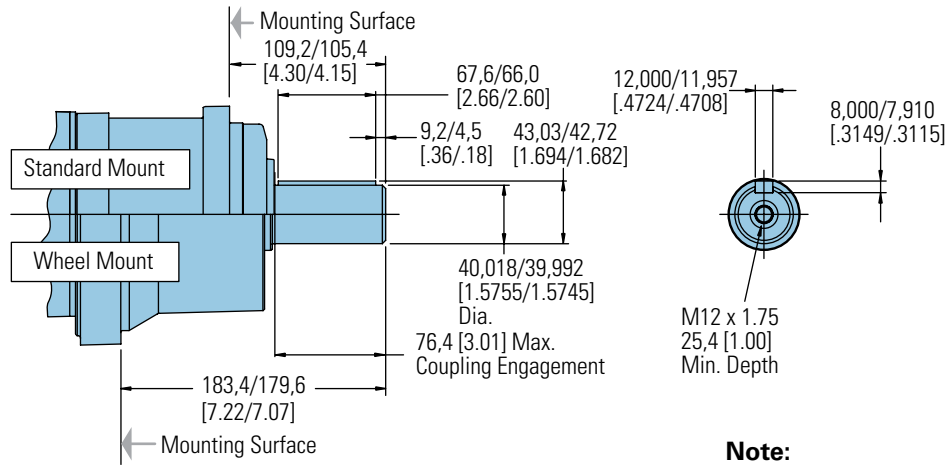
VIS 40 Series

Dimensions

Shafts

ISO

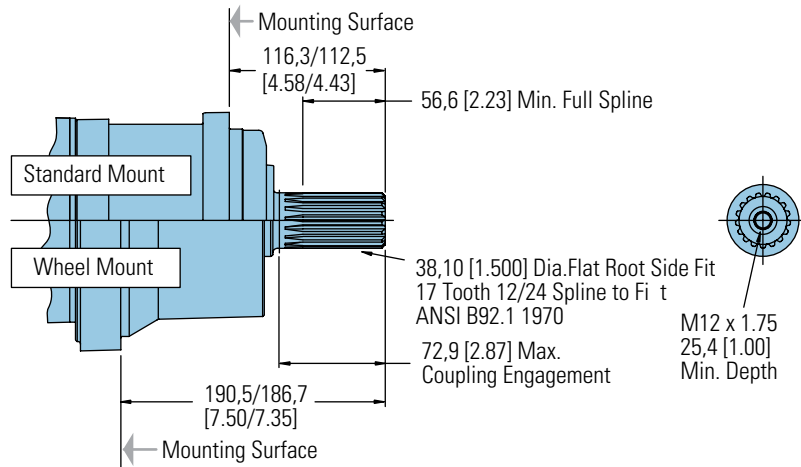
40 mm Straight



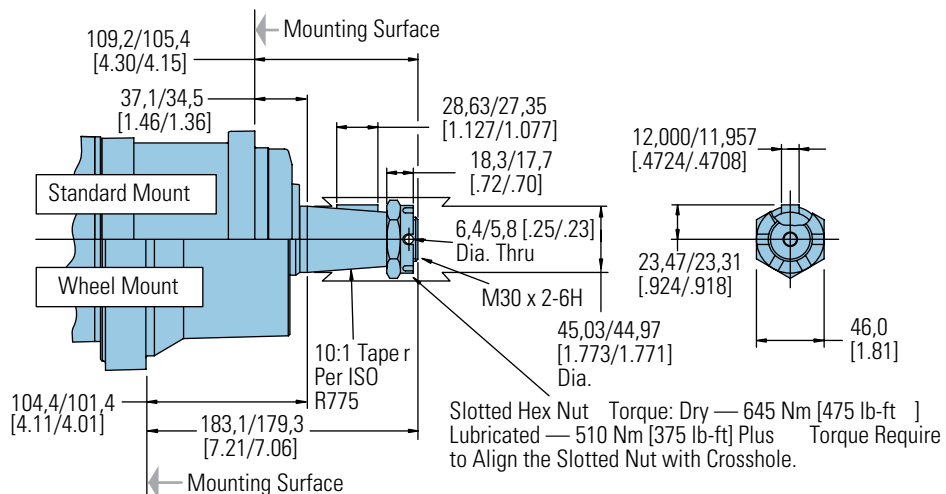
Note:

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

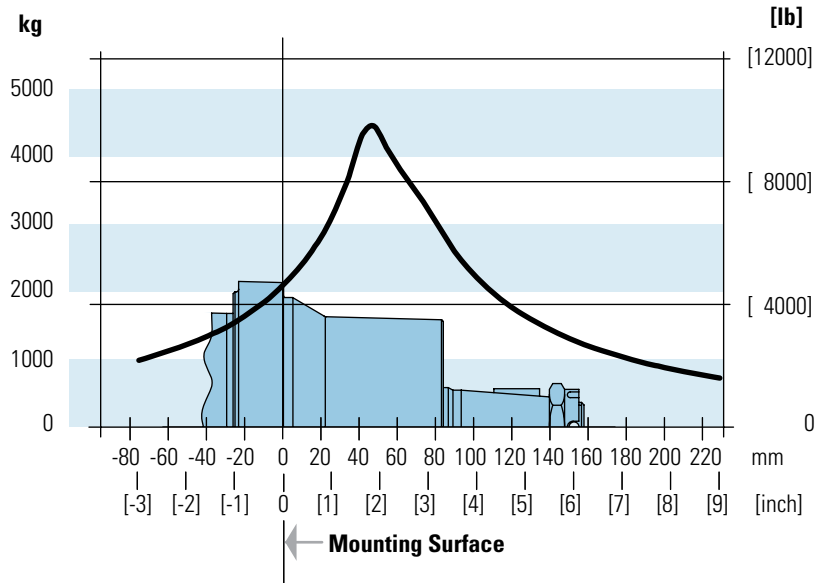
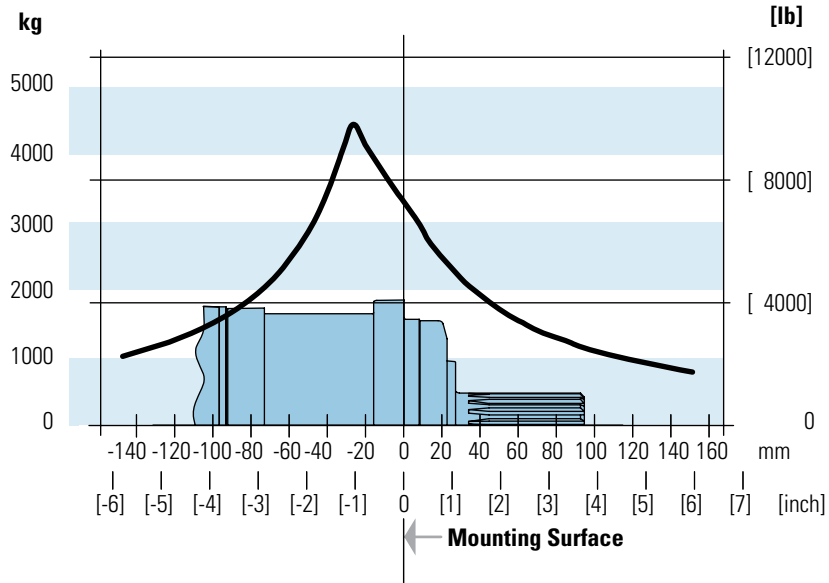
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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 —
159-, 160-, 161-, 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)	—	-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

180-0088

168-0018

OverSize

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0047	-0048	-0049	-0050	-0051	-0052
	46 mm 28 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0053	-0054	-0055	-0056	-0057	-0058
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0059	-0060	-0061	-0062	-0063	-0064

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER							
			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

177-0224

168-0024

Note:

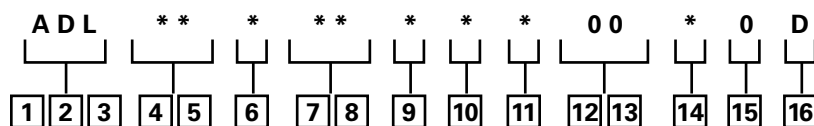
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

- 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 – Painted Low Gloss
Black, Individual Box

B – No Paint, Bulk Box

Option

C – Painted Low Gloss
Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

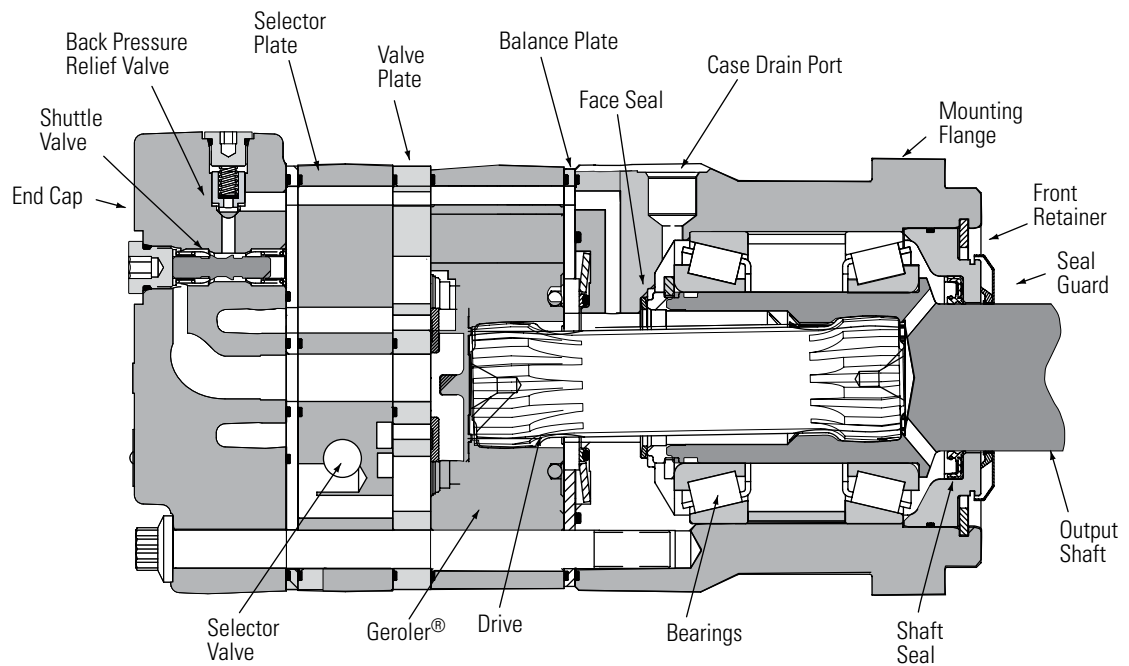
0 – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code

VIS 40 Series Two-speed

Specifications



VIS 40 Series motors are available with an integral two-speed feature that allows the operator to shift the motor between low speed high torque (LSHT) mode and high speed low torque (HSLT) mode.

In the LSHT mode, output torque and rotation speed values are equal to those of the conventional VIS 40 motor. In the HSLT mode motor displacement is reduced by one third, resulting in a fifty percent increase in rotation speed and a torque output reduction of one third.

The VIS 40 two-speed motor is bidirectional. It will function with equal shaft output in either rotation

direction (CW or CCW) in both LSHT and HSLT modes. Shift on the fly technology allows full-power operation throughout the full duration of the shift.

Changing between modes is accomplished by changing the displacement in a ratio of 1 to 1.5. An external two-position three-way control valve is required for shifting pressure to the pilot port between low pressure (LSHT mode) and pilot signal pressure (HSLT mode).

An integral selector valve shifts the motor from LSHT mode to HSLT mode. Initially, low pressure is supplied to the pilot port. The selector valve is biased to LSHT mode by a return spring. When pilot signal pressure is supplied to the

pilot port and 3,5 Δbar [50 PSI] is reached, the selector valve overcomes return spring force and the shifts the spool to select HSLT mode.

Oil on the opposite side of the spool is drained to tank via the drain port. The pressure difference between the pilot port and drain port must be maintained to keep the motor in the high speed mode. When pilot pressure is removed from the pilot port, the pressure in the pilot end of the spool valve is relieved and drained back through the control valve and the return spring forces the spool valve to LSHT position.

Pilot pressure may come from any source that will provide uninterrupted pressure during the high-speed mode operation. Allowable pilot pressure must be at least 3,5 Δbar [50 PSI] and may be as high as full operating pressure of the motor.

All VIS 40 Series two-speed motors are equipped with a return line shuttle for closed circuit applications as standard equipment. All options available on the conventional VIS 40 are also available on VIS 40 two-speed motors.

Performance Data

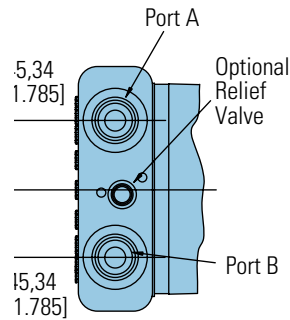
In the LSHT mode, torque and speed values are equal to those of the conventional VIS 40 motor. In the HSLT mode, rotation speed is increased by fifty percent and torque output is reduced by one third. The VIS 40 two-speed motor will function with equal shaft output in either rotation direction (CW or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

VIS 40 Series

Two-speed

Dimensions

Standard and Wheel Mount
– SAE



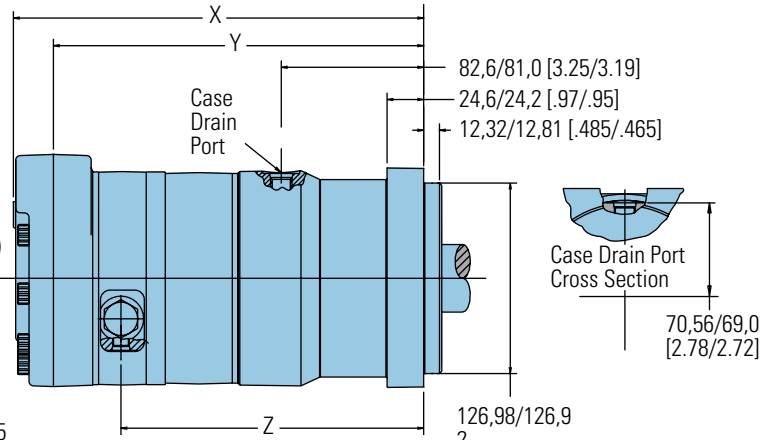
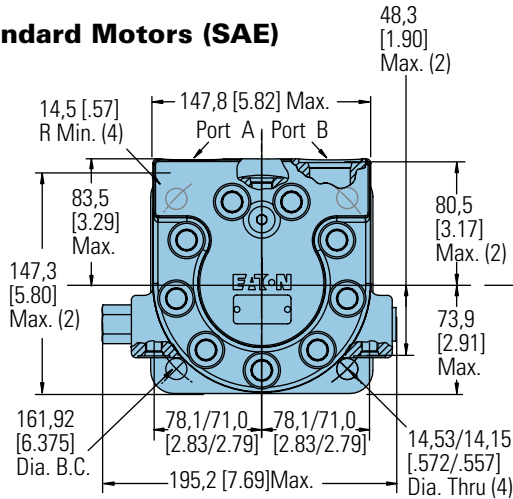
Ports

- 1–1/16-12 UN-2B SAE O-ring Ports (2)
- 9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
- 7/16-20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Shaft End

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

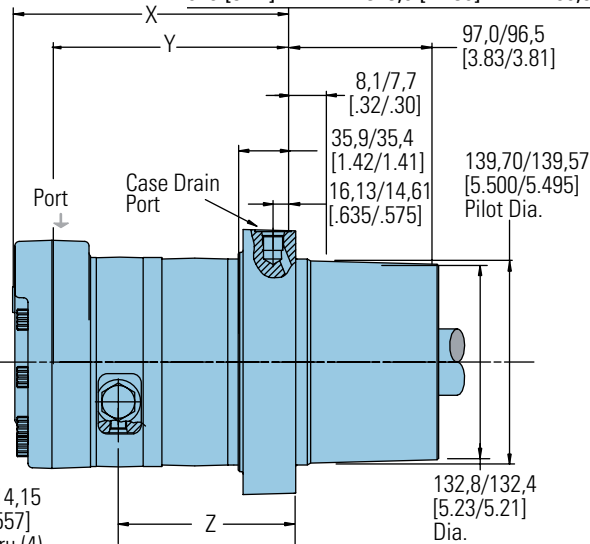
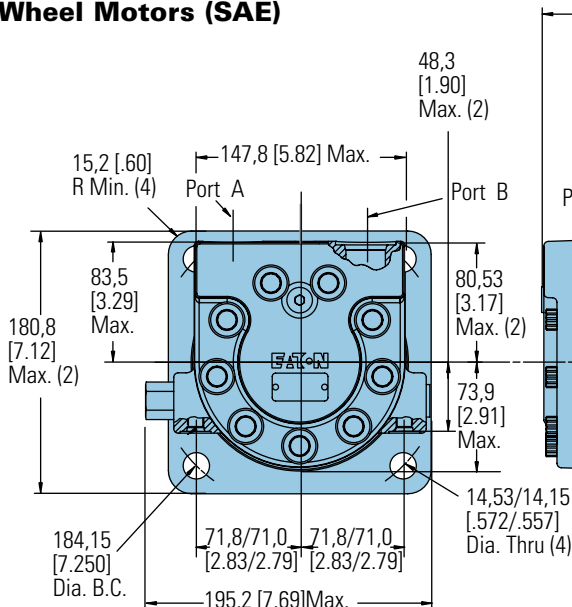
Standard Motors (SAE)



STANDARD MOTORS (SAE)

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

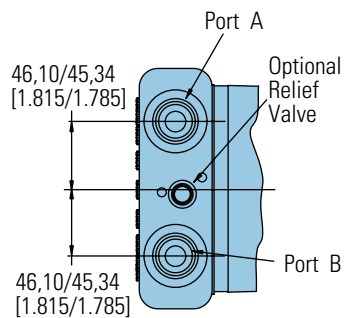
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
325 [19.8]	174,5 [6.87]	146,6 [5.77]	101,3 [3.99]
400 [24.4]	181,1 [7.13]	153,2 [6.03]	108,2 [4.26]
505 [30.7]	190,2 [7.49]	162,1 [6.38]	116,8 [4.60]
570 [34.9]	196,3 [7.73]	168,1 [6.62]	123,2 [4.85]
630 [38.5]	201,4 [7.93]	173,5 [6.83]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

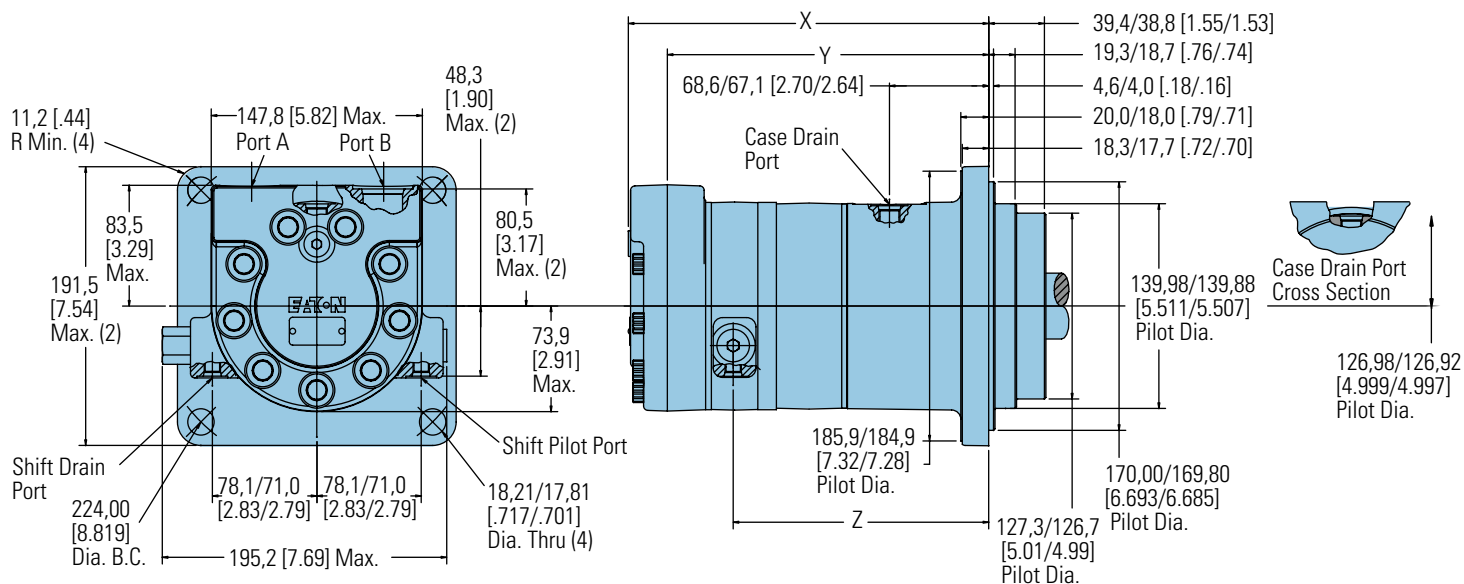
9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

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

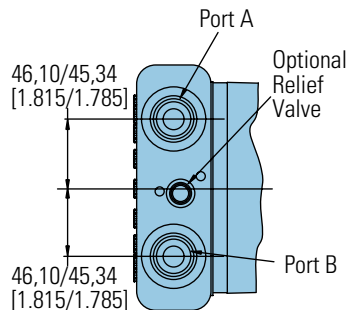
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	248,2 [9.77]	220,0 [8.66]	174,8 [6.88]
570 [34.9]	254,3 [10.01]	226,1 [8.90]	181,1 [7.13]
630 [38.5]	259,3 [10.21]	231,4 [9.11]	186,4 [7.34]
685 [41.7]	263,9 [10.39]	236,0 [9.29]	190,8 [7.51]
785 [48.0]	273,1 [10.75]	245,1 [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)

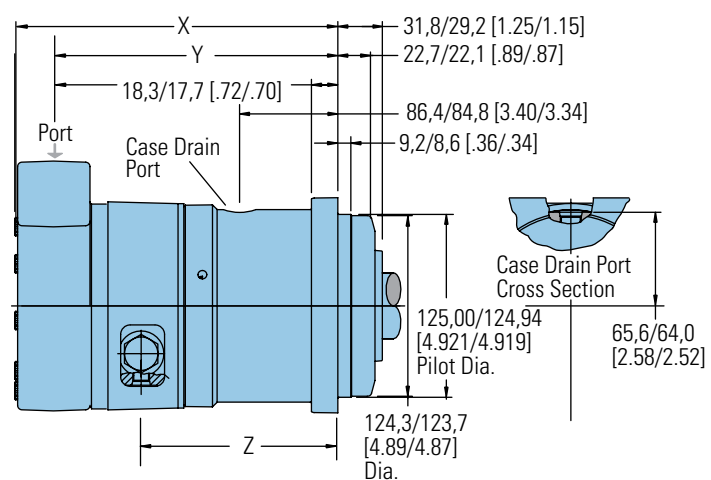
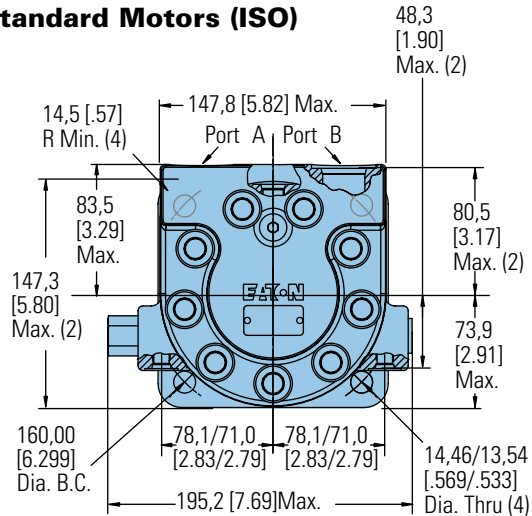
7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

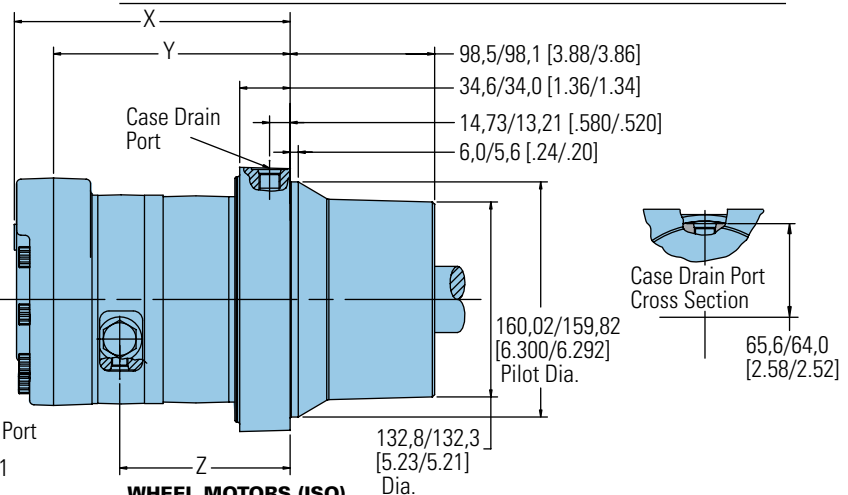
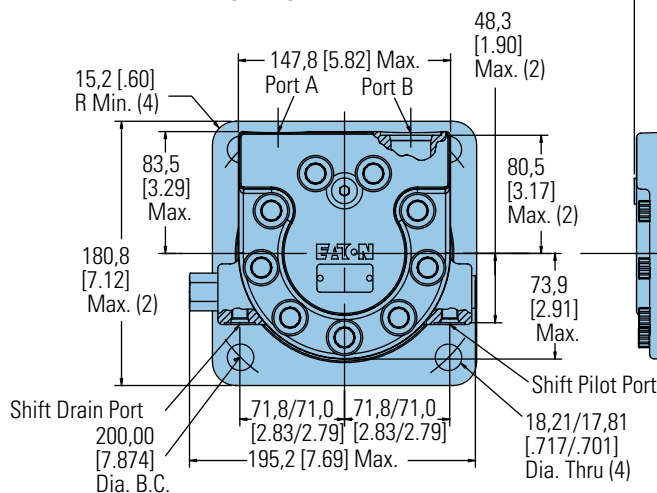
Standard Motors (ISO)



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)

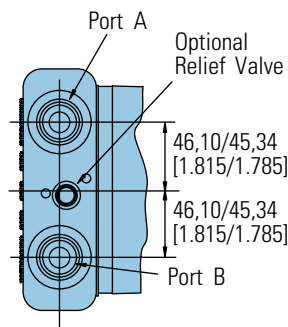
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
325 [19.8]	173,2 [6.82]	145,3 [5.72]	100,1 [3.94]
400 [24.4]	179,6 [7.07]	151,6 [5.97]	106,7 [4.20]
505 [30.7]	189,0 [7.44]	160,8 [6.33]	115,6 [4.55]
570 [34.9]	195,1 [7.68]	166,9 [6.57]	121,9 [4.80]
630 [38.5]	200,2 [7.88]	172,2 [6.78]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



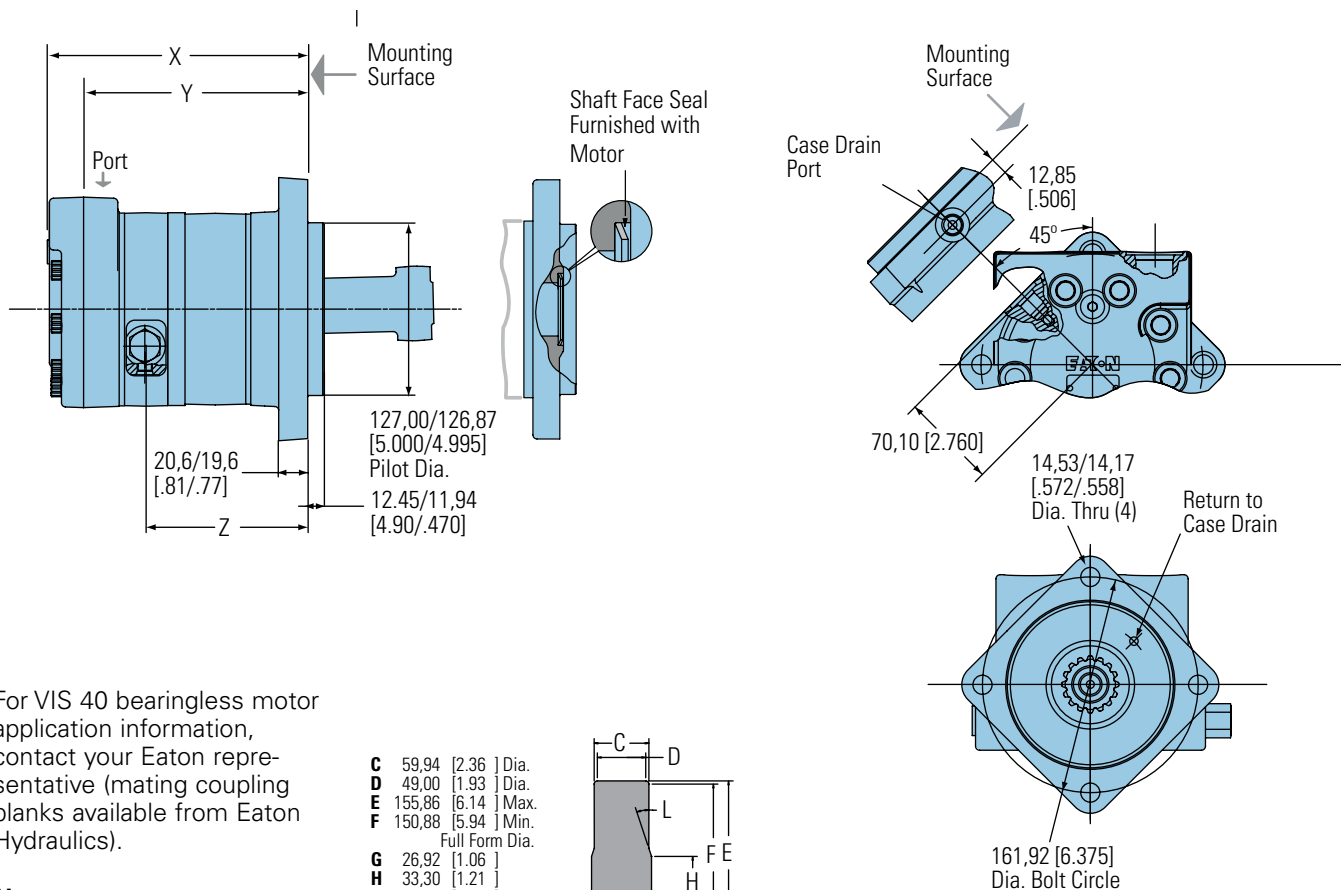
Ports

- 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

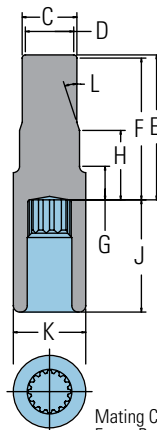


For VIS 40 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

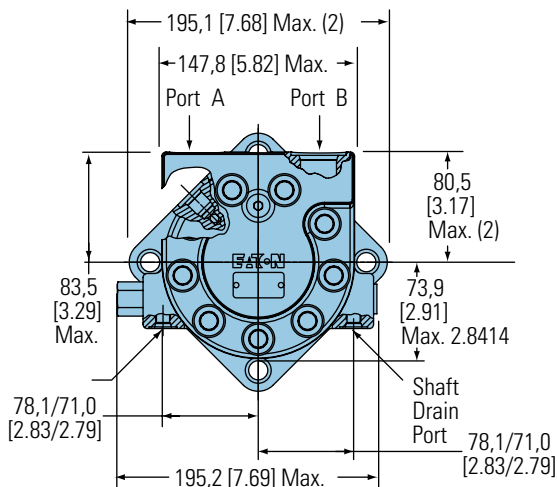
Note:

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

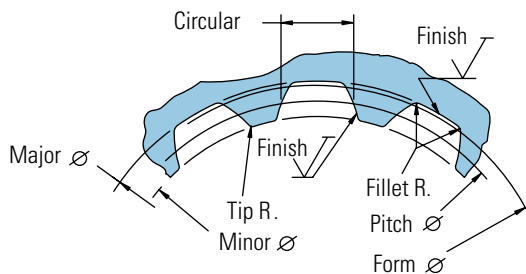
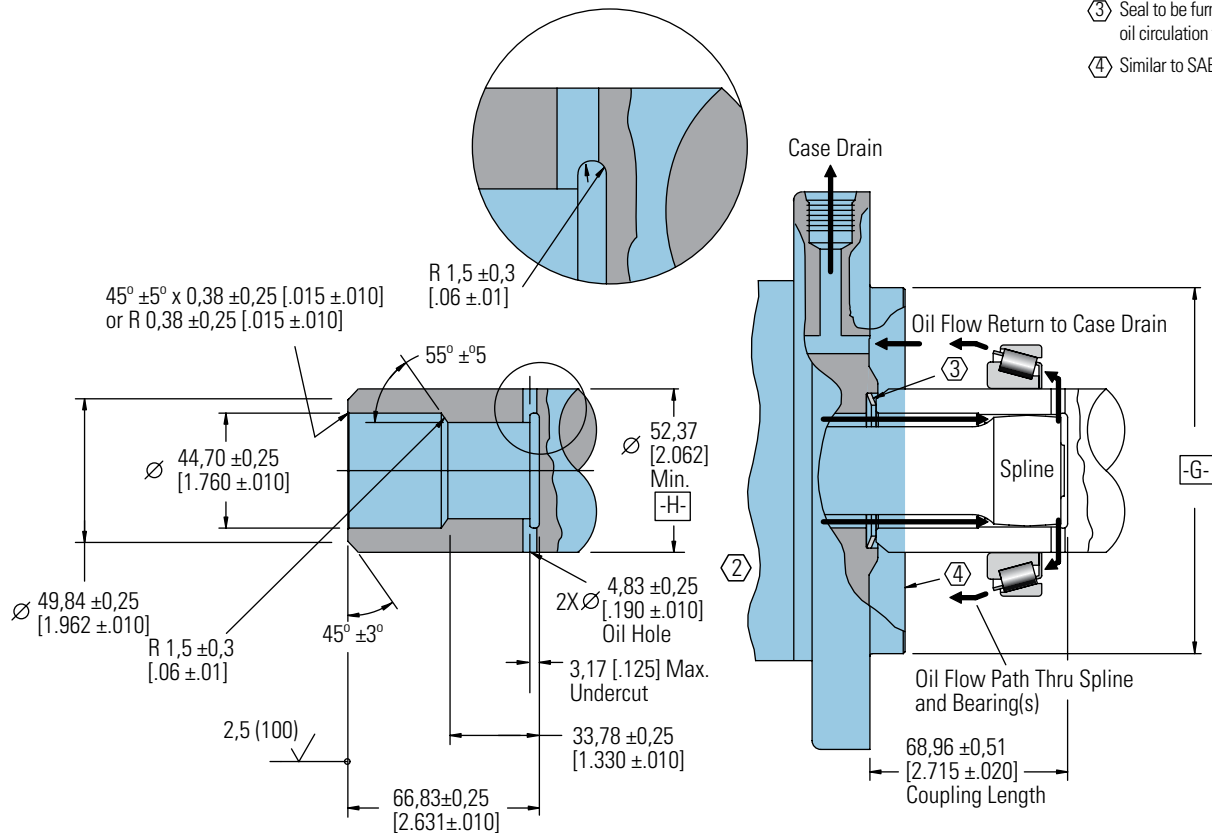
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
325 [19.8]	177,0 [6.97]	149,1 [5.87]	103,9 [4.09]
400 [24.4]	183,6 [7.23]	155,7 [6.13]	110,7 [4.36]
505 [30.7]	193,0 [7.60]	164,8 [6.49]	119,6 [4.71]
570 [34.9]	199,1 [7.84]	170,9 [6.73]	126,0 [4.96]
630 [38.5]	204,0 [8.03]	176,0 [6.93]	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] $\text{Ⓢ} 0,20$ [.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 [+ .0000 -.0010]
Total Index Variation.....	0,040 [.0016]
Lead Variation.....	0,013 [.0005]
Circular Space Width:	
Maximum Actual.....	4.105 [1.616]
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)	—	—	-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)	—	—	-0014	-0015	-0016	-0017	-0018	-0019
Bearingless			176-0037	—	-0019	-0020	-0021	-0022	-0023	-0024

178-0109

176-0022

Oversize

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r[in ³ /r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0039	-0040	-0041	-0042	-0043	-0044
	46 mm 28 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0045	-0046	-0047	-0048	-0049	-0050
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0051	-0052	-0053	-0054	-0055	-0056

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r[in ³ /r] / PRODUCT NUMBER							
			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)	—	—	-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			—	—	-0025	-0026	-0027	-0028	-0029	-0030

178-0111

176-0028

Note:

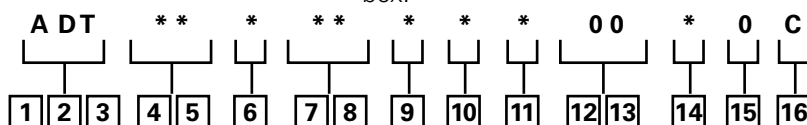
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

- 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 – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

C – Painted Low Gloss Black, Bulk Box Option

15 _ Eaton Assigned Code when Applicable

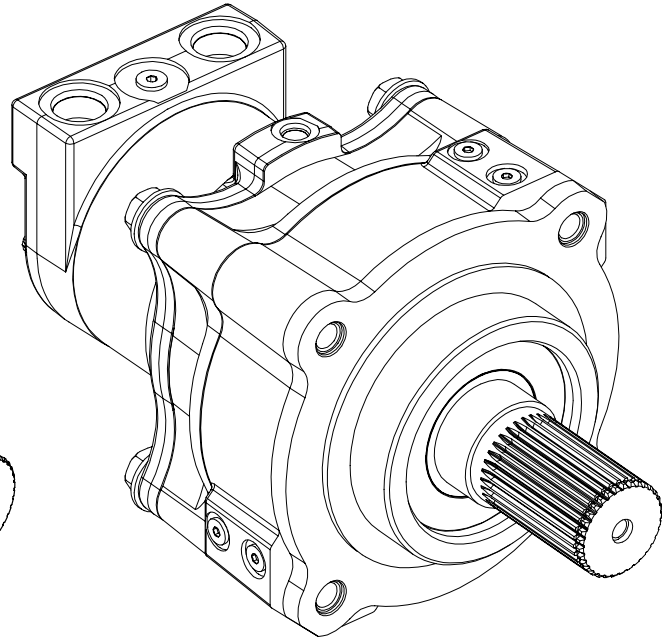
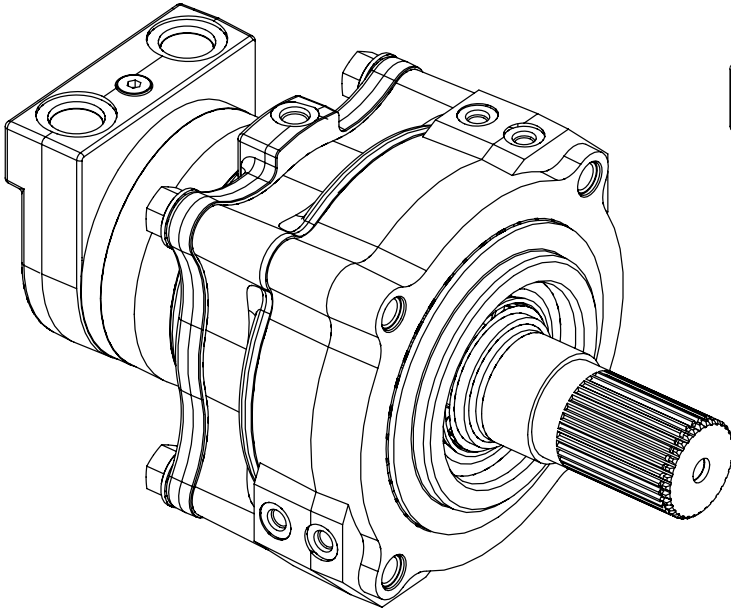
0 – Assigned Code

16 _ Eaton Assigned Design Code

C – Assigned Design Code

VIS 40 Series

Brake Description



Features

- Spring-Applied/
Hydraulically Released
Multi-Disc Brake
- Spring automatically
applies brake when hydro-
static pressure is absent
- Environmentally Protected
- Integral Design –
Motor and brake as a sin-
gle package to minimize
length and cost.
- Infinite Braking –
Eliminates machine creep
associated with park pawl
mechanisms
- Boost Feature –
Increases holding capacity
to match full motor output
torque
- No adjustments needed
- Two Sets of Release
and Boost Ports –
Allows for multiple plumb-
ing options and facilitates
bleeding
- 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

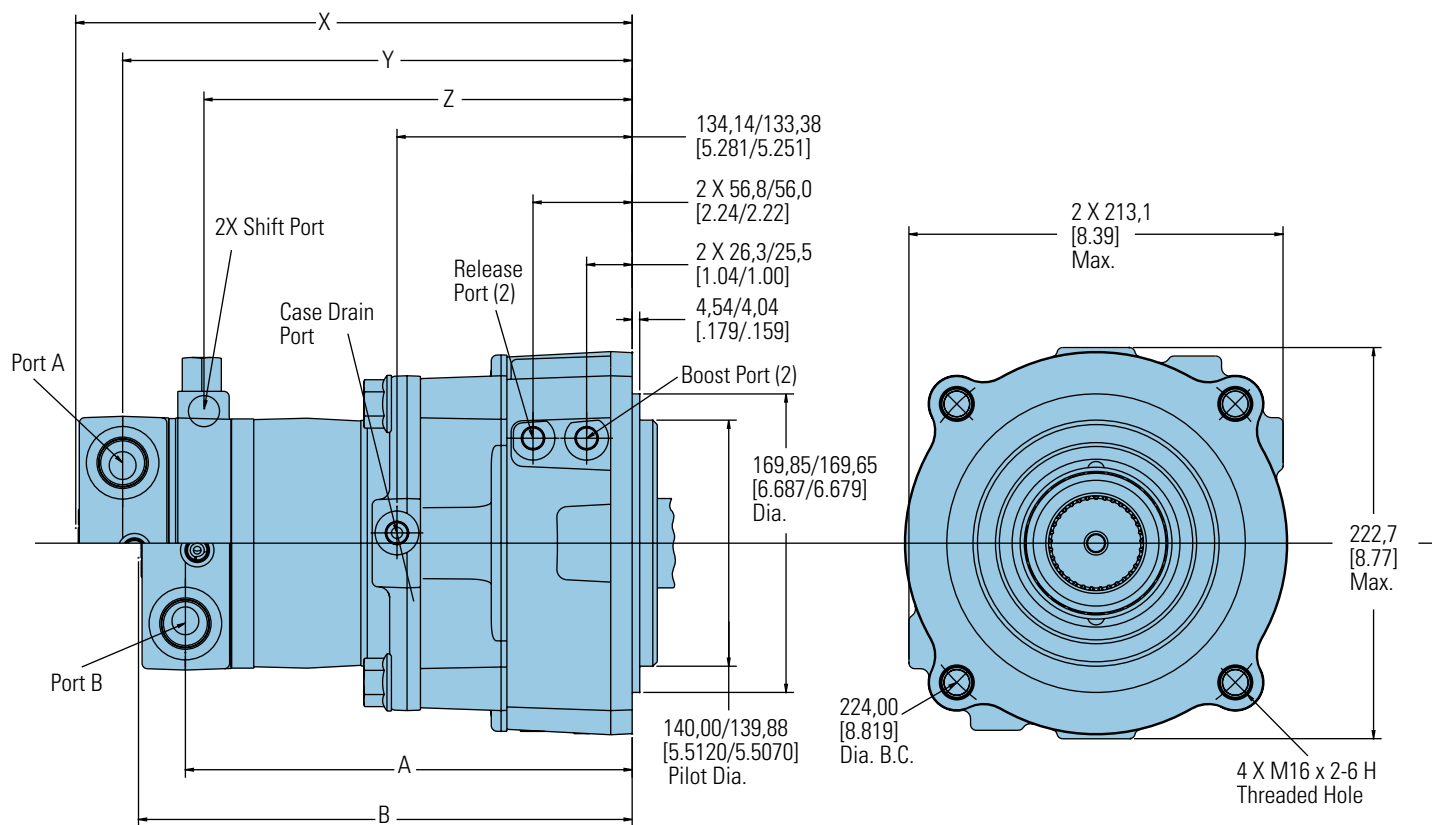
- Static Holding Torque – 780 N-m [6900 lb-in] minimum
(spring only - no boost)
2621 N-m [23200 lb-in] minimum
(@ 10,3 bar [150 PSI] boost)
3570 N-m [31600 lb-in] minimum
(@ 15,2 bar [220 PSI] boost)
- Release Pressure – 10,3 bar [150 PSI] minimum
for full release
68,9 bar [1000 PSI] maximum
allowed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

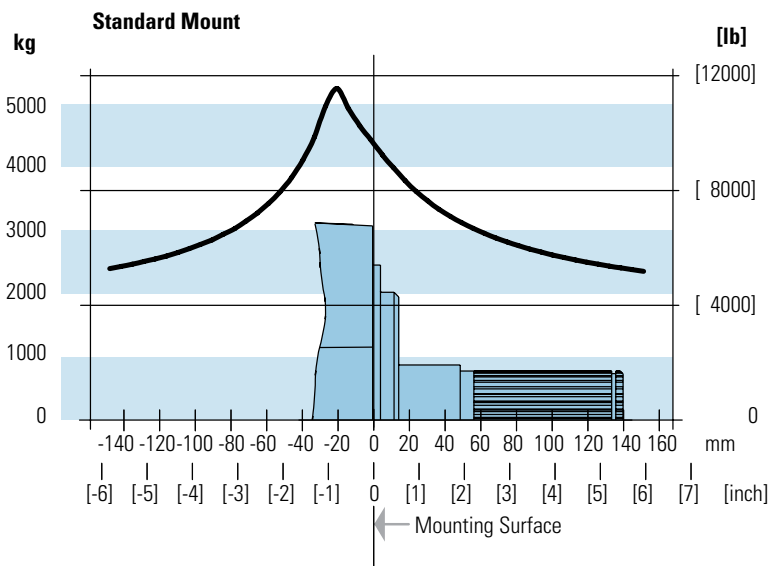
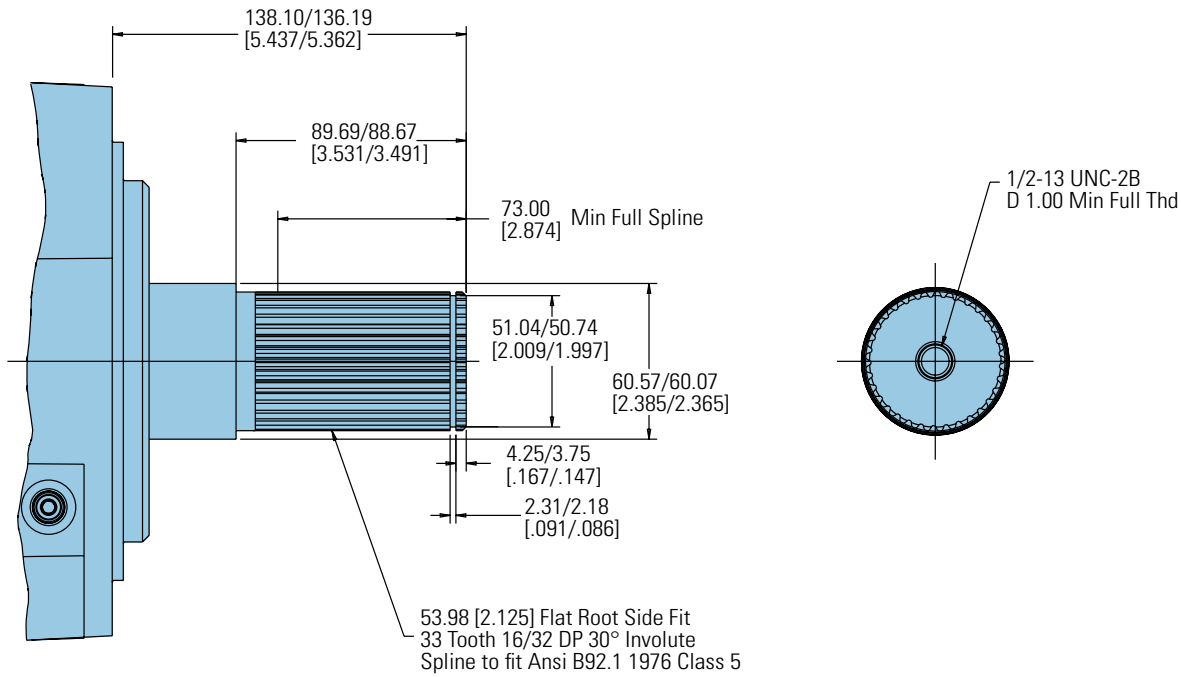
Displacement cm ³ /r [in ³ /r]	A mm [inch]	B mm [inch]
325 [19.8]	220,9 [8.78]	250,2 [9.85]
400 [24.4]	229,7 [9.05]	256,9 [10.11]
505 [30.7]	238,7 [9.40]	265,9 [10.47]
570 [34.9]	244,9 [9.64]	272,1 [10.71]
630 [38.5]	250,1 [9.85]	277,3 [10.92]
685 [41.7]	254,7 [10.04]	281,9 [11.10]
785 [48.0]	264,0 [10.40]	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]

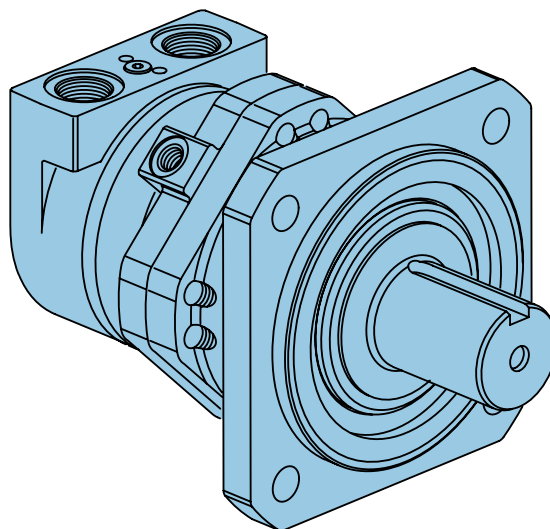
VIS 40 Series

Brake Shaft Dimensions/ Sideload Curves



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



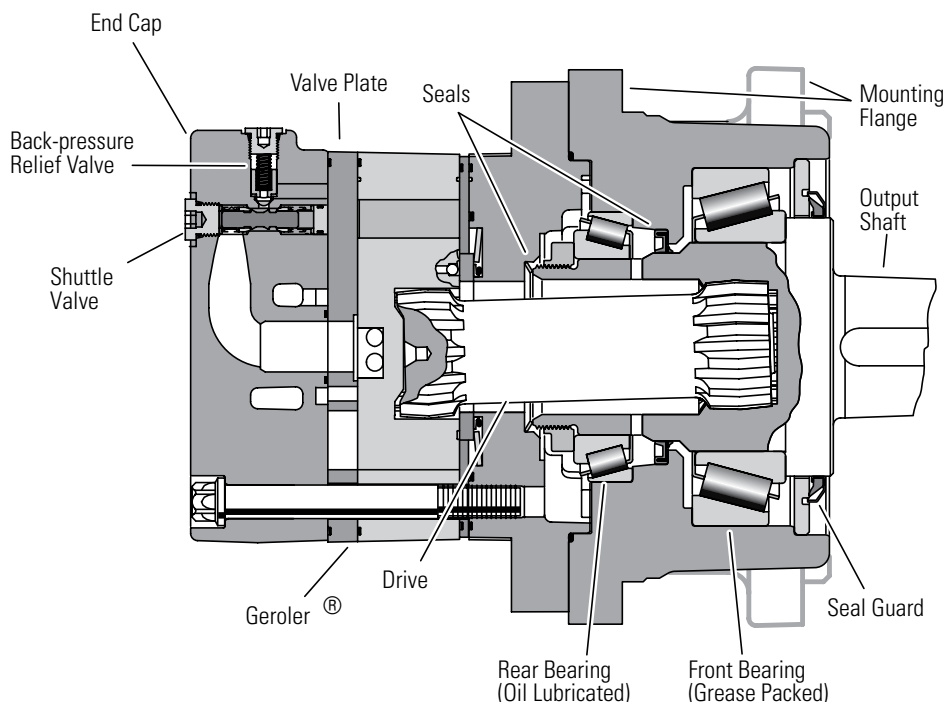
Injector



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	53,8 [118.7]	55,2 [121.6]	56,7 [125.0]	58,7 [129.4]	61,2 [134.9]
	Bearingless	28,3 [62.3]	29,6 [65.2]	31,1 [68.6]	33,1 [73.0]	35,6 [78.5]
Weight kg [lb]	Two-speed Standard or Wheel Mount	58,5 [128.9]	59,8 [131.8]	61,3 [135.2]	63,3 [139.6]	65,8 [145.1]
	Two-speed Bearingless	32,9 [72.5]	34,2 [75.4]	35,7 [78.8]	37,7 [83.2]	40,2 [88.7]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

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

Return Pressure (Back-Pressure):

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

Note:

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

Δ Pressure:

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

Case Pressure:

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

Note:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended 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:

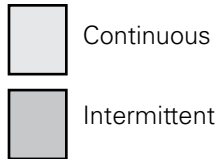
Required for closed loop circuit.

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.



805 cm³/r [48.6 in³/r]

□ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
	15	35	70	105	140	170	205	240	275	310	345
4	1600	3350	7180	10670	13480	16640	19680	21740	25860	28500	31720
15	181	379	811	1206	1523	1880	2224	2457	2922	3221	3584
8	1620	3380	7240	10730	13740	16920	19950	22160	25920	28970	32200
30	183	382	818	1212	1553	1912	2254	2504	2929	3274	3639
12	1640	3310	7180	10770	14170	17290	20730	23270	26340	29420	32470
45	185	374	811	1217	1601	1954	2342	2630	2976	3324	3669
16	1660	3220	7010	10680	14290	17710	21240	24170	26830	30340	32940
61	188	364	792	1207	1615	2001	2400	2731	3032	3428	3722
20	1600	3110	6840	10380	14000	17290	20990	24490	27270	31390	
76	181	351	773	1173	1582	1954	2372	2767	3082	3547	
24	1560	3030	6750	10250	13830	17340	21110	24450	27620	31460	
91	176	342	763	1158	1563	1959	2385	2763	3121	3555	
28		2720	6560	10190	13780	17390	21090	24360	27420	31238	
106		307	741	1151	1557	1965	2383	2753	3098	3529	
32		2620	6330	10000	13480	17070	20730	24180	27270	31064	
121		296	715	1130	1523	1929	2342	2732	3082	3509	
36		147	140	139	137	137	135	135	134	127	
136		2620	5910	9480	13140	16640	20200	23570	26910	30646	
40		296	668	1071	1485	1880	2283	2663	3041	3462	
151		165	158	156	154	154	152	152	150	143	
45			5390	9220	12790	16120	19700	23080	26343	30019	
170			609	1042	1445	1822	2226	2608	2976	3391	
50			175	173	171	171	169	169	167	159	
189			5150	8970	12450	15780	19420	22650	25848	29462	
			582	1014	1407	1783	2194	2559	2920	3328	
			198	196	193	193	191	191	189	179	
			4770	8610	12140	15380	19180	22440			
			539	973	1372	1738	2167	2536			
			220	217	215	215	212	212			

630 cm³/r [38.6 in³/r]

□ Pressure Bar [PSI]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
	15	35	70	105	140	170	205	240	275	310	345
4	1270	2710	5530	8250	10300	12900	15540	17720	20820	23640	25740
15	144	306	625	932	1164	1458	1756	2002	2353	2671	2909
8	1290	2720	5580	8290	10490	13110	15760	18070	21000	24100	26070
30	146	307	631	937	1185	1481	1781	2042	2373	2723	2946
12	1310	2670	5440	8320	10820	13400	16370	18970	21230	24540	26840
45	148	302	615	940	1223	1514	1850	2144	2399	2773	3033
16	1320	2600	5400	8250	10910	13730	16780	19710	21970	24870	27530
61	149	294	610	932	1233	1551	1896	2227	2483	2810	3111
20	1290	2500	5270	8020	10690	13400	16730	20020	22320	25420	
76	146	283	596	906	1208	1514	1890	2262	2522	2872	
24	1240	2440	5200	7920	10560	13430	16700	19970	22610	25730	
91	140	276	588	895	1193	1518	1887	2257	2555	2907	
28		2190	5050	7870	10520	13480	16660	19860	22450	26080	
106		247	571	889	1189	1523	1883	2244	2537	2963	
32		160	160	157	157	155	150	146	143	136	
121		2110	4870	7720	10300	13230	16370	19720	22320	25986	
36		238	550	872	1164	1495	1850	2228	2522	2936	
136		182	182	180	180	177	172	166	164	156	
40		2090	4550	7330	10030	12890	15960	19220	22040	25655	
151		236	514	828	1133	1457	1803	2172	2491	2898	
45		205	205	202	202	199	193	187	184	175	
170			4150	7120	9760	12490	15560	18820	21600	25185	
50			469	805	1103	1411	1758	2127	2441	2845	
189			228	224	224	221	214	208	204	194	
			3970	6930	9500	12230	15340	18470	21207	24742	
			449	783	1074	1382	1733	2087	2396	2795	
			256	252	252	249	241	234	229	218	
			3680	6660	9270	11920	15150	18300			
			416	753	1048	1347	1712	2068			
			284	280	280	276	268	259			

(9270)
1048
280

Torque [lb-in]
Nm
Speed RPM

VIS 45 Series

Performance Data

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

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

Continuous

Intermittent

		1245 cm³/r [76.0 in³/r]									
		□ Pressure Bar [PSI]									
Flow LPM [GPM]		250	500	1000	1500	2000	2500	3000	3500	4000	4250
		15	35	70	105	140	170	205	240	275	295
4	2000	2160	4800	9960	15150	20200	26450	30670	39180	42800	43220
	226	244	542	1125	1712	2283	2989	3466	4427	4836	4884
15	15	12	11	11	11	11	10	10	9	9	9
8	2250	4830	10370	15760	22010	27180	33330	39840	43660	44400	
	254	546	1172	1781	2487	3071	3766	4502	4934	5017	
30	24	23	22	22	21	20	20	19	19	19	
12	2400	5390	10910	17290	22780	28470	34170	40140	44160	47220	
	271	609	1233	1954	2574	3217	3861	4536	4990	5336	
45	36	33	33	32	32	32	32	31	31	30	
16	2410	5150	10930	16970	22880	28600	33900	39500	44510	47592	
	272	582	1235	1918	2585	3232	3831	4464	5030	5376	
61	48	46	45	44	43	43	43	42	41	40	
20	2350	4890	10650	16470	21960	27450	33130	37710	43890	46933	
	266	553	1203	1861	2481	3102	3744	4261	4960	5302	
76	60	59	57	56	56	56	55	55	54	52	
24	2190	4760	10460	15920	21230	26530	32320	37680	42670	45673	
	247	538	1182	1799	2399	2998	3652	4258	4822	5156	
91	72	70	68	67	67	67	66	66	65	63	
28	1990	4260	10070	15860	21200	26420	32480	37500	42464	45418	
	225	481	1138	1792	2396	2985	3670	4238	4797	5131	
106	85	82	80	78	78	78	77	77	76	74	
32		4100	9770	15410	20770	26300	31920	37240	42167	45103	
		463	1104	1741	2347	2972	3607	4208	4764	5095	
121		94	91	90	89	89	88	88	87	84	
36		4090	9060	14650	20060	25670	31110	36295	41087	43955	
		462	1024	1655	2267	2901	3515	4100	4642	4966	
136		106	103	101	101	100	99	99	98	95	
40			8300	14150	19570	24900	30320	35373	40034	42836	
			938	1599	2211	2814	3426	3996	4523	4839	
151			114	113	112	111	110	110	108	105	
45			8100	13970	19310	24610	29972	34967	39570	42343	
			915	1579	2182	2781	3686	3950	4470	4783	
170			129	127	126	125	124	124	122	118	
50			7900	13790	19050	24310					
			893	1558	2153	2747					
189			143	141	140	139					

		990 cm³/r [60.5 in³/r]									
		□ Pressure Bar [PSI]									
Flow LPM [GPM]		250	500	1000	1500	2000	2500	3000	3500	4000	4500
		15	35	70	105	140	170	205	240	275	310
4	2000	226	463	8630	12620	16050	20080	24150	28320	32590	35150
	226	463	975	1426	1814	2269	2729	3200	3683	3972	4186
15	15	15	15	15	14	14	14	13	12	11	10
8	2020	4130	8700	12740	16350	20420	24480	28400	32850	35670	37250
	228	467	983	1440	1848	2307	2766	3209	3712	4031	4209
30	30	30	29	29	29	28	28	27	25	25	24
12	2050	4050	8630	12780	16870	20860	25440	28550	32920	35860	37630
	232	458	975	1444	1906	2357	2875	3226	3720	4052	4252
45	45	45	44	44	43	43	41	41	41	40	39
16	2070	3940	8420	12680	17010	21380	26070	29660	33020	36620	38439
	234	445	951	1433	1922	2416	2946	3352	3731	4138	4342
61	61	60	58	58	58	57	55	55	54	53	52
20	2000	3800	8220	12330	16660	20860	25760	30060	33550	37880	39766
	226	429	929	1393	1883	2357	2911	3397	3791	4280	4492
76	76	75	73	73	72	71	69	69	68	66	64
24	1950	3700	8120	12180	16460	20890	25820	30090	33990	38366	40269
	220	418	918	1376	1860	2361	2918	3400	3841	4334	4549
91	91	90	88	88	86	85	83	83	82	80	78
28		3320	7880	12100	16400	20990	25890	29900	33750	39106	39995
		375	890	1367	1853	2372	2926	3379	3814	4280	4518
106		105	102	102	101	99	97	97	95	92	90
32		3210	7610	11870	16050	20600	25440	29680	33550	37890	39766
		363	860	1341	1814	2328	2875	3354	3791	4280	4492
121		120	117	117	115	114	110	110	109	106	103
36		3200	7100	11260	15640	20080	24800	28930	32716	36936	38759
		362	802	1272	1767	2269	2802	3269	3696	4173	4379
136		135	131	131	130	128	124	124	123	119	116
40			6480	10950	15220	19460	24170	28330	32023	36155	37935
			732	1237	1720	2199	2731	3201	3618	4084	4286
151			146	146	144	142	138	138	137	133	130
45			6190	10650	14810	19040	23830	27952	31599	35679	37432
			699	1203	1674	2152	2693	3158	3570	4031	4229
170			164	164	162	160	155	155	154	149	145
50			5740	10230	14450	18570	23540				
			649	1156	1633	2098	2660				
189			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

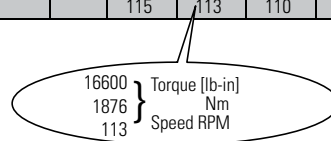
Motors run with high efficiency in all areas designated with a number for torque and speed. For best motor life select a motor to run with a torque and speed range shown in the light shaded area.

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

	Continuous
	Intermittent

□ Pressure Bar [PSI]

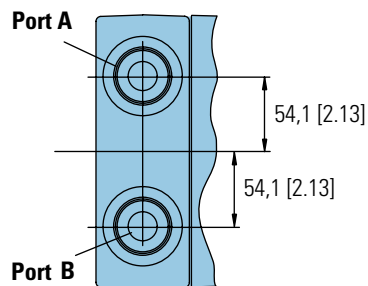
	250	500	1000	1500	2000	2500	3000	3500	4000
	15	35	70	105	140	170	205	240	275
4	2700	5670	11910	18520	24910	30860	37610	42320	48366
	305	641	1346	2093	2815	3487	4250	4782	5464
	9	9	9	9	9	8	8	8	8
8	2810	5910	12400	19260	25590	31740	39310	44150	50457
	318	668	1401	2176	2892	3587	4442	4989	5700
	19	19	18	18	18	17	16	15	15
12	3010	6300	13040	20490	26600	33070	39880	46670	53337
	340	712	1474	2315	3006	3737	4506	5274	6025
	29	28	28	27	26	25	23	22	22
16	3020	6300	13360	20740	27270	33950	40450	48630	55577
	341	712	1510	2344	3082	3836	4571	5495	6279
	38	38	37	36	35	34	31	29	29
20	2930	6150	13200	20490	27110	34830	39820	47662	54470
	331	695	1492	2315	3063	3936	4500	5384	6154
	48	47	46	45	44	42	39	37	37
24	2780	5910	12880	19750	26930	34390	39310	47300	54057
	314	668	1455	2232	3043	3886	4442	5343	6107
	58	56	55	54	53	50	47	44	44
28		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
		579	1364	2176	2967	3787	4314	5195	5937
		75	74	72	70	67	62	58	58
36		5100	11270	18270	25590	33070	37652	45366	
		576	1274	2065	2892	3737	4254	5125	
		85	83	81	79	76	70	66	
40			10280	17760	24910	32630	37124	44750	
			1162	2007	2815	3687	4194	5055	
			92	90	88	84	78	73	
45			9820	17280	24240	31793	36119	43577	
			1110	1953	2739	3592	4080	4923	
			104	101	99	95	87	82	
50			9100	16600	23650				
			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)

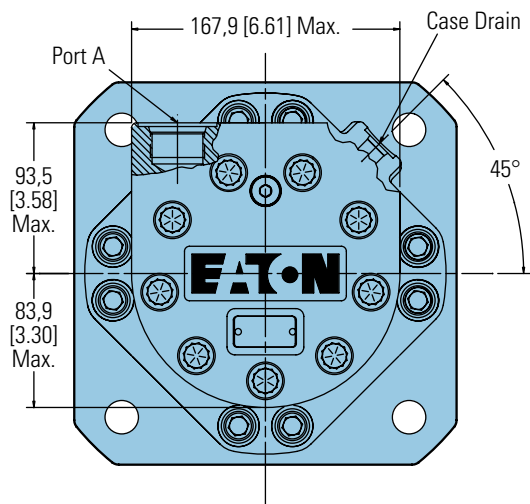
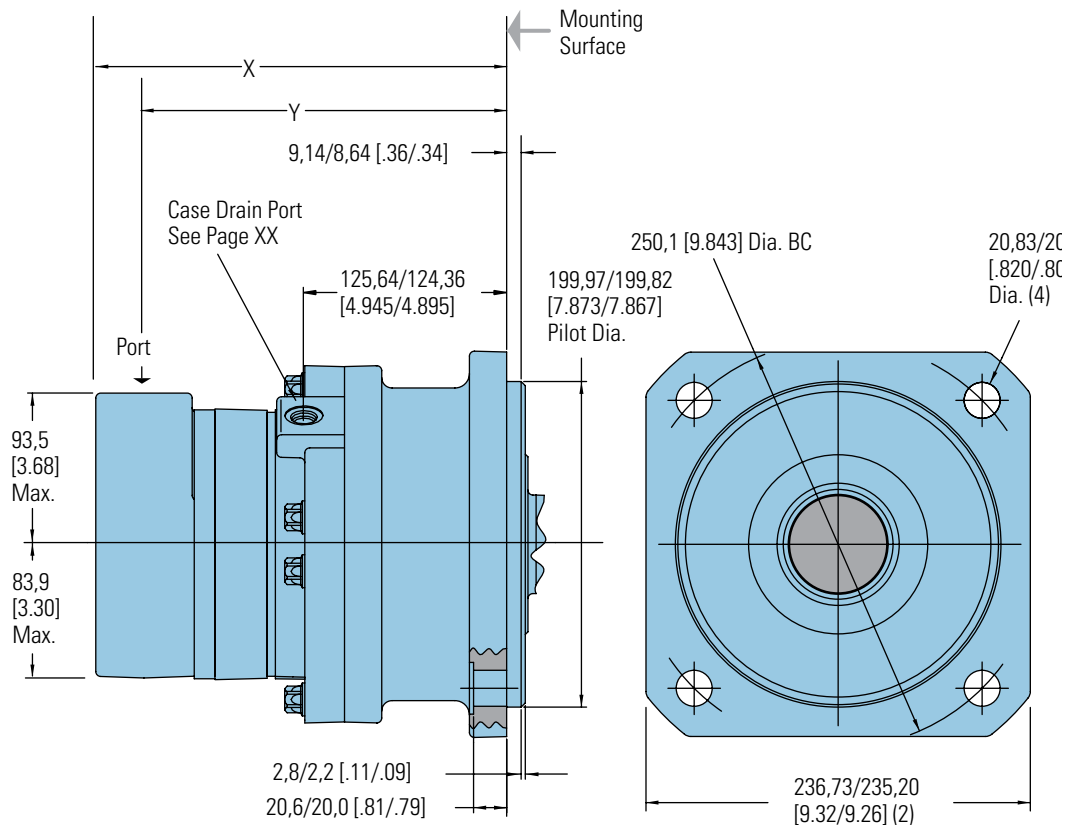
Or G 1 (BSP) O-ring Ports (2)

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW



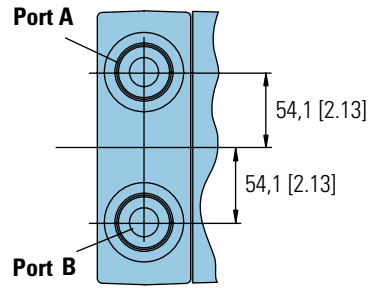
STANDARD MOTORS

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



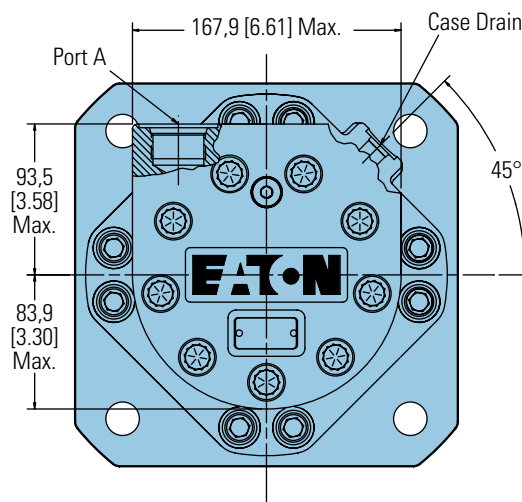
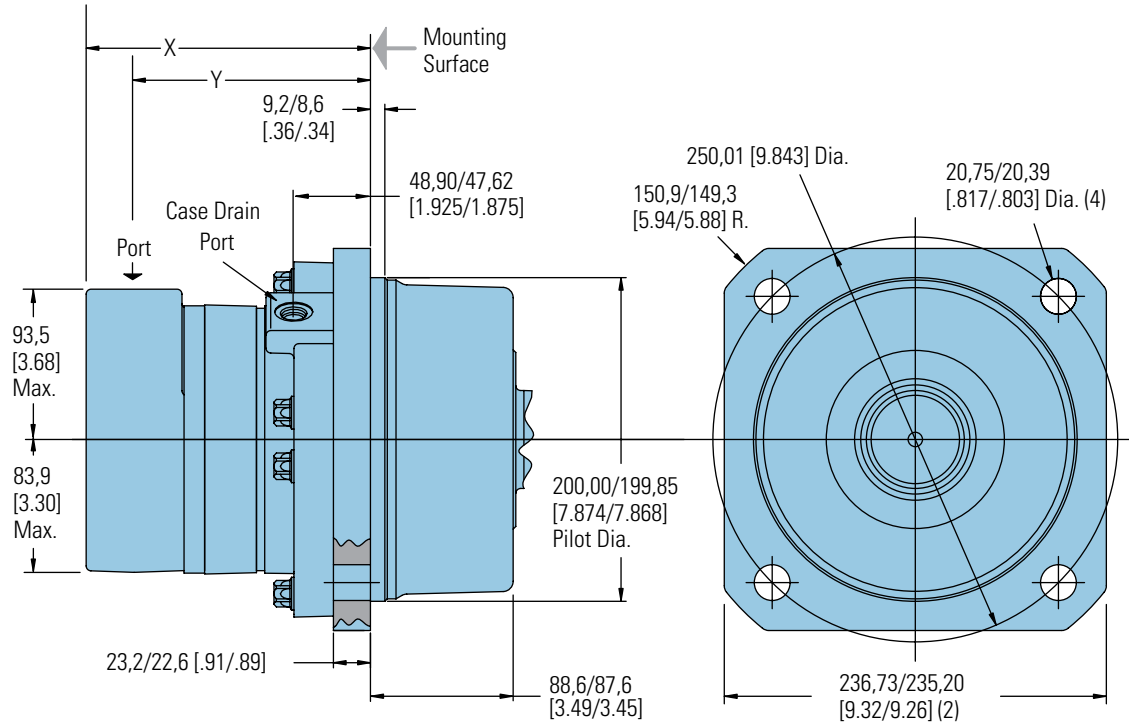
Ports

- 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



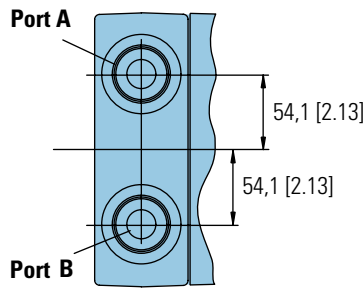
WHEEL MOTORS

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

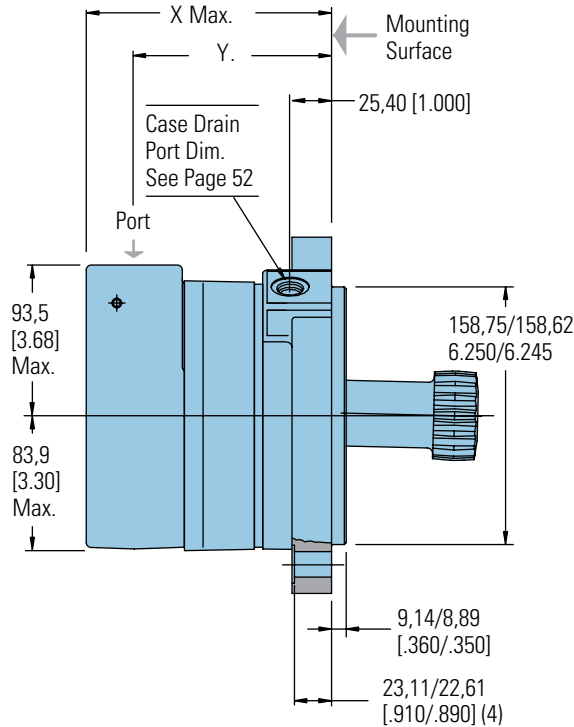
Port A Pressurized — CW

Port B Pressurized — CCW

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

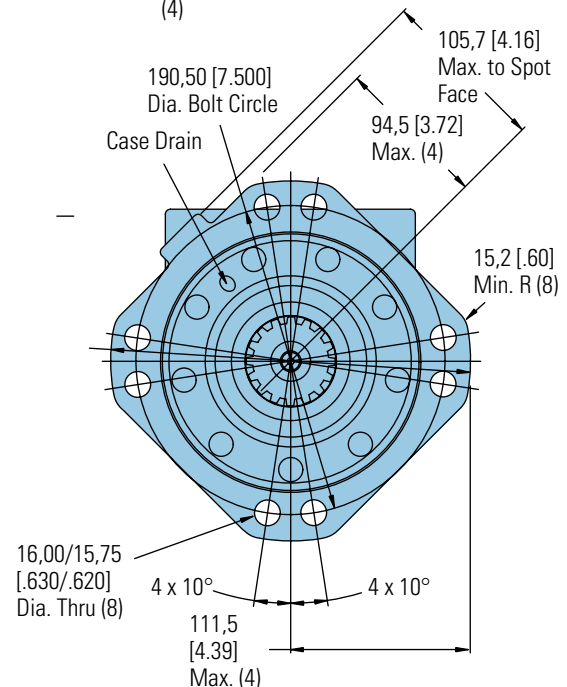
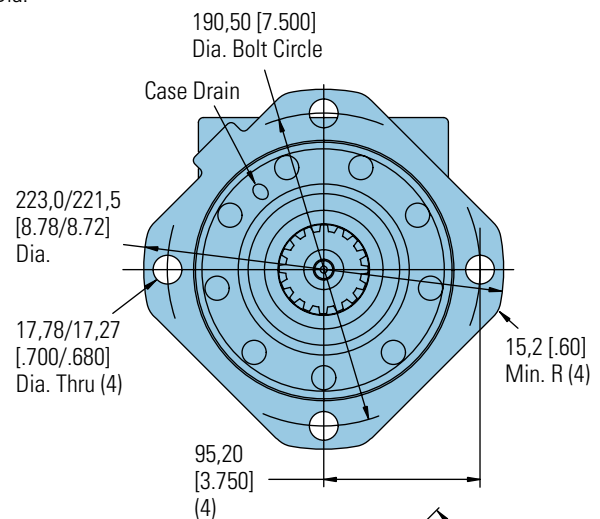
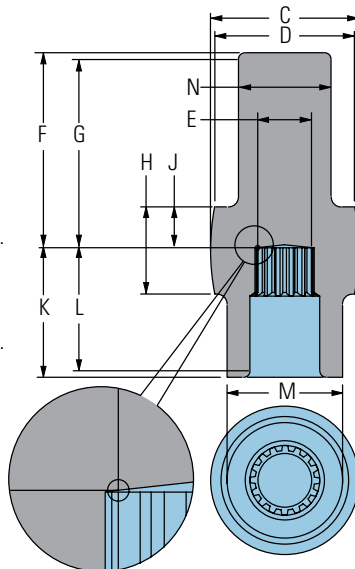
Note:

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

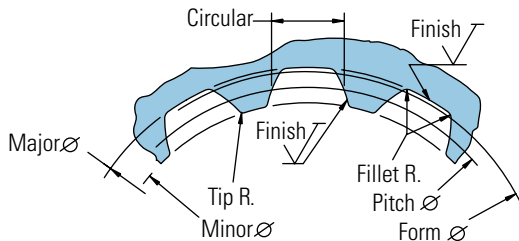
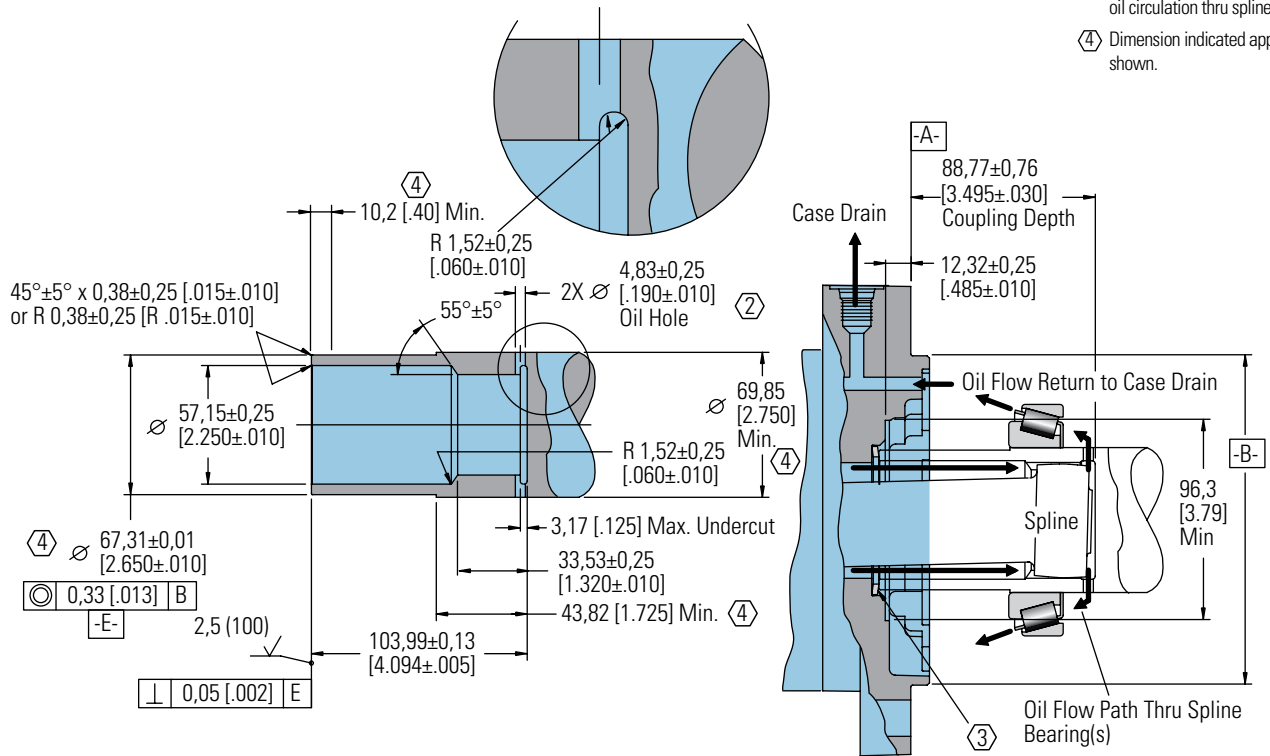
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
630 [38.6]	161,5 [6.36]	130,3 [5.13]
805 [48.6]	172,5 [6.79]	141,2 [5.56]
990 [60.5]	184,4 [7.26]	153,4 [6.04]
1245 [76.0]	200,7 [7.90]	169,7 [6.68]
1560 [95.0]	220,5 [8.68]	189,5 [7.46]

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.



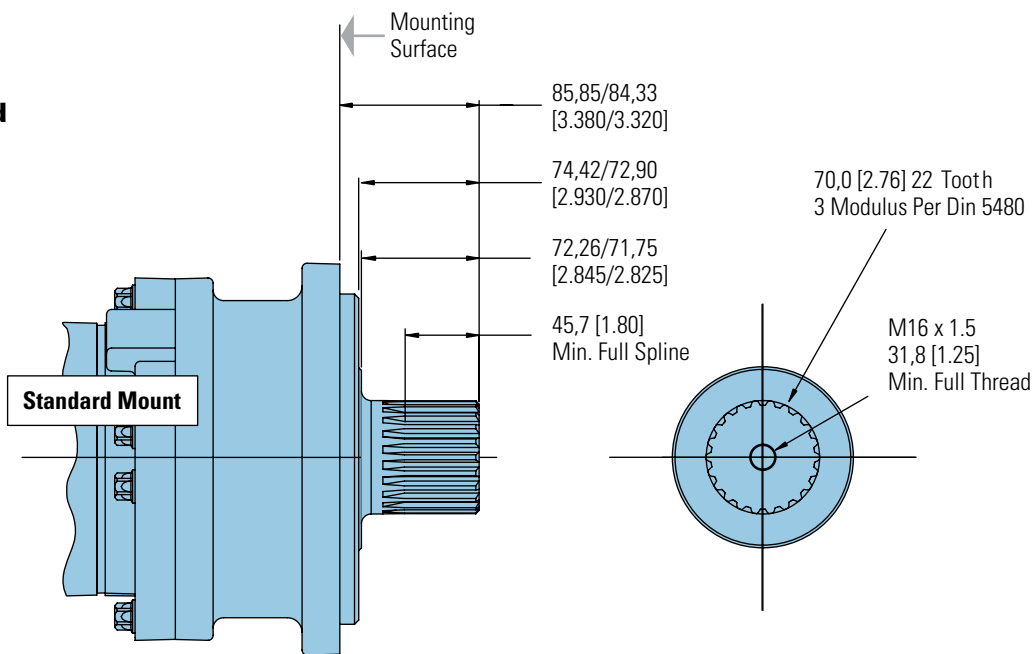
Spline Pitch	8/16
Pressure Angle	30°
Number of teeth	16
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 50,80000 [2.0000000] 0,33 [.013] B
Base Diameter	Ref. 43,994090032 [1.7320508]
Major Diameter	56,34±0,15 [2.218±.006]
Min. Minor Diameter	48,44±0,08 [1.907±.003]
Form Diameter, Min.	55,22 [2.174]
Fillet Radius	1,02±0,25 [.040±.010]
Tip Radius	0,38±0,13 [.015±.005]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+ .0000 -.0010]
Total Index Variation	0,041 [.0016]
Lead Variation	0,015 [.0006]
Circular Space Width:	
Maximum Actual	6,180 [.2433]
Minimum Effective	6,048 [.2381]
Maximum Effective	Ref. 6,099 [.2401]
Minimum Actual	Ref. 6,114 [.2407]
Dimension Between Two Pins	Ref. 42,659 ±0,05 [1.6795±.0020]
Pin Diameter	6,223 [.2450]

VIS 45 Series

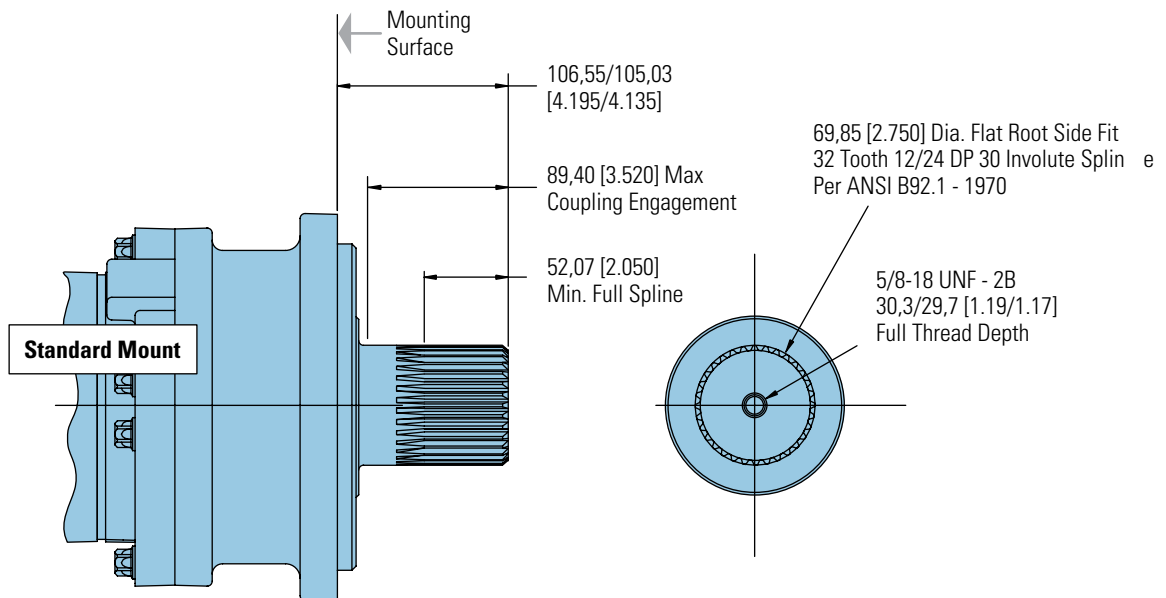
Dimensions Shafts

Splined

70 mm 22 Tooth Splined



2-3/4 Inch 32 Tooth Splined

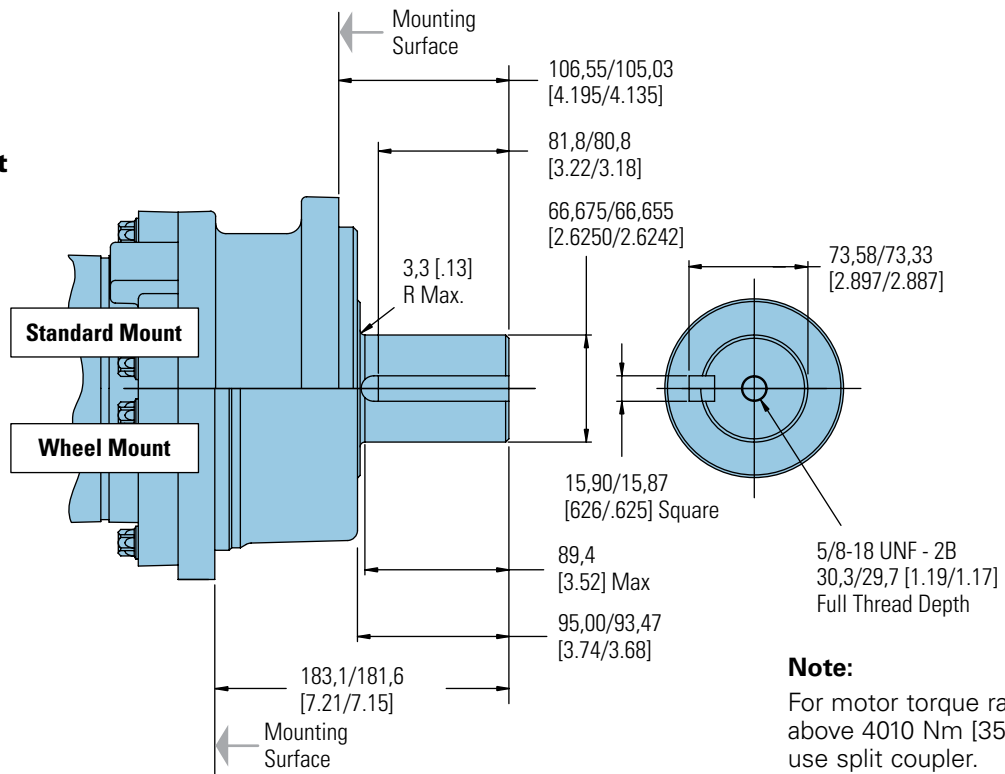


VIS 45 Series

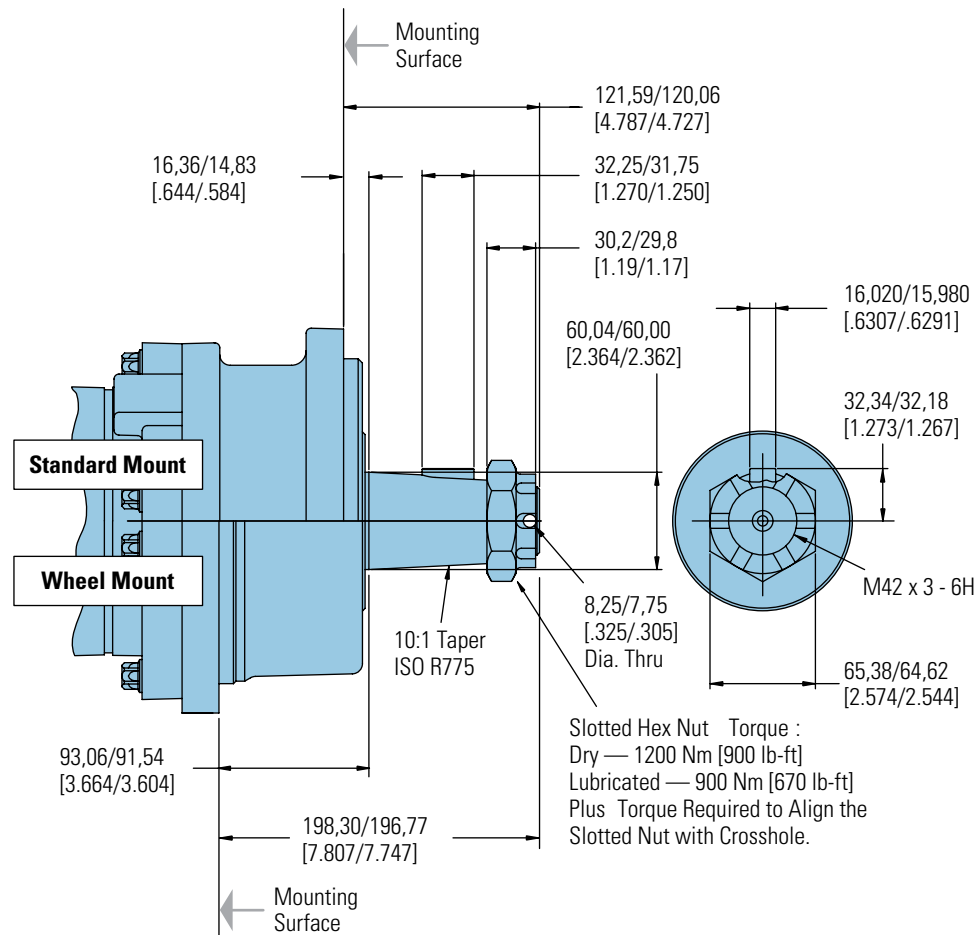
Dimensions Shafts

Keyed

2-5/8 Inch Straight



60 mm Tapered



VIS 45 Series

Side Load Capacity

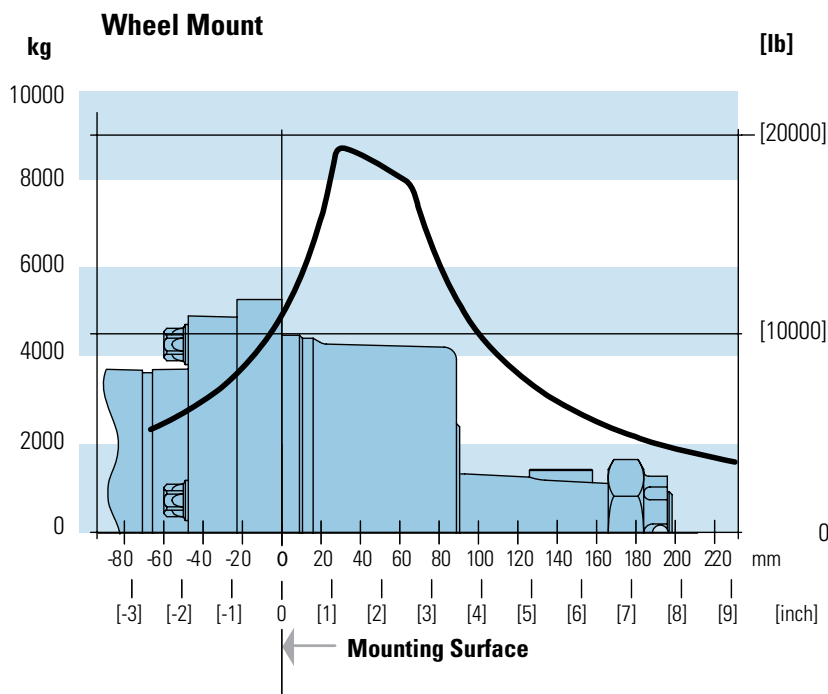
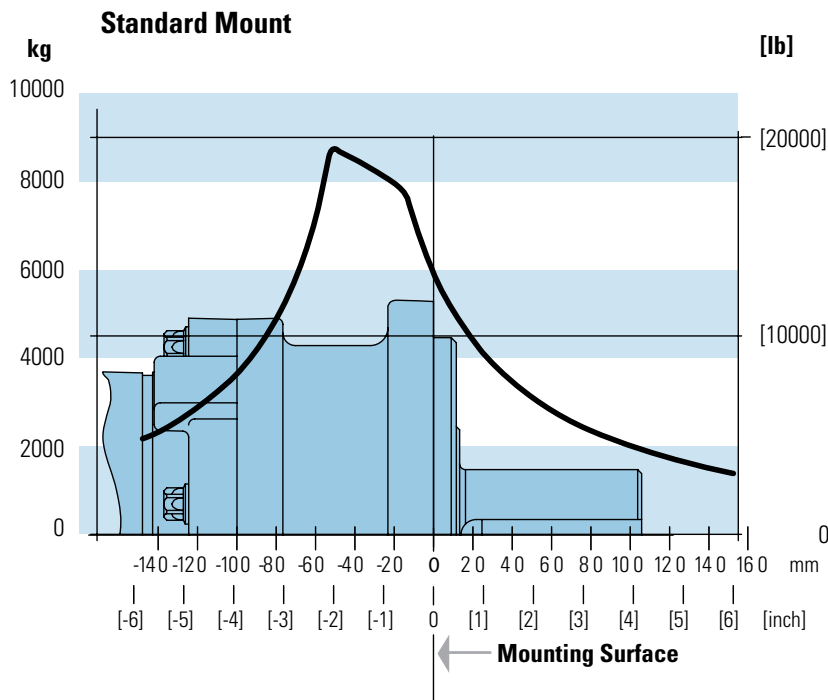
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

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

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

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



VIS 45 Series

Product Numbers

Closed Loop

Use three-digit prefix (155-, 156-, or 157-) plus four-digit number from charts for complete product number (ex: 157-0034).

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

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0107	-0108	-0109	-0110	-0111
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0114	-0115	-0116	-0117	-0118
	70 mm 22 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0121	-0122	-0123	-0124	-0125
	2-3/4 inch 32 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0128	-0085	-0129	-0130	-0131
Wheel	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	156-0039	-0040	-0041	-0042	-0043
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	156-0046	-0047	-0048	-0049	-0050
Bearingless	(8 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	157-0066	-0067	-0068	-0069	-0070
	(4 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	157-0004	-	-	-	-

157-0004

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0134	-0135	-0136	-0137	-0138
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0141	-0142	-0143	-0144	-0145
	70 mm 22 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0148	-0149	-0150	-0151	-0152
	2-3/4 inch 32 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0155	-0156	-0157	-0158	-0159
Wheel	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0053	-0054	-0055	-0056	-0057
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0060	-0061	-0062	-0063	-0064
Bearingless	(8 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	157-0074	-0075	-0076	-0077	-0078
	(4 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	157-0081	-	-	-	-

157-0081

Note:

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

- A case drain is required for all closed loop VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].

VIS 45 Series

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.

A C B			* *		*	* *		*	*	*	0 0		*	0	E
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

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 – Painted Low Gloss
Black, Individual Box

B – No Paint, Bulk Box
Option

C – Painted Low Gloss
Black, Bulk Box Option

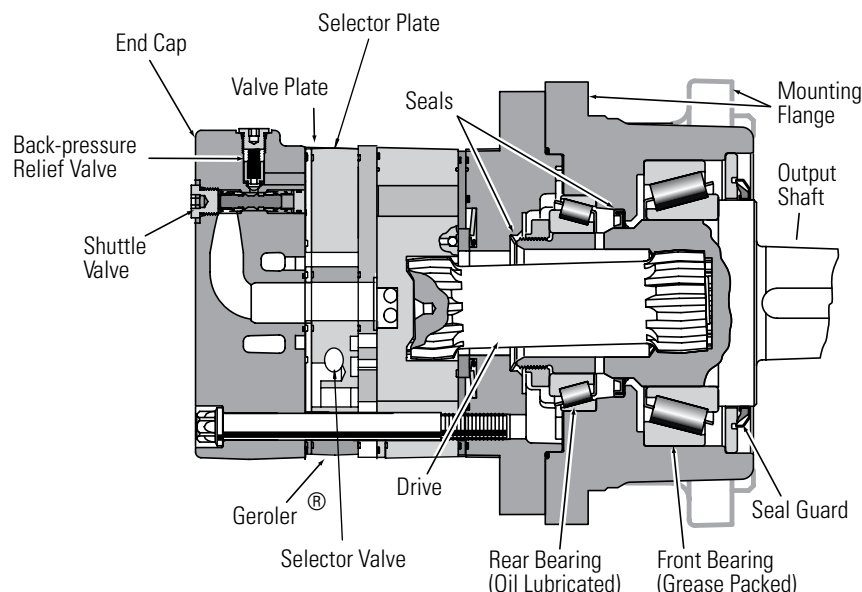
15 Eaton Assigned Code when Applicable

0 – Assigned Code

16 Eaton Assigned Design Code

E – Assigned Design Code

VIS 45 Series Two-speed



Specifications

VIS 45 Series motors are available with an integral two-speed feature that allows the operator to shift the motor between low speed high torque (LSHT) mode and high speed low torque (HSLT) mode. In the LSHT mode, output torque and rotation speed values are equal to those of the conventional VIS 45 motor. In the HSLT mode motor displacement is reduced by one third, resulting in a fifty percent increase in rotation speed and a torque output reduction of one third. The VIS 45 two speed motor is bidirectional. It will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes. Shift on the fly technology allows full-power operation throughout the full duration of the shift.

Changing between modes is accomplished by changing the displacement in a ratio of 1 to 1.5. An external two-position three-way control valve is required for shifting pressure to the pilot port between low pressure (LSHT mode) and pilot signal pressure (HSLT mode). An integral selector valve shifts the motor from LSHT mode to HSLT mode. Initially, low pressure is supplied to the pilot port. The selector valve is biased to LSHT mode by a return spring. When pilot signal pressure is supplied to the pilot port and 3,5 Δbar [50 ΔPSI] is reached, the selector valve overcomes return spring force and 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.

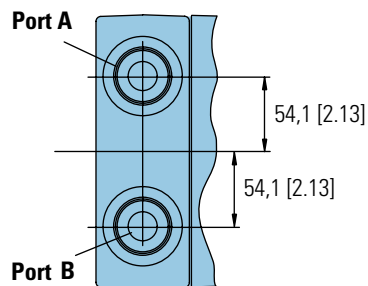
The VIS 45 two speed motor will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes.

VIS 45 Series

Two-speed

Dimensions

Standard Mount

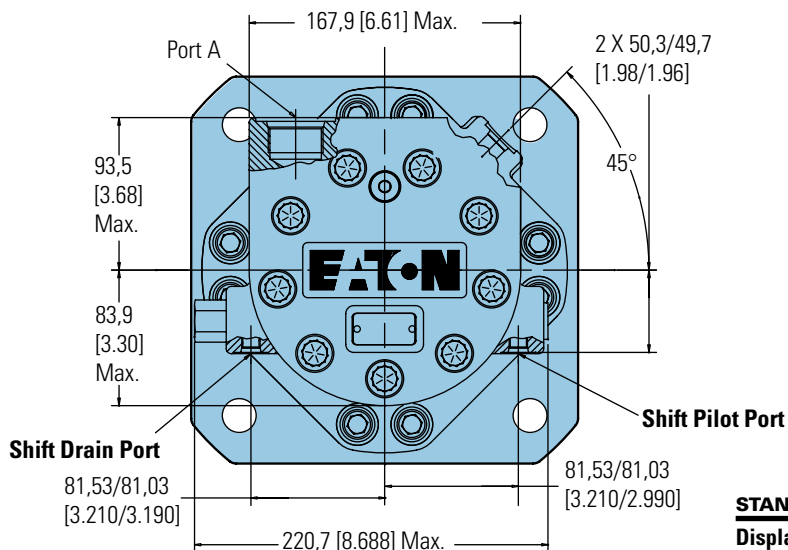
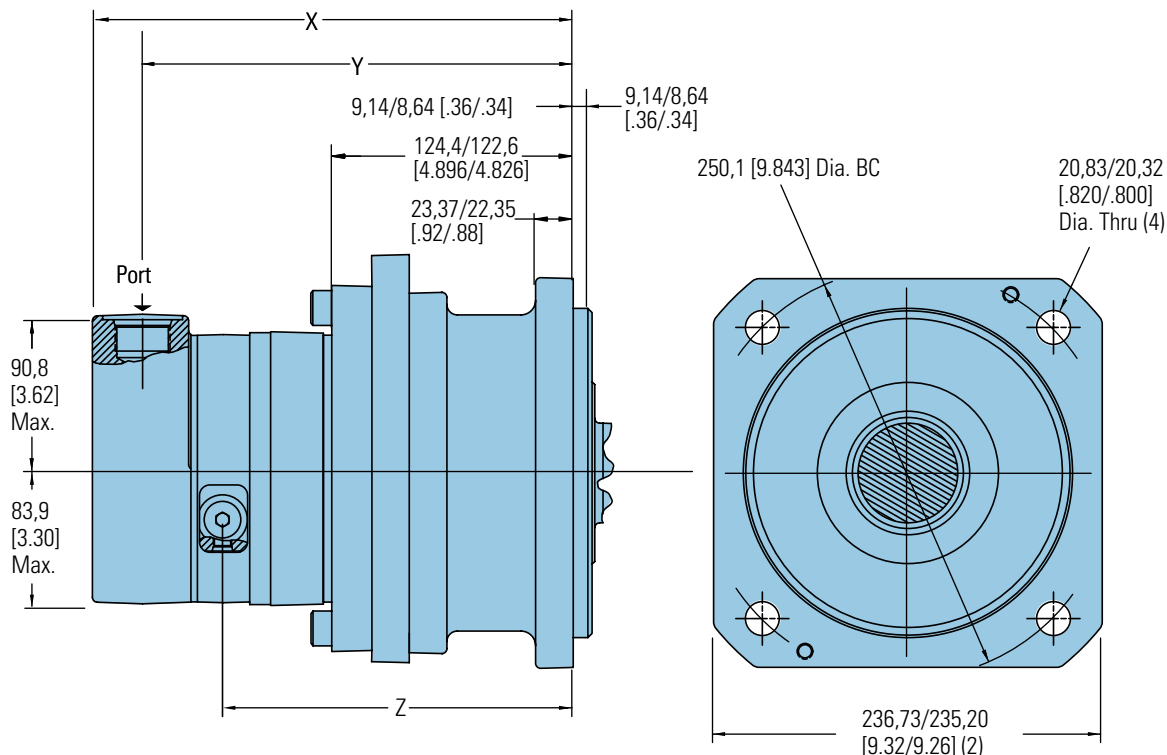


Ports

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

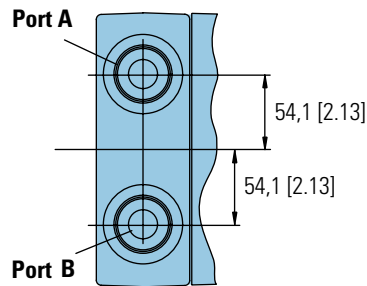
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
630 [38.6]	295,5 [11.63]	263,2 [10.36]	216,3 [8.51]
805 [48.6]	305,9 [12.04]	273,6 [10.77]	226,7 [8.92]
990 [60.5]	318,3 [12.53]	286,0 [11.26]	239,1 [9.41]
1245 [76.0]	334,3 [13.16]	302,0 [11.89]	255,1 [10.04]
1560 [95.0]	353,3 [13.94]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

VIS 45 Series

Two-speed

Dimensions

Wheel Mount

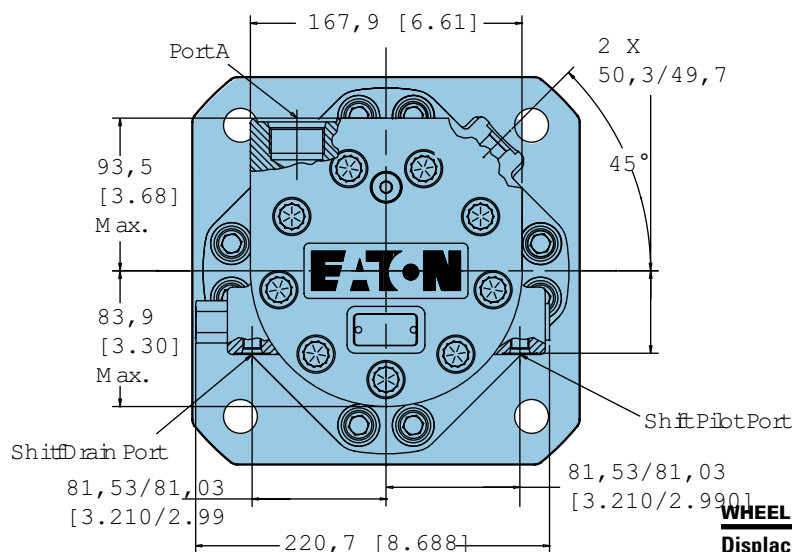
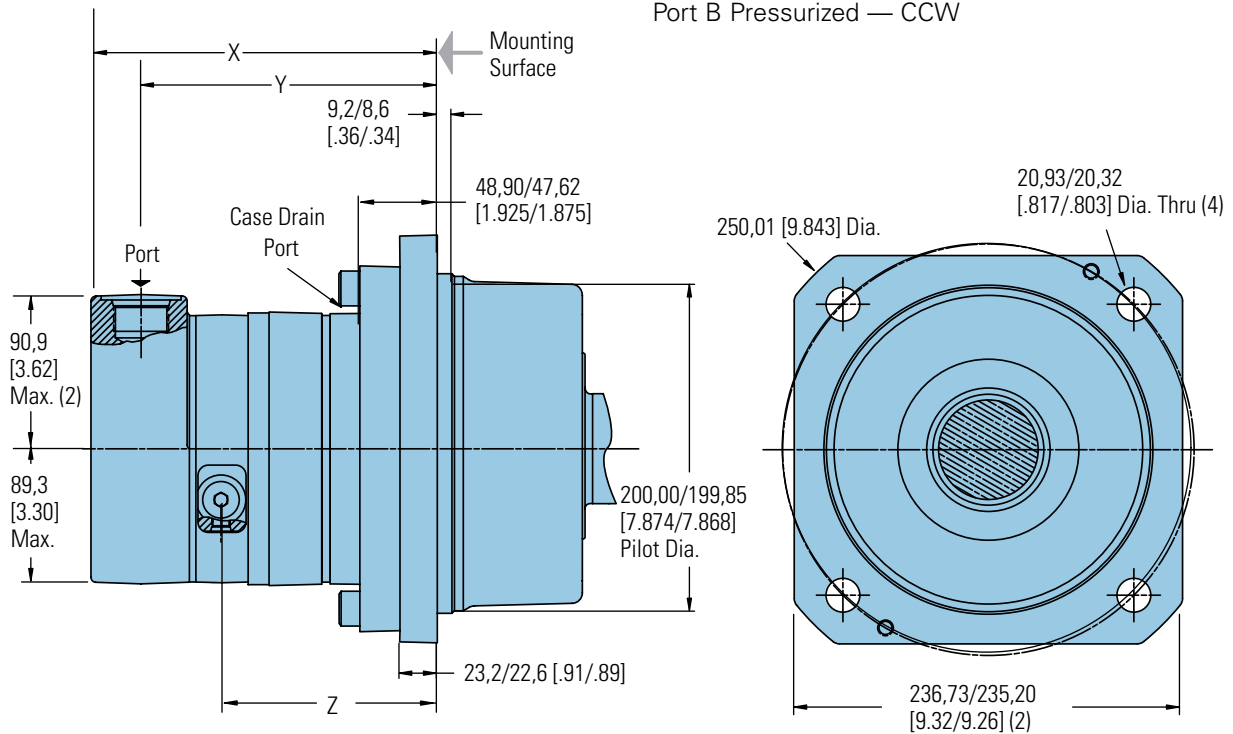


Ports

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

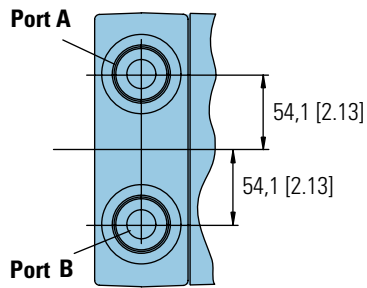
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
630 [38.6]	218,8 [8.61]	186,5 [7.34]	139,6 [5.49]
805 [48.6]	229,2 [9.02]	196,9 [7.75]	150,0 [5.90]
990 [60.5]	241,6 [9.51]	209,4 [8.24]	162,4 [6.39]
1245 [76.0]	257,6 [10.14]	225,6 [8.88]	178,4 [7.02]
1560 [95.0]	276,6 [10.92]	245,4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

VIS 45 Series

Two-speed

Dimensions

Bearingless



Ports

1-1/16-12 UN-2B SAE O-ring Ports (2)
 9/16-18 UNF-2B SAE O-ring Case Drain Port (1)
 7/16-20 UNF -2B SAE O-ring Shift Ports (2)
 Or
 G 3/4 (BSP) O-ring Ports (2)
 G 1/4 (BSP) O-ring Case Drain Port (1)
 7/16-20 UNF -2B SAE O-ring Shift Ports (2)

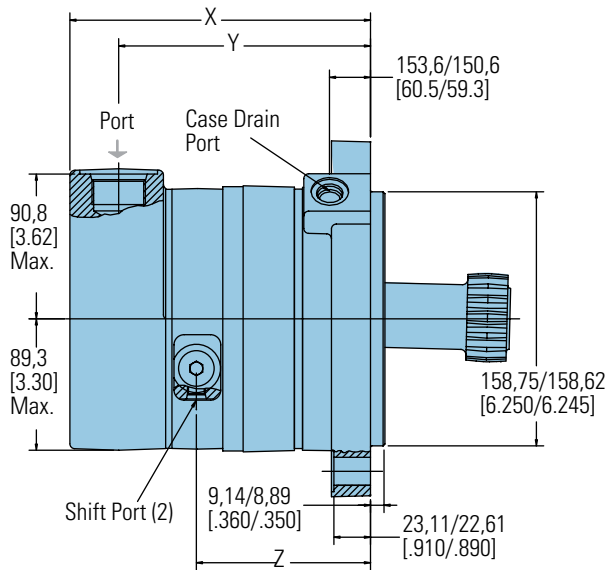
Standard Rotation Viewed from Drive End

Port A Pressurized — CW
 Port B Pressurized — CCW

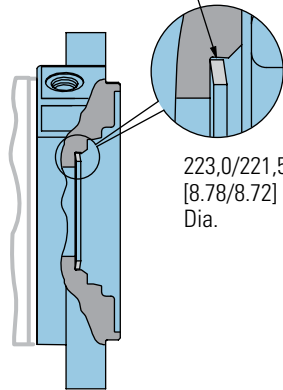
For VIS 45 two-speed bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

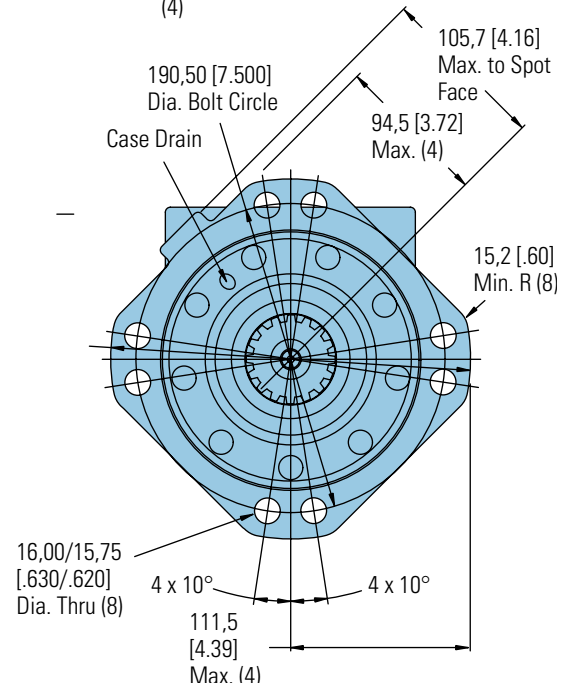
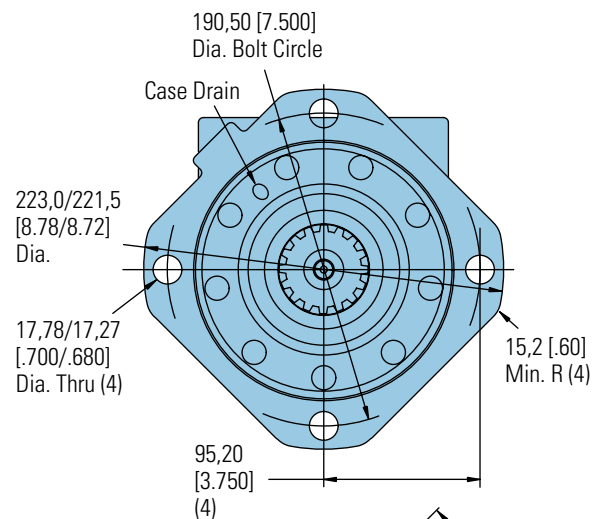
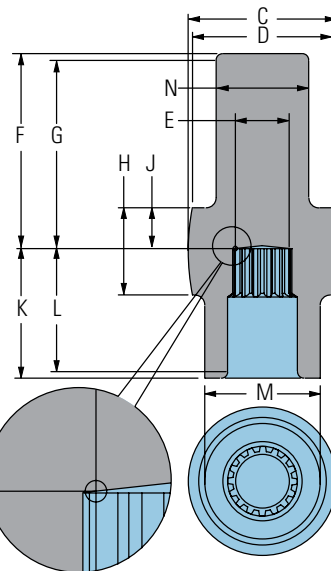


Shaft Face Seal
 Furnished with Motor



Mating Coupling Blank Eaton Part No. 13521-003

C 116,3 [4.58] Dia. Max.
D 111,8 [4.40] Dia. Min.
E 37,64 [1.482] Dia.
F 136,7 [5.38] Max.
G 131,6 [5.18] Min. Full Form Dia.
H 64,8 [2.55]
J 26,4 [1.04]
K 109,7 [4.32] Max.
L 104,6 [4.12] Min. Full Form Dia.
M 92,58 [3.645] Dia.
N 73,28 [2.885] Dia.



BEARINGLESS MOTORS

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	Z mm [inch]
630 [38.6]	196,1 [7.72]	165,9 [6.53]	116,9 [4.60]
805 [48.6]	206,5 [8.13]	176,3 [6.94]	127,3 [5.01]
990 [60.5]	218,9 [8.62]	188,8 [7.43]	139,7 [5.50]
1245 [76.0]	235,2 [9.26]	205,0 [8.07]	156,0 [6.14]
1560 [95.0]	255,0 [10.04]	224,8 [8.85]	175,8 [6.92]

VIS 45 Series Two-speed

Product Numbers

(Closed Loop)

Use digit prefix—173-, 174- or 183- plus four digit number from charts for complete product number—

Example: 173-0013.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0006	-0007	-0008	-0009	-0010
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0011	-0012	-0013	-0014	-0015
	70 mm 22 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0016	-0017	-0018	-0019	-0020
Wheel	2-3/4 inch 32 Tooth Splined	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0021	-0022	-0023	-0024	-0025
	2-5/8 inch Straight	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	183-0006	-0007	-0008	-0009	-0010
	60 mm Tapered	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	183-0011	-0012	-0013	-0014	-0015
Bearingless	(8 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	173-0008	-0009	-0010	-0011	-0012
	(4 Bolt)	1-5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	173-0013	-	-	-	-

173-0013

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm ³ /r [in ³ /r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0026	-0027	-0028	-0029	-0030
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0031	-0032	-0033	-0034	-0035
	70 mm 22 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0036	-0037	-0038	-0039	-0040
Wheel	2-3/4 inch 32 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0041	-0042	-0043	-0044	-0045
	2-5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	183-0016	-0017	-0018	-0019	-0020
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	183-0021	-0022	-0023	-0024	-0025
Bearingless	(8 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	173-0014	-0015	-0016	-0017	-0018
	(4 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	173-0019	-	-	-	-

173-0019

Note:

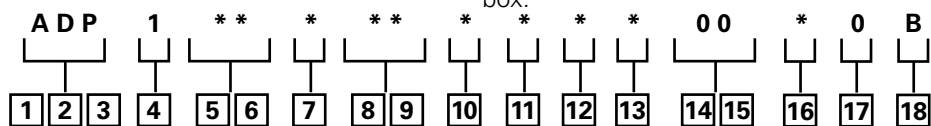
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 15,2 bar [220 PSI].

- A case drain is required for all closed loop VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].

VIS 45 Series Two-speed

Model Code

The following 18-digit coding system has been developed to identify all of the configuration options for the VIS 45 Two-Speed motor. Use this model code to specify a motor with the desired features. All 18 digits of the code must be present when ordering. You may want to photocopy the matrix below to endure that each number is entered in the correct box.



1, 2, 3 Product Series

ADP – VIS 45 Two-speed Motor

4 Eaton Assigned Code

1 – Assigned Code

5, 6 Displacement cm³/r [in³/r]

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 – Painted Low Gloss
Black, Individual Box

B – No Paint, Bulk Box
Option

C – Painted Low Gloss
Black, Bulk Box Option

17 Eaton Assigned Code when Applicable

0 – Assigned Code

18 Eaton Assigned Design Code

B – Assigned Design Code

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