Low Speed, High Torque Motors

Spool Valve:	J, H, S, T, and W Series
Disc Valve:	2,000, 4,000 Compact, Delta, 4,000, 6,000, and 10,000 Series
VIS:	VIS 30, VIS 40, and VIS 45 Series

Why Eaton Hydraulics?

Eaton Hydraulics is the largest business segment of the Eaton Fluid Power Group and a direct result of Eaton's dedication to leadership in hydraulics for both mobile and industrial applications. Eaton produces not only some of the world's best hydraulic products, but also the best and most complete world-class hydraulic services, systems, and solutions.

From off-road to industrial.

Eaton provides hydraulics to large on-road and off-road mobile OEMs in the agriculture, construction, mining, marine and lawn and garden markets. Eaton is also a major force in providing hydraulic components and systems to leading industrial OEMs.

From world-class engineering capabilities in system design assistance to comprehensive service and technical support after the sale, Eaton Hydraulics is committed to one clear objective – complete satisfaction with all Eaton products and systems, for both industrial and mobile users.

Designed to your exacting specifications.

Eaton supports the needs of design engineers with products that meet a range of specifications. According to the functional needs of the vehicle or machine, your engineers can consult with Eaton to determine the exact flow, torque and displacement needs of the required components.

Global distribution.

With distribution through 2000 distributors with 4000 locations worldwide, Eaton meets your needs for ongoing support as well as easy availability of replacement parts. The Eaton distribution network is ideal for meeting the system and component needs of smaller OEMs, too.

So whether your designs require hydraulics that help turn, shape, mold, lift, dig, or haul, Eaton products and systems are engineered for reliable, continuous performance in the world's most demanding and rigorous applications.

Remanufactured Products.

Eaton also offers an extensive line of Remanufactured parts and components that meet the same exacting standards as the original products, including:

- Eaton brand medium-duty and heavy-duty piston pumps and motors
- Vickers brand vane cartridge kits for pumps and motors
- Vickers brand piston rotating groups and complete units

We are your source for **authentic** reman products. Our ISO 9001:2000 certified Reman facility stands ready to meet your aftermarket needs.

World-class brands.

Eaton Hydraulics is comprised of seven key brands: Aeroquip, Boston, Char-Lynn, Eaton, Hydro-Line, Vickers, and Weatherhead, each with well-established reputations around the world:

Aeroquip® brand products serve the industrial, aerospace, and automotive marketplaces. Products include all pressure ranges of hose, fittings, adapters, couplings and other fluid connectors.

BOSTON® Boston brand products include a wide variety of transfer hoses used in diverse markets including the chemical, petroleum, material handling, and food industries. Boston also offers coupling and assembly equipment for most hose applications up to 2"; inside diameter.

Char-Lynn® Char-Lynn brand products have continued the tradition of being a well-respected line of hydraulic steering units and general-purpose motors; Char-Lynn is also known for its spool-valve, disc-valve, and high performance motors.

EATON® Eaton products are known for their excellence in engineering and production and include hydrostatic transmissions, valves, piston and gear pumps and Valve-In-Star™ motors. Eaton brand products are generally more heavily used on mobile equipment.

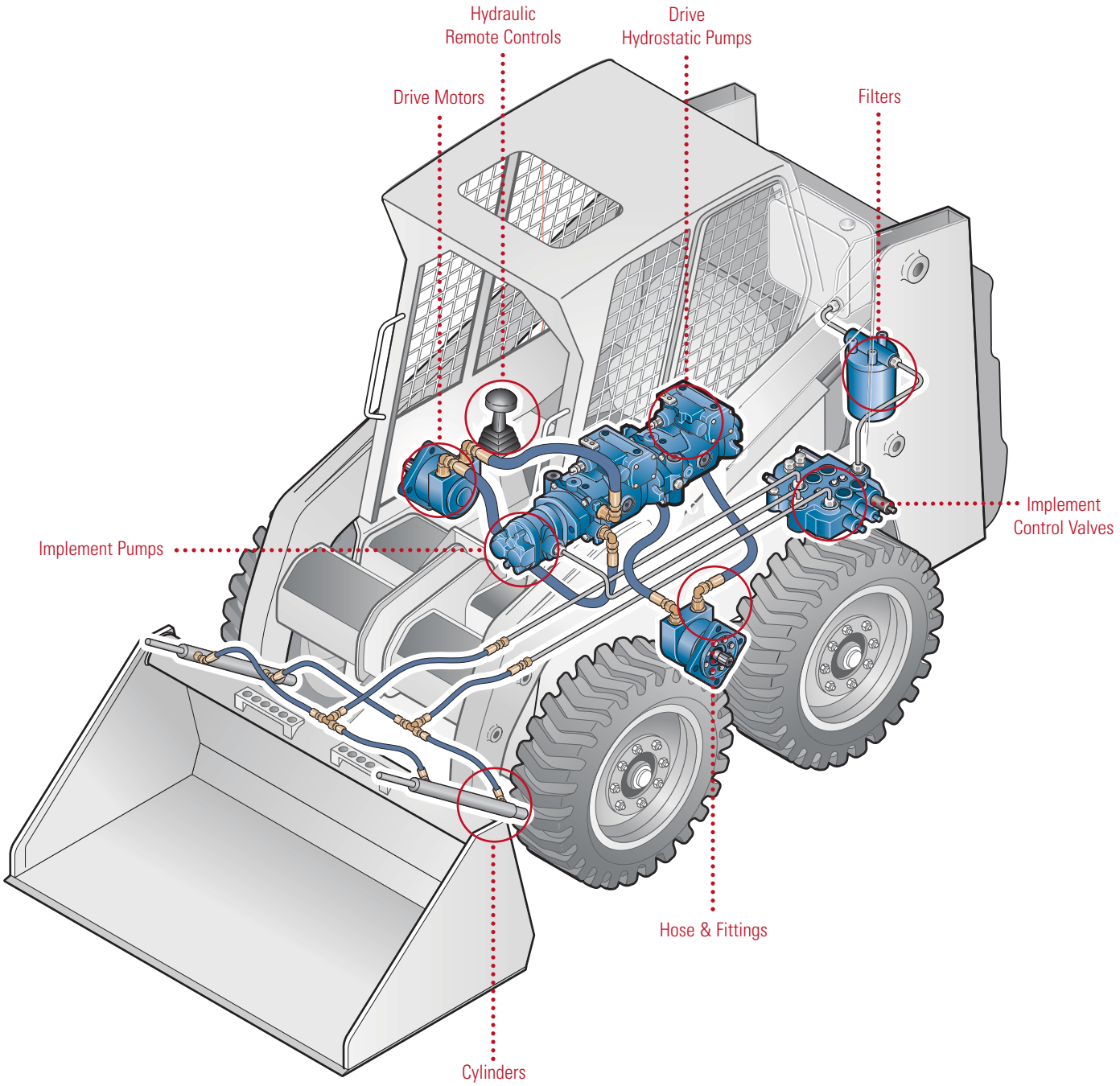
HYDRO-LINE® Hydro-Line industrial cylinder products complement the Hydraulics cylinder business by making available to customers a broader selection of single-source products that can be easily integrated into a complete Eaton system. Industrial cylinders are used by machine and equipment builders to transfer and apply fluid power in applications that range from automobile production to large hydro-electric projects and off-shore drilling platforms.

VICKERS® Vickers has long been a pioneer in providing systems and components including vane pumps, piston pumps, valves, cylinders and filtration products to the industrial, aerospace, marine and defense industries.

WEATHERHEAD® Weatherhead brand products consist of hydraulic hose, hose ends and assembly equipment, tube fittings, and a full range of support accessories. Weatherhead products are supplied to users in industries including construction, mining, agriculture, and truck and bus.

Aeroquip® BOSTON® Char-Lynn® EATON®

HYDRO-LINE® VICKERS® WEATHERHEAD®



Lift. Dig. Haul…day in and day out. This is the work of Eaton Hydraulics products and systems. Engineered for reliable, continuous performance in the world's most rigorous applications.

Long recognized as a global leader, today Eaton is more powerful than ever. Now with an even wider range of reliable world-class products to serve virtually any mobile vehicle.

So whether you're specifying a single product, or an entire hydraulic system, make Eaton your global source for the fluid power products that'll move your world.

Mobile Applications

Agricultural

Eaton pumps, motors, transmissions, valves, cylinders, and controls, as well as hose and fittings, are ruggedly designed, and provide reliable performance in agricultural environments.

Construction

In demanding construction applications – where uptime is of major importance – Eaton hydraulic components provide the necessary functionality and durability.

Material Handling

Eaton hydraulic systems provide precise control and the solutions required for material handling use.

Utility

With a large range of products and solutions, Eaton is the desired supplier of hydraulic components and hydraulic systems to a large range of utility vehicles.

Forestry

In forestry applications, one of the most extreme applications around, Eaton hydraulics are the reliable answer for control, power, and durability.

Mining

Eaton is the preferred choice for many of the auxiliary systems on mining equipment. Eaton products can handle the harsh environments and the rigorous duty cycles, and can survive the tough applications.

Earthmoving

From propel motors and swing drives to auxiliary work systems, Eaton has many solutions to the demanding requirements of earthmoving applications.

Truck and Bus

Eaton hose and fittings and Eaton fan drive systems set a standard for truck and bus applications.

Highlights

Remanufactured Products

- We offer a complete line of Eaton remanufactured medium and heavy-duty pumps and motors to provide cost effective replacement options.
- Our remanufactured products must meet the same rigid specifications as our new products.
- Don't take chances by using look-alike replacement parts. Keep your vehicles running with authentic Eaton Remanufactured product from the original source – Eaton.

STC® Connectors

- Broadest range of threadless connectors in the industry!
- Eaton patented Snap-To-Connect™ technology has been extremely successful in various rigorous mobile applications.
- Direct porting options reduce number of connections.
- STC fittings or formed design for tube applications.

Series 5 Steering Control Unit

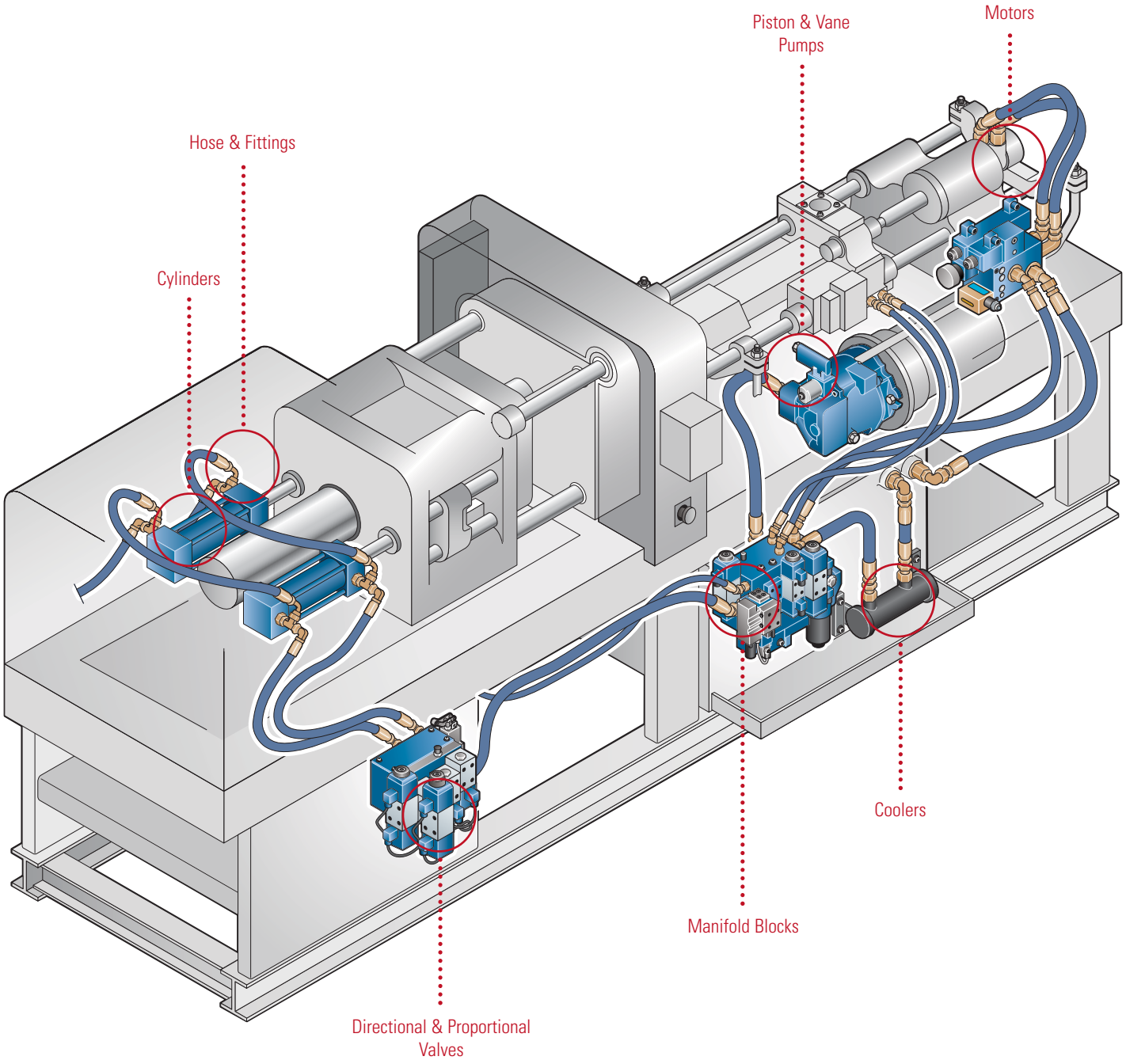
- Compact design and installation flexibility.
- Offering a variety of choices in mounting, port locations, configurations, and valve functionality.
- Provides lower pressure drop than competitive units.

420 Series Open Circuit Piston Pumps

- Eaton brand medium pressure pumps for mobile applications.
- Compact design provides high flow options in smaller package.
- Simple two-piece housing allows easy conversion of pump rotation.
- Four displacements in a common package allow optimized flow from the same size pump.
- Mounting and shaft options conform to SAE B and C specifications.
- SAE and Metric Porting provided in Tube and Flange styles.
- Thru-drive SAE A & SAE B rear pads allow tandem combinations with fixed or variable pumps.

Aeroquip® BOSTON® Char-Lynn® EATON®

HYDRO-LINE® VICKERS® WEATHERHEAD®



Cut. Groove. Bore…day in and day out. This is the work of Eaton Hydraulics products and systems. Engineered for reliable, continuous performance in the world's most demanding applications.

Long recognized as a global leader, today Eaton is more powerful than ever. Now with an even wider range of reliable world-class products to serve virtually any industrial application.

So whether you're specifying a single product, or an entire hydraulic system, make Eaton your global source for the fluid power products that'll keep you up and running.

Industrial Applications

Machine Tools
Metal Cutting and Metal Forming

Eaton Hydraulics enable machinery to deliver high productivity and consistent accuracy for metal cutting machinery.

High pressure and flow components – piston pumps, cylinders and cartridge valves, provide the muscle and control required for metal forming machinery.

Molding
Plastics Injection, Rubber, Blow and Die Cast

Strong application support coupled with a full range of hydraulic products – wide range of cylinders, vane and piston pumps, cartridge valves and manifolds – provides you with a single source solution.

Primary Metals
Steelworks

Eaton high pressure pumps, cylinders and valves are the ideal components for delivering the muscle required in these rugged applications.

We can handle the heat and provide long life in mill environments.

Automotive
Engine and Transmission Plants

Eaton products are trusted and specified by the world's leading automakers.

You can count on Eaton aftermarket support anywhere in the world.

Power Generation
Thermal, Hydro and Wind

Eaton specialized products provide reliable operation with minimal routine maintenance.

Whether you build hydro-electric plants or wind turbines, Eaton has the specific solution for your needs.

Port Machinery
Ship to Shore Cranes and Container Handlers

Eaton understands the fast paced action of dockyards.

You can rely on Eaton components to provide high productivity with maximum efficiency.

Entertainment
Motion Systems

Eaton Hydraulics provide a natural look and feel to amusement park creature motions.

High masses and inertias developed on rides, are controlled with accuracy and simplicity.

Highlights

Open Circuit Piston Pumps

PVM

- Designed as a quiet, medium pressure pump for industrial applications.
- The cradle swashplate design pumps were created with low noise in mind.
- Design features reduce both the structure-borne and fluid-borne noise levels to market leading levels.

Remanufactured Products

- We offer a broad selection of the most popular Vickers remanufactured vane cartridge kits and piston units and rotating groups to provide cost effective replacement options.
- Our remanufactured products must meet the same rigid specifications as our new products.
- Don't take chances by using look-alike replacement parts. Keep your machines running with authentic Eaton Remanufactured product from the original source – Eaton.

Vane Pumps

VMQ

- The latest state-of-the-art Vickers VMQ fixed displacement vane pumps.
- Set new standards of performance and efficiency for both industrial and mobile applications.
- Features design enhancements in all areas, resulting in a unique combination of higher pressure capabilities and outstandingly low noise levels.

V Series Pumps

- Most popular fixed displacement vane pumps for medium pressure industrial applications.
- Lead in operating life, reliability, efficiency and quietness.
- Complete displacement range and pump configuration.

Filtration

Pro Guard Series

- Vickers filters handle flows to 475 USgpm (1800 l/min.) and pressures to 6090 psi (420 bar).
- A wide range of port sizes, bypass valves, pressure drop indicators and media grades facilitate filter installation and achievement of desired system cleanliness levels.
- Inch or metric ports are available.
- Reservoir vent filters feature a visual indicator and corrosion-resistant housing.
- In addition to particle control, these filters also feature water/moisture control.

Motors

Spool Valve Hydraulic Motors

Spool valve motors transmit high torque at low speeds by means of a cylindrical valve and a gerotor or Geroler®, which are special drive members that turn the output shaft.

Applications: Machine tools, drilling and tapping machines, seed drills, augers, conveyors, textile machinery, sweepers, fans, scissors lifts and commercial mowers.

Specifications: Speed Range: Up to 1000 RPM. Torque Range: Up to 565 Nm (5000 lb-in). Options: Variety of optional shafts, ports, mountings and displacements. Output Shafts: Straight with Woodruff key, splined, tapered or straight with cross holes.

Disc Valve Hydraulic Motors

Disc valve hydraulic motors operate similarly to spool valve motors but use Gerolers® exclusively. They are designed with a flat, disc-shaped valving system and are reversible. These products are effective at very low speeds.

Applications: Conveyors, augers, screws, spreaders, mixers, grinders, winches, reel drives, sweepers and various propel applications.

Specifications: Speed Range: Up to 900 RPM. Torque Range: Up to 3390 Nm (30,000 lb-in). Options: Wide variety of optional shafts, mountings, ports, displacements, speed sensors- and bolt-on valves. 2-Speed Models: Available in Series 2000 and 10000.

Motors

Valve-In-Star™ (VIS) Hydraulic Motors

High performance VIS 30, 40 and 45 motors deliver high torque in a compact envelope, plus superior volumetric and mechanical efficiencies. Patented design reduces leakage by incorporating a flexible, pressure-balanced wear plate. VIS design helps extend the performance life of the motor.

Applications: Skid steer loaders, crop sprayers, grape harvesters, specialty harvesting equipment, construction equipment, compactors, augers, forestry equipment, road rollers and trenchers.

Specifications: Speed Range: Up to 500 RPM. Torque Range: Up to 5085 Nm (45,000 lb-in).

ME Series Hydraulic Motors

Double swash plate, opposed-piston, low-speed, high-torque hydraulic motors. These motors operate smoothly at low speed within the maximum ratings and cause very little torque ripple. Available with a brake, counter-balance valve, two speeds and geared motor options.

Applications: Swing drives, winches and propel drives for large vehicles.

Specifications: Pressure Range: 248 and 276 bar (3600 and 4000 psi). Torque Range: Up to 16136 Nm (11,900 lb-ft).

Hydrostatic Power Steering Units

Series 5

The Series 5 steering control unit (SCU) features a compact design and installation flexibility. These units offer a variety of choices in mounting, ports (now available with Snap-To-Connect, STC® direct ports), port locations, configurations and integral valve functionality. Balanced architecture provides smooth, best-in-class steering feel and crisp centering. Series 5 SCUs are affordably designed for low flow, low pressure applications and are more efficient than competitive units.

Applications: Lawn, garden and turf equipment, lift trucks, golf course maintenance equipment and compact utility tractors.

Specifications: Displacement: 31.5-120 cm^3/r (1.92-7.33 in^3/rev). Flow: 11-19 l/min (3-5 gpm). Pressure (max.): 140 bar (2030 psi).

Series 10

The new Series 10 SCU facilitates hydraulic fluid flow like no other unit on the market. Offering an unprecedented, continuous pressure rating of 275 bar (4000 psi). Its robust design, balanced architecture and many options, offer increased performance during transient pressure and high standby conditions. Several optional features and technologies, such as STC® direct ports, Q-Amp, cylinder damping and the new VersaSteer™ (dual "metered" and "quick" steering modes), result in an improved steering experience and reduce system cost.

Applications: Heavy-duty equipment, such as construction and agricultural vehicles.

Specifications: Displacement: 60-739 cm^3/r (3.6-45.1 in^3/rev). Flow: 3.8-45 or 8.0-76 (Q-Amp) l/min (1-16 or 2-20 gpm). Pressure (max.): 275 bar (4000 psi).

Hydrostatic Power Steering Units

Series 20

The Series 20 SCU continues Eaton's tradition of innovative design and high quality that began with the first Char-Lynn fluid linked power system. The balanced and robust design provides, stability and positive low effort steering feel to ensure excellent vehicle control. Available with optional STC® direct ports, Q-Amp, Wide Angle, cylinder damping and the new VersaSteer™ (dual "metered" and "quick" steering modes) which reduce system cost, improve productivity and increase operator satisfaction.

Applications: Articulated vehicles, such as wheel loaders, forestry equipment and dump trucks.

Specifications: Displacement: 60-985 cm^3/r (3.6-60 in^3/rev). Flow: 38-125 l/min (10-33 gpm). Pressure (max.): 241 bar (3500 psi).

Series 25

The Series 25 SCU includes several optional features and technologies, such as STC direct ports, Q-Amp and Wide Angle, that make it even more responsive, reliable and cost effective. Symmetrical valving provides uniform steering and a high capacity gerotor assembly provides a lot of capacity in a compact package. The Series 25 offers a higher flow rating and lower pressure drop than any competitive unit on the market.

Applications: Large articulated and fixed frame vehicles.

Specifications: Displacement: 490-1230 cm^3/r (30-75 in^3/rev). Flow: 95-151 l/min (25-40 gpm). Pressure (max.): 241 bar (3500 psi).

Hydrostatic Power Steering Units

Series 40

The Series 40 SCU is designed for the highest flow, highest pressure applications, and is the most capable steering control unit on the market. This SCU features patented Eaton technology and has design attributes that result in responsive, smooth, stable and cost effective steering.

Applications: Large articulated vehicles such as, loaders, mining trucks, graders, scrapers, haulers and transporters.

Specifications: Displacement: 1230-3030 cm^3/r (75-185 in^3/rev).Flow: 151-227 l/min (40-60 gpm).Pressure (max.): 241 bar (3500 psi).

Steering Accessories

Eaton offers a complete line of steering columns and wheels to fit every need. Both feature the latest technology that result in superior performance in even the most rugged applications.

The f Series fixed column family features a robust design, increased durability, rugged construction and hundreds of versions. The high performance and ergonomic i Series tilt and telescoping column family provides infinite adjustment and large telescoping travel distance for reduced driver fatigue.

Eaton now also offers a complete line of stylish yet robust Eaton Char-Lynn steering wheels.

In addition to the broad standard offering, we will customize to fit your specific application.

Vane Pumps

VMQ

The Vickers VMQ is the world leader in pressure capacity and noise levels and is available in a complete range of singles, doubles, triples and thru-drives. The unique wafer plate design of the VMQ allows for the increase in viscosity and pressure rise during cold start-up — something that competitors do not have. The Vickers VMQ 32nd design is the highest pressure, lowest noise fixed vane pump available.

Applications: Marine and railway winches, oil field and drilling equipment, earthmoving and construction equipment, high-pressure plastic injection molding machines, large press machines, trash compactors and large balers.

Specifications: Displacements: From 10 cc/rev (.60 in^3/r) to 463 cc/rev (28.2 in^3/rev) using triple pump combined flow. Pressure Range: Up to 4250 psi (293 bar). Speed Range: Up to 3000 r/min.

V/VQ Vane Pump

The V/VQ series vane pumps are the pioneers of cartridge-design vane pumps. They are well known for long operating life, outstanding efficiency, flexible configuration and easy serviceability. The quiet 12-vane V series pumps are the most popular medium pressure industrial fixed pumps in the world.

For mobile equipment, the unique flex plate in the VQ pumps adds superior start-up capability in cold and harsh outdoor work environment. That's why the VQ series pumps are widely adopted by world's leading mobile OEMs.

Specifications: Max. continuous pressure up to 3000psi/210 bar. Displacement up to 11.8in^3/rev[194cc/rev]. Speed up to 2700rpm. Available in single, double, triple and thru-drive pump frames.

Vane Pumps

V10/V20

Time proven dependable, durable, quiet and most economical vane pumps.They are the premium fixed pump choice as the main system pumps for small industrial and mobile equipment or as pilot and auxiliary pumps for complex systems.They are also the standard steering pump technology for heavy-duty trucks and interstate buses. Optional integrated flow control valves simplify system design and installation.

Specifications: Max. continuous pressure up to 2500psi/175 bar. Displacement: Up to 2.59in^3/rev[42cc/rev].Speed Range: Up to 4800rpm.

VVS/VVP

The VVS and VVP series variable vane pumps are cost effective solutions for low to medium pressure industrial applications where a flexible flow and low noise is required. A full range of control options are available from basic pressure compensator to load sensing, torque limiting control. The pumps are designed for long operating life thanks to hydrodynamic lubrication of bearings. You can find them in many high-end sophisticated machine tools.

Specifications: Max. continuous pressure up to 2300psi/160 bar. Displacement up to 6.1in^3/rev[100cc/rev]. Speed up to 1800rpm.

Open Circuit Piston Pumps

420

Eaton's new mobile equipment piston pump design sets the standard for high power in a compact envelope. This cradle swashplate style pump provides key performance enhancements over older designed pumps. The mounting, porting and thru-drive options allow extended flexibility for modern mobile equipment applications.

Applications: Refuse Trucks, Utility Boom Trucks, Ag. Tractors, Skid Steer Loaders, Rough Terrain Fork Lifts, Wheel Loaders, Backhoe Loaders, Construction Equipment, Earth Moving Equipment, Hydraulic Generator Drives, Hydraulic Fan Drive Systems.

Specifications: Displacements: 41cc, 49cc, 62cc & 80cc. Speed Range: Up to 2650 rpm. Pressure rating 280 bar continuous, 320 bar intermittent.

PVB

One of the most widely known industrial open circuit piston pumps on the market. The large number of control options provides for extreme flexibility in applications.

Applications: Factory automation, hydraulic power supplies, and small mobile equipment auxiliary circuits.

Specifications: Displacements: From 10cc to 94cc, 1800 RPM maximum and up to 210 bar.

Open Circuit Piston Pumps

PVQ

Based on the industrial versions of PVB and PVE Open Circuit Piston Pumps, the Q Series greatly improves operating noise levels. The design of the PVQ reduces sound levels by 4 dBA. The large number of control options provides for extreme flexibility in applications.

Applications: Factory automation, hydraulic power supplies, food processing machines, and machine tools.

Specifications: Displacements range from 10cc to 45cc, 1800 RPM maximum and up to 210 bar (3000 psi).

PVE

The PVE Open Circuit Piston Pump was designed with mobile hydraulics in mind. The robust design often exceeds the life requirements of the machines it is applied in.

Applications: Farm tractors, agriculture equipment, utility vehicles, construction equipment, and many other mobile applications.

Specifications: Displacements range from 25cc to 45cc, 3000 RPM maximum and up to 210 bar (3000 psi).

Open Circuit Piston Pumps

PVH

The H Series Open Circuit Axial Piston Pumps provide power for a wide range of mobile and industrial applications meeting customer requirements for performance. These cradle type swashplate pumps have rapid response to hydraulic circuit dynamics.

Applications: Mobile: wheel loaders, graders, scrapers, utility vehicles, dozers, forestry harvesting machines, and rock drills. Industrial: metal-forming equipment, hydraulic power supplies, press, factory automation, and machine tools.

Specifications: Displacements from 57cc to 141cc, speeds up to 2600 RPM and pressures up to 250 bar (3600 psi) continuous.

PVM

The M Series Piston Pump family was designed as a quiet, medium pressure pump for industrial applications. The cradle swashplate design pumps were created with low noise in mind. Design features reduce both the structure-borne and fluid-borne noise levels to market leading levels.

Applications: Metal forming, tube bending, machine tools, precision sawing, factory automation, press, and hydraulic power supplies.

Specifications: Full 280 bar (4000 psi) continuous, 320 bar (4600 psi) intermittent pressure. Electric motor speeds. Mineral-oil-based and fire-resistant fluid compatibility. Displacements from 18cc to 141cc. Pressure compensation and pressure/flow compensation controls.

Open Circuit Piston Pumps

PVXS

The Hydrokraft™ PVXS design pumps are high pressure (350 bar) axial piston pumps designed for industrial markets. The PVXS pumps are widely used where their range of specialized pump controls can optimize circuits.

Applications: Metal forming, tube bending, press, marine and off-shore winches, chemical mixing grinding/shredding, and hydraulic power supplies.

Specifications: Full 350 bar (5000 psi) continuous pressure. Electric motor speeds. Mineral oil based and fire resistant fluid compatibility. Displacements from 66cc (4.0 in^3) to 250cc (15/2 in^3).

PVWS

The Hydrokraft™ PVWS design pumps are high pressure (350 bar) axial piston pumps. These products are designed for industrial markets and have a perpendicular style control mechanism allowing tandem pump combinations with short lengths. These high displacement pumps have a very long list of optimized control options that allow operation in many unique customer applications.

Applications: Metal forming, tube bending, press, marine and off-shore winches, chemical mixing grinding/shredding, and hydraulic power supplies.

Specifications: Full 350 bar (5000 psi) continuous pressure. Electric motor speeds. Mineral oil based and fire resistant fluid compatibility. Displacements from 250cc (15.2 in^3) to 750cc (45.7 in^3).

Closed Circuit Piston Pumps & Motors

Heavy Duty Series 2 Axial Piston Pumps

Series 2 pump meets the market's demands for compact, quiet hydrostatic power. The power-dense, axial-piston design and wide range of controls are suited for mobile and industrial applications. Series 2 offers durability and high power density, plus a variety of options and controls.

Applications: Agricultural, crop sprayers, lift trucks, timber harvesters, road rollers, wheel loaders, road building, construction equipment and industrial applications.

Specifications: 430 bar (6250 psi), 5 displacements from 54 to 105cc. Speeds up to 4510 RPM. Integral charge pumps. A, B, B-B, C auxiliary through-drives.

Bent Axis Motors - Fixed & Variable

Eaton's family of Bent Axis Motors offer greater flexibility than ever before. Capable of operation in open or closed circuits, these motors are well suited to a wide range of stationary and mobile applications. Configurations include fixed and variable displacements, flange or gearbox mounts. Can be tailored with controls, ports, and valving to optimize productivity, efficiency, and cost effectiveness.

Applications: Earthmoving machines and construction equipment, agricultural and forestry vehicles, marine and off-shore equipment, industrial conveying, mixing and other stationary in-plant plant uses.

Specifications: Eleven fixed displacement options from 11cc (.66 cir) to 225cc (13.73 cir). Five variable displacement options from 55cc (3.34 cir) to 225cc (13.73 cir). Rated pressure 350 bar (5100 psi), peak pressure to 450 bar (6500 psi). Speeds up to 5590 RPM.

Heavy Duty Series 1 Axial Piston Pumps

Series 1 offers durability and high power density, plus a variety of options and controls.

Applications: Agricultural, transit mixer drum drives, industrial applications, lift trucks, timber harvesters, road rollers, wheel loaders and construction equipment.

Specifications: Six displacements from 54 cc/r (3.34 cir) to 125 cc/r (7.62 cir). Speeds up to 4510 RPM.

Heavy Duty Axial Piston Motors - Fixed & Variable

Eaton offers a complete line of piston motors for all types of hydrostatic drives. Product range includes fixed and variable displacement, axial and bent axis designs. Complete families of control, shaft, valve block, mounting and porting options offer unparalleled flexibility to systems designers.

Applications: Agricultural, construction, lawn and turf, utility equipment.

Specifications: Six displacements from 54 cc/r (3.34 cir) to 125 cc/r (7.62 cir). Pressure up to 430 bar (6250 psi). Speeds up to 4510 RPM.

Closed Circuit Piston Pumps & Motors

Medium Duty Axial Piston Manual Pumps

Different valve plate options provide a range of control efforts that can closely match your application needs. A square control shaft reduces control linkage wear. A flexible pump design, with single, tandem, and back-to-back versions available. When your application calls for a robust, manually controlled pump this product is the choice.

Applications: Agricultural, construction, lawn and turf, utility equipment.

Specifications: Model 70360 – Displacement (Max.): 20,3 cc (1.24 cid). Speed (Max.): 3600 RPM. Continuous Rated Pressure: 210 bar (3000 psi).Intermittent Pressure (Max.): 345 bar (5000 psi). Model 70160 Displacement (Max.): 40,6 cc (2.48 cid). Speed (Max.): 3600 RPM. Continuous Rated Pressure: 210 bar (3000 psi). Intermittent Pressure (Max.): 345 bar (5000 psi).

Medium Duty Axial Piston Servo Pumps

For ease of operation or electronic pump controls this product is the choice. A versatile, pump with many features and options. For example, five different charge pump displacements are available. A flexible design configured to meet your needs with many features and options.

Applications: Agricultural, construction, lawn and turf, utility equipment.

Specifications: Displacement (Max.): 40,6 cc (2.48 cid). Speed (Max.): 3600 RPM. Continuous Rated Pressure: 210 bar (3000 psi). Intermittent Pressure (Max.): 379 bar (5500 psi).

Medium Duty Axial Piston Motors – Fixed & Variable

Match these motors up with the appropriate pump for a robust hydrostatic transmission. They offer opposite, same and rear port configurations with many optional spline and keyed shafts. Available with shuttle valve, back pressure valve for improved loop cooling and flushing. Also offer speed sensors and a through-shaft option for brake mounts. Variable motors are available with manual, hydraulic destroke or servo control.

Applications: Agricultural, construction, lawn and turf, utility equipment.

Specifications: Displacement Range: 1.50, 2.01, 2.48, 3.02 cu. In. Speed (Max.): 3600 RPM. Continuous Rated Pressure: 210 bar (3000 psi). Intermittent Pressure (Max.): 370 bar (5400 psi).

Light Duty Transaxles

Eaton manufactures Models 751, 771, 778 and 851 transaxles with integral ball piston pumps, motors and axle with planetary gears. This design provides a strong and durable compact drive package. Several gear reduction ratios are available.

Applications: Lawn tractors, utility vehicles and ZTR mowers.

Specifications: Output Speeds (Max.): Model 751–110 RPM (@ 3600 RPM Input), Model 771--153 RPM (@ 3600 RPM Input), Model 778–121 RPM (@ 3600 RPM Input), Model 851 – 112 RPM (@ 3200 RPM Input).

Light Duty Hydrostatics

Light Duty Transmissions

These transmissions combine a variable displacement, radial-ball-piston, and hydraulic pump with a fixed displacement, radial-ball-piston, and hydraulic motor in one housing.

Applications: Lawn tractors (8-20 HP) and seeders, commercial mowers, golf course maintenance equipment, concrete saws, utility trucks, garden tractors and ZTR (zero-turn radius) mowers.

Specifications: Models 6 & 7 – Speeds (Max.) Input 3600 RPM, Output 2150 RPM. Torque Output: Continuous, 14 Nm (120 lb-in), Intermittent, 20 Nm (180 lb-in), Peak, 27 Nm (240 lb-in). Model 11– Speeds (Max.): Input 3600 RPM, Output 0 - 1950 RPM. Torque Output: Continuous, 41 Nm (360 lb-in), Intermittent, 61 Nm (540 lb-in), Peak, 81 Nm (720 lb-in).

Gear Pumps

Gear Pumps

SAE AA, A, and B mount aluminum pumps in displacements ranging from .2cid [33cc] to 3.4cid [55cc]. A wide range of mount, shaft, and porting options meeting SAE, Metric, and NPTF standards are available.

Applications: Garden and utility tractors, backhoes, combines, road graders, hay swathers and industrial power units.

Specifications: Speed Range (Max.): 2250 to 4000 RPM. Rated Pressures: 207 – 241 bar (3000 to 3500 psi).

Screw-in Cartridge Valves

Screw-in cartridge valves provide many advantages over traditional hydraulic valves. While offering the same control functions as traditional hydraulic valves, screw-in cartridge valves are compact, reliable, and economical. Combining multiple valves in a common manifold offers the user substantial cost-saving advantages that cannot be achieved with traditional valving.

Specifications: Pressure: Up to 6000 psi. Flow: Up to 150 USgpm.

Slip-in Cartridge Valves

Typically associated with relatively high flows, i.e. 40 USgpm or higher, slip-in cartridge valves are targeted at more efficient, faster and more compact hydraulic systems. Eaton cartridge valve system technology meets the changing needs of new generations of hydraulically operated machinery and equipment. Today's machines need controls that are exceptionally cost effective and energy efficient. Vickers cartridge valves fulfill these needs.

Applications: Compatible with computer or programmable controls via electrically modulated pressure and flow control models. Simple on-off solenoid pilot controls, as well as air operated types, are also available.

Specifications: Rated pressure 5000 psi (350 bar) ; rated flow up to 1300 USgpm (5000 l/min).

Directional Control Valves

DG valves mount on industry standard surfaces and provide 3 or 4-way control in a broad range of applications, industrial and mobile. Their primary function is to direct fluid flow to a cylinder or to control the direction of rotation of a hydraulic motor. These valves can be actuated by solenoid, hydraulic or pneumatic pilot, lever, or mechanically. A full range of complementary pressure, flow and check valve functions are available in the Eaton SystemStak™ family of sandwich mounted valves. Eaton DG valves are available in 10 different frame sizes.

Specifications: Rated pressure up to 5000 psi (350bar); rated flow up to 290 USgpm (1100 l/min).

Flow Controls – Adjustable

Temperature and pressure-compensated flow controls allow precise volumetric control. Suitable for pressures up to 3600 psi, flow controls are available with (bypass type) or without (restrictor type) integral relief valves. Adjustable flow control valves are suited for applications requiring flow regulation without pressure compensation.

Specifications: rated pressure up to 3600 psi (250 bar); rated flow up to 28 USgpm (106 lpm).

Flow Divider Valves

Priority-type, pressure-compensated flow divider valves are made in adjustable and non-adjustable models up to 379 L/Min. (100 GPM).

Pressure Control Valves

Pressure control valves performance pressure relieving, reducing, sequencing, and unloading control. Both subplate and in-line mounting types are available. Both subplate and in-line mounting types are available with various control types including remote, multiple pressure and venting.

Specifications: Rated pressure up to 5000 psi (350 bar); rated flow up to 180 USgpm (680 lpm).

Proportional Control Valves

Proportional control valves include directional, flow, and pressure controls driven by separate amplifier/control cards, or on-board amplifier. Directional control valves have three performance levels, standard, high (main stage feedback), and servo performance (two stage feedback).

Specifications: Rated pressure up to 5000 psi (350 bar); rated flow up to 190 USgpm (680 lpm).

Self-Leveling Valves

These linear flow divider valves for automatic leveling of bucket or attachments are used on skid steer or agricultural loaders. Available in single direction (raise only) or new dual direction.

Specifications: Rated Flow: 20gpm (75 lpm). Rated Pressure: 3500psi (240 bar).

Servovalves

These two-stage, four-way, flapper nozzle valves provide system closed loop control with exact positional accuracy, repeatable velocity and predictable force or torque regulation.

Specifications: rated pressure up to 5000 psi (350 bar); rated flow up to 40 USgpm (151 lpm).

SystemStak™ Modular Valves

These compact hydraulic systems feature modular valves that are "sandwich" mounted between a directional control valve and a standard mounting surface. All circuit flow paths are contained within the control valve and modules. These valves provide a compact hydraulic circuit at a reduced cost, eliminating interconnecting piping. Each valve "stack" can be configured to provide the specific system functions.

Specifications: Rated pressure up to 4500 psi (315 bar); rated flow up to 90 USgpm (340 lpm).

HRCs – Hydraulic Remote Controls

Low effort, precise control means less operator fatigue and more productivity. Excellent pressure metering capability allows precise control and less wear-and-tear. Freedom of system design means single-station control of widely placed directional valves can be readily achieved. In a vehicle, an HRC is easily mountable in the cab or elsewhere because it is compact and eliminates the cumbersome mechanical linkage found in many applications. HRCs are now available with STC Direct Port Options for fast, reliable, one-hand connections.

Applications: Wheel loaders, skid steer loaders, backhoeloaders, excavators, cranes, lift trucks and forestry machines.

Specifications: Rated Flow: 5.3 gpm (20 lpm). Rated Pressure: 1450psi (100 bar).

CMX Sectional Valves

CMX sectional valves provide hydraulic or electrical actuation, allowing generous flexibility for location and installation in a vehicle. Phasing between meter-out and meter-in can be pre-selected to easily match valve metering to type of load and cylinder area ratio and permit lowering without using pump flow. Pressure compensated meter-in provides good metering when two or more functions are operated simultaneously and permits priority to be accomplished in pilot circuit.

Applications: Forestry equipment, wheel loaders, rough terrain lift trucks and boom man lifts.

Specifications: Rated Flow: 26 ans 42gpm (98 & 159 lpm). Rated Pressure: Up to 5075psi (350 bar) depending on port configuration.

Monoblocks™ – 5 & 15 GPM

Excellent monoblock design results in fewer leakage paths. Hardened and plated spools provide superior impact and corrosion resistance. Two–point mounting prevents spool binding.

Applications: Trenchers, sweepers/scrubbers, stand-up lift trucks, aerial work platforms, small ag loaders, garden tractors, golf course maintenance equipment and highway mowers.

Specifications: Rated Flow: 5 and 15gpm (19 & 56 lpm). Rated Pressure: 2500-3000psi (172-207 bar).

Hydraulic, Pneumatic & Electrohydraulic Cylinders

A broad range of single and double acting cylinders is available for industrial and mobile markets, with standard and custom design and manufacturing capability to meet every need.

Applications: Applications include plastic blow and injection molding equipment, machine tools, steel mills, tube benders, packaging and material handling equipment, food processing, off-shore, planters and pickers.

Specifications: Rated Pressures to 4,600 psi (320 bar) Standard, to 10 ksi Custom. Available Sizes: 3/4 to 60 inch (20 to 1500 mm) bore sizes. 5/16 to 50 inch (8 to 1270 mm) rod sizes. Strokes to 65 feet (20 meters).

Filtration

Vickers filters handle flows to 475 USgpm (1800 l/min) and pressures to 6090 psi (420 bar). A wide range of port sizes, bypass valves, pressure drop indicators and media grades facilitates filter installation and achievement of desired system cleanliness levels. Inch or metric ports are available. Reservoir vent filters feature a visual indicator and corrosion-resistant housing. In addition to particle control, these filters also feature water/moisture control.

Packaged Systems

The most complete line of Industrial Power Units in the marketplace, including verticals, horizontals, L's, overheads, and JIC. Available in gear, vane and variable piston pump options with flows from 1 gpm to 57 gpm and standard reservoir sizes from 3 gallons up to 150 gallons. Custom Configurations are available upon request.

Hydraulic Hose Products

High Pressure Spiral Hose and Fittings

Eaton offers spiral hose and fittings exhibiting Best-In-Class longevity and breadth of product line designed to perform in a wide variety of hydraulic applications.

When coupled with our Global Spiral fittings, featuring micro-alloy steel and no-braze technology, our assemblies provide superior lifecycle performance.

Applications: hydrostatic drives, oil rigs, construction equipment, mobile & industrial systems.

Specifications: Available in a broad range of cover materials and sizes that meet a variety of applications. Our hoses meet or exceed EN/DIN, Mil-spec and SAE specifications.

Medium Pressure Braided Hose and Fittings

Medium pressure braided hose and fittings represent the largest market and widest variety of hydraulic applications. Our unsurpassed line of products ensures you can always find the right hose for your application.

Applications: General hydraulic systems, mobile equipment, industrial equipment.

Specifications: A range of hose styles and sizes that meet a variety of EN/DIN, Mil-spec and SAE specifications. Certifications include ABS, DNV, MSHA, DOT/FMVSS and many more.

Hydraulic Hose Products

Thermoplastic

Choose from a full line of hydraulic thermoplastic hose. The versatility of thermoplastics allows for non-conductive hose to be used on utility truck applications.

Applications: Forklifts and agricultural equipment.

Specifications: Hoses with ID's that range from 1/8" thru 1". Pressures: Up to 10000 psi.

MatchMate Plus™

Aeroquip's MatchMate Plus "3 Minute Crimp Hose Assembly System" is tailor made for high-speed assembly processes. Hoses are color-coded for the ease of identification. An error-free selection exists for fittings – the number of rings on the fitting sockets matches-up with the number of rings on the hose laylines.

Applications: General hydraulic systems, mobile equipment, industrial equipment.

Specifications: 6 hose styles; 1/4" thru 2" size range that meet a variety of EN/DIN and SAE specifications.

Specialty Hose Products

PTFE

A broad range of hose and matched fittings are available for use in a wide variety of applications. PTFE fits the bill when high temperature meets the entire spectrum of fluid pressures.

Applications: Ranging from self-contained breathing apparatus to high temperature engine hose.

Specifications: Meet SAE 100R14A and B specifications. Pressures: Up to 5000 psi.

A/C & Transportation Products

Engineered components and assemblies for a wide range of fluid power systems. Hose materials range from high temperature AQP® to PTFE to nylon veneer products for A/C applications.

Applications: Hose and fittings for air conditioning and refrigeration, fuel and lube oil, engine and transmissions, oil cooler lines, airbrake, and power steering applications.

Specifications: A/C = multi-refrigerant; Transportation = truck hose for every application.

Specialty Hose Products

Performance Products

High performing hose, fittings and adapters for discriminating motorsport enthusiasts and professionals around the world. Aeroquip Performance Products...There is a difference!

Specifications: Fuel, oil, coolant, gauge, and brake lines.

Marine/Military

Wide variety of hose, fittings and adapters that meet many marine, military and government specifications. Aeroquip Marine/ Military...there is no equal!

Specifications: Lube, fuel, water, and air. A detailed catalog specifically listing the Mil spec part numbers is available for the customer's use.

Fluid Transfer

From low pressure air and water to hazardous chemical transfer, Boston offers a variety of products to meet the exact needs of an application. These products range from 1/4" to 8" ID in size and many are available in either spiral or braided construction.

Applications: Air, Water, Cleaning, Material Handling, Food, Chemical, Petroleum, Steam hoses and Specialty Service.

Low Pressure Hose

Choose from a full range of low pressure hose with push-on connections, including hi-temperature AQP, abrasion resistant covers for demanding service life and color-covered hose for installation identification. A low temperature MIL-DTL-13444 hose is included in the product offering.

Applications: Ranging from low pressure machine tools, fuel, oil, air and water. The size range is 1/4"ID through 3/4" ID. (not recommended for hydraulic impulse applications).

Adapters and Tube Fittings

Adapters come in a variety of standard and non-standard configurations to meet every need. Available in carbon, steel, brass, and stainless steel. Tube fittings are designed to match up with tube dimensions that are offered in a variety of configurations — ISO, BSP, and NPT to name a few popular standards.

Applications: General hydraulic systems use.

Specifications: Available in sizes 1/8" up to 2". Adapters meet dimensional specifications outlined in SAE, J512, J513, J1926, and J1453.

Couplings

A broad range of products encompassing the simple (air couplings) to the complex (hydraulic applications) to the most complex (SCBA).

Applications: Hydraulic attachments, SCBA.

Specifications: Full range of pneumatic, hydraulic and fluid transfer. Couplings meet a variety of SAE and ISO specifications.

Swivels

Offering compact and robust designs while offering a wide variety of end configurations with the flexibility to perform in many dynamic hydraulic applications.

Applications: Hose reels, scissor lifts.

Specifications: Can be used in a full range of pneumatic, hydraulic and fluid transfer applications.

STC®: Snap-To-Connect

The broadest range of threadless connectors in the industry! Eaton patented technology has been extremely successful in various rigorous mobile applications.

Applications: Truck/bus platforms and construction/agricultural equipment.

Specifications: Connections are offered in 3/8" up to 1". Pressures: Up to 345 bar (5000 psi).

Tools & Crimp Machines

A wide variety of crimp machines are available for every requirement (low and high volume hose assembly) for both distributors and OEMs. Select from a complete line of popular crimp machines.

Specifications: Ability to crimp hose of all sizes (1/8" up to 2").

Accessories

A full range of clamps, protective sleeves, hose cleaning services and hose routing aids.

Specifications: Able to be used with all sizes of hose and metal products.

Learn from the hydraulics experts with Eaton Fluid Power Training.

Knowledge is power. And nowhere can your team strengthen its knowledge more effectively than with Eaton Fluid Power Training.

Attendees can save their company significant costs by reducing unplanned downtime and maximizing the effectiveness of planned downtime. Each year, more than 2,500 people attend training at Eaton Fluid Power Training Centers in Eden Prairie, Minnesota, Maumee, Ohio, and Wehrheim, Germany, or through customized on-site programs, worldwide.

Our field and industry specialists combine 140 years of experience in fluid power and education, with the impressive legacy of Vickers and Aeroquip Training. Along with the recent addition of Eaton's 18,000 square foot state-of-the-art, world-class training facility in Maumee, Ohio, USA, our training team delivers valuable, practical insight about design, contamination and troubleshooting of hydraulic and pneumatic circuits.The Maumee facility is furnished with two fully equipped labs, which are complemented by two innovative classrooms for a thoroughly integrated learning experience.

Eaton Fluid Power Training offers more than 15 top-line, hands-on courses for industrial and mobile applications – with other programs and resource materials available for home study. Eaton Fluid Power Training is ideal for maintenance personnel, supervisors, engineers, and even purchasing agents.

With Eaton Fluid Power Training, you can benefit from:

- Immediate access to Eaton experts
- Focused and consistent training
- Two fully-equipped training facilities
- Small class sizes for focused instruction
- Multi-lingual training and worldwide resources
- INVEST, an electrohydraulics home-study program
- Easy-to-read professional publications

Two full-size classrooms and two hands-on instruction labs certify our Maumee facility as one of most highly respected hydraulics training facilities in the world. For an up-to-date class schedule and list of training materials, visit **www.eatonhydraulics.com/training** or call **800-413-8809** (US), **or 49 (0)6081 103344** (Germany).

Courses

- Industrial Hydraulics
- Mobile Hydraulics
- Troubleshooting
- Systemic Contamination Control
- Circuit Design
- Pneumatics
- Electrohydraulics
- Cartridge Valves
- Proportional Valves
- Customized training at your location
- Product Training

Materials

Manuals:

- Industrial Hydraulics
- Mobile Hydraulics
- Electrohydraulics
- Contamination Control

Videos:

- Aeration/Cavitation Demonstration
- Introduction to Hydraulic Technology Set
- Test and Repair Series

Cut-aways:

- Pumps
- Valves
- Motors

Simulators

- FPT-4e: Double-sided workstation, accommodates 4–6
- Desktop: Self-contained, compact
- Electrohydraulic: Single-sided workstation, accommodates 3–4

Contents

Overview

Contents

Char-Lynn, Hydraulic Motors

Introduction...

For the past 45 years, the Char-Lynn®, brand has been recognized as the industry leader in low-speed, high-torque (LSHT) hydraulic motor technology. The name Char-Lynn was coined by one of the original pioneers in the hydraulic industry, the late Mr. Lynn Charlson. The hydraulic motor designs developed by Lynn Charlson and his team use what is termed as the Orbit principle. This principal is the center of the designs pioneered by the Char-Lynn team and is based on the fact that a gerotor or Geroler®, star orbits multiple times (typically 6 to 8 times depending on specific star and ring geometry) for each complete single revolution within the outer ring. This principle is what gives Char-Lynn motors their reliable high power density and extremely compact size. Only three primary moving components are needed to transmit torque through the motor: star, drive and output shaft. Shaft rotation can be instantly reversed by changing inlet / outlet flow while generating equal torque in either direction. A variety of displacement sizes are available in each motor family that provide a wide variety of speeds and torque ranges from any series of motors. The results are compact, modular, economical designs that can be easily customized to suit a wide variety of application needs.

Motor options include:

- Displacement size (cubic inches or cc's per revolution)
- Output shaft size and type
- Mounting flange type
- Porting interface
- A wide selection of special features such as integrated brakes, sensors, integrated cross-over relief valves, 2-speed capability, manifold valve packages, and environmental protection suited for corrosive environments.

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

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

- **Spool Valve**
- **Disc Valve**
- **VIS (Valve-in-Star)**

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

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

MOTOR QUICK-GUIDE (BASED ON MAXIMUM CONTINUOUS RATINGS)

Type	Output Torque Nm [lb-in]	Pressure bar [psi]	Flow lpm [gpm]	Side Load kg [lbs]
Spool Valve	441 [3905]	165 [2400]	62 [18]	725 [1600]
Disc Valve	2700 [24000]	205 [3000]	170 [45]	4500 [10000]
VIS (valve-in-star)	4520 [40000]	345 [5000]	170 [45]	8640 [19000]

Hydraulic Circuit

Hydraulic drives can be divided into two basic types: 1) Traction Drives and 2) Non-Traction drives. Traction drives (also referred to as propel drives) are used to propel a wheeled or track-driven vehicle. Non-traction drives (also referred to as work drives) are used for some other vehicle function such as a winch, auger, conveyor or rotate function for a boom or crane.

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

Open Loop Circuit

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

Typical applications using open loop circuits include:

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

Closed Loop Circuit

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

These systems provide dynamic control of flow through the closed loop of the motor/pump circuit. They are, however, subject to some inherent internal leakage that results in the inability of the loop to hold a load over time. This is why a static brake is typically found in such systems to mechanically hold the load. Brakes used include mechanical caliper, disc or ball-ramp type brakes. In addition, spring-applied, hydraulic release brakes are used. The T Series Motor w/Parking Brake meets this need.

Typical applications using closed loop circuits include:

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

Design Flexibility

Char-Lynn motors are truly built for high torque low speed. A lot of power is derived from this small package. This power advantage provides the designer with a product that can be used for overall compactness in addition to taking full advantage of the high pressure ratings typical of present day hydraulic components.

Char-Lynn hydraulic motors allow the designer to put the power where it is needed. Furthermore, the motors can be mounted directly on the driven device away from the original power source which eliminates the need for other mechanical linkages such as chains, sprockets, belts, pulleys, gears, rotating drive shafts, and universal joints. Several motors can be driven from the same power source and can be connected in series or parallel to each other.

Durability

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

Performance Rating

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

Controllable Speeds

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

Dependable Performance

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

Reliability

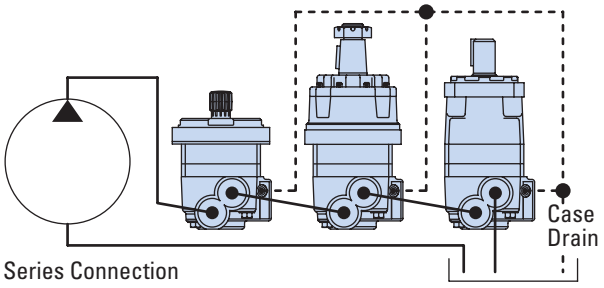
Char-Lynn motors are self contained, with hydraulic fluid providing lubrication. These motors are completely sealed so they can operate safely and reliably in hostile environments such as dust, dirt, steam, water, and heat and provide reliable performance.

High Efficiencies

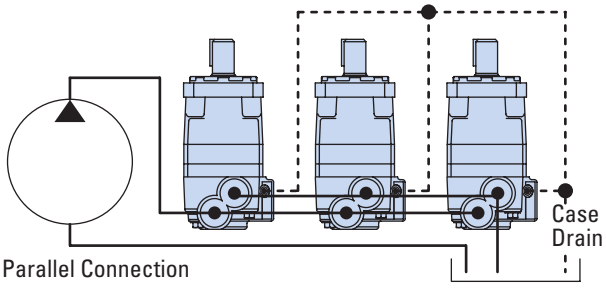
Char-Lynn motors efficiently convert the supplied hydraulic fluid's pressure and flow into a low speed high torque rotational output. This efficiency minimizes the rate of hydraulic system heat generation and maximizes shaft horsepower.

Case Drain and Shuttle Valve Options

Many hydraulic systems can benefit from the use of a system case drain. Char-Lynn motors provide this feature built in. One of the advantages for case drain flow is that contamination is flushed from the system. This flushing also aids in cooling the system and lowering the case pressure which will extend motor seal life. With a case drain line in place, oil pressure in the gear box (Bearingless motor applications) can also be controlled. In applications where more system cooling and flushing is required, a shuttle valve option is available in W series, 2000, 4000 Compact, 4000, 6000 series, VIS 30, VIS 40 and VIS 45 series motors.



Series Connection



Parallel Connection

Motor Application Information

Vehicle Drive Calculations

Step One — Calculate Motor Speed (RPM)

$$RPM = \frac{2.65 \times KPH \times G}{R_m} \qquad RPM = \frac{168 \times MPH \times G}{R_I}$$

where KPH = vehicle speed (kilometers per hour)
where MPH = vehicle speed (miles per hour)
R_m = rolling radius of tires (meter)
R_I = rolling radius of tires (inch)
G = gear reduction ratio (if any) between motors and wheels. If no gear box or other gear reduction devices are used G = 1.

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

Step Two — Determine Rolling Resistance

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

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

where GVW = gross (loaded) vehicle weight lb/Kg
ρ = value from Table 1

TABLE 1- ROLLING RESISTANCE COEFFICIENTS FOR RUBBER TIRES ON VARIOUS SURFACES

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

Step Three — Tractive Effort to Ascend Grade

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

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

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:

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

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

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

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

Step Five — Determine Drawbar Pull

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

1. A goal or objective of the designer.

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

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 (Kg. or lb.)

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

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

Step Seven — Calculate Hydraulic Motor Torque (T)

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

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

Where: N = number of driving motors
Eg = gear box mechanical efficiency

Step Eight—Wheel Slip

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

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

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

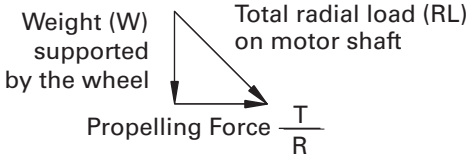
Where: f = coefficient of friction
W = loaded vehicle weight over drive wheel

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

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

Step Nine — Motor Radial Load Carrying Capacity

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



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

Refer to radial load rating of each motor series.

Shaft Torque (T)

$$\frac{T = q\ \Delta P}{2\pi}$$

$$\frac{\text{bar} \times \text{cm}^3/\text{rev}}{62.8} = \text{Nm} \quad \frac{\text{PSI} \times \text{in}^3/\text{rev}}{6.28} = \text{lb} - \text{in}$$

Shaft Speed (N)

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

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

Power (into motor)

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

Power (out of motor)

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

where:
- Kw = Kilowatt
- HP = Horsepower
- LPM = Liters per Minute
- GPM = Gallons per Minute
- Nm = Newton Meters
- lb-in = Pound inch
- Bar = 10 Newtons per Square Centimeter
- PSI = Pounds per Square Inch
- q = Displacement

Optional Features

OPTIONAL FEATURE	BENEFIT
2 Speed motors	Allows motor to have two displacements (higher speed has lower torque)
Seal Guard	Prevents physical damage to shaft seal from foreign debris
High pressure Shaft Seal	More robust shaft seal that can withstand high case pressure spikes
Environmental protection	Epoxy coating for demanding application in harsh environment
Nickel Plated Shaft	For highly corrosive environment or food/sanitary applications
Integrated Parking Brake	Spring applied hydraulic release brake
Mechanical Disc Brake	Bolt on caliper brake for wheel motor applications
Free running option	Improved mechanical efficiency at high-speed/high-flow conditions
Speed sensors	To collect speed and/or direction information from a motor and provide electric signal
Shuttle valve	Redirect some low pressure oil for increased cooling in closed loop applications
Case port	To increase lubrication and flushing of the motor and reduce case pressure , extend seal life
Internal check valves	Relieves the case pressure to the low pressure port
Low speed valving	For better efficiency and smooth running at low speed conditions (<200 RPM)
Vented Two-Stage seal	Extends shaft seal life
Viton seals	For higher temperature or chemical resistance applications
Integral cross over valving	Cost effective design that limits the differential pressure across the motor
Metric Shafts, Ports, & Mounts	EU specific threads
Reverse Rotation	Allows clockwise shaft rotation with B port pressurized

Optional Features

OPTIONAL FEATURES	TYPICAL APPLICATIONS*													
	WINCH	SWING DRIVES	SWEEPER BRUSH DRIVES	AUGER	INDUSTRIAL CONVEYOR	CAR WASH	TURF PROPEL	IRRIGATION REELS	MIXERS/GRINDERS	PLASTIC INJECTION MOLDING	TRACTION DRIVES	TRENCHER CHAIN DRIVES	SALT SAND SPREADER	MARINE WINCHES
2 Speed Motors	x			x				x			x			x
Seal Guard			x				x		x			x		
Viton Seals					x					x				
High Pressure Shaft Seal	x								x					
Environmental protection					x	x							x	x
Nickel Plated Shaft					x	x							x	
Integrated Parking Brake	x	x			x			x			x			x
Mechanical Disc Brake							x				x			
Free running option		x												
Speed sensors					x			x	x	x		x	x	
Shuttle valve							x		x		x	x		
Case port	x	x	x	x	x		x		x		x	x		
Internal check valves					x	x	x							
Low speed valving		x			x		x				x		x	
Vented Two-Stage seal					x	x	x				x			
Integral cross over valving	x	x		x										x
Metric Shafts, Ports, & Mounts	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Reverse Rotation					x									

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

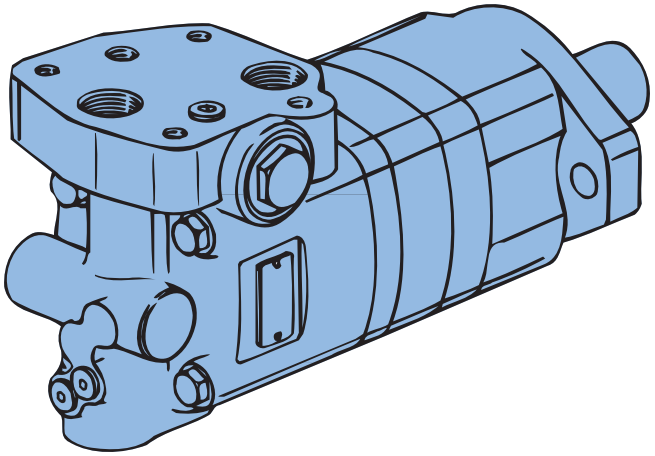
Optional Features

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

O Optional
S Standard
— Not applicable

Two Speed Motors

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



Features:

This option gives the user the ability to switch the displacement of the motor thus providing a different speed at a different torque without changing the input flow or pressure. An external three way valve is required for shifting the pilot pressure port between signal pressure (HSLT) and low pressure (LSHT).

Two speed motors are available with a return line closed center shuttle for closed circuit applications.

Benefits:

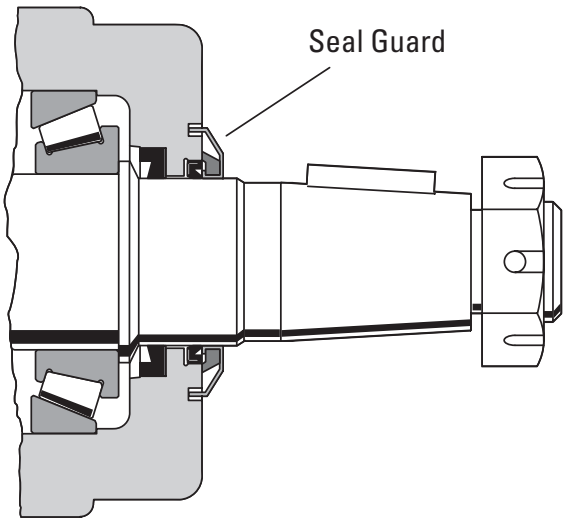
- Two operating speeds and torque levels with one motor
- Two selectable performance ranges in one motor package

Application:

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

Seal Guard

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



Features:

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

Benefits:

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

Applications:

- Street sweepers
- Industrial sweepers
- Lawn and turf equipment (ZTR)
- Harvesting machinery
- Mining equipment

Viton Seals

This option is available on all Char-Lynn motors.

Features:

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

Benefits:

- Longer seal life in chemically aggressive environment

Applications:

- Industrial conveyors
- Plastic injection molding

High Pressure Seals

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

Features:

Eaton has introduced a high-pressure shaft seal option for its H, S, T and 2000 series motors. The seal geometry is optimized for applications that operate under extreme conditions. The seal geometry increases the clamping force of the sealing lip against the output shaft to prevent seal leakage at extreme pressure conditions. Case pressure forces the lip of the seal to clamp more tightly against the output shaft. The result is a seal the handles high pressure spike conditions without failure. The seal is designed to withstand case pressures up to 200 bar [2900 PSI] at 150 rpm.

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

- 100 bars (1500 PSI) for H, S, T motors
- 140 bars (2000PSI) for 2000 Series
- 100 bars (1500 PSI) for 4000 Series
- 70 bars (1000 PSI) for 6000 Series
- 20 bars (300 PSI) for the 10,000 Series
- 20 bars (300 PSI) for VIS 30, 40, 45

Benefits:

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

Applications:

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

Special Notes:

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

Part Numbers:

H Series – Kit No. 60572-000

S Series – Kit No. 60578-000

T Series – Kit No. 60579-000

Shaft Seal –
Part No. 14778-001

2000 Series –
Kit No. 61329-000.

Shaft Seal – No. 14857-001

Environmental Protection

(epoxy paint) (plated shafts)

This option is available on all Char-Lynn motors.

Features:

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

Benefits:

This coating protects the motor from salt water and various chemicals.

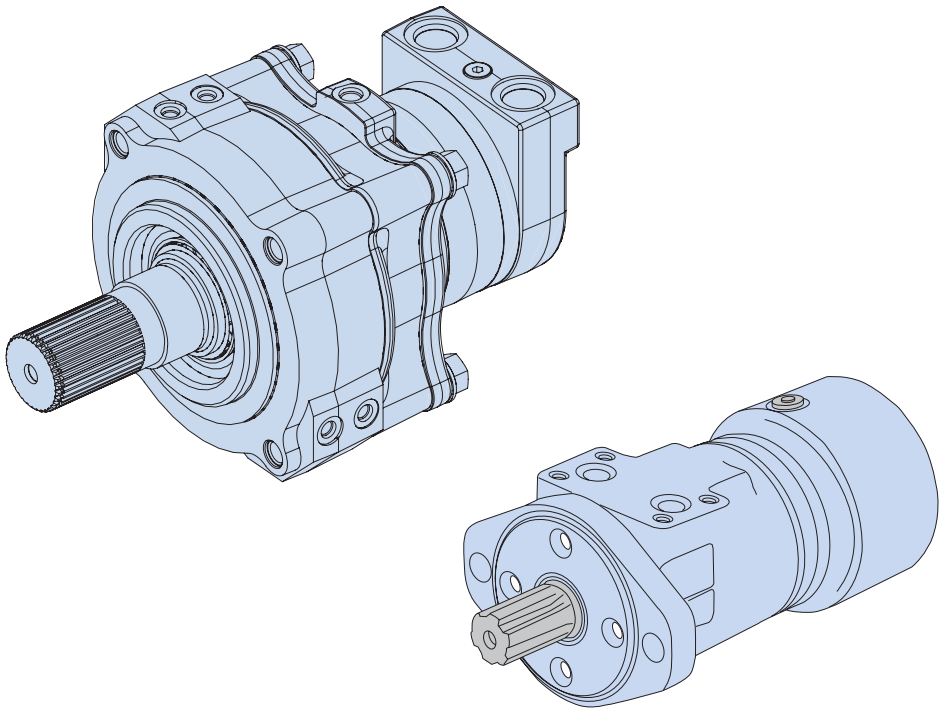
Motor output shaft plating helps eliminate seal damage caused by caustic or acidic materials.

Applications:

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

Brake Solutions

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



Features:

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

- T Series with Integrated Parking Brake
- W Series with Integrated Parking Brake
- VIS Series with Integrated Parking Brake

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

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

Benefits:

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

Applications:

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

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

Contact:

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

Free Running Geroler Sets/ Gerotor Sets

This feature is available in all Char-Lynn motors.

Features:

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

Benefits:

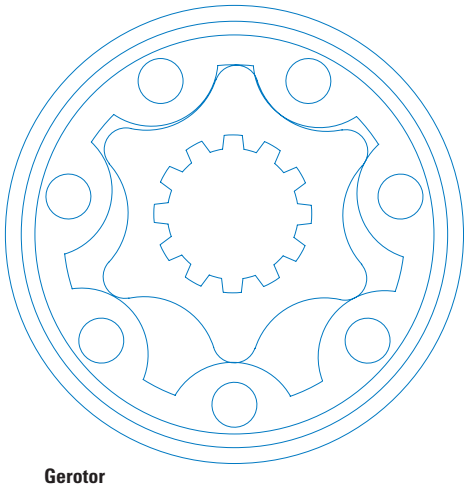
- Suited for applications with rapid stop/start or rapid reversals.
- Reduces starting pressure and increases starting torque efficiency.
- Reduces pressure spikes through the orbit gear set.

Applications:

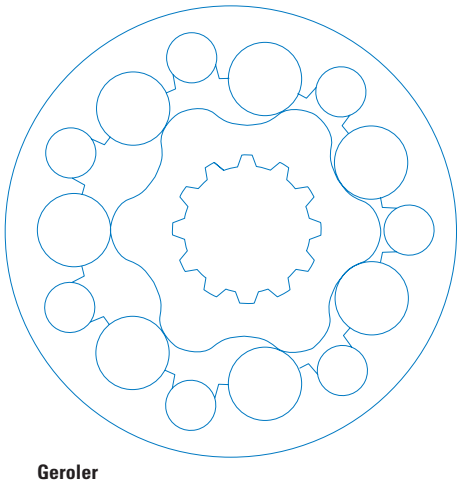
- Harvesters
- Stump Grinders
- Skid Steer Loader Attachments
- Machine Tools
- Especially suited for continuous high speed/ high flow applications.
- Also suited for applications with high-pressure spikes from rapid reversals.

Special Notes:

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



Gerotor



Geroler

Gerotor or Geroler?

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

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

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

RPM = speed of output shaft in revolutions per minute

SUS = minimum viscosity measured in SUS.

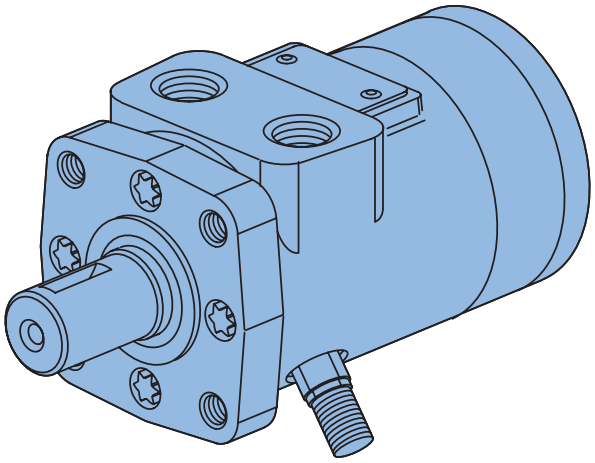
The recommended viscosity limits are as follows:

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

2) A Geroler Orbit gear set requires a minimum fluid viscosity of 70 SUS.

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

Speed Sensors



Note:

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

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

Features:

Eaton has developed speed sensors specifically designed for LSHT motors.

The single output speed sensor:

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

The dual output speed sensor:

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

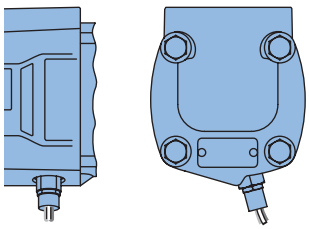
- The first version speed sensor has two output signals 90° out of phase. Each output provides one pulse per target.
- The second version has a speed signal that is twice the output pulses per revolution and it also has a direction signal. (Direction not available on spool motors)

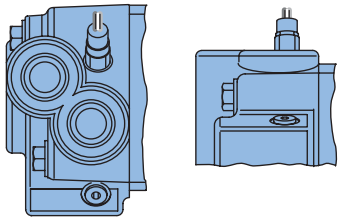
Benefits:

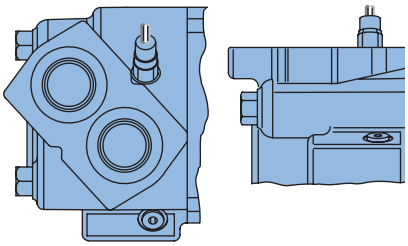
These speed sensors provide vital information that can be collected and interpreted by a PLC or other device.

Applications:

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







TECHNICAL INFORMATION

Motors	Speed Sensor Pulses Per Rev	Quadrature Pulses Per Rev
J,H,S,T,W	15	60
2000 series	30	60
4000 series	30	72
6000 series	30	80
10,000 series	30	60
VIS 30, 40, 45	30	60

Single and Two Outputs:

Supply Voltage: 8 to 24 Vdc (compatible with 12V vehicle systems

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

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

M12 Connector (version 1)

Pin 1 = Power supply

Pin 2 = Output one

Pin 3 = Common

Pin 4 = Output two

M12 Connector (version 2)

Pin 1= Power Supply

Pin 2 = Direction

Pin 3 = Common

Pin 4 = Speed signal

Shuttle Valve

Lubricating Shuttle

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

Features

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

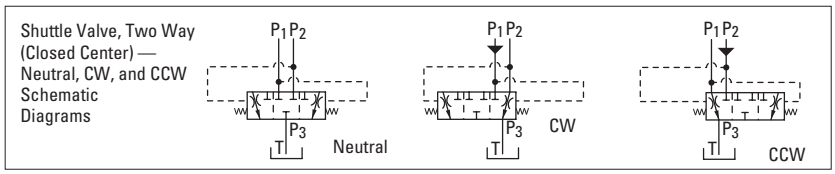
Benefits

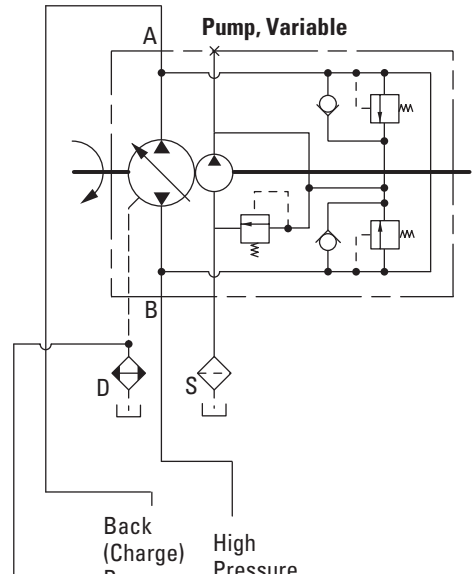
- Flushing
- Cooling
- Longer system life

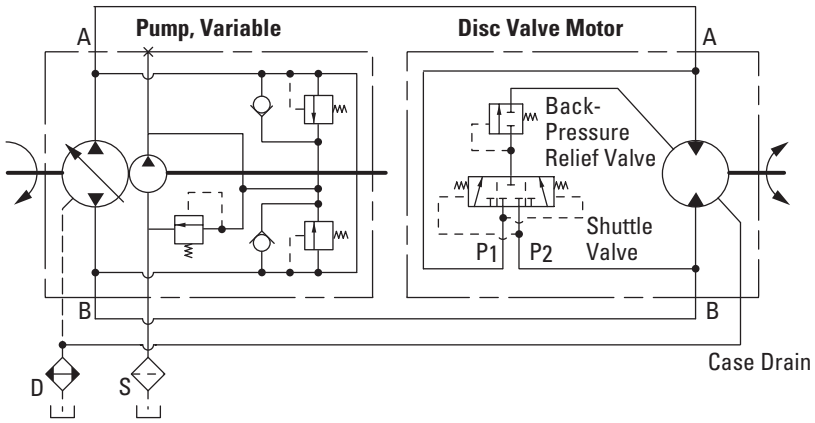
Applications

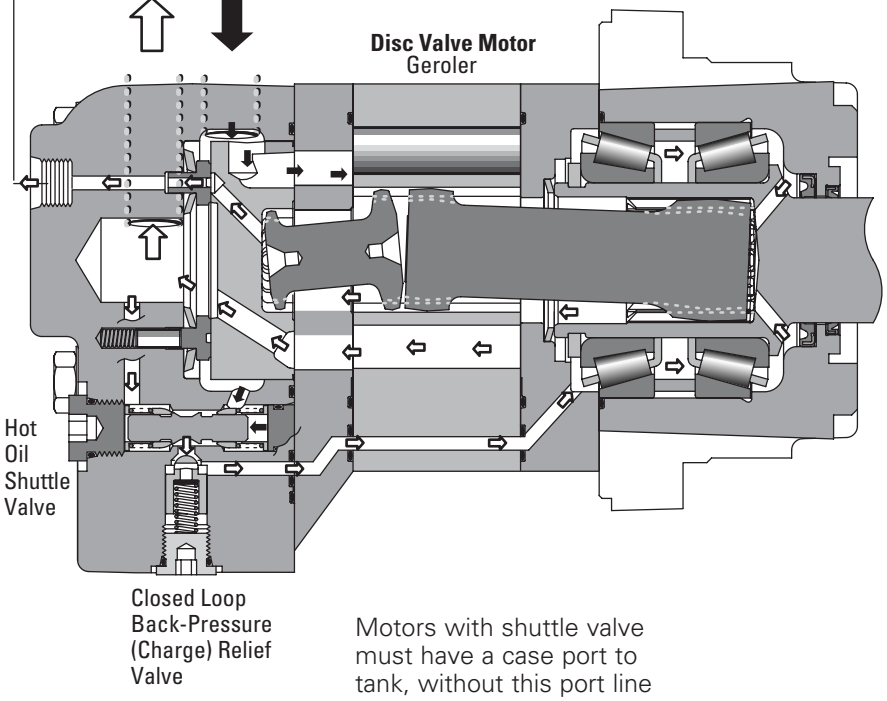
- Turf Propel
- Mixers/Grinders
- Traction drives
- Trencher chain drives

Closed Loop Circuit



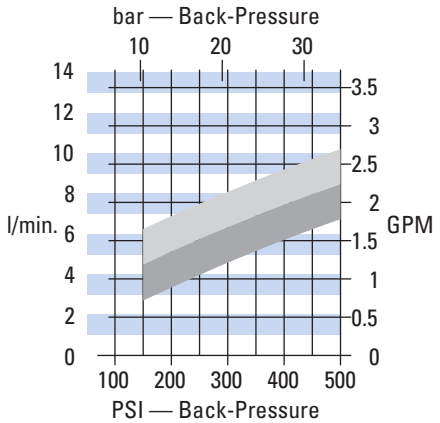






Typical Disc Valve Motor Shuttle Flow with 4,5 bar [65 PSI] Back-Pressure Relief Valve (Typical Data)

Due to Machining Tolerances, Flow May be More or Less



4000 Series and 6000 Series

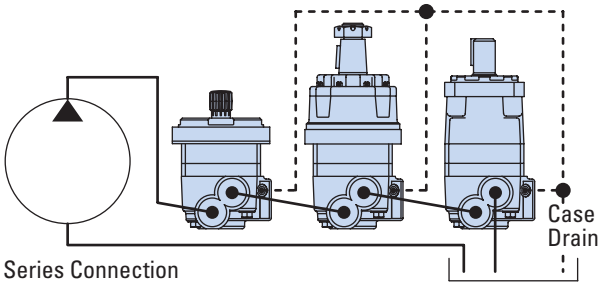
2000 Series and 4000 Compact Series

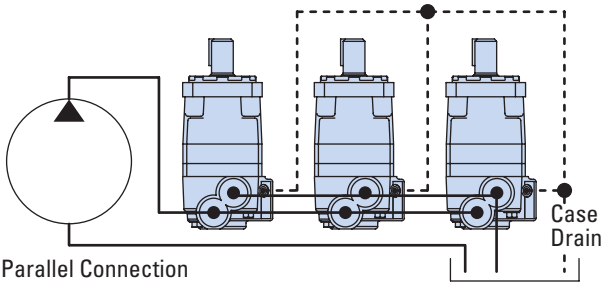
Motors with shuttle valve must have a case port to tank, without this port line the internal drive splines will not have adequate lubrication.

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

Case Porting

This option is available on all Char-Lynn Motors.





Features:

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

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

Benefits:

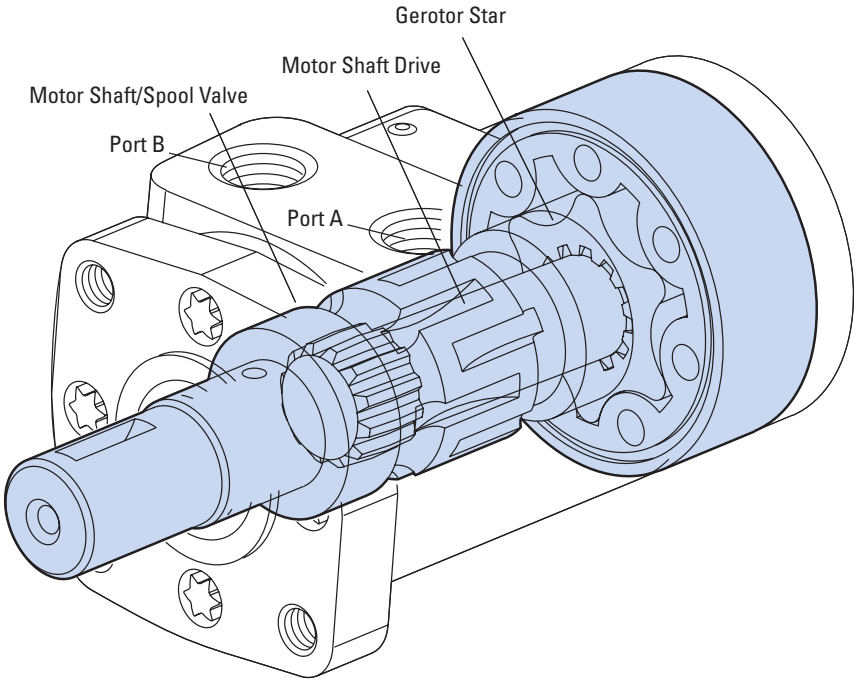
- Extends shaft seal life
- Extends thrust bearing life
- Reduces shaft seal leakage problems
- Improves flushing of the circuit to reduce system contaminates and cooling the system.

Applications:

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

Low Speed Valving

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



Features:

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

Benefits:

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

Applications:

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

Notes:

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

Vented Two-Stage Seal

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

Features:

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

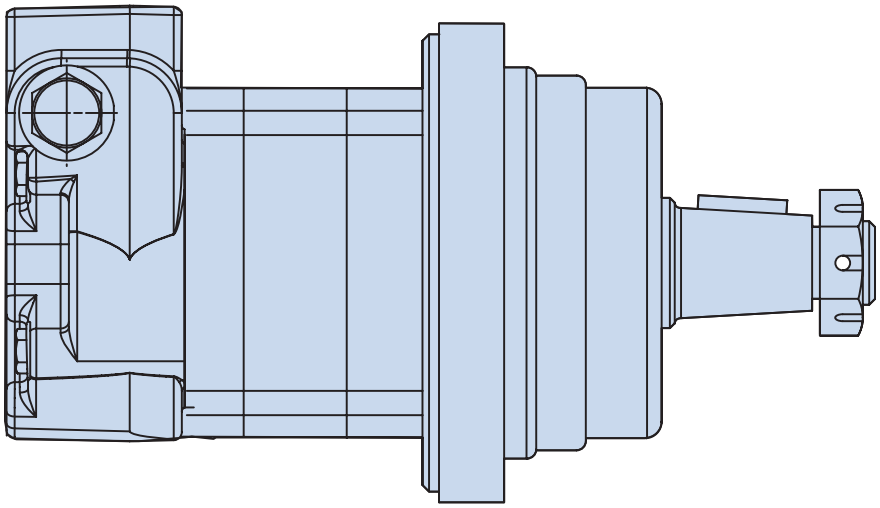
Benefits:

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

Applications:

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

Integral Valves for 2000 Series



Features:

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

Benefits:

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

Applications:

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

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

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

REPLACEMENT CARTRIDGES

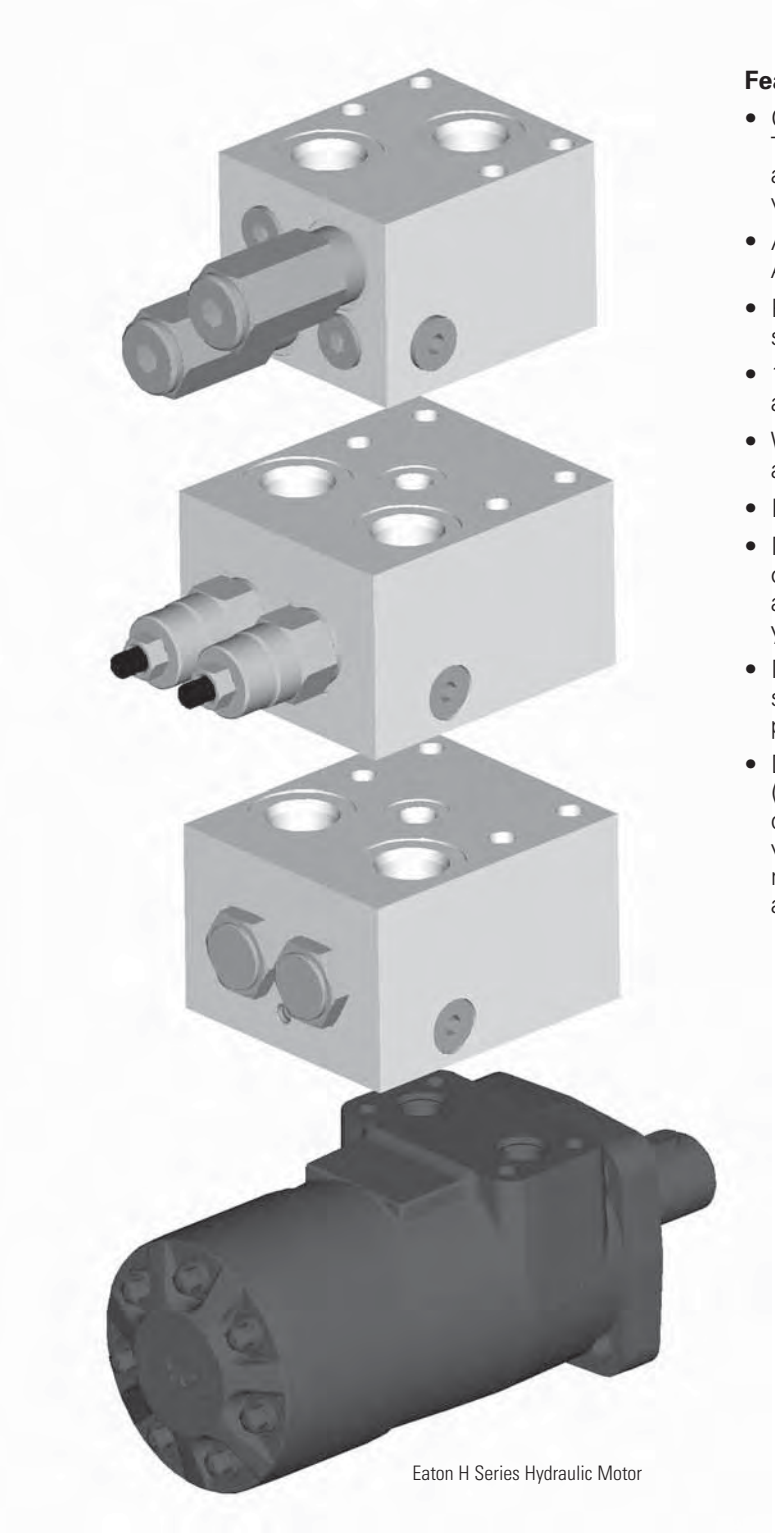
Item part #	Item desc.	Relief valve setting
02-199291	RV5A-10-F-0-35/15	1500 PSI
02-199292	RV5A-10-F-0-35/17.5	1750 PSI
02-199293	RV5A-10-F-0-35/20	2000 PSI
02-199295	RV5A-10-F-0-35/22.5	2250 PSI
02-198563	RV5A-10-F-0-35/25	2500 PSI
02-199294	RV5A-10-F-0-35/27.5	2750 PSI
02-199296	RV5A-10-F-0-35/30	3000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

Special Housings
Bolt on Solutions

Cartridge Valves &
Manifolds for Spool
& Disk Valve Motors

We Manufacture Solutions

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



Eaton H Series Hydraulic Motor

Features

- Compatible with Eaton H & T series spool valve motors, and most 2000 series disk valve motors
- Aluminum Manifolds Anodized Black
- Pre-set cartridges to your specifications
- 100% production tested assembly
- Wide range of settings available
- Intelligent model code
- Manifolds are available with out cartridge valves, or pre-assembled and tested to your specifications
- Manifolds and motors can be supplied as a pre-assembled package
- Dual counterbalance valve (with integral shuttle valve), dual pilot operated check valve and dual cross port relief valve packages are available

Dual CBV Package for H & T Series Motors

Cartridge valves & manifolds for spool valve motors

Dual Counterbalance Valve Assembly with Brake Release Shuttle

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

How to Order

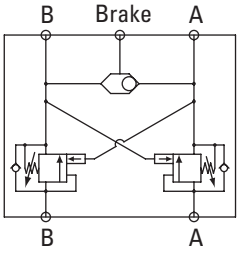
Complete pre-assembled packages are specified using the CBV*-10 model code, position 6 of the model code is "H". To order the manifold sub-assembly, without the two CBV valves, but with integral shuttle valve order 4997072-001.

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

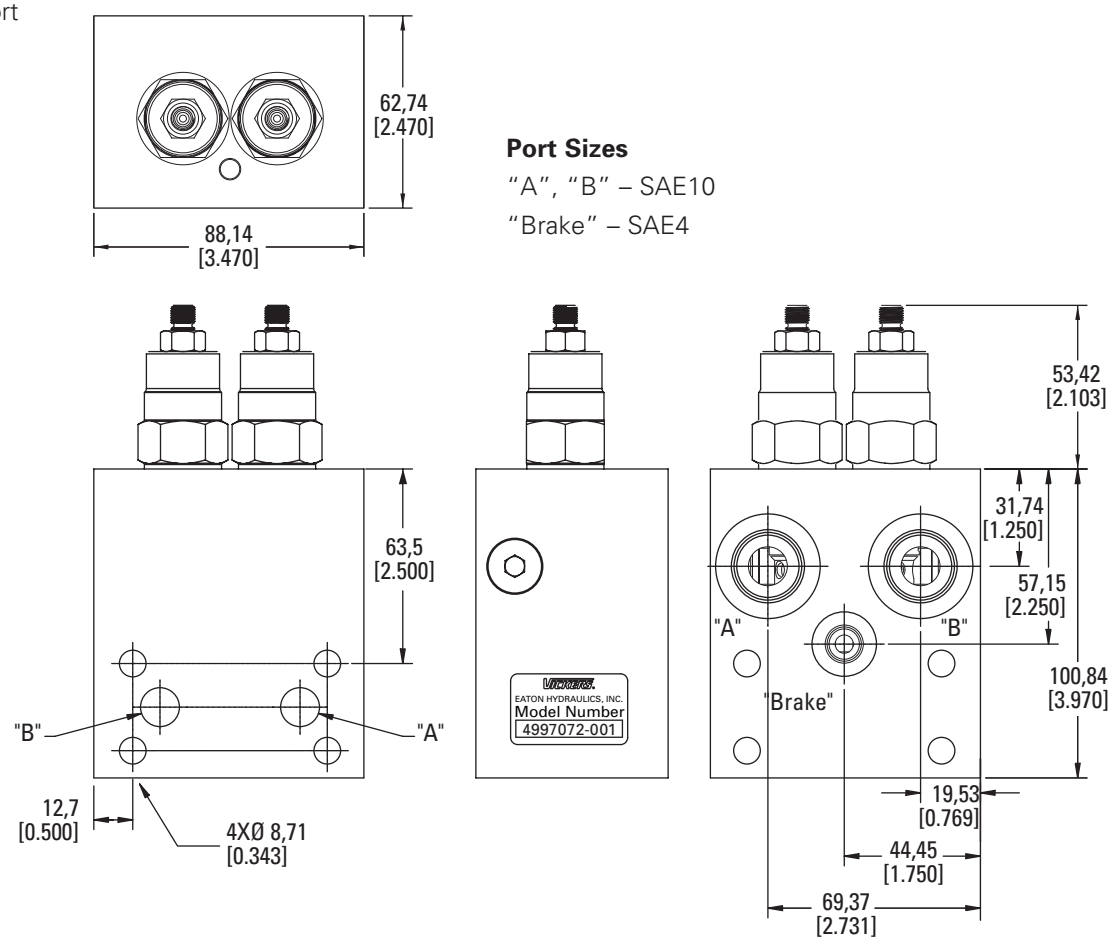
For detailed specifications refer to the CBV*-10 data sheet

Functional Symbol



Dimensions

mm (inch)



Port Sizes

"A", "B" – SAE10

"Brake" – SAE4

Dual POC Package for H & T Series Motors

Cartridge valves and manifolds for spool valve motors

Dual Pilot Operated Check Valve Assembly

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

How to Order

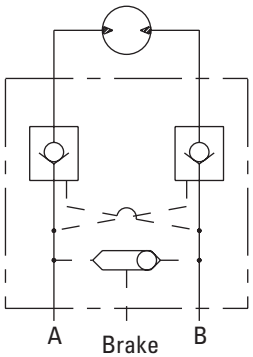
Complete pre-assembled packages are specified using the POC1-10 model code, position 6 of the model code is "H". To order the manifold sub-assembly, without the two POC1 valves, but with integral shuttle valve order 4997072-001.

RATINGS AND SPECIFICATIONS

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

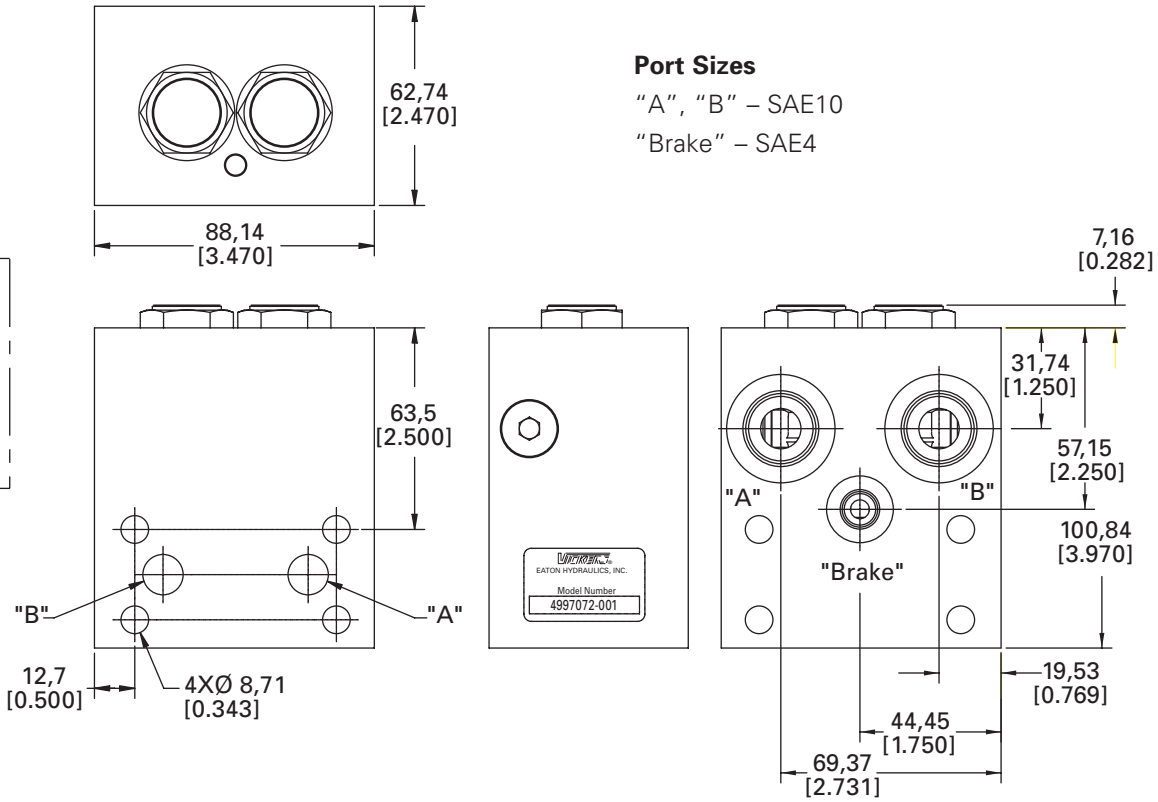
For detailed specifications refer to the POC1-10 data sheet

Functional Symbol



Dimensions

mm (inch)



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.

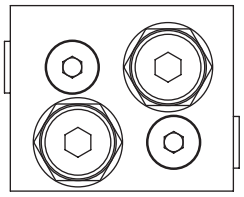
RATINGS AND SPECIFICATIONS

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)

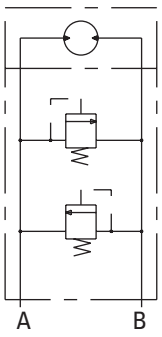


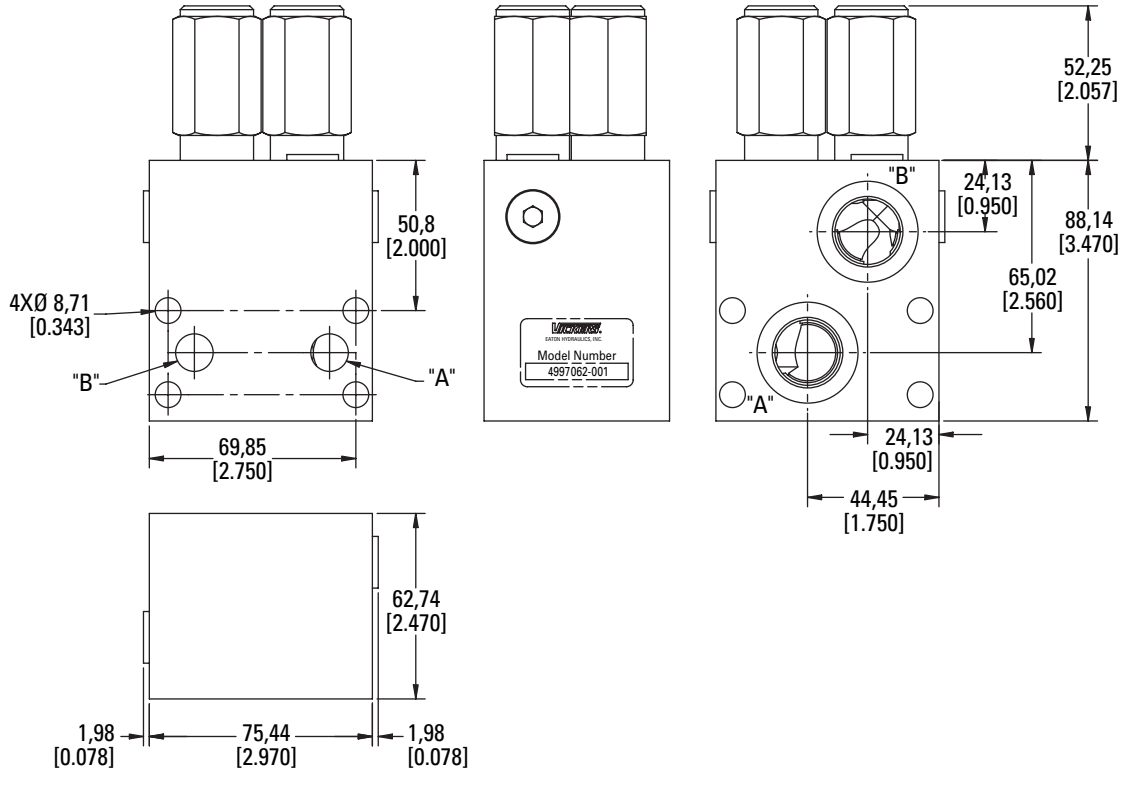
Port Sizes

"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

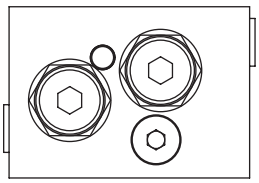
RATINGS AND SPECIFICATIONS

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

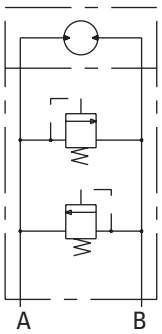
"A", "B" – SAE10

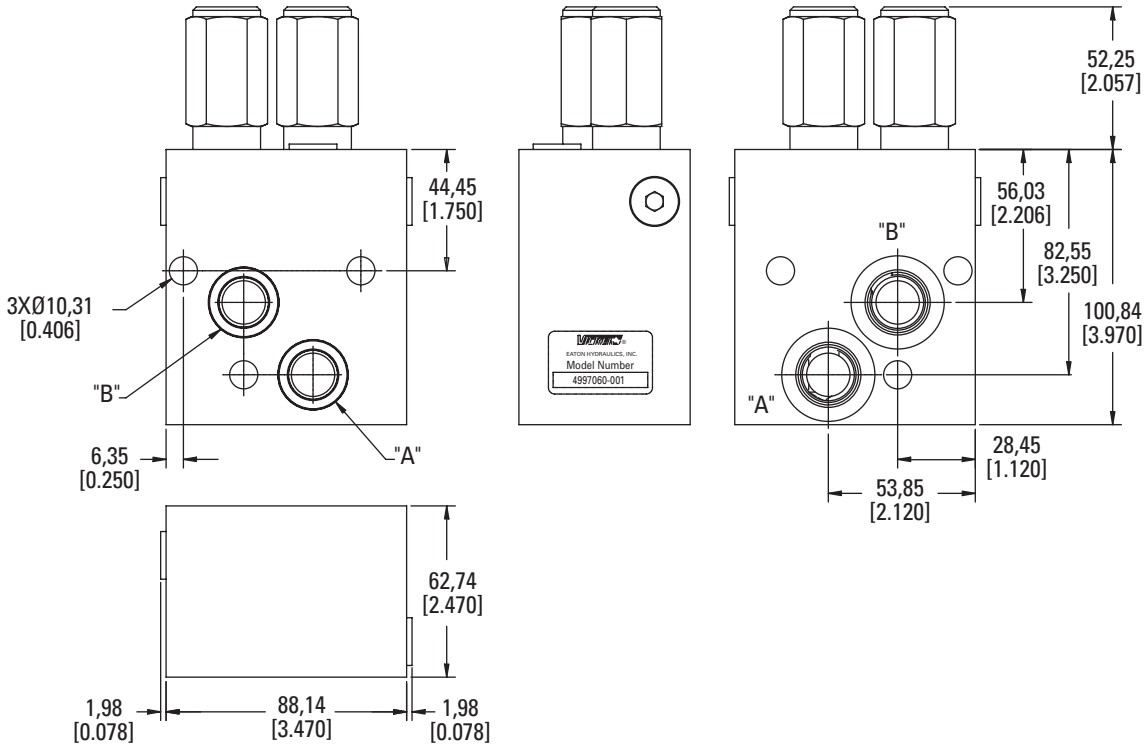
"Brake" – SAE4

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

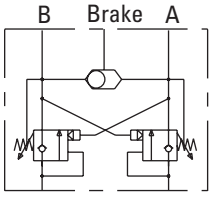
Cartridge valves & manifolds for disc valve motors

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.

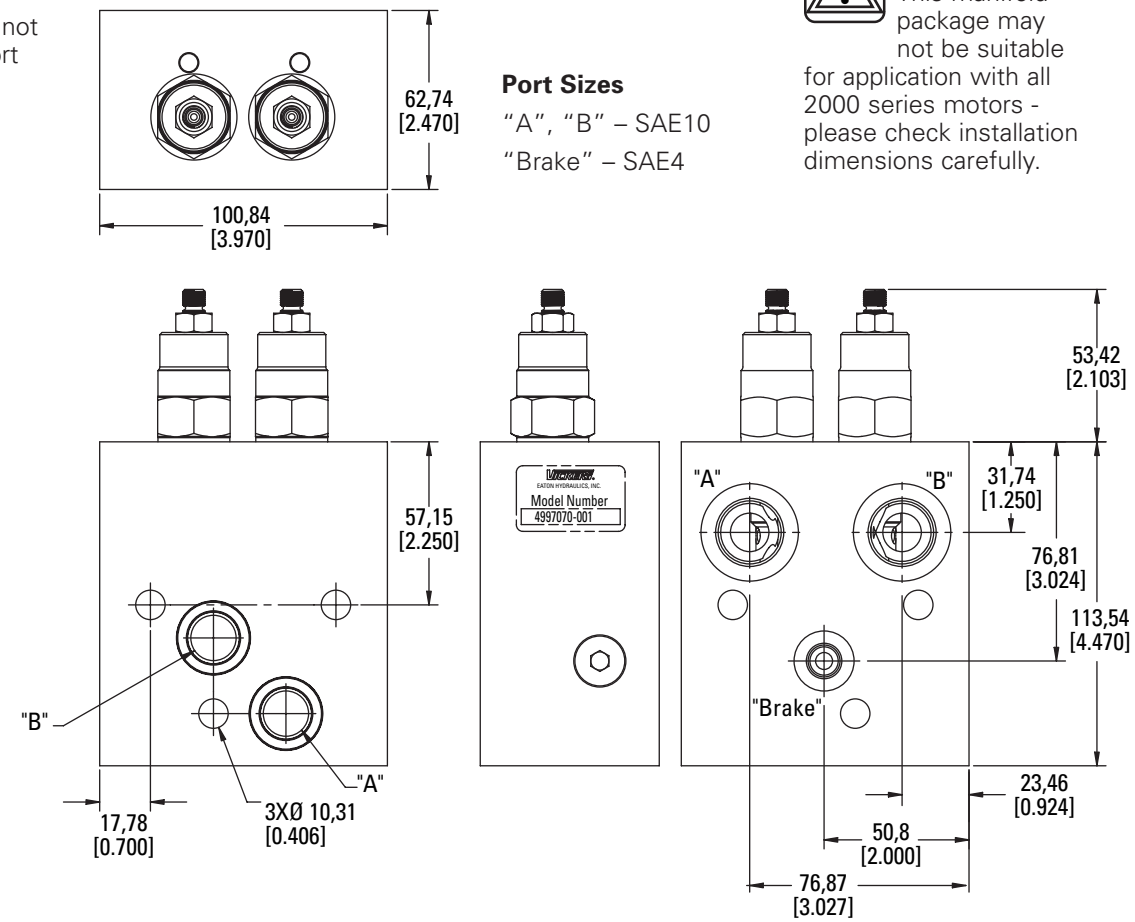
RATINGS AND SPECIFICATIONS

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

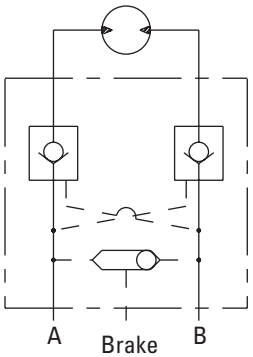
mm (inch)

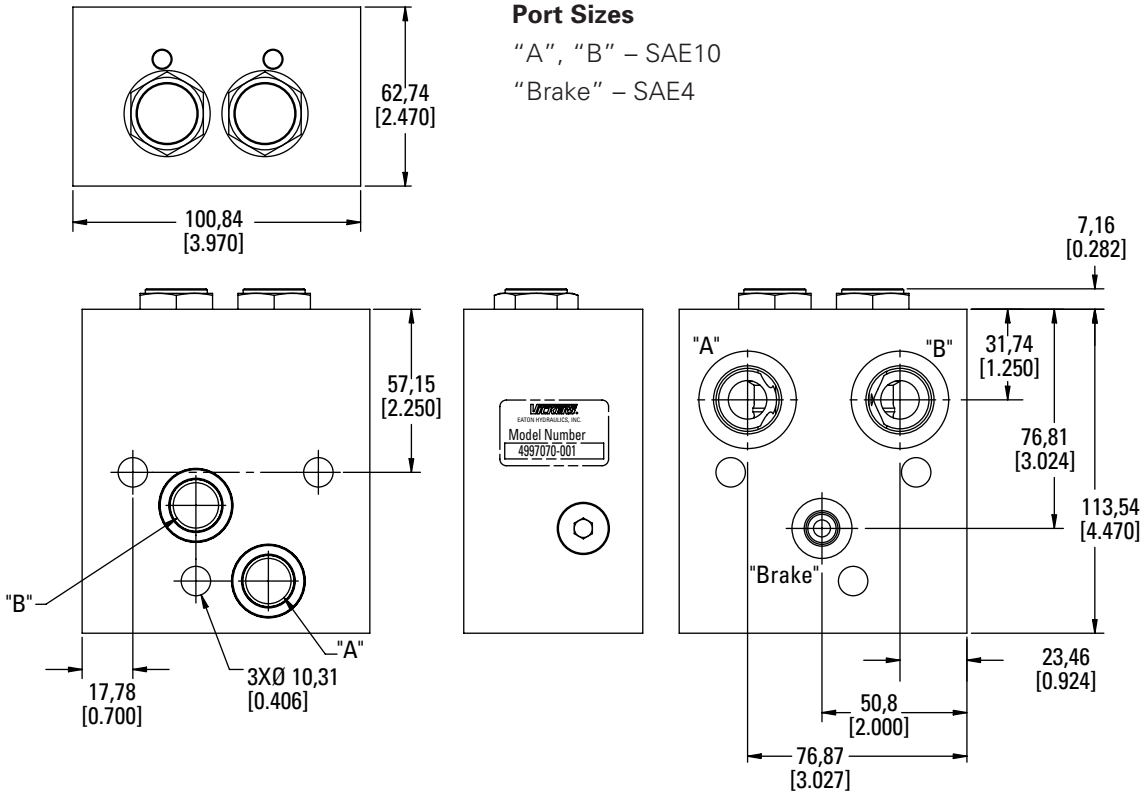
Port Sizes

"A", "B" – SAE10

"Brake" – SAE4

Functional Symbol





Fluid Recommendations

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

Introduction

The ability of Eaton hydraulic components to provide the desired performance and life expectancy depends largely on the fluid used. The purpose of this section is to provide readers with the knowledge required to select the appropriate fluids for use in systems that employ Eaton hydraulic components.

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

Viscosity and Temperature

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

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

From then on, the fluid is maintained at the temperature for which the hydraulic system was designed. In actual applications this sequence varies; hydraulic systems are used in many environments from very cold to very hot. Cooling systems also vary from very elaborate to very simple, so ambient temperature may affect operating temperature. Equipment manufacturers who use Eaton hydraulic components in their products should anticipate temperature in their designs and make the appropriate fluid recommendations to their customers.

Cleanliness

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

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

Fluid Maintenance

Maintaining correct fluid viscosity and cleanliness level is essential for all hydraulic systems. Since Eaton hydraulic components are used in a wide variety of applications it is impossible for Eaton to publish a fluid maintenance schedule that would cover every situation. Field testing and monitoring are the only ways to get accurate measurements of system cleanliness. OEM's and distributors who use Eaton hydraulic components should test and establish fluid maintenance schedules for their products. These maintenance schedules should be designed to meet the viscosity and cleanliness requirements laid out in this document.

Fluid Selection

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

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

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

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

Additional Notes:

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

Notes

Spool Valve Hydraulic Motors

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

Spool Valve Motors

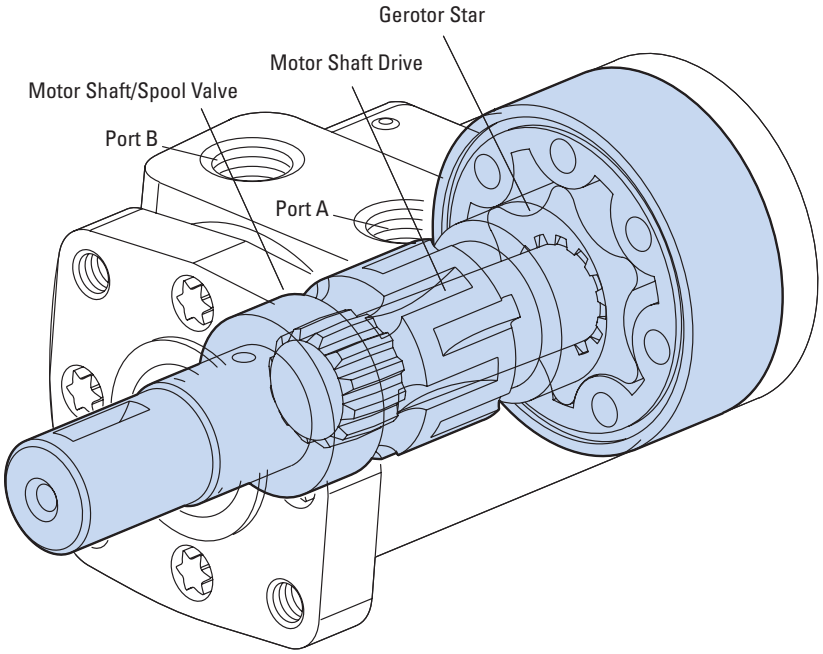
Highlights

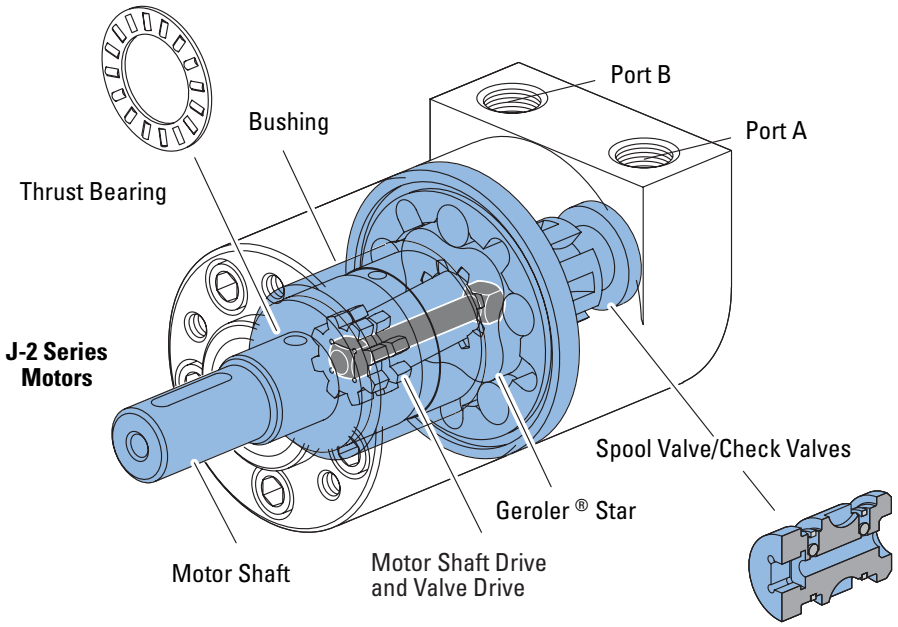
Product Description

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

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)

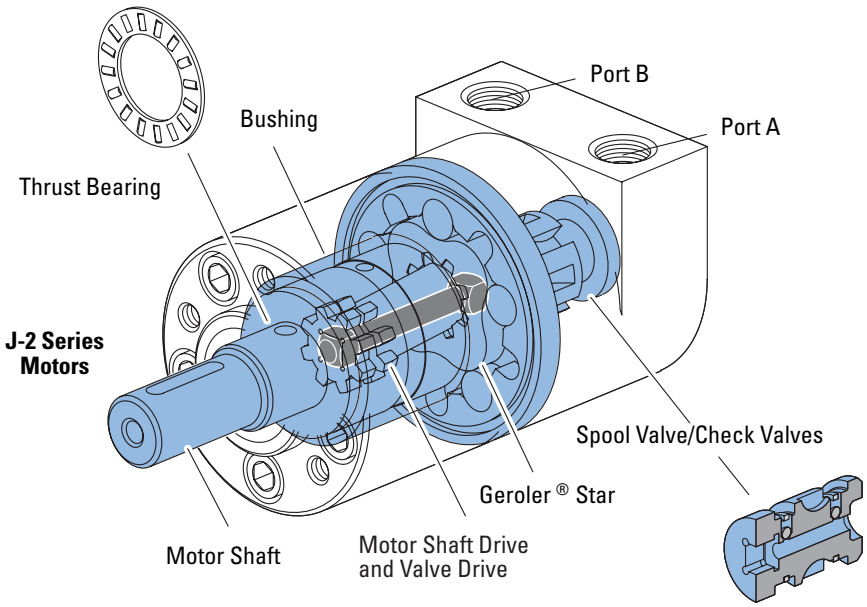
Series	Output Torque Nm [lb-in]	Pressure bar [psi]	Flow lpm [gpm]	Side Load kg [lbs]
J Series	62 [550]	140 [2030]	21 [5.5]	196 [430]
H Series	407 [3607]	124 [1800]	57 [15]	635 [1400]
S Series	430 [3800]	135 [2000]	55 [15]	635 [1400]
T Series	450 [4000]	155 [2250]	55 [15]	635 [1400]
W Series	410 [3625]	165 [2400]	68 [18]	845 [1900]

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

Table of Contents

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 rotater
- Industrial sweepers and floor polishers
- Saw mill works
- Turf equipment reel drives
- Paint stripper
- Many more


Plastic Injection

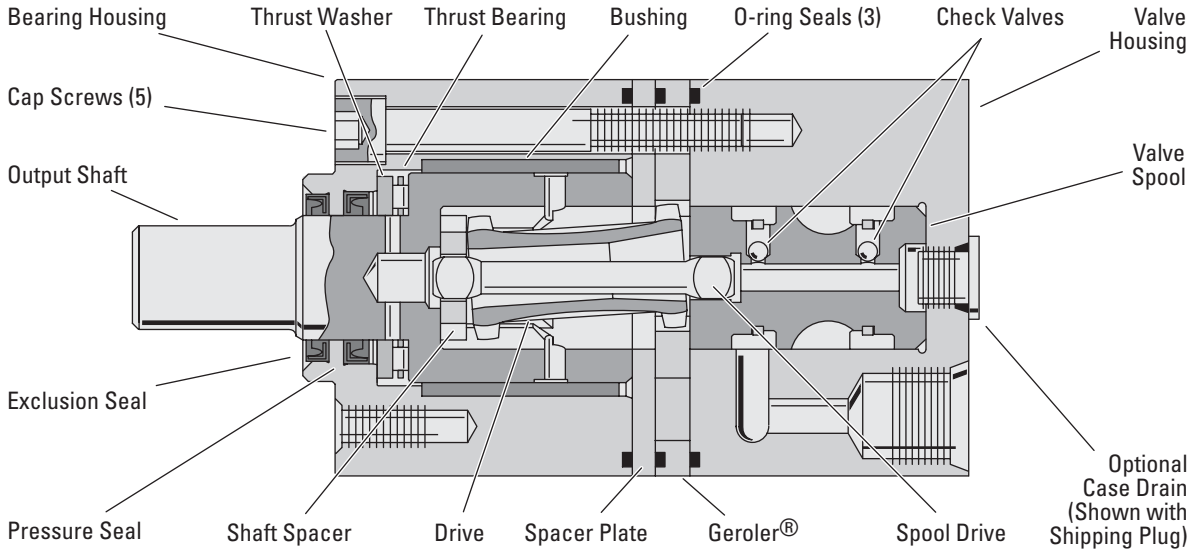

Metal Forming


Food Processing


Ship-Boat Building

J Series (129-)

Specifications



SPECIFICATION DATA — J MOTORS

Displ. cm3/r [in3/r]		8,2 [.50]	12,9 [.79]	19,8 [1.21]	31,6 [1.93]	50,0 [3.00]
Max. Speed (RPM) @ Continuous Flow		1992	1575	1043	650	393
Flow l/min [GPM]	Continuous	17 [4.5]	21 [5.5]	21 [5.5]	21 [5.5]	21 [5.5]
	Intermittent	21 [5.5]	25 [6.5]	25 [6.5]	25 [6.5]	25 [6.5]
Torque Nm [lb-in]	Continuous	16 [141]	25 [225]	38 [333]	50 [446]	62 [549]
	Intermittent	19 [164]	30 [263]	46 [405]	62 [546]	84 [743]
	Peak	22 [193]	36 [321]	48 [425]	83 [733]	86 [765]
Pressure	Continuous	140 [2030]	140 [2030]	140 [2030]	121 [1750]	97 [1400]
Δ bar [Δ PSI]	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.

Continuous

Intermittent

8,2 cm ³/r [.50 in ³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	[200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1400] 97	[1500] 103	[2000] 138	Max. Continuous [2030] 140	Max. Intermittent [2400] 165
[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] 10 1750	[97] 11 1721	[133] 15 1599	[135] 15 1585	[160] 18 1475
Max. Continuous [4.5] 17,0		[16] 2 1992	[23] 3 1979	[29] 3 1964	[36] 4 1947	[43] 5 1929	[59] 7 1900	[89] 10 1833	[96] 11 1808	[131] 15 1684	[134] 15 1673	[160] 18 1553
Max. Intermittent [5.5] 20,8		[12] 1 2458	[18] 2 2437	[26] 3 2420	[33] 4 2405	[40] 5 2387	[54] 6 2353	[83] 9 2272	[92] 10 2255	[124] 14 2134	[129] 15 2115	[154] 17 1994

12,9 cm ³/r [0.79 in ³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	[200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1400] 97	[1450] 100	[1500] 103	[2000] 138	2030] 140	Max. Continuous [2400] 165
[1] 3,8	[19] 2 290	[43] 5 285	[54] 6 281	[65] 7 277	[76] 9 273	[88] 10 268	[109] 12 260	[154] 17 237	[159] 18 234	[164] 19 230	[214] 24 194	[217] 25 189	[250] 28 151
[2] 7,6	[16] 2 573	[39] 4 566	[51] 6 561	[63] 7 555	[74] 8 549	[86] 10 544	[109] 12 534	[155] 18 501	[160] 18 496	[165] 19 490	[221] 25 442	[225] 25 437	[263] 30 396
[3] 11,4	[11] 1 859	[35] 4 849	[47] 5 843	[58] 7 838	[70] 8 832	[82] 9 825	[105] 12 810	[152] 17 777	[157] 18 771	[163] 18 763	[219] 25 708	[223] 25 701	[263] 30 652
[4] 15,1	[6] 1 1153	[30] 3 1140	[41] 5 1135	[53] 6 1129	[64] 7 1124	[76] 9 1117	[99] 11 1101	[146] 16 1060	[152] 17 1051	[157] 18 1044	[214] 24 982	[217] 25 975	[260] 29 924
Max. Continuous [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. Intermittent [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**

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

19.8 cm ^{3}/r [1.21 in ^{3}/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	Continuous [200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1400] 97	[1450] 100	[1500] 103	[2000] 138	[2030] 140	Max. Continuous	Max. Intermittent [2400] 165
[1] 3,8	[32] 4 189	[67] 8 187	[85] 10 186	[102] 12 185	[119] 13 183	[136] 15 182	[170] 19 179	[236] 27 172	[244] 28 170	[253] 29 169	[321] 36 141	[325] 37 138		[374] 42 114
[2] 7,6	[30] 3 379	[65] 7 375	[83] 9 373	[101] 11 370	[119] 13 368	[136] 15 366	[172] 19 361	[223] 25 351	[248] 28 349	[257] 29 347	[328] 37 312	[333] 38 309		[388] 44 285
[3] 11,4	[21] 2 569	[57] 6 565	[75] 8 563	[93] 11 560	[111] 13 558	[128] 14 556	[163] 18 551	[231] 26 529	[240] 27 526	[248] 28 523	[325] 37 487	[330] 37 484		[405] 46 459
[4] 15,1	[12] 1 761	[47] 5 758	[65] 7 754	[83] 9 751	[101] 11 749	[119] 13 746	[154] 17 741	[221] 25 717	[230] 26 711	[239] 27 707	[316] 36 660	[320] 36 656		[382] 43 628
Max. Continuous [5.5] 20,8		[31] 4 1043	[49] 6 1040	[67] 8 1035	[84] 9 1033	[101] 11 1028	[137] 15 1021	[202] 23 997	[211] 24 993	[218] 25 990	[295] 33 938	[299] 34 934		[365] 41 899
Max. Intermittent [6.5] 24,6		[21] 2 1226	[38] 4 1222	[56] 6 1219	[74] 8 1215	[91] 10 1211	[126] 14 1204	[189] 21 1179	[196] 22 1174	[206] 23 1169	[278] 31 1121	[283] 32 1117		[347] 39 1079

31,6 cm ^{3}/r [1.93 in ^{3}/r]

Δ Pressure Bar [PSI]

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

50.0 cm ^{3}/r [3.00 in ^{3}/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	Continuous [200] 14	[400] 28	[500] 34	[600] 41	[700] 48	[800] 55	[1000] 69	[1100] 76	[1200] 83	[1300] 90	[1400] 97	Max. Continuous	Max. Intermittent [2030] 140
[1] 3,8	[82] 9 75	[167] 19 72	[211] 24 72										
[2] 7,6	[70] 8 149	[156] 18 147	[201] 23 145	[243] 28 144	[286] 32 143	[327] 37 142							
[3] 11,4	[53] 6 221	[140] 16 220	[184] 21 218	[227] 26 217	[271] 31 215	[311] 35 213	[396] 45 209	[441] 50 205	[484] 55 201	[521] 59 200	[549] 62 191		
[4] 15,1	[30] 3 296	[120] 14 292	[162] 18 289	[204] 23 286	[250] 28 284	[292] 33 282	[374] 42 273	[419] 47 270	[460] 52 265	[501] 57 263	[541] 61 259		[743] 84 213
Max. Continuous [5.5] 20,8		[81] 9 393	[127] 14 392	[170] 19 389	[214] 24 387	[254] 29 383	[339] 38 377	[379] 43 372	[422] 48 369	[463] 52 364	[506] 57 358		[702] 79 302
Max. Intermittent [6.5] 24,6		[47] 5 465	[90] 10 462	[133] 15 460	[176] 20 458	[219] 25 455	[307] 35 448	[345] 39 445	[385] 43 440	[429] 48 435	[467] 53 430		[685] 77 364

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

J Series (129-)

Dimensions

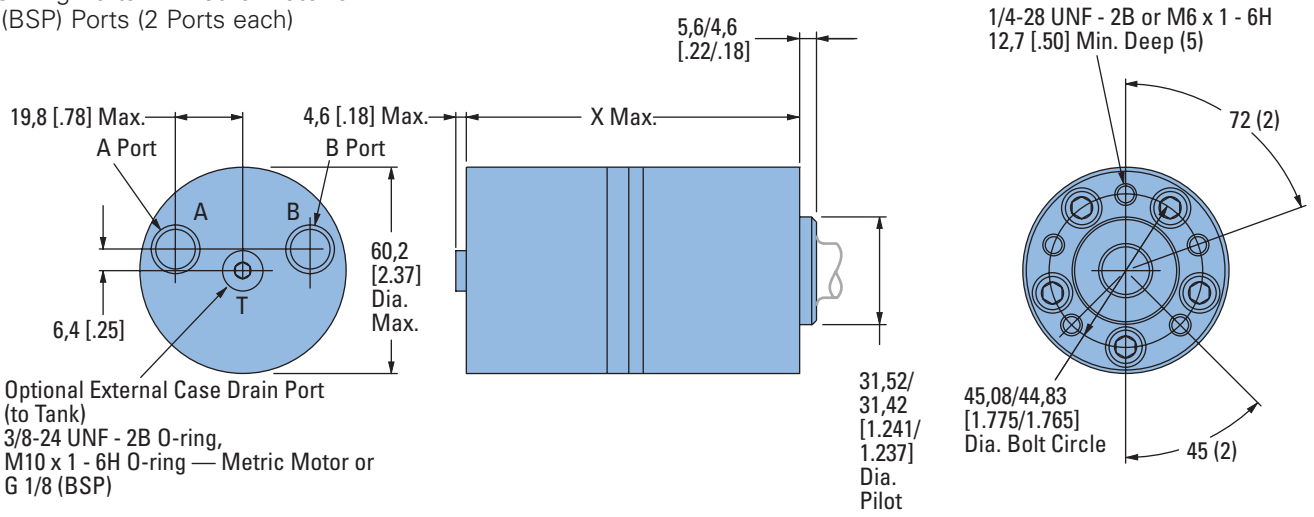
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

9/16 Inch End Port

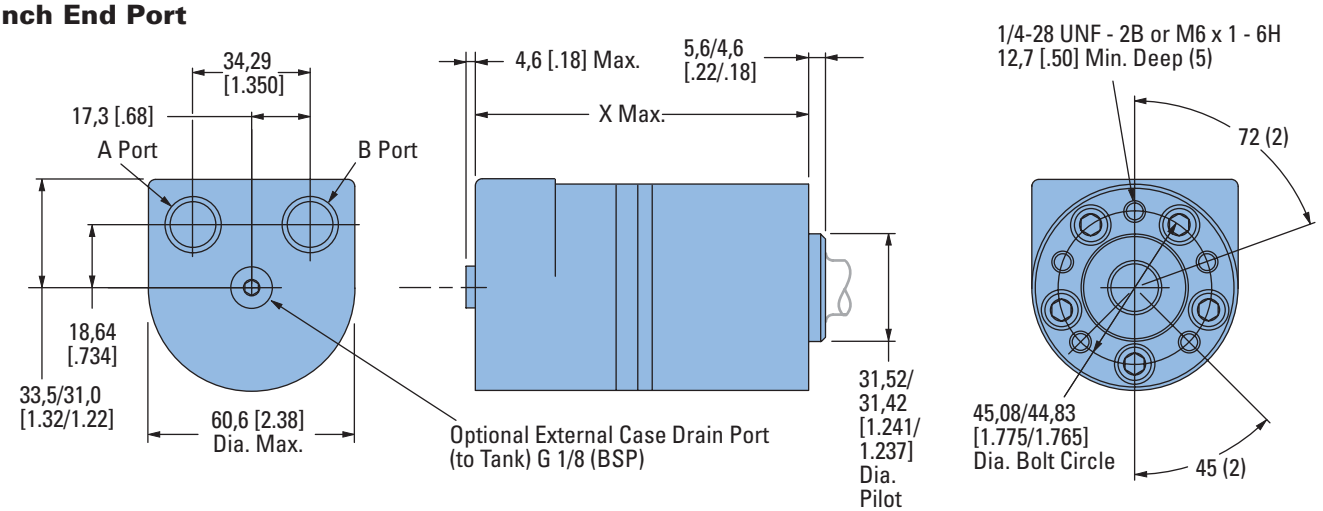
9/16 -18 UNF - 2B O-Ring Ports, M14 x 1,5 - 6H O-Ring Ports — Metric Motor or G 1/4 (BSP) Ports (2 Ports each)



END PORT DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]
8,2 [.50]	103,9 [4.09]
12,9 [.79]	106,9 [4.21]
19,8 [1.21]	112,5 [4.38]
31,6 [1.93]	118,9 [4.68]
50,0 [3.00]	130,3 [5.13]

3/8 Inch End Port



END PORT DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]
8,2 [.50]	103,9 [4.09]
12,9 [.79]	106,9 [4.21]
19,8 [1.21]	112,5 [4.38]
31,6 [1.93]	118,9 [4.68]
50,0 [3.00]	130,0 [5.12]
160,5 [6.32]	132,3 [5.21]

J Series (129-)

Dimensions

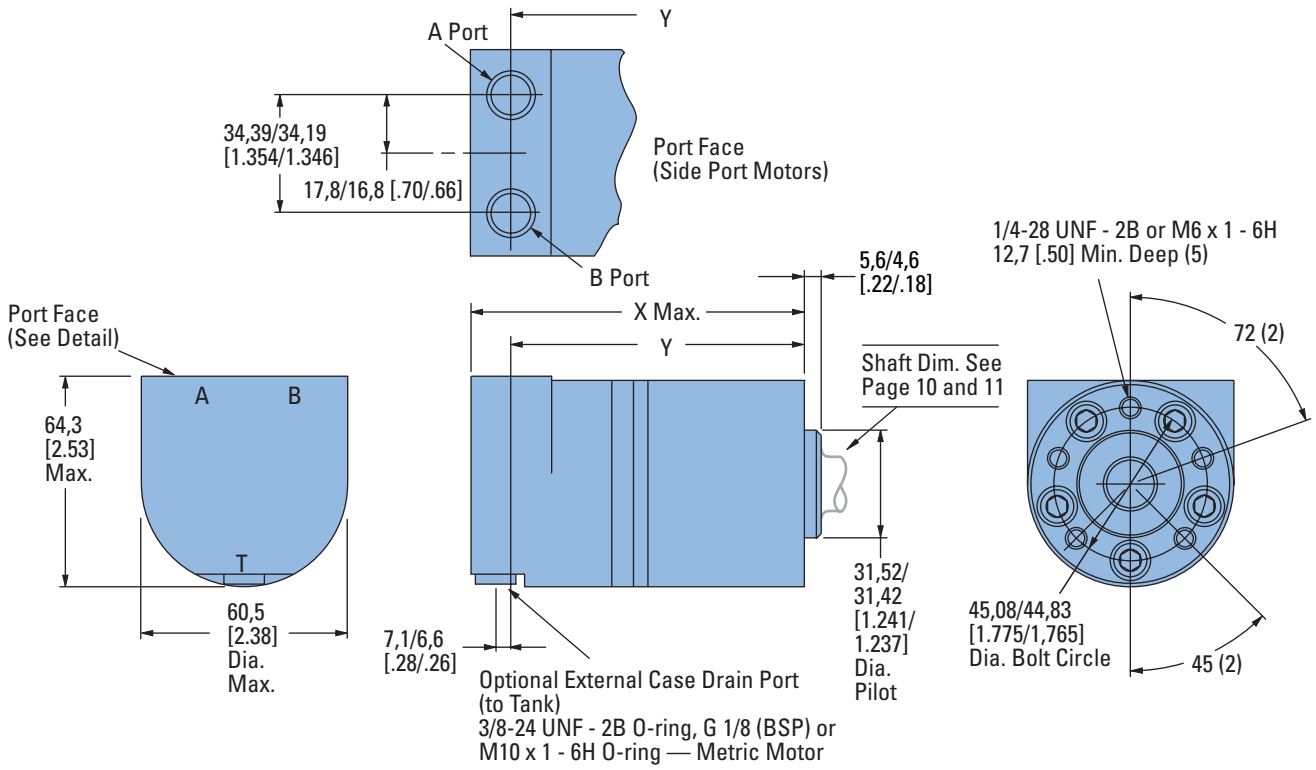
Ports

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

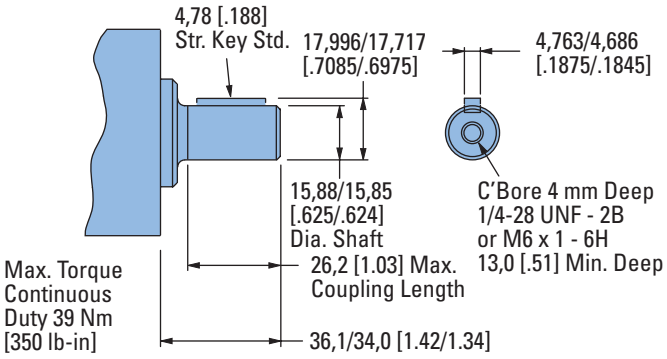
Side Port



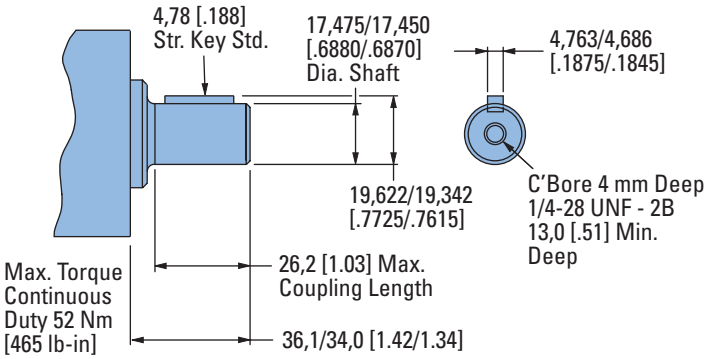
SIDE PORT MOTORS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
8,2 [.50]	103,9 [4.09]	89,4/ 87,4 [3.52/3.44]
12,9 [.79]	106,9 [4.21]	92,5/ 90,4 [3.64/3.56]
19,8 [1.21]	112,5 [4.38]	96,8/ 94,7 [3.81/3.73]
31,6 [1.93]	118,9 [4.68]	104,4/102,4 [4.11/4.03]
50,0 [3.00]	130,0 [5.12]	115,7/113,9 [4.56/4.48]

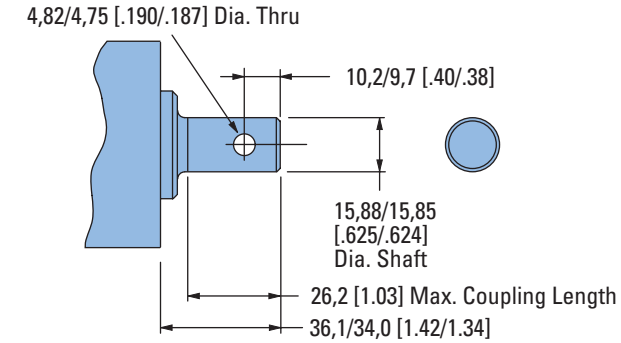
5/8 Inch Straight Keyed



11/16 Inch Straight Keyed



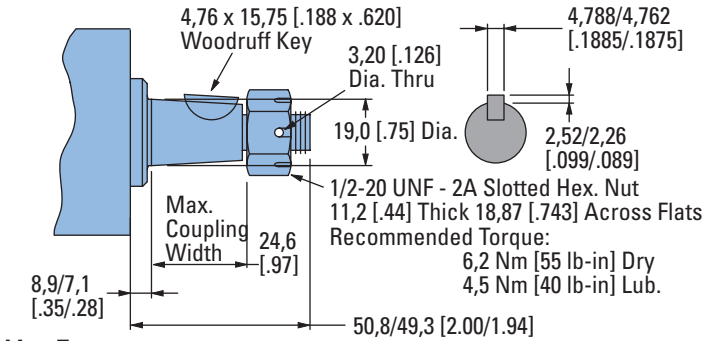
5/8 Inch Straight Keyed w/ Crosshole



3/4 Inch Tapered

(Tapered Shaft End Per SAE J744

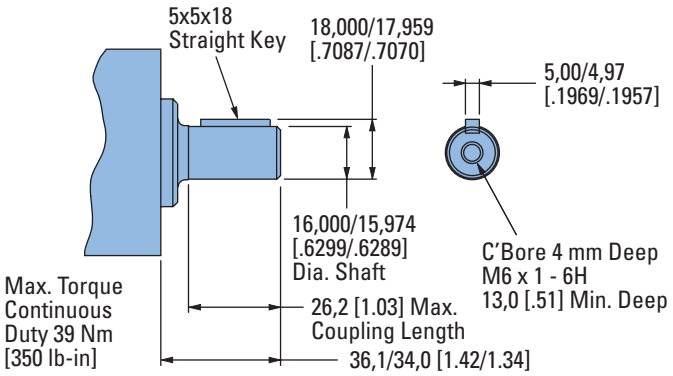
Except as Specified — 1.5 : 12 Ratio)



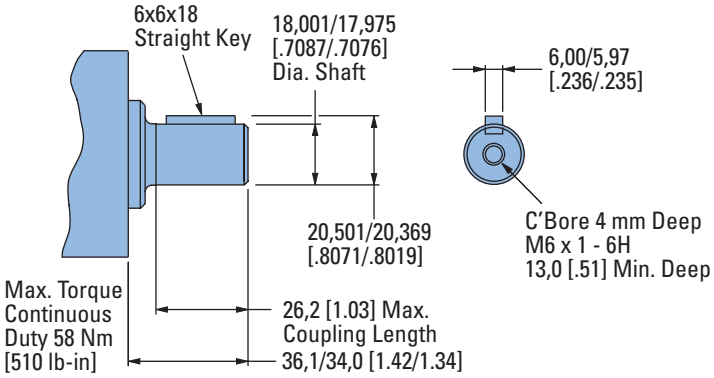
Dimensions

Shafts and Flange Kit

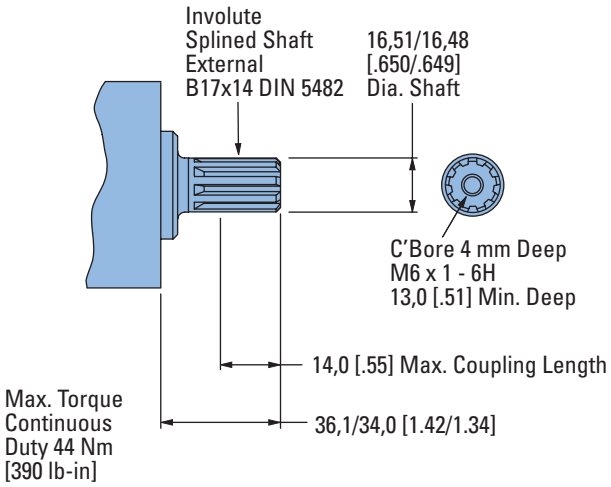
16 mm Straight Keyed



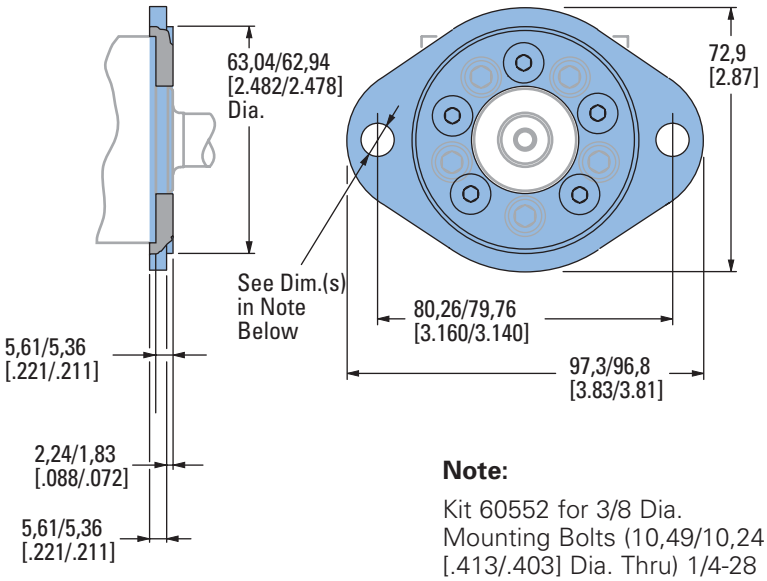
18 mm Straight Keyed



Involute 9T Splined — Metric



2 Bolt Flange Kits (2)



Note:

Kit 60552 for 3/8 Dia. Mounting Bolts (10,49/10,24 [.413/.403] Dia. Thru) 1/4-28 UNF screws for attaching flange to motor (5)

Kit 60553 for M8 Dia. Mounting Bolts (9,12/8,86 [.359/.349] Dia. Thru) M6 x 1 -6H screws for attaching flange to motor (5)

J Series (129-)

Product Numbers

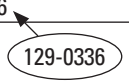
Use digit prefix — 129- plus four digit number from charts for complete product number— Example 129-0479.

Orders will not be accepted without three digit prefix.

End Port

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER				
			8,2 [.50]	12,9 [.79]	19,8 [1.21]	31,6 [1.93]	50,0 [3.00]
1/4-28 UNF 2B	5/8 inch Straight	9/16 -18 UNF 2B O-Ring (2)	129-0291	-0292	-0293	-0294	-0458
	11/16 inch Straight		129-0295	-0296	-0297	-0298	-0459
	Splined — Metric		129-0299	-0300	-0301	-0302	-0460
	3/4 inch Tapered		129-0480				
M6 x 1 - 6H	16 mm Straight	M14 x 1,5 - 6H O-Ring (2)	129-0303	-0304	-0305	-0306	-0461
	18 mm Straight		129-0307	-0308	-0309	-0310	-0462
	Splined — Metric		129-0311	-0312	-0313	-0314	-0463
	16 mm Straight	G 1/4 (BSP) (2)	129-0315	-0316	-0317	-0318	-0464
	18 mm Straight		129-0319	-0320	-0321	-0322	-0465
	Splined — Metric		129-0323	-0324	-0325	-0326	-0466
	16 mm Straight	G 3/8 (BSP) (2)*	129-0327	-0328	-0329	-0330	-0467
	18 mm Straight		129-0331	-0332	-0333	-0334	-0468
	Splined — Metric		129-0335	-0336	-0337	-0338	-0469

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



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-)

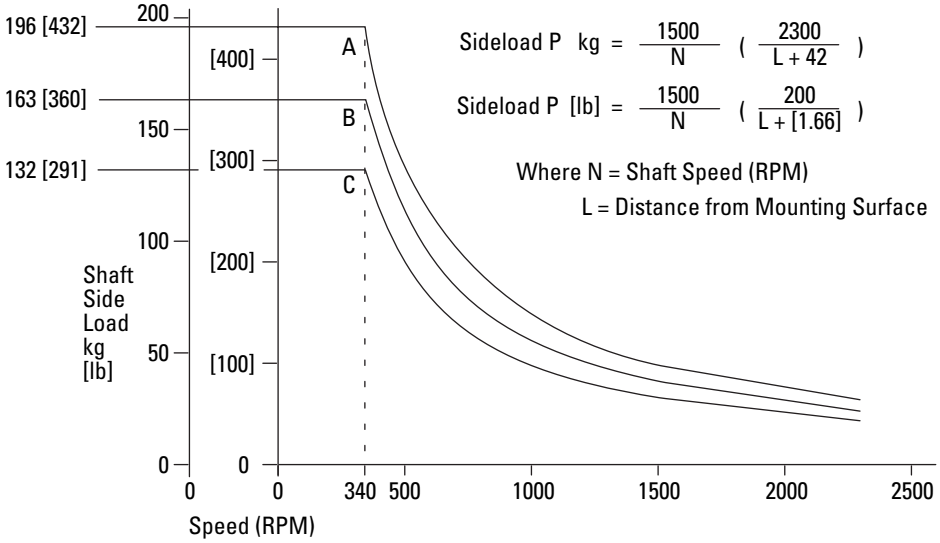
Shaft Side Load Capacity

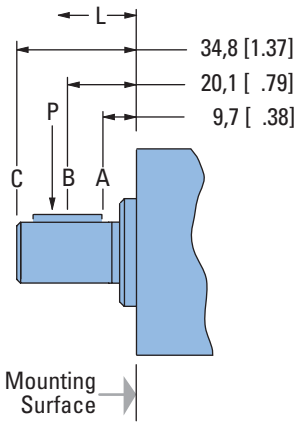
The hydrodynamic bearing has infinite life when shaft load ratings are not exceeded. Hence, the shaft side load capacity is more than adequate to handle most externally applied loads (such as belts, chains, etc.), providing the motor to shaft size is applied within its torque rating.

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

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 kg pushing inward on shaft. Tension load is 82 kg under all case pressure conditions.

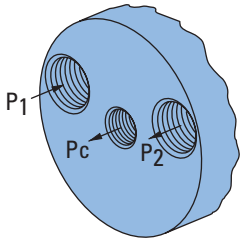
Example:

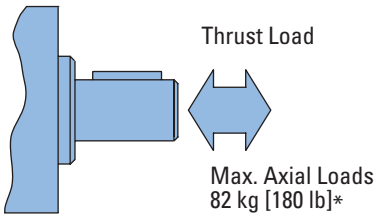
A 200 PSI case pressure will cause a load of 88 lbs, so the allowable thrust load will be 180 lbs plus 88 = 268 lbs pushing inward on shaft. Tension load is 180 lb under all case pressure conditions

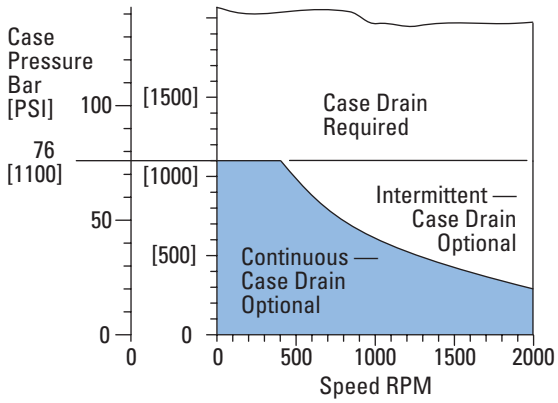
Note:

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].





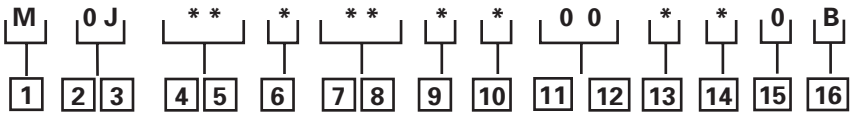


Case Pressure Seal Limitation

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

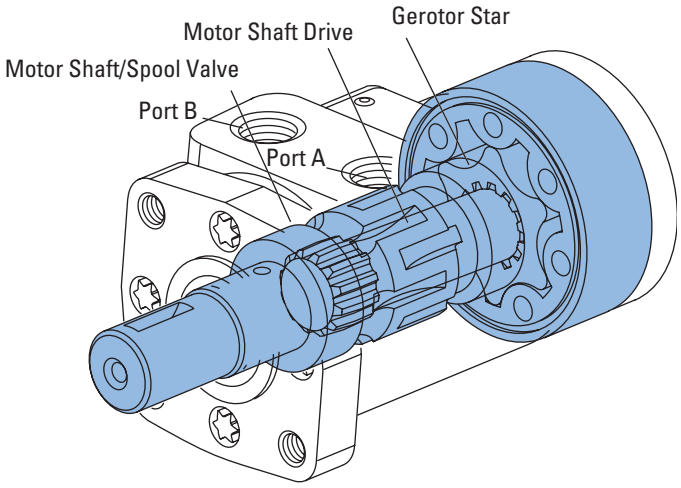
0 – Assigned Code

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


Conveyer

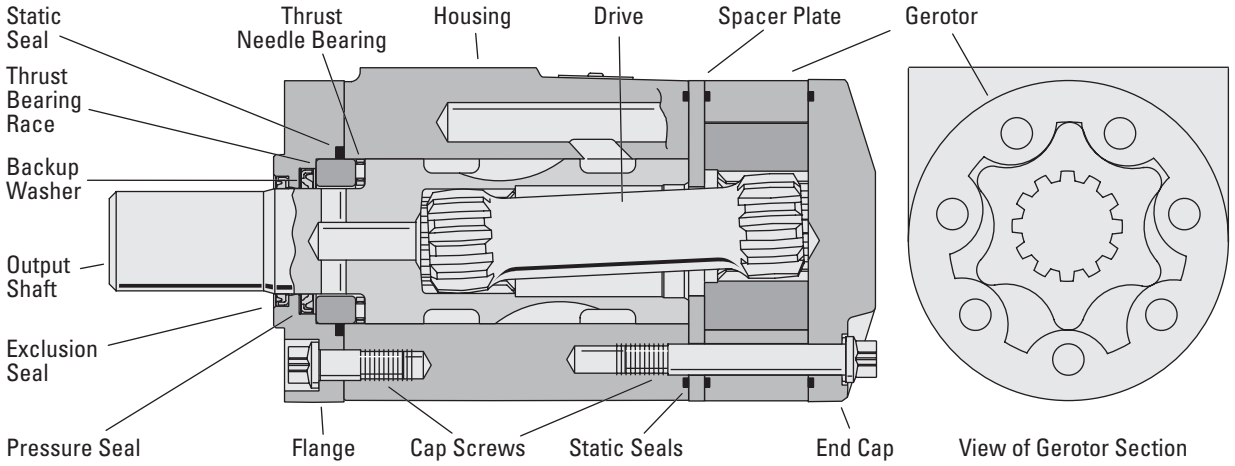

Combine


Sweeper


Salt and Sand Spreader

H Series (101-)

Specifications



SPECIFICATION DATA — H MOTORS

Displ. cm³/r [in³/r]		36 [2.2]	46 [2.8]	59 [3.6]	74 [4.5]	97 [5.9]	120 [7.3]	146 [8.9]	159 [9.7]	185 [11.3]	231 [14.1]	293 [17.9]	370 [22.6]	739 [45.1]
Max. Speed (RPM) @ Continuous Flow		1021	969	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:

The End Ported Units Only ratings are for Standard 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 SUS or

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

Recommended Maximum System Operating Temp.:

82°C [180°F]

Recommended Filtration:

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

H Series (101-)

Performance Data

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

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

Continuous

Intermittent

36 cm³/r [2.2 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	Continuous [200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	Max. Continuous [2400] 165	Max. Intermittent
[2]	[49]	[103]	[162]	[189]	[270]	[325]	[379]	[432]	[489]	[650]	
	6	12	18	21	31	37	43	49	55	73	
7,6	204	201	198	194	189	184	177	170	162	122	
[4]	[47]	[106]	[160]	[191]	[274]	[327]	[384]	[439]	[495]	[654]	
	5	12	18	22	31	37	43	50	56	74	
15,1	408	407	402	399	394	387	381	373	365	323	
[6]	[44]	[102]	[158]	[188]	[272]	[328]	[383]	[440]	[496]	[661]	
	5	12	18	21	31	37	43	50	56	75	
22,7	613	612	609	604	599	591	586	576	565	523	
[8]	[40]	[97]	[153]	[184]	[270]	[326]	[383]	[440]	[497]	[668]	
	5	11	17	21	31	37	43	50	56	75	
30,3	817	817	814	807	799	793	785	776	762	721	
Max. Continuous [10]	[36]	[90]	[148]	[180]	[265]	[322]	[380]	[438]	[495]	[664]	
	4	10	17	20	30	36	43	49	56	75	
37,9	1021	1021	1015	1008	1001	991	981	969	959	920	

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

46 cm³/r [2.8 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	Continuous [200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	Max. Continuous [2400] 165	Max. Intermittent
[2]	[64]	[136]	[212]	[284]	[355]	[426]	[497]	[567]	[641]	[852]	
	7	15	24	32	40	48	56	64	72	96	
7,6	161	158	156	153	148	145	139	133	127	95	
[4]	[61]	[139]	[209]	[286]	[359]	[429]	[503]	[576]	[649]	[857]	
	7	16	24	32	41	48	57	65	73	97	
15,1	323	320	316	314	310	304	300	293	287	253	
[6]	[58]	[134]	[207]	[282]	[356]	[430]	[502]	[577]	[650]	[867]	
	7	15	23	32	40	49	57	65	73	98	
22,7	486	481	479	475	471	464	461	453	444	410	
[8]	[52]	[128]	[200]	[276]	[354]	[428]	[502]	[577]	[651]	[876]	
	6	14	23	31	40	48	57	65	74	99	
30,3	648	643	640	635	628	623	617	610	599	566	
[10]	[47]	[118]	[194]	[269]	[347]	[423]	[498]	[575]	[649]	[871]	
	5	13	22	30	39	48	56	65	73	98	
37,9	808	803	798	793	787	779	771	761	753	722	
Max. Continuous [12]	[36]	[109]	[188]	[260]	[340]	[417]	[492]	[567]	[643]	[864]	
	4	12	21	29	38	47	56	64	73	98	
45,4	969	964	960	952	946	938	931	922	914	877	
Max. Intermittent [14]	[25]	[98]	[175]	[249]	[327]	[404]	[484]	[559]	[634]		
	3	11	20	28	37	46	55	63	72		
53,0	1127	1123	1115	1108	1100	1093	1086	1079	1068		

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

59 cm³/r [3.6 in³/r]

Δ Pressure Bar [PSI]

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

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

74 cm³/r [4.5 in³/r]

Δ Pressure Bar [PSI]

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

Performance Data

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

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

Continuous

Intermittent

97 cm³/r [5.9 in³/r]

Δ Pressure Bar [PSI]

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

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

120 cm³/r [7.3 in³/r]

Δ Pressure Bar [PSI]

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

Performance Data

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

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

Continuous

Intermittent

146 cm³/r [8.9 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	Continuous [200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	Max. Continuous [1700] 117	Max. Intermittent [2300] 159
[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. Continuous [15] 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. Intermittent [20] 75,7	[24] 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 cm³/r [9.7 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	Continuous [200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	Max. Continuous [1650] 134	Max. Intermittent [2250] 155
[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. Continuous [15] 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. Intermittent [20] 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] Torque [lb-in]
41 Nm
352 Speed RPM

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]

Flow LPM [GPM]	Continuous [200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	Max. Continuous [1600] 110	Max. Intermittent [2150] 148
[2] 7,6	[257] 29 40	[554] 63 40	[847] 96 39	[1150] 130 38	[1447] 163 37	[1739] 196 36	[2035] 230 33	[2320] 262 29	[3103] 351 12
[4] 15,1	[254] 29 81	[546] 62 81	[845] 95 80	[1145] 129 79	[1448] 164 78	[1744] 197 77	[2049] 232 76	[2343] 265 74	[3147] 356 63
[6] 22,7	[246] 28 121	[540] 61 121	[834] 94 120	[1137] 128 120	[1434] 162 119	[1736] 196 117	[2036] 230 115	[2337] 264 112	[3151] 356 100
[8] 30,3	[224] 25 162	[520] 59 162	[820] 93 161	[1117] 126 160	[1414] 160 159	[1716] 194 157	[2014] 228 155	[2315] 262 152	[3133] 354 140
[10] 37,9	[202] 23 202	[499] 56 202	[793] 90 201	[1095] 124 201	[1394] 158 200	[1699] 192 198	[1997] 226 196	[2299] 260 193	[3112] 352 181
[12] 45,4	[176] 20 243	[475] 54 242	[767] 87 242	[1063] 120 241	[1368] 155 240	[1664] 188 238	[1969] 222 236	[2268] 256 234	[3088] 349 222
[14] 53,0	[140] 16 283	[443] 50 283	[735] 83 282	[1035] 117 281	[1340] 151 280	[1637] 185 279	[1936] 219 277	[2227] 252 274	[3051] 345 262
Max. Continuous [15] 56,8	[120] 14 304	[425] 48 303	[719] 81 302	[1014] 115 301	[1320] 149 300	[1618] 183 299	[1914] 216 297	[2205] 249 294	[3023] 342 283
Max. Intermittent [20] 75,7	[27] 3 405	[321] 36 404	[612] 69 402	[911] 103 401	[1211] 137 400	[1504] 170 398	[1795] 203 397		

231 cm³/r [14.1 in³/r]

Δ Pressure Bar [PSI]

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

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

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 cm³/r [17.9 in³/r]

Δ Pressure Bar [PSI]

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

370 cm³/r [22.6 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	Continuous [200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	Max. Continuous [1250] 86	Max. Intermittent [1500] 103
[2] 7,6	[537] 61 20	[1121] 127 20	[1715] 194 20	[2285] 258 19	[2862] 323 16			
[4] 15,1	[532] 60 40	[1123] 127 40	[1715] 194 40	[2308] 261 39	[2893] 327 38	[3467] 392 36	[3604] 407 35	[4274] 483 27
[6] 22,7	[508] 57 61	[1100] 124 61	[1693] 191 61	[2294] 259 60	[2884] 326 58	[3458] 391 55	[3598] 407 53	[4283] 484 47
[8] 30,3	[463] 52 81	[1060] 120 81	[1661] 188 81	[2255] 255 80	[2840] 321 79	[3414] 386 76	[3557] 402 74	[4254] 481 68
[10] 37,9	[414] 47 101	[1017] 115 101	[1613] 182 101	[2203] 249 101	[2788] 315 99	[3363] 380 96	[3506] 396 94	[4212] 476 88
[12] 45,4	[363] 41 121	[960] 108 121	[1553] 175 121	[2152] 243 121	[2737] 309 119	[3305] 373 116	[3446] 389 115	[4152] 469 109
[14] 53,0	[303] 34 142	[897] 101 142	[1484] 168 142	[2086] 236 142	[2667] 301 140	[3246] 367 137	[3386] 383 136	[4092] 462 130
Max. Continuous [15] 56,8	[266] 30 152	[862] 97 152	[1452] 164 152	[2050] 232 152	[2630] 297 150	[3206] 362 148	[3347] 378 147	[4054] 458 140
Max. Intermittent [20] 75,7	[61] 7 202	[671] 76 202	[1269] 143 202	[1847] 209 202	[2410] 272 202	[2987] 337 199	[3119] 352 198	

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

739 cm³/r [45.1 in³/r]

Δ Pressure Bar [PSI]

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

H Series (101-)

Dimensions

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

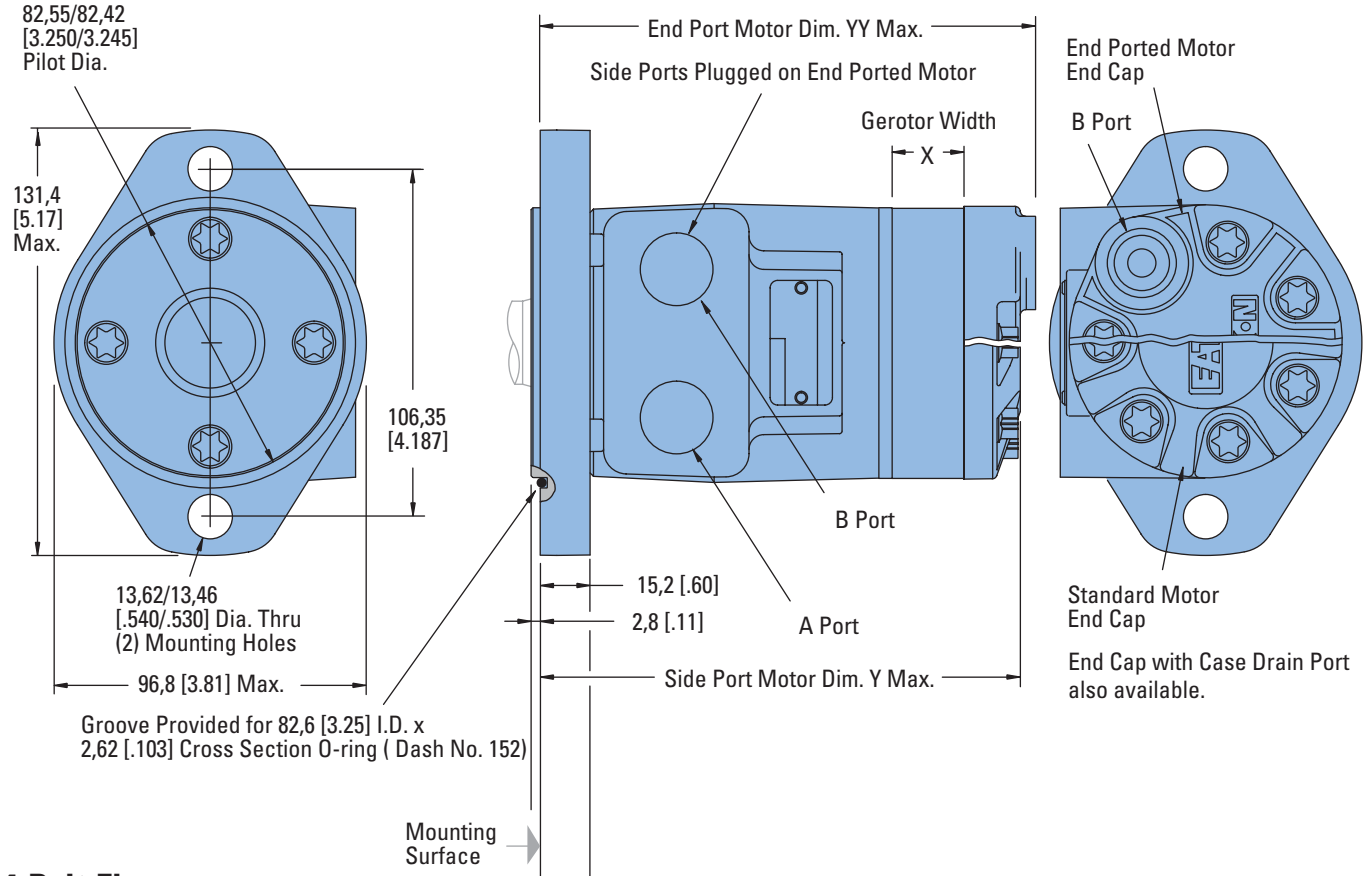
Note:

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

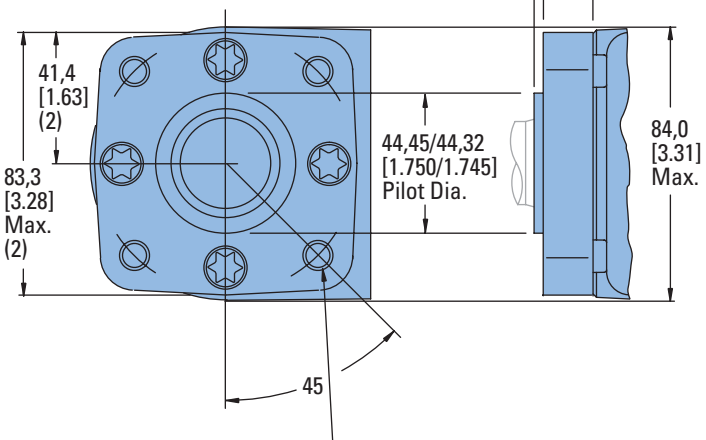
Note:

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

2 Bolt Flange



4 Bolt Flange



3/8-16 UNC (15,2 [.60] Max. Bolt Thread Engagement) Mounting Holes (4) Equally Spaced on 82,6 [3.25] Dia. Bolt Circle
or
M10 x 1,5 (15,2 [.60] Max. Bolt Thread Engagement) Mounting Holes (4) Equally Spaced on 82,6 [3.25] Dia. Bolt Circle

2 AND 4 BOLT FLANGE

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]	YY mm [inch]
36 [2.2]	6,4 [.25]	132,1 [5.20]	138,5 [5.45]
46 [2.8]	6,4 [.25]	132,1 [5.20]	138,5 [5.45]
59 [3.6]	10,2 [.40]	135,9 [5.35]	142,3 [5.60]
74 [4.5]	10,2 [.40]	135,9 [5.35]	142,3 [5.60]
97 [5.9]	13,2 [.52]	139,0 [5.47]	145,3 [5.72]
120 [7.3]	16,5 [.65]	142,3 [5.60]	148,6 [5.85]
146 [8.9]	20,1 [.79]	145,8 [5.74]	152,2 [5.99]
159 [9.7]	21,9 [.86]	147,6 [5.81]	154,0 [6.06]
185 [11.3]	25,4 [1.00]	151,2 [5.95]	157,5 [6.20]
231 [14.1]	31,8 [1.25]	157,5 [6.20]	
293 [17.9]	40,4 [1.59]	166,2 [6.54]	
370 [22.6]	50,8 [2.00]	176,6 [6.95]	
739 [45.1]	101,6 [4.00]	227,4 [8.95]	

H Series (101-)

Product Numbers

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

2 Bolt Flange

SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER												
		36 [2.2]	46 [2.8]	59 [3.6]	74 [4.5]	97 [5.9]	120 [7.3]	146 [8.9]	159 [9.7]	185 [11.3]	231 [14.1]	293 [17.9]	370 [22.6]	740 [45.0]
1 in. Straight 7/8-14 O-Ring	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 7/8-14 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	H0	* * *	* *	* *	* *	*	*	*	* *	*	0	* *	*	*	0	J
1	2 3	4 5 6	7 8	9 10	11 12	13	14	15	16 17	18	19	20 21	22	23	24	25

1 Product

M - Motor

2, 3 Series

H0 - H Motor

4, 5, 6 Displacement cm³/r [in³/r]

022 – 36 [2.2]†

028 – 46 [2.8]

035 – 58 [3.5]†

045 – 74 [4.5]

059 – 96 [5.9]

073 – 120 [7.3]

089 – 146 [8.9]

097 – 159 [9.7]

113 – 185 [11.3]

141 – 231 [14.1]

179 – 294 [17.9]

226 – 370 [22.6]

451 – 739 [45.1]

†The H Series motors with displacement code "**022**" or "**035**" must also specify free running gerotor (option "**AA**" in position **11,12**).

7, 8 Mounting Type

AA – 2 Bolt (Standard) 82.50 [3.248] Dia. x 3.05 [.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)

DA – 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

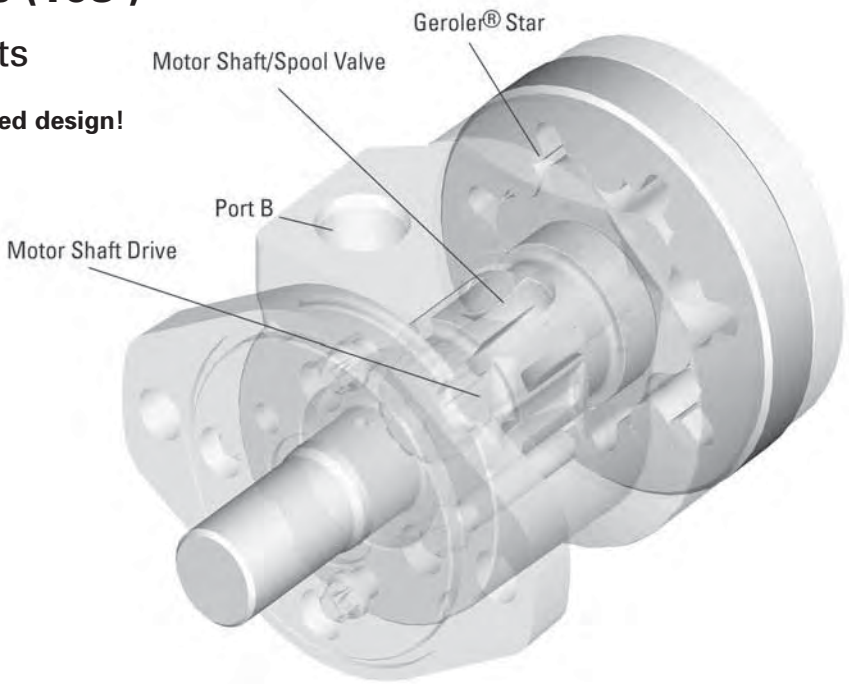
J – Nine (9)

Notes

S Series (103-)

Highlights

New, improved design!



Description

The new improved Char-Lynn S Series motors with optimized Geroler geometry offers enhanced performance with reduced drive-running angle while retaining the overall package size of the original S series. Design improvements include upgraded steel end cap, O-Ring section seals, and optimized Geroler set. The Geroler set has precision-machined rollers in the outer ring which provide support with rolling contact between the star and ring. This improves mechanical efficiency, especially at start-up and at low speed conditions. Improvements incorporated into the latest S Series motor provide reliable leak-free performance and smooth operation at start-up conditions.

Specifications

Geroler Element	10 Displacements
Flow l/min [GPM]	55 [15] Continuous***
	75 [20] Intermittent**
Speed	Up to 963 RPM
Pressure bar [PSI]	135 [2000] Cont.***
	170 [2500] Inter.**
Torque Nm [lb-in]	528 [4672] Cont.***
	587 [5190] Inter.**

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

Features:

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

Benefits:

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

Applications:

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


Conveyor

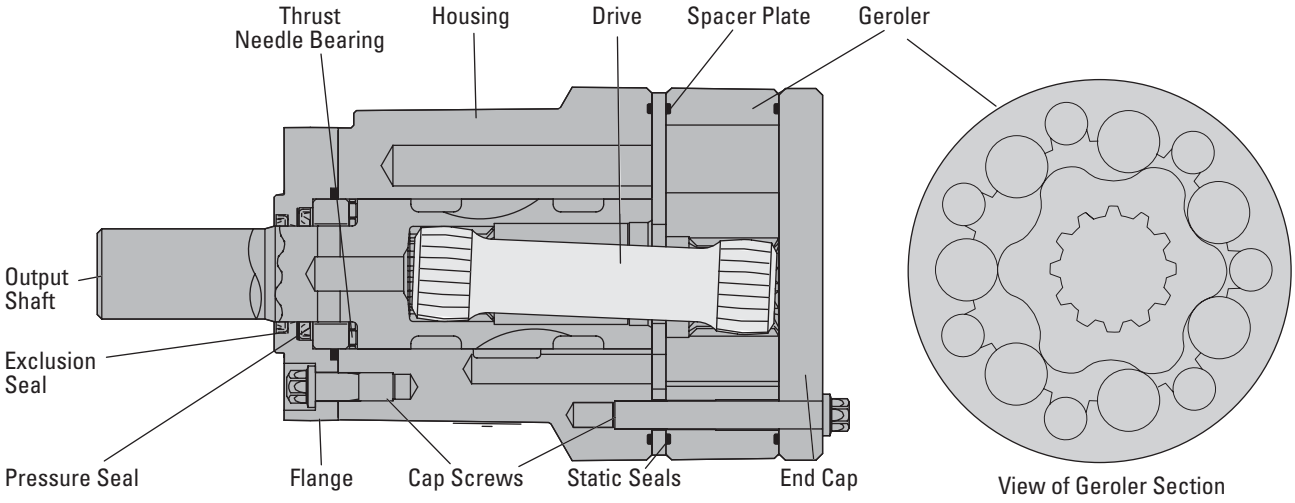

Casting


Amusement ride


Combine

S Series (103-)

Specifications



SPECIFICATION DATA — S MOTORS

Displ. cm^3/r [in^3/r]		59 [3.6]	75 [4.6]	97 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]
Max. Speed (RPM)	@ Continuous Flow	963	792	607	472	394	343	304	253	190	153
Flow LPM [GPM]	Continuous	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]	57 [15]
	Intermittent	68 [18]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	115 [1021]	150 [1325]	183 [1623]	237 [2010]	265 [2347]	301 [2662]	333 [2950]	372 [3290]	491 [4345]	528 [4672]
	Intermittent	144 [1271]	186 [1649]	225 [1992]	292 [2582]	324 [2870]	360 [3191]	399 [3533]	434 [3843]	505 [4467]	587 [5200]
Min. Starting Torque Nm[lb-in]	@ Cont. Pressure	90 [800]	113 [1000]	148 [1310]	184 [1630]	212 [2050]	232 [2330]	263 [2670]	302 [2990]	338 [3270]	369 [3270]
	@ Int. Pressure	116 [1030]	146 [1290]	190 [1680]	236 [2090]	271 [2400]	289 [2560]	329 [2910]	374 [3310]	417 [3690]	438 [3880]
Pressure Bar [PSI]	Continuous	138 [2000]	138 [2000]	138 [2000]	138 [2000]	131 [1900]	131 [1900]	128 [1850]	117 [1700]	103 [1500]	90 [1300]
	Intermittent	172 [2500]	172 [2500]	172 [2500]	172 [2500]	162 [2350]	159 [2300]	155 [2250]	141 [2050]	124 [1800]	103 [1500]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

172 Bar [2500 PSI] without regard to Δ Bar [Δ PSI] and/ or back pressure ratings or combination thereof.

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

Δ Pressure:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82°C [180°F]

Recommended Filtration:

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

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 59 cm3/r [3.6 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

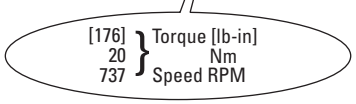
	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	**28**	**41**	**55**	**69**	**83**	**97**	**110**	**124**	**138**	**172**
[2]	83	185	288	389	486	580	681	764	849	878	
	9	*21*	*33*	*44*	*55*	*66*	*77*	*86*	*96*	*99*	
7,6	**128**	**127**	**125**	**122**	**119**	**116**	**112**	**108**	**103**	**96**	
[4]	83	189	294	399	502	605	699	804	896	967	1227
	9	*21*	*33*	*45*	*57*	*68*	*79*	*91*	*101*	*109*	*139*
15,1	**257**	**254**	**250**	**245**	**239**	**232**	**224**	**215**	**206**	**193**	**154**
[6]	76	182	289	395	500	606	691	813	918	1021	1271
	9	*21*	*33*	*45*	*57*	*68*	*78*	*92*	*104*	*115*	*144*
22,7	**384**	**379**	**374**	**367**	**360**	**351**	**340**	**328**	**315**	**299**	**254**
[8]	70	172	279	386	492	598	676	806	908	1017	1269
	8	*19*	*32*	*44*	*56*	*68*	*76*	*91*	*103*	*115*	*143*
30,3	**513**	**508**	**502**	**495**	**486**	**475**	**463**	**449**	**435**	**418**	**372**
[10]	52	160	266	373	478	584	652	793	898	1003	1262
	6	*18*	*30*	*42*	*54*	*66*	*74*	*90*	*101*	*113*	*143*
37,9	**642**	**636**	**630**	**622**	**612**	**601**	**589**	**575**	**561**	**545**	**499**
[12]	41	146	252	359	465	571	628	781	886	991	1253
	5	*17*	*28*	*41*	*53*	*65*	*71*	*88*	*100*	*112*	*142*
45,4	**770**	**765**	**759**	**751**	**742**	**731**	**718**	**704**	**689**	**673**	**626**
[14]	21	129	234	342	449	556	599	765	871	977	1239
	2	*15*	*26*	*39*	*51*	*63*	*68*	*86*	*98*	*110*	*140*
53,0	**898**	**894**	**888**	**879**	**869**	**857**	**845**	**832**	**815**	**798**	**750**
[15]	24	121	228	336	442	547	589	758	864	972	1230
	3	*14*	*26*	*38*	*50*	*62*	*67*	*86*	*98*	*110*	*139*
56,8	**963**	**957**	**950**	**942**	**933**	**921**	**909**	**894**	**879**	**861**	**807**
[18]	39	95	199	304	410	518	533	728	837	941	1206
	4	*11*	*22*	*34*	*46*	*58*	*60*	*82*	*95*	*106*	*136*
68,1	**1155**	**1149**	**1140**	**1131**	**1122**	**1111**	**1096**	**1082**	**1065**	**1047**	**996**

S Motor 75 cm3/r [4.6 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	**28**	**41**	**55**	**69**	**83**	**97**	**110**	**124**	**138**	**172**
[2]	116	248	377	505	627	743	884	930	953	1073	
	13	*28*	*43*	*57*	*71*	*84*	*100*	*105*	*108*	*121*	
7,6	**93**	**91**	**87**	**80**	**71**	**63**	**50**	**39**	**22**	**18**	
[4]	114	251	388	523	656	788	916	1048	1170	1276	1455
	13	*28*	*44*	*59*	*74*	*89*	*103*	*118*	*132*	*144*	*164*
15,1	**194**	**189**	**184**	**177**	**168**	**159**	**152**	**141**	**130**	**111**	**66**
[6]	110	243	382	518	657	792	906	1059	1196	1325	1631
	12	*27*	*43*	*59*	*74*	*89*	*102*	*120*	*135*	*150*	*184*
22,7	**294**	**287**	**279**	**272**	**263**	**253**	**245**	**231**	**220**	**204**	**159**
[8]	100	234	371	507	646	780	888	1053	1188	1320	1649
	11	*26*	*42*	*57*	*73*	*88*	*100*	*119*	*134*	*149*	*186*
30,3	**391**	**389**	**383**	**377**	**368**	**360**	**351**	**341**	**329**	**316**	**278**
[10]	77	216	353	491	626	762	859	1037	1168	1308	1641
	9	*24*	*40*	*55*	*71*	*86*	*97*	*117*	*132*	*148*	*185*
37,9	**493**	**488**	**482**	**474**	**466**	**457**	**447**	**435**	**424**	**410**	**371**
[12]	63	204	331	473	606	745	828	1015	1153	1288	1626
	7	*23*	*37*	*53*	*68*	*84*	*94*	*115*	*130*	*146*	*184*
45,4	**593**	**586**	**581**	**573**	**564**	**555**	**545**	**533**	**521**	**508**	**468**
[14]	42	173	324	450	587	723	787	995	1131	1268	1604
	5	*20*	*37*	*51*	*66*	*82*	*89*	*112*	*128*	*143*	*181*
53,0	**692**	**686**	**679**	**672**	**662**	**653**	**641**	**629**	**615**	**601**	**561**
[15]	41	176	304	442	577	715	774	987	1123	1257	1591
	5	*20*	*34*	*50*	*65*	*81*	*87*	*112*	*127*	*142*	*180*
56,8	**742**	**737**	**729**	**720**	**712**	**701**	**690**	**677**	**664**	**650**	**610**
[20]	36	107	234	368	506	642	644	916	1053	1187	1527
	4	*12*	*26*	*42*	*57*	*73*	*73*	*103*	*119*	*134*	*173*
75,7	**991**	**982**	**975**	**967**	**957**	**947**	**936**	**924**	**910**	**895**	**852**



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]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	**28**	**41**	**55**	**69**	**83**	**97**	**110**	**124**	**138**	**172**
[2]	143	306	463	617	766	876	1080	1020	1129	1182	
	16	*35*	*52*	*70*	*87*	*99*	*122*	*115*	*128*	*134*	
7,6	**77**	**72**	**65**	**57**	**48**	**36**	**24**	**11**	**9**	**1**	
[4]	150	318	487	652	819	982	1141	1288	1425	1558	1570
	17	*36*	*55*	*74*	*92*	*111*	*129*	*146*	*161*	*176*	*177*
15,1	**157**	**153**	**146**	**138**	**128**	**119**	**105**	**90**	**76**	**64**	**5**
[6]	134	302	473	639	808	977	1119	1306	1466	1623	1980
	15	*34*	*53*	*72*	*91*	*110*	*126*	*148*	*166*	*183*	*224*
22,7	**240**	**236**	**230**	**223**	**215**	**207**	**195**	**185**	**167**	**151**	**108**
[8]	121	286	453	619	786	955	1083	1286	1448	1607	1992
	14	*32*	*51*	*70*	*89*	*108*	*122*	*145*	*164*	*182*	*225*
30,3	**322**	**317**	**311**	**303**	**294**	**284**	**272**	**260**	**246**	**228**	**187**
[10]	97	266	433	600	766	934	1050	1264	1428	1588	1974
	11	*30*	*49*	*68*	*87*	*106*	*119*	*143*	*161*	*179*	*223*
37,9	**403**	**398**	**392**	**383**	**374**	**364**	**352**	**337**	**323**	**307**	**262**
[12]	78	246	412	578	742	913	1012	1240	1402	1563	1952
	9	*28*	*47*	*65*	*84*	*103*	*114*	*140*	*158*	*177*	*221*
45,4	**485**	**479**	**473**	**465**	**454**	**444**	**431**	**418**	**401**	**384**	**340**
[14]	52	217	383	550	711	881	962	1212	1375	1538	1927
	6	*24*	*43*	*62*	*80*	*99*	*109*	*137*	*155*	*174*	*218*
53,0	**566**	**560**	**554**	**545**	**536**	**525**	**512**	**498**	**483**	**466**	**420**
[15]	47	207	372	539	707	867	943	1197	1357	1521	1917
	5	*23*	*42*	*61*	*80*	*98*	*106*	*135*	*153*	*172*	*217*
56,8	**607**	**602**	**596**	**588**	**580**	**570**	**558**	**545**	**529**	**512**	**467**
[20]	10	113	277	444	612	776	776	1111	1276	1445	1844
	1	*13*	*31*	*50*	*69*	*88*	*88*	*126*	*144*	*163*	*208*
75,7	**811**	**805**	**800**	**793**	**785**	**775**	**764**	**751**	**736**	**720**	**671**

S Motor 120 cm3/r [7.3 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]
	14	**28**	**41**	**55**	**69**	**83**	**97**	**110**	**124**	**138**	**172**
[2]	191	402	613	817	1017	1207	1430	1542	1657	1725	
	22	*45*	*69*	*92*	*115*	*136*	*162*	*174*	*187*	*195*	
7,6	**57**	**57**	**54**	**49**	**45**	**39**	**34**	**26**	**16**	**7**	
[4]	193	411	630	846	1059	1271	1480	1684	1884	2075	2480
	22	*46*	*71*	*96*	*120*	*144*	*167*	*190*	*213*	*234*	*280*
15,1	**124**	**121**	**117**	**114**	**109**	**104**	**97**	**90**	**81**	**72**	**43**
[6]	159	397	616	832	1051	1269	1456	1692	1897	2098	2575
	18	*45*	*70*	*94*	*119*	*143*	*165*	*191*	*214*	*237*	*291*
22,7	**174**	**183**	**179**	**175**	**170**	**163**	**157**	**149**	**140**	**131**	**102**
[8]	156	374	590	808	1026	1242	1414	1670	1879	2085	2582
	18	*42*	*67*	*91*	*116*	*140*	*160*	*189*	*212*	*236*	*292*
30,3	**250**	**247**	**243**	**238**	**233**	**227**	**219**	**211**	**202**	**191**	**160**
[10]	129	345	561	780	997	1214	1364	1637	1847	2056	2560
	15	*39*	*63*	*88*	*113*	*137*	*154*	*185*	*209*	*232*	*289*
37,9	**313**	**311**	**307**	**302**	**297**	**291**	**283**	**275**	**266**	**257**	**227**
[12]	99	319	535	749	968	1184	1312	1609	1820	2031	2536
	11	*36*	*60*	*85*	*109*	*134*	*148*	*182*	*206*	*230*	*286*
45,4	**377**	**375**	**370**	**365**	**359**	**353**	**345**	**337**	**328**	**317**	**287**
[14]	67	285	501	709	934	1150	1240	1578	1789	1995	2512
	8	*32*	*57*	*80*	*106*	*130*	*140*	*178*	*202*	*225*	*284*
53,0	**440**	**437**	**434**	**428**	**423**	**416**	**409**	**400**	**390**	**380**	**350**
[15]	63	272	485	699	912	1128	1224	1552	1764	1969	2487
	7	*31*	*55*	*79*	*103*	*127*	*138*	*175*	*199*	*222*	*281*
56,8	**472**	**469**	**464**	**459**	**453**	**445**	**438**	**429**	**419**	**407**	**373**
[20]	19	159	369	585	801	1018	1024	1444	1657	1867	2386
	2	*18*	*42*	*66*	*91*	*115*	*116*	*163*	*187*	*211*	*270*
75,7	**631**	**627**	**624**	**619**	**614**	**607**	**600**	**591**	**582**	**572**	**542**

[272] Torque [lb-in]
31 Nm
469 Speed RPM

Performance Data

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

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

Continuous

Intermittent

S Motor 144 cm3/r [8.8 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1900]	[2350]
	14	**28**	**41**	**55**	**69**	**83**	**97**	**110**	**124**	**131**	**162**
[2]	219	481	731	975	1214	1437	1707	1726	1815	1925	
	25	*54*	*83*	*110*	*137*	*162*	*193*	*195*	*205*	*217*	
7,6	**51**	**48**	**45**	**41**	**36**	**30**	**24**	**20**	**12**	**1**	
[4]	228	493	750	1011	1263	1512	1770	1994	2223	2320	2659
	26	*56*	*85*	*114*	*143*	*171*	*200*	*225*	*251*	*262*	*300*
15,1	**103**	**101**	**98**	**94**	**89**	**83**	**77**	**70**	**59**	**51**	**28**
[6]	214	474	730	994	1249	1502	1739	1989	2233	2347	2850
	24	*54*	*82*	*112*	*141*	*170*	*196*	*225*	*252*	*265*	*322*
22,7	**156**	**153**	**151**	**147**	**142**	**136**	**130**	**122**	**113**	**103**	**82**
[8]	188	448	708	965	1224	1481	1688	1977	2220	2339	2870
	21	*51*	*80*	*109*	*138*	*167*	*191*	*223*	*251*	*264*	*324*
30,3	**209**	**206**	**203**	**200**	**195**	**190**	**183**	**175**	**166**	**156**	**135**
[10]	156	416	674	934	1195	1449	1635	1947	2194	2316	2845
	18	*47*	*76*	*106*	*135*	*164*	*185*	*220*	*248*	*262*	*321*
37,9	**261**	**259**	**256**	**253**	**249**	**243**	**237**	**229**	**221**	**210**	**188**
[12]	123	381	639	900	1157	1415	1576	1913	2160	2282	2818
	14	*43*	*72*	*102*	*131*	*160*	*178*	*216*	*244*	*258*	*318*
45,4	**314**	**312**	**310**	**306**	**302**	**297**	**291**	**283**	**274**	**264**	**241**
[14]	82	339	600	855	1109	1371	1497	1874	2121	2246	2778
	9	*38*	*68*	*97*	*125*	*155*	*169*	*212*	*240*	*254*	*314*
53,0	**367**	**365**	**362**	**359**	**354**	**349**	**343**	**335**	**327**	**315**	**292**
[15]	79	329	583	837	1094	1346	1465	1849	2100	2230	2758
	9	*37*	*66*	*95*	*124*	*152*	*166*	*209*	*237*	*252*	*312*
56,8	**394**	**391**	**388**	**385**	**380**	**374**	**368**	**360**	**350**	**340**	**316**
[20]		185	439	694	947	1206	1214	1713	1961	2100	2631
		21	*50*	*78*	*107*	*136*	*137*	*194*	*222*	*237*	*297*
75,7		**523**	**521**	**518**	**513**	**508**	**502**	**495**	**486**	**475**	**450**

S Motor 166 cm3/r [10.1 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1900]	[2300]
	14	**28**	**41**	**55**	**69**	**83**	**97**	**110**	**124**	**131**	**159**
[2]	321	643	964	1256	1534	1800	1910	1970	2280	2261	
	36	*73*	*109*	*142*	*173*	*203*	*216*	*223*	*258*	*255*	
7,6	**43**	**42**	**42**	**39**	**36**	**32**	**27**	**25**	**15**	**14**	
[4]	321	643	964	1286	1607	1919	2159	2405	2629	2420	3049
	36	*73*	*109*	*145*	*182*	*217*	*244*	*272*	*297*	*273*	*344*
15,1	**91**	**88**	**88**	**88**	**85**	**78**	**72**	**64**	**54**	**50**	**30**
[6]	321	643	964	1286	1555	1838	2125	2400	2656	2445	3187
	36	*73*	*109*	*145*	*176*	*208*	*240*	*271*	*300*	*276*	*360*
22,7	**137**	**136**	**134**	**132**	**130**	**122**	**111**	**103**	**91**	**90**	**74**
[8]	711	892	1026	1222	1564	1907	2159	2398	2401	2448	3191
	80	*101*	*116*	*138*	*177*	*215*	*244*	*271*	*271*	*277*	*360*
30,3	**183**	**182**	**180**	**178**	**174**	**173**	**166**	**155**	**144**	**130**	**117**
[10]	321	643	964	1260	1536	1862	2037	2333	2296	2413	3168
	36	*73*	*109*	*142*	*174*	*210*	*230*	*264*	*259*	*273*	*358*
37,9	**229**	**229**	**227**	**225**	**220**	**215**	**209**	**198**	**185**	**170**	**162**
[12]	321	643	894	1198	1476	1813	2060	2353	2548	2662	3132
	36	*73*	*101*	*135*	*167*	*205*	*233*	*266*	*288*	*301*	*354*
45,4	**274**	**274**	**274**	**274**	**273**	**267**	**259**	**247**	**233**	**218**	**209**
[14]	321	643	927	1190	1420	1752	2054	2326	2535	2305	3085
	36	*73*	*105*	*134*	*160*	*198*	*232*	*263*	*286*	*260*	*349*
53,0	**320**	**320**	**320**	**322**	**319**	**315**	**304**	**294**	**277**	**265**	**256**
[15]	321	607	854	1112	1333	1675	2022	1950	2204	2268	3059
	36	*69*	*96*	*126*	*151*	*189*	*228*	*220*	*249*	*256*	*346*
56,8	**343**	**343**	**343**	**343**	**342**	**335**	**325**	**317**	**303**	**289**	**279**
[20]		567	647	954	1239	1409	1740	1851	2072	2181	2911
		64	*73*	*108*	*140*	*159*	*197*	*209*	*234*	*246*	*329*
75,7		**457**	**457**	**457**	**457**	**457**	**451**	**442**	**425**	**410**	**394**

[607] Torque [lb-in]
69 Nm
343 Speed RPM

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]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1850]	[2250]
	14	**28**	**41**	**55**	**69**	**83**	**97**	**110**	**124**	**128**	**155**
[2]	282	626	950	1267	1582	1879	2217	2407	2591	2541	
	32	*71*	*107*	*143*	*179*	*212*	*250*	*272*	*293*	*287*	
7,6	**39**	**38**	**36**	**34**	**31**	**27**	**24**	**18**	**11**	**4**	
[4]	304	642	979	1311	1640	1961	2295	2588	2891	2938	3463
	34	*73*	*111*	*148*	*185*	*222*	*259*	*292*	*327*	*332*	*391*
15,1	**80**	**78**	**76**	**74**	**71**	**67**	**63**	**58**	**52**	**44**	**32**
[6]	288	624	959	1294	1625	1949	2264	2584	2889	2950	3533
	33	*71*	*108*	*146*	*184*	*220*	*256*	*292*	*326*	*333*	*399*
22,7	**120**	**119**	**117**	**114**	**111**	**107**	**102**	**96**	**90**	**82**	**68**
[8]	255	591	923	1256	1584	1905	2199	2536	2843	2912	3515
	29	*67*	*104*	*142*	*179*	*215*	*248*	*286*	*321*	*329*	*397*
30,3	**162**	**160**	**158**	**155**	**152**	**147**	**142**	**135**	**127**	**119**	**104**
[10]	218	553	882	1216	1546	1872	2128	2503	2809	2874	3468
	25	*62*	*100*	*137*	*175*	*212*	*240*	*283*	*317*	*325*	*392*
37,9	**203**	**201**	**199**	**196**	**193**	**189**	**183**	**177**	**169**	**160**	**145**
[12]	169	507	837	1165	1491	1817	2039	2431	2736	2802	3390
	19	*57*	*95*	*132*	*169*	*205*	*230*	*275*	*309*	*317*	*383*
45,4	**243**	**242**	**240**	**238**	**234**	**231**	**225**	**219**	**212**	**203**	**187**
[14]	119	455	780	1110	1432	1743	1942	2353	2659	2733	3323
	13	*51*	*88*	*125*	*162*	*197*	*219*	*266*	*300*	*309*	*375*
53,0	**284**	**283**	**281**	**279**	**276**	**272**	**267**	**261**	**254**	**245**	**229**
[15]	105	434	761	1088	1404	1720	1904	2313	2605	2692	3267
	12	*49*	*86*	*123*	*159*	*194*	*215*	*261*	*294*	*304*	*369*
56,8	**304**	**304**	**302**	**299**	**296**	**293**	**288**	**281**	**274**	**266**	**250**
[20]		250	578	909	1230	1548	1590	2178	2470	2548	3122
		28	*65*	*103*	*139*	*175*	*180*	*246*	*279*	*288*	*353*
75,7		**405**	**405**	**403**	**400**	**397**	**393**	**386**	**379**	**369**	**354**

S Motor 225 cm3/r [13.7 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1700]	[2050]
	14	**28**	**41**	**55**	**69**	**83**	**97**	**110**	**117**	**138**
[2]	436	842	1156	1592	1884	2251	2787	2846	2845	3359
	49	*95*	*131*	*180*	*213*	*254*	*315*	*322*	*321*	*379*
7,6	**32**	**30**	**29**	**26**	**23**	**19**	**16**	**13**	**6**	**2**
[4]	554	871	1265	1710	2103	2421	2992	3069	3267	3843
	63	*98*	*143*	*193*	*238*	*274*	*338*	*347*	*369*	*434*
15,1	**66**	**65**	**63**	**60**	**57**	**54**	**49**	**44**	**38**	**32**
[6]	410	827	1253	1670	2079	2427	2923	3049	3214	3838
	46	*93*	*142*	*189*	*235*	*274*	*330*	*344*	*363*	*434*
22,7	**100**	**99**	**96**	**94**	**91**	**87**	**83**	**77**	**71**	**63**
[8]	382	853	1292	1724	2131	2433	3017	3155	3290	3835
	43	*96*	*146*	*195*	*241*	*275*	*341*	*356*	*372*	*433*
30,3	**134**	**133**	**131**	**128**	**125**	**121**	**116**	**109**	**101**	**94**
[10]	436	843	1092	1471	1841	2229	2574	2983	3164	3769
	49	*95*	*123*	*166*	*208*	*252*	*291*	*337*	*358*	*426*
37,9	**168**	**167**	**166**	**164**	**161**	**157**	**151**	**144**	**135**	**125**
[12]	382	778	1151	1540	1874	2256	2694	2991	3158	3764
	43	*88*	*130*	*174*	*212*	*255*	*304*	*338*	*357*	*425*
45,4	**202**	**201**	**200**	**197**	**194**	**190**	**185**	**178**	**168**	**159**
[14]	234	646	1059	1471	1899	2250	2575	2951	3165	3777
	26	*73*	*120*	*166*	*215*	*254*	*291*	*333*	*358*	*427*
53,0	**236**	**236**	**234**	**232**	**229**	**225**	**220**	**213**	**203**	**192**
[15]	287	674	1018	1408	1807	2142	2464	2832	3029	3606
	32	*76*	*115*	*159*	*204*	*242*	*278*	*320*	*342*	*407*
56,8	**253**	**253**	**252**	**249**	**246**	**242**	**237**	**232**	**222**	**213**
[20]		418	797	1173	1604	1917	2053	2620	2808	3405
		47	*90*	*133*	*181*	*217*	*232*	*296*	*317*	*385*
75,7		**337**	**337**	**336**	**333**	**329**	**325**	**320**	**312**	**303**

[674] Torque [lb-in]
76 Nm
253 Speed RPM

Performance Data

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

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

Continuous

Intermittent

S Motor 298 cm3/r [18.2 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1500]	[1800]
	14	**28**	**41**	**55**	**69**	**83**	**97**	**103**	**124**
[2]	529	1069	1711	2210	2515	2924	3867	4143	3843
	60	*121*	*193*	*250*	*284*	*330*	*437*	*468*	*434*
7,6	**24**	**22**	**20**	**18**	**15**	**13**	**10**	**5**	**2**
[4]	579	1159	1738	2317	2897	3230	4055	4345	4441
	65	*131*	*196*	*262*	*327*	*365*	*458*	*491*	*502*
15,1	**49**	**48**	**45**	**42**	**40**	**38**	**35**	**35**	**25**
[6]	507	1159	1738	2170	2694	3050	3798	4070	4467
	57	*131*	*196*	*245*	*304*	*345*	*429*	*460*	*505*
22,7	**75**	**73**	**71**	**70**	**67**	**64**	**60**	**60**	**49**
[8]	567	1158	1721	2144	2516	2994	3752	4020	4424
	64	*131*	*194*	*242*	*284*	*338*	*424*	*454*	*500*
30,3	**101**	**100**	**98**	**96**	**94**	**91**	**87**	**87**	**75**
[10]	494	1067	1621	2109	2539	3086	3691	3955	4442
	56	*121*	*183*	*238*	*287*	*349*	*417*	*447*	*502*
37,9	**127**	**126**	**124**	**122**	**120**	**117**	**113**	**113**	**99**
[12]	471	1075	1588	2209	2577	3075	3866	4142	4323
	53	*121*	*179*	*250*	*291*	*347*	*437*	*468*	*488*
45,4	**152**	**151**	**150**	**148**	**145**	**142**	**137**	**137**	**125**
[14]	334	947	1463	2096	2485	2968	3668	3930	4190
	38	*107*	*165*	*237*	*281*	*335*	*414*	*444*	*473*
53,0	**178**	**177**	**176**	**174**	**171**	**168**	**164**	**164**	**153**
[15]	329	930	1446	1990	2434	2780	3482	3731	4122
	37	*105*	*163*	*225*	*275*	*314*	*393*	*421*	*466*
56,8	**190**	**190**	**189**	**187**	**185**	**182**	**177**	**177**	**165**
[20]		598	1113	1650	2169	2533	2888	3094	3890
		68	*126*	*186*	*245*	*286*	*326*	*350*	*439*
75,7		**254**	**254**	**252**	**250**	**248**	**244**	**244**	**232**

S Motor 372 cm3/r [22.7 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[200]	[400]	[600]	[800]	[1000]	[1200]	[1300]	[1500]
	14	**28**	**41**	**55**	**69**	**83**	**90**	**103**
[2]	723	1445	2168	2822	3447	4045	4383	4599
	82	*163*	*245*	*319*	*390*	*457*	*495*	*520*
7,6	**19**	**19**	**18**	**17**	**15**	**13**	**13**	**11**
[4]	723	1445	2168	2890	3613	4312	4672	5200
	82	*163*	*245*	*327*	*408*	*487*	*528*	*587*
15,1	**40**	**39**	**39**	**39**	**38**	**35**	**35**	**32**
[6]	723	1445	2168	2890	3494	4131	4475	5117
	82	*163*	*245*	*327*	*395*	*467*	*506*	*578*
22,7	**61**	**60**	**60**	**59**	**58**	**54**	**54**	**50**
[8]	723	1445	2168	2746	3516	4286	4643	5199
	82	*163*	*245*	*310*	*397*	*484*	*525*	*587*
30,3	**81**	**81**	**80**	**79**	**78**	**77**	**77**	**74**
[10]	723	1445	2168	2831	3453	4184	4532	4906
	82	*163*	*245*	*320*	*390*	*473*	*512*	*554*
37,9	**102**	**102**	**101**	**100**	**98**	**96**	**96**	**93**
[12]	723	1445	2008	2692	3316	4075	4414	4961
	82	*163*	*227*	*304*	*375*	*460*	*499*	*561*
45,4	**122**	**122**	**122**	**122**	**121**	**119**	**119**	**115**
[14]	723	1445	2084	2675	3192	3938	4266	4946
	82	*163*	*235*	*302*	*361*	*445*	*482*	*559*
53,0	**142**	**142**	**142**	**142**	**142**	**140**	**140**	**135**
[15]	723	1365	1918	2499	2996	3766	4079	4870
	82	*154*	*217*	*282*	*338*	*425*	*461*	*550*
56,8	**153**	**153**	**153**	**153**	**152**	**149**	**149**	**145**
[20]		1274	1454	2144	2784	3167	3431	4191
		144	*164*	*242*	*315*	*358*	*388*	*474*
75,7		**204**	**204**	**204**	**204**	**203**	**203**	**201**

[1365] Torque [lb-in]
154 Nm
153 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

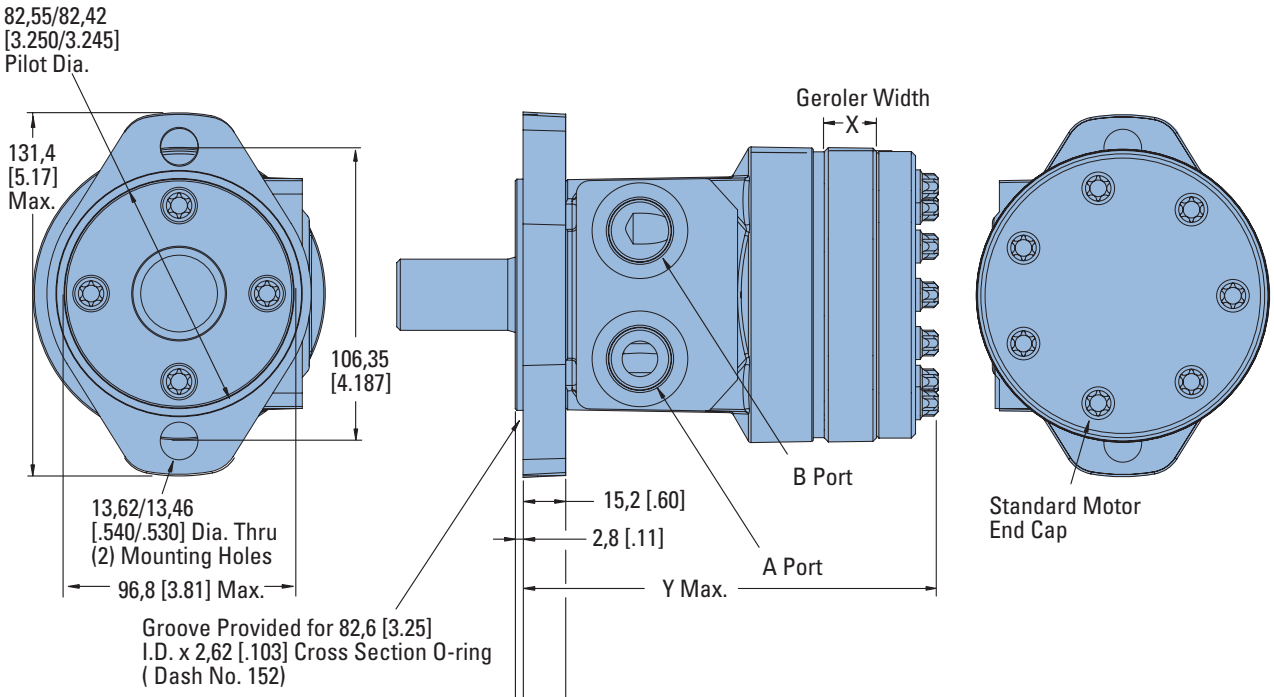
6-1/2 (BSP) Straight thread manifold

Standard Rotation Viewed from Shaft End

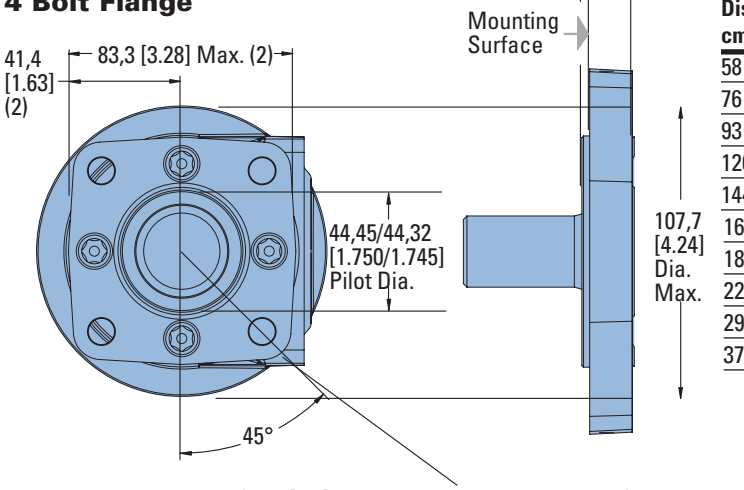
Port A Pressurized — CW

Port B Pressurized — CCW

2 Bolt Flange



4 Bolt Flange



Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
58 [3.6]	7,5 [.30]	138,0 [5.43]
76 [4.6]	9,8 [.39]	140,3 [5.52]
93 [5.7]	12,0 [.47]	142,5 [5.61]
120 [7.3]	15,5 [.61]	146,0 [5.75]
144 [8.8]	18,6 [.73]	149,1 [5.87]
165 [10.1]	21,3 [.84]	151,8 [5.98]
186 [11.4]	24,0 [.94]	154,5 [6.08]
225 [13.7]	28,9 [1.14]	159,4 [6.28]
299 [18.2]	38,5 [1.52]	169,0 [6.66]
371 [22.7]	47,9 [1.88]	178,4 [7.02]

3/8-16 UNC (15,2 [.60] Max. Bolt Thread Engagement) Mounting Holes (4) Equally Spaced on 82,6 [3.25] Dia. Bolt Circle
or
M10 x 1,5 (15,2 [.60] Max. Bolt Thread Engagement) Mounting Holes (4) Equally Spaced on 82,6 [3.25] Dia. Bolt Circle

S Series (103-)

Product Numbers

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

2 Bolt Flange

SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER									
		59 [3.6]	75 [4.6]	93 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]
1 in. Straight w/Woodruff Key	7/8-14 O-Ring	103-1537	-1034	-1035	-1538	-1539	-1036	-1037	-1038	-1039	-1040
	1/2 NPTF	103-1540	-1026	-1027	-1541	-1542	-1028	-1029	-1030	-1031	-1032
	Manifold	103-1543	-1042	-1043	-1544	-1545	-1044	-1045	-1046	-1047	-1048
1 in. SAE 6B Splined	7/8-14 O-Ring	103-1552	-1082	-1083	-1553	-1554	-1084	-1085	-1086	-1087	-1088
	1/2 NPTF	103-1555	-1074	-1075	-1556	-1557	-1076	-1077	-1078	-1079	-1080
	Manifold	103-1558	-1090	-1091	-1559	-1560	-1092	-1093	-1094	-1095	-1096

103-1093

4 Bolt Flange

SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER									
		59 [3.6]	75 [4.6]	93 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]
1 in. Straight w/Woodruff Key	7/8-14 O-Ring	103-1570	-1010	-1011	-1571	-1572	-1012	-1013	-1014	-1015	-1016
	1/2 NPTF	103-1573	-1002	-1003	-1574	-1575	-1004	-1005	-1006	-1007	-1008
	Manifold	103-1576	-1018	-1019	-1577	-1578	-1020	-1021	-1022	-1023	-1024
1 in. SAE 6BSplined	7/8-14 O-Ring	103-1579	-1058	-1059	-1580	-1581	-1060	-1061	-1062	-1063	-1064
	1/2 NPTF	103-1582	-1050	-1051	-1583	-1584	-1052	-1053	-1054	-1055	-1056
	Manifold	103-1585	-1066	-1067	-1586	-1587	-1068	-1069	-1070	-1071	-1072

103-1069

S Series Motors with Corrosion Protection

SHAFT	MOUNTING	PORT SIZE	DISPL. 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.

Product Numbers

S Series with Low Speed Valving

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

Designed to run continuously at up to 200 RPM at standard rated pressures and reduced flows, this option provides smooth operation at low speeds. Furthermore, they resist slippage and have more momentary load holding ability than the standard H and S Series motors. Motors with this valving are not intended for low pressure applications (41 Bar [600 PSI] Minimum). Shaft side / radial load ratings are not affected by this valving.

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

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

2 Bolt Flange

SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER										
		59 [3.6]	75 [4.6]	93 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]	
1 in. Straight w/Woodruff Key	7/8 -14 O-Ring		103- —	-1427	-1428	—	—	-1429	-1430	-1431	-1432	-1433
	1/2 NPTF	103- —	-1419	-1420	—	—	-1421	-1422	-1423	-1424	-1425	
	Manifold*	103- —	—	—	—	—	—	—	—	—	—	
1 in. SAE 6B Splined	7/8 -14 O-Ring		103- —	-1525	—	—	-2692	—	—	-1675	—	—
	1/2 NPTF	103- —	—	-1634	—	—	—	—	—	—	—	
	Manifold*	103- —	-1522	-2678	—	—	—	—	—	—	-1527	

4 Bolt Flange

SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER										
		59 [3.6]	75 [4.6]	93 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]	
1 in. Straight w/Woodruff Key	7/8 -14 O-Ring		103-1625	-1410	-1411	-1626	-2531	-1412	-1413	-1414	-1415	-1416
	1/2 NPTF	103-1644	-1402	-1403	—	—	-1404	-1405	-1406	-1407	-1408	

103-1404

103-1527

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

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

S Series (103-)

Model Code

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

M	S0	* * *	* *	* *	* *	*	*	*	* *	*	0	* *	*	*	0	M
1	2 3	4 5 6	7 8	9 10	11 12	13	14	15	16 17	18	19	20 21	22	23	24	25

1 Product

M – Motor

2, 3 Series

S0 – S Series Motor

4, 5, 6 Displacement cm³/r [in³/r]

036 – 58 [3.6]

046 – 76 [4.6]

057 – 93 [5.7]

073 – 120 [7.3]

088 – 144 [8.8]

101 – 165 [10.1]

114 – 186 [11.4]

137 – 224 [13.7]

182 – 299 [18.2]

227 – 371 [22.7]

7, 8 Mounting Type

AA – 2 Bolt Std: 82.50 [3.248] Dia. x 3.05 [.120] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C.

BA – 4 Bolt Std: 44.40 [1.748] Dia. x 3.05 [.120] Pilot, .375-16 Unc-2b Mounting Holes on 82.55 [3.250] Dia. B.C.

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

DD – 2 Bolt Std: 101.60 [4.000] Dia. x 6.10 [.240] Pilot, 14.35 [.565] Dia. Mounting Holes on 146.05 [5.750] Dia. B.C. (SAE B) (Ductile)

EA – 4 Bolt Magneto: 82.50 [3.248] Dia. x 3.05 [.120] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C.

FA – 4 Bolt Std: 44.40 [1.748] Dia. x 3.05 [.120] Pilot, M10 x 1.5-6h Mounting Holes on 82.55 [3.250] Dia. B.C.

LA – 2 Bolt Std: 44.45 [1.750] Dia. x 3.05 [.120] Pilot, 13.59 [.535] Dia. Mounting Holes on 106.35 [4.187] Dia. B.C.

9, 10 Output Shaft

01 – 25.4 [1.00] Dia. Straight, Woodruff Key, .250-20 UNC-2B Hole in Shaft End

02 – 25.4 [1.00] Dia. SAE 6B Spline, .250-20 UNC-2B Hole in Shaft End

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

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

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

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

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

24 – 25.00 [.984] Dia. Straight, 8.00 [.315] Key, M8 x 1.25-6H Hole in Shaft End

11, 12 Port Type

AA – .875-14 UNF-2B SAE O-Ring Ports

AB – .500-14 NPTF Dryseal Pipe Thread Ports

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

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

AF – G 1/2 BSP Straight Thread Ports

13 Case Flow Options ††

0 – None Specified

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

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

3 – Manifold Case Drain

†† – Internal check valves are standard fetures.

14 Geroler Options

0 – None Specified

15 Shaft Options

0 – None Specified

N – Electroless Nickel Plated

16, 17 Seal Options

00 – Standard Seals

02 – Seal Guard

03 – Viton Seals

04 – Viton Shaft Seal

05 – Vented Two-Stage Seal

07 – High Pressure Shaft Seal

18 Speed Sensor Options

0 – None

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

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

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

19 Manifold Block Options

0 – None

* Contact your Eaton sales representatitve for available options.

20, 21 Special Features (Hardware)

00 – None Specified

AB – Low Speed Valving

SS – Stainless Steel Flange Bolts

22 Special Assembly Instructions

0 – None

1 – Reverse Rotation

2 – Flange Rotated 90°

3 – Reverse Rotation, Flange Rotated 90°

23 Paint/Packaging Options

0 – No Paint

A – Painted Low Gloss Black

D – Environmental Coated Gloss White

F – Environmental Coated Black

24 Eaton Assigned Code When Applicable

0 – Assigned Code

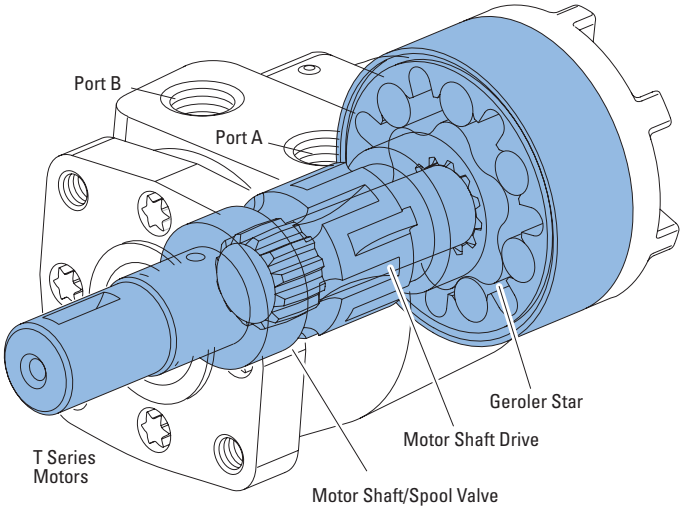
25 Eaton Assigned Design Code

M – Twelve (12)

Notes

T Series (158-)

Highlights



Description

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

Specifications for T Series Motors

Geroler Element	11 Displacements
Flow l/min [GPM]	55 [15] Continuous***
	75 [20] Intermittent**
Speed	Up to 1021 RPM
Pressure bar [PSI]	155 [2250] Cont.***
	190 [2750] Inter.**
Torque Nm [lb-in]	441 [3905] Cont.***
	486 [4300] Inter.**

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

Features:

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

Benefits:

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

Applications:

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


Crane (winch)

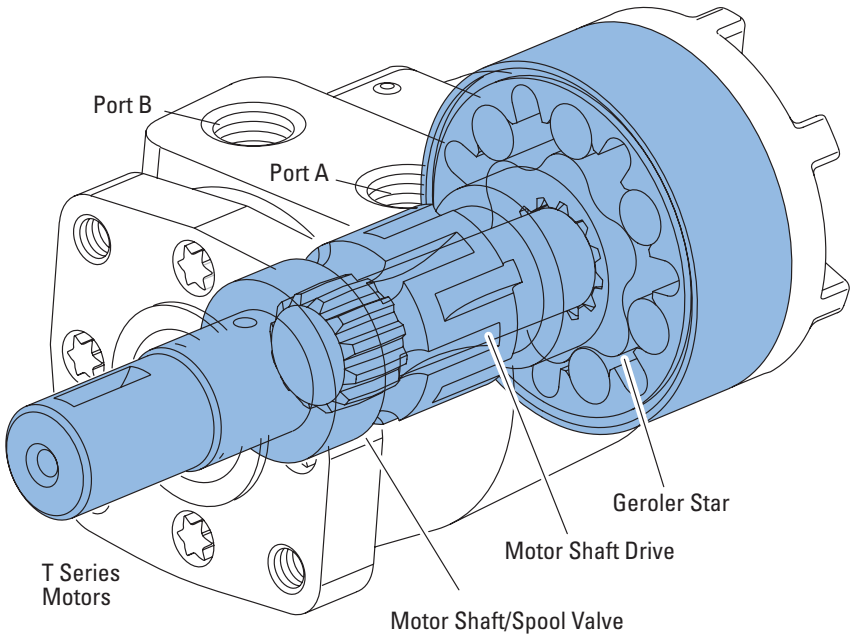

Paving


Harvester


Crane and winches

T Series (158-)

Specifications



SPECIFICATION DATA — T MOTORS

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

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

Δ Pressure:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82°C [180°F]

Recommended Filtration:

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

T Series (158-, 185-)

Performance Data

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

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

Continuous

Intermittent

36 cm³/r [2.2 in³/r]

Δ Pressure Bar [PSI]

Continuous

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

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

49 cm³/r [3.0 in³/r]

Δ Pressure Bar [PSI]

Continuous

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

T Series (158-, 185-)

Performance Data

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

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

Continuous

Intermittent

66 cm³/r [4.0 in³/r]

Δ Pressure Bar [PSI]

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

80 cm³/r [4.9 in³/r]

Δ Pressure Bar [PSI]

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

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

T Series (158-, 185-)

Performance Data

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

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

Continuous

Intermittent

102 cm³/r [6.2 in³/r]

Δ Pressure Bar [PSI] Continuous

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

131 cm³/r [8.0 in³/r]

Δ Pressure Bar [PSI] Continuous

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

[302] Torque [lb-in]
34 Nm
423 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]

Δ Pressure Bar [PSI]

Continuous

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

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

[465] 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

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1650] 114	[1800] 125	[1850] 127	Max. Continuous [2250] 155
[2] 7,6	[406] 46 30	[833] 94 29	[1260] 142 27	[1655] 187 26	[2038] 230 24	[2403] 272 22	[2707] 306 17	[2597] 293 12	[2552] 288 11	[2373] 268 7	[2299] 260 6	
[4] 15,1	[404] 46 62	[843] 95 62	[1277] 144 60	[1695] 192 59	[2083] 235 59	[2468] 279 57	[2820] 319 55	[3177] 359 50	[3261] 368 49	[3509] 396 46	[3589] 406 44	[4194] 474 35
[6] 22,7	[382] 43 92	[823] 93 91	[1261] 142 90	[1687] 191 89	[2088] 236 88	[2477] 280 86	[2843] 321 82	[3196] 361 78	[3285] 371 76	[3547] 401 72	[3633] 410 71	[4290] 485 60
[8] 30,3	[341] 39 123	[787] 89 122	[1220] 138 121	[1651] 187 120	[2059] 233 119	[2454] 277 116	[2820] 319 113	[3177] 359 108	[3265] 369 106	[3530] 399 101	[3615] 408 99	[4285] 484 85
[10] 37,9	[297] 34 154	[744] 84 152	[1177] 133 151	[1611] 182 150	[2017] 228 148	[2412] 273 146	[2774] 313 143	[3151] 356 136	[3241] 366 134	[3504] 396 127	[3593] 406 125	[4269] 482 107
[12] 45,4	[225] 25 184	[687] 78 183	[1132] 128 181	[1553] 175 180	[1967] 222 179	[2360] 267 177	[2734] 309 173	[3105] 351 166	[3194] 361 163	[3466] 392 156	[3554] 402 153	[4237] 479 134
[14] 53,0	[154] 17 214	[628] 71 213	[1072] 121 212	[1498] 169 211	[1910] 216 209	[2298] 260 207	[2674] 302 202	[3052] 345 195	[3148] 356 193	[3419] 386 185	[3510] 397 182	[4226] 477 161
Max. Continuous [15] 56,8	[119] 13 229	[586] 66 228	[1035] 117 227	[1458] 165 226	[1872] 212 224	[2261] 255 222	[2637] 298 217	[3022] 341 209	[3116] 352 207	[3389] 383 200	[3488] 394 197	[4220] 477 174
Max. Intermittent [20] 75,7		[372] 42 305	[816] 92 303	[1251] 141 301	[1663] 188 300	[2067] 234 297	[2448] 277 292	[2832] 320 284	[2928] 331 281	[3214] 363 273	[3312] 374 270	

306 cm³/r [18.7 in³/r]

Δ Pressure Bar [PSI]

Continuous

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1500] 103	Max. Continuous [1600] 110	Max. Intermittent [1800] 124
[2] 7,6	[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] 15,1	[497] 56 49	[1052] 119 49	[1590] 180 48	[2101] 237 48	[2561] 289 47	[3023] 342 47	[3464] 391 44	[3680] 416 41	[3886] 439 38	[4221] 477 30
[6] 22,7	[480] 54 74	[1031] 116 74	[1578] 178 72	[2096] 237 72	[2564] 290 71	[3023] 342 69	[3464] 391 64	[3689] 417 62	[3905] 441 60	[4275] 483 51
[8] 30,3	[427] 48 99	[975] 110 98	[1520] 172 97	[2051] 232 97	[2525] 285 96	[2998] 339 94	[3448] 390 89	[3667] 414 86	[3881] 438 83	[4264] 482 73
[10] 37,9	[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	[4264] 482 92
[12] 45,4	[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	[4189] 473 112
[14] 53,0	[192] 22 171	[791] 89 171	[1338] 151 170	[1851] 209 170	[2338] 264 169	[2816] 318 165	[3281] 371 159	[3511] 397 154	[3743] 423 150	[4135] 467 133
Max. Continuous [15] 56,8	[148] 17 183	[738] 83 183	[1288] 146 182	[1803] 204 182	[2287] 258 181	[2773] 313 177	[3243] 366 171	[3475] 393 165	[3705] 419 160	[4098] 463 146
Max. Intermittent [20] 75,7		[476] 54 243	[1020] 115 242	[1544] 174 242	[2010] 227 241	[2519] 285 238	[3010] 340 231	[3243] 366 226	[3495] 395 209	

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

370 cm³/r [22.6 in³/r]

Δ Pressure Bar [PSI]

Continuous

Flow LPM [GPM]	[200] 14	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	Max. Continuous [1300] 90	Max. Intermittent [1500] 103
[2] 7,6	[590] 67 20	[1237] 140 19	[1858] 210 18	[2406] 272 17	[2953] 334 15	[3388] 383 12	[3586] 405 11	
[4] 15,1	[588] 66 41	[1263] 143 41	[1906] 215 40	[2506] 283 40	[3029] 342 39	[3557] 402 38	[3811] 431 37	[4252] 480 36
[6] 22,7	[580] 66 61	[1245] 141 60	[1899] 215 60	[2506] 283 59	[3029] 342 58	[3544] 400 57	[3788] 428 56	[4300] 486 54
[8] 30,3	[514] 58 82	[1164] 132 81	[1824] 206 80	[2452] 277 79	[2975] 336 78	[3518] 397 77	[3783] 427 77	[4284] 484 75
[10] 37,9	[444] 50 102	[1119] 126 102	[1759] 199 101	[2391] 270 101	[2928] 331 100	[3479] 393 97	[3750] 424 96	[4275] 483 93
[12] 45,4	[337] 38 122	[1062] 120 121	[1690] 191 120	[2256] 255 119	[2813] 318 119	[3393] 383 118	[3685] 416 116	[4273] 483 112
[14] 53,0	[231] 26 142	[958] 108 141	[1608] 182 140	[2201] 249 139	[2748] 310 138	[3319] 375 137	[3610] 408 134	[4198] 474 129
Max. Continuous [15] 56,8	[178] 20 152	[896] 101 152	[1543] 174 151	[2147] 243 150	[2683] 303 149	[3272] 370 147	[3572] 404 146	[4187] 473 140
Max. Intermittent [20] 75,7		[587] 66 202	[1228] 139 201	[1833] 207 201	[2331] 263 200	[2948] 333 198	[3273] 370 196	

T Series (158-)

Dimensions

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

Ports

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

1/2 -14 NPTF (2)

G 1/2 BSP (2)

Manifold Ports (5/16-18 mounting threads

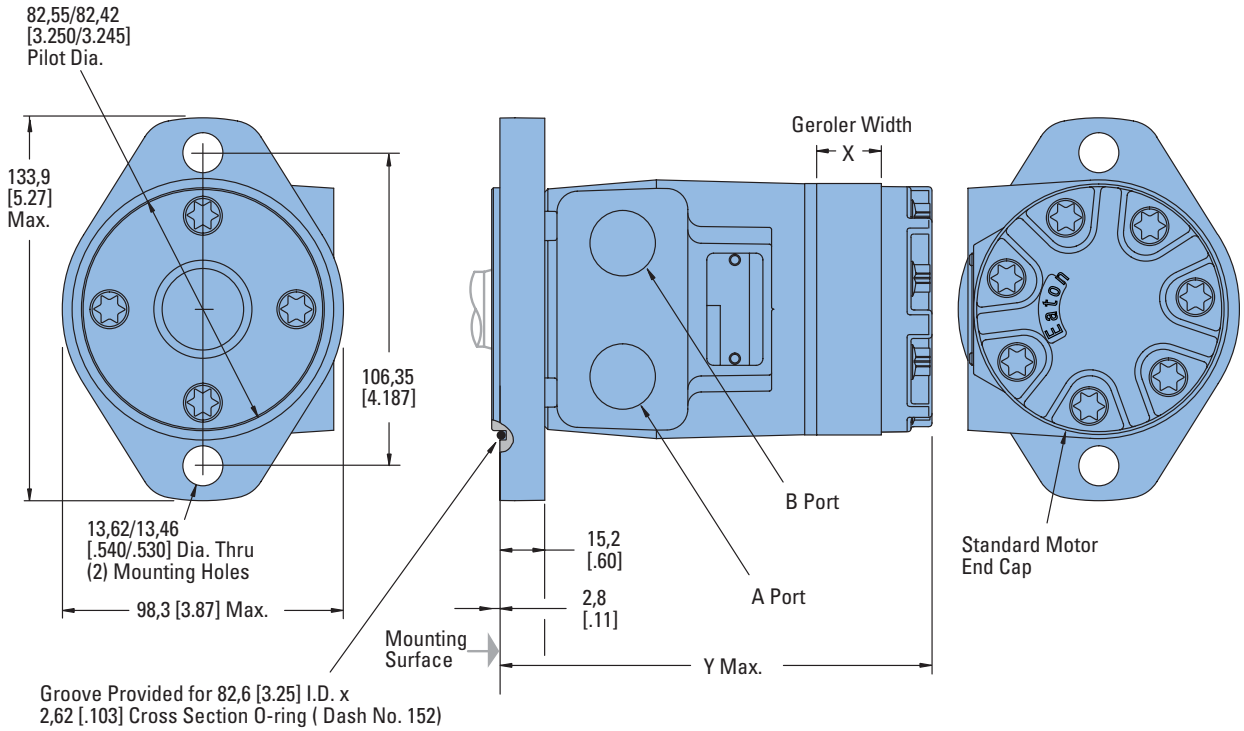
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

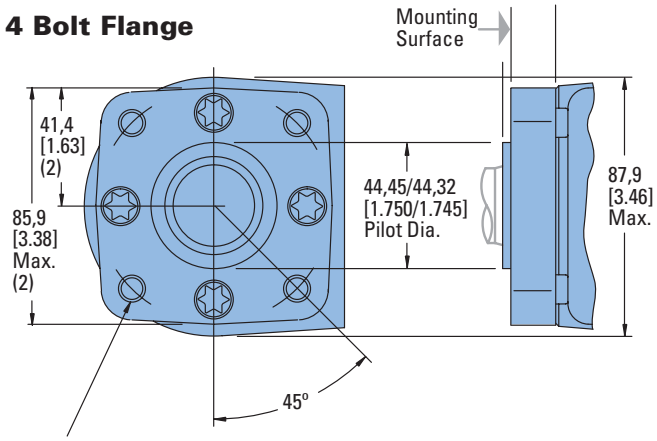
Note:

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

2 Bolt Flange



4 Bolt Flange



2 AND 4 BOLT FLANGE PORT DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
36 [2.2]	6,6 [.26]	132,2 [5.21]
49 [3.0]	9,1 [.36]	134,6 [5.30]
66 [4.0]	12,2 [.48]	137,7 [5.42]
80 [4.9]	14,7 [.58]	140,3 [5.53]
102 [6.2]	18,5 [.73]	144,3 [5.68]
131 [8.0]	24,1 [.95]	149,6 [5.89]
157 [9.6]	29,0 [1.14]	154,5 [6.09]
195 [11.9]	35,6 [1.40]	161,3 [6.35]
244 [14.9]	44,7 [1.76]	170,3 [6.71]
306 [18.7]	56,1 [2.21]	181,6 [7.16]
370 [22.6]	72,1 [2.84]	197,9 [7.79]

T Series (158-)

Product Numbers

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

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

Standard

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER										
			36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
2 Bolt Flange	1 in. Straight w/Woodruff Key	7/8 -14 O-Ring	158- —	—	-1537	-1034	-1035	-1538	-1036	-1037	-1038	-1039	-1040
		1/2 NPTF	158- —	—	-1540	-1026	-1027	-1541	-1028	-1029	-1030	-1031	-1032
		Manifold*	158- —	—	-1543	-1042	-1043	-1544	-1044	-1045	-1046	-1047	-1048
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158- —	—	-1552	-1082	-1083	-1553	-1084	-1085	-1086	-1087	-1088
		1/2 NPTF	158- —	—	-1555	-1074	-1075	-1556	-1076	-1077	-1078	-1079	-1080
		Manifold*	158- —	—	-1558	-1090	-1091	-1559	-1092	-1093	-1094	-1095	-1096
4 Bolt Flange	1 in. Straight w/Woodruff Key	7/8 -14 O-Ring	158- —	—	-1570	-1010	-1011	-1571	-1012	-1013	-1014	-1015	-1016
		1/2 NPTF	158- —	—	-1573	-1002	-1003	-1574	-1004	-1005	-1006	-1007	-1008
		Manifold*	158- —	—	-1576	-1018	-1019	-1577	-1020	-1021	-1022	-1023	-1024
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158- —	—	-1579	-1058	-1059	-1580	-1060	-1061	-1062	-1063	-1064
		1/2 NPTF	158- —	—	-1582	-1050	-1051	-1583	-1052	-1053	-1054	-1055	-1056
		Manifold*	158- —	—	-1585	-1066	-1067	-1586	-1068	-1069	-1070	-1071	-1072

158-1067

T Series Motors with Corrosion Protection

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER										
			36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
2 Bolt Flange	1 in. Straight w/ Woodruff Key	7/8 -14 O-Ring	158- —	—	—	1645	—	—	—	—	-1649	—	-1650
4 Bolt Flange		1/2 NPTF	158- —	—	—	—	—	—	—	—	-1620	—	-1621

158-1620

T Series Motors with Low Speed Valving

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER										
			36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
2 Bolt Flange	1 in. Straight w/Woodruff Key	7/8 -14 O-Ring	158- —	—	—	-1427	-1428	—	—	-1430	-1431	-1432	-1433
		1/2 NPTF	158- —	—	—	-1419	-1420	—	—	-1422	-1423	-1424	-1425
		Manifold*	158- —	—	—	—	—	—	—	—	—	—	—
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158- —	—	—	-1525	—	—	—	—	-1675	—	—
		1/2 NPTF	158- —	—	—	—	-1634	—	—	—	—	—	—
4 Bolt Flange	1 in. Straight w/ Woodruff Key	Manifold*	158- —	—	—	-1522	-2678	—	—	—	—	—	-1527
		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

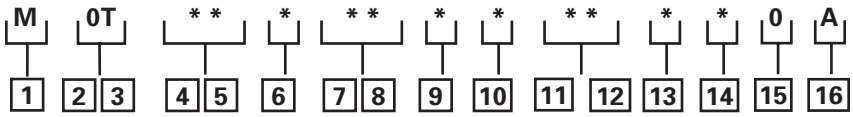
*Manifold product numbers shown are for motors with four 5/16 -18 port face mounting threads. Manifold, manifold mounting O-Rings and bolts are NOT included.

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 16-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 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 Product Series

0T – T Series

4, 5 Displacement cm³/r [in³/r]

02 – 36 [2.2]

03 – 49 [3.0]

04 – 66 [4.0]

05 – 80 [4.9]

06 – 102 [6.2]

08 – 131 [8.0]

10 – 157 [9.6]

12 – 195 [11.9]

15 – 244 [14.9]

19 – 306 [18.7]

23 – 370 [22.6]

6 Mounting Type

A – 2 Bolt (Standard) 82,6 [3.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes 106,2 [4.18] Dia. B.C.

B – 4 Bolt (Standard) 44,4 [1.75] Pilot Dia. and 3/8 -16 Mounting Holes 82,6 [3.25] Dia. B.C.

E – 4 Bolt (Standard) 44,4 [1.75] Pilot Dia. and M10 x 1,5 Mounting Holes 82,6 [3.25] Dia. B.C.

H – 2 Bolt (Std.) 101,6 [4.00] Pilot Dia. and 14,35 [.565] Dia. Mounting Holes 146,0 [5.75] Dia. B.C. (SAE B)

K – 4 Bolt Magneto 82,6 [3.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes 106,2 [4.18] Dia. B.C.

7, 8 Output Shaft

01 – 1 inch Dia. Straight with Woodruff Key and 1/4 -20 Threaded Hole

02 – 1 inch Dia. SAE 6B Splined with 1/4 -20 Threaded Hole

07 – 1 inch Dia. Straight with 7,9 [.31] Dia. Crosshole 11,2 [.44] from End

08 – 1 inch Dia. Straight with 10,2 [.40] Dia. Crosshole 15,7 [.62] from End and 1/4 -20 Threaded Hole

16 – 7/8 inch Dia. SAE B 13T Splined

17 – 7/8 inch Dia. SAE B Straight with Square Key

18 – 1 inch Dia. Tapered with Woodruff Key and Nut

24 – 25mm Dia. Straight with 8mm Key and 8mm x 1.2 Threaded Hole

27 – 1 inch Dia. Straight with Woodruff Key and 1/4-20 Threaded Hole (Plated for Corrosion Protection)

9 Ports

A – 7/8 -14 O-Ring

B – 1/2 -14 NPTF

C – Manifold (5/16-18 Mounting Threads)

D – Manifold (M8 x 1,25 Mounting Threads)

E – G 1/2 (BSP) End Cap

10 Case Flow Options

0 – No Case Drain

1 – 7/16 -20 O-Ring Port End Cap

2 – G 1/4 (BSP) End Cap

11, 12 Special Features (Hardware)

00 – None

AB – Low Speed Valve

AC – Viton Shaft Seal

BZ – Speed Sensor

DS – High Pressure Shaft Seal

13 Special Features (Assembly)

0 – None

1 – Reverse Rotation

2 – Flange Rotated 90°

14 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

C – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

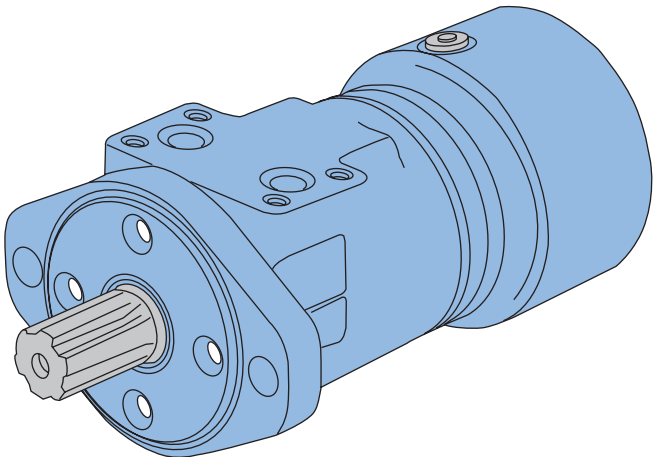
0 – Assigned Code

16 Eaton Assigned Design Code

A – Assigned Design Code

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 and efficient performance as the T Series Motor.

Specifications

Geroler Element	11 Displacements
Flow l/min [GPM]	55 [15] Continuous***
	75 [20] Intermittent**
Speed	Up to 1055 RPM
Pressure bar [PSI]	155 [2250] Cont.***
	190 [2750] Inter.**
Torque Nm [lb-in]	441 [3905] Cont.***
	486 [4300] Inter.**

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

Features

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

Benefits

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

Applications

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

Crane and winches

Boom Lift (Swing)

Maintenance Equipment

T Series with Parking Brake (185-)

Application Information

Principle of Operation

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

Release Pressure

Release pressure is defined as the amount of pressure required to fully release the brake. The brake pressure cavity is common (shared) with the motor case. As a result, maximum release pressure is constrained by the motor case-pressure capability. The T Series Motor with Parking Brake incorporates a shaft seal capable up to 1500 psi (see page B-4-15). However, seal life is reduced at higher case pressure.

Residual Pressure

Residual pressure is the pressure trapped in the system by restrictions or long return lines.

Residual pressure in the motor case will lower the rated load holding torque of the brake.

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

Holding Torque and Motor Output Torque

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

Note:

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

Note:

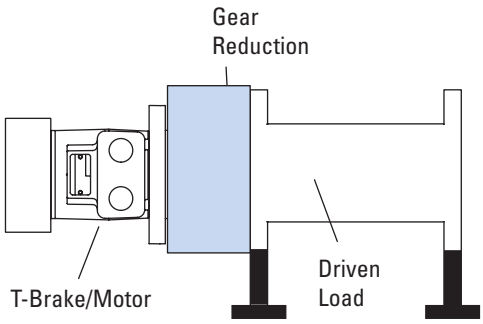
Special attention should be given to system back pressure. System back pressure directly affects brake release pressure and can cause the brake to release at undesired conditions.

Note:

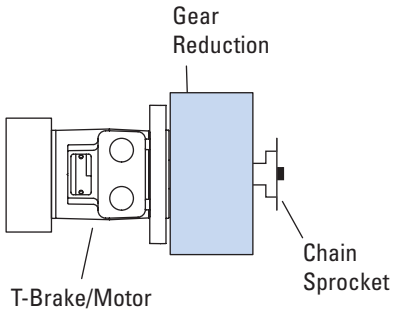
The T Series with parking brake is not compatible with water based fluids.

Typical Applications

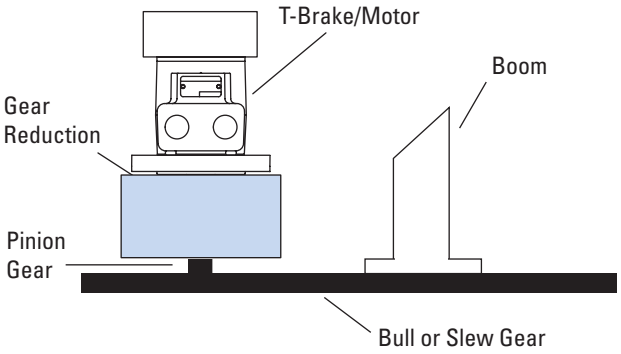
Winch



Machine Drive

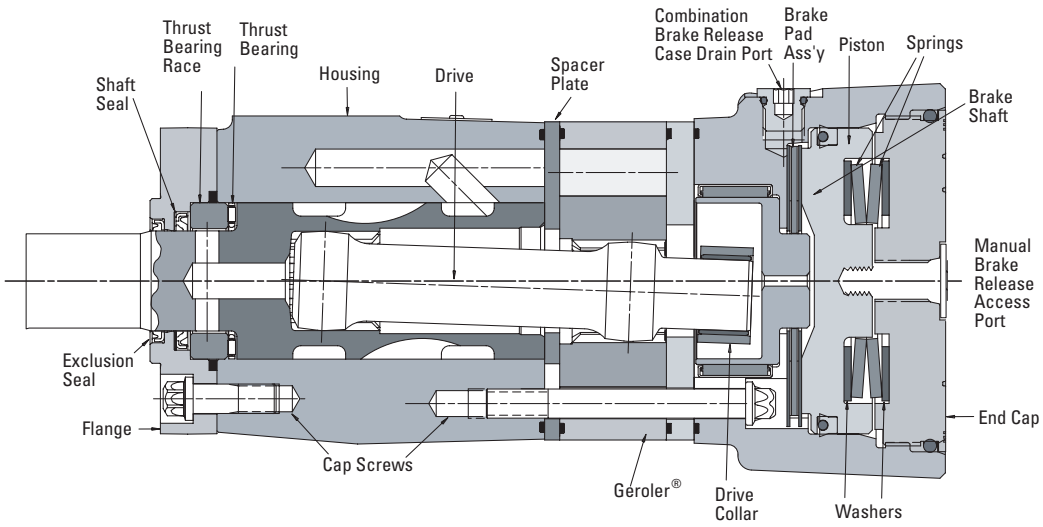


Swing Boom



T Series with Parking Brake (185-)

Specifications



SPECIFICATION DATA — T SERIES WITH PARKING BRAKE MOTORS

Displ. cm³/r [in³/r]		36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
Max. Speed (RPM) @ Continuous Flow		1021	906	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 [in³/r]	2.2	3.0	4.0	4.9	6.2	8.0	9.6	11.9	14.9	18.7	22.6
18	1 Tapered w/key and nut	2,000	2,000	2,000	3,500	3,500	3,500	5,000	5,000	5,000	5,000	5,000
02	1 SAE 6B Splined	2,000	2,000	2,000	3,500	3,500	3,500	5,000	5,000	5,000	5,000	5,000
24	25mm Straight w/key	2,000	2,000	2,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
01	1 Straight w/key	2,000	2,000	2,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
07	1 Straight w/.31 dia. crosshole	2,000	2,000	2,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
08	1 Straight w/.40 dia. crosshole	2,000	2,000	2,000	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
16	7/8 SAE B 13T Splined	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
17	7/8 SAE B Straight w/key	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000

in-lbs Full Capacity Brake

in-lbs Limited Capacity Brake

Note:

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

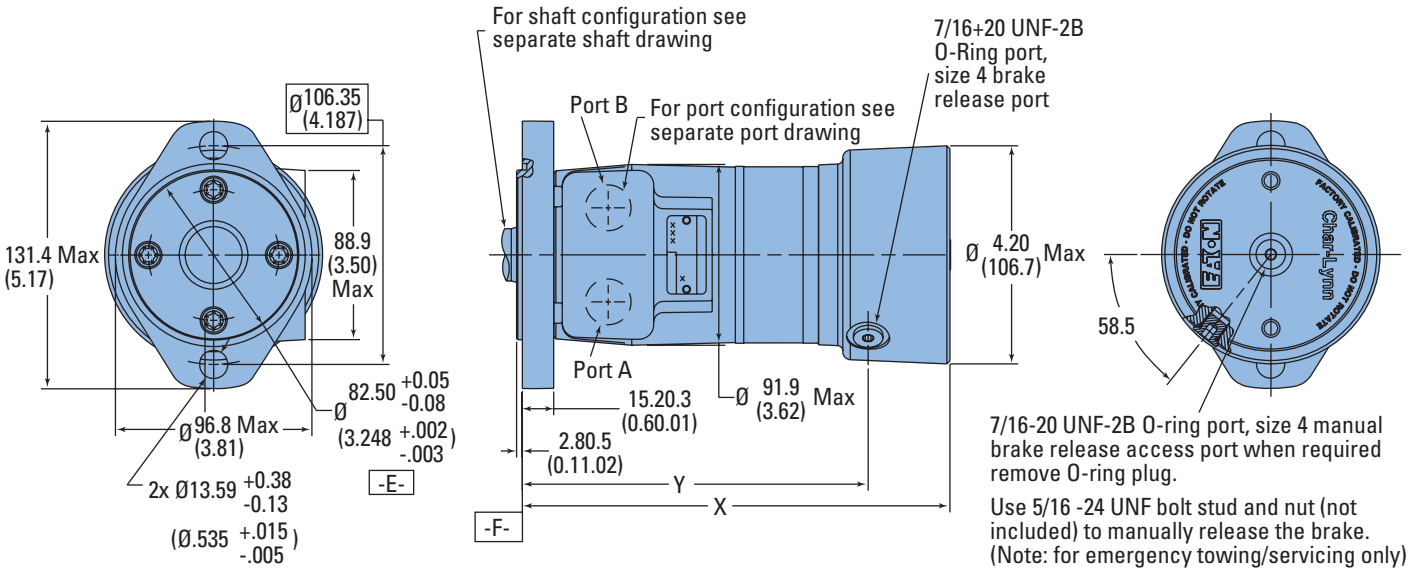
T Series with Parking Brake (185-)

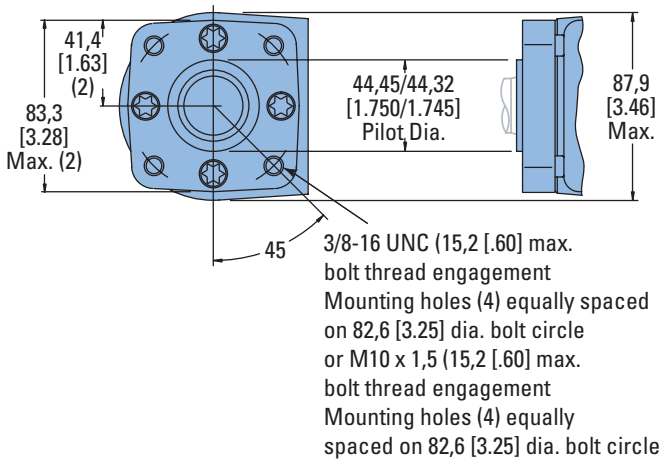
Dimensions

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW





T-SERIES WITH PARKING BRAKE DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
02	190.2 [7.49]	145.8±0.9 [5.74±0.3]
A2	190.8 [7.51]	146.4±0.9 [5.76±0.3]
03	192.5 [7.58]	148.2±0.9 [5.84±0.3]
A3	194.3 [7.65]	150.0±0.9 [5.90±0.3]
04	195.6 [7.70]	151.2±0.9 [5.95±0.3]
05	198.4 [7.81]	153.9±0.9 [6.06±0.3]
06	202.2 [7.96]	157.8±0.9 [6.21±0.3]
08	207.5 [8.17]	163.2±0.9 [6.42±0.3]
10	212.6 [8.37]	168.1±0.9 [6.62±0.3]
12	219.2 [8.63]	174.8±0.9 [6.88±0.3]
15	228.3 [8.99]	183.8±0.9 [7.24±0.3]
19	239.5 [9.43]	195.2±0.9 [7.69±0.3]
23	251.2 [9.89]	206.9±0.9 [8.14±0.3]

Note:

Standard Rotation
When facing shaft end of motor shaft to rotate clockwise when port "A is pressurized, counterclock-wise when port "B is pressurized

Reverse Rotation
When facing shaft end of motor shaft will rotate clockwise when port "B is pressurized, counterclock-wise when port "A is pressurized

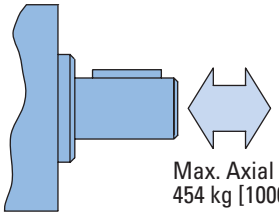
T Series with Parking Brake (185-)

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).

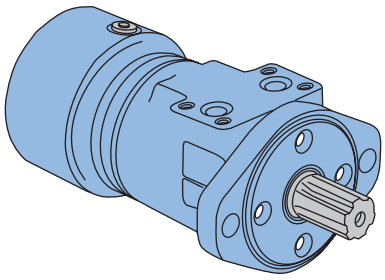
Refer to the Case Pressure/ Shaft Seal chart below. This chart is based on case pressure and motor shaft speed. A minimum release pressure of 17 Bar [250 PSI] must be maintained to fully release the brake.



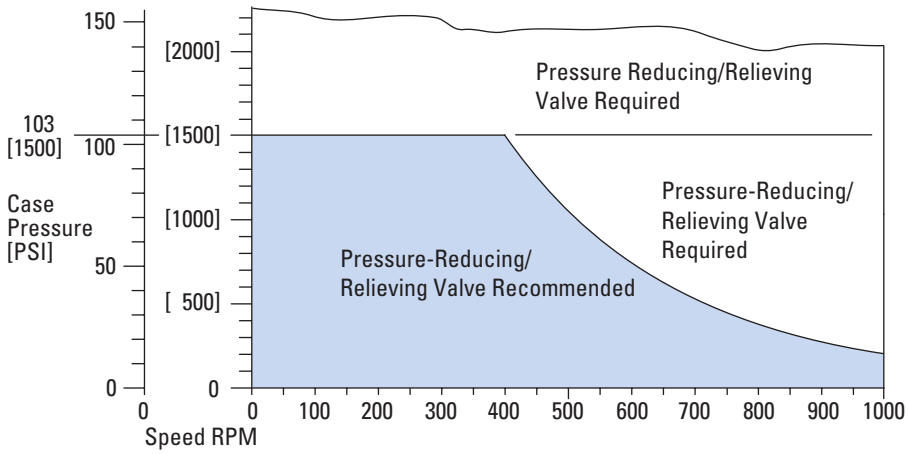
Max. Axial Loads
454 kg [1000 lb]

$P_C \approx .6\ DP + P_2$

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 223
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 standard motors.

Motors with this valving are not intended for low pressure applications (41 Bar [600 PSI] Minimum).

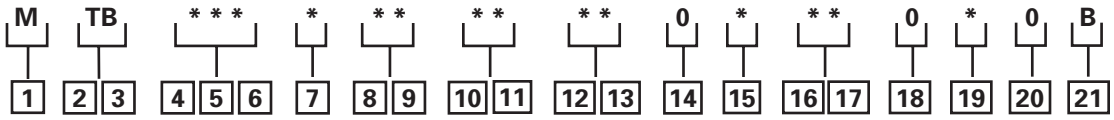
Shaft side / radial load ratings are not affected by this valving.

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

T Series with Parking Brake (185-)

Model Code

The following 21-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 21-digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1 Product
M – Motor

2, 3 Series
T B – T Series Motor with Parking Brake

4, 5, 6 Displacement cm3/r [in3/r]
022 – 36 [2.2]
030 – 49 [3.0]
040 – 66 [4.0]
049 – 80 [4.9]
062 – 102 [6.2]
080 – 131 [8.0]
096 – 157 [9.6]
119 – 195 [11.9]
149 – 244 [14.9]
187 – 306 [18.7]
226 – 370 [22.6]

7 Gerotor/Geroler Options
A – Standard
B – Free Running

8, 9 Mounting Type
AA – 2 Bolt (Standard) 82,6 [3.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes on 106,4 [4.19] Dia. B.C.
BA – 4 Bolt (Standard) 44,4 [1.75] Pilot Dia. and 3/8-16 Mounting Holes on 82,6 [3.25] Dia. B.C.
DA – 2 Bolt (Standard) 101,6 [4.00] Pilot Dia. and 14,35 [.565] Dia. Mounting Holes on 146,0 [5.75] Dia. B.C. (SAE B)
EA – 4 Bolt Magneto 82,6 [3.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes 106,4 [4.19] Dia. B.C.
FA – 4 Bolt (Standard) 44,4 [1.75] Pilot Dia. and M10 x 1,5-6H Mounting Holes on 82,6 [3.25] Dia. B.C.

10, 11 Output Shaft
01 – 25.4 [1.00] Dia. Straight with Woodruff Key and 1/4-20 Threaded Hole
02 – 25.4 [1.00] Dia. SAE 6B Spline with 1/4-20 Threaded Hole
16 – 21,74 [.856] Dia. SAE B 13 T Spline
18 – 25.4 [1.00] Dia. Tapered with Woodruff Key and Nut
24 – 25 [.98] Dia. Straight with 8mm Key and 8mm x 1.2 Threaded Hole
27 – 25.4 [1.00] Dia. Straight with Woodruff Key and 1/4-20 Threaded Hole (Plated for Corrosion Pr

12, 13 Port Type
AA – 7/8 - 14 O-Ring
AC – Manifold (5/16-18 Mounting Threads)
AE – G 1/2 (BSP) Straight Thread

14 Case Flow Options
0 – None

15 Seal Options
0 – Standard
7 – High Pressure Shaft Seal

16, 17 Special Features (Hardware)
00 – None Specified
AB – Low Speed Valve

18 Special Features (Assembly)
0 – None Specified

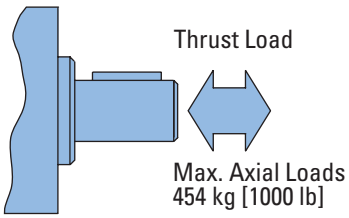
19 Paint/Packaging Options
0 – No Paint
A – Painted Low Gloss Black

20 Eaton Assigned Code When Applicable
0 – Assigned Code

21 Design Code
B – Two (2)

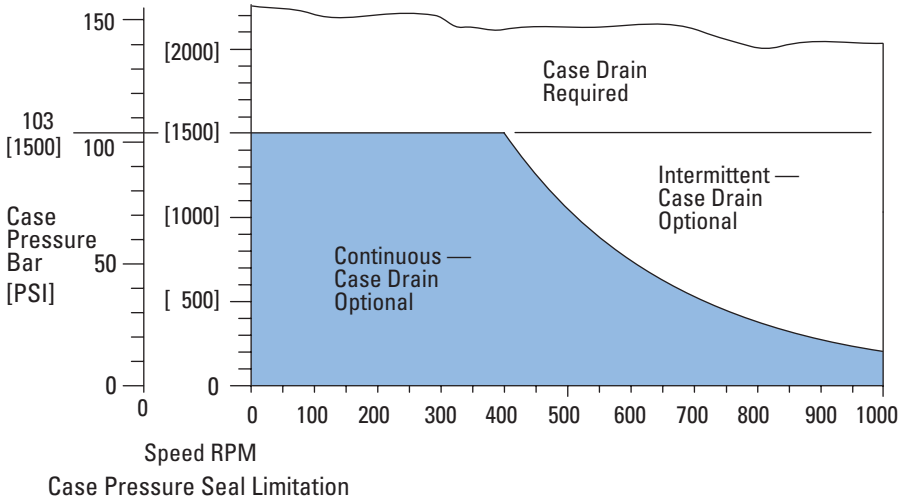
Case Pressure and Case Drain — H, S, and T Series

Char-Lynn H Series, S Series and T Series motors are durable andhave long life as long as the recommended case pressure is notexceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceedsthese ratings (acceptability may vary with application). Determine if anexternal case drain is required from the case pressure seal limition-chart below — chart based on case pressure and shaft speed. If acase drain line is needed, connect drain line to assure that the motorwill always remain full of fluid. A pressure restriction should be addedto the case drain line, during which a motor case pressure of 3,5 Bar[50 PSI] is maintained.

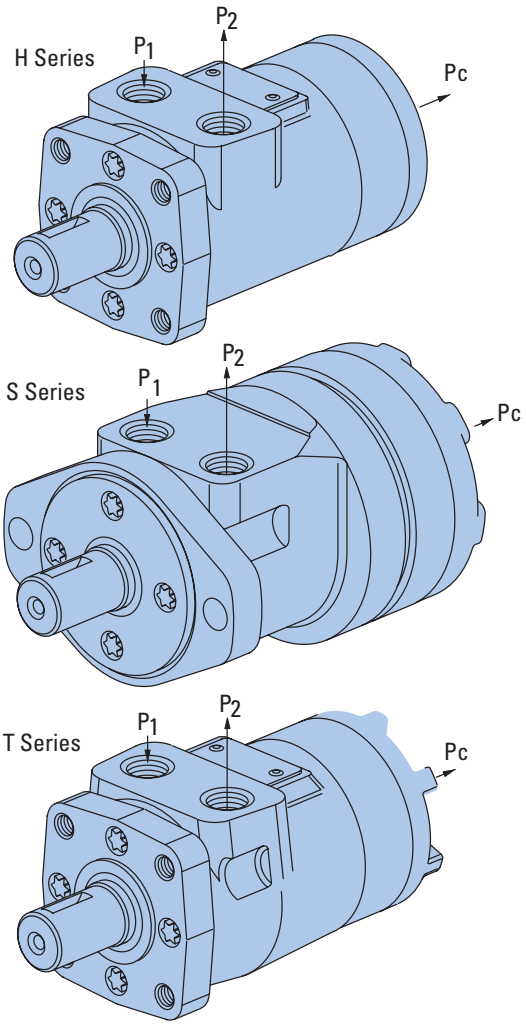


$P_C \approx .6 ? P + P_2$

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



Case Pressure Seal Limitation



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

Side Load Capacity

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

Allowable side load chart, shaft load location drawing and load curves (below) are based on the side / radial loads being applied to shaft at locations A, B, and C, to determine the shaft side load capacity at locations other than those shown use the formula (shown below).

For more information about shaft side loads on Char-Lynn motors contact your Eaton representative.

Note:

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

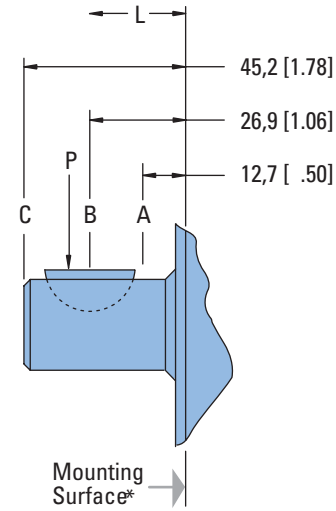
RPM	ALLOWABLE SHAFT SIDE LOAD — KG [LB]		
	A	B	C
900	154 [339]	136 [300]	118 [261]
625	205 [452]	181 [400]	158 [348]
500	256 [565]	227 [500]	197 [435]
400	307 [678]	272 [600]	237 [522]
300	410 [904]	363 [800]	316 [696]
200	718 [1582]	635 [1400]	552 [1216]

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

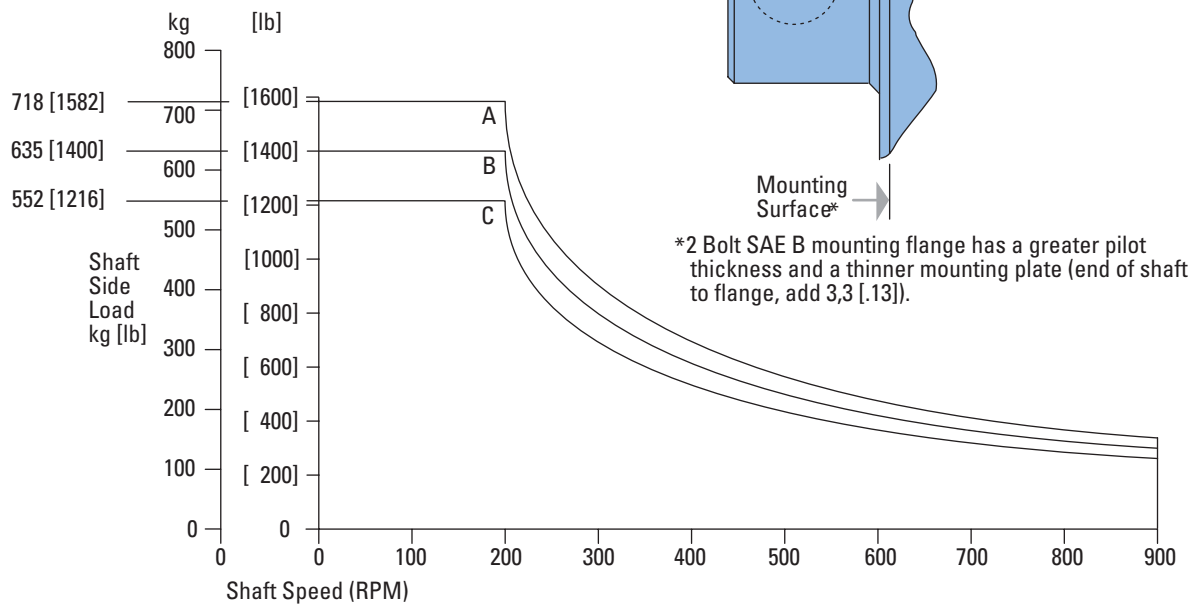
$$\text{Sideload P [lb]} = \frac{900}{N}\left(\frac{1460}{L + [3.79]}\right) \quad \text{for 200-900 RPM}$$

Where N = Shaft Speed (RPM)

L = Distance from Mounting Surface



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

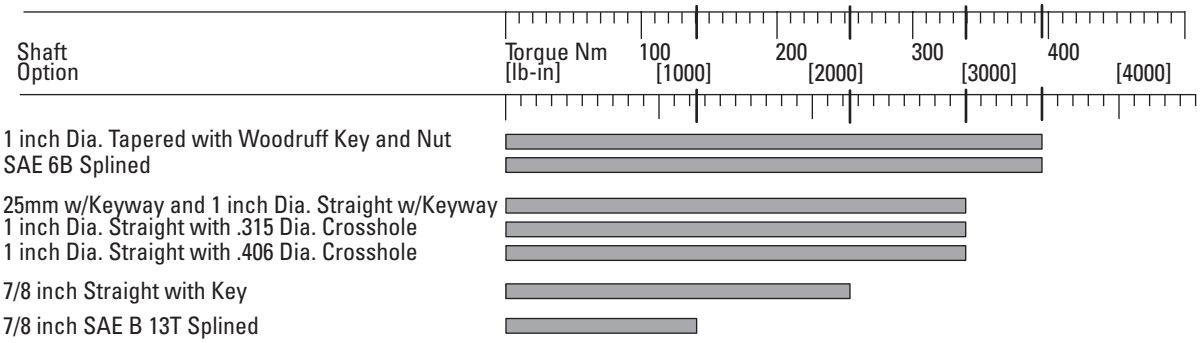


H, S and T Series (101, 103- 158, 185)

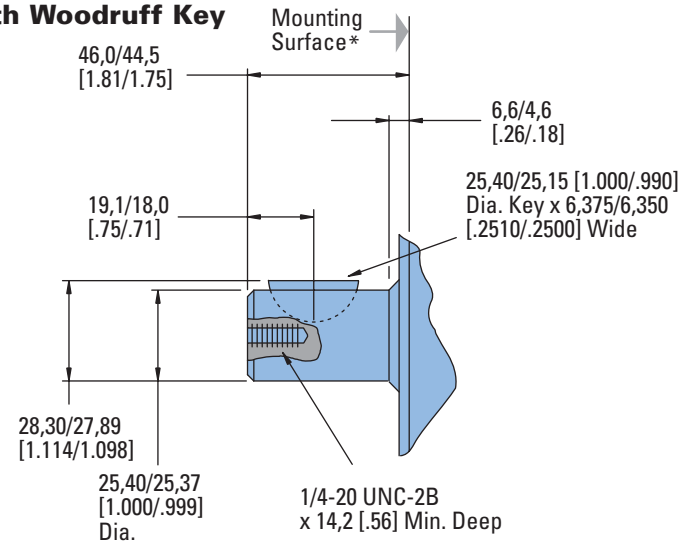
Dimensions

Shafts

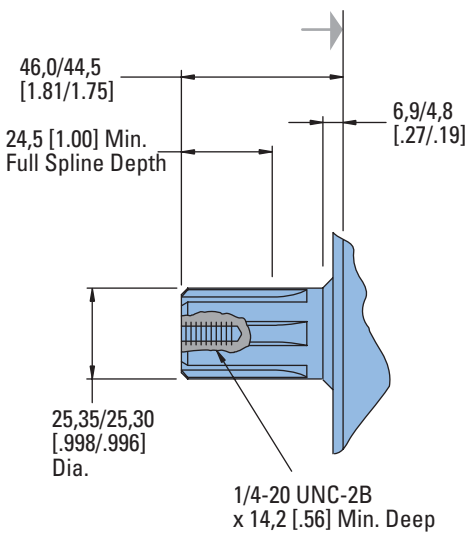
Shaft Size Motor Torque Combination Limit Guide



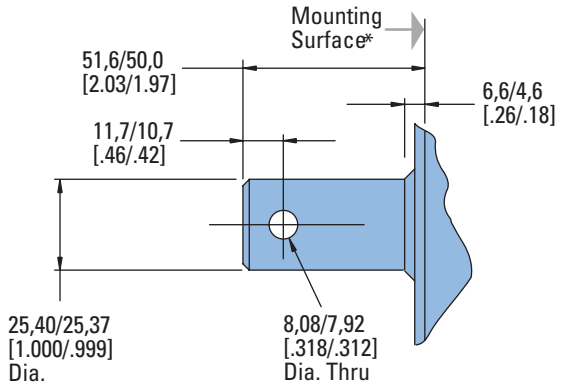
1 in. Dia. Straight with Woodruff Key



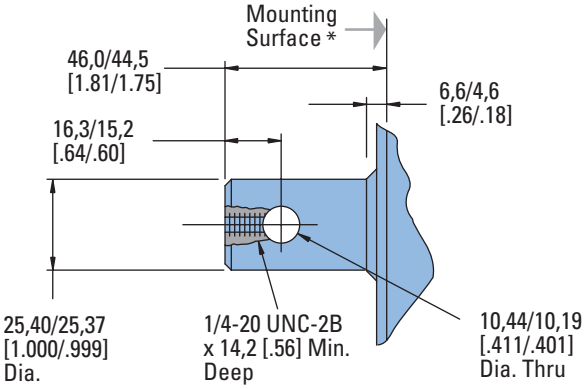
SAE 6B Splined Shaft



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

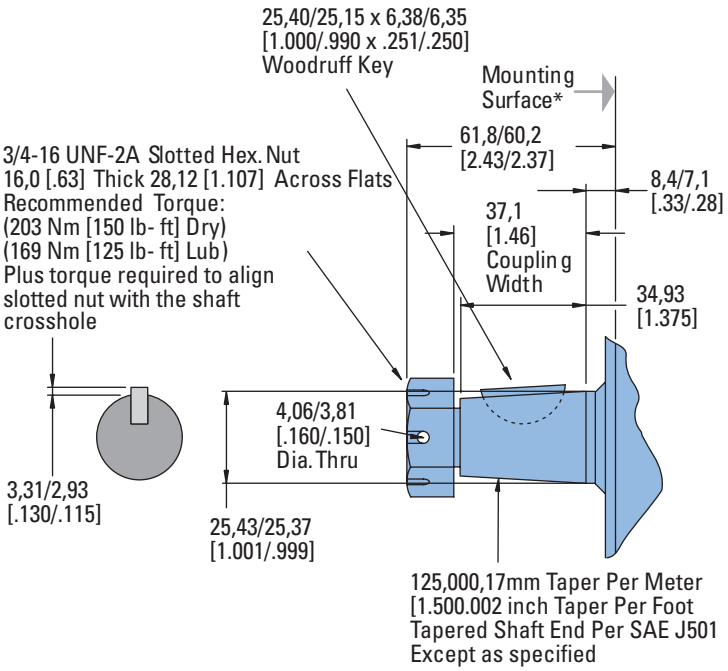


1 in. Dia. Straight Shaft with .406 Dia. Crosshole

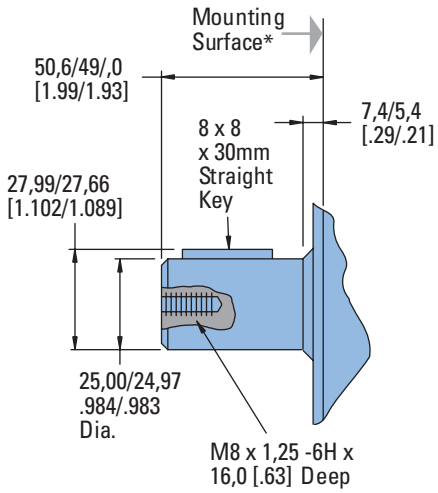


* 2 Bolt SAE B mounting flange has a greater pilot thickness and a thinner mounting plate (end of shaft to flange, add 3,3 [.13]).

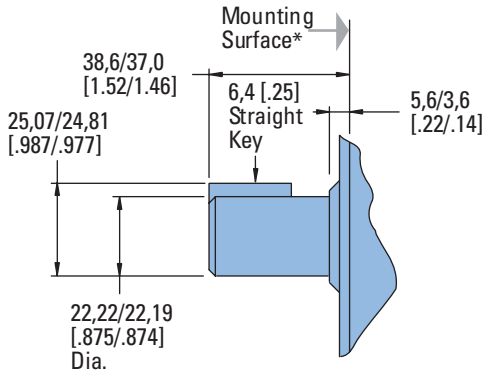
1 in. Dia. Tapered Shaft with Woodruff Key and Nut



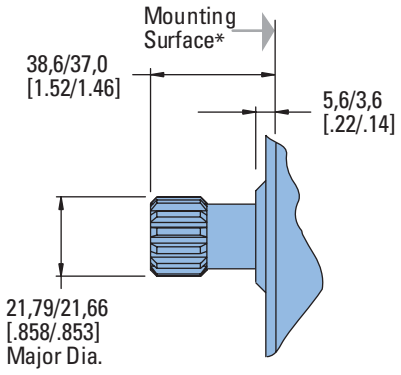
25mm Dia. Straight Shaft with 8mm Keyway



7/8 in. Dia. Straight Shaft with Key



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



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

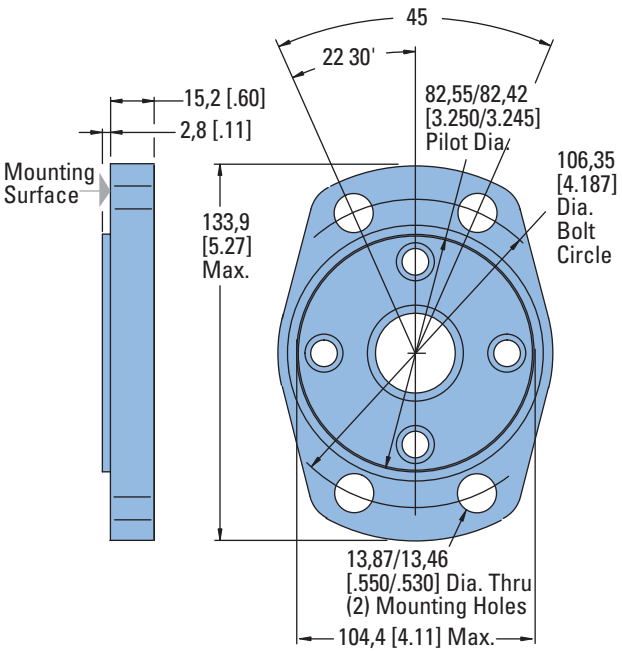
H, S and T Series (101-, 103- 158-, 185-)

Mounting Options

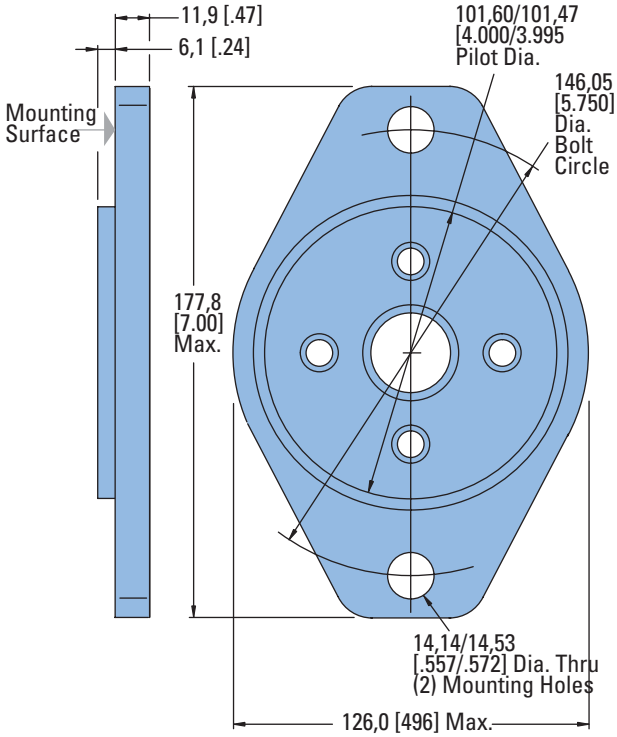
Note:

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

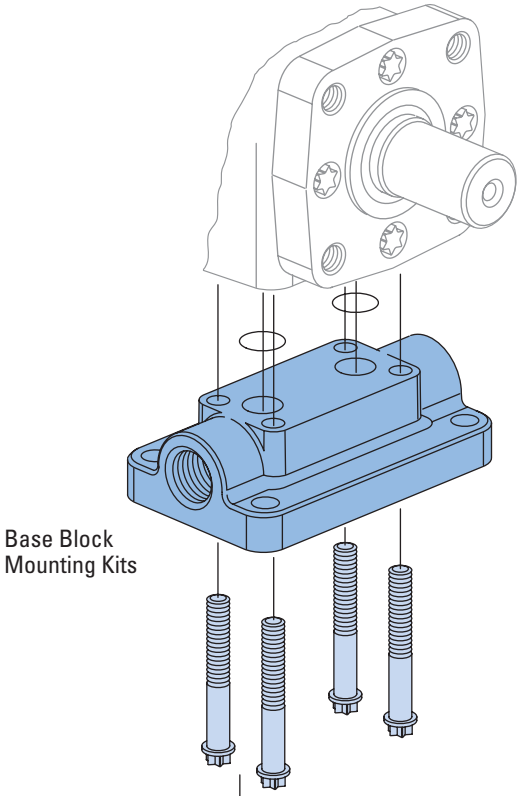
4 Bolt Magneto

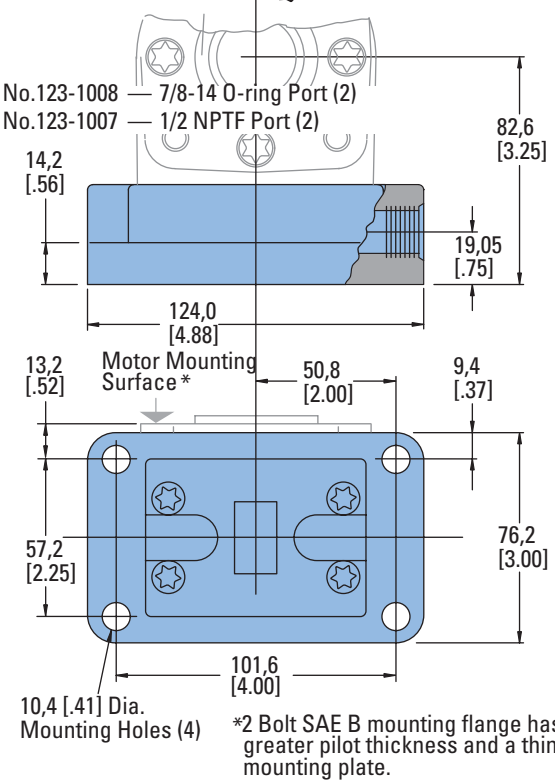


2 Bolt SAE B



Base Bock Mounting Kits





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

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

Dimensions

Ports

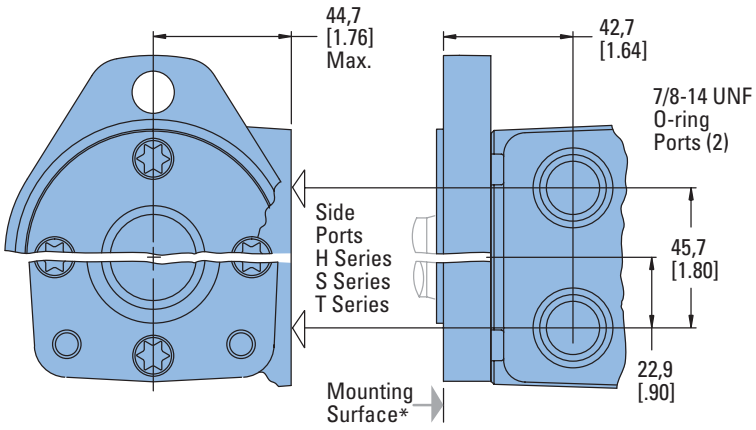
Ports

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

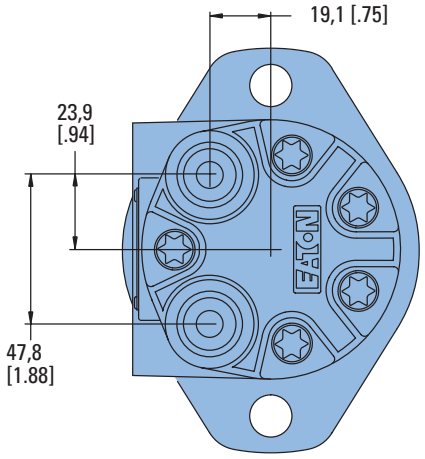
Standard Rotation Viewed from Drive End

Port A Pressurized — CW
Port B Pressurized — CCW

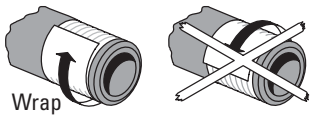
7/8-14 ports



End Ports (H Series only)



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

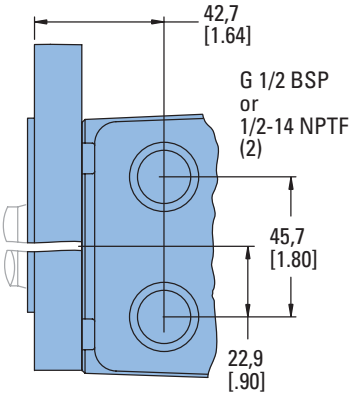


When using fittings with Teflon tape, be careful when taping and tightening. Over tightening or improperly taped fittings can cause damage to housing or leakage.

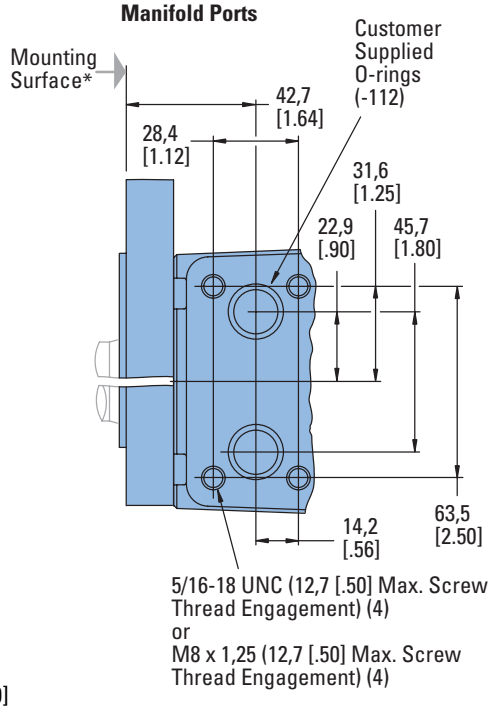
Use the following procedures:

- 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.

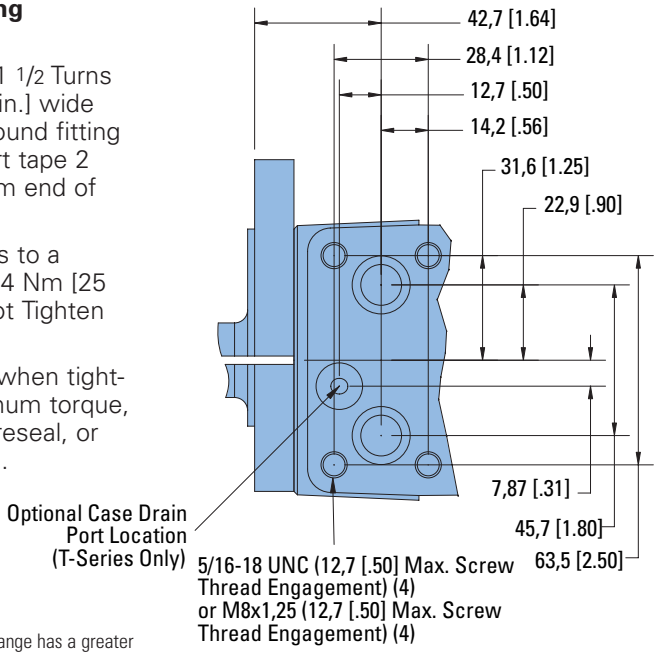
6-1/2 or 1/2 NPTF ports



Manifold Ports



Manifold Ports w/manifold case port



Note:

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

Note:

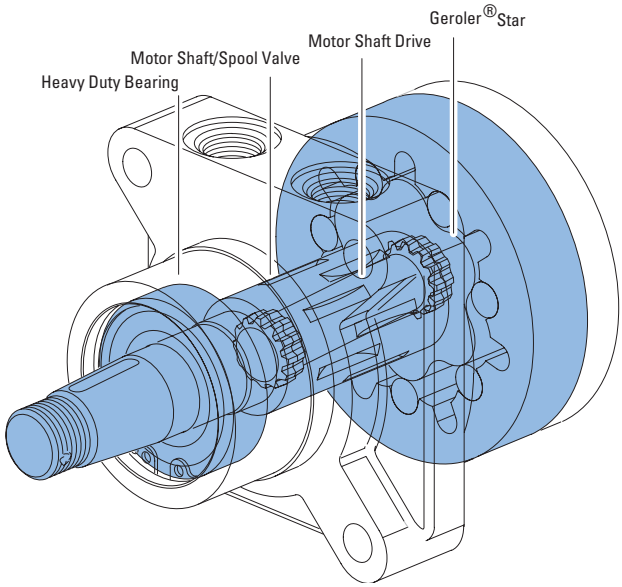
End ported motor pressure is derated. Reference page B-2-2 for ratings.

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

Notes

W Series (162-)

Highlights



Description

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

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

W Series Motors

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

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

Features:

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

Benefits:

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

Applications:

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


Scissor Lift

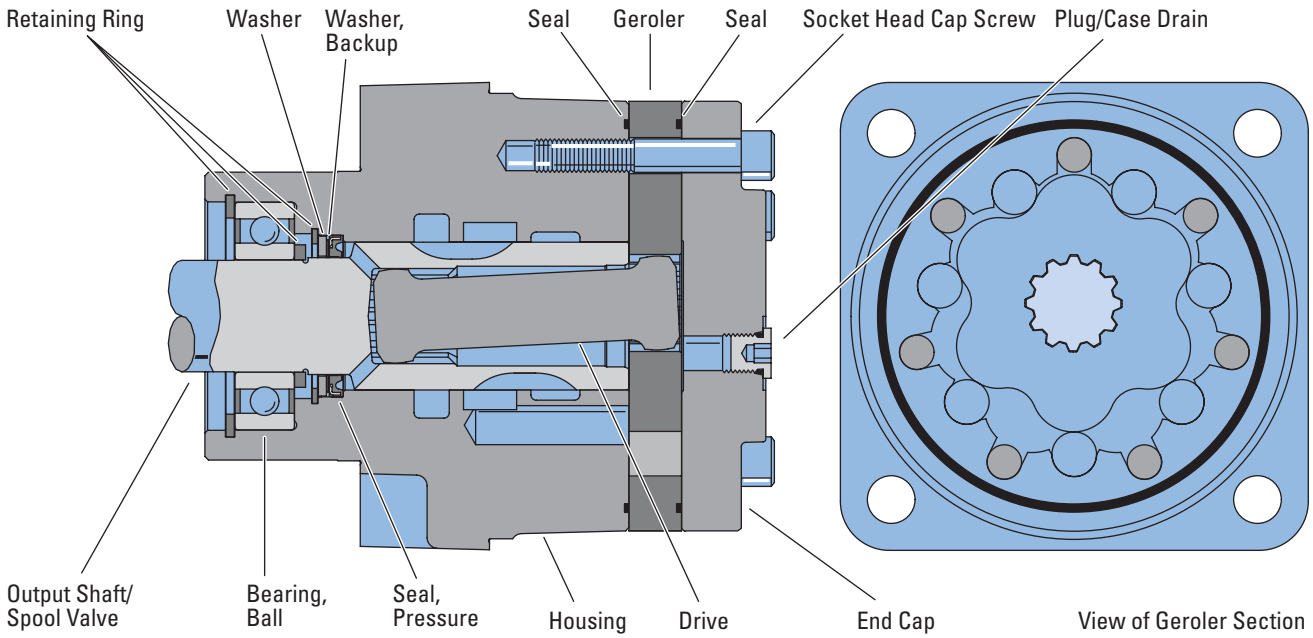

Sweeper


Trencher


Boom Lift

W Series (162-)

Specifications



SPECIFICATION DATA — W SERIES MOTORS

Displ. cm³/r [in³/r]		80 [4.9]	126 [7.7]	154 [9.4]	195 [11.9]	251 [15.3]	303 [18.5]	374 [22.8]
Max. Speed (RPM)		267	288	214	200	200	200	200
Flow l/min [GPM]	Continuous	23 [6]	30 [8]	34 [9]	38 [10]	53 [14]	62 [16.5]	68 [18]
	Intermittent	23 [6]	30 [8]	34 [9]	38 [10]	53 [14]	62 [16.5]	76 [20]
Theo. Torque Nm [lb-in]	Continuous	176 [1555]	279 [2470]	318 [2813]	318 [2816]	375 [3319]	387 [3429]	410 [3624]
	Intermittent	189 [1676]	298 [2640]	373 [3301]	439 [3882]	548 [4849]	539 [4769]	562 [4970]
Pressure Δbar [ΔPSI]	Continuous	165 [2400]	165 [2400]	152 [2200]	124 [1800]	110 [1600]	97 [1400]	83 [1200]
	Intermittent	179 [2600]	179 [2600]	179 [2600]	179 [2600]	165 [2400]	138 [2000]	124 [1800]

Note:

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

Maximum Inlet Pressure:

179 bar [2600 PSI]

Do Not Exceed Δ Pressure Rating (for displacement size see chart above).

Return Pressure (Back-Pressure):

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

Note:

Optional version can be used without case drain.

Case Pressure:

Minimum – No Pressure

Maximum – 103 bar [1500 PSI] without case drain.

Note:

The case must be flooded when the motor is operating.

Δ Pressure:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82°C [180°F]

Recommended Filtration:

per ISO Cleanliness Code, level 20/18/13

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

Flow l/min [GPM]	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2400] 165	[2600] 179
[2] 7,6	[204] 23 **93**	[337] 38 **89**	[474] 54 **88**	[612] 69 **84**	[748] 85 **83**	[883] 100 **79**	[1019] 115 **73**	[1149] 130 **69**	[1281] 145 **69**	[1412] 160 **61**	[1540] 174 **56**	[1610] 182 **39**
[4] 15,1	[223] 25 **178**	[357] 40 **172**	[489] 55 **170**	[627] 71 **168**	[769] 87 **165**	[902] 102 **159**	[1035] 117 **157**	[1169] 132 **154**	[1295] 146 **146**	[1424] 161 **142**	[1555] 176 **131**	[1676] 189 **117**
[6] 22,7	[255] 29 **267**	[342] 39 **265**	[477] 54 **262**	[612] 69 **258**	[749] 85 **257**	[879] 99 **252**	[1014] 115 **248**	[1154] 130 **241**	[1286] 145 **235**	[1408] 159 **229**	[1533] 173 **219**	[1648] 186 **206**

126 cm³/r [7.7 in³/r]

Δ Pressure bar [PSI]

Continuous

Flow l/min [GPM]	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2400] 165	[2600] 179
[2] 7,6	[390] 44 **58**	[605] 68 **56**	[817] 92 **55**	[1032] 117 **51**	[1248] 141 **49**	[1448] 164 **45**	[1656] 187 **43**	[1871] 211 **41**	[2069] 234 **33**	[2243] 253 **32**	[2414] 273 **26**	[2513] 284 **17**
[4] 15,1	[382] 43 **113**	[605] 68 **106**	[817] 92 **106**	[1036] 117 **104**	[1252] 141 **93**	[1463] 165 **97**	[1694] 191 **94**	[1908] 216 **88**	[2113] 239 **82**	[2306] 261 **79**	[2470] 279 **74**	[2640] 298 **60**
[6] 22,7	[367] 41 **172**	[587] 66 **167**	[802] 91 **164**	[1017] 115 **161**	[1236] 140 **156**	[1444] 163 **152**	[1668] 188 **147**	[1882] 213 **141**	[2091] 236 **134**	[2284] 258 **130**	[2459] 278 **120**	[2637] 298 **103**
[8] 30,3	[346] 39 **228**	[561] 63 **225**	[769] 87 **220**	[981] 111 **216**	[1203] 136 **213**	[1419] 160 **208**	[1634] 185 **201**	[1849] 209 **195**	[2039] 230 **188**	[2217] 250 **174**	[2432] 275 **163**	[2633] 297 **149**

154 cm³/r [9.4 in³/r]

Δ Pressure bar [PSI]

Continuous

Flow l/min [GPM]	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2400] 165	[2600] 179
[2] 7,6	[450] 51 **47**	[723] 82 **47**	[989] 112 **46**	[1249] 141 **44**	[1512] 171 **40**	[1769] 200 **39**	[2021] 228 **36**	[2269] 256 **33**	[2502] 283 **30**	[2714] 307 **26**	[2904] 328 **19**	[3019] 341 **10**
[4] 15,1	[470] 53 **94**	[737] 83 **93**	[1009] 114 **90**	[1276] 144 **89**	[1540] 174 **87**	[1802] 204 **84**	[2064] 233 **81**	[2323] 262 **78**	[2570] 290 **73**	[2813] 318 **67**	[3019] 341 **65**	[3242] 366 **52**
[6] 22,7	[435] 49 **143**	[715] 81 **140**	[984] 111 **138**	[1252] 141 **137**	[1513] 171 **134**	[1787] 202 **131**	[2020] 228 **128**	[2274] 257 **124**	[2521] 285 **117**	[2812] 318 **112**	[3042] 344 **103**	[3301] 373 **91**
[8] 30,3	[407] 46 **190**	[677] 76 **188**	[945] 107 **186**	[1214] 137 **184**	[1477] 167 **182**	[1740] 197 **179**	[2005] 227 **176**	[2260] 255 **171**	[2503] 283 **166**	[2735] 309 **158**	[2964] 335 **148**	[3206] 362 **137**
[9] 34	[380] 43 **214**	[648] 73 **212**	[914] 103 **210**	[1183] 134 **207**	[1452] 164 **206**	[1714] 194 **202**	[1981] 224 **200**	[2243] 253 **196**	[2499] 282 **191**	[2733] 309 **182**	[2964] 335 **173**	[3195] 361 **162**

195 cm³/r [11.9 in³/r]

Δ Pressure bar [PSI]

Continuous

Flow l/min [GPM]	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 138	[2200] 152	[2400] 165	[2600] 179
[2] 7,6	[478] 54 **38**	[827] 93 **38**	[1171] 132 **37**	[1511] 171 **36**	[1839] 208 **35**	[2153] 243 **34**	[2452] 277 **34**	[2756] 311 **30**	[3027] 342 **29**	[3275] 370 **26**	[3513] 397 **22**	[3673] 415 **16**
[4] 15,1	[515] 58 **75**	[872] 99 **73**	[1220] 138 **73**	[1558] 176 **71**	[1886] 213 **70**	[2206] 249 **69**	[2518] 284 **66**	[2816] 318 **64**	[3107] 351 **62**	[3382] 382 **56**	[3647] 412 **52**	[3882] 439 **44**
[6] 22,7	[524] 59 **114**	[878] 99 **111**	[1214] 137 **111**	[1551] 175 **110**	[1875] 212 **108**	[2199] 248 **106**	[2518] 284 **105**	[2824] 319 **103**	[3113] 352 **99**	[3389] 383 **95**	[3666] 414 **91**	
[8] 30,3	[518] 59 **151**	[856] 97 **150**	[1187] 134 **150**	[1524] 172 **149**	[1861] 210 **147**	[2187] 247 **145**	[2499] 282 **144**	[2782] 314 **143**	[3064] 346 **141**	[3334] 377 **136**		
[10] 38	[462] 52 **190**	[797] 90 **188**	[1133] 128 **187**	[1468] 166 **186**	[1799] 203 **184**	[2118] 239 **184**	[2442] 276 **182**	[2739] 309 **179**	[3023] 342 **176**	[3281] 371 **160**		

[3673] 415 **16** } Torque [lb-in] 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

Flow l/min [GPM]	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 140	[2200] 152	[2400] 165
[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

Flow l/min [GPM]	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124	[2000] 140
[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]

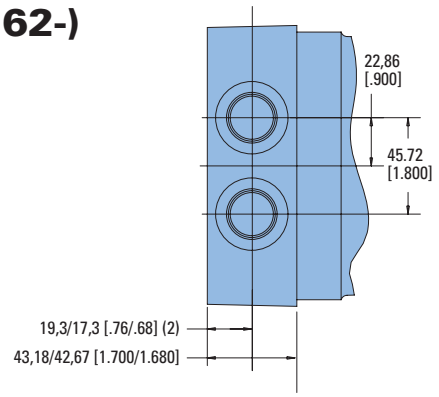
Δ Pressure bar [PSI]

Continuous

Flow l/min [GPM]	[400] 28	[600] 41	[800] 55	[1000] 69	[1200] 83	[1400] 97	[1600] 110	[1800] 124
[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



Ports

7/8-14 SAE O-Ring Ports

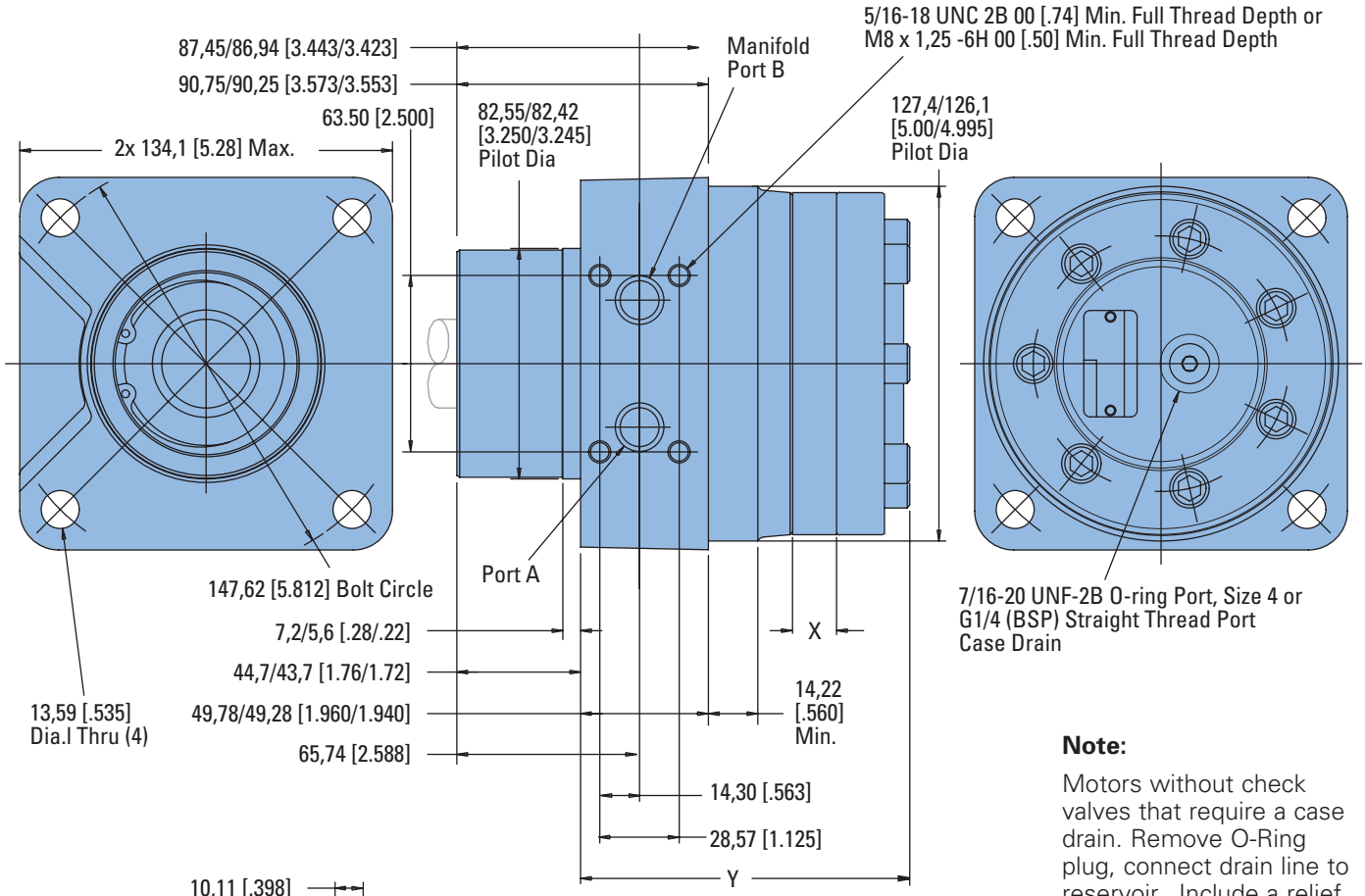
G1/2 BSP Straight Thread Port

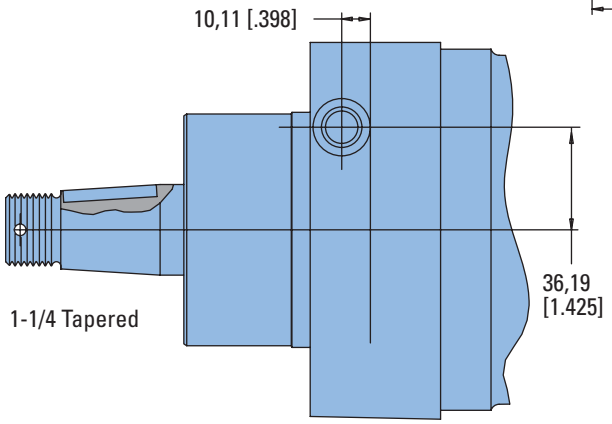
Manifold (15/16-18 Mounting Threads)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW





Note:

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

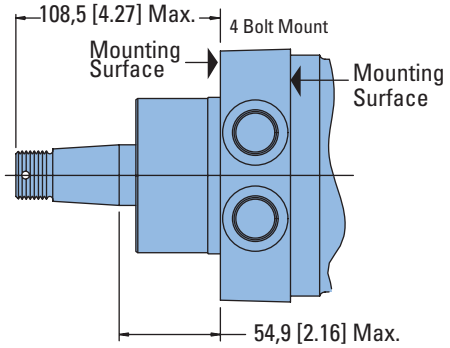
W SERIES DIMENSIONS

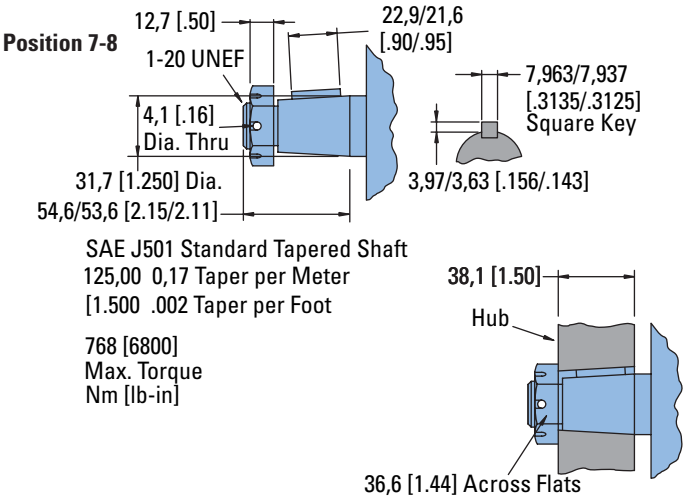
Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
80 [4.9]	9,1 [.36]	116,6 [4.59]
126 [7.7]	11,9 [.47]	119,6 [4.71]
154 [9.4]	14,7 [.58]	122,2 [4.81]
195 [11.9]	18,5 [.73]	126,2 [4.97]
251 [15.3]	23,9 [.94]	131,6 [5.18]
303 [18.5]	29,0 [1.14]	136,4 [5.37]
374 [22.8]	35,6 [1.40]	143,3 [5.64]

Recommended Torque:

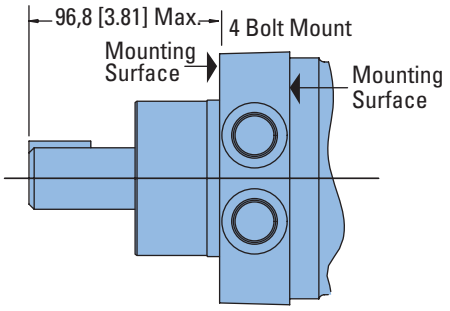
(373 Nm [275 lb-ft] Dry)
(305 Nm [225 lb-ft] Lub) Plus Torque required to align the slotted nut with the Shaft Crosshole.

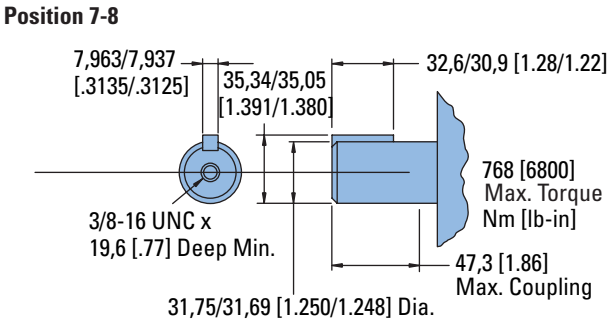
1 1/4 Tapered



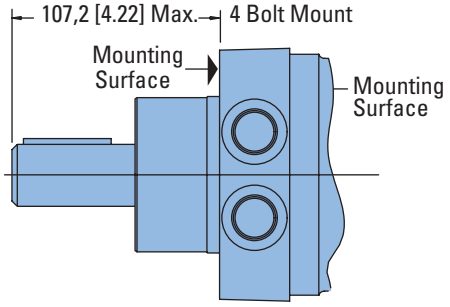


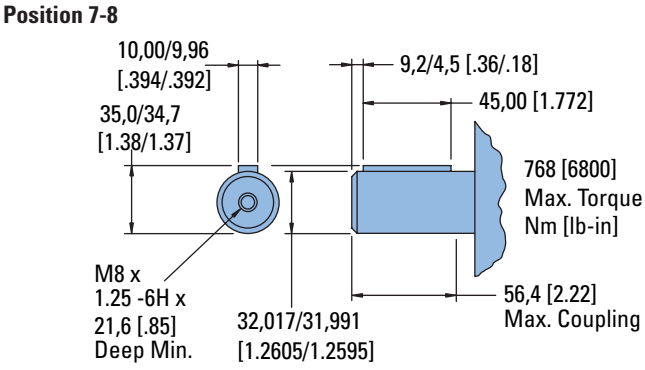
1 1/4 Inch Straight



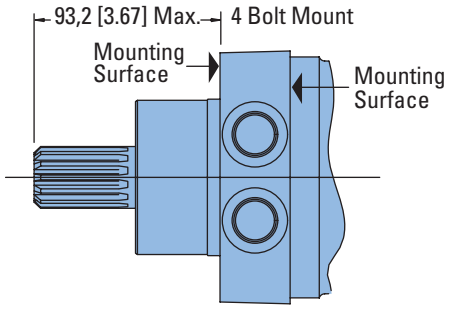


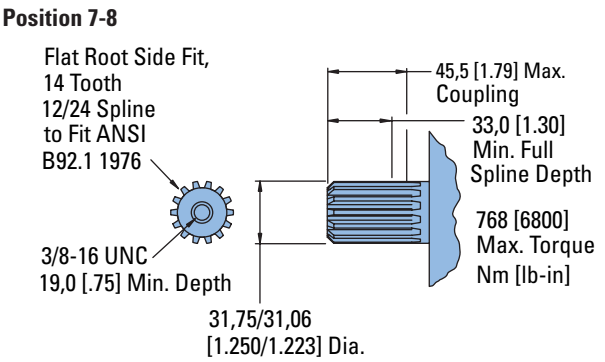
32 mm Straight





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.

$$\frac{\text{Life value x 100 rpm}}{\text{application rpm}}$$

3) Shaded areas are intermittent loading.

4) To convert application radial load at any load location to sideload at the center of keyway multiply load by the application factor from Chart B.

Example:

Side Load: 4849 N @ 120 mm [1090 lbf @ 4.75 inch] from flange.
Average Thrust Load: 890 N [200 lbf] inward (toward motor).
Case Pressure: 66 bar [960 PSI].
Average Speed: 150 rpm.

Expected Life Calculation: Adjust side load value (due to load variation): from Chart B look at 120mm [4.75 inch] read at angled curve for load adjustment factor of 1.38. Adjusted load is: (4849 N [1090 lbf]) x (1.38) = 6690 N [1504 lbf]
Thrust Load Value (due to case pressure):
(960 PSI) x (1.35) = [1296 lbf]
(66 bar) x (87,1) = 5750 N
Average thrust load found to be 890 N [200 lbf] inwards so subtract from thrust load due from case pressure:
5750 N - 890 N = 4860 N or
[1296 lbf] - 200 lbf = [1096 lbf]

Read Life Expectancy from Chart A: Value from chart reading across top to 6672 [1500] (6090 N [1504 lbf]) and down left side to 4895 [1100] (4875 N [1096 lbf])
Life = 1800 Hours
Speed Adjustment for over 100 rpm:

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

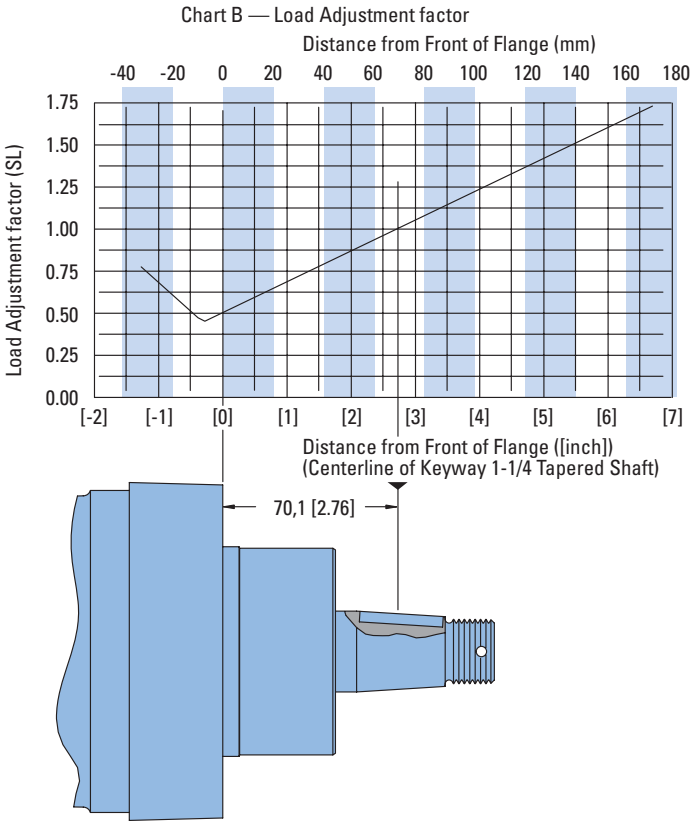


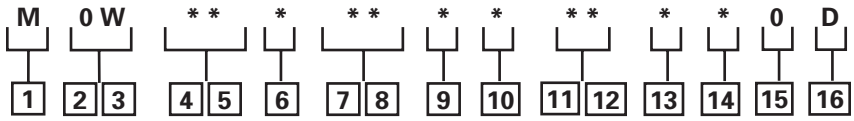
CHART A — EXPECTED B10 LIFE (HOURS) OF BEARING UNDER VARIOUS LOADS

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., 127,0 127,0 [5.00] rear pilot

7, 8 Output Shaft

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

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

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

06 – 1 1/4 inch Dia. Straight Shaft with 3/8 – 16 UNC 2B Thread in End, 7.938 [.3125] Square x 34,92 [1.375] Straight Key

9 Ports

A – 7/8 -14 UNF - 2B SAE O-Ring Port

B – G 1/2 (BSP) Straight Thread Port

10 Case Flow Options

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

B – G 1/4 (BSP) Straight Thread Port

C – Internal Check Valve

11, 12 Special Features (Hardware)

00 – None

01 – Viton Seals

13 Special Features (Assembly)

0 – None

1 – Reverse Rotation

14 Paint/Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

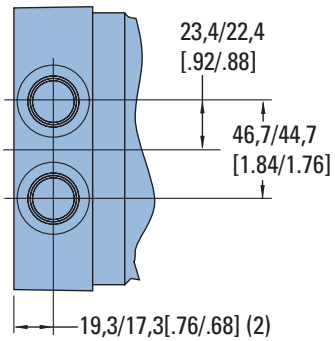
0 – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code

W Series with Parking Brake (162-)

Dimensions



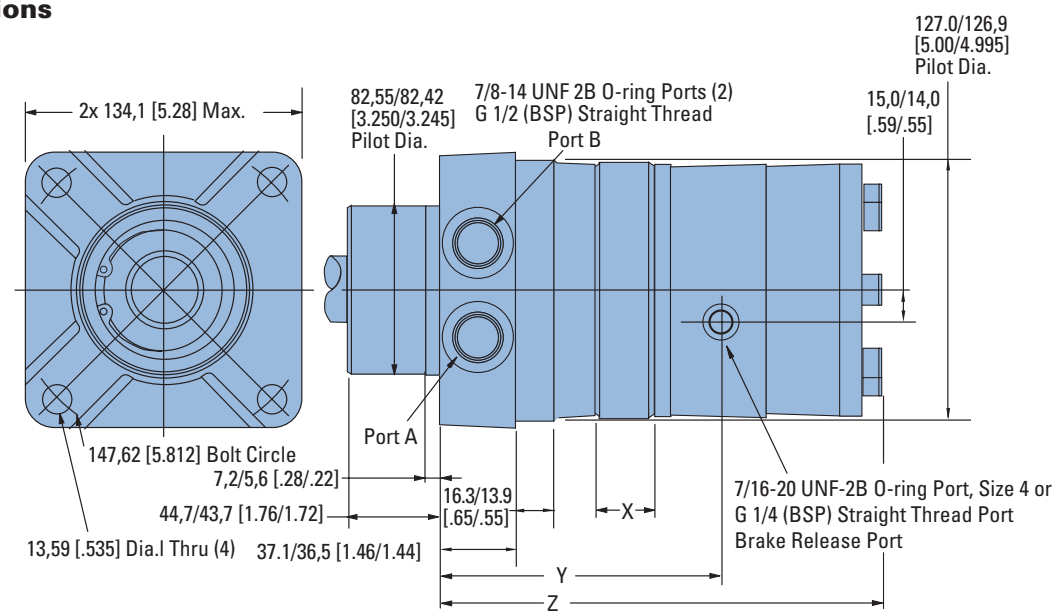
Ports

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

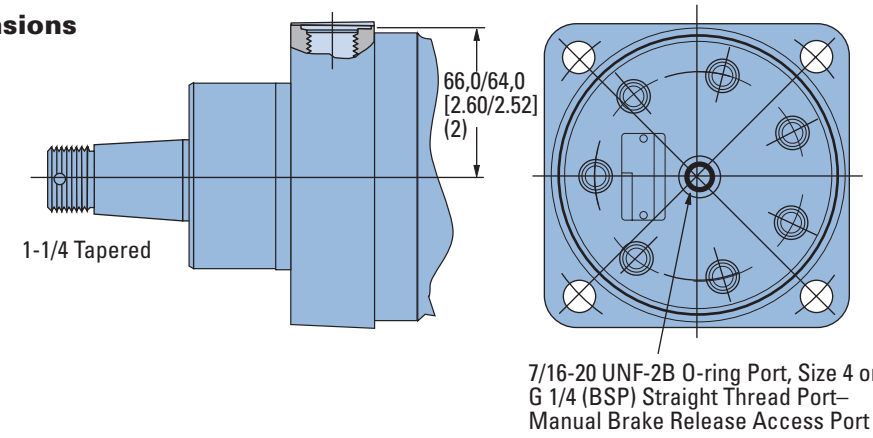
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Port Dimensions



Mounting Dimensions



PORTING AND MOUNTING DIMENSIONS

Displacement cm3/r [in3/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.

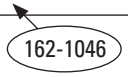
Orders will not be accepted without three digit prefix.

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

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	-1044	-1045	-1046	-1034	-1048	-1049



Note:

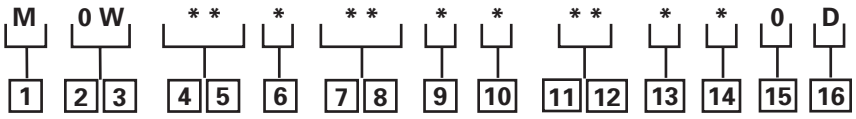
All above motors have 1 1/4 inch tapered output shaft, 7/8 inch O-Ring Ports.

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., 127,0 127,0 [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

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C – Internal Check Valve

11, 12 Special Features (Hardware)

00 – None

01 – Viton Seals

06 – 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

EATON | Char-Lynn

Disc Valve Hydraulic Motors

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

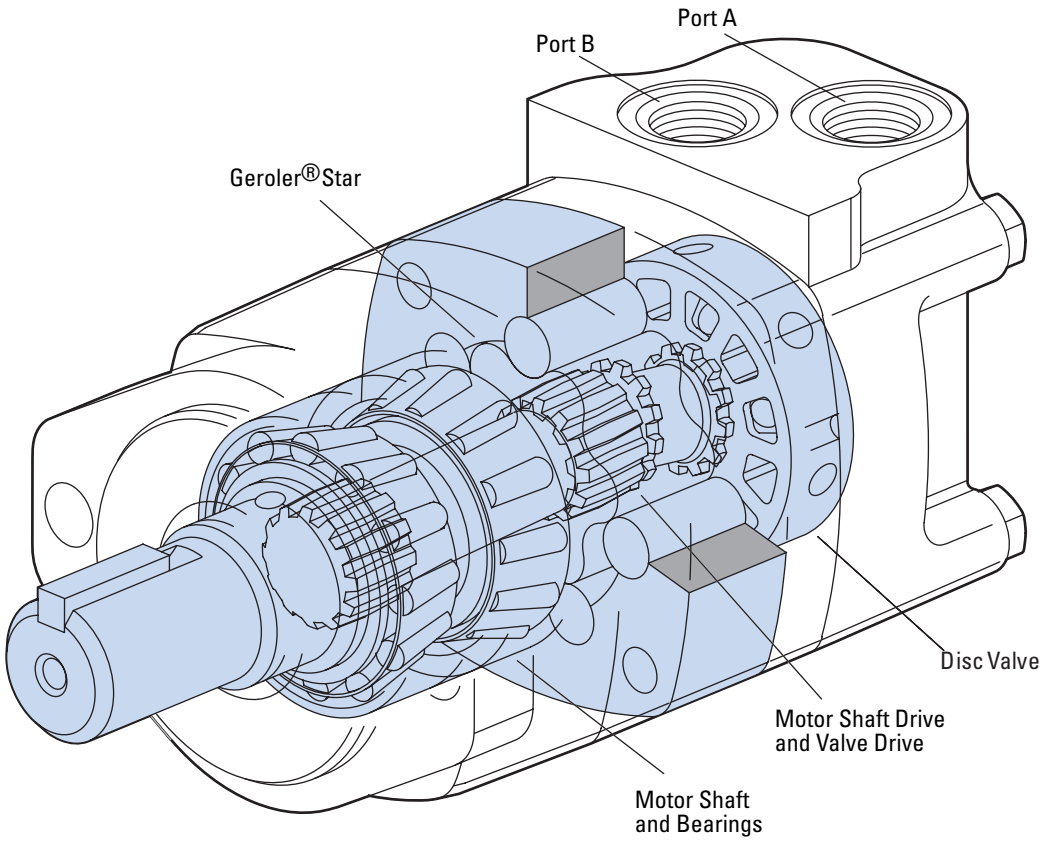
Disc Valve Hydraulic Motors

Highlights

Product Description

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

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



Features, Benefits, and Applications

Features

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

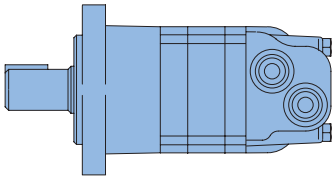
- Displacement (Geroler size)
- Output Shaft
- No Shaft and Bearing Assembly (Bearingless Motor)
- Port Configuration
- Mounting Flange
- Other Special Features

Benefits

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

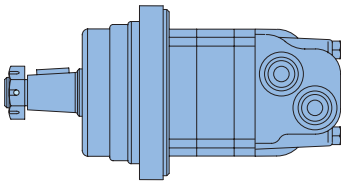
Applications

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



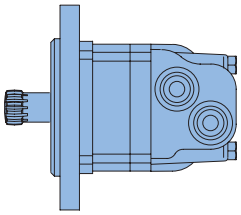
Standard Motor

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



Wheel Motor

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



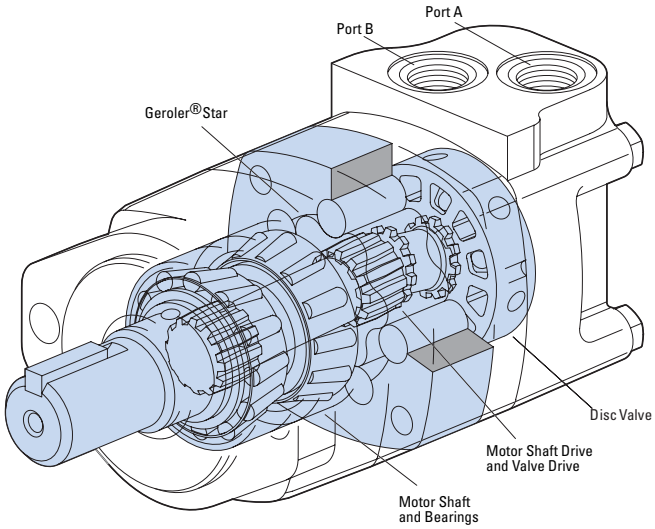
Bearingless Motor

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

Table of Contents

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
- Reliablity and performance in tough application
- Compact design of the integrated cross-over relief valve option

Applications

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


Auger

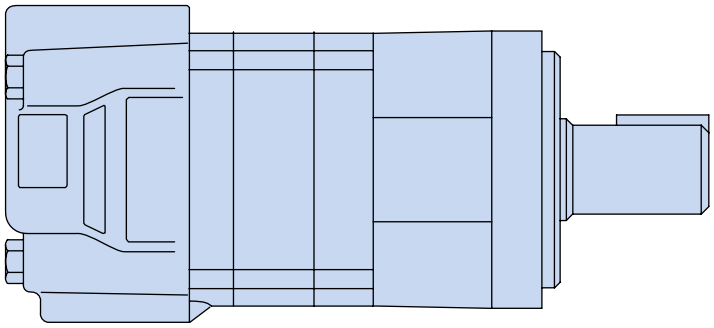

Boring


Plastic Injection


Oil and Gas Equipment

2000 Series

Specifications



SPECIFICATION DATA — 2000 SERIES MOTORS

Displ. cm³/r [in³/r]		80 [4.9]	90 [5.5]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 14.9]	305 [18.7]	395 [24.0]	490 [29.8]
Max. Speed (RPM) @ Flow	Continuous	908	836	742	576	477	385	308	246	191	153
	Intermittent	908	1042	924	720	713	577	462	365	287	230
Flow l/min [GPM]	Continuous	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Intermittent	75 [20]	95 [25]	95 [25]	95 [25]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]
Torque* Nm [lb-in]	Continuous	235 [2065]	265 [2326]	295 [2630]	385 [3420]	455 [4040]	540 [4780]	660 [5850]	765 [6750]	775 [6840]	845 [7470]
	Intermittent	345 [3035]	390 [3458]	445 [3950]	560 [4970]	570 [5040]	665 [5890]	820 [7250]	885 [7820]	925 [8170]	930 [8225]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	155 [2250]	120 [1750]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	260 [3700]	170 [2750]	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	205 [3250]	170 [2500]
Weight kg [lb]	Standard or Wheel Mount	9.3 [20.5]	9.3 [20.5]	9.5 [21.0]	9.8 [21.5]	10.0 [22.0]	10.4 [23.0]	10.9 [24.0]	11.3 [25.0]	11.8 [26.0]	12.2 [27.0]
	Bearingless	7.3 [16.0]	7.3 [16.0]	7.5 [16.5]	7.7 [17.0]	7.9 [17.5]	8.4 [18.5]	8.8 [18.5]	9.3 [20.5]	9.8 [21.5]	10.2 [22.5]

Maximum Case Pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

Note:

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

Maximum Inlet Pressure:

310 bar [4500 PSI]

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

Maximum Return Pressure:

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

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

Δ bar [Δ PSI] :

The true pressure difference between inlet port and outlet port

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

2000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

80 cm³/r [4.9 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.25] ,95	[210] 25 **3**	[420] 45 **1**							
[.5] 1,9	[250] 30 **17**	[500] 50 **8**	[740] 85 **3**						
[1] 3,8	[330] 35 **44**	[670] 75 **40**	[990] 110 **37**	[1300] 145 **34**	[1550] 175 **28**	[1800] 205 **22**	[1950] 220 **14**	[2110] 240 **2**	
[2] 7,5	[330] 35 **90**	[670] 75 **85**	[995] 110 **81**	[1310] 150 **78**	[1580] 180 **72**	[1840] 210 **65**	[2100] 235 **57**	[2365] 265 **49**	[2630] 295 **42**
[4] 15	[325] 35 **182**	[670] 75 **176**	[1005] 115 **170**	[1330] 150 **166**	[1620] 185 **159**	[1920] 215 **152**	[2200] 250 **140**	[2480] 280 **128**	[2765] 310 **117**
[6] 23	[320] 35 **273**	[665] 75 **267**	[1010] 115 **259**	[1340] 150 **254**	[1655] 185 **246**	[1975] 225 **238**	[2270] 255 **223**	[2570] 290 **207**	[2880] 325 **192**
[8] 30	[310] 35 **365**	[660] 75 **375**	[1015] 115 **349**	[1345] 150 **341**	[1685] 190 **333**	[2020] 230 **325**	[2330] 265 **306**	[2640] 300 **286**	[2960] 335 **266**
[10] 38	[300] 35 **456**	[650] 75 **448**	[1010] 115 **439**	[1350] 155 **429**	[1700] 190 **420**	[2050] 230 **411**	[2370] 270 **388**	[2690] 305 **364**	[3010] 340 **341**
[12] 45	[285] 30 **547**	[640] 70 **537**	[1005] 115 **530**	[1350] 155 **516**	[1705] 195 **507**	[2065] 235 **497**	[2390] 270 **470**	[2715] 305 **442**	[3035] 345 **415**
[14] 53	[270] 30 **638**	[625] 70 **629**	[990] 110 **622**	[1340] 150 **603**	[1705] 195 **593**	[2065] 235 **584**	[2395] 270 **553**	[2720] 305 **521**	[3030] 340 **490**
[16] 61	[255] 30 **729**	[610] 70 **720**	[975] 110 **714**	[1330] 150 **689**	[1690] 190 **679**	[2055] 230 **670**	[2385] 270 **635**	[2700] 305 **599**	[2995] 340 **564**
[18] 68	[230] 25 **818**	[590] 65 **810**	[955] 110 **795**	[1310] 150 **775**	[1680] 190 **765**	[2025] 230 **756**	[2355] 265 **717**	[2660] 300 **677**	[2935] 330 **638**
[20] 76	[210] 25 **908**	[570] 65 **901**	[930] 105 **880**	[1290] 145 **861**	[1645] 185 **851**	[1985] 225 **842**	[2305] 260 **799**	[2600] 295 **755**	[2845] 320 **712**

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

90 cm³/r [5.5 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.25] ,95	[124] 14 **5**	[233] 26 **2**	[471] 53 **1**							
[.5] 1,9	[133] 15 **15**	[273] 31 **13**	[555] 63 **6**	[832] 94 **2**						
[1] 3,8	[151] 17 **39**	[358] 40 **39**	[744] 84 **35**	[1091] 123 **32**	[1424] 161 **28**	[1697] 192 **21**	[1952] 221 **13**	[2189] 247 **12**	[2368] 268 **2**	
[2] 7,5	[151] 17 **82**	[358] 40 **80**	[744] 84 **76**	[1099] 124 **72**	[1439] 163 **68**	[1737] 196 **61**	[2015] 228 **50**	[2293] 259 **38**	[2570] 290 **29**	[2855] 323 **20**
[4] 15	[151] 17 **167**	[350] 40 **163**	[899] 102 **158**	[1113] 126 **152**	[1473] 166 **148**	[1800] 203 **139**	[2132] 241 **126**	[2454] 277 **115**	[2775] 314 **102**	[3100] 350 **90**
[6] 23	[142] 16 **250**	[348] 39 **245**	[736] 83 **240**	[613] 69 **233**	[1492] 169 **227**	[1851] 209 **218**	[2208] 249 **203**	[2552] 288 **191**	[2898] 327 **176**	[3249] 367 **161**
[8] 30	[133] 15 **35**	[338] 38 **328**	[729] 82 **329**	[1128] 127 **314**	[1509] 170 **306**	[1890] 214 **295**	[2269] 256 **281**	[2635] 298 **266**	[3000] 339 **249**	[3367] 380 **231**
[10] 38	[124] 14 **418**	[331] 37 **410**	[724] 82 **404**	[1130] 128 **395**	[1521] 172 **385**	[1912] 216 **373**	[2309] 261 **361**	[2670] 302 **342**	[3036] 343 **322**	[3398] 384 **302**
[12] 45	[106] 12 **502**	[315] 36 **493**	[714] 81 **485**	[1127] 127 **477**	[1525] 172 **464**	[1924] 217 **451**	[2326] 263 **441**	[2704] 306 **417**	[3082] 348 **394**	[3458] 391 **372**
[14] 53	[98] 11 **585**	[298] 34 **575**	[706] 80 **567**	[1115] 126 **559**	[1525] 172 **543**	[1924] 217 **529**	[2326] 263 **521**	[2707] 306 **493**	[3080] 348 **467**	[3450] 390 **431**
[16] 61	[80] 9 **670**	[285] 32 **658**	[688] 78 **650**	[1107] 125 **641**	[1510] 171 **622**	[1907] 215 **607**	[2311] 261 **610**	[2697] 305 **568**	[3070] 347 **541**	[3432] 388 **513**
[18] 68	[62] 7 **753**	[262] 30 **740**	[673] 76 **732**	[1087] 123 **719**	[1490] 168 **701**	[1892] 214 **685**	[2281] 258 **680**	[2662] 301 **643**	[3030] 342 **613**	[3381] 382 **583**
[20] 76	[53] 6 **836**	[242] 27 **822**	[644] 73 **814**	[1045] 118 **796**	[1447] 163 **780**	[1850] 209 **765**	[2246] 254 **748**	[2617] 296 **719**	[2988] 338 **686**	[3301] 373 **653**
[22] 83	[35] 4 **920**	[231] 26 **916**	[639] 72 **907**	[1047] 118 **895**	[1437] 162 **876**	[1836] 207 **854**	[2218] 251 **749**	[2599] 294 **803**	[2981] 337 **774**	
[24] 91	[18] 2 **1003**	[204] 23 **1000**	[612] 69 **991**	[1011] 114 **978**	[1366] 154 **960**	[1792] 202 **940**	[2182] 247 **918**	[2573] 291 **882**	[2963] 335 **850**	
[25] 95		[195] 22 **1042**	[594] 67 **1033**	[994] 112 **1020**	[1384] 156 **1003**	[1765] 199 **984**	[2173] 246 **954**	[2564] 290 **921**		

2000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

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

Flow LPM [GPM]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.25] ,95	[140] 15 **4**	[260] 30 **2**								
[.5] 1,9	[150] 15 **13**	[300] 35 **9**	[620] 70 **5**	[940] 105 **2**						
[1] 3,8	[170] 20 **35**	[390] 45 **34**	[830] 95 **31**	[1210] 135 **28**	[1570] 175 **23**	[1870] 210 **15**	[2130] 240 **6**			
[2] 7,5	[170] 20 **73**	[390] 45 **71**	[830] 95 **68**	[1220] 140 **63**	[1590] 180 **59**	[1920] 215 **51**	[2220] 250 **38**	[2520] 285 **24**	[2810] 315 **14**	[3120] 355 **4**
[4] 15	[170] 20 **148**	[380] 45 **145**	[820] 90 **141**	[1240] 140 **136**	[1640] 185 **131**	[2010] 225 **121**	[2380] 270 **104**	[2750] 310 **94**	[3120] 355 **80**	[3490] 395 **69**
[6] 23	[160] 20 **222**	[380] 45 **219**	[820] 90 **215**	[1260] 140 **209**	[1670] 190 **202**	[2080] 235 **192**	[2480] 280 **172**	[2880] 325 **163**	[3280] 370 **149**	[3680] 415 **134**
[8] 30	[150] 15 **297**	[370] 40 **294**	[810] 90 **288**	[1260] 140 **281**	[1700] 190 **273**	[2130] 240 **261**	[2560] 290 **243**	[2990] 340 **231**	[3420] 385 **216**	[3840] 435 **200**
[10] 38	[140] 15 **371**	[368] 40 **367**	[810] 90 **362**	[1270] 145 **354**	[1720] 195 **344**	[2160] 245 **330**	[2610] 295 **316**	[3020] 340 **300**	[3440] 390 **283**	[3850] 435 **266**
[12] 45	[120] 15 **445**	[350] 40 **442**	[800] 90 **436**	[1270] 145 **427**	[1730] 195 **415**	[2180] 245 **399**	[2630] 295 **389**	[3070] 345 **369**	[3510] 395 **350**	[3950] 445 **332**
[14] 53	[110] 10 **519**	[330] 35 **516**	[800] 90 **509**	[1260] 140 **500**	[1740] 195 **486**	[2180] 245 **469**	[2630] 295 **463**	[3070] 345 **437**	[3500] 395 **417**	[3940] 445 **378**
[16] 61	[90] 10 **594**	[320] 35 **591**	[780] 90 **583**	[1260] 140 **573**	[1720] 195 **558**	[2160] 245 **540**	[2610] 295 **537**	[3060] 345 **506**	[3500] 395 **485**	[3940] 445 **463**
[18] 68	[70] 10 **668**	[300] 35 **665**	[770] 85 **657**	[1240] 140 **646**	[1700] 190 **630**	[2140] 240 **611**	[2580] 290 **609**	[3020] 340 **574**	[3460] 390 **552**	[3900] 440 **529**
[20] 76	[60] 5 **742**	[280] 30 **739**	[730] 80 **731**	[1180] 135 **715**	[1630] 185 **703**	[2090] 235 **684**	[2550] 290 **662**	[2980] 335 **643**	[3440] 390 **619**	[3830] 435 **595**
[22] 83	[40] 5 **816**	[260] 30 **813**	[720] 80 **805**	[1180] 135 **794**	[1620] 185 **777**	[2070] 235 **758**	[2500] 280 **749**	[2930] 330 **712**	[3360] 380 **687**	
[24] 91	[20] 1,0 **890**	[230] 25 **887**	[690] 80 **879**	[1140] 130 **868**	[1540] 175 **852**	[2020] 230 **834**	[2460] 280 **814**	[2900] 330 **782**	[3340] 375 **754**	
[25] 95		[220] 25 **924**	[670] 75 **916**	[1120] 125 **905**	[1560] 175 **890**	[1990] 225 **873**	[2450] 275 **846**	[2890] 325 **817**		

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

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

Flow LPM [GPM]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.25] ,95	[170] 20 **3**									
[.5] 1,9	[190] 20 **12**	[410] 45 **8**	[870] 100 **2**							
[1] 3,8	[230] 25 **28**	[510] 60 **27**	[1070] 120 **23**	[1580] 180 **19**	[2050] 230 **16**	[2520] 285 **13**	[2920] 330 **9**	[3310] 375 **3**		
[2] 7.5	[230] 25 **56**	[510] 60 **56**	[1080] 120 **53**	[1600] 180 **47**	[2090] 235 **42**	[2580] 290 **39**	[2930] 330 **36**	[3320] 375 **28**	[3640] 410 **21**	[3990] 450 **13**
[4] 15	[220] 25 **114**	[500] 55 **113**	[1080] 120 **111**	[1620] 185 **104**	[2150] 245 **97**	[2660] 300 **95**	[3100] 350 **92**	[3540] 400 **85**	[3980] 450 **77**	[4420] 500 **70**
[6] 23	[220] 25 **172**	[490] 55 **171**	[1080] 120 **169**	[1640] 185 **161**	[2190] 245 **153**	[2740] 310 **149**	[3260] 370 **146**	[3770] 425 **132**	[4280] 485 **118**	[4800] 540 **104**
[8] 30	[200] 25 **230**	[480] 55 **224**	[1080] 120 **222**	[1650] 185 **219**	[2220] 250 **210**	[2780] 315 **204**	[3310] 375 **201**	[3840] 435 **192**	[4360] 495 **184**	[4890] 550 **175**
[10] 38	[180] 20 **287**	[470] 55 **286**	[1070] 120 **282**	[1650] 185 **276**	[2230] 250 **269**	[2800] 315 **261**	[3420] 385 **255**	[3940] 445 **243**	[4450] 505 **231**	[4970] 560 **219**
[12] 45	[160] 20 **345**	[460] 50 **344**	[1060] 120 **338**	[1640] 185 **333**	[2230] 250 **327**	[2800] 315 **317**	[3350] 380 **307**	[3910] 440 **295**	[4440] 500 **284**	[4960] 560 **272**
[14] 53	[150] 15 **403**	[440] 50 **402**	[1030] 115 **395**	[1620] 185 **391**	[2220] 250 **385**	[3000] 340 **373**	[3350] 380 **360**	[3910] 440 **348**	[4440] 500 **336**	
[16] 61	[130] 15 **461**	[420] 45 **460**	[1010] 115 **452**	[1600] 180 **447**	[2200] 250 **443**	[2780] 315 **430**	[3330] 375 **411**	[3890] 440 **397**	[4440] 500 **384**	
[18] 68	[110] 10 **518**	[400] 45 **517**	[990] 110 **509**	[1580] 180 **504**	[2160] 245 **500**	[2750] 310 **484**	[3300] 375 **471**	[3860] 435 **456**	[4410] 500 **440**	
[20] 76	[90] 10 **576**	[380] 45 **575**	[960] 110 **568**	[1550] 175 **560**	[2130] 240 **551**	[2710] 305 **539**	[3280] 370 **524**	[3840] 435 **508**		
[22] 83	[60] 5 **634**	[350] 40 **633**	[940] 105 **624**	[1520] 170 **619**	[2100] 235 **604**	[2680] 305 **597**	[3250] 365 **579**	[3820] 430 **560**		
[24] 91	[40] 5 **692**	[325] 35 **691**	[920] 105 **682**	[1490] 170 **676**	[2070] 235 **665**	[2650] 300 **651**	[3220] 365 **633**	[3780] 425 **616**		
[25] 95	[20] 1,0 **720**	[310] 35 **719**	[900] 100 **712**	[1480] 165 **705**	[2050] 230 **692**	[2630] 295 **679**	[3200] 360 **682**	[3700] 420 **656**		

2000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

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

Flow LPM [GPM]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[3750] 260
[.25] ,95	[200] 25 **3**								
[.5] 1,9	[240] 25 **9**	[490] 55 **7**	[990] 110 **5**	[1570] 175 **3**	[2140] 240 **1**				
[1] 3,8	[280] 30 **23**	[590] 65 **21**	[1170] 130 **19**	[1730] 195 **17**	[2290] 260 **13**	[2830] 320 **8**	[3330] 375 **3**	[3820] 430 **2**	[4070] 460 **1**
[2] 7.5	[300] 35 **46**	[610] 70 **45**	[1210] 135 **42**	[1790] 200 **39**	[2350] 265 **35**	[2920] 330 **34**	[3480] 395 **33**	[4050] 460 **28**	[4330] 490 **22**
[4] 15	[320] 35 **93**	[630] 70 **92**	[1260] 140 **89**	[1890] 215 **85**	[2530] 285 **79**	[3170] 360 **77**	[3820] 430 **75**	[4460] 505 **59**	[4780] 540 **43**
[6] 23	[320] 35 **142**	[650] 75 **140**	[1300] 145 **137**	[1960] 220 **131**	[2620] 295 **124**	[3280] 370 **118**	[3940] 445 **113**	[4600] 520 **104**	[4930] 560 **96**
[8] 30	[310] 35 **190**	[650] 75 **187**	[1330] 150 **184**	[2010] 225 **178**	[2670] 300 **170**	[3330] 375 **166**	[4000] 450 **164**	[4660] 525 **153**	[4990] 565 **142**
[10] 38	[290] 35 **237**	[640] 70 **235**	[1340] 150 **231**	[2030] 230 **226**	[2850] 320 **217**	[3410] 385 **212**	[4030] 455 **205**	[4700] 530 **193**	[5030] 570 **187**
[12] 45	[270] 30 **286**	[620] 70 **283**	[1320] 150 **279**	[2030] 230 **274**	[2700] 305 **265**	[3370] 380 **254**	[4040] 455 **246**	[4710] 530 **235**	[5040] 570 **224**
[14] 53	[240] 25 **334**	[590] 65 **331**	[1300] 145 **326**	[2020] 230 **322**	[2690] 305 **312**	[3360] 380 **305**	[4030] 455 **297**	[4700] 530 **286**	
[16] 61	[220] 25 **382**	[570] 65 **378**	[1270] 145 **374**	[1980] 225 **369**	[2660] 300 **360**	[3330] 375 **349**	[4010] 455 **339**	[4680] 530 **326**	
[18] 68	[190] 20 **429**	[540] 60 **426**	[1240] 140 **422**	[1960] 220 **416**	[2640] 300 **407**	[3320] 375 **394**	[3990] 450 **387**		
[20] 76	[170] 20 **477**	[510] 60 **474**	[1210] 135 **469**	[1920] 215 **462**	[2630] 300 **451**	[3310] 375 **440**	[3940] 445 **430**		
[22] 83	[150] 15 **525**	[480] 55 **522**	[1170] 130 **517**	[1880] 210 **510**	[2600] 295 **501**	[3290] 370 **484**	[3920] 445 **473**		
[24] 91	[120] 15 **572**	[450] 50 **569**	[1150] 130 **564**	[1860] 210 **556**	[2570] 290 **546**	[3260] 370 **531**	[3900] 440 **522**		
[25] 95	[90] 10 **596**	[440] 50 **593**	[1140] 130 **587**	[1840] 210 **580**	[2560] 290 **566**	[3230] 365 **553**	[3880] 440 **544**		
[30] 114		[330] 35 **713**	[1040] 120 **706**	[1750] 200 **696**	[2470] 280 **682**	[3140] 355 **672**	[3800] 430 **658**		

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

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

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
[.25] ,95	[240] 25 **4**	[590] 65 **2**													
[.5] 1,9	[290] 35 **8**	[640] 70 **6**	[990] 110 **5**	[1340] 150 **2**											
[1] 3,8	[380] 45 **17**	[730] 80 **16**	[1100] 125 **15**	[1430] 160 **14**	[1790] 200 **13**	[2120] 200 **11**	[2450] 275 **9**	[2720] 305 **7**	[2990] 340 **5**	[3260] 370 **4**	[3540] 400 **3**	[3810] 430 **2**	[4080] 460 **2**	[4350] 490 **1**	[4620] 520 **1**
[2] 7,5	[390] 45 **37**	[755] 85 **35**	[1135] 130 **34**	[1470] 165 **33**	[1860] 210 **32**	[2195] 250 **31**	[2535] 285 **28**	[2880] 325 **26**	[3120] 355 **24**	[3680] 415 **21**	[4090] 460 **20**	[4500] 510 **19**	[4800] 540 **17**	[5100] 575 **14**	[5400] 610 **14**
[4] 15	[405] 45 **76**	[795] 90 **74**	[1185] 135 **73**	[1540] 175 **72**	[1970] 225 **71**	[2310] 260 **70**	[2675] 300 **66**	[3040] 345 **64**	[3420] 385 **62**	[3790] 430 **61**	[4160] 470 **59**	[4520] 510 **57**	[4890] 550 **55**	[5260] 595 **51**	[5630] 635 **45**
[6] 23	[405] 45 **115**	[815] 90 **113**	[1220] 140 **111**	[1590] 180 **110**	[2035] 230 **109**	[2395] 270 **108**	[2780] 315 **104**	[3170] 360 **102**	[3560] 400 **100**	[3940] 445 **99**	[4320] 490 **96**	[4700] 530 **94**	[5070] 570 **91**	[5450] 615 **87**	[5830] 660 **81**
[8] 30	[400] 45 **154**	[820] 90 **151**	[1230] 140 **149**	[1625] 185 **148**	[2065] 235 **147**	[2450] 275 **146**	[2850] 320 **143**	[3260] 370 **140**	[3670] 415 **137**	[4040] 455 **135**	[4410] 500 **132**	[4780] 540 **130**	[5150] 580 **127**	[5520] 625 **123**	[5890] 665 **117**
[10] 38	[380] 45 **193**	[810] 95 **190**	[1230] 140 **188**	[1645] 185 **187**	[2095] 235 **186**	[2480] 280 **184**	[2895] 325 **181**	[3310] 375 **177**	[3730] 420 **175**	[4100] 465 **173**	[4470] 505 **170**	[4840] 545 **168**	[5210] 590 **164**	[5590] 630 **160**	
[12] 45	[355] 40 **231**	[790] 90 **229**	[1215] 135 **227**	[1650] 185 **226**	[2100] 235 **224**	[2485] 280 **221**	[2915] 330 **219**	[3340] 375 **218**	[3760] 425 **215**	[4120] 465 **211**	[4480] 505 **208**	[4850] 550 **204**			
[14] 53	[320] 35 **269**	[765] 85 **267**	[1190] 135 **267**	[1645] 185 **264**	[2090] 235 **261**	[2475] 280 **260**	[2915] 330 **257**	[3350] 380 **254**	[3770] 425 **250**	[4130] 465 **248**	[4480] 505 **245**	[4860] 550 **241**			
[16] 61	[290] 30 **308**	[730] 80 **306**	[1160] 130 **305**	[1625] 185 **303**	[2070] 235 **299**	[2455] 275 **296**	[2900] 330 **294**	[3340] 375 **290**	[3760] 425 **286**	[4130] 465 **283**	[4490] 505 **279**	[4860] 550 **276**			
[18] 68	[290] 30 **346**	[690] 80 **345**	[1120] 125 **345**	[1590] 180 **342**	[2035] 230 **337**	[2420] 270 **334**	[2870] 325 **333**	[3310] 375 **327**	[3730] 420 **321**	[4100] 465 **315**	[4480] 505 **308**				
[20] 76	[210] 25 **385**	[650] 75 **384**	[1080] 120 **383**	[1550] 175 **380**	[1995] 225 **375**	[2380] 270 **372**	[2830] 320 **371**	[3270] 370 **367**	[3690] 415 **363**	[4070] 460 **359**	[4450] 500 **355**				
[22] 83	[170] 20 **424**	[610] 70 **423**	[1040] 120 **422**	[1500] 170 **418**	[1955] 220 **414**	[2340] 265 **410**	[2785] 315 **408**	[3220] 365 **404**	[3640] 410 **399**	[4050] 460 **395**					
[24] 91	[135] 15 **462**	[570] 65 **461**	[1000] 115 **460**	[1440] 165 **457**	[1910] 215 **453**	[2300] 260 **449**	[2740] 310 **446**	[3170] 360 **441**	[3590] 405 **436**	[3980] 450 **432**					
[25] 95	[120] 15 **484**	[550] 60 **482**	[980] 110 **479**	[1410] 160 **476**	[1890] 215 **473**	[2280] 260 **469**	[2720] 305 **464**	[3150] 355 **459**	[3570] 405 **454**	[3960] 445 **449**					
[30] 114		[420] 45 **577**	[860] 95 **575**	[1290] 145 **571**	[1700] 190 **567**	[2120] 240 **562**	[2530] 285 **556**	[2940] 330 **550**	[3400] 385 **542**						

2000 Series

Performance Data

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

Continuous

Peak

Intermittent

No Operation

245 cm³/r [14.9 in³/r]

Δ Pressure Bar [PSI]

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
[.5] 1,9	[410] 45 **4**	[850] 95 **2**													
[1] 3,8	[450] 50 **14**	[930] 105 **13**	[1420] 160 **12**	[1850] 210 **11**	[2320] 260 **10**	[2780] 315 **9**	[3250] 365 **8**	[3650] 410 **6**	[4100] 465 **5**	[4540] 515 **4**	[4980] 560 **4**	[5430] 615 **3**	[5870] 665 **2**	[6310] 715 **1**	
[2] 7,5	[460] 50 **29**	[960] 110 **28**	[1460] 165 **27**	[1900] 215 **26**	[2400] 270 **25**	[2860] 325 **23**	[3340] 375 **22**	[3780] 425 **20**	[4320] 490 **19**	[4770] 540 **18**	[5210] 590 **17**	[5660] 640 **15**	[6110] 690 **14**	[6570] 740 **12**	[6950] 785 **10**
[4] 15	[470] 55 **60**	[1000] 115 **59**	[1540] 175 **58**	[1980] 225 **56**	[2510] 285 **54**	[3010] 340 **53**	[3480] 395 **51**	[3980] 450 **49**	[4450] 505 **48**	[4910] 555 **47**	[5380] 610 **47**	[5850] 660 **46**	[6320] 715 **45**	[6780] 765 **44**	[7250] 820 **42**
[6] 23	[460] 50 **91**	[1020] 115 **90**	[1550] 175 **89**	[2040] 230 **87**	[2580] 290 **84**	[3110] 350 **83**	[3590] 405 **81**	[4120] 465 **78**	[4580] 515 **76**	[5050] 570 **73**	[5520] 625 **71**	[5980] 675 **69**	[6440] 730 **67**	[6910] 780 **65**	
[8] 30	[460] 50 **122**	[1010] 115 **121**	[1560] 175 **120**	[2080] 235 **118**	[2630] 295 **115**	[3170] 360 **113**	[3670] 415 **111**	[4210] 475 **108**	[4680] 530 **106**	[5160] 585 **104**	[5630] 635 **102**	[6110] 690 **101**	[6590] 745 **99**		
[10] 38	[440] 50 **153**	[1000] 115 **152**	[1550] 175 **150**	[2110] 240 **148**	[2650] 300 **146**	[3200] 360 **144**	[3730] 420 **142**	[4250] 480 **139**	[4730] 535 **137**	[5210] 560 **135**	[5720] 645 **133**	[6230] 705 **103**			
[12] 45	[410] 45 **184**	[960] 110 **183**	[1530] 175 **182**	[2100] 235 **180**	[2640] 300 **177**	[3190] 360 **175**	[3760] 425 **173**	[4260] 480 **170**	[4740] 535 **168**	[5220] 600 **165**	[5730] 645 **162**				
[14] 53	[380] 40 **215**	[910] 105 **214**	[1500] 170 **213**	[2080] 235 **211**	[2600] 295 **209**	[3160] 355 **207**	[3760] 425 **204**	[4230] 480 **201**	[4710] 530 **198**	[5190] 585 **195**					
[16] 61	[340] 40 **246**	[860] 95 **245**	[1460] 165 **244**	[2040] 230 **242**	[2570] 290 **240**	[3120] 355 **238**	[3740] 425 **235**	[4180] 470 **232**	[4660] 525 **227**	[5140] 580 **223**					
[18] 68	[290] 30 **277**	[810] 90 **276**	[1420] 160 **275**	[2000] 225 **273**	[2520] 285 **271**	[3060] 345 **269**	[3700] 420 **266**	[4130] 465 **263**	[4610] 520 **258**	[5090] 575 **253**					
[20] 76	[250] 30 **308**	[800] 90 **306**	[1350] 155 **304**	[1910] 215 **302**	[2460] 280 **300**	[3010] 340 **298**	[3630] 410 **295**	[4110] 465 **291**	[4610] 520 **288**						
[22] 83	[200] 25 **339**	[710] 80 **337**	[1300] 145 **337**	[1870] 210 **334**	[2390] 270 **332**	[2940] 330 **330**	[3560] 400 **327**	[4010] 455 **323**	[4510] 510 **318**						
[24] 91	[150] 15 **370**	[670] 75 **369**	[1240] 140 **367**	[1790] 200 **364**	[2330] 265 **362**	[2880] 325 **360**	[3460] 390 **357**	[3960] 445 **353**	[4460] 505 **344**						
[25] 95	[120] 15 **385**	[660] 75 **384**	[1210] 135 **382**	[1750] 200 **379**	[2300] 260 **377**	[2860] 325 **375**	[3410] 385 **372**	[3950] 445 **367**	[4470] 505 **363**						
[30] 114		[520] 60 **462**	[1080] 120 **460**	[1620] 185 **458**	[2180] 245 **456**	[2720] 305 **453**	[3260] 370 **450**	[3790] 430 **447**							

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

305 cm³/r [18.7 in³/r]

Δ Pressure Bar [PSI]

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
[.5] 1,9	[500] 55 **4**	[1050] 120 **2**												
[1] 3,8	[610] 70 **12**	[1180] 135 **11**	[1750] 200 **11**	[2330] 260 **10**	[2870] 325 **10**	[3440] 390 **9**	[3930] 445 **8**	[4410] 500 **6**	[4900] 555 **3**	[5380] 610 **1**				
[2] 7,5	[620] 70 **24**	[1210] 135 **24**	[1800] 205 **23**	[2400] 270 **22**	[2970] 335 **22**	[3510] 395 **20**	[4050] 460 **19**	[4600] 520 **18**	[5140] 580 **17**	[5680] 640 **15**	[6220] 705 **13**	[6750] 765 **11**	[7290] 825 **8**	[7820] 885 **6**
[4] 15	[680] 75 **49**	[1250] 140 **49**	[1880] 210 **48**	[2500] 280 **47**	[3120] 355 **47**	[3690] 415 **45**	[4260] 480 **43**	[4840] 545 **42**	[5410] 610 **40**	[5980] 675 **38**	[6550] 740 **36**	[7120] 805 **34**	[7690] 870 **33**	
[6] 23	[620] 70 **74**	[1270] 145 **74**	[1920] 215 **72**	[2560] 290 **72**	[3230] 365 **71**	[3810] 430 **69**	[4390] 495 **66**	[4970] 560 **64**	[5560] 630 **61**	[6130] 695 **58**	[6710] 760 **55**	[7290] 825 **52**		
[8] 30	[600] 70 **98**	[1270] 145 **98**	[1940] 220 **97**	[2600] 295 **96**	[3290] 370 **95**	[3880] 440 **93**	[4470] 505 **90**	[5070] 575 **86**	[5660] 640 **83**	[6250] 705 **80**	[6840] 775 **77**			
[10] 38	[570] 65 **123**	[1250] 140 **122**	[1940] 220 **121**	[2610] 295 **120**	[3310] 375 **119**	[3920] 440 **117**	[4530] 510 **113**	[5150] 580 **110**	[5760] 650 **106**	[6370] 720 **102**				
[12] 45	[530] 60 **148**	[1220] 140 **147**	[1920] 215 **145**	[2600] 295 **144**	[3300] 375 **143**	[3920] 440 **142**	[4530] 510 **138**	[5150] 580 **133**	[5760] 650 **128**	[6370] 720 **124**				
[14] 53	[480] 55 **172**	[1180] 135 **172**	[1870] 210 **170**	[2560] 290 **168**	[3260] 370 **167**	[3900] 440 **165**	[4510] 510 **160**	[5120] 580 **156**	[5730] 645 **152**					
[16] 61	[430] 50 **196**	[1120] 125 **196**	[1820] 205 **194**	[2500] 280 **192**	[3210] 365 **191**	[3870] 440 **188**	[4480] 505 **183**	[5080] 575 **178**	[5690] 645 **174**					
[18] 68	[370] 40 **221**	[1060] 120 **221**	[1760] 200 **218**	[2440] 275 **217**	[3140] 355 **215**	[3800] 440 **212**	[4420] 500 **207**	[5050] 570 **202**						
[20] 76	[320] 35 **246**	[980] 110 **245**	[1680] 190 **243**	[2360] 265 **241**	[3050] 345 **239**	[3710] 420 **236**	[4370] 495 **231**	[5020] 565 **226**						
[22] 83	[240] 25 **271**	[920] 105 **270**	[1620] 185 **268**	[2300] 260 **266**	[2990] 340 **263**	[3560] 400 **260**	[4190] 475 **258**	[4820] 545 **255**						
[24] 91	[180] 20 **296**	[870] 100 **294**	[1550] 175 **293**	[2240] 255 **290**	[2920] 330 **288**	[3420] 385 **285**	[4020] 455 **283**	[4630] 525 **280**						
[25] 95	[150] 15 **308**	[840] 95 **307**	[1520] 170 **305**	[2200] 250 **303**	[2890] 325 **300**	[3340] 375 **298**	[3930] 445 **295**	[4520] 510 **293**						
[30] 114		[680] 75 **365**	[1360] 155 **362**	[2040] 230 **360**	[2720] 305 **357**	[3140] 355 **356**	[3810] 430 **352**							

2000 Series

Performance Data

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

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

Continuous | Peak | Intermittent | No Operation

490 cm³/r [29.8 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140
[.5] **1,9**	[670] 75 **2**	[1600] 180 **1**						
[1] **3,8**	[920] 105 **7**	[2000] 225 **6**	[2990] 340 **5**	[3900] 440 **4**	[4880] 550 **2**			
[2] **7,5**	[950] 105 **14**	[2060] 235 **13**	[3110] 350 **12**	[4080] 460 **10**	[5110] 575 **9**	[6320] 715 **7**		
[4] **15**	[980] 110 **30**	[2130] 240 **29**	[3230] 365 **28**	[4270] 480 **27**	[5350] 605 **26**	[6370] 720 **24**	[7380] 835 **22**	[7980] 900 **20**
[6] **23**	[980] 110 **45**	[2120] 240 **44**	[3230] 365 **43**	[4300] 485 **42**	[5370] 605 **41**	[6420] 725 **39**	[7470] 845 **37**	[8225] 930 **35**
[8] **30**	[980] 110 **61**	[2110] 240 **60**	[3220] 365 **59**	[4330] 490 **58**	[5400] 610 **57**	[6470] 730 **55**	[7550] 855 **52**	
[10] **38**	[920] 105 **76**	[2050] 230 **75**	[3170] 360 **74**	[4300] 485 **73**	[5390] 610 **72**	[6460] 730 **70**	[7550] 855 **68**	
[12] **45**	[860] 95 **91**	[1990] 225 **90**	[3120] 355 **90**	[4260] 480 **89**	[5370] 605 **87**	[6460] 730 **85**	[7560] 855 **84**	
[14] **53**	[790] 90 **106**	[1930] 220 **105**	[3055] 345 **105**	[4185] 475 **104**	[5300] 600 **102**	[6400] 725 **100**		
[16] **61**	[720] 80 **122**	[1870] 210 **121**	[2990] 340 **120**	[4110] 465 **119**	[5230] 590 **118**	[6340] 715 **116**		
[18] **68**	[630] 70 **137**	[1770] 200 **136**	[2890] 325 **135**	[4020] 455 **134**	[5140] 580 **133**	[6260] 705 **131**		
[20] **76**	[550] 60 **153**	[1670] 190 **152**	[2800] 315 **151**	[3940] 445 **150**	[5060] 570 **149**	[6180] 700 **146**		
[22] **83**	[450] 50 **168**	[1570] 175 **168**	[2700] 305 **167**	[3830] 435 **165**	[4960] 560 **164**	[6070] 685 **161**		
[24] **91**	[360] 40 **184**	[1480] 165 **184**	[2600] 295 **183**	[3730] 420 **181**	[4860] 550 **179**	[5970] 675 **177**		
[26] **98**	[270] 30 **199**	[1390] 155 **195**	[2510] 285 **194**	[3640] 410 **192**	[4770] 540 **190**			
[28] **106**		[1260] 140 **212**	[2370] 270 **211**	[3520] 400 **209**	[4630] 525 **207**			
[30] **114**		[1130] 125 **230**	[2240] 255 **229**	[3400] 385 **277**	[4500] 510 **224**			

395 cm³/r [24.0 in³/r]

Δ Pressure Bar [PSI]

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

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

2000 Series

Dimensions

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

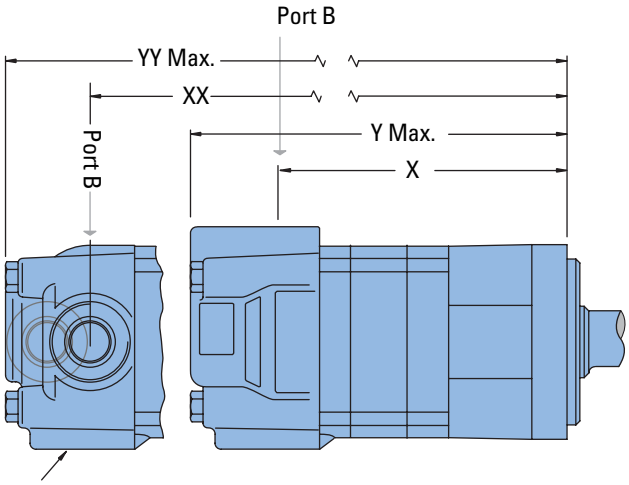
Manifold Mount
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

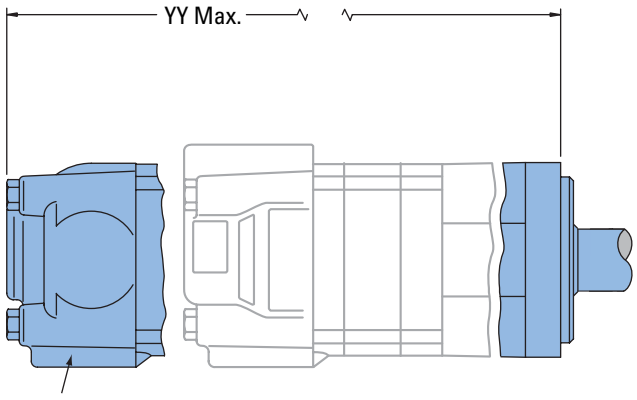
Port A Pressurized — CW

Port B Pressurized — CCW

Standard Mount



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



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

STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
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

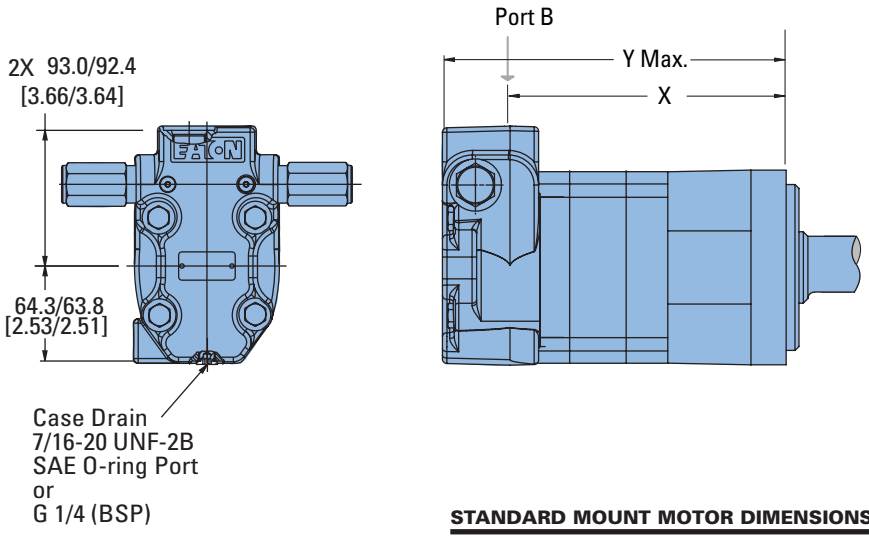
Ports

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Standard Mount with Integral Relief Valve



STANDARD MOUNT MOTOR DIMENSIONS

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

2000 Series

Dimensions

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

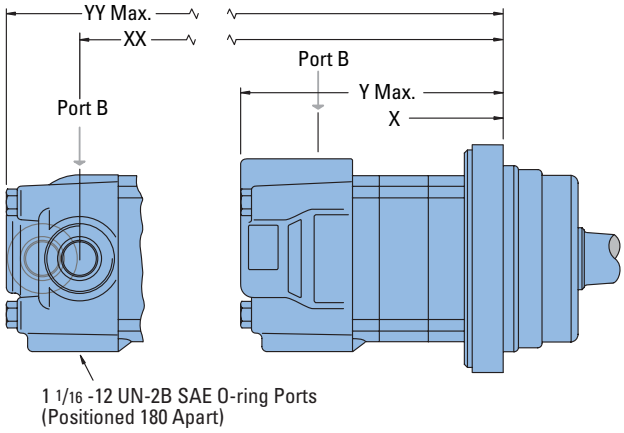
Manifold Mount
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

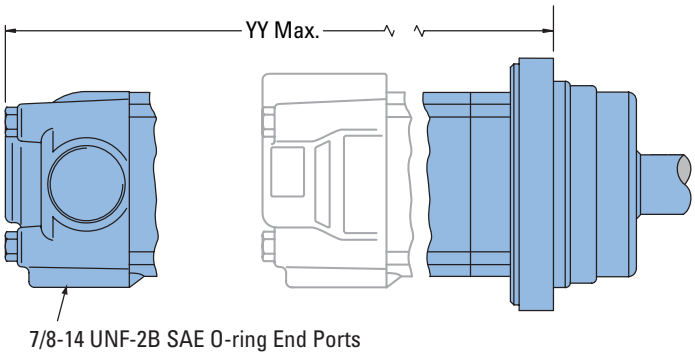
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

Wheel Mount





WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY 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

Ports

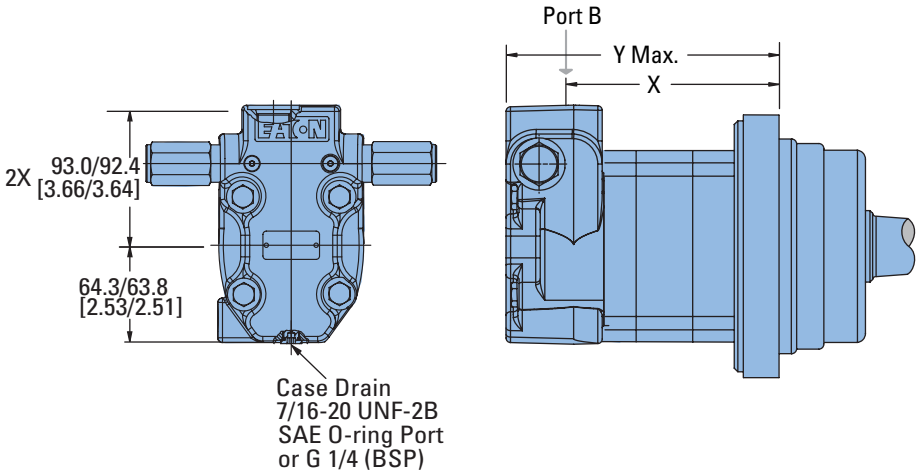
7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

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 cm³/r [in³/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

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

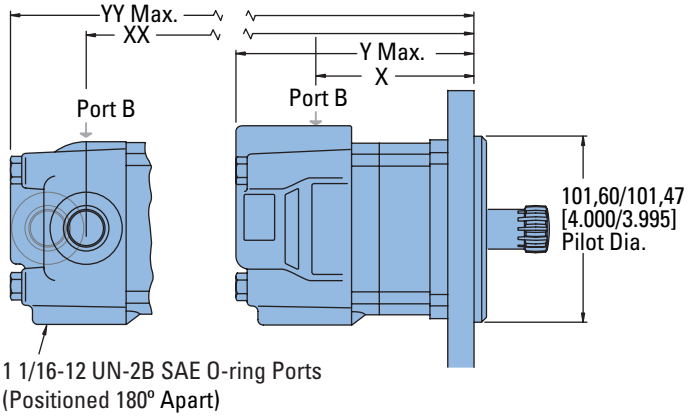
G 1/2 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1) or

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

Standard Rotation Viewed from Shaft End

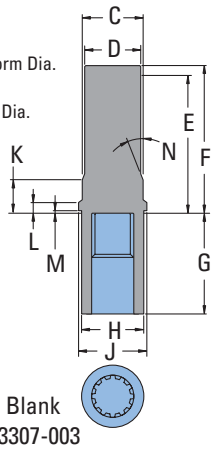
Port A Pressurized — CW
Port B Pressurized — CCW

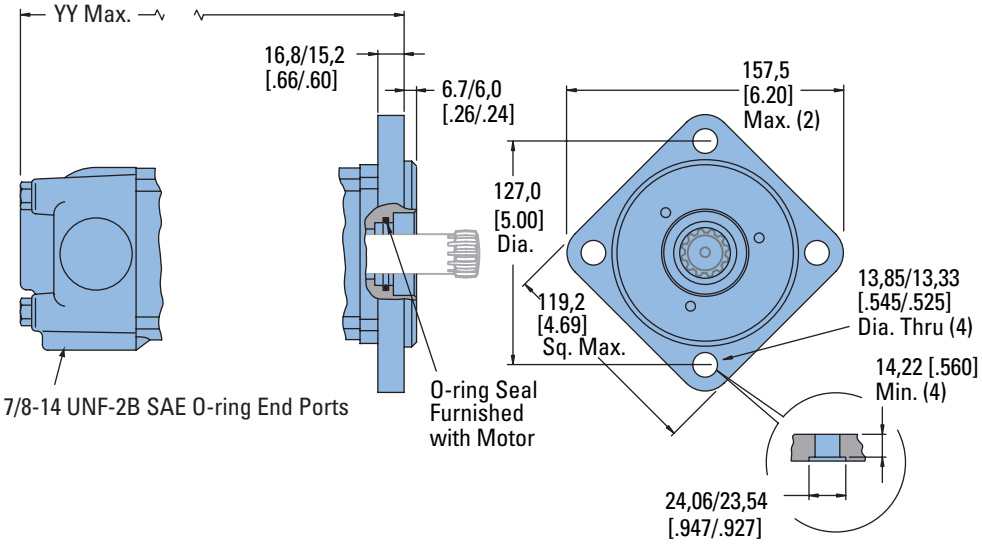
Bearingless



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 cm³/r [in³/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

Ports

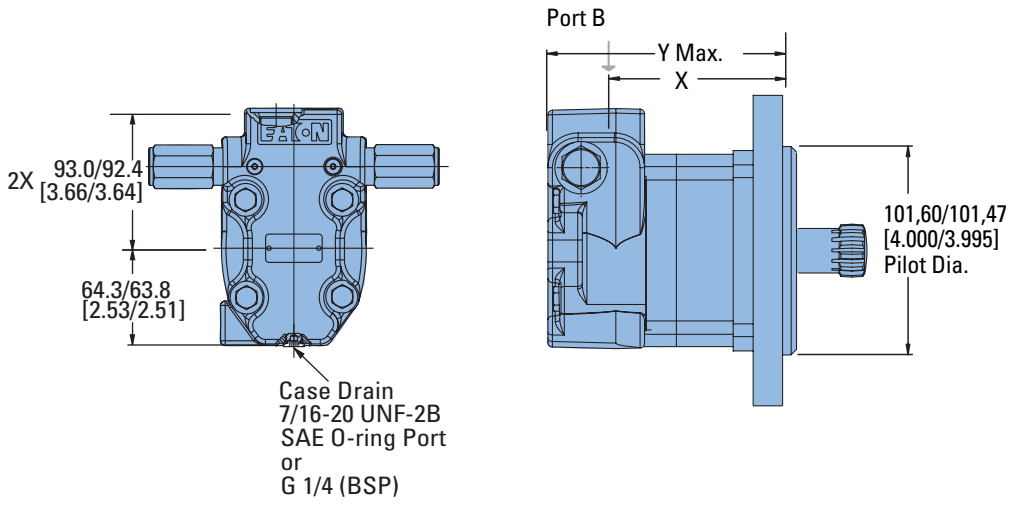
7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

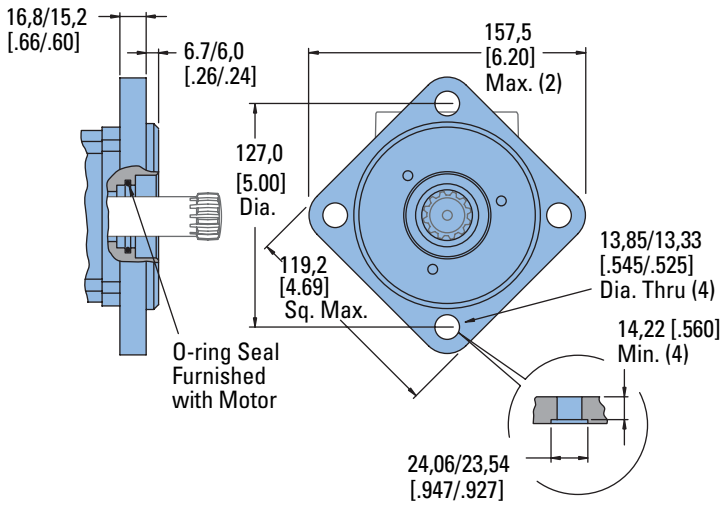
G 1/2 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Bearingless with Integral Relief Valve





BEARINGLESS MOTORS DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
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

1 Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H vacuum degassed alloy steel carbonize to a hardness of 59-62 HRc with case depth (to 50HRc) of 0,076 -1,02 [.030 -.040]. Dimensions apply after heat treat.

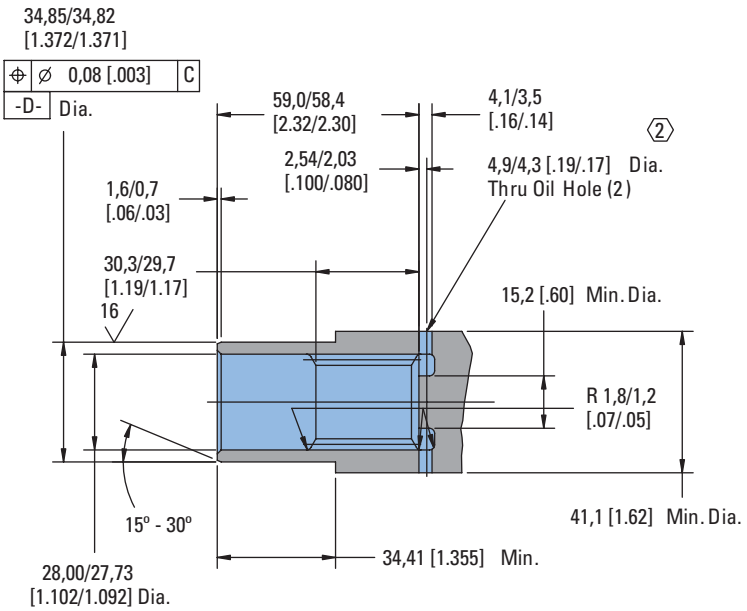
(2) Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.

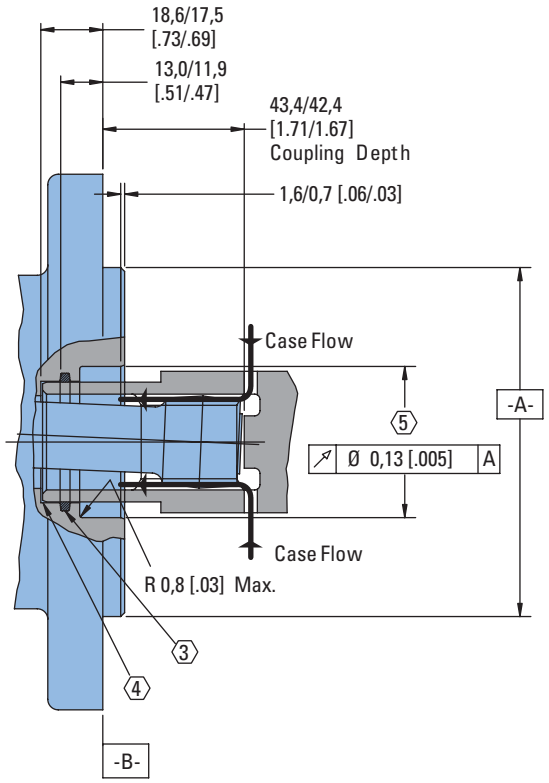
(3) Seal to be furnished with motor for proper oil circulation thru splines.

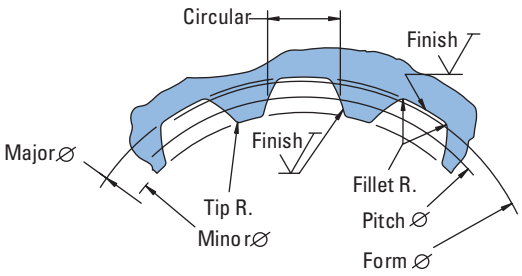
(4) Some means of maintaining clearance between shaft and mounting flange must be provided.

(5) Counterbore designed to adapt a standard sleeve bearing 35,010 -35,040 [1.3784 -1.3795] I.D. by 44,040 -44,070 [1.7339 -1.7350] O.D. (Oilite Bronze Sleeve Bearing AAM3544-22).

Bearingless

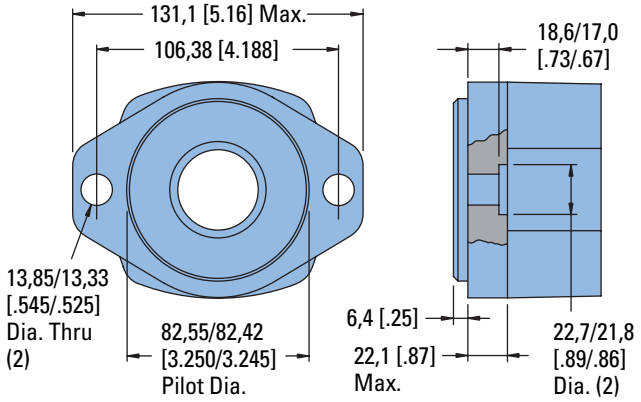




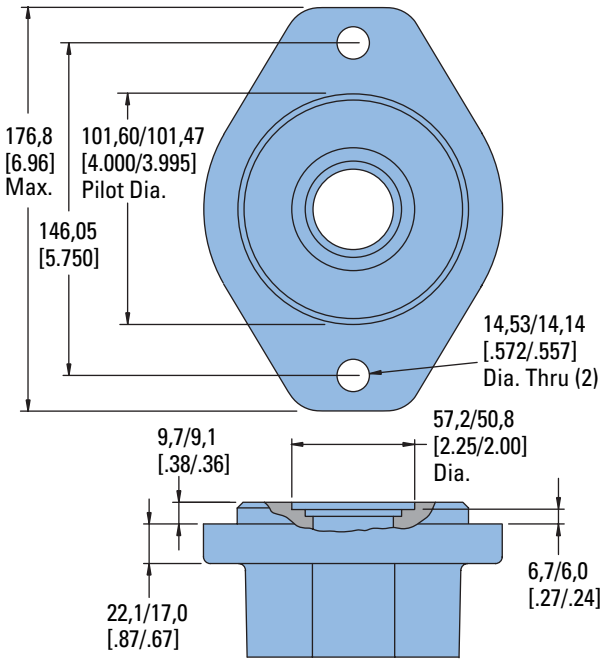


Spline Pitch	12/24
Pressure Angle	30°
Number of teeth	12
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 25,400000 [1.0000000]
Base Diameter	Ref. 21,997045 [.8660254] ◎ 0,21 [.008] D
Major Diameter	(27,74 [1.092] Max. 27,59 [1.086] Min.)
Minor Diameter	23,097 - 23,224 [.9093 - .9143]
Form Diameter, Min.	29,93 [1.060]
Fillet Radius	0,64 - 0,76 [.025 - .030]
Tip Radius	0,25 - 0,38 [.010 - .015]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+.0000 -.0010]
Total Index Variation	0,038 [.0015]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual	4,318 [.1700]
Minimum Effective	4,216 [.1660]
Maximum Effective	Ref. 4,270 [.1681]
Minimum Actual	Ref. 4,247 [.1672]
Dimension Between Two Pins	Ref. 19,020 - 19,190 [.7488 - .7555]
Pin Diameter	4,496 [.1770] Pins to Have 3,38 [.133] Wide Flat for Root Clearance

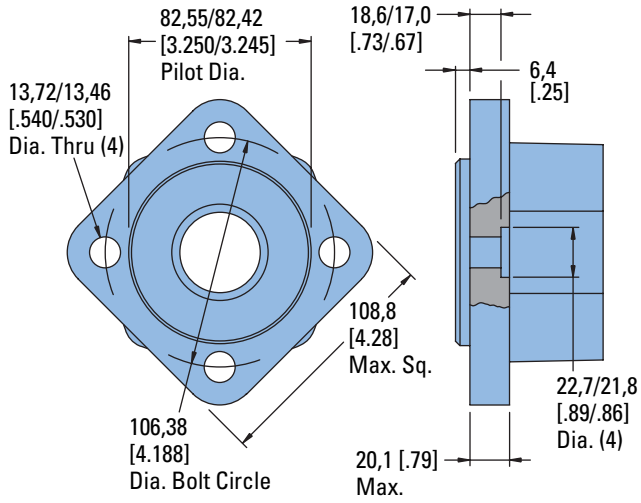
SAE A — Two Bolt (Standard Motor)



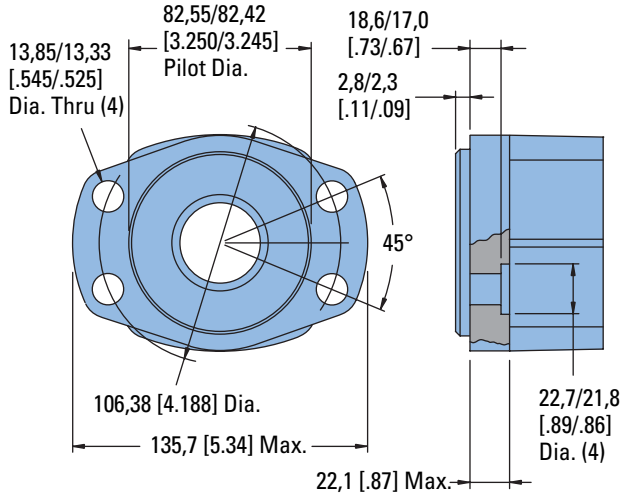
SAE B — Two Bolt



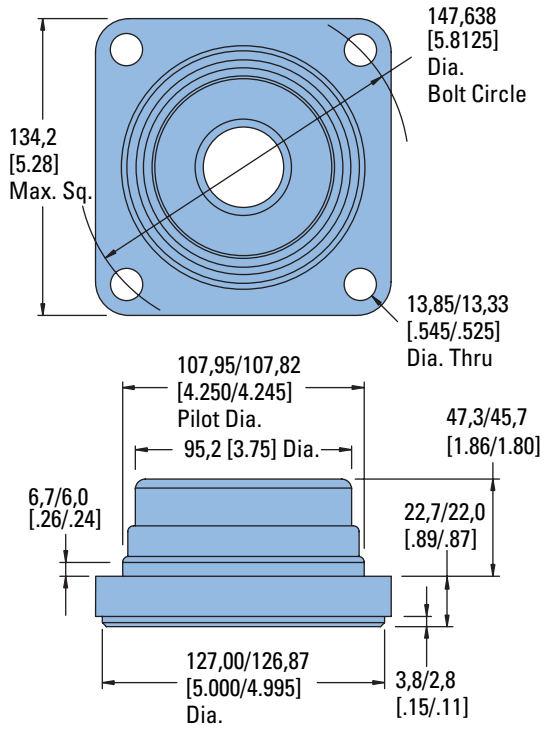
Four Bolt



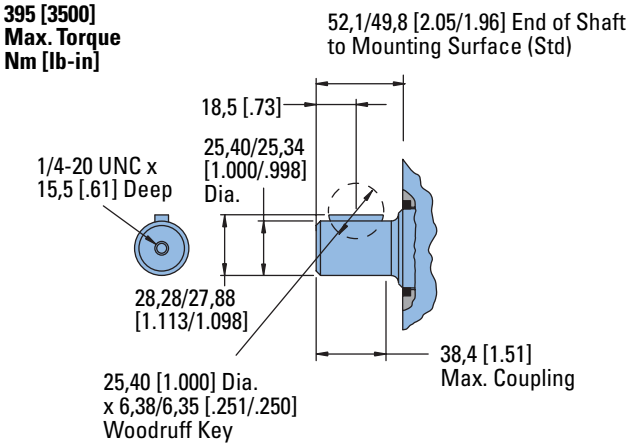
Four Bolt Magneto



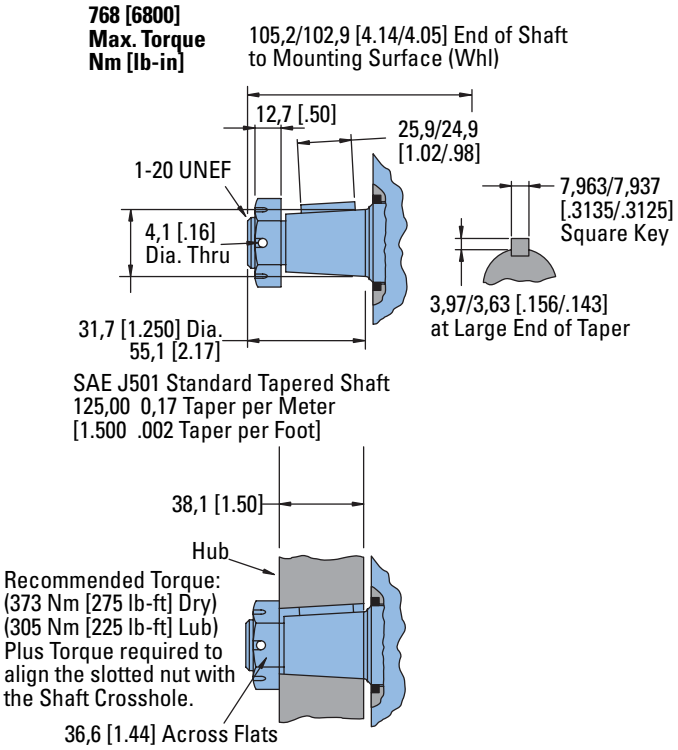
Four Bolt (Wheel Motor)



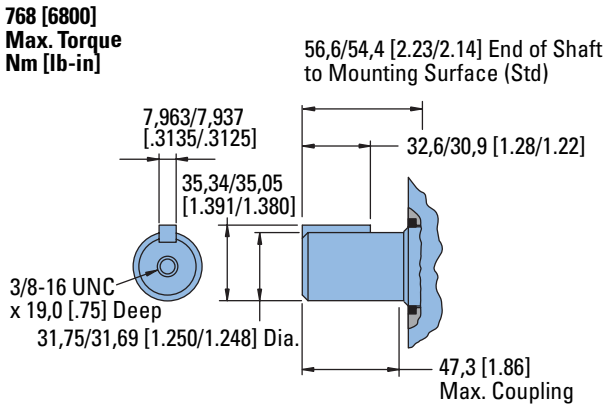
1 Inch Straight



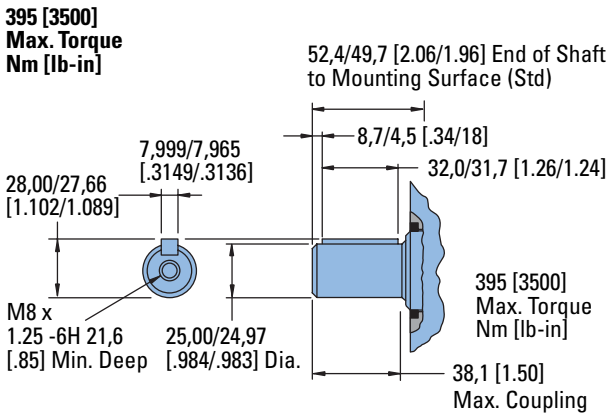
1 1/4 Inch Tapered



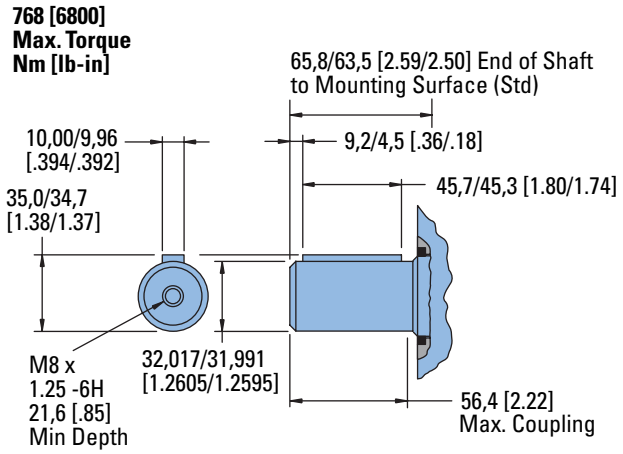
1 1/4 Inch Straight



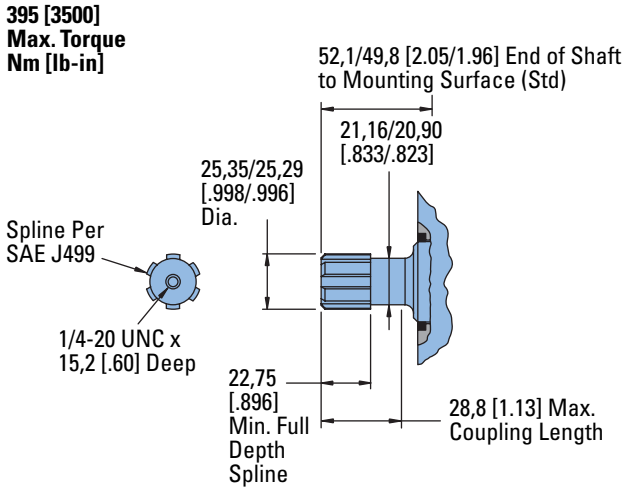
25 mm Straight



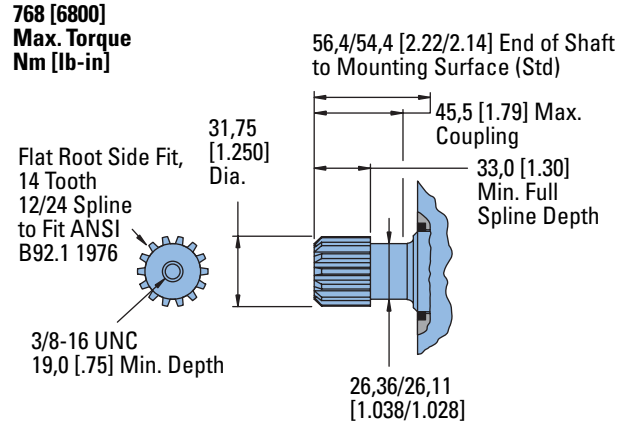
32 mm Straight



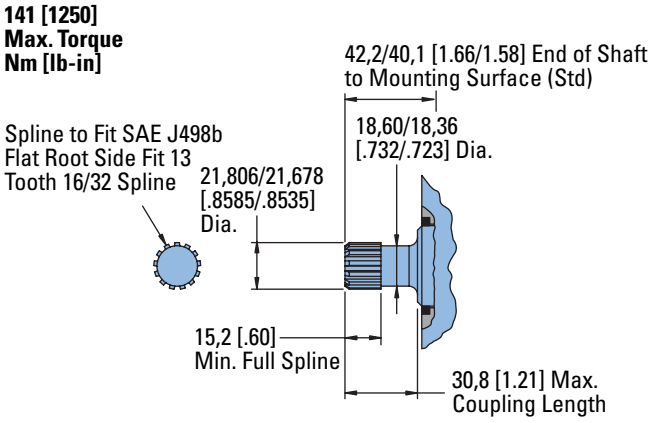
SAE 6B Splined



1 1/4 -14 Tooth Splined



13 Tooth Splined



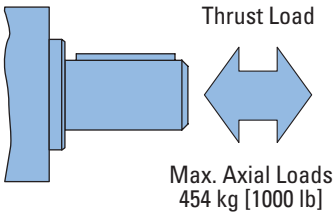
Shaft Side Load Capacity

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

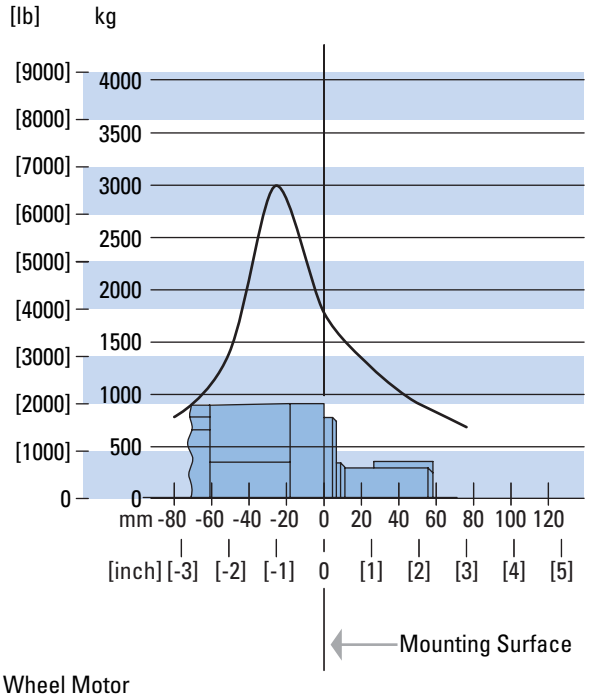


B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.
To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

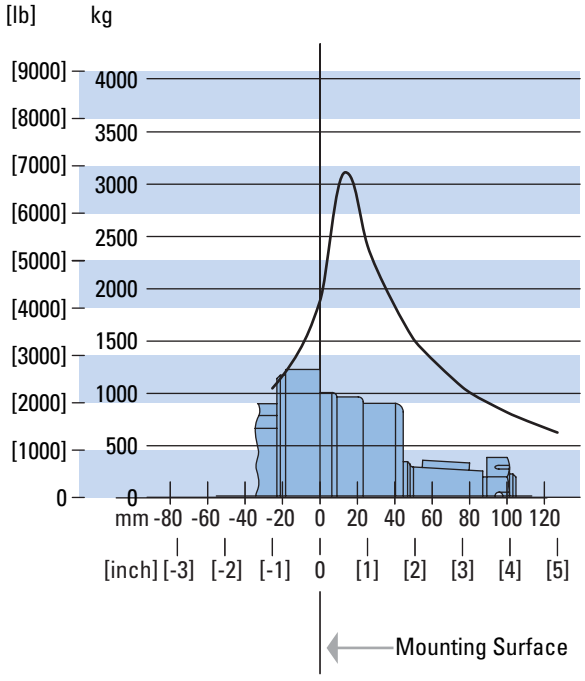
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



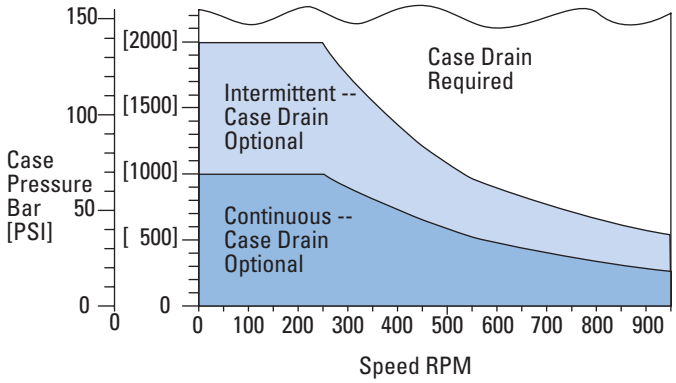
Wheel Motor
Tapered Shaft



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 Pressure Seal Limitation



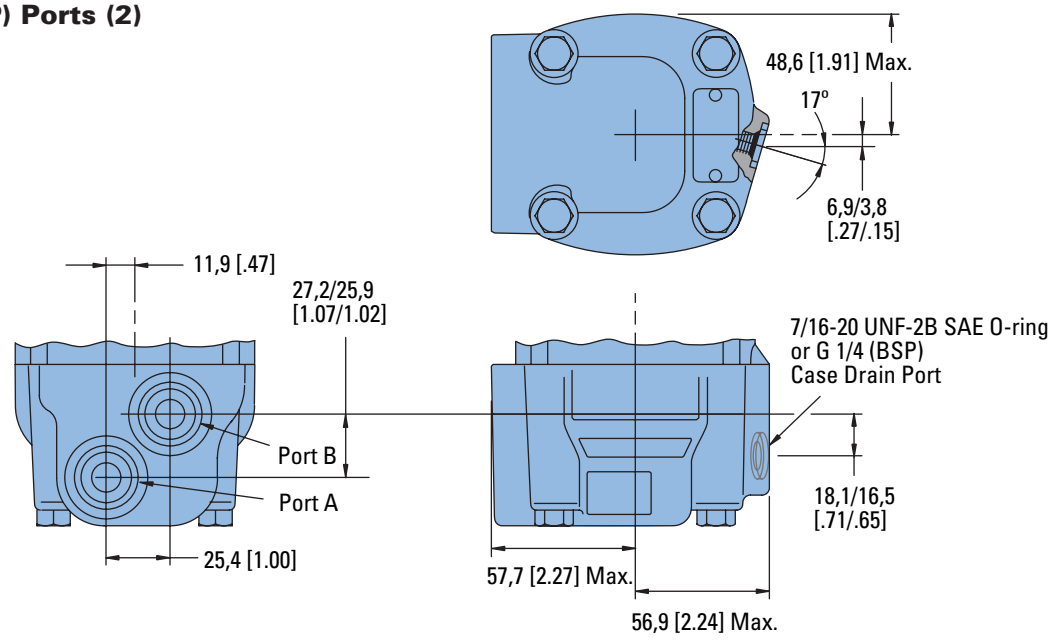
Case Porting Advantage

Contamination Control — flushing the motor case.

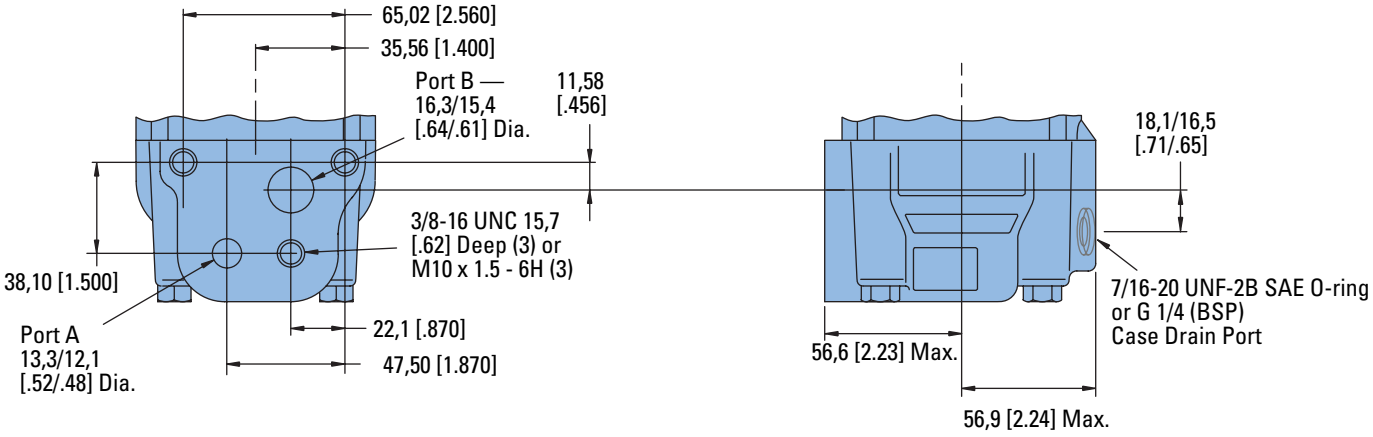
Cooler Motor — exiting oil draws motor heat away.

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

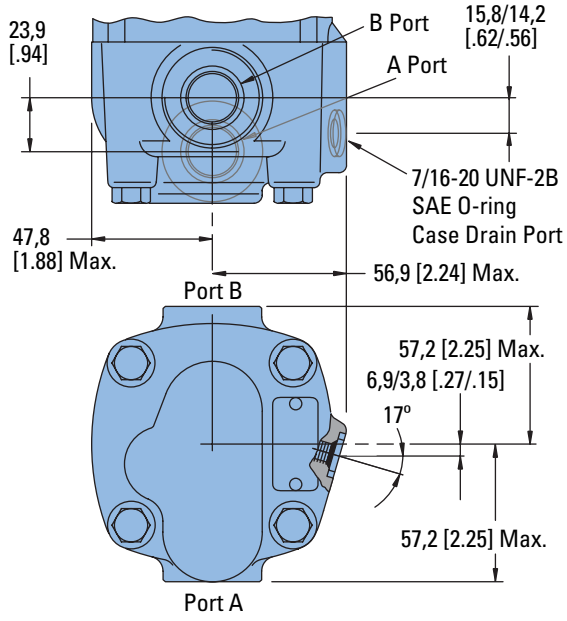
7/8-14 UNF-2B SAE O-ring Ports (2) or G 1/2 (BSP) Ports (2)



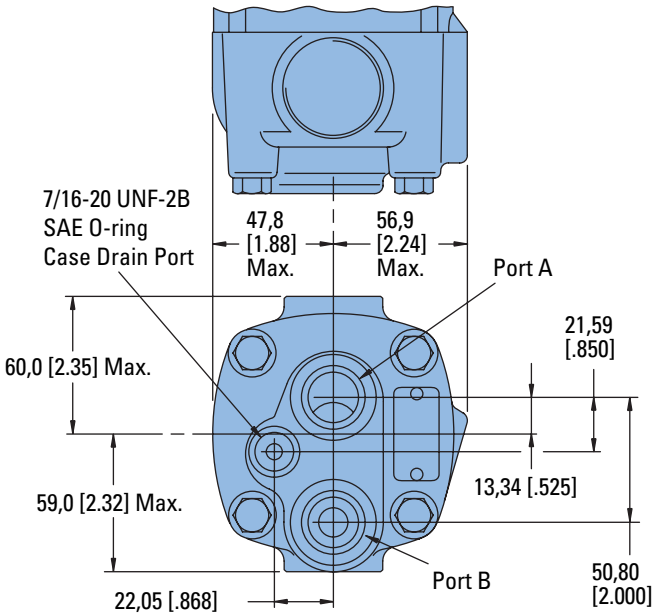
Manifold Mount



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



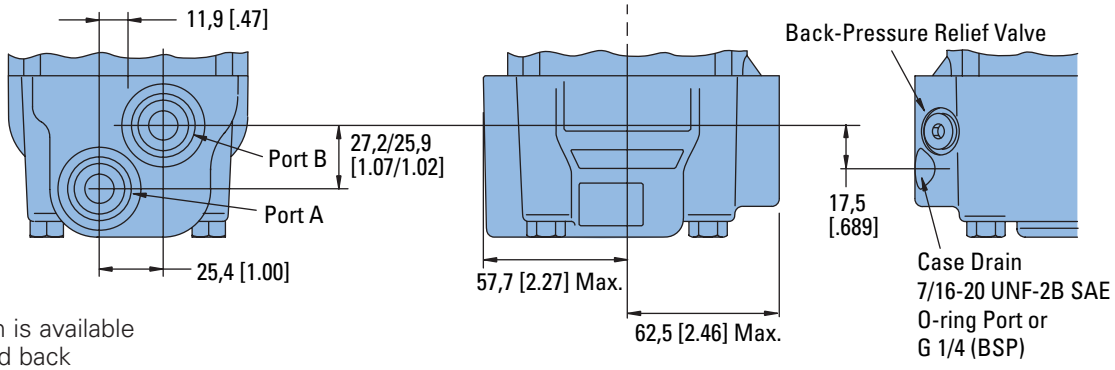
7/8-14 UNF-2B SAE O-ring End Ports (2)



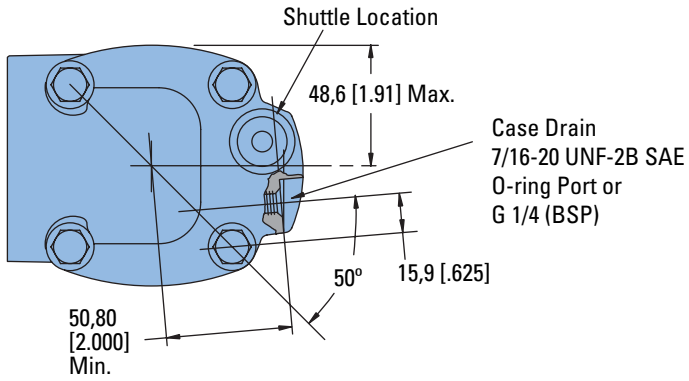
Dimensions

Ports with Shuttle

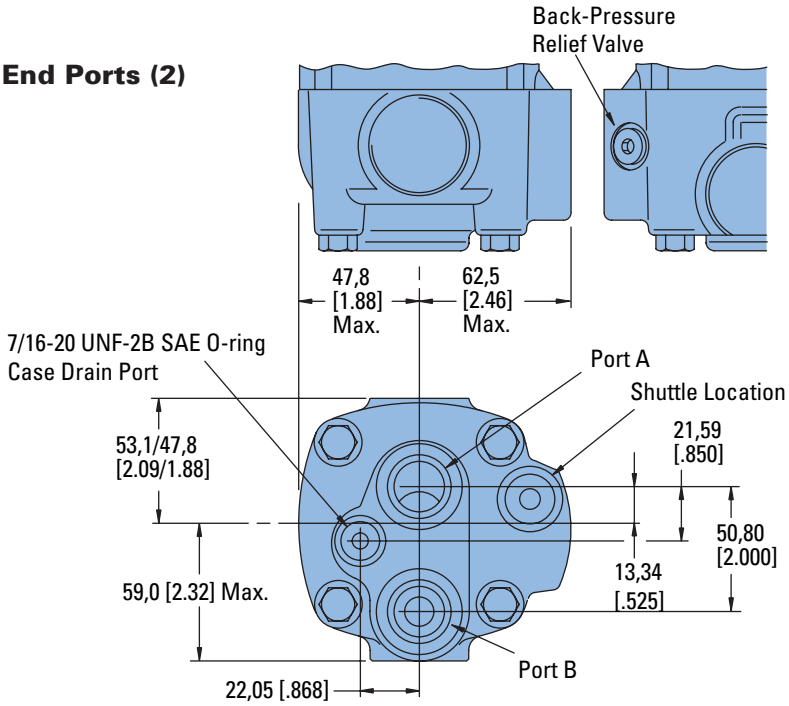
7/8 -14 UNF-2B SAE O-ring Ports (2) or G 1/2 (BSP) Ports (2)



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. cm³/r [in³/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. cm³/r [in³/r] / PRODUCT NUMBER									
			80 [4.9]	90* [5.5]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
2 Bolt SAE A Flange	1 inch Straight	7/8 -14 O-ring Staggered	104-1528	—	-1529	-1530	-1531	-1532	-1533	-1534	-1519	-1535
	1 1/4 Inch Straight	7/8 -14 O-ring	104-1516	—	-1536	-1537	-1538	-1539	-1452	-1479	-1509	-1489

*New Release

2000 Series

Model Code

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

M	0 2	* **	**	* *	**	**	*	**	1	*	**	**	**	**	**	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 [4.92]
055 – 90.6 [5.53]
062 – 101.6 [6.20]
080 – 130.6 [7.97]
096 – 158.1 [9.65]
119 – 194.8 [11.89]
149 – 244.3 [14.91]
187 – 306.6 [18.71]
240 – 393.8 [24.03
298 – 489.0 [29.84]

7, 8 Mounting Type
AB – Wheel, 4 Bolt: 108.0 [4-1/8] Pilot Dia. 13.59 [.535] Dia. Holes On 147.6 [5.81] Dia. Bolt Circle. 127.0 [5.00] Dia. Rear Mount Pilot

AC – Standard, 2 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. SAE A

AD – Bearingless (w/ Leakage Slots), 4 Bolt: 101.6 [4.00] Pilot Dia. 13.59 [.535] Dia. Holes on 127.0 [5.00] Dia. Bolt Circle

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

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

AJ – Standard (Magneto), 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. 2.79 [.110] Pilot Length

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 Sha ft
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 3/8-16UNC-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 w/ 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 -16UNC-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 or AD only)

00 – None

01 – .4375-20 UNF-2B SAE O-Ring Port

02 – G 1/4 BSP Straight THD Port

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

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

15 Low Pressure Relief
0 – None
A – Set at 4.5 bar [65 lbf/in^2]
B – Set at 15.2 bar [220 lbf/in^2]
C – Set at 20,7 bar [300 lbf/in^2]
D – Set at 13.1 bar [190 lbf/in^2]

16, 17 Pressure/Flow Option
Integral Cross-Over Relief Valve:
00 – None
30 – Set at 103.4 bar [1500 lbf/in^2]
31 – Set at 120.6 bar [1750 lbf/in^2]
32 – Set at 137.9 bar [2000 lbf/in^2]
33 – Set at 155.1 bar [2250 lbf/in^2]
34 – Set at 172.4 bar [2500 lbf/in^2]
35 – Set at 189.6 bar [2750 lbf/in^2]
36 – Set at 206.8 bar [3000 lbf/in^2]

18 Geroler Option
1 – Standard

19 Seal Options
0 – Standard
1 – Viton
2 – Viton Shaft Seal
4 – Seal Guard

20, 21 Accessories
0 – None
AD – M 12 Threaded Connector, Digital Speed Pickup (30 Pulse)
AE – M 12 Threaded Connector, Long Body Digital Speed and Direction Pickup

22, 23 Special Features (Hardware)
0 – 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 Identification
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].

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

Important!

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

Performance Data

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

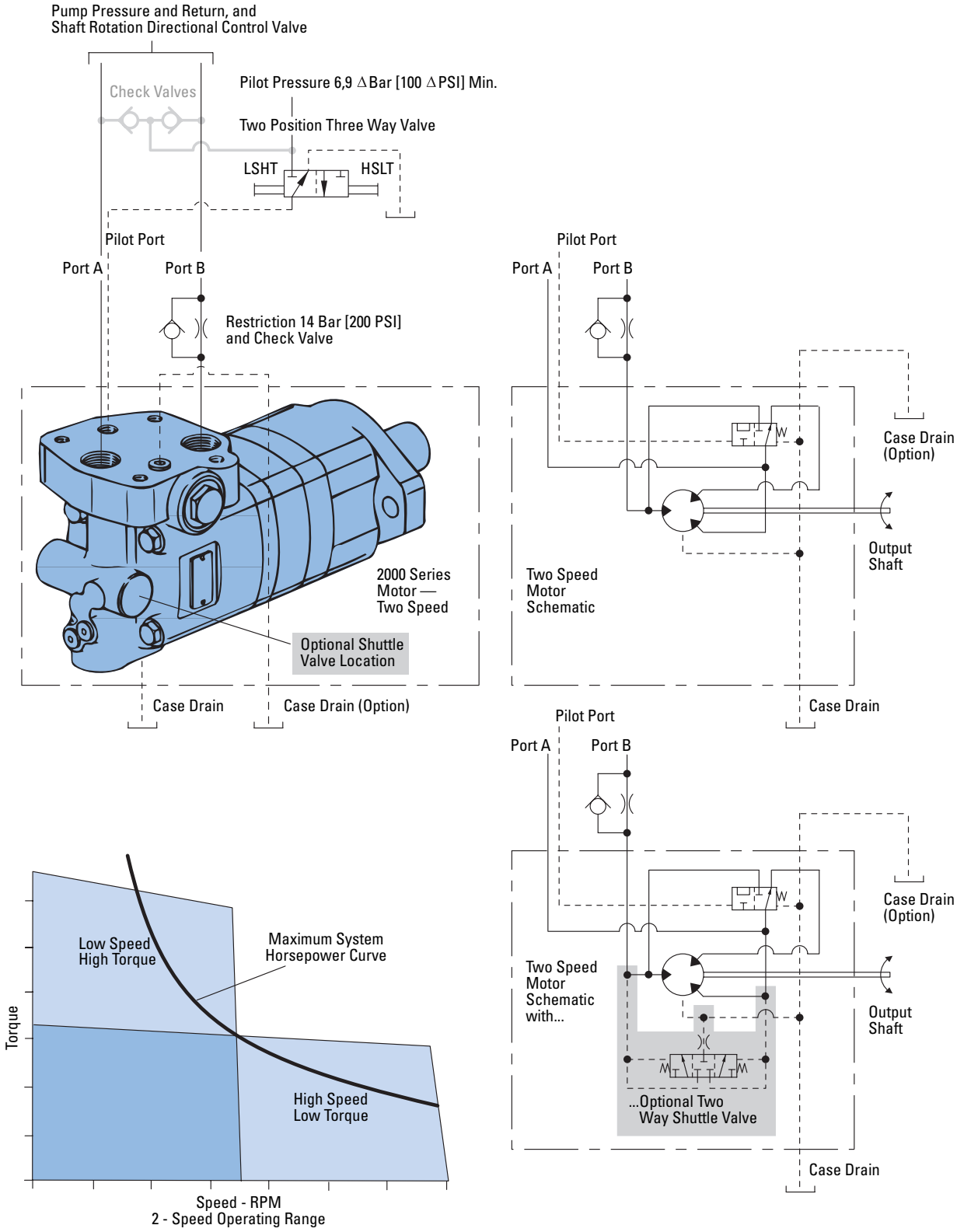
In the low speed mode torque and speed values are the same as the conventional 2000 Series motors.

Note:

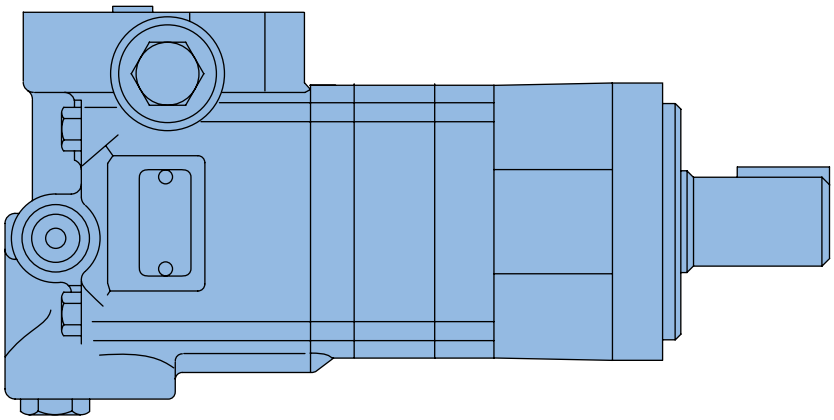
Low displacement (4.9 to 8.0 CID) motors have limited starting torque when started in high speed mode.

2000 Series Two-Speed

Typical Hydraulic Circuit



2000 Series Two-Speed
Specifications



SPECIFICATION DATA — 2000 SERIES TWO-SPEED MOTORS

Displ. cm^3/r [in^3/r]	High Speed Mode	40 [2.45]	50 [3.1]	65 [4.0]	80 [4.8]	95 [5.95]	120 [7.45]	155 [9.35]	195 [12.0]	245 [14.9]
	Low Speed Mode	80 [4.9]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 14.9]	305 [18.7]	395 [24.0]	490 [29.8]
Max. Speed (RPM) @ Continuous Flow	High Speed Mode	1000	1000	990	860	700	560	450	350	230
	Low Speed Mode	500	500	495	430	350	280	225	175	115
Flow l/min [GPM]	High Speed Mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Low Speed Mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
Torque*	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 kg [lb]	Standard or Wheel Mount	13,8 [30.5]	14,1 [31.0]	14,3 [31.5]	14,5 [32.0]	15,0 [33.0]	15,4 [34.0]	15,9 [35.0]	16,3 [36.0]	16,8 [37.0]
	Bearingless	11.8 [26.0]	12,0 [26.5]	12,2 [27.0]	12,5 [27.5]	12.9 [28.5]	13,4 [29.5]	13,8 [30.5]	14,3 [31.5]	14,7 [32.5]

Maximum Case Pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

Note:

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

High Speed Mode

(Reduced Motor Displacement)

Low Speed Mode

(Full Motor Displacement)

Maximum Inlet Pressure:

310 bar [4500 PSI]

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

Maximum Return Pressure:

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

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

Δ bar [Δ PSI] :

The true pressure difference between inlet port and outlet port

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

2000 Series Two-Speed

Dimensions

Standard and Wheel

Ports

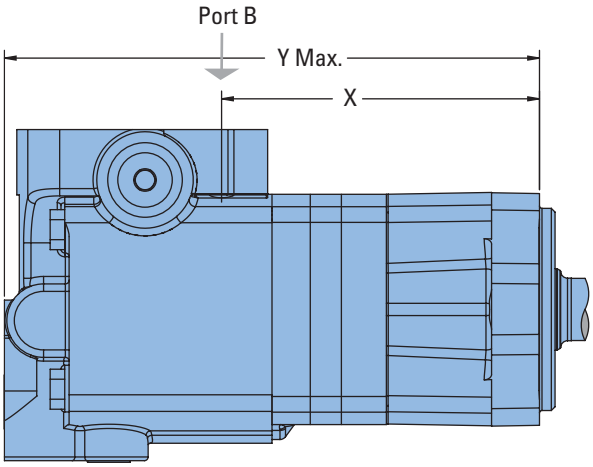
7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
9/16 -18 UNF-2B SAE O-ring Case Drain Port (1)
7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1) or

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

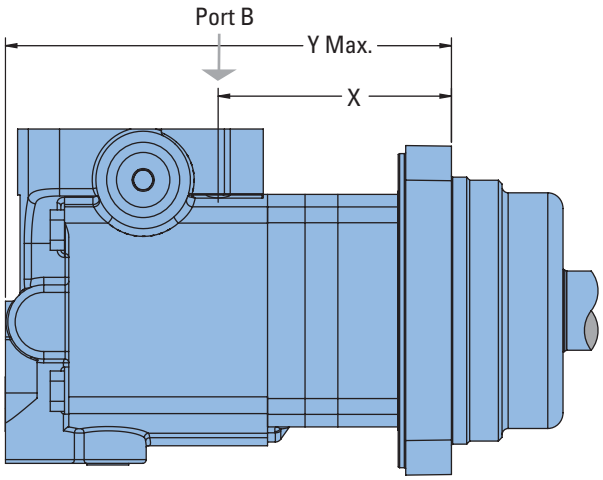
Two-Speed Standard Motors



STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]
80 [4.9]	137,4 [5.41]	231,6 [9.12]
100 [6.2]	142,0 [5.59]	236,5 [9.31]
130 [8.0]	148,5 [5.85]	242,9 [9.56]
160 [9.6]	148,5 [5.85]	242,9 [9.56]
195 [11.9]	155,2 [6.11]	249,4 [9.82]
245 [14.9]	164,2 [6.47]	258,6 [10.18]
305 [18.7]	175,7 [6.92]	270,1 [10.63]
395 [24.0]	191,5 [7.54]	286,1 [11.26]
490 [29.8]	209,0 [8.23]	303,3 [11.94]

Two-Speed Wheel Motors



WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]
80 [4.9]	97,2 [3.83]	191,5 [7.54]
100 [6.2]	101,8 [4.01]	196,4 [7.73]
130 [8.0]	108,3 [4.27]	202,7 [7.98]
160 [9.6]	108,3 [4.27]	202,7 [7.98]
195 [11.9	115,0 [4.53]	209,3 [8.24]
245 [14.9]	124,2 [4.89]	218,5 [8.60]
305 [18.7]	135,5 [5.34]	229,9 [9.05]
395 [24.0]	151,4 [5.96]	245,9 [9.68]
490 [29.8]	168,9 [6.65]	263,1 [10.36]

2000 Series Two-Speed

Dimensions

Bearingless

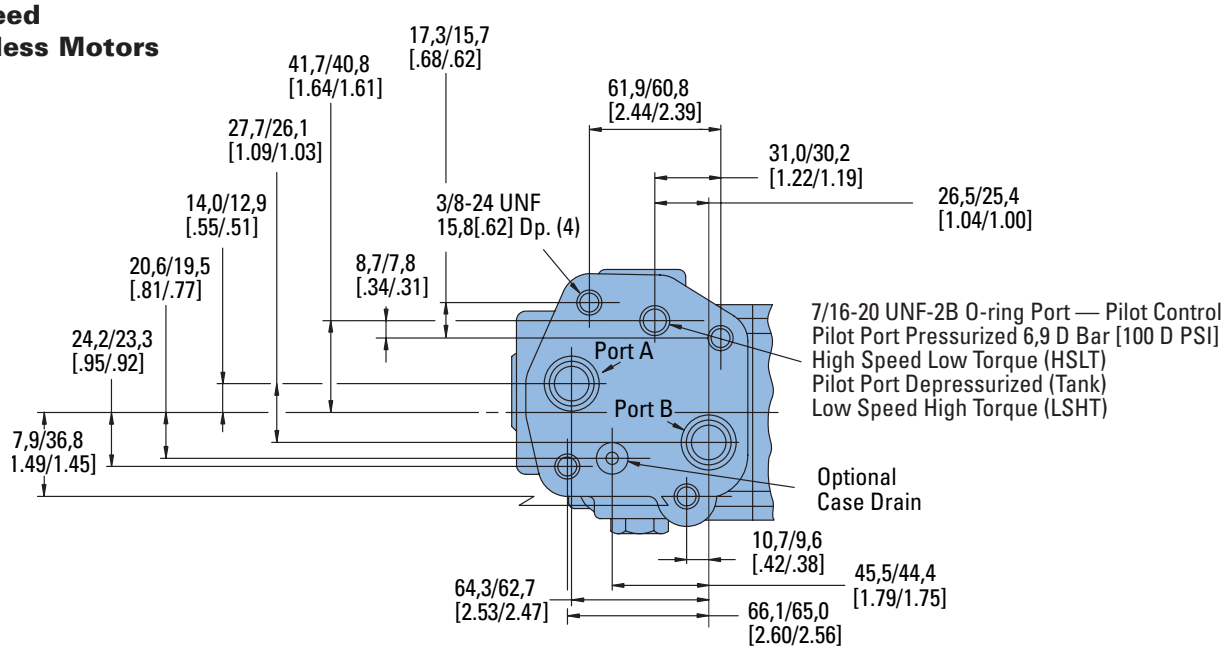
Ports

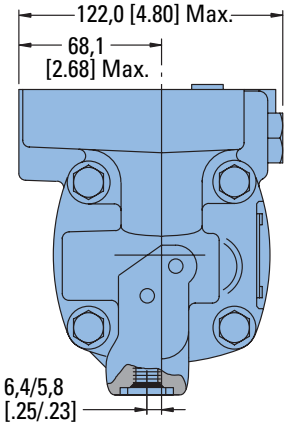
7/8 -14 UNF-2B SAE O-ring Staggered Ports (2)
9/16 -18 UNF-2B SAE O-ring Case Drain Port (1)
7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1) or
G 1/2 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1)
G 1/4 (BSP) Pilot Control Port (1)

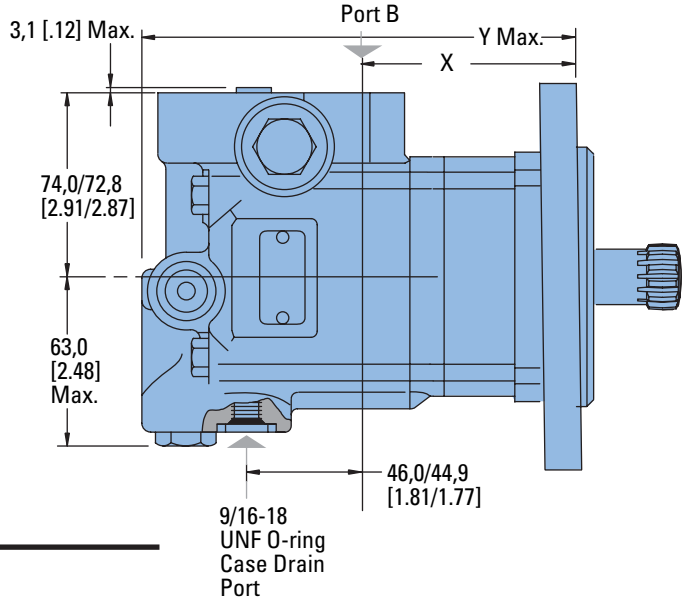
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Two-Speed Bearingless Motors







BEARINGLESS MOTOR DIMENSIONS

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]
80 [4.9]	79,3 [3.13]	174,0 [6.85]
100 [6.2]	84,1 [3.31]	178,9 [7.04]
130 [8.0]	90,7 [3.57]	185,2 [7.29]
160 [9.6]	90,7 [3.57]	185,2 [7.29]
195 [11.9]	97,3 [3.83]	191,8 [7.55]
245 [14.9]	106,4 [4.19]	201,0 [7.91]
305 [18.7]	117,8 [4.64]	212,4 [8.36]
395 [24.0]	133,6 [5.26]	228,4 [8.99]
490 [29.8]	151,1 [5.95]	245,6 [9.67]

2000 Series Two-Speed

Product Numbers

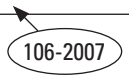
Note:

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

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

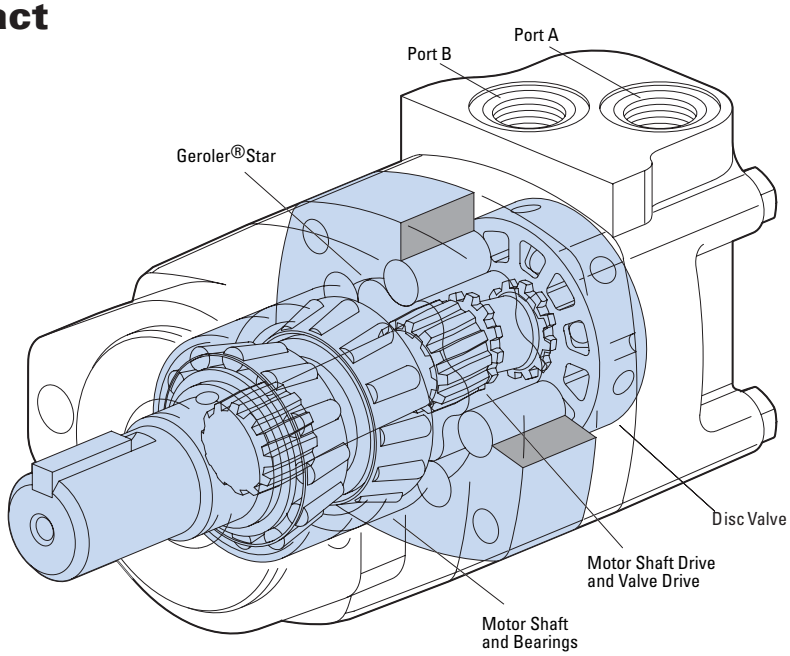
Orders will not be accepted without three digit prefix.

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER								
			80 [4.9]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
2 Bolt SAE A Flange	1 Inch Straight	7/8 -14 O-ring Staggered	104-2001	-2002	-2003	-2004	-2005	-2006	-2007	-2008	—
	1 1/4 Inch Straight	7/8 -14 O-ring Staggered	104-2009	-2010	-2011	-2012	-2013	-2014	-2015	-2016	-2219
	1 1/4 Inch 14 T Splined	7/8 -14 O-ring Staggered	104-2017	-2018	-2019	-2020	-2021	-2022	-2023	-2024	—
Wheel Motor	1 1/4 Inch Tapered	7/8 -14 O-ring Staggered	105-2001	-2002	-2003	-2004	-2005	-2006	-2007	-2008	—
	1 1/4 Inch 14 T Splined	7/8 -14 O-ring Staggered	105-2009	-2010	-2011	-2012	-2013	-2014	-2015	-2016	—
Bearingless		7/8 -14 O-ring Staggered	106-2001	-2002	-2003	-2004	-2005	-2006	-2007	-2008	—



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

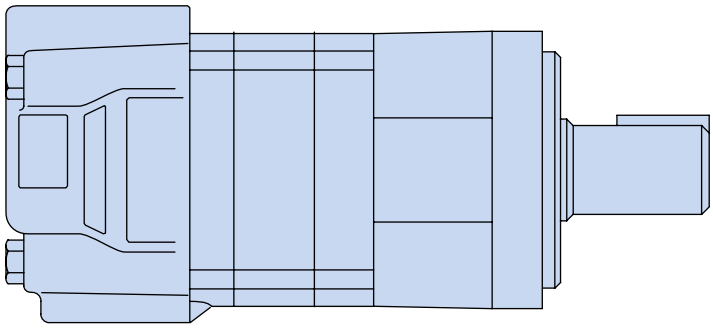

Skid Steer


Boom Lift


Harvestor

4000 Compact Series

Specifications



SPECIFICATION DATA — 4000 COMPACT SERIES MOTORS

Displ. cm3/r [in3/r]		160 [9.8]	200 [12.3]	250 [15.4]	325 [19.8]	405 [24.6]	490 [29.8]
Max. Speed (RPM)	Continuous	464	375	300	234	188	155
@ Flow	Intermittent	699	562	450	351	282	232
Flow	Continuous	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
l/min [GPM]	Intermittent	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]
Torque*	Continuous	510 [4514]	758 [5715]	734 [6500]	793 [7021]	800 [7079]	975 [8627]
Nm [lb-in]	Intermittent	690 [6108]	840 [7436]	935 [8272]	1053 [9320]	921 [8153]	1218 [10778]
Pressure	Continuous	225 [3000]	225 [3000]	205 [3000]	170 [2500]	140 [2000]	140 [2000]
Δ bar	Intermittent	310 [4500]	295 [4250]	260 [3750]	240 [3500]	170 [2500]	171 [2500]
[Δ PSI]	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	275 [4000]	260 [3750]
Weight kg [lb]	Standard or Wheel Mount	10,4 [23.0]	10,9 [24.0]	11,3 [25.0]	11,8 [26.0]	12,2 [27.0]	12,2 [27.0]
	Bearingless	8,4 [18.5]	8,8 [19.5]	9,3 [20.5]	9,8 [21.5]	10,2 [22.5]	10,2 [22.5]

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

Note:

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

Maximum Inlet Pressure:

310 bar [4500 PSI]

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

Maximum Return Pressure:

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

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

Δ bar [Δ PSI] :

The true pressure difference between inlet port and outlet port

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

4000 Compact Series

Performance Data

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

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

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]	244	543															
	28	61															
0,95	**4**	**3**															
[0.5]	274	554	854														
	31	63	96														
1,9	**10**	**8**	**7**														
[1]	274	593	899	1210	1513	1816	2092	2361	2621	2874	3088						
	31	67	102	137	171	205	236	267	296	325	349						
3,8	**22**	**21**	**20**	**19**	**17**	**14**	**12**	**10**	**9**	**7**	**6**						
[2]	301	623	940	1261	1579	1898	2197	2492	2766	3033	3270	3496	3761	4022			
	34	70	106	143	178	214	248	282	313	343	369	395	425	454			
7,5	**40**	**39**	**38**	**36**	**35**	**33**	**31**	**28**	**24**	**20**	**17**	**14**	**10**	**6**			
[4]	305	662	1004	1354	1699	2046	2386	2725	3049	3368	3693	4016	4319	4618	4828	5022	
	34	75	113	153	192	231	270	308	344	381	417	454	488	522	545	567	
15	**87**	**85**	**83**	**81**	**79**	**77**	**74**	**72**	**67**	**63**	**59**	**55**	**49**	**44**	**35**	**27**	
[6]	293	659	1003	1357	1705	2056	2399	2741	3074	3405	3751	4098	4417	4732	5023	5308	
	33	74	113	153	193	232	271	310	347	385	424	463	499	535	568	600	
23	**133**	**131**	**129**	**127**	**124**	**121**	**118**	**114**	**109**	**104**	**99**	**93**	**87**	**80**	**71**	**63**	
[8]	280	656	1002	1360	1711	2066	2412	2758	3100	3442	3809	4180	4514	4846	5218	5593	5856
	32	74	113	154	193	233	273	312	350	389	430	472	510	548	590	632	662
30	**181**	**179**	**177**	**175**	**172**	**169**	**166**	**162**	**157**	**152**	**145**	**139**	**133**	**127**	**120**	**113**	**104**
[10]	259	630	978	1348	1701	2061	2408	2755	3102	3450	3806	4163	4500	4835	5191	5547	5784
	29	71	110	152	192	233	272	311	351	390	430	470	508	546	586	627	653
38	**228**	**225**	**223**	**220**	**217**	**213**	**209**	**204**	**199**	**193**	**186**	**179**	**172**	**165**	**157**	**150**	**141**
[12]	238	604	954	1336	1692	2056	2403	2752	3105	3458	3802	4146	4485	4824	5163	5501	
	27	68	108	151	191	232	272	311	351	391	430	468	507	545	583	622	
45	**275**	**272**	**269**	**266**	**262**	**258**	**253**	**247**	**241**	**235**	**229**	**223**	**214**	**205**	**197**	**189**	
[14]	210	577	923	1308	1665	2034	2385	2739	3092	3447	3796	4144	4487	4830			
	24	65	104	148	188	230	269	310	349	390	429	468	507	546			
53	**322**	**319**	**316**	**313**	**308**	**304**	**298**	**293**	**286**	**279**	**272**	**265**	**256**	**247**			
[16]	182	550	893	1280	1638	2012	2367	2727	3080	3436	3789	4143	4489	4836			
	21	62	101	145	185	227	267	308	348	388	428	468	507	546			
61	**370**	**367**	**363**	**360**	**356**	**351**	**345**	**339**	**332**	**324**	**317**	**309**	**301**	**292**			
[18]	143	514	853	1247	1601	1973	2329	2692	3045	3401	3756	4114					
	16	58	96	141	181	223	263	304	344	384	424	465					
68	**417**	**414**	**410**	**406**	**401**	**397**	**390**	**383**	**375**	**366**	**358**	**350**					
[20]	105	478	814	1213	1564	1935	2291	2658	3010	3366	3724	4085					
	12	54	92	137	177	219	259	300	340	380	421	462					
76	**464**	**461**	**457**	**453**	**448**	**442**	**435**	**428**	**418**	**409**	**400**	**390**					
[22]		433	762	1167	1518	1893	2252	2623	2973	3328	3682	4040					
		49	86	132	172	214	254	296	336	376	416	456					
83		**508**	**504**	**500**	**495**	**489**	**482**	**474**	**465**	**456**	**446**	**436**					
[24]		387	711	1121	1472	1851	2212	2589	2937	3291	3641	3995					
		44	80	127	166	209	250	292	332	372	411	451					
91		**556**	**552**	**548**	**542**	**537**	**529**	**521**	**513**	**504**	**493**	**483**					
[25]		363	683	1095	1445	1824	2184	2561	2910	3266							
		41	77	124	163	206	247	289	329	369							
95		**580**	**576**	**572**	**566**	**560**	**552**	**544**	**535**	**526**							
[30]		244	546	967	1308	1689	2045	2421	2777	3144							
		28	62	109	148	191	231	274	314	355							
114		**699**	**695**	**692**	**685**	**678**	**669**	**660**	**648**	**637**							

[2777] 314 **648** } 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

200 cm³/r [12.3 in³/r]

Δ Pressure Bar [PSI]

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]	115	504															
	13	57															
0,95	**4**	**3**															
[0.5]	268	584	963	1274													
	30	66	109	144													
1,9	**8**	**7**	**4**	**3**													
[1]	306	721	1104	1516	1913	2243	2397	2772									
	35	81	125	171	216	253	271	313									
3,8	**17**	**16**	**14**	**13**	**12**	**10**	**9**	**6**									
[2]	402	841	1218	1647	2107	2478	2826	3238	3954	4451	4755	5127	5407	5569	5855		
	45	95	138	186	238	280	319	366	447	503	537	579	611	629	662		
7,5	**35**	**34**	**32**	**31**	**30**	**28**	**27**	**24**	**29**	**26**	**23**	**21**	**17**	**11**	**8**		
[4]	403	896	1361	1780	2247	2649	3068	3513	3947	4367	4710	5125	5509	5880	6249	6547	6753
	46	101	154	201	254	299	347	397	446	493	532	579	622	664	706	740	763
15	**72**	**70**	**69**	**68**	**66**	**65**	**62**	**60**	**56**	**53**	**50**	**46**	**42**	**37**	**31**	**24**	**19**
[6]	385	863	1354	1785	2260	2657	3087	3547	3965	4389	4793	5218	5610	6015	6408	6754	7436
	44	98	153	202	255	300	349	401	448	496	542	590	634	680	724	763	840
23	**109**	**107**	**106**	**104**	**102**	**100**	**97**	**93**	**90**	**86**	**81**	**77**	**72**	**66**	**60**	**52**	**47**
[8]	368	831	1347	1790	2273	2665	3106	3581	3982		4876	5311	5712	6151	6567	6961	7334
	42	94	152	202	257	301	351	405	450	498	551	600	645	695	742	786	829
30	**147**	**146**	**144**	**142**	**140**	**137**	**134**	**130**	**127**	**122**	**117**	**113**	**108**	**103**	**98**	**91**	**83**
[10]	353	822	1319	1774	2212	2642	3086	3556	3974	4410	4839	5297	5715	6147	6563		
	40	93	149	200	250	299	349	402	449	498	547	598	646	695	742		
38	**185**	**184**	**181**	**179**	**177**	**174**	**170**	**165**	**161**	**156**	**151**	**146**	**140**	**134**	**129**		
[12]	339	813	1291	1758	2151	2620	3067	3530	3965	4408	4802	5283	5718	6144	6568		
	38	92	146	199	243	296	346	399	448	498	543	597	646	694	742		
45	**223**	**222**	**219**	**217**	**214**	**211**	**207**	**202**	**197**	**192**	**186**	**180**	**174**	**167**	**164**		
[14]	282	762	1237	1693	2121	2601	2968	3504	3953	4368	4832	5261	5690				
	32	86	140	191	240	294	335	396	447	493	546	594	643				
53	**261**	**260**	**257**	**255**	**252**	**248**	**244**	**238**	**233**	**227**	**221**	**214**	**208**				
[16]	224	712	1183	1629	2091	2581	2870	3477	3940	4328	4861	5240	5661				
	25	80	134	184	236	292	324	393	445	489	549	592	640				
61	**299**	**298**	**296**	**293**	**290**	**286**	**282**	**275**	**269**	**263**	**256**	**249**	**243**				
[18]	200	667	1148	1619	2053	2520	2899	3442	3906	4337	4819	5245	5644				
	23	75	130	183	232	285	328	389	441	490	544	593	638				
68	**337**	**336**	**334**	**331**	**328**	**324**	**320**	**314**	**307**	**301**	**293**	**285**	**278**				
[20]	176	623	1112	1609	2014	2458	2929	3407	3872	4347	4777	5250	5627				
	20	70	126	182	228	278	331	385	437	491	540	593	636				
76	**375**	**374**	**372**	**369**	**366**	**363**	**358**	**353**	**346**	**339**	**331**	**322**	**315**				
[22]		565	1053	1530	1934	2387	2868	3347	3804	4254	4698						
		64	119	173	219	270	324	378	430	481	531						
83		**412**	**410**	**407**	**404**	**401**	**396**	**390**	**383**	**375**	**367**						
[24]		507	994	1450	1855	2316	2806	3287	3737	4162	4618						
		57	112	164	210	262	317	371	422	470	522						
91		**449**	**448**	**446**	**443**	**439**	**434**	**427**	**420**	**412**	**403**						
[25]		465	950	1411	1820	2276	2768	3233	3688	4116	4493						
		53	107	159	206	257	313	365	417	465	508						
95		**468**	**467**	**464**	**462**	**458**	**453**	**446**	**439**	**431**	**423**						
[30]		259	726	1214	1645	2072	2577	2961	3443	3889	3866						
		29	82	137	186	234	291	335	389	439	437						
114		**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

250 cm³/r [15.4 in³/r]
Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170	[2750] 190	[3000] 205	[3250] 225	[3500] 240	[3750] 260
[0.5]	384	833													
	43	94													
1,9	**6**	**5**													
[1]	438	904	1403	1887	2359	2798	3221	3657	3822	4326					
	49	102	158	213	267	316	364	413	432	489					
3,8	**14**	**14**	**13**	**12**	**11**	**9**	**8**	**7**	**4**	**3**					
[2]	492	1054	1563	2081	2623	3160	3717	4147	4585	5070	5470	5721	5962		
	56	119	177	235	296	357	420	469	518	573	618	646	674		
7,5	**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
	68	134	200	257	318	380	440	508	565	621	676	734	797	850	897
15	**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
	66	131	197	263	318	381	446	506	567	628	686	741	806	863	916
23	**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
	65	128	193	269	318	381	453	505	569	634	695	747	815	877	935
30	**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		
	62	129	189	260	317	380	446	503	566	631	692	747	814		
38	**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		
	60	129	184	251	316	378	440	501	562	628	688	747	813		
45	**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			
	50	121	181	249	311	375	439	501	560	625	685	745			
53	**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			
	39	113	177	247	306	372	439	501	558	621	682	742			
61	**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			
	35	106	171	239	300	367	433	495	554	615	676	736			
68	**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			
	30	99	165	230	293	363	427	489	550	610	670	731			
76	**300**	**298**	**296**	**293**	**290**	**285**	**280**	**272**	**265**	**259**	**251**	**241**			
[22]		826	1414	1991	2528	3144	3709	4262	4806	5354	5915				
		93	160	225	286	355	419	482	543	605	668				
83		**328**	**326**	**323**	**320**	**315**	**309**	**302**	**295**	**288**	**279**				
[24]		776	1370	1945	2462	3079	3642	4196	4745	5313	5901				
		88	155	220	278	348	411	474	536	600	667				
91		**359**	**356**	**354**	**350**	**345**	**339**	**332**	**325**	**317**	**308**				
[25]		732	1322	1959	2426	3026	3594	4153	4696	5152					
		83	149	221	274	342	406	469	531	582					
95		**374**	**371**	**369**	**365**	**360**	**354**	**347**	**340**	**333**					
[30]		509	1082	2029	2246	2761	3358	3939	4450	4347					
		57	122	229	254	312	379	445	503	491					
114		**450**	**449**	**445**	**442**	**437**	**430**	**423**	**414**	**413**					

[2246] Torque [lb-in]
254 Nm
442 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]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170	[2750] 190	[3000] 205	[3250] 225	[3500] 240
[0.5]	536	1152												
	61	130												
1,9	**5**	**4**												
[1]	555	1220	1900	2559	3222	3862	4522	5061	5580	6106				
	63	138	215	289	364	436	511	572	630	690				
3,8	**11**	**10**	**10**	**9**	**9**	**8**	**7**	**5**	**3**	**3**				
[2]	643	1349	2025	2712	3378	4051	4696	5335	5889	6366	6876			
	73	152	229	306	382	458	531	603	665	719	777			
7,5	**22**	**21**	**20**	**19**	**19**	**17**	**15**	**13**	**10**	**5**	**3**			
[4]	679	1420	2140	2852	3557	4259	4947	5628	6300	6960	7596	8201	8767	9320
	77	160	242	322	402	481	559	636	712	786	858	927	991	1053
15	**45**	**44**	**43**	**42**	**40**	**38**	**36**	**33**	**30**	**26**	**23**	**19**	**14**	**11**
[6]	654	1400	2132	2859	3575	4281	4977	5668	6346	7021	7678	8244	8792	
	74	158	241	323	404	484	562	640	717	793	868	931	993	
23	**68**	**67**	**66**	**64**	**62**	**59**	**56**	**53**	**49**	**44**	**40**	**38**	**35**	
[8]	629	1379	2125	2866	3592	4304	5007	5707	6392	7082	7760	8400		
	71	156	240	324	406	486	566	645	722	800	877	949		
30	**92**	**90**	**89**	**87**	**85**	**82**	**79**	**75**	**71**	**66**	**61**	**56**		
[10]	587	1337	2082	2827	3556	4272	4976	5672	6362	7053				
	66	151	235	319	402	483	562	641	719	797				
38	**115**	**114**	**112**	**110**	**107**	**103**	**100**	**94**	**90**	**85**				
[12]	546	1295	2040	2787	3520	4240	4944	5638	6332	7023				
	62	146	230	315	398	479	559	637	715	794				
45	**139**	**137**	**136**	**134**	**130**	**125**	**121**	**115**	**110**	**105**				
[14]	489	1238	1984	2729	3467	4193	4903	5600	6293					
	55	140	224	308	392	474	554	633	711					
53	**162**	**161**	**159**	**157**	**153**	**148**	**143**	**136**	**131**					
[16]	431	1182	1929	2671	3415	4145	4861	5562	6254					
	49	134	218	302	386	468	549	628	707					
61	**186**	**185**	**183**	**181**	**177**	**171**	**165**	**159**	**153**					
[18]	360	1110	1856	2600	3343	4073	4794	5499						
	41	125	210	294	378	460	542	621						
68	**210**	**208**	**206**	**204**	**200**	**195**	**189**	**183**						
[20]	288	1038	1784	2529	3271	4001	4726	5436						
	33	117	202	286	370	452	534	614						
76	**234**	**232**	**230**	**228**	**224**	**220**	**214**	**207**						
[22]		958	1706	2451	3194	3926	4650	5360						
		108	193	277	361	444	525	606						
83		**256**	**254**	**251**	**248**	**243**	**237**	**229**						
[24]		878	1628	2373	3116	3850	4574	5285						
		99	184	268	352	435	517	597						
91		**279**	**277**	**275**	**271**	**266**	**260**	**252**						
[25]		826	1576	2320	3063	3798	4523							
		93	178	262	346	429	511							
95		**291**	**289**	**287**	**283**	**277**	**271**							
[30]		566	1314	2056	2799	3536	4268							
		64	148	232	316	399	482							
114		**351**	**349**	**346**	**342**	**337**	**332**							

[2799] Torque [lb-in]
316 Nm
342 Speed RPM

4000 Compact Series

Performance Data

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

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

Continuous

Intermittent

Peak

No Operation

405 cm³/r [24.6 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

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

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

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]

Flow LPM [GPM]

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

[3341] } Torque [lb-in]
378 } Nm
232 } **Speed RPM**

4000 Compact Series

Dimensions

Ports

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

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

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

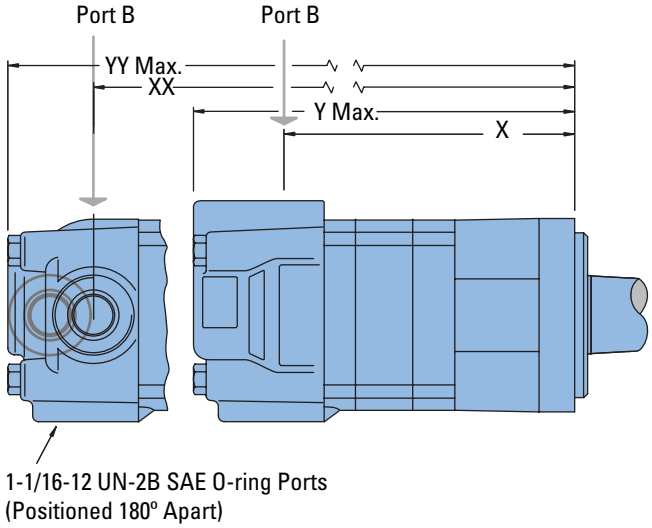
G 1/2 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1) or

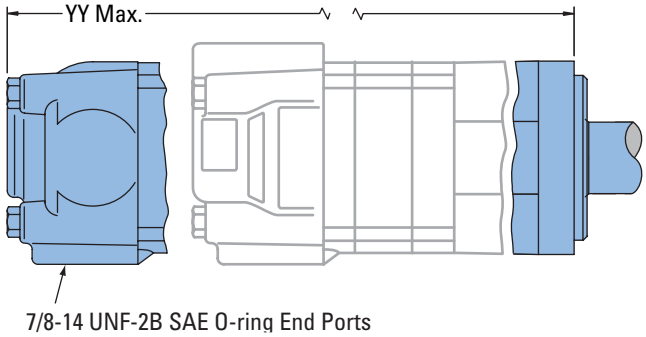
Manifold Mount
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Standard Mount





STANDARD MOUNT MOTOR DIMENSIONS

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

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

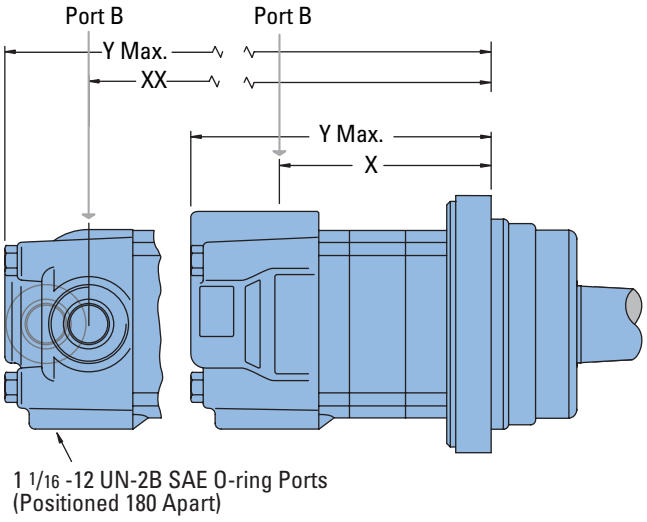
G 1/2 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1) or

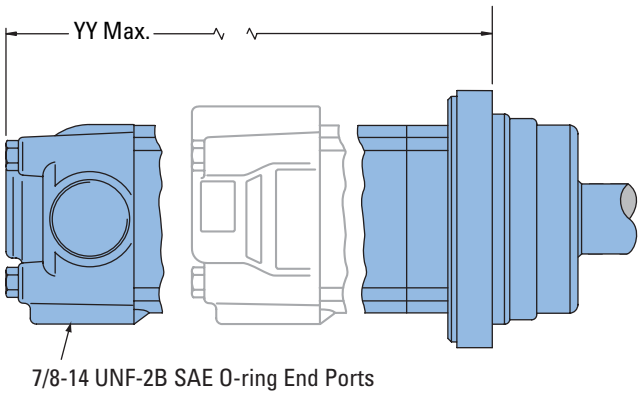
Manifold Mount
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Wheel Mount





WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch
160 [9.8]	114,6 [4.51]	161,8 [6.37]	114,6 [4.51]	161,8 [6.37]
200 [12.3]	123,7 [4.87]	170,9 [6.73]	123,7 [4.87]	170,9 [6.73]
250 [15.4]	135,1 [5.32]	182,4 [7.18]	135,1 [5.32]	182,4 [7.18]
325 [19.8]	150,9 [5.94]	198,4 [7.81]	150,9 [5.94]	198,4 [7.81]
405 [24.6]	168,4 [6.63]	215,6 [8.49]	168,4 [6.63]	215,6 [8.49]
490 [29.8]	168,4 [6.63]	215,6 [8.49]	168,4 [6.63]	215,6 [8.49]

4000 Compact Series

Dimensions

Ports

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

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

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

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

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

Standard Rotation Viewed from Shaft End

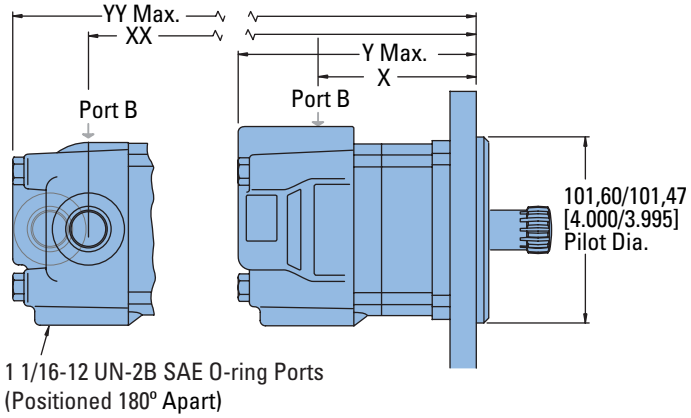
Port A Pressurized — CW
Port B Pressurized — CCW

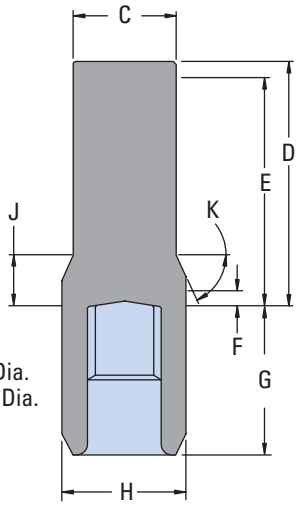
For 4000 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

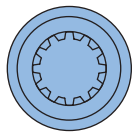
Bearingless

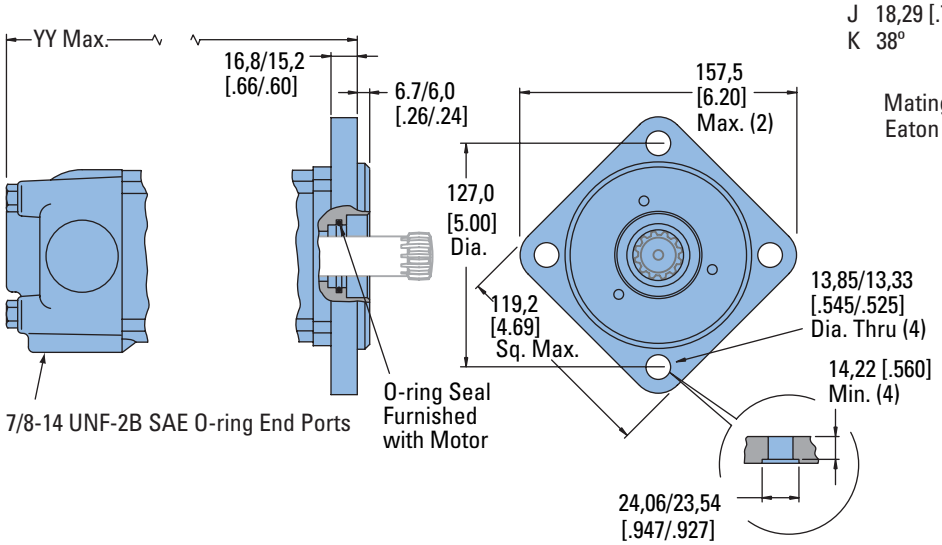




C 47,2 [1.86] Dia.
D 112,5 [4.43] Max.
E 107,4 [4.23] Full Form Dia.
F 7,4 [.29]Min. Full Form Dia.
G 68,8 [2.71] Max.
H 56,9 [2.24] Dia.
J 18,29 [.720]
K 38º

Mating Coupling Blank
Eaton Part No. 12745-003





BEARINGLESS MOTOR DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
160 [9.8]	96,8 [3.81]	144,3 [5.68]	99,1 [3.90]	145,5 [5.73]
200 [12.3]	105,7 [4.16]	153,4 [6.04]	108,0 [4.25]	154,7 [6.09]
250 [15.4]	117,1 [4.61]	164,8 [6.49]	119,4 [4.70]	166,1 [6.54]
325 [19.8]	133,1 [5.24]	180,8 [7.12]	135,4 [5.33]	182,1 [7.17]
405 [24.6]	150,4 [5.92]	198,1 [7.80]	152,7 [6.01]	199,4 [7.85]
490 [29.8]	150,4 [5.92]	198,1 [7.80]	152,7 [6.01]	199,4 [7.85]

4000 Compact Series

Installation Information

Bearingless

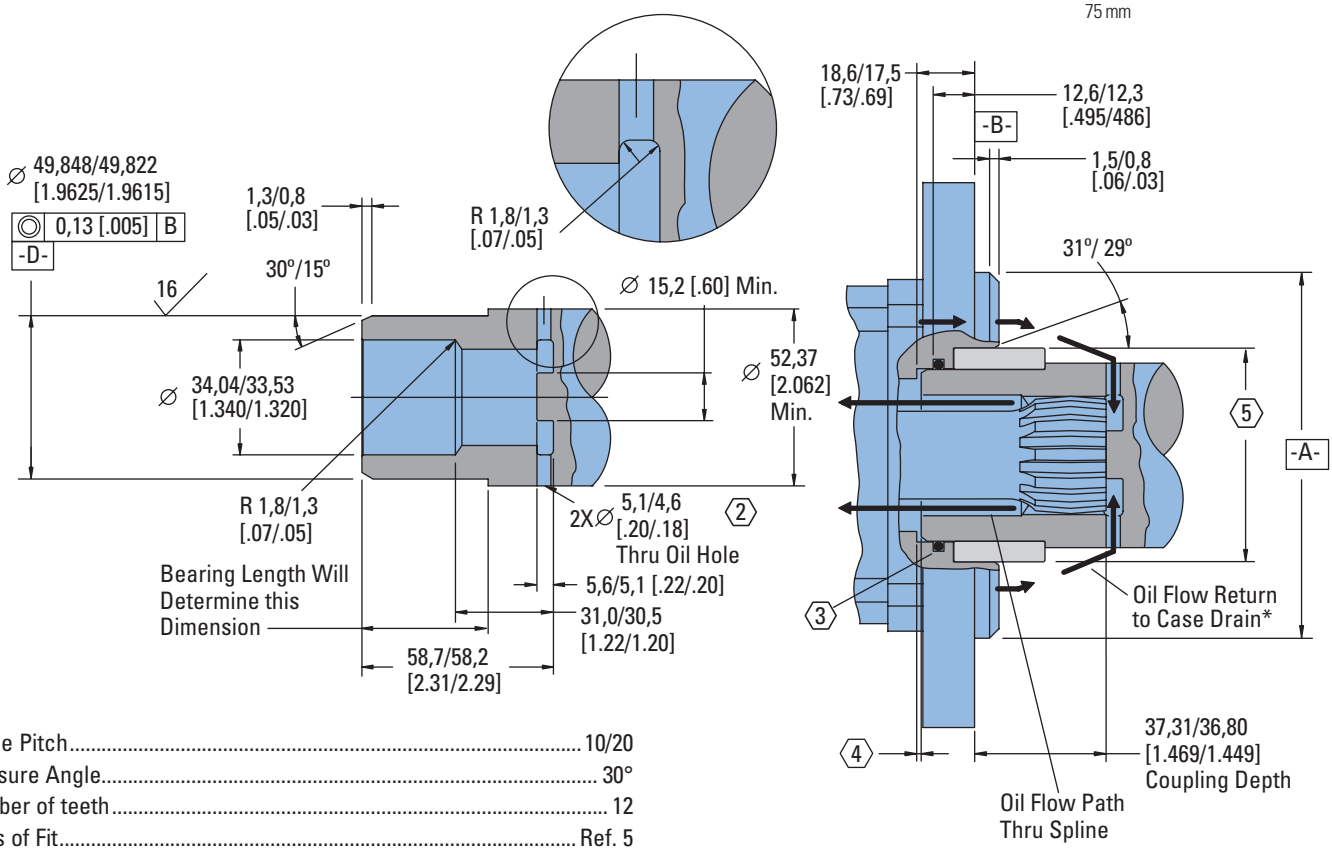
1 Internal spline in mating part to be per spline data specification. Material to be ASTM A304, 8620H vacuum degassed alloy steel carbonize to a hardness of 59-62 HRc with case depth (to 50HRc) of 0,76 - 1,02 [.030 - .040] dimensions apply after heat treat.

2 Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.

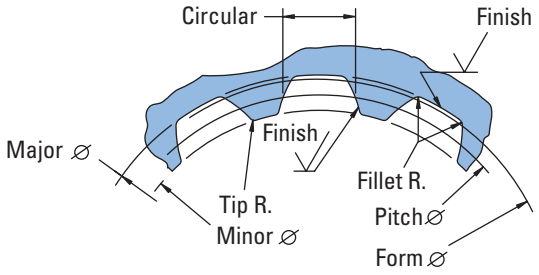
3 Seal to be furnished with motor for proper oil circulation thru splines.

4 Some means of maintaining clearance between shaft and mounting flange must be provided.

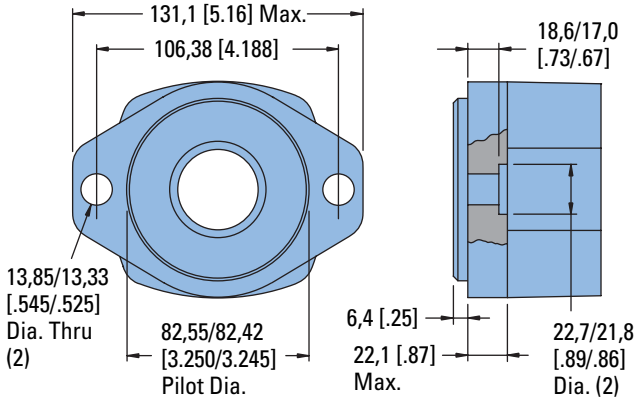
5 Counterbore designed to adapt to a standard sleeve bearing 50,010 - 50,040 [1.9689 - 1.9700] ID by 60,050 - 60,080 [2.3642 - 2.3653] (Oilite bronze sleeve bearing) Source: Beemer Precision Inc. www.oilite.com, 1-800-836-2340
AAM 50 mm ID - 60 mm OD Length Determined by the Customer.
Stock Bearing Lengths:
35 mm
50 mm
60 mm
70 mm
75 mm



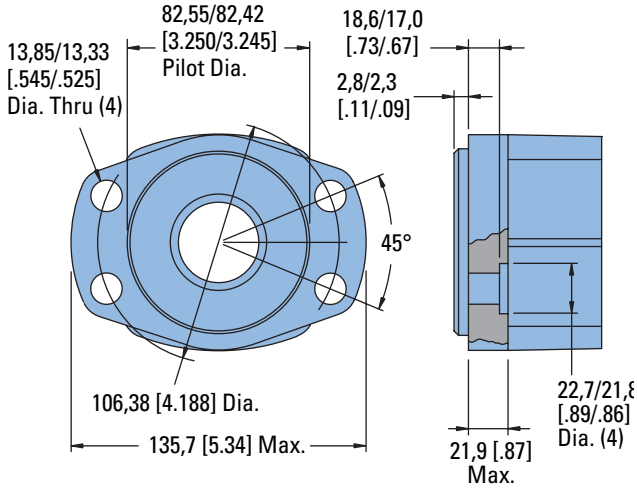
Spline Pitch	10/20
Pressure Angle	30°
Number of teeth	12
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 30,480000 [1.2000000] ↗ 0,20 [.008] D
Base Diameter	Ref. 26,396455 [1.0392305]
Major Diameter	(33,43 [1.316] Max. 33,23 [1.308] Min.)
Minor Diameter	28,40 - 25,58 [1.118 - 1.125]
Form Diameter, Min.	32,59 [1.283]
Fillet Radius	0,63 - 0,76 [.025 - .030]
Tip Radius	0,26 - 0,51 [.010 - .020]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+.0000 -.0010]
Total Index Variation	0,038 [.0015]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual	5,045 [.1986]
Minimum Effective	4,995 [.1951]
Maximum Effective	Ref. 5,009 [.1972]
Minimum Actual	Ref. 4,986 [.1963]
Dimension Between Two Pins	Ref. 22,783 - 22,929 [.8970 - .9027]
Pin Diameter	5,334 [.2100] Pins to Have 3,73 [.147] Wide Flat for Root Clearance



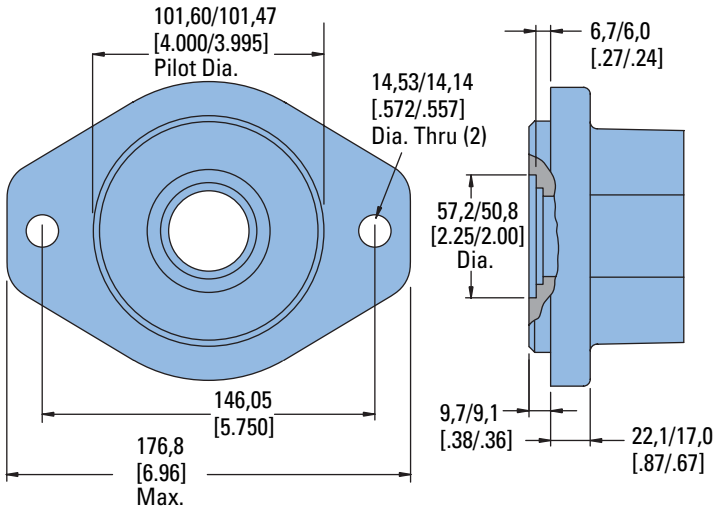
SAE A — Two Bolt (Standard Motor)



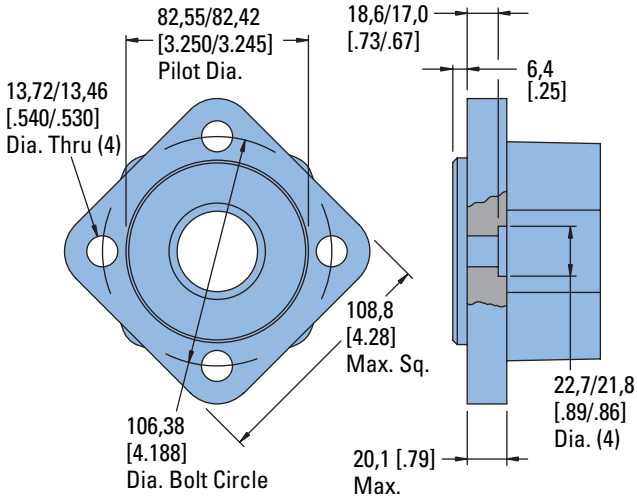
Four Bolt Magneto



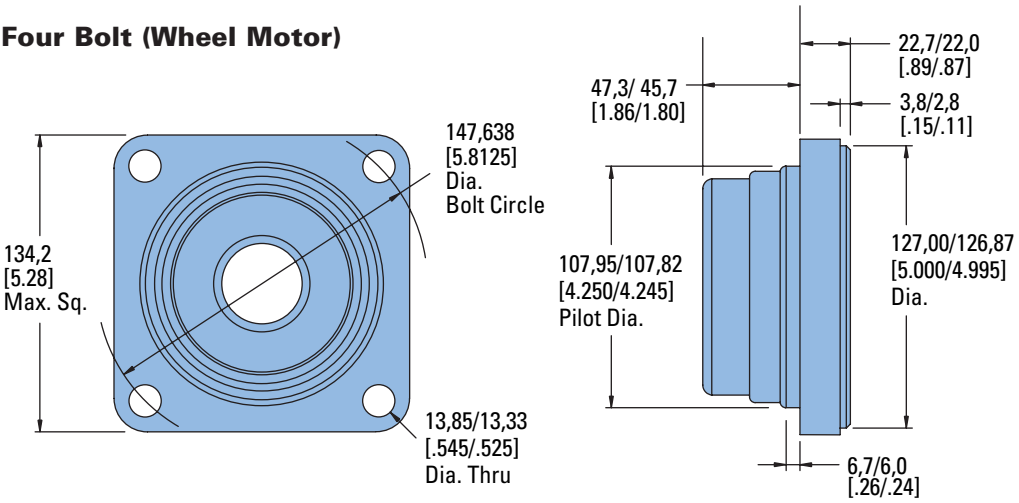
Two Bolt SAE B



Four Bolt



Four Bolt (Wheel Motor)

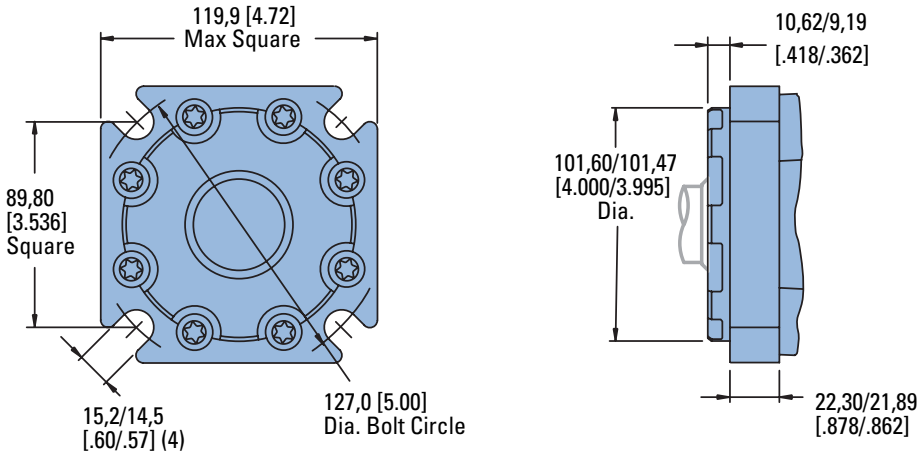


4000 Compact Series

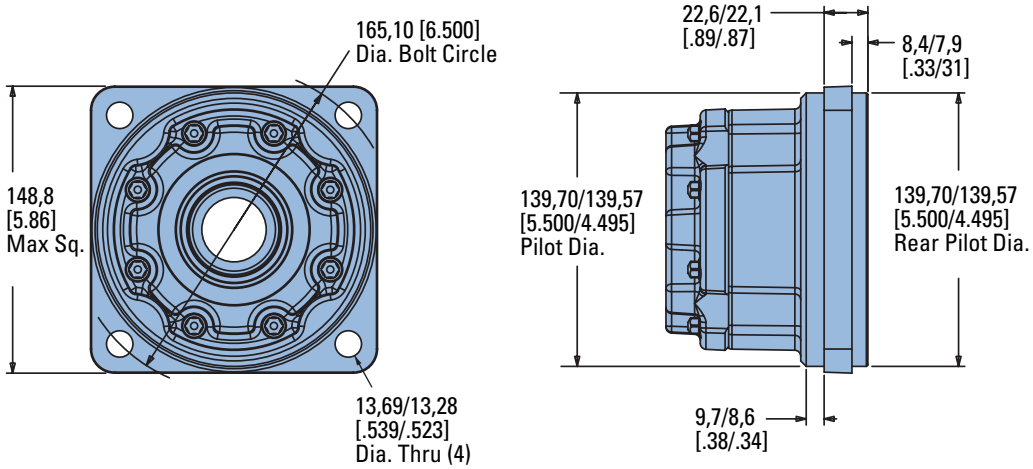
Dimensions

Mounting Options for use with Enhanced Bearings

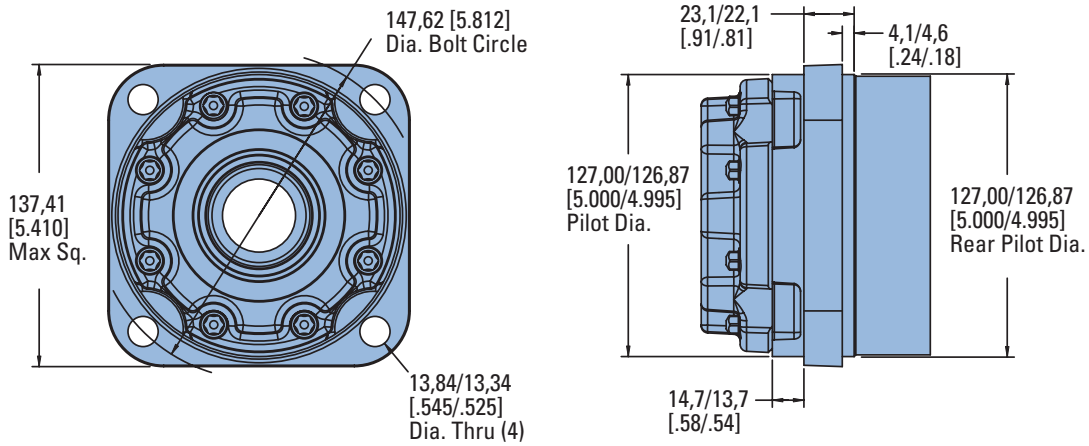
Standard Flange- Similar to SAE B type



Four Bolt (Wheel Motor)



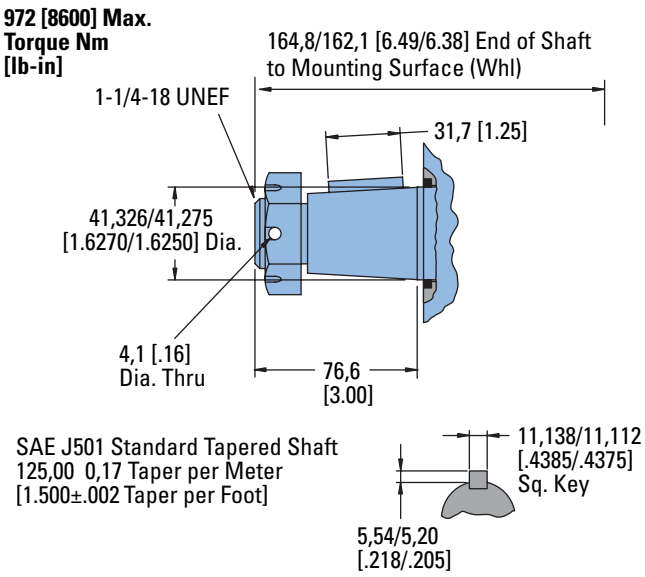
Four Bolt (Wheel Motor- Short)



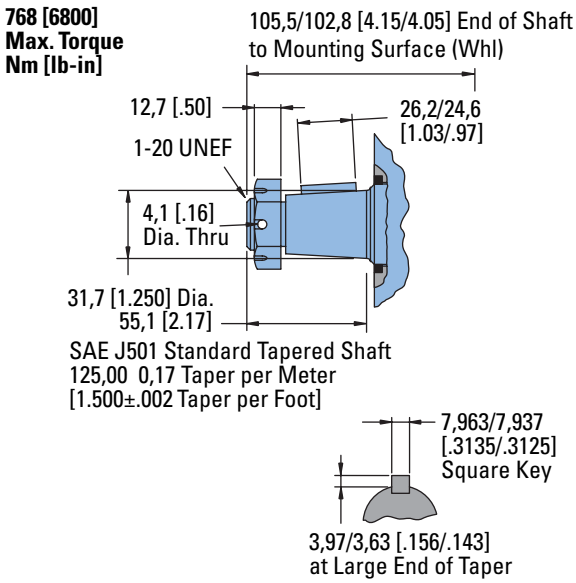
Dimensions

Shafts

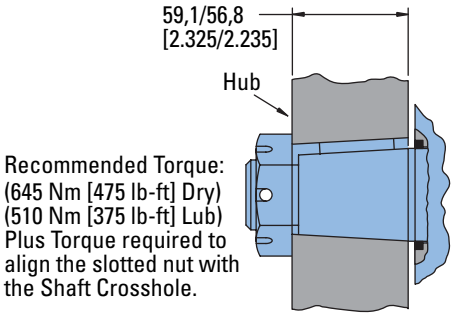
1-5/8 Inch Tapered



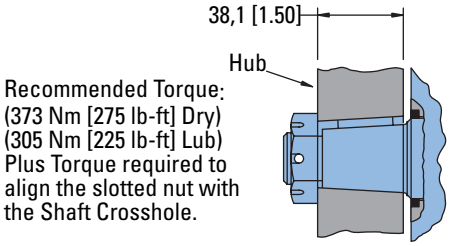
1-1/4 Inch Tapered



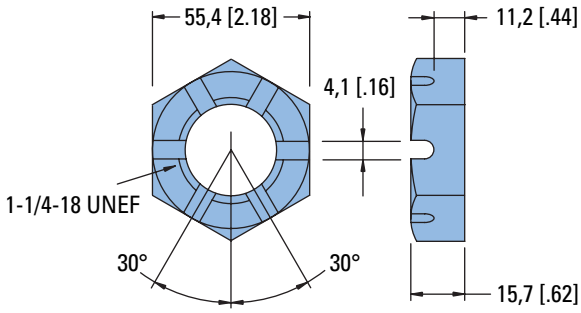
Tapered Shaft Hub Data



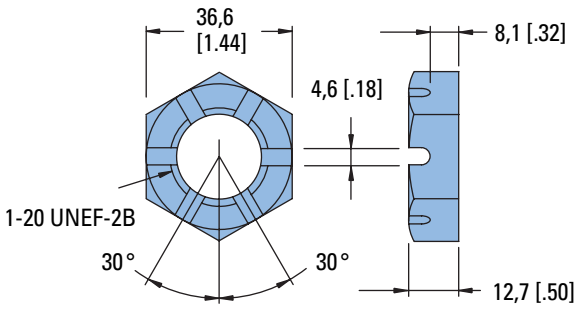
Tapered Shaft Hub Data



Slotted Hexagon Nut



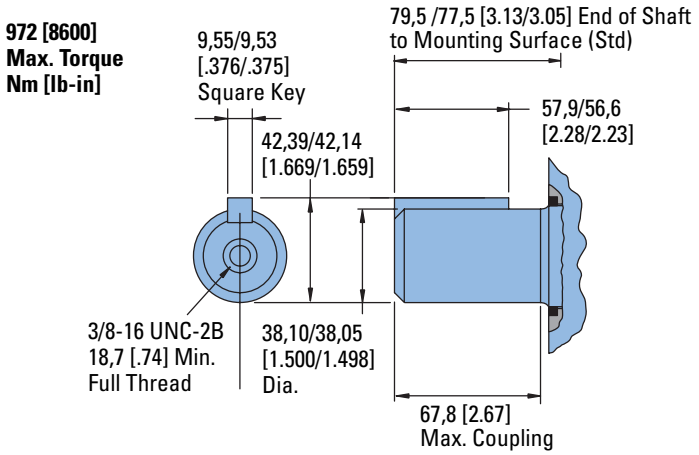
Slotted Hexagon Nut



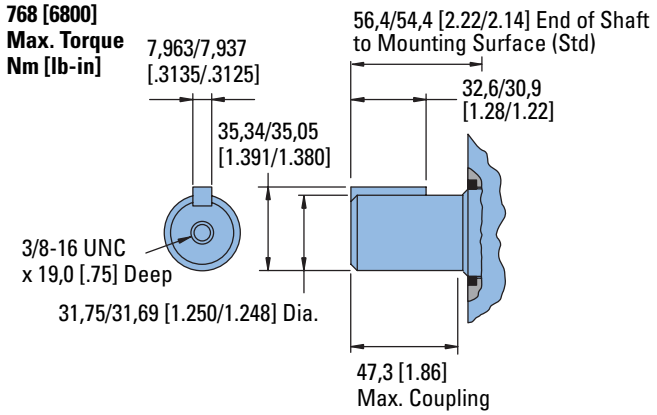
Dimensions

Shafts

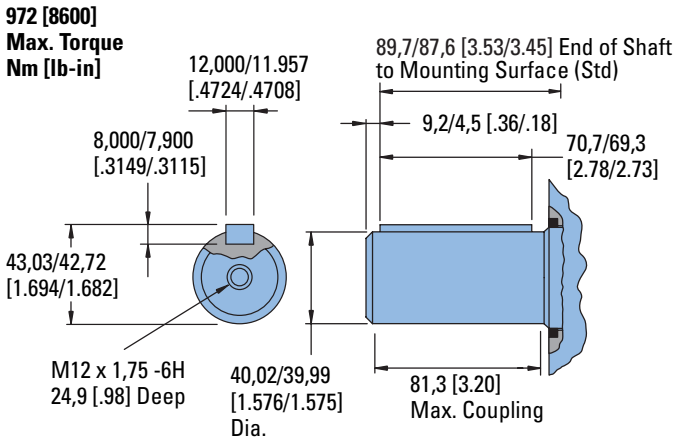
1-1/2 Inch Straight



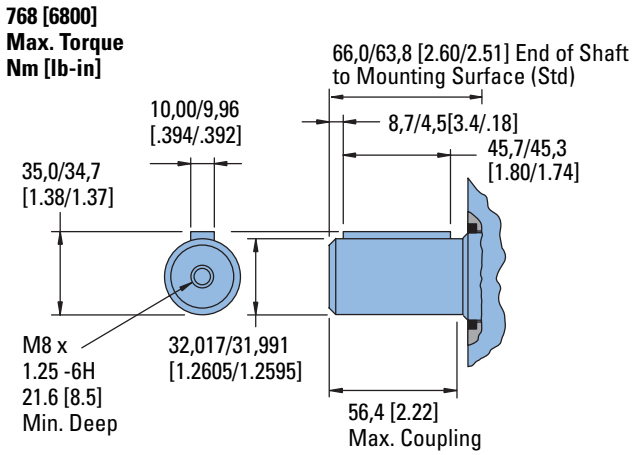
1-1/4 Inch Straight



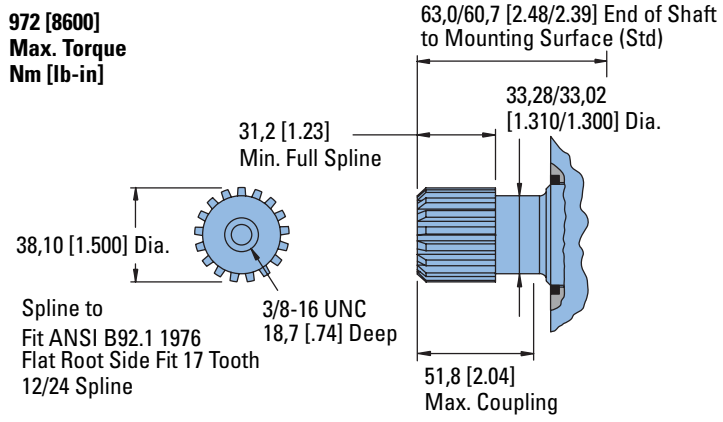
40 mm Straight



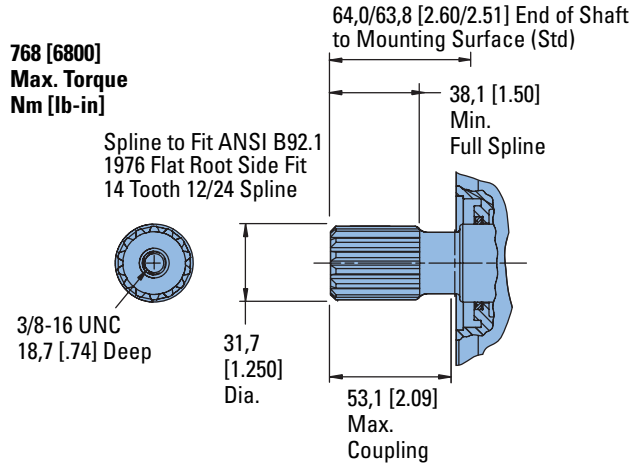
32 mm Straight



1-1/2 Inch 17 Tooth Straight



1-1/4 Inch 14 Tooth Splined



4000 Compact Series

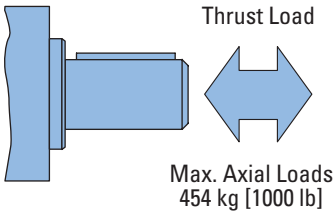
Shaft Side Load Capacity

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

Note:

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

Each curve is based on

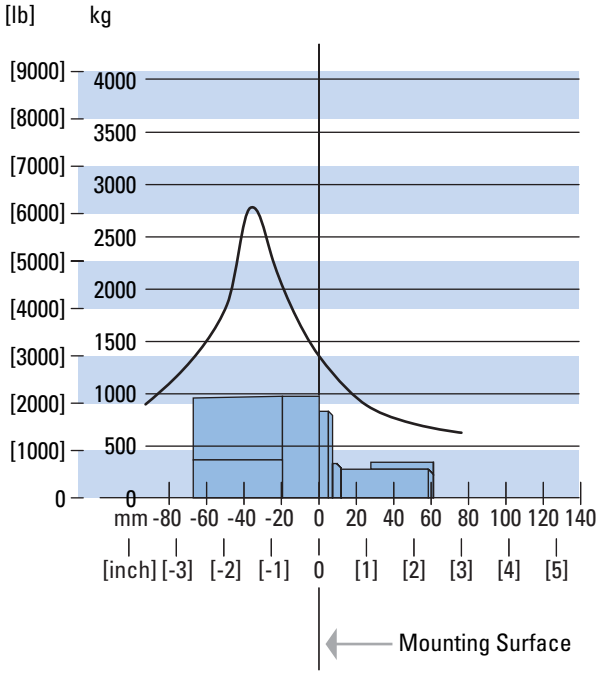


B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.
To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

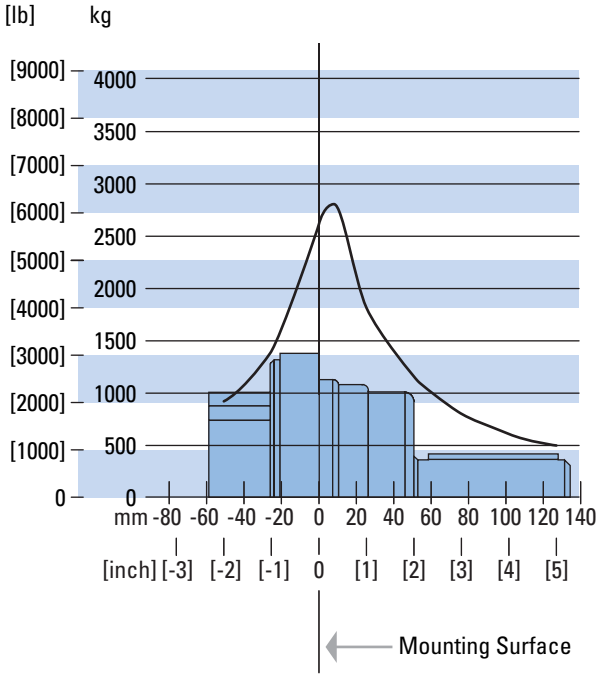
RPM	Multiplication Factor
50	**1.23**
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

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



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



4000 Compact Series

Case Pressure and Case Port

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

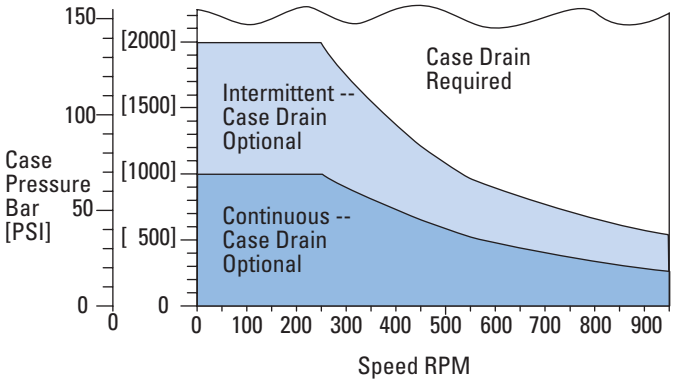
Case Porting Advantage

Contamination Control — flushing the motor case.

Cooler Motor — exiting oil draws motor heat away.

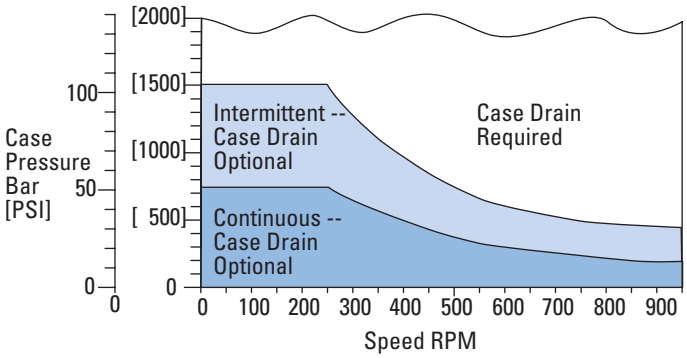
Extend Motor Seal Life — maintain low case pressure with a preset restriction in the case drain line.

Case Pressure Seal Limitation



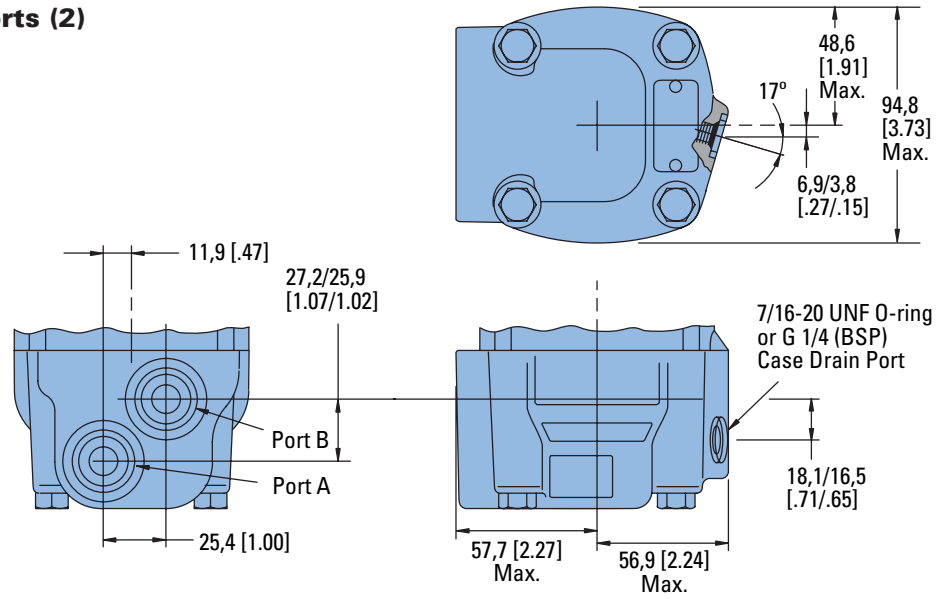
All Shaft options 1-1/4 inch and smaller.

Case Pressure Seal Limitation

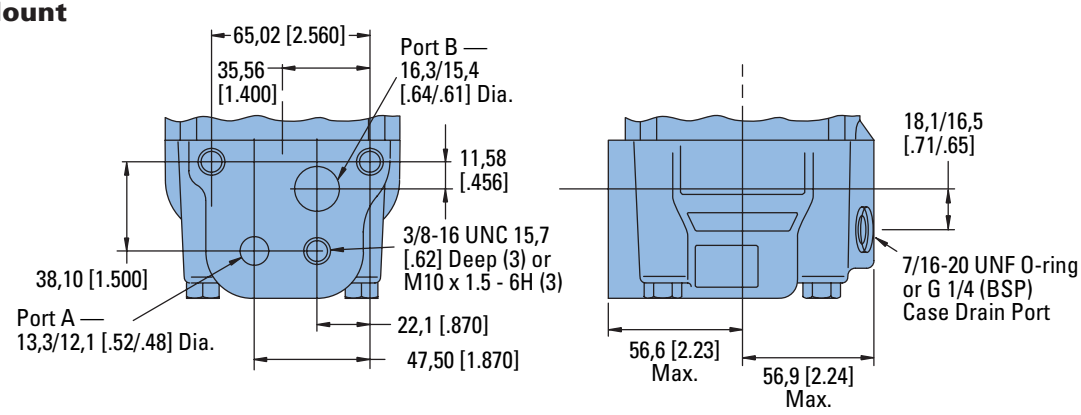


All Shaft options larger than 1-1/4 inch.

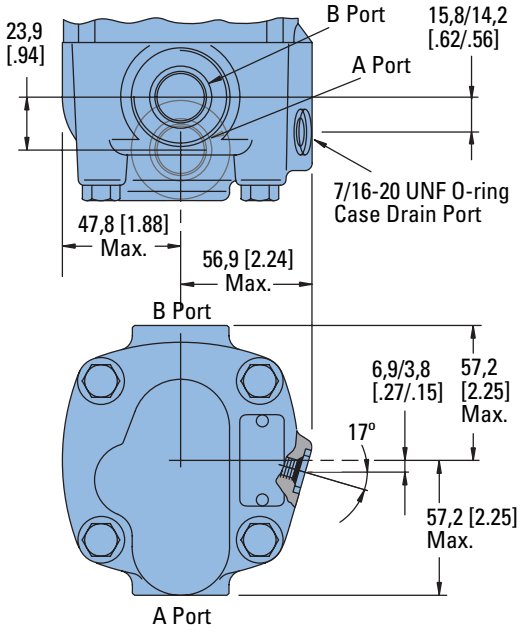
7/8-14 O-ring Ports (2) or G 1/2 (BSP) Ports (2)



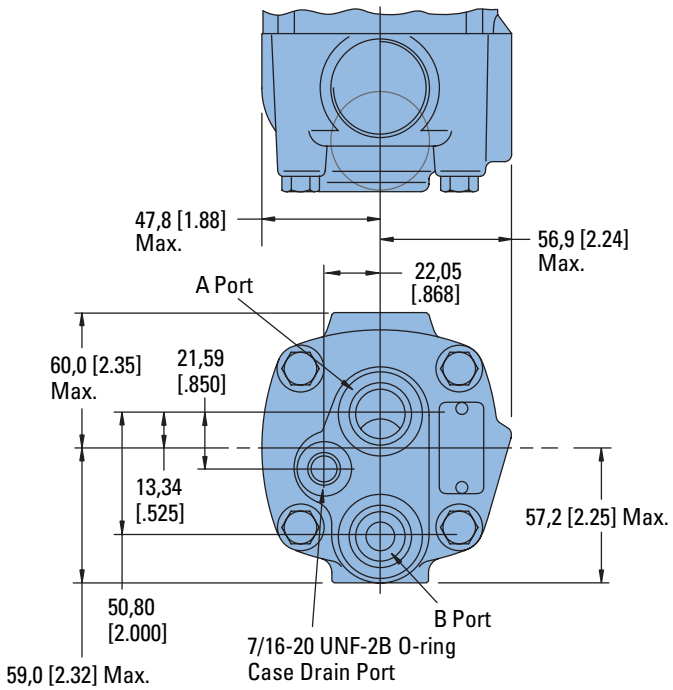
Manifold Mount



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



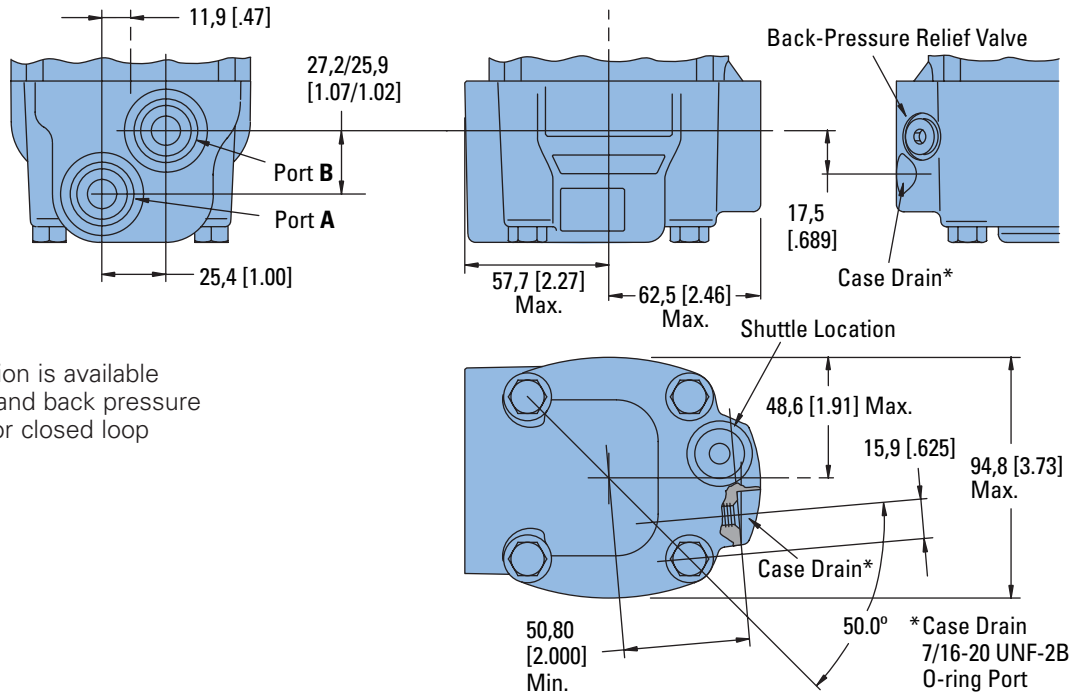
7/8-14 O-ring End Ports (2)



Dimensions

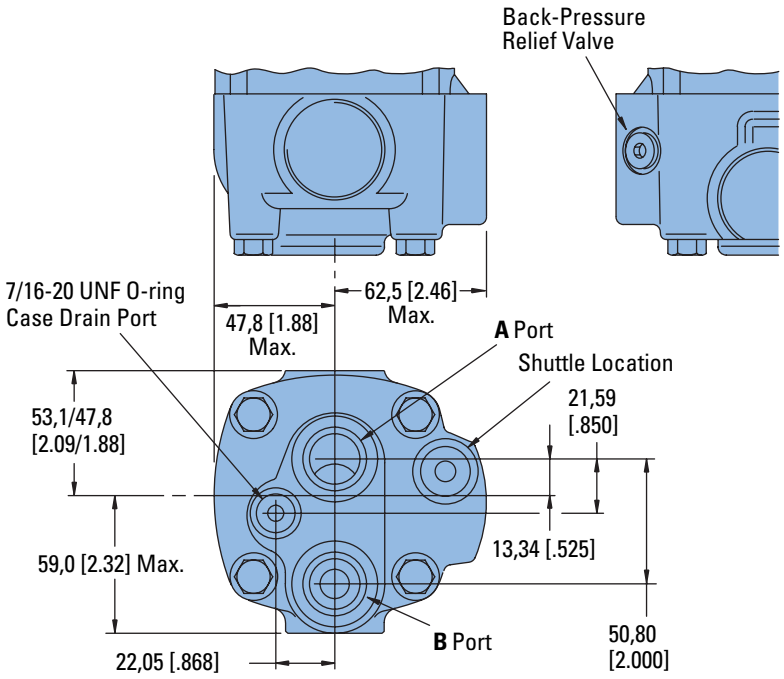
Ports with Shuttle

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)

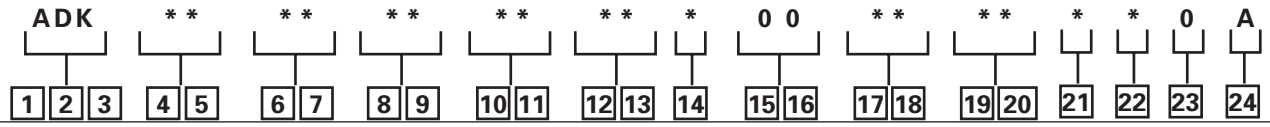


This port option is available with shuttle and back pressure relief valve for closed loop applications.

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.



1, 2, 3 Product Series

ADK – 4000 Compact Series Motor

4, 5 Displacement cm3/r [in3/r]

10 – 160 [9.8]

12 – 200 [12.3]

15 – 250 [15.4]

20 – 325 [19.8]

25 – 405 [24.6]

30 – 490 [29.8]

6, 7 Mounting Type

AB – 4 Bolt (Wheel) 108,0 [4.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes on 147,6 [5.81] Dia. B.C. 127,0 [5.00] Dia. Rear Mount Pilot

AC – 2 Bolt SAE A (Std.) 82,5 [3.25] Pilot Dia and 13,59 [.535] Dia. Mtg. Holes on 106,4 [4.19] Dia. B.C.

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

AF – 2 Bolt SAE B (Std.) 101,6 [4.00] Pilot Dia. and 14,35 [.565] Dia. Mtg. Holes on 146,0 [5.75] Dia. B.C.

AH – 4 Bolt (Standard) 82,5 [3.25] Pilot Dia. and 14,59 [.535] Dia. Mounting Holes on 106,4 [4.19] Dia. B.C.

AJ – 4 Bolt Magneto (Std.) 82,6 [3.25] Pilot Dia. and 13,59 [.535] Dia. Mtg. Holes on 106,4 [4.19] Dia. B.C. 2,79 [.110] Pilot Length

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

BB* – 4 Bolt (SAE B) (Standard) 101,6 [4.00] Pilot Dia. and 14,7 [.58] Dia. Mounting Slots on 127,0 [5.00] Dia. B.C.

BE* – 4 Bolt (Wheel) 139,7 [5.50] Front and Rear Pilot Dia. and 13,49 [.531] Dia. Mounting Holes on 165,1 [6.50] Dia. B.C.

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

8, 9 Output Shaft

00 – None (Bearingless)

02 – 1 1/4 inch Dia. Straight with 3/8-16 Thread in end, 7,938 [.3125] Sq. x 31,75 [1.250] Straight Key

03 – 1 1/4 inch Dia. .125 : 1 Tapered Shaft Per SAE J501 with 1-20 UNEF -2A Threaded Shaft end, and slotted Hex Nut, 7,938 [.3125] Sq. x 25,40 [1.000] Straight Key

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

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)

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

B – Corrosion Protected

23 Eaton Assigned Code when Applicable

0 – Assigned Code

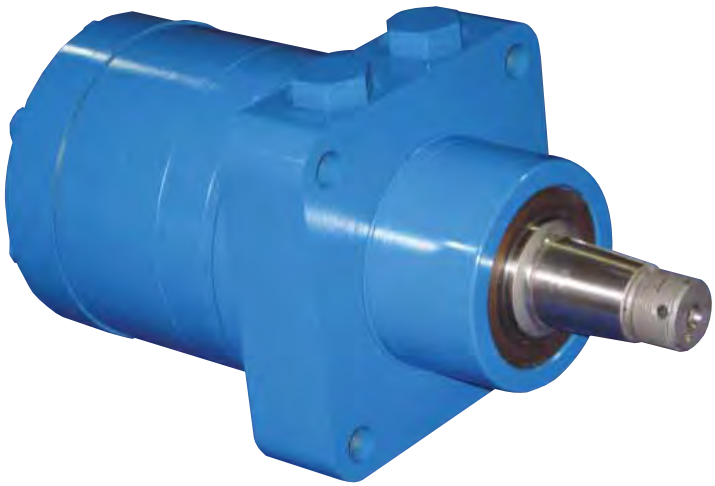
24 Eaton Assigned Design Code

A – Assigned Design Code

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

Delta Series

Highlights



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 intermittant duty / Flow up to 30 GPM intermittant
- 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 standard at 3" from the mount face

Applications:

- Scissor Lift
- Boom Lift
- Industrial Sweeper
- Mower

Description

This wheel motor is the latest addition to the Char Lynn product line. The Delta motor provides torques up to 11,500 in-lbs. Eaton has packed this motor with many "best in class" features: the optimized geroler profile ensures smooth operation; the disc valve technology has the best performance and the bearing capacity is the highest in the industry for very demanding applications.

Delta Series

Geroler Element	12 Displacements
Flow l/min [GPM]	75 [20] Continuous**
	115 [30] Intermittent*
Speed RPM	670 Cont.**
	837 Inter.*
Pressure bar [PSI]	200 [3000] Cont.**
	275 [4000] Inter.*
Torque Nm [lb-in]	1015 [9000] Cont**.
	1185 [10500] Inter.*

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

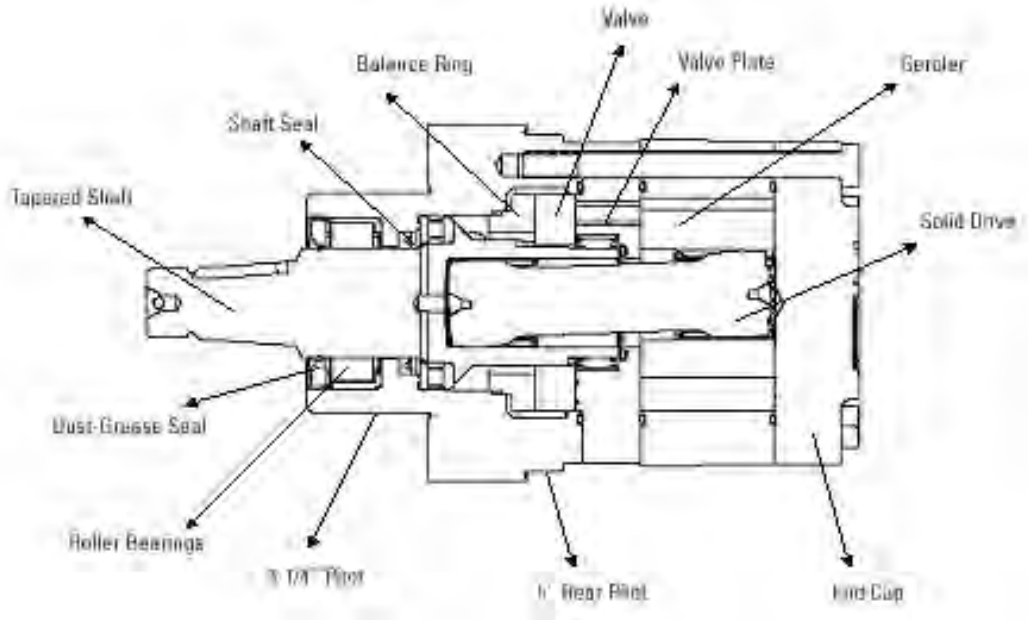
Boom Lift

Sweeper

Mower

Delta Series

Performance Data



DISPLACEMENT	CONTINUOUS FLOW CAPACITY	INTERMITTENT FLOW CAPACITY	CONTINUOUS PRESSURE RATING	INTERMITTENT PRESSURE RATING
cm³/r (in³/rev)	**gpm**	**gpm**	**psid**	**psid**
110 (6.9)	20	25	3000	4000
142 (8.9)	20	30	3000	4000
194 (12.1)	20	30	3000	4000
229 (14.3)	20	30	3000	4000
246 (15.4)	20	30	3000	4000
293 (18.3)	20	30	3000	4000
340 (21.2)	20	30	3000	4000
386 (24.1)	20	30	2750	3500
459 (28.7)	20	30	2500	3000
530 (33.1)	20	30	2000	2500
634 (39.6)	20	30	1750	2250
736 (46)	20	30	1500	2000

Note:

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

Maximum Inlet Pressure:

310 bars (4500 PSI)

Do not exeed "delta sign" pressure rating (see chart above).

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82°C (180°F)

Recommended Filtration:

Per ISO cleanliness Code 4406: 20/18/13

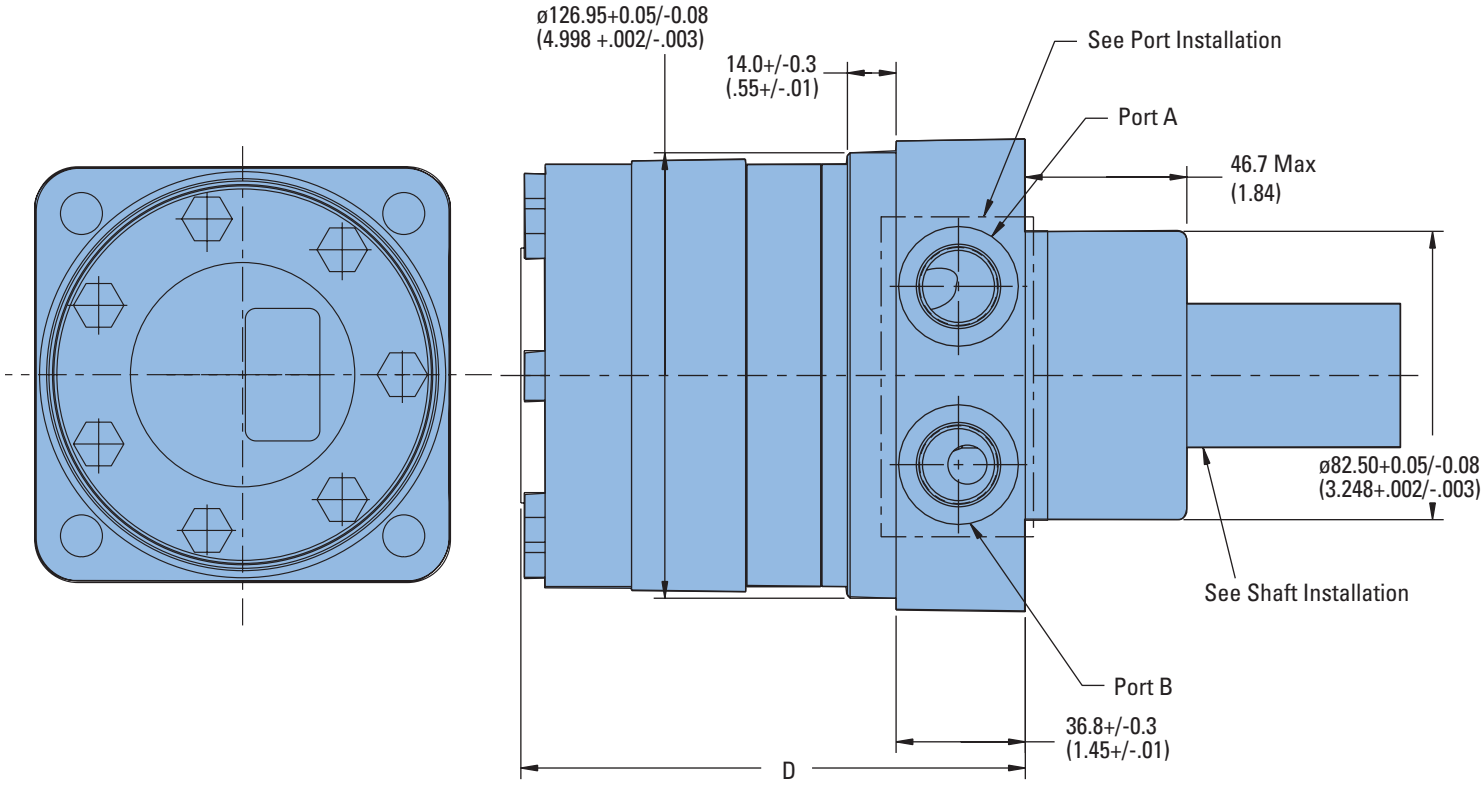
MOUNTING	SHAFT	PORTS	TIMING	DISPLACEMENT			
				6.9 CID 113 cm³	**8.9 CID 146 cm³**	**12.1 CID 198 cm³**	**14.3 CID 234 cm³**
Wheel Motor	1-1/4" Tapered	7/8" O-ring	Standard -CCW	184-0005-001	184-0006-001	184-0002-001	184-0001-001
			Standard -CW	184-0025-001	184-0026-001	184-0027-001	184-0028-001
Wheel Motor	1-1/2" 17 T Splined	7/8" O-ring	Standard -CCW	184-0013-001	184-0014-001	184-0015-001	184-0016-001
			Standard -CW	184-0037-001	184-0038-001	184-0039-001	184-0040-001

MOUNTING	SHAFT	PORTS	TIMING	DISPLACEMENT			
				15.4 CID 252 cm³	**18.3 CID 300 cm³**	**21.2 CID 347 cm³**	**24.1 CID 395 cm³**
Wheel Motor	1-1/4" Tapered	7/8" O-ring	Standard -CCW	184-0003-001	184-0004-001	184-0007-001	184-0008-001
			Standard -CW	184-0029-001	184-0030-001	184-0031-001	184-0032-001
Wheel Motor	1-1/2" 17 T Splined	7/8" O-ring	Standard -CCW	184-0017-001	184-0018-001	184-0019-001	184-0020-001
			Standard -CW	184-0041-001	184-0042-001	184-0043-001	184-0044-001

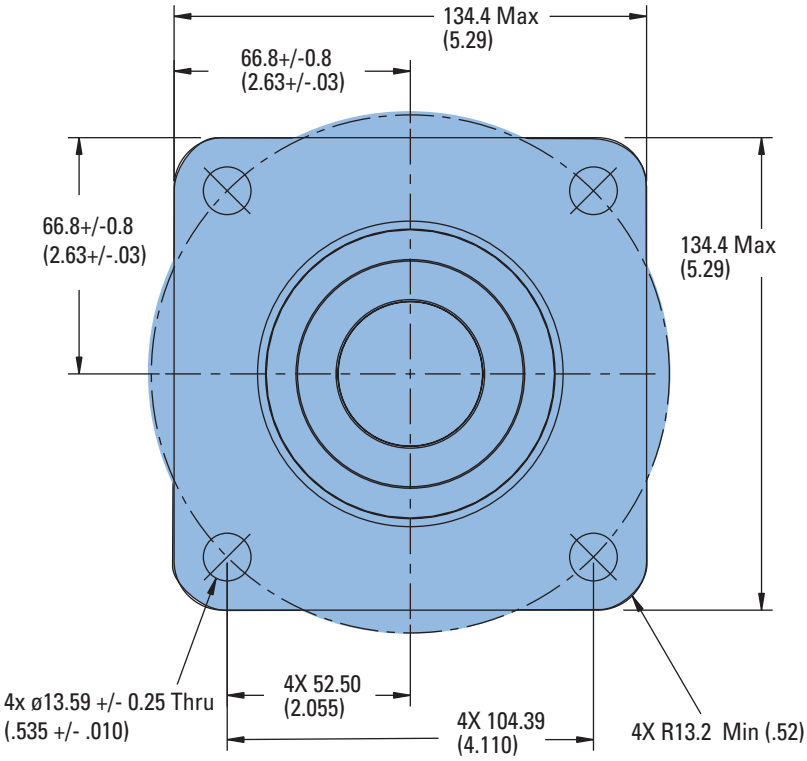
MOUNTING	SHAFT	PORTS	TIMING	DISPLACEMENT			
				28.7 CID 470 cm³	**33.1 CID 542 cm³**	**39.6 CID 649 cm³**	**46.0 CID 754 cm³**
Wheel Motor	1-1/4" Tapered	7/8" O-ring	Standard -CCW	184-0009-001	184-0010-001	184-0011-001	184-0012-001
			Standard -CW	184-0033-001	184-0034-001	184-0035-001	184-0036-001
Wheel Motor	1-1/2" 17 T Splined	7/8" O-ring	Standard -CCW	184-0021-001	184-0022-001	184-0023-001	184-0024-001
			Standard -CW	184-0045-001	184-0046-001	184-0047-001	184-0048-001

Delta Series

Dimensional Data



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

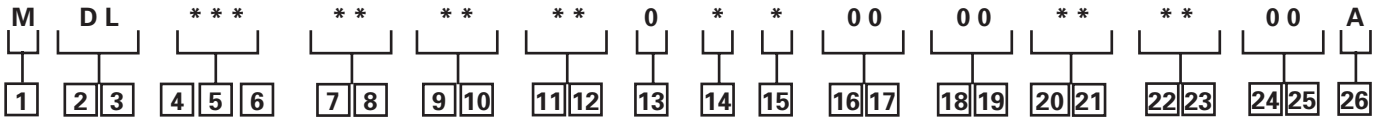


Delta Series

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.

Item not in bold are not standard and may have a longer lead time.



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 1.250-18 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

AB – Dash 10 STC Type II+ (Snap to Connect)

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

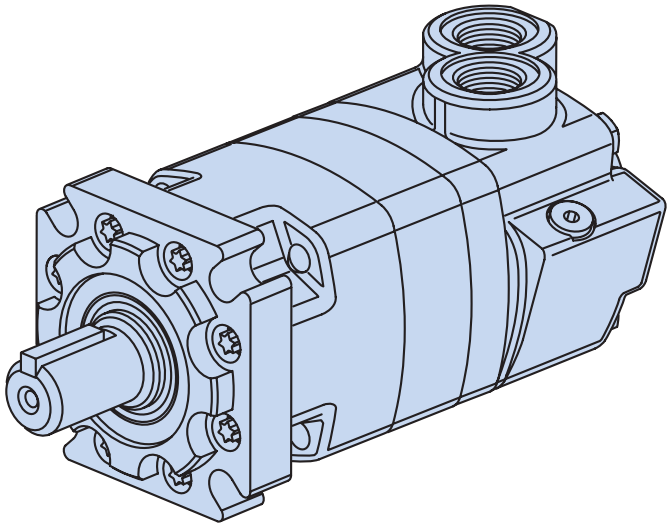
00 – None

26 Design Code

A – One (1)

4000 Series

Highlights



Features

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

Benefits

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

Applications

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

Description

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

4000 Series Motors

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

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

Mowing

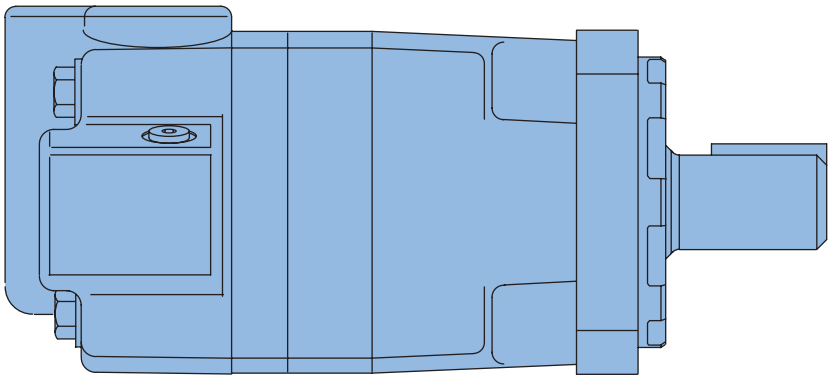
Snow Removal

Sprayer

Trencher

4000 Series

Specifications



4000 SERIES MOTORS

Displ. cm^3/r [in^3/r]		110 [6.7]	130 [7.9]	160 [9.9]	205 [12.5]	245 [15.0]	280 [17.1]	310 [19.0]	395 [24.0]	495 [30.0]	625 [38.0]
Max. Speed (RPM) @ Flow	Continuous	697	722	582	459	383	336	303	239	191	151
	Intermittent	868	862	693	546	532	488	422	376	305	241
Flow l/min [GPM]	Continuous	75 [20]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]
	Intermittent	95 [25]	115 [30]	115 [30]	115 [30]	130 [35]	130 [35]	130 [35]	150 [40]	150 [40]	150 [40] .
Torque* Nm [lb-in]	Continuous	320 [2850]	375 [3330]	485 [4290]	600 [5300]	705 [6240]	753 [6666]	850 [7530]	930 [8240]	945 [8375]	970 [8605]
	Intermittent	470 [4160]	560 [4940]	705 [6240]	800 [7100]	845 [7470]	957 [8471]	1065 [9420]	1185 [10470]	1170 [10350]	1180 [10450]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	190 [2750]	140 [2000]	115 [1700]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	260 [3750]	310 [4500]	260 [3750]	260 [3750]	240 [3500]	170 [2500]	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	295 [4250]	230 [3300]	180 [2600]
Weight kg [lb]	Standard or Wheel Mount	17.9 [39.5]	18.1 [40.0]	18.1 [40.0]	18.4 [40.5]	18.6 [41.0]	19.1 [42.0]	19.5 [43.0]	20.4 [45.0]	21.8 [48.0]	23.1 [51.0]
	Bearingless	14.1 [31.0]	14.3 [31.5]	14.1 [31.0]	14.5 [32.0]	14.7 [32.5]	15.2 [33.5]	15.6 [34.5]	16.6 [36.5]	17.9 [39.5]	19.3 [[42.5]

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

Note:

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

Maximum Inlet Pressure:

310 bar [4500 PSI]

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

Maximum Return Pressure:

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

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

Δ bar [Δ PSI] :

The true pressure difference between inlet port and outlet port

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

4000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

110 cm³/r [6.7 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	[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 **14**	[390] 45 **10**	[850] 95 **5**	[1290] 145 **2**						
[1] 3,8	[170] 20 **34**	[440] 50 **33**	[900] 100 **31**	[1380] 155 **28**	[1860] 210 **25**	[2270] 255 **22**	[2680] 305 **18**	[3110] 350 **11**		
[2] 7,5	[180] 20 **68**	[450] 50 **67**	[910] 105 **62**	[1390] 155 **56**	[1860] 210 **50**	[2280] 260 **44**	[2700] 305 **36**	[3120] 355 **28**	[3450] 390 **18**	
[4] 15	[190] 20 **138**	[460] 50 **136**	[940] 105 **123**	[1400] 160 **110**	[1870] 210 **97**	[2310] 260 **84**	[2730] 310 **70**	[3140] 355 **56**	[3560] 400 **42**	[3880] 440 **28**
[6] 23	[200] 25 **207**	[470] 55 **204**	[960] 110 **200**	[1420] 160 **193**	[1880] 210 **184**	[2320] 260 **174**	[2760] 310 **163**	[3200] 360 **150**	[3640] 410 **136**	[3950] 455 **121**
[8] 30	[190] 20 **277**	[460] 50 **274**	[950] 105 **270**	[1420] 160 **262**	[1880] 210 **253**	[2340] 265 **241**	[2790] 315 **228**	[3230] 365 **213**	[3670] 415 **196**	[4010] 455 **179**
[10] 38	[180] 20 **347**	[460] 50 **344**	[950] 105 **340**	[1420] 160 **331**	[1890] 215 **322**	[2350] 265 **308**	[2820] 320 **292**	[3260] 370 **274**	[3700] 420 **255**	[4070] 460 **236**
[12] 45	[160] 20 **417**	[450] 50 **414**	[940] 105 **410**	[1420] 160 **400**	[1880] 210 **390**	[2350] 265 **374**	[2820] 320 **355**	[3260] 370 **335**	[3710] 420 **313**	[4080] 460 **292**
[14] 53	[140] 15 **487**	[440] 50 **484**	[930] 105 **480**	[1420] 160 **469**	[1880] 210 **458**	[2350] 265 **440**	[2830] 320 **419**	[3280] 370 **446**	[3730] 420 **471**	[4110] 465 **348**
[16] 61	[130] 15 **556**	[440] 50 **553**	[920] 105 **549**	[1410] 160 **537**	[1870] 210 **525**	[2350] 265 **505**	[2840] 320 **482**	[3300] 375 **455**	[3750] 425 **428**	[4120] 465 **404**
[18] 68	[100] 10 **626**	[440] 50 **622**	[910] 105 **618**	[1400] 160 **606**	[1870] 210 **593**	[2350] 265 **570**	[2840] 320 **545**	[3300] 375 **516**	[3770] 425 **485**	[4140] 465 **460**
[20] 76	[80] 10 **697**	[430] 50 **694**	[900] 100 **690**	[1370] 155 **677**	[1860] 210 **664**	[2350] 265 **638**	[2850] 320 **611**	[3320] 375 **579**	[3790] 430 **545**	[4160] 470 **518**
[25] 95		[400] 45 **868**	[860] 95 **861**	[1350] 155 **838**	[1850] 210 **816**	[2320] 260 **792**	[2830] 320 **767**	[3300] 375 **729**	[3780] 425 **690**	

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

130 cm³/r [7.9 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	[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 **12**	[510] 60 **9**	[1060] 120 **5**	[1590] 180 **2**						
[1] 3,8	[290] 35 **30**	[530] 60 **28**	[1080] 120 **25**	[1600] 180 **19**	[2110] 240 **14**	[2640] 300 **13**	[3060] 345 **12**	[3450] 390 **4**		
[2] 7,5	[280] 30 **57**	[530] 60 **56**	[1100] 125 **53**	[1620] 185 **47**	[2140] 240 **42**	[2660] 300 **40**	[3180] 360 **38**	[3600] 405 **29**	[4020] 455 **20**	[4080] 460 **12**
[4] 15	[260] 30 **116**	[520] 60 **114**	[1100] 125 **111**	[1650] 185 **105**	[2200] 250 **100**	[2700] 305 **95**	[3210] 365 **90**	[3660] 415 **70**	[4100] 465 **50**	[4560] 515 **37**
[6] 23	[240] 25 **173**	[510] 60 **170**	[1100] 125 **167**	[1650] 185 **161**	[2200] 250 **156**	[2720] 305 **149**	[3240] 365 **142**	[3710] 420 **123**	[4180] 470 **104**	[4660] 525 **91**
[8] 30	[230] 25 **228**	[510] 60 **225**	[1080] 120 **222**	[1640] 185 **216**	[2210] 250 **210**	[2740] 310 **202**	[3270] 370 **194**	[3770] 425 **176**	[4270] 480 **158**	[4750] 535 **145**
[10] 38	[210] 25 **283**	[510] 60 **281**	[1080] 120 **278**	[1640] 185 **272**	[2210] 250 **266**	[2750] 310 **256**	[3300] 375 **246**	[3820] 430 **229**	[4350] 490 **212**	[4840] 545 **189**
[12] 45	[200] 25 **341**	[500] 55 **338**	[1070] 120 **335**	[1640] 185 **329**	[2220] 250 **323**	[2750] 310 **312**	[3300] 375 **300**	[3840] 435 **282**	[4370] 495 **263**	[4870] 550 **237**
[14] 53	[180] 20 **400**	[490] 55 **396**	[1060] 120 **392**	[1640] 185 **386**	[2220] 250 **380**	[2750] 310 **368**	[3310] 375 **355**	[3860] 435 **335**	[4390] 495 **315**	[4890] 550 **286**
[16] 61	[160] 20 **457**	[490] 55 **453**	[1050] 120 **449**	[1630] 185 **443**	[2220] 250 **437**	[2760] 310 **424**	[3310] 375 **410**	[3860] 435 **388**	[4400] 495 **366**	[4920] 555 **335**
[18] 68	[130] 15 **516**	[480] 55 **511**	[1050] 120 **506**	[1630] 185 **500**	[2220] 250 **494**	[2760] 310 **480**	[3320] 375 **465**	[3870] 435 **442**	[4420] 500 **418**	[4940] 560 **384**
[20] 76	[110] 10 **574**	[470] 55 **569**	[1040] 120 **564**	[1620] 185 **559**	[2210] 250 **551**	[2760] 310 **536**	[3330] 375 **520**	[3890] 440 **495**	[4440] 500 **470**	
[22] 83	[70] 10 **633**	[450] 50 **628**	[1020] 115 **624**	[1610] 180 **615**	[2190] 245 **606**	[2750] 310 **590**	[3320] 375 **573**	[3880] 440 **547**	[4440] 500 **520**	
[25] 95	[50] 5 **722**	[430] 50 **718**	[1000] 115 **714**	[1580] 180 **702**	[2160] 245 **690**	[2720] 305 **672**	[3300] 375 **653**	[3860] 435 **625**	[4430] 500 **595**	
[30] 114		[400] 45 **862**	[940] 105 **855**	[1500] 170 **842**	[2080] 235 **827**	[2670] 300 **806**	[3200] 360 **783**	[3740] 425 **749**		

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

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

Flow LPM [GPM]

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

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

Flow LPM [GPM]

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

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

4000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

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

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
[.5] **1,9**	[460] 50 **5**	[980] 110 **2**													
[1] **3,8**	[480] 55 **14**	[990] 110 **14**	[1490] 170 **14**	[1990] 225 **13**	[2480] 280 **13**	[2970] 335 **12**	[3400] 385 **12**	[3830] 435 **11**	[4250] 480 **11**	[4680] 530 **10**	[5020] 565 **4**				
[2] **7,5**	[500] 55 **30**	[1000] 115 **30**	[1520] 170 **29**	[2040] 230 **29**	[2540] 285 **28**	[3050] 345 **27**	[3420] 385 **26**	[3930] 445 **24**	[4440] 500 **23**	[4900] 555 **22**	[5320] 600 **20**	[5740] 650 **18**	[6160] 695 **16**	[6640] 750 **14**	[7150] 810 **11**
[4] **15**	[510] 60 **61**	[1030] 115 **61**	[1560] 175 **60**	[2080] 235 **60**	[2600] 295 **59**	[3130] 355 **59**	[3630] 410 **58**	[4130] 465 **56**	[4630] 525 **53**	[5120] 580 **49**	[5570] 630 **47**	[6030] 680 **44**	[6480] 730 **42**	[6870] 775 **39**	[7340] 830 **36**
[6] **23**	[510] 60 **91**	[1040] 120 **90**	[1570] 175 **90**	[2100] 235 **89**	[2620] 295 **88**	[3160] 355 **88**	[3660] 415 **86**	[4200] 475 **83**	[4710] 530 **80**	[5220] 590 **75**	[5690] 645 **72**	[6150] 695 **70**	[6620] 750 **67**	[7050] 795 **63**	[7430] 840 **59**
[8] **30**	[500] 55 **121**	[1020] 115 **121**	[1560] 175 **120**	[2110] 240 **119**	[2630] 295 **118**	[3150] 355 **117**	[3680] 415 **115**	[4210] 475 **113**	[4740] 535 **111**	[5250] 595 **106**	[5720] 645 **103**	[6200] 700 **99**	[6670] 755 **96**	[7090] 800 **91**	[7470] 845 **87**
[10] **38**	[470] 55 **152**	[1000] 115 **151**	[1540] 175 **150**	[2100] 235 **148**	[2620] 295 **148**	[3150] 355 **147**	[3690] 415 **145**	[4230] 480 **143**	[4770] 540 **141**	[5290] 600 **137**	[5760] 650 **133**	[6240] 705 **129**	[6710] 760 **125**	[7140] 805 **120**	
[12] **45**	[450] 50 **183**	[980] 110 **182**	[1530] 175 **180**	[2080] 235 **179**	[2610] 295 **178**	[3140] 355 **178**	[3680] 415 **176**	[4220] 475 **173**	[4760] 540 **170**	[5280] 595 **166**	[5750] 650 **161**	[6230] 705 **157**	[6700] 755 **152**		
[14] **53**	[420] 45 **213**	[960] 110 **212**	[1520] 170 **211**	[2060] 235 **210**	[2600] 295 **209**	[3130] 355 **208**	[3670] 415 **206**	[4200] 475 **203**	[4740] 535 **200**	[5260] 595 **195**	[5740] 650 **190**	[6220] 705 **185**			
[16] **61**	[400] 45 **244**	[950] 105 **243**	[1500] 170 **242**	[2040] 230 **241**	[2580] 290 **240**	[3120] 355 **239**	[3660] 415 **236**	[4190] 475 **232**	[4730] 535 **229**	[5250] 595 **225**	[5730] 650 **219**	[6210] 700 **213**			
[18] **68**	[380] 45 **275**	[930] 105 **274**	[1480] 165 **273**	[2020] 230 **272**	[2560] 290 **270**	[3110] 350 **269**	[3650] 415 **266**	[4180] 470 **262**	[4710] 530 **259**	[5230] 590 **254**	[5720] 645 **248**	[6200] 700 **241**			
[20] **76**	[350] 40 **305**	[910] 105 **305**	[1460] 165 **304**	[2000] 225 **303**	[2550] 290 **302**	[3100] 350 **300**	[3640] 410 **296**	[4170] 470 **292**	[4700] 530 **288**	[5220] 590 **283**	[5710] 645 **276**				
[22] **83**	[310] 35 **337**	[870] 100 **336**	[1420] 160 **335**	[1970] 225 **334**	[2500] 280 **332**	[3050] 345 **330**	[3590] 405 **326**	[4140] 465 **323**	[4680] 530 **319**	[5200] 590 **313**	[5680] 640 **306**				
[25] **95**	[260] 30 **383**	[820] 95 **382**	[1380] 155 **381**	[1930] 220 **380**	[2460] 280 **378**	[2980] 335 **376**	[3540] 400 **372**	[4090] 460 **369**	[4640] 525 **365**	[5180] 585 **357**					
[30] **114**		[680] 75 **457**	[1250] 140 **456**	[1860] 210 **455**	[2390] 270 **453**	[2900] 330 **450**	[3430] 390 **445**	[3960] 445 **442**	[4460] 505 **437**	[4950] 560 **427**					
[35] **132**			[1110] 125 **532**	[1740] 195 **531**	[2270] 255 **528**	[2790] 315 **525**	[3340] 375 **519**	[3910] 440 **515**	[4400] 495 **509**						

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

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

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
[.5] **1,9**	[533] 60 **4**	[1074] 121 **2**													
[1] **3,8**	[553] 62 **12**	[1136] 128 **12**	[1714] 194 **12**	[2287] 258 **11**	[2841] 321 **11**	[3394] 384 **11**	[3868] 437 **10**	[4389] 496 **10**	[4895] 553 **10**	[6080] 685 **8**	[5870] 663 **6**	[368] 720 **6**	[6811] 770 **6**	[7239] 818 **5**	[7654] 865 **4**
[2] **7,5**	[568] 64 **26**	[1146] 130 **26**	[1740] 197 **25**	[2328] 263 **25**	[2902] 328 **24**	[3461] 391 **24**	[3955] 447 **23**	[4524] 511 **22**	[2922] 330 **21**	[5630] 636 **20**	[6146] 694 **19**	[6666] 753 **17**	[7191] 813 **17**	[7749] 876 **15**	[8323] 940 **13**
[4] **15**	[579] 65 **53**	[1167] 132 **53**	[1771] 200 **52**	[2374] 268 **52**	[2962] 335 **51**	[3557] 402 **51**	[4139] 468 **50**	[4712] 532 **49**	[5285] 597 **47**	[5848] 661 **45**	[6395] 722 **44**	[6946] 785 **42**	[7502] 848 **41**	[8020] 906 **40**	[8471] 957 **38**
[6] **23**	[583] 66 **79**	[1177] 133 **79**	[1781] 201 **78**	[2395] 271 **78**	[2987] 338 **77**	[3601] 407 **77**	[4193] 474 **76**	[4793] 542 **74**	[5376] 607 **72**	[5959] 673 **69**	[6521] 737 **67**	[7082] 800 **66**	[7607] 859 **65**	[8097] 915 **64**	
[8] **30**	[573] 65 **106**	[167] 132 **106**	[1780] 201 **105**	[2404] 272 **105**	[3007] 340 **104**	[3610] 408 **104**	[4218] 477 **102**	[4812] 544 **101**	[5411] 611 **99**	[5994] 677 **96**	[6556] 741 **94**	[7022] 793 **92**	[7518] 849 **90**		
[10] **38**	[547] 62 **134**	[1146] 130 **133**	[1765] 199 **133**	[2395] 271 **131**	[2997] 339 **131**	[3629] 410 **130**	[4238] 479 **129**	[4837] 547 **127**	[5442] 615 **126**	[6035] 682 **122**	[6601] 746 **119**	[7022] 793 **115**	[7518] 849 **111**		
[12] **45**	[527] 60 **161**	[1126] 127 **160**	[1745] 197 **186**	[2369] 268 **158**	[2991] 338 **157**	[3609] 408 **157**	[4228] 478 **156**	[4832] 546 **154**	[5441] 615 **152**	[6034] 682 **148**	[6586] 744 **144**	[6940] 784 **141**			
[14] **53**	[497] 56 **187**	[1106] 125 **187**	[1730] 195 **186**	[2344] 265 **186**	[2972] 336 **185**	[3585] 405 **184**	[4213] 476 **182**	[4816] 544 **180**	[5430] 614 **178**	[6028] 681 **174**	[6511] 736 **170**	[6940] 784 **166**			
[16] **61**	[472] 53 214	[1096] 124 **214**	[1715] 194 **213**	[2324] 263 **212**	[2947] 333 **211**	[3565] 403 **210**	[4203] 475 **208**	[4811] 544 **206**	[5420] 612 **203**	[5919] 669 **199**	[6436] 727 **195**				
[18] **68**	[437] 39 **241**	[1075] 121 **241**	[1690] 191 **240**	[2299] 260 **239**	[2917] 330 **237**	[3541] 400 **236**	[4188] 473 **234**	[4801] 542 **231**	[5400] 610 **229**	[5919] 669 **224**	[6362] 719 **219**				
[20] **76**	[402] 45 **268**	[1055] 1119 **268**	[1669] 189 **268**	[2274] 257 **267**	[2898] 327 **266**	[3521] 398 **264**	[4178] 472 **261**	[4791] 541 **258**	[5394] 609 **255**	[5851] 661 **249**					
[22] **83**	[366] 41 **296**	[1005] 114 **295**	[1629] 184 **295**	[2257] 255 **294**	[2856] 323 **292**	[3480] 393 **290**	[4136] 467 **288**	[4756] 537 **285**	[5205] 588 **279**						
[25] **95**	[301] 34 **336**	[940] 106 **336**	[1588] 179 **335**	[2231] 252 **334**	[2825] 319 **333**	[3419] 386 **331**	[4086] 462 **328**	[4710] 532 **325**	[5205] 588 **314**						
[30] **114**		[845] 96 **402**	[1480] 167 **401**	[2151] 243 **400**	[2759] 312 **398**	[3328] 376 **396**	[3984] 450 **392**	[4573] 517 **389**	[5021] 567 **377**						
[35] **132**			[1348] 152 **468**	[2057] 232 **466**	[2623] 296 **464**	[3183] 360 **463**	[3883] 439 **457**	[4354] 492 **449**							

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

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

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
[.5] 1,9	[600] 70 **4**	[1150] 130 **2**													
[1] 3,8	[620] 70 **11**	[1270] 145 **11**	[1920] 215 **11**	[2560] 290 **10**	[3170] 360 **10**	[3780] 425 **10**	[4290] 485 **9**	[4900] 555 **9**	[5490] 620 **9**	[6080] 685 **8**	[6670] 755 **8**	[7270] 820 **7**	[7880] 890 **7**	[8490] 960 **6**	[9080] 1025 **5**
[2] 7,5	[630] 70 **23**	[1280] 145 **23**	[1940] 220 **22**	[2590] 295 **22**	[3230] 365 **21**	[3830] 435 **21**	[4450] 505 **20**	[5070] 575 **20**	[5680] 640 **19**	[6300] 710 **18**	[6910] 780 **18**	[7530] 850 **17**	[8160] 920 **17**	[8790] 995 **16**	[9420] 1065 **15**
[4] 15	[640] 70 **47**	[1290] 145 **47**	[1960] 220 **46**	[2640] 300 **46**	[3290] 370 **45**	[3940] 445 **45**	[4600] 520 **44**	[5240] 590 **44**	[5880] 665 **43**	[6510] 735 **42**	[7150] 810 **42**	[7790] 880 **41**	[8450] 955 **41**	[9100] 1030 **40**	
[6] 23	[650] 75 **71**	[1300] 145 **71**	[1970] 225 **70**	[2660] 300 **70**	[3320] 375 **69**	[4000] 450 **69**	[4680] 530 **68**	[5330] 600 **67**	[5980] 675 **66**	[6630] 750 **64**	[7280] 825 **64**	[7940] 895 **63**			
[8] 30	[640] 70 **96**	[1300] 145 **96**	[1980] 225 **95**	[2670] 300 **95**	[3350] 380 **94**	[4030] 455 **94**	[4710] 530 **93**	[5360] 605 **92**	[6020] 680 **91**	[6670] 755 **89**	[7320] 825 **88**				
[10] 38	[620] 70 **121**	[1280] 145 **120**	[1970] 225 **120**	[2660] 300 **119**	[3340] 375 **119**	[4070] 460 **118**	[4740] 535 **117**	[5390] 610 **116**	[6050] 685 **115**	[6710] 760 **112**	[7370] 835 **109**				
[12] 45	[600] 70 **145**	[1260] 140 **144**	[1940] 220 **144**	[2630] 295 **143**	[3340] 375 **142**	[4040] 455 **142**	[4730] 535 **141**	[5390] 610 **140**	[6060] 685 **139**	[6720] 760 **135**					
[14] 53	[570] 65 **169**	[1240] 140 **169**	[1920] 215 **168**	[2600] 295 **168**	[3310] 375 **167**	[4000] 450 **167**	[4710] 530 **165**	[5380] 610 **164**	[6060] 685 **163**	[6730] 760 **159**					
[16] 61	[540] 60 **193**	[1230] 140 **193**	[1900] 215 **192**	[2580] 290 **192**	[3280] 370 **190**	[3970] 450 **189**	[4700] 530 **188**	[5380] 610 **187**	[6050] 685 **185**						
[18] 68	[490] 55 **217**	[1210] 135 **217**	[1880] 210 **216**	[2550] 290 **216**	[3240] 365 **214**	[3930] 445 **213**	[4680] 530 **211**	[5370] 605 **209**	[6040] 680 **207**						
[20] 76	[450] 50 **242**	[1190] 135 **242**	[1860] 210 **242**	[2520] 285 **241**	[3210] 365 **240**	[3900] 440 **238**	[4670] 530 **236**	[5360] 605 **234**	[6030] 680 **232**						
[22] 83	[420] 45 **267**	[1130] 130 **266**	[1820] 205 **266**	[2520] 285 **265**	[3180] 360 **264**	[3870] 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**	[5140] 580 **351**							
[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]

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
[.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 **95**	[2550] 290 **94**	[3400] 385 **93**	[4260] 480 **92**	[5100] 575 **91**	[5920] 670 **89**	[6730] 760 **86**	[7560] 855 **84**					
[12] 45	[760] 85 **114**	[1660] 190 **114**	[2520] 285 **113**	[3380] 380 **112**	[4270] 480 **111**	[5110] 575 **110**	[5900] 665 **108**	[6690] 755 **105**						
[14] 53	[740] 85 **133**	[1640] 185 **133**	[2490] 280 **132**	[3370] 380 **131**	[4260] 480 **130**	[5100] 575 **129**	[5880] 665 **127**	[6650] 750 **124**						
[16] 61	[710] 80 **153**	[1620] 185 **153**	[2460] 280 **152**	[3350] 380 **151**	[4240] 480 **149**	[5080] 575 **147**	[5840] 660 **145**							
[18] 68	[680] 75 **172**	[1600] 180 **172**	[2430] 275 **171**	[3340] 375 **170**	[4220] 475 **168**	[5060] 570 **166**	[5810] 655 **164**							
[20] 76	[610] 70 **192**	[1580] 180 **191**	[2400] 270 **190**	[3320] 375 **189**	[4210] 475 **187**	[5040] 570 **185**	[5780] 655 **183**							
[22] 83	[570] 65 **211**	[1490] 170 **210**	[2340] 265 **209**	[3220] 365 **208**	[4160] 470 **206**	[5010] 565 **204**	[5740] 650 **201**							
[25] 95	[490] 55 **239**	[1350] 155 **238**	[2250] 255 **237**	[3080] 350 **236**	[4070] 460 **235**	[4960] 560 **233**	[5700] 645 **230**							
[30] 114		[1080] 120 **285**	[1650] 185 **284**	[2270] 255 **282**	[3020] 340 **281**	[3850] 435 **279**								
[35] 132			[1520] 170 **331**	[2120] 240 **330**	[2870] 325 **328**	[3760] 425 **325**								
[40] 151				[2050] 230 **376**	[2790] 315 **374**	[3620] 410 **371**								

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

4000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

625 cm³/r [38.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1600] 100	[1700] 115	[1800] 125	[2000] 140
[.5] **1,9**	[1000] 115 **2**									
[1] **3,8**	[1080] 120 **5**	[2340] 265 **5**	[3600] 405 **5**	[4850] 550 **4**	[6100] 690 **4**	[7350] 830 **3**	[7820] 885 **3**	[8290] 935 **2**	[8760] 990 **2**	
[2] **7,5**	[1085] 125 **14**	[2380] 270 **14**	[3675] 415 **14**	[5010] 565 **13**	[6350] 715 **12**	[7625] 860 **11**	[8115] 915 **10**	[8605] 970 **9**	[9095] 1030 **8**	[10075] 1140 **7**
[4] **15**	[1090] 125 **23**	[2420] 275 **23**	[3750] 425 **23**	[5175] 585 **22**	[6600] 745 **21**	[7900] 895 **19**	[8410] 950 **18**	[9000] 1015 **17**	[9590] 1085 **16**	[10450] 1180 **14**
[6] **23**	[1095] 125 **35**	[2460] 280 **35**	[3825] 430 **35**	[5220] 590 **34**	[6620] 750 **33**	[7950] 900 **31**	[8430] 950 **30**	[8910] 1005 **29**	[9490] 1070 **28**	
[8] **30**	[1100] 125 **48**	[2500] 280 **48**	[3900] 440 **47**	[5270] 595 **46**	[6640] 750 **45**	[7990] 905 **43**	[8460] 955 **43**	[8925] 1010 **42**		
[10] **38**	[1130] 130 **60**	[2550] 290 **60**	[3975] 450 **59**	[5320] 600 **58**	[6670] 755 **57**	[8045] 910 **54**	[8595] 970 **53**	[9150] 1035 **52**		
[12] **45**	[1160] 130 **72**	[2600] 295 **72**	[4050] 460 **71**	[5375] 605 **70**	[6700] 755 **69**	[8100] 915 **65**	[8660] 980 **64**			
[14] **53**	[1105] 125 **84**	[2535] 285 **84**	[3965] 450 **83**	[5325] 600 **82**	[6685] 755 **81**	[8065] 910 **77**	[8620] 975 **76**			
[16] **61**	[1050] 120 **96**	[2465] 280 **95**	[3880] 440 **95**	[5275] 595 **94**	[6670] 755 **93**	[8035] 910 **89**	[8580] 970 **88**			
[18] **68**	[990] 110 **108**	[2405] 270 **107**	[3825] 430 **107**	[5240] 590 **105**	[6655] 750 **104**	[7345] 830 **100**				
[20] **76**	[930] 105 **121**	[2350] 265 **120**	[3770] 425 **120**	[5205] 590 **118**	[6640] 750 **116**					
[25] **95**	[750] 85 **151**	[2175] 245 **150**	[3600] 405 **149**	[5000] 565 **147**	[6400] 725 **146**					
[30] **114**	[550] 60 **181**	[1975] 225 **180**	[3400] 385 **179**	[4800] 530 **177**	[6200] 700 **176**					
[35] **132**			[3125] 355 **210**	[4545] 515 **208**						
[40] **151**			[2850] 320 **241**	[4295] 485 **239**						

495 cm³/r [30.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170
[.5] **1,9**	[800] 90 **3**	[1750] 200 **1**								
[1] **3,8**	[880] 100 **7**	[1875] 210 **6**	[2875] 325 **6**	[3825] 430 **5**	[4775] 540 **4**	[5720] 645 **3**	[6670] 755 **2**	[7600] 860 **1**		
[2] **7,5**	[905] 100 **18**	[1940] 220 **17**	[2975] 335 **17**	[3990] 450 **16**	[5010] 565 **15**	[6010] 680 **12**	[7010] 790 **11**	[8000] 905 **10**	[8980] 1015 **8**	
[4] **15**	[935] 105 **30**	[2005] 225 **29**	[3075] 345 **28**	[4160] 470 **27**	[5245] 595 **26**	[6300] 710 **23**	[7355] 830 **21**	[8375] 945 **19**	[9400] 1060 **17**	[10350] 1170 **14**
[6] **23**	[920] 105 **45**	[2010] 225 **44**	[3100] 350 **43**	[4185] 475 **42**	[5265] 595 **40**	[6345] 715 **37**	[7420] 840 **35**	[8445] 955 **32**	[9465] 1070 **30**	
[8] **30**	[905] 100 **61**	[2015] 230 **60**	[3125] 355 **59**	[4205] 475 **57**	[5290] 600 **55**	[6385] 720 **52**	[7485] 845 **49**	[8510] 960 **46**		
[10] **38**	[880] 100 **76**	[1995] 225 **75**	[3095] 350 **74**	[4205] 475 **72**	[5295] 600 **70**	[6390] 720 **66**	[7480] 845 **63**	[8525] 960 **59**		
[12] **45**	[860] 95 **91**	[1975] 225 **90**	[3095] 350 **89**	[4200] 475 **87**	[5305] 600 **85**	[6390] 720 **81**	[7475] 845 **77**			
[14] **53**	[830] 95 **106**	[1945] 220 **105**	[3055] 345 **104**	[4165] 470 **102**	[5275] 595 **100**	[6360] 720 **96**	[7445] 840 **92**			
[16] **61**	[805] 90 **122**	[1910] 215 **120**	[3020] 340 **119**	[4130] 465 **117**	[5245] 595 **115**	[6330] 715 **111**	[7420] 840 **107**			
[18] **68**	[740] 85 **137**	[1860] 210 **136**	[2980] 335 **134**	[4105] 465 **132**	[5235] 590 **130**	[6305] 715 **125**	[7380] 835 **121**			
[20] **76**	[680] 75 **153**	[1810] 205 **152**	[2940] 330 **150**	[4085] 460 **147**	[5225] 590 **145**	[6285] 710 **140**				
[25] **95**	[570] 65 **191**	[1665] 190 **189**	[2800] 315 **187**	[4005] 455 **184**	[5210] 590 **182**	[6135] 695 **177**				
[30] **114**		[1520] 170 **228**	[2645] 300 **226**	[3765] 425 **223**	[4885] 550 **220**	[5985] 675 **215**				
[35] **132**			[2400] 270 **265**	[3510] 395 **263**						
[40] **151**			[2155] 245 **305**	[3260] 370 **303**						

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

4000 Series

Dimensions

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

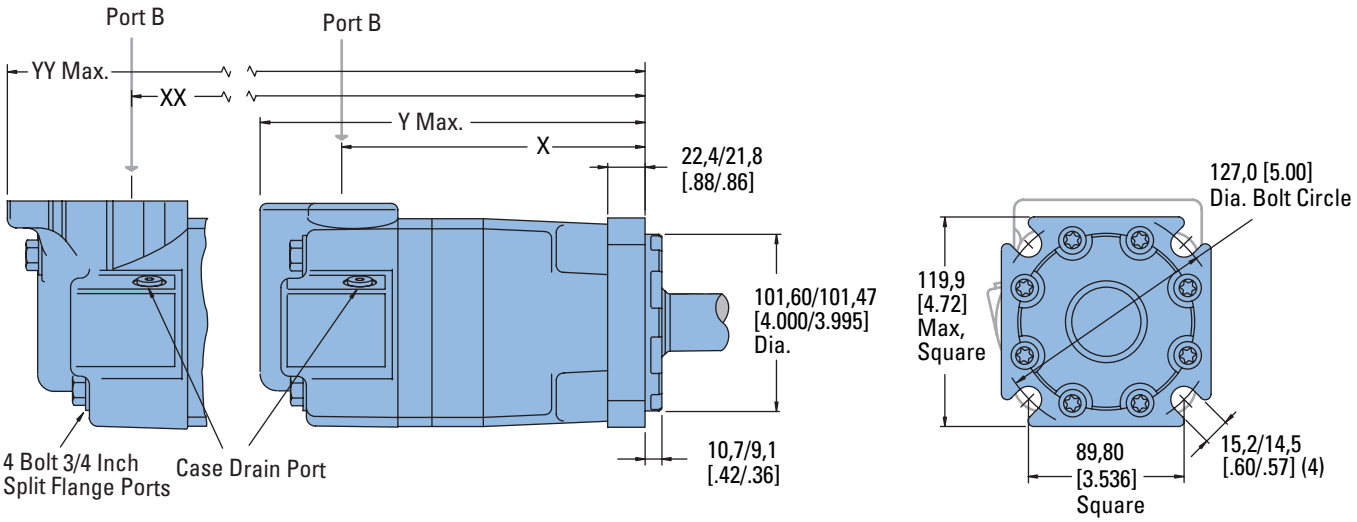
4 Bolt 3/4 inch Split Flange Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or

G 3/4 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1)

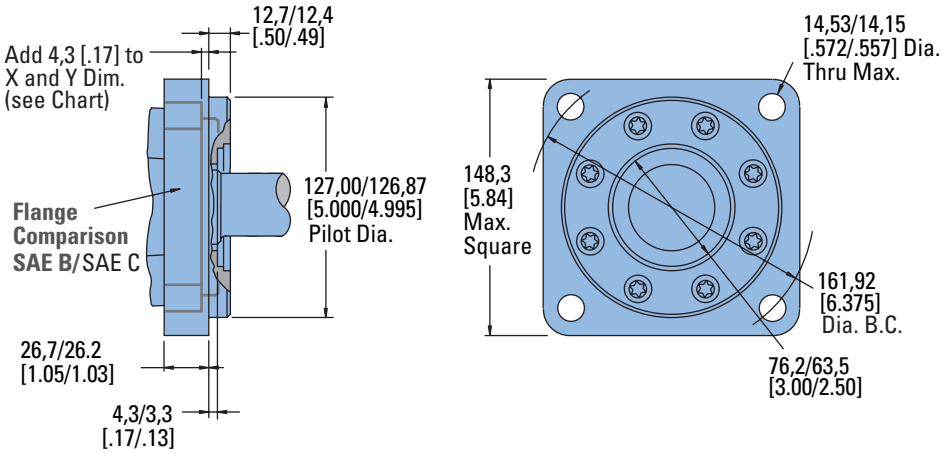
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Standard Mount



SAE C Flange



STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	158,3 [6.23]	214,4 [8.44]	167,3 [6.59]	246,3 [9.70]
130 [7.9]	162,3 [6.39]	218,4 [8.60]	171,3 [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

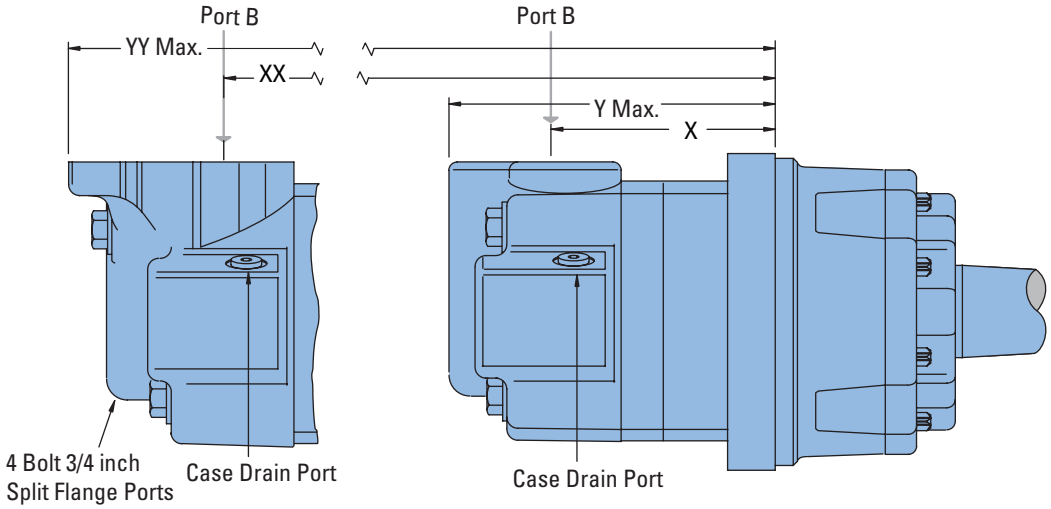
Ports

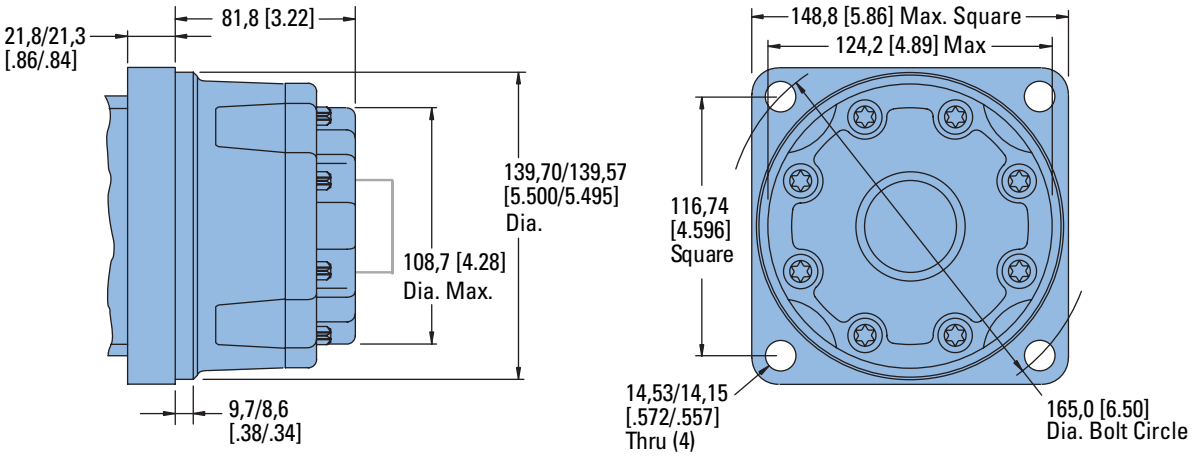
1 1/16 -12 UN-2B SAE O-ring Staggered Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
4 Bolt 3/4 inch Split Flange Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or
G 3/4 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Wheel Mount





WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/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

Ports

1 1/16 -12 UN-2B SAE O-ring Staggered Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or

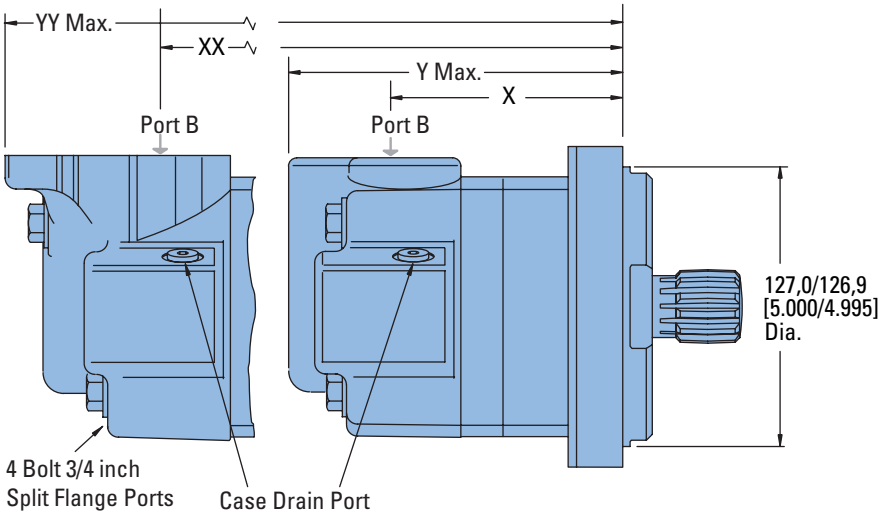
4 Bolt 3/4 inch Split Flange Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or

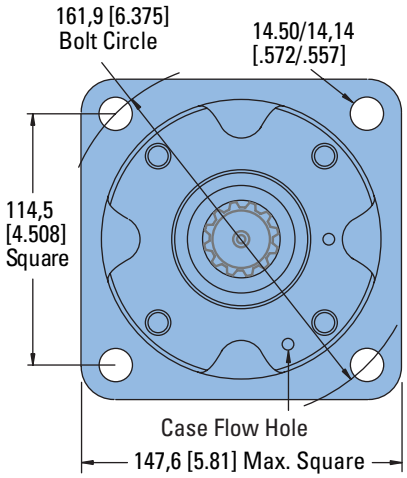
G 3/4 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1)

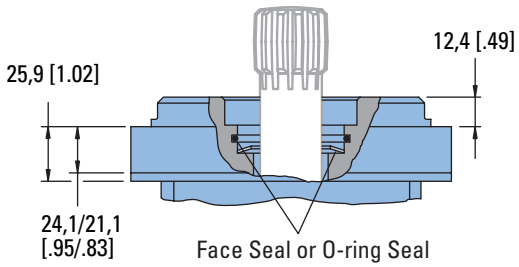
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Bearingless



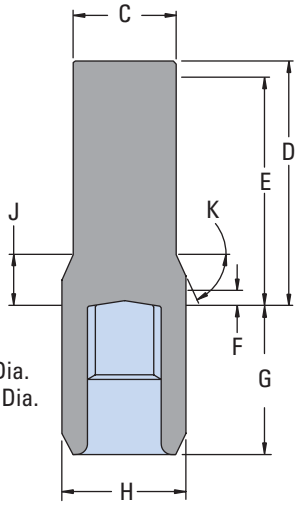




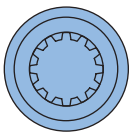
For 4000 Series Bearingless Motor application information contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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



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



Mating Coupling Blank
Eaton Part No. 12745-003

BEARINGLESS MOTOR DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	91,0 [3.58]	146,8 [5.78]	100,1 [3.94]	178,8 [7.04]
130 [7.9]	95,0 [3.74]	150,8 [5.94]	104,1 [4.10]	182,9 [7.20]
160 [9.9]	101,4 [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.

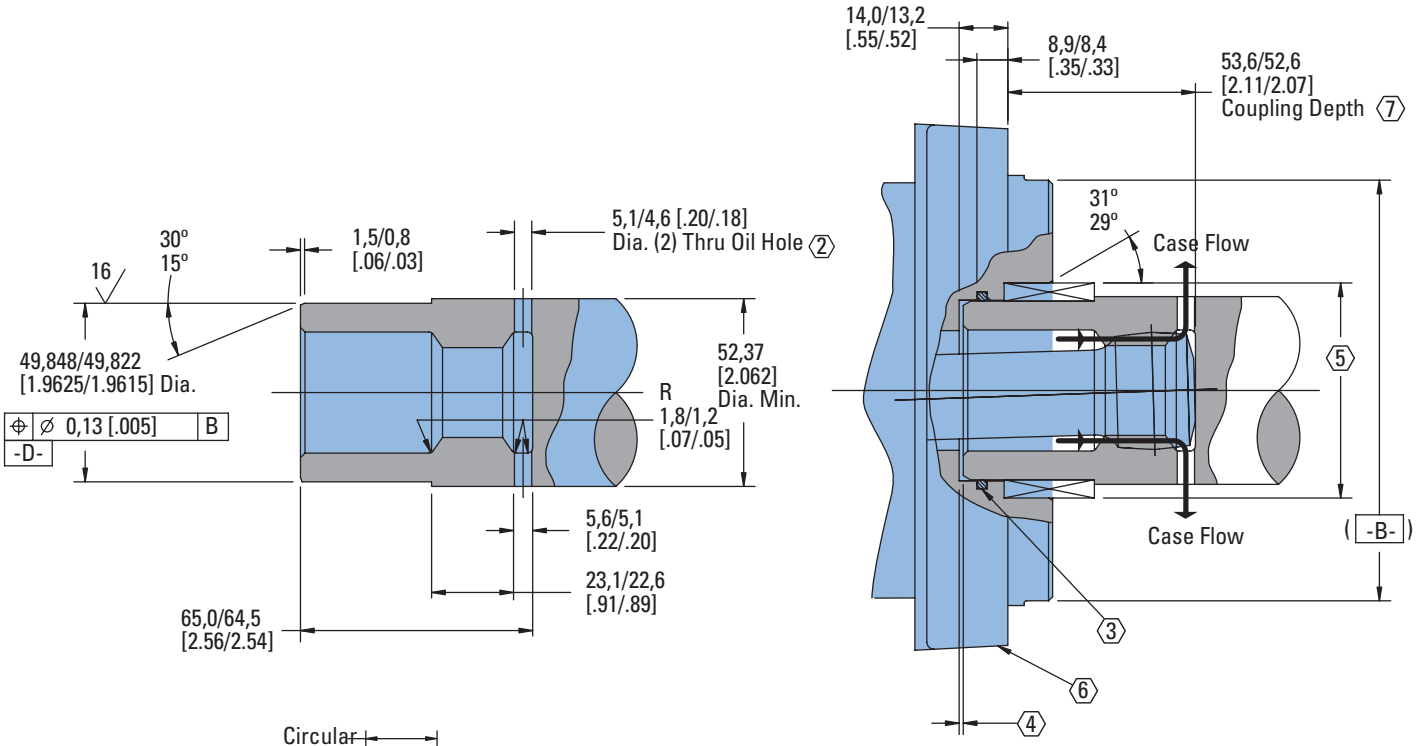
3 Seal to be furnished with motor for proper oil circulation thru splines.

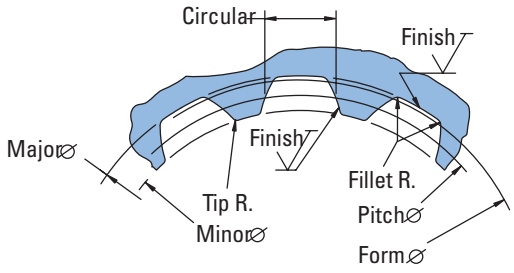
4 Some means of maintaining clearance between shaft and mounting flange must be provided.

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).



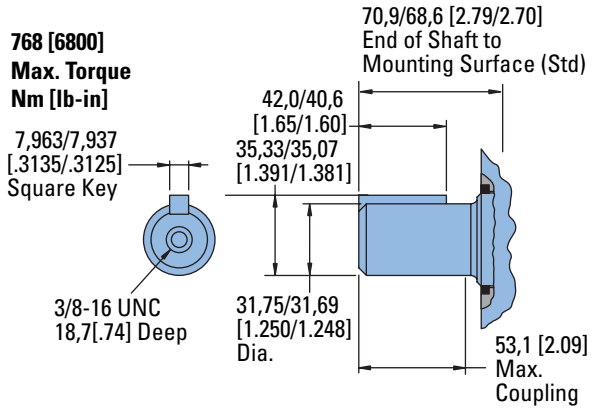


Spline Pitch	10/20
Pressure Angle	30°
Number of teeth	12
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 30,480000 [1.2000000] ⌖ 0,20 [.008] D
Base Diameter	Ref. 26,396455 [1.0392305]
Major Diameter	33,43 [1.316] Max. 33,23 [1.308] Min.
Min. Minor Diameter	28,40 - 28,58 [1.118 - 1.125]
Form 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 [.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

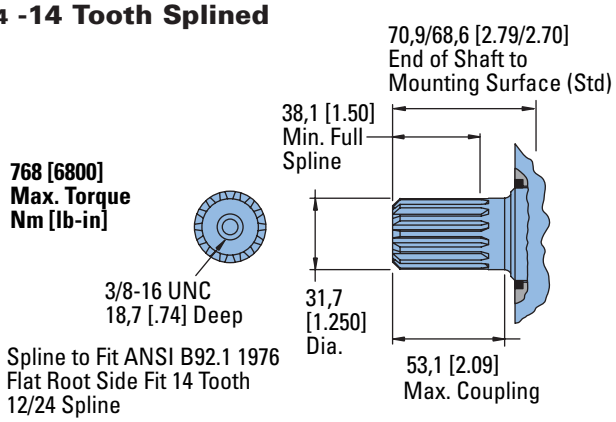
Dimensions

Shafts

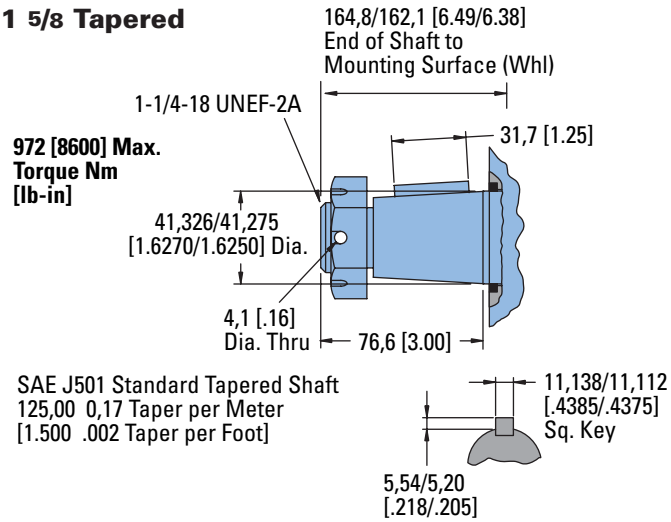
1 1/4 Inch Straight



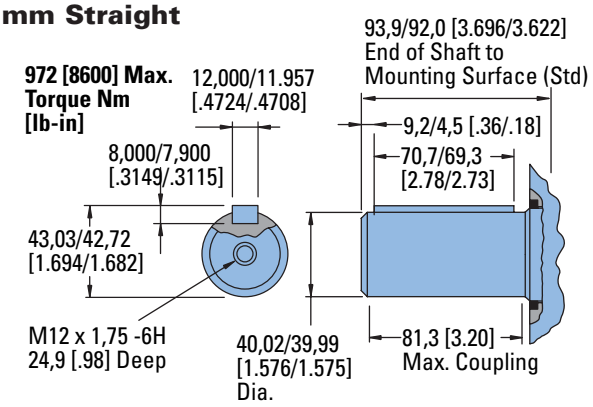
1 1/4 -14 Tooth Splined



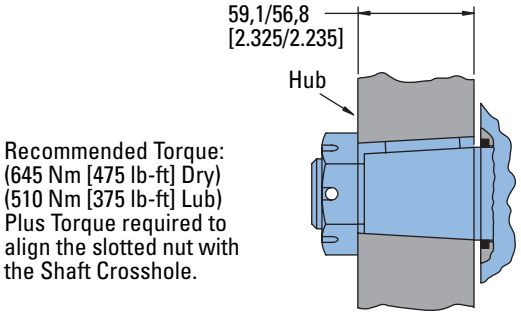
1 5/8 Tapered



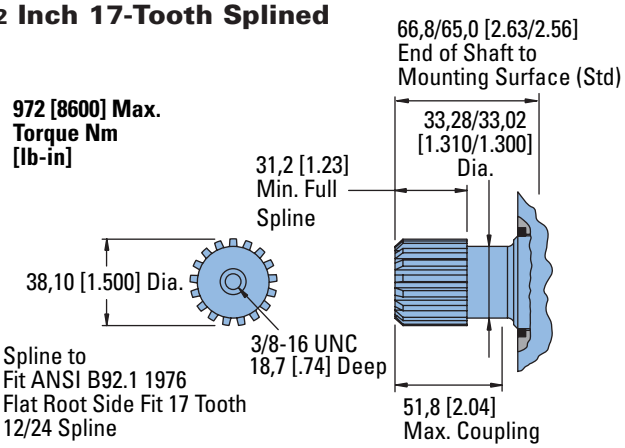
40 mm Straight



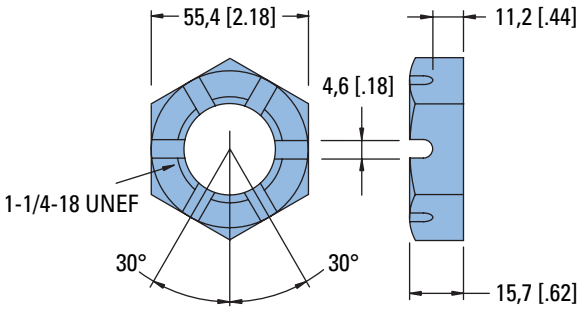
Tapered Shaft Hub Data



1 1/2 Inch 17-Tooth Splined



Slotted Hexagon Nut

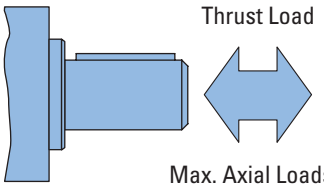


Shaft Side Load Capacity

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].

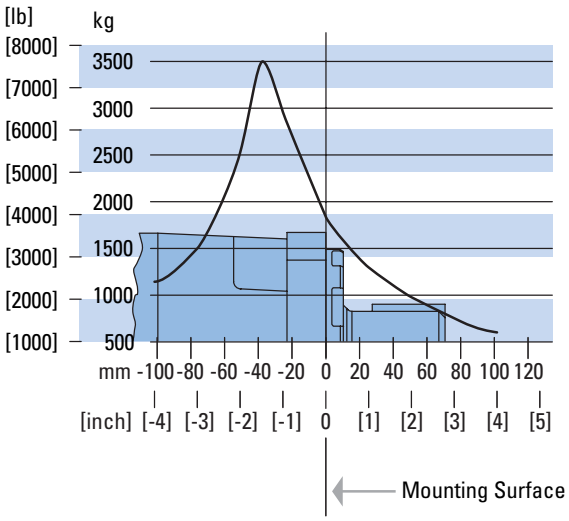


Each curve is based on B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque. To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

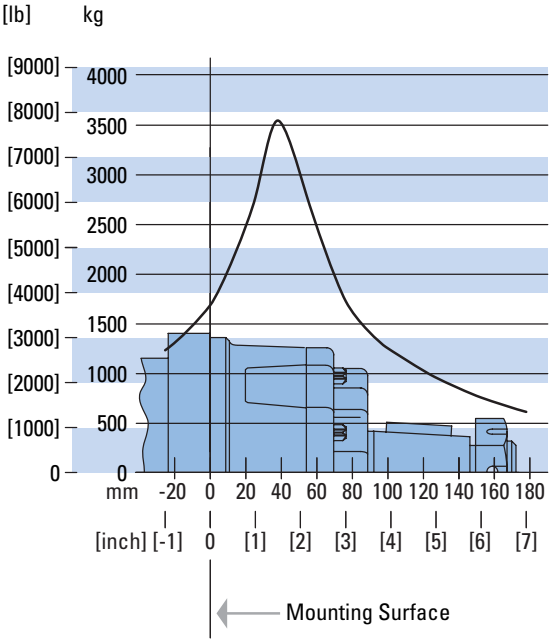
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



Wheel Motor Tapered Shaft



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.

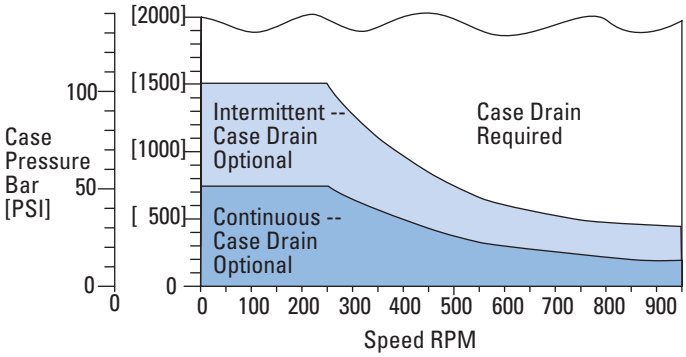
Case Porting Advantage

Contamination Control — flushing the motor case.

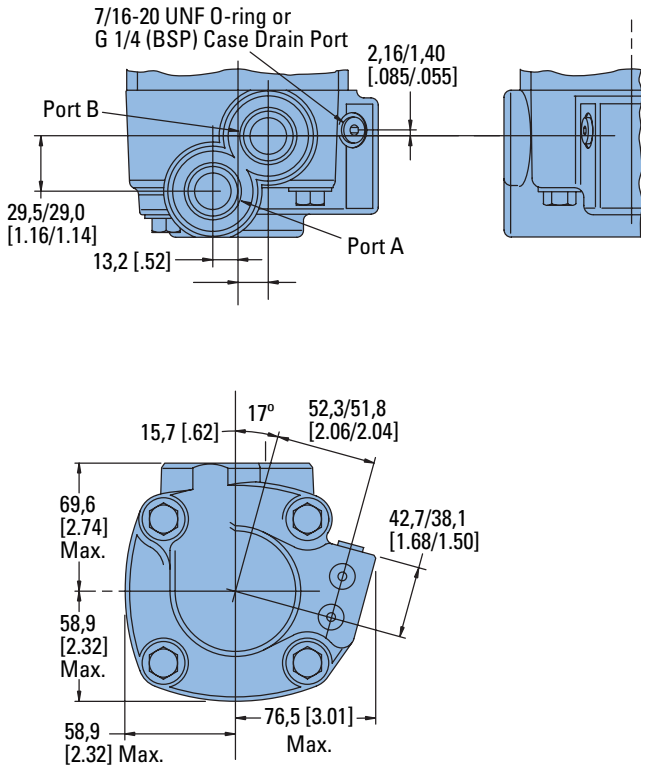
Cooler Motor — exiting oil draws motor heat away.

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

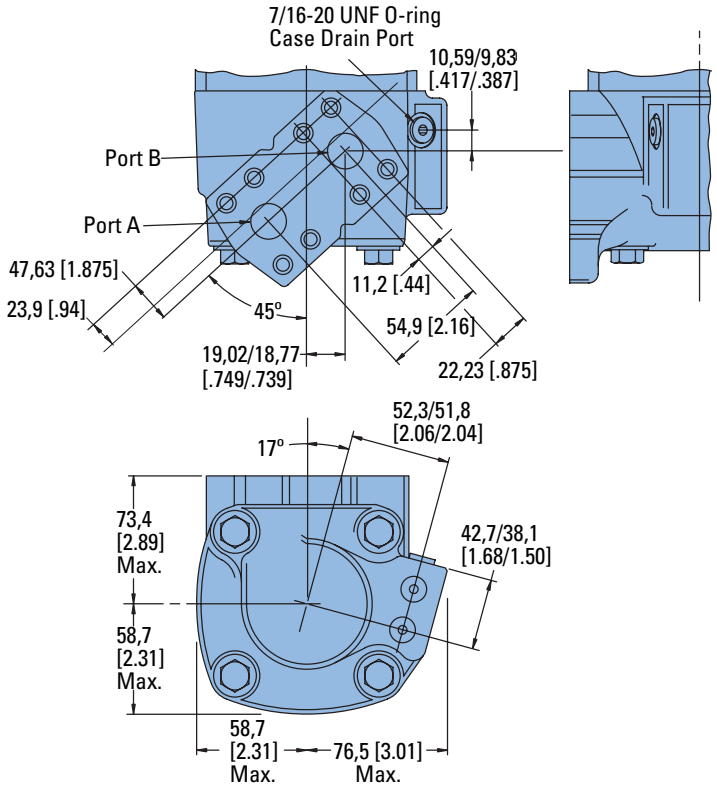
Case Pressure Seal Limitation



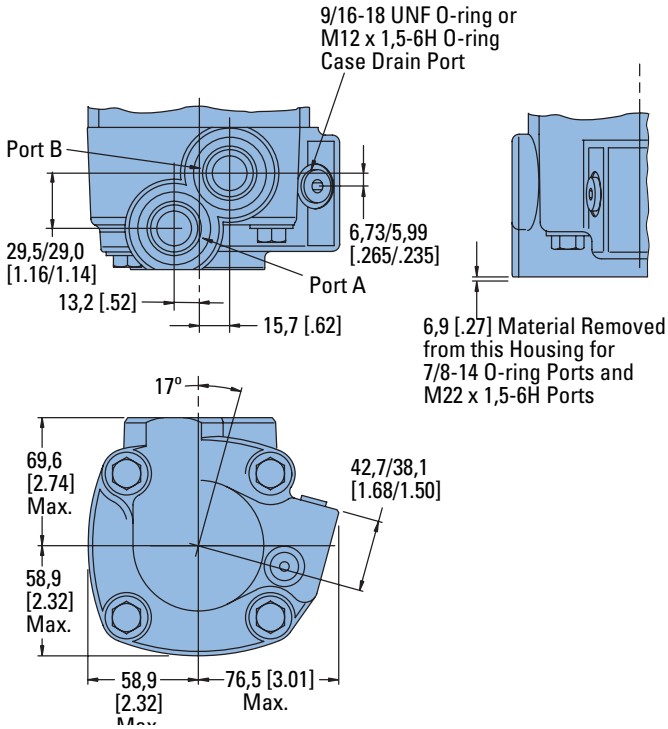
1-1/16-12 O-ring Ports (2) or G 3/4 (BSP) Ports (2)



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	—	—

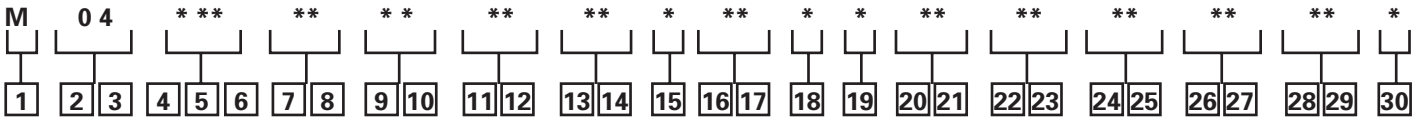
* New Release

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.



1 Product M

2, 3 Series

04 – 4000 Series

4, 5, 6 Displacement cm³/r [in³/r]

067 – 109.8
080 – 130.3
099 – 162.2
125 – 205.5
150 – 246.3
171 – 280.1
190 – 311.8
225 – 369.0
240 – 393.9
301 – 492.6
342 – 560.2
381 – 623.9

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.

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

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

00 – None

A – Set at 4.5 Bar [65 Lbf/In²]

B – Set at 15.2 Bar [220 Lbf/In²]

C – Set at 13.1 Bar [190 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)

0 – No Paint, Individual Box

26, 27 Paint/Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

C – Epoxy Coated (Frost Gray), Individual Box

28, 29 Customer Identification

0 –None

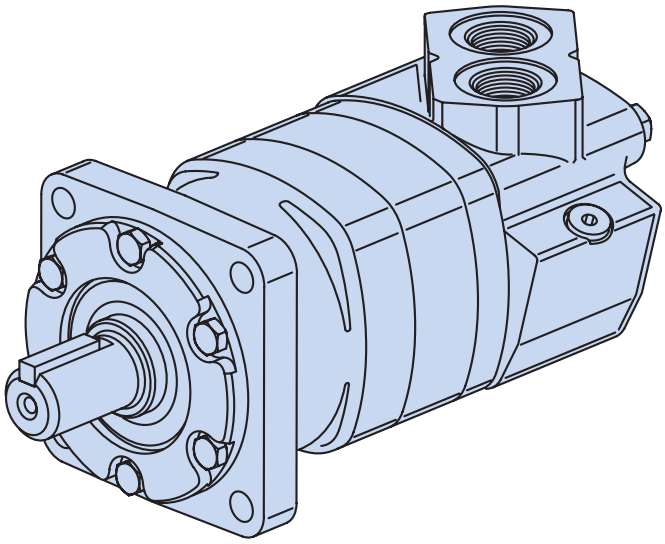
30 Design Code

F – Sixth

Notes

6000 Series

Highlights



Features

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

Benefits

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

Applications

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

Description

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

Specifications

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

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

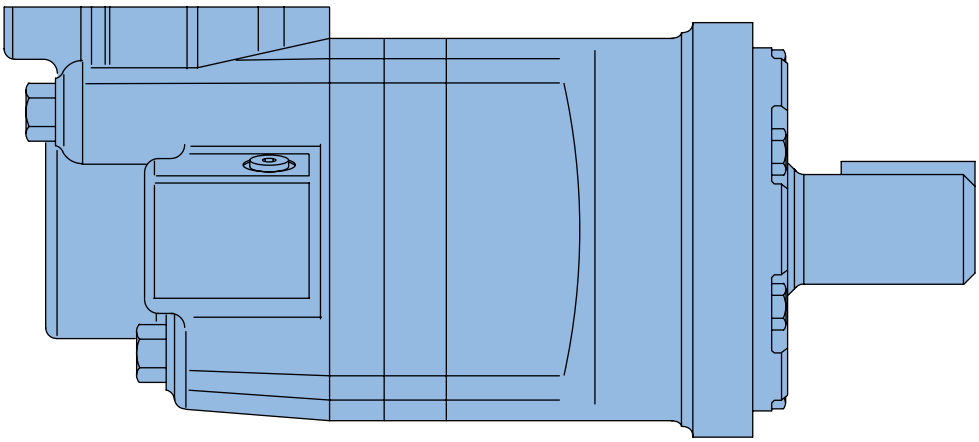
Mowing

Snow Removal

Sprayer

Trencher

6000 Series
Specifications



6000 SERIES MOTORS

Displ. cm³/r [in³/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) @ Flow	Continuous	775	615	485	387	307	241	203	187	153
	Intermittent	866	834	698	570	454	355	303	280	230
Flow l/min [GPM]	Continuous	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]
	Intermittent	170 [45]	210 [55]	225 [60]	225 [60]	225[60]	225 [60]	225[60]	225[60]	225 [60]
Torque* Nm [lb-in]	Continuous	575 [5100]	735 [6510]	930 [8230]	1155 [10230]	1445 [12800]	1480 [13100]	1378 [12192]	1582 [14004]	1685 [14920]
	Intermittent	860 [7620]	1100 [9740]	1355 [11990]	1635 [14490]	1885 [16670]	1898 [16800]	1699 [15040]	1850 [16377]	1875 [16580]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	170 [2500]	140 [2000]	140 [2000]	140 [2000]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	275 [4000]	221 [3200]	170 [2500]	170 [2500	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	240 [3500]	205 [3000]	170 [2500	170 [2250]
Weight kg [lb]	Standard or Wheel Mount	24,9 [55.0]	25,2 [55.5]	25,6 [56.5]	26,3 [58.0]	27.0 [59.5]	27,9 [61.5]	28.6 [63.0]	29 [64.0]	30,4 [67.0]
	Bearingless	20.2 [44.5]	20.4 [45.0]	20.9 [46.0]	21.5 [47.5]	22.2 [49.0]	23.1 [51.0]	28.3 [52.5]	28.8 [53.5]	30.2 [56.5]

Maximum Case Pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations..

Note:

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

Maximum Inlet Pressure:

310 bar [4500 PSI]

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

Maximum Return Pressure:

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

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

Δ bar [Δ PSI] :

The true pressure difference between inlet port and outlet port

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

6000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

195 cm³/r [11.9 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] 1,9	[280] 30 **9**	[650] 75 **7**	[1450] 165 **5**	[2290] 260 **2**						
[2] 7,5	[290] 35 **38**	[680] 75 **37**	[1500] 170 **35**	[2340] 265 **34**	[3100] 350 **30**	[3880] 440 **26**	[4140] 470 **18**			
[4] 15	[300] 35 **77**	[710] 80 **76**	[1500] 175 **74**	[2390] 270 **72**	[3210] 365 **66**	[4030] 455 **62**	[4600] 520 **46**	[5200] 590 **32**	[5790] 655 **18**	
[8] 30	[310] 35 **154**	[740] 85 **153**	[1590] 180 **148**	[2450] 275 **144**	[3280] 370 **131**	[4120] 465 **119**	[4810] 545 **116**	[5530] 625 **99**	[6250] 705 **83**	[6900] 780 **65**
[12] 45	[320] 35 **232**	[750] 85 **230**	[1610] 180 **225**	[2480] 280 **221**	[3330] 375 **212**	[4190] 475 **203**	[4990] 565 **186**	[5810] 655 **167**	[6630] 750 **148**	[7320] 825 **118**
[16] 61	[300] 35 **309**	[730] 80 **307**	[1600] 180 **303**	[2470] 280 **300**	[3340] 375 **291**	[4210] 475 **283**	[5090] 575 **258**	[5900] 665 **236**	[6710] 760 **214**	[7470] 845 **181**
[20] 76	[270] 30 **387**	[720] 80 **384**	[1590] 180 **379**	[2460] 280 **374**	[3350] 380 **365**	[4240] 480 **356**	[5100] 575 **332**	[5950] 670 **306**	[6800] 770 **280**	[7620] 860 **247**
[24] 91	[240] 25 **465**	[700] 80 **462**	[1570] 175 **456**	[2440] 275 **450**	[3330] 375 **440**	[4220] 475 **429**	[5080] 575 **413**	[5940] 670 **388**	[6810] 770 **363**	
[28] 106	[190] 20 **542**	[660] 75 **539**	[1530] 175 **532**	[2400] 270 **526**	[3300] 375 **514**	[4200] 475 **502**	[5060] 570 **476**	[5940] 670 **448**	[6810] 770 **421**	
[32] 121	[160] 20 **620**	[630] 70 **617**	[1500] 170 **609**	[2370] 270 **602**	[3270] 370 **589**	[4160] 470 **576**	[5040] 570 **542**	[5920] 670 **511**	[6790] 765 **480**	
[36] 136	[120] 15 **697**	[620] 70 **692**	[1480] 165 **683**	[2350] 265 **674**	[3240] 365 **659**	[4130] 465 **645**	[5000] 565 **601**	[5880] 665 **564**	[6760] 765 **527**	
[40] 151	[80] 10 **775**	[610] 70 **770**	[1450] 165 **759**	[2320] 260 **749**	[3210] 365 **733**	[4100] 465 **718**	[4960] 560 **666**	[5840] 660 **624**		
[45] 170		[590] 65 **866**	[1410] 160 **854**	[2280] 260 **843**	[3170] 360 **825**	[4060] 460 **808**	[4920] 555 **749**	[5790] 655 **702**		

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

245 cm³/r [15.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[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 **7**	[860] 95 **4**	[1890] 215 **1**							
[2] 7,5	[440] 50 **30**	[900] 100 **29**	[1940] 220 **26**	[2990] 340 **24**	[3960] 445 **21**	[4920] 555 **17**	[5040] 570 **11**	[5930] 670 **6**		
[4] 15	[460] 50 **61**	[940] 105 **60**	[2000] 225 **56**	[3060] 345 **54**	[4080] 460 **48**	[5090] 575 **42**	[5680] 640 **39**	[6630] 750 **30**	[7570] 855 **12**	[8520] 965 **6**
[8] 30	[470] 55 **122**	[960] 110 **120**	[2060] 235 **116**	[3150] 355 **113**	[4210] 475 **104**	[5260] 595 **95**	[6180] 700 **81**	[7100] 800 **67**	[8020] 905 **53**	[9020] 1020 **37**
[12] 45	[480] 55 **183**	[970] 110 **182**	[2080] 235 **178**	[3180] 360 **174**	[4270] 480 **165**	[5360] 605 **157**	[6390] 720 **141**	[7420] 840 **125**	[8450] 955 **109**	[9510] 1075 **92**
[16] 61	[450] 50 **245**	[960] 110 **244**	[2070] 235 **240**	[3180] 360 **236**	[4290] 485 **228**	[5420] 610 **221**	[6480] 730 **202**	[7490] 845 **184**	[8480] 960 **165**	[9540] 1180 **145**
[20] 76	[420] 45 **307**	[940] 105 **306**	[2050] 230 **301**	[3160] 355 **297**	[4290] 485 **287**	[5440] 615 **277**	[6510] 735 **257**	[7580] 855 **238**	[8660] 980 **218**	[9740] 1100 **197**
[24] 91	[380] 45 **368**	[920] 105 **365**	[2020] 230 **361**	[3120] 355 **358**	[4260] 480 **348**	[5400] 610 **338**	[6490] 735 **316**	[7590] 860 **294**	[8680] 980 **271**	
[28] 106	[330] 35 **430**	[870] 100 **426**	[1980] 225 **421**	[3100] 350 **416**	[4240] 480 **404**	[5380] 610 **376**	[6480] 730 **358**	[7580] 855 **340**	[8670] 980 **322**	
[32] 121	[290] 35 **491**	[800] 90 **489**	[1920] 215 **481**	[3050] 345 **475**	[4170] 470 **461**	[5290] 600 **448**	[6410] 725 **423**	[7520] 850 **398**	[8640] 975 **373**	
[36] 136	[250] 30 **556**	[730] 80 **549**	[1850] 210 **543**	[2980] 335 **537**	[4060] 460 **524**	[5150] 580 **509**	[6300] 710 **482**	[7440] 840 **456**		
[40] 151	[200] 25 **615**	690] 80 **612**	[1790] 200 **606**	[2940] 330 **599**	[4010] 455 **585**	[5130] 580 **570**	[6190] 700 **540**	[7100] 800 **510**		
[45] 170		[570] 65 **688**	[1760] 200 **682**	[2860] 325 **674**	[3960] 445 **658**	[5070] 575 **641**	[6080] 685 **608**	[6690] 755 **574**		
[50] 189			[1720] 195 **758**	[2800] 315 **749**	[3890] 440 **731**	[4920] 555 **712**	[5940] 670 **676**			
[55] 208			[1670] 190 **834**	[2740] 310 **824**	[3820] 430 **804**	[4890] 550 **783**	[5880] 665 **744**			

6000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

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

Flow LPM [GPM]	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[.5] **1,9**	[530] 60 **6**	[1120] 125 **4**	[2440] 275 **1**							
[2] **7,5**	[540] 60 **24**	[1150] 130 **23**	[2460] 280 **22**	[3620] 410 **20**	[4780] 540 **17**	[5690] 645 **14**	[6670] 755 **10**	[7780] 880 **4**		
[4] **15**	[550] 60 **48**	[1180] 135 **47**	[2560] 290 **45**	[3800] 430 **42**	[5030] 570 **38**	[6050] 685 **32**	[7070] 800 **24**	[8260] 935 **17**	[9070] 1025 **10**	[9530] 1075 **3**
[8] **30**	[560] 65 **96**	[1250] 140 **95**	[2650] 300 **91**	[3970] 450 **87**	[5280] 595 **81**	[6480] 730 **73**	[7710] 870 **64**	[8740] 985 **55**	[9770] 1105 **46**	[10990] 1240 **35**
[12] **45**	[570] 65 **144**	[1260] 140 **143**	[2690] 305 **140**	[4050] 460 **135**	[5420] 610 **129**	[6730] 760 **121**	[8040] 910 **111**	[9260] 1045 **99**	[10490] 1185 **88**	[11800] 1335 **76**
[16] **61**	[540] 60 **193**	[1230] 140 **192**	[2660] 300 **188**	[4060] 460 **184**	[5450] 615 **178**	[6800] 770 **167**	[8150] 920 **156**	[9400] 1060 **141**	[10660] 1205 **126**	[11990] 1355 **109**
[20] **76**	[510] 60 **242**	[1200] 135 **241**	[2630] 295 **236**	[4040] 455 **232**	[5450] 615 **226**	[6820] 770 **216**	[8190] 925 **201**	[9520] 1075 **184**	[10840] 1225 **167**	
[24] **91**	[480] 55 **290**	[1160] 130 **289**	[260] 295 **282**	[4020] 455 **279**	[5440] 615 **273**	[6840] 775 **260**	[8230] 930 **248**	[9560] 1080 **232**	[10900] 1230 **215**	
[28] **106**	[420] 45 **339**	[1130] 130 **336**	[2570] 290 **333**	[3990] 450 **328**	[5420] 610 **320**	[6820] 770 **308**	[8220] 930 **295**	[9520] 1075 **276**	[10840] 1225 **257**	
[32] **121**	[360] 40 **388**	[1100] 125 **384**	[2510] 285 **381**	[3920] 445 **375**	[5330] 600 **368**	[6750] 765 **354**	[8170] 920 **341**	[9440] 1065 **320**		
[36] **136**	[300] 35 **436**	[1060] 120 **430**	[2440] 275 **421**	[3830] 435 **416**	[5220] 590 **410**	[6660] 750 **396**	[8100] 915 **383**	[9330] 1055 **360**		
[40] **151**	[270] 30 **485**	[1020] 115 **478**	[2400] 270 **466**	[3780] 425 **461**	[5150] 580 **456**	[6580] 745 **441**	[8020] 905 **427**	[9220] 1040 **403**		
[50] **189**		[982] 110 **597**	[2180] 245 **582**	[3420] 385 **576**	[4660] 525 **570**	[6050] 685 **551**	[7440] 840 **534**			
[60] **227**			[1960] 220 **698**	[3250] 365 **691**	[4540] 515 **684**	[5750] 650 **661**	[7080] 800 **641**			

[5750] 650 **661** } Torque [lb-in] Nm **Speed RPM**

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

Flow LPM [GPM]	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275	[4500] 310
[1] **3,8**	[760] 85 **4**	[1570] 175 **2**	[3230] 365 **1**							
[2] **7,5**	[780] 90 **19**	[1610] 180 **18**	[3270] 370 **17**	[4910] 555 **16**	[6440] 730 **14**	[7760] 875 **12**	[9080] 1025 **9**	[10590] 1195 **4**		
[4] **15**	[800] 90 **38**	[1640] 185 **38**	[3300] 375 **37**	[4970] 560 **35**	[6570] 740 **33**	[8160] 920 **29**	[9570] 1080 **22**	[11270] 1275 **14**	[12120] 1370 **5**	[14490] 1635 **1**
[8] **30**	[810] 90 **77**	[1650] 185 **76**	[3370] 380 **74**	[5080] 575 **72**	[6740] 760 **68**	[8430] 950 **65**	[10050] 1135 **55**	[11620] 1315 **45**	[12880] 1455 **33**	[14480] 1635 **21**
[12] **45**	[800] 90 **115**	[1620] 185 **115**	[3390] 385 **112**	[5130] 580 **109**	[6810] 770 **105**	[8520] 965 **100**	[10190] 1150 **91**	[11860] 1340 **81**	[13640] 1540 **79**	
[16] **61**	[750] 85 **154**	[1600] 180 **154**	[3380] 380 **151**	[5120] 580 **147**	[6820] 770 **143**	[8560] 965 **132**	[10230] 1155 **126**	[11920] 1345 **116**		
[20] **76**	[680] 75 **193**	[1580] 180 **193**	[3360] 380 **189**	[5120] 580 **187**	[6840] 775 **182**	[8590] 970 **175**	[10280] 1160 **162**	[11980] 1355 **152**		
[24] **91**	[620] 70 **232**	[1520] 170 **230**	[3280] 370 **229**	[5060] 570 **225**	[6780] 765 **220**	[8530] 965 **212**	[10240] 1155 **204**			
[28] **106**	[570] 65 **270**	[1460] 165 **268**	[3210] 365 **266**	[5000] 565 **261**	[6730] 760 **256**	[8480] 960 **248**	[10200] 1150 **236**			
[32] **121**	[530] 60 **309**	[1420] 160 **306**	[3140] 355 **304**	[4930] 555 **299**	[6640] 750 **292**	[8380] 945 **282**	[10120] 1145 **269**			
[36] **136**	[450] 50 **348**	[1370] 155 **346**	[3010] 340 **340**	[4840] 545 **336**	[6500] 730 **329**	[8250] 930 **317**	[10000] 1130 **301**			
[40] **151**	[380] 45 **387**	[1320] 150 **386**	[2880] 325 **380**	[4740] 535 **375**	[6460] 730 **368**	[8120] 915 **359**				
[50] **189**		[1140] 130 **482**	[2650] 300 **475**	[4540] 515 **469**	[6440] 730 **460**	[8050] 910 **449**				
[60] **227**			[2460] 280 **570**	[4430] 500 **562**	[6360] 720 **552**	[7860] 890 **538**				

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

490 cm³/r [30.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[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**

625 cm³/r [38.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3200] 221
[1] **3,8**	[1060] 120 **5**	[2205] 250 **5**	[4515] 510 **4**	[6690] 755 **2**				
[2] **7,5**	[1090] 125 **12**	[2300] 260 **12**	[4720] 535 **13**	[7025] 795 **10**	[9360] 1060 **6**			
[4] **15**	[1145] 130 **24**	[2450] 275 **24**	[5052] 570 **24**	[7520] 850 **21**	[9410] 1065 **16**	[12700] 1434 **13**		
[8] **30**	[1195] 135 **45**	[2600] 295 **45**	[5350] 605 **44**	[8195] 925 **42**	[11220] 1270 **37**	[13100] 1480 **35**	[15800] 1785 **32**	[16800] 1898 **30**
[12] **45**	[1200] 135 **72**	[2600] 295 **72**	[5390] 610 **71**	[8145] 920 **68**	[11770] 1330 **64**	[13000] 1469 **60**	[15700] 1774 **56**	
[16] **61**	[1120] 125 **94**	[2530] 285 **94**	[5340] 605 **92**	[8105] 915 **89**	[11740] 1325 **85**	[13000] 1469 **83**		
[20] **76**	[1050] 120 **120**	[2465] 280 **119**	[5285] 595 **117**	[8080] 915 **115**	[11725] 1325 **110**			
[24] **91**	[950] 105 **144**	[2365] 265 **143**	[5180] 585 **140**	[7990] 905 **138**	[11705] 1320 **132**			
[28] **106**	[855] 95 **169**	[2255] 255 **168**	[5080] 575 **165**	[7915] 895 **162**	[11640] 1315 **156**			
[32] **121**	[730] 80 **193**	[2140] 240 **192**	[4960] 560 **188**	[7775] 880 **185**	[11505] 1300 **179**			
[36] **136**	[555] 65 **217**	[1965] 220 **216**	[4780] 540 **213**	[7585] 855 **210**				
[40] **151**	[380] 45 **241**	[1790] 200 **240**	[4600] 520 **238**	[7395] 835 **236**				
[50] **189**			[4180] 470 **296**	[6985] 790 **290**				
[60] **227**			[3800] 430 **353**	[6600] 745 **345**				

6000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

735 cm³/r [45.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170
[1] **3,8**	[1311] 148 **4**	[2775] 314 **4**	[4200] 475 **3**	[5480] 619 **3**	[7000] 791 **2**					
[2] **7,5**	[1340] 151 **10**	[2856] 323 **10**	[4535] 512 **10**	[5809] 656 **10**	[7551] 853 **9**	[8685] 981 **7**	[10182] 1150 **6**	[11121] 1257 **5**		
[4] **15**	[1253] 142 **20**	[2854] 322 **20**	[4363] 493 **19**	[5813] 657 **18**	[7272] 822 **17**	[8714] 985 **16**	[10135] 1145 **14**	[11537] 1303 **13**	[12970] 1465 **11**	[15040] 1699 **11**
[8] **30**	[1290] 146 **40**	[2889] 326 **39**	[4540] 513 **38**	[6130] 693 **38**	[7703] 870 **37**	[9202] 1040 **37**	[10666] 1205 **35**	[12192] 1378 **33**	[13713] 1549 **32**	
[12] **45**	[1277] 144 **61**	[2821] 319 **60**	[4528] 512 **59**	[6180] 698 **58**	[7795] 881 **57**	[9338] 1055 **56**	[10877] 1229 **54**	[12419] 1403 **52**		
[16] **61**	[1196] 135 **82**	[2753] 311 **80**	[4478] 506 **79**	[6148] 695 **78**	[7768] 878 **77**	[9376] 1059 **76**	[10984] 1241 **74**			
[20] **76**	[1092] 123 **102**	[2794] 316 **101**	[4320] 488 **101**	[6021] 680 **99**	[7697] 870 **97**	[9311] 1052 **96**	[10907] 1232 **93**			
[24] **91**	[1206] 136 **123**	[2556] 289 **122**	[4162] 470 **120**	[5871] 663 **119**	[7564] 855 **118**	[9289] 1049 **116**				
[28] **106**	[1083] 122 **145**	[2338] 264 **142**	[4040] 456 **141**	[5666] 640 **139**	[7365] 832 **137**	[9022] 1019 **135**				
[32] **121**	[950] 107 **163**	[2110] 238 **162**	[3795] 429 **162**	[5457] 617 **159**	[7122] 805 **159**	[8828] 997 **156**				
[36] **136**	[726] 82 **184**	[1845] 208 **183**	[3517] 397 **182**	[5223] 590 **181**	[6853] 774 **179**					
[40] **151**	[515] 58 **203**	[2227] 252 **202**	[3270] 369 **202**	[4965] 561 **201**	[6672] 754 **199**					
[50] **189**			[3869] 437 **254**	[4148] 469 **252**	[5850] 661 **250**					
[60] **227**				[4856] 549 **303**	[6604] 746 **301**					

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

805 cm³/r [49.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[750] 50	[1000] 70	[1250] 85	[1500] 105	[1750] 120	[2000] 140	[2250] 155	[2500] 170
[1] **3,8**	[1455] 164 **4**	[3100] 350 **4**	[4680] 529 **2**	[6031] 681 **2**	[7799] 881 **1**					
[2] **7,5**	[1483] 168 **9**	[3173] 359 **9**	[5121] 579 **9**	[6432] 727 **8**	[8510] 961 **7**	[9633] 1088 **6**	[11319] 1279 **5**	[12127] 1370 **5**		
[4] **15**	[1547] 175 **19**	[3331] 376 **19**	[5292] 598 **18**	[6744] 762 **17**	[8714] 984 **16**	10075] 1138 **15**	[11352] 1283 **14**	[12539] 1417 **12**	[14564] 1645 **11**	[16377] 1850 **10**
[8] **30**	[1599] 181 **35**	[3473] 392 **35**	[5415] 612 **34**	[7039] 795 **33**	[8934] 1009 **32**	[10629] 1201 **31**	[11842] 1338 **29**	[14004] 1582 **29**	[15441] 1745 **28**	
[12] **45**	[1599] 181 **56**	[3469] 392 **56**	[5415] 612 **55**	[7093] 801 **53**	[9024] 1020 **53**	[10658] 1204 **52**	[12283] 1388 **50**	[13726] 1551 **50**		
[16] **61**	[1543] 174 **73**	[3395] 384 **73**	[5357] 605 **72**	[7032] 794 **70**	[8983] 1015 **69**	[10640] 1202 **68**	[12010] 1357 **67**			
[20] **76**	[1457] 165 **93**	[3312] 374 **92**	[5292] 598 **91**	[6968] 787 **89**	[8943] 1010 **88**	[10583] 1196 **87**	[12146] 1372 **86**			
[24] **91**	[1352] 153 **112**	[3183] 360 **112**	[5088] 575 **111**	[6811] 769 **110**	[8812] 996 **108**	[10411] 1176 **106**				
[28] **106**	[1213] 137 **131**	[3055] 345 **131**	[5047] 570 **131**	[6713] 758 **129**	[8681] 981 **128**	[10411] 1176 **127**				
[32] **121**	[1075] 121 **150**	[2907] 328 **149**	[4884] 552 **149**	[6546] 740 **146**	[8395] 949 **145**	[10060] 1137 **144**				
[36] **136**	[823] 93 **168**	[2692] 304 **168**	[4663] 527 **168**	[6320] 714 **167**	[8118] 917 **165**					
[40] **151**	[592] 67 **187**	[2477] 280 **186**	[4426] 500 **186**	[6085] 688 **185**	[7832] 885 **184**					
[50] **189**		[2730] 308 **234**	[4214] 476 **233**	[5849] 661 **231**	[7603] 859 **230**					
[60] **227**			[3806] 430 **280**	[5459] 617 **277**	[7407] 837 **275**					

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]

Flow LPM [GPM]

	[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

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

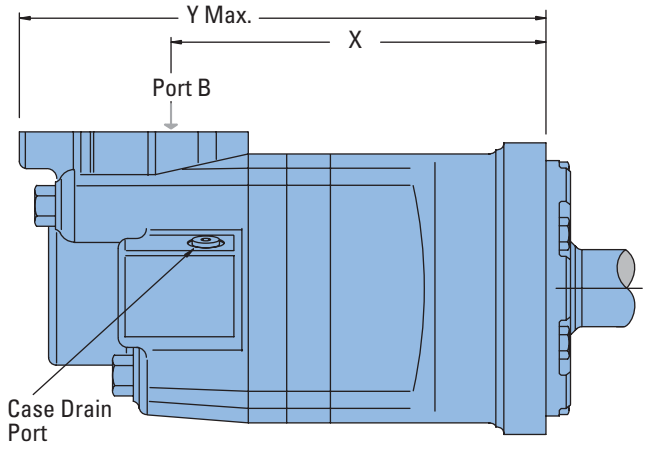
G 1 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1) or

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)

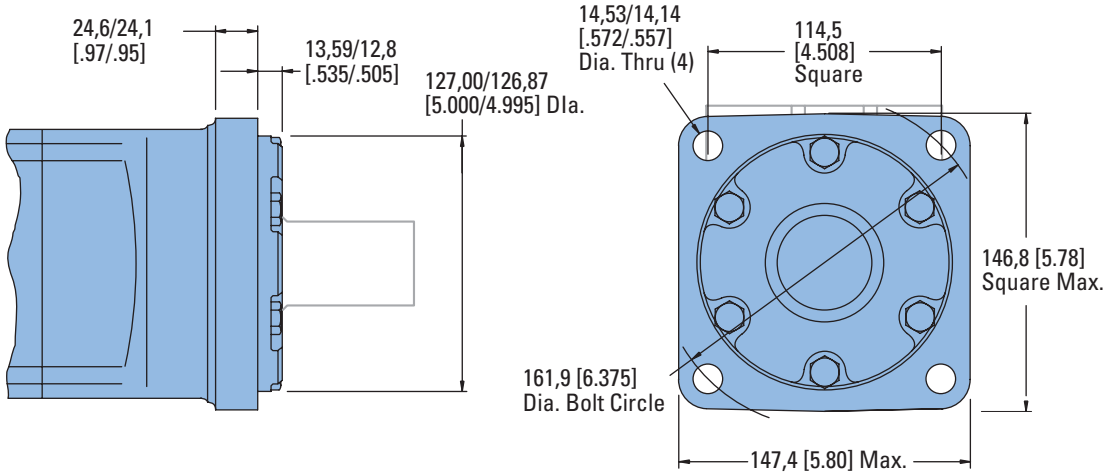
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Standard Mount



Standard SAE CC Flange



STANDARD MOTOR MOUNT DIMENSIONS

Displacement cm³/r [in³/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

Ports

1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
7/16 -20 UNF-2B SAE O-ring Case Drain Port (1) or

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

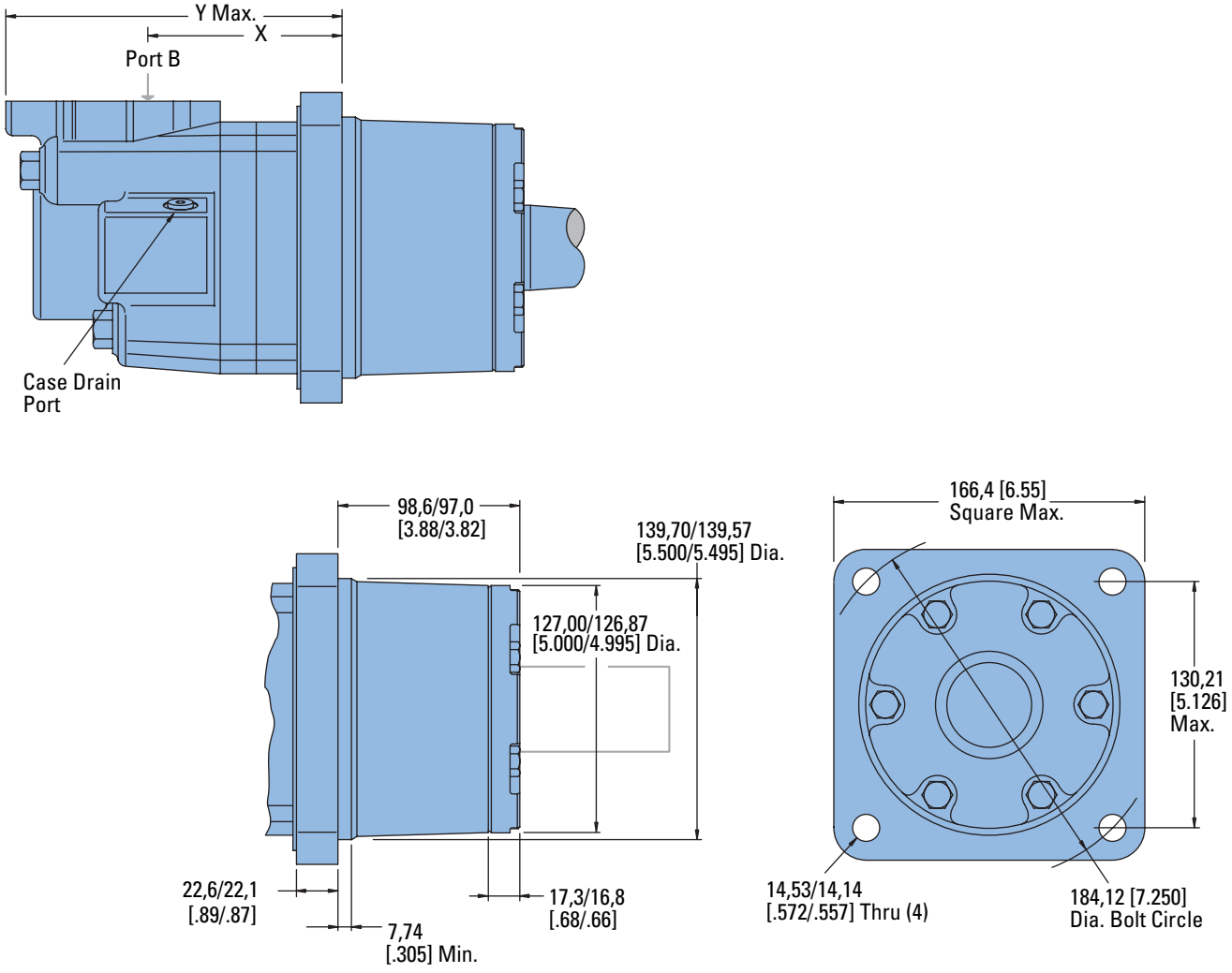
G 1 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1) or

1 5/16 UN-2B SAE O-ring Staggered Ports (2) with Shuttle
9/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Wheel Mount



WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/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

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

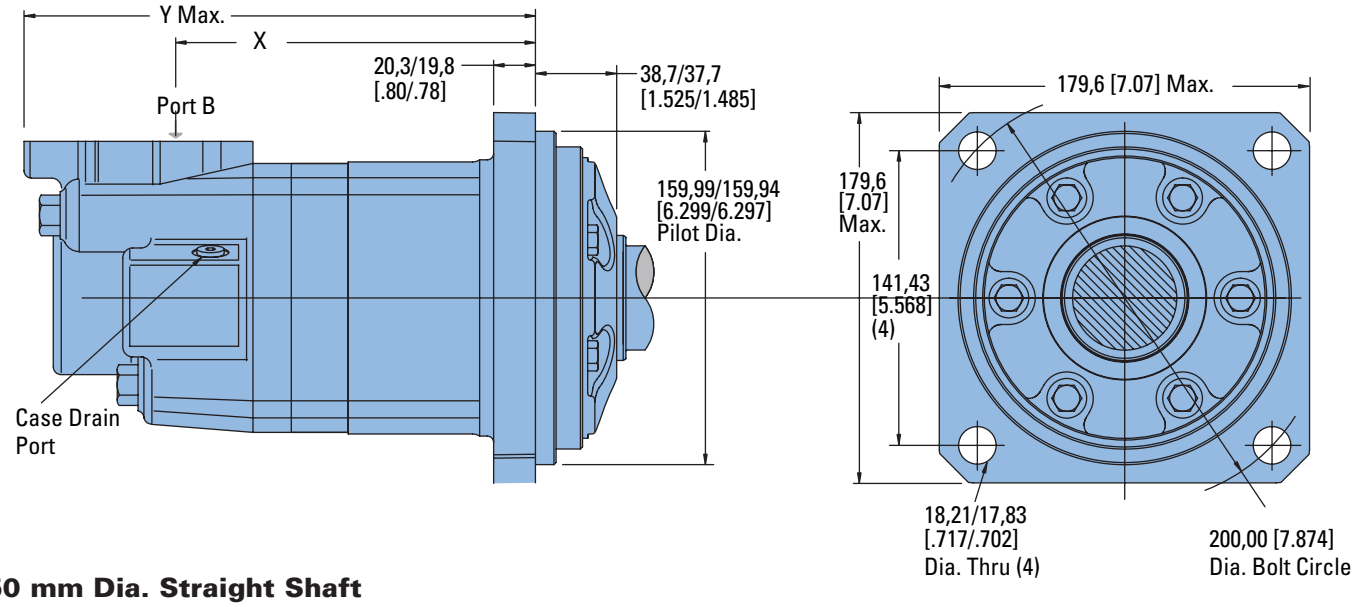
G 1 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1) or

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)

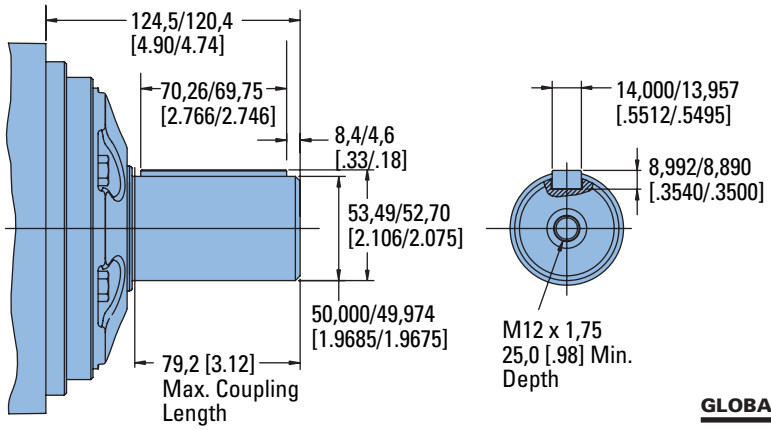
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Global Mount (ISO)



50 mm Dia. Straight Shaft



GLOBAL MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
310 [19.0]	182,4 [7.18]	264,9 [10.43]
390 [24.0]	191,0 [7.52]	273,6 [10.77]
490 [30.0]	202,2 [7.96]	284,7 [11.21]
625 [38.0]	216,9 [8.54]	299,5 [11.79]
800 [45.0]	229,4 [9.03]	312,2 [12.29]
800 [49.0]	236,7 [9.32]	319,3 [12.57]
985 [60.0]	256,5 [10.10]	339,1 [13.35]

6000 Series
Dimensions

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

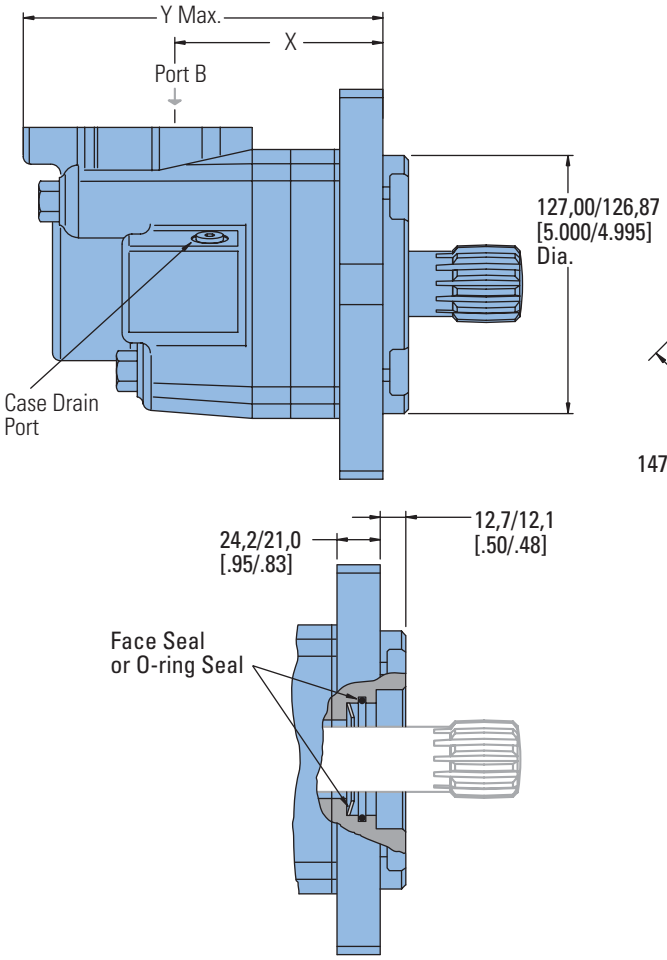
G 1 (BSP) Staggered Ports (2)
G 1/4 (BSP) Case Drain Port (1) or

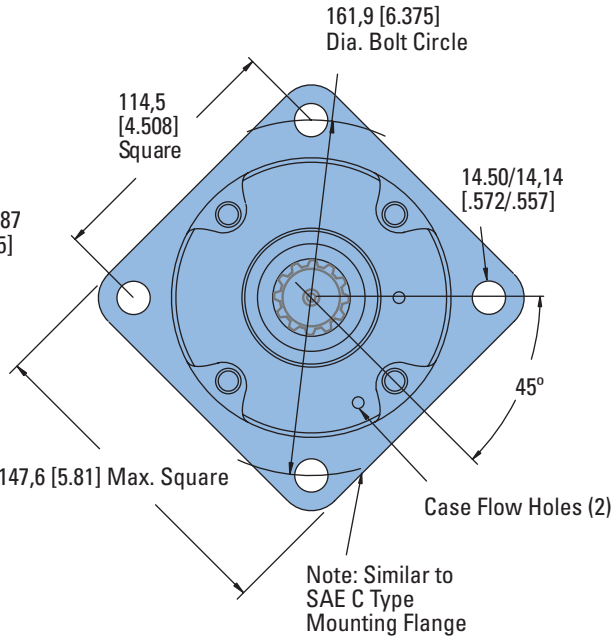
1 5/16 UN-2B SAE O-ring Staggered Ports (2) with Shuttle
9/16 -20 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Bearingless





BEARINGLESS MOTOR DIMENSIONS

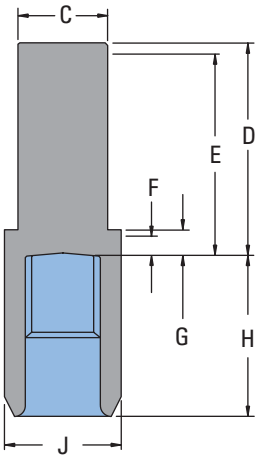
Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
195 [11.9]	105,4 [4.15]	188,0 [7.40]
245 [15.0]	111,0 [4.37]	193,5 [7.62]
310 [19.0]	118,4 [4.66]	200,9 [7.91]
390 [23.9]	127,3 [5.01]	209,6 [8.25]
490 [30.0]	138,2 [5.44]	220,7 [8.69]
625 [38.0]	152,9 [6.02]	235,5 [9.27]
985 [60.0]	192,8 [7.59]	275,1 [10.83]

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

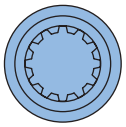
Note:

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



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).

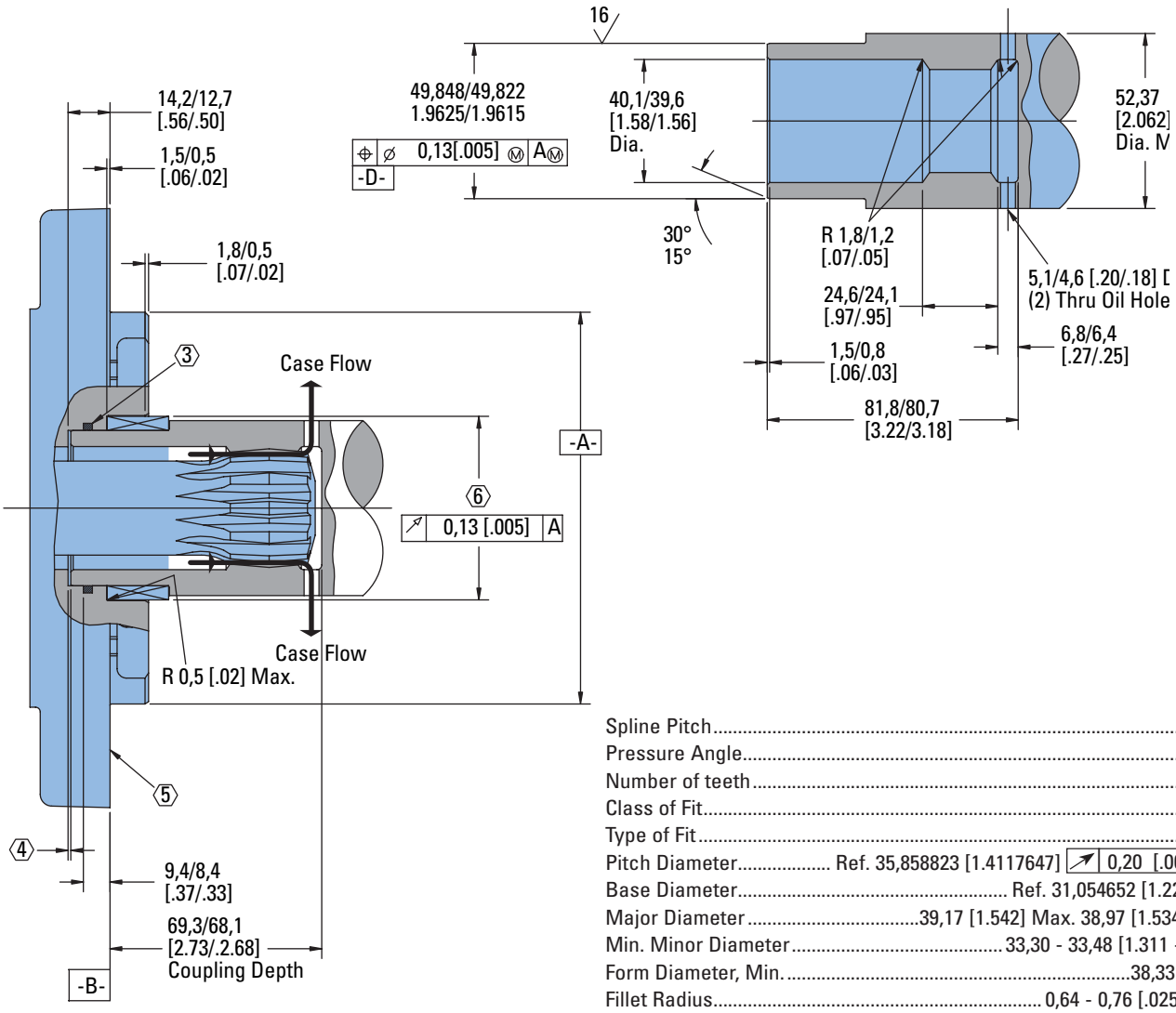
2 Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.

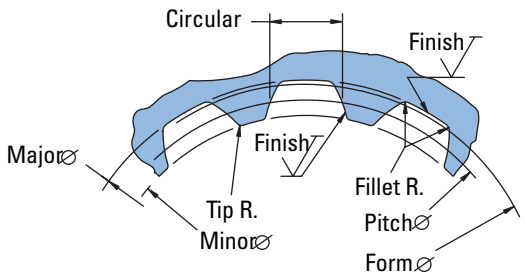
3 Seal to be furnished with motor for proper oil circulation thru splines.

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).





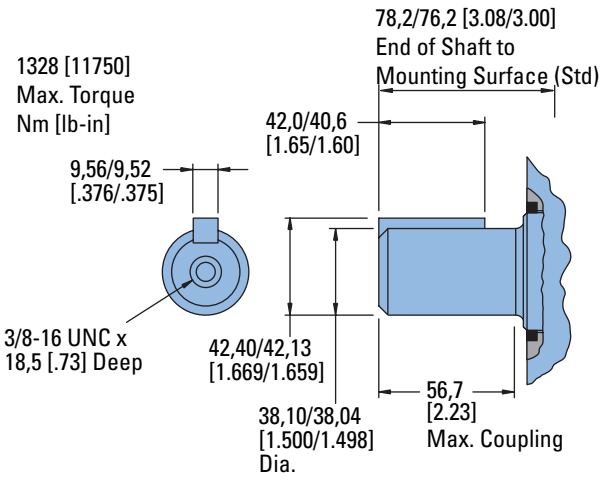
Spline Pitch	8.5/17
Pressure Angle	30°
Number of teeth	12
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 35,858823 [1.4117647] ⟋ 0,20 [.008] D
Base Diameter	Ref. 31,054652 [1.2226241]
Major Diameter	39,17 [1.542] Max. 38,97 [1.534] Min..
Min. Minor Diameter	33,30 - 33,48 [1.311 - 1.318]
Form 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 [+.0000 -.0010]
Total Index Variation	0,038 [.0015]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual	5,898 [.2322]
Minimum Effective	5,804 [.2285]
Maximum Effective	Ref. 5,857 [.2306]
Minimum Actual	Ref. 5,834 [.2297]
Dimension Between Two Pins	Ref. 26,929 - 27,084 [1.0602 - 1.0663]
Pin Diameter	6,223 [.2450] Pins to Have 4,0 [.160] Wide Flat for Root Clearance

6000 Series

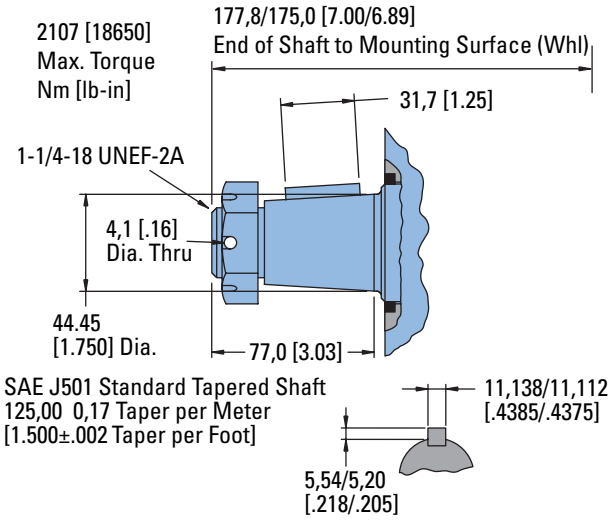
Dimensions

Shafts Splined

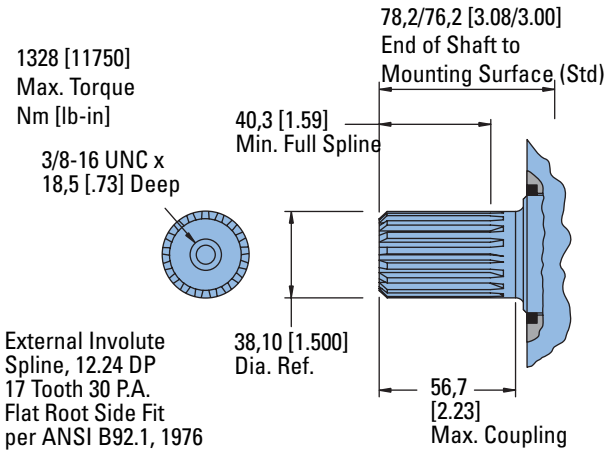
1 1/2 Inch Straight



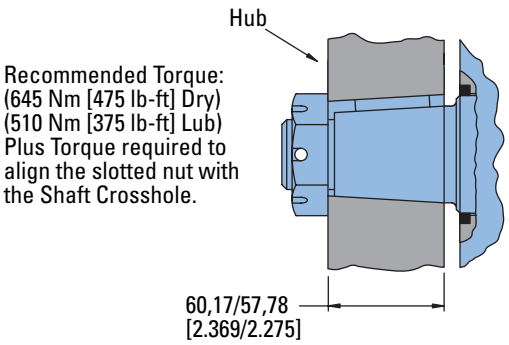
1 3/4 Inch Tapered



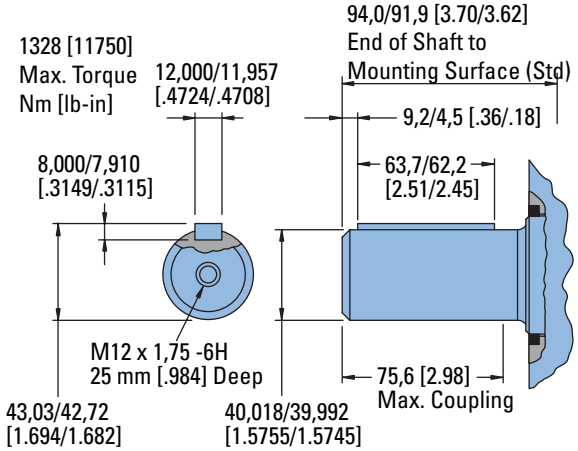
1 1/2 Inch 17 Tooth Splined



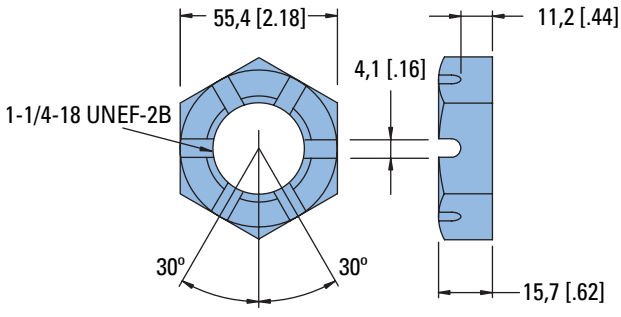
Tapered Shaft Hub Data



40 mm Straight



Slotted Hexagon Nut



6000 Series

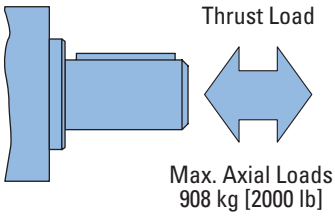
Shaft Side Load Capacity

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

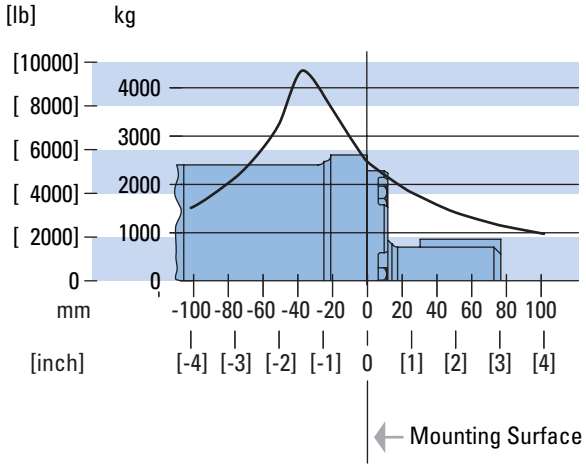


B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.
To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

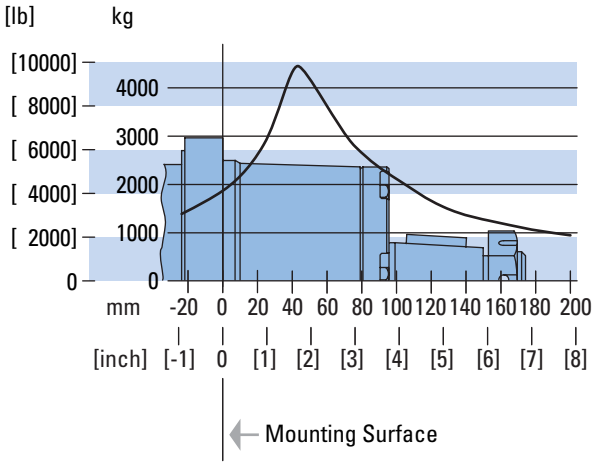
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Motor
Straight and Splined Shafts



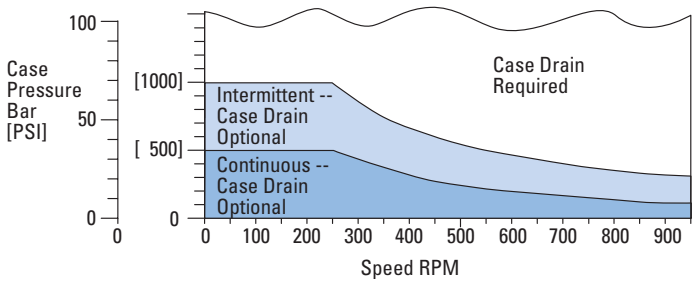
Wheel Motor Tapered Shaft



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 Pressure Seal Limitation



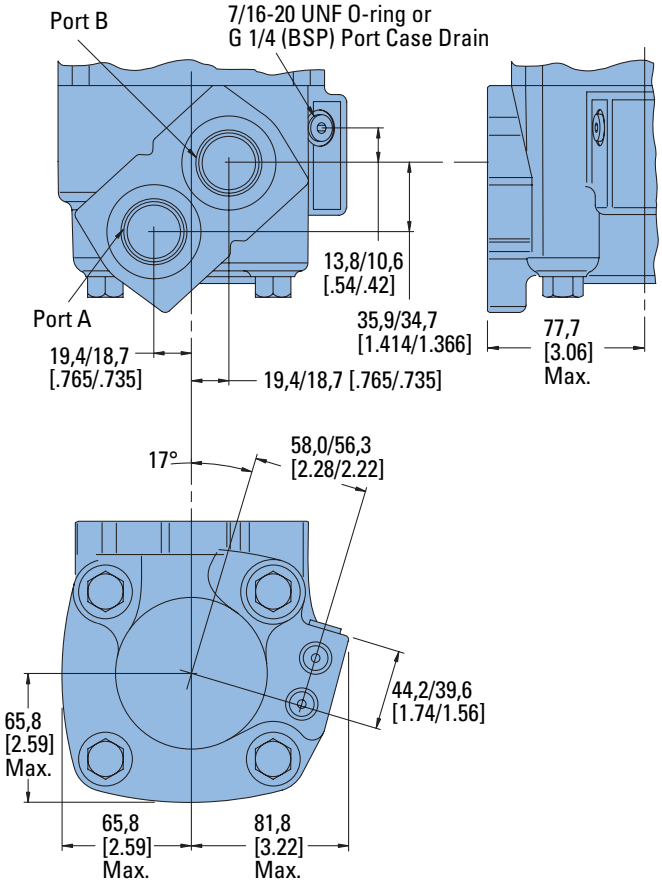
Case Porting Advantage

Contamination Control — flushing the motor case.

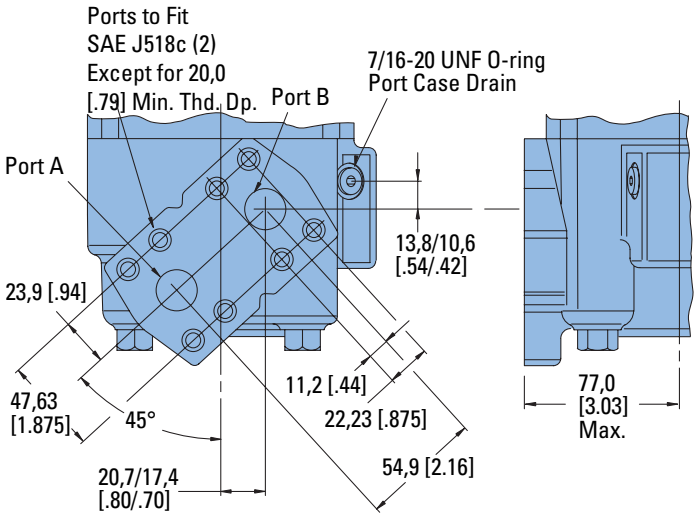
Cooler Motor — exiting oil draws motor heat away.

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

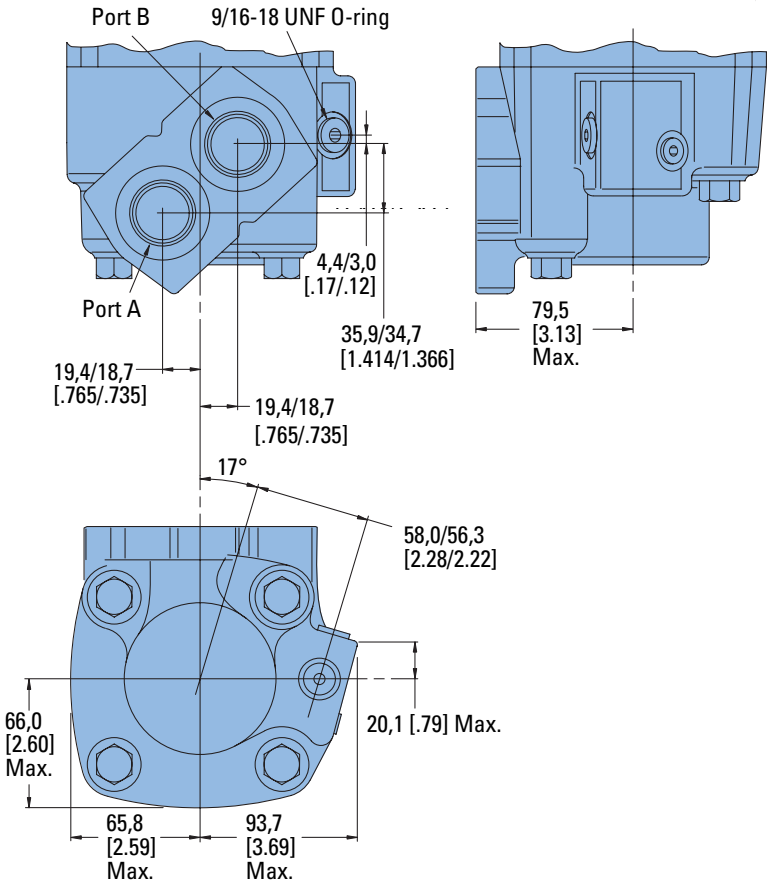
1 5/16 -12 O-ring Ports (2) or G 1 (BSP) Ports (2)



4 Bolt 3/4 Inch Split Flange



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



6000 Series
Product Numbers

Note:

For 6000 Series Motors with a configuration **Not Shown** in the charts above: Use model code number system on the next page to specify product in detail.

Use digit prefix — 112-, 113-, or 114 - plus four digit number from charts for complete product number— Example 114-1047.

Orders will not be accepted without three digit prefix.

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER								
			195 [11.9]	245 [15.0]	310 [19.0]	390 [23.9]	490 [30.0]	625 [38.0]	735* [45.0]	805* [49.0]	985 [60.0]
Standard	1 1/2 inch Straight	1 5/16 O-ring	112-1064	-1065	-1066	-1067	-1068	-1107	-1145	—	-1069
	40 mm Straight	G 1 (BSP)	112-1094	-1095	-1096	-1097	-1098	—	—	—	-1099
	1 1/2 Inch 17 T Splined	1 5/16 O-ring	112-1058	-1059	-1060	-1061	-1062	-1109	1163	—	-1063
		G 1 (BSP)	112-1088	-1089	-1090	-1091	-1092	—	—	—	-1093
Wheel Motor	40 mm Straight	G 1 (BSP)	113-1082	-1083	-1084	-1085	-1086	-1100	—	—	-1087
	1-3/4 Inch Tapered	1 5/16 O-ring	113-1070	-1071	-1072	-1073	-1074	-1093	—	—	-1075
Bearingless		1 5/16 O-ring	114-1031	-1032	-1033	-1034	-1035	-1055	—	—	-1036
		G 1 (BSP)	114-1043	-1044	-1045	-1046	-1047	—	—	—	-1048

*New release

114-1047

Mounting Type - Standard (Code H), 4 Bolt:

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

Output Shaft - Straight (Code 21)

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

Paint - Low Gloss Black (Code A)

Use digit prefix — 112- plus four digit number from charts for complete product number— Example 112-1215.

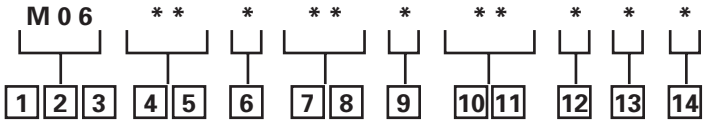
Orders will not be accepted without three digit prefix.

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

112-1215

6000 Series
Model Code

The following 14-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 14 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

M06 – 6000 Motor

4, 5 Displacement cm³/r [in³/r]

07 – 110 [6.7]

12 – 195 [11.9]

15 – 245 [15.0]

19 – 310 [19.0]

24 – 390 [23.9]

30 – 490 [30.0]

38 – 625 [38.0]

45 – 740 [45.0]

49 – 805 [49.0]

60 – 985 [60.0]

6 Mounting Type

A – 4 Bolt (Bearingless 127,0 [5.00] Pilot Dia. and 14,3 [.56] Dia. Mounting Holes 161,9 [6.38] Dia. B.C.

B – 4 Bolt (SAE CC) (Standard) 127,0 [5.00] Pilot Dia. and 14,3 [.56] Mounting Holes on 161,9 [6.38] Dia. B.C.

C – 4 Bolt (Wheel) 139,7 [5.50] Pilot Dia. and 14,3 [.56] Dia. Mounting Holes on 184,1 [7.25] Dia. B.C.

H – 4 Bolt (Global) (Standard) 160,0 [6.30] Pilot Dia. and 18,0 [.709] Dia. Mounting Holes on 200,0 [7.87] Dia. Bolt Circle

7, 8 Output Shaft

00 – None (Bearingless)

01 – 1 1/2 inch Dia. Straight with Straight Key, 3/8 -16 Threaded Hole and 56,7 [2.23] Max. Coupling Length

02 – 1 3/4 inch Dia. Tapered with Straight Key and 1–1/4 18 UNEF Slotted Hex. Nut

03 – 1 1/2 inch Dia. Splined 17T with 40,3 [1.59] Min. Full Spline Length and 3/8 -16 Threaded Hole

10 – 40 mm Dia. Straight with Straight Key, M12 x 1,75- 6H Threaded Hole

21 – 50 mm Dia. Straight with Straight Key, 14W x 9H x 70L, M12 x 1,75-6H Thread in End (Available with Mounting Flange Code H Only)

24 – 60 mm Dia. 10:1 Tapered Shaft with M42 x 3-6H Threaded End (Available with Mounting Flange Code H Only)

25 – 2 1/8 inch Dia. Splined 16 Tooth, 55,9 mm [2.20] Min. Full Spline Length (Available with Mounting Flange Code H Only)

9 Ports

A – 1 5/16 - 12 O-ring with 7/16-20 O-ring Case Drain and Check Valve

B – 3/4 inch 4 Bolt Split Flange with 7/16-20 O-ring Case Drain and Check Valve

C – G 1 (BSP) O-ring with G 1/4 (BSP) O-ring Case Drain and Check Valve

D – 1 5/16 -12 O-ring with (2) 9/16-18 O-ring Case Drain Ports and Hot Oil Shuttle Valve

R – 1 5/16 -12 O-ring with (2) 9/16 -18 O-ring Ports for External Lubrication Circuit (both case ports must be connected)

10, 11 Special Features (Hardware)

00 – None

10 – Viton Shaft Seal

07 – Viton Seals

13 – Reverse Rotation

14 – Seal Guard

21 – Speed Sensor (Std.)

12 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – Corrosion Protected

13 Eaton Assigned Code when Applicable

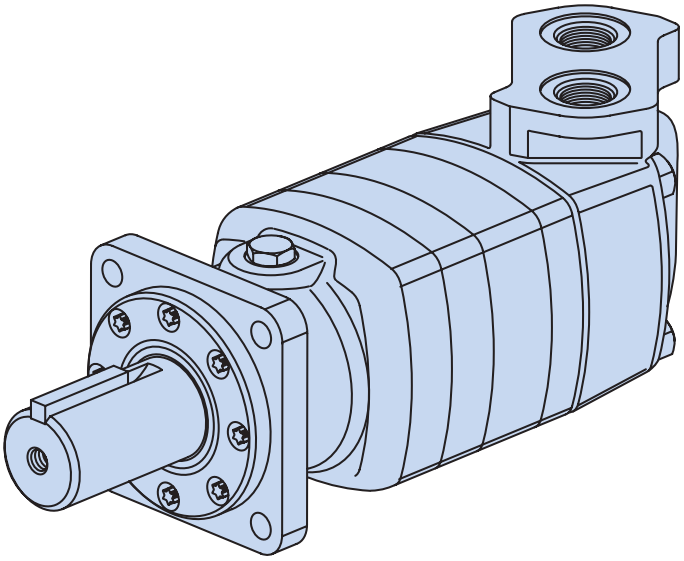
0 – Assigned Code

14 Eaton Assigned Design Code

F – Assigned Design Code

10,000 Series

Highlights



Features

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

Benefits

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

Applications

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

Description

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

Specifications

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

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

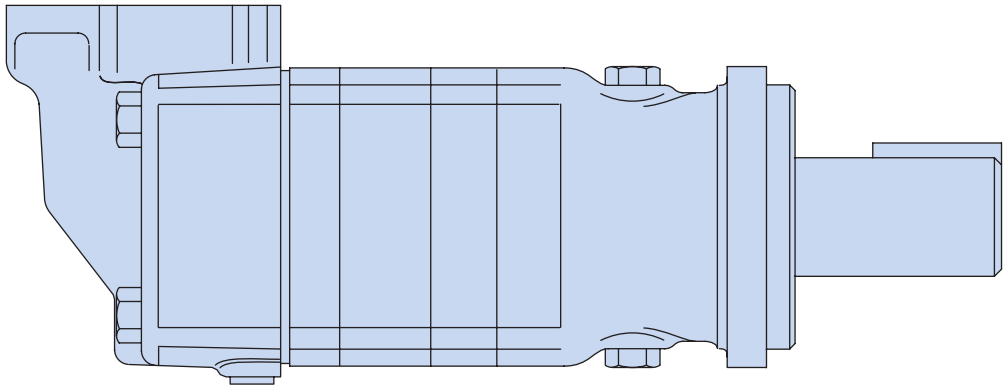
Boring

Metal Forming

Port Equipment

10,000 Series

Specifications



10,000 SERIES MOTORS

Displ. cm³/r [in³/r]		345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]
Max. Speed (RPM) @ Flow	Continuous	501	354	254	179
	Intermittent	784	552	396	279
Flow l/min [GPM]	Continuous	170 [45]	170 [45]	170 [45]	170 [45]
	Intermittent	265 [70]	265 [70]	265 [70]	265 [70]
Torque* Nm [lb-in]	Continuous	1040 [9220]	1475 [13050]	2085 [18450]	2700 [23910]
	Intermittent	1390 [12310]	1965 [17410]	2610 [23080]	3440 [30460]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	190 [2750]
	Intermittent	275 [4000]	275 [4000]	260 [3750]	240 [3500]
	Peak	275 [4000]	275 [4000]	275 [4000]	260 [3750]
Weight kg [lb]	Standard or Wheel Mount	43,5 [96.0]	45,4 [100.0]	46,3 [100.0]	47,2 [104.0]
	Bearingless	31,3 [69.0]	33,1 [73.0]	33,1 [73.0]	34,9 [77.0]

*See shaft torque ratings for limitations..

Note:

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

Maximum Inlet Pressure:

275 bar [4000 PSI]

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

Maximum Return Pressure:

275 bar [4000 PSI] with case drain line installed.

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

Maximum Case Pressure:

20 bar [300 PSI]

Δ bar [Δ PSI] :

The true pressure difference between inlet port and outlet port

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

10,000 Series

Performance Data

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

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

Continuous

Peak

Intermittent

No Operation

345 cm³/r [21.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[250] 15	[500] 35	[1000] 70	[1500] 105	[2000] 140	[2500] 170	[3000] 205	[3500] 240	[4000] 275
[1] 3,8	[600] 70 **3**	[1310] 150 **1**							
[2] 7,5	[740] 85 **21**	[1510] 170 **19**	[3050] 345 **15**	[4600] 520 **11**	[6140] 695 **8**	[7680] 865 **4**			
[4] 15	[730] 80 **43**	[1500] 170 **41**	[3040] 345 **37**	[4590] 520 **33**	[6140] 695 **30**	[7680] 870 **26**	[9220] 1040 **22**	[10770] 1215 **18**	[12310] 1390 **14**
[8] 30	[720] 80 **87**	[1490] 170 **86**	[3030] 340 **82**	[4580] 515 **78**	[6120] 690 **74**	[7670] 865 **70**	[9210] 1040 **66**	[10750] 1215 **62**	[12300] 1390 **58**
[12] 45	[700] 80 **131**	[1470] 165 **130**	[3020] 340 **127**	[4560] 515 **123**	[6100] 690 **118**	[7650] 865 **114**	[9190] 1040 **110**	[10740] 1215 **106**	[12280] 1385 **102**
[16] 61	[680] 75 **176**	[1450] 165 **175**	[3000] 340 **172**	[4540] 515 **167**	[6080] 685 **163**	[7630] 860 **158**	[9170] 1035 **154**	[10720] 1210 **149**	[12260] 1385 **145**
[20] 76	[660] 75 **221**	[1430] 160 **220**	[2970] 335 **217**	[4520] 510 **212**	[6060] 685 **207**	[7600] 860 **202**	[9150] 1035 **198**	[10690] 1210 **193**	[12230] 1380 **189**
[24] 91	[630] 70 **266**	[1400] 160 **265**	[2950] 335 **261**	[4490] 505 **256**	[6030] 680 **252**	[7580] 855 **246**	[9120] 1030 **242**	[10660] 1205 **237**	[12210] 1380 **232**
[28] 106	[600] 70 **310**	[1370] 155 **309**	[2920] 330 **306**	[4460] 505 **301**	[6000] 680 **296**	[7550] 855 **291**	[9090] 1025 **286**	[10640] 1200 **280**	[12180] 1375 **275**
[32] 121	[570] 65 **356**	[1340] 150 **355**	[2890] 325 **351**	[4430] 500 **346**	[5970] 675 **340**	[7520] 850 **335**	[9060] 1025 **329**	[10610] 1200 **324**	[12150] 1370 **319**
[36] 136	[540] 60 **400**	[1310] 150 **399**	[2850] 320 **396**	[4400] 495 **390**	[5940] 670 **384**	[7480] 845 **379**	[9030] 1020 **373**	[10570] 1195 **368**	[12120] 1370 **362**
[40] 151	[500] 55 **445**	[1270] 145 **444**	[2820] 320 **441**	[4360] 495 **435**	[5910] 670 **429**	[7450] 840 **423**	[8990] 1015 **417**	[10540] 1190 **412**	
[45] 170	[460] 50 **501**	[1220] 140 **500**	[2760] 310 **498**	[4300] 485 **492**	[5840] 660 **486**	[7380] 835 **480**	[8910] 1005 **473**	[10450] 1180 **467**	
[60] 227		[1080] 130 **668**	[2620] 295 **665**	[4160] 470 **658**	[5710] 645 **651**	[7250] 820 **644**	[8800] 995 **637**		
[70] 265		[960] 110 **784**	[2510] 285 **777**	[4050] 460 **769**	[5590] 630 **761**	[7140] 805 **754**	[8680] 980 **746**		

[2510] 285 **777** } Torque [lb-in] Nm **Speed RPM**

480 cm³/r [29.3 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	[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**		

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

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

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
[1] **3,8**	[1470] 165 **4**	[3010] 340 **3**	[4550] 515 **3**	[6100] 690 **2**	[7630] 860 **1**										
[2] **7,5**	[1480] 165 **10**	[3020] 340 **9**	[4560] 515 **8**	[6110] 690 **7**	[7650] 865 **7**	[9200] 1040 **6**	[10740] 1215 **5**	[12280] 1385 **4**	[13830] 1565 **3**	[15370] 1735 **2**	[16910] 1910 **1**				
[4] **15**	[1470] 165 **22**	[3010] 340 **21**	[4550] 515 **20**	[6100] 690 **19**	[7640] 865 **18**	[9190] 1040 **17**	[10730] 1210 **16**	[12270] 1385 **15**	[13820] 1560 **14**	[15360] 1735 **13**	[16900] 1910 **12**	[18450] 2085 **11**	[19990] 2260 **10**	[21540] 2435 **9**	[23080] 2610 **8**
[8] **30**	[1440] 165 **44**	[2980] 335 **43**	[4530] 510 **42**	[6070] 685 **41**	[7610] 860 **40**	[9160] 1035 **39**	[10700] 1210 **38**	[12250] 1385 **37**	[13790] 1560 **36**	[15330] 1730 **35**	[16880] 1905 **34**	[18420] 2080 **33**	[19960] 2255 **32**	[21510] 2430 **32**	[23050] 2605 **31**
[12] **45**	[1400] 160 **67**	[2950] 335 **66**	[4490] 505 **65**	[6040] 680 **64**	[7580] 855 **63**	[9120] 1030 **62**	[10670] 1205 **61**	[12210] 1380 **60**	[13750] 1555 **59**	[15300] 1730 **58**	[16840] 1905 **57**	[18380] 2075 **56**	[19930] 2255 **55**	[21470] 2425 **54**	[23020] 2600 **53**
[16] **61**	[1360] 155 **89**	[2910] 330 **88**	[4450] 505 **87**	[5990] 675 **86**	[7540] 850 **85**	[9080] 1025 **84**	[10620] 1200 **83**	[12170] 1375 **82**	[13710] 1550 **81**	[15260] 1725 **80**	[16800] 1900 **79**	[18340] 2070 **78**	[19890] 2245 **77**	[21430] 2420 **76**	
[20] **76**	[1310] 150 **112**	[2860] 375 **111**	[4400] 495 **110**	[5940] 670 **109**	[7490] 845 **108**	[9030] 1020 **107**	[10580] 1195 **106**	[12120] 1370 **104**	[13660] 1545 **103**	[15210] 1720 **102**	[16750] 1890 **101**	[18300] 2070 **100**	[19840] 2240 **99**		
[24] **91**	[1260] 140 **135**	[2800] 315 **134**	[4350] 490 **132**	[5890] 665 **131**	[7440] 840 **130**	[8980] 1015 **129**	[10520] 1190 **128**	[12070] 1365 **127**	[13610] 1540 **126**	[15150] 1710 **124**	[16700] 1885 **123**	[18240] 2060 **122**			
[28] **106**	[1200] 135 **157**	[2750] 310 **156**	[4290] 485 **155**	[5840] 660 **154**	[7380] 835 **153**	[8920] 1010 **151**	[10470] 1185 **150**	[12010] 1355 **149**	[13550] 1530 **148**	[15100] 1705 **147**	[16640] 1880 **146**				
[32] **121**	[1140] 130 **180**	[2690] 305 **179**	[4230] 480 **177**	[5770] 650 **176**	[7320] 825 **175**	[8860] 1000 **174**	[10400] 1175 **173**	[11950] 1350 **172**	[13490] 1525 **170**	[15040] 1700 **169**	[16580] 1875 **168**				
[36] **136**	[1080] 120 **202**	[2620] 295 **201**	[4160] 470 **200**	[5710] 645 **199**	[7250] 820 **198**	[8800] 995 **196**	[10340] 1170 **195**	[11880] 1340 **194**	[13430] 1515 **193**	[14970] 1690 **191**	[16510] 1865 **190**				
[40] **151**	[1010] 115 **225**	[2550] 290 **224**	[4100] 465 **222**	[5640] 635 **221**	[7180] 810 **220**	[8730] 985 **219**	[10270] 1160 **217**	[11810] 1335 **216**	[13360] 1510 **215**	[14900] 1685 **214**	[16440] 1855 **212**				
[45] **170**	[920] 105 **254**	[2460] 280 **252**	[4000] 450 **251**	[5550] 625 **249**	[7090] 800 **248**	[8630] 975 **247**	[10180] 1150 **245**	[11720] 1325 **244**	[13260] 1500 **243**	[14810] 1675 **242**					
[60] **227**	[610] 70 **338**	[2150] 245 **336**	[3700] 420 **335**	[5240] 590 **334**	[6780] 765 **332**	[8330] 940 **331**	[9870] 1115 **329**	[11420] 1290 **328**	[12960] 1465 **327**						
[70] **265**	[380] 45 **396**	[1930] 220 **393**	[3470] 390 **391**	[5010] 565 **390**	[6560] 740 **388**	[8100] 915 **387**	[9640] 1090 **385**	[11190] 1265 **384**							

[3470] 390 **391** } Torque [lb-in] Nm **Speed RPM**

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

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

10,000 Series

Dimensions

Ports

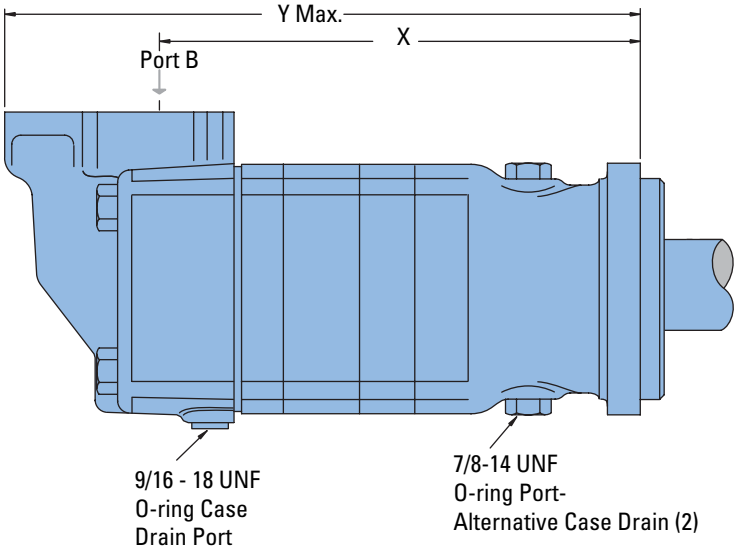
1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
9/16 -18 UNF-2B SAE O-ring Case Drain Port (1) or

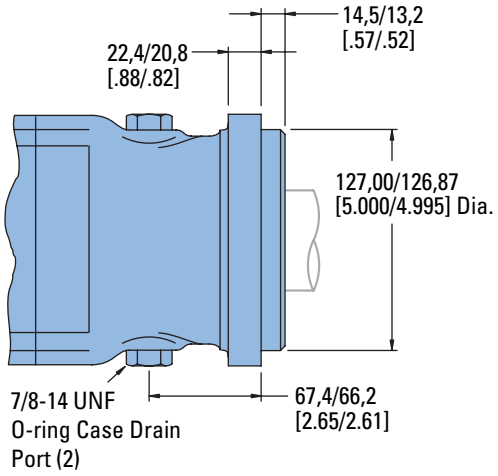
4 Bolt 1 1/4 inch Split Flange Ports (2)
9/16 -18 UNF-2B SAE O-ring Case Drain Port (1)

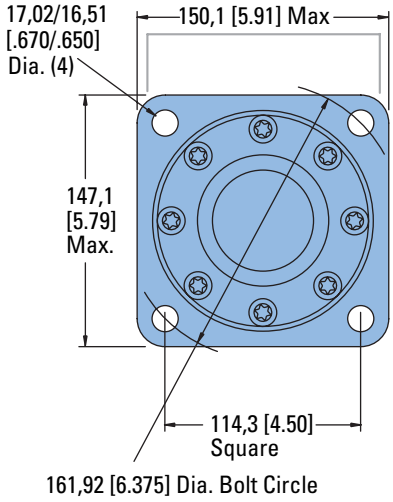
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Standard Mount







STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/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

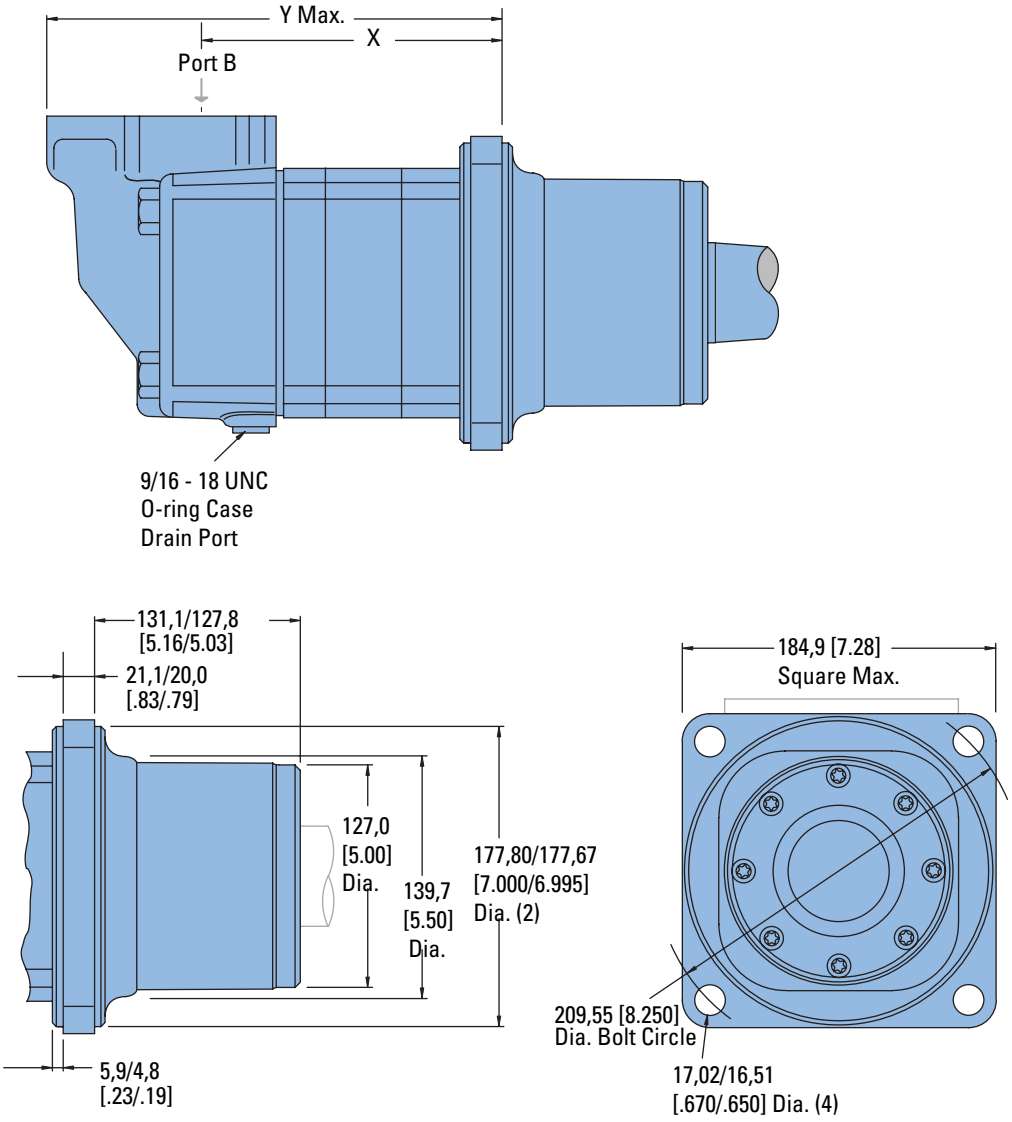
1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
9/16 -18 UNF-2B SAE O-ring Case Drain Port (1) or

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 cm³/r [in³/r]	X mm [inch]	Y mm [inch]
345 [21.0]	166,9 [6.57]	265,9 [10.47]
480 [29.2]	179,6 [7.07]	278,6 [10.97]
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

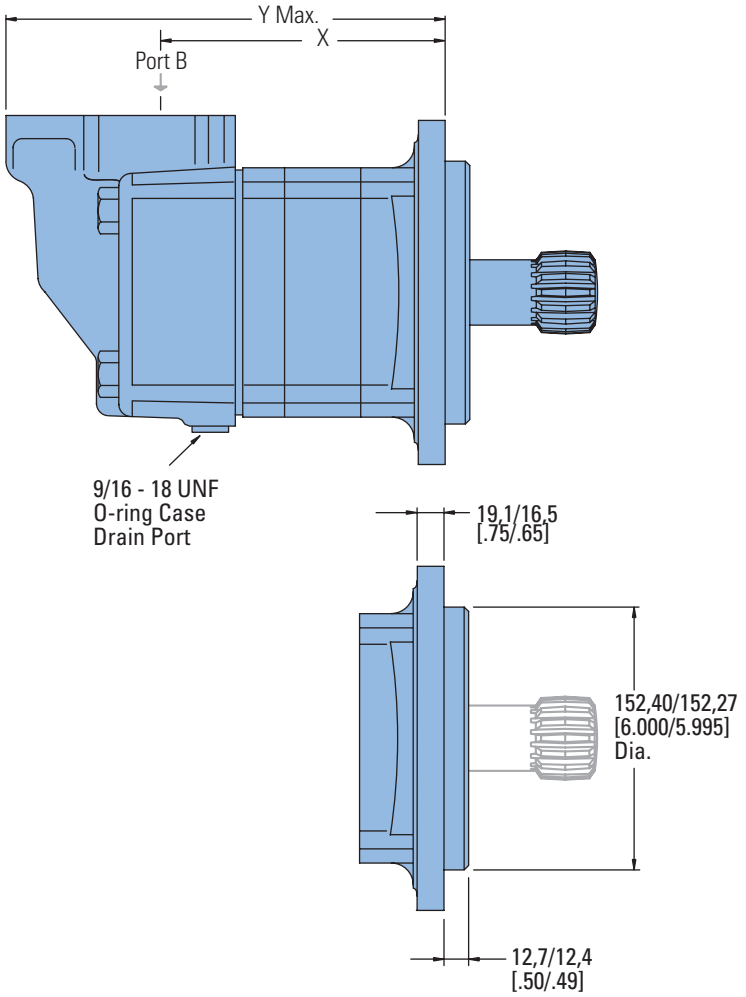
Ports

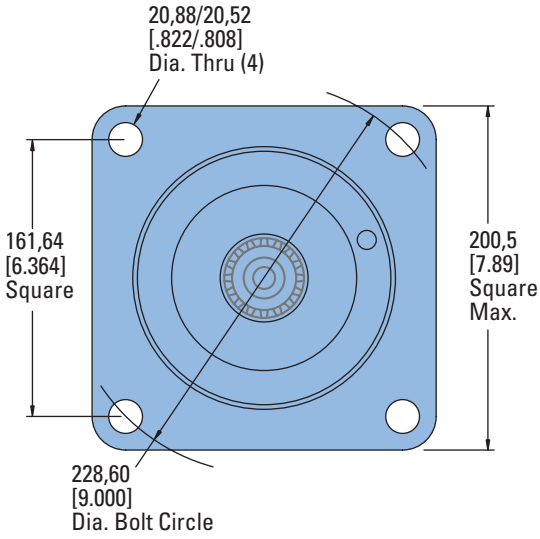
1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
9/16 -18 UNF-2B SAE O-ring Case Drain Port (1) or
4 Bolt 1 1/4 inch Split Flange Ports (2)
9/16 -18 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Bearingless





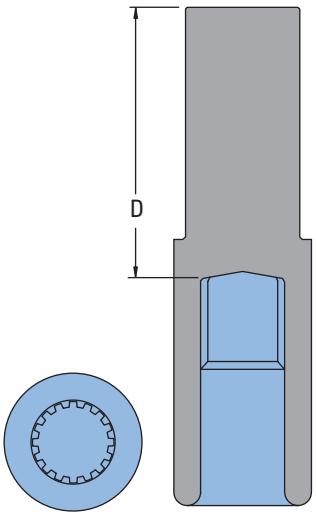
BEARINGLESS MOTOR DIMENSIONS

Displacement cm³/r [in³/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).

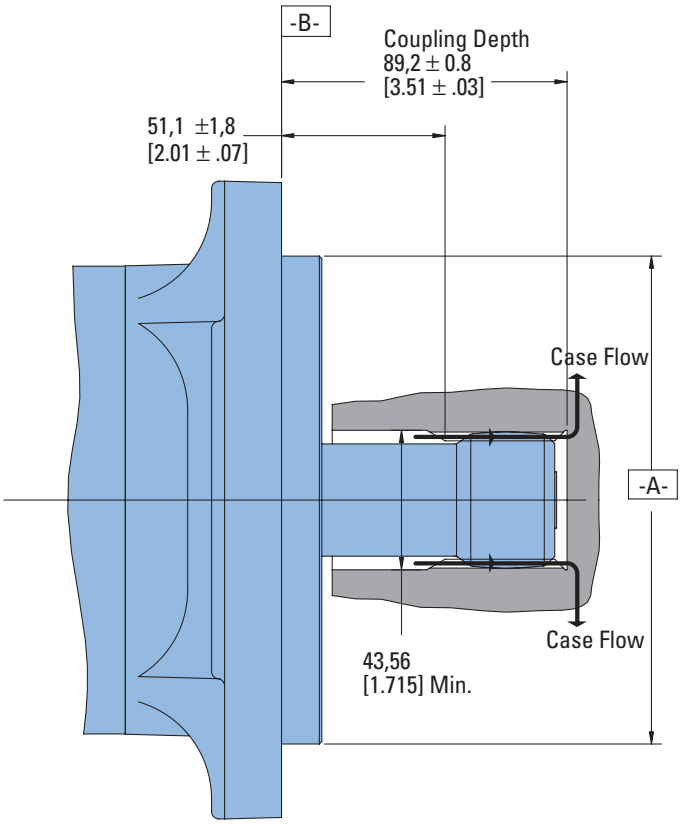


Note:

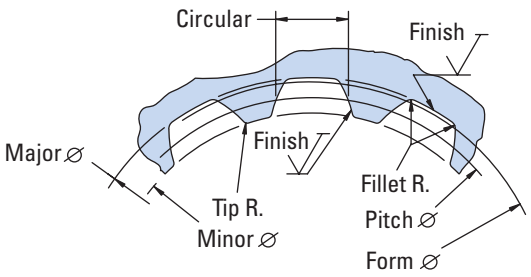
After machining blank, part must be hardened per Eaton specification.

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).



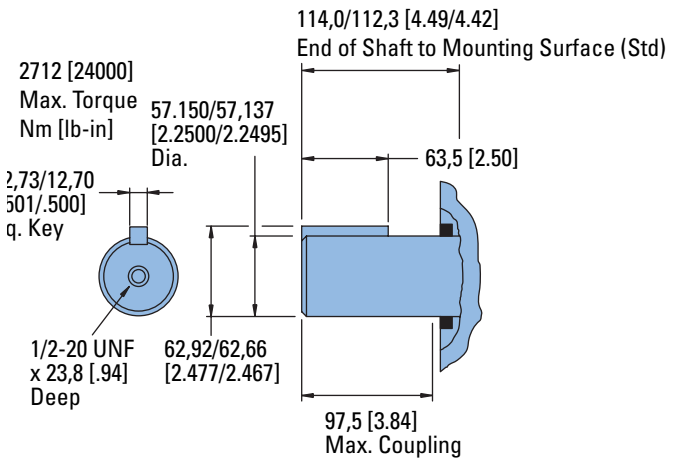
Spline Pitch	10/20
Pressure Angle	30°
Number of teeth	16
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 40,640000 [1.6000000] ⌀ 0,25 [.010] D
Base Diameter	Ref. 35,195272 [1.3856406]
Major Diameter	43,56 [1.715] Max. 43,18 [1.700] Min.
Min. Minor Diameter	36,83 - 37,08 [1.450 - 1.460]
Form 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 [+.0000 -.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

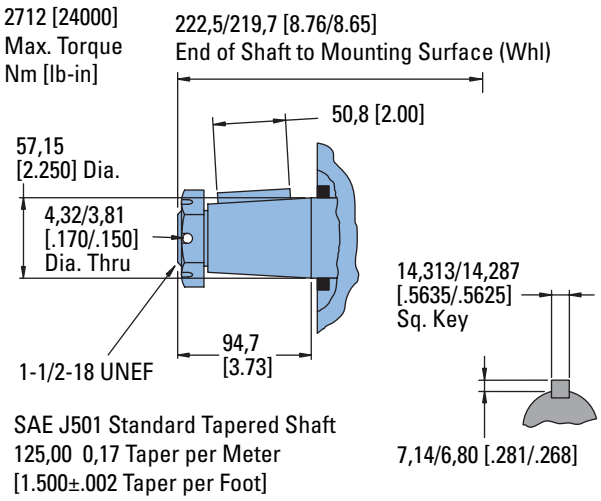
Dimensions

Shafts

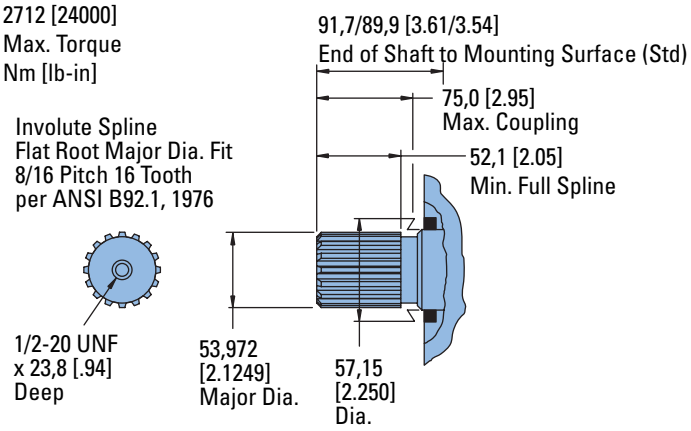
2 1/4 Inch Straight



2 1/4 Inch Tapered

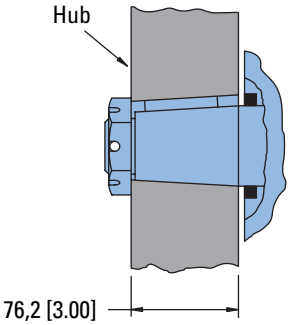


2 1/8 Inch 16 Tooth Splined

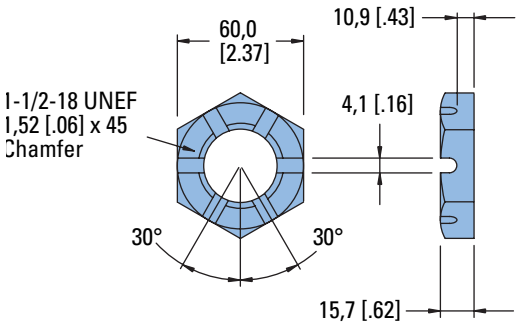


Tapered Shaft Hub Data

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

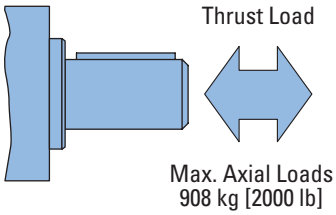
Side Shaft Load Capacity

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].

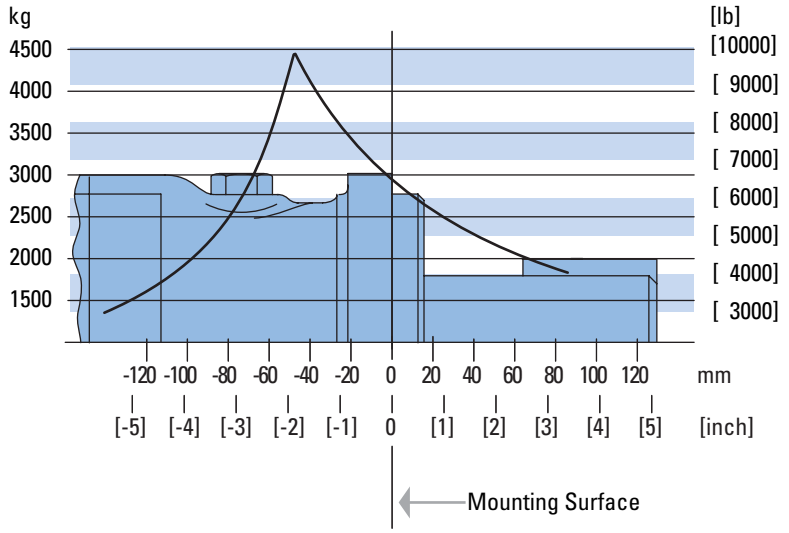
Each curve is based on

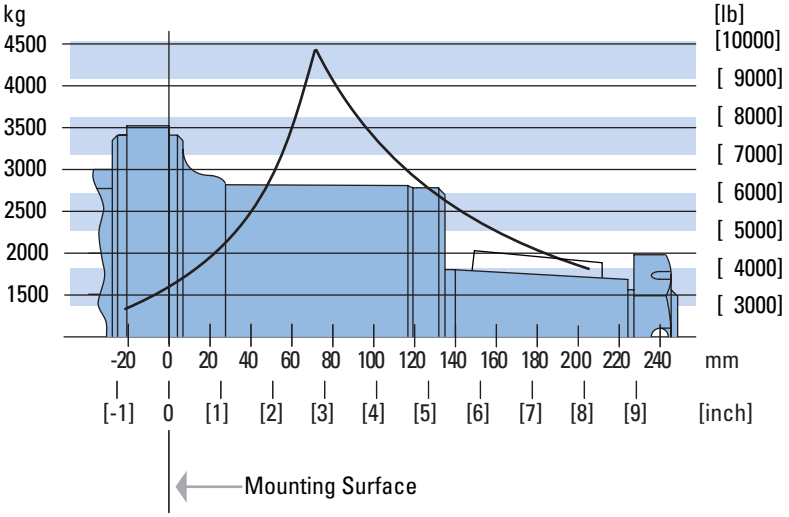


B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.
To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

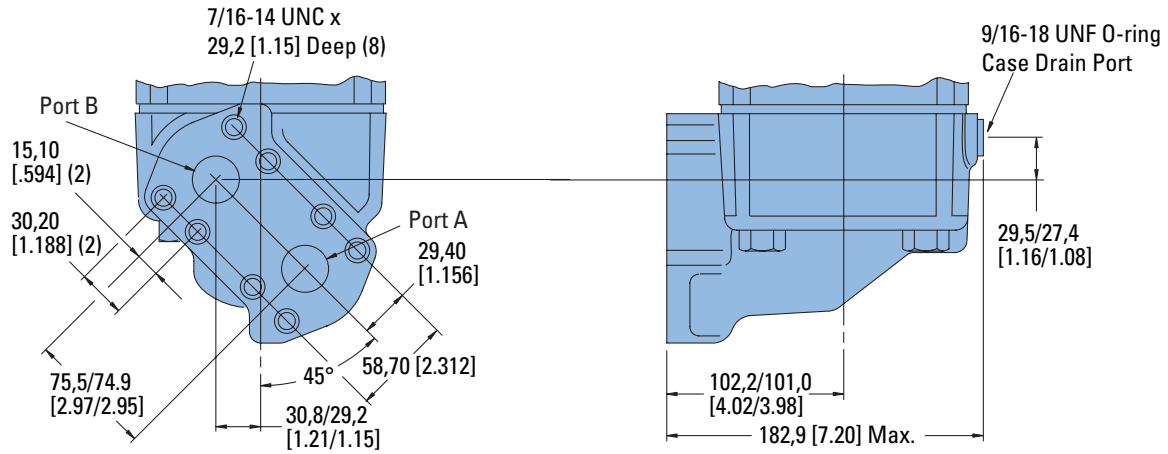
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

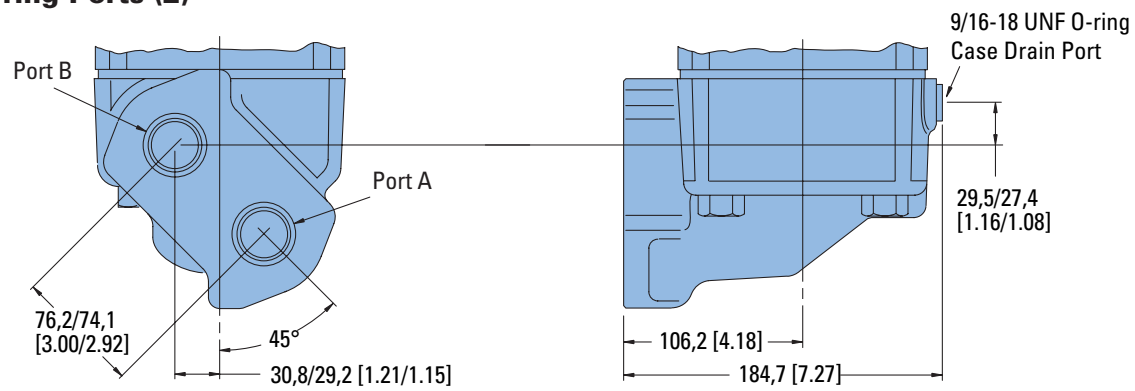




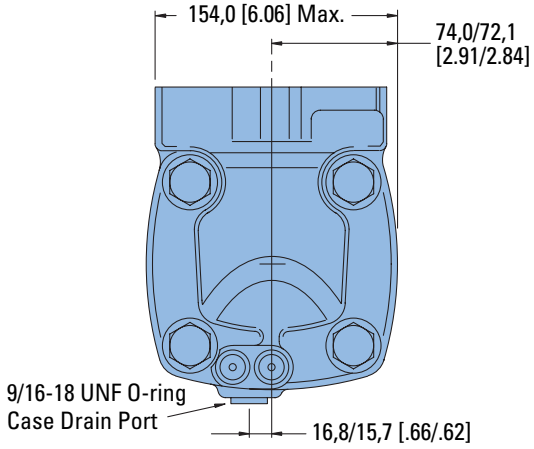
1 1/4 Inch Split Flange Ports (2)



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.

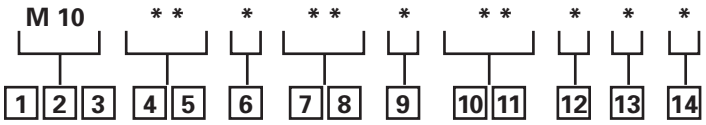
Orders will not be accepted without three digit prefix.

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

10,000 Series

Model Code

The following 14-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 14 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

M10 – 10,000 Motor

4, 5 Displacement cm³/r [in³/r]

20 – 345 [21.0]

29 – 480 [29.2]

40 – 665 [40.6]

57 – 940 [57.4]

6 Mounting Type

A – 4 Bolt (Std.): Dia. 127,0 [5.00] Pilot 16,76 [.660] Mounting Holes on 161,92 [6.375] Dia. Bolt Circle

B – 4 Bolt (Whl.): Dia. 177,8 [7.00] Pilot 16,76 [.660] Mounting Holes on 209,55 [8.250] Dia. Bolt Circle

C – 4 Bolt (Brgl.): Dia. 152,4 [6.00] Pilot 20,70[.815] Mounting Holes on 228,60 [9.000] Dia. Bolt Circle

7, 8 Output Shaft

00 – None (Bearingless)

01 – 2 1/4 inch Dia. Straight with 12,7 [.50] Square Key x 63,5 [2.50] and 1/2 - 20 Threaded Hole

02 – 2 1/4 inch Dia. Tapered with 14,3 [.56] Square Key x 50,8 [2.00] and 1 1/2 - 18 UNEF -2A Threaded Shaft End and Slotted Hex Nut

03 – 2 1/8 inch 16 Tooth Splined with 52,1 [2.05] Min. Full Spline Length 1/2 - 20 UNF Threaded Hole

9 Ports

A – 1 5/16 -12 UN O-ring End Ports (Size -16), 9/16 - 18 UNF O-ring Case Drain Port (Size - 6)

B – 1 1/4 Inch Split Flange Ports, 9/16 - 18 UNF O-ring Case Drain Port (Size - 6)

10, 11 Special Features (Hardware)

00 – None

01 – Free Running Geroler

03 – Reverse Rotation

12 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

13 Eaton Assigned Code when Applicable

0 – Assigned Code

14 Eaton Assigned Design Code

C – Standard and Wheel Mounts

D – Bearingless Mount

10,000 Series Two-Speed

Description

The Eaton 10,000 Series motors are available with an integral two speed feature that changes the displacement in a ratio of 1 to 2 and shifts the motor from a low speed high torque (LSHT) mode to a high speed low torque (HSLT) mode. The open center selector valve shifts the speed mode from low to high speed when pilot pressure of 6.9 Δ Bar [100 Δ PSI] minimum is applied to the pilot port (6.9 Bar [100 PSI] higher than case pressure). In the high speed mode torque values are approximately one half with twice the speed of the conventional 10,000 Series single speed motors.

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

Two speed motors are available with a return line closed center shuttle for closed circuit applications.

Low speed high torque mode is the normal position of the speed selector valve. When a differential pressure is supplied to the pilot port and 6,9 Bar [100 PSI] is reached, the selector valve overcomes the return spring force and the spool shifts to the high speed mode. The oil in the opposite side of the spool is drained internally. Pressure between the pilot supply and case drain or return line (depending on open or closed circuit system) must be maintained to keep the motor in the high speed mode.

When pilot pressure is removed from the pilot port the pressure in the pilot end of the spool valve is relieved and drained back through this three way valve, the spring force returns the spool valve to LSHT position.

Pilot pressure may come from any source that will provide uninterrupted pressure during the high speed mode operation. Pilot pressure 6,9 Δ Bar [100 Δ PSI] minimum, up to the full operating pressure of the motor.

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

However, to prevent cavitation in the HSLT mode, the preferred direction of shaft rotation is counter clockwise (port B pressurized). This unique disc valve is not symmetrical in porting the fluid for the HSLT mode. Consequently, when the pressure is reversed for HSLT CW rotation, cavitation can occur. Installing a restriction (200 PSI or more depending on flow) in the hydraulic line that connects port B will prevent cavitation.

If you are operating in a critical area and a restriction in the hydraulic line causes concern, these two speed motors can be ordered timed with CW preferred HSLT shaft rotation. Hence, with this option port B will have to be pressurized for CW preferred HSLT shaft rotation. The restriction recommended for the line connecting port B remains unchanged. Finally in closed circuit applications a hydraulic line restriction is not required. Instead, the charge pump can be used to supply and maintain a minimum pressure of 14 Bar [200 PSI].

Note:

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

Important!

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

Performance Data

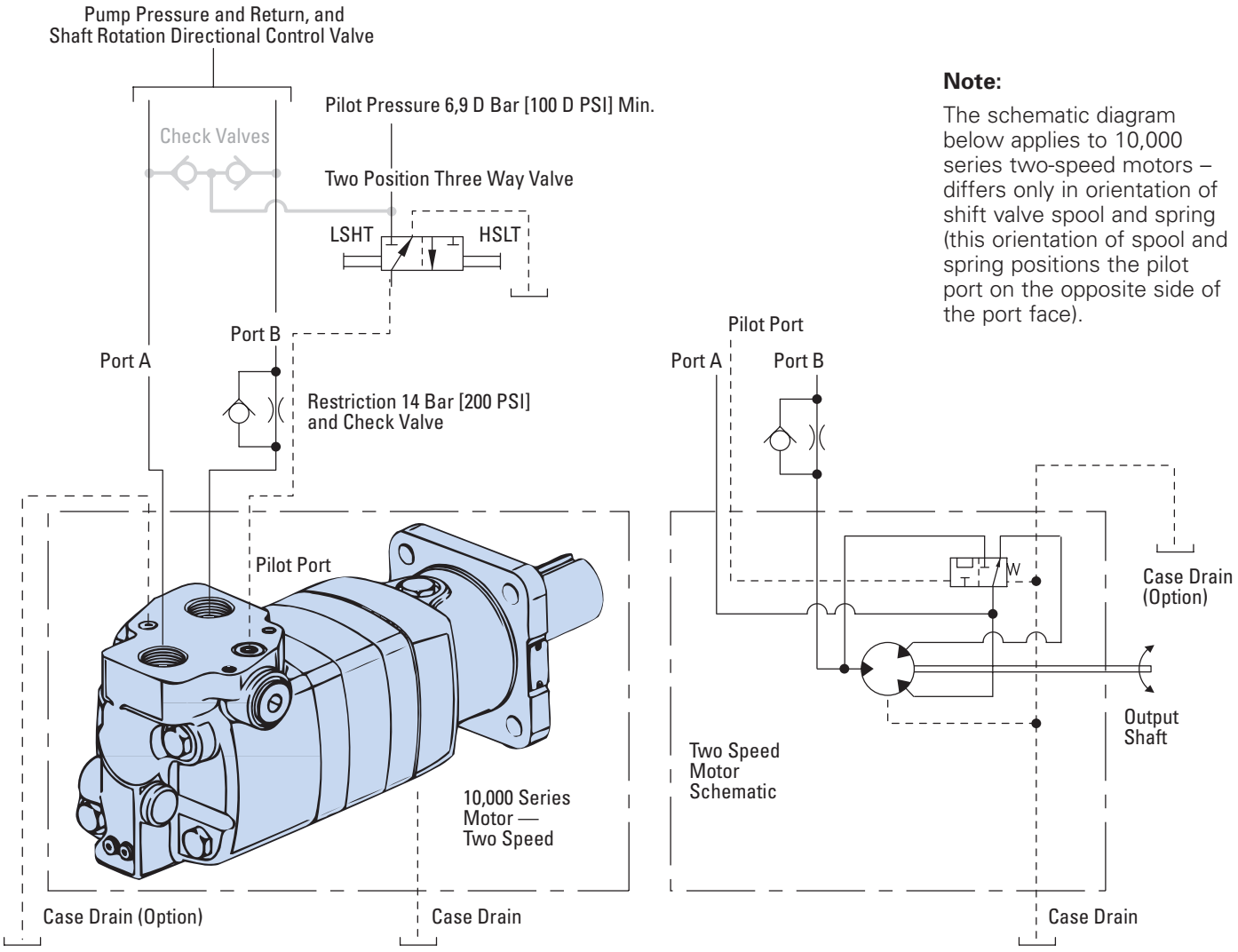
10,000 Series Two-Speed

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

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

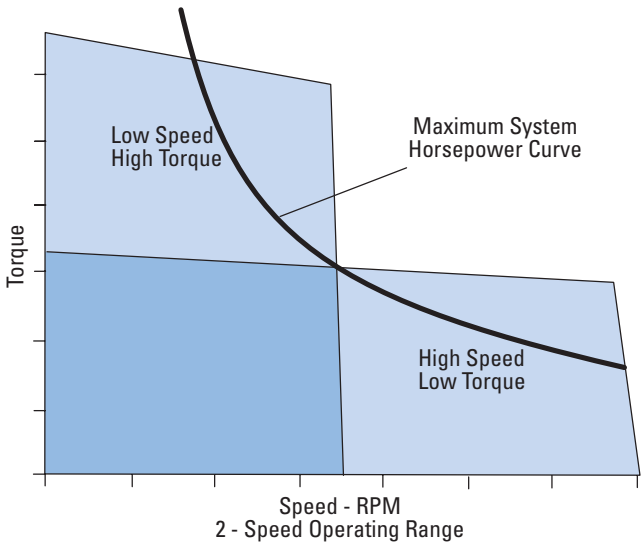
10,000 Series Two-Speed

Typical Hydraulic Circuit



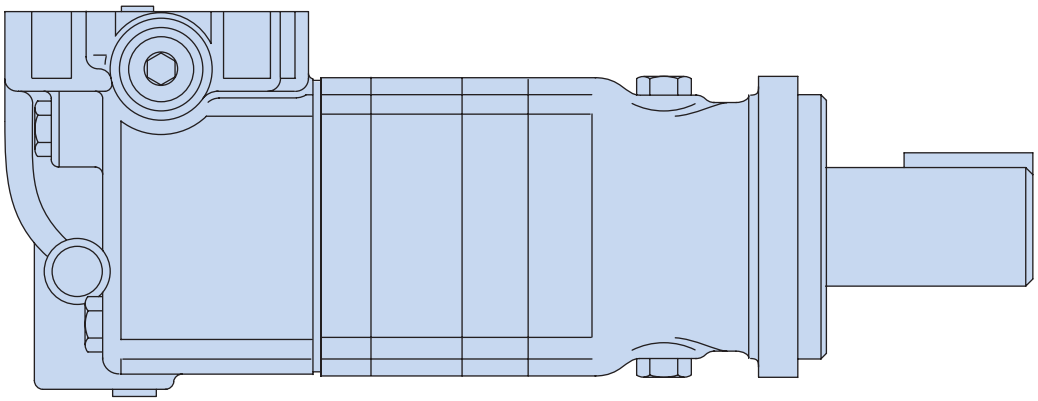
Note:

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



10,000 Series Two-Speed

Specifications



10,000 SERIES TWO-SPEED MOTORS

Displ. cm³/r [in³/r]	High Speed Mode	169[10.3]	239 [14.6]	332,7 [20.3]	470 [28.7]
	Low Speed Mode	345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]
Max. Speed (RPM)	High Speed Mode	750	630	500	400
@ Continuous Flow	Low Speed Mode	375	315	250	200
Flow	High Speed Mode	130 [35]	170 [45]	170 [45]	170 [45]
l/min [GPM]	Low Speed Mode	130 [35]	170 [45]	170 [45]	170 [45]
Torque*	High Speed Mode				
Nm [lb-in]	Continuous	440 [3900]	630 [5600]	905 [8000]	1175 [10400]
	Intermittent	585 [5200]	845 [7500]	1130 [10000]	1470 [13000]
Torque*	Low Speed Mode				
Nm [lb-in]	Continuous	1015 [9000]	1470 [13000]	2090 [18500]	2710 [24000]
	Intermittent	1355 [12000]	1965 [17400]	2600 [23000]	3445 [30500]
Pressure	Continuous	205 [3000]	205 [3000]	205 [3000]	190 [2750]
Δ bar [Δ PSI]	Intermittent	275 [4000]	275 [4000]	260 [3750]	240 [3500]
Weight kg [lb]	Standard or Wheel Mount	50,3 [111.0]	52,2 [115.0]	52.2 [115.0]	54,0 [119.0]
	Bearingless	38,1 [84.0]	39,9 [88.0]	39,9 [88.0]	41,7 [92.0]

*See shaft torque ratings for limitations..

Note:

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

High Speed Mode

(Reduced Motor Displacement)

Low Speed Mode

(Full Motor Displacement)

Maximum Inlet Pressure:

275 bar [4000 PSI]

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

Maximum Return Pressure:

275 bar [4000 PSI] with case drain line installed.

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

Δ bar [Δ PSI] :

The true pressure difference between inlet port and outlet port

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

10,000 Series Two-Speed

Dimensions

Standard and Wheel

Ports

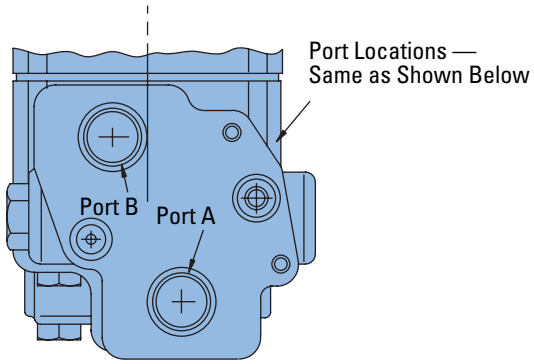
1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
3/4 -16 UNF-2B SAE O-ring Case Drain Port (1)
7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1) or

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

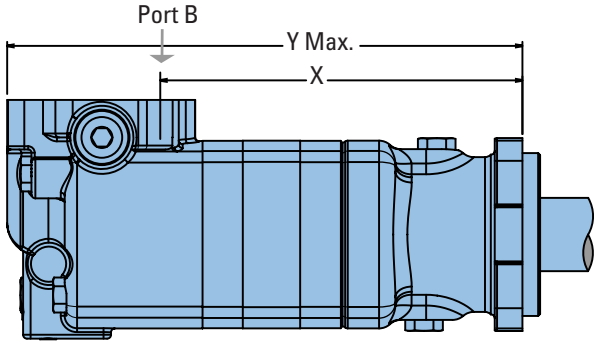
Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

1 5/16 -12 O-ring Staggered Ports



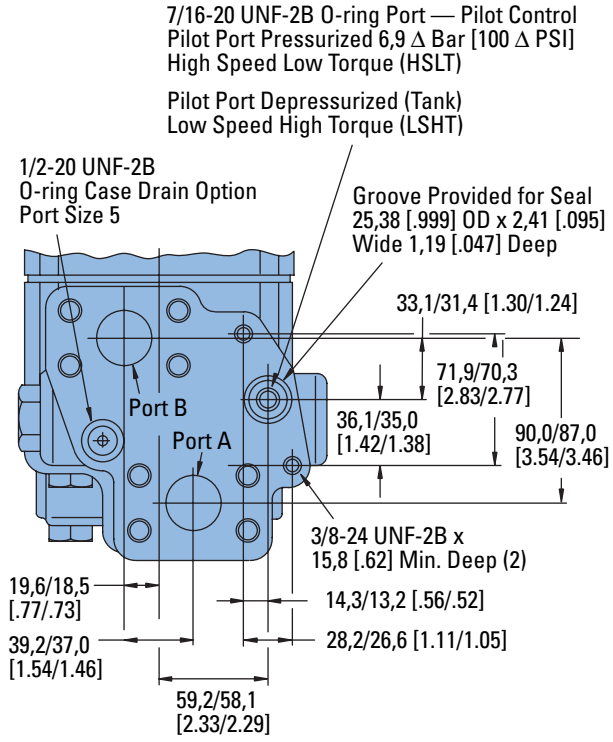
Two-Speed Standard Motors



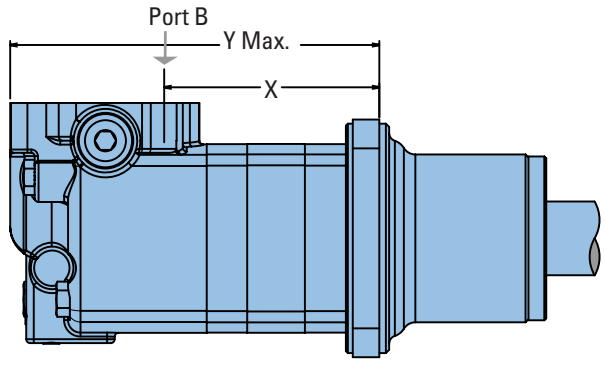
STANDARD MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
345 [21.0]	270,8 [10.66]	392,7 [15.46]
480 [29.2]	283,5 [11.16]	405,4 [15.96]
665 [40.6]	283,5 [11.16]	405,4 [15.96]
940 [57.4]	301,8 [11.88]	423,7 [16.68]

4 Bolt 1 1/4 Inch Split Flange Ports



Two-Speed Wheel Motors



WHEEL MOUNT MOTOR DIMENSIONS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
345 [21.0]	155,2 [6.11]	277,9 [10.94]
480 [29.2]	167,9 [6.61]	290,6 [11.44]
665 [40.6]	167,9 [6.61]	290,6 [11.44]
940 [57.4]	186,2 [7.33]	309,1 [12.17]

10,000 Series Two-Speed

Dimensions

Ports

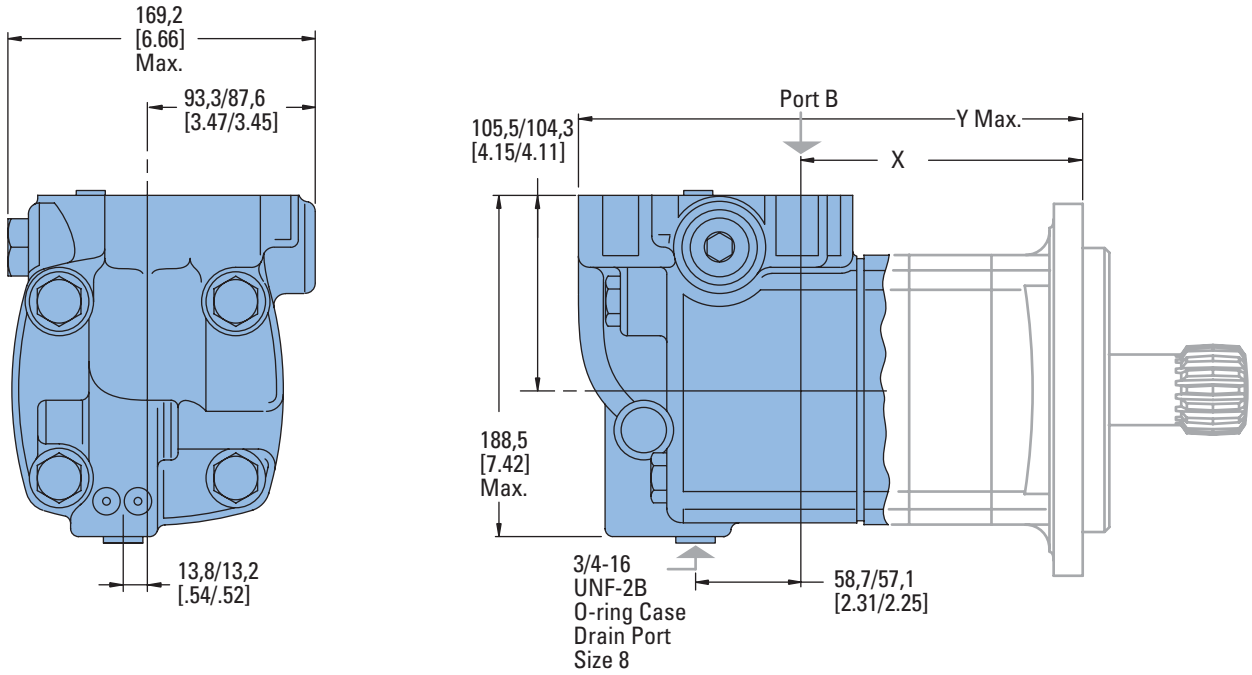
1 5/16 -12 UN-2B SAE O-ring Staggered Ports (2)
3/4 -16 UNF-2B SAE O-ring Case Drain Port (1)
7/16 -20 UNF-2B SAE O-ring Pilot Control Port (1) or

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

Bearingless



BEARINGLESS MOTOR DIMENSIONS

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

10,000 Series Two-Speed

Product Numbers

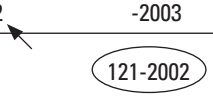
Note:

For 10,000 Series Motors with a configuration **Not Shown** in the chart below: Use model code number system on the page C-5-13 to specify product in detail.

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

Orders will not be accepted without three digit prefix.

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

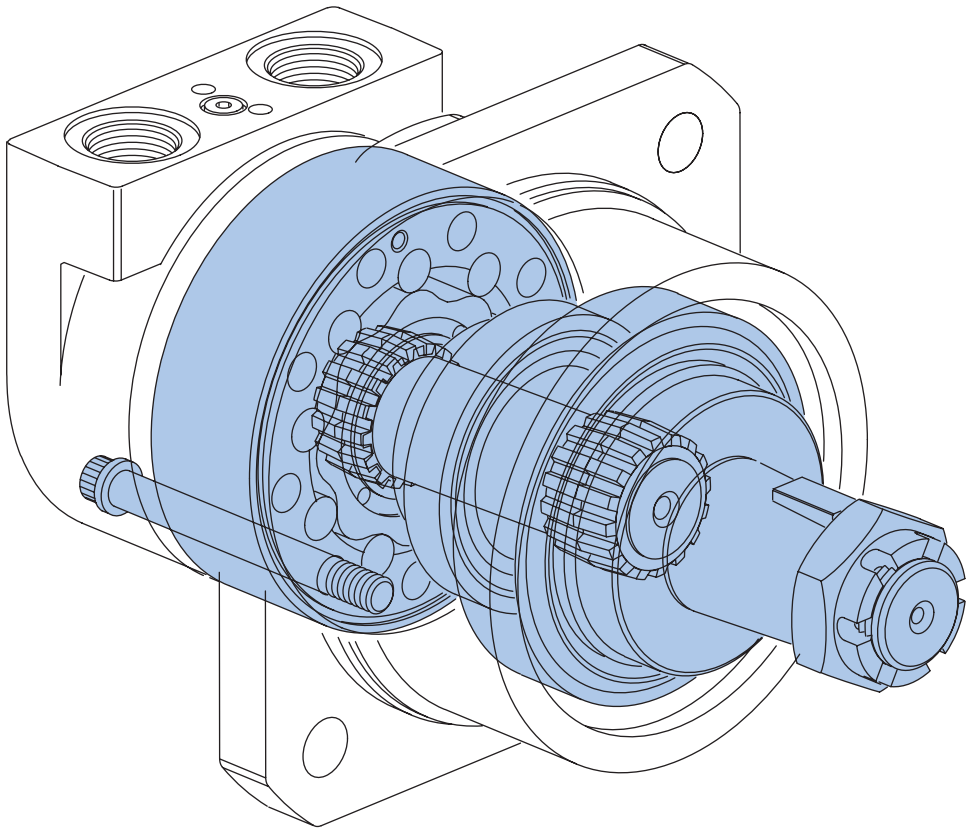


Notes

VIS (Valve-In-Star) Hydraulic Motors

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

VIS 30 Series
VIS 40 Series
VIS 45 Series



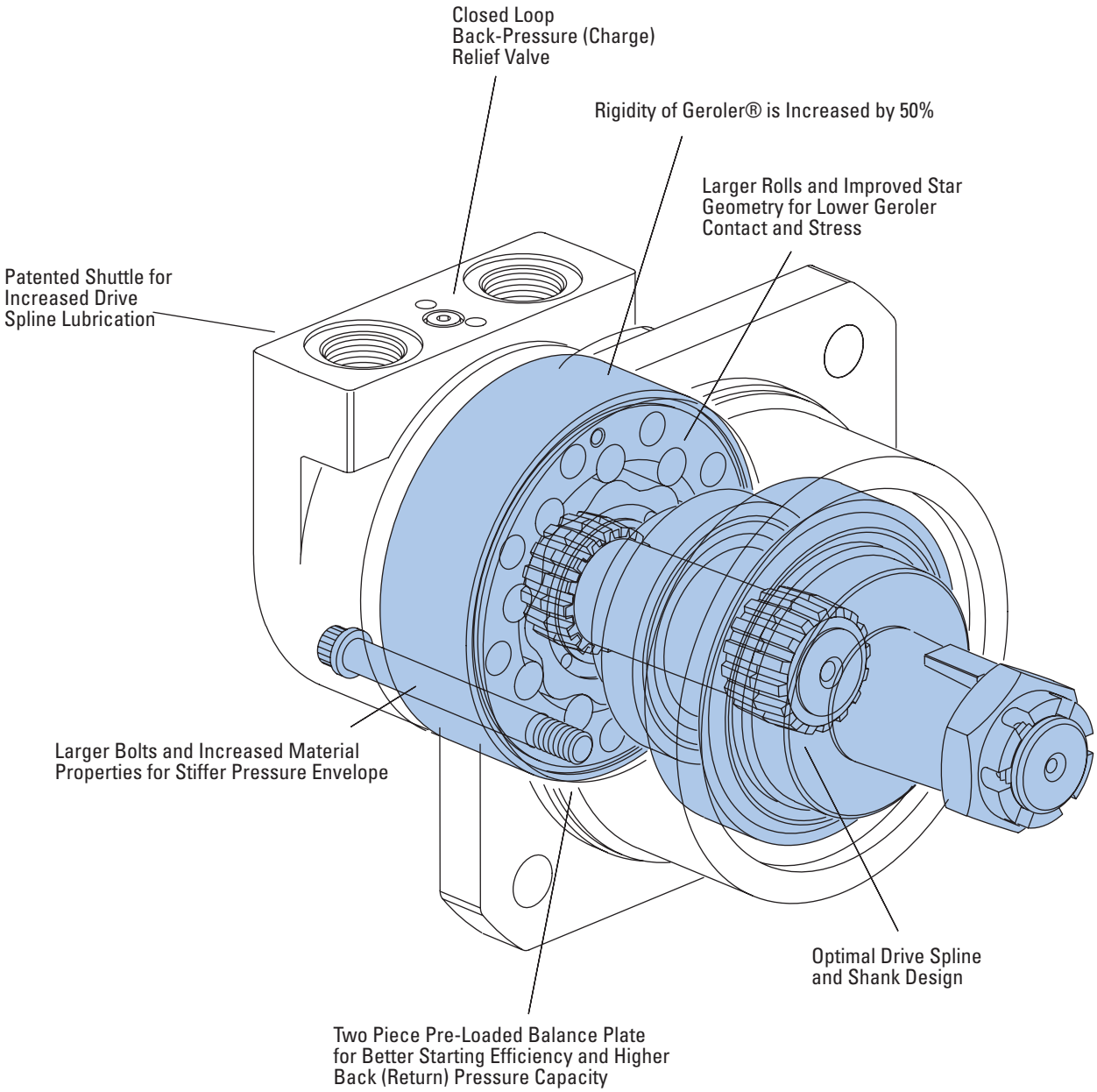
VIS Motors

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

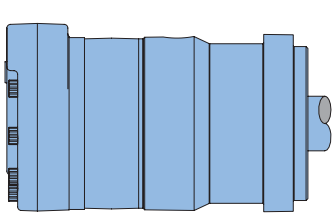
Applications

- 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

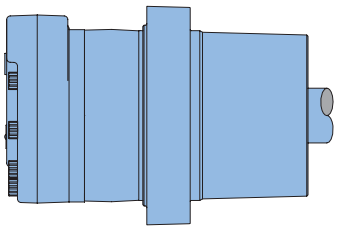
Eaton hydraulic motors provide design flexibility. All VIS motors are available with various configurations consisting of:

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



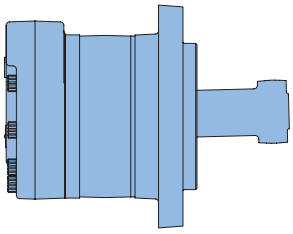
Standard Motor

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

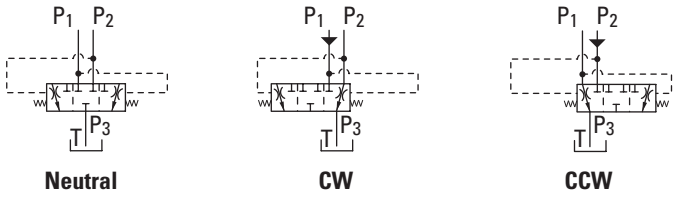
The bearingless motor has the same drive components as the standard and wheel motors with the exception that the motor is assembled without the output shaft, bearings and bearing housing. The bearingless motor is especially suited for applications such as gear boxes, winch drives, reel and roll drives. 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.

Table of Contents

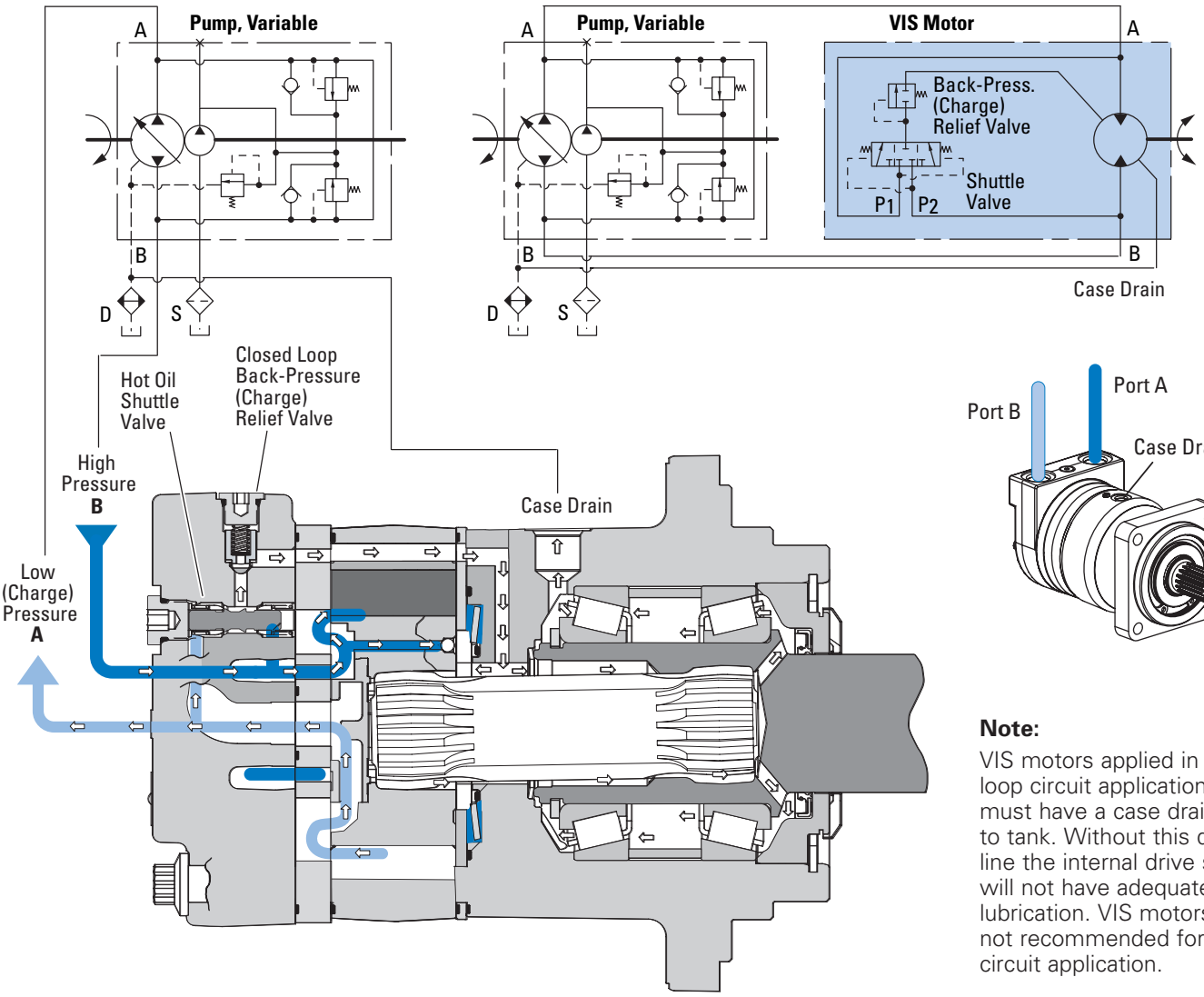
Typical Hydraulic Circuit

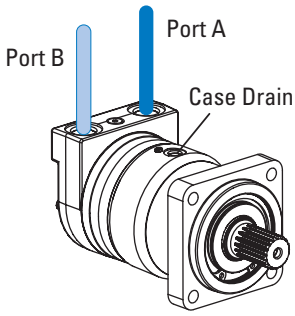
VIS 30, 40 and 45 Series

Shuttle Valve, Two Way (Closed Center) —
Schematic Diagrams



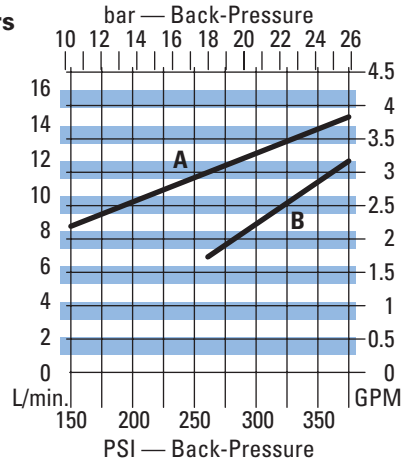
Closed Loop Circuit





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 30, 40 and 45 Motors Shuttle Flow Charts



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

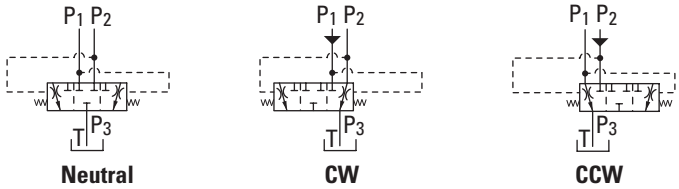
B
15,2 bar [220 PSI] @ 60° C [140° F]
Δ Between Back-Pressure and Case Pressure (Typical Data)

Due to Machining Tolerances, Flow May be More or Less

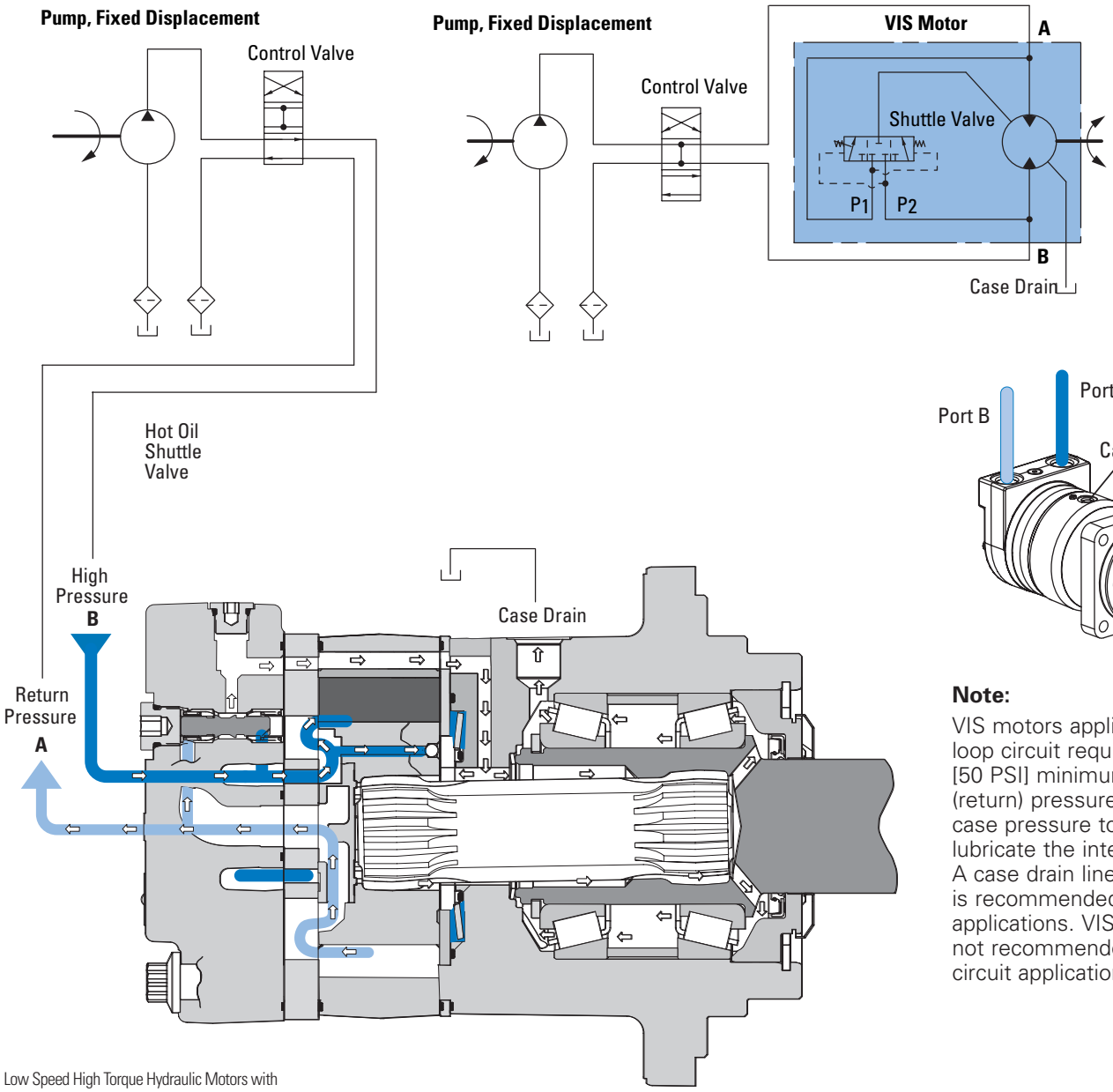
Typical Hydraulic Circuit

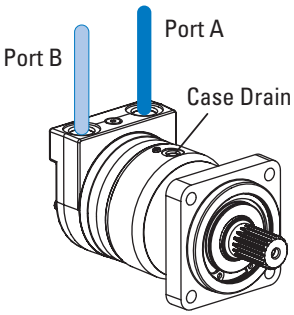
VIS 30, 40 and 45 Series

Shuttle Valve, Two Way (Closed Center) —
Schematic Diagrams



Open Loop Circuit





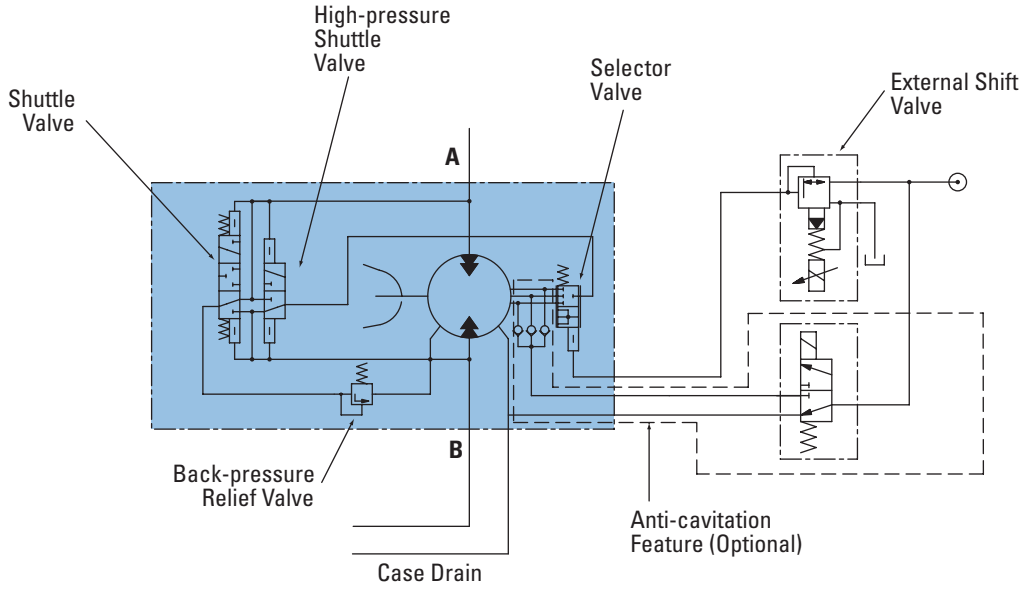
Note:
VIS motors applied in open loop circuit require 3,5 bar [50 PSI] minimum back (return) pressure over the case pressure to properly lubricate the internal drive. A case drain line to tank is recommended in all VIS applications. VIS motors are not recommended for series circuit application.

Low Speed High Torque Hydraulic Motors with Shuttle – Patent No. U.S. 4,645,438

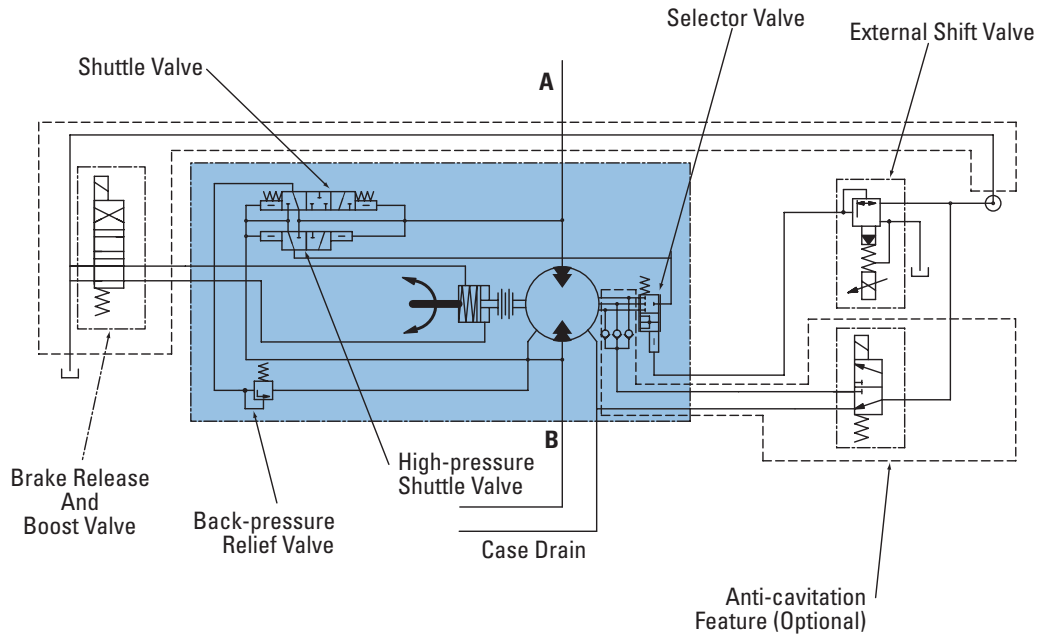
Typical Hydraulic Circuit

VIS 30, 40 and 45 Series

Two-speed Circuit



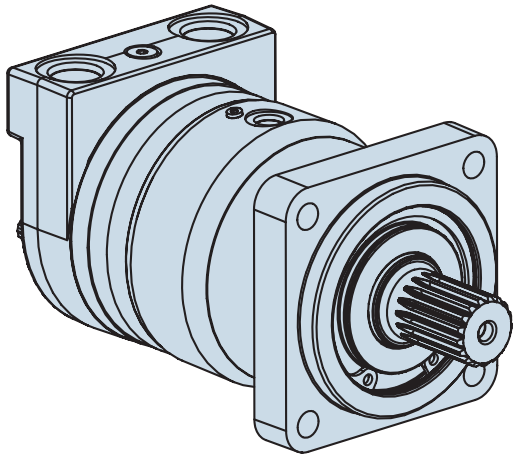
Two-Speed Brake Motor Circuit



Notes

VIS 30 Series

Highlights



Description

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

Specifications

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

*** Continuous— (Cont.) Continuous rating, motor may be run continuously at these ratings.
** Intermittent— (Inter.) Intermittent operation, 10% of every minute.
* Peak— (Peak) Peak operation, 1% of every minute.

Features

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

Benefits

- Extremely Compact Powerful Package
- Highest Output Torque in its Class
- High Efficiency
- Reliable performance
- Reduced System Temperatures
- Quiet, Smooth Operation
- High Horsepower Density
- Design Flexibility

Applications

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


Skid Steer

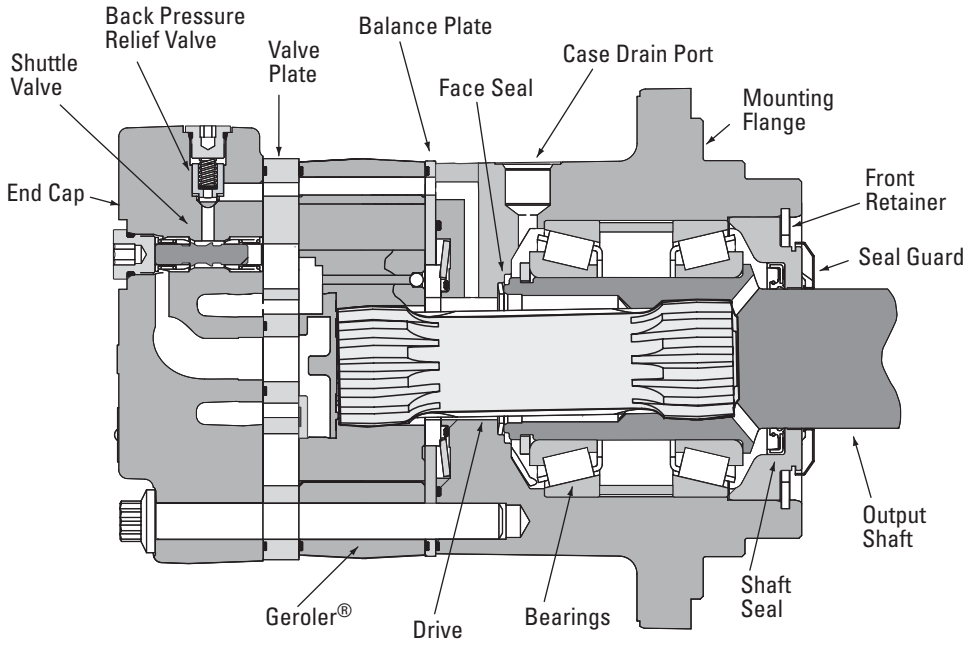

Sprayer


Boring


Injection Molding

VIS 30 Series

Specifications



SPECIFICATION DATA — VIS 30 SERIES MOTORS

Displ. cm³/r [in³/r]		325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Max. Speed (RPM) @ Flow	Continuous	440	357	284	249
	Intermittent	454	368	293	257
Flow l/min [GPM]	Continuous	151 [40]	151 [40]	151 [40]	151 [40]
	Intermittent	170 [45]	170 [45]	170 [45]	170 [45]
Torque Nm [lb-in]	Continuous	1445 [12789]	1589 [14063]	1632 [14440]	1632 [14440]
	Intermittent	1597 [14137]	1968 [17421]	2034 [18000]	2034 [18000]
Pressure Δ bar [Δ PSI]	Continuous	310 [4500]	255 [3700]	203 [2950]	179 [2600]
	Intermittent	345 [5000]	320 [4635]	254 [3685]	223 [3240]
	Peak	380 [5500]	380 [5500]	305 [4420]	268 [3890]
Weight kg [lb]	Standard or Wheel Mount	28,5 [62.9]	29,1 [64.2]	29,9 [66.0]	30,5 [67.2]
	Bearingless	16,3 [36.0]	16,9 [37.3]	17,7 [39.1]	18,3 [40.3]
Weight kg [lb]	Two-speed Standard or Wheel Mount	32,1 [70.8]	32,7 [72.1]	33,5 [73.9]	34,1 [75.1]
	Two-speed Bearingless	19,9 [43.9]	20,5 [45.2]	21,3 [47.0]	21,9 [48.2]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

400 bar [5800 PSI]

Do Not Exceed Pressure Rating (for displacement size see chart above).

Return Pressure (Back-Pressure):

Minimum – 3,5 bar [50 PSI]

Maximum – 21 bar [300 PSI]

Note:

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

Case Pressure:

Minimum – No Pressure

Maximum – 3,5 bar [50 PSI]

Note:

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

Δ Pressure:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

Shuttle:

Standard

Back-Pressure Relief Valve:

Required for closed loop circuit.

VIS 30 Series

Performance Data

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

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

Continuous

Intermittent

Will Operate at Reduced Life

325 cm³/r [19.8 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

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

400 cm3/r [24.4 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

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

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

VIS 30 Series

Performance Data

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

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

Continuous

Intermittent

Will Operate at Reduced Life

505 cm3/r [30.7 in3/r]

Δ Pressure Bar [PSI]

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

570 cm³/r [34.9 in³/r]

Δ Pressure Bar [PSI]

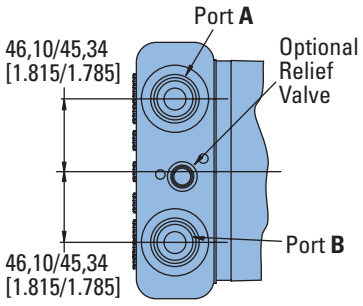
Flow LPM [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000	4500
	15	**35**	**70**	**105**	**140**	**170**	**205**	**240**	**275**	**310**
4	1177	2466	4996	7494	9841	12204	14556	16794	18308	20511
	133	*279*	*564*	*847*	*1112*	*1379*	*1645*	*1897*	*2069*	*2317*
15	**26**	**26**	**26**	**25**	**24**	**24**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

8870 / *1002* / **244** } Torque [lb-in] / Nm / **Speed RPM**

VIS 30 Series

Dimensions

Standard and Wheel Mount – SAE



Ports

1–1/16-12 UN-2B SAE O-ring Ports (2)

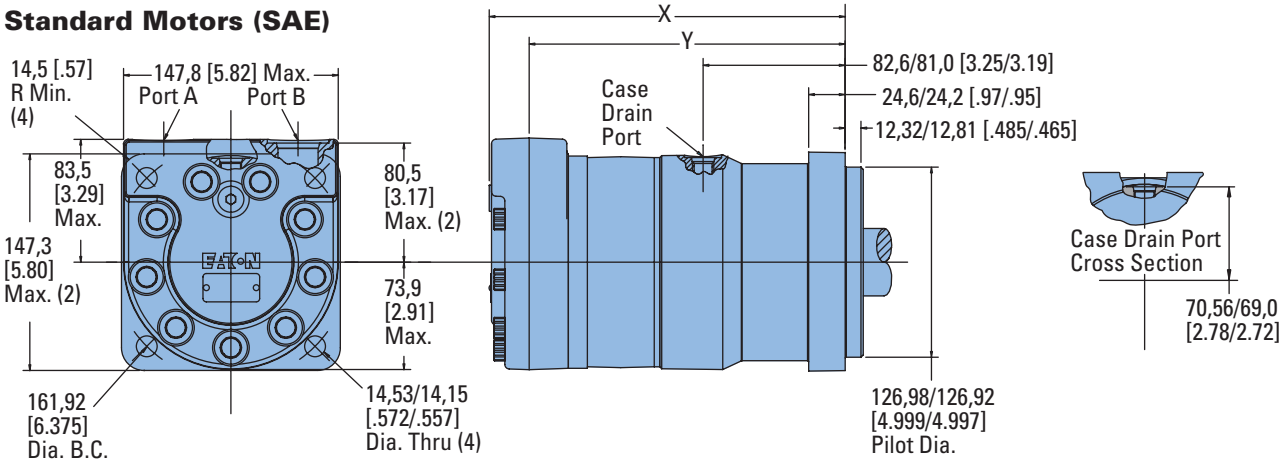
9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

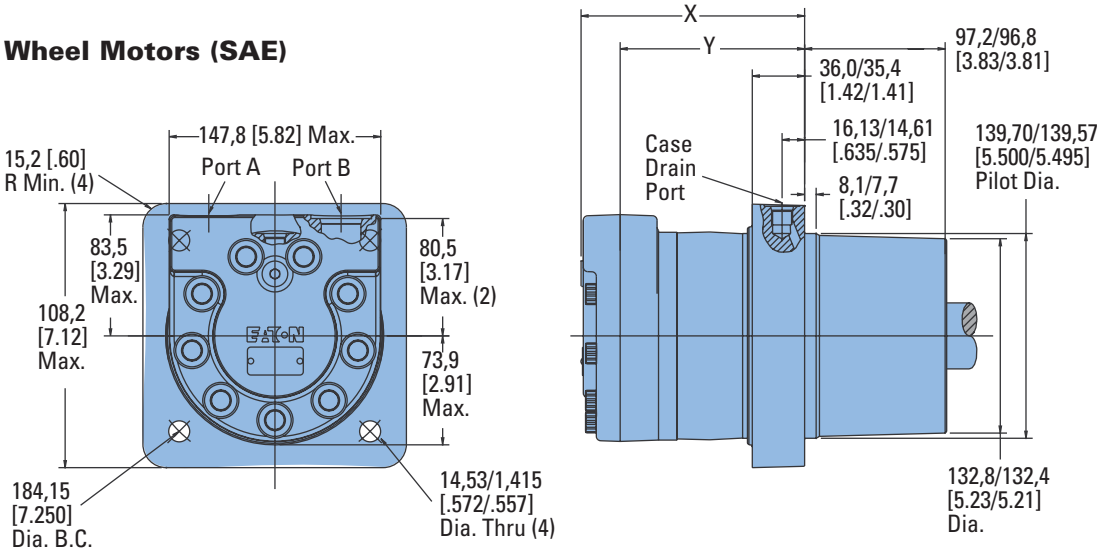
Standard Motors (SAE)



STANDARD MOTORS (SAE)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
325 [19.8]	223,5 [8.80]	195,3 [7.69]
400 [24.4]	230,4 [9.07]	201,9 [7.95]
505 [30.7]	239,3 [9.42]	211,1 [8.31]
570 [34.9]	245,4 [9.66]	217,2 [8.55]

Wheel Motors (SAE)



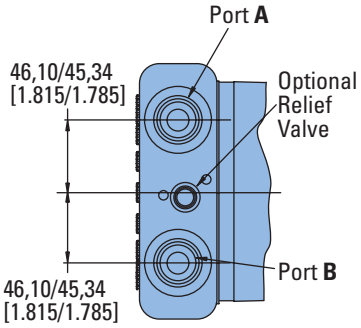
WHEEL MOTORS (SAE)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
325 [19.8]	138,7 [5.46]	110,5 [4.35]
400 [24.4]	145,5 [5.73]	117,1 [4.61]
505 [30.7]	154,5 [6.08]	126,2 [4.97]
570 [34.9]	160,5 [6.32]	132,3 [5.21]

VIS 30 Series

Dimensions

Standard and Wheel Mount – ISO



Ports

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

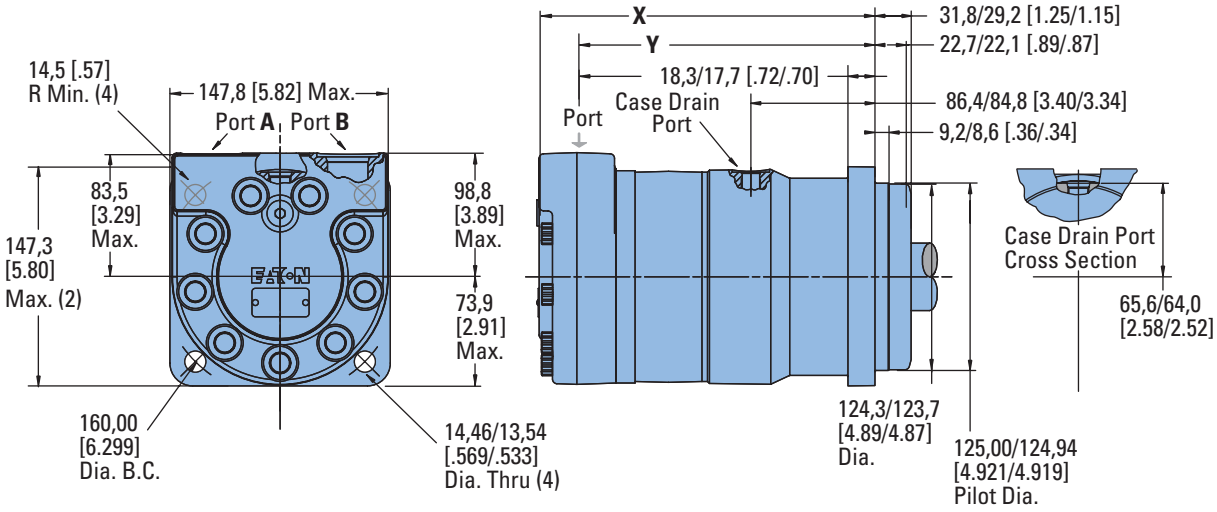
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

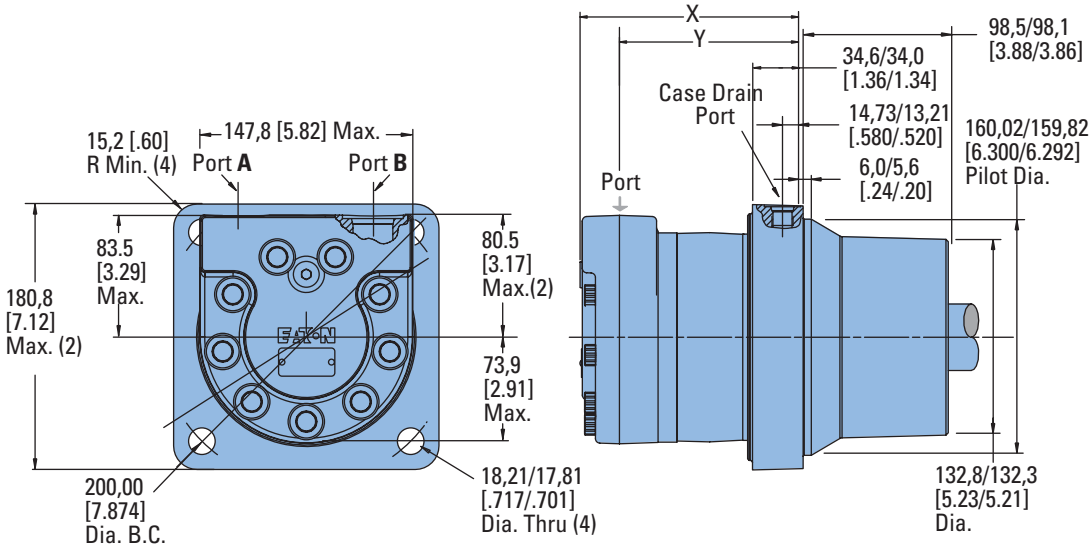
Standard Motors (ISO)



STANDARD MOTORS (ISO)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
325 [19.8]	211,6 [8.33]	183,1 [7.21]
400 [24.4]	218,2 [8.59]	190,0 [7.48]
505 [30.7]	227,3 [8.95]	198,9 [7.83]
570 [34.9]	233,4 [9.19]	205,2 [8.08]

Wheel Motors (ISO)



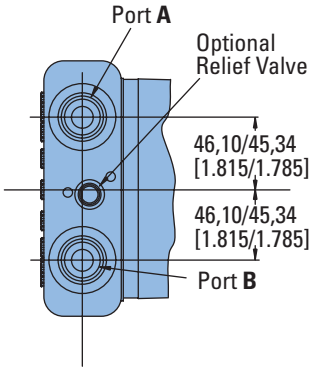
WHEEL MOTORS (ISO)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
325 [19.8]	137,4 [5.41]	109,0 [4.29]
400 [24.4]	144,0 [5.67]	115,8 [4.56]
505 [30.7]	153,2 [6.03]	124,7 [4.91]
570 [34.9]	159,3 [6.27]	131,1 [5.16]

VIS 30 Series

Dimensions

Bearingless



Ports

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

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

Or

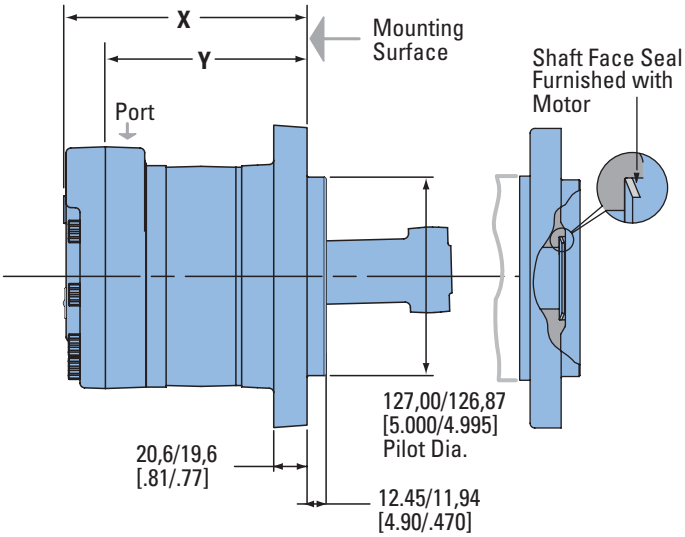
G 3/4 (BSP) O-ring Ports (2)

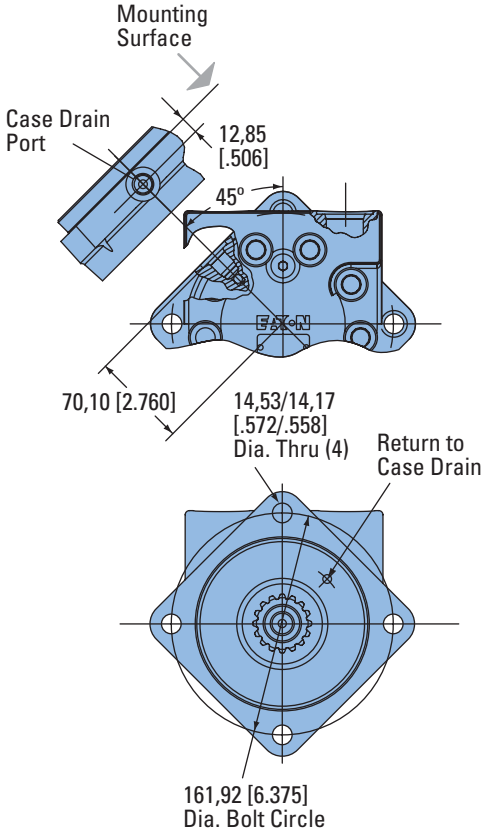
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Drive End

Port A Pressurized — CW

Port B Pressurized — CCW



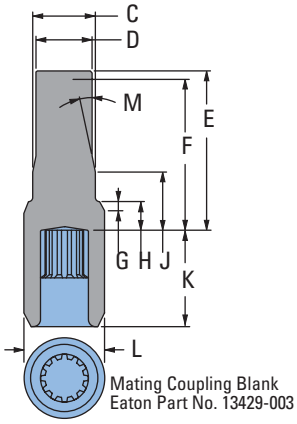


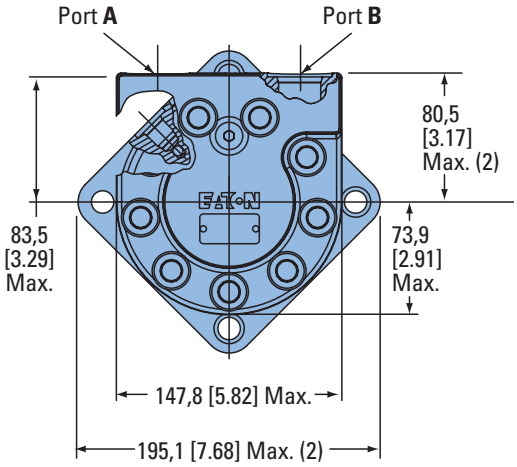
For VIS 30 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

C	52,80	[2.08] Dia.
D	49,00	[1.93] Dia.
E	147,57	[5.81] Max.
F	142,49	[5.61] Min. Full Form Dia.
G	7,87	[.310] Max.
H	17,27	[.680]
J	33,30	[1.31]
K	84,20	[3.315] Full Form Dia.
L	69,60	[2.74]
M	15	





BEARINGLESS MOTORS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
325 [19.8]	141,2 [5.56]	113,3 [4.46]
400 [24.4]	148,1 [5.83]	120,1 [4.73]
505 [30.7]	157,2 [6.19]	129,0 [5.08]
570 [34.9]	163,3 [6.43]	135,1 [5.32]

VIS 30 Series

Installation Information

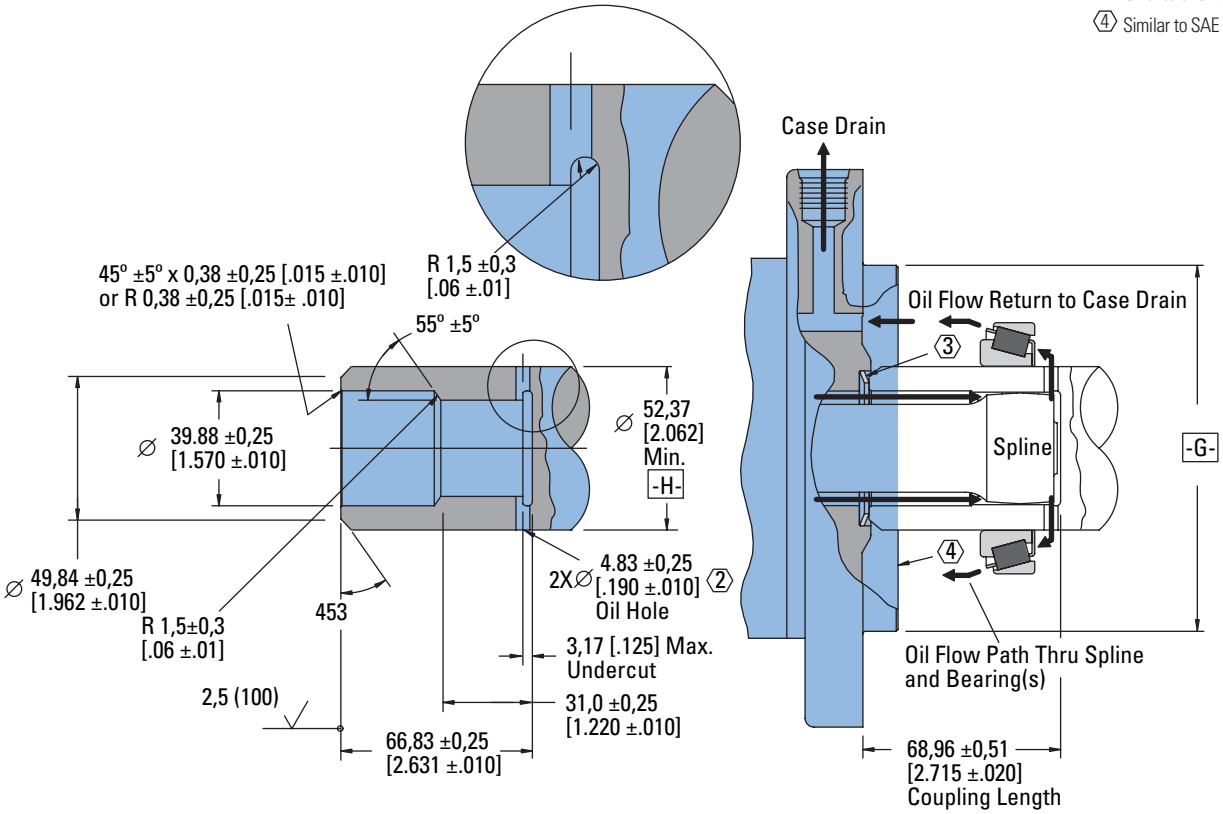
Bearingless

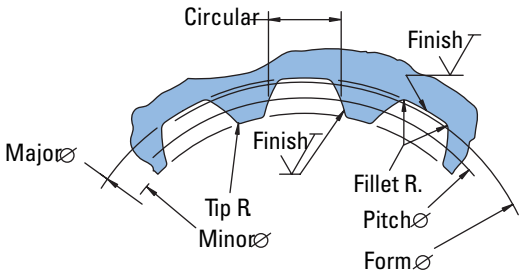
1 Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 -1,27 [.030 -.050]. Dimensions apply after heat treat.

2 Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.

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

4 Similar to SAE "C" Four Bolt Flange.





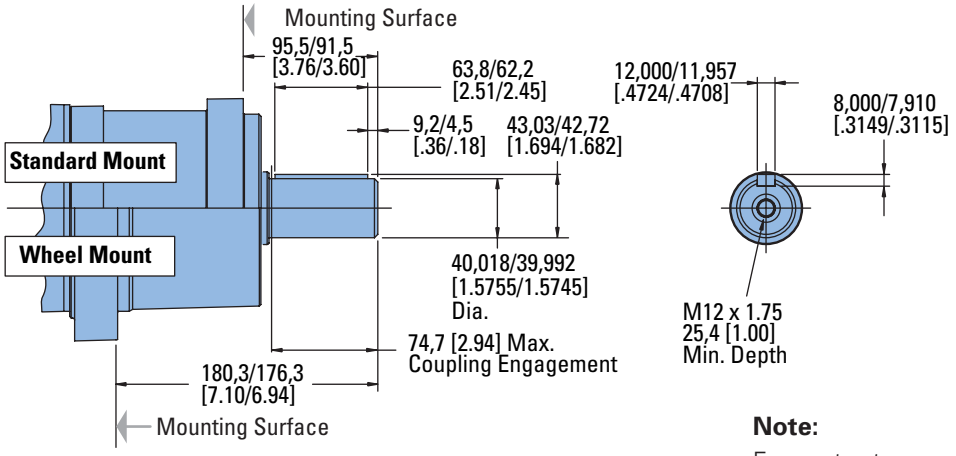
Spline Pitch	8.5/17
Pressure Angle	30°
Number of teeth	12
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 35,858823 [1.4117647] ◎ 0,20 [.008] | H
Base Diameter	Ref. 31,054652 [1.2226241]
Major Diameter	39,17 [1.542] Max. 38,97 [1.534] Min.
Minor Diameter	33,30 -33,48 [1.311 -1.318]
Form Diameter, Min.	38,33 [1.509]
Fillet Radius	0,64 -0,76 [.025 -.030]
Tip Radius	0,25 -0,51 [.010 -.020]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+.0000 -.0010]
Total Index Variation	0,038 [.0015]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual	5,898 [.2322]
Minimum Effective	5,804 [.2285]
Maximum Effective	Ref. 5,857 [.2306]
Minimum Actual	Ref. 5,834 [.2297]
Dimension Between Two Pins	Ref. 26,929 -27,084 [1.0602 -1.0663]
Pin Diameter	6,223 [.2450] Pins to Have 4,0 [.160] Wide Flat for Root Clearance

VIS 30 Series

Dimensions
Shafts

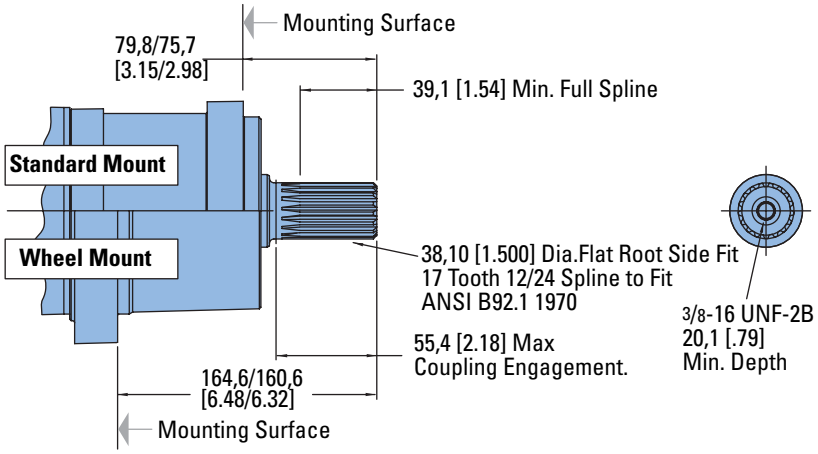
SAE

40 mm Straight

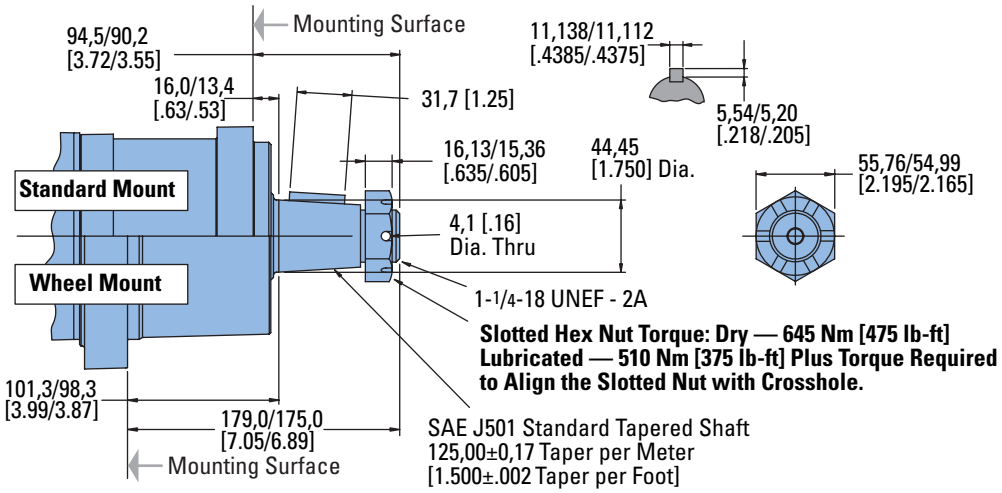


Note:
For motor torque ratings above 875 Nm [7750 lb - in] use split coupler.

1–1/2 Inch 17 Tooth Splined



1–3/4 Inch Tapered



VIS 30 Series

Shaft Side Load Capacity

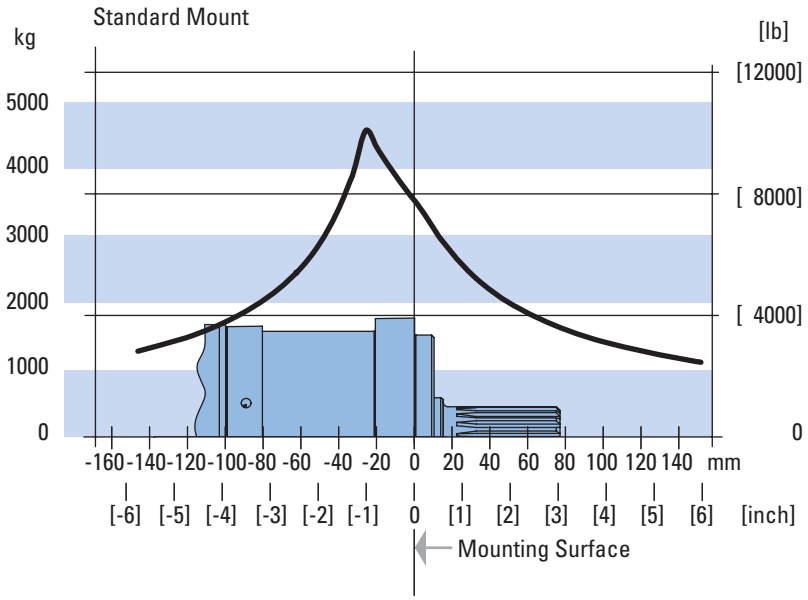
SAE

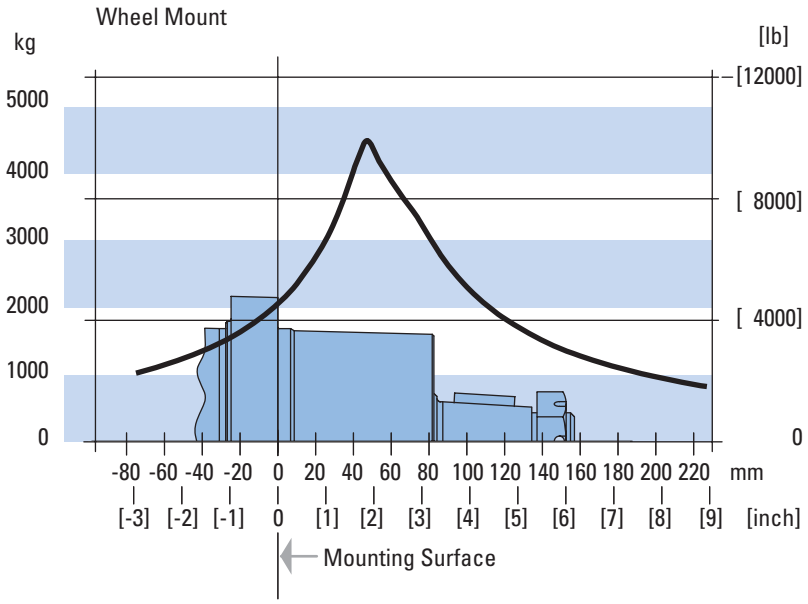
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

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

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



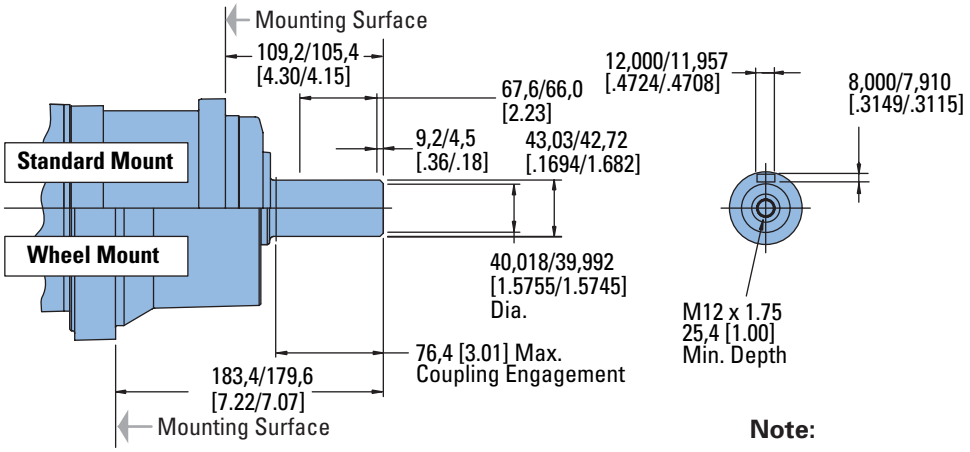


VIS 30 Series

Dimensions
Shafts

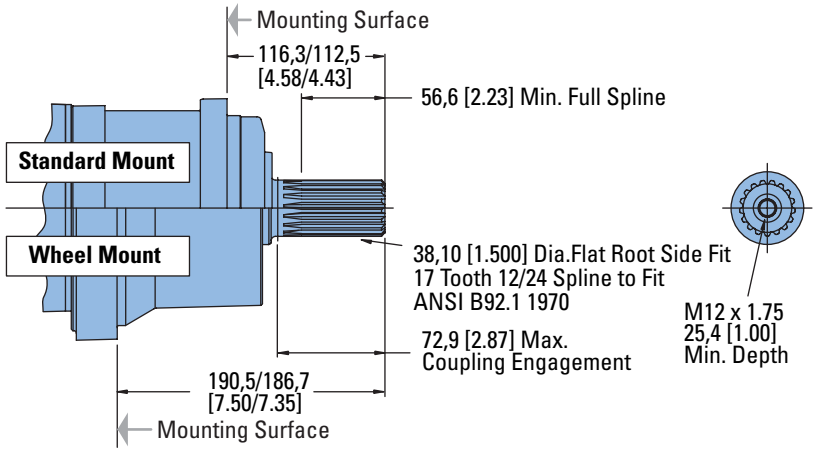
ISO

40 mm Straight

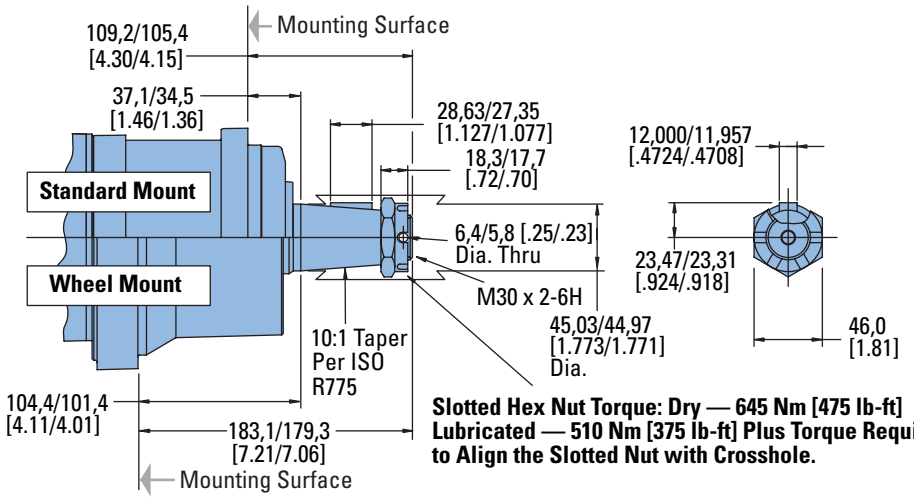


Note:
For motor torque ratings above 875 Nm [7750 lb - in] use split coupler.

38,1 mm [1–1/2 Inch] 17 Tooth Splined



45 mm Tapered



Slotted Hex Nut Torque: Dry — 645 Nm [475 lb-ft] Lubricated — 510 Nm [375 lb-ft] Plus Torque Required to Align the Slotted Nut with Crosshole.

VIS 30 Series

Shaft Side Load Capacity

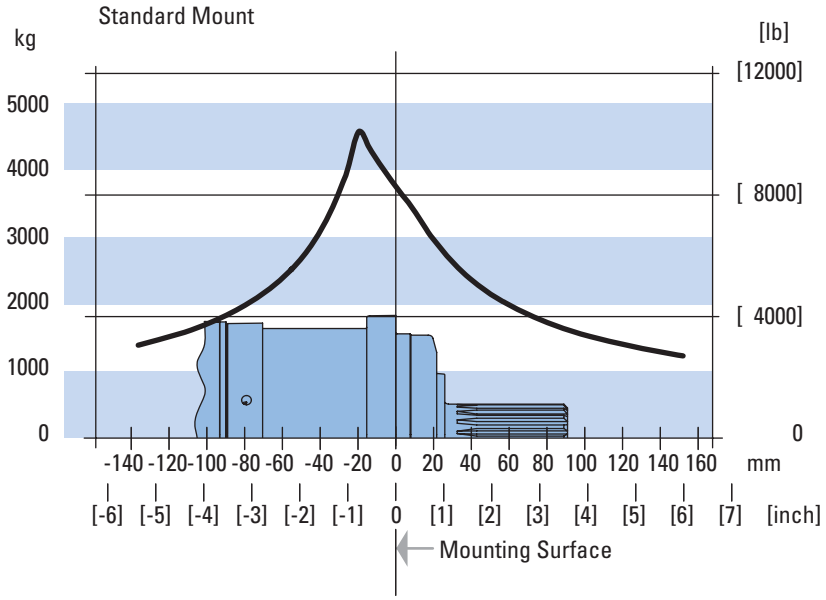
ISO

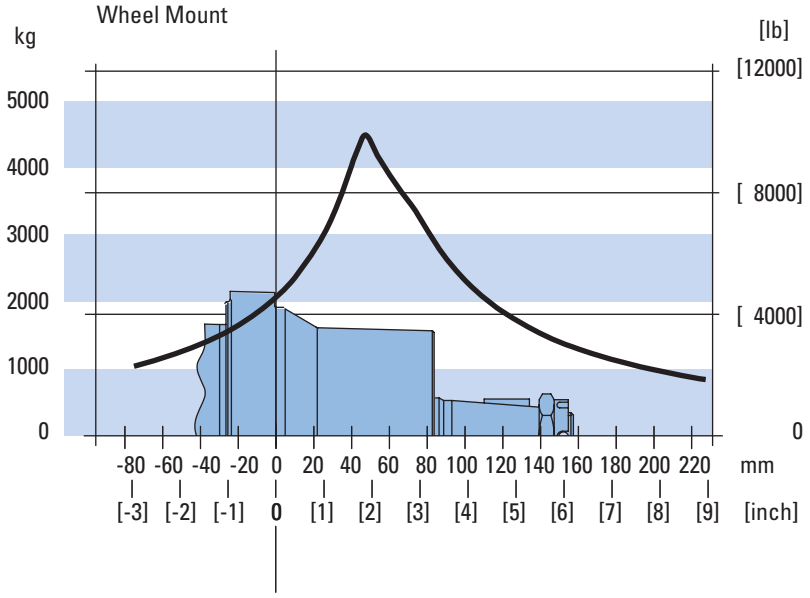
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

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

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





VIS 30 Series

Product Numbers

Closed Loop

Use digit prefix — 159-, 160-, or 161- plus four digit number from charts for complete product number— Example 161-0064.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0103	-0094	-0104	-0105
	1–1/2 inch 17 Tooth Splined	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0107	-0108	-0109	-0110
	1–3/4 inch Tapered	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0112	-0113	-0114	-0115
Wheel	40 mm Straight	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0054	-0055	-0056	-0057
	1–1/2 inch 17 Tooth Splined	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0059	-0060	-0061	-0062
	1–3/4 inch Tapered	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0064	-0065	-0066	-0067
Bearingless		1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	161-0045	-0064	-0065	-0090

161-0064

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0117	-0118	-0119	-0120
	1–1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0122	-0123	-0124	-0125
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0127	-0128	-0129	-0130
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0069	-0070	-0071	-0072
	1–1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0074	-0075	-0076	-0077
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0079	-0080	-0081	-0092
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	161-0067	-0068	-0069	-0070

161-0068

Note:

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

- A case drain is required for all closed loop VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].

VIS 30 Series

Product Numbers

Open Loop

Use digit prefix — 159-, 160-, or 161- plus four digit number from charts for complete product number— Example 161-0064.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0035	-0038	-0041	-0131
	1–1/2 inch 17 Tooth Splined	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0036	-0039	-0042	-0132
	1–3/4 inch Tapered	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	159-0034	-0037	-0040	-0133
Wheel	40 mm Straight	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0021	-0024	-0027	-0083
	1–1/2 inch 17 Tooth Splined	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0022	-0025	-0028	-0084
	1–3/4 inch Tapered	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	160-0020	-0023	-0026	-0085
Bearingless		1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	161-0030	-0034	-0020	-0077

161-0034

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0051	-0054	-0057	-0134
	1–1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0050	-0053	-0056	-0135
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	159-0049	-0052	-0055	-0136
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0037	-0040	-0043	-0086
	1–1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0036	-0039	-0042	-0087
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	160-0035	-0038	-0041	-0088
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	161-0035	-0036	-0037	-0078

161-0036

Note:

All product numbers in the charts (above) are for motors **without** a back-pressure relief valve. These motors would generally be used in open loop circuits.

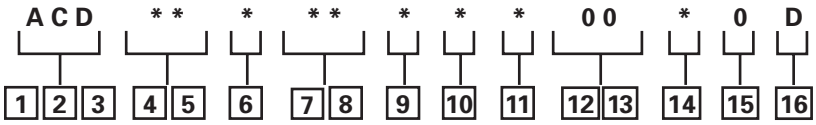
For closed loop circuits a motor **with** a back-pressure relief valve is required.

- A case drain is recommended for all VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].
- In open loop circuits, return pressure must be 3,5 bar [50 PSI] greater than case pressure to properly lubricate the internal drive.

VIS 30 Series

Model Code

The following 16 - digit coding system has been developed to identify all of the configuration options for the VIS 30 motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1, 2, 3 Product Series

ACD – VIS 30 Motor

4, 5 Displacement cm³/r [in³/r]

20 – 325 [19.8]

24 – 400 [24.4]

31 – 505 [30.7]

35 – 570 [34.9]

6 Mounting Type

A – 4 Bolt Bearingless 127,00 [5.000] Pilot Dia. with 12,19 [.480] Pilot Length and 14,35 [.565] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle

B – 4 Bolt Wheel Mount 160 [6.3] Pilot Dia. with 5,8 [.23] Pilot Length and 18,00 [.709] Dia. Holes on 200,00 [7.874] Dia. Bolt Circle (ISO Compatible)

F – 4 Bolt Standard Mount (SAE CC) 127,00 [5.000] Pilot Dia. with 12,2 [.48] Pilot Length and 14,32 [.564] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle

G – 4 Bolt Wheel Mount 139,7 [5.50] Pilot Dia. with 7,9 [.31] Pilot Length and 14,32 [.564] Dia. Holes on 184,15 [7.250] Dia. Bolt Circle (SAE Compatible)

H – 4 Bolt Standard Mount 125,0 [4.92] Pilot Dia. with 8,9 [.35] Pilot Length and 14,00 [.551] Dia. Holes on 160,00 [6.299] Dia. Bolt Circle (ISO Compatible)

7, 8 Output Shaft

00 – None (Bearingless)

01 – 45 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M30 x 2- 6H Threaded Shaft End, 12W x 8H x 28L [.472W x .313H x 1.102L] Key

02 – 1–3/4 inch Dia. .125:1 Tapered Shaft Per SAE J 501 with 1-1/4–18 UNEF - 2A Threaded Shaft End, 11,11 [.4375] Square x 31,8 [1.25] Straight Key

07 – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 63L [.472W x .313H x 2.480L] Key (SAE Compatible)

08 – 1–1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 39,1 [1.54] Minimum Full Spline with 3/8 -16 UNC - 2B Thread in End (SAE Compatible)

09 – 1–1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP30 Degree Involute Spline, 56,6 [2.23] Minimum Full Spline with M12 x 1,75 - 6H Thread in End (ISO Compatible)

10 – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 67L [.472W x .313H x 2.630L] Key (ISO Compatible)

9 Ports

A – 1–1/16-12 UN-2B Size 12 O-ring Port, Accepts Fittings for SAE J1926

B – G 3/4 (BSP) Straight Thread Port

10 Case Flow Options

A – Shuttle Valve with 9/16-18 UNF-2B, Size 6 O-ring Port Case Drain, Accepts Fittings for SAE J1926

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

11 Back-Pressure Relief

0 – None (for Open Loop Only)

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

2 – Set at 15,2 bar [220 PSI] (for Servo Pumps)

4 – Set at 15,2 bar [300 PSI] (for high charge Servo Pumps)

12, 13 Special Features

00 – None

14 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

C – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

0 – Assigned Code

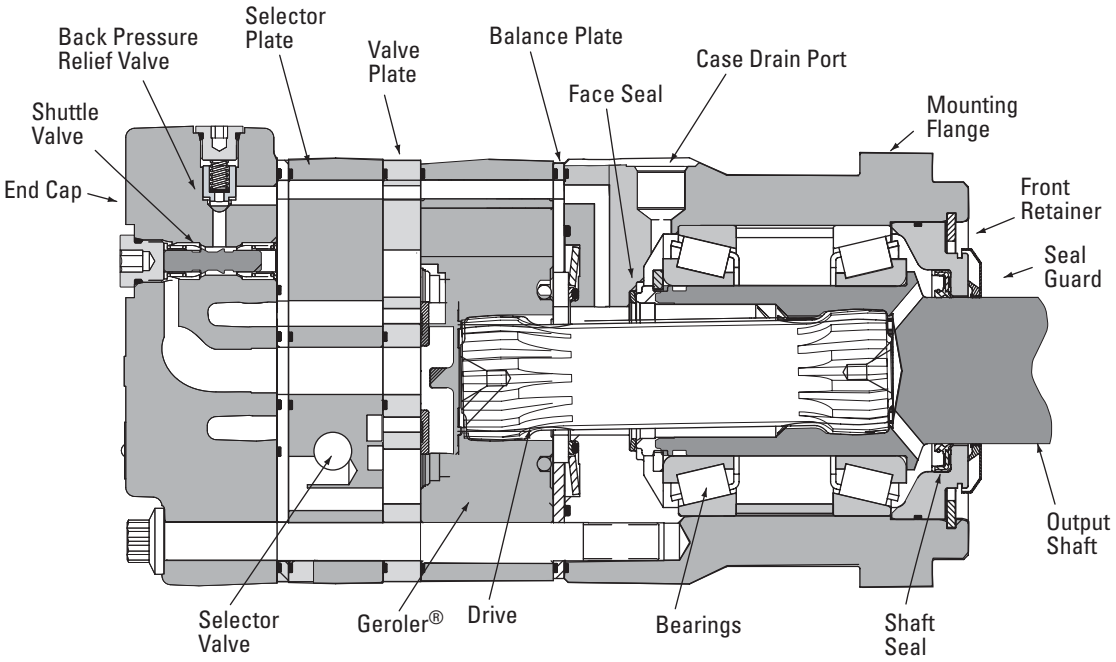
16 Eaton Assigned Design Code

E – Assigned Design Code

- A case drain is recommended for all VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].
- In open loop circuits, return pressure must be 3,5 bar [50 PSI] greater than case pressure to properly lubricate the internal drive.

VIS 30 Series Two-speed

Specifications



VIS 30 Series motors are available with an integral two-speed feature that allows the operator to shift the motor between low speed high torque (LSHT) mode and high speed low torque (HSLT) mode.

In the LSHT mode, output torque and rotation speed values are equal to those of the conventional VIS 30 motor. In the HSLT mode motor displacement is reduced by one third, resulting in a fifty percent increase in rotation speed and a torque output reduction of one third.

The VIS 30 two-speed motor is bidirectional. It will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes. Shift on the fly technology allows full-power operation throughout the full duration of the shift.

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

An integral selector valve shifts the motor from LSHT mode to HSLT mode. Initially, low pressure is supplied to the pilot port. The selector valve is biased to LSHT mode by a return spring. When pilot signal pressure is supplied to the pilot port and 3,5 Δbar [50 PSI] is reached, the selector valve overcomes return spring force and the shifts the spool to select HSLT mode.

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

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

All VIS 30 Series two-speed motors are equipped with a return line shuttle for closed circuit applications as standard equipment. All options available on the conventional VIS 30 are also available on VIS 30 two-speed motors.

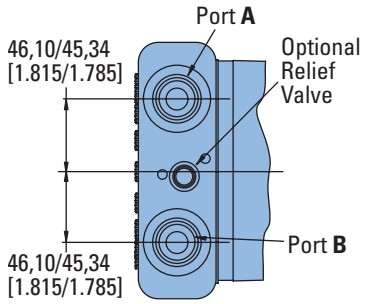
Performance Data

In the LSHT mode, torque and speed values are equal to those of the conventional VIS 30 motor (refer to single speed motor performance data.) In the HSLT mode, rotation speed is increased by fifty percent and torque output is reduced by one third. The VIS 30 Two-speed motor will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes.

VIS 30 Series Two-speed

Dimensions

Standard and Wheel Mount – SAE



Ports

1–1/16 -12 UN-2B SAE O-ring Ports (2)

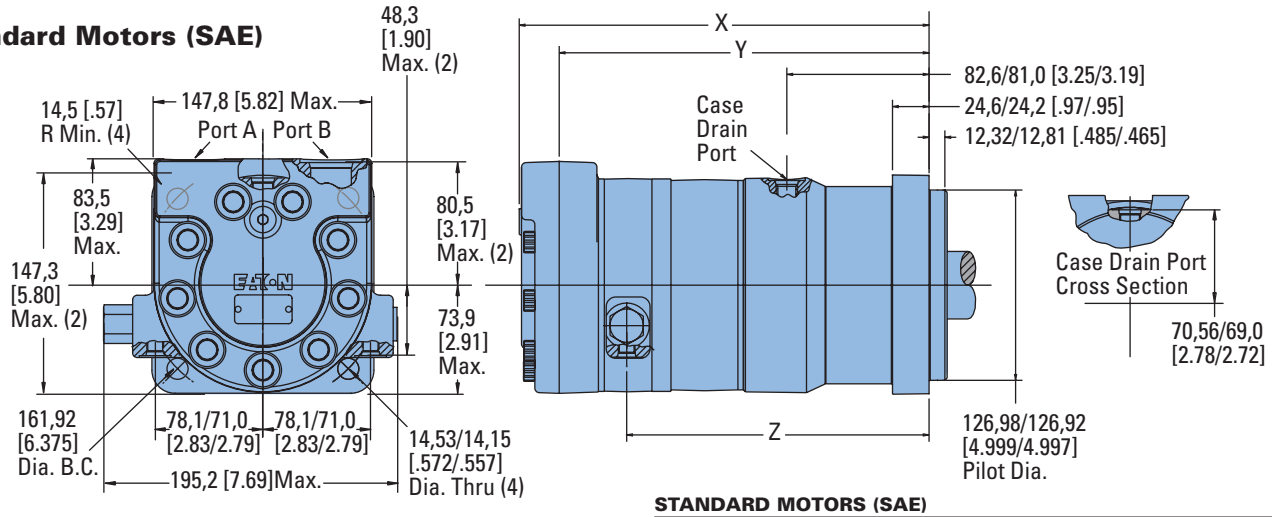
9/16 -18 UNF -2B SAE O-ring Case Drain Port (1)

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

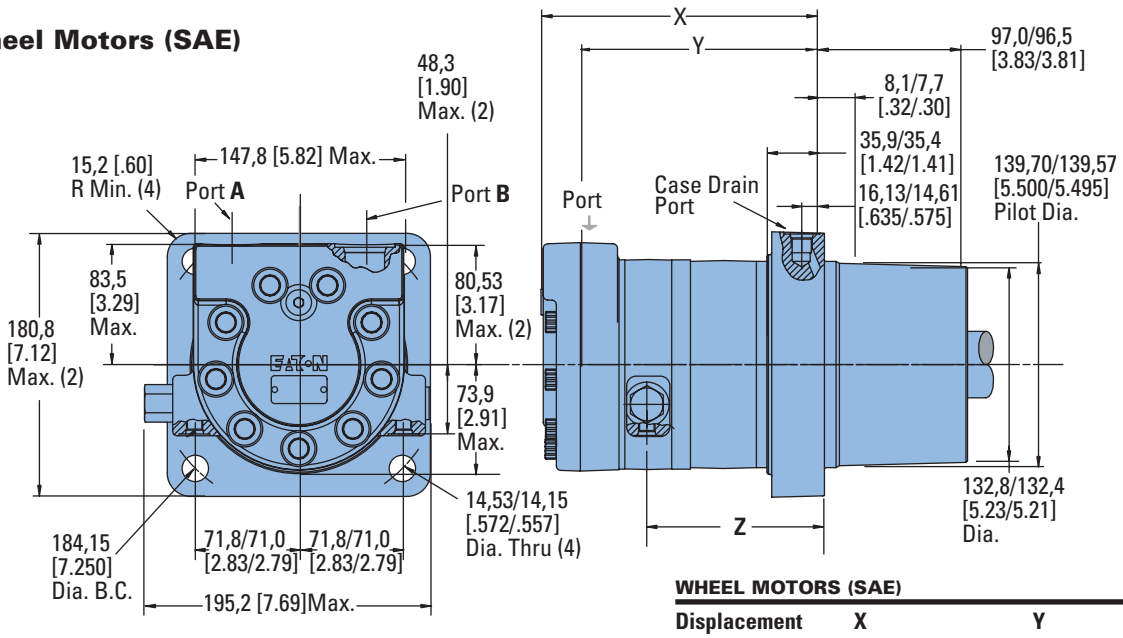
Standard Motors (SAE)



STANDARD MOTORS (SAE)

Displacement	X	Y	Z
cm³/r [in³/r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	259,3 [10.21]	231,4 [9.11]	186,2 [7.33]
400 [24.4]	265,9 [10.47]	238,0 [9.37]	193,0 [7.60]
505 [30.7]	275,1 [10.83]	246,9 [9.72]	201,7 [7.94]
570 [34.9]	281,2 [11.07]	253,0 [9.96]	208,0 [8.19]

Wheel Motors (SAE)



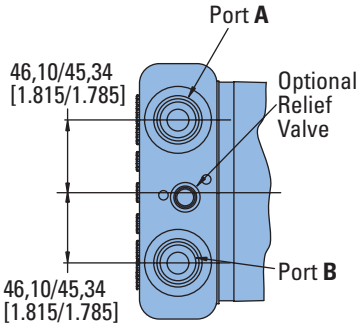
WHEEL MOTORS (SAE)

Displacement	X	Y	Z
cm³/r [in³/r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	174,5 [6.87]	146,6 [5.77]	101,3 [3.99]
400 [24.4]	181,1 [7.13]	153,2 [6.03]	108,2 [4.26]
505 [30.7]	190,2 [7.49]	162,1 [6.38]	116,8 [4.60]
570 [34.9]	196,3 [7.73]	168,1 [6.62]	123,2 [4.85]

VIS 30 Series Two-speed

Dimensions

Standard and Wheel Mount – ISO



Ports

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

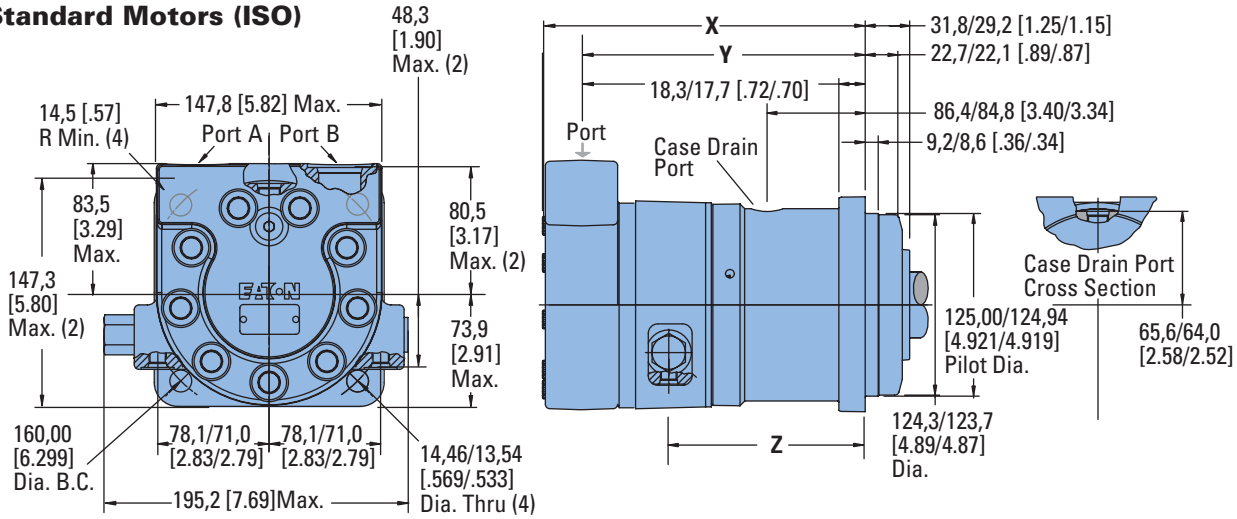
G 1/4 (BSP) O-ring Case Drain Port (1)

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

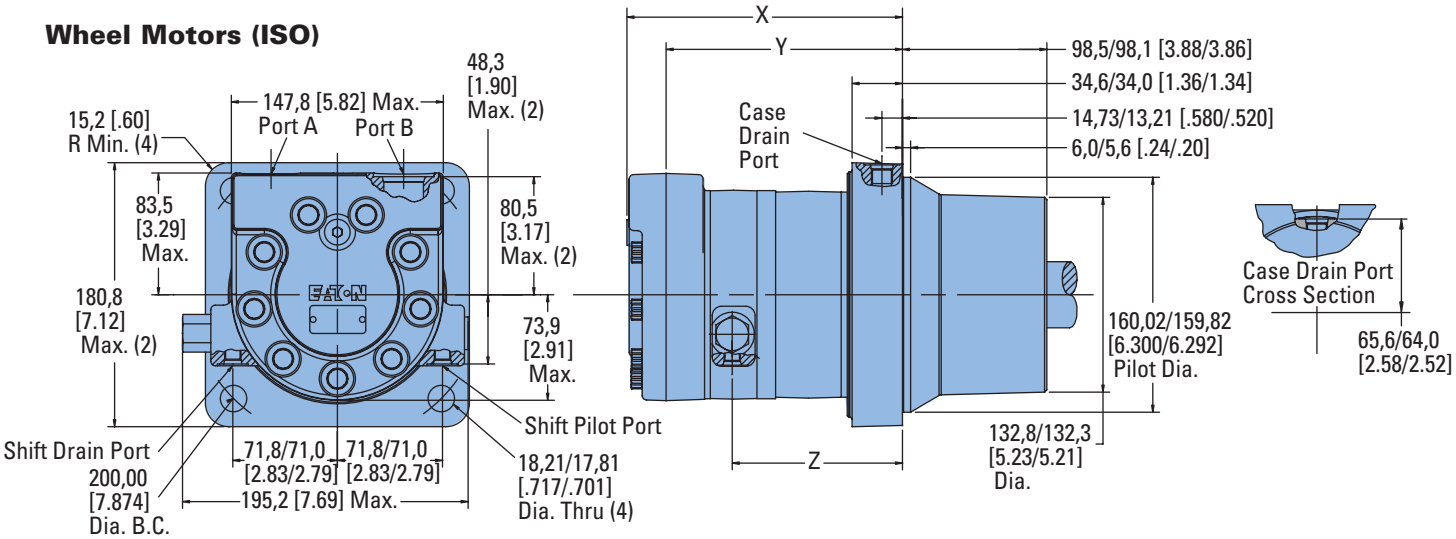
Standard Motors (ISO)



STANDARD MOTORS (ISO)

Displacement	X	Y	Z
cm³/r [in³/r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	247,4 [9.74]	219,5 [8.64]	174,2 [6.86]
400 [24.4]	253,7 [9.99]	225,8 [8.89]	180,8 [7.12]
505 [30.7]	263,1 [10.36]	235,0 [9.25]	189,7 [7.47]
570 [34.9]	269,2 [10.60]	241,0 [9.49]	196,1 [7.72]

Wheel Motors (ISO)



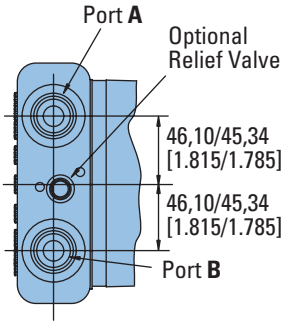
WHEEL MOTORS (ISO)

Displacement	X	Y	Z
cm³/r [in³/r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	173,2 [6.82]	145,3 [5.72]	100,1 [3.94]
400 [24.4]	179,6 [7.07]	151,6 [5.97]	106,7 [4.20]
505 [30.7]	189,0 [7.44]	160,8 [6.33]	115,6 [4.55]
570 [34.9]	195,1 [7.68]	166,9 [6.57]	121,9 [4.80]

VIS 30 Series Two-speed

Dimensions

Bearingless



Ports

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

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

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

Or

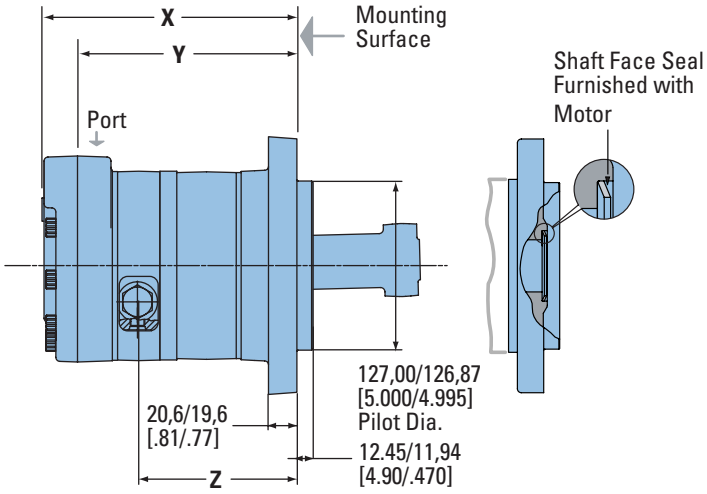
G 3/4 (BSP) O-ring Ports (2)

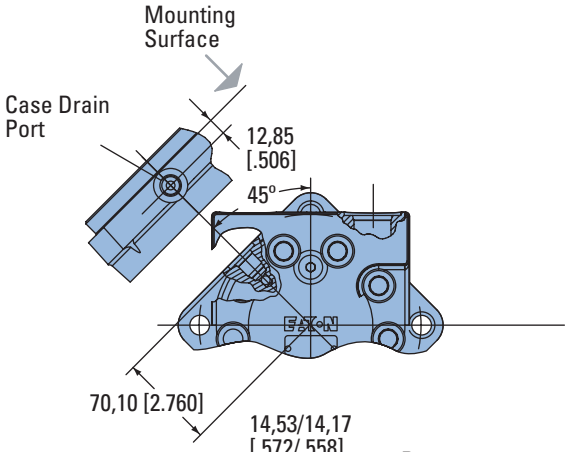
G 1/4 (BSP) O-ring Case Drain Port (1)

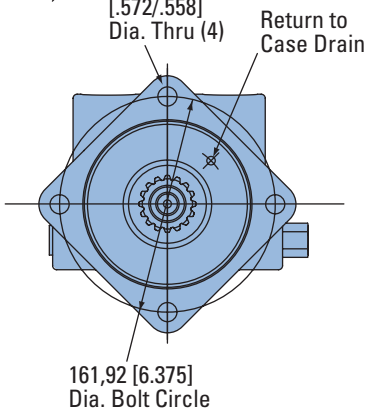
7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

Standard Rotation Viewed from Drive End

Port A Pressurized — CW
Port B Pressurized — CCW





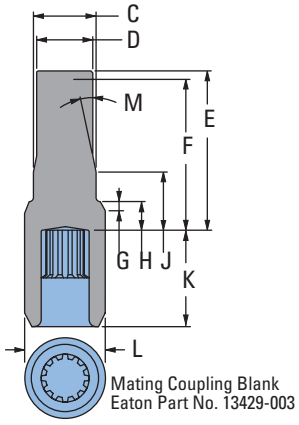


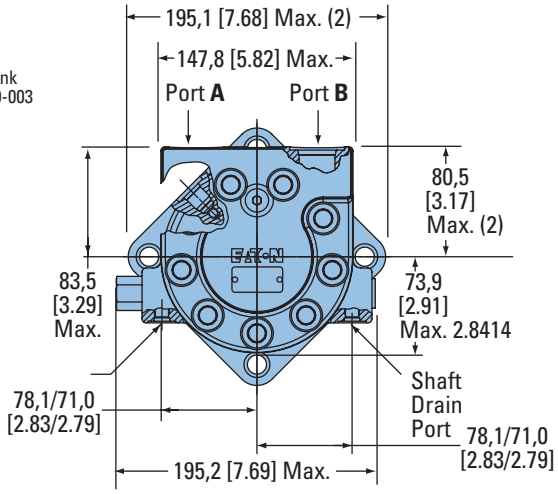
For VIS 30 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

C 52,80 [2.08] Dia.
D 49,00 [1.93] Dia.
E 147,57 [5.81] Max.
F 142,49 [5.61] Min. Full Form Dia.
G 7,87 [.310] Max.
H 17,27 [.680]
J 33,30 [1.31]
K 84,20 [3.315] Full Form Dia.
L 69,60 [2.74]
M 15





BEARINGLESS MOTORS

Displacement	X	Y	Z
cm^3/r [in^3/r]	mm [inch]	mm [inch]	mm [inch]
325 [19.8]	177,0 [6.97]	149,1 [5.87]	103,9 [4.09]
400 [24.4]	183,6 [7.23]	155,7 [6.13]	110,7 [4.36]
505 [30.7]	193,0 [7.60]	164,8 [6.49]	119,6 [4.71]
570 [34.9]	199,1 [7.84]	170,9 [6.73]	126,0 [4.96]

VIS 30 Series
Two-speed

Installation Information

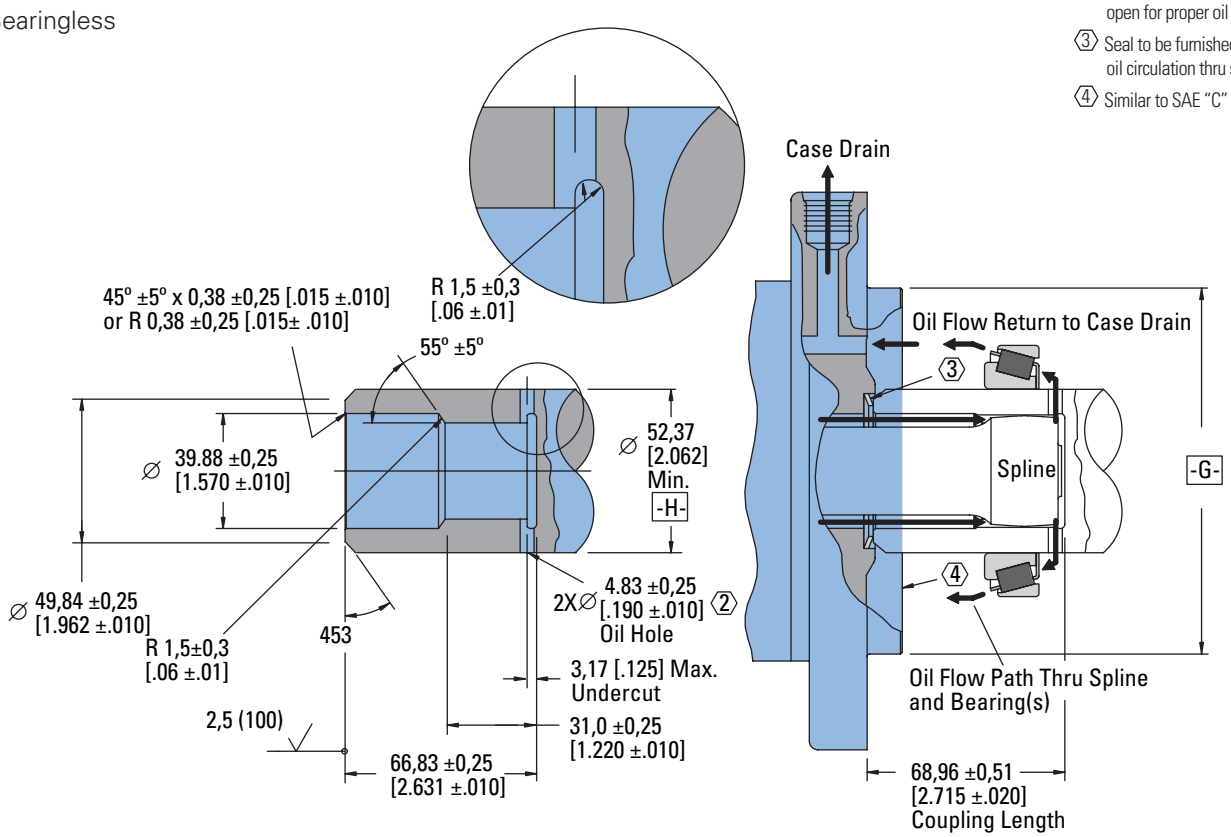
Bearingless

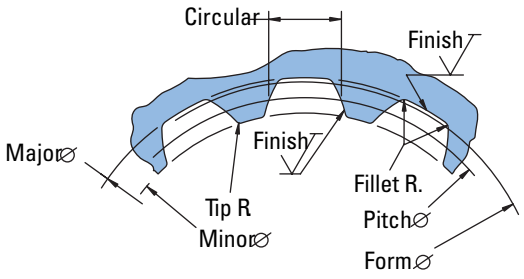
1 Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 -1,27 [.030 -.050]. Dimensions apply after heat treat.

〈2〉 Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.

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

〈4〉 Similar to SAE "C" Four Bolt Flange.





Spline Pitch	8.5/17
Pressure Angle	30°
Number of teeth	12
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 35,858823 [1.4117647] ◎ 0,20 [.008] | H
Base Diameter	Ref. 31,054652 [1.2226241]
Major Diameter	39,17 [1.542] Max. 38,97 [1.534] Min.
Minor Diameter	33,30 -33,48 [1.311 -1.318]
Form Diameter, Min.	38,33 [1.509]
Fillet Radius	0,64 -0,76 [.025 -.030]
Tip Radius	0,25 -0,51 [.010 -.020]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+.0000 -.0010]
Total Index Variation	0,038 [.0015]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual	5,898 [.2322]
Minimum Effective	5,804 [.2285]
Maximum Effective	Ref. 5,857 [.2306]
Minimum Actual	Ref. 5,834 [.2297]
Dimension Between Two Pins	Ref. 26,929 -27,084 [1.0602 -1.0663]
Pin Diameter	6,223 [.2450] Pins to Have 4,0 [.160] Wide Flat for Root Clearance

VIS 30 Series
Two-speed

Product Numbers

Closed Loop

Use digit prefix — 171-, 172-, or 181- plus four digit number from charts for complete product number— Example 171-0016.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	172-0017	-0018	-0019	-0020
	1–1/2 inch 17 Tooth Splined	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	172-0021	-0022	-0023	-0024
	1–3/4 inch Tapered	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	172-0025	-0026	-0027	-0028
Wheel	40 mm Straight	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	181-0001	-0002	-0003	-0004
	1–1/2 inch 17 Tooth Splined	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	181-0005	-0006	-0007	-0008
	1–3/4 inch Tapered	1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	181-0009	-0010	-0011	-0012
Bearingless		1–1/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	171-0015	-0016	-0017	-0018

171-0016

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER			
			325 [19.8]	400 [24.4]	505 [30.7]	570 [34.9]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	172-0029	-0030	-0031	-0032
	1–1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	172-0033	-0034	-0035	-0036
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	172-0037	-0038	-0039	-0040
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	181-0013	-0014	-0015	-0016
	1–1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	181-0017	-0018	-0019	-0020
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	181-0021	-0022	-0023	-0024
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	171-0019	-0020	-0021	-0022

171-0020

Note:

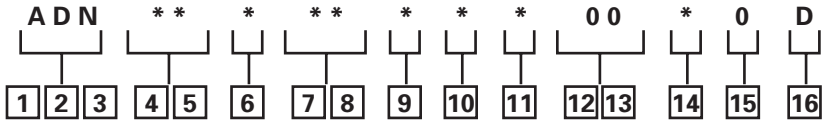
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

- A case drain is required for all closed loop VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].

VIS 30 Series Two-speed

Model Code

The following 16-digit coding system has been developed to identify all of the configuration options for the VIS 30 two-speed motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1, 2, 3 Product Series

ADN – VIS 30- Two-speed Motor

4, 5 Displacement cm³/r [in³/r]

20 – 325 [19.8]

24 – 400 [24.4]

31 – 505 [30.7]

35 – 570 [34.9]

6 Mounting Type

A – 4 Bolt Bearingless 127,00 [5.000] Pilot Dia. with 12,19 [.480] Pilot Length and 14,35 [.565] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle

B – 4 Bolt Wheel Mount 160 [6.3] Pilot Dia. with 5,8 [.23] Pilot Length and 18,00 [.709] Dia. Holes on 200,00 [7.874] Dia. Bolt Circle (ISO Compatible)

F – 4 Bolt Standard Mount (SAE CC) 127,00 [5.000] Pilot Dia. with 12,2 [.48] Pilot Length and 14,32 [.564] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle

G – 4 Bolt Wheel Mount 139,7 [5.50] Pilot Dia. with 7,9 [.31] Pilot Length and 14,32 [.564] Dia. Holes on 184,15 [7.250] Dia. Bolt Circle (SAE Compatible)

H – 4 Bolt Standard Mount 125,0 [4.92] Pilot Dia. with 8,9 [.35] Pilot Length and 14,00 [.551] Dia. Holes on 160,00 [6.299] Dia. Bolt Circle (ISO Compatible)

7, 8 Output Shaft

00 – None (Bearingless)

01 – 45 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M30 x 2- 6H Threaded Shaft End, 12W x 8H x 28L [.472W x .313H x 1.102L] Key

02 – 1–3/4 inch Dia. .125:1 Tapered Shaft Per SAE J 501 with 1-1/4–18 UNEF - 2A Threaded Shaft End, 11,11 [.4375] Square x 31,8 [1.25] Straight Key

07 – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 63L [.472W x .313H x 2.480L] Key (SAE Compatible)

08 – 1–1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 39,1 [1.54] Minimum Full Spline with 3/8-16 UNC - 2B Thread in End (SAE Compatible)

09 – 1–1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP30 Degree Involute Spline, 56,6 [2.23] Minimum Full Spline with M12 x 1,75 - 6H Thread in End (ISO Compatible)

10 – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 67L [.472W x .313H x 2.630L] Key (ISO Compatible)

9 Ports

A – 1–1/16-12 UN-2B Size 12 O-ring Port, Accepts Fittings for SAE J1926

B – G 3/4 (BSP) Straight Thread Port

10 Case Flow Options

A – Shuttle Valve with 9/16-18 UNF-2B, Size 6 O-ring Port Case Drain, Accepts Fittings for SAE J1926

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

11 Back-Pressure Relief

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

2 – Set at 15,2 bar [220 PSI] (for Servo Pumps)

4 – Set at 15,2 bar [300 PSI] (for high charge Servo Pumps)

12, 13 Special Features

00 – None

14 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

C – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

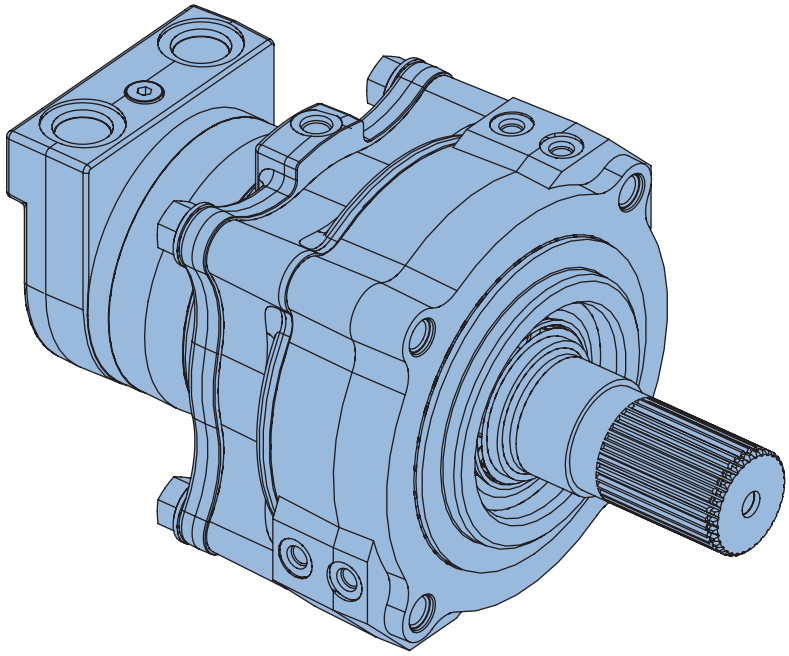
0 – Assigned Code

16 Eaton Assigned Design Code

E – Assigned Design Code

VIS 30 Series

Brake Description



Features

- Spring-Applied/ Hydraulically Released Multi-Disc Brake
- Spring automatically applies brake when hydrostatic pressure is absent
- Environmentally Protected
- Integral Design – Motor and brake as a single 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 plumbing options and facilitates bleeding

Applications

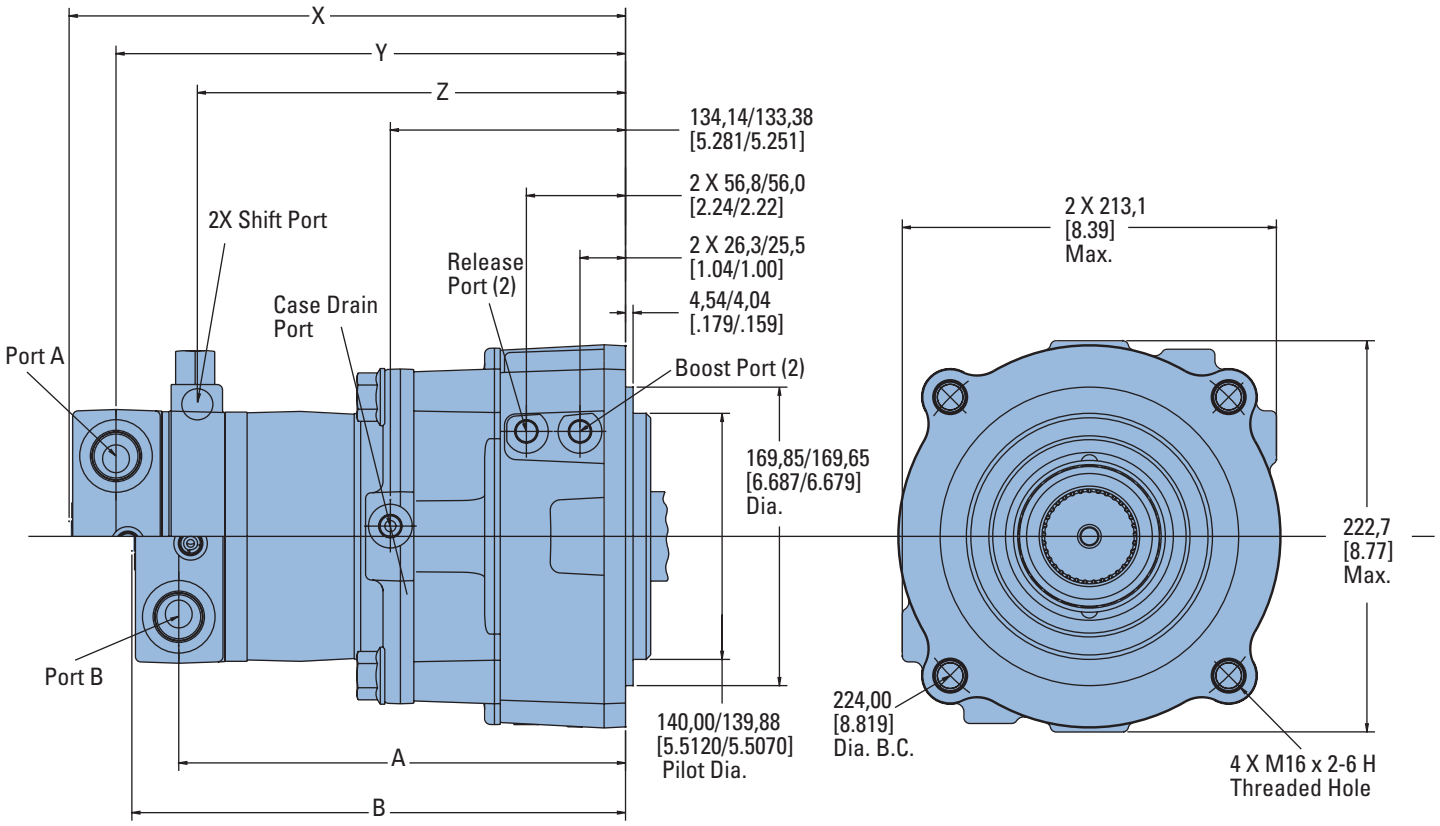
- Skid Steer Loaders
- Mini Excavators
- Trenchers
- Road Rollers
- Anywhere load-holding is needed on a Low-Speed High-Torque drive system

Specifications

• Static Holding Torque –	780 N-m [6900 lb-in] minimum (spring only - no boost) 2621 N-m [23200 lb-in] minimum (@ 10,3 bar [150 PSI] boost)
	3570 N-m [31600 lb-in] minimum (@ 15,2 bar [220 PSI] boost)
• Release Pressure –	10,3 bar [150 PSI] minimum for full release 68,9 bar [1000 PSI] maximum allowed at release port
• Case Pressure –	1,4 bar [20 PSI] continuous
	3,5 bar [50 PSI] maximum
• Boost Pressure –	15,2 bar [220 PSI] continuous
	34,5 bar [500 PSI] maximum
• Speed –	360 RPM maximum
• Emergency –	After 3 consecutive stops, brake to still meet parking requirement

VIS 30 Series

Brake
Dimensions



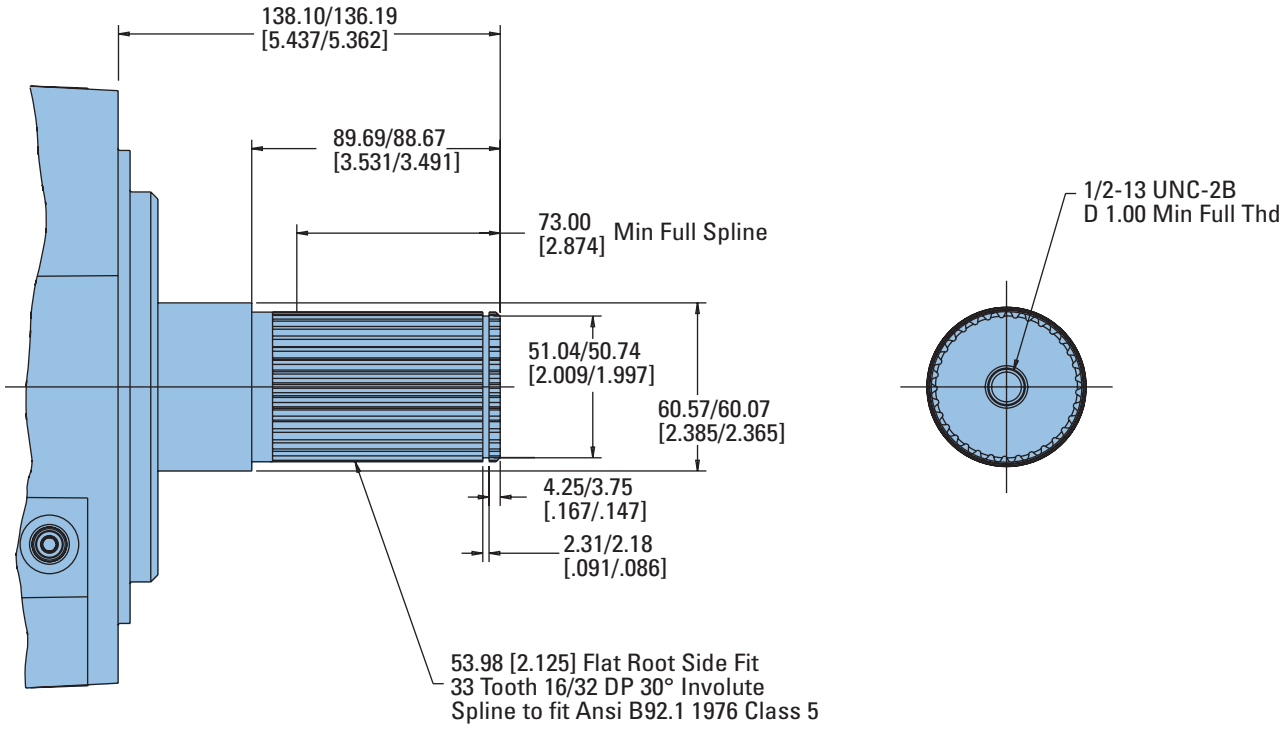
BRAKE MOTORS (SINGLE-SPEED)

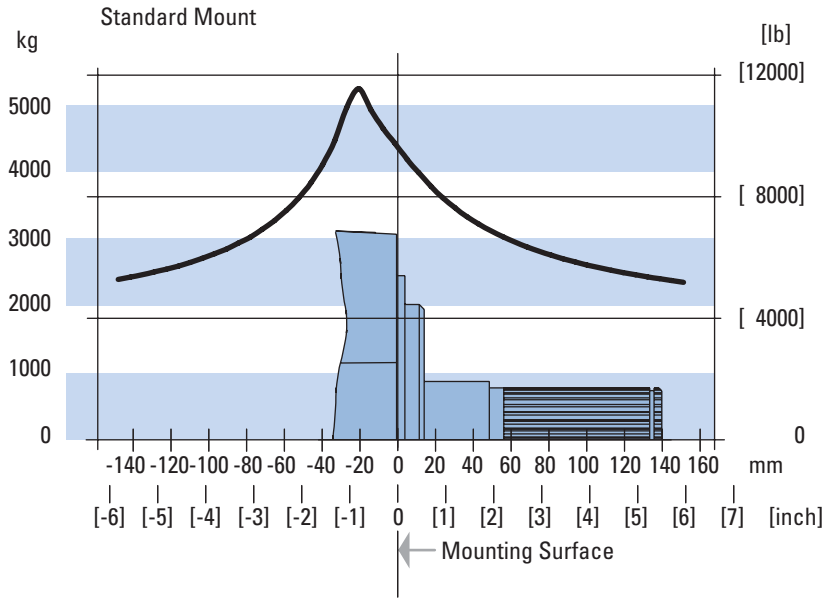
Displacement cm^3/r [in^3/r]	A mm [inch]	B mm [inch]
325 [19.8]	220,9 [8.78]	250,2 [9.85]
400 [24.4]	229,7 [9.05]	256,9 [10.11]
505 [30.7]	238,7 [9.40]	265,9 [10.47]
570 [34.9]	244,9 [9.64]	272,1 [10.71]

BRAKE MOTORS (TWO-SPEED)

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]	Z mm [inch]
325 [19.8]	286,1 [11.26]	258,9 [10.20]	213,5 [8.41]
400 [24.4]	292,7 [11.52]	265,7 [10.46]	220,3 [8.67]
505 [30.7]	301,9 [11.88]	274,7 [10.82]	229,3 [9.03]
570 [34.9]	308,0 [12.12]	280,9 [11.06]	235,5 [9.27]

Brake Shaft Dimensions and Sideload Curves

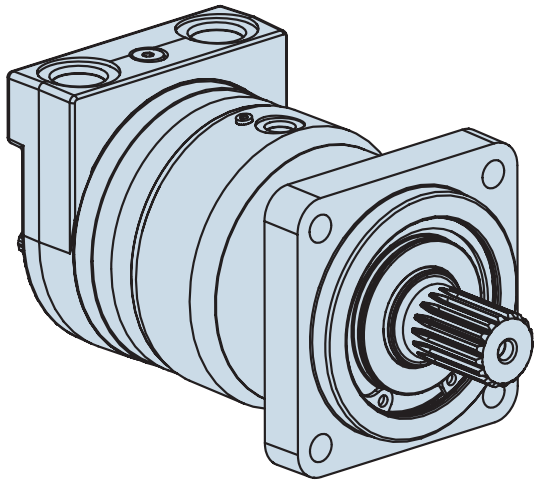




Notes

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.**

*** Continuous— (Cont.) Continuous rating, motor may be run continuously at these ratings.
** Intermittent— (Inter.) Intermittent operation, 10% of every minute.
* Peak— (Peak) Peak operation, 1% of every minute.

Features

- Patented VIS Geroler technology
- Three moving components: (Geroler, star, drive, and output shaft)
- Maximized drive strength in compact package size
- Compact package size similar to VIS 30 Seriies.
- 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

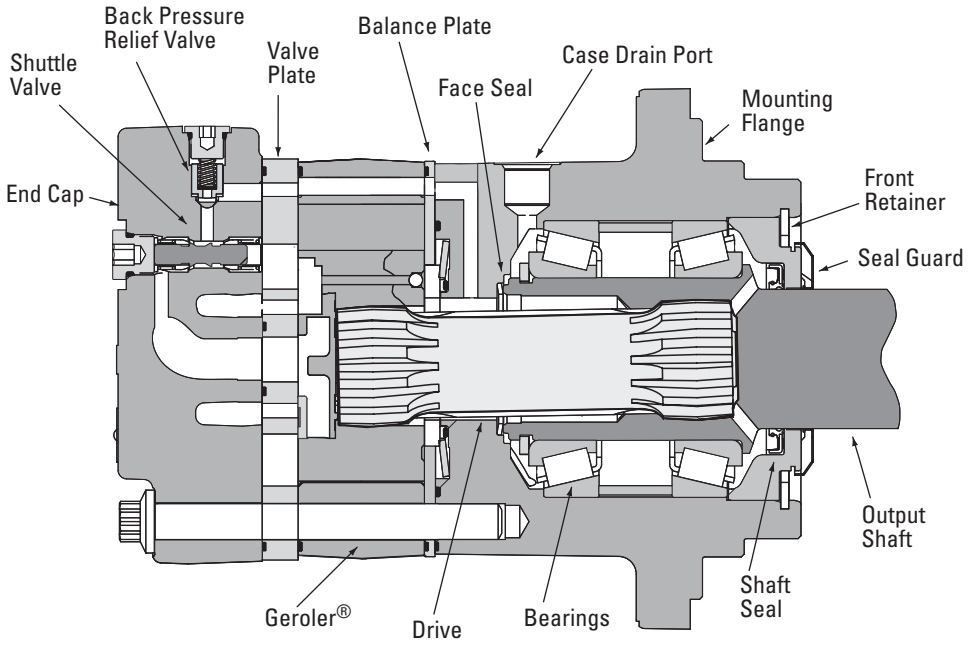
Trencher

Digger

Port Equipment

VIS 40 Series

Specifications



SPECIFICATION DATA — VIS 40 MOTORS

Displ. cm³/r [in³/r]		505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Max. Speed (RPM) @ Flow	Continuous	279	244	221	204	177	148
	Intermittent	293	257	233	215	187	148
Flow l/min [GPM]	Continuous	151 [40]	151 [40]	151 [40]	151 [40]	151 [40]	151 [40]
	Intermittent	170 [45]	170 [45]	170 [45]	170 [45]	170 [45]	170 [45]
Torque Nm [lb - in]	Continuous	2240 [19829]	2531 [22400]	2531 [22400]	2531 [22400]	2531 [22400]	2531 [22400]
	Intermittent	2746 [21919]	2815 [24918]	3165 [28000]	3165 [28000]	3165 [28000]	3165 [28000]
Pressure Δ bar [Δ PSI]	Continuous	310 [4500]	279 [4040]	254 [3686]	235 [3389]	208 [3012]	171 [2489]
	Intermittent	345 [5000]	309 [4486]	315 [4574]	290 [4212]	254 [3682]	214 [3100]
	Peak	380 [5500]	380 [5500]	380 [5500]	380 [5500]	300 [4355]	250 [3621]
Weight kg [lb]	Standard or Wheel Mount	29,9 [66.0]	30,5 [67.2]	31,4 [68.2]	31,4 [69.2]	32,2 [71.0]	33,4 [73.6]
	Bearingless	17,7 [39.1]	18,3 [40.3]	18,7 [41.3]	19,2 [42.3]	20,0 [44.1]	21,2 [46.7]
Weight kg [lb]	Two-speed Standard or Wheel Mount	33,5 [73.9]	34,1 [75.1]	34,5 [76.1]	35,0 [77.1]	35,8 [78.9]	37,0 [81.5]
	Two-speed Bearingless	21,3 [47.0]	21,9 [48.2]	22,3 [49.2]	22,8 [50.2]	23,6 [52]	24,8 [54.6]

A simultaneous maximum torque and maximum speed NOT recommended.

Note:

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

Maximum Inlet Pressure:

400 bar [5800 PSI]

Do Not Exceed A Pressure Rating (for displacement size see chart above).

Return Pressure (Back-Pressure):

Minimum – 3,5 bar [50 PSI]

Maximum – 21 bar [300 PSI]

Note:

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

Δ Pressure:

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

Case Pressure:

Minimum – No Pressure

Maximum – 3,5 bar [50 PSI]

Note:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

Shuttle:

Standard

Back-Pressure Relief Valve:

Required for closed loop circuit.

VIS 40 Series

Performance Data

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

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

Continuous

Intermittent

Will Operate at Reduced Life

505 cm3/r [30.7 in3/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	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	1035	2169	4395	6592	8656	10735	12804	14773	16105	18043	19628	
	117	*245*	*497*	*745*	*978*	*1213*	*1447*	*1669*	*1820*	*2039*	*2218*	
15	**29**	**29**	**29**	**29**	**28**	**28**	**27**	**27**	**25**	**24**	**23**	
8	1055	2200	4445	6671	8855	11049	13225	15313	17473	19319	21368	23010
	119	*249*	*502*	*754*	*1000*	*1248*	*1494*	*1730*	*1974*	*2183*	*2414*	*2600*
30	**60**	**59**	**58**	**56**	**55**	**54**	**53**	**52**	**50**	**48**	**45**	**42**
12	1003	2190	4464	6730	8944	11155	13364	15520	17614	19648	21753	23640
	113	*247*	*504*	*760*	*1011*	*1260*	*1510*	*1754*	*1990*	*2220*	*2458*	*2671*
45	**90**	**88**	**86**	**85**	**83**	**83**	**83**	**82**	**81**	**80**	**73**	**70**
16	1069	2202	4422	6692	8901	11150	13367	15527	17694	19747	21833	23932
	121	*249*	*500*	*756*	*1006*	*1260*	*1510*	*1754*	*1999*	*2231*	*2467*	*2704*
61	**120**	**118**	**117**	**115**	**112**	**110**	**108**	**108**	**107**	**104**	**100**	**98**
20	1019	1938	4301	6833	8830	11117	13552	15431	17663	19829	21919	23783
	115	*219*	*486*	*772*	*998*	*1256*	*1531*	*1743*	*1996*	*2240*	*2476*	*2687*
76	**150**	**148**	**145**	**144**	**140**	**138**	**136**	**135**	**134**	**131**	**129**	**127**
25	843	1963	4363	6440	9083	11194	13207	15406	17473	19620	21765	23775
	95	*222*	*493*	*728*	*1026*	*1265*	*1492*	*1741*	*1974*	*2217*	*2459*	*2686*
95	**188**	**185**	**183**	**180**	**179**	**173**	**172**	**171**	**168**	**165**	**164**	**160**
30	226	1824	4039	6153	8375	10670	12892	15006	17199	19437	21645	23756
	26	*206*	*456*	*695*	*946*	*1206*	*1457*	*1695*	*1943*	*2196*	*2446*	*2684*
114	**220**	**223**	**219**	**217**	**215**	**210**	**208**	**206**	**204**	**201**	**198**	**195**
35	176	1774	3926	6140	8252	10494	12763	14868	17086	18959	20619	23294
	20	*200*	*444*	*694*	*932*	*1186*	*1442*	*1680*	*1930*	*2142*	*2330*	*2632*
132	**255**	**259**	**255**	**253**	**250**	**244**	**243**	**240**	**238**	**234**	**228**	**228**
40	142	864	3174	5542	7803	10089	12317	14391	16570	18779	20837	23162
	16	*98*	*359*	*626*	*882*	*1140*	*1392*	*1626*	*1872*	*2122*	*2354*	*2617*
151	**293**	**292**	**284**	**279**	**277**	**277**	**277**	**276**	**274**	**271**	**267**	**263**

570 cm³/r [34.9 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]	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	1177	2466	4996	7494	9841	12204	14556	16794	18308	20511	22313	
	133	*279*	*564*	*847*	*1112*	*1379*	*1645*	*1897*	*2069*	*2317*	*2521*	
15	**26**	**26**	**26**	**25**	**24**	**24**	**24**	**24**	**22**	**21**	**20**	
8	1199	2501	5053	7584	10067	12560	15034	17408	19864	21962	24292	26158
	135	*283*	*571*	*857*	*1137*	*1419*	*1699*	*1967*	*2244*	*2481*	*2745*	*2955*
30	**52**	**52**	**51**	**50**	**48**	**48**	**47**	**46**	**44**	**42**	**40**	**37**
12	1140	2489	5074	7650	10167	12681	15193	17644	20024	22336	24729	26874
	129	*281*	*573*	*864*	*1149*	*1433*	*1717*	*1993*	*2262*	*2524*	*2794*	*3036*
45	**79**	**78**	**76**	**75**	**73**	**73**	**73**	**72**	**71**	**71**	**64**	**62**
16	1216	2503	5027	7608	10119	12675	15195	17652	20115	22449	24820	27206
	137	*283*	*568*	*860*	*1143*	*1432*	*1717*	*1994*	*2273*	*2536*	*2804*	*3074*
61	**106**	**104**	**103**	**101**	**99**	**96**	**95**	**95**	**94**	**92**	**88**	**86**
20	1159	2203	4890	7768	10038	12638	15407	17542	20080	22542	24918	27037
	131	*249*	*552*	*878*	*1134*	*1428*	*1741*	*1982*	*2269*	*2547*	*2815*	*3055*
76	**132**	**130**	**128**	**127**	**123**	**121**	**120**	**119**	**118**	**115**	**114**	**112**
25	958	2231	4960	7321	10325	12725	15014	17513	19863	22305	24743	27027
	108	*252*	*560*	*827*	*1167*	*1438*	*1696*	*1979*	*2244*	*2520*	*2796*	*3054*
95	**165**	**163**	**161**	**159**	**157**	**152**	**151**	**150**	**148**	**145**	**144**	**141**
30	257	2074	4591	6994	9520	12130	14656	17059	19552	22096	24606	27006
	29	*234*	*519*	*790*	*1076*	*1370*	*1656*	*1927*	*2209*	*2496*	*2780*	*3051*
114	**193**	**196**	**193**	**191**	**189**	**184**	**183**	**181**	**179**	**177**	**174**	**172**
35	200	2017	4463	6980	9381	11930	14509	16902	19423	21553	23440	26481
	23	*228*	*504*	*789*	*1060*	*1348*	*1639*	*1910*	*2195*	*2435*	*2648*	*2992*
132	**225**	**228**	**224**	**222**	**220**	**214**	**214**	**211**	**209**	**206**	**201**	**201**
40	162	983	3608	6300	8870	11469	14002	16360	18837	21348	23688	26331
	18	*111*	*408*	*712*	*1002*	*1296*	*1582*	*1848*	*2128*	*2412*	*2676*	*2975*
151	**257**	**257**	**249**	**246**	**244**	**243**	**244**	**243**	**241**	**238**	**234**	**232**

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]
Δ Pressure Bar [PSI]

Flow **LPM** [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	**35**	**70**	**105**	**140**	**170**	**205**	**240**	**275**	**310**	**345**	**380**
4	1298	2720	5511	8267	10856	13463	16058	18526	20197	22627	24615	
	147	*307*	*623*	*934*	*1227*	*1521*	*1814*	*2093*	*2282*	*2556*	*2781*	
15	**23**	**23**	**23**	**23**	**22**	**22**	**22**	**22**	**20**	**19**	**18**	
8	1323	2759	5575	8366	11105	13856	16585	19204	21913	24227	26797	28856
	149	*312*	*630*	*945*	*1255*	*1565*	*1874*	*2170*	*2476*	*2737*	*3028*	*3260*
30	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**42**	**40**	**38**	**36**	**34**
12	1257	2746	5598	8439	11216	13990	16760	19464	22089	24640	27279	29646
	142	*310*	*632*	*954*	*1267*	*1581*	*1894*	*2199*	*2496*	*2784*	*3082*	*3350*
45	**72**	**70**	**68**	**68**	**67**	**67**	**67**	**65**	**65**	**64**	**58**	**56**
16	1341	2761	5546	8393	11163	13982	16763	19472	22190	24765	27381	30012
	152	*312*	*627*	*948*	*1261*	*1580*	*1894*	*2200*	*2507*	*2798*	*3094*	*3391*
61	**96**	**94**	**93**	**92**	**89**	**87**	**86**	**86**	**86**	**83**	**79**	**78**
20	1278	2430	5394	8569	11073	13942	16996	19352	22151	24867	27488	29825
	144	*275*	*609*	*968*	*1251*	*1575*	*1920*	*2186*	*2503*	*2810*	*3106*	*3370*
76	**120**	**118**	**116**	**115**	**112**	**110**	**108**	**108**	**107**	**104**	**103**	**102**
25	1057	2461	5471	8076	11390	14038	16563	19320	21912	24605	27295	29815
	119	*278*	*618*	*912*	*1287*	*1586*	*1871*	*2183*	*2476*	*2780*	*3084*	*3369*
95	**150**	**148**	**146**	**144**	**143**	**138**	**137**	**136**	**134**	**132**	**130**	**128**
30	283	2288	5065	7716	10502	13381	16167	18819	21569	24375	27145	29792
	32	*258*	*572*	*872*	*1187*	*1512*	*1827*	*2126*	*2437*	*2754*	*3067*	*3366*
114	**175**	**177**	**175**	**173**	**171**	**167**	**166**	**164**	**163**	**160**	**158**	**156**
35	221	2225	4923	7700	10349	13160	16006	18646	21427	23776	25858	29212
	25	*251*	*556*	*870*	*1169*	*1487*	*1808*	*2107*	*2421*	*2686*	*2922*	*3301*
132	**204**	**207**	**203**	**202**	**199**	**194**	**194**	**191**	**190**	**187**	**182**	**182**
40	178	1084	3980	6950	9785	12652	15446	18048	20780	23551	26132	29047
	20	*122*	*450*	*785*	*1106*	*1430*	*1745*	*2039*	*2348*	*2661*	*2952*	*3282*
151	**233**	**233**	**226**	**223**	**221**	**221**	**221**	**220**	**219**	**216**	**213**	**210**

685 cm³/r [41.7 in³/r]
Δ Pressure Bar [PSI]

Flow **LPM** [GPM]	250	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
	15	**35**	**70**	**105**	**140**	**170**	**205**	**240**	**275**	**310**	**345**	**380**
4	1406	2947	5969	8954	11758	14582	17392	20066	21875	24507	26661	
	159	*333*	*674*	*1012*	*1328*	*1647*	*1965*	*2267*	*2472*	*2769*	*3012*	
15	**22**	**22**	**22**	**21**	**20**	**20**	**20**	**20**	**19**	**18**	**17**	
8	1433	2989	6038	9062	12028	15007	17964	20800	23734	26241	29025	31254
	162	*338*	*682*	*1024*	*1359*	*1696*	*2030*	*2350*	*2682*	*2965*	*3279*	*3531*
30	**44**	**43**	**43**	**42**	**40**	**40**	**39**	**39**	**37**	**35**	**33**	**31**
12	1362	2974	6063	9141	12148	15152	18153	21082	23925	26688	29547	32110
	154	*336*	*685*	*1033*	*1373*	*1712*	*2051*	*2382*	*2703*	*3015*	*3338*	*3628*
45	**66**	**65**	**63**	**63**	**61**	**61**	**61**	**60**	**60**	**59**	**54**	**52**
16	1453	2991	6007	9090	12090	15145	18156	21091	24034	26823	29656	32506
	164	*338*	*679*	*1027*	*1366*	*1711*	*2051*	*2383*	*2715*	*3031*	*3351*	*3673*
61	**88**	**87**	**86**	**85**	**83**	**81**	**80**	**80**	**79**	**77**	**73**	**72**
20	1384	2632	5842	9281	11994	15100	18408	20960	23992	26934	29773	32304
	156	*297*	*660*	*1049*	*1355*	*1706*	*2080*	*2368*	*2711*	*3043*	*3364*	*3650*
76	**111**	**109**	**107**	**106**	**103**	**102**	**100**	**99**	**99**	**96**	**95**	**94**
25	1145	2666	5926	8748	12337	15205	17939	20926	23733	26650	29563	32293
	129	*301*	*670*	*988*	*1394*	*1718*	*2027*	*2364*	*2681*	*3011*	*3340*	*3649*
95	**138**	**136**	**135**	**133**	**132**	**128**	**126**	**126**	**124**	**122**	**120**	**118**
30	307	2478	5486	8357	11375	14493	17511	20383	23361	26401	29401	32268
	35	*280*	*620*	*944*	*1285*	*1637*	*1978*	*2303*	*2639*	*2983*	*3322*	*3646*
114	**162**	**164**	**161**	**160**	**158**	**154**	**153**	**152**	**150**	**148**	**146**	**144**
35	239	2410	5332	8340	11209	14254	17337	20196	23207	25752	28007	31640
	27	*272*	*602*	*942*	*1266*	*1610*	*1959*	*2282*	*2622*	*2910*	*3164*	*3575*
132	**188**	**191**	**188**	**186**	**184**	**179**	**179**	**177**	**175**	**172**	**168**	**168**
40	193	1174	4311	7527	10598	13704	16730	19548	22507	25508	28304	31461
	22	*133*	*487*	*850*	*1197*	*1548*	*1890*	*2209*	*2543*	*2882*	*3198*	*3555*
151	**215**	**215**	**209**	**206**	**204**	**204**	**204**	**203**	**202**	**199**	**196**	**194**

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

VIS 40 Series

Performance Data

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

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

Continuous

Intermittent

Will Operate at Reduced Life

785 cm³/r [48.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

	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**	**19**	**18**	**18**	**18**	**17**	**17**	**16**	**15**	**15**
8	1649	3440	6950	10431	13845	17275	20678	23942	27320	30205	33410
	186	*389*	*785*	*1178*	*1564*	*1952*	*2336*	*2705*	*3087*	*3413*	*3775*
30	**38**	**38**	**37**	**36**	**35**	**35**	**34**	**34**	**32**	**31**	**29**
12	1568	3423	6979	10522	13984	17441	20895	24267	27540	30720	34011
	177	*387*	*789*	*1189*	*1580*	*1971*	*2361*	*2742*	*3112*	*3471*	*3843*
45	**57**	**56**	**55**	**54**	**53**	**53**	**53**	**52**	**52**	**51**	**47**
16	1672	3443	6914	10464	13917	17433	20899	24277	27665	30876	34137
	189	*389*	*781*	*1182*	*1572*	*1970*	*2361*	*2743*	*3126*	*3488*	*3857*
61	**77**	**76**	**75**	**74**	**72**	**70**	**69**	**69**	**69**	**67**	**64**
20	1593	3030	6725	10683	13805	17382	21190	24127	27617	31003	34271
	180	*342*	*760*	*1207*	*1560*	*1964*	*2394*	*2726*	*3120*	*3503*	*3872*
76	**96**	**95**	**93**	**92**	**89**	**88**	**87**	**86**	**86**	**84**	**83**
25	1318	3069	6821	10069	14201	17502	20649	24087	27319	30677	34030
	149	*347*	*771*	*1138*	*1604*	*1977*	*2333*	*2721*	*3087*	*3466*	*3845*
95	**120**	**118**	**117**	**115**	**114**	**111**	**110**	**109**	**107**	**106**	**105**
30	353	2852	6315	9620	13094	16683	20157	23463	26891	30390	33843
	40	*322*	*713*	*1087*	*1479*	*1885*	*2277*	*2651*	*3038*	*3434*	*3824*
114	**141**	**142**	**140**	**139**	**137**	**134**	**133**	**132**	**130**	**129**	**127**
35	275	2774	6138	9600	12903	16408	19956	23247	26714	29643	32238
	31	*313*	*693*	*1085*	*1458*	*1854*	*2255*	*2627*	*3018*	*3349*	*3642*
132	**163**	**166**	**163**	**162**	**160**	**156**	**155**	**154**	**152**	**150**	**146**
40	222	1351	4962	8665	12200	15774	19257	22501	25908	29362	32580
	25	*153*	*561*	*979*	*1378*	*1782*	*2176*	*2542*	*2927*	*3317*	*3681*
151	**187**	**187**	**181**	**179**	**177**	**177**	**177**	**177**	**175**	**173**	**170**

940 cm³/r [57.4 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

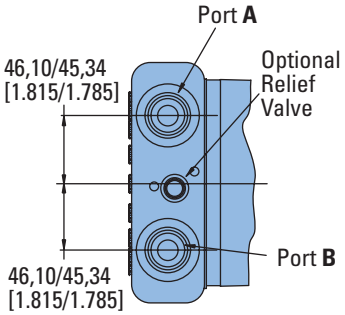
	250	500	1000	1500	2000	2500	3000	3500	4000
	15	**35**	**70**	**105**	**140**	**170**	**205**	**240**	**275**
4	1935	4056	8216	12325	16185	20071	23940	27620	30111
	219	*458*	*928*	*1393*	*1829*	*2268*	*2705*	*3121*	*3402*
15	**16**	**16**	**16**	**15**	**15**	**15**	**14**	**14**	**14**
8	1972	4114	8311	12473	16557	20658	24727	28631	32670
	223	*465*	*939*	*1409*	*1871*	*2334*	*2794*	*3235*	*3691*
30	**32**	**31**	**31**	**30**	**29**	**29**	**28**	**28**	**27**
12	1875	4094	8346	12582	16722	20857	24987	29019	32933
	212	*463*	*943*	*1422*	*1889*	*2357*	*2823*	*3279*	*3721*
45	**48**	**47**	**46**	**45**	**45**	**45**	**45**	**44**	**43**
16	2000	4117	8268	12513	16642	20846	24992	29032	33083
	226	*465*	*934*	*1414*	*1880*	*2355*	*2824*	*3280*	*3738*
61	**64**	**63**	**62**	**62**	**60**	**59**	**58**	**58**	**57**
20	1905	3623	8042	12776	16509	20786	25339	28851	33025
	215	*409*	*909*	*1443*	*1865*	*2348*	*2863*	*3260*	*3731*
76	**80**	**79**	**78**	**77**	**75**	**74**	**73**	**72**	**72**
25	1576	3670	8157	12041	16982	20929	24693	28804	32669
	178	*415*	*922*	*1360*	*1919*	*2365*	*2790*	*3254*	*3691*
95	**100**	**99**	**98**	**96**	**96**	**93**	**92**	**91**	**90**
30	423	3411	7551	11504	15658	19950	24104	28057	32157
	48	*385*	*853*	*1300*	*1769*	*2254*	*2723*	*3170*	*3633*
114	**118**	**119**	**117**	**116**	**115**	**112**	**111**	**110**	**109**
35	329	3317	7340	11480	15429	19621	23864	27799	31945
	37	*375*	*829*	*1297*	*1743*	*2217*	*2696*	*3141*	*3609*
132	**137**	**139**	**136**	**135**	**133**	**130**	**130**	**128**	**127**
40	266	1616	5934	10361	14589	18863	23029	26907	30982
	30	*183*	*670*	*1171*	*1648*	*2131*	*2602*	*3040*	*3500*
151	**156**	**156**	**152**	**149**	**148**	**148**	**148**	**148**	**147**

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

VIS 40 Series

Dimensions

Standard and Wheel Mount – SAE



Ports

1–1/16-12 UN-2B SAE O-ring Ports (2)

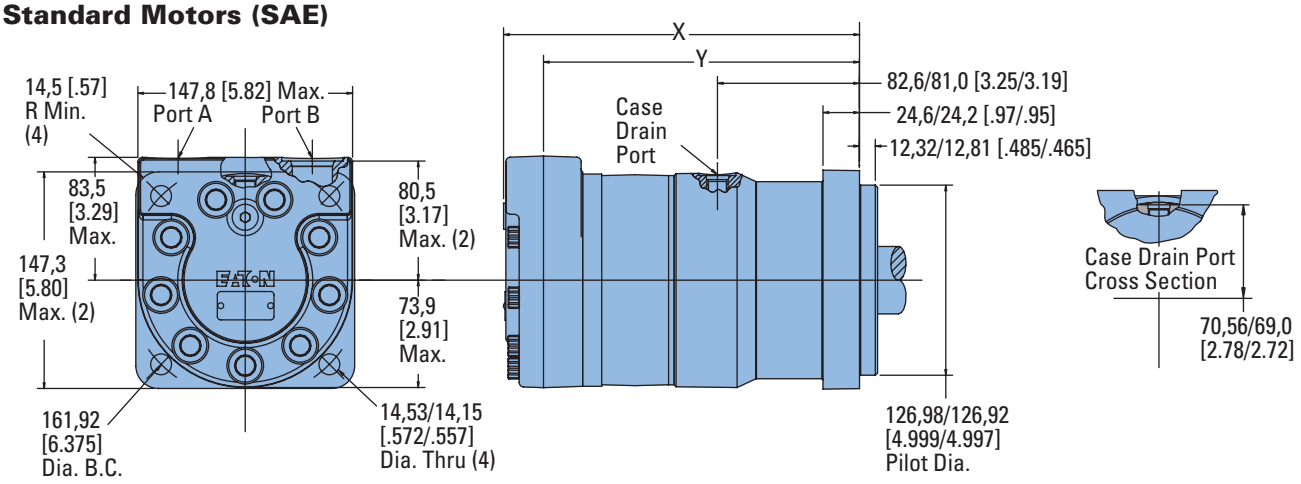
9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

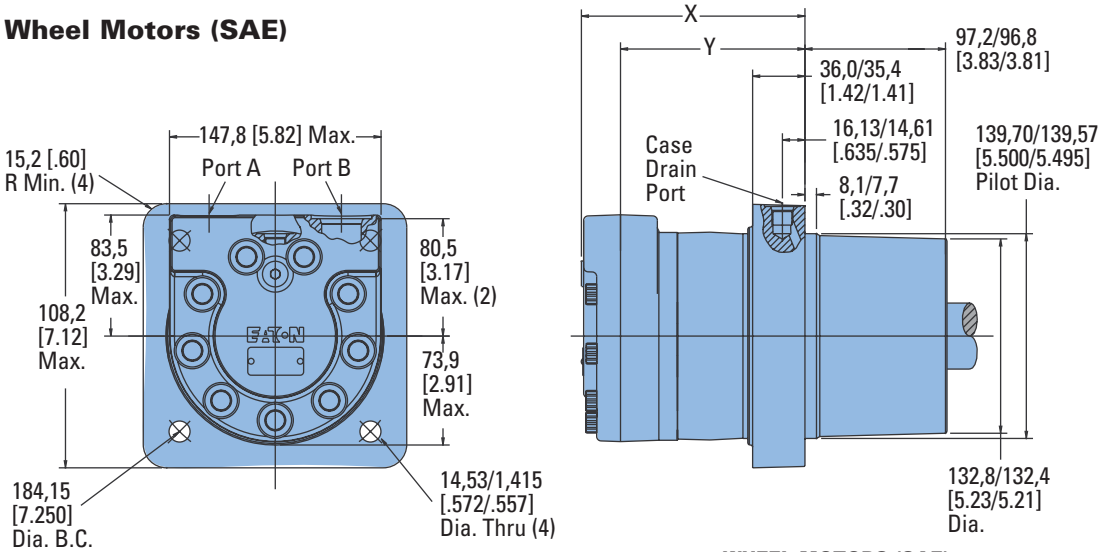
Standard Motors (SAE)



STANDARD MOTORS (SAE)

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]
505 [30.7]	239,3 [9.42]	211,1 [8.31]
570 [34.9]	245,4 [9.66]	217,2 [8.55]
630 [38.5]	250,7 [9.87]	222,5 [8.76]
685 [41.7]	255,3 [10.05]	227,1 [8.94]
785 [48.0]	264,7 [10.42]	236,2 [9.30]
940 [57.4]	278,4 [10.96]	249,9 [9.84]

Wheel Motors (SAE)



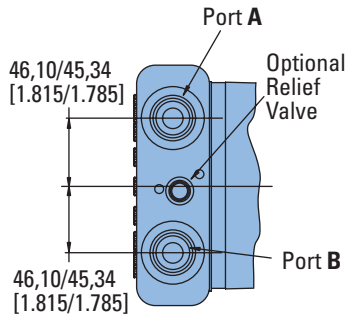
WHEEL MOTORS (SAE)

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]
505 [30.7]	154,4 [6.08]	126,2 [4.97]
570 [34.9]	160,5 [6.32]	132,3 [5.21]
630 [38.5]	165,9 [6.53]	137,7 [5.42]
685 [41.7]	170,4 [6.71]	142,2 [5.60]
785 [48.0]	179,8 [7.08]	151,4 [5.96]
940 [57.4]	193,5 [7.62]	165,1 [6.50]

VIS 40 Series

Dimensions

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



Ports

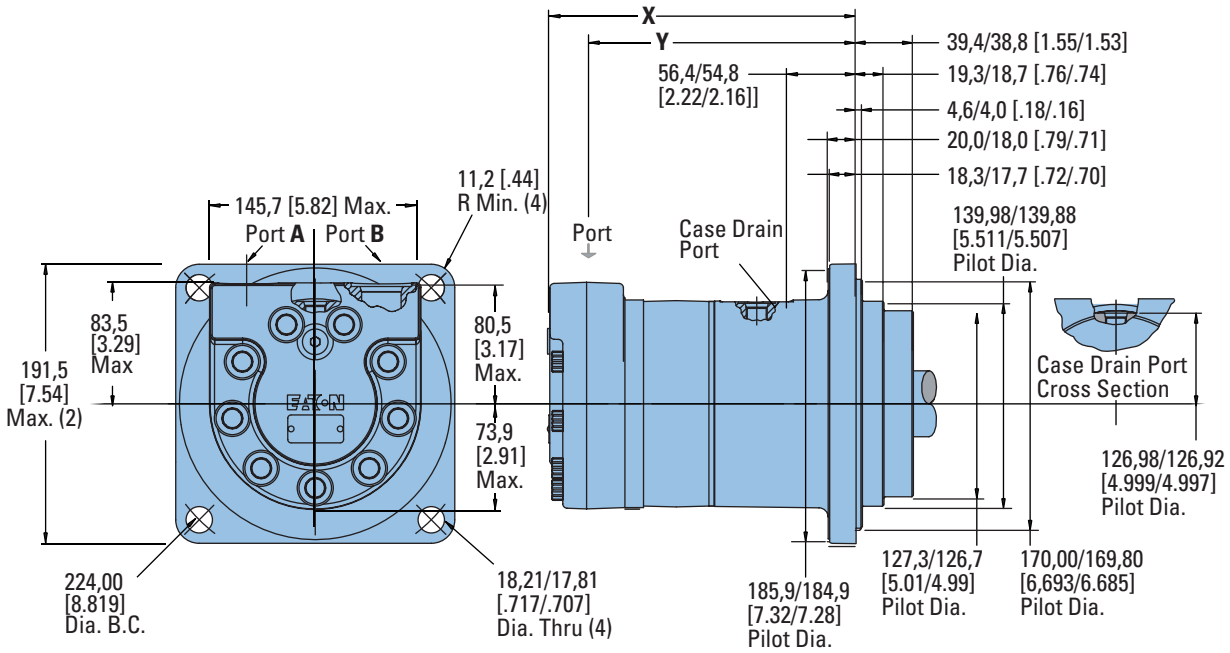
1–1/16-12 UN-2B SAE O-ring Ports (2)

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW



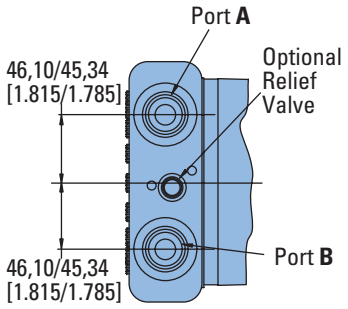
STANDARD MOTORS (OVERSIZE)

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

VIS 40 Series

Dimensions

Standard and Wheel Mount – ISO



Ports

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

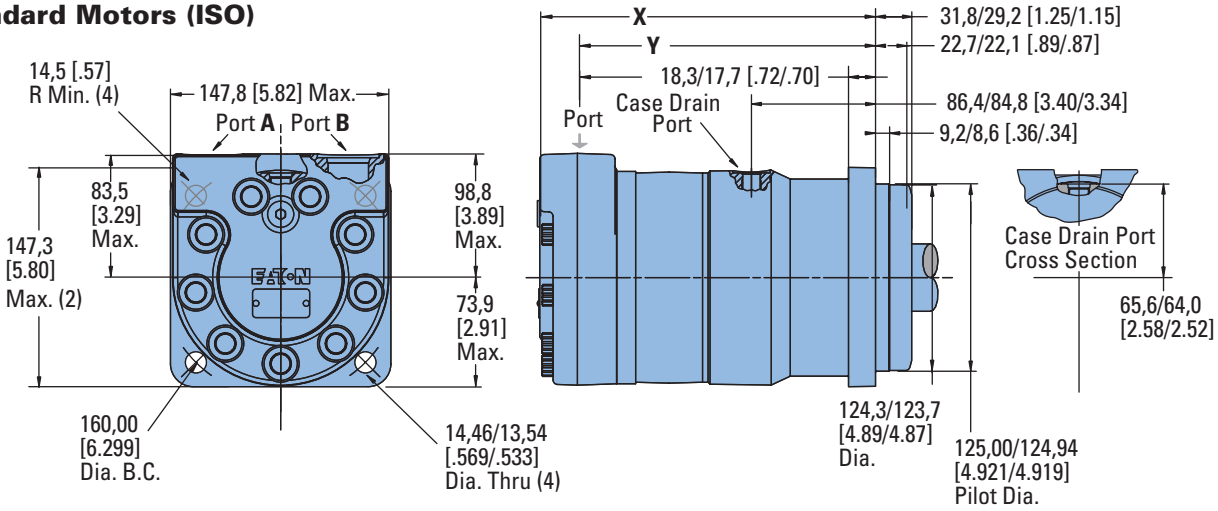
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW

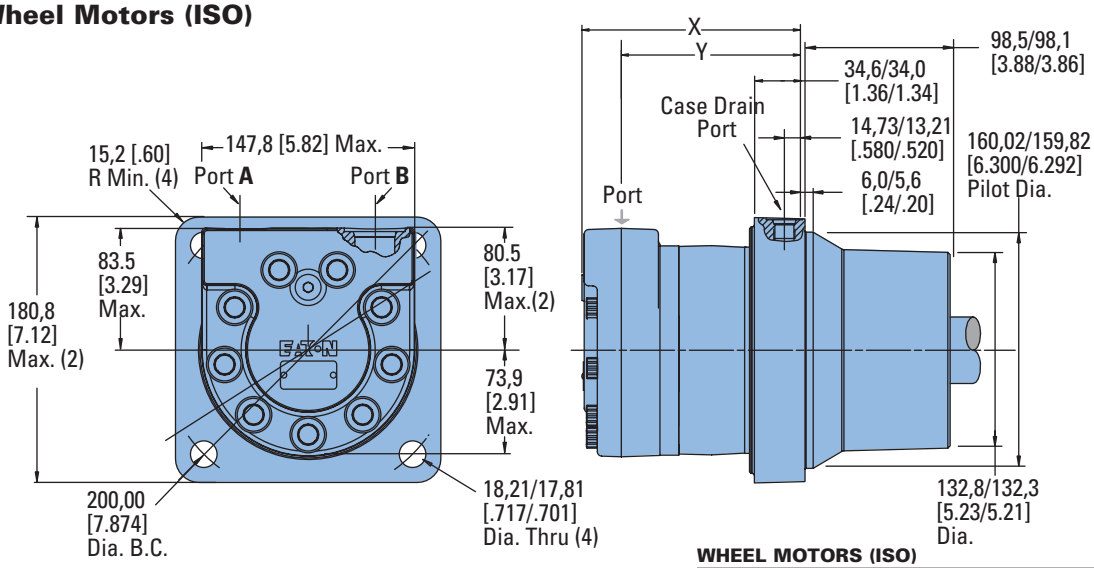
Standard Motors (ISO)



STANDARD MOTORS (ISO)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
505 [30.7]	227,3 [8.95]	198,9 [7.83]
570 [34.9]	233,4 [9.19]	205,2 [8.08]
630 [38.5]	238,8 [9.40]	210,3 [8.28]
685 [41.7]	243,3 [9.58]	214,9 [8.46]
785 [48.0]	252,5 [9.94]	224,3 [8.83]
940 [57.4]	266,2 [10.48]	238,0 [9.37]

Wheel Motors (ISO)



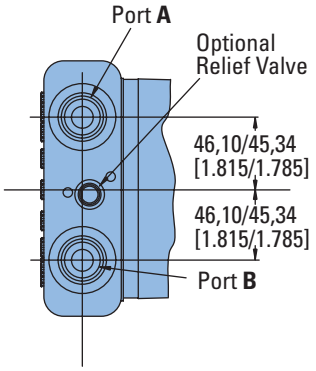
WHEEL MOTORS (ISO)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
505 [30.7]	153,2 [6.03]	124,7 [4.91]
570 [34.9]	159,3 [6.27]	131,1 [5.16]
630 [38.5]	164,6 [6.48]	136,1 [5.36]
685 [41.7]	169,2 [6.66]	140,7 [5.54]
785 [48.0]	178,3 [7.02]	150,1 [5.91]
940 [57.4]	192,0 [7.56]	163,8 [6.45]

VIS 40 Series

Dimensions

Bearingless



Ports

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

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

Or

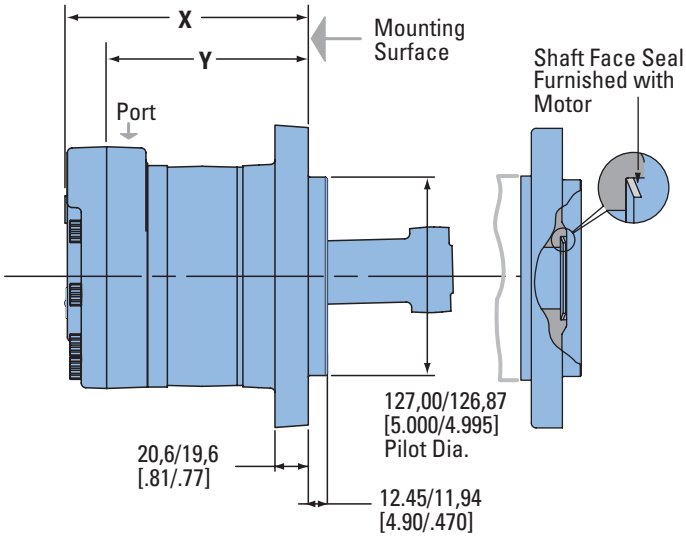
G 3/4 (BSP) O-ring Ports (2)

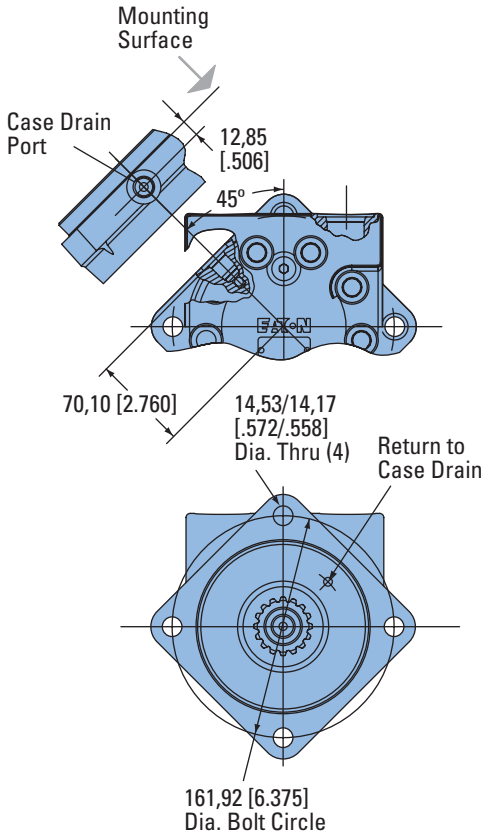
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Drive End

Port A Pressurized — CW

Port B Pressurized — CCW



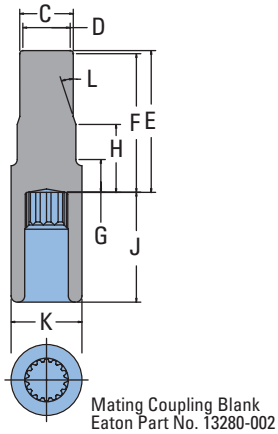


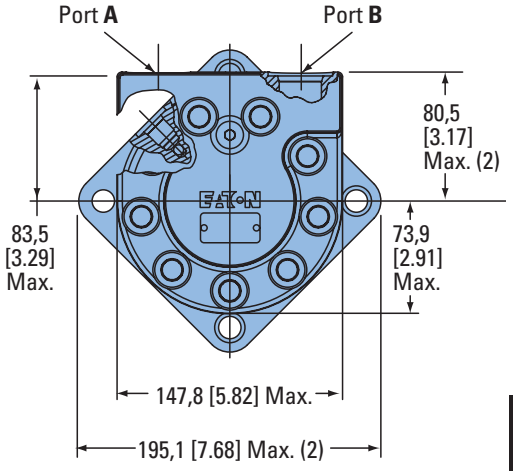
For VIS 40 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

C 59,94 [2.36] Dia.
D 49,00 [1.93] Dia.
E 155,86 [6.14] Max.
F 150,88 [5.94] Min. Full Form Dia.
G 26,92 [1.06]
H 33,30 [1.21]
J 106,43 [4.19] Full Form Dia.
K 72,64 [2.86]
L 15





BEARINGLESS MOTORS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]
505 [30.7]	157,2 [6.19]	129,0 [5.08]
570 [34.9]	163,3 [6.43]	135,1 [5.32]
630 [38.5]	168,4 [6.63]	140,5 [5.53]
685 [41.7]	173,2 [6.82]	145,3 [5.72]
785 [48.0]	182,2 [7.18]	154,4 [6.08]
940 [57.4]	196,1 [7.72]	168,1 [6.62]

VIS 40 Series

Installation Information

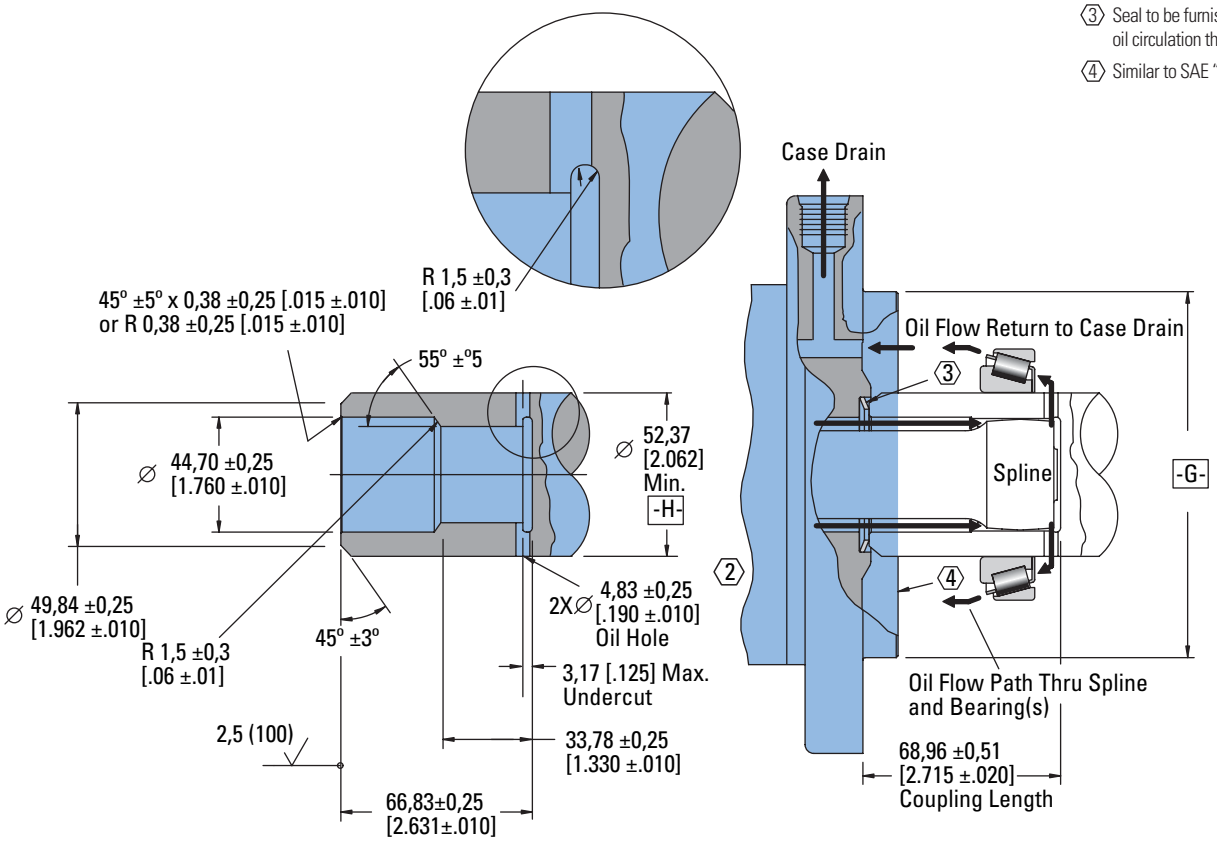
Bearingless

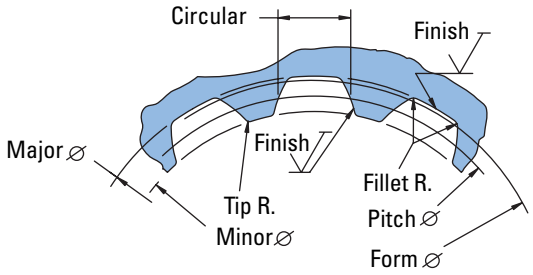
1 Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 -1,27 [.030 -.050]. Dimensions apply after heat treat.

〈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.





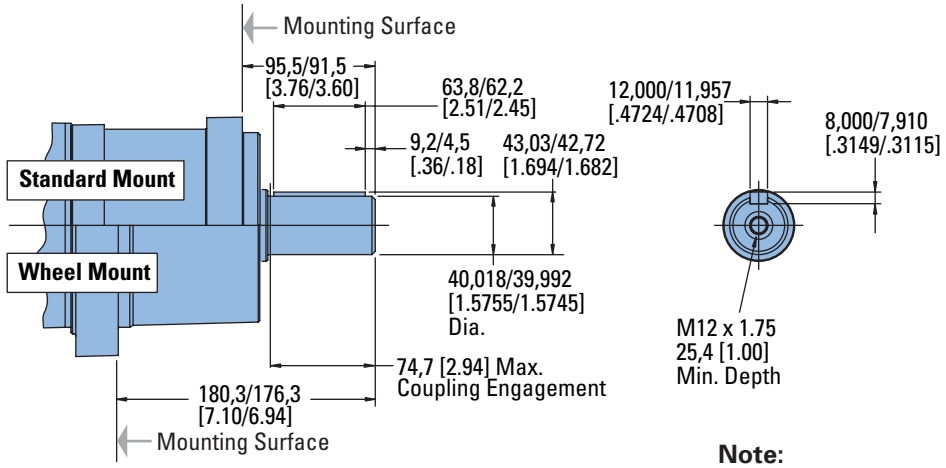
Spline Pitch	10/20
Pressure Angle	30°
Number of teeth	16
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 40,640000 [1.6000000] ◎ 0,20 [.008] H
Base Diameter	Ref. 35,195272 [1.3856406]
Major Diameter	43,56 [1.715] Max. 43,18 [1.700]
Min. Minor Diameter	36,83 -37,08 [1.450 -1.460]
Form Diameter, 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 [.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

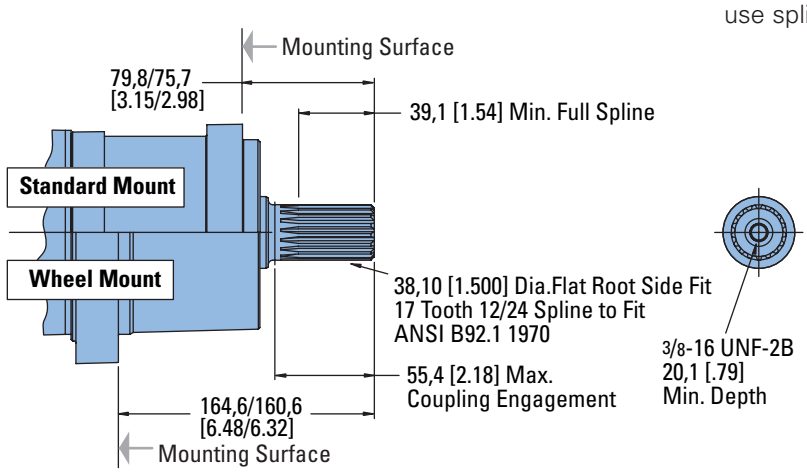
SAE

40 mm Straight

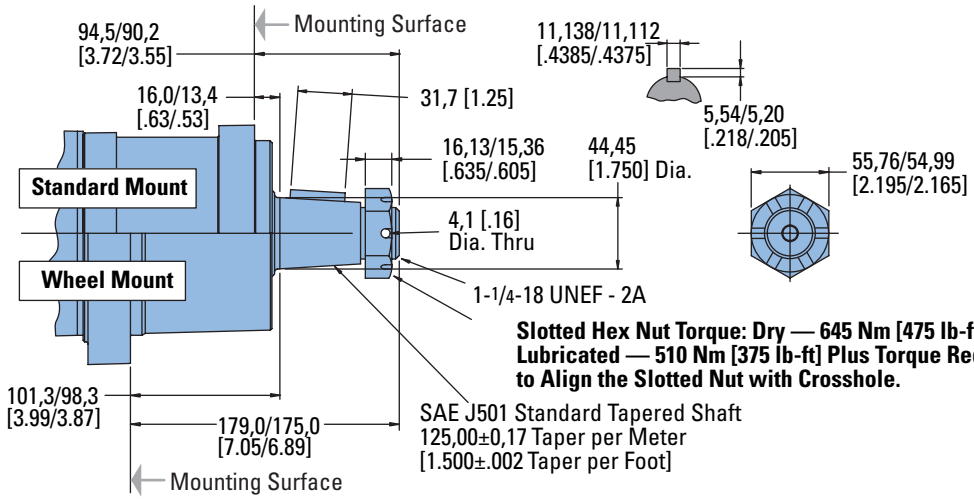


Note:
For motor torque ratings above 875 Nm [7750 lb - in] use split coupler.

1–1/2 Inch 17 Tooth Splined



1–3/4 Inch Tapered



VIS 40 Series

Side Load Capacity

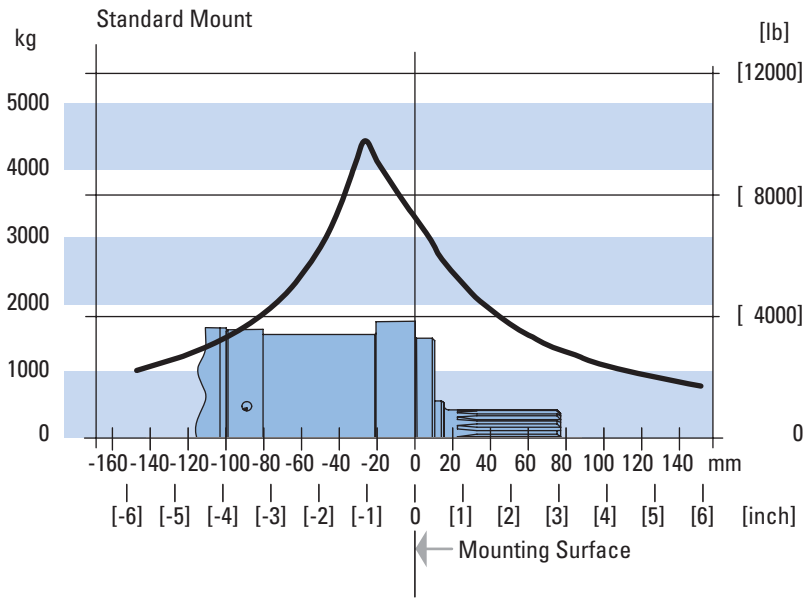
SAE

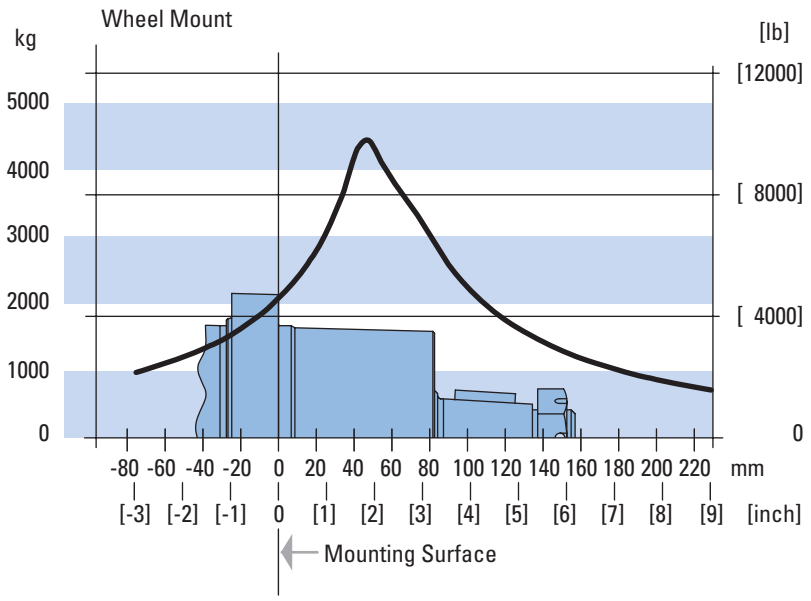
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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%.



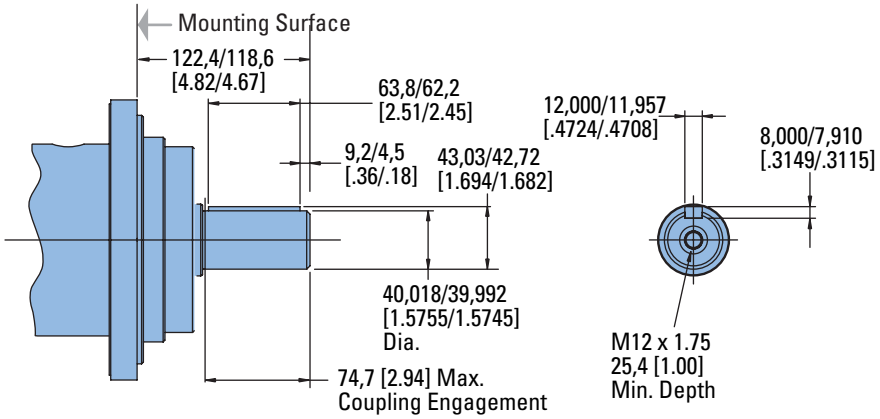


VIS 40 Series

Dimensions Shafts

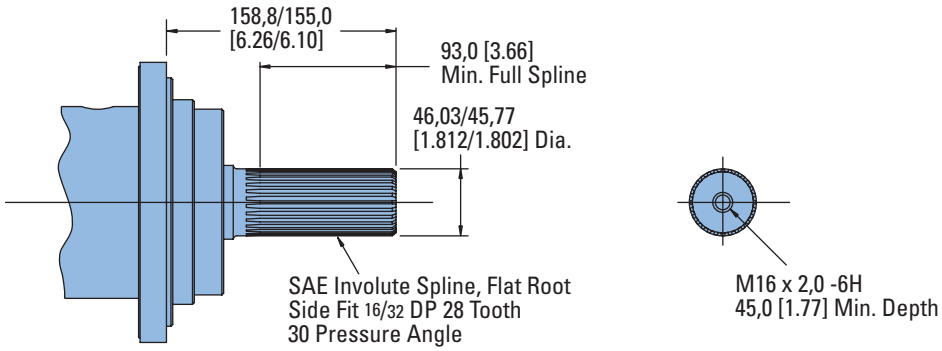
Oversize Flange
224,0 [8.82] B.C.

40 mm Straight

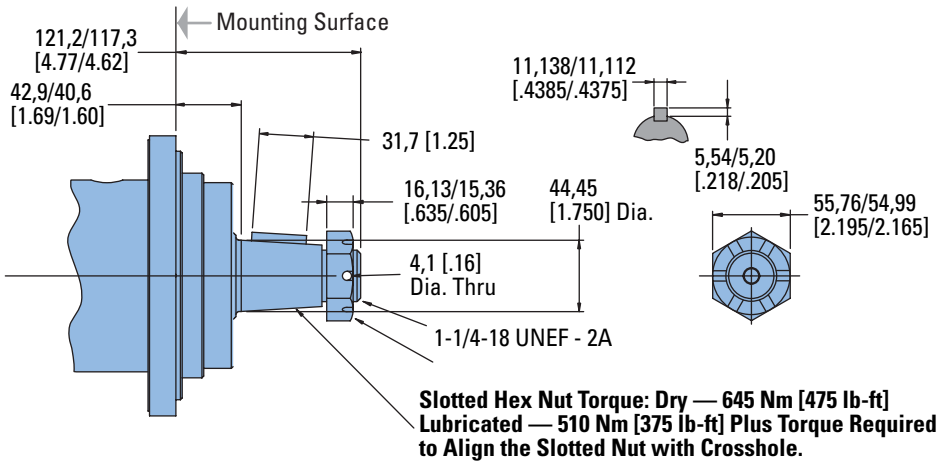


Note:
For motor torque ratings above 875 Nm [7750 lb - in] use split coupler.

46 mm 28 Tooth Splined



1-3/4 Inch Tapered



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

VIS 40 Series

Side Load Capacity

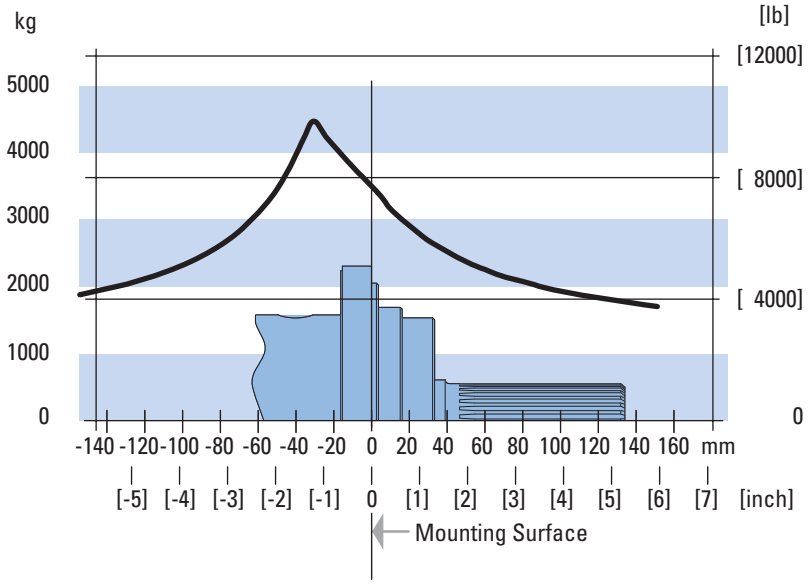
Oversize Flange
224,0 [8.82] B.C.

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

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

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

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

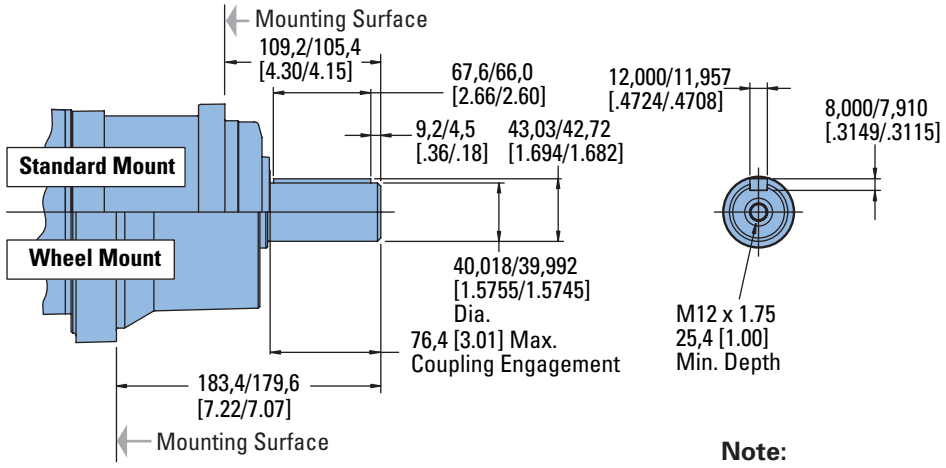


VIS 40 Series

Dimensions
Shafts

ISO

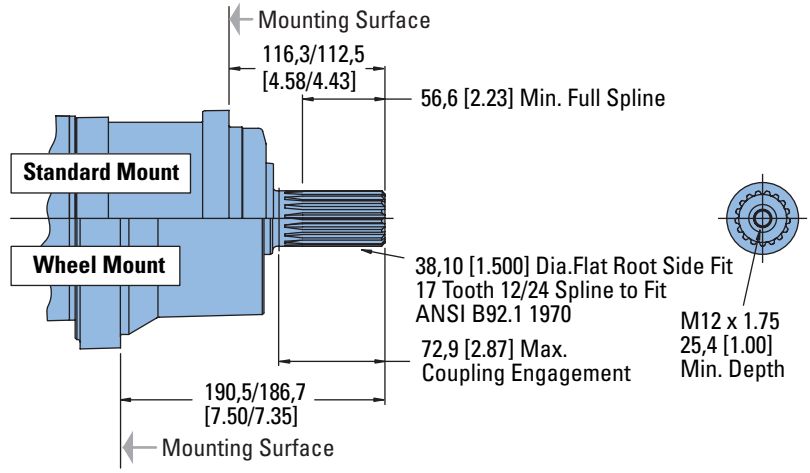
40 mm Straight



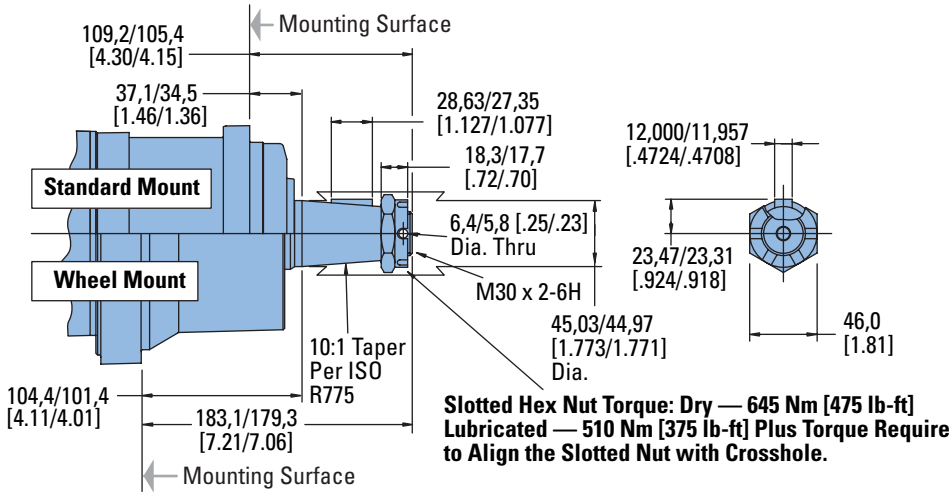
Note:

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

38,1 mm [1–1/2 inch] 17 Tooth Splined



45 mm Tapered



Slotted Hex Nut Torque: Dry — 645 Nm [475 lb-ft] Lubricated — 510 Nm [375 lb-ft] Plus Torque Require to Align the Slotted Nut with Crosshole.

VIS 40 Series

Side Load Capacity

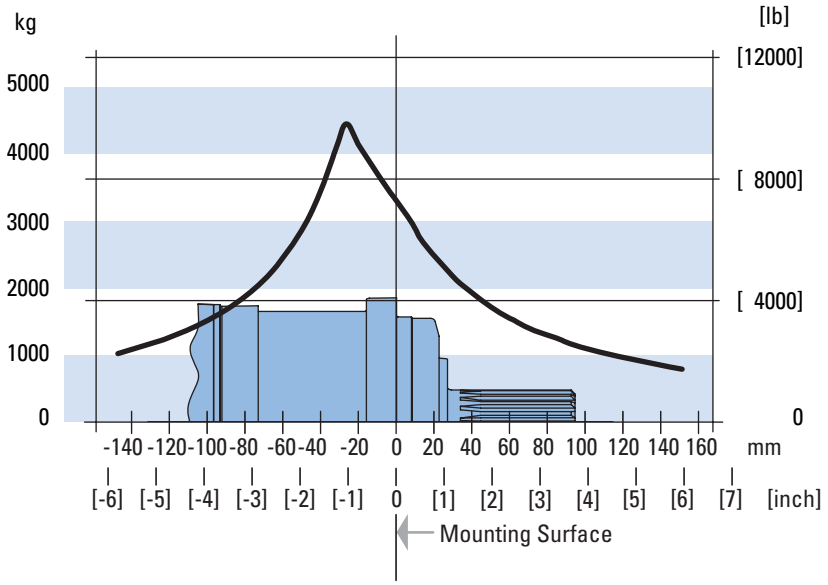
ISO

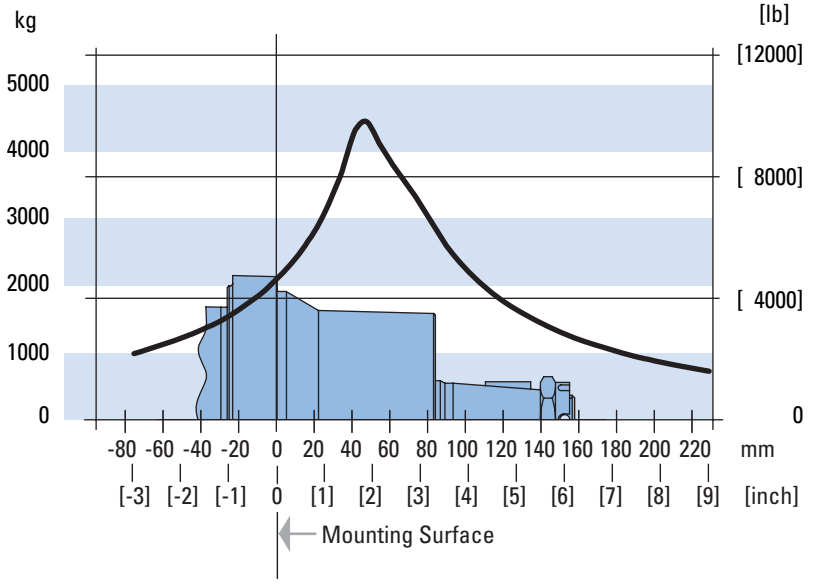
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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

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

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





VIS 40 Series

Product Numbers

Closed Loop

Use digit prefix — 168-, 177-, or 180- plus four digit number from charts for complete product number— Example: 168-0018.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0032	-0022	-0033	-0034	-0035	-0036
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0024	-0026	-0037	-0038	-0039	-0040
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0041	-0042	-0043	-0044	-0045	-0046
Wheel	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0007	-0008	-0009	-0010	-0011	-0012
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0013	-0014	-0015	-0016	-0017	-0018
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0019	-0020	-0021	-0022	-0023	-0024
Bearingless		1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	168-0015	-0016	-0017	-0018	-0019	-0020

168-0018

Oversize

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

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0065	-0066	-0067	-0068	-0069	-0070
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0071	-0072	-0073	-0074	-0075	-0076
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0077	-0078	-0079	-0080	-0081	-0082
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0025	-0026	-0027	-0028	-0029	-0030
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0031	-0032	-0033	-0034	-0035	-0036
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0037	-0038	-0039	-0040	-0041	-0042
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	168-0021	-0022	-0023	-0024	-0025	-0026

168-0024

Note:

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

- A case drain is required for all closed loop VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].

VIS 40 Series

Product Numbers

Open Loop

Use digit prefix — 168-, 177-, or 180- plus four digit number from charts for complete product number— Example 168-0029.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0083	-0084	-0085	-0086	-0087	-0088
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0089	-0090	-0091	-0092	-0093	-0094
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0095	-0096	-0097	-0098	-0099	-0100
Wheel	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0043	-0044	-0045	-0046	-0047	-0048
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0049	-0050	-0051	-0052	-0053	-0054
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	180-0055	-0056	-0006	-0057	-0058	-0059
Bearingless		1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	168-0027	-0028	-0010	-0029	-0030	-0031

168-0029

Oversize

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0101	-0102	-0103	-0104	-0105	-0106
	46 mm 28 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0107	-0108	-0109	-0110	-0111	-0112
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	177-0113	-0114	-0115	-0116	-0117	-0118

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0119	-0120	-0121	-0122	-0029	-0124
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0125	-0126	-0127	-0128	-0129	-0130
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	177-0131	-0132	-0133	-0134	-0135	-0136
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0060	-0061	-0062	-0063	-0064	-0065
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0066	-0067	-0068	-0069	-0070	-0071
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	180-0072	-0073	-0074	-0075	-0076	-0077
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	168-0032	-0033	-0034	-0035	-0036	-0037

168-0035

Note:

All product numbers in the charts (above) are for motors **without** a back-pressure relief valve. These motors would generally be used in open loop circuits.

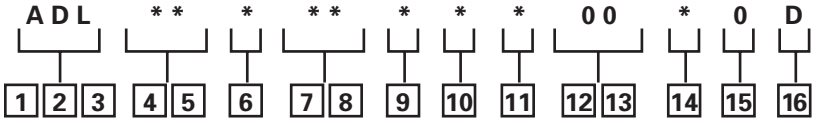
For closed loop circuits a motor with a back-pressure relief valve is required.

- A case drain is recommended for all VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].
- In open loop circuits, return pressure must be 3,5 bar [50 PSI] greater than case pressure to properly lubricate the internal drive.

VIS 40 Series

Model Code

The following 16 - digit coding system has been developed to identify all of the configuration options for the VIS 40 motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1, 2, 3 Product Series

ADL – VIS 40 Motor

4, 5 Displacement cm³/r [in³/r]

31 – 505 [30.7]

35 – 570 [34.9]

38 – 630 [38.5]

42 – 685 [41.7]

48 – 785 [48.0]

57 – 940 [57.4]

6 Mounting Type

A – 4 Bolt Bearingless 127,00 [5.000] Pilot Dia. with 12,19 [.480] Pilot Length and 14,35 [.565] Dia holes on 161,92 [6.375] Dia. Bolt Circle

B – 4 Bolt Wheel Mount 160,00 [6.3] Pilot Dia. With 5,8 [.23] Pilot Length and 18,00 [.709] Dia. Holes on 200,00 [7.874] Dia. Bolt Circle (ISO Compatible)

C – 4 Bolt Oversize Flange 185,4 [7.30] Rear Pilot Dia., 169,90 [6.689], 139,93 [5.509], 127,0 [5.00] Dia (Front Pilots) and 18,01 [.709] Dia. Holes on 224,00 [8.819] Dia. Bolt Circle

F – 4 Bolt Standard Mount (SAE CC) 127,00 [5.000] Pilot Dia. With 12,2 [.48] Pilot Length and 14,32 [.564] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle

G – 4 Bolt Wheel Mount 139,7 [5.50] Pilot Dia. with 7,9 [.31] Pilot Length and 14,32 [.564] Dia. Holes on 184,15 [7.250] Dia. Bolt Circle (SAE Compatible)

H – 4 Bolt Standard Mount 125,00 [4.92] Pilot Dia. with 8,9 [.35] Pilot Length and 14,00 [.551] Dia. Holes on 160,00 [6.299] Dia. Bolt Circle (ISO Compatible)

7, 8 Output Shaft

00 – None (Bearingless)

01 – 45 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M30 x 2- 6H Threaded Shaft End, 12W x 8H X 28L [.472W x .313H x 1.102L] Key

02 – 1-3/4 inch Dia. .125:1 Tapered Shaft Per SAE J 501 with 1 1/4 - 18 UNEF - 2A Threaded Shaft End, 11,11 [.4375] Square x 31,8 [1.25] Straight Key

04 – 46 mm Dia. Flat Root Side Fit, 28 Tooth, 16/32 DP 30 Degree Involute Spline, 93,0 [3.66] Minimum Full Spline with M16 X 2,0-6H Thread in End

07 – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 63L [.472W x .313H x 2.480L] Key (SAE Compatible)

08 – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 39,1 [1.54] Minimum Full Spline with 3/8-16 UNC - 2B Thread in End (SAE Compatible)

09 – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 56,6 [2.23] Minimum Full Spline with M12 x 1.75 - 6H Thread in End (ISO Compatible)

10 – 40 mm Dia. Straight Shaft with M12 x 1,75 - 6H Thread in End, 12W x 8H x 67L [.472W x .313H x 2.630L] Key (ISO Compatible)

9 Ports

A – 1-1/16-12 UN-2B Size 12 O-ring Port, Accepts Fittings for SAE J1926

B – G 3/4 (BSP) Straight Thread Port

10 Case Flow Options

A – Shuttle Valve with 9/16-18 UNF-2B, Size 6 O-ring Port Case Drain, Accepts Fittings for SAE J1926

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

11 Back-Pressure Relief

0 – None (for Open Loop Only)

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

2 – Set at 15,2 bar [220 PSI] (for Servo Pumps)

4 – Set at 15,2 bar [300 PSI] (for high charge Servo Pumps)

12, 13 Special Features

00 – None

14 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

C – Painted Low Gloss Black, Bulk Box Option

15 Eaton Assigned Code when Applicable

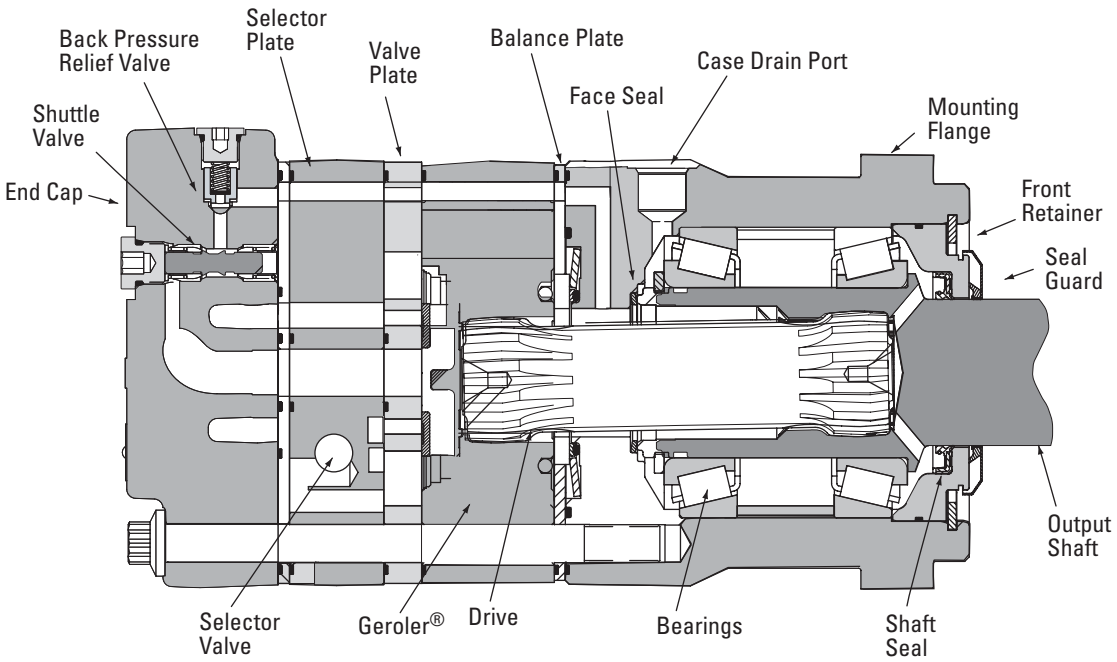
0 – Assigned Code

16 Eaton Assigned Design Code

D – Assigned Design Code

VIS 40 Series Two-speed

Specifications



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

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

The VIS 40 two-speed motor is bidirectional. It will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes. Shift on the fly technology allows full-power operation throughout the full duration of the shift.

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

An integral selector valve shifts the motor from LSHT mode to HSLT mode. Initially, low pressure is supplied to the pilot port. The selector valve is biased to LSHT mode by a return spring. When pilot signal pressure is supplied to the pilot port and 3,5 Δbar [50 PSI] is reached, the selector valve overcomes return spring force and the shifts the spool to select HSLT mode.

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

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

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

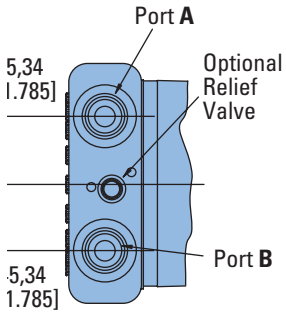
Performance Data

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

VIS 40 Series Two-speed

Dimensions

Standard and Wheel Mount – SAE



Ports

1–1/16-12 UN-2B SAE O-ring Ports (2)

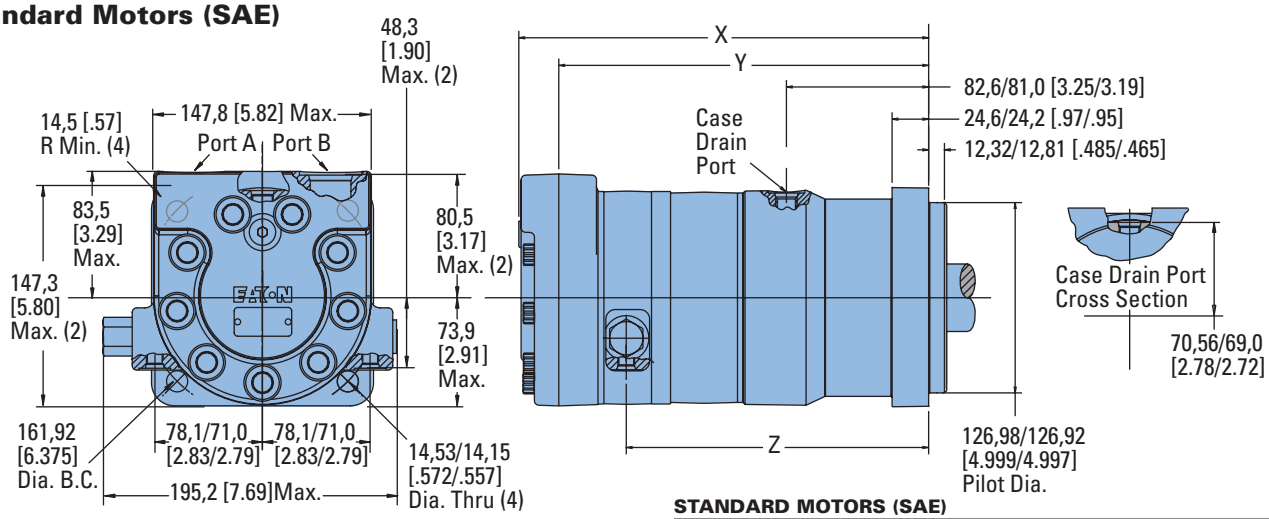
9/16-18 UNF-2B SAE O-ring Case Drain Port (1)

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

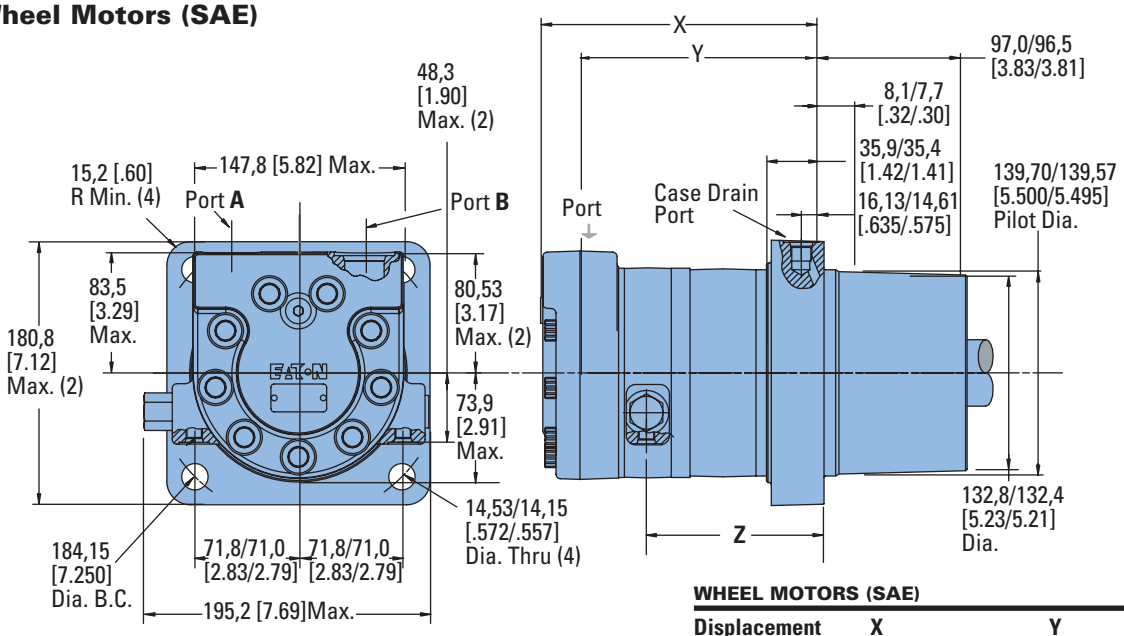
Standard Motors (SAE)



STANDARD MOTORS (SAE)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	275,1 [10.83]	246,9 [9.72]	201,7 [7.94]
570 [34.9]	281,2 [11.07]	253,0 [9.96]	208,0 [8.19]
630 [38.5]	286,3 [11.27]	258,3 [10.17]	213,4 [8.40]
685 [41.7]	290,8 [11.45]	262,9 [10.35]	217,7 [8.57]
785 [48.0]	300,2 [11.82]	272,3 [10.72]	227,3 [8.95]
940 [57.4]	313,9 [12.36]	286,0 [11.26]	241,0 [9.49]

Wheel Motors (SAE)



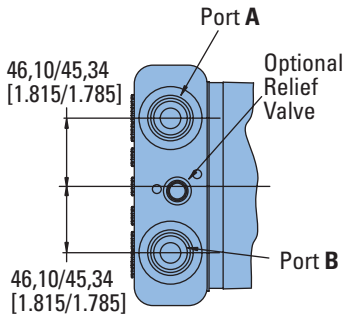
WHEEL MOTORS (SAE)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	190,2 [7.49]	162,1 [6.38]	116,8 [4.60]
570 [34.9]	196,3 [7.73]	168,1 [6.62]	123,2 [4.85]
630 [38.5]	201,4 [7.93]	173,5 [6.83]	128,5 [5.06]
685 [41.7]	206,0 [8.11]	178,1 [7.01]	132,8 [5.23]
785 [48.0]	215,4 [8.48]	187,5 [7.38]	142,5 [5.61]
940 [57.4]	229,1 [9.02]	201,2 [7.92]	156,2 [6.15]

VIS 40 Series Two-speed

Dimensions

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



Ports

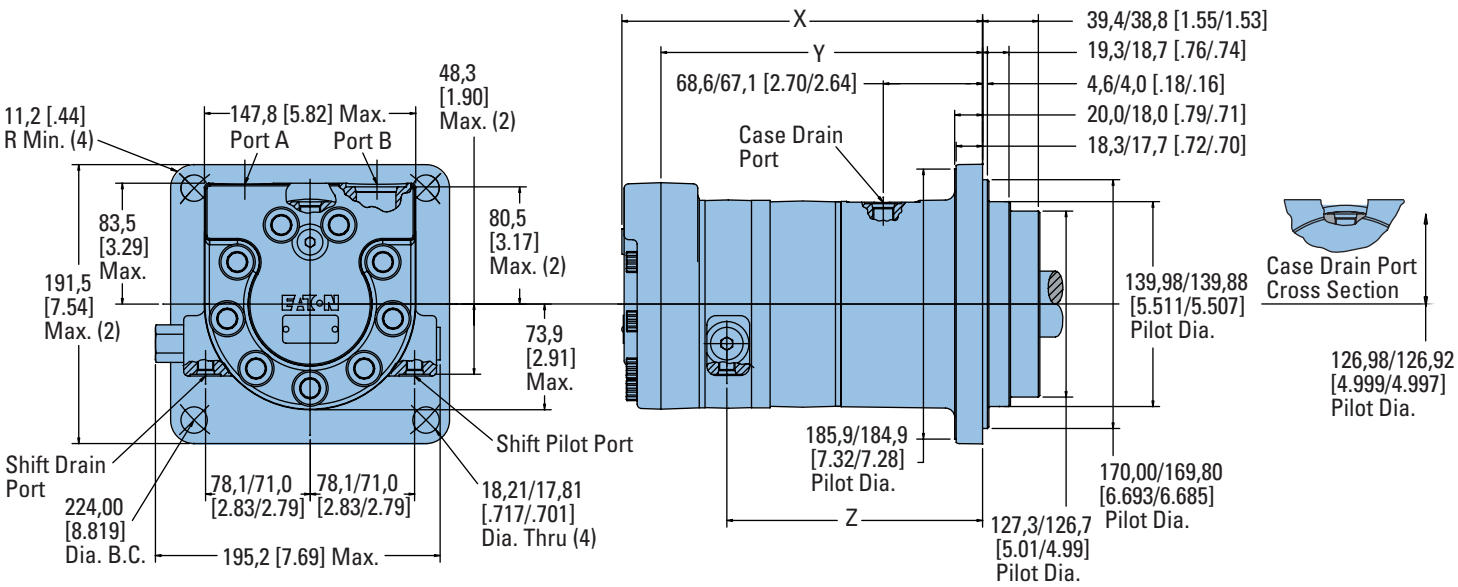
1–1/16-12 UN-2B SAE O-ring Ports (2)

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

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW



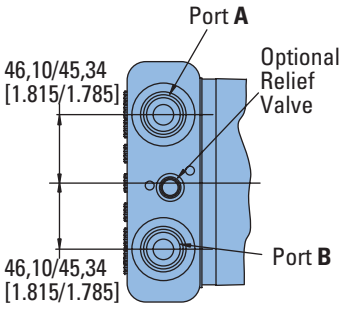
OVERSIZE MOTORS

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	248,2 [9.77]	220,0 [8.66]	174,8 [6.88]
570 [34.9]	254,3 [10.01]	226,1 [8.90]	181,1 [7.13]
630 [38.5]	259,3 [10.21]	231,4 [9.11]	186,4 [7.34]
685 [41.7]	263,9 [10.39]	236,0 [9.29]	190,8 [7.51]
785 [48.0]	273,1 [10.75]	245,1 [9.65]	200,2 [7.88]
940 [57.4]	286,8 [11.29]	258,8 [10.19]	213,9 [8.42]

VIS 40 Series Two-speed

Dimensions

Standard and Wheel Mount – ISO



Ports

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

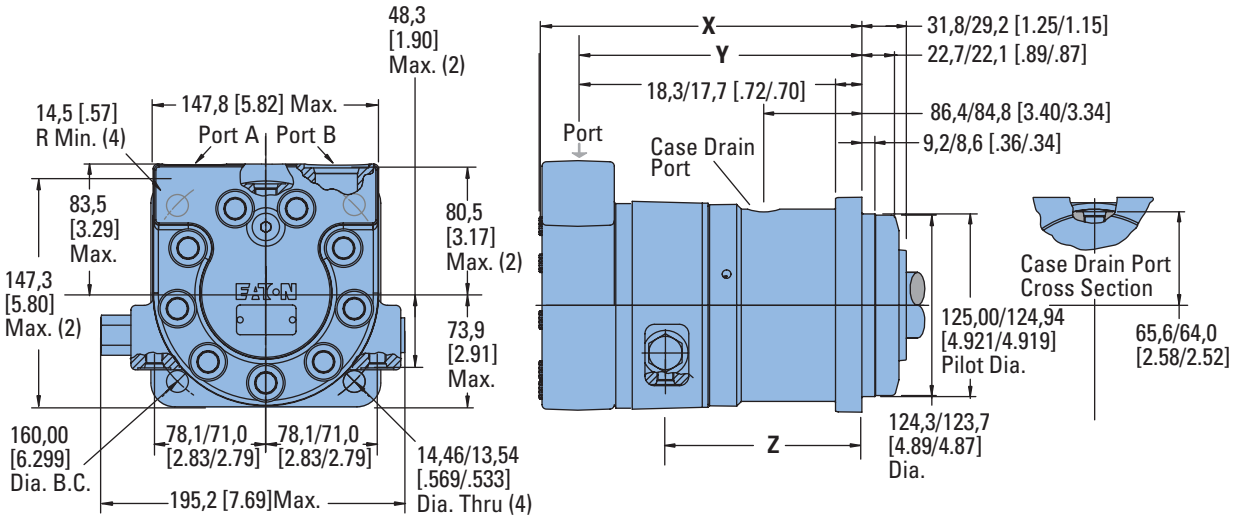
G 1/4 (BSP) O-ring Case Drain Port (1)

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

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW
Port B Pressurized — CCW

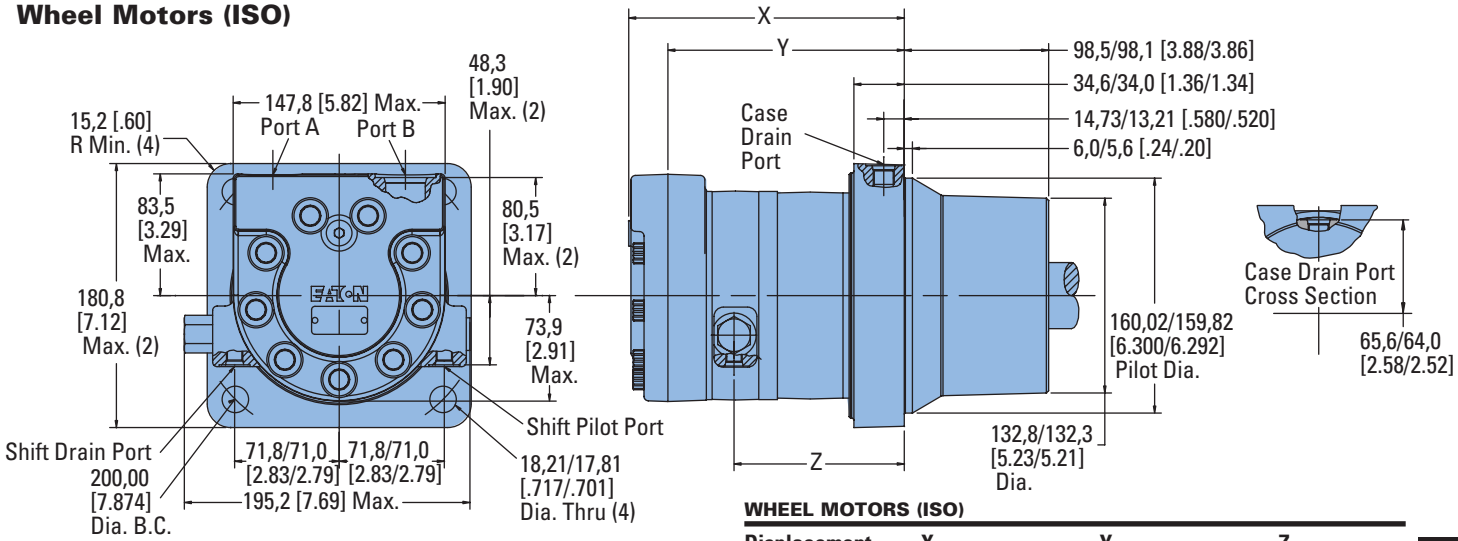
Standard Motors (ISO)



STANDARD MOTORS (ISO)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	263,1 [10.36]	235,0 [9.25]	189,7 [7.47]
570 [34.9]	269,2 [10.60]	241,0 [9.49]	196,1 [7.72]
630 [38.5]	274,3 [10.80]	246,4 [9.70]	201,4 [7.93]
685 [41.7]	278,9 [10.98]	251,0 [9.88]	205,7 [8.10]
785 [48.0]	288,0 [11.34]	260,1 [10.24]	215,1 [8.47]
940 [57.4]	301,8 [11.88]	273,8 [10.78]	228,9 [9.01]

Wheel Motors (ISO)



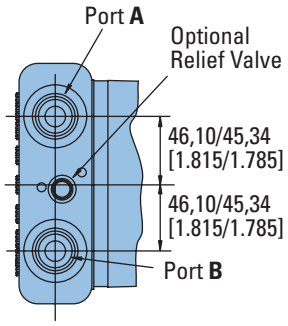
WHEEL MOTORS (ISO)

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	189,0 [7.44]	160,8 [6.33]	115,6 [4.55]
570 [34.9]	195,1 [7.68]	166,9 [6.57]	121,9 [4.80]
630 [38.5]	200,2 [7.88]	172,2 [6.78]	127,3 [5.01]
685 [41.7]	204,7 [8.06]	176,8 [6.96]	131,6 [5.18]
785 [48.0]	213,9 [8.42]	185,9 [7.32]	141,0 [5.55]
940 [57.4]	227,6 [8.96]	199,6 [7.86]	154,7 [6.09]

VIS 40 Series Two-speed

Dimensions

Bearingless



Ports

1–1/16-12 UN-2B SAE O-ring Ports (2)

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

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

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

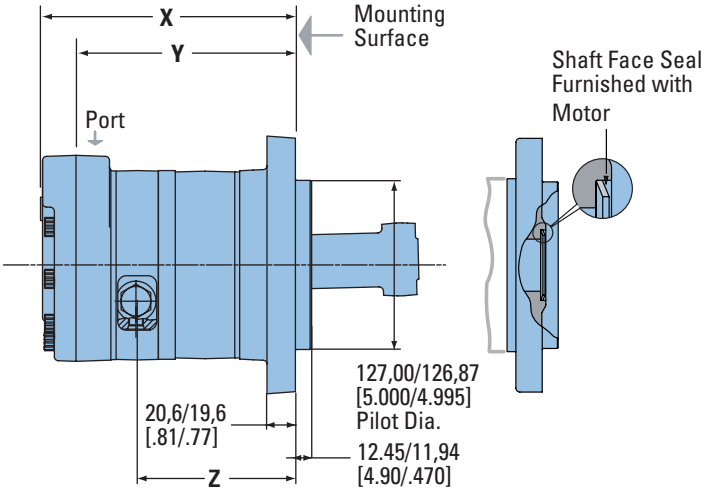
G 1/4 (BSP) O-ring Case Drain Port (1)

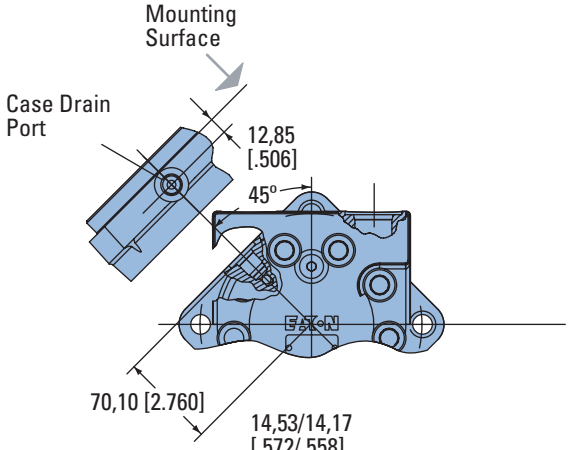
7/16 -20 UNF -2B SAE O-ring Shift Ports (2)

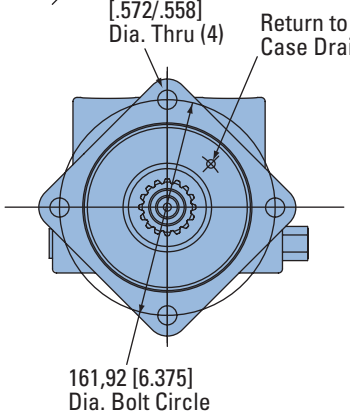
Standard Rotation Viewed from Drive End

Port A Pressurized — CW

Port B Pressurized — CCW





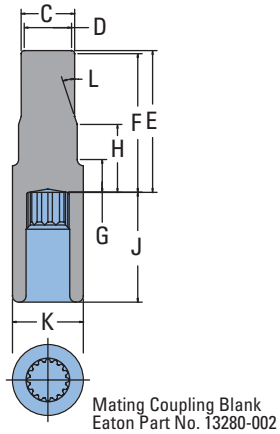


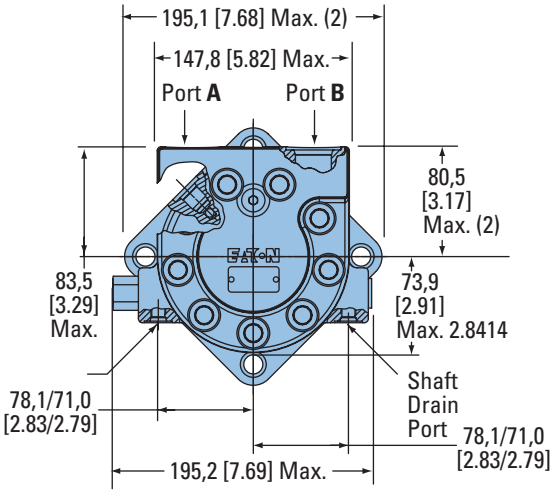
For VIS 40 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

C	59,94	[2.36] Dia.
D	49,00	[1.93] Dia.
E	155,86	[6.14] Max.
F	150,88	[5.94] Min. Full Form Dia.
G	26,92	[1.06]
H	33,30	[1.21]
J	106,43	[4.19] Full Form Dia.
K	72,64	[2.86]
L	15	





BEARINGLESS MOTORS

Displacement cm³/r [in³/r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	193,0 [7.60]	164,8 [6.49]	119,6 [4.71]
570 [34.9]	199,1 [7.84]	170,9 [6.73]	126,0 [4.96]
630 [38.5]	204,0 [8.03]	176,0 [6.93]	131,1 [5.16]
685 [41.7]	208,8 [8.22]	180,8 [7.12]	135,6 [5.34]
785 [48.0]	217,9 [8.58]	190,0 [7.48]	145,0 [5.71]
940 [57.4]	231,6 [9.12]	203,7 [8.02]	158,8 [6.25]

VIS 40 Series
Two-speed

Installation Information

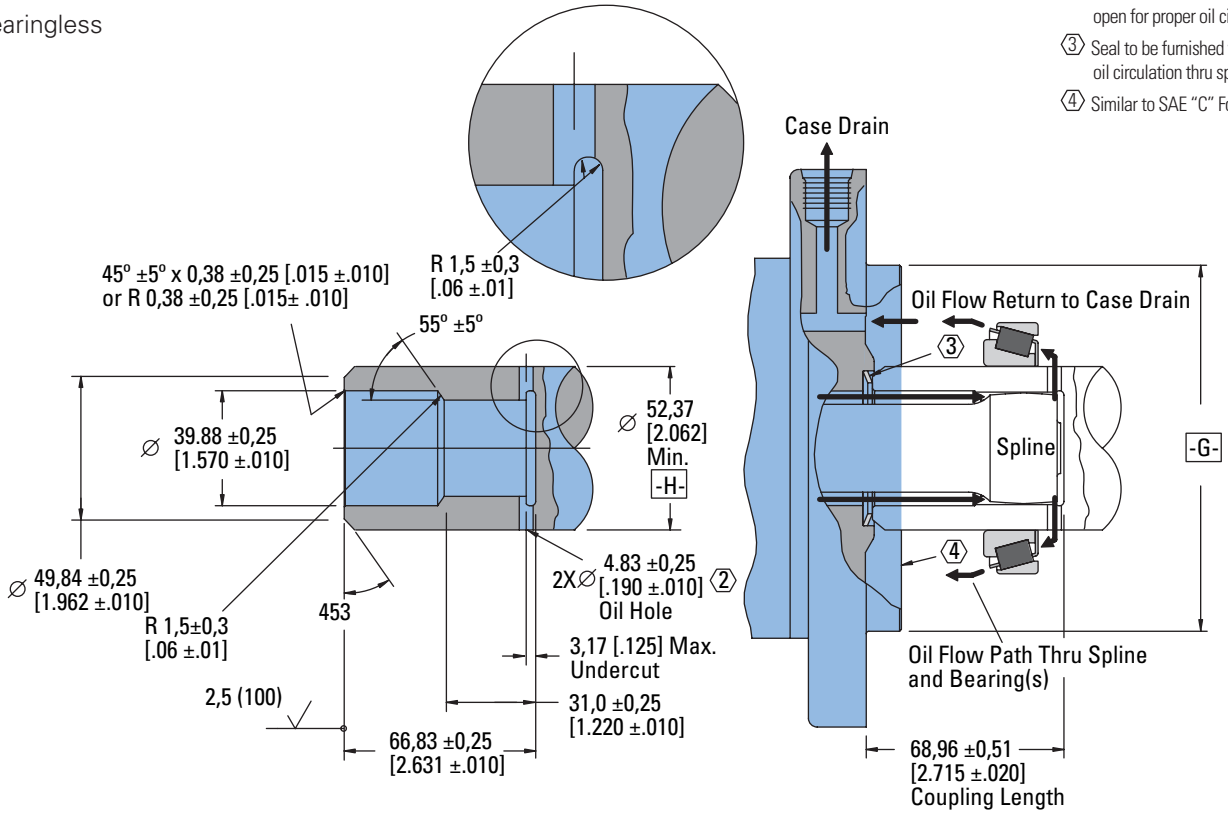
Bearingless

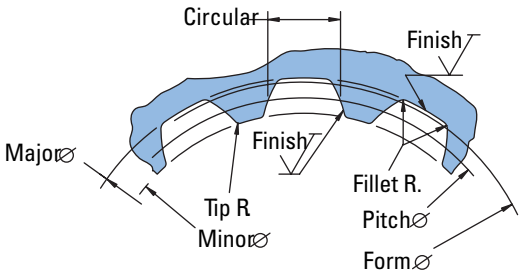
1 Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 60-64 HRc with case depth (to 50HRc) of 0,076 -1,27 [.030 -.050]. Dimensions apply after heat treat.

② Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.

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

④ Similar to SAE "C" Four Bolt Flange.





Spline Pitch	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] | H
Base Diameter	Ref. 31,054652 [1.2226241]
Major Diameter	39,17 [1.542] Max. 38,97 [1.534] Min.
Minor Diameter	33,30 -33,48 [1.311 -1.318]
Form Diameter, Min.	38,33 [1.509]
Fillet Radius	0,64 -0,76 [.025 -.030]
Tip Radius	0,25 -0,51 [.010 -.020]
Finish	1,6 (63)
Involute Profile Variation	+0,000 -0,025 [+.0000 -.0010]
Total Index Variation	0,038 [.0015]
Lead Variation	0,013 [.0005]
Circular Space Width:	
Maximum Actual	5,898 [.2322]
Minimum Effective	5,804 [.2285]
Maximum Effective	Ref. 5,857 [.2306]
Minimum Actual	Ref. 5,834 [.2297]
Dimension Between Two Pins	Ref. 26,929 -27,084 [1.0602 -1.0663]
Pin Diameter	6,223 [.2450] Pins to Have 4,0 [.160] Wide Flat for Root Clearance

VIS 40 Series Two-speed

Product Numbers

Closed Loop

Use digit prefix — 176-, 178-, or 182- plus four digit number from charts for complete product number— Example 176-0022.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. $cm^3/r[in^3/r]$ / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0021	-0022	-0023	-0024	-0025	-0026
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0027	-0028	-0029	-0030	-0031	-0032
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0033	-0034	-0035	-0036	-0037	-0038
Wheel	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	182-0002	-0003	-0004	-0005	-0006	-0007
	1 1/2 inch 17 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	182-0008	-0009	-0010	-0011	-0012	-0013
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	182-0014	-0015	-0016	-0017	-0018	-0019
Bearingless		1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	176-0019	-0020	-0021	-0022	-0023	-0024

176-0022

Oversize

MOUNTING	SHAFT	PORT SIZE	DISPL. $cm^3/r[in^3/r]$ / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0039	-0040	-0041	-0042	-0043	-0044
	46 mm 28 Tooth Splined	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	1178-0045	-0046	-0047	-0048	-0049	-0050
	1 3/4 inch Tapered	1 1/16 -12 UNF O-ring (2) 9/16 -18 UNC Drain Port (1)	178-0051	-0052	-0053	-0054	-0055	-0056

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. $cm^3/r[in^3/r]$ / PRODUCT NUMBER					
			505 [30.7]	570 [34.9]	630 [38.5]	685 [41.7]	785 [48.0]	940 [57.4]
Standard	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	178-0057	-0058	-0059	-0060	-0061	-0062
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	178-0063	-0064	-0065	-0066	-0067	-0068
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	178-0069	-0070	-0071	-0072	-0073	-0074
Wheel	40 mm Straight	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	182-0020	-0021	-0022	-0023	-0024	-0025
	45 mm Tapered	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	182-0026	-0027	-0028	-0029	-0030	-0031
	1 1/2 inch 17 Tooth Splined	G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	182-0032	-0033	-0034	-0035	-0036	-0037
Bearingless		G 3/4 (BSP) (2) G 1/4 (BSP) Drain Port (1)	176-0025	-0026	-0027	-0028	-0029	-0030

176-0028

Note:

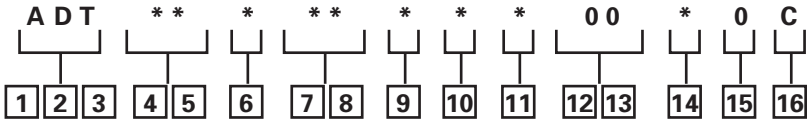
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 4,5 bar [65 PSI].

- A case drain is required for all closed loop VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].

VIS 40 Series Two-speed

Model Code

The following 16 - digit coding system has been developed to identify all of the configuration options for the VIS 40 two-speed motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1, 2, 3 Product Series

ADT – VIS 40- Two-speed Motor

4, 5 Displacement – cm³/r [in³/r]

20 – 325 [19.8]

31 – 505 [30.7]

35 – 570 [34.9]

38 – 630 [38.5]

42 – 685 [41.7]

48 – 785 [48.0]

57 – 940 [57.4]

6 Mounting Type

A – 4 Bolt Bearingless 127,00 [5.000] Pilot Dia. with 12,19 [.480] Pilot Length and 14,35 [.565] Dia holes on 161,92 [6.375] Dia. Bolt Circle

B – 4 Bolt Wheel Mount 160,00 [6.3] Pilot Dia. With 5,8 [.23] Pilot Length and 18,00 [.709] Dia. Holes on 200,00 [7.874] Dia. Bolt Circle (ISO Compatible)

C – 4 Bolt Oversize Flange 185,4 [7.30] Rear Pilot Dia., 169,90 [6.689], 139,93 [5.509], 127,0 [5.00] Dia (Front Pilots) and 18,01 [.709] Dia. Holes on 224,00 [8.819] Dia. Bolt Circle

F – 4 Bolt Standard Mount (SAE CC) 127,00 [5.000] Pilot Dia. With 12,2 [.48] Pilot Length and 14,32 [.564] Dia. Holes on 161,92 [6.375] Dia. Bolt Circle

G – 4 Bolt Wheel Mount 139,7 [5.50] Pilot Dia. with 7,9 [.31] Pilot Length and 14,32 [.564] Dia. Holes on 184,15 [7.250] Dia. Bolt Circle (SAE Compatible)

H – 4 Bolt Standard Mount 125,00 [4.92] Pilot Dia. With 8,9 [.35] Pilot Length and 14,00 [.551] Dia. Holes on 160,00 [6.299] Dia. Bolt Circle (ISO Compatible)

7, 8 Output Shaft

00 – None (Bearingless)

01 – 45 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M30X2-6H Threaded Shaft End, 12W X 8H X 28L [.472W X .313H X 1.102L] Key

02 – 1-3/4 inch Dia. .125:1 Tapered Shaft Per SAE J501 with 1-1/4 - 18 UNEF-2A Threaded Shaft End, 11,11 [.4375] Square X 31,8 [1.25] Straight Key

04 – 46 mm Dia. Flat Root Side Fit, 28 Tooth, 16/32 DP 30 Degree Involute Spline, 93,0 [3.66] Minimum Ful Spline with M16 X 2,0-6H Thread in End

07 – 40 mm Dia. Straight Shaft with M12 X 1,75-6H Thread in End, 12W X 8H X 63L [.472W X .313H X 2.480L] Key (SAE Compatible)

08 – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 39,1 [1.54] Minimum Full Spline with 3/8-16 UNC-2B Thread in End (SAE Compatible)

09 – 1-1/2 inch Dia. Flat Root Side Fit, 17 Tooth, 12/24 DP 30 Degree Involute Spline, 56,6 [2.23] Minimum Full Spline with M12 X 1.75-6H Thread in End (ISO Compatible)

10 – 40 mm Dia. Straight Shaft with M12 X 1,75-6H Thread in End, 12W X 8H X 67L [.472W X .313H X 2.630L] Key (ISO Compatible)

9 Ports

A – 1–1/16-12 UN-2B Size 12 O-ring Port, Accepts Fittings for SAE J1926

B – G 3/4 (BSP) Straight Thread Port

10 Case Flow Options

A – Shuttle Valve with 9/16-18 UNF-2B, Size 6 O-ring Port Case Drain, Accepts Fittings for SAE J1926

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

11 Back-Pressure Relief

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

2 – Set at 15,2 bar [220 PSI] (for Servo Pumps)

4 – Set at 15,2 bar [300 PSI] (for high charge Servo Pumps)

12, 13 Special Features

00 – None

14 _ Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

C – Painted Low Gloss Black, Bulk Box Option

15 _ Eaton Assigned Code when Applicable

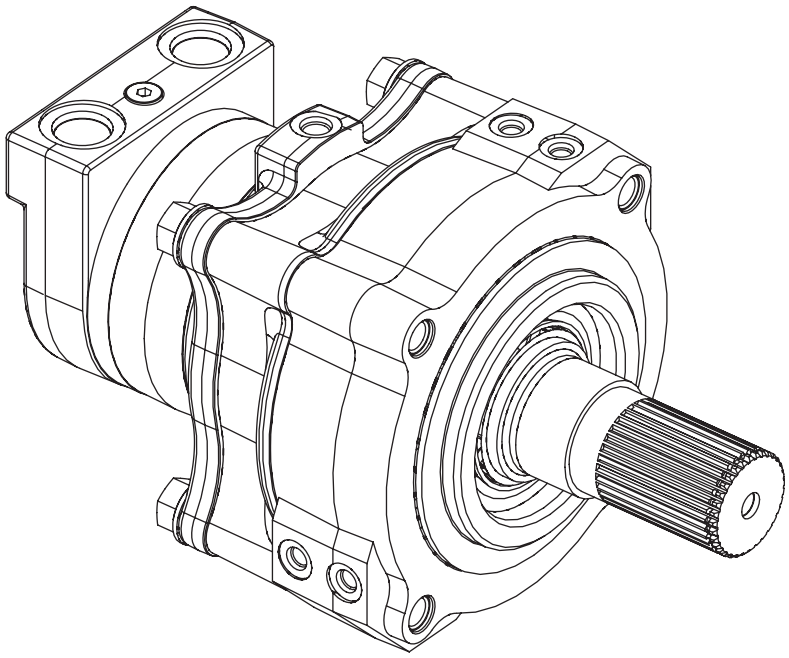
0 – Assigned Code

16 _ Eaton Assigned Design Code

C – Assigned Design Code

VIS 40 Series

Brake Description



Features

- Spring-Applied/ Hydraulically Released Multi-Disc Brake
- Spring automatically applies brake when hydrostatic pressure is absent
- Environmentally Protected
- Integral Design – Motor and brake as a single 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 plumbing options and facilitates bleeding

Applications

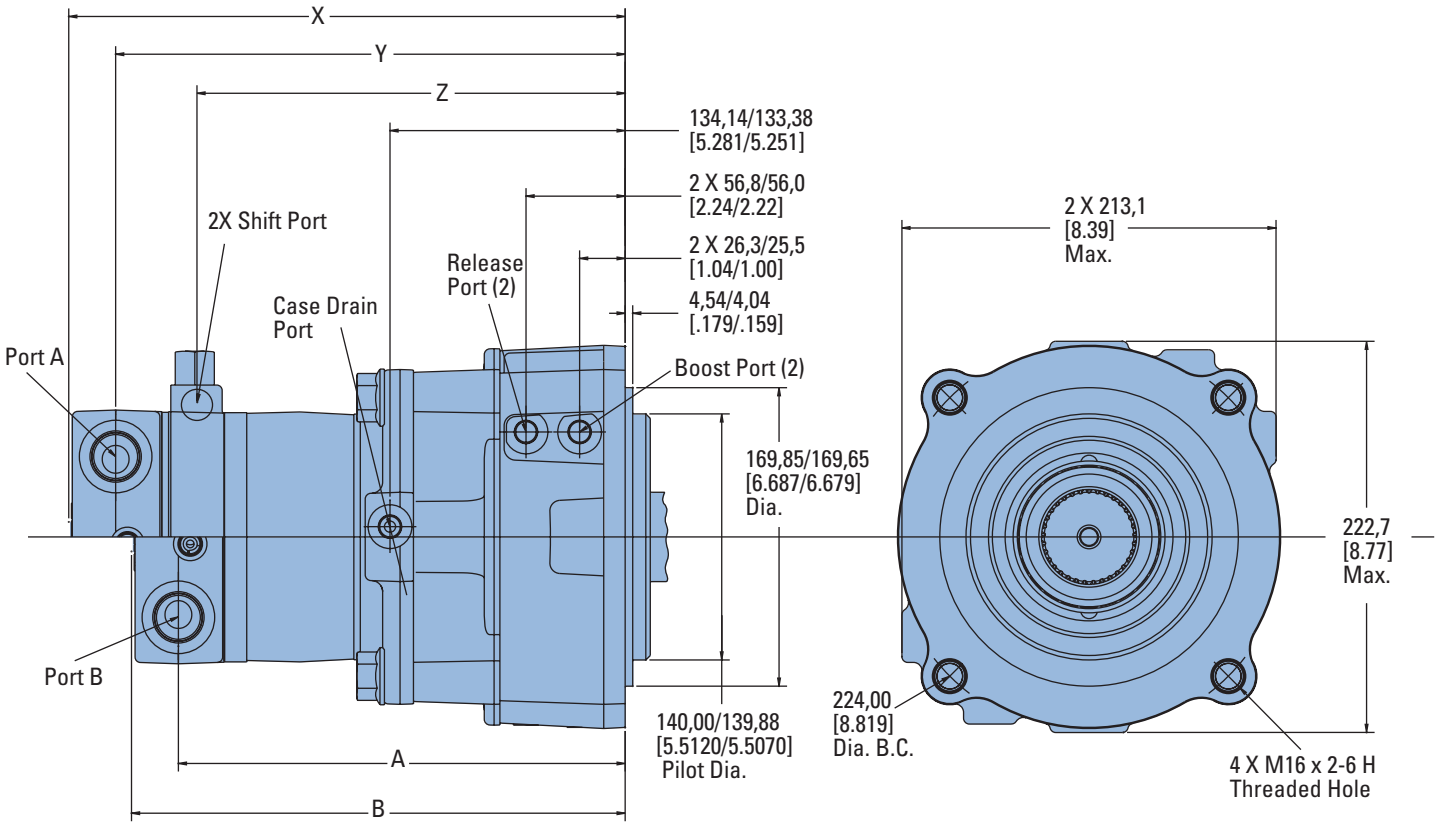
- Skid Steer Loaders
- Mini Excavators
- Trenchers
- Road Rollers
- Anywhere load-holding is needed on a Low-Speed High-Torque drive system

Specifications

- Static Holding Torque – 780 N-m [6900 lb-in] minimum (spring only - no boost)
  2621 N-m [23200 lb-in] minimum (@ 10,3 bar [150 PSI] boost)
  3570 N-m [31600 lb-in] minimum (@ 15,2 bar [220 PSI] boost)
- Release Pressure – 10,3 bar [150 PSI] minimum for full release
  68,9 bar [1000 PSI] maximum allowed at release port
- Case Pressure – 1,4 bar [20 PSI] continuous
  3,5 bar [50 PSI] maximum
- Boost Pressure – 15,2 bar [220 PSI] continuous
  34,5 bar [500 PSI] maximum
- Speed – 360 RPM maximum
- Emergency – After 3 consecutive stops, brake to still meet parking requirement

VIS 40 Series

Brake
Dimensions



BRAKE MOTORS (SINGLE-SPEED)

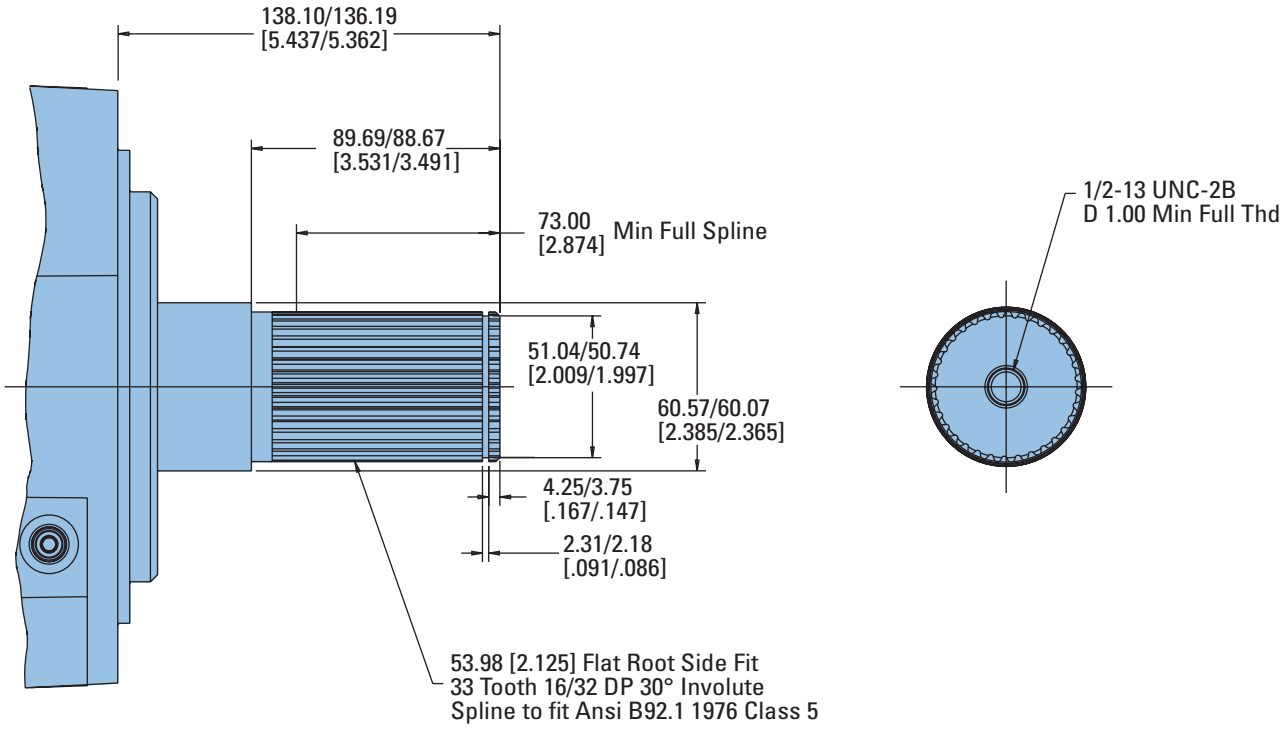
Displacement cm^3/r [in^3/r]	A mm [inch]	B mm [inch]
505 [30.7]	238,7 [9.40]	265,9 [10.47]
570 [34.9]	244,9 [9.64]	272,1 [10.71]
630 [38.5]	250,1 [9.85]	277,3 [10.92]
685 [41.7]	254,7 [10.04]	281,9 [11.10]
785 [48.0]	264,0 [10.40]	291,2 [11.46]
940 [57.4]	277,7 [10.94]	304,9 [12.00]

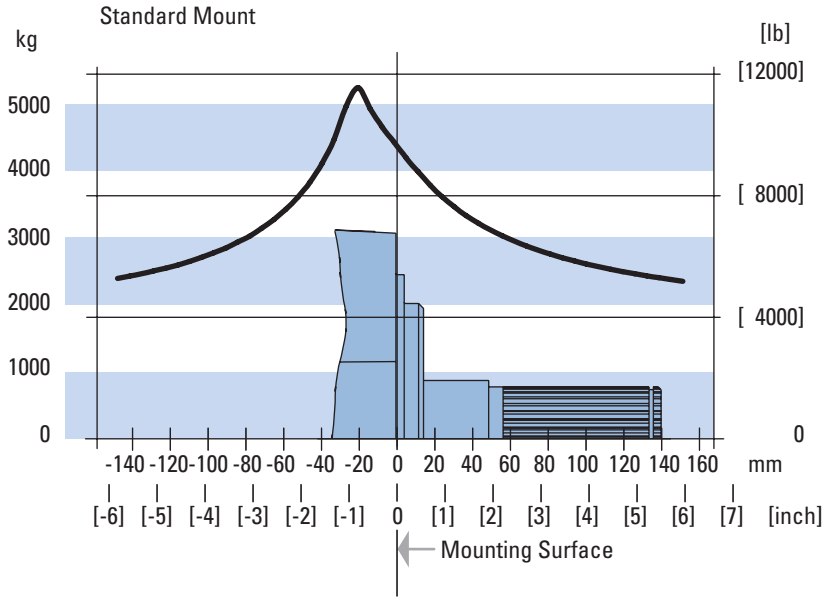
BRAKE MOTORS (TWO-SPEED)

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]	Z mm [inch]
505 [30.7]	301,9 [11.88]	274,7 [10.82]	229,3 [9.03]
570 [34.9]	308,0 [12.12]	280,9 [11.06]	235,5 [9.27]
630 [38.5]	313,1 [12.32]	285,9 [11.27]	238,5 [9.27]
685 [41.7]	317,9 [12.52]	290,7 [11.45]	245,3 [9.66]
785 [48.0]	327,0 [12.88]	300,0 [11.80]	254,6 [10.02]
940 [57.4]	340,7 [13.42]	313,7 [12.35]	268,3 [10.56]

VIS 40 Series

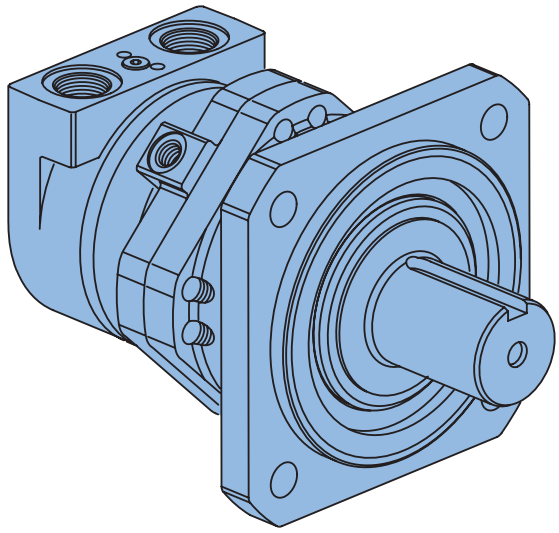
Brake Shaft Dimensions/ Sideload Curves





VIS 45 Series

Highlights



Description

The VIS 45 is the most powerful motor in the VIS Series product line. Maximum continuous output torque capability is rated to 4520 Nm [40,000 lb-in.] with a displacement range from 630cc to 1560cc per revolution. VIS 45 motors can be run up to 170 LPM [45 GPM] with pressure capability up to 310 bar [4500 PSI]. The motor utilizes patented VIS technology with improved high-strength Geroler, optimized drive geometry, and two-piece pre-loaded balance plate for increased starting efficiency, reduced leakage and higher back pressure capacity.

VIS 45 Motors

Geroler Element	5 Displacements
Flow l/min [GPM]	170 [45] Continuous***
	189 [50] Intermittent**
Speed	Up to 284 RPM
Pressure bar [PSI]	310 [4500] Cont.***
	345 [5000] Inter.**
	380 [5500] Peak*
Torque Nm [lb - in]	4520 [40000] Cont.***
	5650 [50000] Inter.**

*** Continuous— (Cont.) Continuous rating, motor may be run continuously at these ratings.
** Intermittent— (Inter.) Intermittent operation, 10% of every minute.
* Peak— (Peak) Peak operation, 1% of every minute.

Features

- Patented VIS Geroler technology
- Three moving components: (Geroler, star, drive, and output shaft)
- Two-piece pre-loaded pressure balance plate
- Variety of optional features including two-speed option, and case flow solutions for both closed-loop and open-loop applications.

Benefits

- Extremely compact powerful package
- Increased torque capability
- Greatest horsepower density in the VIS motor line
- High efficiency
- Quiet, smooth operation
- Reliable performance
- Design Flexibility

Applications

- Traction Drives
- Skid Steer loaders
- Grapples
- Excavator Swing Drives
- Marine & Military Winches
- Utility Reels
- Harvesters
- Snow Grooming Equipment
- Trenchers
- Piggy-back Forklifts
- Industrial Machine Tools
- Truck Grapples
- Wood Processing – Saw Mills
- Augers


Auger

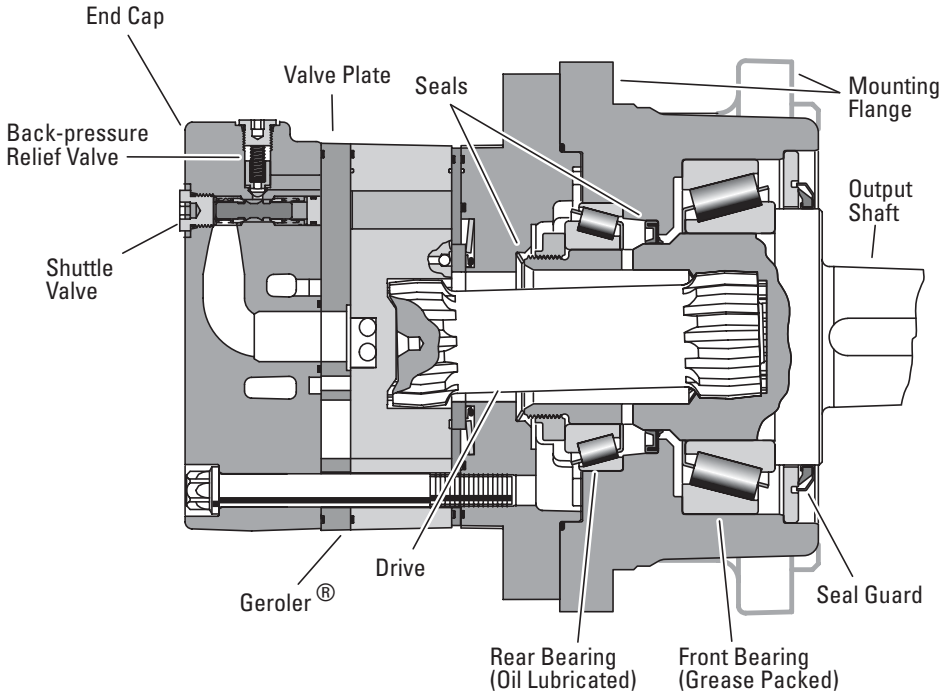

Skid Steer


Injector


Port Equipment

VIS 45 Series

Specifications



SPECIFICATION DATA — VIS 45 SERIES MOTORS

Displ. cm³/r [in³/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.

Δ Pressure:

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

Case Pressure:

Minimum – No Pressure

Maximum – 3,5 bar [50 PSI]

Note:

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

Continuous Rating:

Motor may be run continuously at these ratings

Intermittent Operation:

10% of every minute

Peak Operation:

1% of every minute

Recommended Fluids:

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

Recommended Maximum System Operating Temp.:

82° C [180° F]

Recommended Filtration:

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

Shuttle:

Standard

Back-Pressure Relief Valve:

Required for closed loop circuit.

VIS 45 Series

Performance Data

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

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

Continuous

Intermittent

805 cm³/r [48.6 in³/r]
Δ Pressure Bar [PSI]

Flow LPM [GPM]

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

630 cm³/r [38.6 in³/r]
Δ Pressure Bar [PSI]

Flow LPM [GPM]

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

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

VIS 45 Series

Performance Data

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

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

Continuous

Intermittent

1245 cm³/r [76.0 in³/r]
Δ 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	2160	4800	9960	15150	20200	26450	30670	39180	42800	43220
	244	542	1125	1712	2283	2989	3466	4427	4836	4884
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]
Δ Pressure Bar [PSI]

Flow LPM [GPM]

	250	500	1000	1500	2000	2500	3000	3500	4000	4500	4750
	15	**35**	**70**	**105**	**140**	**170**	**205**	**240**	**275**	**310**	**330**
4	2000	4100	8630	12620	16050	20080	24150	28320	32590	35150	37040
	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

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

1560 cm³/r [95.0 in³/r]

Δ Pressure Bar [PSI]

Flow LPM [GPM]

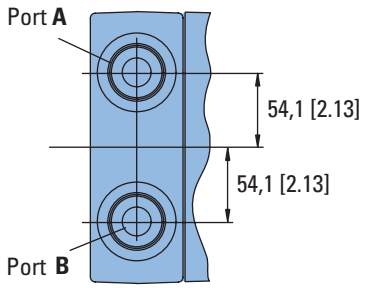
	250	500	1000	1500	2000	2500	3000	3500	4000
	15	**35**	**70**	**105**	**140**	**170**	**205**	**240**	**275**
4	2700	5670	11910	18520	24910	30860	37610	42320	48366
	305	*641*	*1346*	*2093*	*2815*	*3487*	*4250*	*4782*	*5464*
15	**9**	**9**	**9**	**9**	**9**	**8**	**8**	**8**	**8**
8	2810	5910	12400	19260	25590	31740	39310	44150	50457
	318	*668*	*1401*	*2176*	*2892*	*3587*	*4442*	*4989*	*5700*
30	**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*
45	**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*
61	**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*
76	**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*
91	**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*
106		**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*
121		**75**	**74**	**72**	**70**	**67**	**62**	**58**	**58**
36		5100	11270	18270	25590	33070	37652	45366	
		576	*1274*	*2065*	*2892*	*3737*	*4254*	*5125*	
136		**85**	**83**	**81**	**79**	**76**	**70**	**66**	
40			10280	17760	24910	32630	37124	44750	
			1162	*2007*	*2815*	*3687*	*4194*	*5055*	
151			**92**	**90**	**88**	**84**	**78**	**73**	
45			9820	17280	24240	31793	36119	43577	
			1110	*1953*	*2739*	*3592*	*4080*	*4923*	
170			**104**	**101**	**99**	**95**	**87**	**82**	
50			9100	16600	23650				
			1028	*1876*	*2672*				
189			**115**	**113**	**110**				

16600 *1876* **113** } Torque [lb-in] Nm **Speed RPM**

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)

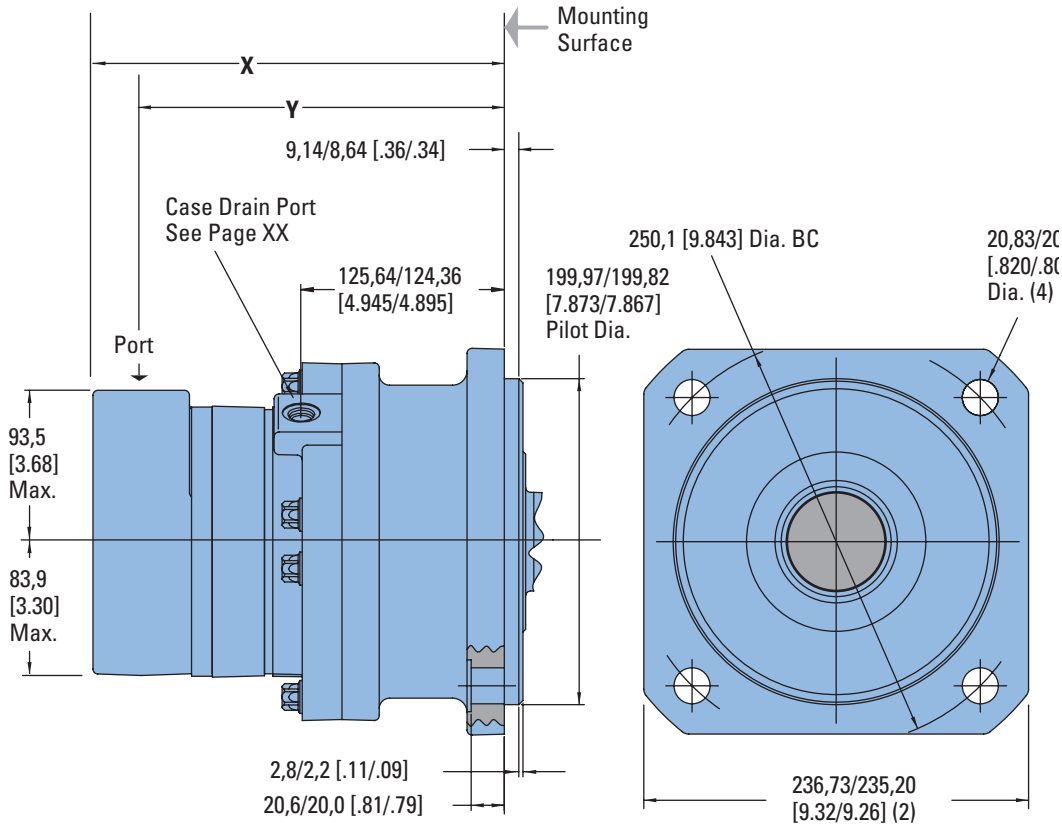
Or G 1 (BSP) O-ring Ports (2)

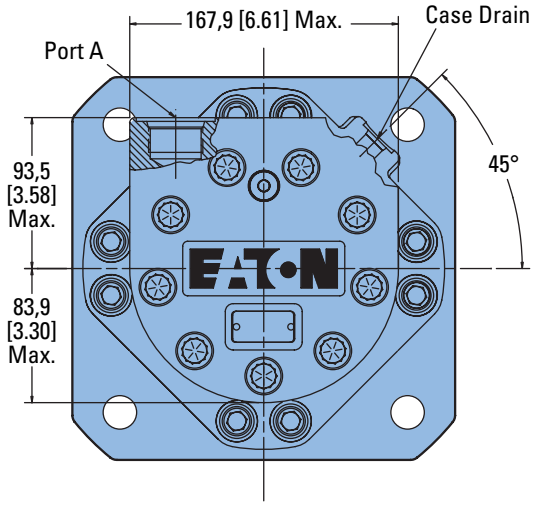
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW





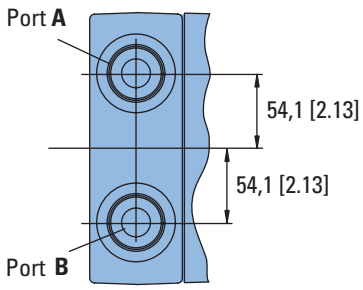
STANDARD MOTORS

Displacement cm³/r [in³/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)

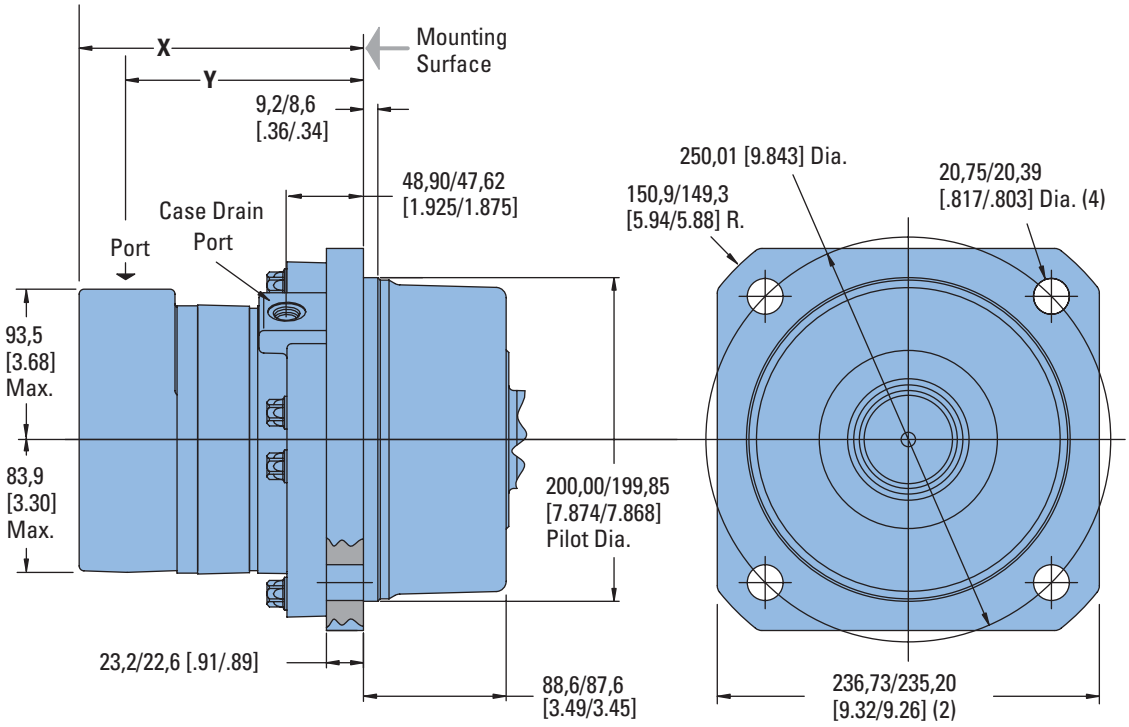
Or G 1 (BSP) O-ring Ports (2)

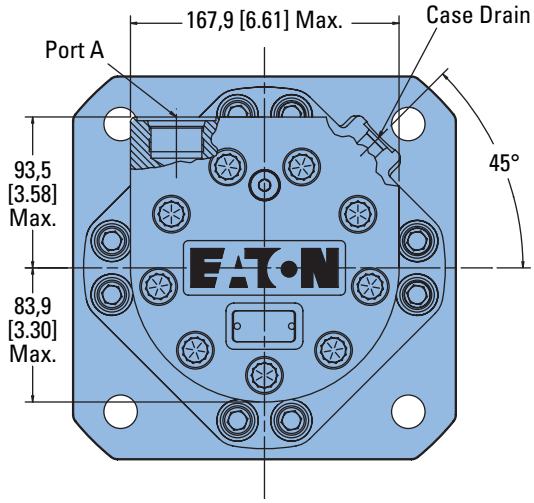
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Shaft End

Port A Pressurized — CW

Port B Pressurized — CCW





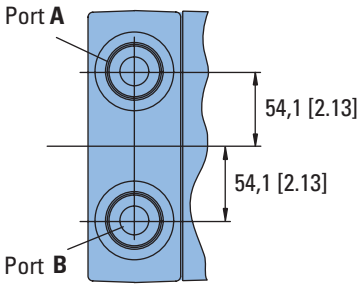
WHEEL MOTORS

Displacement cm³/r [in³/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)

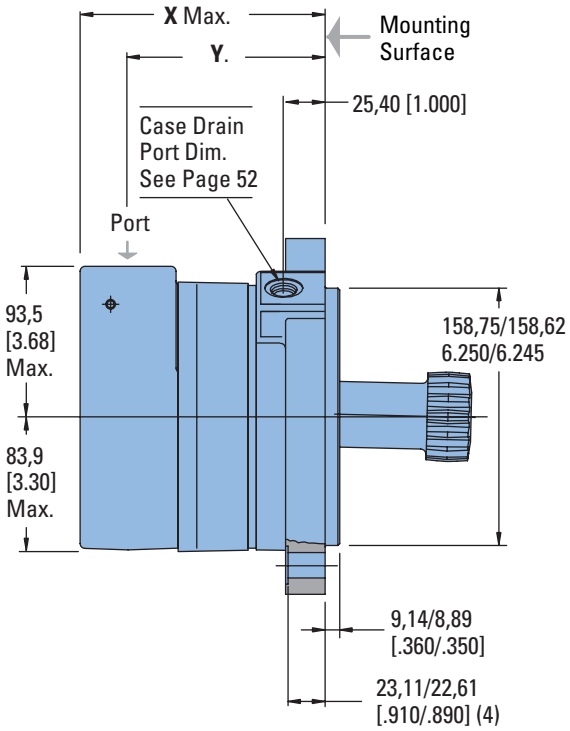
Or G 1 (BSP) O-ring Ports (2)

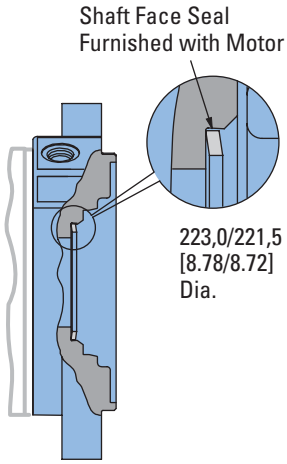
G 1/4 (BSP) O-ring Case Drain Port (1)

Standard Rotation Viewed from Drive End

Port A Pressurized — CW

Port B Pressurized — CCW

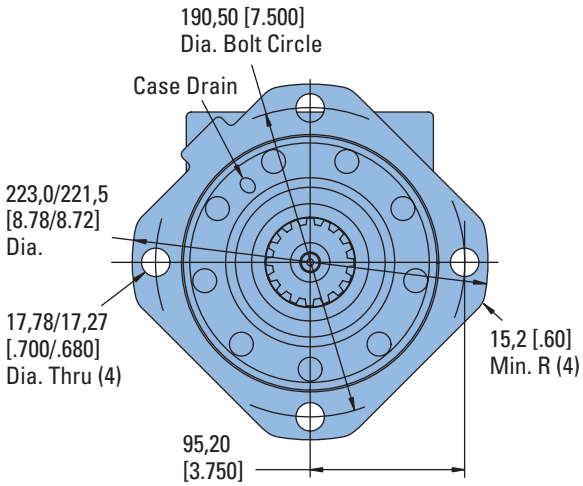




For VIS 45 bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

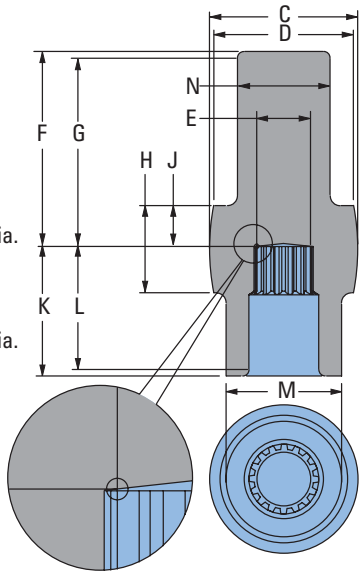
Note:

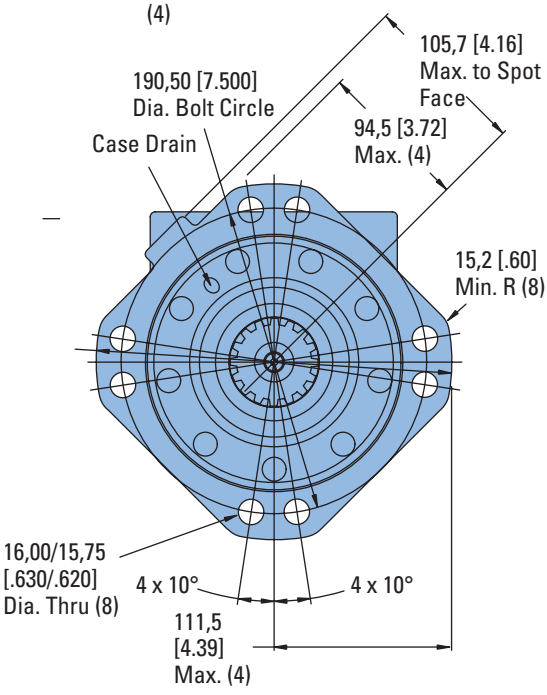
After machining blank, part must be hardened per Eaton specification.



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 cm³/r [in³/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

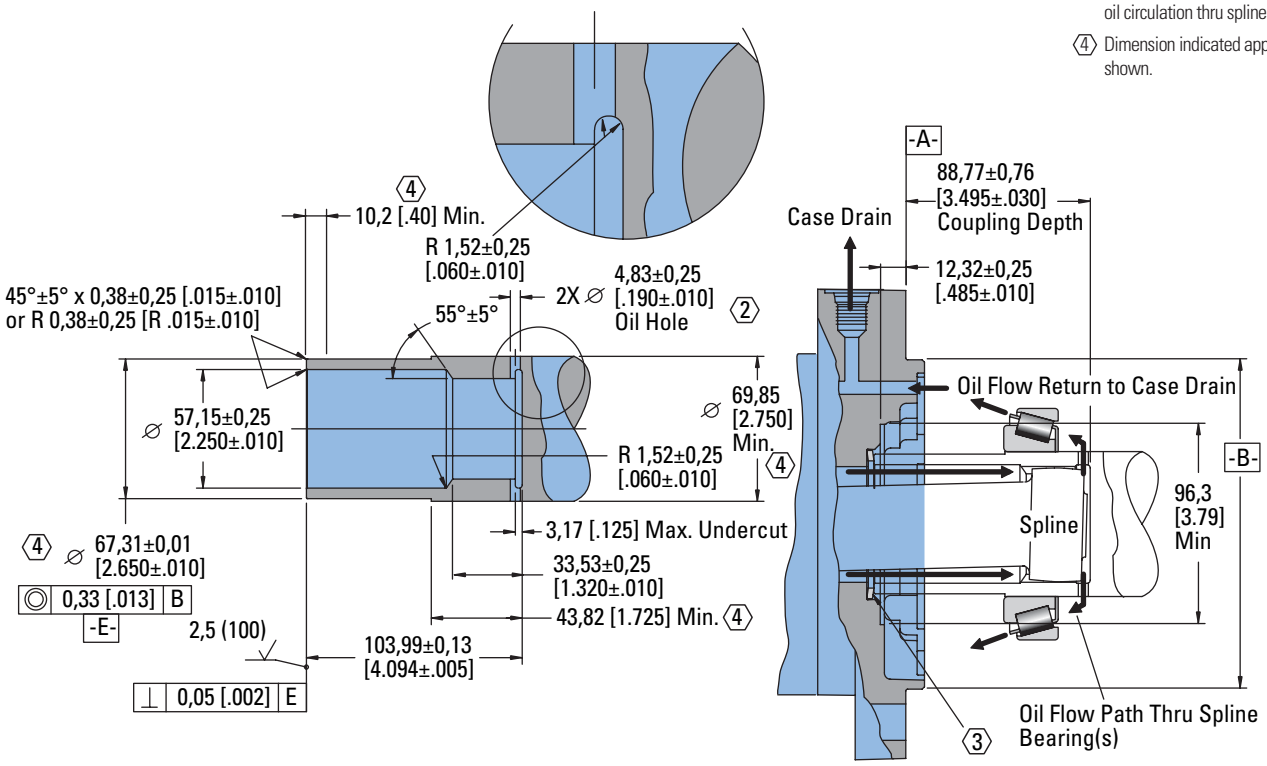
Bearingless

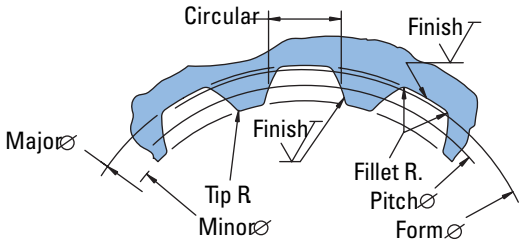
1 Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H carburize to a hardness of 59-62 HRc with case depth (to 50HRc) of 0,76 -1,27 [.030 -.050]. Dimensions apply after heat treat.

(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.

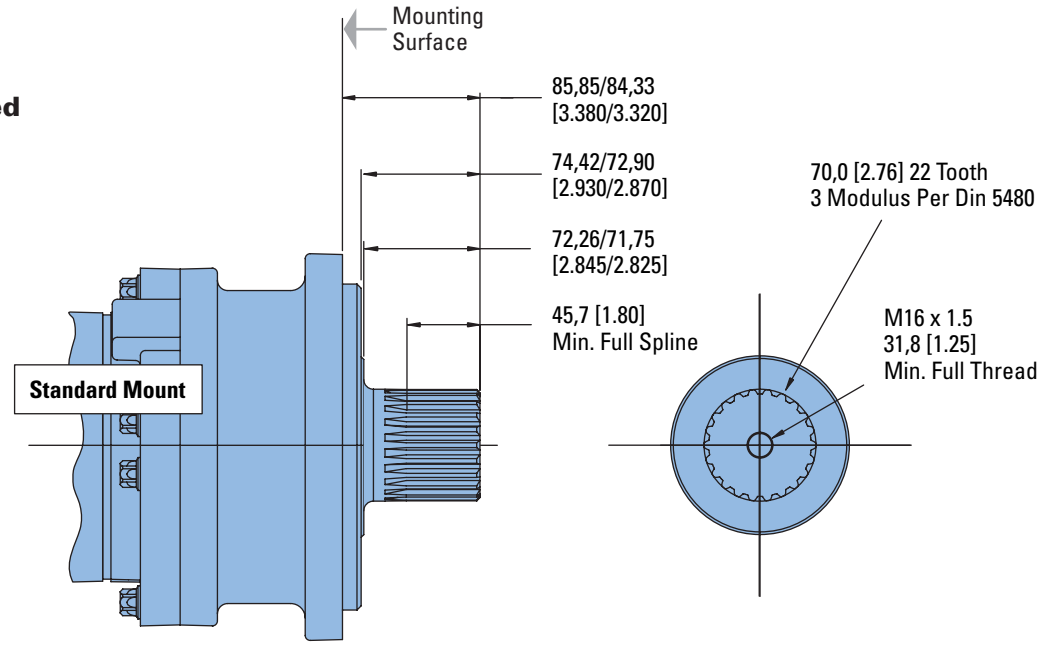




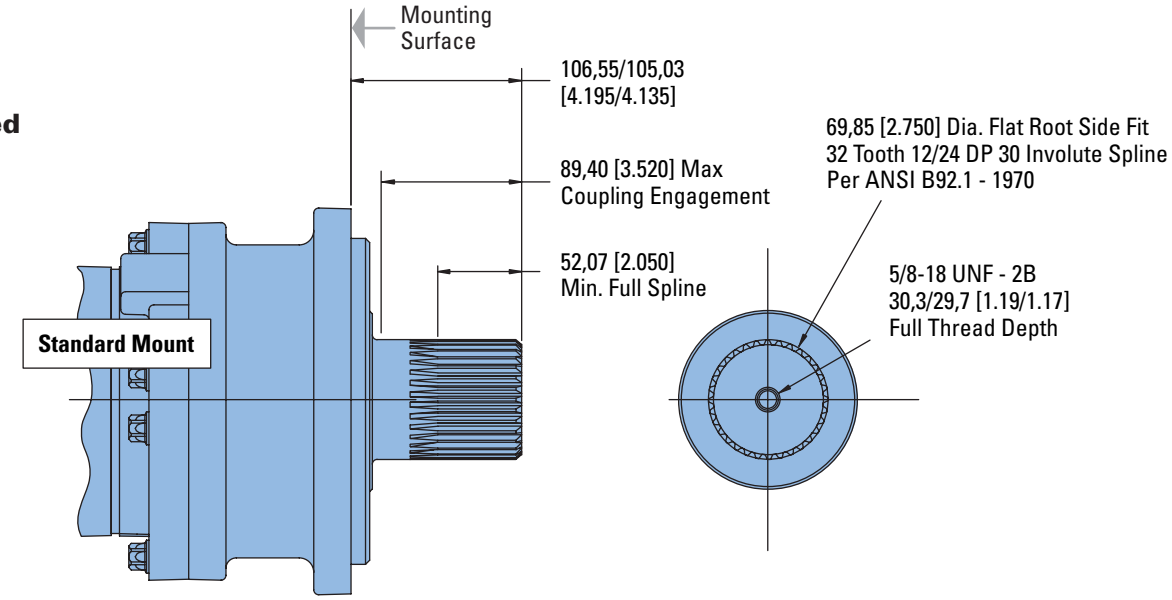
Spline Pitch	8/16
Pressure Angle	30°
Number of teeth	16
Class of Fit	Ref. 5
Type of Fit	Side
Pitch Diameter	Ref. 50,80000 [2.0000000] ◎ 0,33 [.013] B
Base Diameter	Ref. 43,994090032 [1.7320508]
Major Diameter	56,34±0,15 [2.218±.006]
Min. Minor Diameter	48,44±0,08 [1.907±.003]
Form Diameter, Min.	55,22 [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]

Dimensions
Shafts
Splined

70 mm
22 Tooth Splined



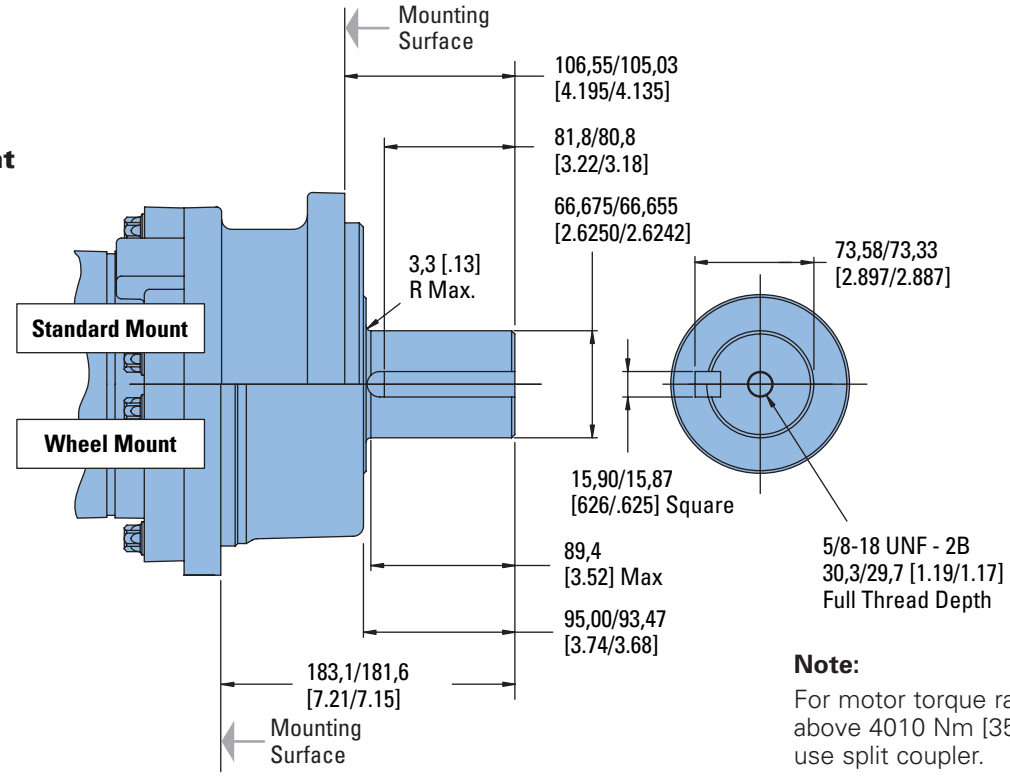
2–3/4 Inch
32 Tooth Splined



Dimensions
Shafts

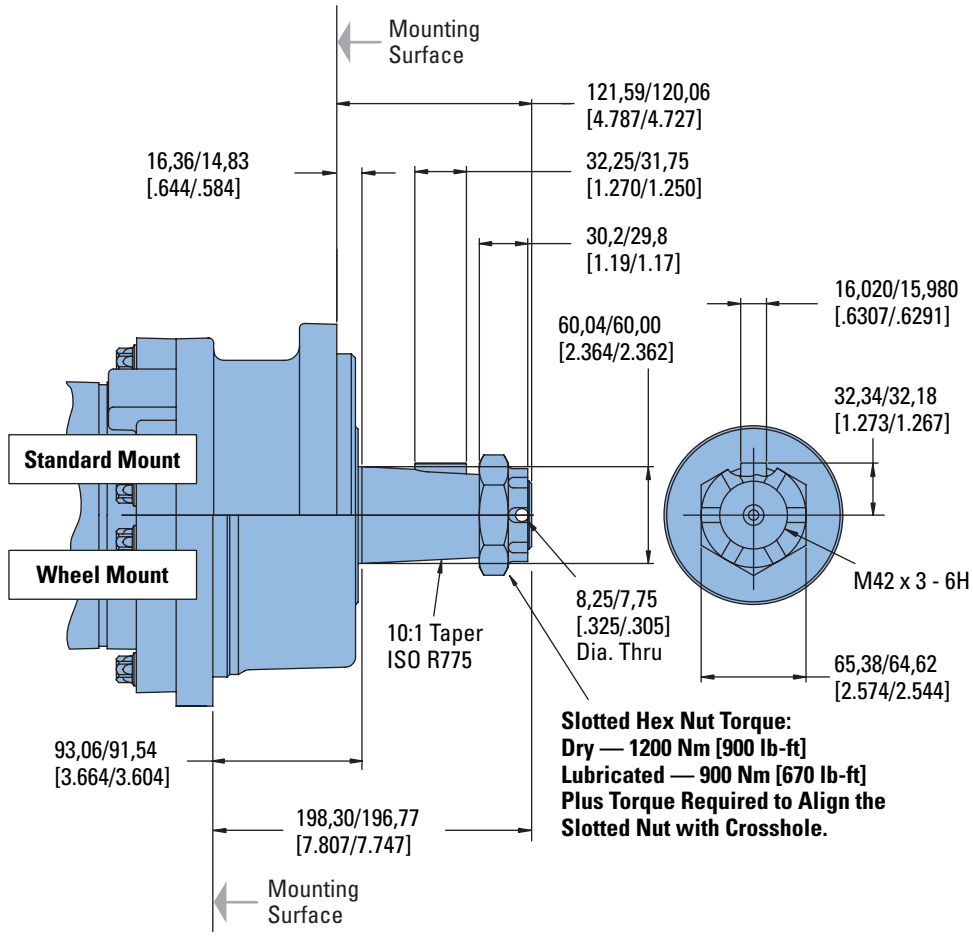
Keyed

2–5/8 Inch Straight



Note:
For motor torque ratings above 4010 Nm [35500 lb - in] use split coupler.

60 mm Tapered



VIS 45 Series

Side Load Capacity

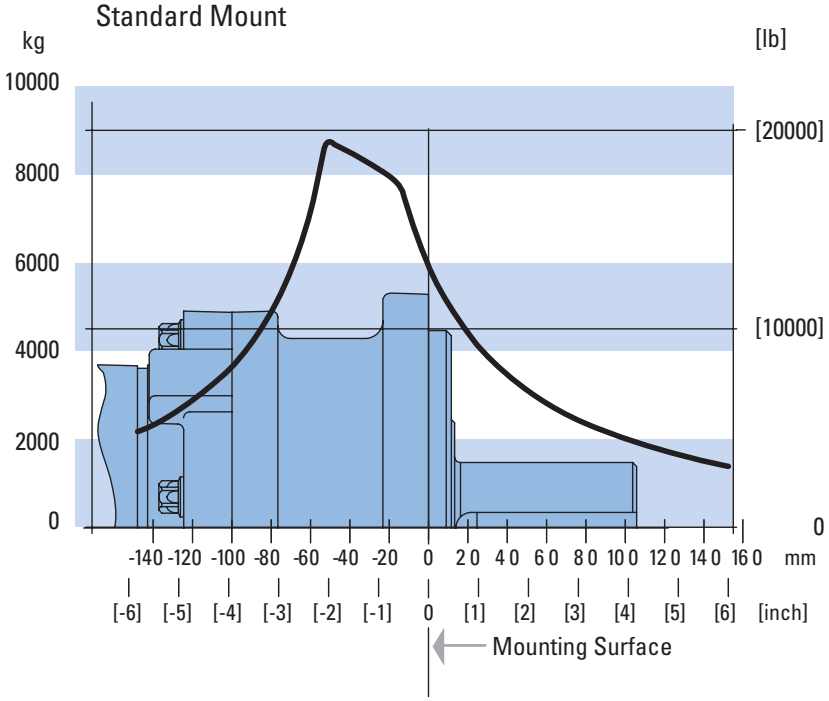
These curves indicate the radial load capacity on the motor shaft(s) at various locations.

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.

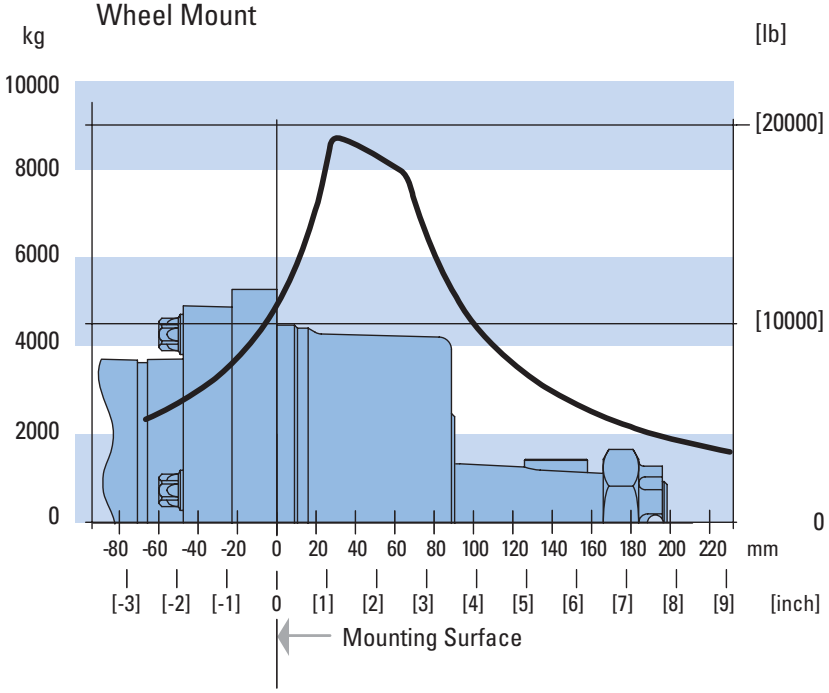
RPM	Multiplication Factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

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

Standard Mount



Wheel Mount



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
Wheel	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
	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
Wheel	2–3/4 inch 32 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0155	-0156	-0157	-0158	-0159
	2–5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0053	-0054	-0055	-0056	-0057
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0060	-0061	-0062	-0063	-0064
Bearingless	(8 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	157-0074	-0075	-0076	-0077	-0078
	(4 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	157-0081				

157-0081

Note:

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

- A case drain is required for all closed loop VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].

VIS 45 Series

Product Numbers

Open Loop

Use three-digit prefix (155-, 156-, or 157-) plus four-digit number from charts for complete product number (ex: 157-0038).

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2–5/8 inch Straight	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0029	-0030	-0031	-0032	-0033
	60 mm Tapered	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0043	-0044	-0045	-0046	-0047
	70 mm 22 Tooth Splined	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0014	-0057	-0058	-0059	-0060
	2–3/4 inch 32 Tooth Splined	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0070	-0071	-0072	-0073	-0074
Wheel	2–5/8 inch Straight	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	156-0011	-0012	-0013	-0014	-0015
	60 mm Tapered	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	155-0025	-0026	-0027	-0028	-0029
Bearingless	(8 Bolt)	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	157-0050	-0040	-0042	-0044	-0046
	(4 Bolt)	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	157-0038	-	-	-	-

157-0038

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2–5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0036	-0037	-0038	-0039	-0040
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0050	-0051	-0052	-0053	-0054
	70 mm 22 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0063	-0064	-0065	-0066	-0067
	2–3/4 inch 32 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0077	-0078	-0079	-0080	-0081
Wheel	2–5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0018	-0019	-0020	-0021	-0022
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	156-0032	-0033	-0034	-0035	-0036
Bearingless	(8 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	155-0053	-0041	-0043	-0045	-0047
	(4 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	157-0039	-0036	-0037	-0078	

157-0036

Note:

All product numbers in the charts (above) are for motors **without** a back-pressure relief valve. These motors would generally be used in open loop circuits.

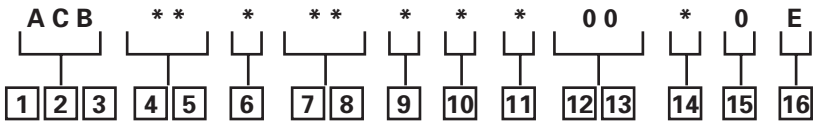
For closed loop circuits a motor **with** a back-pressure relief valve is required.

- A case drain is recommended for all VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].
- In open loop circuits, return pressure must be 3,5 bar [50 PSI] greater than case pressure to properly lubricate the internal drive.

VIS 45 Series

Model Code

The following 16 - digit coding system has been developed to identify all of the configuration options for the VIS 45 motor. Use this model code to specify a motor with the desired features. All 16 digits of the code must be present when ordering. You may want to photocopy the matrix below to ensure that each number is entered in the correct box.



1, 2, 3 Product Series

ACB – VIS 45 Motor

4, 5 Displacement cm³/r [in³/r]

31 – 520 [31.7]*

35 – 572 [34.9]*

39 – 630 [38.6]

44 – 720 [43.9]*

49 – 805 [48.6]

60 – 990 [60.5]

76 – 1245 [76.0]

95 – 1560 [95.0]

* For performance and dimension data contact your Eaton Hydraulics representative.

6 Mounting Type

A – 4 Bolt Bearingless 158,70 [6.250] Pilot Dia. With 9,07 [.355] Pilot Length and 17,53 [.690] Dia holes on 190,50 [7.500] Dia. B. C. - Max. Torque Allowed 3615 Nm [32000 lb - in] (Displ. Code 32, 35, 39 Only)

C – 8 Bolt Bearingless 158,70 [6.250] Pilot Dia. With 9,07 [.355] Pilot Length and 17,53 [.690] Dia holes on 190,50 [7.500] Dia. Bolt Circle

D – 4 Bolt Wheel Mount 200,0 [7.87] Pilot Dia. With 9,0 [.35] Pilot Length and 20,57 [.810] Dia. Holes on 250,0 [9.84] Dia. Bolt Circle

H – 4 Bolt Standard Mount 200,0 [7.87] Pilot Dia. With 9,0 [.35] Pilot Length and 20,57 [.810] Dia. Holes on 250,00 [9.84] Dia. Bolt Circle

7, 8 Output Shaft

00 – None (Bearingless)

05 – 2-5/8 inch Dia. Straight Shaft with 5/8-18 UNF-2B Thread in End and 15,88 [.625] Sq. X 81,3 [3.20] Straight Key

06 – 70 mm Dia. 22 Tooth 3 Modulus Splined Shaft Per DIN 5480 with M16 X 1,5 Thread in End

08 – 2-3/4 inch Dia. Flat Root Side Fit 32 Tooth 12/24 DP 30º. 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

A – Shuttle Valve with Side Facing 9/16-18 UNF-2B, O-ring Port Case Drain, Accepts Fittings for SAE J1926/1, Case Drain Required

B – Shuttle Valve with Side Facing G 1/4 (BSP) Port Case Drain, Case Drain Required

11 Back-Pressure Relief

0 – None (for Open Loop Only)

1 – Set at 15,2 bar [220 psi] (for Servo Pumps)

3 – Set at 4,5 bar [65 psi] (for Manual Pumps)

4 – Set at 20,7 bar [300 PSI] (for High Pressure Servo Pumps)

12, 13 Special Features

00 – None

14 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

C – Painted Low Gloss Black, Bulk Box Option

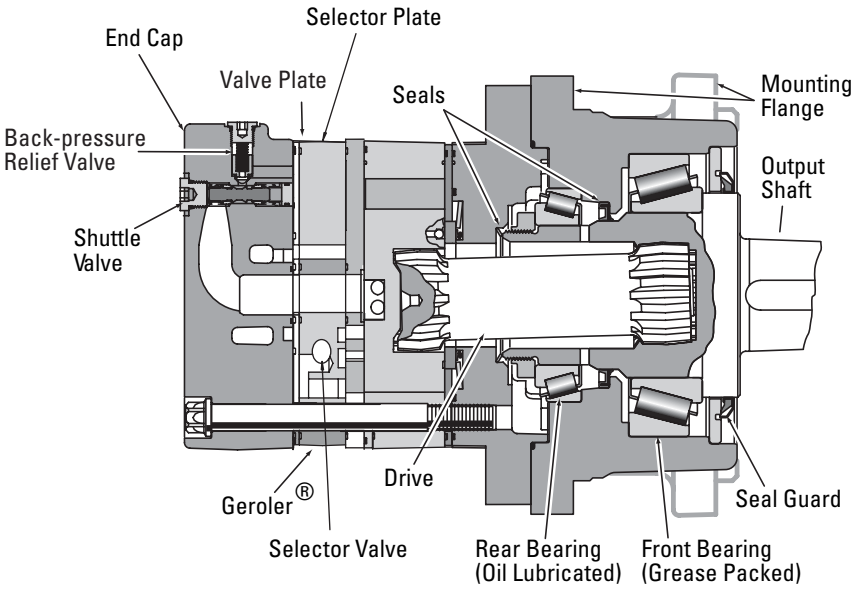
15 Eaton Assigned Code when Applicable

0 – Assigned Code

16 Eaton Assigned Design Code

E – Assigned Design Code

VIS 45 Series Two-speed



Specifications

VIS 45 Series motors are available with an integral two-speed feature that allows the operator to shift the motor between low speed high torque (LSHT) mode and high speed low torque (HSLT) mode. In the LSHT mode, output torque and rotation speed values are equal to those of the conventional VIS 45 motor. In the HSLT mode motor displacement is reduced by one third, resulting in a fifty percent increase in rotation speed and a torque output reduction of one third. The VIS 45 two speed motor is bidirectional. It will function with equal shaft output in either rotation direction (CW or CCW) in both LSHT and HSLT modes. Shift on the fly technology allows full-power operation throughout the full duration of the shift.

Changing between modes is accomplished by changing the displacement in a ratio of 1 to 1.5. An external two-position three-way control valve is required for shifting pressure to the pilot port between low pressure (LSHT mode) and pilot signal pressure (HSLT mode). An integral selector valve shifts the motor from LSHT mode to HSLT mode. Initially, low pressure is supplied to the pilot port. The selector valve is biased to LSHT mode by a return spring. When pilot signal pressure is supplied to the pilot port and 3,5 Δbar [50 ΔPSI] is reached, the selector valve overcomes return spring force and 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

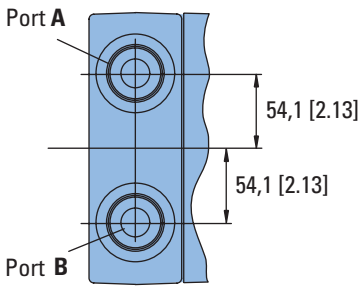
In the LSHT mode, torque and speed values are equal to those of the conventional VIS 45 motor. In the HSLT mode, rotation speed is increased by fifty percent and torque output is reduced by one third.

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

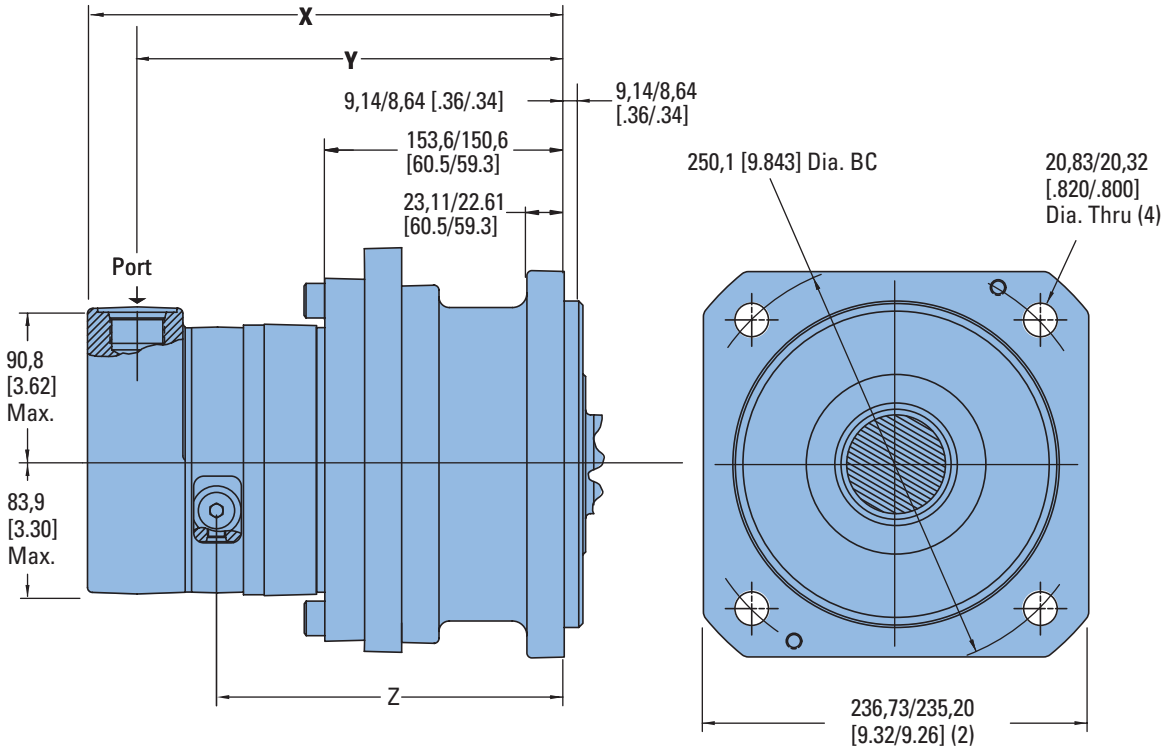
G 1 (BSP) O-ring Ports (2)

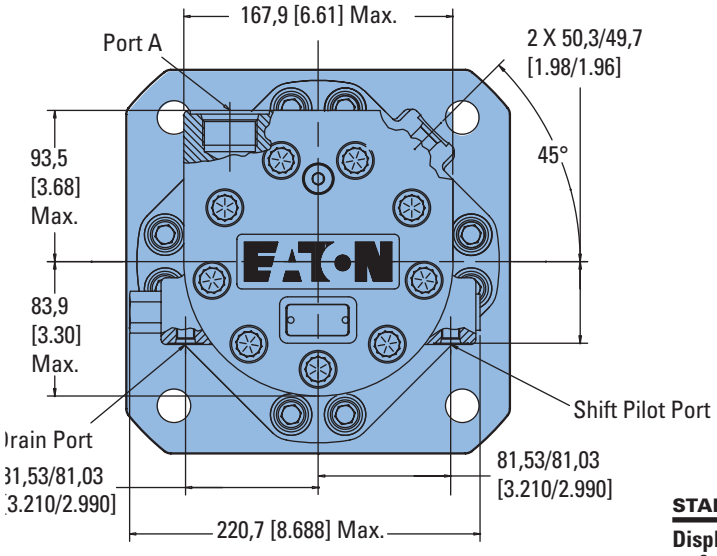
G 1/4 (BSP) O-ring Case Drain Port (1)

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





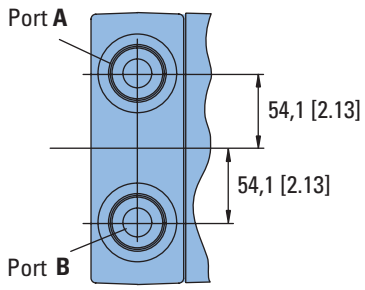
STANDARD MOUNT

Displacement cm³/r [in³/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

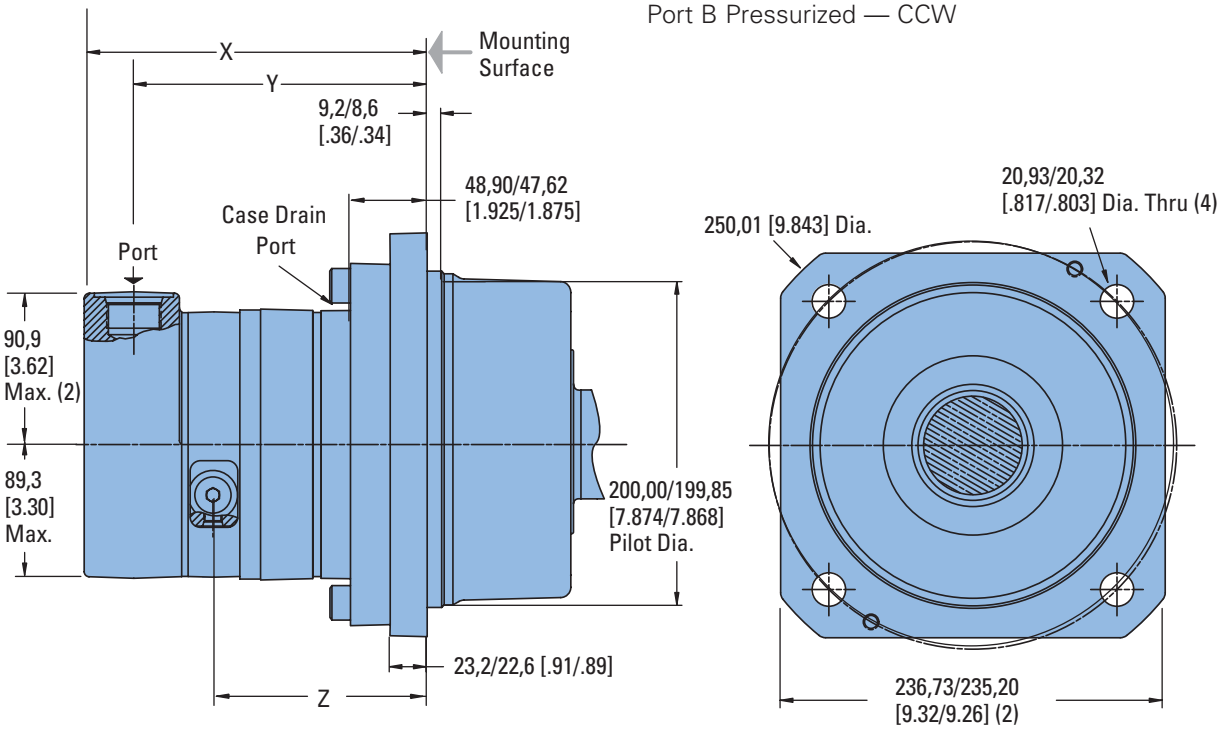
G 1 (BSP) O-ring Ports (2)

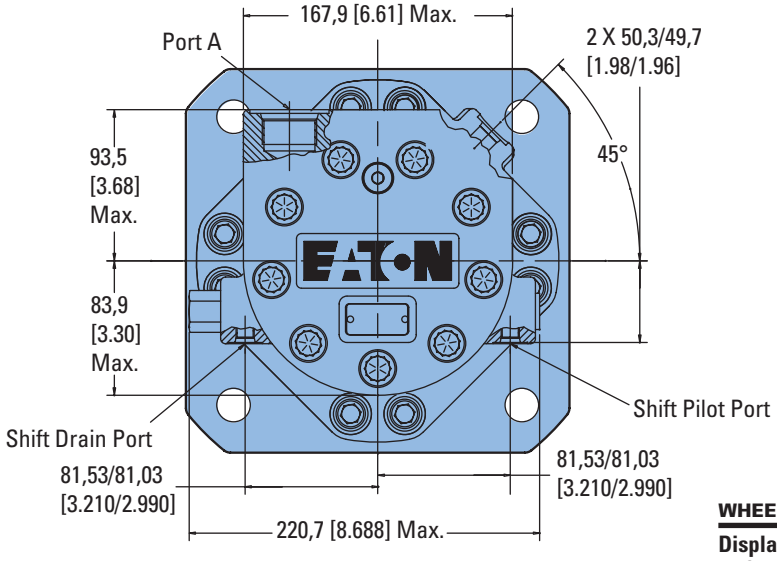
G 1/4 (BSP) O-ring Case Drain Port (1)

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





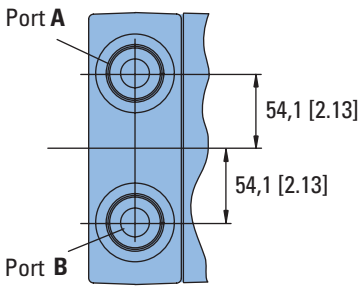
WHEEL MOUNT

Displacement cm³/r [in³/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)

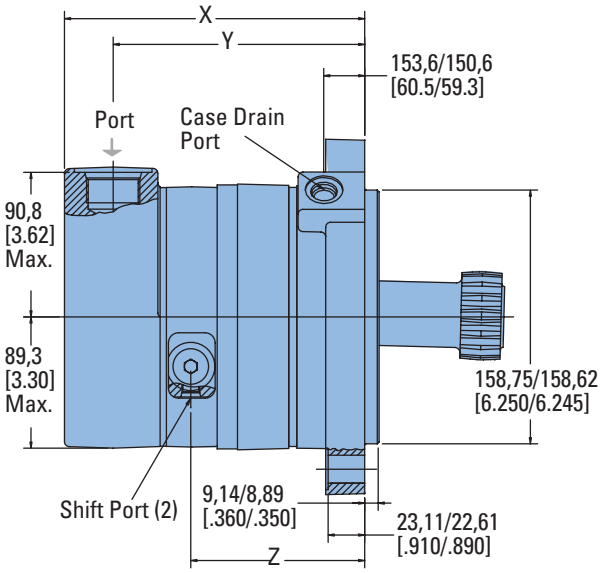
Standard Rotation Viewed from Drive End

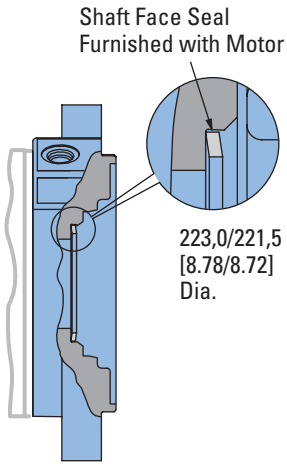
Port A Pressurized — CW
Port B Pressurized — CCW

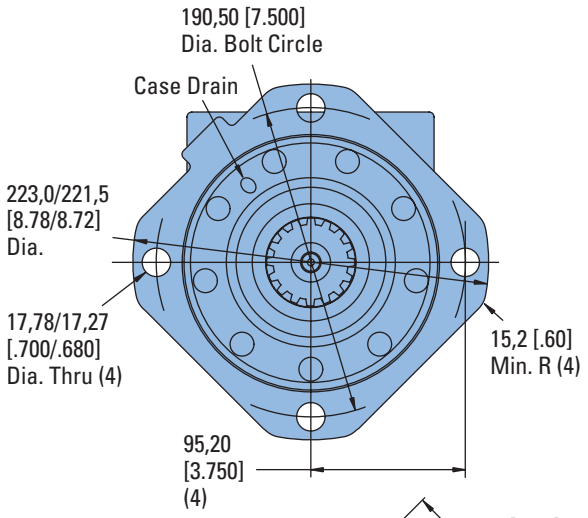
For VIS 45 two-speed bearingless motor application information, contact your Eaton representative (mating coupling blanks available from Eaton Hydraulics).

Note:

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

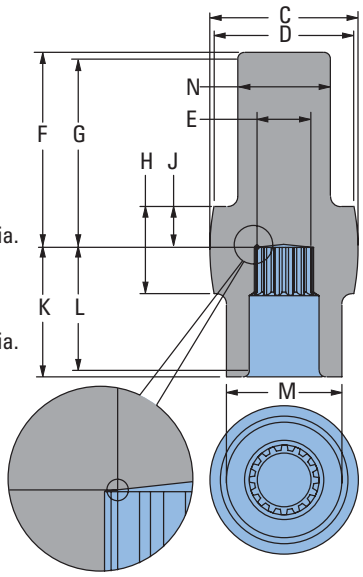


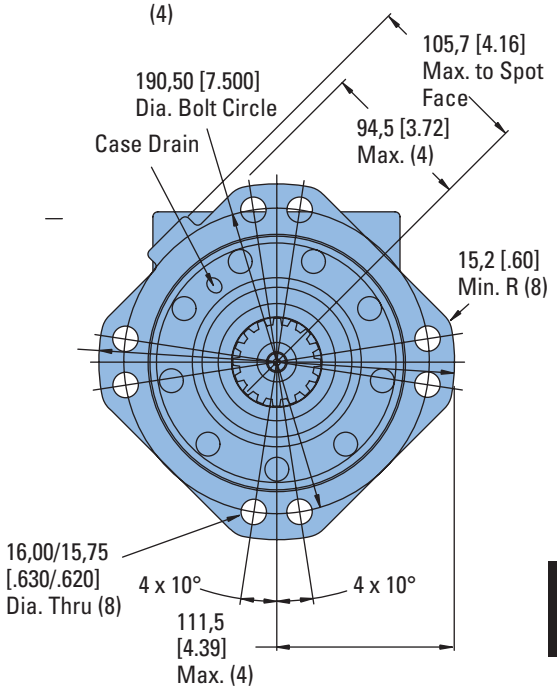




Mating Coupling Blank
Eaton Part No. 13521-003

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 cm³/r [in³/r]	X mm [inch]	Y mm [inch]	Z mm [inch]
630 [38.6]	196,1 [7.72]	165,9 [6.53]	116,9 [4.60]
805 [48.6]	206,5 [8.13]	176,3 [6.94]	127,3 [5.01]
990 [60.5]	218,9 [8.62]	188,8 [7.43]	139,7 [5.50]
1245 [76.0]	235,2 [9.26]	205,0 [8.07]	156,0 [6.14]
1560 [95.0]	255,0 [10.04]	224,8 [8.85]	175,8 [6.92]

VIS 45 Series Two-speed

Product Numbers

(Closed Loop)

Use digit prefix—173-,174- or 183- plus four digit number from charts for complete product number—

Example: 173-0013.

Orders will not be accepted without three digit prefix.

SAE

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2–5/8 inch Straight	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0006	-0007	-0008	-0009	-0010
	60 mm Tapered	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0011	-0012	-0013	-0014	-0015
	70 mm 22 Tooth Splined	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0016	-0017	-0018	-0019	-0020
Wheel	2–3/4 inch 32 Tooth Splined	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	174-0021	-0022	-0023	-0024	-0025
	2–5/8 inch Straight	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	183-0006	-0007	-0008	-0009	-0010
	60 mm Tapered	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	183-0011	-0012	-0013	-0014	-0015
Bearingless	(8 Bolt)	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	173-0008	-0009	-0010	-0011	-0012
	(4 Bolt)	1–5/16-12 UNF O-ring (2) 9/16-18 UNC Drain Port (1)	173-0013	-	-	-	-

173-0013

ISO

MOUNTING	SHAFT	PORT SIZE	DISPL. cm^3/r [in^3/r] / PRODUCT NUMBER				
			630 [38.6]	805 [48.6]	990 [60.5]	1245 [76.0]	1560 [95.0]
Standard	2–5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0026	-0027	-0028	-0029	-0030
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0031	-0032	-0033	-0034	-0035
	70 mm 22 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0036	-0037	-0038	-0039	-0040
Wheel	2–3/4 inch 32 Tooth Splined	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	174-0041	-0042	-0043	-0044	-0045
	2–5/8 inch Straight	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	183-0016	-0017	-0018	-0019	-0020
	60 mm Tapered	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	183-0021	-0022	-0023	-0024	-0025
Bearingless	(8 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	173-0014	-0015	-0016	-0017	-0018
	(4 Bolt)	G 1 (BSP) (2) G 1/4 (BSP) Drain Port (1)	173-0019	-	-	-	-

173-0019

Note:

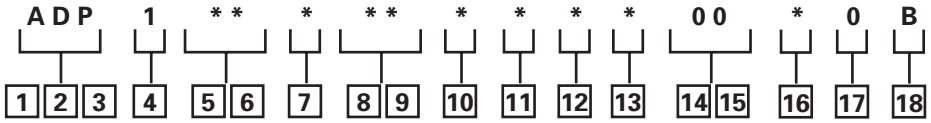
The product numbers on this page are for motors used in closed loop circuits. They include a back-pressure relief valve that is set at 15,2 bar [220 PSI].

- A case drain is required for all closed loop VIS motor applications.
- The maximum case pressure for the VIS motor is 3,5 bar [50 PSI].

VIS 45 Series Two-speed

Model Code

The following 18-digit coding system has been developed to identify all of the configuration options for the VIS 45 Two-Speed motor. Use this model code to specify a motor with the desired features. All 18 digits of the code must be present when ordering. You may want to photocopy the matrix below to endure that each number is entered in the correct box.



1, 2, 3 Product Series

ADP – VIS 45 Two-speed Motor

4 Eaton Assigned Code

1 – Assigned Code

5 6 Displacement cm³/r [in³/r]

32 – 520 [31.7]*

35 – 572 [34.9]*

39 – 630 [38.6]

44 – 720 [43.9]*

49 – 805 [48.6]

60 – 990 [60.5]

76 – 1245 [76.0]

95 – 1560 [95.0]

* For performance and dimension data, contact your Eaton Hydraulics representative.

7 Mounting Type

A – 4 Bolt Bearingless 158,70 [6.250] Pilot Dia. With 9,07 [.355] Pilot Length and 17,53 [.690] Dia holes on 190,50 [7.500] Dia. B. C. - Max. Torque Allowed 3615 Nm [32000 lb-in] (Displ. Code 32, 35, 39 Only)

C – 8 Bolt Bearingless 158,70 [6.250] Pilot Dia. With 9,07 [.355] Pilot Length and 17,53 [.690] Dia holes on 190,50 [7.500] Dia. Bolt Circle

D – 4 Bolt Wheel Mount 200,0 [7.87] Pilot Dea. 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 30º. Involute Spline with 5/8-18 UNF-2B Thread in End

09 – 60 mm Dia. 10:1 Tapered Shaft Per ISO R775 with M42 x 3 - 6H Threaded Shaft End, 16W x 10H x 32L [.630W x .394H x 1.260L]

10 Ports

A – 1-5/16-12 UN-2B O-ring Port, Accepts Fittings for SAE J1926/1

B – G 1 (BSP) Straight Thread Ports

11 Case Flow Options

D – Shuttle Valve with Side Facing 9/16-18 UNF-2B, O-ring Port Case Drain, Accepts Fittings for SAE J1926/1, Case Drain Required

F – Shuttle Valve with Side Facing G 1/4 (BSP) Port Case Drain, Case Drain Required

12 Back-Pressure Relief

1 – Set at 15,2 bar [220 psi] (for Servo Pumps)

3 – Set at 4,5 bar [65 psi] (for Manual Pumps)

4 – Set at 20,7 bar [300 PSI] (for High Pressure Servo Pumps)

13 Eaton Assigned Code

0 – Assigned Code

14, 15 Special Features

00 – None

16 Paint/ Special Packaging

0 – No Paint, Individual Box

A – Painted Low Gloss Black, Individual Box

B – No Paint, Bulk Box Option

C – Painted Low Gloss Black, Bulk Box Option

17 Eaton Assigned Code when Applicable

0 – Assigned Code

18 Eaton Assigned Design Code

B – Assigned Design Code

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