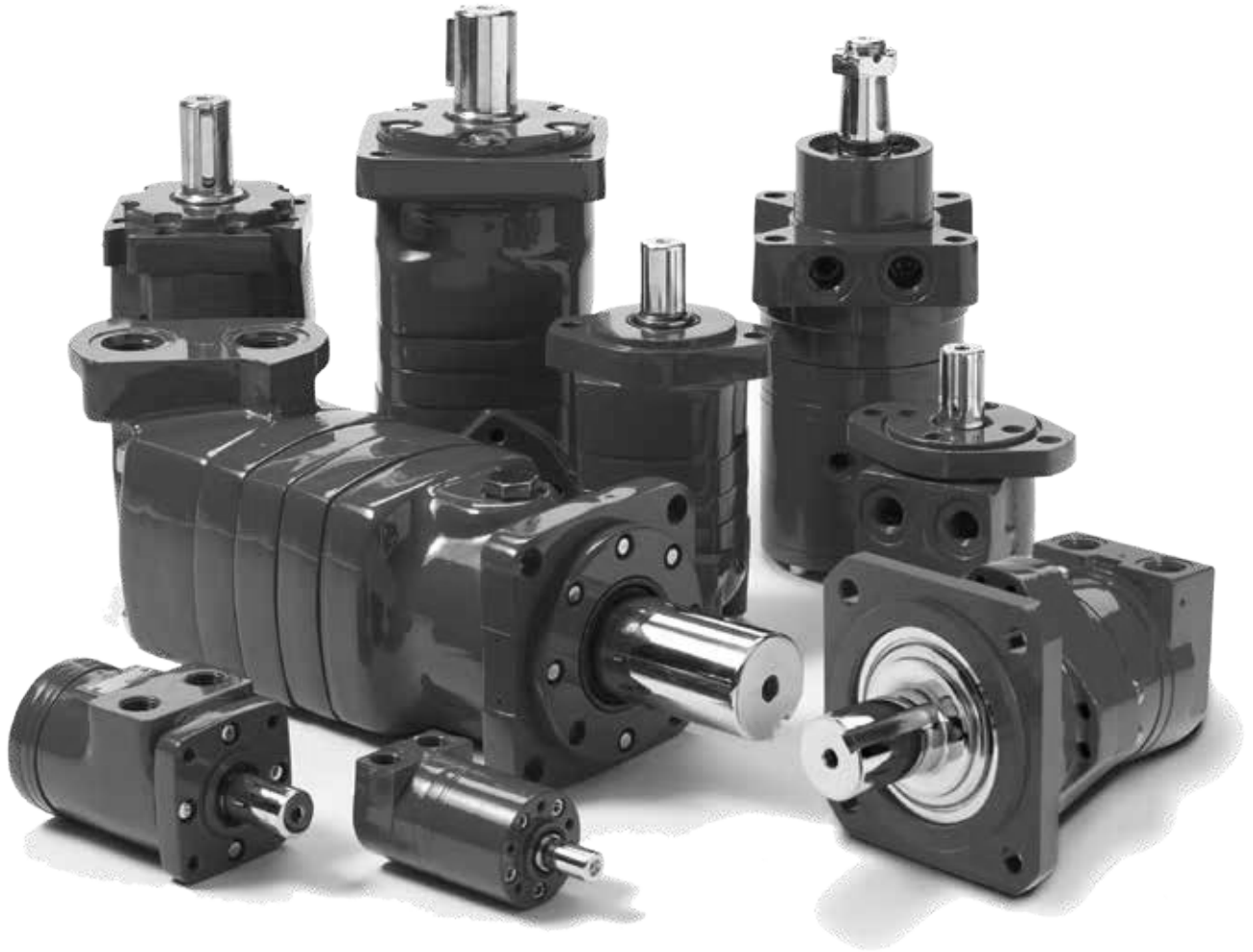



Low Speed, High Torque Motors

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

Danfoss Orbital Motors
BC453983407117en-000104

ENGINEERING
TOMORROW



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

Serving eight key segments - sharing one focus

Alternative Energy

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

Discrete Manufacturing Oil & Gas

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

Processing

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

Agriculture & Forestry

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

Commercial Vehicles

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

Material Handling

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

Construction & Mining

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

Danfoss is a leading diversified power management company

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

Understanding and helping our customers succeed

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

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

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

Our strength is global reach with local responsiveness and support

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

Table of contents

	Section	Product number prefix	Page
	Introduction to Danfoss Motors		1
	J Series	(129-)	25
	H Series	(101-)	39
	S Series	(103-)	55
	T Series & T Series w/Parking Brake	(158-) (185-)	71
	2000 Series & 2000 Series Two-Speed	(104-, 105-, 106-) (193-)	105
	4000 Compact Series	(167-,169-, 170-)	142
	Delta Series & Delta w/ Parking Brake	(184-)	166
	4000 Series	(109-, 110-, 111-)	189
	6000 Series	(112-,113-,114-)	213
	10,000 Series	(119-, 120-, 121-)	236
	S Series with Pin Brake	(SBP-, SBR-)	252
	S Series with Mechanical brake	(SBA-, SBD-, SBE-, SBF-)	255
	2000 Series with Mechanical Brake (Brake Torque 98-196 Nm)	(2-**K,M,L,N-)	258
	2000 Series with Mechanical Brake (Brake Torque 294-392 Nm)	(2BE-, 2BF-)	262
	S Swing Series	(S-)	267
	2K Swing Series	(2P-)	270
	2.5K Swing Series	(25P-)	274
	4K Swing Series	(4P-)	278
	4.5K Swing Series	(45P-)	280
	K-D Series	(K-D-)	284
	TRB Series	(TRB-)	286

A
B-1
B-2
B-3
B-4
B-5
C-1
C-2
C-3
C-4
C-5
C-6
D-1
D-2
D-3
D-4
D-5
D-6
D-7
D-8
D-9
D-10
D-11

Overview

Introduction to Danfoss motors

Char-Lynn, Hydraulic motors	1
Circuits	2
Design flexibility	3
Motor application information	4
Optional features	6
Two speed motors	8
Seal guard/Extreme duty seal guard	9
Viton seals	9
High pressure seals	10
Braking solution	11
Free running and reduced side clearance Gerotor/Geroler sets	12
Speed sensors	13
Shuttle valve	14
Case porting	15
Low speed valving/Low flow housing	16
Nickel and Chrome plating options	17
Integral valves for 2000 series	18
Fluid recommendations	20

Introduction:

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

Motor quick-guide (based on maximum continuous ratings)

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

Motor options include:

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

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

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

These three types are:

- Spool valve
- Disc valve

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

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

Circuits

Circuit design considerations

A

Hydraulic circuit:

Hydraulic drives can be divided into two basic types:

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

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

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

Open loop circuit:

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

Typical applications using open loop circuits include:

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

Closed loop circuit:

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

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

Typical applications using closed loop circuits include:

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

Power density:

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

Durability:

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

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

Controllable speeds:

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

Dependable performance:

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

Reliability:

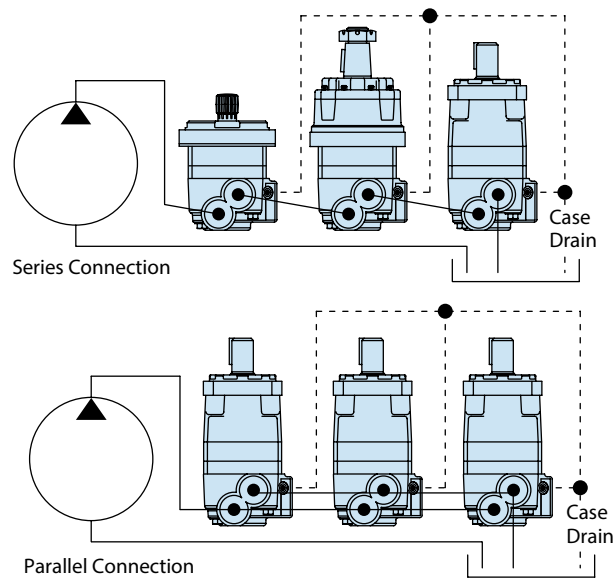
Char-Lynn motors are self contained, with hydraulic fluid providing lubrication. These motors are completely sealed so they can operate safely and reliably in hostile environments such as dust, dirt, steam, water, and heat and provide reliable performance.

High efficiencies:

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

Case drain and shuttle valve options:

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



Motor application information

Vehicle drive calculations

A

Step One – Calculate motor speed (RPM)

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

$$\text{RPM} = \frac{168 \times \text{MPH} \times G}{R_i}$$

Where KPH = vehicle speed (kilometers per hour)

Where MPH = vehicle speed (miles per hour)

R_m = rolling radius of tires (meter)

R_i = rolling radius of tires (inch)

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

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

Step Two – Determine rolling resistance

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

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

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

ρ = value from Table 1

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

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

Step Three – Tractive effort to ascend grade

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

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

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

Step Four – Determine acceleration force (FA)

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

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

FA = Acceleration Force (Newton)

t = Time (Seconds)

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

FA = Acceleration Force (lb)

t = Time (Seconds)

Step Five – Determine drawbar pull

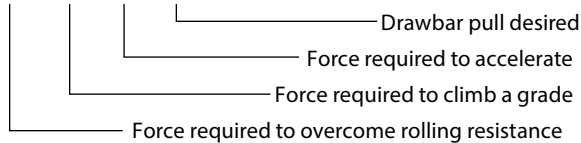
Drawbar Pull (DP) is total force available at the drawbar or “hitch” after the above forces have been subtracted from the total propelling force produced by the hydraulic motors. This value is established as either:

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

Step Six – Total Tractive Effort

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

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



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

Step Seven – Calculate Hydraulic Motor Torque (T)

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

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

Where: N = number of driving motors

E_g = gear box mechanical efficiency

Step Eight – Wheel Slip

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

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

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

Where: f = coefficient of friction

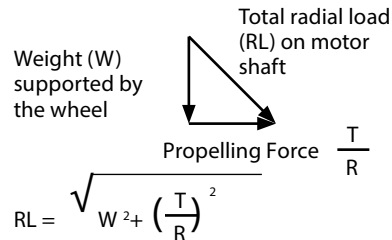
W = loaded vehicle weight over drive wheel

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

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

Step Nine – Motor Radial Load Carrying Capacity

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



Refer to radial load rating of each motor series.

Shaft Torque (T)

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

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

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

Shaft Speed (N)

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

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

Power (into motor)

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

Power (out of motor)

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

where:

Kw = Kilowatt

HP = Horsepower

LPM = Liters per Minute

GPM = Gallons per Minute

Nm = Newton Meters

lb-in = Pound inch

Bar = 10 Newtons per Square Centimeter

PSI = Pounds per Square Inch

q = Displacement

Optional features

A

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

Typical applications*

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

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

Feature description	Spool valve motors				Disc valve motors					
	J Series	H Series	S Series	T Series	2000 Series	4000 Compact Series	Delta	4000 Series	6000 Series	10000 Series
2 Speed motors	—	—	—	—	0	—	—	—	—	0
Seal guard	—	0	0	0	0	0	0	0	0	0
Viton seals	0	0	0	0	0	0	0	0	0	0
High pressure shaft seal	—	0	0	0	0	0	—	0	—	—
Environmental protection	0	0	0	0	0	0	0	0	0	0
Nickel plating options	0	0	0	0	0	0	0	0	0	0
Integrated parking brake	—	—	—	0	—	—	0	—	—	—
Free running / reduced clearance option	0	0	0	0	0	0	—	0	0	0
Speed sensors	0	0	0	0	0	0	0	0	0	0
Shuttle valve					0	0	—	0	0	—
Case port	0	0	0	0	S	S	S	S	S	S
Internal check valves	S	0	S	0	—	—	—	—	—	—
Low speed valving	—	0	0	0	—	—	—	—	—	—
Integral cross over valving	—	—	—	—	0	0	—	—	—	0
Reverse rotation	0	0	0	0	0	0	0	0	0	0

O Optional
 S Standard
 — Not applicable

Two speed motors

This option is available on all 2000 series motors.

A

Features:

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

Benefits:

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

Application:

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



Seal guard / Extreme duty seal guard

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

Seal guard

Features:

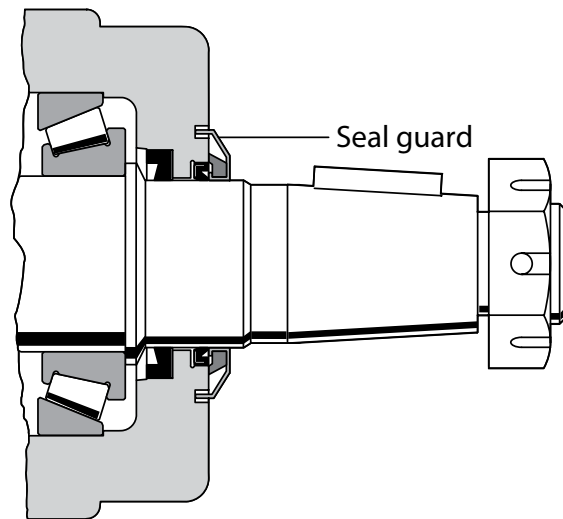
This option consists of a metal shield that protects an internal wiper seal. The shield is interference fit on the output shaft and moves with the output shaft. For added protection, the shield is recessed into a groove in the bearing housing face.

Benefits:

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

Applications:

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

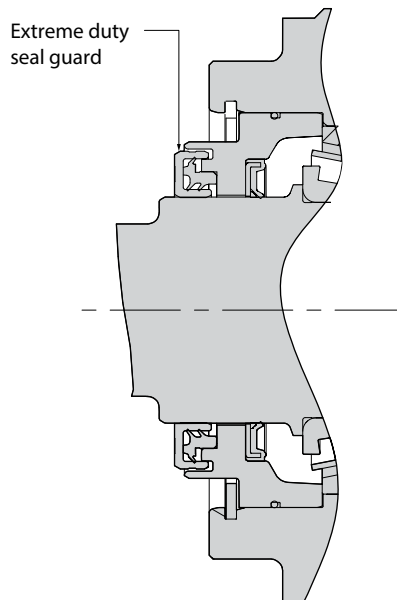


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Extreme duty seal guard

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

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



Viton seals

This option is available on most Char-Lynn motors.

Features:

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

Benefits:

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

Applications:

- Industrial conveyors
- Plastic injection molding

Note: Minimum Viscosity Levels must still be maintained

High pressure seals

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

A

Features:

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

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

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

Benefits:

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

Special notes:

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

Applications:

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

High pressure shaft seal part numbers:

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

Integrated brake options are available for T and Delta series motors

Features:

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

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

Parking brake

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

Benefits:

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

Applications:

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



Free running and reduced side clearance Gerotor/Geroler sets

This feature is available in all Char-Lynn motors.

A

Free running Gerotor/Geroler sets

Features:

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

Benefits:

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

Applications:

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

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

Reduced side clearance Gerotor/Geroler sets

Features:

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

Benefits:

- Increased volumetric efficiency

Applications:

- Conveyors, seeders, low speed industrial applications.

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

Gerotor or Geroler:

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

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

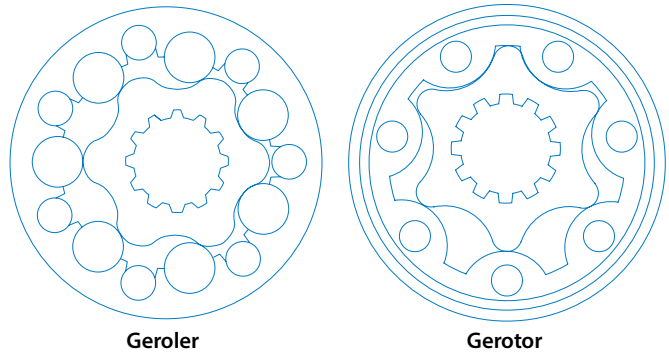
$20 \times \text{psi} / \text{RPM} = \text{SUS}$ (use this formula to determine minimum fluid viscosity)

RPM = speed of output shaft in revolutions per minute

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

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

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

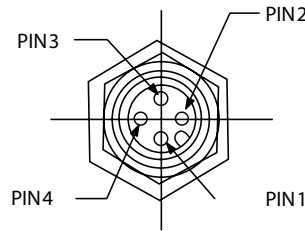


Thermal shock:

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



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



M12 Connector
PIN Detail

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:

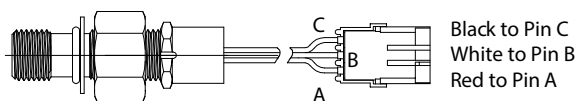
This sensor provides both speed and direction information. Its design is based on the field proven technology of our standard sensor and is designed for off road environments. The new sensor is based on the principle of quadrature.

- 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)

Connector Type

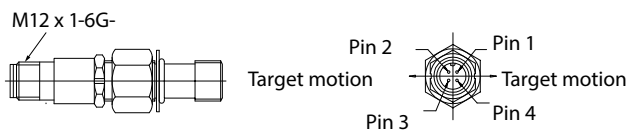
Output	Signal	Weather pack shroud	M12	Deutsch
Single	Digital on/off	6026077-00	6026077-22 (spool & disc) 5989814-001 (HP30)	
Dual	Version 1 2 Signals 90 degree out of phase		113003-001 (disc)	5998790-001
	Version 2 Dual pulse with speed and direction		113003-002 (disc)	
			203266-001 (spool - no direction)	

Weather pac shroud

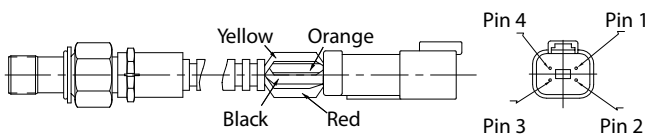


Black to Pin C
White to Pin B
Red to Pin A

M12 Connector

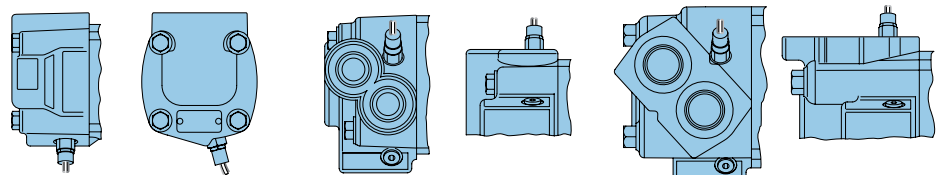


Deutsch Connector



Pin Details

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



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 10kΩ pull-up resistor

M12 Connector (version 1)

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

M12 Connector (version 2)

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

Technical information

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

Shuttle valve

Lubricating shuttle

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

Features:

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

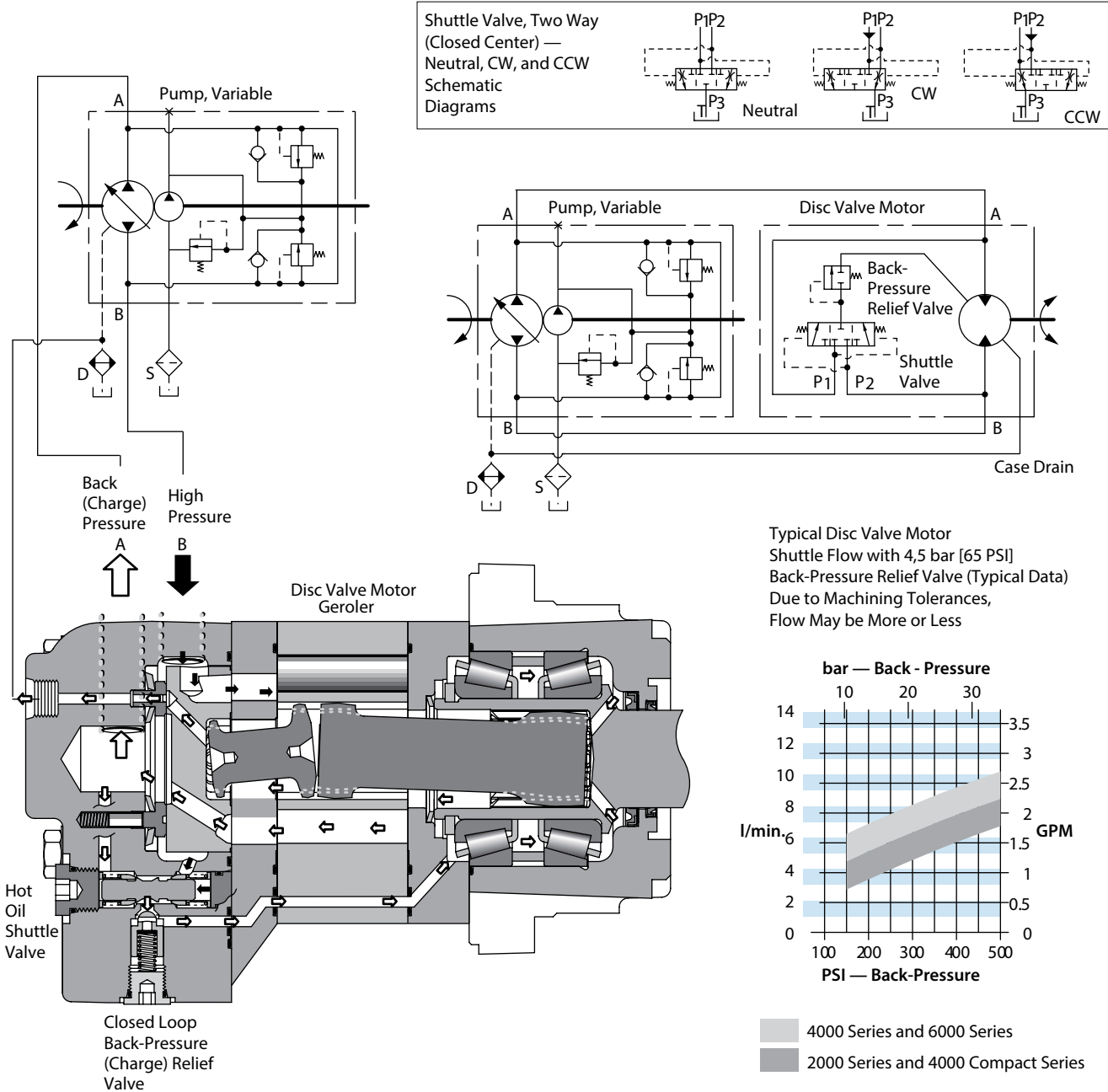
Applications:

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

Benefits:

- Flushing
- Cooling
- Longer system life

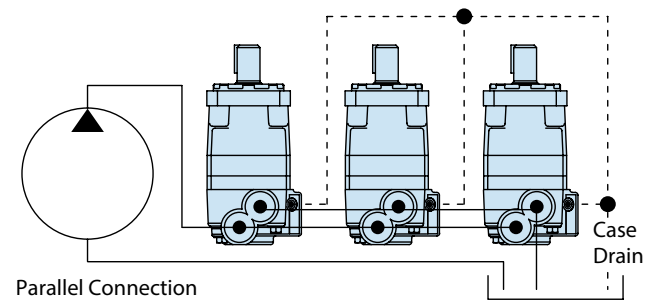
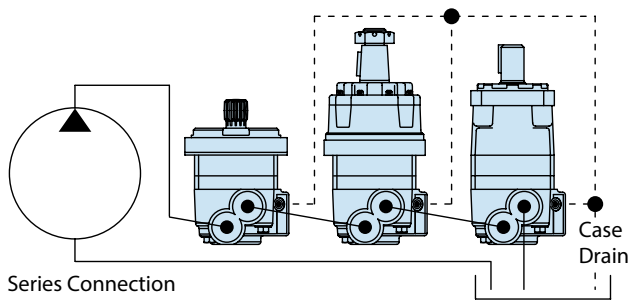
Closed Loop Circuit



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

Case porting

This option is available on all Char-Lynn motors.



Features:

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

Benefits:

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

Applications:

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

Internal check valves:

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

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

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

Low speed valving / Low flow housing

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

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Features:

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

Benefits:

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

Applications:

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

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



Low flow housing:

This feature is available on the H and T Series motor

Features:

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

Benefits:

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

Applications:

- Seed metering
- Steering motors
- Low speed conveyors



Full body Nickel plating:

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

Features:

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

Paint option	Description	Applications
Electroless Nickel Plating (AMS 2404D specification)	Premium process offering extremely high quality corrosion resistance	Where water contact is extremely high+
+ Washdown applications only – does not include salt water applications		

Benefits:

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

Applications:

- Food processing
- Industrial conveyors

Environmental protection (epoxy paint):

This option is available on all Char-Lynn motors.

Features:

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

Benefits:

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

Applications:

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

Nickel plated shafts:

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

Features:

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

Benefits:

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

Applications:

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

Chrome plated shafts:

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

Benefits:

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

Applications:

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

Integral valves for 2000 series

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

Replacement cartridges

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

Special housings bolt on solutions

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

Features:

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

Benefits:

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

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

Features:

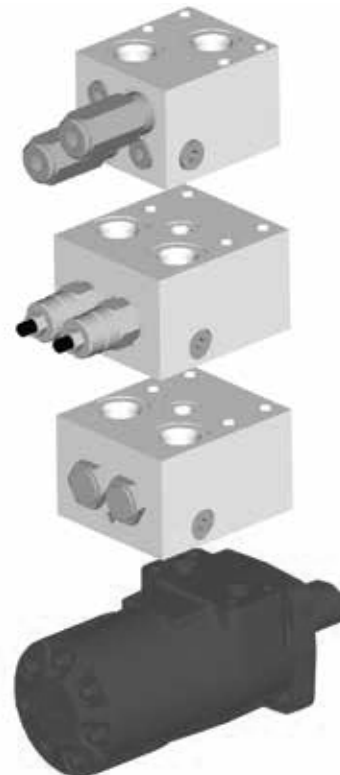
- Complete packaged system solution, single source for motors with relief valve capability
- Relief valves as close to Geroler as possible, providing added protection
- Eliminate leak points from in-line or bolt-on reliefs
- Valves capable of full motor pressure
- Provides added flexibility to system 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 Danfoss into your applications.
- Minimizing the use of hoses, tubing and fittings reduces production and assembly.

Applications:

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



Fluids recommendations

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Performance data

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

Introduction:

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

Viscosity and temperature:

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

Cleanliness:

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

Fluid maintenance:

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

Fluid selection:

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

Additional notes:

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

Spool Valve Hydraulic Motors

Spool Valve: J, H, S, T Series

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



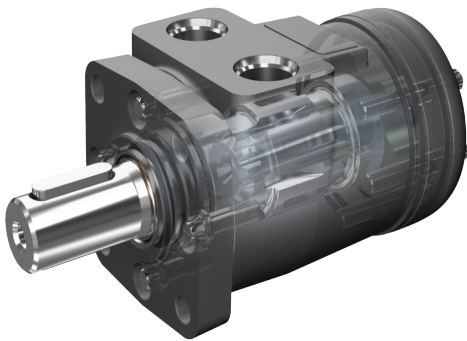
Spool valve motors

Highlights

Product description

B-1

Char-Lynn spool valve motors distribute pressurized fluid into and out of the orbit gear set (Gerotor or Geroler) via valve slots integrated into the output shaft. Spool valve motors incorporate both valving and hydrodynamic journal bearings into a common shaft design. The valve section (spool valve) can be optimized for low flow, low speed needs, using a low speed spool option to enhance smooth running performance. These motors incorporate the proven orbit motor principle to provide high torque at low speeds. Motor shaft rotation can be instantly reversed by changing direction of input/output flow while generating equal torque in either direction. The displacements available provide a wide variety of speeds and torques from any spool valve motor series.



Features:

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

Benefits:

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

Design features

Spool valve technology is typically used where compact, economical solutions are most needed. Spool valve motors use a spool valve to precisely time and control flow through the orbit gear set (Gerotor or Geroler). Inlet flow is directed into and out of the orbit set via slots in the spool and passages through the motor housing. The result is a very cost effective compact package suited to many application requirements. The three primary components in the motor are the orbit star, drive and output shaft. H, S and T Series incorporate the spool valve and hydrodynamic bearings in the motor shaft. Due to its compact size and high speed capability, the J Series is unique and utilizes a separate dedicated spool and spool valve drive. All motors utilize Danfoss' 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.

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

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]	141 [2050]	61 [16]	635 [1400]
S Series	465 [4112]	135 [2000]	55 [15]	635 [1400]
T Series	441 [3905]	177 [2565]	61 [16]	635 [1400]

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

Table of contents

B-1

Highlights	22	T Series (158-)	
Features, benefits, and applications	23	Highlights	71
Table of Contents	24	Specifications	72
J Series (129-)		Performance data	73
Highlights	25	Dimensions	83
Specifications	26	Product numbers	84
Performance data	27	Model code	85
Dimensions	30	T Series with parking brake (185-)	
Product numbers	34	Highlights	87
Shaft side load capacity	35	Application Information	88
Case pressure and case drain	36	Specifications	89
Model code	37	Dimensions	90
H Series (101-)		Brake release and motor case pressure	91
Highlights	38	Product numbers	92
Specifications	39	Model code	93
Performance data	40	H, S and T Series (101-, 103-, 158-, 185-)	
Dimensions	51	Case pressure and case drain	95
Product numbers	52	Side load capacity	96
Model code	53	Dimensions	97
S Series (103-)		Mounting options	99
Highlights	55		
Specifications	56		
Performance data	57		
Dimensions	66		
Product numbers	67		
S Series with low speed valving	68		
Model code	69		

Description:

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



Specifications

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

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

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

Features:

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

Benefits:

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

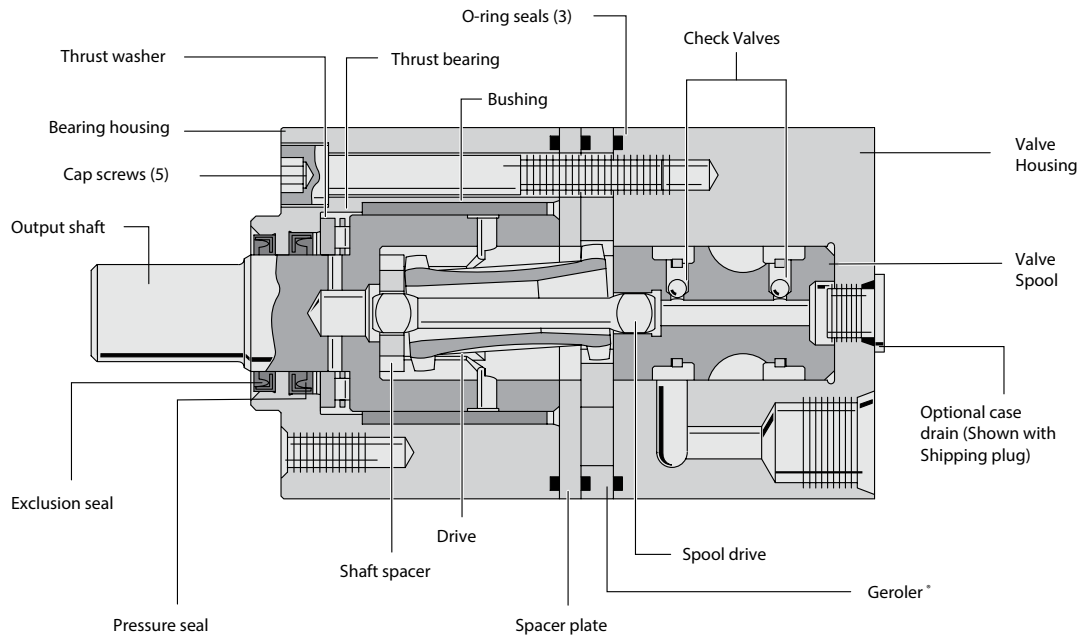
Applications:

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

J Series (129-)

Specifications

B-1



Specification data — J motors

		8.2 [5.0]	12.9 [7.9]	19.8 [1.21]	31.6 [1.93]	50.0 [3.00]
Displ. cm ³ /r [in ³ /r]		8.2 [5.0]	12.9 [7.9]	19.8 [1.21]	31.6 [1.93]	50.0 [3.00]
Max. Speed (RPM) @continuous flow		1992	1575	1043	650	393
Flow l/min [GPM]	Continuous	17 [4.5]	21 [5.5]	21 [5.5]	21 [5.5]	21 [5.5]
	Intermittent	21 [5.5]	25 [6.5]	25 [6.5]	25 [6.5]	25 [6.5]
Torque Nm [lb-in]	Continuous	16 [141]	25 [225]	38 [333]	50 [446]	62 [549]
	Intermittent	19 [164]	30 [263]	46 [405]	62 [546]	84 [743]
	Peak	22 [193]	36 [321]	48 [425]	83 [733]	86 [765]
Pressure Δ bar [Δ PSI]	Continuous	140 [2030]	140 [2030]	140 [2030]	121 [1750]	97 [1400]
	Intermittent	165 [2400]	165 [2400]	165 [2400]	150 [2175]	140 [2030]
	Peak	220 [3190]	220 [3190]	220 [3190]	190 [2756]	150 [2175]
Weight kg [lbs]		2 [4.4]	2.1 [4.6]	2.2 [4.8]	2.3 [5.0]	2.4 [5.4]

Maximum case pressure: See case pressure seal limitation graph.

A simultaneous maximum torque and maximum speed NOT recommended.

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

Maximum Inlet Pressure

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

Δ Pressure:

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

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

Continuous rating:

Motor may be run continuously at these ratings

Intermittent operation:

10% of every minute

*See shaft torque ratings for limitations.

Peak operation:

1% of every minute

Recommended fluids:

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

Recommended system operating temp:

-34°C to 82°C

[-30°F to 180°F]

Recommended filtration:

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

Thermal shock warning:

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

Minimum delta pressure warning:

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

J Series (129-)

Performance data

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



B-1

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

8.2 cm³/r [0.50 in³/r]
Δ Pressure bar [PSI]

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

12.9 cm³/r [0.79 in³/r]
Δ Pressure bar [PSI]

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

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

J Series (129-)

Performance data

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

 Continuous  Intermittent

B-1

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

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

		[200]	[400]	[500]	[600]	[700]	[800]	[1000]	[1400]	[1450]	[1500]	[2000]	[2030]	[2400]
		14	28	34	41	48	55	69	97	100	103	138	140	166
Flow LPM [GPM]	[1]	[32]	[67]	[85]	[102]	[119]	[136]	[170]	[236]	[244]	[253]	[321]	[325]	[374]
	4	4	8	10	12	13	15	19	27	28	29	36	37	42
	[2]	[30]	[65]	[83]	[101]	[119]	[136]	[172]	[223]	[248]	[257]	[328]	[333]	[388]
	8	3	7	9	11	13	15	19	25	28	29	37	38	44
Max. Continuous	[3]	[21]	[57]	[75]	[93]	[111]	[128]	[163]	[231]	[240]	[248]	[325]	[330]	[405]
	11	2	6	8	11	13	14	18	26	27	28	37	37	46
	[4]	[12]	[47]	[65]	[83]	[101]	[119]	[154]	[221]	[230]	[239]	[316]	[320]	[382]
	15	1	5	7	9	11	13	17	25	26	27	36	36	43
Max. Intermittent	[5.5]		[31]	[49]	[67]	[84]	[101]	[137]	[202]	[211]	[218]	[295]	[299]	[365]
	21		4	6	8	9	11	15	23	24	25	33	34	41
	[6.5]		[21]	[38]	[56]	[74]	[91]	[126]	[189]	[196]	[206]	[278]	[283]	[347]
	25		2	4	6	8	10	14	21	22	23	31	32	39
			1226	1222	1219	1215	1211	1204	1179	1174	1169	1121	1117	1079

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

		[200]	[400]	[500]	[600]	[700]	[800]	[1000]	[1450]	[1450]	[1500]	[1750]	[2175]
		14	28	34	41	48	55	69	97	100	103	121	150
Flow LPM [GPM]	[1]	[51]	[106]	[133]	[160]	[187]	[213]	[265]	[362]	[372]	[383]	[439]	
	4	6	12	15	18	21	24	30	41	42	43	50	
	[2]	[46]	[103]	[132]	[159]	[187]	[214]	[269]	[362]	[374]	[387]	[446]	[546]
	8	5	12	15	18	21	24	30	41	42	44	50	62
Max. Continuous	[3]	[36]	[94]	[122]	[149]	[177]	[205]	[259]	[351]	[364]	[377]	[440]	[542]
	11	4	11	14	17	20	23	29	40	41	43	50	61
	[4]	[24]	[79]	[107]	[135]	[162]	[190]	[246]	[337]	[349]	[362]	[425]	[528]
	15	3	9	12	15	18	21	28	38	39	41	48	60
Max. Intermittent	[5.5]		[55]	[83]	[111]	[139]	[167]	[221]	[307]	[320]	[334]	[400]	[505]
	21		6	9	13	16	19	25	35	36	38	45	57
	[6.5]		[35]	[64]	[93]	[121]	[150]	[204]	[279]	[294]	[308]	[378]	[485]
	25		4	7	11	14	17	23	32	33	35	43	55
			767	764	760	755	751	742	712	707	701	675	637

J Series (129-)

Performance data

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



B-1

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

		50.0 cm ³ /r [3.00 in ³ /r]											Max. Continuous	Max. Intermittent		
		Δ Pressure bar [PSI]														
		[200]	[400]	[500]	[600]	[700]	[800]	[1000]	[1100]	[1200]	[1300]	[1400]	[2030]			
		14	28	34	41	48	55	69	76	83	90	97	140			
Flow LPM [GPM]	[1]	[82]	[167]	[211]												
	4	9	19	24												
		75	72	72												
	[2]	[70]	[156]	[201]	[243]	[286]	[327]									
	8	18	23	28	32	37										
	149	147	145	144	143	142										
	[3]	[53]	[140]	[184]	[227]	[271]	[311]	[396]	[441]	[484]	[521]	[549]				
	11	6	16	21	26	31	35	45	50	55	59	62				
		221	220	218	217	215	213	209	205	201	200	191				
	[4]	[30]	[120]	[162]	[204]	[250]	[292]	[374]	[419]	[460]	[501]	[541]	[743]			
	15	3	14	18	23	28	33	42	47	52	57	61	84			
		296	292	289	286	284	282	273	270	265	263	259	213			
Max. Continuous	[5.5]		[81]	[127]	[170]	[214]	[254]	[339]	[379]	[422]	[463]	[506]	[702]			
	21		9	14	19	24	29	38	43	48	52	57	79			
			393	392	389	387	383	377	372	369	364	358	302			
Max. Intermittent	[6.5]		[47]	[90]	[133]	[176]	[219]	[307]	[345]	[385]	[429]	[467]	[685]			
	25		5	10	15	20	25	35	39	43	48	53	77			
			465	462	460	458	455	448	445	440	435	430	364			

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

J Series (129-)

Dimensions

Ports

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

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

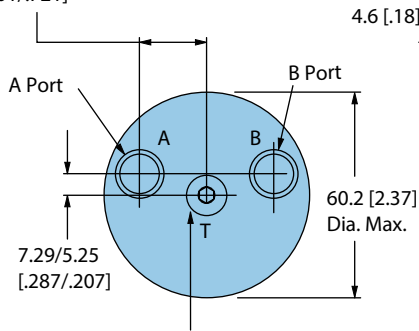
Standard rotation viewed from shaft end

Port A Pressurized — CW

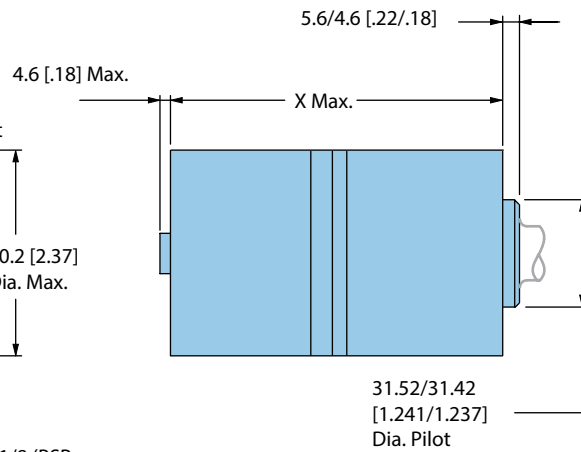
Port B Pressurized — CCW

End Port

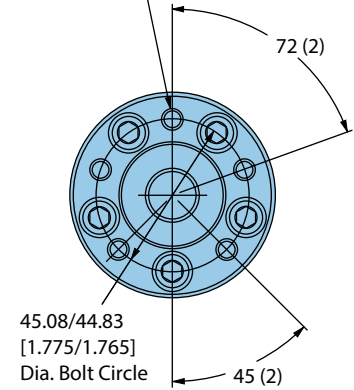
20.35/18.31
[.801/.721]



Optional External Case Drain Port
(to Tank) 3/8-24 UNF - 2B O-ring.
M10 x 1 - 6H O-ring — Metric Motor or G 1/8 (BSP)



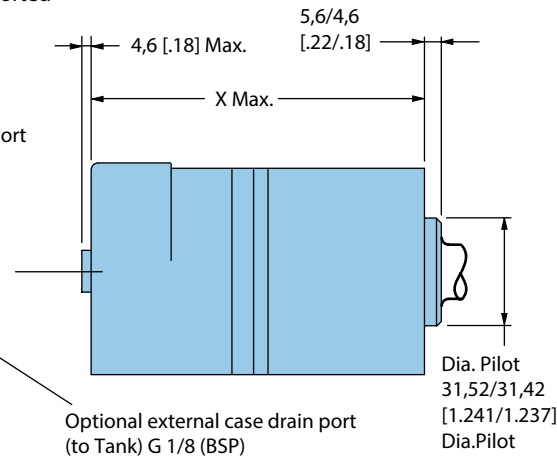
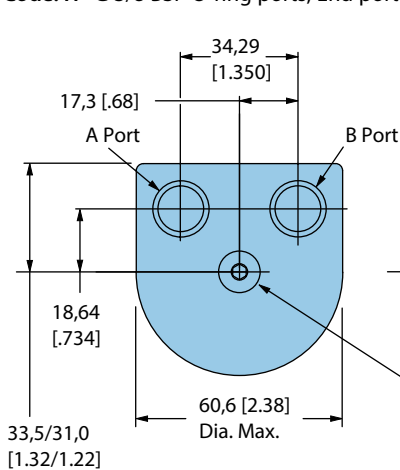
1/4-28 UNF - 2B or M6 x 1 - 6H
12.7 [.50] Min. Deep (5)



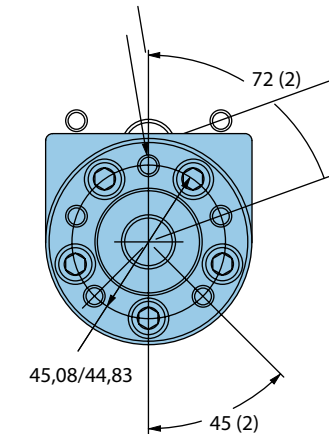
End port dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]
8.2 [.50]	103.9 [4.09]
12.9 [.79]	106.9 [4.21]
19.8 [1.21]	112.5 [4.38]
31.6 [1.93]	118.9 [4.68]
50.0 [3.00]	130.3 [5.13]

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



1/4-28 UNF - 2B or M6 x 1 - 6H



End port dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]
8.2 [.50]	103.9 [4.09]
12.9 [.79]	106.9 [4.21]
19.8 [1.21]	112.5 [4.38]
31.6 [1.93]	118.9 [4.68]
50.0 [3.00]	130.0 [5.12]
160.5 [6.32]	132.3 [5.21]

Ports

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

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

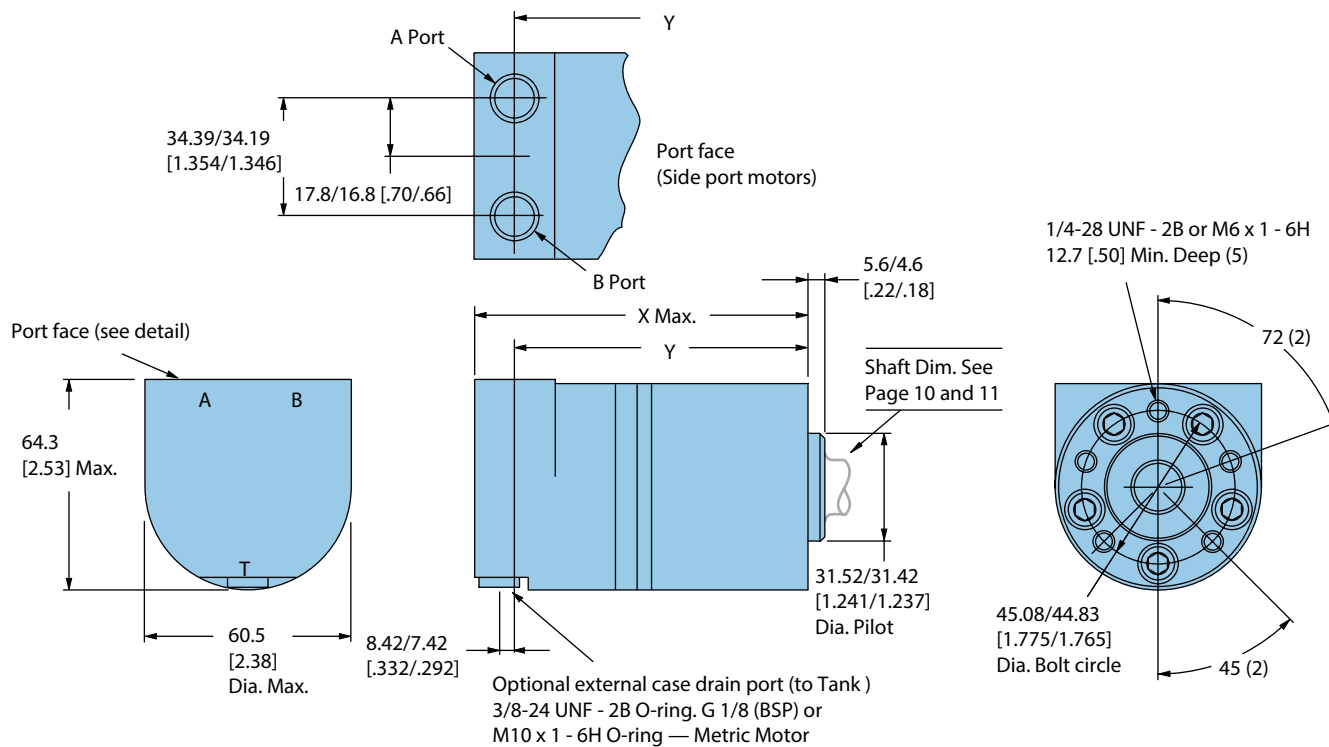
Standard rotation viewed from shaftend

Port A Pressurized — CW

Port B Pressurized — CCW

B-1

Side port



Side port motors

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
8.2 [.50]	103.9 [4.09]	89.4/ 87.4 [3.52/3.44]
12.9 [.79]	106.9 [4.21]	92.5/ 90.4 [3.64/3.56]
19.8 [1.21]	112.5 [4.38]	96.8/ 94.7 [3.81/3.73]
31.6 [1.93]	118.9 [4.68]	104.4/102.4 [4.11/4.03]
50.0 [3.00]	130.0 [5.12]	115.7/113.9 [4.56/4.48]

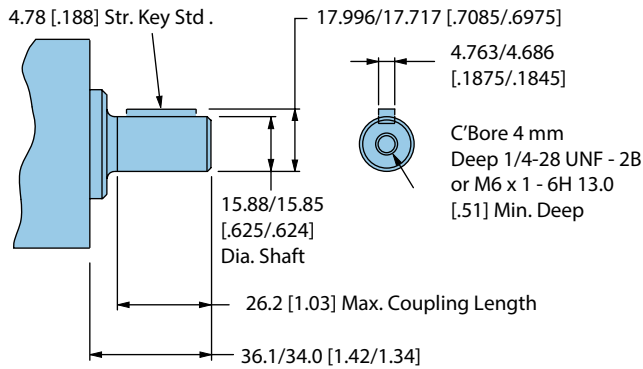
J Series (129-)

Dimensions

Shafts

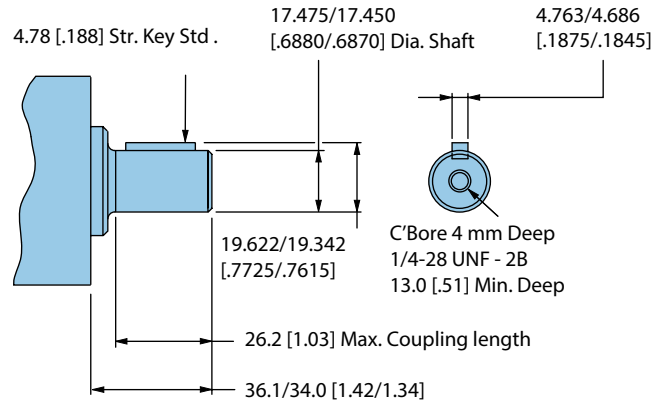
B-1

5/8 inch straight keyed



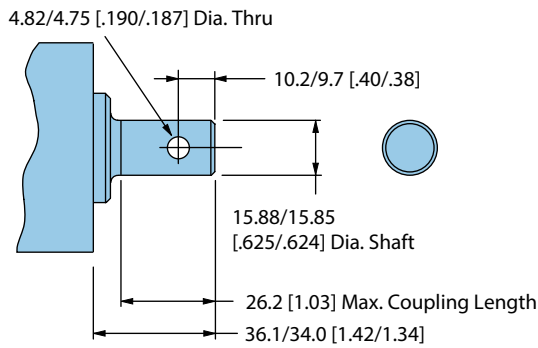
Max. Torque continuous Duty 39 Nm [350 lb-in]

11/16 inch straight keyed



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

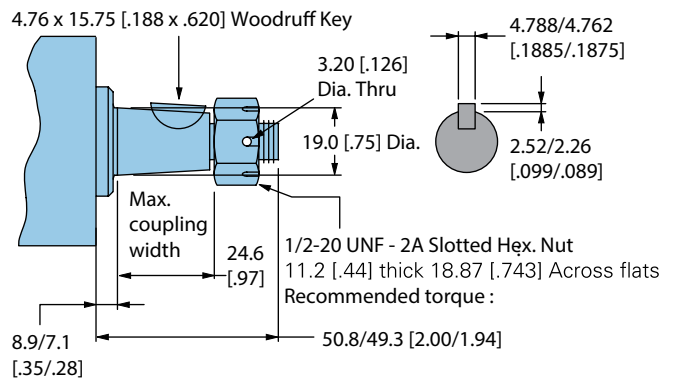
5/8 Inch straight keyed w/crosshole



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

3/4 inch tapered

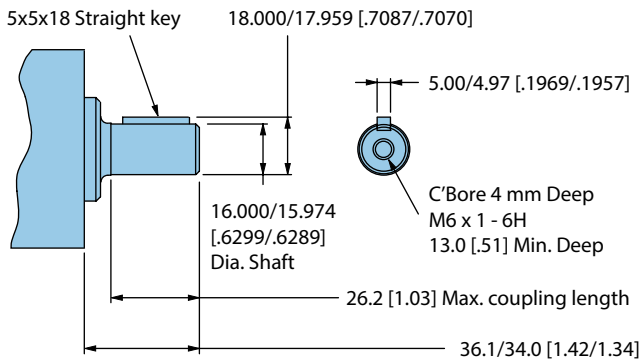
(Tapered shaft end per SAE J744 except as specified - 1.5 : 12 Ratio)



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

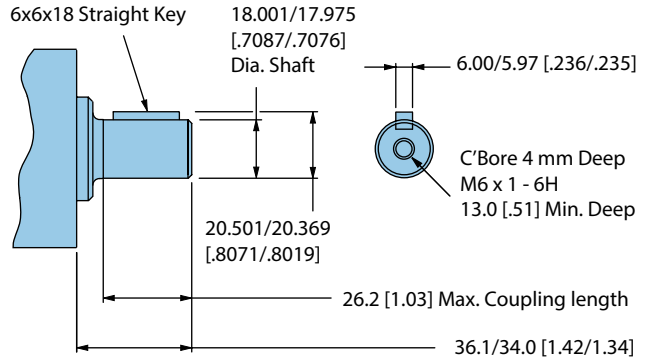
Shafts and flange kit

16 mm Straight keyed



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

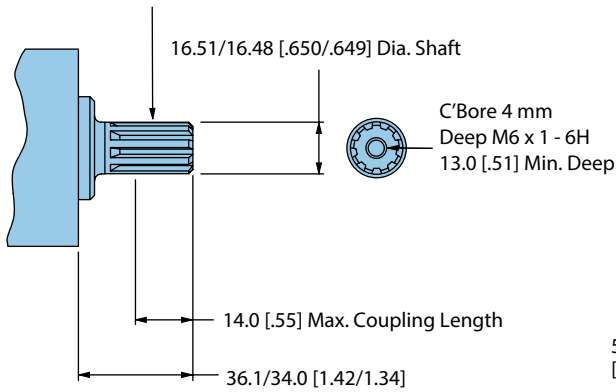
18 mm Straight keyed



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

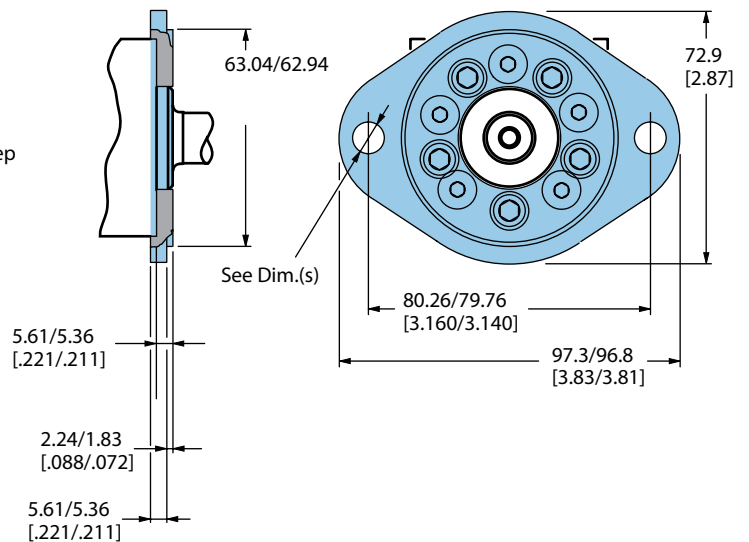
Involute 9T splined — metric

Involute splined shaft external B17x14 DIN 5482



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

2 Bolt flange kits (2)



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

J Series (129-)

Product numbers

Use digit prefix —

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

Orders will not be accepted without three digit prefix.

B-1

End port

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

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

129-0336

Side port

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

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

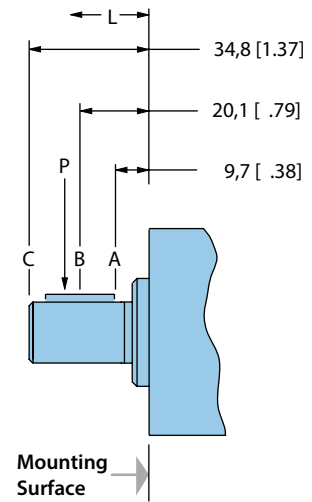
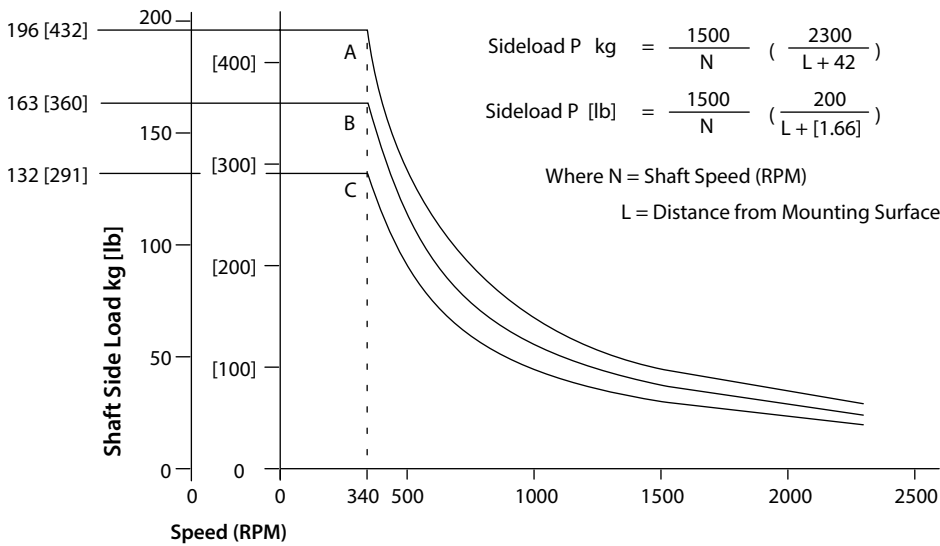
Two bolt mounting flange kit (for M8 mounting bolts) — kit number 60553 (includes 5 screws — M6 x 1-6H)

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

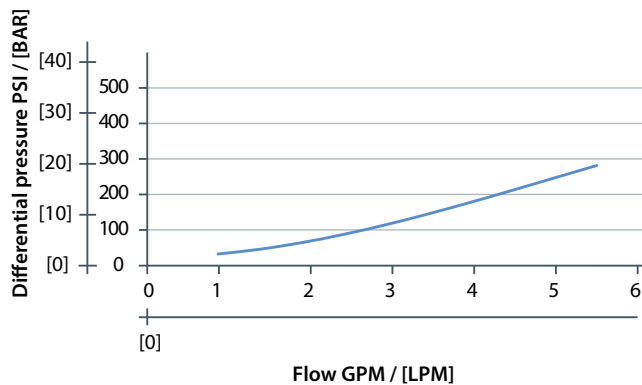
Allowable side load chart, shaft load location drawing (right) and load curves (below) are based on the side or radial loads being applied to shaft at locations A, B, and C, to determine the shaft side load capacity at locations other than those shown use the formula (shown below). For more information about shaft side loads on Char-Lynn motors contact your Danfoss 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 NLPD - no load pressure drop



J Series (129-)

Case pressure and case drain

B-1

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

Case drain advantage

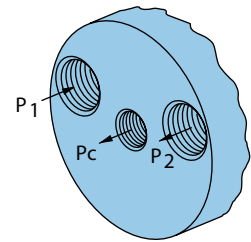
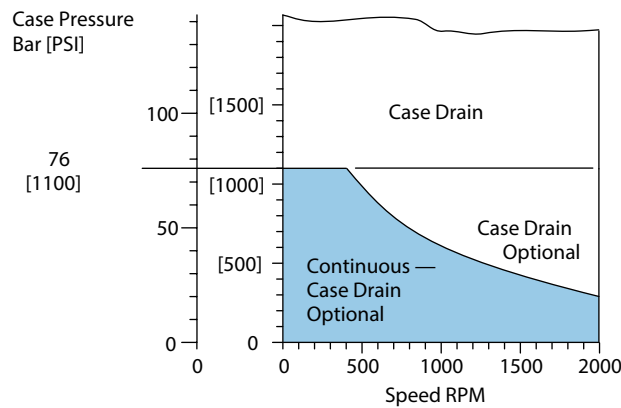
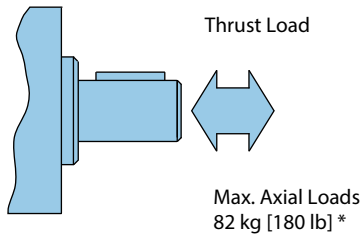
In addition to providing lower case pressures for motors connected in series, there are advantages for adding an external case drain line to motors with normal case pressures as well. These advantages are:

- Contamination Control** — flushing the motor case.
- Motor Cooler** — exiting oil draws motor heat away.
- Extend Motor Seal Life** — maintain low case pressure with a preset restriction installed in the case drain line

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

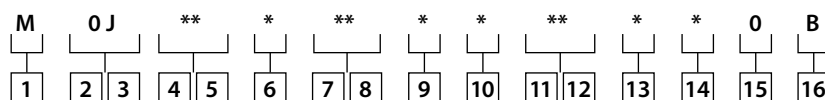
Example: A 200 PSI case pressure will cause a load of 88 lbs, so the allowable thrust load will be 180 lbs plus 88 = 268 lbs pushing inward on shaft. Tension load is 180 lb under all case pressure conditions

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

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.



1		Product	M Motor
2	3	Series	0J J Series
4	5	Displacement cm³/r [in³/r]	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> A 5 Bolt: Dia. 31,47 [1.239] x 5,1 [.20] Pilot 1/4-28 UNF 2B Mounting Holes on 45 [1.77] Dia. Bolt Circle B 5 Bolt: Dia. 31,47 [1.239] x 5,1 [.20] Pilot M6 x 1- 6H Mounting Holes on 45 [1.77] Dia. Bolt Circle C 2 Bolt: Dia. 62,99 [2.480] x 2,0 [.08] Pilot 10,36[.408] Mounting Holes on 80,0 [3.150] Dia. Bolt Circle
7	8	Output shaft	<ul style="list-style-type: none"> 01 5/8 inch Dia. straight with 4,72 [.186] square key and 1/4-28 UNF - 2B threaded hole 02 16 mm Dia. Straight with 5,00 [.197] square key with M6 x 1 - 6H threaded hole 04 11/16 inch Dia. straight with 4,72 [.186] square key and 1/4-28 UNF - 2B threaded hole 05 18 mm Dia. straight with 5,92 [.233] square key with M6 x 1 - 6H threaded hole 06 Involute splined 9T— metric 16,50 [.650] Dia. (B17 x 14 DIN 5482) M6 x 1 - 6H threaded hole 07 5/8 inch straight key w/ crosshole

9		Ports	<ul style="list-style-type: none"> A 9/16 -18 UNF - 2B O-Ring end ported C M14 x 1,5 - 6H O-Ring port, end ported D 9/16 -18 UNF - 2B O-Ring side ported E G 3/8 (BSP) side ported H G 3/8 (BSP) end ported
10		Case flow options	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 00 None 08 Digital speed pickup (15 pulse), M12 connector (A=Power, B=Common, C=Signal)
13		Special features (assembly)	<ul style="list-style-type: none"> 0 None 1 Reverse rotation
14		Paint/special packaging	<ul style="list-style-type: none"> 0 No paint, individual box A Low gloss black primer, individual box B Environmental coated black E Nickel plated motor (excluding shaft)
15		Danfoss assigned code when applicable	<ul style="list-style-type: none"> 0 None
16		Danfoss assigned design code	<ul style="list-style-type: none"> B Two

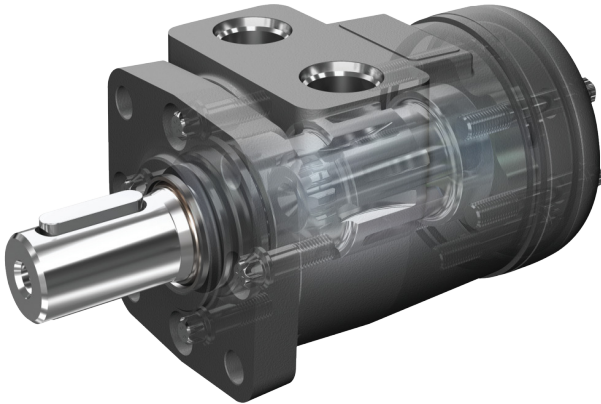
H Series (101-)

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.

B-2



Specifications

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

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

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

Features:

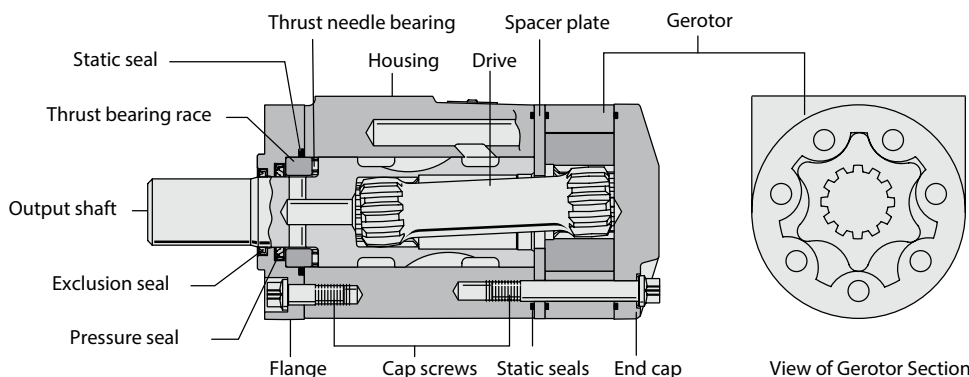
- Time-tested Char-Lynn drive set
- Three moving components (gerotor-star, drive, and shaft)
- Optimized drive running angle
- Three-zone pressure design (inlet, return and case)
- Variety of displacements, shafts and mounts
- Special options to meet customer needs

Benefits:

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

Applications:

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



Specification data — H motors

Displ. cm ³ /r [in ³ /r]		36	46	59	74	97	120	146	159	185	231	293	370	739	
		[2.2]	[2.8]	[3.6]	[4.5]	[5.9]	[7.3]	[8.9]	[9.7]	[11.3]	[14.1]	[17.9]	[22.6]	[45.1]	
Max. Speed (RPM) @ continuous flow		1021	969	993	796	620	501	411	377	324	259	205	162	79	
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	
	Intermittent	38 [10]	53 [14]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	
Torque Nm [lb-in]	Continuous	64	84	103	134	176	219	268	275	339	319	351	407	389	
		[566]	[745]	[913]	[1189]	[1559]	[1936]	[2370]	[2434]	[3004]	[2821]	[3110]	[3604]	[3440]	
	Intermittent	81	106	130	170	222	276	353	336	426	427	466	484	520	
		[715]	[937]	[1153]	[1507]	[1962]	[2442]	[3126]	[2974]	[3773]	[3780]	[4121]	[4283]	[4600]	
Min. Starting torque Nm [lb-in]	@ Cont. Pressure	53	67	86	108	142	175	213	232	271	252	282	330	316	
		[467]	[592]	[763]	[957]	[1253]	[1549]	[1881]	[2050]	[2396]	[2234]	[2500]	[2920]	[2800]	
	@ Int. Pressure	68	87	111	139	182	225	275	299	349	347	388	408	434	
		[599]	[770]	[983]	[1229]	[1614]	[1988]	[2431]	[2645]	[3090]	[3075]	[3430]	[3610]	[3840]	
Pressure Δ bar [Δ PSI]	Continuous	141	141	141	141	141	141	141	141	141	106	93	86	41	
		[2050]	[2050]	[2050]	[2050]	[2050]	[2050]	[2050]	[2050]	[2050]	[1535]	[1350]	[1250]	[600]	
	Intermittent	177	177	177	177	177	177	177	177	177	141	124	103	55	
		[2565]	[2565]	[2565]	[2565]	[2565]	[2565]	[2565]	[2565]	[2565]	[2050]	[1800]	[1500]	[800]	
End ported units only															
Δ Bar [Δ PSI]	Cont. Pressure	83	83	76	76	76	69	69	69	62	55	48	57	27	
		[1200]	[1200]	[1100]	[1100]	[1100]	[1000]	[1000]	[1000]	[900]	[800]	[700]	[825]	[396]	
	Intermittent	117	117	110	110	110	103	103	103	91	90	83	68	36	
		[1700]	[1700]	[1600]	[1600]	[1600]	[1500]	[1500]	[1500]	[1400]	[1300]	[1200]	[990]	[528]	
Weight kg [lb]		5.1	5.1	5.2	5.2	5.4	5.5	5.6	5.7	5.8	6.0	6.3	6.7	8.4	
		[11.2]	[11.2]	[11.5]	[11.5]	[11.8]	[12.1]	[12.4]	[12.5]	[12.8]	[13.3]	[14.0]	[14.7]	[18.6]	

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

A simultaneous maximum torque and maximum speed NOT recommended.

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

Maximum inlet pressure:

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

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

Continuous rating: Motor may be run continuously at these ratings

Intermittent operation: 10% of every minute

Recommended fluids

Premium quality, anti-wear type hydraulic oil. Minimum oil viscosity (at operating temperature) should be the highest of the following: 20 cSt [100 SUS] or

$$\left[\begin{array}{l} 300 \times \text{Bar} = \text{SUS} \\ \text{RPM} \\ 20 \times \text{PSI} = \text{SUS} \\ \text{RPM} \end{array} \right]$$

Recommended system

Operating temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended filtration:

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

Note: Δ pressure is derated for end ported units.

Thermal shock warning:

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

Minimum delta pressure warning:

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

H Series (101-)

Performance data

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

 Continuous

 Intermittent

B-2

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

		Δ Pressure bar [PSI] 36 cm ³ /r [2.2 in ³ /r]											Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2400]	[2565]		
		14	28	41	55	69	83	97	110	124	141	166	177		
Flow LPM [GPM]	[2]	[49]	[103]	[162]	[216]	[270]	[325]	[379]	[432]	[489]	[556]	[650]	[694]		
	8	6	12	18	24	31	37	43	49	55	63	73	78		
		204	201	198	194	189	184	177	170	162	146	122	112		
	[4]	[47]	[106]	[160]	[217]	[274]	[327]	[384]	[439]	[495]	[561]	[654]	[698]		
	15	5	12	18	25	31	37	43	50	56	63	74	79		
		408	407	402	399	394	387	381	373	365	348	323	312		
[6]	[44]	[102]	[158]	[215]	[272]	[328]	[383]	[440]	[496]	[565]	[661]	[706]			
23	5	12	18	24	31	37	43	50	56	64	75	80			
	613	612	609	604	599	591	586	576	565	549	523	510			
[8]	[40]	[97]	[153]	[212]	[270]	[326]	[383]	[440]	[497]	[566]	[668]	[715]			
30	5	11	17	24	31	37	43	50	56	64	75	81			
	817	817	814	807	799	793	785	776	762	747	721	707			
Max. Continuous	[10]	[36]	[90]	[148]	[207]	[265]	[322]	[380]	[438]	[495]	[565]	[664]	[713]		
	4	10	17	23	30	36	43	49	56	64	75	81			
	38	1021	1021	1015	1008	1001	991	981	969	959	944	920	906		

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

		Δ Pressure bar [PSI] 46 cm ³ /r [2.8 in ³ /r]											Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2400]	[2565]		
		14	28	41	55	69	83	97	110	124	141	166	177		
Flow LPM [GPM]	[2]	[64]	[136]	[212]	[284]	[355]	[426]	[497]	[567]	[641]	[728]	[852]	[909]		
	8	7	15	24	32	40	48	56	64	72	82	96	103		
		161	158	156	153	148	145	139	133	127	114	95	87		
	[4]	[61]	[139]	[209]	[286]	[359]	[429]	[503]	[576]	[649]	[735]	[857]	[915]		
	15	7	16	24	32	41	48	57	65	73	83	97	103		
		323	320	316	314	310	304	300	293	287	273	253	245		
[6]	[58]	[134]	[207]	[282]	[356]	[430]	[502]	[577]	[650]	[740]	[867]	[927]			
23	7	15	23	32	40	49	57	65	73	84	98	105			
	486	481	479	475	471	464	461	453	444	431	410	401			
[8]	[52]	[128]	[200]	[276]	[354]	[428]	[502]	[577]	[651]	[745]	[876]	[937]			
30	6	14	23	31	40	48	57	65	74	84	99	106			
	648	643	640	635	628	623	617	610	599	586	566	556			
[10]	[47]	[118]	[194]	[269]	[347]	[423]	[498]	[575]	[649]	[742]	[871]	[934]			
38	5	13	22	30	39	48	56	65	73	84	98	106			
	808	803	798	793	787	779	771	761	753	741	722	712			
Max. Continuous	[12]	[36]	[109]	[188]	[260]	[340]	[417]	[492]	[567]	[643]	[735]	[864]	[926]		
	4	12	21	29	38	47	56	64	73	83	98	105			
	45	969	964	960	952	946	938	931	922	914	899	877	867		
Max. Intermittent	[14]	[25]	[98]	[175]	[249]	[327]	[404]	[484]	[559]	[634]	[733]				
	3	11	20	28	37	46	55	63	72	83					
	53	1127	1123	1115	1108	1100	1093	1086	1079	1068	1058				

H Series (101-)

Performance data

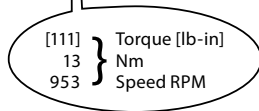
Motors run with high efficiency in all areas designated with a number for torque and speed, however for best motor life select a motor to run with a torque and speed range printed in the light shaded area.



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

B-2

		Δ Pressure bar [PSI] 59 cm ³ /r [3.6 in ³ /r]											Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2400]			[2565]
		14	28	41	55	69	83	97	110	124	141	166	177		
Flow LPM [GPM]	[2]	[79]	[169]	[260]	[349]	[437]	[526]	[616]	[704]	[796]	[903]	[1055]	[1128]		
	8	9	19	29	39	49	59	70	80	90	102	119	127		
		127	125	123	121	117	114	109	103	96	84	65	56		
	[4]	[76]	[168]	[257]	[349]	[441]	[529]	[620]	[710]	[800]	[910]	[1065]	[1138]		
	15	9	19	29	39	50	60	70	80	90	103	120	129		
		254	254	251	249	246	241	236	230	224	211	193	184		
	[6]	[73]	[161]	[252]	[346]	[439]	[529]	[618]	[709]	[802]	[913]	[1069]	[1143]		
	23	8	18	28	39	50	60	70	80	91	103	121	129		
		381	381	380	377	373	368	364	358	349	338	319	309		
	[8]	[64]	[151]	[243]	[336]	[428]	[519]	[609]	[701]	[794]	[911]	[1076]	[1153]		
30	7	17	27	38	48	59	69	79	90	103	122	130			
	508	508	508	504	500	496	491	484	476	465	446	436			
[10]	[57]	[141]	[234]	[327]	[419]	[512]	[602]	[693]	[786]	[905]	[1071]	[1149]			
38	6	16	26	37	47	58	68	78	89	102	121	130			
	635	635	634	630	626	621	614	608	601	589	571	561			
[12]	[45]	[131]	[227]	[318]	[409]	[505]	[593]	[684]	[778]	[895]	[1058]	[1138]			
45	5	15	26	36	46	57	67	77	88	101	120	129			
	762	762	762	757	753	747	741	734	728	714	694	684			
[14]	[33]	[118]	[213]	[305]	[396]	[492]	[583]	[676]	[770]	[889]	[1055]	[1135]			
53	4	13	24	34	45	56	66	76	87	100	119	128			
	889	889	887	882	877	872	866	860	851	836	813	803			
[15]	[29]	[111]	[205]	[297]	[389]	[486]	[576]	[670]	[765]	[885]	[1055]	[1132]			
57	3	13	23	34	44	55	65	76	86	100	119	128			
	953	953	951	945	940	935	929	921	913	896	872	861			
[16]	[25]	[108]	[201]	[293]	[384]	[482]	[573]	[666]	[762]	[881]	[1050]	[1129]			
61	3	12	23	33	43	54	65	75	86	100	119	128			
	993	992	991	991	984	978	972	965	957	944	918	905			
[20]	[17]	[98]	[192]	[285]	[377]	[475]	[567]	[660]	[757]	[877]					
Max. Intermittent	76	2	11	22	32	43	54	64	75	86	99				
	1080	1080	1077	1071	1067	1062	1055	1049	1040	1029					



H Series (101-)

Performance data

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

 Continuous

 Intermittent

B-2

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

		Δ Pressure bar [PSI]											Max. Continuous	Max. Intermittent	
		74 cm ³ /r [4.5 in ³ /r]													
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2400]	[2565]		
		14	28	41	55	69	83	97	110	124	141	166	177		
Flow LPM [GPM]	[2]	[103]	[220]	[339]	[454]	[569]	[685]	[801]	[916]	[1036]	[1175]	[1373]	[1468]		
	8	12	25	38	51	64	77	91	103	117	133	155	166		
		101	99	98	96	93	90	86	81	76	66	51	44		
	[4]	[99]	[219]	[335]	[457]	[574]	[689]	[808]	[925]	[1042]	[1185]	[1386]	[1481]		
	15	11	25	38	52	65	78	91	105	118	134	157	167		
		203	201	199	197	194	191	187	182	177	167	153	147		
	[6]	[94]	[210]	[328]	[451]	[571]	[689]	[805]	[924]	[1044]	[1189]	[1392]	[1489]		
	23	11	24	37	51	65	78	91	104	118	134	157	168		
		305	303	301	298	296	292	288	283	276	267	252	245		
	[8]	[86]	[196]	[319]	[438]	[558]	[676]	[793]	[913]	[1033]	[1186]	[1401]	[1507]		
	30	10	22	36	49	63	76	90	103	117	134	158	170		
		406	404	402	399	396	393	388	383	377	367	352	345		
	[10]	[74]	[183]	[310]	[422]	[545]	[667]	[784]	[903]	[1024]	[1178]	[1394]	[1495]		
	38	8	21	35	48	62	75	89	102	116	133	158	169		
		507	505	502	499	496	492	486	482	476	466	452	445		
	[12]	[58]	[171]	[295]	[408]	[533]	[657]	[773]	[891]	[1013]	[1165]	[1377]	[1477]		
45	7	19	33	46	60	74	87	101	114	132	156	167			
	608	606	603	600	596	591	587	581	576	565	549	542			
[14]	[43]	[154]	[277]	[396]	[515]	[640]	[760]	[880]	[1002]	[1157]	[1374]	[1470]			
53	5	17	31	45	58	72	86	99	113	131	155	166			
	709	706	702	698	694	691	686	681	674	661	643	636			
[15]	[36]	[145]	[268]	[387]	[506]	[632]	[750]	[873]	[996]	[1153]	[1373]	[1468]			
57	4	16	30	44	57	71	85	99	113	130	155	166			
	760	757	753	749	744	740	735	729	723	709	690	683			
[16]	[31]	[138]	[261]	[382]	[500]	[627]	[744]	[869]	[991]	[1150]	[1371]	[1466]			
61	4	16	29	43	56	71	84	98	112	130	155	166			
	796	793	790	786	782	778	773	768	761	750	734	723			
[20]	[14]	[121]	[233]	[351]	[482]	[609]	[725]	[856]	[981]	1140					
Max. Intermittent	2	14	26	40	54	69	82	97	111	129					
	904	902	898	895	891	887	882	877	869	861					

H Series (101-)

Performance data

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



Continuous



Intermittent

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

B-2

		Δ Pressure bar [PSI] 97 cm ³ /r [5.9 in ³ /r]											Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2400]	[2565]		
		14	28	41	55	69	83	97	110	124	141	166	177		
Flow LPM [GPM]	[2]	[134]	[292]	[442]	[593]	[746]	[899]	[1054]	[1209]	[1365]	[1546]	[1806]	[1933]		
	8	15	33	50	67	84	102	119	137	154	175	204	218		
		78	76	75	73	71	68	65	61	55	47	33	27		
	[4]	[131]	[281]	[436]	[596]	[750]	[903]	[1059]	[1212]	[1367]	[1559]	[1828]	[1955]		
	15	15	32	49	67	85	102	120	137	154	176	207	221		
		156	155	153	151	149	147	143	139	134	126	113	107		
	[6]	[126]	[269]	[425]	[588]	[747]	[900]	[1054]	[1206]	[1368]	[1556]	[1823]	[1951]		
	23	14	30	48	66	84	102	119	136	155	176	206	220		
		234	233	231	230	228	224	221	217	210	202	189	182		
	[8]	[110]	[246]	[408]	[566]	[718]	[873]	[1023]	[1177]	[1339]	[1542]	[1829]	[1962]		
	30	12	28	46	64	81	99	116	133	151	174	207	222		
		312	311	310	308	305	303	300	295	291	282	269	263		
[10]	[96]	[231]	[392]	[539]	[699]	[859]	[1005]	[1156]	[1318]	[1528]	[1821]	[1956]			
38	11	26	44	61	79	97	114	131	149	173	206	221			
	390	389	387	385	383	380	376	373	368	359	346	340			
[12]	[77]	[218]	[378]	[522]	[681]	[844]	[990]	[1142]	[1301]	[1506]	[1792]	[1925]			
45	9	25	43	59	77	95	112	129	147	170	202	217			
	468	467	465	463	460	457	453	449	445	435	421	415			
[14]	[60]	[197]	[358]	[513]	[662]	[828]	[973]	[1131]	[1293]	[1493]	[1776]	[1906]			
53	7	22	40	58	75	94	110	128	146	169	201	215			
	546	544	542	539	537	535	531	526	521	512	499	493			
[15]	[52]	[189]	[346]	[495]	[651]	[819]	[963]	[1126]	[1286]	[1490]	[1778]	[1899]			
57	6	21	39	56	74	93	109	127	145	168	201	215			
	585	583	581	578	575	573	569	564	559	550	536	530			
[16]	[46]	[181]	[339]	[489]	[643]	[813]	[960]	[1121]	[1283]	[1488]	[1773]	[1893]			
61	5	20	38	55	73	92	108	127	145	168	200	214			
	620	617	613	610	608	607	601	599	594	585	569	561			
Max. Continuous	[20]	[25]	[157]	[311]	[455]	[625]	[790]	[941]	[1110]	[1272]	[1482]				
Max. Intermittent	76	3	18	35	51	71	89	106	125	144	167				
		701	700	697	694	691	688	684	681	674	668				

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

H Series (101-)

Performance data

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



Continuous



Intermittent

B-2

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

		Δ Pressure bar [PSI]										Max. Continuous	Max. Intermittent
		120 cm ³ /r [7.3 in ³ /r]											
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2400]	[2565]
		14	28	41	55	69	83	97	110	124	141	166	177
Flow LPM [GPM]	[2]	[162]	[357]	[544]	[736]	[927]	[1116]	[1305]	[1498]	[1687]	[1913]	[2231]	[2385]
	8	18	40	61	83	105	126	147	169	191	216	252	269
		62	61	61	59	58	55	53	49	45	38	26	21
	[4]	[160]	[348]	[539]	[736]	[930]	[1119]	[1316]	[1506]	[1698]	[1936]	[2268]	[2426]
	15	18	39	61	83	105	126	149	170	192	219	256	274
		125	124	123	121	120	119	116	114	110	102	90	86
	[6]	[155]	[338]	[530]	[729]	[923]	[1116]	[1310]	[1500]	[1699]	[1936]	[2271]	[2432]
	23	18	38	60	82	104	126	148	169	192	219	257	275
		188	187	186	185	183	180	178	175	170	163	152	147
	[8]	[139]	[319]	[515]	[710]	[901]	[1094]	[1283]	[1476]	[1673]	[1925]	[2278]	[2442]
	30	16	36	58	80	102	124	145	167	189	217	257	276
		250	250	249	247	245	243	241	237	233	226	216	211
	[10]	[121]	[303]	[497]	[686]	[883]	[1081]	[1267]	[1460]	[1655]	[1911]	[2268]	[2433]
	38	14	34	56	78	100	122	143	165	187	216	256	275
		313	312	311	309	308	306	302	300	296	289	278	273
	[12]	[102]	[288]	[480]	[664]	[862]	[1060]	[1246]	[1440]	[1640]	[1885]	[2232]	[2397]
45	12	33	54	75	97	120	141	163	185	213	252	271	
	375	374	373	371	370	367	365	361	358	350	338	333	
[14]	[78]	[263]	[458]	[652]	[841]	[1041]	[1228]	[1420]	[1616]	[1865]	[2213]	[2375]	
53	9	30	52	74	95	118	139	160	183	211	250	268	
	438	437	435	433	431	430	427	423	419	412	401	396	
[15]	[67]	[253]	[446]	[632]	[828]	[1030]	[1214]	[1411]	[1608]	[1856]	[2205]	[2370]	
57	8	29	50	71	94	116	137	159	182	210	249	268	
	469	468	466	464	462	460	458	454	450	442	430	425	
[16]	[59]	[241]	[436]	[619]	[819]	[1020]	[1206]	[1402]	[1602]	[1847]	[2196]	[2363]	
61	7	27	49	70	93	115	136	158	181	209	248	267	
	501	499	497	495	493	491	488	485	482	476	465	460	
[20]	[20]	[202]	[384]	[581]	[778]	[971]	[1169]	[1356]	[1559]	1810			
Max. Intermittent	2	23	43	66	88	110	132	153	176	205			
	626	624	621	618	617	614	611	609	606	603			

H Series (101-)

Performance data

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



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

B-2

		Δ Pressure bar [PSI] 146 cm³/r [8.9 in³/r]											Max. Continuous	Max. Intermittent		
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1700]	[1800]	[2050]	[2300]	[2565]		
		14	28	41	55	69	83	97	110	117	124	141	159	177		
Flow LPM [GPM]	[2]	[198]	[435]	[664]	[897]	[1130]	[1361]	[1591]	[1827]	[1942]	[2050]	2333	[2611]	[2911]		
	8	22	49	75	101	128	154	180	206	219	232	264	295	329		
		51	50	50	49	47	45	43	40	39	36	31	24	17		
	[4]	[196]	[424]	[657]	[898]	[1133]	[1365]	[1604]	[1836]	[1954]	[2068]	2359	[2648]	[2957]		
	15	22	48	74	101	128	154	181	207	221	234	267	299	334		
		103	102	101	99	99	97	95	93	92	89	84	78	72		
	[6]	[189]	[412]	[646]	[889]	[1125]	[1361]	[1598]	[1829]	[1951]	[2066]	2360	[2653]	[2967]		
	23	21	47	73	100	127	154	181	207	220	233	267	300	335		
		154	153	152	151	150	148	146	143	141	139	134	128	121		
	[8]	[169]	[389]	[628]	[866]	[1098]	[1333]	[1564]	[1799]	[1919]	[2043]	2343	[2649]	[2969]		
30	19	44	71	98	124	151	177	203	217	231	265	299	335			
	205	205	204	203	201	200	197	195	193	191	186	180	173			
[10]	[148]	[369]	[605]	[836]	[1076]	[1318]	[1544]	[1780]	[1899]	[2030]	2370	[2789]	[3126]			
38	17	42	68	94	122	149	174	201	215	229	268	315	353			
	257	256	255	253	252	251	248	246	244	242	237	231	225			
[12]	[125]	[351]	[586]	[810]	[1051]	[1293]	[1519]	[1756]	[1878]	[1999]	2301	[2606]	[2930]			
45	14	40	66	92	119	146	172	198	212	226	260	294	331			
	308	307	306	305	303	301	299	296	295	292	287	281	275			
[14]	[95]	[321]	[558]	[795]	[1026]	[1290]	[1497]	[1731]	[1851]	[1978]	2276	[2580]	[2895]			
53	11	36	63	90	116	146	169	196	209	223	257	292	327			
	359	358	357	355	354	352	350	347	346	343	338	331	325			
[15]	[82]	[308]	[544]	[771]	[1010]	[1256]	[1480]	[1720]	[1840]	[1962]	2264	[2569]	[2893]			
57	9	35	61	87	114	142	167	194	208	222	256	290	327			
	385	384	383	381	379	378	375	373	371	368	363	356	349			
[16]	[76]	[299]	[532]	[765]	[1003]	[1249]	[1475]	[1710]	[1832]	[1955]	2245	[2547]	[2873]			
Max. Continuous	61	9	34	60	86	113	141	167	193	207	221	254	288	325		
	411	410	408	406	405	403	400	398	396	394	390	385	375			
Max. Intermittent	[20]	[24]	[246]	[468]	[708]	[948]	[1184]	[1425]	[1653]	[1780]	1902	2208				
	76	3	28	53	80	107	134	161	187	201	215	249				
		513	512	509	507	506	504	501	499	498	497	494				

H Series (101-)

Performance data

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



B-2

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

		Δ Pressure bar [PSI] 159 cm ³ /r [9.7 in ³ /r]											Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2400]	[2565]		
		14	28	41	55	69	83	97	110	124	141	166	177		
Flow LPM [GPM]	[2]	[209]	[465]	[715]	[973]	[1228]	[1478]	[1724]	[1981]	[2046]	[2401]	[2764]	[2903]		
	8	24	53	81	110	139	167	195	224	231	271	312	328		
		47	46	46	45	44	42	40	38	37	31	23	20		
	[4]	[210]	[460]	[710]	[971]	[1229]	[1480]	[1745]	[1996]	[2059]	[2432]	[2813]	[2959]		
	15	24	52	80	110	139	167	197	226	233	275	318	334		
		94	94	93	91	91	90	89	87	87	82	76	74		
	[6]	[205]	[454]	[704]	[965]	[1216]	[1477]	[1738]	[1991]	[2055]	[2434]	[2824]	[2974]		
	23	23	51	80	109	137	167	196	225	232	275	319	336		
		141	141	140	139	138	136	134	132	132	126	119	116		
	[8]	[186]	[440]	[693]	[951]	[1205]	[1461]	[1716]	[1973]	[2038]	[2417]	[2808]	[2956]		
	30	21	50	78	107	136	165	194	223	230	273	317	334		
		188	188	187	186	185	183	181	179	178	173	166	163		
[10]	[164]	[422]	[671]	[930]	[1189]	[1451]	[1702]	[1965]	[2032]	[2404]	[2789]	[2938]			
38	19	48	76	105	134	164	192	222	230	272	315	332			
	235	234	234	232	232	230	228	226	225	220	213	210			
[12]	[144]	[404]	[652]	[900]	[1163]	[1421]	[1674]	[1937]	[2004]	[2379]	[2770]	[2922]			
45	16	46	74	102	131	161	189	219	226	269	313	330			
	282	281	281	279	279	277	275	273	272	267	260	257			
[14]	[109]	[374]	[623]	[883]	[1140]	[1396]	[1653]	[1900]	[1963]	[2342]	[2727]	[2873]			
53	12	42	70	100	129	158	187	215	222	265	308	325			
	330	329	328	327	325	323	322	319	319	313	306	304			
[15]	[92]	[359]	[612]	[861]	[1123]	[1381]	[1633]	[1886]	[1950]	[2326]	[2712]	[2847]			
57	10	41	69	97	127	156	185	213	220	263	306	322			
	353	352	351	350	348	347	345	343	342	337	330	328			
[16]	[87]	[344]	[591]	[848]	[1108]	[1366]	[1624]	[1877]	[1938]	[2299]	[2665]	[2808]			
61	10	39	67	96	125	154	183	212	219	260	301	317			
	377	376	374	373	372	370	368	366	365	361	356	354			
Max. Continuous	[20]	[26]	[268]	[510]	[772]	[1034]	[1290]	[1553]	[1802]	[1865]	[2179]				
Max. Intermittent	3	30	58	87	117	146	175	204	211	246					
	471	470	467	465	464	462	460	458	458	456					

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

H Series (101-)

Performance data

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



Continuous



Intermittent

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

B-2

		Δ Pressure bar [PSI] 185 cm ³ /r [11.3 in ³ /r]											Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2050]	[2150]	[2565]		
		14	28	41	55	69	83	97	110	124	141	148	177		
Flow LPM [GPM]	[2]	[257]	[554]	[847]	[1150]	[1447]	[1739]	[2035]	[2320]	[2607]	[2963]	[3103]			
	8	29	63	96	130	163	196	230	262	295	335	351			
		40	40	39	38	37	36	33	29	23	16	12			
	[4]	[254]	[546]	[845]	[1145]	[1448]	[1744]	[2049]	[2343]	[2635]	[3003]	[3147]	[3758]		
	15	29	62	95	129	164	197	232	265	298	339	356	425		
		81	81	80	79	78	77	76	74	70	66	63	55		
	[6]	[246]	[540]	[834]	[1137]	[1434]	[1736]	[2036]	[2337]	[2631]	[3004]	[3151]	[3773]		
	23	28	61	94	128	162	196	230	264	297	339	356	426		
		121	121	120	120	119	117	115	112	108	103	100	89		
	[8]	[224]	[520]	[820]	[1117]	[1414]	[1716]	[2014]	[2315]	[2611]	[2985]	[3133]	[3754]		
	30	25	59	93	126	160	194	228	262	295	337	354	424		
		162	162	161	160	159	157	155	152	148	143	140	129		
	[10]	[202]	[499]	[793]	[1095]	[1394]	[1699]	[1997]	[2299]	[2593]	[2966]	[3112]	[3733]		
	38	23	56	90	124	158	192	226	260	293	335	352	422		
		202	202	201	201	200	198	196	193	189	184	181	170		
[12]	[176]	[475]	[767]	[1063]	[1368]	[1664]	[1969]	[2268]	[2565]	[2940]	[3088]	[3715]			
45	20	54	87	120	155	188	222	256	290	332	349	420			
	243	242	242	241	240	238	236	234	230	225	222	212			
[14]	[140]	[443]	[735]	[1035]	[1340]	[1637]	[1936]	[2227]	[2529]	[2902]	[3051]	[3667]			
53	16	50	83	117	151	185	219	252	286	328	345	414			
	283	283	282	281	280	279	277	274	270	265	262	252			
[15]	[120]	[425]	[719]	[1014]	[1320]	[1618]	[1914]	[2205]	[2510]	[2885]	[3023]	[3648]			
57	14	48	81	115	149	183	216	249	284	326	342	412			
	304	303	302	301	300	299	297	294	290	286	283	274			
[16]	[108]	[407]	[700]	[998]	[1301]	[1598]	[1895]	[2185]	[2490]	[2863]	[3012]	[3630]			
61	12	46	79	113	147	181	214	247	281	323	340	410			
	324	323	322	321	320	318	316	314	312	308	306	295			
Max. Continuous	[20]	[27]	[321]	[612]	[911]	[1211]	[1504]	[1795]	[2070]	[2387]	[2756]				
Max. Intermittent	76	3	36	69	103	137	170	203	234	270	311				
		405	404	402	401	400	398	397	395	394	389				

H Series (101-)

Performance data

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



B-2

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

		Δ Pressure bar [PSI] 231 cm ³ /r [14.1 in ³ /r]										Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1450]	[1535]	[2000]	[2050]		
		14	28	41	55	69	83	97	100	106	138	141		
Flow LPM [GPM]	[2]	[338]	[707]	[1074]	[1456]	[1827]	[2192]	[2572]	[2657]	[2819]				
	8	38	80	121	165	206	248	291	300	319				
		32	32	31	30	30	28	26	25	24				
	[4]	[328]	[695]	[1076]	[1447]	[1827]	[2201]	[2577]	[2669]	[2821]	[3671]	[3780]		
	15	37	79	122	163	206	249	291	302	319	415	427		
		65	65	64	63	62	62	60	60	58	50	49		
	[6]	[317]	[687]	[1057]	[1434]	[1811]	[2186]	[2555]	[2650]	[2806]	[3668]	[3766]		
	23	36	78	119	162	205	247	289	299	317	414	426		
		97	97	97	96	95	94	92	91	89	80	78		
	[8]	[289]	[659]	[1038]	[1406]	[1777]	[2160]	[2531]	[2625]	[2781]	[3644]	[3742]		
	30	33	74	117	159	201	244	286	297	314	412	423		
		130	130	130	129	128	127	124	124	122	112	112		
	[10]	[265]	[631]	[1004]	[1381]	[1751]	[2131]	[2510]	[2602]	[2753]	[3608]	[3713]		
	38	30	71	113	156	198	241	284	294	311	408	420		
		162	162	162	162	160	158	156	156	154	145	144		
	[12]	[230]	[599]	[968]	[1345]	[1722]	[2088]	[2480]	[2571]	[2718]	[3571]	[3678]		
45	26	68	109	152	195	236	280	290	307	403	416			
	195	195	194	194	193	192	189	189	187	178	172			
[14]	[191]	[563]	[927]	[1299]	[1686]	[2058]	[2428]	[2519]	[2675]	[3532]	[3633]			
53	22	64	105	147	190	233	274	285	302	399	410			
	227	227	227	226	226	224	222	221	220	212	210			
[15]	[167]	[538]	[904]	[1279]	[1661]	[2030]	[2404]	[2493]	[2645]	[3488]	[3598]			
57	19	61	102	145	188	229	272	282	299	394	407			
	243	243	243	242	242	240	238	238	236	229	228			
[16]	[143]	[517]	[887]	[1258]	[1634]	[2002]	[2369]	[2462]	[2611]	[3444]	[3557]			
61	16	58	100	142	185	226	268	278	295	389	402			
	259	259	259	258	258	256	254	253	252	245	244			
[20]	[29]	[411]	[785]	[1152]	[1520]	[1877]	[2222]	[2318]	[2462]					
76	3	46	89	130	172	212	251	262	278					
	324	324	323	322	322	320	319	318	318					

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

H Series (101-)

Performance data

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



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

B-2

		Δ Pressure bar [PSI] 293 cm ³ /r [17.9 in ³ /r]							Max. Continuous	Max. Intermittent
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1350]	[1800]	
		14	28	41	55	69	83	93	124	
Flow LPM [GPM]	[2]	[427]	[893]	[1361]	[1829]	[2293]	[2672]	[2977]		
	8	48	101	154	207	259	302	336		
		26	25	25	24	22	16	13		
	[4]	[419]	[886]	[1362]	[1833]	[2305]	[2771]	[3110]	[4107]	
	15	47	100	154	207	260	313	351	464	
		51	51	51	50	49	47	44	22	
	[6]	[402]	[872]	[1342]	[1819]	[2291]	[2757]	[3098]	[4121]	
	23	45	99	152	206	259	312	350	466	
		77	77	76	76	74	71	68	54	
	[8]	[367]	[838]	[1316]	[1785]	[2252]	[2723]	[3070]	[4086]	
	30	41	95	149	202	254	308	347	462	
		102	102	102	101	100	98	95	84	
	[10]	[332]	[803]	[1276]	[1749]	[2215]	[2684]	[3034]	[4061]	
	38	38	91	144	198	250	303	343	459	
		128	128	128	127	126	123	120	108	
	[12]	[289]	[760]	[1230]	[1706]	[2177]	[2634]	[2989]	[4012]	
45	33	86	139	193	246	298	338	453		
	153	153	153	153	151	149	146	135		
[14]	[241]	[712]	[1176]	[1650]	[2126]	[2592]	[2935]	[3963]		
53	27	80	133	186	240	293	332	448		
	179	179	179	179	177	175	172	161		
[15]	[211]	[683]	[1149]	[1623]	[2096]	[2558]	[2905]	[3914]		
57	24	77	130	183	237	289	328	442		
	192	192	192	191	190	188	185	174		
[16]	[182]	[657]	[1128]	[1598]	[2066]	[2534]	[2884]	[3886]		
61	21	74	127	181	233	286	326	439		
	205	205	204	204	203	201	198	189		
[20]	[43]	[527]	[1001]	[1463]	[1919]	[2375]	[2720]			
76	5	60	113	165	217	268	307			
	256	256	255	255	254	252	249			

H Series (101-)

Performance data

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



B-2

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

		Δ Pressure bar [PSI] 370 cm ³ /r [22.6 in ³ /r]							Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1250]	[1500]		
		14	28	41	55	69	83	86	103		
Flow LPM [GPM]	[2]	[537]	[1121]	[1715]	[2285]	[2862]					
	8	61	127	194	258	323					
		20	20	20	19	16					
	[4]	[532]	[1123]	[1715]	[2308]	[2893]	[3467]	[3604]	[4274]		
	15	60	127	194	261	327	392	407	483		
		40	40	40	39	38	36	35	27		
	[6]	[508]	[1100]	[1693]	[2294]	[2884]	[3458]	[3598]	[4283]		
	23	57	124	191	259	326	391	407	484		
		61	61	61	60	58	55	53	47		
	[8]	[463]	[1060]	[1661]	[2255]	[2840]	[3414]	[3557]	[4254]		
30	52	120	188	255	321	386	402	481			
	81	81	81	80	79	76	74	68			
[10]	[414]	[1017]	[1613]	[2203]	[2788]	[3363]	[3506]	[4212]			
38	47	115	182	249	315	380	396	476			
	101	101	101	101	99	96	94	88			
[12]	[363]	[960]	[1553]	[2152]	[2737]	[3305]	[3446]	[4152]			
45	41	108	175	243	309	373	389	469			
	121	121	121	121	119	116	115	109			
[14]	[303]	[897]	[1484]	[2086]	[2667]	[3246]	[3386]	[4092]			
53	34	101	168	236	301	367	383	462			
	142	142	142	142	140	137	136	130			
[15]	[266]	[862]	[1452]	[2050]	[2630]	[3206]	[3347]	[4054]			
57	30	97	164	232	297	362	378	458			
	152	152	152	152	150	148	147	140			
[16]	[230]	[832]	[1426]	[2020]	[2597]	[3168]	[3307]	[4010]			
61	26	94	161	228	293	358	374	453			
	162	162	162	162	161	158	157	151			
Max. Continuous	[20]	[61]	[671]	[1269]	[1847]	[2410]	[2987]	[3119]			
Max. Intermittent		7	76	143	209	272	337	352			
		202	202	202	202	202	199	198			

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

		Δ Pressure bar [PSI] 739 cm ³ /r [45.1 in ³ /r]				Max. Continuous	Max. Intermittent
		[200]	[400]	[600]	[800]		
		14	28	41	55		
Flow LPM [GPM]	[2]	[1080]	[2250]	[3440]	[4570]		
	8	122	254	389	516		
		10	10	10	9		
	[4]	[1070]	[2250]	[3440]	[4600]		
	15	121	254	389	520		
		20	20	19	18		
	[6]	[1020]	[2200]	[3390]	[4590]		
	23	115	249	383	519		
		30	30	29	27		
	[8]	[945]	[2135]	[3330]	[4515]		
30	107	241	376	510			
	40	40	39	37			
[10]	[840]	[2050]	[3250]	[4430]			
38	95	232	367	501			
	50	50	48	46			
[12]	[740]	[1945]	[3130]	[4320]			
45	84	220	354	488			
	60	59	58	55			
[14]	[630]	[1820]	[3005]	[4195]			
53	71	206	340	474			
	69	68	68	66			
[15]	[540]	[1735]	[2905]	[4130]			
57	61	196	328	467			
	74	74	73	72			
[16]	[478]	[1681]	[2860]	[4060]			
61	54	190	323	459			
	79	79	78	77			
Max. Continuous	[20]	[143]	[1350]	[2565]	[3705]		
Max. Intermittent		16	153	290	419		
		99	98	97	96		

Standard rotation viewed from shaft end

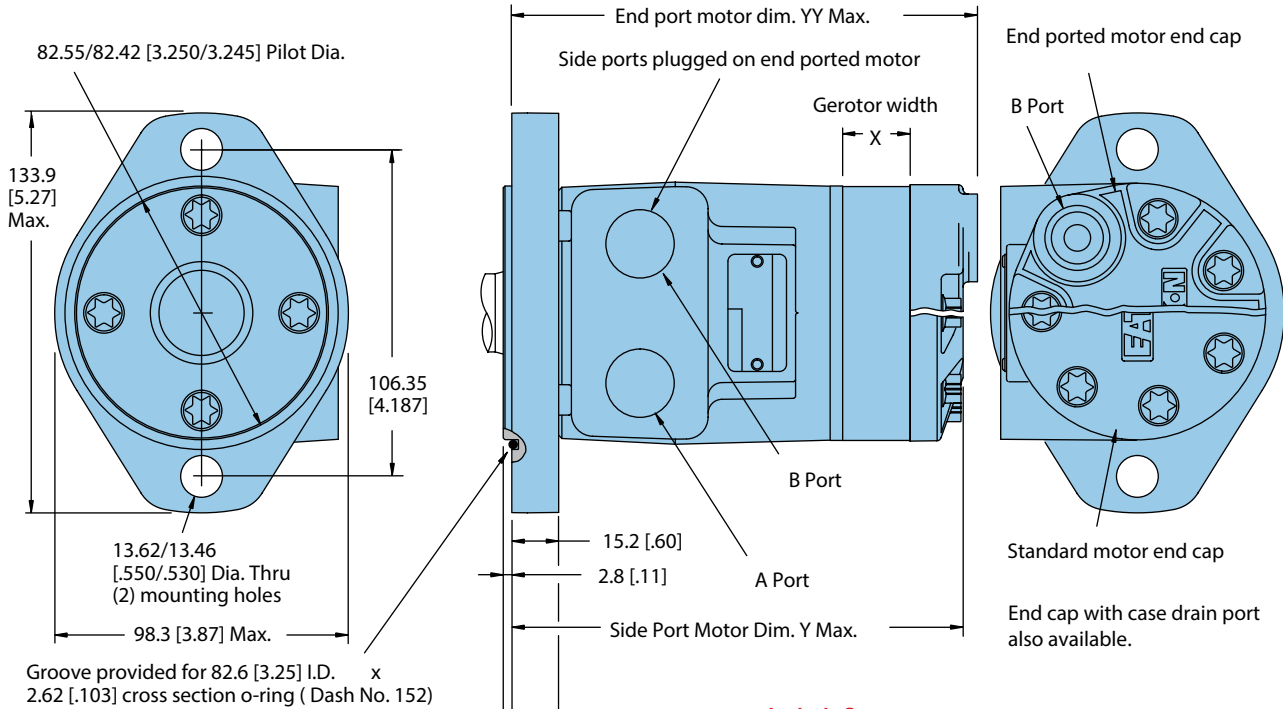
Port A pressurized — CW

Port B pressurized — CCW

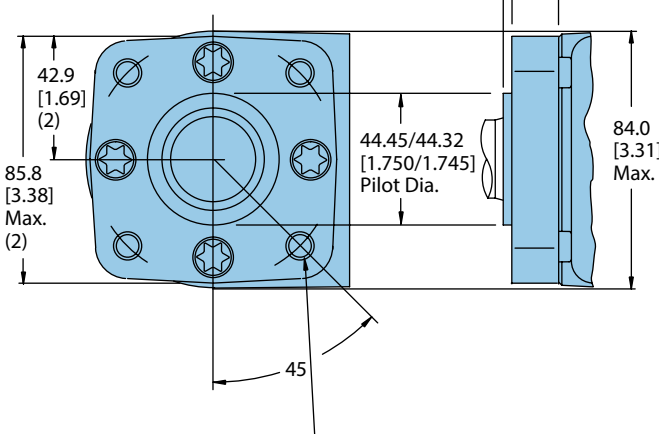
Note: Mounting surface flatness requirement is 13 mm [.005 inch] Max.

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

Code: AA 2 Bolt flange



Code: BA 4 Bolt flange



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

2 and 4 bolt flange

Displacement 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

B-2

Shaft	Port size	Displ. cm ³ / r [in ³ / r] / product number												
		36 [2.2]	46 [2.8]	59 [3.6]	74 [4.5]	97 [5.9]	120 [7.3]	146 [8.9]	159 [9.7]	185 [11.3]	231 [14.1]	293 [17.9]	370 [22.6]	740 [45.0]
1 in. Straight w/ Woodruff key	7/8-14 O-Ring	101-1700	-1033	-1701	-1034	-1035	-1702	-1703	-1036	-1037	-1038	-1039	-1040	—
	1/2 NPTF	101-1704	-1025	-1705	-1026	-1027	-1706	-1707	-1028	-1029	-1030	-1031	-1032	—
	Manifold*	101-1708	-1041	-1709	-1042	-1043	-1710	-1711	-1044	-1045	-1046	-1047	-1048	—
1 in. SAE 6B Splined	7/8-14 O-Ring	101-1721	-1081	-1722	-1082	-1083	-1723	-1724	-1084	-1085	-1086	-1087	-1088	—
	1/2 NPTF	101-1725	-1073	-1726	-1074	-1075	-1727	-1728	-1076	-1077	-1078	-1079	-1080	—
	Manifold*	101-1729	-1089	-1730	-1090	-1091	-1731	-1732	-1092	-1093	-1094	-1095	-1096	—
1 in. Straight w/.31 Dia. Crosshole	7/8-14 O-Ring	101-1796	-1797	-1798	-1799	-1800	-1801	-1802	-1803	—	—	—	—	—
	1/2 NPTF	101-1804	-1805	-1806	-1807	-1808	-1870	—	—	—	—	—	—	—
	Manifold*	101-1811	-1812	-1813	-1814	-1815	-1816	—	-1818	—	—	—	—	—
1 in. Straight w/.40 Dia. Crosshole	7/8-14 O-Ring	101-1819	-1323	-1820	-1324	-1325	-1821	-1822	-1326	—	—	—	—	—
	1/2 NPTF	101-1823	-1319	-1824	-1320	-1825	-1826	-1827	-1828	—	—	—	—	—
	Manifold*	101-1829	-1463	-1830	-1831	-1832	-1833	-1834	-1871	—	—	—	—	—

101-1834

4 Bolt flange

Shaft	Port size	Displ. cm ³ / r [in ³ / r] / product number												
		36 [2.2]	46 [2.8]	59 [3.6]	74 [4.5]	97 [5.9]	120 [7.3]	146 [8.9]	159 [9.7]	185 [11.3]	231 [14.1]	293 [17.9]	370 [22.6]	740 [45.0]
1 in. Straight w/ Woodruff key O-Ring	7/8-14 O-Ring	101-1749	-1009	-1750	-1010	-1011	-1751	-1752	-1012	-1013	-1014	-1015	-1016	—
	1/2 NPTF	101-1753	-1001	-1754	-1002	-1003	-1755	-1756	-1004	-1005	-1006	-1007	-1008	—
	Manifold*	101-1757	-1017	-1758	-1018	-1019	-1759	-1760	-1020	-1021	-1022	-1023	-1024	—
1 in. SAE 6B Splined	7/8-14 O-Ring	101-1761	-1057	-1762	-1058	-1059	-1762	-1763	-1060	-1061	-1062	-1063	-1064	—
	1/2 NPTF	101-1764	-1049	-1765	-1050	-1051	-1766	-1767	-1052	-1053	-1054	-1055	-1056	—
	Manifold*	101-1768	-1065	-1769	-1066	-1067	-1770	-1771	-1068	-1069	-1070	-1071	-1072	—
1 in. Straight w/.31 Dia. Crosshole	7/8-14 O-Ring	101-1835	-1836	-1837	-1838	-1839	-1840	-1841	-1842	—	—	—	—	—
	1/2 NPTF	101-1843	-1497	-1844	-1449	-1352	-1845	—	-1847	—	—	—	—	—
	Manifold*	101-1811	-1466	-1849	-1459	-1850	—	-1852	-1853	—	—	—	—	—
1 in. Straight w/.40 Dia. Crosshole	7/8-14 O-Ring	101-1854	-1311	-1855	-1856	-1857	-1858	-1859	-1860	—	—	—	—	—
	1/2 NPTF	101-1861	-1313	-1824	-1312	-1314	-1863	-1827	-1315	—	—	—	—	—
	Manifold*	101-1829	-1305	-1830	-1306	-1307	-1833	-1868	-1871	—	—	—	—	—

101-1834

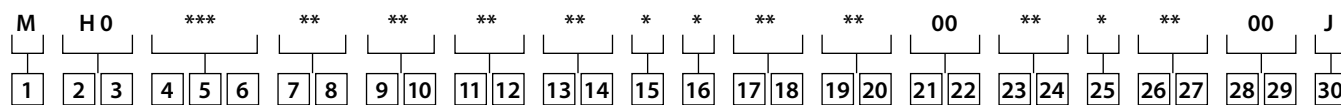
4 Bolt Flange with corrosion protection

Shaft	Port size	Displ. cm ³ / r [in ³ / r] / product number												
		36 [2.2]	46 [2.8]	59 [3.6]	74 [4.5]	97 [5.9]	120 [7.3]	146 [8.9]	159 [9.7]	185 [11.3]	231 [14.1]	293 [17.9]	370 [22.6]	740 [45.0]
1 in. Straight w/ Woodruff key O-Ring	1/2 NPTF	101-2032	-2014	—	—	—	—	—	-2015	-2028	—	-2030	-2031	—
	Manifold*	—	-2067	—	—	-2223	—	—	-2151	—	—	—	—	—

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

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

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



1	Product	
	M	Motor
2 3	Series	
	H0	H Motor
4 5 6	Displacement cm³/r [in³/r]	
	022	36 [2.2]†
	028	46 [2.8]
	035	58 [3.5]†
	045	74 [4.5]
	059	96 [5.9]
	073	120 [7.3]
	089	146 [8.9]
	097	159 [9.7]
	113	185 [11.3]
	141	231 [14.1]
	179	294 [17.9]
	226	370 [22.6]
	451	739 [45.1]†
	†	The H Series motors with the displacement code "022", "035", or "451" must also specify free running gerotor. (option "A" in position 15).

7 8	Mounting type	
	AA	2 Bolt (standard) 82.50 [3.248] Dia. x 3.05 [.120] pilot, 13.59 [.535] Dia. mounting holes on 106.35 [4.187] Dia. B.C.
	BA	4 Bolt (standard) 44.40 [1.748] Dia. x 3.05 [.120] pilot, .375-16 UNC-2B mounting holes on 82.55 [3.250] Dia. B.C.
	DD	2 Bolt (standard) 101.60 [4.000] Dia. x 6.10 [.240] Pilot, 14.35 [.565] Dia. Mounting holes on 146.05 [5.750] Dia. B.C. (SAE B)
	FA	4 Bolt (standard) 44.40 [1.748] Dia. x 3.05 [.120] pilot, M10 x 1.5-6H mounting holes on 82.55 [3.250] Dia. B.C.
	MA	2 Bolt (standard) 82.50 [3.248] Dia. x 8.13 [.320] Pilot, 13.59 [.535] Dia. Mounting holes on 106.35 [4.187] Dia. B.C.

9 10	Output shaft	
	01	25.4 [1.00] Dia. Straight, woodruff key, .250-20 UNC-2B hole in shaft end
	02	25.4 [1.00] Dia. SAE 6B Spline, .250-20 UNC-2B Hole in Shaft End
	08	25.4 [1.00] Dia. Straight, 10.31 [.406] Dia. Cross hole 15.7 [.62] from End, .250-20 UNC-2B hole in shaft end
	16	22.22 [.875] Dia. SAE 13 Tooth Spline (SAE B)
	18	25.4 [1.00] Dia. Tapered, woodruff key and nut, 34.92 [1.375] taper length
	24	25.00 [.984] Dia. Straight, 8.00 [.315] KEY, M8 x 1.25-6H hole in shaft end
	39	25.00 [.984] Dia. Straight (k6), 8.00 [.315] Key, M8 x 1.25-6H Hole in Shaft End

11 12	Ports	
	AA	.875-14 UNF-2B SAE O-Ring Ports
	AB	.500-14 NPTF Dry seal pipe thread ports
	AC	Manifold ports (.3125-18 UNC-2B mounting holes)
	AD	Manifold ports (M8 x 1.25-6H mounting holes)
	AF	G 1/2 BSP Straight Thread Ports
	EB††	End ports: .750-16 UNF-2B SAE O-Ring ports
	EC††	End ports: G 1/2 BSP straight thread ports
	††	End ported motor pressure is derated.
	Note	Reference page B-2-18 for ratings.

13 14	Case flow options	
	00	None
	01	.4375-20 UNF-2B SAE o-ring port (end cap)
	02	G 1/4 BSP straight THD port (end cap)
	A	Internal check valves

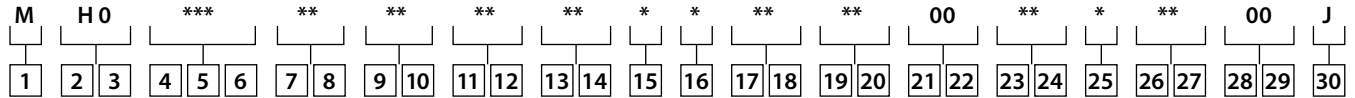
15	Gerotor options	
	0	None
	A	Free running

H Series (101-)

Model code

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

B-2



16	Shaft options
0	None
N	Electroless nickel plated
17 18	Seal options
00	Standard seals
02	Seal guard
03	Viton seals
07	High pressure shaft seal
A	Extreme duty shaft seal
19 20	Speed sensor options
00	None
AA	Digital speed pickup (15 pulse), M12 connector (A=Power, B=Common, C=Signal)
AB	Magnetic speed pickup (60 pulse by quadrature), with M12 connector (A=Power, B=Common, C=Signal)
AE	Digital Speed Pickup (15 pulse), 127 [5.0] lead wire with weather pack shroud connector (A=Power, B=Signal, C=Common)
21 22	Manifold block options
00	None
*	Contact your Danfoss sales representative for available options.

23 24	Special features (hardware)
00	None
AB	Low speed valving
JM	Low flow housing and low speed valving
25	Special features (assembly)
0	None
1	Reverse rotation
2	Flange rotated 90°
26 27	Paint/special packaging
00	No paint
AA	Low gloss black primer
AF	Environmental coated black
AY	Nickel plated motor (excluding shaft)
28 29	Danfoss assigned code when applicable
00	None
30	Danfoss assigned design code
J	Nine

Description

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



Specifications

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

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

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

Features:

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

Benefits:

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

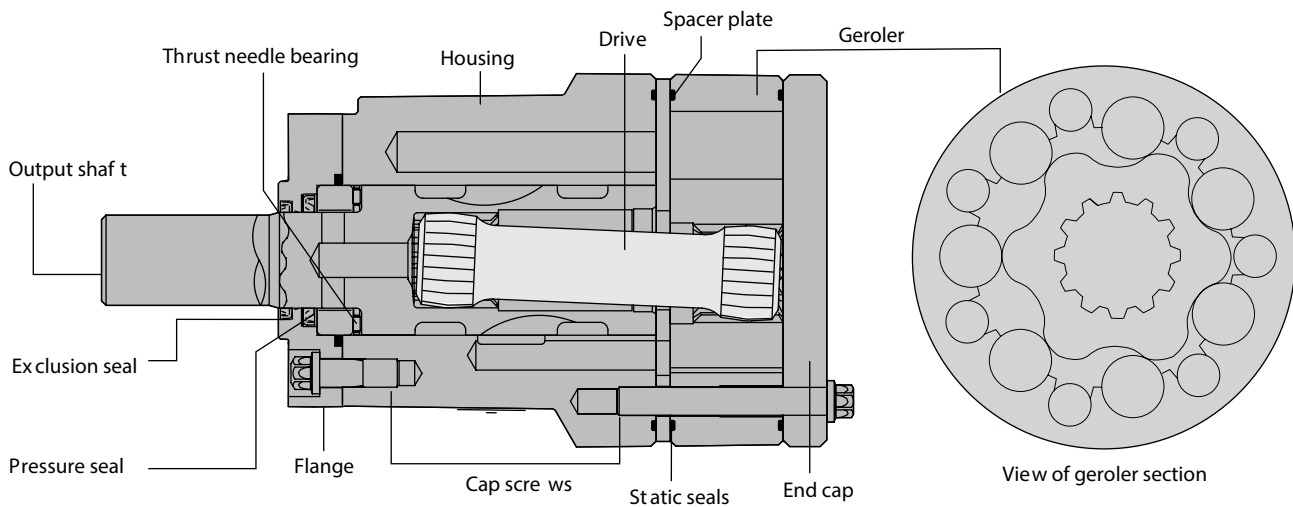
Applications:

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

S Series (103-)

Specifications

B-3



Specification data — S motors

Displ. cm ³ /r [in ³ /r]		59	75	97	120	144	166	187	225	298	372
		[3.6]	[4.6]	[5.7]	[7.3]	[8.8]	[10.1]	[11.4]	[13.7]	[18.2]	[22.7]
Max. Speed (RPM) @ continuous flow		960	741	602	469	389	341	304	253	190	153
Flow LPM [GPM]	Continuous	57	57	57	57	57	57	57	57	57	57
		[15]	[15]	[15]	[15]	[15]	[15]	[15]	[15]	[15]	[15]
	Intermittent	68	76	76	76	76	76	76	76	76	76
		[18]	[20]	[20]	[20]	[20]	[20]	[20]	[20]	[20]	[20]
Torque Nm [lb-in]	Continuous	114	147	182	233	266	304	331	369	433	465
		[1011]	[1297]	[1610]	[2059]	[2358]	[2692]	[2932]	[3265]	[3835]	[4112]
	Intermittent	143	184	227	289	327	366	400	440	512	530
		[1264]	[1628]	[2012]	[2559]	[2894]	[3239]	[3539]	[3894]	[4536]	[4687]
Min. Starting torque [Ⓢ]	Cont. Pressure	90	113	148	184	212	232	263	302	338	369
Nm[lb-in]		[800]	[1000]	[1310]	[1630]	[2050]	[2330]	[2670]	[2990]	[3270]	[3270]
	@ Int. Pressure	116	146	190	236	271	289	329	374	417	438
		[1030]	[1290]	[1680]	[2090]	[2400]	[2560]	[2910]	[3310]	[3690]	[3880]
Pressure Δ Bar [Δ PSI]	Continuous	138	138	138	138	131	131	128	117	103	90
		[2000]	[2000]	[2000]	[2000]	[1900]	[1900]	[1850]	[1700]	[1500]	[1300]
	Intermittent	172	172	172	172	162	159	155	141	124	103
		[2500]	[2500]	[2500]	[2500]	[2350]	[2300]	[2250]	[2050]	[1800]	[1500]
Weight kg [lbs]		6.1	6.2	6.4	6.6	6.8	6.9	7.1	7.4	7.9	8.4
		[13.4]	[13.7]	[14.1]	[14.6]	[15.0]	[15.2]	[15.7]	[16.3]	[17.4]	[18.5]

Maximum case pressure: See case pressure seal limitation graph.

A simultaneous maximum torque and maximum speed NOT recommended.

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

Maximum Inlet Pressure:

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

*See shaft torque ratings for limitations.

Intermittent operation:

10% of every minute

Recommended fluids:

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

Recommended system operating temp.:

-34°C to 82°C [-30°F to 180°F]

Recommended filtration:

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

Thermal shock warning:

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

Minimum delta pressure warning:

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

S Series (103-)

Performance data

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



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

B-3

		Δ Pressure bar [PSI]										Max. Continuous	Max. Intermittent	
		S Motor 59 cm ³ /r [3.6 in ³ /r]												
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]		
		14	28	41	55	69	83	97	110	124	138	172		
Flow LPM [GPM]	[2]	[86]	[190]	[292]	[390]	[484]	[578]	[662]	[729]	[764]	[803]			
	8	10	22	33	44	55	65	75	82	86	91			
		126	121	115	107	97	85	75	63	45	24			
	[4]	[79]	[185]	[289]	[395]	[498]	[600]	[702]	[804]	[903]	[998]	[1156]		
	15	9	21	33	45	56	68	79	91	102	113	131		
		256	250	243	235	224	212	199	183	166	147	89		
	[6]	[71]	[177]	[280]	[387]	[495]	[602]	[704]	[808]	[909]	[1011]	[1257]		
	23	8	20	32	44	56	68	80	91	103	114	142		
		383	377	369	360	349	336	320	302	284	266	207		
	[8]	[62]	[166]	[274]	[379]	[488]	[594]	[699]	[806]	[907]	[1007]	[1264]		
30	7	19	31	43	55	67	79	91	102	114	143			
	514	508	500	490	477	464	448	430	409	390	333			
[10]	[52]	[155]	[264]	[369]	[475]	[583]	[686]	[793]	[897]	[1000]	[1257]			
38	6	17	30	42	54	66	78	90	101	113	142			
	642	635	628	617	605	591	575	557	538	517	461			
[12]	[38]	[141]	[248]	[354]	[462]	[568]	[674]	[777]	[884]	[987]	[1244]			
45	4	16	28	40	52	64	76	88	100	111	141			
	772	764	757	747	736	722	706	687	670	648	592			
[14]	[21]	[125]	[231]	[337]	[445]	[551]	[658]	[763]	[868]	[972]	[1233]			
53	2	14	26	38	50	62	74	86	98	110	139			
	900	893	885	876	866	852	836	819	798	778	721			
[15]	[8]	[116]	[223]	[328]	[434]	[543]	[648]	[756]	[862]	[965]	[1225]			
57	1	13	25	37	49	61	73	85	97	109	138			
	960	958	949	940	929	915	900	882	863	842	784			
[18]		[86]	[191]	[296]	[403]	[511]	[617]	[726]	[831]	[935]	[1195]			
68		10	22	33	46	58	70	82	94	106	135			
		1151	1139	1128	1117	1105	1090	1074	1054	1033	977			

S Series (103-)

Performance data

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



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

B-3

		Δ Pressure bar [PSI] S Motor 75 cm ³ /r [4.6 in ³ /r]										Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]		
		14	28	41	55	69	83	97	110	124	138	172		
Flow LPM [GPM]	[2]	[91]	[218]	[343]	[467]	[590]	[708]	[815]	[900]	[981]	[1086]			
	8	10	25	39	53	67	80	92	102	111	123			
		93	89	81	75	66	59	43	31	23	16			
	[4]	[87]	[217]	[352]	[484]	[616]	[748]	[874]	[1001]	[1123]	[1236]	[1472]		
	15	10	25	40	55	70	85	99	113	127	140	166		
		193	188	181	173	163	150	139	125	107	89	37		
	[6]	[82]	[219]	[355]	[492]	[627]	[763]	[898]	[1027]	[1155]	[1284]	[1590]		
	23	9	25	40	56	71	86	101	116	131	145	180		
		292	286	277	269	258	244	228	214	202	186	140		
	[8]	[69]	[202]	[341]	[481]	[619]	[761]	[896]	[1032]	[1165]	[1296]	[1618]		
30	8	23	38	54	70	86	101	117	132	146	183			
	390	384	375	364	355	342	326	309	295	276	230			
[10]	[56]	[193]	[330]	[471]	[610]	[751]	[887]	[1025]	[1162]	[1297]	[1628]			
38	6	22	37	53	69	85	100	116	131	147	184			
	489	484	476	467	457	444	431	416	399	381	336			
[12]	[39]	[175]	[315]	[453]	[595]	[736]	[873]	[1011]	[1148]	[1284]	[1617]			
45	4	20	36	51	67	83	99	114	130	145	183			
	587	582	573	564	552	540	526	510	494	476	427			
[14]	[12]	[153]	[290]	[431]	[571]	[716]	[856]	[993]	[1129]	[1265]	[1605]			
53	1	17	33	49	65	81	97	112	128	143	181			
	691	680	673	665	654	641	628	613	594	578	533			
[15]	[9]	[143]	[281]	[424]	[567]	[708]	[846]	[985]	[1121]	[1259]	[1599]			
57	1	16	32	48	64	80	96	111	127	142	181			
	741	729	723	714	704	690	675	661	644	628	580			
[20]		[82]	[220]	[362]	[505]	[645]	[784]	[922]	[1061]	[1200]	[1545]			
76		9	25	41	57	73	89	104	120	136	175			
		970	963	957	948	935	921	906	888	871	825			

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

S Series (103-)

Performance data

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



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

B-3

		Δ Pressure bar [PSI]										Max. Continuous	Max. Intermittent	
		S Motor 93 cm ³ /r [5.7 in ³ /r]												
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]		
		14	28	41	55	69	83	97	110	124	138	172		
Flow LPM [GPM]	[2]	[146]	[308]	[466]	[620]	[771]	[913]	[1031]	[1086]	[1176]	[1281]			
	8	16	35	53	70	87	103	116	123	133	145			
		76	72	64	55	48	34	22	7	4	1			
	[4]	[136]	[301]	[466]	[633]	[797]	[959]	[1116]	[1275]	[1430]	[1570]	[1798]		
	15	15	34	53	72	90	108	126	144	162	177	203		
		158	153	146	138	126	115	103	90	77	59	17		
	[6]	[113]	[278]	[446]	[616]	[786]	[952]	[1116]	[1280]	[1444]	[1603]	[1971]		
	23	13	31	50	70	89	108	126	145	163	181	223		
		238	232	225	215	206	191	175	161	145	129	87		
	[8]	[98]	[262]	[431]	[604]	[777]	[947]	[1112]	[1279]	[1446]	[1610]	[2006]		
30	11	30	49	68	88	107	126	144	163	182	227			
	319	313	306	296	284	270	255	240	224	208	165			
[10]	[81]	[246]	[415]	[590]	[763]	[935]	[1100]	[1271]	[1439]	[1604]	[2012]			
38	9	28	47	67	86	106	124	144	163	181	227			
	400	394	388	378	366	353	340	324	306	288	244			
[12]	[65]	[232]	[401]	[574]	[746]	[916]	[1081]	[1255]	[1425]	[1591]	[2001]			
45	7	26	45	65	84	103	122	142	161	180	226			
	481	476	469	460	448	435	423	408	394	374	326			
[14]	[42]	[207]	[376]	[552]	[721]	[893]	[1064]	[1235]	[1405]	[1570]	[1983]			
53	5	23	43	62	81	101	120	140	159	177	224			
	561	557	549	541	531	519	504	489	470	455	412			
[15]	[31]	[196]	[364]	[538]	[708]	[881]	[1052]	[1223]	[1391]	[1560]	[1974]			
57	4	22	41	61	80	100	119	138	157	176	223			
	602	597	591	582	571	559	546	530	514	498	453			
[20]		[119]	[290]	[461]	[633]	[807]	[976]	[1145]	[1315]	[1485]	[1904]			
76		13	33	52	72	91	110	129	149	168	215			
		799	792	785	775	762	748	734	717	702	660			

S Series (103-)

Performance data

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



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

B-3

		Δ Pressure bar [PSI]										Max. Continuous	Max. Intermittent	
		S Motor 120 cm ³ /r [7.3 in ³ /r]												
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]		
		14	28	41	55	69	83	97	110	124	138	172		
Flow LPM [GPM]	[2]	[191]	[403]	[605]	[801]	[978]	[1146]	[1288]	[1440]	[1552]	[1679]			
	8	22	46	68	91	110	129	146	163	175	190			
		60	56	50	43	36	29	19	15	8	6			
	[4]	[188]	[403]	[617]	[829]	[1031]	[1236]	[1438]	[1632]	[1816]	[1990]	[1914]		
	15	21	46	70	94	117	140	162	184	205	225	216		
		122	118	112	106	98	87	78	67	56	49	16		
	[6]	[172]	[391]	[607]	[821]	[1030]	[1241]	[1449]	[1654]	[1858]	[2056]	[2522]		
	23	19	44	69	93	116	140	164	187	210	232	285		
		186	180	175	167	159	149	137	126	114	103	73		
	[8]	[156]	[375]	[593]	[807]	[1015]	[1229]	[1439]	[1648]	[1855]	[2059]	[2557]		
30	18	42	67	91	115	139	163	186	210	233	289			
	249	244	237	229	220	210	199	185	174	162	128			
[10]	[130]	[349]	[567]	[785]	[995]	[1210]	[1420]	[1630]	[1838]	[2045]	[2559]			
38	15	39	64	89	112	137	160	184	208	231	289			
	311	307	301	293	286	275	264	252	239	227	193			
[12]	[103]	[320]	[539]	[756]	[965]	[1175]	[1383]	[1593]	[1799]	[2003]	[2500]			
45	12	36	61	85	109	133	156	180	203	226	282			
	374	369	363	355	346	336	327	314	303	288	253			
[14]	[70]	[285]	[502]	[715]	[923]	[1131]	[1335]	[1540]	[1745]	[1948]	[2452]			
53	8	32	57	81	104	128	151	174	197	220	277			
	437	433	427	419	411	402	391	379	369	355	322			
[15]	[54]	[267]	[485]	[705]	[913]	[1122]	[1329]	[1540]	[1746]	[1947]	[2441]			
57	6	30	55	80	103	127	150	174	197	220	276			
	469	465	459	452	444	433	423	411	400	386	349			
[20]		[159]	[377]	[600]	[815]	[1026]	[1232]	[1444]	[1651]	[1859]	[2383]			
76		18	43	68	92	116	139	163	186	210	269			
		621	618	612	603	594	583	571	560	549	515			

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

S Series (103-)

Performance data

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



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

B-3

		Δ Pressure bar [PSI]											Max. Continuous	Max. Intermittent	
		S Motor 144 cm ³ /r [8.8 in ³ /r]													
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1900]	[2350]			
		14	28	41	55	69	83	97	110	124	131	162			
Flow LPM [GPM]	[2]	[222]	[480]	[729]	[967]	[1190]	[1402]	[1591]	[1786]	[2031]	[2107]				
	8	25	54	82	109	134	158	180	202	229	238				
		49	45	40	34	29	21	17	15	14	13				
	[4]	[217]	[475]	[728]	[987]	[1237]	[1488]	[1727]	[1957]	[2181]	[2292]	[2310]			
	15	24	54	82	112	140	168	195	221	246	259	261			
		101	97	91	84	77	69	61	52	45	42	22			
	[6]	[193]	[453]	[715]	[976]	[1234]	[1494]	[1746]	[1995]	[2239]	[2358]	[2867]			
	23	22	51	81	110	139	169	197	225	253	266	324			
		153	149	143	136	128	119	110	101	91	86	66			
	[8]	[173]	[434]	[699]	[961]	[1218]	[1479]	[1735]	[1984]	[2235]	[2358]	[2894]			
30	20	49	79	109	138	167	196	224	252	266	327				
	205	202	195	187	179	170	160	150	139	134	109				
[10]	[144]	[407]	[673]	[940]	[1197]	[1459]	[1715]	[1967]	[2218]	[2344]	[2890]				
38	16	46	76	106	135	165	194	222	251	265	327				
	259	254	247	240	231	221	211	202	191	185	158				
[12]	[118]	[380]	[644]	[907]	[1167]	[1429]	[1685]	[1941]	[2194]	[2319]	[2878]				
45	13	43	73	102	132	161	190	219	248	262	325				
	312	307	301	294	286	277	267	257	246	241	217				
[14]	[87]	[346]	[610]	[871]	[1131]	[1395]	[1651]	[1907]	[2163]	[2289]	[2851]				
53	10	39	69	98	128	158	187	215	244	259	322				
	363	359	354	346	339	330	319	309	299	293	266				
[15]	[69]	[327]	[592]	[853]	[1113]	[1376]	[1633]	[1890]	[2146]	[2271]	[2835]				
57	8	37	67	96	126	156	185	214	242	257	320				
	389	386	380	372	364	355	344	336	323	317	289				
[20]		[200]	[460]	[726]	[987]	[1251]	[1512]	[1770]	[2025]	[2153]	[2724]				
76		23	52	82	112	141	171	200	229	243	308				
		516	513	507	499	491	480	470	459	454	427				

S Series (103-)

Performance data

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



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

B-3

		Δ Pressure bar [PSI]												
		S Motor 166 cm ³ /r [10.1 in ³ /r]										Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1900]	[2300]		
		14	28	41	55	69	83	97	110	124	131	159		
Flow LPM [GPM]	[2]	[267]	[563]	[841]	[1105]	[1364]	[1622]	[1852]	[2081]	[2288]				
	8	30	64	95	125	154	183	209	235	259				
		43	39	35	30	27	21	16	13	10				
	[4]	[247]	[544]	[838]	[1129]	[1418]	[1707]	[1988]	[2255]	[2514]	[2641]	[3116]		
	15	28	61	95	128	160	193	225	255	284	298	352		
		89	85	80	74	68	60	53	47	41	38	28		
	[6]	[217]	[517]	[813]	[1108]	[1401]	[1700]	[1994]	[2281]	[2559]	[2692]	[3214]		
	23	25	58	92	125	158	192	225	258	289	304	363		
		134	131	125	120	113	105	96	88	79	75	58		
	[8]	[195]	[494]	[794]	[1089]	[1387]	[1687]	[1983]	[2269]	[2552]	[2691]	[3239]		
30	22	56	90	123	157	191	224	256	288	304	366			
	180	176	171	164	156	147	138	128	118	114	96			
[10]	[176]	[477]	[776]	[1072]	[1371]	[1668]	[1960]	[2249]	[2537]	[2676]	[3228]			
38	20	54	88	121	155	188	221	254	287	302	365			
	227	222	217	210	203	194	185	175	165	160	136			
[12]	[136]	[436]	[737]	[1037]	[1335]	[1636]	[1928]	[2217]	[2509]	[2651]	[3210]			
45	15	49	83	117	151	185	218	251	284	300	363			
	272	269	264	258	249	241	233	223	214	208	186			
[14]	[93]	[394]	[696]	[995]	[1296]	[1599]	[1890]	[2185]	[2475]	[2617]	[3178]			
53	11	44	79	112	146	181	214	247	280	296	359			
	318	315	310	303	296	287	279	269	259	254	230			
[15]	[73]	[371]	[672]	[973]	[1272]	[1575]	[1867]	[2159]	[2453]	[2596]	[3158]			
57	8	42	76	110	144	178	211	244	277	293	357			
	341	338	333	326	319	309	300	290	280	274	253			
[20]	[227]	[527]	[829]	[1128]	[1430]	[1724]	[2020]	[2313]	[2457]	[3030]				
76	26	60	94	127	162	195	228	261	278	278	342			
	452	449	443	435	426	417	407	396	390	390	366			

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

S Series (103-)

Performance data

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



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

B-3

		Δ Pressure bar [PSI]											Max. Continuous	Max. Intermittent	
		S Motor 187 cm ³ /r [11.4 in ³ /r]													
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[1850]	[2250]			
		14	28	41	55	69	83	97	110	124	128	155			
Flow LPM [GPM]	[2]	[298]	[627]	[944]	[1244]	[1532]	[1805]	[2030]	[2250]	[2478]					
	8	34	71	107	141	173	204	229	254	280					
		37	34	31	25	22	18	10	9	7					
	[4]	[298]	[640]	[969]	[1291]	[1607]	[1919]	[2219]	[2511]	[2799]	[2869]	[3411]			
	15	34	72	109	146	182	217	251	284	316	324	385			
		78	75	70	65	60	53	47	41	35	33	19			
	[6]	[279]	[621]	[953]	[1283]	[1608]	[1930]	[2243]	[2551]	[2850]	[2922]	[3502]			
	23	32	70	108	145	182	218	253	288	322	330	396			
		119	115	110	104	97	89	82	74	66	64	50			
	[8]	[252]	[593]	[928]	[1257]	[1579]	[1905]	[2224]	[2542]	[2855]	[2932]	[3539]			
30	28	67	105	142	178	215	251	287	323	331	400				
	160	156	151	144	137	129	120	110	101	99	78				
[10]	[211]	[555]	[888]	[1217]	[1546]	[1872]	[2193]	[2516]	[2831]	[2909]	[3518]				
38	24	63	100	138	175	211	248	284	320	329	397				
	201	198	193	187	180	173	164	154	143	141	114				
[12]	[162]	[502]	[835]	[1164]	[1490]	[1818]	[2139]	[2463]	[2780]	[2857]	[3476]				
45	18	57	94	131	168	205	242	278	314	323	393				
	243	240	235	229	222	214	206	196	184	181	154				
[14]	[118]	[452]	[786]	[1117]	[1443]	[1772]	[2095]	[2417]	[2736]	[2814]	[3438]				
53	13	51	89	126	163	200	237	273	309	318	388				
	283	280	276	270	262	254	245	235	224	221	194				
[15]	[91]	[425]	[759]	[1089]	[1418]	[1747]	[2068]	[2389]	[2708]	[2786]	[3410]				
57	10	48	86	123	160	197	234	270	306	315	385				
	304	301	296	290	283	274	265	256	243	240	214				
[20]		[259]	[590]	[925]	[1255]	[1585]	[1907]	[2229]	[2552]	[2633]	[3265]				
76		29	67	105	142	179	216	252	288	297	369				
		403	400	394	387	379	370	359	347	344	319				

S Series (103-)

Performance data

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



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

B-3

		Δ Pressure bar [PSI]										Max. Continuous	Max. Intermittent	
		S Motor 225 cm ³ /r [13.7 in ³ /r]												
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1700]	[2050]			
		14	28	41	55	69	83	97	110	117	141			
Flow LPM [GPM]	[2]	[358]	[765]	[1139]	[1498]	[1842]	[2163]	[2474]	[2738]	[2894]				
	8	40	86	129	169	208	244	280	309	327				
		32	29	27	23	20	16	12	10	8				
	[4]	[367]	[774]	[1177]	[1577]	[1956]	[2325]	[2680]	[3022]	[3191]	[3753]			
	15	41	87	133	178	221	263	303	341	361	424			
		66	63	60	55	50	46	40	34	31	23			
	[6]	[348]	[758]	[1161]	[1567]	[1960]	[2344]	[2716]	[3083]	[3264]	[3863]			
	23	39	86	131	177	221	265	307	348	369	437			
		99	96	92	88	82	76	70	63	59	45			
	[8]	[313]	[721]	[1124]	[1529]	[1921]	[2312]	[2696]	[3073]	[3265]	[3894]			
30	35	81	127	173	217	261	305	347	369	440				
	133	132	127	123	117	111	104	96	92	76				
[10]	[262]	[669]	[1069]	[1473]	[1859]	[2247]	[2627]	[2997]	[3184]	[3810]				
38	30	76	121	166	210	254	297	339	360	430				
	167	165	161	157	152	146	139	130	126	107				
[12]	[203]	[609]	[1006]	[1400]	[1782]	[2160]	[2531]	[2912]	[3098]	[3721]				
45	23	69	114	158	201	244	286	329	350	420				
	202	199	196	191	186	180	173	165	160	141				
[14]	[143]	[544]	[938]	[1324]	[1700]	[2079]	[2452]	[2824]	[3008]	[3639]				
53	16	62	106	150	192	235	277	319	340	411				
	236	233	230	225	219	214	207	199	194	177				
[15]	[106]	[504]	[897]	[1281]	[1653]	[2027]	[2393]	[2761]	[2944]	[3576]				
57	12	57	101	145	187	229	270	312	333	404				
	253	251	248	243	237	231	224	215	211	192				
[20]	[303]	[697]	[1091]	[1477]	[1854]	[2214]	[2581]	[2765]	[3399]					
76	34	79	123	167	210	250	292	312	384					
	336	334	330	325	318	312	304	298	282					

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

S Series (103-)

Performance data

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



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

B-3

		Δ Pressure bar [PSI]								Max. Continuous	Max. Intermittent	
		S Motor 298 cm ³ /r [18.2 in ³ /r]										
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1500]	[1800]		
		14	28	41	55	69	83	97	103	124		
Flow LPM [GPM]	[2]	[487]	[1009]	[1509]	[1991]	[2460]	[2931]	[3360]	[3577]	[4113]		
	8	55	114	170	225	278	331	380	404	465		
		24	22	20	18	17	14	11	10	8		
	[4]	[498]	[1043]	[1576]	[2093]	[2597]	[3087]	[3567]	[3798]	[4500]		
	15	56	118	178	236	293	349	403	429	508		
		49	47	45	41	38	34	31	29	25		
	[6]	[470]	[1017]	[1552]	[2080]	[2594]	[3097]	[3594]	[3835]	[4536]		
	23	53	115	175	235	293	350	406	433	513		
		74	72	69	66	62	57	52	49	42		
	[8]	[423]	[967]	[1502]	[2031]	[2549]	[3062]	[3563]	[3807]	[4526]		
30	48	109	170	229	288	346	403	430	511			
	100	98	95	92	88	83	77	73	64			
[10]	[357]	[901]	[1433]	[1961]	[2477]	[2989]	[3486]	[3730]	[4456]			
38	40	102	162	222	280	338	394	421	504			
	126	124	121	118	113	108	101	97	87			
[12]	[287]	[826]	[1357]	[1884]	[2402]	[2917]	[3410]	[3652]	[4363]			
45	32	93	153	213	271	330	385	413	493			
	152	150	147	144	140	134	126	121	109			
[14]	[199]	[733]	[1261]	[1786]	[2303]	[2818]	[3316]	[3561]	[4276]			
53	22	83	142	202	260	318	375	402	483			
	177	176	173	170	165	160	152	147	134			
[15]	[154]	[688]	[1218]	[1742]	[2258]	[2771]	[3273]	[3518]	[4241]			
57	17	78	138	197	255	313	370	398	479			
	190	189	186	183	178	173	165	160	146			
[20]		[418]	[945]	[1471]	[1986]	[2502]	[3004]	[3253]	[3997]			
Max. Conts.	76		47	107	166	224	283	339	368	452		
			253	251	248	244	239	231	226	212		

		Δ Pressure bar [PSI]								Max. Continuous	Max. Intermittent
		S Motor 372 cm ³ /r [22.7 in ³ /r]									
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1300]	[1500]		
		14	28	41	55	69	83	90	103		
Flow LPM [GPM]	[2]	[629]	[1287]	[1905]	[2501]	[3066]	[3624]	[3886]	[4370]		
	8	71	145	215	283	346	409	439	494		
		19	18	16	14	13	11	9	7		
	[4]	[628]	[1304]	[1962]	[2600]	[3206]	[3799]	[4082]	[4642]		
	15	71	147	222	294	362	429	461	525		
		40	38	36	34	30	27	25	23		
	[6]	[587]	[1261]	[1926]	[2578]	[3203]	[3813]	[4112]	[4687]		
	23	66	142	218	291	362	431	465	530		
		60	59	56	54	50	45	43	38		
	[8]	[529]	[1201]	[1867]	[2518]	[3148]	[3769]	[4072]	[4657]		
30	60	136	211	285	356	426	460	526			
	81	79	77	75	71	66	64	58			
[10]	[451]	[1124]	[1779]	[2429]	[3056]	[3678]	[3983]	[4583]			
38	51	127	201	274	345	416	450	518			
	102	100	98	96	92	86	84	78			
[12]	[359]	[1030]	[1688]	[2333]	[2963]	[3587]	[3889]	[4482]			
45	41	116	191	264	335	405	439	506			
	122	121	119	117	113	107	104	98			
[14]	[256]	[922]	[1577]	[2226]	[2864]	[3487]	[3787]	[4381]			
53	29	104	178	252	324	394	428	495			
	143	142	140	137	134	128	126	119			
[15]	[199]	[862]	[1514]	[2167]	[2797]	[3424]	[3727]	[4322]			
57	22	97	171	245	316	387	421	488			
	153	152	150	148	144	138	135	129			
[20]		[534]	[1187]	[1832]	[2470]	[3093]	[3402]	[4004]			
Max. Conts.	76		60	134	207	279	349	384	452		
			204	202	200	197	192	189	183		

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

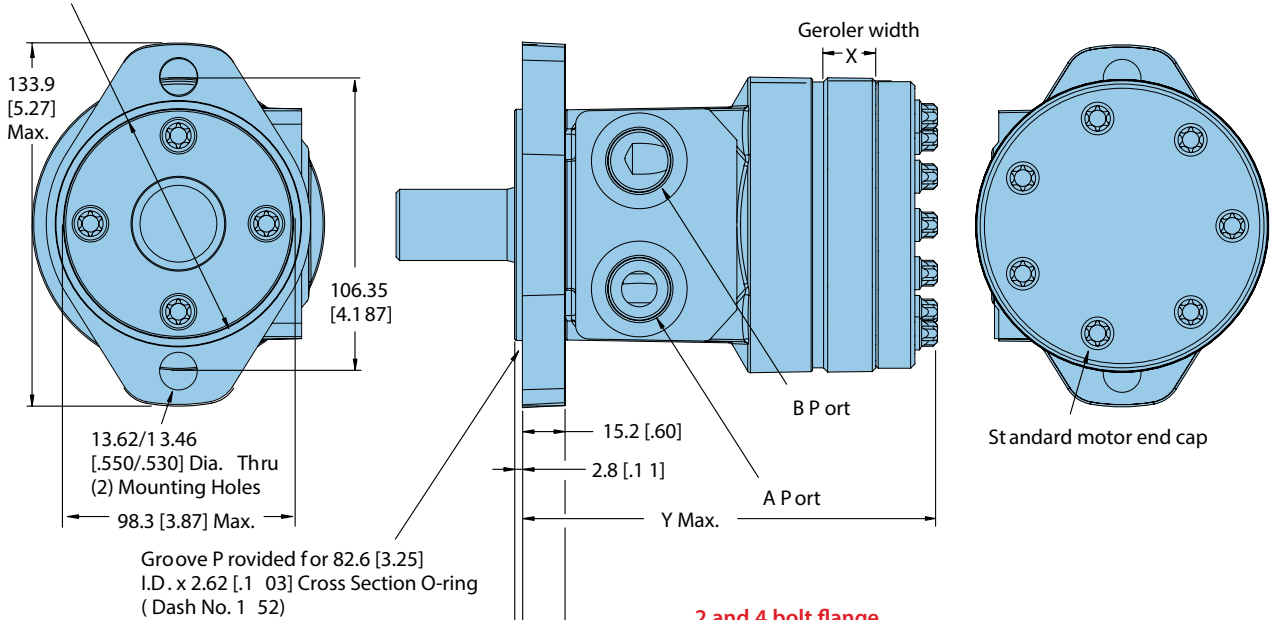
S Series (103-)

Dimensions

B-3

Code: AA 2 Bolt flange

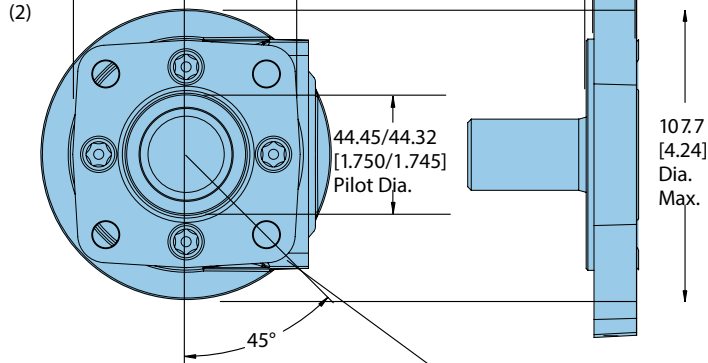
82.55/82.42 [3.250/3.245] Pilot Dia.



Code: BA 4 Bolt flange

42.9 [1.69] (2)

85.8 [3.38] Max.(2)



3/8-16 UNC (1 5.2 [.60] Max. Bolt Thread Engagement) Mounting Holes (4) Equally Spaced on 82.6 [3.25] Dia. Bolt Circle or M10 x 1.5 (1 5.2 [.60] Max. Bolt Thread Engagement) Mounting Holes (4) Equally Spaced on 82.6 [3.25] Dia. Bolt Circle

Ports

Standard rotation viewed from shaft end

Port A pressurized — CW

Port B pressurized — CCW

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

2 and 4 bolt flange

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
58 [3.6]	7.5 [.30]	138.0 [5.43]
76 [4.6]	9.8 [.39]	140.3 [5.52]
93 [5.7]	12.0 [.47]	142.5 [5.61]
120 [7.3]	15.5 [.61]	146.0 [5.75]
144 [8.8]	18.6 [.73]	149.1 [5.87]
165 [10.1]	21.3 [.84]	151.8 [5.98]
186 [11.4]	24.0 [.94]	154.5 [6.08]
225 [13.7]	28.9 [1.14]	159.4 [6.28]
299 [18.2]	38.5 [1.52]	169.0 [6.66]
371 [22.7]	47.9 [1.88]	178.4 [7.02]

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

103-1560

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 O-Ring	7/8-14 O-Ring	103-1570	-1010	-1011	-1571	-1572	-1012	-1013	-1014	-1015	-1016
	1/2 NPTF	103-1573	-1002	-1003	-1574	-1575	-1004	-1005	-1006	-1007	-1008
	Manifold	103-1576	-1018	-1019	-1577	-1578	-1020	-1021	-1022	-1023	-1024
1 in. SAE 6B Splined	7/8-14 O-Ring	-	-1058	-1059	-	-1581	-1060	-1061	-1062	-1063	-1064
	1/2 NPTF	-	-1050	-1051	-1583	-1584	-1052	-1053	-1054	-1055	-1056
	Manifold	103-1585	-1066	-1067	-	-1587	-1068	-1069	-1070	-	-1072

103-1587

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

S Series with low speed valving

Product numbers

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

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

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

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

B-3

2 Bolt flange

Shaft	Port size	Displ. cm ³ / r [in ³ / r] / product number									
		59 [3.6]	75 [4.6]	93 [5.7]	120 [7.3]	144 [8.8]	166 [10.1]	187 [11.4]	225 [13.7]	298 [18.2]	372 [22.7]
1 in. Straight w/ Woodruff Key	7/8 -14 O-Ring	103- —	-1427	-1428	—	—	-1429	-1430	-1431	-1432	-1433
	1/2 NPTF	103- —	-1419	-1420	—	—	-1421	-1422	-1423	-1424	-1425
	Manifold*	103- —	—	—	—	—	—	—	—	—	—
1 in. SAE 6B Splined	7/8 -14 O-Ring	103- —	-1525	—	—	-2692	—	-2764	—	-3373	-3155
	1/2 NPTF	103- —	—	-1634	—	—	-2690	—	—	—	—
	Manifold*	103- —	-1522	—	—	—	—	—	—	—	-1527

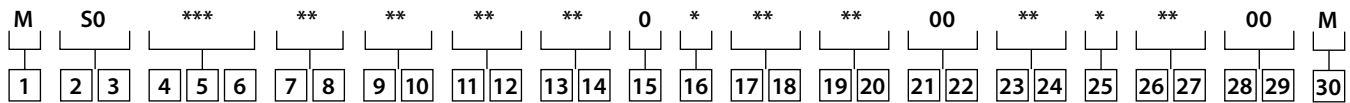
4 Bolt flange

Shaft	Port size	Displ. 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- —	-1410	-1411	-1626	-2531	-1412	—	—	-1415	-1416
	1/2 NPTF	103- —	-1402	-1403	—	—	-1404	-1405	-1406	-1407	-1408
							103-1404			103-1408	

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

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

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



B-3

1 **Product**
M Motor

2 **3** **Series**
S0 S Series Motor

4 **5** **6** **Displacement cm³/r [in³/r]**

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

7 **8** **Mounting type**

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

9 **10** **Output shaft**

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

11 **12** **Port type**

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

13 **14** **Case flow options ††**

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

15 **Geroler options**
0 None specified

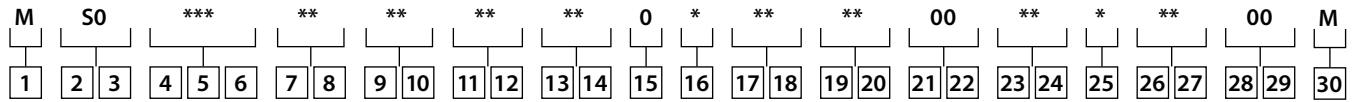
16 **Shaft options**
0 None specified
N Electroless nickel plated

S Series (103-)

Model code

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

B-3



17 18

Seal options

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

19 20

Speed sensor options

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

21 22

Manifold block options

- 00 None
- * Contact your Danfoss sales representative for available options.

23 24

Special features (hardware)

- 00 None specified
- AB Low speed valving

25

Special assembly instructions

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

26 27

Paint/packaging options

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

28 29

Danfoss assigned code when applicable

- 00 None

30

Danfoss assigned design code

- M Twelve

Description

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



Specifications

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

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

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

Features:

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

Benefits:

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

Applications:

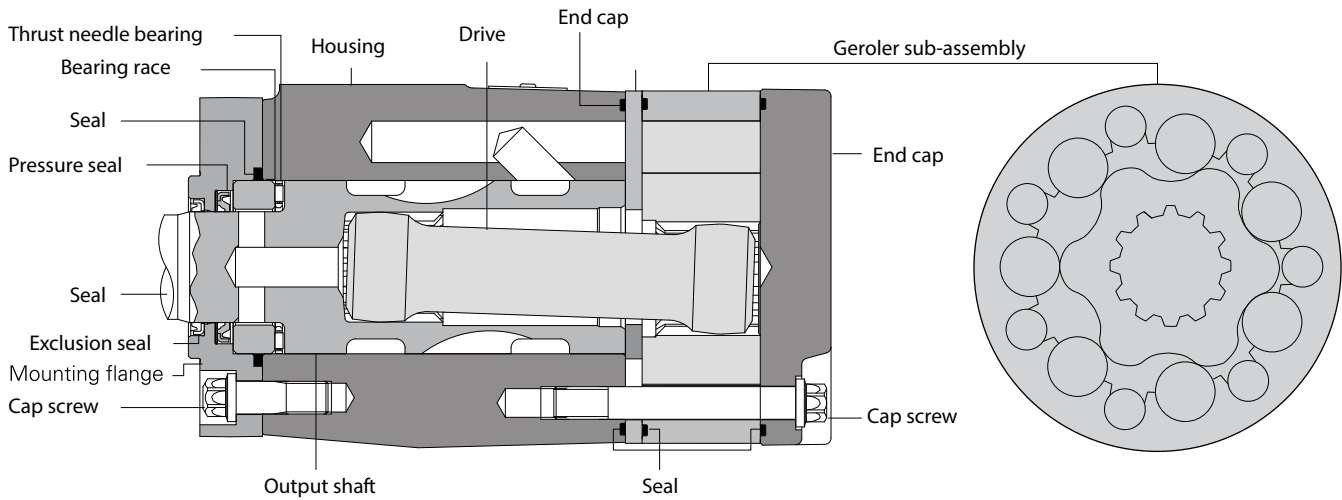
- Agricultural augers, harvesters, seeders
- Car wash brushes
- Food processing
- Railroad maintenance equipment
- Machine tools
- Conveyors
- Industrial sweepers and floor polishers
- Saw mills
- Turf equipment
- Concrete and asphalt equipment
- Skid steer attachments

B-4

T Series (158-)

Specifications

B-4



Specification data — T Motors

Displ. cm ³ /r [in ³ /r]	36	49	66	80	102	131	157	195	244	306	370
	[2.2]	[3.0]	[4.0]	[4.9]	[6.2]	[8.0]	[9.6]	[11.9]	[14.9]	[18.7]	[22.6]
Max. speed (RPM) @continuous flow	2021	906	898	740	586	454	379	306	244	195	162
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]
	Intermittent	38 [10]	57 [15]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	87	119	157	198	248	315	349	359	410	441
	Intermittent	99	135	178	225	280	353	410	445	485	483
Pressure Δ bar [ΔPSI]	Continuous	177	177	177	177	177	177	167	138	127	110
	Intermittent	202	202	202	202	202	202	202	177	155	124
Weight kg [lbs]	5.2	5.3	5.5	5.6	5.7	5.9	6.1	6.4	6.8	7.2	7.7

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

A simultaneous maximum torque and maximum speed NOT recommended.

Recommended fluids:

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

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

Maximum inlet pressure:

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

Recommended system operating temp.:

-34°C to 82°C [-30°F to 180°F]

Δ Pressure:

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

Recommended filtration:

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

Continuous rating:

Motor may be run continuously at these ratings

Thermal shock warning:

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

Intermittent operation:

10% of every minute

Minimum delta pressure warning:

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

T Series (158-, 185-)

Performance data

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



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

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

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

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

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

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

B-4

T Series (158-, 185-)

Performance data

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



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

B-4

		Δ Pressure bar [PSI] 66 cm ³ /r [4.0 in ³ /r]																Max. Continuous	Max. Intermittent
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	[2565]	[2750]	[2930]			
		14	28	41	55	69	83	97	110	124	138	152	155	177	190	202			
Max. Continuous	[2]	[78]	[191]	[303]	[414]	[522]	[625]	[706]	[804]	[898]	[991]	[1081]	[1103]	[1237]	[1318]	[1384]			
	8	9	22	34	47	59	71	80	91	101	112	122	125	140	149	156			
	[4]	114	111	110	107	105	101	96	92	87	81	73	72	58	48	41			
	15	229	229	217	216	212	205	194	190	186	183	181	178	172	170	166			
	[6]	[79]	[192]	[309]	[426]	[534]	[649]	[760]	[874]	[984]	[1090]	[1190]	[1218]	[1389]	[1488]	[1578]			
	23	9	22	35	48	60	73	86	99	111	123	134	138	157	168	178			
	[8]	344	343	335	334	321	320	319	315	291	288	279	276	270	270	255			
	30	[75]	[191]	[304]	[419]	[532]	[645]	[759]	[871]	[982]	[1092]	[1197]	[1222]	[1379]	[1458]	[1557]			
	[10]	8	22	34	47	60	73	86	98	111	123	135	138	156	165	176			
	38	456	451	447	442	431	426	419	415	412	401	391	386	361	339	334			
Max. Intermittent	[12]	[49]	[163]	[283]	[398]	[509]	[623]	[742]	[856]	[971]	[1080]	[1186]	[1209]	[1371]	[1425]	[1528]			
	45	6	18	32	45	58	70	84	97	110	122	134	137	155	161	173			
	[14]	569	565	560	552	547	541	532	525	512	504	498	496	482	475	464			
	53	[24]	[156]	[270]	[385]	[502]	[614]	[729]	[845]	[963]	[1067]	[1182]	[1209]	[1373]	[1472]	[1570]			
	[15]	3	18	31	43	57	69	82	95	109	121	134	137	155	166	177			
	57	681	678	671	665	658	651	641	635	623	612	604	601	582	571	559			
	[16]	[19]	[143]	[261]	[370]	[485]	[602]	[718]	[837]	[948]	[1064]	[1175]	[1199]	[1359]	[1436]	[1542]			
	61	2	16	29	42	55	68	81	95	107	120	133	135	154	162	174			
	[18]	793	788	787	778	771	762	753	746	733	723	715	711	690	677	665			
	68	[13]	[120]	[236]	[352]	[471]	[590]	[707]	[823]	[939]	[1052]	[1165]	[1192]	[1351]	[1462]	[1567]			
76	1	14	27	40	53	67	80	93	106	119	132	135	153	165	177				
	849	844	839	832	826	819	806	800	786	779	770	766	742	725	714				
	[16]	[122]	[234]	[347]	[464]	[579]	[695]	[812]	[927]	[1041]	[1152]	[1179]	[1346]	[1451]	[1551]				
	14	26	39	52	65	79	92	105	118	130	133	152	164	175					
	898	894	888	880	870	863	855	842	831	820	815	793	774	757					
	[18]	[107]	[215]	[326]	[442]	[555]	[669]	[786]	[900]	[1016]	[1123]	[1152]	[1327]						
	12	24	37	50	63	76	89	102	115	127	130	150							
	1006	1003	998	988	976	975	965	952	940	924	919	896							
	[20]	[76]	[182]	[290]	[408]	[520]	[623]	[737]	[845]	[960]	[1075]	[1104]	[1304]						
	9	21	33	46	59	70	83	95	108	121	125	147							
	1115	1115	1109	1103	1088	1086	1075	1064	1052	1035	1030	1003							

T Series (158-, 185-)

Performance data

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



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

		Δ Pressure bar [PSI] 80 cm ³ /r [4.9 in ³ /r]																Max. Continuous	Max. Intermittent
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	[2565]	[2750]	[2930]			
		14	28	41	55	69	83	97	110	124	138	152	155	177	190	202			
Flow LPM [GPM]	[2]	[123]	[265]	[405]	[544]	[680]	[804]	[934]	[1052]	[1181]	[1079]	[937]	[895]						
	8	14	30	46	61	77	91	106	119	133	122	106	101						
		93	90	86	83	80	75	70	63	57	43	24	20						
	[4]	[120]	[264]	[406]	[551]	[689]	[828]	[965]	[1101]	[1237]	[1369]	[1505]	[1537]	[1740]	[1857]	[1973]			
	15	14	30	46	62	78	94	109	124	140	155	170	174	197	210	223			
		187	185	183	179	175	171	166	162	156	150	142	140	129	121	113			
	[6]	[113]	[255]	[398]	[542]	[682]	[823]	[963]	[1101]	[1239]	[1373]	[1508]	[1541]	[1749]	[1868]	[1986]			
	23	13	29	45	61	77	93	109	124	140	155	170	174	198	211	224			
		279	275	271	267	265	258	253	248	240	232	223	221	207	198	188			
	[8]	[99]	[243]	[386]	[528]	[669]	[812]	[954]	[1094]	[1233]	[1368]	[1503]	[1537]	[1749]	[1872]	[1992]			
	30	11	27	44	60	76	92	108	124	139	155	170	174	198	212	225			
		372	367	364	359	354	351	343	338	333	324	315	313	299	289	280			
	[10]	[84]	[228]	[371]	[514]	[655]	[798]	[941]	[1080]	[1219]	[1357]	[1496]	[1530]	[1745]	[1870]	[1992]			
	38	9	26	42	58	74	90	106	122	138	153	169	173	197	211	225			
		463	460	456	450	446	441	435	428	420	412	403	399	381	368	358			
	[12]	[63]	[209]	[354]	[498]	[638]	[782]	[926]	[1067]	[1208]	[1346]	[1484]	[1520]	[1737]	[1864]	[1987]			
45	7	24	40	56	72	88	105	121	136	152	168	172	196	211	225				
	557	552	547	543	537	530	523	515	509	500	489	487	476	470	459				
[14]	[55]	[185]	[331]	[476]	[620]	[762]	[904]	[1046]	[1188]	[1327]	[1467]	[1502]	[1718]	[1842]	[1969]				
53	6	21	37	54	70	86	102	118	134	150	166	170	194	208	222				
	649	646	642	635	630	622	616	609	599	592	581	578	561	550	539				
[15]	[51]	[176]	[316]	[463]	[609]	[748]	[891]	[1037]	[1177]	[1316]	[1457]	[1491]	[1715]	[1844]	[1960]				
57	6	20	36	52	69	85	101	117	133	149	165	168	194	208	221				
	694	691	687	680	673	668	660	650	642	634	622	619	606	598	591				
[16]	[38]	[171]	[315]	[462]	[609]	[748]	[884]	[1029]	[1172]	[1317]	[1447]	[1487]	[1701]	[1822]	[1948]				
61	4	19	36	52	69	85	100	116	132	149	163	168	192	206	220				
	740	735	731	721	717	707	699	697	681	672	668	665	657	650	643				
Max. Continuous	[20]	[160]	[305]	[455]	[578]	[737]	[857]	[968]	[1144]	[1277]	[1412]	[1446]	[1668]						
Max. Intermittent	76	18	34	51	65	83	97	109	129	144	160	163	188						
		916	910	893	893	875	866	877	843	833	839	836	821						

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

B-4

T Series (158-, 185-)

Performance data

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



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

B-4

		Δ Pressure bar [PSI] 102 cm ³ /r [6.2 in ³ /r]																Max. Continuous	Max. Intermittent
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2200]	[2250]	[2565]	[2750]	[2930]			
		14	28	41	55	69	83	97	110	124	138	152	155	177	190	202			
Flow LPM [GPM]	[2]	[161]	[341]	[519]	[697]	[871]	[1030]	[1193]	[1349]	[1511]	[1496]	[1441]	[1421]						
	8	18	39	59	79	98	116	135	152	171	169	163	161						
		73	71	68	66	63	60	56	51	46	36	23	20						
	[4]	[157]	[340]	[520]	[702]	[879]	[1056]	[1229]	[1401]	[1567]	[1727]	[1889]	[1925]	[2151]	[2271]	[2412]			
	15	18	38	59	79	99	119	139	158	177	195	213	217	243	257	273			
		149	146	144	141	138	135	131	128	124	118	111	109	99	92	86			
	[6]	[147]	[329]	[510]	[692]	[871]	[1050]	[1227]	[1401]	[1571]	[1731]	[1895]	[1936]	[2192]	[2339]	[2478]			
	23	17	37	58	78	98	119	139	158	178	196	214	219	248	264	280			
		221	217	214	211	208	204	199	195	190	184	176	174	162	154	147			
	[8]	[132]	[315]	[497]	[675]	[857]	[1038]	[1216]	[1392]	[1564]	[1725]	[1891]	[1932]	[2184]	[2326]	[2470]			
30	15	36	56	76	97	117	137	157	177	195	214	218	247	263	279				
	294	290	287	284	280	277	271	267	262	255	247	245	231	220	213				
[10]	[109]	[293]	[477]	[657]	[839]	[1018]	[1198]	[1374]	[1542]	[1711]	[1878]	[1918]	[2178]	[2326]	[2470]				
38	12	33	54	74	95	115	135	155	174	193	212	217	246	263	279				
	367	363	360	355	351	347	343	337	332	325	318	315	299	287	277				
[12]	[84]	[271]	[457]	[638]	[818]	[999]	[1179]	[1354]	[1527]	[1697]	[1858]	[1901]	[2168]	[2323]	[2465]				
45	9	31	52	72	92	113	133	153	173	192	210	215	245	262	279				
	440	436	432	429	424	419	414	409	402	395	386	384	372	364	355				
[14]	[59]	[242]	[428]	[611]	[794]	[974]	[1151]	[1328]	[1502]	[1674]	[1841]	[1883]	[2148]	[2301]	[2447]				
53	7	27	48	69	90	110	130	150	170	189	208	213	243	260	276				
	513	510	506	501	497	492	487	482	475	469	458	456	440	428	420				
[15]	[39]	[227]	[411]	[595]	[780]	[957]	[1136]	[1314]	[1486]	[1658]	[1828]	[1869]	[2137]	[2285]	[2435]				
57	4	26	46	67	88	108	128	148	168	187	207	211	241	258	275				
	550	545	542	537	532	528	522	516	510	502	492	490	474	463	454				
[16]	[22]	[213]	[395]	[581]	[767]	[943]	[1119]	[1301]	[1471]	[1642]	[1825]	[1861]	[2124]	[2271]	[2425]				
61	2	24	45	66	87	107	126	147	166	186	206	210	240	257	274				
	586	581	576	574	567	563	556	549	544	535	526	524	508	497	486				
Max. Intermittent	[20]		[154]	[328]	[515]	[710]	[874]	[1060]	[1243]	[1405]	[1579]	[1763]	[1803]	[2071]					
	76		17	37	58	80	99	120	140	159	178	199	204	234					
			724	718	720	709	707	696	684	683	670	659	660	640					

T Series (158-, 185-)

Performance data

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



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

		Δ Pressure bar [PSI] 131 cm ³ /r [8.0 in ³ /r]												Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2500]	[2565]	[2930]		
		14	28	41	55	69	83	97	110	124	138	172	177	202		
Flow LPM [GPM]	[2]	[219]	[450]	[682]	[915]	[1144]	[1348]	[1561]	[1771]	[1979]	[2159]					
	8	25	51	77	103	129	152	176	200	224	244					
		57	55	53	51	49	47	43	40	36	30					
	[4]	[212]	[449]	[681]	[917]	[1148]	[1376]	[1600]	[1822]	[2025]	[2221]	[2629]	[2704]	[3043]		
	15	24	51	77	104	130	155	181	206	229	251	297	306	344		
		115	113	110	109	107	105	102	99	96	91	75	74	62		
	[6]	[197]	[435]	[669]	[903]	[1139]	[1370]	[1600]	[1818]	[2032]	[2226]	[2718]	[2785]	[3123]		
	23	22	49	76	102	129	155	181	205	230	252	307	315	353		
		171	168	166	163	160	157	154	150	147	142	125	124	112		
	[8]	[181]	[417]	[657]	[886]	[1122]	[1359]	[1589]	[1812]	[2022]	[2215]	[2699]	[2768]	[3101]		
30	20	47	74	100	127	154	180	205	228	250	305	313	350			
	227	225	222	219	217	213	209	206	202	196	175	174	159			
[10]	[144]	[389]	[631]	[859]	[1098]	[1330]	[1562]	[1783]	[1993]	[2198]	[2687]	[2755]	[3094]			
38	16	44	71	97	124	150	176	201	225	248	304	311	350			
	284	281	278	275	271	267	265	261	258	252	231	230	217			
[12]	[114]	[361]	[605]	[838]	[1075]	[1307]	[1532]	[1755]	[1965]	[2177]	[2671]	[2737]	[3079]			
45	13	41	68	95	121	148	173	198	222	246	302	309	348			
	341	338	334	332	328	325	321	318	312	307	285	284	269			
[14]	[82]	[327]	[569]	[803]	[1042]	[1273]	[1498]	[1722]	[1935]	[2147]	[2655]	[2721]	[3073]			
53	9	37	64	91	118	144	169	195	219	243	300	307	347			
	397	394	391	387	384	361	378	374	370	365	339	338	329			
[15]	[66]	[302]	[550]	[785]	[1025]	[1254]	[1480]	[1704]	[1915]	[2119]	[2648]	[2709]	[3066]			
57	7	34	62	89	116	142	167	193	216	239	299	306	346			
	426	423	422	415	412	409	405	402	398	392	367	365	351			
[16]	[41]	[281]	[529]	[767]	[1004]	[1238]	[1468]	[1685]	[1904]	[2106]	[2621]	[2678]	[3041]			
61	5	32	60	87	113	140	166	190	215	238	296	303	344			
	454	451	448	443	440	436	433	429	425	418	401	396	374			
Max. Continuous	[20]	[177]	[429]	[678]	[908]	[1143]	[1375]	[1596]	[1811]	[2017]						
Max. Intermittent	76	20	48	77	103	129	155	180	205	228						
		565	560	556	553	549	546	541	536	527						

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

B-4

T Series (158-, 185-)

Performance data

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

 Continuous  Intermittent

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

B-4

		Δ Pressure bar [PSI] 157 cm ³ /r [9.6 in ³ /r]											Max. Continuous	Max. Intermittent		
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1800]	[2000]	[2415]	[2500]	[2930]		
		14	28	41	55	69	83	97	110	124	138	167	172	202		
Flow LPM [GPM]	[2]	[264]	[541]	[819]	[1092]	[1357]	[1605]	[1847]	[2084]	[2311]	[1858]					
	8	30	61	93	123	153	181	209	235	261	210					
		47	45	44	42	40	37	34	30	25	16					
	[4]	[259]	[541]	[822]	[1101]	[1373]	[1638]	[1890]	[2145]	[2383]	[2613]	[3005]	[3063]	[3466]		
	15	29	61	93	124	155	185	214	242	269	295	340	346	392		
		96	95	92	91	90	88	85	82	78	73	63	60	47		
	[6]	[241]	[526]	[808]	[1090]	[1368]	[1638]	[1900]	[2150]	[2399]	[2628]	[3086]	[3169]	[3612]		
	23	27	59	91	123	155	185	215	243	271	297	349	358	408		
		142	140	138	136	134	132	129	125	121	114	102	99	84		
	[8]	[219]	[506]	[789]	[1068]	[1348]	[1625]	[1885]	[2140]	[2388]	[2619]	[3091]	[3178]	[3631]		
30	25	57	89	121	152	184	213	242	270	296	349	359	410			
	189	187	185	183	181	178	175	172	166	159	144	140	122			
[10]	[180]	[472]	[759]	[1037]	[1319]	[1590]	[1853]	[2111]	[2355]	[2594]	[3076]	[3170]	[3631]			
38	20	53	86	117	149	180	209	239	266	293	348	358	410			
	237	234	232	230	227	224	222	218	211	203	188	183	163			
[12]	[141]	[436]	[728]	[1010]	[1292]	[1561]	[1821]	[2079]	[2331]	[2573]	[3063]	[3162]	[3630]			
45	16	49	82	114	146	176	206	235	263	291	346	357	410			
	284	282	279	277	274	272	269	265	257	248	230	225	202			
[14]	[101]	[397]	[687]	[969]	[1252]	[1519]	[1778]	[2040]	[2295]	[2539]	[3043]	[3147]	[3629]			
53	11	45	78	109	141	172	201	230	259	287	344	356	410			
	332	329	326	323	321	319	316	311	305	296	279	274	253			
[15]	[81]	[367]	[665]	[944]	[1231]	[1497]	[1755]	[2018]	[2273]	[2512]	[3028]	[3136]	[3620]			
57	9	41	75	107	139	169	198	228	257	284	342	354	409			
	355	353	350	347	344	342	339	334	327	318	304	300	280			
[16]	[51]	[344]	[639]	[924]	[1209]	[1480]	[1743]	[2005]	[2261]	[2505]	[3009]	[3119]	[3594]			
Max. Continuous	61	6	39	72	104	137	167	197	227	255	283	340	352	406		
	379	377	373	370	368	365	362	357	350	343	329	325	305			
Max. Intermittent	[20]		[221]	[519]	[814]	[1095]	[1368]	[1631]	[1891]	[2149]	[2396]	[2895]				
	76		25	59	92	124	155	184	214	243	271	327				
			472	467	464	462	459	455	450	443	433	417				

T Series (158-, 185-)

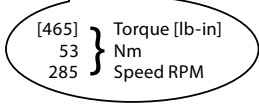
Performance data

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



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

		Δ Pressure bar [PSI] 195 cm ³ /r [11.9 in ³ /r]												Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1750]	[1800]	[2000]	[2500]	[2565]		
		14	28	41	55	69	83	97	110	121	124	138	172	177		
Flow LPM [GPM]	[2]	[330]	[671]	[1016]	[1345]	[1654]	[1969]	[2242]	[2507]	[2689]	[2748]	[2973]				
	8	37	76	115	152	187	222	253	283	304	310	336				
		38	36	34	33	31	28	25	20	16	14	8				
	[4]	[328]	[675]	[1026]	[1366]	[1692]	[2010]	[2289]	[2586]	[2799]	[2867]	[3144]	[3797]	[3867]		
	15	37	76	116	154	191	227	259	292	316	324	355	429	437		
		77	77	75	73	73	71	68	65	62	61	55	40	38		
	[6]	[306]	[658]	[1011]	[1360]	[1698]	[2021]	[2324]	[2604]	[2829]	[2901]	[3178]	[3831]	[3905]		
	23	35	74	114	154	192	228	263	294	320	328	359	433	441		
		115	113	111	110	109	107	104	100	97	95	87	68	66		
	[8]	[272]	[634]	[980]	[1331]	[1675]	[2003]	[2300]	[2592]	[2815]	[2888]	[3174]	[3864]	[3936]		
	30	31	72	111	150	189	226	260	293	318	326	359	437	445		
		153	151	150	148	146	144	142	139	134	132	123	99	98		
	[10]	[238]	[596]	[945]	[1296]	[1637]	[1960]	[2255]	[2565]	[2786]	[2857]	[3140]	[3816]	[3894]		
	38	27	67	107	146	185	221	255	290	315	323	355	431	440		
		192	189	188	186	184	183	181	176	168	166	156	133	130		
	[12]	[181]	[545]	[908]	[1260]	[1607]	[1924]	[2223]	[2529]	[2759]	[2836]	[3121]	[3807]	[3883]		
45	20	62	103	142	182	217	251	286	312	320	353	430	439			
	230	228	226	224	222	221	219	213	207	204	192	160	159			
[14]	[154]	[500]	[860]	[1211]	[1556]	[1869]	[2175]	[2483]	[2713]	[2792]	[3080]	[3778]	[3860]			
53	17	56	97	137	176	211	246	281	307	315	348	427	436			
	268	266	264	261	259	259	256	251	244	242	229	199	196			
[15]	[140]	[465]	[832]	[1179]	[1525]	[1835]	[2144]	[2459]	[2693]	[2768]	[3061]	[3764]	[3852]			
57	16	53	94	133	172	207	242	278	304	313	346	425	435			
	287	285	283	281	279	278	275	269	262	260	247	220	216			
[16]	[105]	[438]	[800]	[1155]	[1505]	[1824]	[2128]	[2440]	[2678]	[2754]	[3056]	[3755]	[3843]			
61	12	49	90	130	170	206	240	276	303	311	345	424	434			
	306	305	302	300	298	297	294	289	281	279	267	241	236			
[20]		[291]	[653]	[1013]	[1366]	[1689]	[1987]	[2298]	[2540]	[2622]	[2928]					
Max. Intermittent	76	33	74	114	154	191	225	260	287	296	331					
		382	378	375	373	372	368	363	356	353	342					



B-4

T Series (158-, 185-)

Performance data

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



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

B-4

		Δ Pressure bar [PSI] 244 cm ³ /r [14.9 in ³ /r]											Max. Continuous	Max. Intermittent	
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1600]	[1650]	[1800]	[1850]	[2250]		
		14	28	41	55	69	83	97	110	114	124	128	155		
Flow LPM [GPM]	[2]	[406]	[833]	[1260]	[1655]	[2038]	[2403]	[2707]	[2597]	[2552]	[2373]	[2299]			
	8	46	94	142	187	230	272	306	293	288	268	260			
		30	29	27	26	24	22	17	12	11	7	6			
	[4]	[404]	[843]	[1277]	[1695]	[2083]	[2468]	[2820]	[3177]	[3261]	[3509]	[3589]	[4194]		
	15	46	95	144	192	235	279	319	359	368	396	406	474		
		62	62	60	59	59	57	55	50	49	46	44	35		
	[6]	[382]	[823]	[1261]	[1687]	[2088]	[2477]	[2843]	[3196]	[3285]	[3547]	[3633]	[4290]		
	23	43	93	142	191	236	280	321	361	371	401	410	485		
		92	91	90	89	88	86	82	78	76	72	71	60		
	[8]	[341]	[787]	[1220]	[1651]	[2059]	[2454]	[2820]	[3177]	[3265]	[3530]	[3615]	[4285]		
30	39	89	138	187	233	277	319	359	369	399	408	484			
	123	122	121	120	119	116	113	108	106	101	99	85			
[10]	[297]	[744]	[1177]	[1611]	[2017]	[2412]	[2774]	[3151]	[3241]	[3504]	[3593]	[4269]			
38	34	84	133	182	228	273	313	356	366	396	406	482			
	154	152	151	150	148	146	143	136	134	127	125	107			
[12]	[225]	[687]	[1132]	[1553]	[1967]	[2360]	[2734]	[3105]	[3194]	[3466]	[3554]	[4237]			
45	25	78	128	175	222	267	309	351	361	392	402	479			
	184	183	181	180	179	177	173	166	163	156	153	134			
[14]	[154]	[628]	[1072]	[1498]	[1910]	[2298]	[2674]	[3052]	[3148]	[3419]	[3510]	[4226]			
53	17	71	121	169	216	260	302	345	356	386	397	477			
	214	213	212	211	209	207	202	195	193	185	182	161			
[15]	[119]	[586]	[1035]	[1458]	[1872]	[2261]	[2637]	[3022]	[3116]	[3389]	[3488]	[4220]			
57	13	66	117	165	212	255	298	341	352	383	394	477			
	229	228	227	226	224	222	217	209	207	200	197	174			
[16]	[78]	[547]	[993]	[1415]	[1829]	[2218]	[2589]	[2956]	[3037]	[3299]	[3393]	[4170]			
61	9	62	112	160	207	251	293	334	343	373	383	471			
	244	243	242	241	239	237	231	223	221	213	209	189			
[20]		[372]	[816]	[1251]	[1663]	[2067]	[2448]	[2832]	[2928]	[3214]	[3312]				
76		42	92	141	188	234	277	320	331	363	374				
		305	303	301	300	297	292	284	281	273	270				

T Series (158-, 185-)

Performance data

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



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

		Δ Pressure bar [PSI] 306 cm ³ /r [18.7 in ³ /r]										Max. Continuous	Max. Intermittent		
		[200]	[400]	[600]	[800]	[1000]	[1200]	[1400]	[1500]	[1600]	[1800]				
		14	28	41	55	69	83	97	103	110	124				
Flow LPM [GPM]	[2]	[499]	[1035]	[1560]	[2034]	[2501]	[2912]	[3239]	[2859]	[2400]					
	8	56	117	176	230	283	329	366	323	271					
		24	23	22	21	19	16	11	8	5					
	[4]	[497]	[1052]	[1590]	[2101]	[2561]	[3023]	[3464]	[3680]	[3886]	[4221]				
	15	56	119	180	237	289	342	391	416	439	477				
		49	49	48	48	47	47	44	41	38	30				
	[6]	[480]	[1031]	[1578]	[2096]	[2564]	[3023]	[3464]	[3689]	[3905]	[4275]				
	23	54	116	178	237	290	342	391	417	441	483				
		74	74	72	72	71	69	64	62	60	51				
	[8]	[427]	[975]	[1520]	[2051]	[2525]	[2998]	[3448]	[3667]	[3881]	[4264]				
	30	48	110	172	232	285	339	390	414	438	482				
		99	98	97	97	96	94	89	86	83	73				
	[10]	[370]	[930]	[1467]	[2001]	[2477]	[2955]	[3406]	[3631]	[3852]	[4264]				
	38	42	105	166	226	280	334	385	410	435	482				
		123	122	121	120	120	117	112	108	104	92				
	[12]	[281]	[871]	[1410]	[1908]	[2400]	[2887]	[3352]	[3573]	[3790]	[4189]				
45	32	98	159	216	271	326	379	404	428	473					
	147	146	145	145	145	142	136	131	127	112					
[14]	[192]	[791]	[1338]	[1851]	[2338]	[2816]	[3281]	[3511]	[3743]	[4135]					
53	22	89	151	209	264	318	371	397	423	467					
	171	171	170	170	169	165	159	154	150	133					
[15]	[148]	[738]	[1288]	[1803]	[2287]	[2773]	[3243]	[3475]	[3705]	[4098]					
57	17	83	146	204	258	313	366	393	419	463					
	183	183	182	182	181	177	171	165	160	146					
[16]	[97]	[692]	[1236]	[1742]	[2229]	[2714]	[3195]	[3410]	[3639]	[4064]					
61	11	78	140	197	252	307	361	385	411	459					
	195	195	194	194	193	189	182	177	171	157					
[20]	[476]	[1020]	[1544]	[2010]	[2519]	[3010]	[3243]	[3495]							
76	54	115	174	227	285	340	366	395							
	243	242	242	241	238	231	226	209							

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

B-4

T Series (158-, 185-)

Performance data

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

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



B-4

		Δ Pressure bar [PSI] 370 cm ³ /r [22.6 in ³ /r]							Max. Continuous	Max. Intermittent	
		200	400	600	800	1000	1200	1300	1500		
		14	28	41	55	69	83	90	103		
Flow LPM [GPM]	[2]	[590]	[1237]	[1858]	[2406]	[2953]	[3388]	[3586]			
	8	67	140	210	272	334	383	405			
		20	19	18	17	15	12	11			
	[4]	[588]	[1263]	[1906]	[2506]	[3029]	[3557]	[3811]	[4252]		
	15	66	143	215	283	342	402	431	480		
		41	41	40	40	39	38	37	36		
	[6]	[580]	[1245]	[1899]	[2506]	[3029]	[3544]	[3788]	[4300]		
	23	66	141	215	283	342	400	428	486		
		61	60	60	59	58	57	56	54		
	[8]	[514]	[1164]	[1824]	[2452]	[2975]	[3518]	[3783]	[4284]		
	30	58	132	206	277	336	397	427	484		
		82	81	80	79	78	77	77	75		
	[10]	[444]	[1119]	[1759]	[2391]	[2928]	[3479]	[3750]	[4275]		
	38	50	126	199	270	331	393	424	483		
		102	102	101	101	100	97	96	93		
	[12]	[337]	[1062]	[1690]	[2256]	[2813]	[3393]	[3685]	[4273]		
45	38	120	191	255	318	383	416	483			
	122	121	120	119	119	118	116	112			
[14]	[231]	[958]	[1608]	[2201]	[2748]	[3319]	[3610]	[4198]			
53	26	108	182	249	310	375	408	474			
	142	141	140	139	138	137	134	129			
[15]	[178]	[896]	[1543]	[2147]	[2683]	[3272]	[3572]	[4187]			
57	20	101	174	243	303	370	404	473			
	152	152	151	150	149	147	146	140			
[16]	[118]	[843]	[1481]	[2065]	[2609]	[3194]	[3495]	[4131]			
61	13	95	167	233	295	361	395	467			
	162	162	161	160	159	157	155	150			
[20]		[587]	[1228]	[1833]	[2331]	[2948]	[3273]				
76		66	139	207	263	333	370				
		202	201	201	200	198	196				

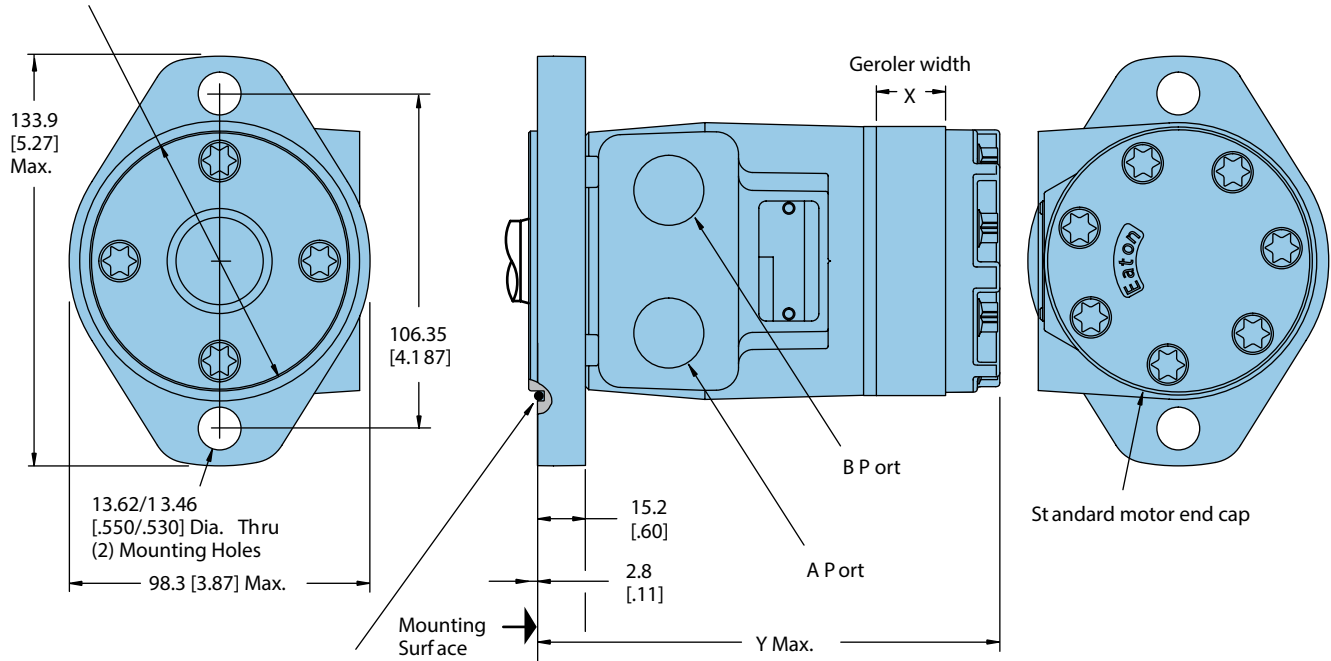
Standard rotation viewed from shaft end

Port A pressurized — CW

Port B pressurized — CCW

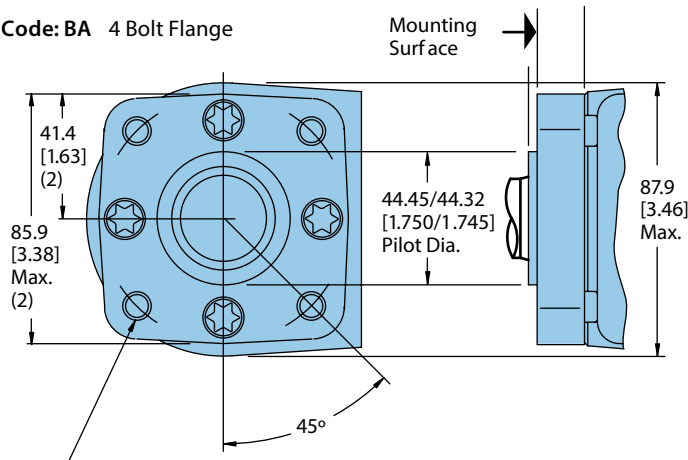
Code: AA 2 Bolt Flange

82.55/82.42 [3.250/3.245] Pilot Dia.



Groove P provided for 82.6 [3.25] I. D. x 2.62 [.103] Cross Section O-ring (Dash No. 1 52)

Code: BA 4 Bolt Flange



2 and 4 bolt flange port dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
36 [2.2]	6.6 [.26]	132.2 [5.21]
49 [3.0]	9.1 [.36]	134.6 [5.30]
66 [4.0]	12.2 [.48]	137.7 [5.42]
80 [4.9]	14.7 [.58]	140.3 [5.53]
102 [6.2]	18.5 [.73]	144.3 [5.68]
131 [8.0]	24.1 [.95]	149.6 [5.89]
157 [9.6]	29.0 [1.14]	154.5 [6.09]
195 [11.9]	35.6 [1.40]	161.3 [6.35]
244 [14.9]	44.7 [1.76]	170.3 [6.71]
306 [18.7]	56.1 [2.21]	181.6 [7.16]
370 [22.6]	72.1 [2.84]	197.9 [7.79]

3/8-16 UNC (1 5.2 [.60] Max. Bolt thread engagement)

Mounting holes (4) equally spaced on 82.6 [3.25] Dia.

Bolt circle or M1 0 x 1.5 (1 5.2 [.60] Max. Bolt thread engagement) mounting holes (4) equally

spaced on 82.6 [3.25] Dia. Bolt circle

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	-2045	-1046	-1047	-1048
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158- — —	—	-1552	-1082	-1083	-1553	-1084	-1085	-1086	-1087	-1088
		1/2 NPTF	158- — —	—	-1555	-2074	-1075	—	-1076	-1077	-2078	-1079	-1080
		Manifold*	158- — —	—	-1558	-1647	-1091	-1559	-1092	-1093	-1094	-1095	-3065
4 Bolt Flange	1 in. Straight w/Woodruff Key	7/8 -14 O-Ring	158- — —	—	-1570	-1010	-1011	-1571	-1012	-1013	-1014	-1015	-1016
		1/2 NPTF	158- — —	—	-1573	-1002	-1003	-1574	-1004	-1005	-1006	-1007	-1008
		Manifold*	158- — —	—	-1576	-1018	-1019	-1577	-1020	-1021	-1022	-1023	-1024
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158- — —	—	-1579	-1058	-1059	-1580	-1060	-1061	-1062	-1063	-1064
		1/2 NPTF	158- — —	—	-1582	-1050	-2051	-1583	-1052	-1053	—	-1055	-1056
		Manifold*	158- — —	—	-1585	-1066	-2067	-1586	—	-1069	-3976	-1071	-1072

158-2067

T Series motors with corrosion protection

Mounting	Shaft	Port size	Displ. 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- — —	—	-4246	-3469	-4247	—	-3416	—	—	—	-3490
4 Bolt Flange		1/2 NPTF	158- — —	—	—	—	—	—	—	—	—	—	-1621

T Series motors with low speed valving

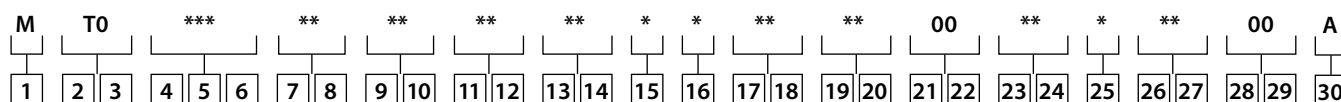
Mounting	Shaft	Port size	Displ. cm ³ /r [in ³ /r] / product number										
			36 [2.2]	49 [3.0]	66 [4.0]	80 [4.9]	102 [6.2]	131 [8.0]	157 [9.6]	195 [11.9]	244 [14.9]	306 [18.7]	370 [22.6]
2 Bolt Flange	1 in. Straight w/Woodruff Key	7/8 -14 O-Ring	158- — —	—	—	-1427	-1428	—	—	-1430	-1431	-1432	-1433
		1/2 NPTF	158- — —	—	—	-1419	-1420	—	—	-1422	-1423	-1424	—
		Manifold*	158- — —	—	—	—	—	—	—	—	—	—	—
	1 in. SAE 6B Splined	7/8 -14 O-Ring	158- — —	—	—	-1525	—	—	—	—	-1675	—	—
		1/2 NPTF	158- — —	—	—	—	-1634	—	—	—	—	—	—
		Manifold*	158- — —	—	—	-1522	—	—	—	—	—	—	-1527
4 Bolt Flange	1 in. Straight w/Woodruff Key	7/8 -14 O-Ring	158- — —	—	-1625	-1410	-1411	-1626	-1412	-1413	-1414	-1415	-3385
		1/2 NPTF	158- — —	—	-1644	-1402	-1403	—	-1404	-1405	-1406	-1407	-1408
		Manifold*	158- — —	—	—	—	—	—	—	—	—	—	—

158-1403

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

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

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



1	Product
M	Motor

2	3	Series
T0		T Series

4	5	6	Displacement cm³/r [in³/r]
022	35		[2.2]
030	49		[3.0]
040	65		[4.0]
049	80		[4.9]
062	102		[6.2]
080	131		[8.0]
096	158		[9.6]
119	195		[11.9]
149	244		[14.9]
187	306		[18.7]
226	370		[22.6]

7	8	Mounting type
AA		2 Bolt (standard) 82,6 [3.248] Dia. and 3,05 [.120] pilot, 13,59 [.535] Dia. Mounting holes 106,35 [4.187] Dia. B.C.
BA		4 Bolt (standard) 44,40 [1.748] Dia. x 3,05 [.120] pilot, .375-16 UNC-2B mounting holes 82,55 [3.250] Dia. B.C.
DD		2 Bolt (Std.) 101,60 [4.000] Dia. x 6.10 [.240] pilot, 14,35 [.565] Dia. Mounting holes 146,05 [5.750] Dia. B.C. (SAE B) (Ductile)
EA		4 Bolt magneto 82,50 [3.248] Dia. x 3,05 [.120] Pilot, 13,59 [.535] Dia. Mounting holes 106,35 [4.187] Dia. B.C.
FA		4 Bolt (standard) 44,40 [1.748] Dia. x 3,05 [.120] pilot, M10 x 1.5-6H mounting holes on 82,55 [3.250] Dia. B.C.
MA		2 Bolt (standard) 82,50 [3.248] Dia. x 8.13 [.320] Pilot, 13,59 [.535] Dia. Mounting holes on 106,35 [4.187] Dia. B.C.

9	10	Output shaft description
01		25,4 [1.00] Dia. Straight, woodruff key, .250-20 UNC-2B hole in shaft end
02		25,4 [1.00] Dia. SAE 6B Spline, .25-20 UNC-2B hole in shaft end
08		25,4 [1.00] Dia. Straight, 10,31 [.406] Dia. crosshole 15,7 [.62] from end, .250-20 UNC-2B hole in shaft end
16		22,22 [.875] Dia. SAE 13 tooth spline (SAE B)
18		25,4 [1.00] Dia. Tapered, Woodruff key and Nut, 34,92 [1.375] taper length
24		25,00 [.984] Dia. Straight, 8,0 [.315] key, MB x 1.25-6H hole in shaft end
39		25,00 [.984] Dia. Straight (k6), 8,00 [.315] Key, M8 x 1.25-6H hole in shaft end

11	12	Port type
AA		.875-14 UNF-2B SAE O-Ring ports
AB		.500-14 NPTF Dryseal pipe thread ports
AC		Manifold (.3125-18 UNC-2B mounting holes)
AD		Manifold ports (MB x 1.25-6H mounting holes)
AF		G 1/2 BSP straight thread ports

13	14	Case flow options
00		None specified
01		.4375-20 UNF-2B SAE O-ring port (end cap)
02		G 1/4 BSP straight thread port (end cap)
A		Internal check valves

15	Geroler options
0	None
A	Free running

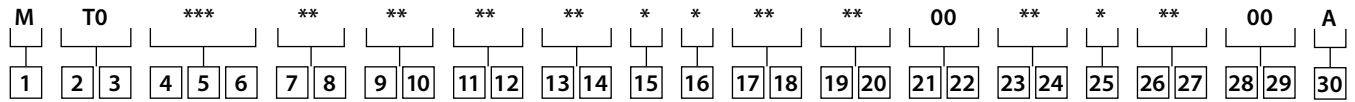
16	Shaft options
0	None
N	Electroless nickel plated

T Series (158-)

Model code

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

B-4



17	18	Seal options
00		Standard seals
02		Seal guard
03		Viton seals
07		High pressure shaft seal
11		High pressure shaft seal & seal guard

19	20	Speed sensor options
00		None
AA		Digital speed pickup (15 pulse), M12 connector (A=Power, B=Common, C=Signal)
AB		Magnetic speed pickup (60 pulse by quadrature), M12 connector, (A=Power, B=Common, C=Signal)
AE		Digital speed pickup (15 pulse), 127 [5.0] lead wire with weather pack shroud connector (A=Power, B=Signal, C=Common)

21	22	Valve options
00		None

23	24	Special features (hardware)
00		None specified
AB		Low speed valving
JM		Low flow housing and low speed valving

25	Special assembly instructions
0	None
1	Reverse rotation
2	Flange rotation 90°

26	27	Paint/packaging options
00		No paint
AA		Low gloss black primer
AY		Nickel plated motor (excluding shaft)
AF		Environmental coated black

28	29	Danfoss assigned code when applicable
00		None

30	Design code
A	One

Description

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



Specifications

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

Features

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

Benefits

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

Applications

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

B-4

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-4-70). However, seal life is reduced at higher case pressure.

Residual pressure

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

Holding torque and motor output torque

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

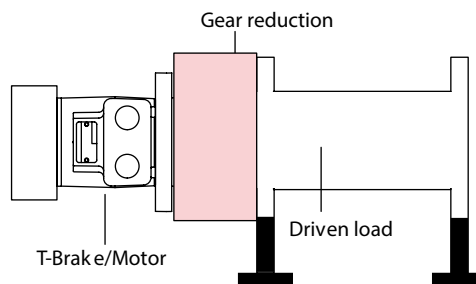
Note: Danfoss does not approve any products for customer applications. It is the sole responsibility of the customer to qualify and verify the correct operation of products in their systems.

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

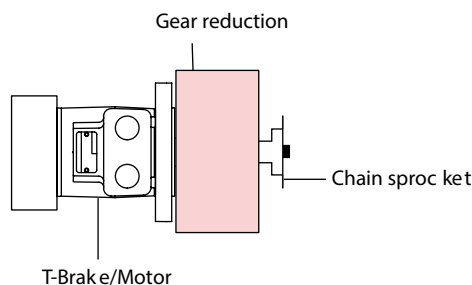
Note: The T Series with parking brake is not compatible with water based fluids.

Typical applications

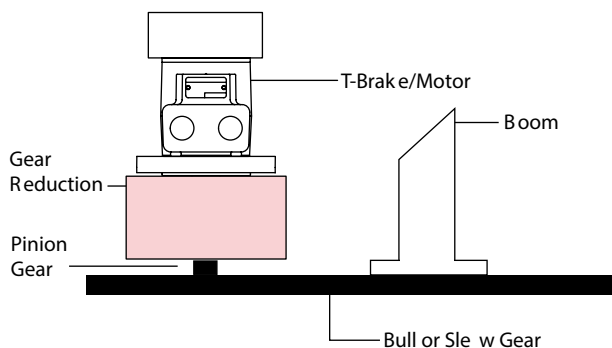
Winch



Machine drive

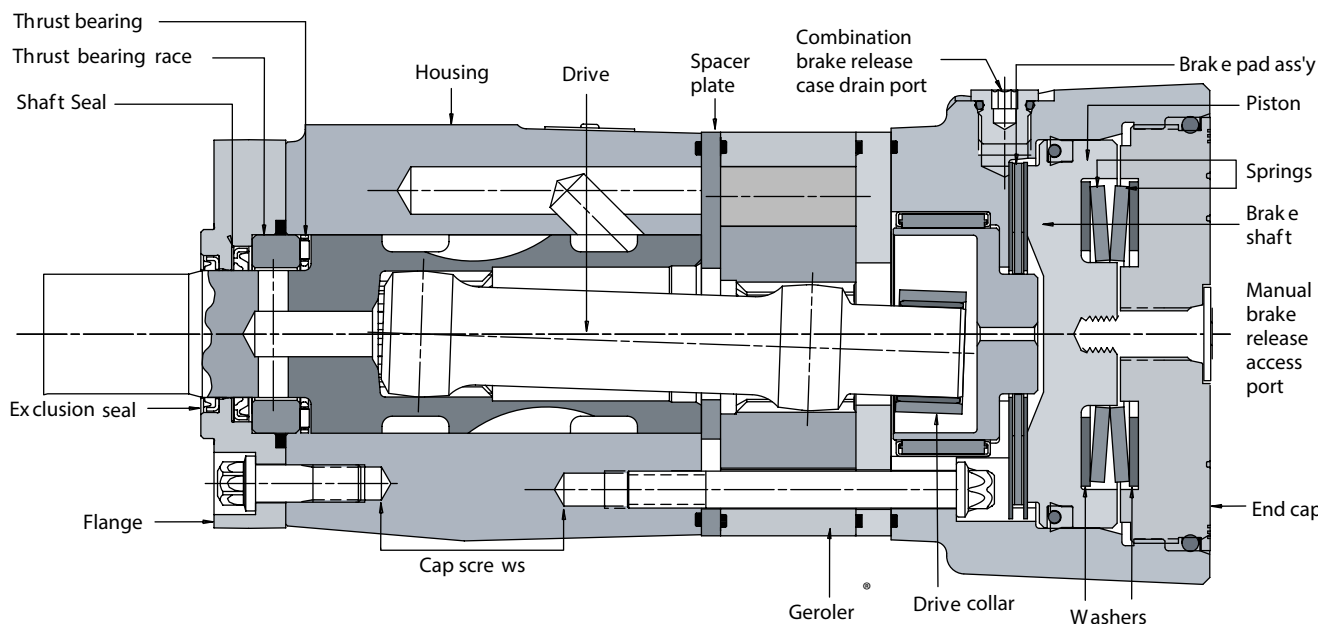


Swing boom



T Series with Parking Brake (185-)

Specifications



B-4

Specification Data — T Series with parking brake motors

Shaft		36	49	66	80	102	131	157	195	244	306	370
Displ. cm ³ /r [in ³ /r]		[2.2]	[3.0]	[4.0]	[4.9]	[6.2]	[8.0]	[9.6]	[11.9]	[14.9]	[18.7]	[22.6]
Max. Speed (RPM) @ continuous flow		906	898	694	550	426	355	287	229	183	152	
Flow LPM [GPM]	Continuous	38 [10]	45 [12]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]	61 [16]
	Intermittent	38 [10]	57 [15]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]	76 [20]
Torque Nm [lb-in]	Continuous	76	105	138	174	219	251	297	359	410	441	430
		[672]	[928]	[1222]	[1541]	[1936]	[2226]	[2628]	[3178]	[3633]	[3905]	[3811]
	Intermittent **	93	118	168	212	264	307	359	437	485	483	486
		[824]	[1131]	[1488]	[1872]	[2339]	[2718]	[3178]	[3864]	[4290]	[4275]	[4300]
Pressure Δ Bar [Δ PSI]	Continuous	177	177	177	177	177	177	167	138	127	110	90
		[2565]	[2565]	[2565]	[2565]	[2565]	[2565]	[2415]	[2000]	[1850]	[1600]	[1300]
	Intermittent***	202	202	202	202	202	202	202	177	155	124	103
		[2930]	[2930]	[2930]	[2930]	[2930]	[2930]	[2930]	[2565]	[2250]	[1800]	[1500]
Weight kg [lbs]		8.5	8.6	8.8	8.9	9.0	9.3	9.5	9.7	10.1	10.5	11.1
		[18.7]	[19.0]	[19.4]	[19.6]	[19.8]	[20.5]	[20.9]	[21.4]	[22.3]	[23.1]	[24.5]

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

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

T Series brake holding torque settings:

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

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

in-lbs Full capacity brake

in-lbs Limited capacity brake

T Series with Parking Brake (185-)

Dimensions

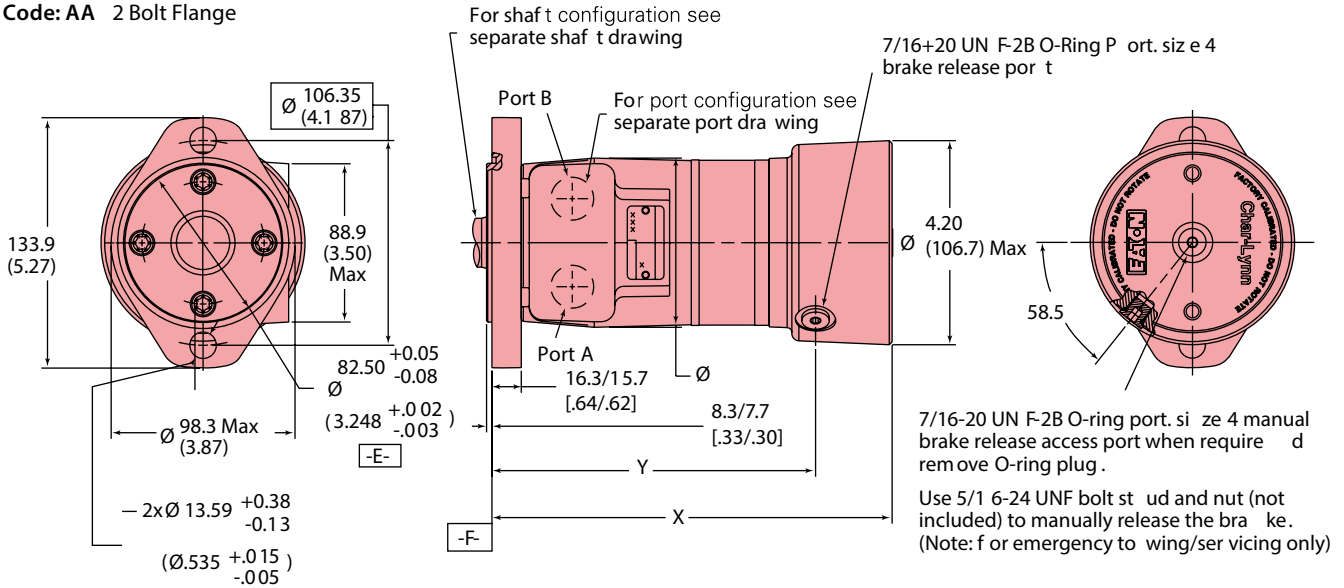
Standard rotation viewed from shaft end

Port A pressurized -- CW

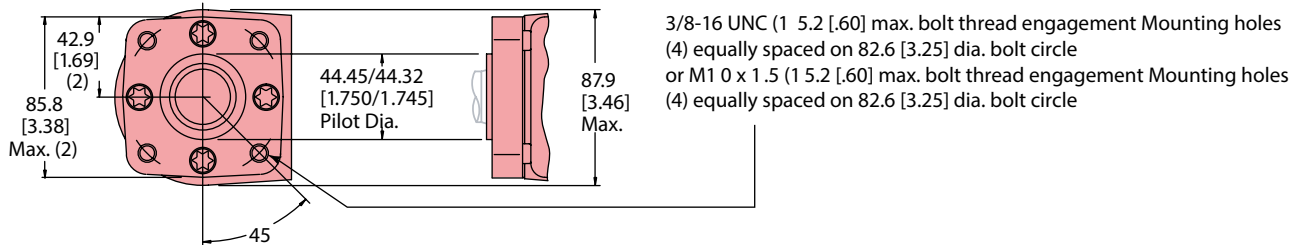
Port B pressurized -- CCW

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

Code: AA 2 Bolt Flange



Code: BA 4 Bolt Flange



T-Series with parking brake dimensions

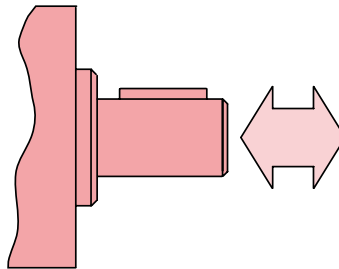
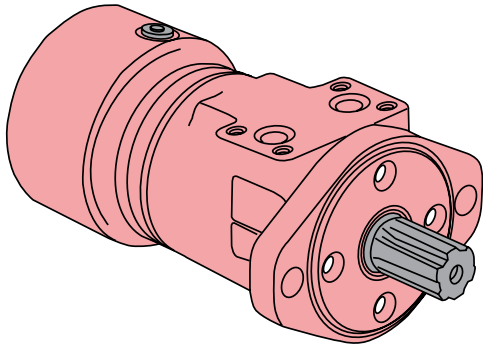
Displacement	X	Y
cm ³ /r [in ³ /r]	mm [inch]	mm [inch]
36 [2.2]	190.2 [7.49]	143.9±0.9 [5.66±0.3]
41 [2.5]	190.8 [7.51]	144.5±0.9 [5.69±0.3]
49 [3.0]	192.5 [7.58]	146.3±0.9 [5.76±0.3]
59 [3.6]	194.3 [7.65]	148.1±0.9 [5.83±0.3]
66 [4.0]	195.6 [7.70]	149.3±0.9 [5.88±0.3]
80 [4.9]	198.4 [7.81]	152.0±0.9 [5.98±0.3]
102 [6.2]	202.2 [7.96]	155.9±0.9 [6.14±0.3]
131 [8.0]	207.5 [8.17]	161.3±0.9 [6.35±0.3]
157 [9.6]	212.6 [8.37]	166.2±0.9 [6.54±0.3]
195 [11.9]	219.2 [8.63]	172.9±0.9 [6.81±0.3]
244 [14.9]	228.3 [8.99]	181.9±0.9 [7.16±0.3]
306 [18.7]	239.5 [9.43]	193.3±0.9 [7.61±0.3]
370 [22.6]	251.2 [9.89]	205.0±0.9 [8.07±0.3]

T Series with Parking Brake (185-)

Brake release and motor case pressure

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

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



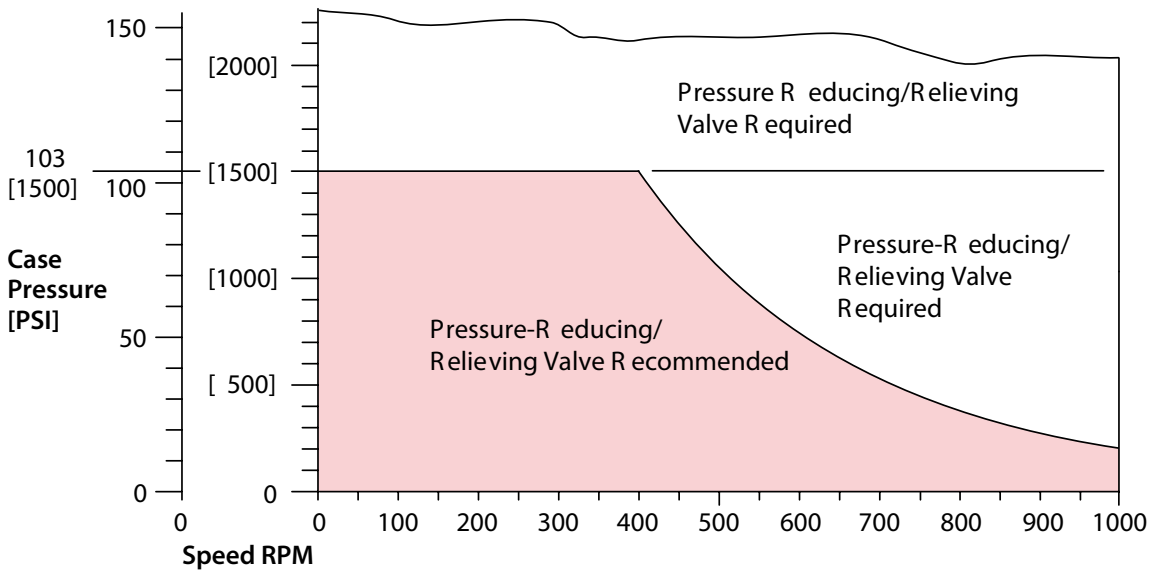
$$P_C \approx 6 DP + P_2$$

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

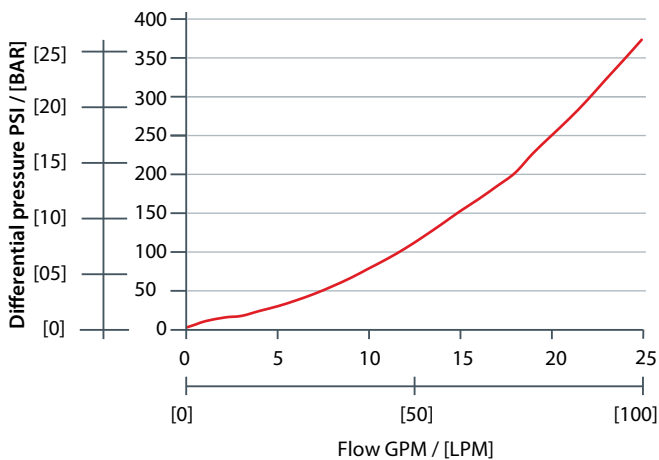
Max. Axial loads 454 kg [1000 lb]

B-4

Case pressure/shaft seal



T Series with Parking Brake NLPD - no load pressure drop



T Series with Parking Brake (185-)

Product numbers

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

Orders will not be accepted without three digit prefix.

Standard valving

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

Low speed valving

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

185-2357

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

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

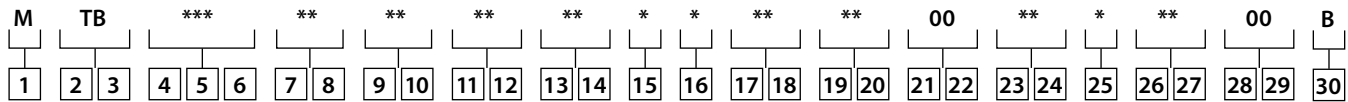
Motors with this valving are not intended for low pressure applications (A minimum of 300 psi delta must be maintained between A port pressure and case pressure).

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

T Series with Parking Brake (185-)

Model code

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



B-4

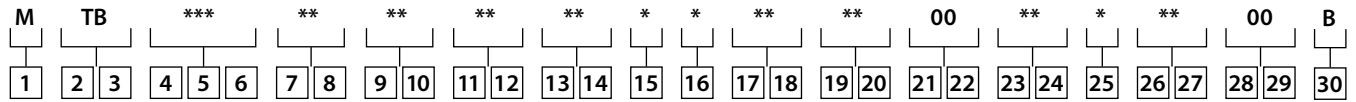
1	Product	M	Motor
2 3	Series	TB	T Series motor with parking brake
4 5 6	Displacement cm ³/r [in ³/r]	022	36 [2.2]
		030	49 [3.0]
		040	66 [4.0]
		049	80 [4.9]
		062	102 [6.2]
		080	131 [8.0]
		096	157 [9.6]
		119	195 [11.9]
		149	244 [14.9]
		187	306 [18.7]
		226	370 [22.6]
7 8	Mounting type	AA	2 Bolt (Standard) 82,5 [3.248] Dia. and 3,05 [.120] pilot, 13,59 [.535] Dia. Mounting Holes 106,35 [4.187] Dia. B.C.
		BA	4 Bolt (Standard) 44,40 [1.748] Dia. x 3,05 [.120] pilot, .375-16 UNC-2B Mounting Holes 82,55 [3.250] Dia. B.C.
		DA	2 Bolt (Std.) 101,60 [4.000] Dia. x 6.10 [.240] pilot, 14,35 [.565] Dia. Mounting Holes 146,05 [5.750] Dia. B.C. (SAE B)
		EA	4 Bolt Magneto 82,50 [3.248] Dia. x 3,05 [.120] Pilot, 13,59 [.535] Dia. Mounting Holes 106,35 [4.187] Dia. B.C.
		FA	4 Bolt (Standard) 44,40 [1.748] Dia. x 3,05 [.120] pilot, M10 x 1.5-6H Mounting Holes on 82,55 [3.250] Dia. B.C.

9 10	Output shaft description	01	25,4 [1.00] Dia. Straight, Woodruff Key, .250-20 UNC-2B Hole in Shaft End
		02	25,4 [1.00] Dia. SAE 6B Spline, .25-20 UNC-2B Hole in Shaft End
		16	SAE 13 Tooth Spline, 16/32 Pitch, 21,74 (.856) Dia. (SAE B)
		18	25,4 [1.00] Dia. Tapered, Woodruff Key and Nut, 34,92 [1.375] Taper Length
		24	25.00 [.984] Dia. Straight, 8.0 [.315] Key, MB x 1.25-6H Hole in Shaft End
11 12	Port type	AA	.875-14 UNF-2B SAE O-Ring Ports
		AB	.500-14 NPTF Dryseal Pipe Thread Ports
		AC	Manifold (.3125-18 UNC-2B Mounting Holes)
		AD	Manifold Ports (MB x 1.25-6H Mounting Holes)
13 14	Case flow options	00	None specified
		03	Manifold case drain
15	Geroler options	A	Standard
		B	Free running
16	Shaft options	0	None
		N	Electroless nickel plated
17 18	Seal options	00	Standard seals
		03	Viton seals
		07	High pressure shaft seal
19 20	Speed sensor options	00	None
		AA	Digital speed pickup (15 pulse), M12 connector (A=Power, B=Common, C=Signal)

T Series with Parking Brake (185-)

Model code

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



B-4

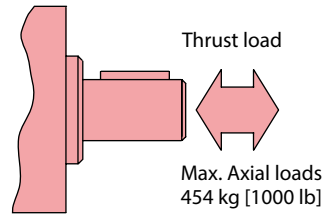
21	22	Valve options
00	None	
23	24	Special features (hardware)
00	None specified	
AB	Low speed valving	
25		Special assembly instructions
0	None	
2	Flange rotation 90°	

26	27	Paint/packaging options
00	No paint	
AA	Low gloss black primer	
28	29	Danfoss assigned code when applicable
00	None	
30		Design code
B	Two	

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

Case pressure and case drain instead

Char-Lynn H Series, S Series and T Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine if an external case drain is required from the case pressure seal limitation chart below — chart based on case pressure and shaft speed. If a case drain line is needed, connect drain line to assure that the motor will always remain full of fluid.



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

PC = Case Pressure

P_1 = Inlet Line Pressure

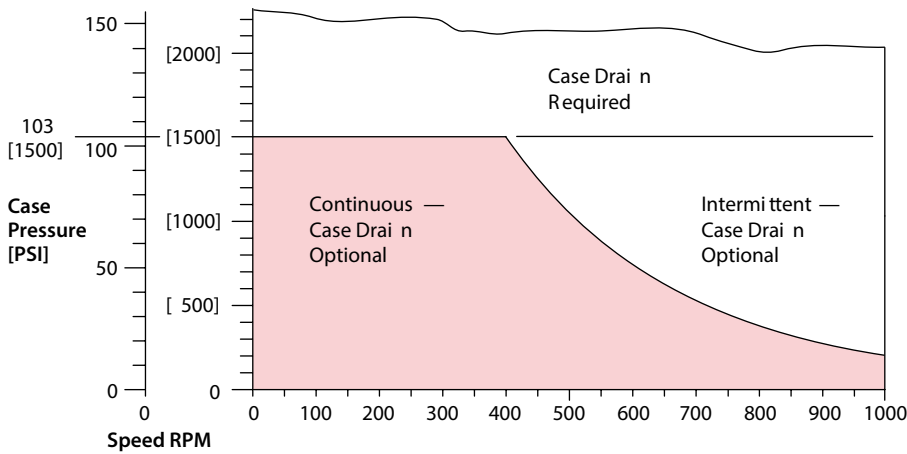
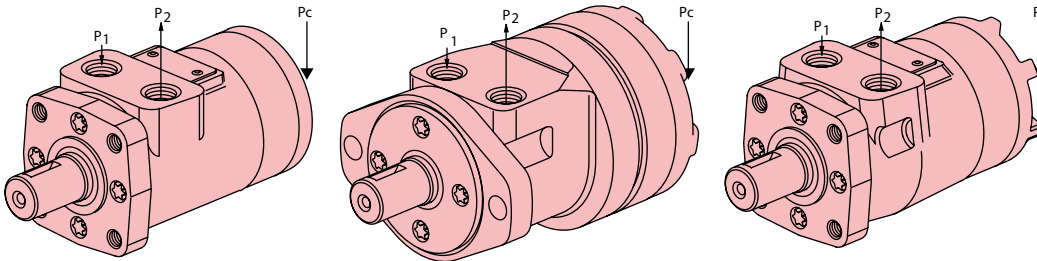
P_2 = Back Pressure

$$\Delta P = P_1 - P_2$$

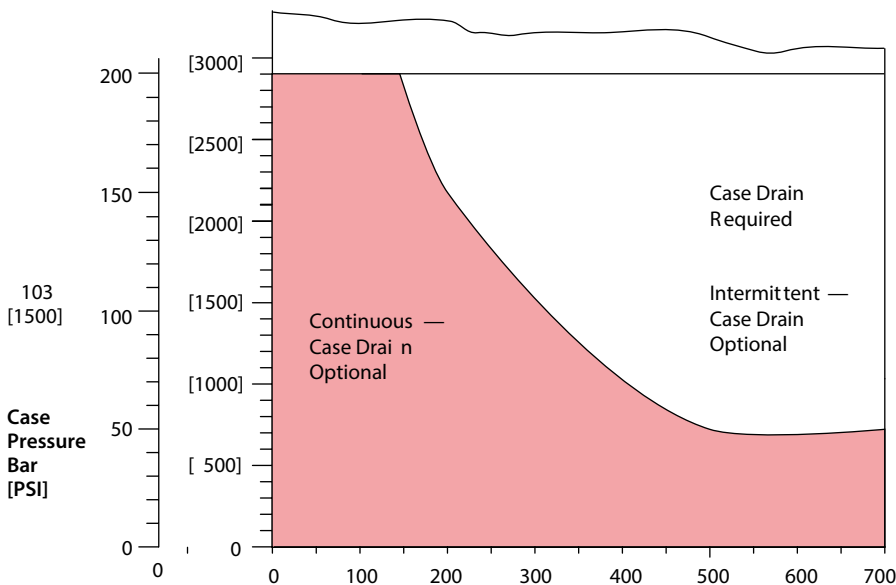
H Series

S Series

T Series



High pressure shaft seal



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

Side load capacity

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

B-4

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

RPM Allowable shaft side load — Kg [lb]

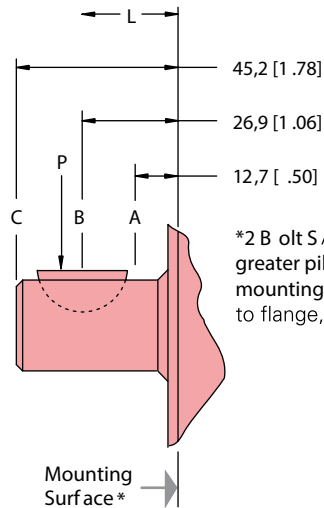
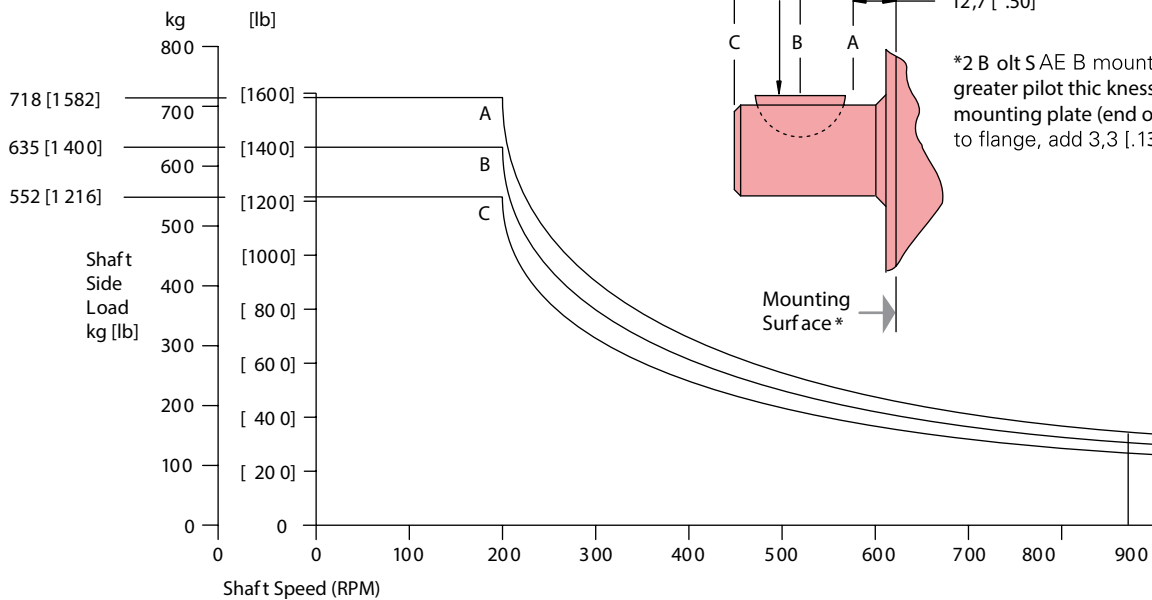
	A	B	C
900	154 [339]	136 [300]	118 [261]
625	205 [452]	181 [400]	158 [348]
500	256 [565]	227 [500]	197 [435]
400	307 [678]	272 [600]	237 [522]
300	410 [904]	363 [800]	316 [696]
200	718 [1582]	635 [1400]	552 [1216]

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

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

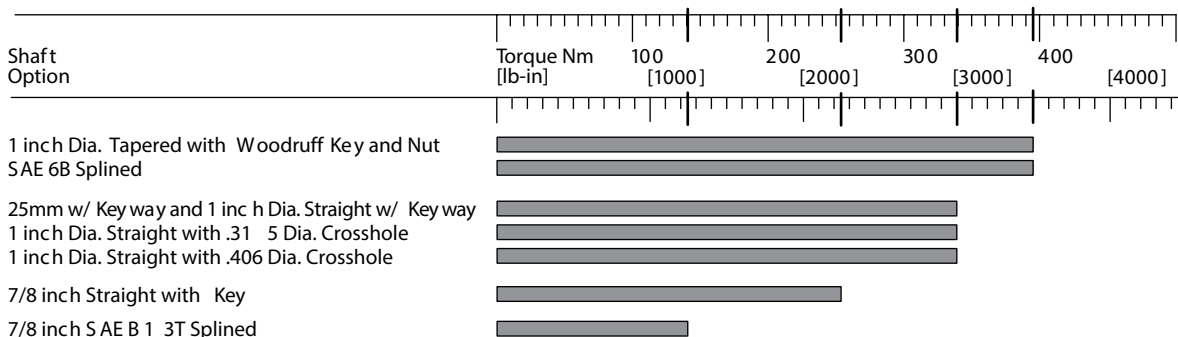
Where N = Shaft Speed (RPM)

L = Distance from Mounting Surface



Shafts

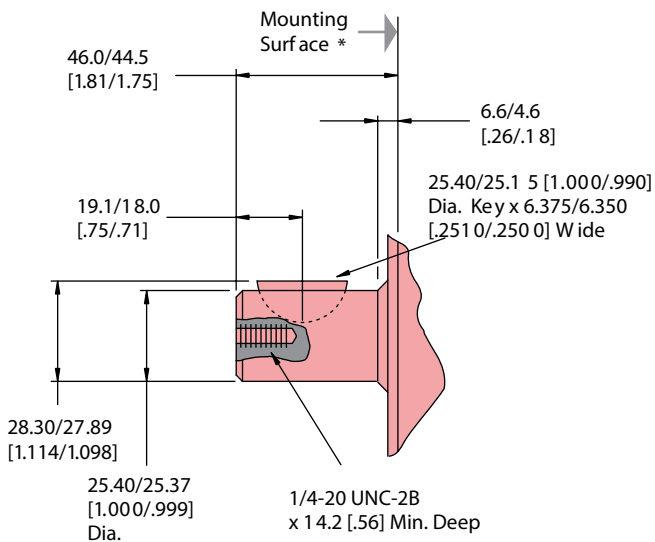
Shaft size motor torque combination limit guide



B-4

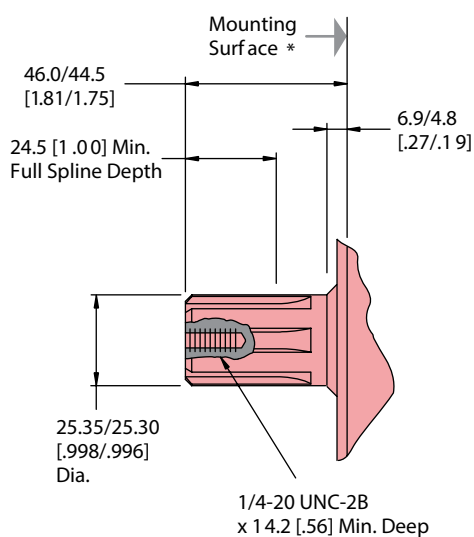
Code: 01

1 in. Dia. Straight with woodruff key



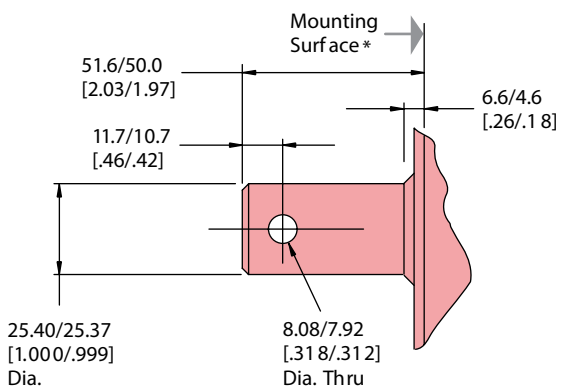
Code: 02

SAE 6B Splined shaft code: 02



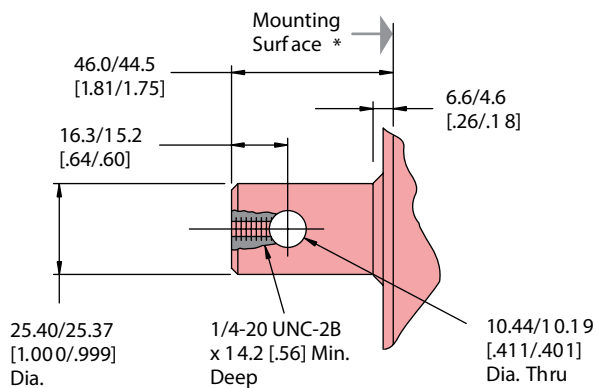
Code: 07

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



Code: 08

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



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

Dimensions

Shafts

Code: 18

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

25.40/25.15 x 6.38/6.35

[1.000/.990 x .251/.250] Woodruff Key

3/4-16 UNF -2A Slotted Hex Nut

16.0 [.63] Thick 28.12 [1.107]

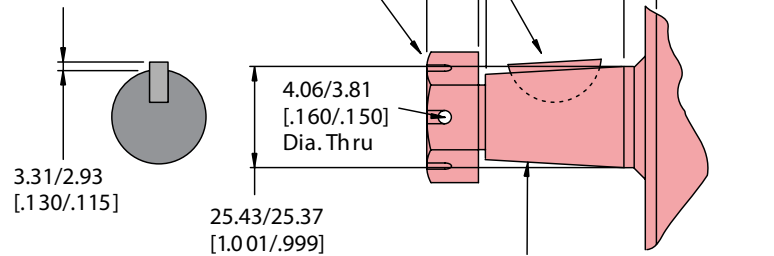
Across Flats

Recommended Torque :

(203 Nm [150 lb-ft] Dry)

(169 Nm [125 lb-ft] Lub)

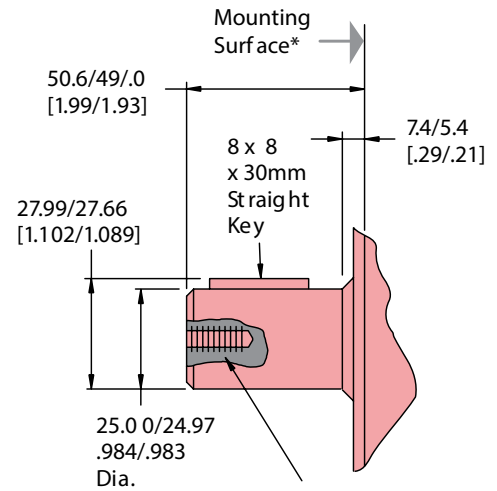
Plus torque required to align slotted nut with the shaft crosshole



125.000.17mm Taper Per Meter [1.500.02 inch Taper Per Foot]
Tapered Shaft End Per SAE J501 Except as specified

Code: 24

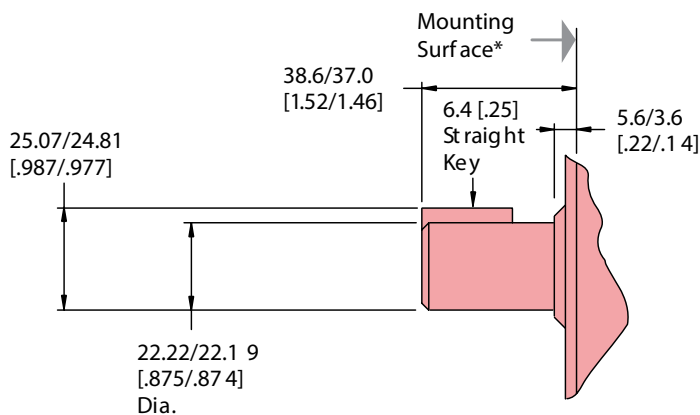
25mm Dia. Straight Shaft with 8mm Keyway



M8 x 1.25 -6H x 16.0 [.63] Deep

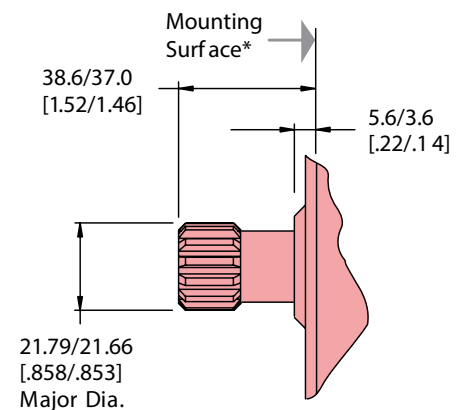
Code: 17

7/8 in. Dia. Straight shaft with key



Code: 16

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



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

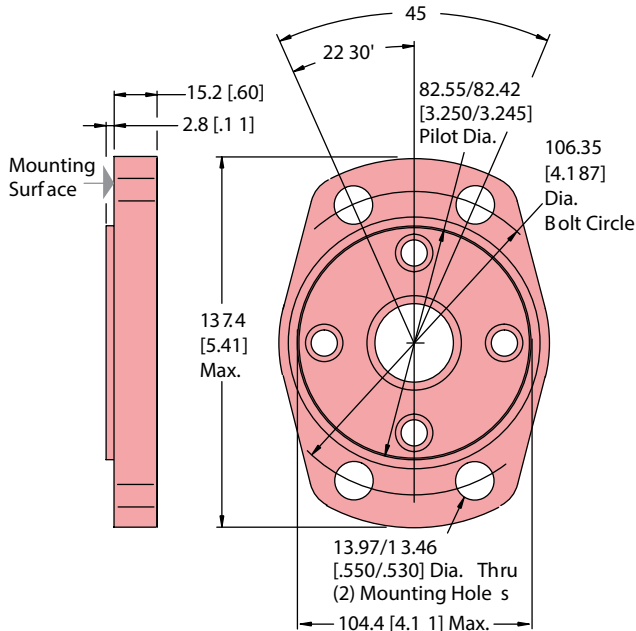
B-4

Mounting options

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

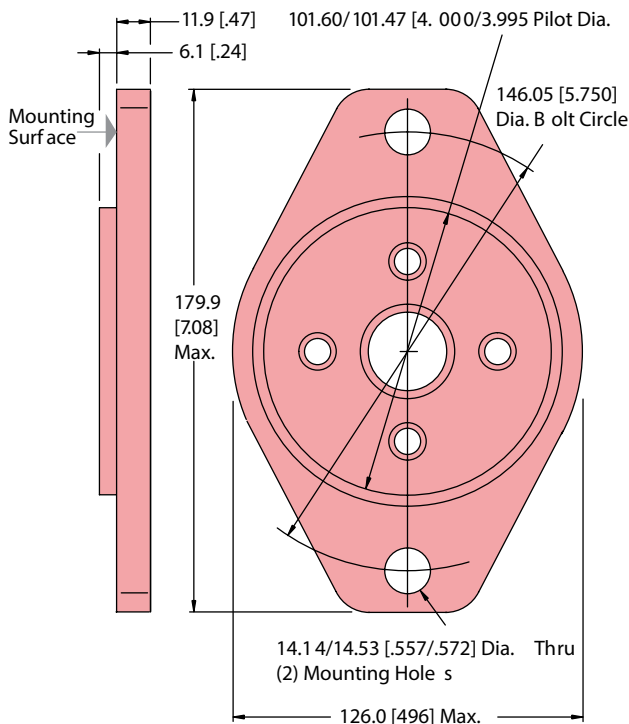
Code: MA

4 Bolt Magnet

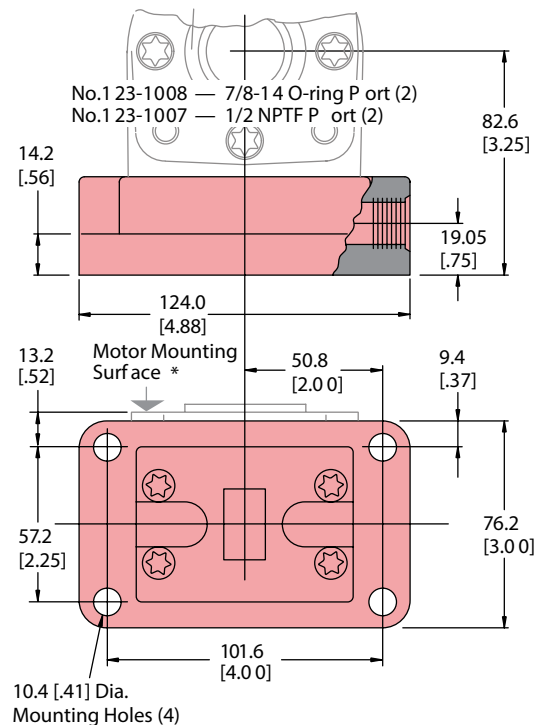
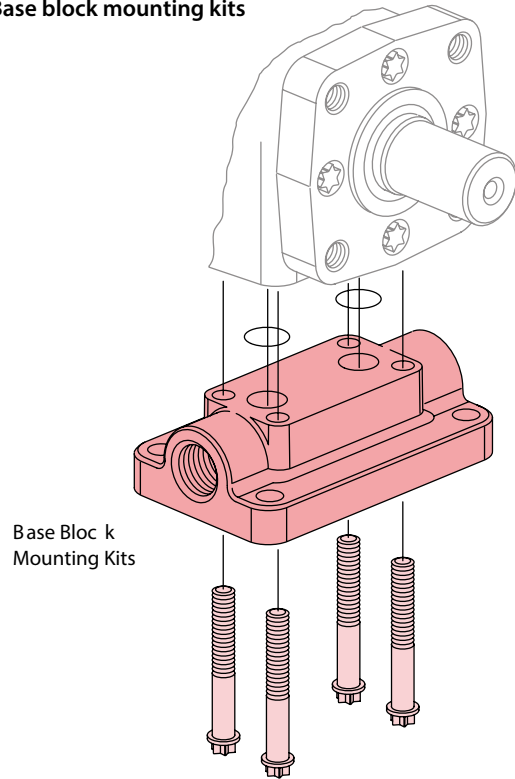


Code: DD

2 Bolt SAE B



Base block 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-)

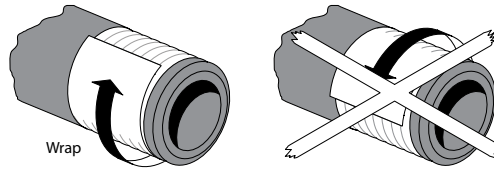
Dimensions

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

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

Use the following procedures:

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



Ports

End Ports — H Series only

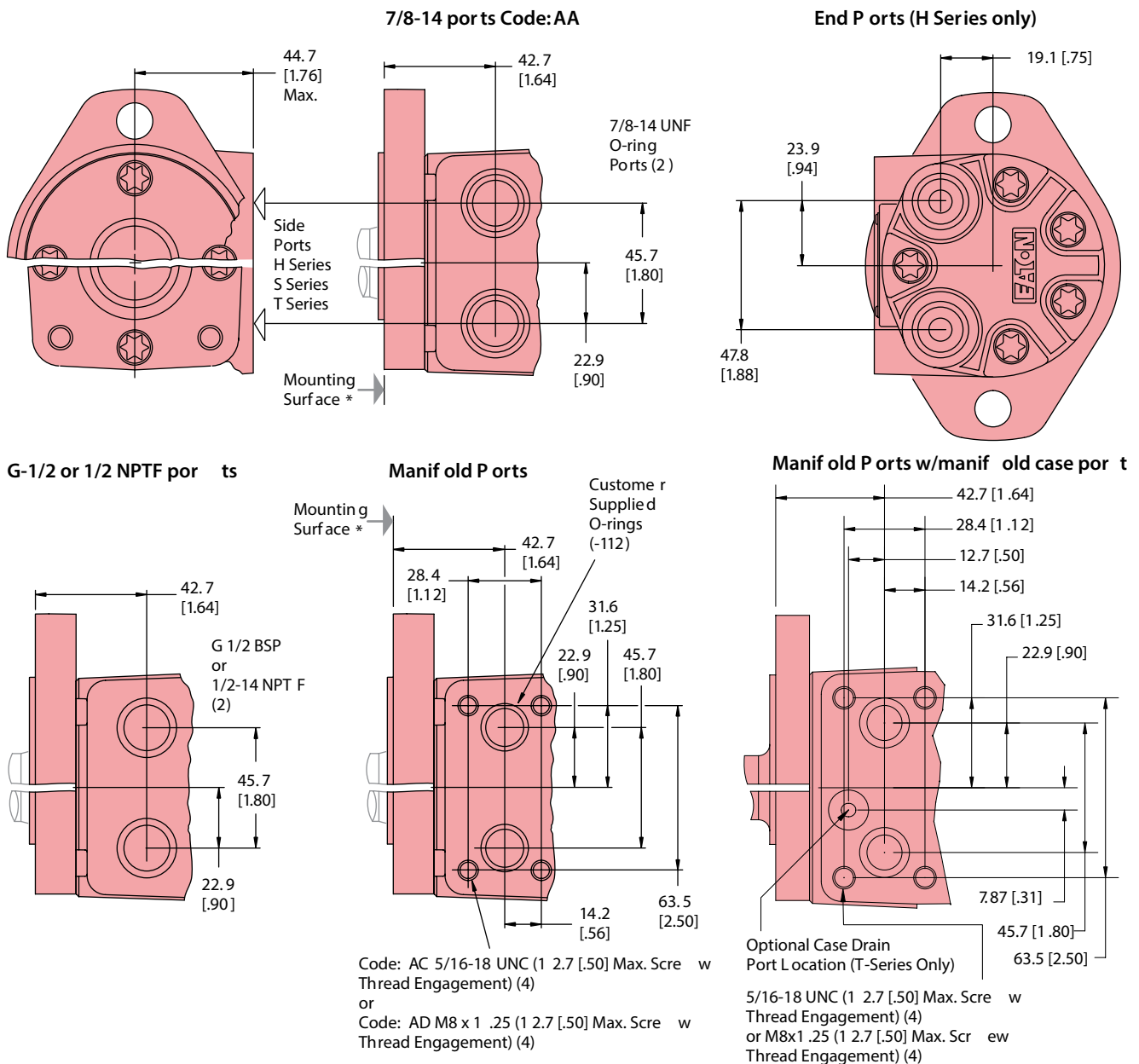
Code: EC G 1/2 (BSP) (2)

or

Code: EB 3/4-16 O-Ring (2)

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

B-4



Disc Valve Hydraulic Motors

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

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



Disc valve hydraulic motors

Highlights

Product description

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

A few years after this original Char-Lynn Orbit motor was introduced another original motor concept went into production. This motor had rolls incorporated into the internal gear ring, this element was identified by the name Geroler and is a registered trade name of Danfoss . 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 Danfoss.

C-1



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

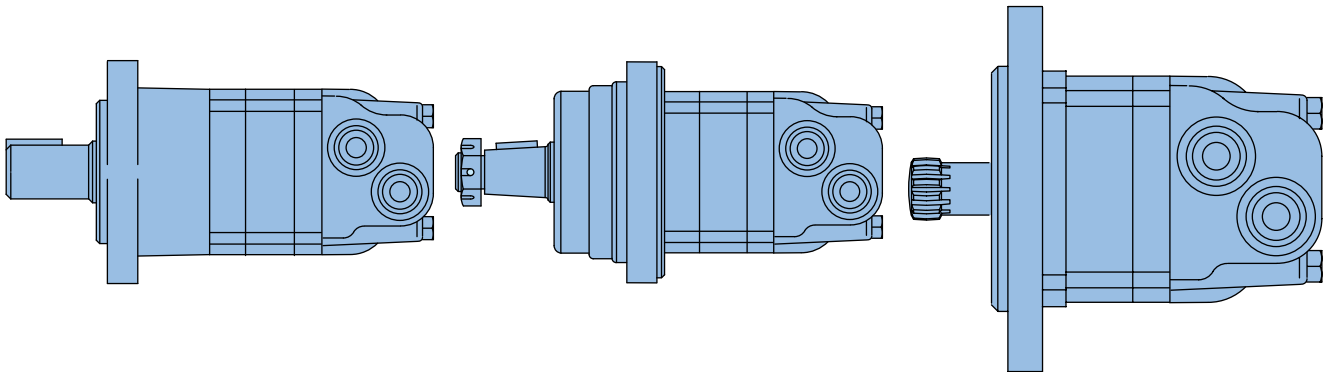
Benefits:

- 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

C-1



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

C-1

Highlights	102	4000 Series	Highlights	189
Features, Benefits, and Applications	103		Specifications	190
Table of Contents	104		Performance data	192
2000 Series			Dimensions	202
Highlights	105		Installation information	205
Specifications	106		Dimensions	206
Performance data	108		Shaft side load capacity	207
Dimensions	117		Case pressure and case port	208
Installation information	123		Dimensions	209
Dimensions	124		Product numbers	210
Shaft side load capacity	127		Model code	211
Case pressure and case porting	128	6000 Series		
Dimensions	129		Highlights	213
Product numbers	132		Specifications	214
Model code	133		Performance data	215
2000 Series Two-Speed			Dimensions	224
Description	135		Installation information	228
Typical hydraulic circuit	136		Dimensions	229
Specifications	137		Shaft side load capacity	230
Dimensions	138		Case pressure and case port	231
Product numbers	140		Dimensions	232
Model code	141		Product numbers	233
4000 Compact Series			Model code	234
Highlights	142	10,000 Series		
Specifications	143		Highlights	236
Performance data	144		Specifications	237
Dimensions	150		Performance data	238
Installation information	153		Dimensions	242
Dimensions	154		Shaft side load capacity	245
Shaft side load capacity	158		Dimensions	246
Case pressure and case port	159		Product numbers	247
Dimensions	160		Model code	248
Model code	163			
Delta Series				
Highlights	165			
Specifications	166			
Performance data	167			
Dimensions	180			
Shaft side load capacity	183			
Product numbers	184			
Model code	185			
Delta Series with Parking Brake				
Highlights	186			
Dimensions	187			

Description:

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



2000 Series

Geroler element	13 Displacements
Flow l/min [GPM]	75 [20] Continuous** 115 [30] Intermittent*
Speed RPM	1215 Cont.** 1215 Inter.*
Pressure bar [PSI]	205 [3000] Cont.** 310 [4500] Inter.*
Torque Nm [lb-in]	845 [7470] Cont.** 930 [8225] Inter.*

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

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

Features:

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

Benefits:

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

Applications:

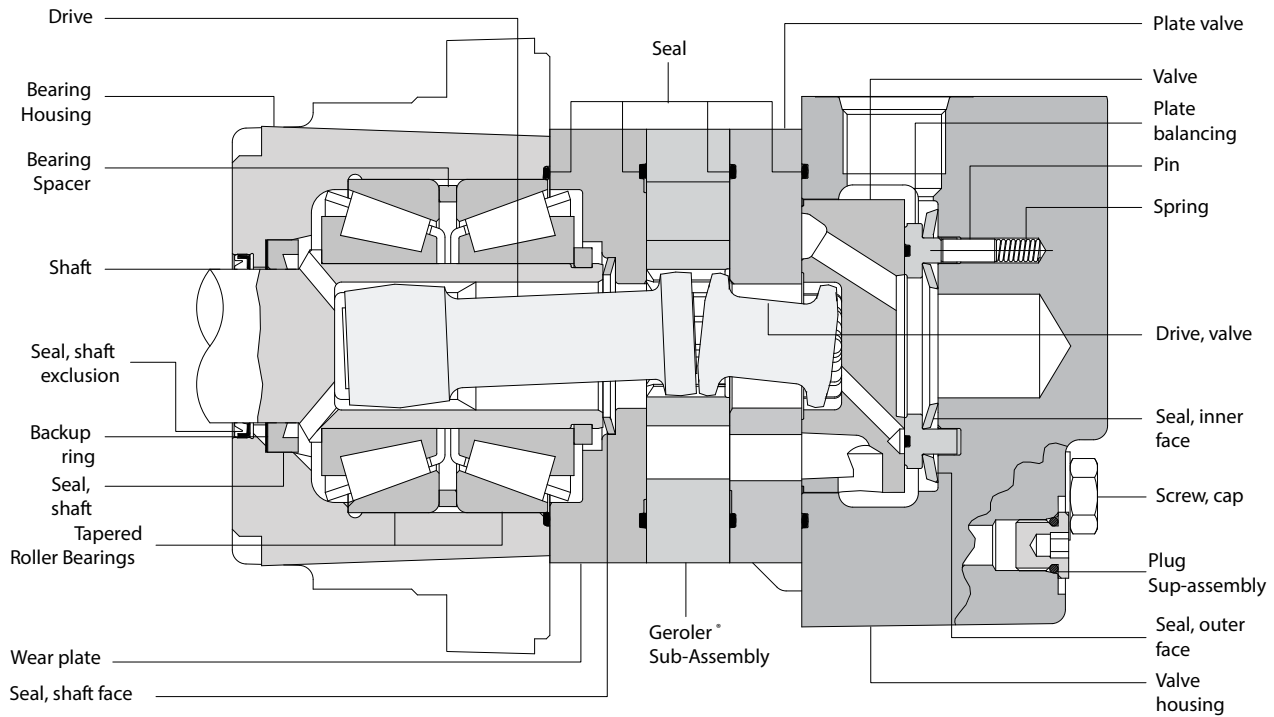
- Skid steer attachments
- Swing motor
- Brush cutters & mowers
- Harvesting equipment
- Directional Boring any place pressure relief protection is optimal for system or motor performance and life
- Turf equipment

C-1

2000 Series

Specifications

C-1



Specification data — 2000 series motors

Displ. cm ³ /r [in ³ /r]	34	41	66	80	90	100	130	160	195	245	305	395	490	
	[2.1]	[2.5]	[4.0]	[4.9]	[5.5]	[6.2]	[8.0]	[9.6]	[11.9]	[14.9]	[18.7]	[24.0]	[29.8]	
Max. Speed (RPM) @ Flow	Continuous	1215	1104	1075	908	836	742	576	477	385	308	246	191	153
	Intermittent	1215	1216	1214	908	1042	924	720	713	577	462	365	335	230
Flow l/min [GPM]	Continuous	42	45	72	75	75	75	75	75	75	75	75	75	75
	Intermittent	42	53	87	75	95	95	95	115	115	115	115	115	115
Torque* Nm [lb - in]	Continuous	98	112	186	235	265	295	385	455	540	660	765	775	845
	Intermittent	142	169	276	345	390	445	560	570	665	820	885	925	930
Pressure Δ bar [Δ PSI]	Continuous	205	205	205	205	205	205	205	205	205	205	155	120	
	Intermittent	310	310	310	310	310	310	310	260	260	260	240	190	
	Peak	310	310	310	310	310	310	310	310	310	310	310	225	
Weight kg [lb]	Standard or Wheel mount	8.8	8.8	8.8	9.3	9.3	9.5	9.8	10.0	10.4	11.3	11.3	11.8	
	Bearingless	6.8	6.8	6.8	7.3	7.3	7.5	7.7	7.9	8.4	9.3	9.3	9.8	

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

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

Maximum inlet pressure:

310 bar [4500 PSI]

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

Maximum return pressure:

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

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

Δ bar [Δ PSI]

The true pressure difference between inlet port and outlet port

Continuous rating:

Motor may be run continuously at these ratings

Intermittent operation:

10% of every minute

Peak operation:

1% of every minute

Recommended fluids:

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

Recommended system operating temp:

-34°C to 82°C [-30°F to 180°F]

Recommended filtration:

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

Thermal shock warning:

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

Minimum delta pressure warning:

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

2000 Series

Performance data

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

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



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

[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
34	69	103	138	172	207	241	276	310

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

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

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

[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
34	69	103	138	172	207	241	276	310

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

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

[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
34	69	103	138	172	207	241	276	310

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

2000 Series

Performance data

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

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



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

[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
34	69	103	138	172	207	241	276	310

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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
17	34	69	103	138	172	207	241	276	310

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

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

C-1

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

2000 Series

Performance data

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

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

Continuous
Intermittent

Peak
No operation

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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[3750]
17	34	69	103	138	172	207	241	259

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

C-1

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

2000 Series

Performance data

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

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



Δ Pressure bar [PSI]
 $490 \text{ cm}^3/\text{r}$ [29.8in³/r]

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]
17	34	52	69	86	103	121	138

C-1

Flow LPM [GPM]

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

Standard mount

Ports

- 7/8 -14 UNF-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 7/8 -14 UNF-2B SAE O-ring end ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1) or
- G 1/2 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)

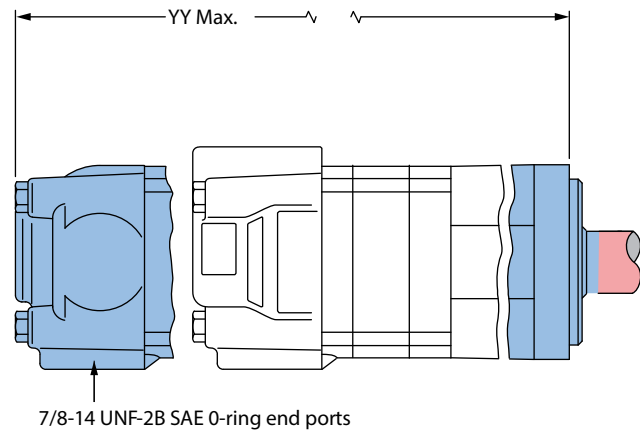
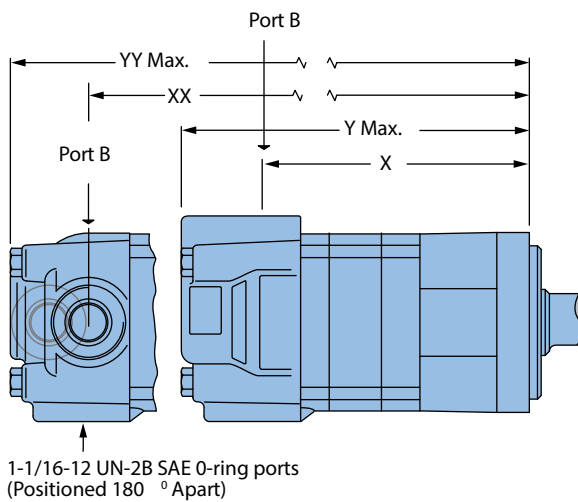
Manifold mount

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

Standard rotation viewed from shaft end

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

Standard mount



Standard mount motor dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
34 [2.1]	126.7 [4.99]	1740 [6.85]	1290 [5.08]	175.3 [6.90]
41 [2.5]	128.0 [5.04]	175.3 [6.90]	130.5 [5.14]	176.8 [6.96]
66 [4.0]	133.9 [5.27]	181.1 [7.13]	136.1 [5.36]	182.4 [7.18]
80 [4.9]	136.9 [5.39]	184.2 [7.25]	139.2 [5.48]	185.4 [7.30]
100 [6.2]	141.5 [5.57]	189.0 [7.44]	143.8 [5.66]	190.3 [7.49]
130 [8.0]	147.9 [5.83]	195.4 [7.69]	150.2 [5.92]	196.6 [7.74]
160 [9.6]	147.9 [5.83]	195.4 [7.69]	150.2 [5.92]	196.6 [7.74]
195 [11.9]	154.7 [6.09]	202.2 [7.96]	157.0 [6.18]	203.2 [8.00]
245 [14.9]	163.7 [6.45]	211.1 [8.31]	166.0 [6.54]	212.4 [8.36]
305 [18.7]	175.1 [6.90]	222.3 [8.75]	177.4 [6.99]	223.5 [8.80]
395 [24.0]	191.0 [7.52]	238.6 [9.39]	193.3 [7.61]	239.8 [9.44]
490 [29.8]	208.4 [8.21]	255.8 [10.07]	210.7 [8.30]	257.0 [10.12]

2000 Series

Dimensions

Standard mount with integral relief valve

Ports

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

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

Standard rotation viewed from shaft end

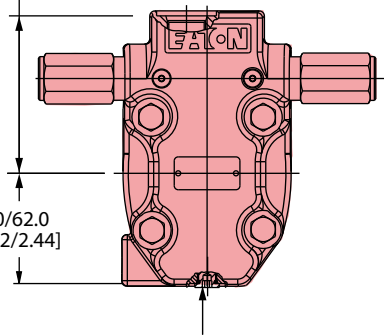
Port A pressurized — CW
 Port B pressurized — CCW

Standard mount with integral relief valve

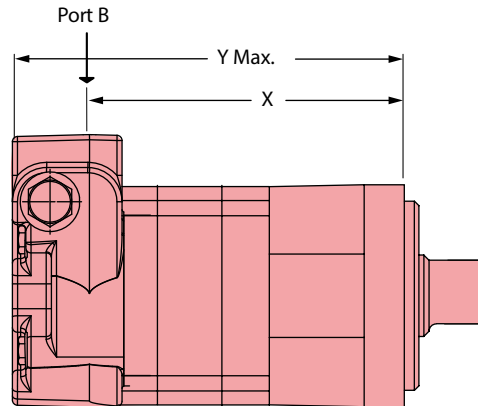
C-1

2X 93.7/91.7
 [3.69/3.61]

64.0/62.0
 [2.52/2.44]



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



Standard mount motor dimensions

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]
34 [2.1]	126.7 [4.99]	174.0 [6.85]
41 [2.5]	128.2 [5.05]	175.5 [6.91]
66 [4.0]	133.9 [5.27]	181.2 [7.13]
80 [4.9]	137.0 [5.40]	184.5 [7.26]
100 [6.2]	141.6 [5.58]	189.0 [7.44]
130 [8.0]	147.9 [5.83]	195.4 [7.69]
160 [9.6]	147.9 [5.83]	195.4 [7.69]
195 [11.9]	154.8 [6.10]	202.2 [7.96]
245 [14.9]	163.7 [6.45]	211.1 [8.31]
305 [18.7]	175.1 [6.90]	222.6 [8.76]
395 [24.0]	191.1 [7.53]	238.6 [9.39]
490 [29.8]	208.4 [8.21]	255.8 [10.07]

Wheel mount

Ports

- 7/8 -14 UNF-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 7/8 -14 UNF-2B SAE O-ring end ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 1/2 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)

Manifold mount

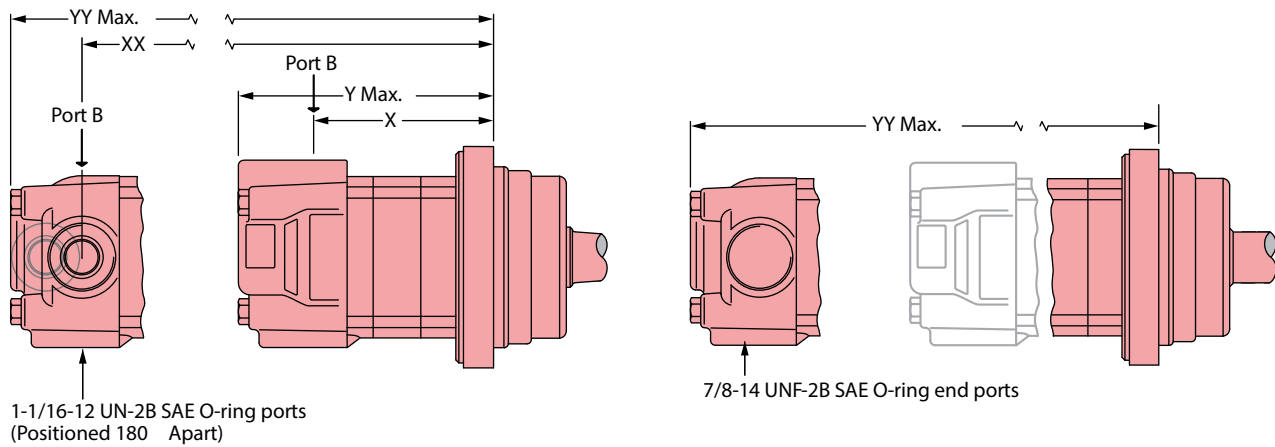
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)

Standard rotation viewed from shaft end

- Port A pressurized — CW
- Port B pressurized — CCW

C-1

Wheel mount



Wheel mount motor dimensions

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
34 [2.1]	86.5 [3.41]	133.8 [5.27]	88.8 [3.50]	135.1 [5.32]
41 [2.5]	88.0 [3.47]	135.3 [5.33]	90.3 [3.56]	136.6 [5.38]
66 [4.0]	93.7 [3.69]	141.0 [5.55]	96.0 [3.78]	142.3 [5.60]
80 [4.9]	96.8 [3.81]	144.0 [5.67]	99.1 [3.90]	145.3 [5.72]
100 [6.2]	101.3 [3.99]	148.9 [5.86]	103.6 [4.08]	150.2 [5.91]
130 [8.0]	107.8 [4.25]	155.2 [6.11]	110.1 [4.34]	156.5 [6.16]
160 [9.6]	107.8 [4.25]	155.2 [6.11]	110.1 [4.34]	156.5 [6.16]
195 [11.9]	114.6 [4.51]	161.8 [6.37]	116.8 [4.60]	163.1 [6.42]
245 [14.9]	123.5 [4.87]	171.0 [6.73]	125.8 [4.96]	172.8 [6.80]
305 [18.7]	135.0 [5.32]	182.1 [7.17]	137.4 [5.41]	183.4 [7.22]
395 [24.0]	150.9 [5.94]	198.4 [7.81]	153.2 [6.03]	199.7 [7.86]
490 [29.8]	168.2 [6.63]	215.7 [8.49]	170.7 [6.72]	217.0 [8.54]

2000 Series

Dimensions

Wheel mount with intergal relief valve

Ports

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

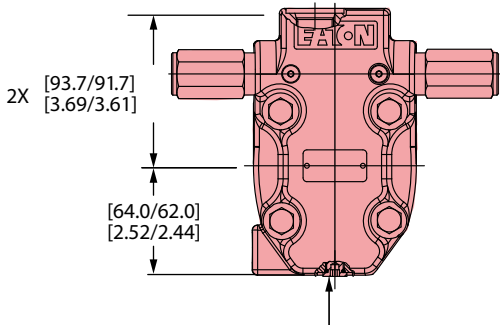
G 1/2 (BSP) staggered ports (2)
 G 1/4 (BSP) case drain port (1)

Standard rotation viewed from shaft end

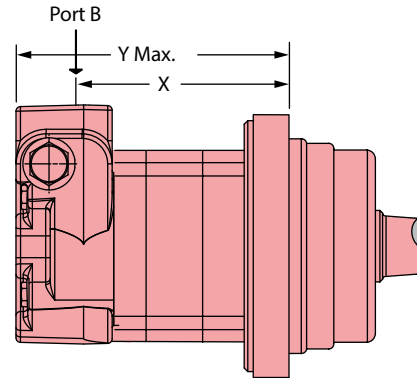
Port A pressurized — CW
 Port B pressurized — CCW

Wheel mount with integral relief valve

C-1



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



Wheel mount motor dimensions

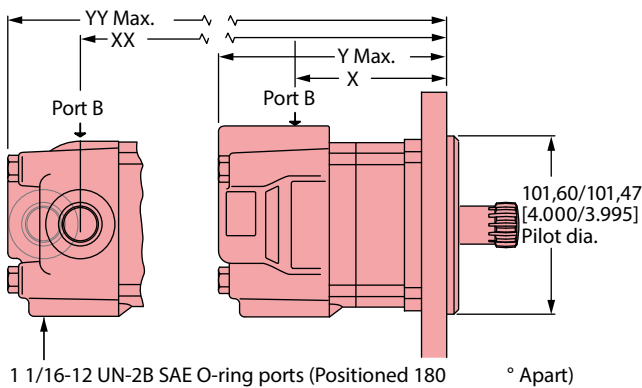
Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]
34 [2.1]	86.5 [3.41]	133.8 [5.27]
41 [2.5]	88.0 [3.47]	135.3 [5.33]
66 [4.0]	93.7 [3.69]	141.0 [5.55]
80 [4.9]	96.9 [3.82]	144.3 [5.68]
100 [6.2]	101.4 [4.00]	148.9 [5.86]
130 [8.0]	107.8 [4.25]	155.2 [6.11]
160 [9.6]	107.8 [4.25]	155.2 [6.11]
195 [11.9]	114.6 [4.52]	162.1 [6.38]
245 [14.9]	123.5 [4.87]	171.0 [6.73]
305 [18.7]	135.0 [5.32]	182.4 [7.18]
395 [24.0]	151.0 [5.95]	198.4 [7.81]
490 [29.8]	168.2 [6.63]	215.7 [8.49]

Bearingless

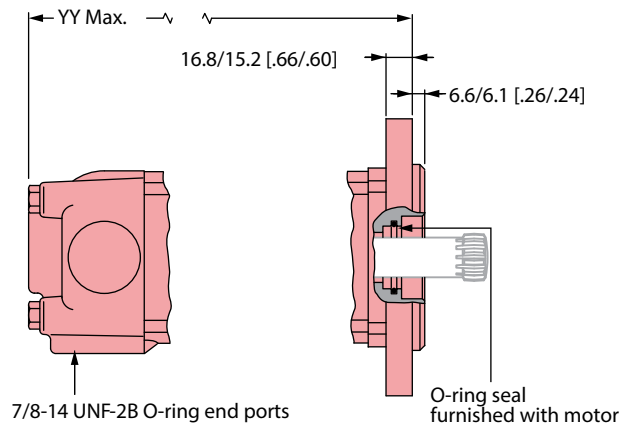
Ports

- 7/8 -14 UNF-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 7/8 -14 UNF-2B SAE O-ring end ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 1/2 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)

Bearingless



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



Manifold mount

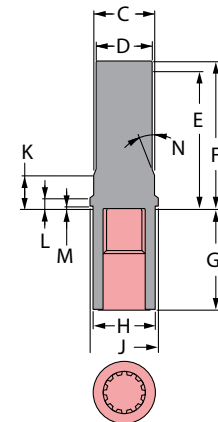
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)

Standard rotation viewed from drive end

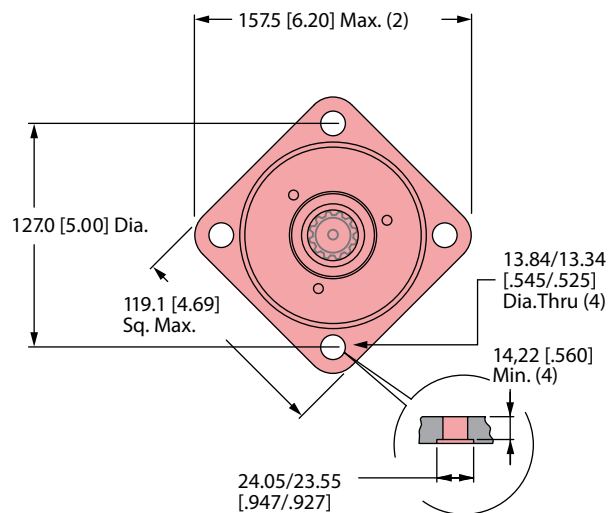
- Port A pressurized — CW
- Port B pressurized — CCW

Blank Dimensions

- C 35.87 [1.412] Dia.
- D 34.04 [1.340] Dia.
- E 81.0 [3.19] Min. Full form dia
- F 86.1 [3.39] Max.
- G 62.10 [2.445] full form dia.
- H 38.40 [1.512] Dia.
- J 43.7 [1.72] Dia.
- K 725.91 [1.020]
- L 8.25 [.325]
- M 0.89 [.035]
- N 15°



Mating coupling blank
Danfoss Part no. 13307-003



Bearingless motors dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
34 [2.1]	68.7 [2.70]	116.3 [4.58]	70.9 [2.79]	117.6 [4.63]
41 [2.5]	70.1 [2.76]	117.7 [4.63]	72.4 [2.85]	119.1 [4.69]
66 [4.0]	75.7 [2.98]	123.4 [4.86]	78.1 [3.08]	124.8 [4.91]
80 [4.9]	79.0 [3.11]	126.5 [4.98]	81.3 [3.20]	127.8 [5.03]
100 [6.2]	83.5 [3.29]	131.4 [5.17]	85.8 [3.38]	132.6 [5.22]
130 [8.0]	89.9 [3.54]	137.7 [5.42]	92.2 [3.63]	139.0 [5.47]

Bearingless motors dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
160 [9.6]	89.9 [3.54]	137.7 [5.42]	92.2 [3.63]	139.0 [5.47]
195 [11.9]	96.8 [3.81]	144.6 [5.68]	99.0 [3.90]	145.5 [5.73]
245 [14.9]	105.6 [4.16]	153.5 [6.04]	107.9 [4.25]	154.7 [6.09]
305 [18.7]	117.1 [4.61]	164.9 [6.48]	119.4 [4.70]	165.9 [6.53]
395 [24.0]	133.1 [5.24]	180.9 [7.12]	135.4 [5.33]	182.1 [7.17]
490 [29.8]	150.3 [5.92]	198.2 [7.80]	152.7 [6.01]	199.3 [7.85]

2000 Series

Dimensions

Bearingless with integral relief valve

Ports

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

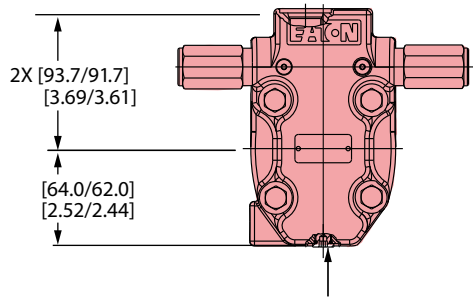
G 1/2 (BSP) Staggered Ports (2)
 G 1/4 (BSP) Case Drain Port (1)

Standard rotation viewed from shaft end

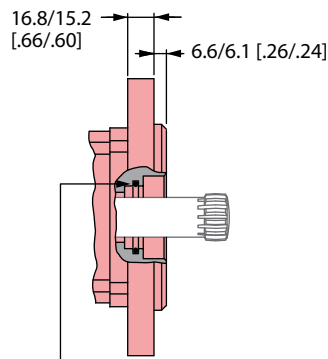
Port A Pressurized — CW
 Port B Pressurized — CCW

C-1

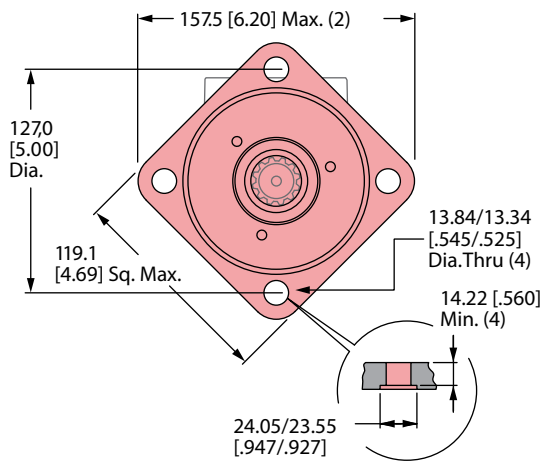
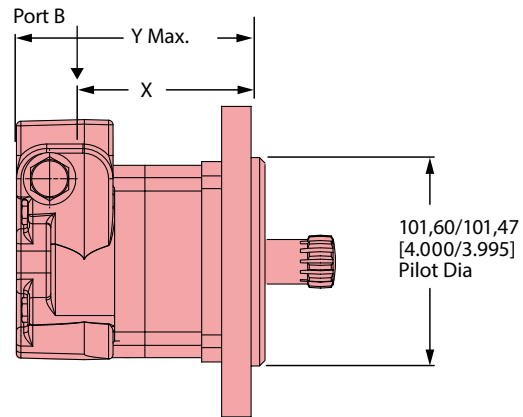
Bearingless with integral relief valve



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



O-ring seal furnished with motor



Bearingless motors dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
34 [2.1]	68.6 [2.70]	116.3 [4.58]
41 [2.5]	70.1 [2.76]	117.8 [4.64]
66 [4.0]	75.8 [2.99]	123.5 [4.86]
80 [4.9]	79.0 [3.11]	126.8 [4.99]
100 [6.2]	83.5 [3.29]	131.4 [5.17]
130 [8.0]	89.9 [3.54]	137.7 [5.42]

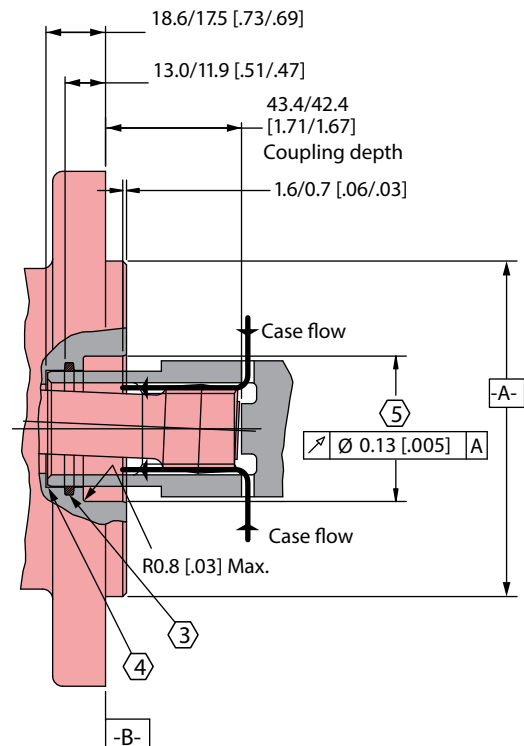
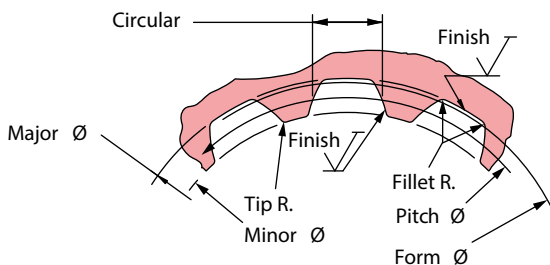
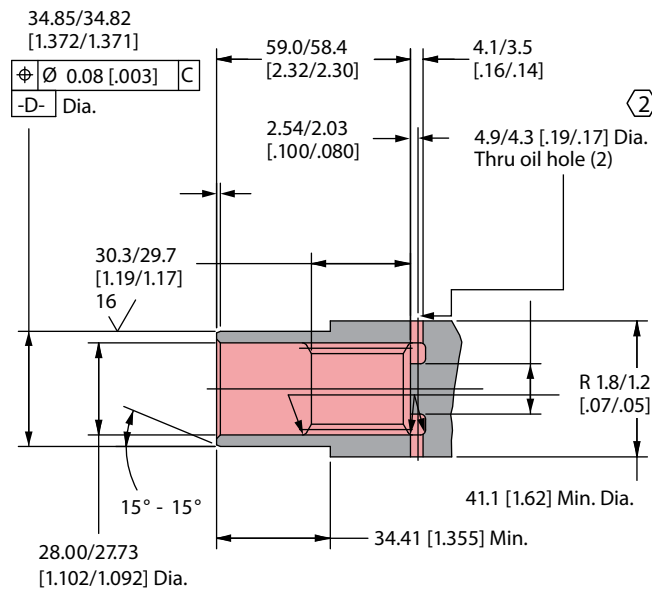
Bearingless motors dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
160 [9.6]	89.9 [3.54]	137.7 [5.42]
195 [11.9]	96.8 [3.81]	144.6 [5.69]
245 [14.9]	105.6 [4.16]	153.5 [6.04]
305 [18.7]	117.1 [4.61]	164.9 [6.49]
395 [24.0]	133.1 [5.24]	180.9 [7.12]
490 [29.8]	150.3 [5.92]	198.2 [7.80]

1. Internal spline in mating part to be per spline data. Specification material to be ASTM A304, 8620H vacuum degassed alloy steel carbonize to a hardness of 59-62 HRC with case depth (to 50HRC) of 0,076 -1,02 [.030 -.040]. Dimensions apply after heat treat.
2. Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
3. Seal to be furnished with motor for proper oil circulation thru splines.

4. Means of maintaining clearance between shaft and mounting flange must be provided.
5. Counter bore designed to adapt a standard sleeve bearing 35.010-35.040 [1.3784 -1.3795] I.D. by 44.040 - 44.070 [1.7339 -1.7350] O.D. (Oilite Bronze Sleeve Bearing AAM3544-22).

Bearingless



Spline pitch	12/24
Pressure angle	30°
Number of teeth	12
Class of fit	Ref. 5
Type of fit	Side
Pitch diameter	Ref. 25.400000 [1.0000000]
Base diameter	Ref. 21.997045 [.866025] \pm 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]

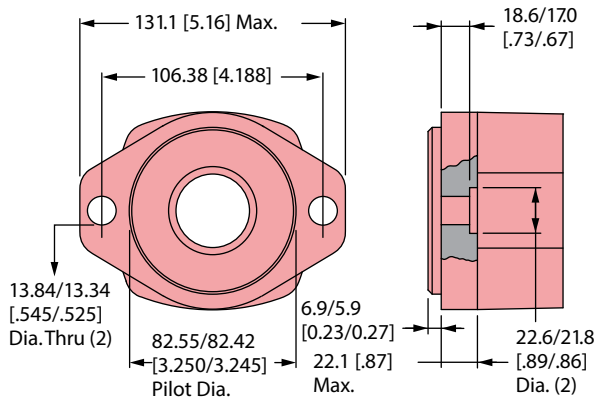
Finish	1.6 (63)
Involute profile variation	+0.000 -0.025 [+0.0000 -0.010]
Total index variation	0.038 [.0015]
Lead variation	0.013 [.0005]
Circular space width:	
Maximum actual	4.318 [.1700]
Minimum effective	4.216 [.1660]
Maximum effective	Ref. 4.270 [.1681]
Minimum actual	Ref. 4.247 [.1672]
Dimension 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

2000 Series

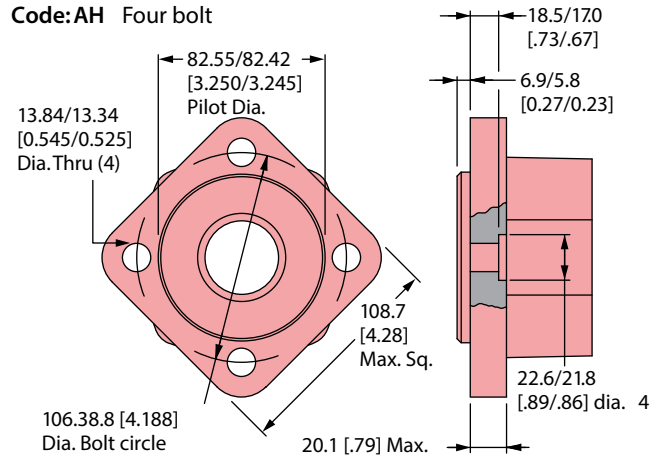
Dimensions

Mounting options

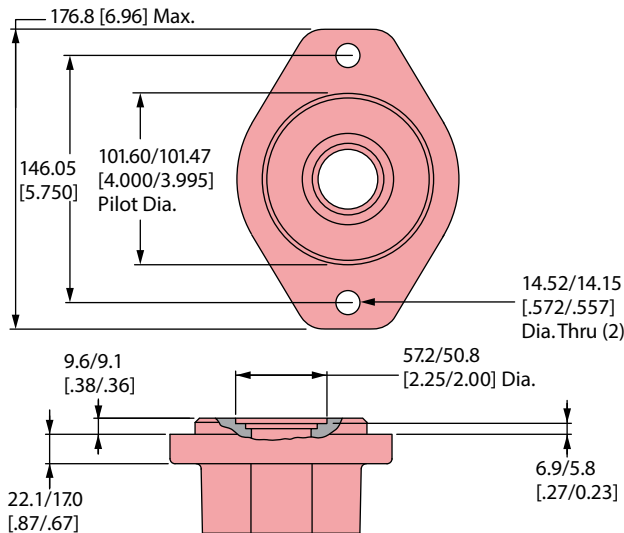
Code:AC SAE A - Two bolt (Standard motor)



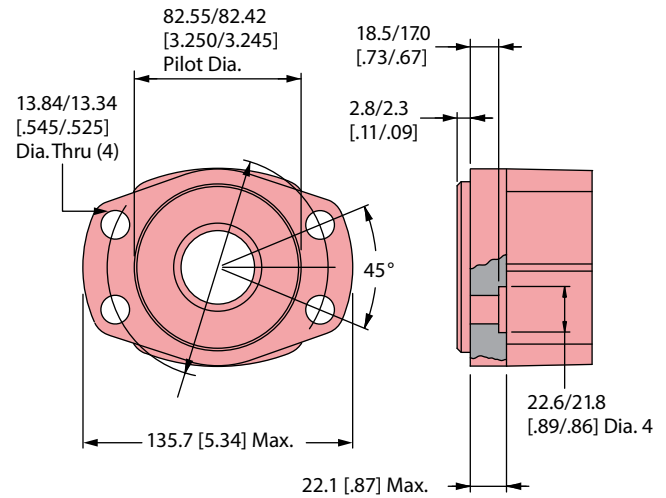
Code:AH Four bolt



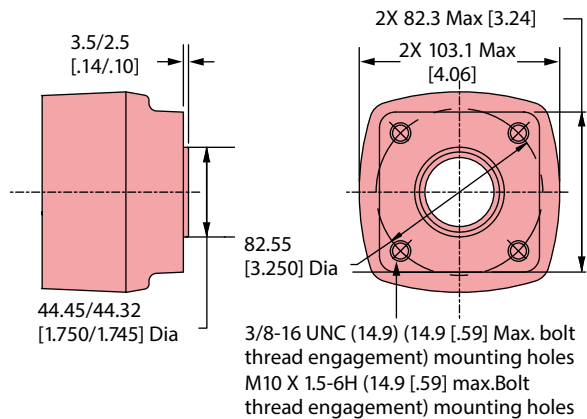
Code:AF SAE B - Two bolt



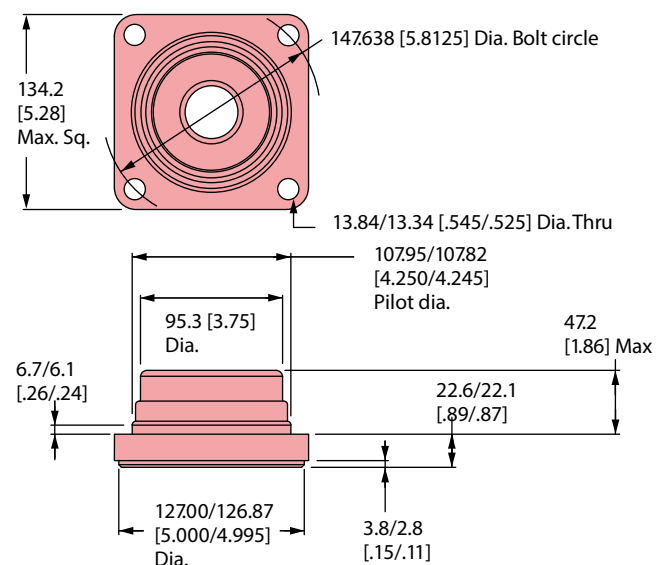
Code:AJ Four bolt magneto



Code:BY Four bolt (Standard motor)



Code:AB Four bolt (Wheel motor)

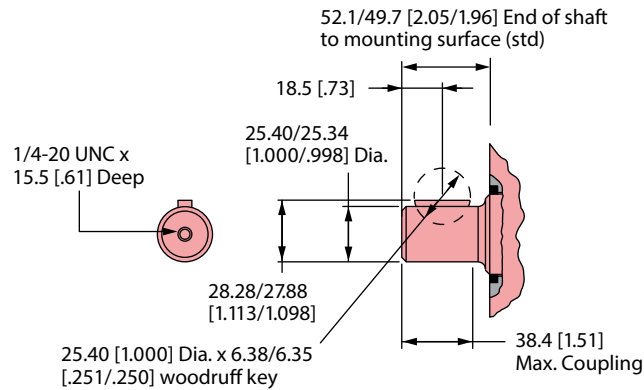


C-1

Shafts

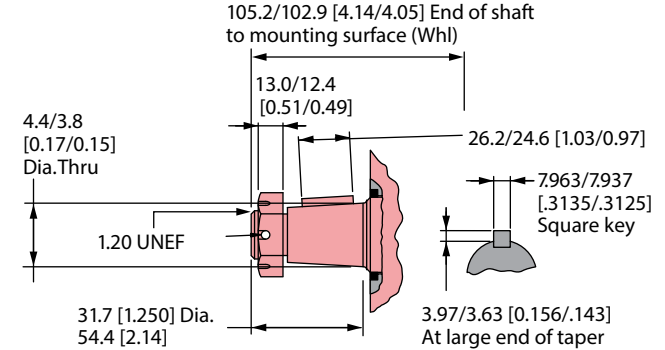
Code: 01 1 Inch straight

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

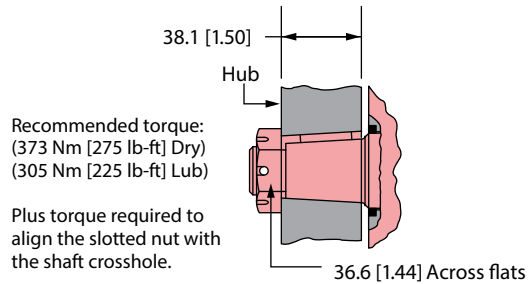


Code: 03 1 1/4 Inch tapered

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

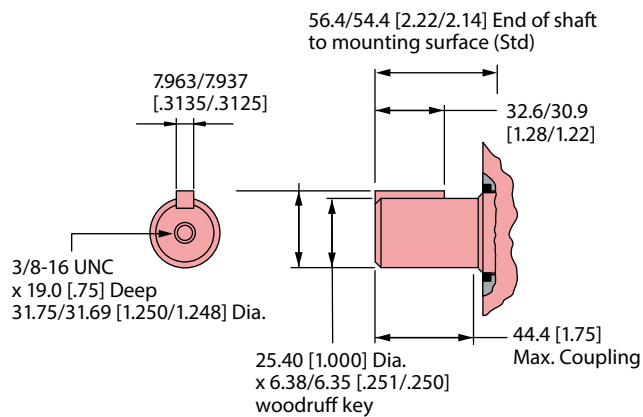


SAE J501 Standard tapered shaft 125.00±0.17Taper per meter [1.500±.002Taper per foot]



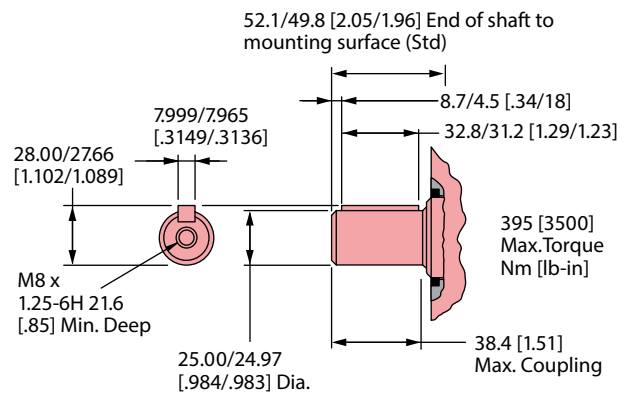
Code: 02 1 1/4 Inch straight

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



Code: 19 25 mm straight

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



C-1

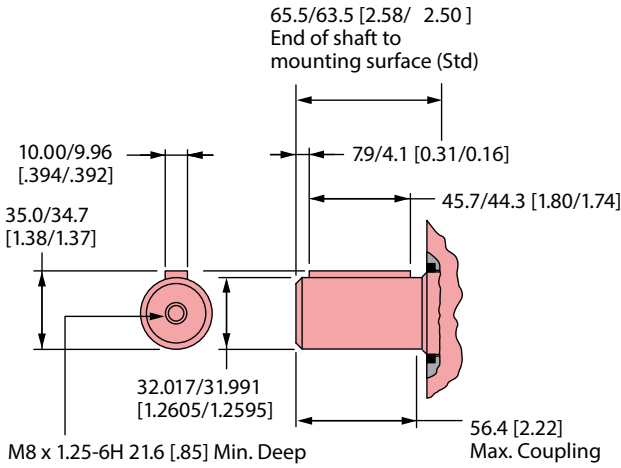
2000 Series

Dimensions

Shafts

Code: 16 32 mm straight

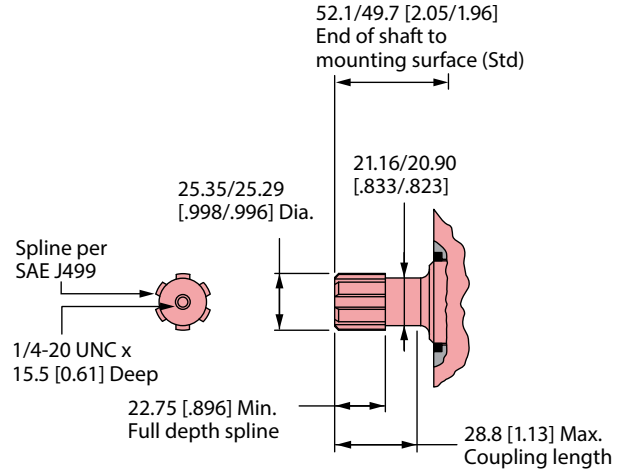
768 [6800] Max.Torque Nm [lb-in]



C-1

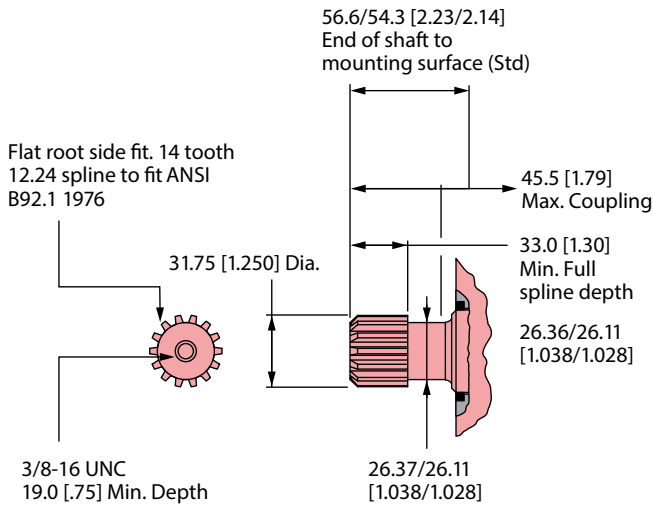
Code: 05 SAE 6B splined

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



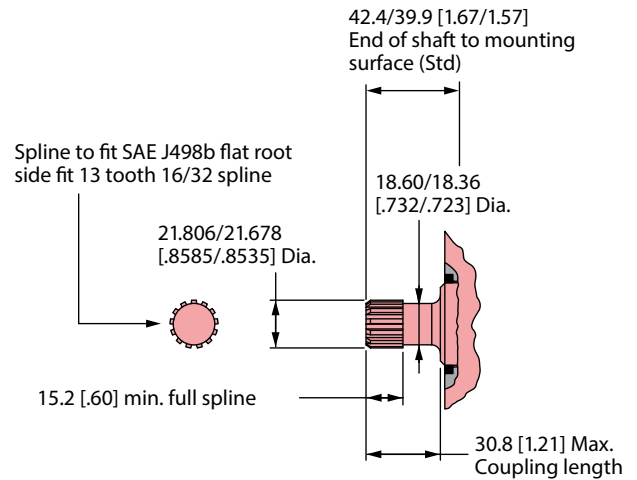
Code: 04 1 1/4 -14 Tooth splined

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



Code: 07 13 Tooth splined

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

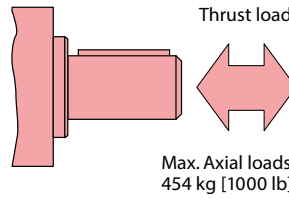


These curves indicate the radial load capacity on the motor shaft at various locations with an allowable external thrust load of 454 kg [1000 lb].

Note: Case pressure will increase the allowable inward thrust load and decrease the allowable outward thrust load. Case pressure will push outward on the shaft at 61 kg/7 Bar [135 lb/100 PSI].

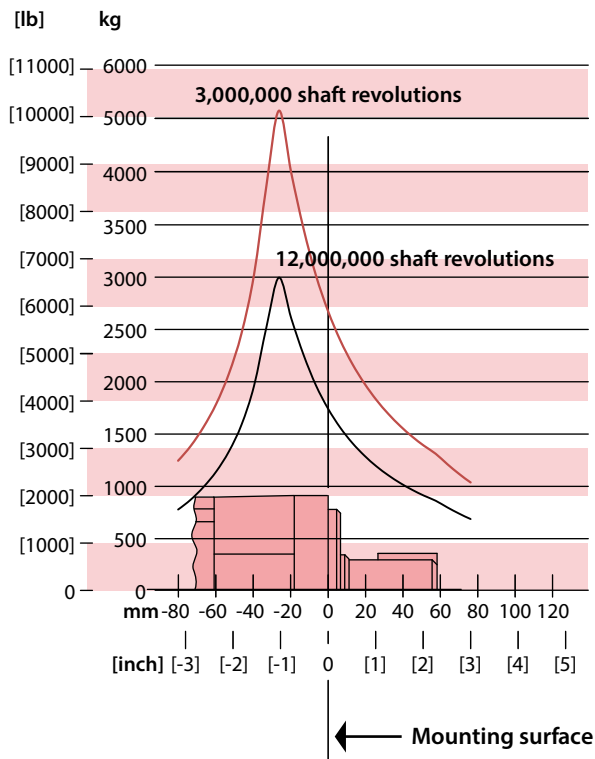
Each curve is based on B 10 bearing life (2000 Hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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

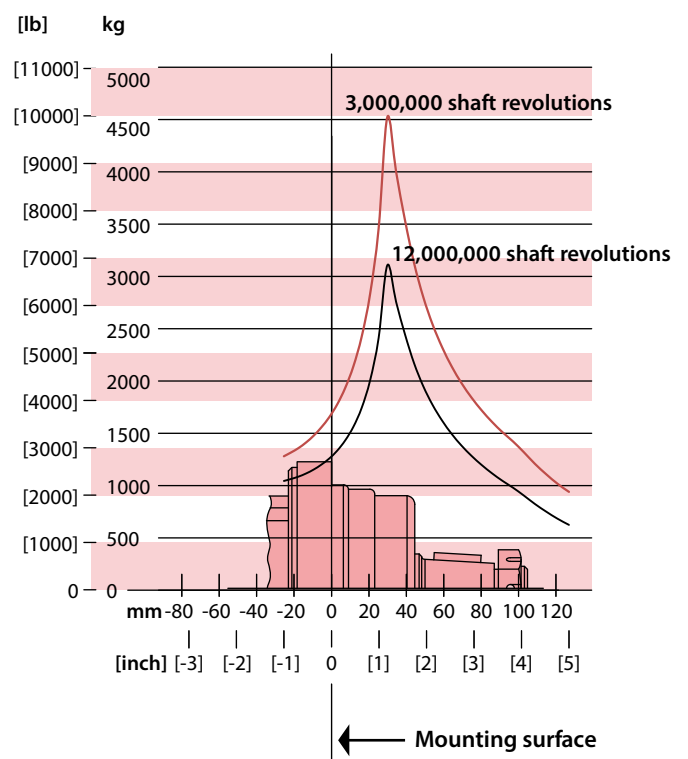


RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

Standard motor straight and splined shafts



Wheel motor Tapered shaft



2000 Series

Case pressure and case porting

Char-Lynn 2000 Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application). Determine if an external case drain is required from the case pressure seal limitation chart.

Case porting advantages:

Contamination control — flushing the motor case.

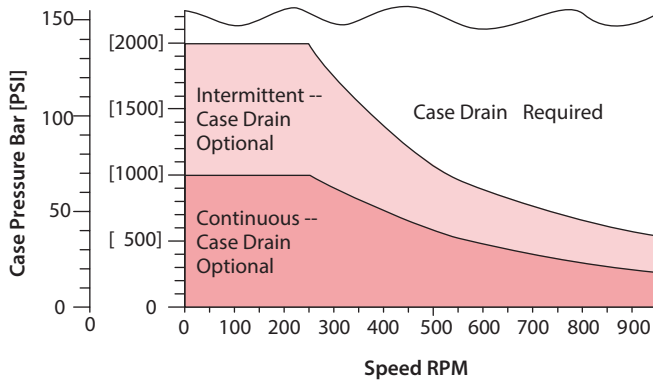
Cooler motor — exiting oil draws motor heat away.

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

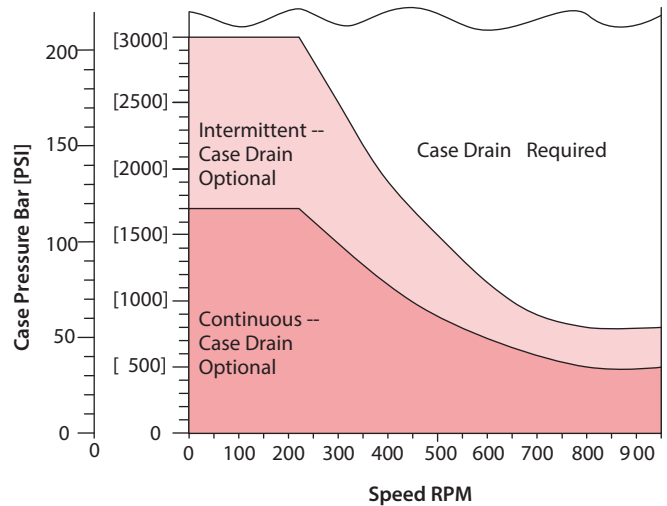
Case pressure seal limitation

Standard shaft seal

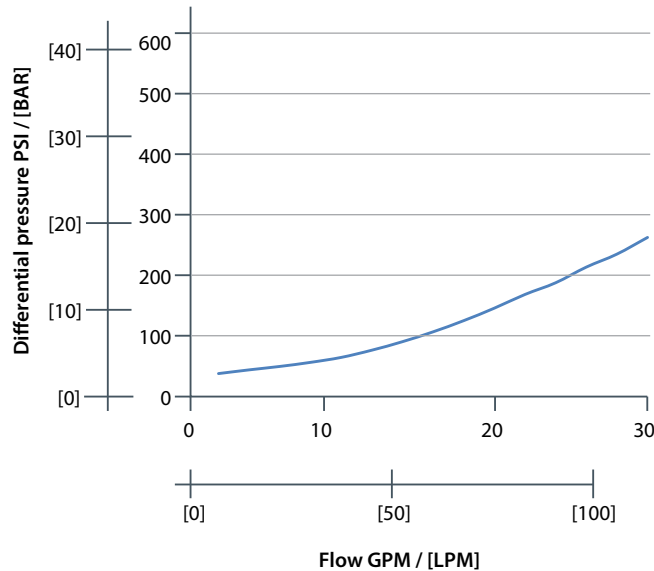
C-1



High pressure shaft seal



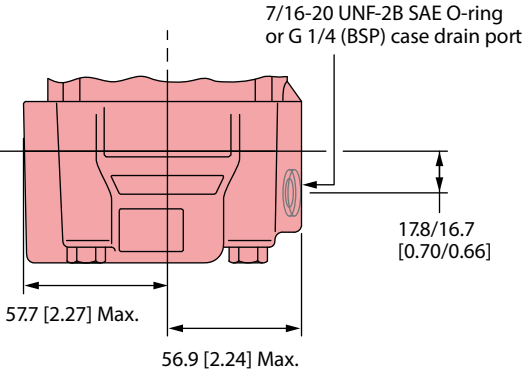
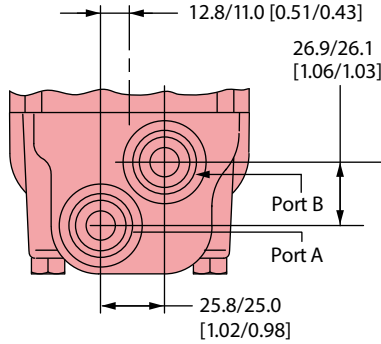
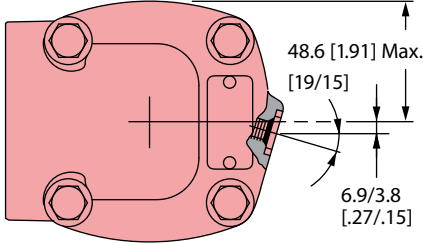
2000 Series NLPD - No Load Pressure Drop



Ports

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

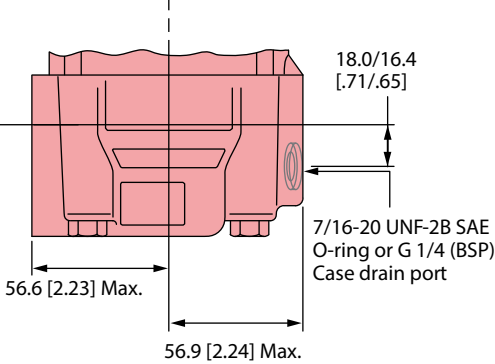
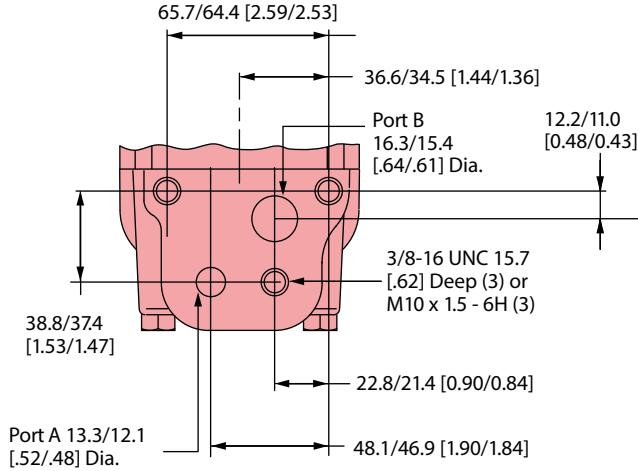
Code: AG G 1/2 BSP ports (2)



C-1

Code: AB 3/8-16 UNC threaded holes

Code: AE M10x1.5 -6H threaded holes



2000 Series

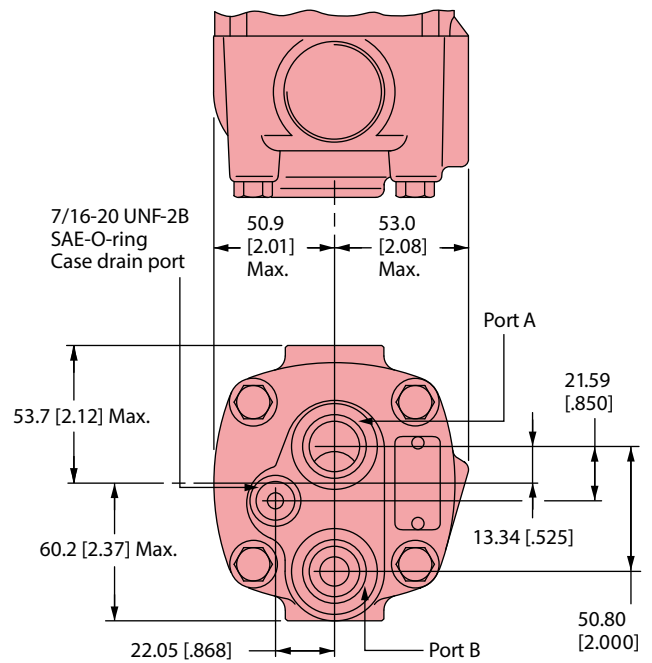
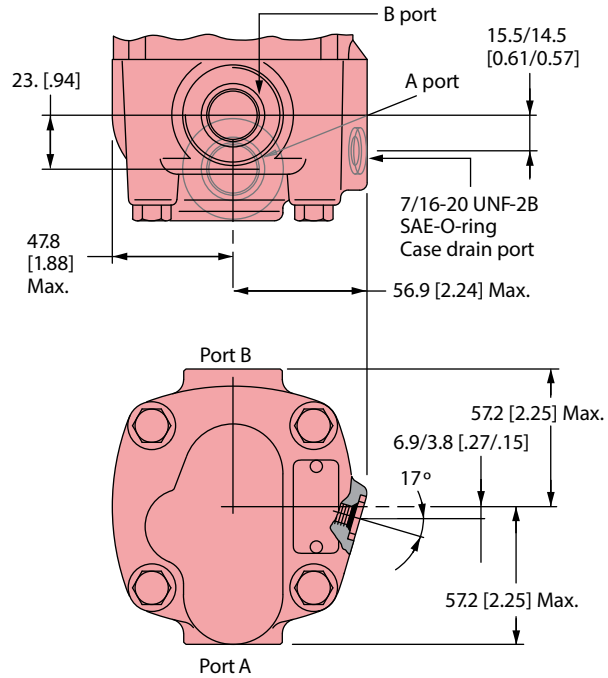
Dimensions

Ports

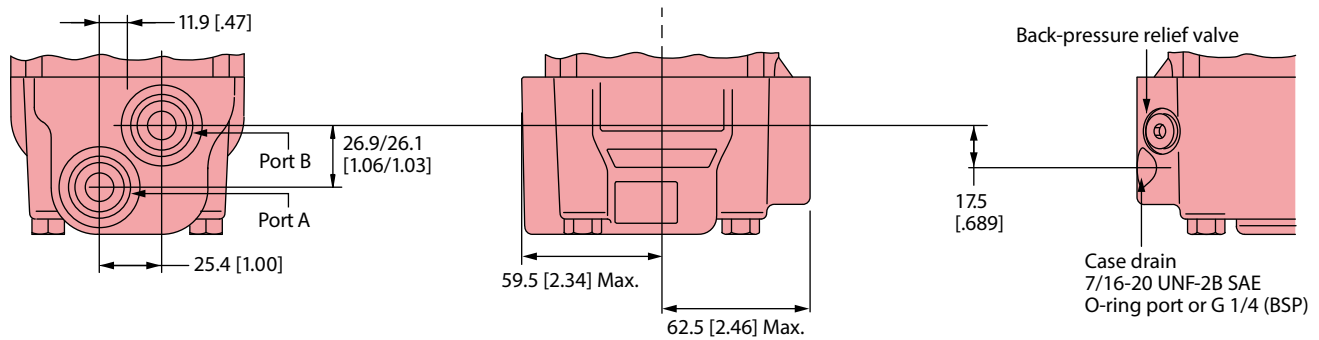
Code: AF 1-1/16-12 UN-2B SAE O-ring Ports (2) Positioned 180° Apart

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

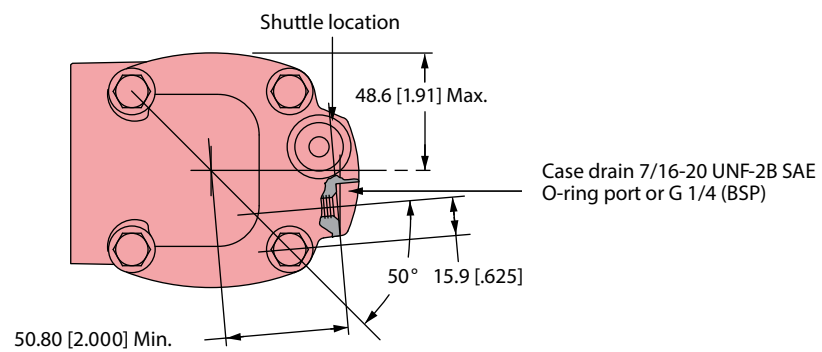
C-1



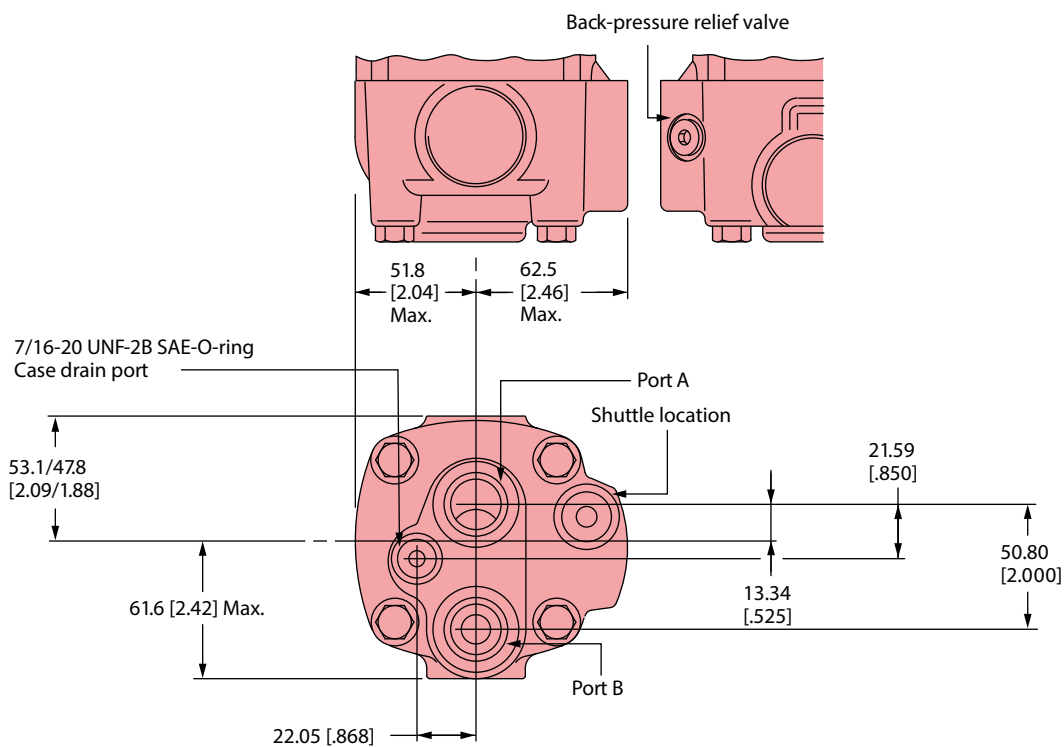
Ports with Shuttle



C-1



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.

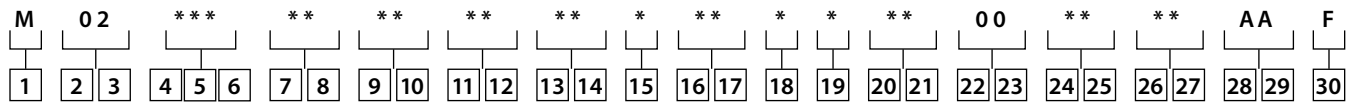
C-1

Mounting	Shaft	Port size	Displ. cm ³ / r [in ³ /r] / product number										
			41	80	90	100	130	160	195	245	305	395	490
			[2.5]	[4.9]	[5.5]	[6.2]	[8.0]	[9.6]	[11.9]	[14.9]	[18.7]	[24.0]	[29.8]
2 Bolt sae A flange	1 Inch straight	7/8 -14 O-ring staggered	104-4708	-1001	—	-1002	-1003	-1004	-1005	-1006	-1007	-1143	—
		1 1/16 -12 O-ring 180° apart	104-4708	-1037	—	-1038	-1039	-1040	-1041	-1042	-1043	-1044	—
	1 ¼ Inch straight	7/8 -14 O-ring staggered	104-4774	-1022	—	-1023	-1024	-1025	-1026	-1027	-1028	-1228	-1420
		1 1/16 -12 O-ring 180° apart	104-4774	-1061	—	-1062	-1063	-1064	-1065	-1066	-1067	-1068	-1421
	1 ¼ Inch - 14 T splined	7/8 -14 O-ring staggered	104-4764	-1029	—	-1030	-1031	-1032	-1033	-1034	-1035	-1229	-1422
		1 1/16 -12 O-ring 180° apart	104-4764	-1087	—	-1088	-1089	-1090	-1091	-1092	-1093	-1094	-1423
2 Bolt SAE B flange	1 ¼ Inch straight	7/8-14 O-ring staggered	104-4764	-1200	—	1201	-1202	-1203	-1204	-1205	-1206	-1207	—
	1 ¼ Inch involute SAE C splined	7/8 -14 O-ring staggered	104-4764	-1208	—	-1209	-1210	-1211	-1212	-1213	-1214	-1215	—
	1 Inch SAE 6B splined	7/8 -14 O-ring staggered	104-4764	-1193	—	-1194	-1195	-1196	-1197	-1198	-1199	—	—
		7/8 Inch SAE B splined	7/8 -14 O-ring staggered	104-4764	-1216	—	-1217	-1218	-1219	-1220	—	—	—
Standard with 4 bolt flange	32 mm Straight	G 1/2 (BSP))	104-4672	-1384	—	-1385	-1386	-1387	-1388	-1389	-1390	-1391	—
	1 ¼ Inch 14 T splined	G 1/2 (BSP)	104-4672	-1376	—	-1377	-1378	-1379	-1380	-1381	-1382	-1383	—
Wheel motor	1 ¼ Inch straight	7/8 -14 O-ring staggered	105-4708	—	—	—	—	—	—	—	—	—	-1148
		1 1/16 -12 O-ring 180° Apart	105-4708	—	—	—	—	—	—	—	—	—	—
	32 mm straight	G 1/2 (BSP)	105-4708	-1134	—	-1135	-1136	-1137	-1138	-1139	-1140	-1141	—
	1 ¼ Inch tapered	7/8 -14 O-ring staggered	105-4708	-1001	—	-1002	-1003	-1004	-1005	-1006	-1007	-1060	-1152
		1 1/16 -12 O-ring 180° apart	105-4708	-1071	—	-1072	-1073	-1074	-1075	-1076	-1077	-1078	—
1 ¼ Inch 14 T splined	7/8 -14 O-ring staggered	105-4708	-1029	—	-1030	-1031	-1032	-1033	-1034	-1035	-1096	—	
	1 1/16 -12 O-ring 180° apart	105-4708	-1079	—	—	—	-1082	-1083	-1084	-1085	-1086	—	
Bearingless		7/8 -14 O-ring staggered	106-4708	-1008	—	-1009	-1010	-1011	-1012	-1013	-1014	-1015	-1047
		G 1/2 (BSP)	106-4708	-1038	—	-1039	-1040	-1041	-1042	-1043	-1044	-1045	—

↑
106-1044

Mounting	Shaft	Port size	Displ. cm ³ / r [in ³ /r] / product number										
			41	80	90	100	130	160	195	245	305	395	490
			[2.5]	[4.9]	[5.5]	[6.2]	[8.0]	[9.6]	[11.9]	[14.9]	[18.7]	[24.0]	[29.8]
2 Bolt SAE A flange	1 Inch straight	7/8 -14 O-ring Staggered	104-4708	-1528	—	-1529	-1530	-1531	-1532	-1533	-1534	-1519	-1535
	1 1/4 Inch straight	7/8 -14 O-ring	104-4708	-3615	—	-1536	-1537	-1568	-1539	-1452	-1479	-1509	-1489

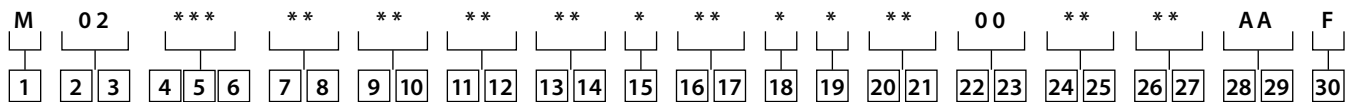
The following 30-digit coding system has been developed to identify all of the configuration options for the 2000 Series motor. Use this model code to specify a motor with the desired features. All 30 digits of the code must be present when ordering.



1	Product	M	2000 Series motor	9	10	Output shaft			
2	3	Product series	02	2000 Series Motor		00	None (Bearingless)		
4	5	6	Displacement				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	
			021	34.0 cm ³ /r [in ³ /r]				02	31.75 [1.250] Dia. Straight shaft with .375-16UNC-2B Thread in end, 7.938 [.3125] Sq x 31.75 [1.250] straight key
			025	40.8 cm ³ /r [in ³ /r]				03	31.75 [1.250] Dia. 0.125:1 tapered shaft per SAE J501 with 1.000-20 UNEF-2A Threaded shaft end and slotted hex nut, 7.938 [.3125] Sq x 25.40 [1.0] straight key
			040	66.5 cm ³ /r [in ³ /r]				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
			049	80.6 cm ³ /r [4.92 in ³ /r]				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
			055	90.6 cm ³ /r [5.53 in ³ /r]				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
			062	101.6 cm ³ /r [6.20 in ³ /r]				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
			080	130.6 cm ³ /r [7.97 in ³ /r]				17	31.75 [1.250] Dia. Straight shaft with 3/8-16 UNC-2B Thread in end, 7.938 [.3125] Sq x 31.75 [1.250] straight key, corrosion resistant (seal area to shaft end)
			096	158.1 cm ³ /r [9.65 in ³ /r]				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
			119	194.8 cm ³ /r [11.89 in ³ /r]				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
			149	244.3 cm ³ /r [14.91 in ³ /r]				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
			187	306.6 cm ³ /r [18.71 in ³ /r]					
			240	393.8 cm ³ /r [24.03 in ³ /r]					
			298	489.0 cm ³ /r [29.84 in ³ /r]					
7	8	Mounting type	AB	Wheel, 4 Bolt: 108.0 [4.25] Pilot Dia. 13.59 [.535] Dia. Holes on 147.6 [5.81] Dia. Bolt circle. 127.0 [5.00] Dia. Rear mount pilot					
			AC	Standard, 2 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt circle. SAE A					
			AD	Bearingless (w/ leakage slots), 4 Bolt: 101.6 [4.00] Pilot Dia. 13.59 [.535] Dia. Holes on 127.0 [5.00] Dia. Bolt circle					
			AF	Standard, 2 Bolt: 101.6 [4.00] Pilot dia. 14.35 [.565] Dia. Holes on 146.0 [5.75] Dia. Bolt circle. SAE B					
			AH	Standard, 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt circle					
			AJ	Standard (Magneto), 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. 2.79 [.110] Pilot Length					
			AL	Wheel (European), 4 Bolt: 125 [4.92] Pilot Dia. 13.79 [.543] Dia. Holes on 159.99 [6.299] Dia. Bolt Circle					
			AP	Wheel, 4 Bolt: 108.0 [4.25] Pilot Dia. 13.59 [.535] Dia. Holes on 147.6 [5.81] Dia. Bolt Circle. 127.0 [5.00] Dia. Rear mount pilot. Spigot reduced to 88.9 [3.50] Dia. by 25.4 [1.00] Depth.					
			AZ	Bearingless (w/ leakage slots), 4 Bolt: 100.0 [3.94] Pilot Dia. 11.0 [.43] Dia. Holes on 125.0 [4.92] Dia bolt circle (european)					

2000 Series

Model code



11 12

Ports

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

13 14

Case flow options

(Shuttles available with port code AA only)

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

15

Low pressure relief

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

16 17

Pressure/flow option

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

18

Geroler option

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

19

Seal option

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

20 21

Accessories

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

22 23

Special features (hardware)

- 00** None

24 25

Special features (assembly)

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

26 27

Paint/packageing

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

28 29

Customer ID

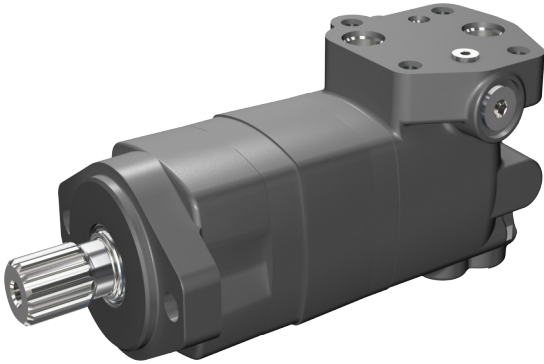
- AA** None

30

Design code

- F** Sixth

C-1



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

An external two position three way valve is required for shifting the pilot pressure port between signal pressure (HSLT) and low pressure (LSHT) Two speed motors are available with a return line closed center shuttle for closed circuit applications. Low speed high torque mode is the normal position of the speed selector valve. When a differential pressure is supplied to the

Performance data

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

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

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

pilot port and 6.9 Bar [100 PSI] is reached, the selector valve overcomes the return spring force and the spool shifts to the high speed mode. The oil in the opposite side of the spool is drained internally. Pressure between the pilot supply and case drain or return line (depending on open or closed circuit system) must be maintained to keep the motor in the high speed mode.

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

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

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

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

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

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

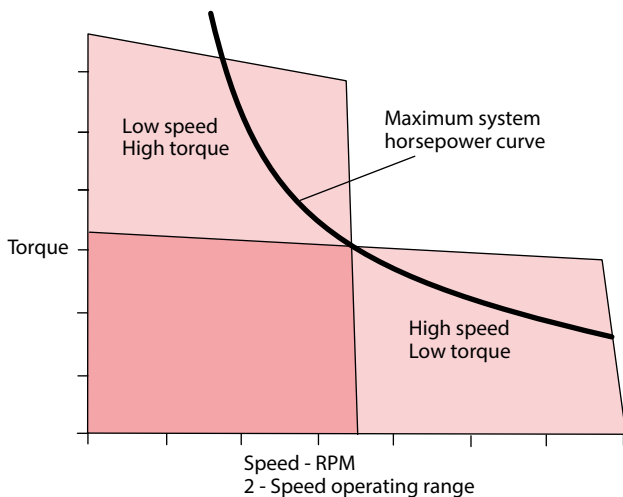
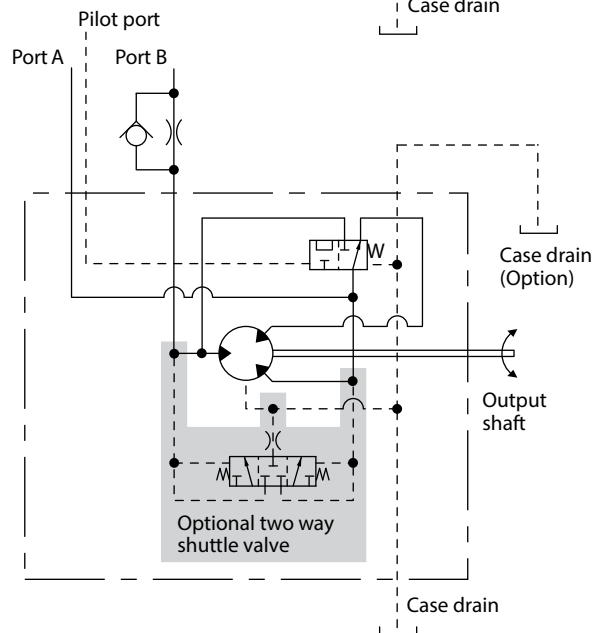
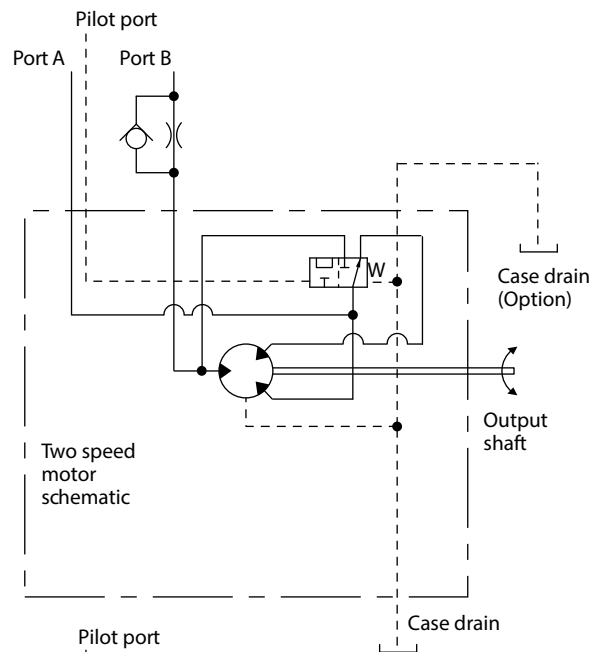
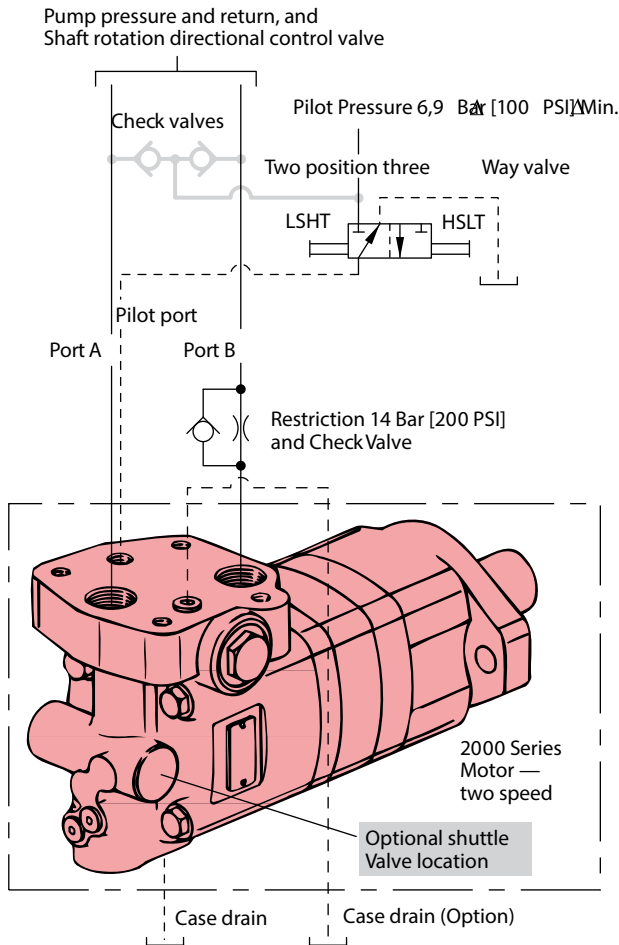
2000 Series Two-speed

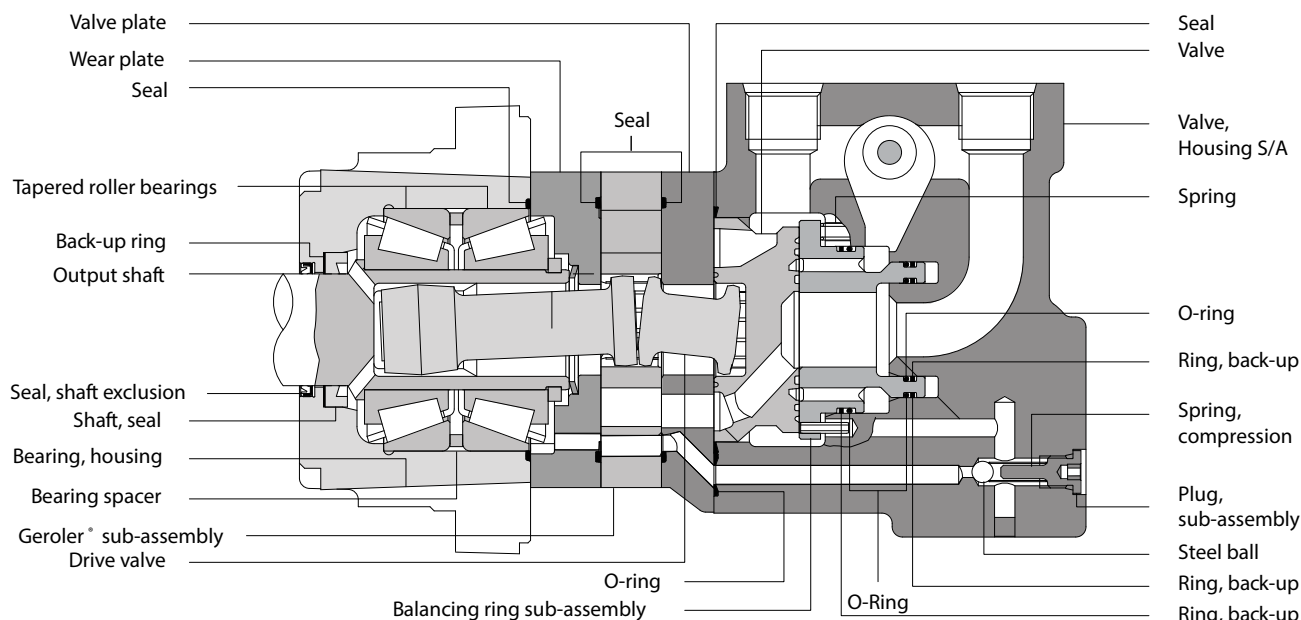
Typical hydraulic circuit

Note:

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

C-1





C-1

Specification data — 2000 series two-speed motors

Displ. cm ³ /r [in ³ /r]	High speed mode	40 [2.45]	50 [3.1]	65 [4.0]	80 [4.8]	95 [5.95]	120 [7.45]	155 [9.35]	195 [12.0]	245 [14.9]
	Low speed mode	80 [4.9]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 [14.9]	305 [18.7]	395 [24.0]	490 [29.8]
Max. Speed (RPM) @ Continuous flow	High speed mode	1000	1000	990	860	700	560	450	350	230
	Low speed mode	500	500	495	430	350	280	225	175	115
Flow l/min [GPM]	High speed mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Low speed mode	45 [12]	55 [15]	70 [19]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
Torque* Nm [lb - in]	High speed mode	100 [880]	125 [1115]	165 [1450]	195 [1725]	240 [2150]	300 [2675]	380 [3350]	365 [3225]	448 [3970]
	continuous intermittent	145 [1300]	185 [1660]	240 [2150]	240 [2150]	300 [2650]	375 [3330]	440 [3900]	445 [3940]	486 [4300]
Torque* Nm [lb - in]	Low speed mode	235 [2065]	295 [2630]	385 [3420]	455 [4040]	540 [4780]	660 [5850]	765 [6750]	775 [6840]	845 [7470]
	continuous intermittent	345 [3035]	445 [3950]	560 [4970]	570 [5040]	665 [5890]	820 [7250]	885 [7820]	925 [8170]	930 [8225]
Pressure Δ bar [Δ PSI]	Continuous intermittent	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	155 [2250]	120 [1750]
		310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	240 [3500]	190 [2750]	140 [2000]
Weight kg [lb]	Standard or wheel mount bearingless	13,8 [30.5]	14,1 [31.0]	14,3 [31.5]	14,5 [32.0]	15,0 [33.0]	15,4 [34.0]	15,9 [35.0]	16,3 [36.0]	16,8 [37.0]
		11,8 [26.0]	12,0 [26.5]	12,2 [27.0]	12,5 [27.5]	12,9 [28.5]	13,4 [29.5]	13,8 [30.5]	14,3 [31.5]	14,7 [32.5]

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

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

High speed mode: (Reduced motor displacement)

Low speed mode: (Full motor displacement)

Maximum inlet pressure:

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

Maximum return pressure:

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

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

Δ bar [Δ PSI]:

The true pressure difference between inlet port and outlet port

Continuous rating:

Motor may be run continuously at these ratings

Intermittent operation: 10% of every minute

Peak operation: 1% of every minute

Recommended fluids:

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

Recommended system operating temp:

-34°C to 82°C [-30°F to 180°F]

Recommended filtration:

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

Thermal shock warning:

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

Minimum delta pressure warning:

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

2000 Series Two-speed

Dimensions

Standard and Wheel

Ports

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

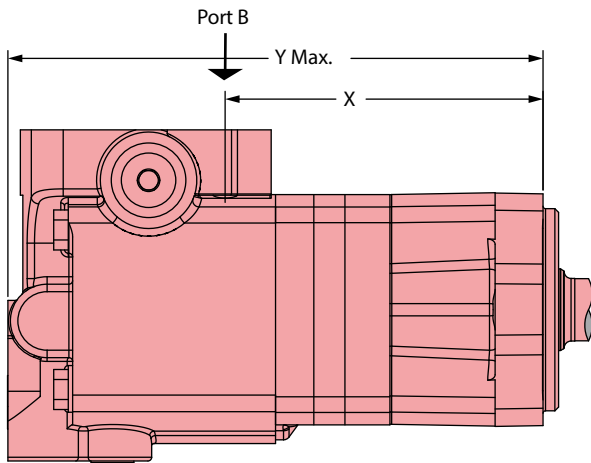
G 1/2 (BSP) staggered ports (2)
 G 1/4 (BSP) case drain port (1)
 G 1/4 (BSP) pilot control port (1)

Standard rotation viewed from shaft end

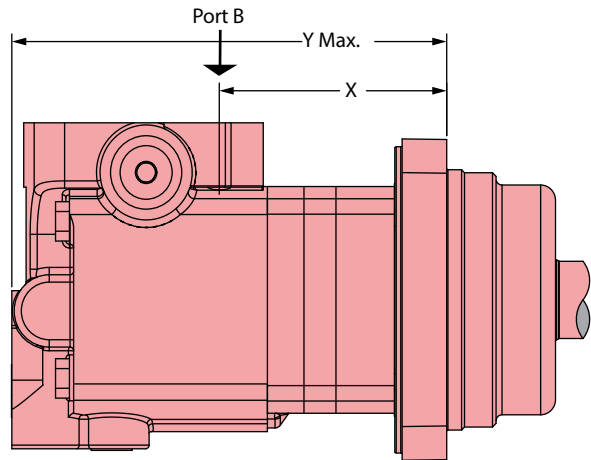
Port A pressurized — CW
 Port B pressurized — CCW

C-1

Two-speed standard motors



Two-speed wheel 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]

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]

Bearingless

Ports

- 7/8 -14 UNF-2B SAE O-ring staggered ports (2)
- 9/16 -18 UNF-2B SAE O-ring case drain port (1)
- 7/16 -20 UNF-2B SAE O-ring pilot control port (1)
- G 1/2 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)
- G 1/4 (BSP) pilot control port (1)

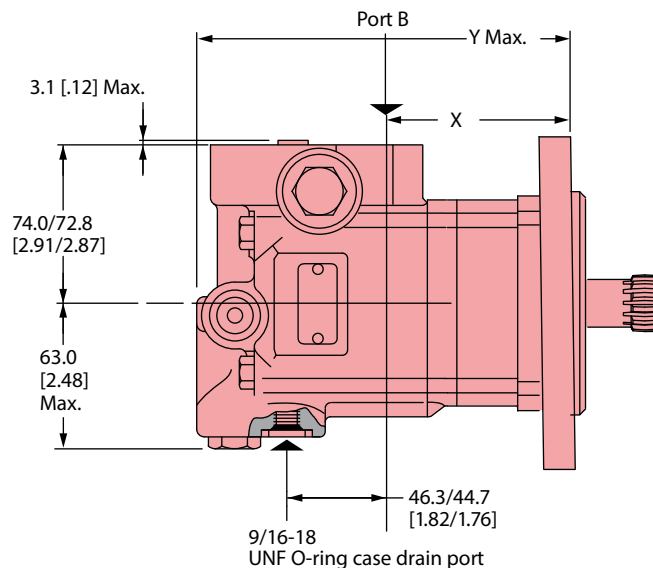
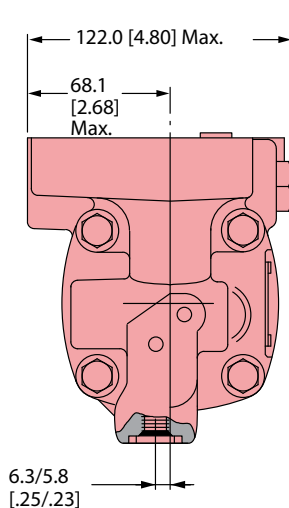
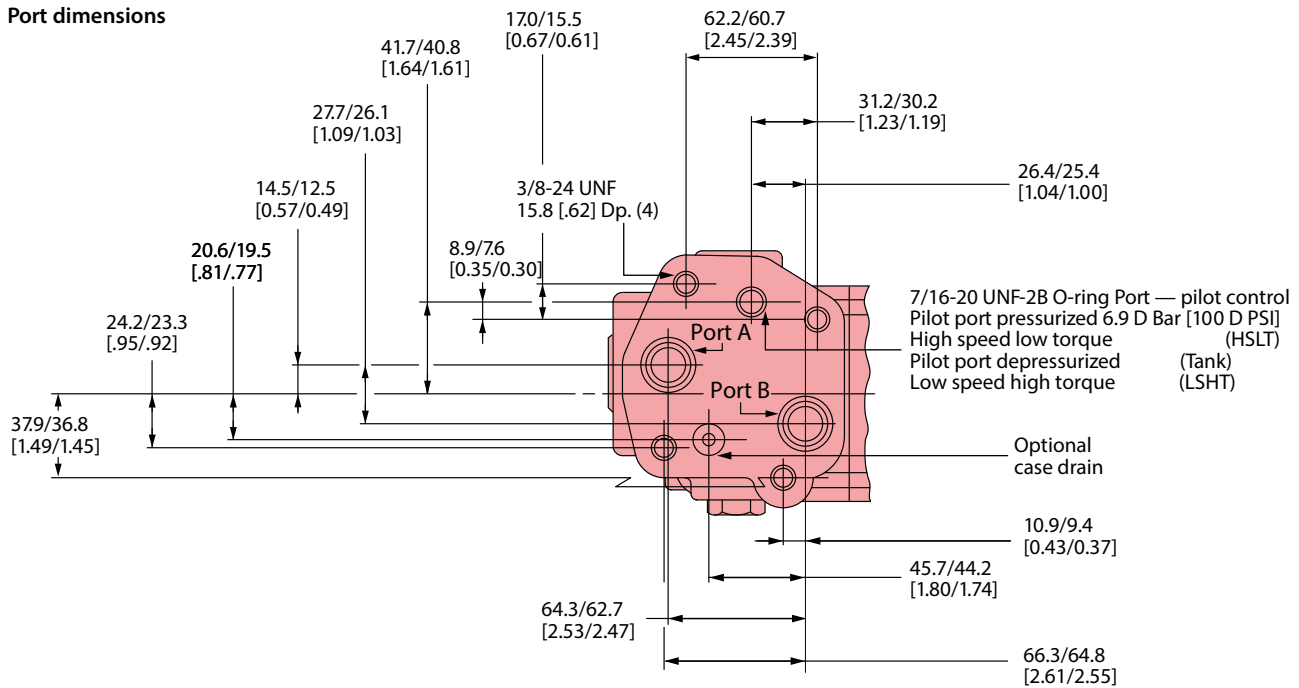
Standard rotation viewed from shaft end

- Port A pressurized — CW
- Port B pressurized — CCW

Bearingless motor dimensions

Displacement 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]

Port dimensions



2000 Series Two-speed

Product numbers

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

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

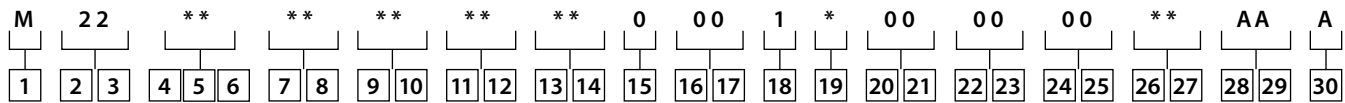
Orders will not be accepted without three digit prefix.

Mounting	Shaft	Port size	Displ. cm ³ /r [in ³ /r] / product number								
			80	100	130	160	195	245	305	395	490
			[4.9]	[6.2]	[8.0]	[9.6]	[11.9]	[14.9]	[18.7]	[24.0]	[29.8]
2 Bolt SAE A flange	1 Inch straight	7/8 -14 O-ring staggered	193-0002-001-0003	-0004	-0005	-0006	-0007	-0008	-0009	—	
	1 1/4 Inch straight	7/8 -14 O-ring staggered	193-0010-001-0011	-0012	-0013	-0014	-0015	-0016	-0017	-0070	
	1 1/4 Inch 14 T splined	7/8 -14 O-ring staggered	193-0018-001-0019	-0020	-0021	-0022	-0023	-0024	-0025	—	
Wheel motor	1 1/4 Inch Tapered	7/8 -14 O-ring staggered	193-0222-001	—	—	-0225	-0226	-0227	-0228	-0229	—
	1 1/4 Inch 14 T splined	7/8 -14 O-ring staggered	—	—	-0232	-0257	-0234	-0235	-0236	-0237	—
Bearingless		7/8 -14 O-ring staggered	193-0282-001-0283	-0234	-0285	-0286	-0287	-0288	-0289	—	

↑
193-0288-001

C-1

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.



1	Product	M Motor
2 3	Series	22 2000 2 speed series (1:2 ratio)
4 5 6	Displacement	049 80.6 cm ³ /r [4.92 in ³ /r] 062 101.6 cm ³ /r [6.20 in ³ /r] 080 130.6 cm ³ /r [7.97 in ³ /r] 096 158.1 cm ³ /r [9.65 in ³ /r] 119 194.8 cm ³ /r [11.89 in ³ /r] 149 244.3 cm ³ /r [14.91 in ³ /r] 187 306.6 cm ³ /r [18.71 in ³ /r] 240 393.8 cm ³ /r [24.03 in ³ /r] 298 489.0 cm ³ /r [29.84 in ³ /r]
7 8	Mounting description	AC Standard, 2 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes on 106.4 [4.19] Dia. Bolt Circle. SAE A AE Bearingless (w/ leakage slots), 4 bolt: 101.6 [4.00] pilot Dia. 13.59 [.535] Dia. Holes on 127.0 [5.00] Dia. Bolt circle AF Standard, 2 Bolt: 101.6 [4.00] Pilot Dia. 14.35 [.565] Dia. Holes on 146.0 [5.75] Dia. Bolt Circle. SAE B Dia bolt circle (european)
9 10	Output shaft description	00 None (bearingless) 01 25.40 [1.000] Dia. Straight shaft with 1/4-20UNC-2B thread in end, 6.35 [.250] Wide x 25.40 [1.000] Dia. Woodruff key 02 31.75 [1.250] Dia. Straight shaft with .375-16UNC-2B Thread in end, 7.938 [.3125] Sq x 31.75 [1.250] straight key 04 31.75 [1.250] Dia. Flat root side fit, 14 tooth, 12/24 DP 30° involute spline w/ .375-16UNC-2B thread in end, 33.0 [1.30] Min. Full spline
11 12	Ports description	AA .875-14 UNF-2B SAE O-ring ports - staggered ports AD G1/2 BSP ports - Staggered with M10x1.5-6H port block mounting holes

13 14	Case flow options/ Selector valve	01 .5625-10 UNF-2B SAE O-Ring case drain port, .4375-20 UNF-2B SAE O-Ring pilot control port, optional .4375-20 UNF-2B SAE case drain port for pilot, normally low speed 02 G1/4 Case drain port, G1/4 pilot control port, optional G1/4 case drain port for pilot, normally low speed
15	Shuttle valve/Low pressure relief	0 None
16 17	Pressure/flow option	00 None
18	Geroler option	1 Standard
19	Seal option	0 Standard 1 Viton 2 High Pressure shaft Seal 3 Seal Guard
20 21	Accessories	00 None
22 23	Special features (Hardware)	00 None
24 25	Special features (Assembly)	00 None
26 27	Paint/packaging	AA No paint, individual box AB Low gloss black primer, individual box BT Epoxy coated black, individual box
28 29	Customer Identification	AA None
30	Design code	A First

4000 Compact Series

Highlights

Description:

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

Features:

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

Benefits:

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

Applications:

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

C-2

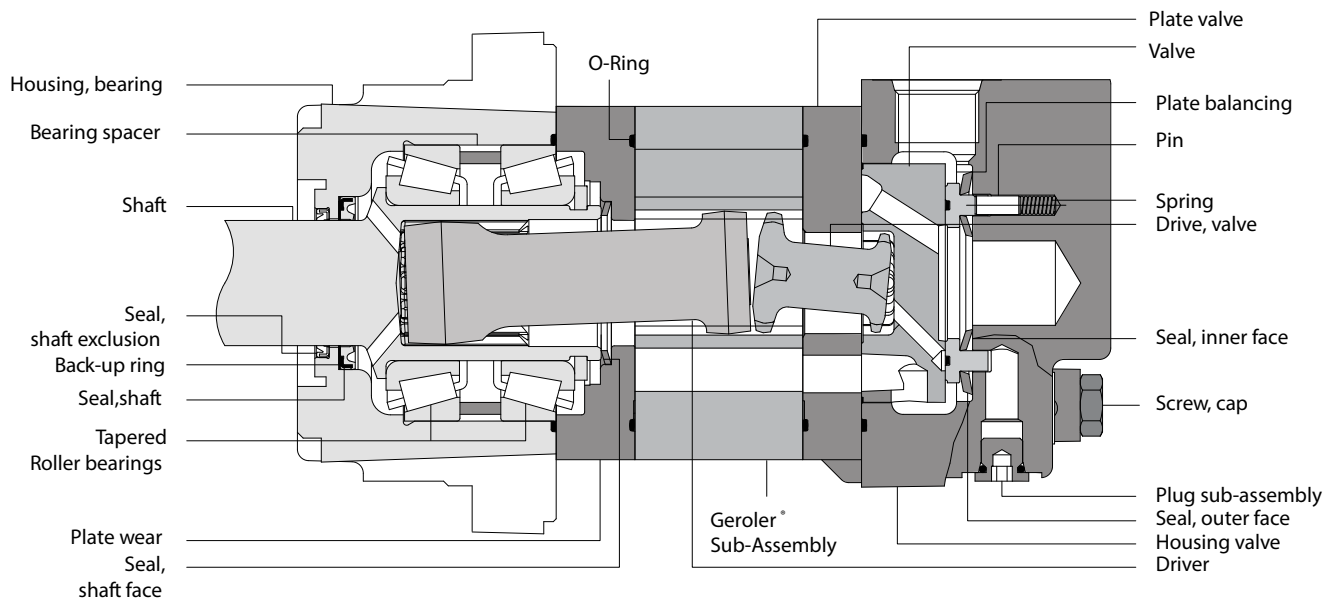


Specifications

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

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

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



C-2

Specification data — 4000 Compact Series motors

Displ. cm ³ /r [in ³ /r]		160 [9.8]	200 [12.3]	250 [15.4]	325 [19.8]	405 [24.6]	490 [29.8]
Max. Speed (RPM) @ Flow	Continuous	464	375	300	234	188	155
	Intermittent	699	563	450	351	282	232
Flow l/min [GPM]	Continuous	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Intermittent	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]
Torque* Nm [lb - in]	Continuous	510 [4514]	646 [5715]	734 [6500]	793 [7021]	800 [7079]	975 [8627]
	Intermittent	690 [6108]	840 [7436]	935 [8272]	1053 [9320]	921 [8153]	1218 [10778]
Pressure Δ bar [Δ PSI]	Continuous	225 [3250]	225 [3250]	205 [3000]	170 [2500]	140 [2000]	140 [2000]
	Intermittent	310 [4500]	295 [4250]	260 [3750]	240 [3500]	170 [2500]	170 [2500]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	275 [4000]	260 [3750]
Weight kg [lb]	Standard or Wheel mount	10.4 [23.0]	10.9 [24.0]	11.3 [25.0]	11.8 [26.0]	12.2 [27.0]	12.2 [27.0]
	Bearingless	8.4 [18.5]	8.8 [19.5]	9.3 [20.5]	9.8 [21.5]	10.2 [22.5]	10.2 [22.5]

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

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

Maximum inlet pressure:

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

Maximum return pressure:

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

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

Δ bar [Δ PSI]:

The true pressure difference between inlet port and outlet port

Continuous rating: Motor may be run continuously at these ratings

Intermittent operation: 10% of every minute

Peak operation: 1% of every minute

Recommended fluids:

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

Recommended system operating temp:

-34°C to 82°C [-30°F to 180°F]

Recommended filtration:

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

Thermal shock warning:

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

Minimum delta pressure warning:

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

4000 Compact Series

Performance data

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

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



C-2

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

	[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]	[4000]	[4250]	[4500]
	15	35	50	70	85	105	120	140	155	170	190	205	225	240	260	275	295	310
[0.5]	[244]	[543]																
2	28 4	61 3																
[1]	[274]	[554]	[854]															
4	31 10	63 8	96 7															
[2]	[274]	[593]	[899]	[1210]	[1513]	[1816]	[2092]	[2361]	[2621]	[2874]	[3088]							
8	31 22	67 21	102 20	137 19	171 17	205 14	236 12	267 10	296 9	325 7	349 6							
[4]	[301]	[623]	[940]	[1261]	[1579]	[1898]	[2197]	[2492]	[2766]	[3033]	[3270]	[3496]	[3761]	[4022]				
15	34 40	70 39	106 38	143 36	178 35	214 33	248 31	282 28	313 24	343 20	369 17	395 14	425 10	454 6				
[6]	[305]	[662]	[1004]	[1354]	[1699]	[2046]	[2386]	[2725]	[3049]	[3368]	[3693]	[4016]	[4319]	[4618]	[4828]	[5022]		
[23]	34 87	75 85	113 83	153 81	192 79	231 77	270 74	308 72	344 67	381 63	417 59	454 55	488 49	522 44	545 35	567 27		
[8]	[293]	[659]	[1003]	[1357]	[1705]	[2056]	[2399]	[2741]	[3074]	[3405]	[3751]	[4098]	[4417]	[4732]	[5023]	[5308]		
[30]	33 133	74 131	113 129	153 127	193 124	232 121	271 118	310 114	347 109	385 104	424 99	463 93	499 87	535 80	568 71	600 63		
[10]	[280]	[656]	[1002]	[1360]	[1711]	[2066]	[2412]	[2758]	[3100]	[3442]	[3809]	[4180]	[4514]	[4846]	[5218]	[5593]	[5856]	[6108]
[38]	32 181	74 179	113 177	154 175	193 172	233 169	273 166	312 162	350 157	389 152	430 145	472 139	510 133	548 127	590 120	632 113	662 104	690 96
[12]	[259]	[630]	[978]	[1348]	[1701]	[2061]	[2408]	[2755]	[3102]	[3450]	[3806]	[4163]	[4500]	[4835]	[5191]	[5547]	[5784]	
[45]	29 228	71 225	110 223	152 220	192 217	233 213	272 209	311 204	351 199	390 193	430 186	470 179	508 172	546 165	586 157	627 150	653 141	
[14]	[238]	[604]	[954]	[1336]	[1692]	[2056]	[2403]	[2752]	[3105]	[3458]	[3802]	[4146]	[4485]	[4824]	[5163]	[5501]		
[53]	27 275	68 272	108 269	151 266	191 262	232 258	272 253	311 247	351 241	391 235	430 229	468 223	507 214	545 205	583 197	622 189		
[16]	[210]	[577]	[923]	[1308]	[1665]	[2034]	[2385]	[2739]	[3092]	[3447]	[3796]	[4144]	[4487]	[4830]				
[61]	24 322	65 319	104 316	148 313	188 308	230 304	269 298	310 293	349 286	390 279	429 272	468 265	507 256	546 247				
[18]	[182]	[550]	[893]	[1280]	[1638]	[2012]	[2367]	[2727]	[3080]	[3436]	[3789]	[4143]	[4489]	[4836]				
[68]	21 370	62 367	101 363	145 360	185 356	227 351	267 345	308 339	348 332	388 324	428 317	468 309	507 301	546 292				
[20]	[143]	[514]	[853]	[1247]	[1601]	[1973]	[2329]	[2692]	[3045]	[3401]	[3756]	[4114]						
[76]	16 417	58 414	96 410	141 406	181 401	223 397	263 390	304 383	344 375	384 366	424 358	465 350						
[22]	[105]	[478]	[814]	[1213]	[1564]	[1935]	[2291]	[2658]	[3010]	[3366]	[3724]	[4085]						
[83]	12 464	54 461	92 457	137 453	177 448	219 442	259 435	300 428	340 418	380 409	421 400	462 390						
[25]		[433]	[762]	[1167]	[1518]	[1893]	[2252]	[2623]	[2973]	[3328]	[3682]	[4040]						
[95]		49 508	86 504	132 500	172 495	214 489	254 482	296 474	336 465	376 456	416 446	456 436						
[30]		[387]	[711]	[1121]	[1472]	[1851]	[2212]	[2589]	[2937]	[3291]	[3641]	[3995]						
[114]		44 556	80 552	127 548	166 542	209 537	250 529	292 521	332 513	372 504	411 493	451 483						
[35]		[363]	[683]	[1095]	[1445]	[1824]	[2184]	[2561]	[2910]	[3266]								
[132]		41 580	77 576	124 572	163 566	206 560	247 552	289 544	329 535	369 526								
[35]		[244]	[546]	[967]	[1308]	[1689]	[2045]	[2421]	[2777]	[3144]								
[132]		28 699	62 695	109 692	148 685	191 678	231 669	274 660	314 648	355 637								

[2777] } Torque [lb-in]
314 } Nm
648 } 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 25 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.



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

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]	[4000]	[4250]
15	35	50	70	85	105	120	140	155	170	190	205	225	240	260	275	295

[0.25]	[115]	[504]															
0.95	13	57															
	4	3															
[0.5]	[268]	[584]	[963]	[1274]													
1.9	30	66	109	144													
	8	7	4	3													
[1]	[306]	[721]	[1104]	[1516]	[1913]	[2243]	[2397]	[2772]									
3.8	35	81	125	171	216	253	271	313									
	17	16	14	13	12	10	9	6									
[2]	[402]	[841]	[1218]	[1647]	[2107]	[2478]	[2826]	[3238]	[3954]	[4451]	[4755]	[5127]	[5407]	[5569]	[5855]		
7.5	45	95	138	186	238	280	319	366	447	503	537	579	611	629	662		
	35	34	32	31	30	28	27	24	29	26	23	21	17	11	8		
[4]	[403]	[896]	[1361]	[1780]	[2247]	[2649]	[3068]	[3513]	[3947]	[4367]	[4710]	[5125]	[5509]	[5880]	[6249]	[6547]	[6753]
15	46	101	154	201	254	299	347	397	446	493	532	579	622	664	706	740	763
	72	70	69	68	66	65	62	60	56	53	50	46	42	37	31	24	19
[6]	[385]	[863]	[1354]	[1785]	[2260]	[2657]	[3087]	[3547]	[3965]	[4389]	[4793]	[5218]	[5610]	[6015]	[6408]	[6754]	[7436]
23	44	98	153	202	255	300	349	401	448	496	542	590	634	680	724	763	840
	109	107	106	104	102	100	97	93	90	86	81	77	72	66	60	52	47
[8]	[368]	[831]	[1347]	[1790]	[2273]	[2665]	[3106]	[3581]	[3982]	[4408]	[4876]	[5311]	[5712]	[6151]	[6567]	[6961]	[7334]
30	42	94	152	202	257	301	351	405	450	498	551	600	645	695	742	786	829
	147	146	144	142	140	137	134	130	127	122	117	113	108	103	98	91	83
[10]	[353]	[822]	[1319]	[1774]	[2212]	[2642]	[3086]	[3556]	[3974]	[4410]	[4839]	[5297]	[5715]	[6147]	[6563]		
38	40	93	149	200	250	299	349	402	449	498	547	598	646	695	742		
	185	184	181	179	177	174	170	165	161	156	151	146	140	134	129		
[12]	[339]	[813]	[1291]	[1758]	[2151]	[2620]	[3067]	[3530]	[3965]	[4408]	[4802]	[5283]	[5718]	[6144]	[6568]		
45	38	92	146	199	243	296	346	399	448	498	543	597	646	694	742		
	223	222	219	217	214	211	207	202	197	192	186	180	174	167	164		
[14]	[282]	[762]	[1237]	[1693]	[2121]	[2601]	[2968]	[3504]	[3953]	[4368]	[4832]	[5261]	[5690]				
53	32	86	140	191	240	294	335	396	447	493	546	594	643				
	261	260	257	255	252	248	244	238	233	227	221	214	208				
[16]	[224]	[712]	[1183]	[1629]	[2091]	[2581]	[2870]	[3477]	[3940]	[4328]	[4861]	[5240]	[5661]				
61	25	80	134	184	236	292	324	393	445	489	549	592	640				
	299	298	296	293	290	286	282	275	269	263	256	249	243				
[18]	[200]	[667]	[1148]	[1619]	[2053]	[2520]	[2899]	[3442]	[3906]	[4337]	[4819]	[5245]	[5644]				
68	23	75	130	183	232	285	328	389	441	490	544	593	638				
	337	336	334	331	328	324	320	314	307	301	293	285	278				
[20]	[176]	[623]	[1112]	[1609]	[2014]	[2458]	[2929]	[3407]	[3872]	[4347]	[4777]	[5250]	[5627]				
76	20	70	126	182	228	278	331	385	437	491	540	593	636				
	375	374	372	369	366	363	358	353	346	339	331	322	315				
[22]		[565]	[1053]	[1530]	[1934]	[2387]	[2868]	[3347]	[3804]	[4254]	[4698]						
83		64	119	173	219	270	324	378	430	481	531						
		412	410	407	404	401	396	390	383	375	367						
[24]		[507]	[994]	[1450]	[1855]	[2316]	[2806]	[3287]	[3737]	[4162]	[4618]						
91		57	112	164	210	262	317	371	422	470	522						
		449	448	446	443	439	434	427	420	412	403						
[25]		[465]	[950]	[1411]	[1820]	[2276]	[2768]	[3233]	[3688]	[4116]	[4493]						
95		53	107	159	206	257	313	365	417	465	508						
		468	467	464	462	458	453	446	439	431	423						
[30]		[259]	[726]	[1214]	[1645]	[2072]	[2577]	[2961]	[3443]	[3889]	[3866]						
114		29	82	137	186	234	291	335	389	439	437						
		562	563	559	555	556	550	545	536	527	521						

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

4000 Compact Series

Performance data

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



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

Δ Pressure bar [PSI]
250 cm³/r [15.4 in³/r]

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
15	35	50	70	85	105	120	140	155	170	190	205	225	240	260

C-2

	[384]	[833]													
[0.5]	43	94													
1.9	6	5													
[1]	[438]	[904]	[1403]	[1887]	[2359]	[2798]	[3221]	[3657]	[3822]	[4326]					
3.8	49	102	158	213	267	316	364	413	432	489					
[2]	[492]	[1054]	[1563]	[2081]	[2623]	[3160]	[3717]	[4147]	[4585]	[5070]	[5470]	[5721]	[5962]		
7.5	56	119	177	235	296	357	420	469	518	573	618	646	674		
	28	27	26	25	24	23	21	17	16	13	9	7	5		
[4]	[603]	[1183]	[1771]	[2275]	[2817]	[3364]	[3895]	[4495]	[5005]	[5496]	[5982]	[6500]	[7054]	[7519]	[7941]
15	68	134	200	257	318	380	440	508	565	621	676	734	797	850	897
	58	56	55	54	52	50	47	44	42	38	35	32	28	24	17
[6]	[587]	[1159]	[1741]	[2329]	[2815]	[3369]	[3951]	[4483]	[5021]	[5555]	[6068]	[6557]	[7131]	[7641]	[8107]
23	66	131	197	263	318	381	446	506	567	628	686	741	806	863	916
	88	86	84	82	80	77	74	71	67	63	59	55	50	45	38
[8]	[571]	[1135]	[1710]	[2384]	[2813]	[3375]	[4008]	[4471]	[5038]	[5613]	[6154]	[6614]	[7209]	[7763]	[8272]
30	65	128	193	269	318	381	453	505	569	634	695	747	815	877	935
	118	116	114	112	110	107	103	100	96	92	87	83	78	73	67
[10]	[552]	[1138]	[1671]	[2304]	[2804]	[3361]	[3950]	[4452]	[5006]	[5587]	[6123]	[6612]	[7201]		
38	62	129	189	260	317	380	446	503	566	631	692	747	814		
	148	146	144	142	139	136	131	127	123	119	113	109	102		
[12]	[532]	[1140]	[1631]	[2224]	[2796]	[3347]	[3892]	[4434]	[4974]	[5561]	[6093]	[6610]	[7193]		
45	60	129	184	251	316	378	440	501	562	628	688	747	813		
	178	177	175	173	170	166	161	157	151	146	141	136	129		
[14]	[441]	[1072]	[1600]	[2207]	[2754]	[3320]	[3888]	[4433]	[4958]	[5529]	[6066]	[6590]			
53	50	121	181	249	311	375	439	501	560	625	685	745			
	209	207	205	202	199	195	190	185	179	174	168	162			
[16]	[349]	[1003]	[1568]	[2190]	[2711]	[3292]	[3884]	[4431]	[4941]	[5496]	[6039]	[6570]			
61	39	113	177	247	306	372	439	501	558	621	682	742			
	239	237	235	233	229	225	220	214	208	202	195	189			
[18]	[306]	[940]	[1513]	[2114]	[2653]	[3251]	[3830]	[4380]	[4904]	[5446]	[5984]	[6518]			
68	35	106	171	239	300	367	433	495	554	615	676	736			
	269	267	265	263	259	255	250	243	236	230	223	214			
[20]	[263]	[876]	[1458]	[2038]	[2595]	[3210]	[3777]	[4328]	[4867]	[5395]	[5928]	[6471]			
76	30	99	165	230	293	363	427	489	550	610	670	731			
	300	298	296	293	290	285	280	272	265	259	251	241			
[22]		[826]	[1414]	[1991]	[2528]	[3144]	[3709]	[4262]	[4806]	[5354]	[5915]				
83		93	160	225	286	355	419	482	543	605	668				
		328	326	323	320	315	309	302	295	288	279				
[24]		[776]	[1370]	[1945]	[2462]	[3079]	[3642]	[4196]	[4745]	[5313]	[5901]				
91		88	155	220	278	348	411	474	536	600	667				
		359	356	354	350	345	339	332	325	317	308				
[25]		[732]	[1322]	[1959]	[2426]	[3026]	[3594]	[4153]	[4696]	[5152]					
95		83	149	221	274	342	406	469	531	582					
		374	371	369	365	360	354	347	340	333					
[30]		[509]	[1082]	[2029]	[2246]	[2761]	[3358]	[3939]	[4450]	[4347]					
114		57	122	229	254	312	379	445	503	491					
		450	449	445	442	437	430	423	414	413					

[2246]
 254 } Torque [lb-in]
 442 } 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 25 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.

 Continuous	 Peak
 Intermittent	 No operation

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

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]
15	35	50	70	85	105	120	140	155	170	190	205	225	240

[0.5]	[536]	[1152]													
1.9	61	130													
	5	4													
[1]	[555]	[1220]	[1900]	[2559]	[3222]	[3862]	[4522]	[5061]	[5580]	[6106]					
3.8	63	138	215	289	364	436	511	572	630	690					
	11	10	10	9	9	8	7	5	3	3					
[2]	[643]	[1349]	[2025]	[2712]	[3378]	[4051]	[4696]	[5335]	[5889]	[6366]	[6876]				
7.5	73	152	229	306	382	458	531	603	665	719	777				
	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]	
15	77	160	242	322	402	481	559	636	712	786	858	927	991	1053	
	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]		
23	74	158	241	323	404	484	562	640	717	793	868	931	993		
	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]			
30	71	156	240	324	406	486	566	645	722	800	877	949			
	92	90	89	87	85	82	79	75	71	66	61	56			
[10]	[587]	[1337]	[2082]	[2827]	[3556]	[4272]	[4976]	[5672]	[6362]	[7053]					
38	66	151	235	319	402	483	562	641	719	797					
	115	114	112	110	107	103	100	94	90	85					
[12]	[546]	[1295]	[2040]	[2787]	[3520]	[4240]	[4944]	[5638]	[6332]	[7023]					
45	62	146	230	315	398	479	559	637	715	794					
	139	137	136	134	130	125	121	115	110	105					
[14]	[489]	[1238]	[1984]	[2729]	[3467]	[4193]	[4903]	[5600]	[6293]						
53	55	140	224	308	392	474	554	633	711						
	162	161	159	157	153	148	143	136	131						
[16]	[431]	[1182]	[1929]	[2671]	[3415]	[4145]	[4861]	[5562]	[6254]						
61	49	134	218	302	386	468	549	628	707						
	186	185	183	181	177	171	165	159	153						
[18]	[360]	[1110]	[1856]	[2600]	[3343]	[4073]	[4794]	[5499]							
68	41	125	210	294	378	460	542	621							
	210	208	206	204	200	195	189	183							
[20]	[288]	[1038]	[1784]	[2529]	[3271]	[4001]	[4726]	[5436]							
76	33	117	202	286	370	452	534	614							
	234	232	230	228	224	220	214	207							
[22]		[958]	[1706]	[2451]	[3194]	[3926]	[4650]	[5360]							
83		108	193	277	361	444	525	606							
		256	254	251	248	243	237	229							
[24]		[878]	[1628]	[2373]	[3116]	[3850]	[4574]	[5285]							
91		99	184	268	352	435	517	597							
		279	277	275	271	266	260	252							
[25]		[826]	[1576]	[2320]	[3063]	[3798]	[4523]								
95		93	178	262	346	429	511								
		291	289	287	283	277	271								
[30]		[566]	[1314]	[2056]	[2799]	[3536]	[4268]								
114		64	148	232	316	399	482								
		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 25 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.



Δ Pressure bar [PSI]
405 cm³/r [24.6 in³/r]

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]
15	35	50	70	85	105	120	140	155	170

C-2

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

	Continuous		Peak
	Intermittent		No operation

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

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]
15	35	50	70	85	105	120	140	155	170

[0.5]	[375]	[1669]									
1.9	42	189									
[1]	[525]	[1762]	[2945]	[3965]	[5099]	[5926]	[6715]	[7503]			
3.8	59	199	333	448	576	670	759	848			
[2]	[639]	[2108]	[3287]	[4169]	[5416]	[6570]	[7188]	[8295]	[8959]		
7.5	72	238	371	471	612	742	812	937	1012		
[4]	[981]	[2201]	[3333]	[4574]	[5558]	[6634]	[7694]	[8627]	[9567]	[10399]	
15	111	249	377	517	628	750	869	975	1081	1175	
[6]	[1049]	[2218]	[3332]	[4584]	[5604]	[6670]	[7711]	[8713]	[9698]	[10588]	
23	119	251	376	518	633	754	871	984	1096	1196	
[8]	[1118]	[2236]	[3331]	[4593]	[5650]	[6705]	[7727]	[8798]	[9828]	[10778]	
30	126	253	376	519	638	758	873	994	1110	1218	
[10]	[1060]	[2230]	[3304]	[4503]	[5607]	[6693]	[7721]	[8836]			
38	120	252	373	509	633	756	872	998			
[12]	[1003]	[2223]	[3276]	[4413]	[5564]	[6680]	[7715]	[8874]			
45	113	251	370	499	629	755	872	1003			
[14]	[858]	[2127]	[3136]	[4320]	[5496]	[6542]	[7653]				
53	97	240	354	488	621	739	865				
[16]	[713]	[2030]	[2997]	[4226]	[5428]	[6403]	[7590]				
61	81	229	339	477	613	723	858				
[18]	[631]	[1907]	[2935]	[4133]	[5330]	[6339]	[7431]				
68	71	215	332	467	602	716	840				
[20]	[548]	[1784]	[2872]	[4041]	[5232]	[6275]	[7362]				
76	62	202	325	457	591	709	832				
[22]		[1669]	[2704]	[3928]	[5048]	[6124]	[7208]				
83		189	306	444	570	692	814				
[24]		[1553]	[2536]	[3816]	[4864]	[5972]	[7055]				
91		175	287	431	550	675	797				
[25]		[1469]	[2475]	[3737]	[4810]	[5909]	[6959]				
95		166	280	422	543	668	786				
[30]		[1047]	[2172]	[3341]	[4538]	[5592]	[6482]				
114		118	245	378	513	632	732				
		232	232	232	231	229	227				

[3341] } Torque [lb-in]
378 } Nm
232 } Speed RPM

4000 Compact Series

Dimensions

Standard mount

Ports

- 7/8 -14 UNF-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 7/8 -14 UNF-2B SAE O-ring end ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 1/2 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)

Manifold Mount

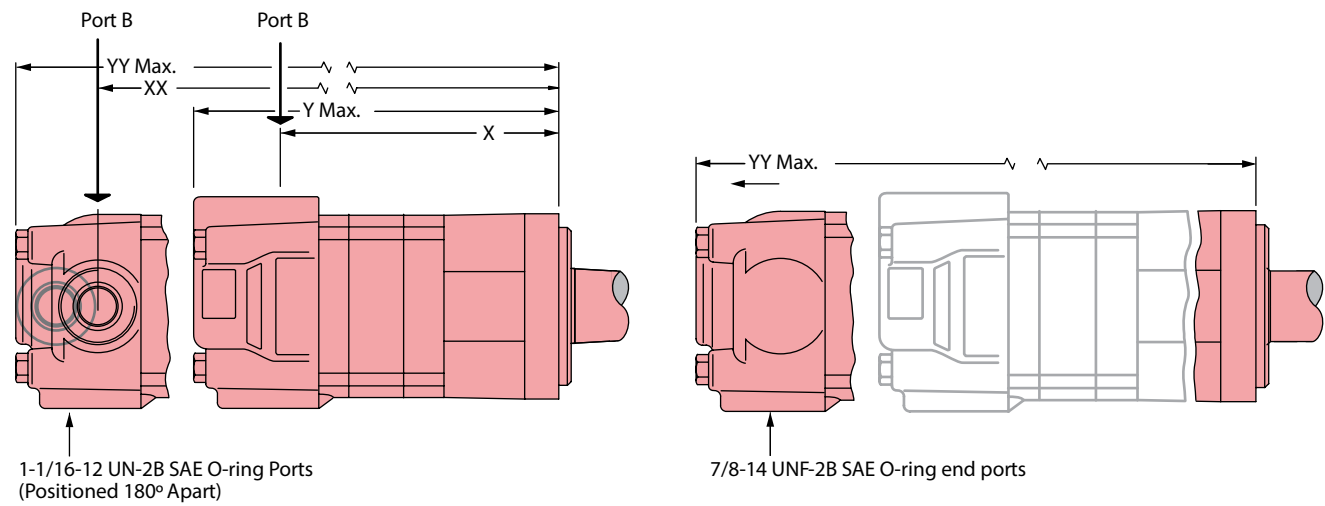
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)

Standard rotation viewed from shaft end

- Port A pressurized — CW
- Port B pressurized — CCW

Standard mount

C-2



Standard mount motor dimensions

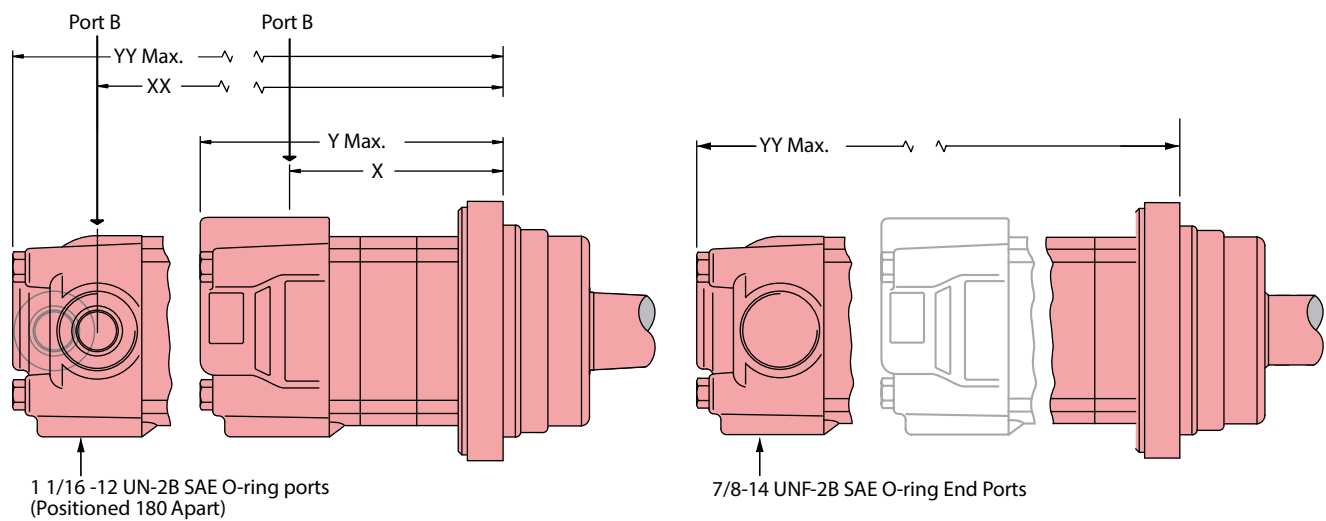
Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
160 [9.8]	154.7 [6.09]	201.9 [7.95]	157.0 [6.18]	203.3 [8.00]
200 [12.3]	163.8 [6.45]	211.1 [8.31]	166.1 [6.54]	212.3 [8.36]
250 [15.4]	175.3 [6.90]	222.5 [8.76]	177.5 [6.99]	223.8 [8.81]
325 [19.8]	191.0 [7.52]	238.5 [9.39]	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]

Wheel mount

Ports

- 7/8 -14 UNF-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 7/8 -14 UNF-2B SAE O-ring end ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 1/2 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)

Standard wheel



C-2

Wheel mount motor dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
160 [9.8]	114.6 [4.51]	161.8 [6.37]	114.6 [4.51]	161.8 [6.37]
200 [12.3]	123.7 [4.87]	170.9 [6.73]	123.7 [4.87]	170.9 [6.73]
250 [15.4]	135.1 [5.32]	182.4 [7.18]	135.1 [5.32]	182.4 [7.18]
325 [19.8]	150.9 [5.94]	198.4 [7.81]	150.9 [5.94]	198.4 [7.81]
405 [24.6]	168.4 [6.63]	215.6 [8.49]	168.4 [6.63]	215.6 [8.49]
490 [29.8]	168.4 [6.63]	215.6 [8.49]	168.4 [6.63]	215.6 [8.49]

4000 Compact Series

Dimensions

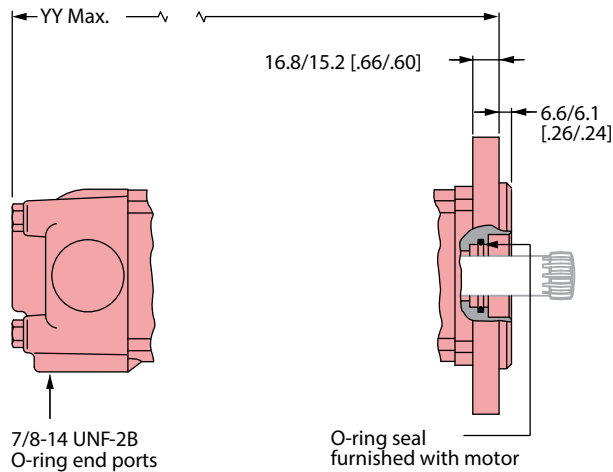
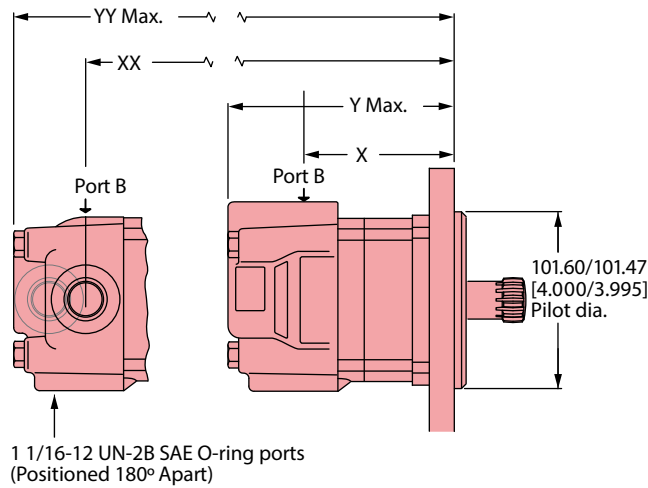
Bearingless

Ports

- 7/8 -14 UNF-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 1 1/16 -12 UN-2B SAE O-ring ports (positioned 180° apart) (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 7/8 -14 UNF-2B SAE O-ring end ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 1/2 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)

Bearingless

C-2



Bearingless motor dimensions

Displacement cm ³ /r [in ³ /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]

Manifold mount

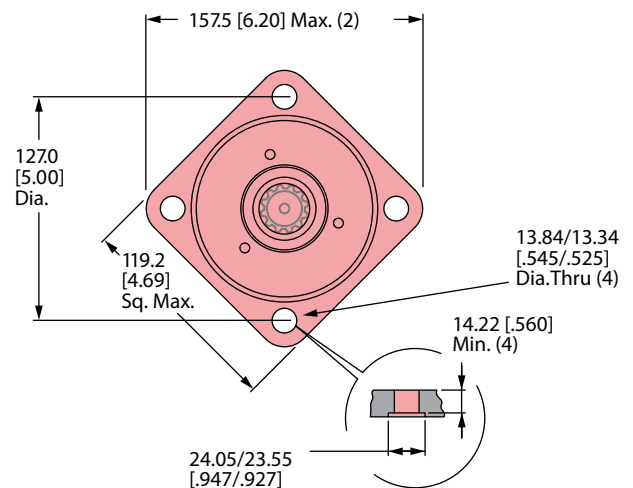
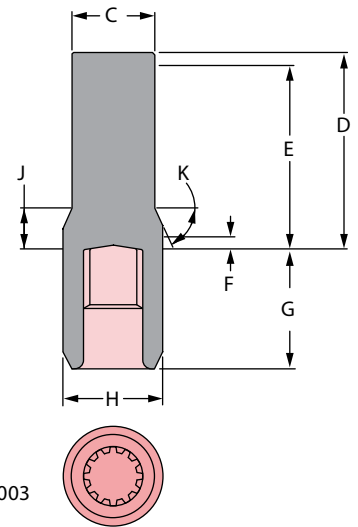
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)

Standard rotation viewed from drive end

- Port A pressurized — CW
- Port B pressurized — CCW

Shaft blank dimensions

- C 47.2 [1.86] Dia.
- D 112.5 [4.43] Max.
- E 107.4 [4.23] Full form dia.
- F 74 [.29] Min. Full form dia.
- G 68.8 [2.71] Max.
- H 56.9 [2.24] Dia.
- J 18.29 [.720]
- K 38 °

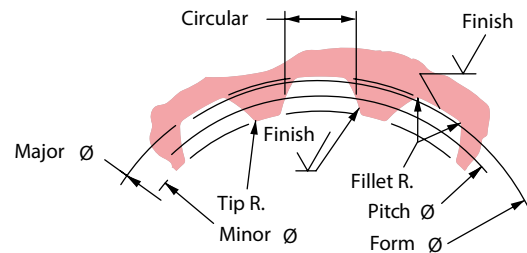
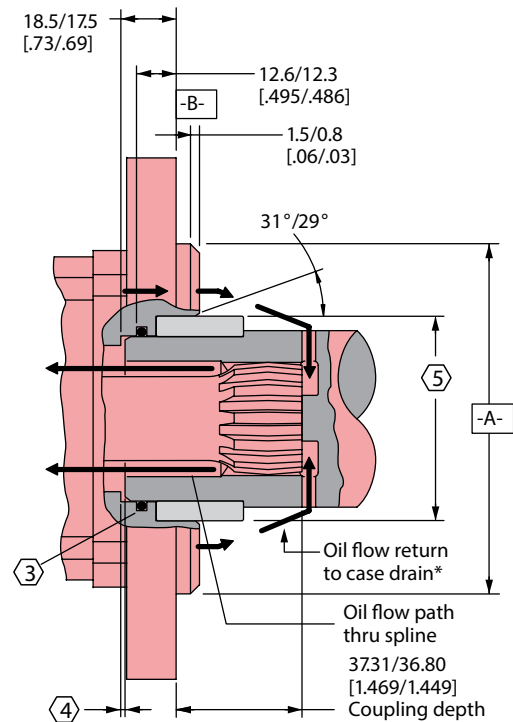
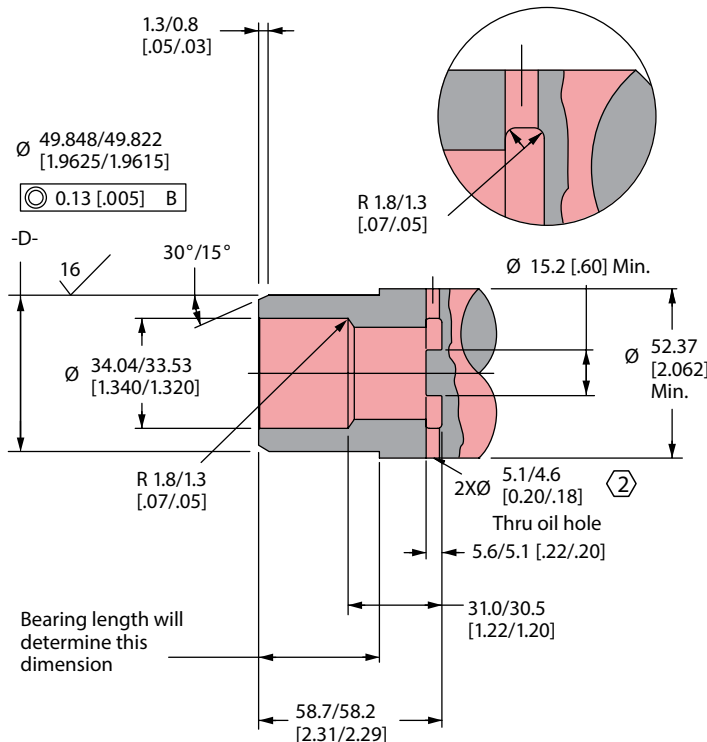


For 4000 compact series bearingless motor application information, contact your Danfoss representative (mating coupling blanks available from Danfoss).

Note: After machining blank, part must be hardened per Danfoss specification.

Bearingless

- 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.
- Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
- Seal to be furnished with motor for proper oil circulation thru splines.
- Some means of maintaining clearance between shaft and mounting flange must be provided.
- Counter bore designed to adapt to a standard sleeve bearing 50.010 - 50.040 [1.9689 - 1.9700] ID by 60.050 - 60.080 [2.3642 - 2.3653] (Oilite bronze sleeve bearing) Source: Beemer Precision Inc. www.oilite.com, 1-800-836-2340 AAM 50 mm ID - 60 mm OD Length Determined by the Customer. Stock bearing lengths: 35 mm, 50 mm, 60 mm, 70 mm, 75 mm



Spline pitch	10/20
Pressure angle	30°
Number of teeth	12
Class of fit	Ref. 5
Type of fit	Side
Pitch diameter	Ref. 30.480000 [1.2000000]
Base diameter	Ref. 26.396455 [1.039230] 0.21 [0.008] D
Major diameter	(33.43 [1.316] Max. 33.23 [1.308] Min.)
Minor diameter	28.40 - 25.58 [1.118 - 1.125]
Form diameter, Min	32.59 [1.283]
Fillet radius	0.63 - 0.76 [0.025 - .030]
Tip radius	0.26 - 0.51 [0.010 - .020]

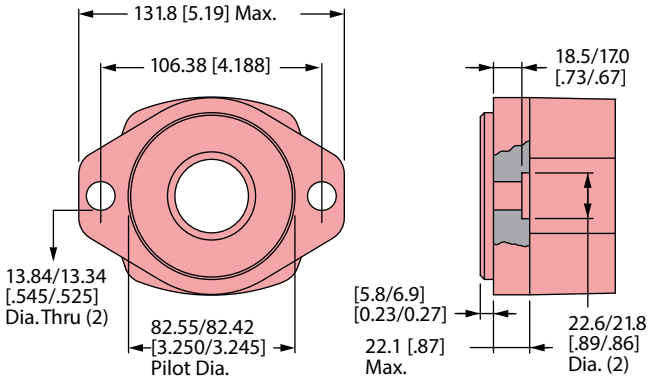
Finish	1.6 (63)
Involute profile variation	+0.000 -0.025 [+0.0000 -0.0010]
Total index variation	0.038 [0.0015]
Lead variation	0.013 [0.0005]
Circular space width:	
Maximum actual	5.045 [1.986]
Minimum effective	4.995 [1.951]
Maximum effective	Ref. 5.009 [1.972]
Minimum actual	Ref. 4.986 [1.963]
Dimension between two pins	Ref. 22.783 - 22.929 [.8970 - .9027]
Pin diameter	5.334 [2.100] Pins to Have 3.73 [.147]
	Wide flat for root clearance

4000 Compact Series

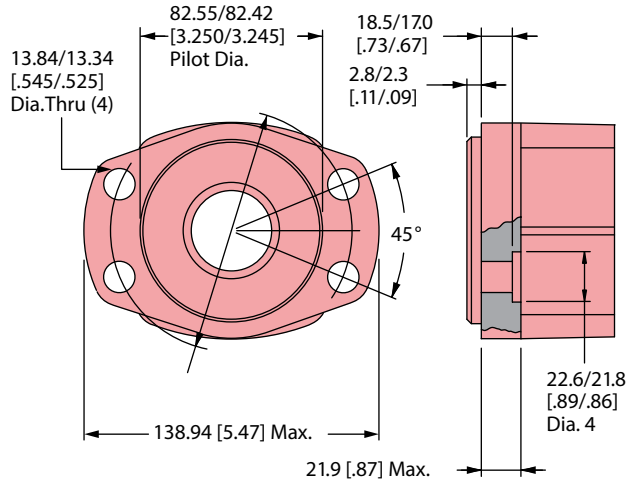
Dimensions

Mounting options

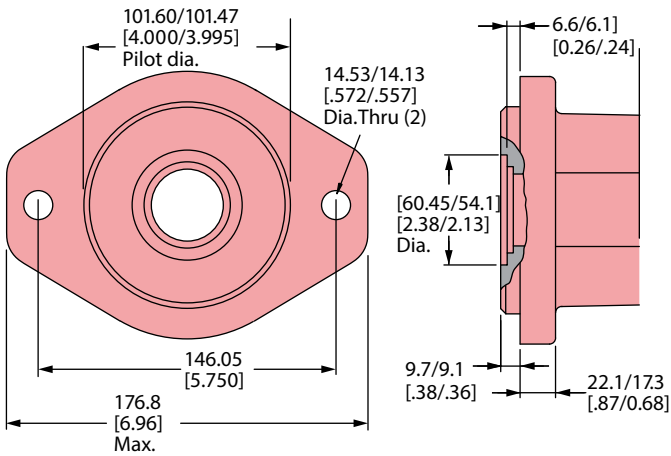
Code:AC SAE A - Two bolt (Standard motor)



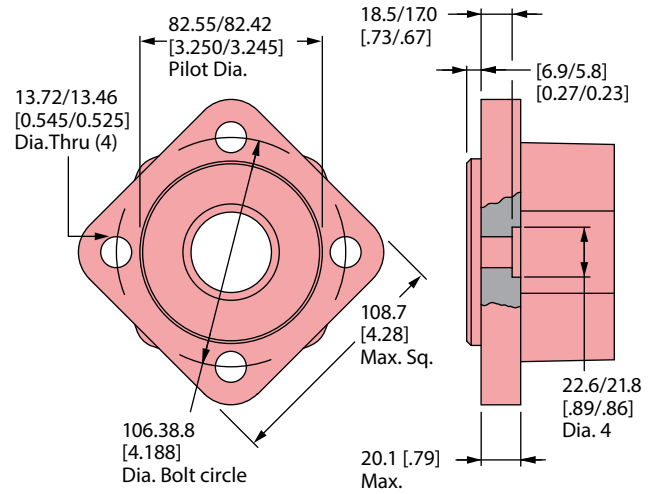
Code:AJ Four bolt magneto



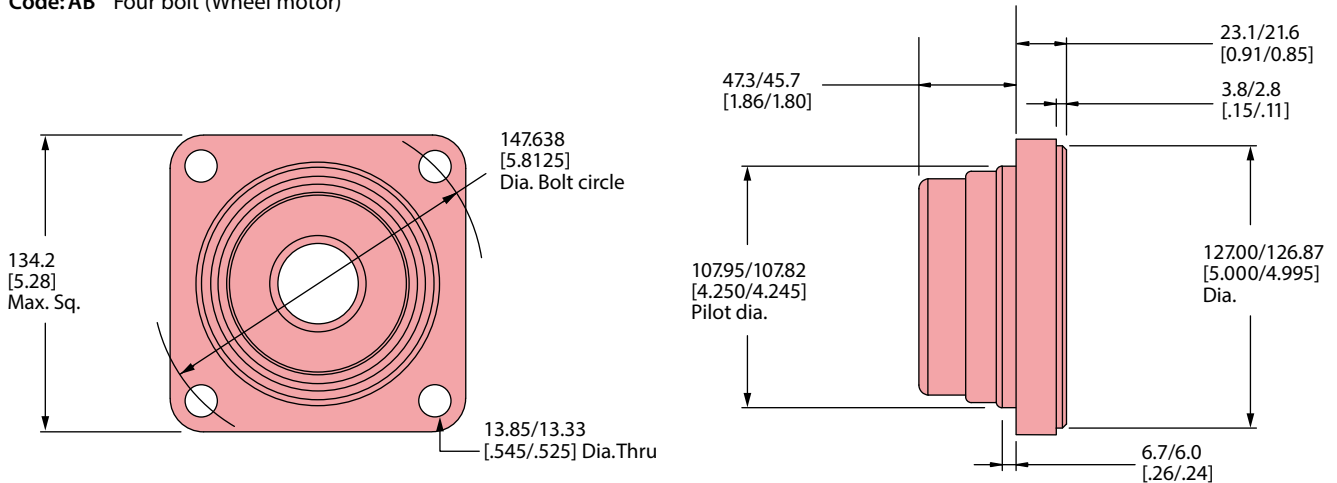
Code:AF Two bolt SAE B



Code:AH Four bolt



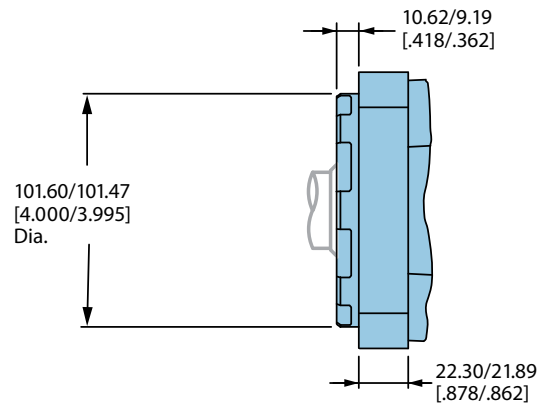
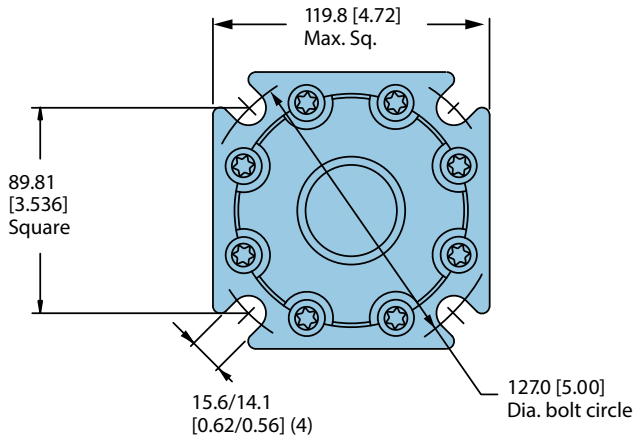
Code:AB Four bolt (Wheel motor)



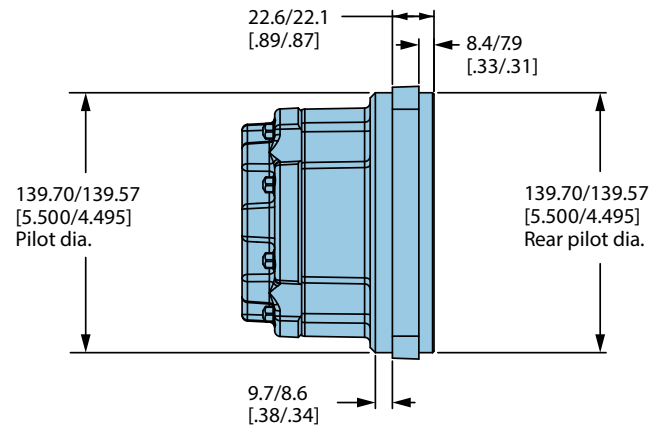
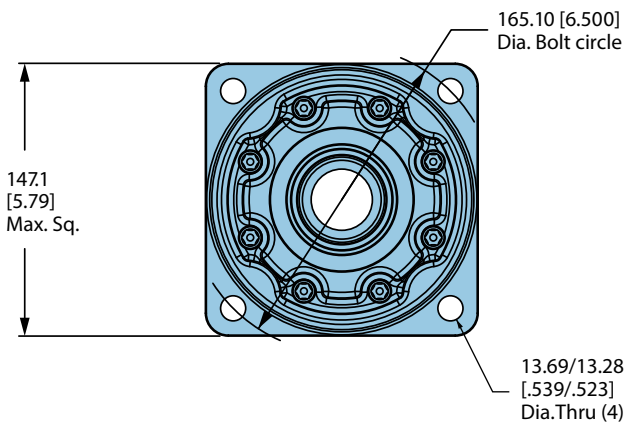
C-2

Mounting options for use with enhanced bearings

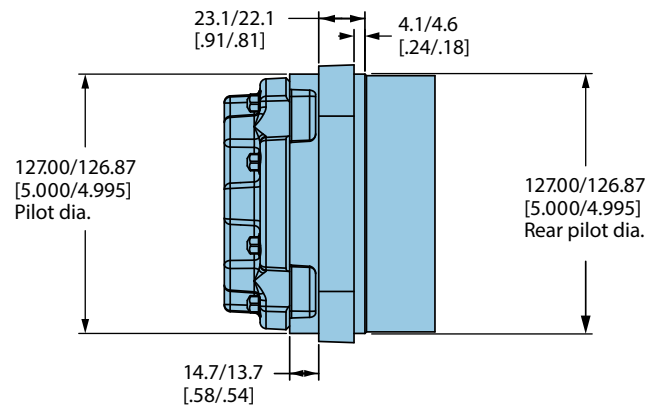
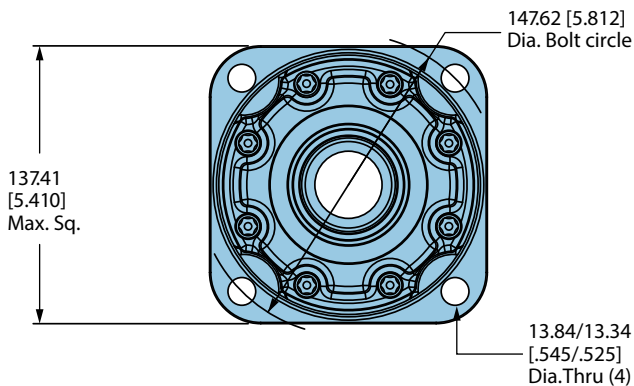
Code: BB Standard flange- Similar to SAE B type



Code: BE Four bolt (Wheel motor)



Code: BG Four bolt (Wheel motor- short)



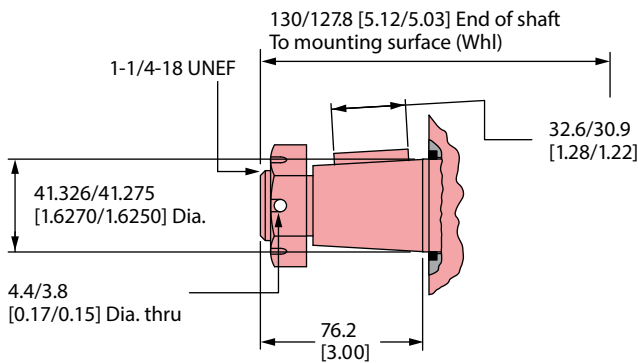
4000 Compact Series

Dimensions

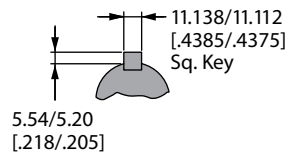
Shafts

Code: 98 1-5/8 Inch tapered

972 [8600] Max.Torque Nm [lb-in]

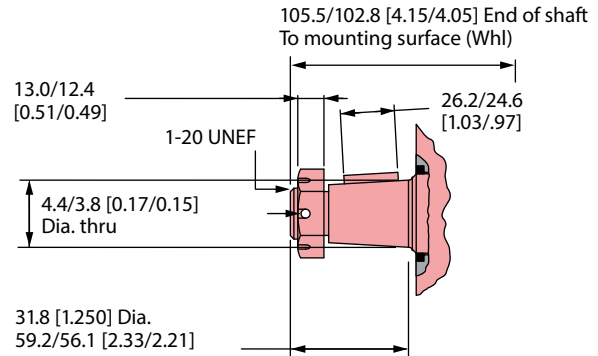


SAE J501 Standard Tapered Shaft
125.00 0.17 Taper per Meter
[1.500±.002 Taper per Foot]

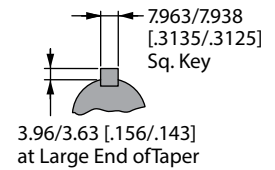


Code: 03 1-1/4 Inch tapered

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



SAE J501 Standard tapered shaft
125.00 0.17 Taper per Meter
[1.500±.002 Taper per Foot]

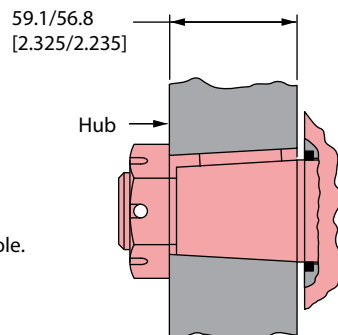


C-2

Tapered shaft hub data

Recommended torque:
(645 Nm [475 lb-ft] Dry)
(510 Nm [375 lb-ft] Lub)

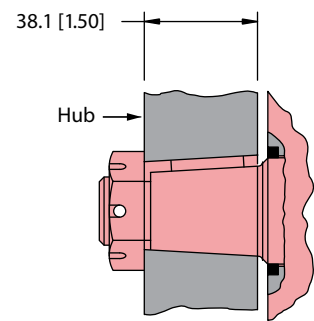
Plus torque required to align the
slotted nut with the Shaft Cross hole.



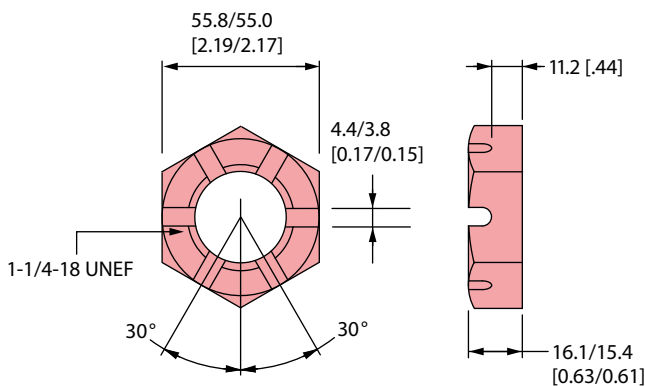
Tapered shaft hub data

Recommended torque:
(373 Nm [275 lb-ft] Dry)
(305 Nm [225 lb-ft] Lub)

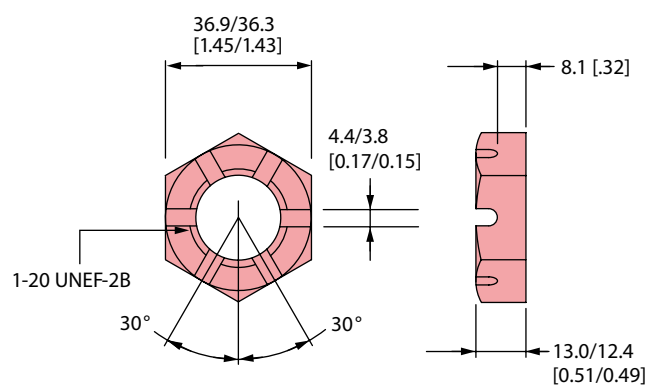
Plus torque required to align the
slotted nut with the Shaft Cross hole.



Tapered shaft hub data



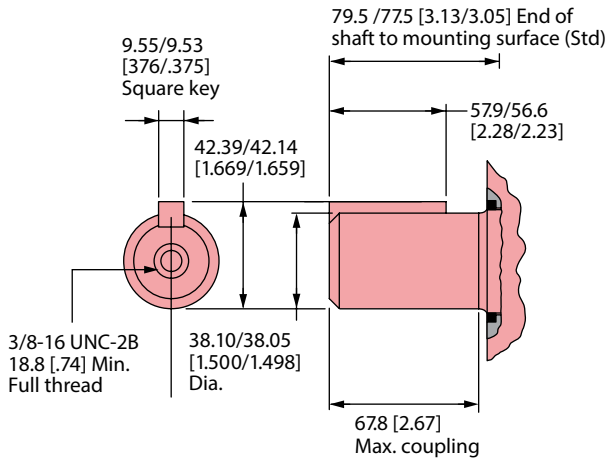
Tapered shaft hub data



Shafts

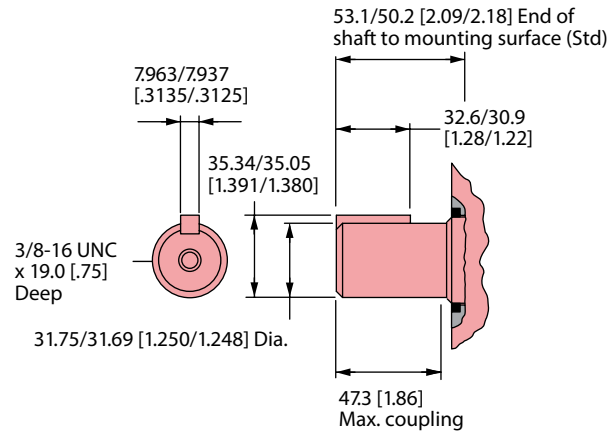
Code: 11 1-1/2 Inch straight

972 [8600] Max. torque Nm [lb-in]



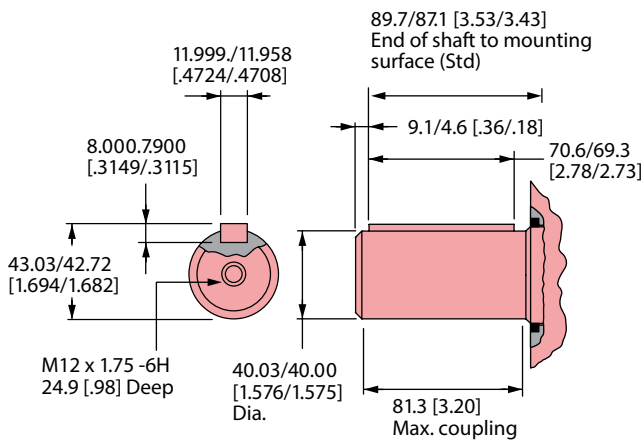
Code: 02 1-1/4 Inch straight

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



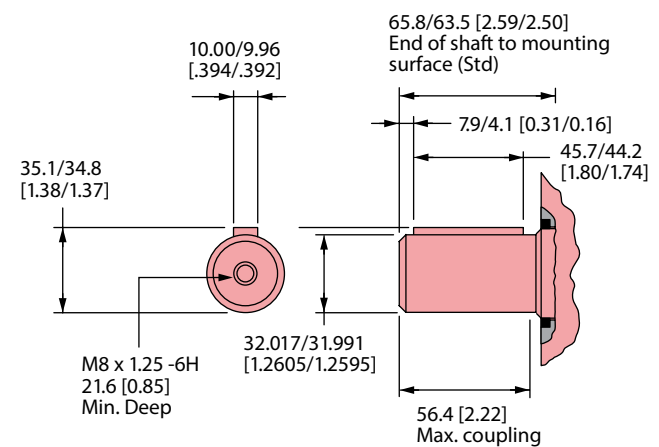
Code: 08 40 mm straight

972 [8600] Max. torque Nm [lb-in]



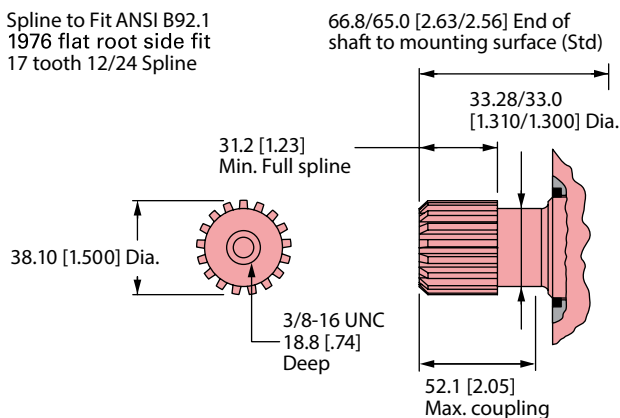
Code: 10 32 mm straight

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



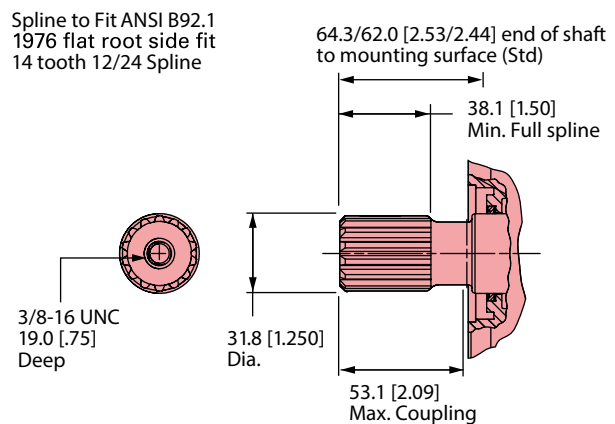
Code: 99 1-1/2 Inch 17 tooth straight

972 [8600] Max. torque Nm [lb-in]



Code: 06 1-1/4 Inch 14 tooth splined

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



4000 Compact Series

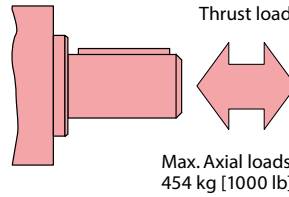
Shaft side load capacity

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

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

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

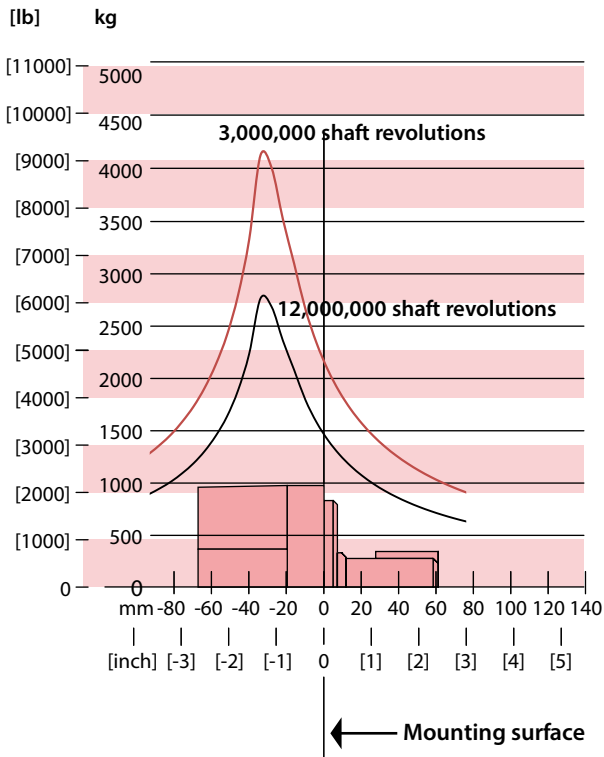
To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.



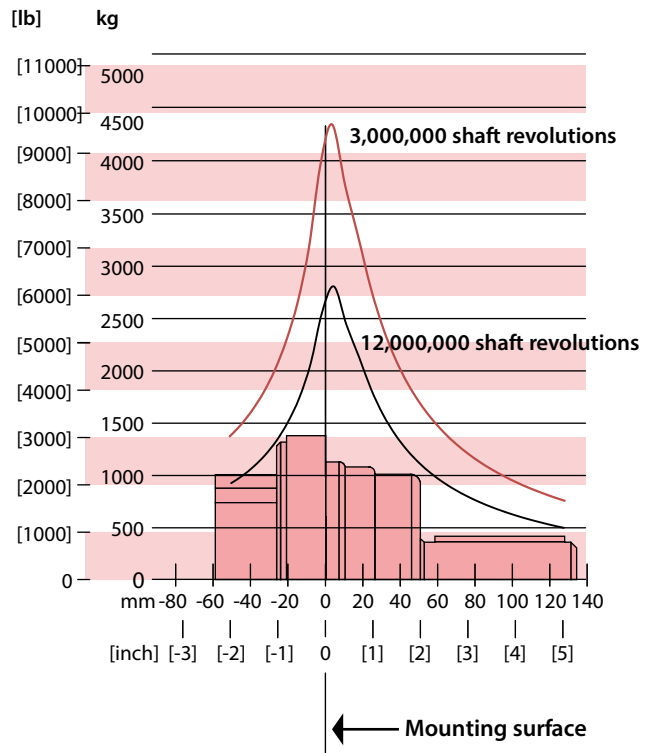
RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

C-2

Standard mount- all shaft options 1-1/4 inch and larger



Wheel mount- all shaft options 1-1/4 inch and larger

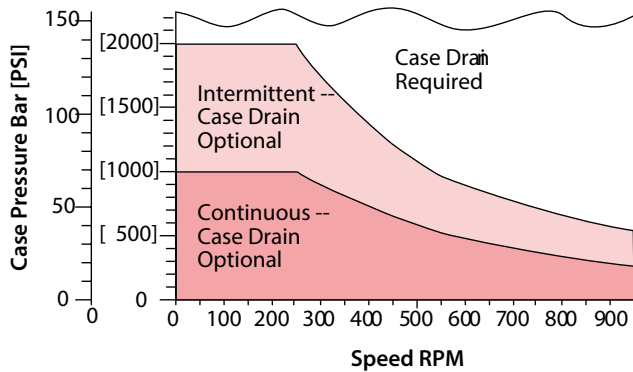


Char-Lynn 4000 Compact Series motors are durable and have long life as long as the recommended case pressure is not exceeded. Allowable case pressure is highest at low shaft speeds. Consequently, motor life will be shortened if case pressure exceeds these ratings (acceptability may vary with application).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

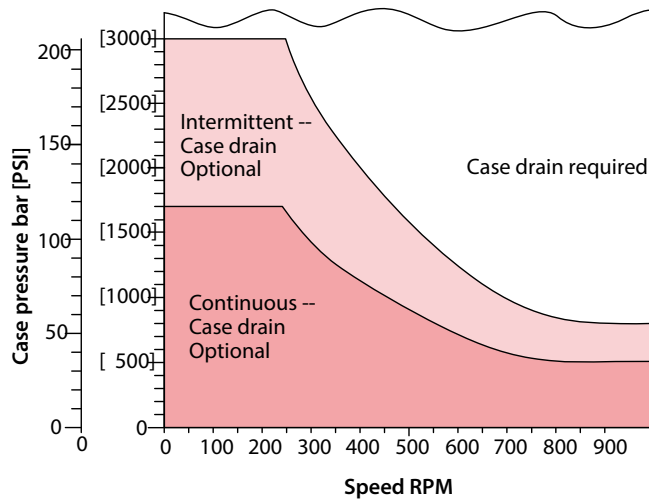
All shaft options 1-1/4 inch and smaller

Case pressure seal limitation

Standard shaft seal



High Pressure Shaft seal



Case porting advantage

Contamination control — flushing the motor case.

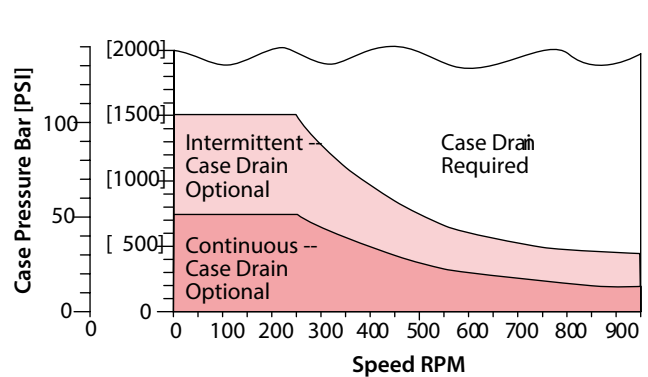
Cooler motor — exiting oil draws motor heat away.

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

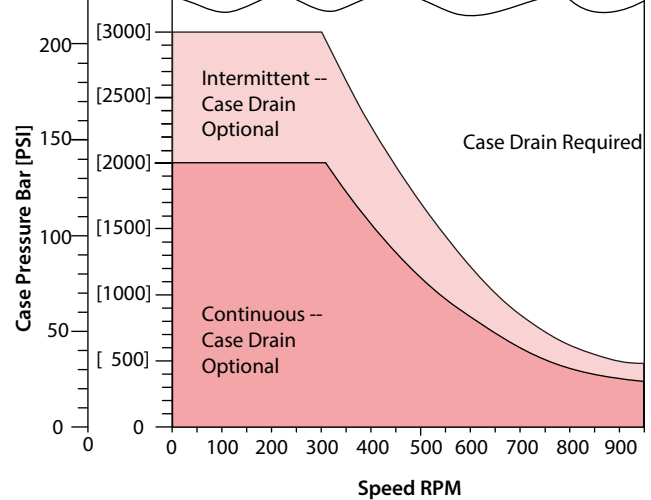
All shaft options larger than 1-1/4 inch.

Case pressure seal limitation

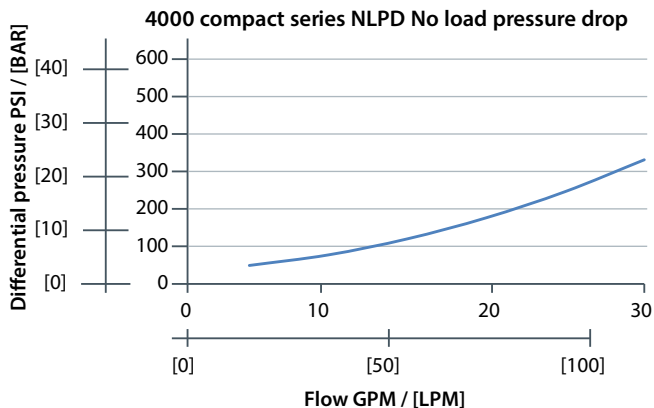
Standard shaft seal



High Pressure Shaft seal



C-2

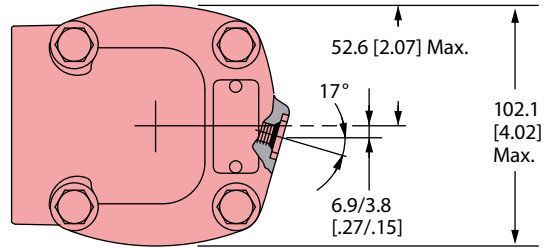


4000 Compact Series

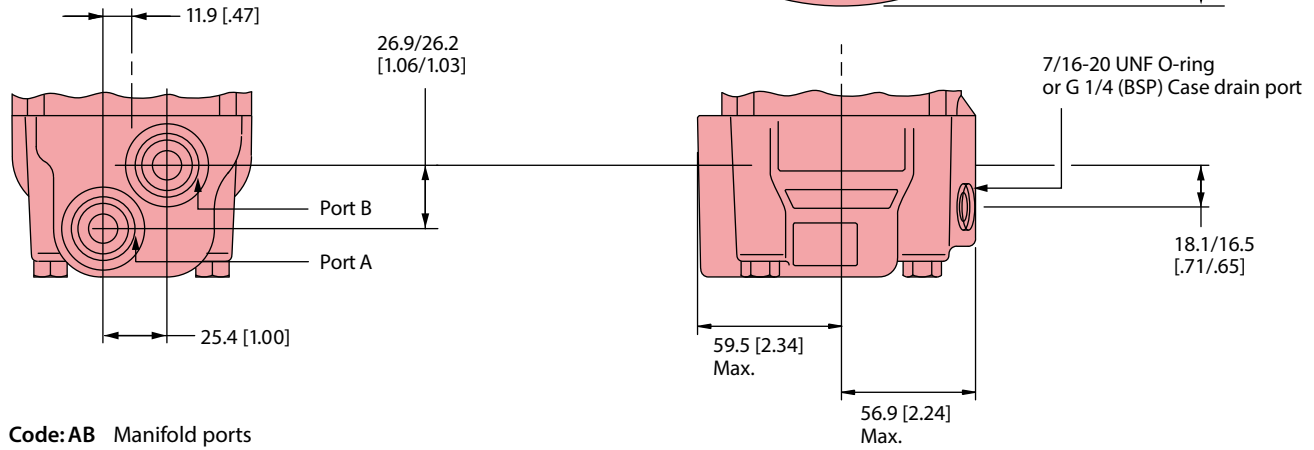
Dimensions

Ports

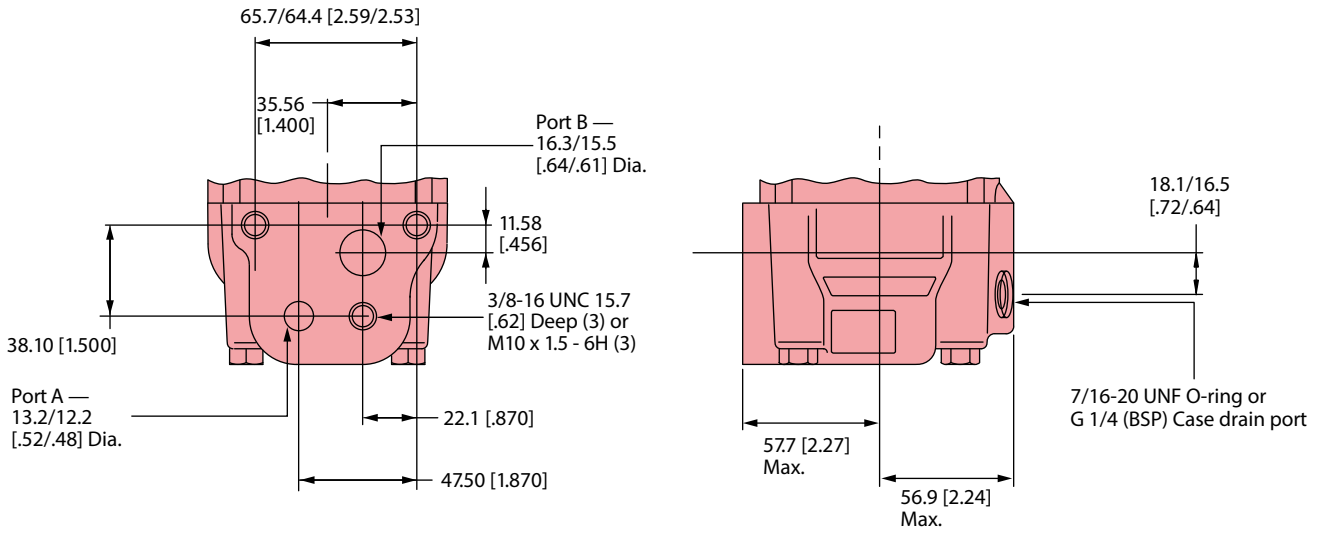
Code: AA Standard flange- Similar to SAE B type



C-2

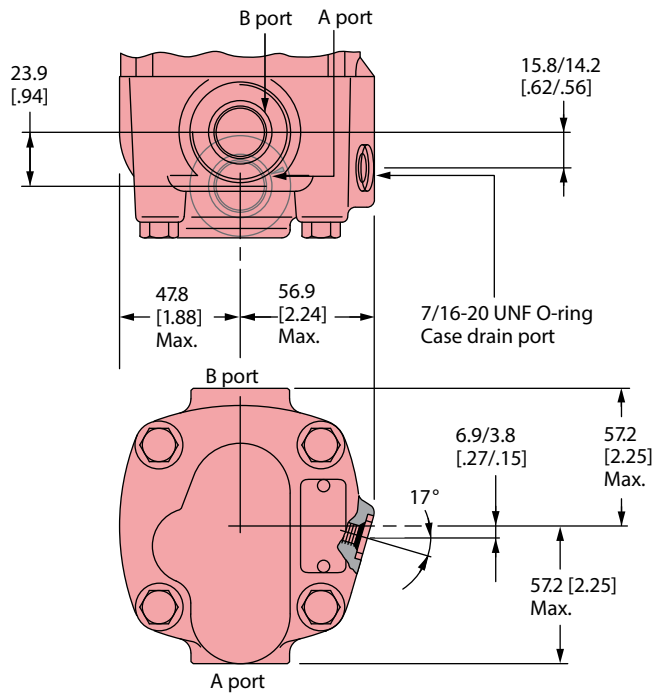


Code: AB Manifold ports

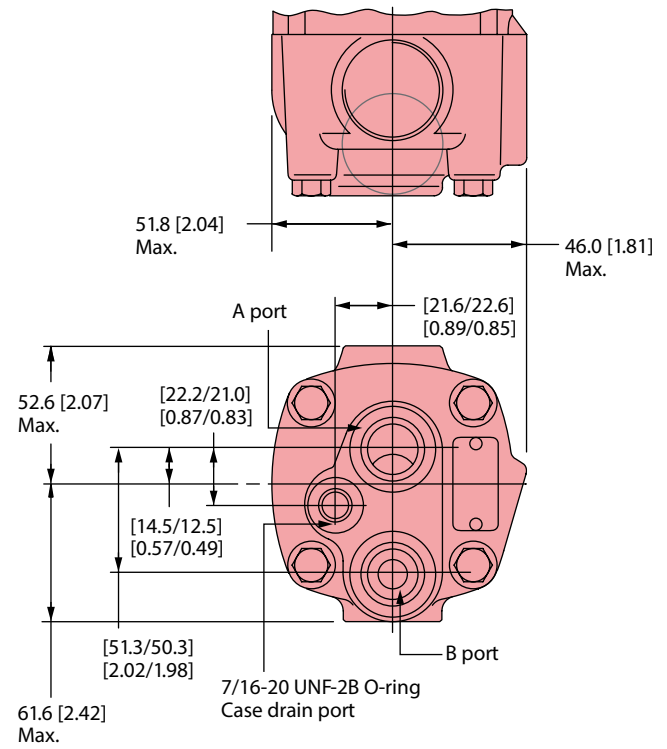


Ports

Code: AH 1-1/16-12 O-ring Ports Positioned 180 apart



Code: AD 7/8-14 O-ring end ports



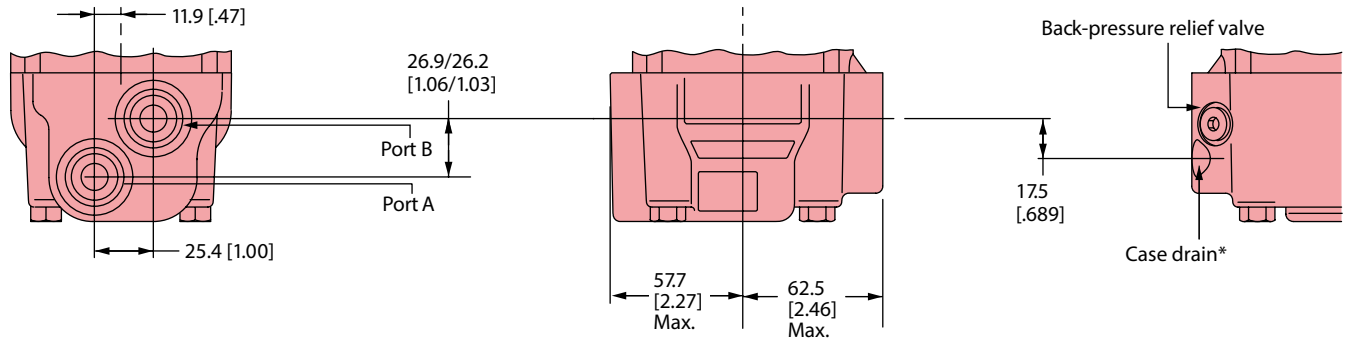
4000 Compact Series

Dimensions

Ports with shuttle

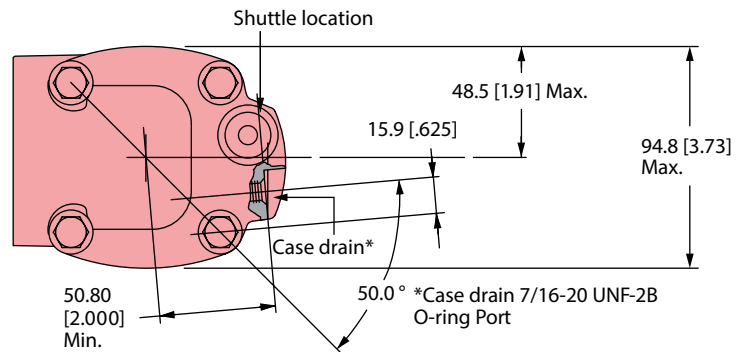
7/8-14 O-ring ports (2)

G 1/2 (BSP) ports (2)



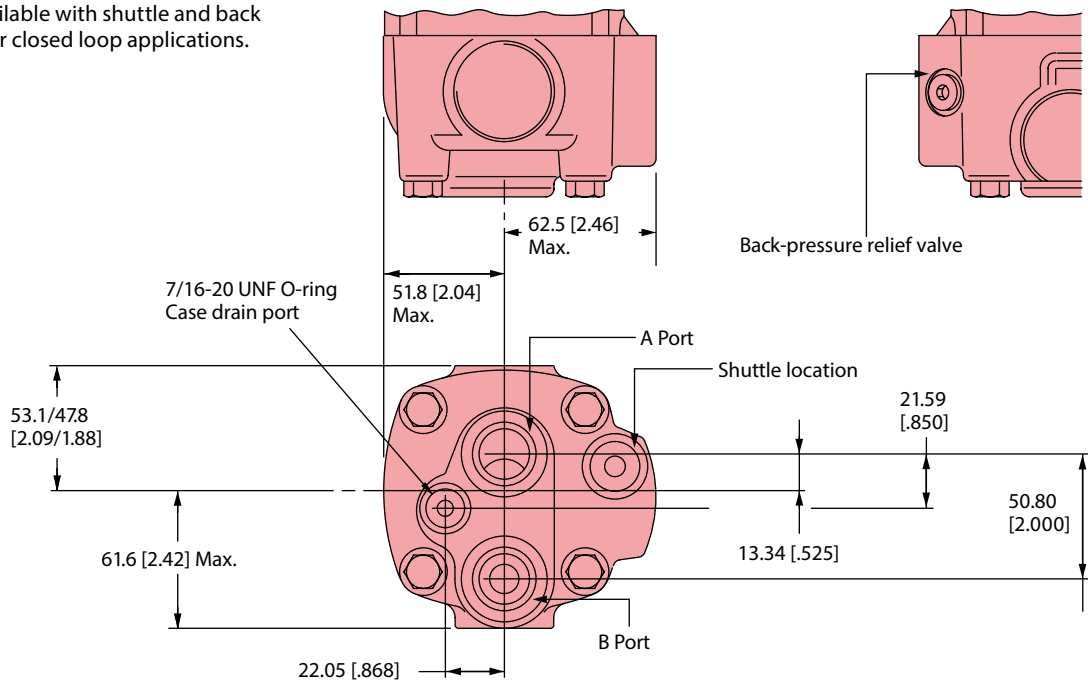
C-2

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

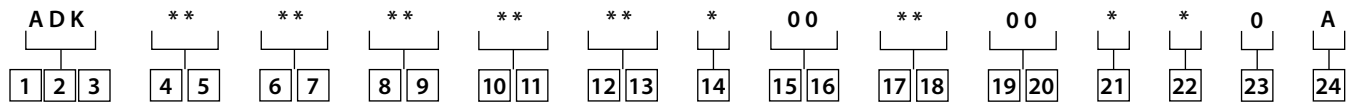


7/8-14 O-ring end ports (2)

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



The following 24-digit coding system has been developed to identify all of the configuration options for the 4000 Compact Series motor. Use this model code to specify a motor with the desired features. All 24 digits of the code must be present when ordering.



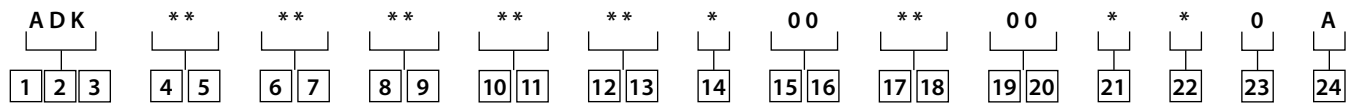
1 2 3	Product series
ADK	4000 Compact Series Motor
4 5	Displacement cm³/r [in³/r]
10	160 [9.8]
12	200 [12.3]
15	250 [15.4]
20	325 [19.8]
25	405 [24.6]
30	490 [29.8]
6 7	Mounting type
AB	4 Bolt (Wheel) 108,0 [4.25] Pilot Dia. and 13,59 [.535] Dia. Mounting Holes on 147,6 [5.81] Dia. B.C. 127,0 [5.00] Dia. Rear Mount Pilot
AC	2 Bolt SAE A (Std.) 82,5 [3.25] pilot dia and 13,59 [.535] Dia. Mtg. Holes on 106,4 [4.19] Dia. B.C.
AF	2 Bolt SAE B (Std.) 101,6 [4.00] Pilot Dia. and 14,35 [.565] Dia. Mtg. Holes on 146,0 [5.75] Dia. B.C.
AH	4 Bolt (standard) 82,5 [3.25] pilot Dia. and 14,59 [.535] Dia. Mounting holes on 106,4 [4.19] Dia. B.C.
AJ	4 Bolt magneto (Std.) 82,6 [3.25] pilot Dia. and 13,59 [.535] dia. Mtg. Holes on 106,4 [4.19] Dia. B.C. 2,79 [.110] pilot length
AG	4 Bolt (wheel - short) 91,9 [3.62] pilot Dia. 14,35 [.565] Dia. Holes on 147,6 [5.81] Dia. Bolt circle with O-ring groove
BB*	4 Bolt (SAE B) (standard) 101,6 [4.00] Pilot Dia. and 14,7 [.58] Dia. Mounting slots on 127,0 [5.00] Dia. Bolt circle
BE*	4 Bolt (Wheel) 139,7 [5.50] front and rear pilot Dia. and 13,49 [.531] Dia. Mounting holes on 165,1 [6.50] Dia. Bolt circle

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

8 9	Output shaft
00	None (Bearingless)
02	1 1/4 inch Dia. Straight with 3/8 -16 thread in end, 7938 [.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, 7938 [.3125] Sq. x 25,40 [1.000] Straight Key
04	31.75 [1.250] Dia. Flat root side fit, 14 tooth, 12/24 DP 30° involute spline with .375-16 UNC-2B Thread in End, 33.0 [1.30] minimum full spline length
06	1 1/4 inch Dia. Splined 14T with 38,1 [1.50] Min. Full spline length and 53,1 [2.09] Max. Coupling length
08	40 mm Dia. Straight (with straight key) M12 x 1,75 - 6H thread in end
10	32 mm dia. Straight (with Straight Key) M8 x 1,25 -6H Thread in end, and 56,4 [2.22] Max. Coupling Length
11	1 1/2 inch Dia. Straight (with Straight Key) 3/8 -16 Thread in end
17	28.22 [1.111] Dia. Flat root side fit, 17 tooth, 16/32 DP 30° involute spline, 28.58 [1.125] Minimum full spline length
98	1 5/8 inch Dia. Tapered with straight key and 1/4 -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)

4000 Compact Series

Model code



12 13	Case flow options
00	None
01	7/16 -20 UNF -2B SAE O-ring Port (Case Drain)
02	G 1/4 (BSP) Straight Thread Port (Case Drain)

14	Back-pressure relief valve
0	None
A	Set at 4,5 bar [65 PSI]

15 16	Valve options
00	None

17 18	Accessories
00	None
AA	Seal guard
AF	M12 threaded connector, (two 30 pulse per rev signals, Pin 1=Power, Pin 2=Output 1, Pin 3=Common, Pin 4=Output 2)
AG	M12 threaded connector, digital speed and direction pickup (one 60 pulse per rev speed signal and one directional signal (Pin 1=Power, Pin 2=Direction, Pin 3=Common, Pin 4=Speed))

19 20	Special features (hardware)
00	None

21	Special features (assembly)
0	None
A	Flange rotated 90°
B	Reverse rotation

22	Paint/ special packaging
0	No Paint, Individual Box
A	Low gloss black primer, individual box
S	Epoxy coated black, individual box

23	Danfoss assigned code when applicable
0	None

24	Danfoss assigned design code
A	First

Description

The Delta motor provides torques up to 11,500 in-lbs. Danfoss has packed this motor with many “best in class” features: the optimized Geroler profile ensures smooth operation; the disc valve technology has the best performance and the bearing capacity is the highest in the industry for very demanding applications.



Delta series

Geroler element	13 Displacements
Flow l/min [GPM]	76 [20] Continuous** 114 [30] Intermittent*
Speed RPM	668 Continuous** 831 Intermittent*
Pressure bar [PSI]	207 [3000] Continuous** 276 [4000] Intermittent*
Torque Nm [lb-in]	1039 [9199] Continuous** 1253[11100] Intermittent*

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

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

Parker is a registered trademark of Parker Intangibles LLC.
White is a trademark of Danfoss.

Features:

- Excellent reliability with time proven Char-Lynn design
- Proven disc valve technology with high efficiencies
- Leak resistant motor with the front bearing protecting the shaft seal
- Torque up to 10,500 lb-in intermittent duty / Flow up to 30 GPM intermittent
- 12 displacements available from 6.9 to 46 CID
- Shaft sizes up to 1-5/8 inch
- 3-1/4 inch front pilot and 5 inch rear pilot

Benefits:

- Perfect replacement for Parker [®] TF-TG and White [™] RE motors
- Torque of 4000 Series
- Lowest no load pressure drop which leads to longer life and lower temperature operation
- High overall efficiency: more available HP to the system than competitive motors
- High side load capacity with 4,500 lbs at 3" from the mount face

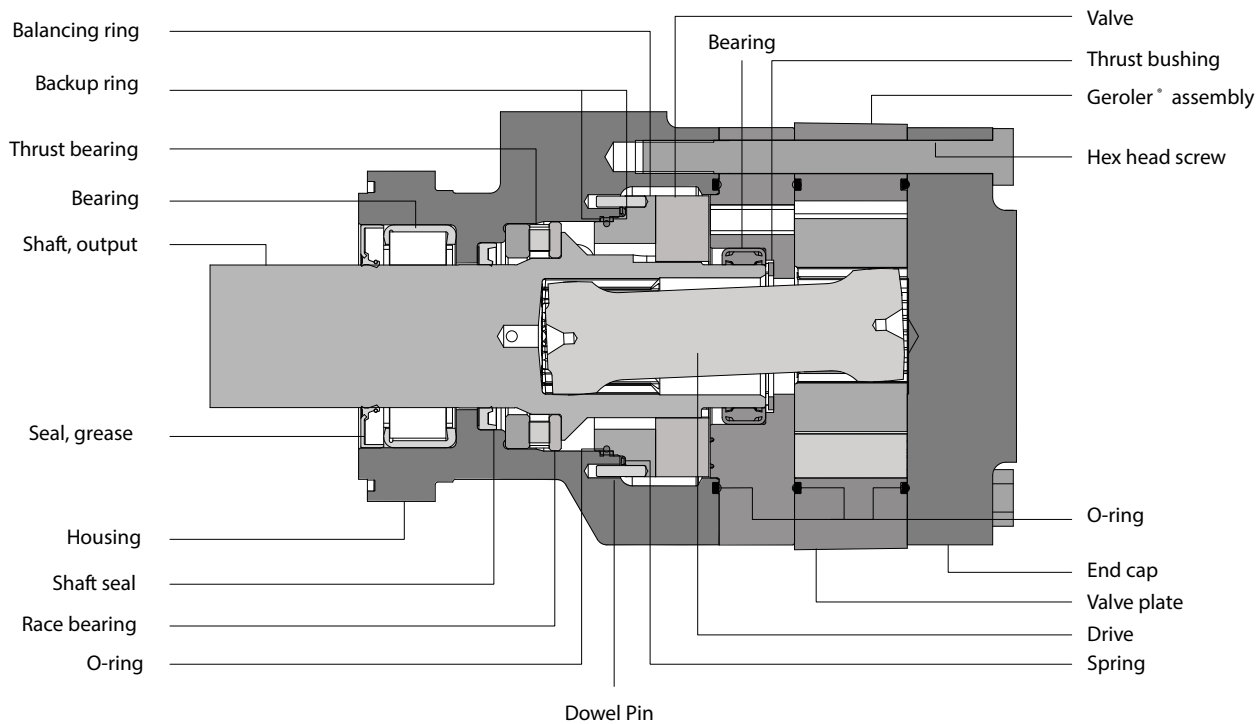
Applications:

- Scissor lift
- Boom lift
- Industrial sweeper
- Mower

C-3

Delta Series

Specifications



C-3

Delta Series motors

Displ. cm ³ /r [in ³ /rev]		113	146	176	198	234	252	300	347	395	470	542	649	754
		[6.9]	[8.9]	[10.7]	[12.1]	[14.3]	[15.4]	[18.3]	[21.2]	[24.1]	[28.7]	[33.1]	[39.6]	[46.0]
Max speed (RPM) @ Flow	Continuous	668	519	432	382	323	300	252	218	192	161	140	117	100
	Intermittent	831	778	615	516	485	450	379	327	288	241	209	175	151
Flow l/min [GPM]	Continuous	75	75	75	75	75	75	75	75	75	75	75	75	75
		[20]	[20]	[20]	[20]	[20]	[20]	[20]	[20]	[20]	[20]	[20]	[20]	[20]
	Intermittent	115	115	115	115	115	115	115	115	115	115	115	115	115
		[30]	[30]	[30]	[30]	[30]	[30]	[30]	[30]	[30]	[30]	[30]	[30]	[30]
Torque* Nm [lb - in]	Continuous	320	429	500	554	651	712	844	933	972	1039	994	1028	985
		[2834]	[3800]	[4427]	[4904]	[5763]	[6311]	[7472]	[8260]	[8607]	[9199]	[8809]	[9102]	[8721]
	Intermittent	417	563	658	725	852	930	1087	1208	1206	1222	1202	1253	1232
		[3697]	[4984]	[5822]	[6421]	[7543]	[8236]	[9629]	[10698]	[10684]	[10824]	[10644]	[11100]	[10910]
Pressure Δ bar [Δ PSI]	Continuous	205	205	205	205	205	205	205	205	190	170	140	120	100
		[3000]	[3000]	[3000]	[3000]	[3000]	[3000]	[3000]	[3000]	[2750]	[2500]	[2000]	[1750]	[1500]
	Intermittent	275	275	275	275	275	275	275	275	240	205	170	155	140
		[4000]	[4000]	[4000]	[4000]	[4000]	[4000]	[4000]	[4000]	[3500]	[3000]	[2500]	[2250]	[2000]
Weight kg [lb]		12.7	12.9	13.5	13.8	14.3	15	15	15.4	16.1	16.8	17.5	18.4	19.1
		[28.0]	[28.5]	[29.7]	30.5	[31.5]	[33.0]	[33.0]	[34.0]	[36.5]	[37.0]	[38.5]	[40.5]	[42.0]

*See shaft torque ratings for limitations.

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

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

Maximum inlet pressure:

310 bars (4500 PSI)

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

Recommended fluids:

Premium quality, anti-wear type hydraulic oil with a viscosity of no less than 13 cSt [70 SUS] at operating temperature.

Recommended system operating temp:

-34°C to 82°C

[-30°F to 180°F]

Recommended filtration:

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

Thermal shock warning:

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

Minimum delta pressure warning:

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

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

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



Δ Pressure bar [PSI]
113 cm³/r [6.9 in³/r]

	[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
[2]	[204]	[450]	[686]	[915]	[1140]	[1355]	[1593]	[1814]	[2018]	[2197]	[2349]	[2573]	[2776]	[2975]	[3182]	[3362]
7.6	23	51	77	103	129	153	180	205	228	248	265	290	313	336	359	380
	65	64	63	62	60	60	59	57	56	55	56	54	52	48	49	44
[4]	[210]	[457]	[706]	[950]	[1194]	[1436]	[1677]	[1906]	[2129]	[2351]	[2571]	[2790]	[3010]	[3231]	[3454]	[3660]
15	24	52	80	107	135	162	189	215	240	265	290	315	340	365	390	413
	132	131	130	129	128	127	126	125	123	122	120	118	115	113	112	110
[6]	[196]	[445]	[696]	[942]	[1186]	[1432]	[1674]	[1914]	[2144]	[2367]	[2587]	[2805]	[3027]	[3252]	[3476]	[3695]
23	22	50	79	106	134	162	189	216	242	267	292	317	342	367	392	417
	199	196	196	195	193	192	191	190	189	185	183	182	180	177	174	172
[8]	[176]	[425]	[677]	[921]	[1168]	[1420]	[1666]	[1906]	[2152]	[2386]	[2616]	[2834]	[3051]	[3265]	[3481]	[3697]
30	20	48	76	104	132	160	188	215	243	269	295	320	344	369	393	417
	266	264	263	261	261	259	257	257	255	252	250	248	246	244	241	237
[10]	[160]	[407]	[659]	[901]	[1149]	[1398]	[1650]	[1894]	[2134]	[2370]	[2601]	[2823]	[3044]	[3258]	[3457]	[3654]
38	18	46	74	102	130	158	186	214	241	268	294	319	344	368	390	413
	333	333	329	326	324	323	321	320	318	314	312	309	306	303	301	295
[12]	[134]	[382]	[632]	[876]	[1122]	[1372]	[1621]	[1868]	[2111]	[2353]	[2589]	[2821]	[3046]	[3270]	[3479]	[3680]
45	15	43	71	99	127	155	183	211	238	266	292	319	344	369	393	415
	399	398	396	393	392	389	387	386	383	381	377	374	372	370	367	364
[14]	[111]	[357]	[608]	[855]	[1102]	[1350]	[1599]	[1847]	[2090]	[2330]	[2569]	[2800]	[3024]	[3250]	[3455]	[3614]
53	13	40	69	97	124	152	181	208	236	263	290	316	341	367	390	408
	466	465	462	460	457	455	453	451	449	446	442	438	436	433	429	415
[16]	[81]	[325]	[577]	[822]	[1071]	[1321]	[1572]	[1817]	[2063]	[2307]	[2549]	[2781]	[3011]	[3237]	[3436]	[3578]
61	9	37	65	93	121	149	177	205	233	260	288	314	340	365	388	404
	533	532	529	527	524	522	520	517	516	513	509	506	503	500	496	477
[18]	[48]	[295]	[543]	[790]	[1036]	[1283]	[1535]	[1781]	[2027]	[2271]	[2512]	[2751]	[2984]	[3214]	[3431]	[3597]
68	5	33	61	89	117	145	173	201	229	256	284	311	337	363	387	406
	601	600	597	593	591	587	586	583	581	577	573	570	568	564	559	542
[20]	[14]	[263]	[510]	[758]	[1005]	[1249]	[1499]	[1746]	[1988]	[2231]	[2474]	[2712]	[2945]	[3176]	[3395]	[3597]
76	2	30	58	86	113	141	169	197	224	252	279	306	332	359	383	406
	668	666	664	661	658	654	652	649	646	644	640	637	634	630	628	621
[22]		[228]	[477]	[725]	[972]	[1218]	[1468]	[1712]	[1957]	[2201]	[2447]	[2686]	[2917]	[3149]	[3350]	[3523]
83		26	54	82	110	138	166	193	221	249	276	303	329	355	378	398
		733	731	728	724	721	718	715	713	710	705	704	700	697	688	664
[25]		[170]	[416]	[663]	[913]	[1153]	[1402]	[1646]	[1891]	[2136]	[2382]	[2622]	[2856]	[3081]	[3273]	[3452]
95		19	47	75	103	130	158	186	214	241	269	296	322	348	369	390
		831	829	827	825	821	818	815	812	809	805	803	800	794	776	745
[30]		[114]	[429]	[755]	[1076]	[1400]	[1725]	[2047]	[2368]	[2687]	[3003]	[3323]	[3635]	[3942]	[4249]	[4552]
114		13	48	85	122	158	195	231	267	303	339	375	410	445	480	514
		778	777	773	770	765	759	756	753	749	746	744	742	740	737	735

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

Delta Series

Performance data

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

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



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

[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000

C-3

Flow LPM [GPM]

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

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

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



Delta Pressure bar [PSI]
 $176\text{cm}^3/\text{r}[10.7\text{in}^3/\text{r}]$

	[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
[2]	[311]	[682]	[1037]	[1366]	[1695]	[2027]	[2027]	[2703]	[3049]	[3379]	[3679]	[3987]	[4317]	[4609]	[4837]	[5194]
7.6	35	77	117	154	192	229	229	305	344	382	416	450	488	521	547	587
	41	40	38	36	36	35	35	32	31	30	28	27	25	23	20	22
[4]	[336]	[730]	[1112]	[1487]	[1859]	[2228]	[2596]	[2922]	[3258]	[3602]	[3926]	[4286]	[4637]	[4938]	[5295]	[5588]
15	38	82	126	168	210	252	293	330	368	407	444	484	524	558	598	631
	85	83	81	80	79	78	77	75	74	72	69	66	65	63	61	59
[6]	[326]	[717]	[1106]	[1488]	[1868]	[2240]	[2614]	[2980]	[3345]	[3706]	[4068]	[4421]	[4772]	[5118]	[5455]	[5785]
23	37	81	125	168	211	253	295	337	378	419	460	500	539	578	616	654
	127	126	125	123	121	120	119	117	115	113	111	109	106	106	103	102
[8]	[305]	[694]	[1085]	[1471]	[1856]	[2232]	[2609]	[2979]	[3347]	[3709]	[4071]	[4425]	[4775]	[5122]	[5463]	[5803]
30	35	78	123	166	210	252	295	337	378	419	460	500	539	579	617	656
	171	169	168	166	165	164	162	161	158	156	154	152	150	148	146	144
[10]	[278]	[668]	[1059]	[1446]	[1835]	[2217]	[2597]	[2971]	[3342]	[3707]	[4069]	[4427]	[4780]	[5134]	[5480]	[5822]
38	31	75	120	163	201	250	293	336	378	419	460	500	540	580	619	658
	214	213	211	209	208	206	205	203	200	198	196	194	192	190	188	186
[12]	[245]	[631]	[1023]	[1408]	[1796]	[2179]	[2559]	[2934]	[3303]	[3669]	[4031]	[4392]	[4743]	[5095]	[5441]	[5782]
45	28	71	116	159	203	246	289	331	373	415	455	496	536	576	615	653
	258	256	255	253	252	250	249	247	244	242	239	237	235	234	231	229
[14]	[200]	[585]	[977]	[1359]	[1748]	[2132]	[2510]	[2886]	[3160]	[3628]	[3993]	[4354]	[4707]	[5061]	[5406]	[5751]
53	23	66	110	154	197	241	284	326	368	410	451	492	532	572	611	650
	302	300	297	296	295	293	291	288	286	284	281	279	277	275	274	271
[16]	[164]	[551]	[939]	[1323]	[1709]	[2091]	[2475]	[2848]	[3221]	[3588]	[3952]	[4314]	[4668]	[5023]	[5370]	[5712]
61	19	62	106	149	193	236	280	322	364	405	446	487	527	568	607	645
	345	343	341	339	338	336	335	332	330	328	325	323	321	319	317	315
[18]	[120]	[500]	[891]	[1276]	[1663]	[2048]	[2428]	[2804]	[3176]	[3544]	[3908]	[4271]	[4615]	[4961]	[5312]	[5658]
68	14	56	101	144	188	231	274	317	359	400	442	483	521	561	600	639
	388	386	384	382	380	379	377	374	372	370	368	366	364	362	360	358
[20]	[69]	[426]	[812]	[1195]	[1581]	[1962]	[2341]	[2717]	[3091]	[3460]	[3825]	[4188]	[4543]	[4904]	[5262]	[5615]
76	8	48	92	135	179	222	264	307	349	391	432	473	513	554	594	634
	432	430	427	425	424	422	419	417	414	412	409	406	405	403	401	399
[22]	[16]	[366]	[754]	[1138]	[1526]	[1906]	[2286]	[2663]	[3036]	[3405]	[3770]	[4133]	[4488]	[4842]	[5193]	[5539]
83	2	41	85	129	172	215	258	301	343	385	426	467	507	547	587	626
	475	473	471	469	466	465	462	460	457	455	453	450	448	446	444	442
[25]		[273]	[656]	[1040]	[1423]	[1806]	[2185]	[2558]	[2931]	[3299]	[3662]	[4028]	[4387]	[4738]	[5090]	[5438]
95		31	74	118	161	204	247	289	331	373	414	455	496	535	575	614
		538	537	535	533	531	528	525	523	521	519	517	515	513	511	508
[30]		[141]	[523]	[912]	[1299]	[1683]	[2061]	[2435]	[2809]	[3179]	[3544]	[3915]	[4280]	[4636]	[4993]	[5345]
114		16	59	103	147	190	233	275	317	359	400	442	484	524	564	604
		615	609	601	595	592	592	594	596	597	599	600	600	600	598	596

Delta Series

Performance data

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

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



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

[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000

C-3

[2]	[313]	[732]	[1113]	[1480]	[1870]	[2249]	[2668]	[3059]	[3447]	[3822]	[4189]	[4544]	[4875]	[5194]	[5508]	[5948]
7.6	35	83	126	167	211	254	301	345	389	432	473	513	550	586	622	671
[4]	[367]	[809]	[1228]	[1640]	[2038]	[2437]	[2844]	[3234]	[3623]	[4010]	[4398]	[4779]	[5164]	[5545]	[5917]	[6275]
15	41	91	139	185	230	275	321	365	409	453	497	540	583	626	668	708
[6]	[365]	[799]	[1231]	[1654]	[2066]	[2473]	[2878]	[3270]	[3665]	[4056]	[4446]	[4833]	[5215]	[5598]	[5975]	[6347]
23	41	90	139	187	233	279	325	369	414	458	502	546	589	632	675	717
[8]	[343]	[782]	[1219]	[1648]	[2069]	[2484]	[2898]	[3300]	[3702]	[4093]	[4482]	[4865]	[5237]	[5607]	[5976]	[6349]
30	39	88	138	186	234	280	327	373	418	462	506	549	591	633	675	717
[10]	[322]	[759]	[1201]	[1633]	[2063]	[2483]	[2904]	[3316]	[3726]	[4125]	[4515]	[4904]	[5290]	[5672]	[6048]	[6421]
38	36	86	136	184	233	280	328	374	421	466	510	554	597	640	683	725
[12]	[283]	[719]	[1158]	[1590]	[2020]	[2448]	[2868]	[3279]	[3691]	[4096]	[4492]	[4883]	[5265]	[5644]	[6015]	[6385]
45	32	81	131	180	228	276	324	370	417	462	507	551	594	637	679	721
[14]	[238]	[671]	[1110]	[1538]	[1970]	[2396]	[2816]	[3228]	[3644]	[4050]	[4451]	[4846]	[5231]	[5613]	[5982]	[6357]
53	27	76	125	174	222	271	318	364	411	457	503	547	591	634	675	718
[16]	[191]	[625]	[1063]	[1493]	[1923]	[2345]	[2768]	[3182]	[3596]	[4003]	[4403]	[4801]	[5191]	[5576]	[5947]	[6316]
61	22	71	120	169	217	265	312	359	406	452	497	542	586	630	671	713
[18]	[139]	[567]	[1006]	[1438]	[1871]	[2299]	[2720]	[3133]	[3547]	[3956]	[4359]	[4760]	[5128]	[5492]	[5871]	[6247]
68	16	64	114	162	211	260	307	354	400	447	492	537	579	620	663	705
[20]	[99]	[457]	[886]	[1315]	[1745]	[2168]	[2590]	[3006]	[3418]	[3822]	[4224]	[4622]	[5018]	[5418]	[5816]	[6208]
76	11	52	100	148	197	245	292	339	386	432	477	522	567	612	657	701
[22]	[15]	[383]	[810]	[1243]	[1676]	[2096]	[2520]	[2938]	[3351]	[3759]	[4161]	[4558]	[4953]	[5339]	[5722]	[6095]
83	2	43	91	140	189	237	284	332	378	424	470	515	559	603	646	688
[25]	[272]	[700]	[1131]	[1559]	[1985]	[2408]	[2823]	[3231]	[3639]	[4042]	[4443]	[4842]	[5229]	[5617]	[5992]	
95	31	79	128	176	224	272	319	365	411	456	502	547	590	634	677	
[30]	[163]	[600]	[1037]	[1474]	[1902]	[2315]	[2723]	[3134]	[3536]	[3933]	[4338]	[4737]	[5125]	[5516]	[5899]	
114	18	68	117	166	215	261	307	354	399	444	490	535	579	623	666	
	516	506	494	487	484	488	494	501	506	511	514	515	516	515	514	

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

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

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



**Δ Pressure bar [PSI]
234 cm³/r [14.3 in³/r]**

	[17] 250	[34] 500	[52] 750	[69] 1000	[86] 1250	[103] 1500	[121] 1750	[138] 2000	[155] 2250	[172] 2500	[190] 2750	[207] 3000	[224] 3250	[241] 3500	[259] 3750	[276] 4000
[2] 7.6	[470] 53	[971] 110	[1457] 164	[1921] 217	[2414] 273	[2877] 325	[3348] 378	[3821] 431	[4275] 483	[4730] 534	[5164] 583	[5630] 636	[5997] 677	[6446] 728	[6863] 775	[7217] 815
[4] 15	[468] 53	[988] 112	[1504] 170	[1989] 225	[2482] 280	[2964] 335	[3447] 389	[3916] 442	[4384] 495	[4843] 547	[5302] 599	[5763] 651	[6213] 701	[6668] 753	[7113] 803	[7543] 852
[6] 23	[449] 51	[966] 109	[1484] 168	[1980] 224	[2470] 279	[2953] 333	[3445] 389	[3922] 443	[4397] 496	[4851] 548	[5304] 599	[5750] 649	[6197] 700	[6643] 750	[7085] 800	[7524] 849
[8] 30	[416] 47	[931] 105	[1446] 163	[1954] 221	[2458] 277	[2948] 333	[3438] 388	[3909] 441	[4381] 495	[4835] 546	[5280] 596	[5714] 645	[6150] 694	[6584] 743	[7015] 792	[7445] 841
[10] 38	[380] 43	[896] 101	[1410] 159	[1917] 216	[2425] 274	[2919] 330	[3412] 385	[3890] 439	[4373] 494	[4831] 545	[5280] 596	[5716] 645	[6148] 694	[6586] 744	[7017] 792	[7452] 841
[12] 45	[341] 39	[856] 97	[1366] 154	[1876] 212	[2384] 269	[2880] 325	[3370] 380	[3843] 434	[4319] 488	[4782] 540	[5229] 590	[5665] 640	[6102] 689	[6537] 738	[6962] 786	[7392] 835
[14] 53	[290] 33	[804] 91	[1312] 148	[1813] 205	[2320] 262	[2821] 318	[3315] 374	[3793] 428	[4268] 482	[4732] 534	[5181] 585	[5623] 635	[6057] 684	[6485] 732	[6907] 780	[7327] 827
[16] 61	[239] 27	[743] 84	[1249] 141	[1756] 198	[2264] 256	[2759] 312	[3255] 367	[3735] 422	[4207] 475	[4669] 527	[5122] 578	[5568] 629	[6004] 678	[6432] 726	[6845] 773	[7268] 820
[18] 68	[176] 20	[688] 78	[1187] 134	[1694] 191	[2203] 249	[2698] 305	[3195] 361	[3676] 415	[4146] 468	[4603] 520	[5055] 571	[5497] 621	[5930] 669	[6358] 718	[6774] 765	[7194] 812
[20] 76	[108] 12	[614] 69	[1121] 127	[1623] 183	[2124] 240	[2620] 296	[3118] 352	[3603] 407	[4077] 460	[4541] 513	[4990] 563	[5430] 613	[5865] 662	[6301] 711	[6720] 759	[7139] 806
[22] 83	[28] 3	[535] 60	[1081] 122	[1582] 179	[2082] 235	[2579] 291	[3071] 347	[3550] 401	[4018] 454	[4483] 506	[4943] 558	[5406] 610	[5855] 661	[6300] 711	[6723] 759	[7139] 806
[25] 95		[410] 46	[956] 108	[1460] 165	[1959] 221	[2454] 277	[2941] 332	[3419] 386	[3892] 439	[4356] 492	[4806] 543	[5251] 593	[5683] 642	[6117] 691	[6531] 737	[6939] 783
[30] 114		[171] 19	[700] 79	[1297] 146	[1735] 196	[2226] 251	[2718] 307	[3204] 362	[3689] 417	[4162] 470	[4623] 522	[5079] 573	[5519] 623	[5959] 673	[6377] 720	[6781] 766

Delta Series

Performance data

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

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



Δ Pressure bar [PSI]
252 cm³/r [15.4 in³/r]

[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000

C-3

[2]	[485]	[1011]	[1520]	[2032]	[2564]	[3059]	[3569]	[4065]	[4561]	[5085]	[5589]	[6054]	[6536]	[6891]	[7388]	[7872]
7.6	55	114	172	229	289	345	403	459	515	574	631	683	738	778	834	889
[4]	[504]	[1062]	[1609]	[2145]	[2684]	[3213]	[3744]	[4263]	[4780]	[5294]	[5804]	[6311]	[6811]	[7308]	[7787]	[8236]
15	57	120	182	242	303	363	423	481	540	598	655	712	769	825	879	930
[6]	[478]	[1031]	[1585]	[2132]	[2670]	[3195]	[3717]	[4222]	[4726]	[5222]	[5721]	[6211]	[6700]	[7179]	[7658]	[8118]
23	54	116	179	241	301	361	420	477	534	590	646	701	756	810	865	917
[8]	[453]	[1012]	[1571]	[2115]	[2664]	[3191]	[3717]	[4224]	[4725]	[5215]	[5706]	[6194]	[6678]	[7161]	[7628]	[8076]
30	51	114	177	239	301	360	420	477	533	589	644	699	754	808	861	912
[10]	[398]	[957]	[1516]	[2063]	[2609]	[3137]	[3668]	[4181]	[4678]	[5157]	[5636]	[6116]	[6589]	[7059]	[7522]	[7974]
38	45	108	171	233	295	354	414	472	528	582	636	690	744	797	849	900
[12]	[370]	[914]	[1468]	[2011]	[2557]	[3085]	[3614]	[4125]	[4622]	[5102]	[5577]	[6059]	[6538]	[7017]	[7497]	[7966]
45	42	103	166	227	289	348	408	466	522	576	630	684	738	792	846	899
[14]	[290]	[842]	[1399]	[1948]	[2496]	[3024]	[3552]	[4065]	[4571]	[5056]	[5525]	[5987]	[6445]	[6905]	[7359]	[7813]
53	33	95	158	220	282	341	401	459	516	571	624	676	728	780	831	882
[16]	[239]	[795]	[1346]	[1891]	[2434]	[2962]	[3494]	[4003]	[4511]	[4995]	[5461]	[5919]	[6382]	[6841]	[7292]	[7743]
61	27	90	152	213	275	334	395	452	509	564	616	668	720	772	823	874
[18]	[157]	[716]	[1265]	[1810]	[2355]	[2881]	[3408]	[3921]	[4431]	[4924]	[5401]	[5860]	[6310]	[6749]	[7184]	[7627]
68	18	81	143	204	266	325	385	443	500	556	610	662	712	762	811	861
[20]	[96]	[650]	[1203]	[1750]	[2294]	[2820]	[3345]	[3857]	[4366]	[4865]	[5340]	[5801]	[6242]	[6686]	[7122]	[7553]
76	11	73	136	198	259	318	378	435	493	549	603	655	705	755	804	853
[22]	[26]	[569]	[1111]	[1656]	[2195]	[2725]	[3250]	[3763]	[4268]	[4769]	[5259]	[5733]	[6182]	[6609]	[7030]	[7459]
83	3	64	125	187	248	308	367	425	482	538	594	647	698	746	794	842
[25]	[425]	[967]	[1508]	[2042]	[2574]	[3093]	[3605]	[4110]	[4602]	[5084]	[5561]	[6028]	[6482]	[6899]	[7316]	[7716]
95	48	109	170	231	291	349	407	464	520	574	628	681	732	779	826	876
[30]	[179]	[723]	[1266]	[1800]	[2330]	[2852]	[3364]	[3868]	[4368]	[4856]	[5338]	[5811]	[6269]	[6701]	[7096]	[7516]
114	20	82	143	203	263	322	380	437	493	548	603	656	708	757	801	851
	450	450	450	449	447	443	439	436	433	430	430	430	431	434	437	438

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

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

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



Δ Pressure bar [PSI]
 300 cm³/r [18.3 in³/r]

	[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
[2]	[608]	[1257]	[1919]	[2553]	[3196]	[3824]	[4475]	[5087]	[5707]	[6307]	[6901]	[7472]	[8015]	[8484]	[8962]	[9413]
7.6	69	142	217	288	361	432	505	574	644	712	779	844	905	958	1012	1063
	24	23	23	22	21	21	21	20	19	18	17	16	15	13	11	11
[4]	[612]	[1283]	[1940]	[2587]	[3227]	[3856]	[4483]	[5094]	[5693]	[6293]	[6881]	[7462]	[8024]	[8574]	[9113]	[9629]
15	69	145	219	292	364	435	506	575	643	710	777	842	906	968	1029	1087
	50	48	47	46	45	44	44	44	43	42	41	40	40	39	38	37
[6]	[570]	[1248]	[1906]	[2547]	[3178]	[3800]	[4420]	[5025]	[5619]	[6203]	[6773]	[7345]	[7899]	[8449]	[8992]	[9525]
23	64	141	215	288	359	429	499	567	634	700	765	829	892	954	1015	1075
	76	74	73	71	70	69	68	68	69	68	68	67	66	65	64	63
[8]	[540]	[1210]	[1871]	[2522]	[3152]	[3781]	[4404]	[5008]	[5607]	[6186]	[6749]	[7319]	[7879]	[8433]	[8977]	[9512]
30	61	137	211	285	356	427	497	565	633	698	762	826	890	952	1013	1074
	101	100	98	96	94	93	92	92	92	93	93	93	93	92	91	91
[10]	[496]	[1161]	[1825]	[2471]	[3110]	[3733]	[4362]	[4968]	[5574]	[6157]	[6721]	[7274]	[7811]	[8356]	[8887]	[9416]
38	56	131	206	279	351	421	492	561	629	695	759	821	882	943	1003	1063
	126	126	124	122	120	118	115	113	113	113	114	116	118	118	117	117
[12]	[443]	[1108]	[1768]	[2418]	[3059]	[3688]	[4307]	[4918]	[5526]	[6114]	[6681]	[7239]	[7786]	[8338]	[8876]	[9411]
45	50	125	200	273	345	416	486	555	624	690	754	817	879	941	1002	1062
	151	151	150	148	145	143	141	140	139	139	140	142	144	144	144	144
[14]	[387]	[1034]	[1701]	[2346]	[2985]	[3610]	[4227]	[4839]	[5452]	[6050]	[6622]	[7184]	[7723]	[8269]	[8816]	[9362]
53	44	117	192	265	337	408	477	546	615	683	748	811	872	934	995	1057
	177	177	176	173	171	168	166	165	163	163	165	167	169	171	170	170
[16]	[366]	[961]	[1620]	[2264]	[2903]	[3530]	[4147]	[4753]	[5366]	[5960]	[6540]	[7098]	[7642]	[8169]	[8685]	[9211]
61	41	109	183	256	328	399	468	537	606	673	738	801	863	922	980	1040
	202	202	201	199	197	195	192	190	189	188	188	189	191	194	196	196
[18]	[291]	[893]	[1546]	[2187]	[2829]	[3450]	[4067]	[4678]	[5283]	[5873]	[6451]	[7005]	[7537]	[8064]	[8580]	[9103]
68	33	101	175	247	319	390	459	528	596	663	728	791	851	910	969	1028
	227	227	227	224	222	219	217	215	213	211	212	214	217	220	221	221
[20]	[204]	[797]	[1444]	[2094]	[2736]	[3361]	[3974]	[4585]	[5184]	[5775]	[6353]	[6907]	[7448]	[7974]	[8489]	[8992]
76	23	90	163	236	309	380	449	518	585	652	717	780	841	900	958	1015
	252	252	252	251	249	246	243	241	239	238	238	239	242	245	247	248
[22]	[102]	[710]	[1366]	[2013]	[2651]	[3270]	[3885]	[4496]	[5096]	[5689]	[6271]	[6831]	[7362]	[7877]	[8375]	[8880]
83	12	80	154	227	299	369	439	508	575	642	708	771	831	889	945	1003
	278	278	278	277	274	272	269	267	265	264	263	265	269	273	275	275
[25]		[553]	[1208]	[1851]	[2489]	[3114]	[3726]	[4335]	[4930]	[5523]	[6108]	[6670]	[7220]	[7783]	[8298]	[8777]
95		62	136	209	281	352	421	489	557	624	690	753	815	879	937	991
		316	316	316	313	310	307	303	301	299	298	298	301	306	310	312
[30]		[233]	[941]	[1539]	[2179]	[2811]	[3430]	[4028]	[4625]	[5217]	[5802]	[6385]	[6957]	[7522]	[8060]	[8565]
114		26	106	174	246	317	387	455	522	589	655	721	785	849	910	967
		379	379	379	377	374	371	367	365	363	362	361	364	368	374	376

Delta Series

Performance data

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

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



Δ Pressure bar [PSI]
347 cm³/r [21.2 in³/r]

[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]	[224]	[241]	[259]	[276]
250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000

C-3

[2]	[687]	[1415]	[2128]	[2824]	[3532]	[4248]	[4947]	[5633]	[6298]	[6964]	[7575]	[8182]	[8743]	[9209]	[9624]	[10081]
7.6	78	160	240	319	399	480	558	636	711	786	855	924	987	1040	1087	1138
	20	19	18	18	17	18	17	17	16	15	14	13	12	9	8	4
[4]	[689]	[1443]	[2179]	[2891]	[3606]	[4302]	[4986]	[5653]	[6316]	[6965]	[7615]	[8260]	[8891]	[9515]	[10120]	[10698]
15	78	163	246	326	407	486	563	638	713	786	860	933	1004	1074	1143	1208
	42	41	41	40	39	37	38	38	39	38	38	37	37	35	33	31
[6]	[648]	[1406]	[2154]	[2866]	[3580]	[4276]	[4970]	[5641]	[6290]	[6921]	[7563]	[8190]	[8812]	[9427]	[10029]	[10630]
23	73	159	243	324	404	483	561	637	710	781	854	925	995	1064	1132	1200
	64	64	63	61	60	58	57	57	59	60	60	59	58	57	56	55
[8]	[606]	[1356]	[2105]	[2825]	[3545]	[4241]	[4943]	[5621]	[6274]	[6899]	[7522]	[8144]	[8768]	[9388]	[9998]	[10598]
30	68	153	238	319	400	479	558	635	708	779	849	919	990	1060	1129	1196
	87	86	85	84	82	81	79	78	79	81	82	81	81	80	78	77
[10]	[550]	[1295]	[2041]	[2765]	[3488]	[4188]	[4891]	[5585]	[6264]	[6899]	[7505]	[8091]	[8672]	[9283]	[9885]	[10488]
38	62	146	230	312	394	473	552	631	707	779	847	913	979	1048	1116	1184
	109	108	107	106	104	103	100	98	97	98	100	103	103	103	102	101
[12]	[478]	[1227]	[1976]	[2698]	[3411]	[4108]	[4802]	[5479]	[6146]	[6782]	[7396]	[7992]	[8585]	[9176]	[9767]	[10345]
45	54	139	223	305	385	464	542	619	694	766	835	902	969	1036	1103	1168
	131	130	130	129	127	125	122	119	117	115	115	119	123	125	125	124
[14]	[409]	[1151]	[1896]	[2624]	[3344]	[4048]	[4742]	[5418]	[6083]	[6722]	[7339]	[7939]	[8541]	[9142]	[9738]	[10318]
53	46	130	214	296	378	457	535	612	687	759	829	896	964	1032	1099	1165
	153	153	152	152	149	147	145	142	140	139	139	143	147	148	147	147
[16]	[339]	[1033]	[1774]	[2494]	[3209]	[3907]	[4605]	[5280]	[5956]	[6610]	[7243]	[7850]	[8438]	[9014]	[9592]	[10166]
61	38	117	200	282	362	441	520	596	672	746	818	886	953	1018	1083	1148
	174	174	174	174	172	169	166	164	162	159	159	160	165	168	170	170
[18]	[245]	[943]	[1676]	[2401]	[3113]	[3809]	[4500]	[5175]	[5837]	[6477]	[7107]	[7711]	[8308]	[8895]	[9466]	[10040]
68	28	106	189	271	351	430	508	584	659	731	802	871	938	1004	1069	1133
	196	196	196	195	193	192	189	187	185	183	181	182	185	188	192	193
[20]	[143]	[832]	[1571]	[2290]	[3003]	[3697]	[4386]	[5050]	[5715]	[6351]	[6968]	[7569]	[8147]	[8721]	[9297]	[9855]
76	16	94	177	259	339	417	495	570	645	717	787	855	920	985	1050	1113
	218	218	218	218	216	214	212	209	207	205	203	203	205	210	214	215
[22]	[34]	[715]	[1454]	[2175]	[2896]	[3594]	[4280]	[4950]	[5602]	[6236]	[6854]	[7449]	[8027]	[8590]	[9150]	[9705]
83	4	81	164	246	327	406	483	559	632	704	774	841	906	970	1033	1096
	240	240	240	240	240	238	236	233	230	228	226	226	228	231	237	240
[25]		[523]	[1251]	[1969]	[2693]	[3395]	[4081]	[4756]	[5414]	[6057]	[6687]	[7296]	[7882]	[8457]	[9011]	[9534]
95		59	141	222	304	383	461	537	611	684	755	824	890	955	1017	1076
		272	272	272	272	272	269	266	263	261	259	259	261	265	270	272
[30]		[152]	[1072]	[1749]	[2434]	[3123]	[3802]	[4468]	[5114]	[5763]	[6400]	[7018]	[7633]	[8232]	[8819]	[9397]
114		17	121	197	275	353	429	504	577	651	723	792	862	929	996	1016
		327	327	327	327	327	323	319	315	314	313	315	319	323	327	327

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

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

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



Δ Pressure bar [PSI]
395 cm³/r [24.1 in³/r]

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

Delta Series

Performance data

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

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



Δ Pressure bar [PSI]
470 cm³/r [28.7 in³/r]

[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]	[172]	[190]	[207]
250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000

C-3

[2]	[925]	[1885]	[2820]	[3727]	[4639]	[5526]	[6404]	[7270]	[8129]	[8978]	[9794]	[10551]
7.6	104	213	318	421	524	624	723	821	918	1014	1106	1191
	14	14	13	12	12	12	11	10	9	9	8	7
[4]	[942]	[1942]	[2917]	[3849]	[4776]	[5692]	[6594]	[7488]	[8352]	[9199]	[10014]	[10824]
15	106	219	329	435	539	643	744	845	943	1039	1131	1222
	31	30	29	29	28	27	27	26	25	24	23	23
[6]	[906]	[1921]	[2892]	[3833]	[4772]	[5676]	[6572]	[7440]	[8309]	[9152]	[9974]	[10786]
23	102	217	327	433	539	641	742	840	938	1033	1126	1218
	47	46	45	45	44	43	43	42	42	41	41	40
[8]	[856]	[1866]	[2853]	[3795]	[4730]	[5634]	[6520]	[7379]	[8230]	[9075]	[9895]	[10693]
30	97	211	322	428	534	636	736	833	929	1025	1117	1207
	63	62	62	61	60	58	57	57	58	58	57	56
[10]	[780]	[1799]	[2800]	[3745]	[4685]	[5594]	[6479]	[7337]	[8177]	[9009]	[9843]	[10638]
38	88	203	316	423	529	632	731	828	923	1017	1111	1201
	79	79	78	77	76	75	74	72	72	74	74	74
[12]	[699]	[1709]	[2711]	[3661]	[4597]	[5508]	[6403]	[7258]	[8101]	[8916]	[9719]	[10506]
45	79	193	306	413	519	622	723	819	915	1007	1097	1186
	96	95	94	93	92	91	90	89	89	90	90	91
[14]	[596]	[1612]	[2609]	[3561]	[4490]	[5390]	[6268]	[7112]	[7941]	[8743]	[9519]	[10282]
53	67	182	295	402	507	608	708	803	897	987	1075	1161
	112	111	111	110	109	107	106	104	103	101	102	104
[16]	[467]	[1486]	[2480]	[3440]	[4371]	[5268]	[6152]	[6992]	[7810]	[8601]	[9370]	[10118]
61	53	168	280	388	493	595	695	789	882	971	1058	1142
	129	128	127	126	125	123	122	120	119	117	116	116
[18]	[332]	[1353]	[2357]	[3317]	[4256]	[5157]	[6043]	[6892]	[7713]	[8501]	[9270]	[10026]
68	37	153	266	375	481	582	682	778	871	960	1047	1132
	145	145	144	143	142	140	138	136	135	134	132	133
[20]	[304]	[1226]	[2218]	[3172]	[4102]	[4994]	[5873]	[6731]	[7557]	[8365]	[9147]	[9922]
76	34	138	250	358	463	564	663	760	853	944	1033	1120
	161	161	160	159	158	157	155	153	152	150	149	150
[22]	[137]	[1059]	[2048]	[3004]	[3945]	[4840]	[5727]	[6576]	[7399]	[8198]	[8967]	[9715]
83	15	120	231	339	445	546	647	742	835	926	1012	1097
	177	177	177	176	175	174	172	170	169	167	166	166
[25]		[833]	[1816]	[2765]	[3680]	[4575]	[5455]	[6313]	[7133]	[7928]	[8691]	[9436]
95		94	205	312	415	517	616	713	805	895	981	1065
		201	201	201	200	198	196	194	193	191	191	192
[30]		[491]	[1318]	[2295]	[3232]	[4142]	[5022]	[5881]	[6721]	[7522]	[8300]	[9320]
114		55	149	259	365	468	567	664	759	849	937	1052
		241	241	241	241	240	237	236	236	233	232	227

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

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

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



Δ Pressure bar [PSI]
542 cm³/r [33.1 in³/r]

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

Delta Series

Performance data

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

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



Δ Pressure bar [PSI]
649 cm³/r [39.6 in³/r]

[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]	[155]
250	500	750	1000	1250	1500	1750	2000	2250

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

8479 } Torque [lb-in]
 957 } Nm
 175 } Speed RPM

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

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



Δ Pressure bar [PSI]
754cm³/r [46.0 in³/r]

[17]	[34]	[52]	[69]	[86]	[103]	[121]	[138]
250	500	750	1000	1250	1500	1750	2000

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

Delta Series

Dimensions

Wheel mount

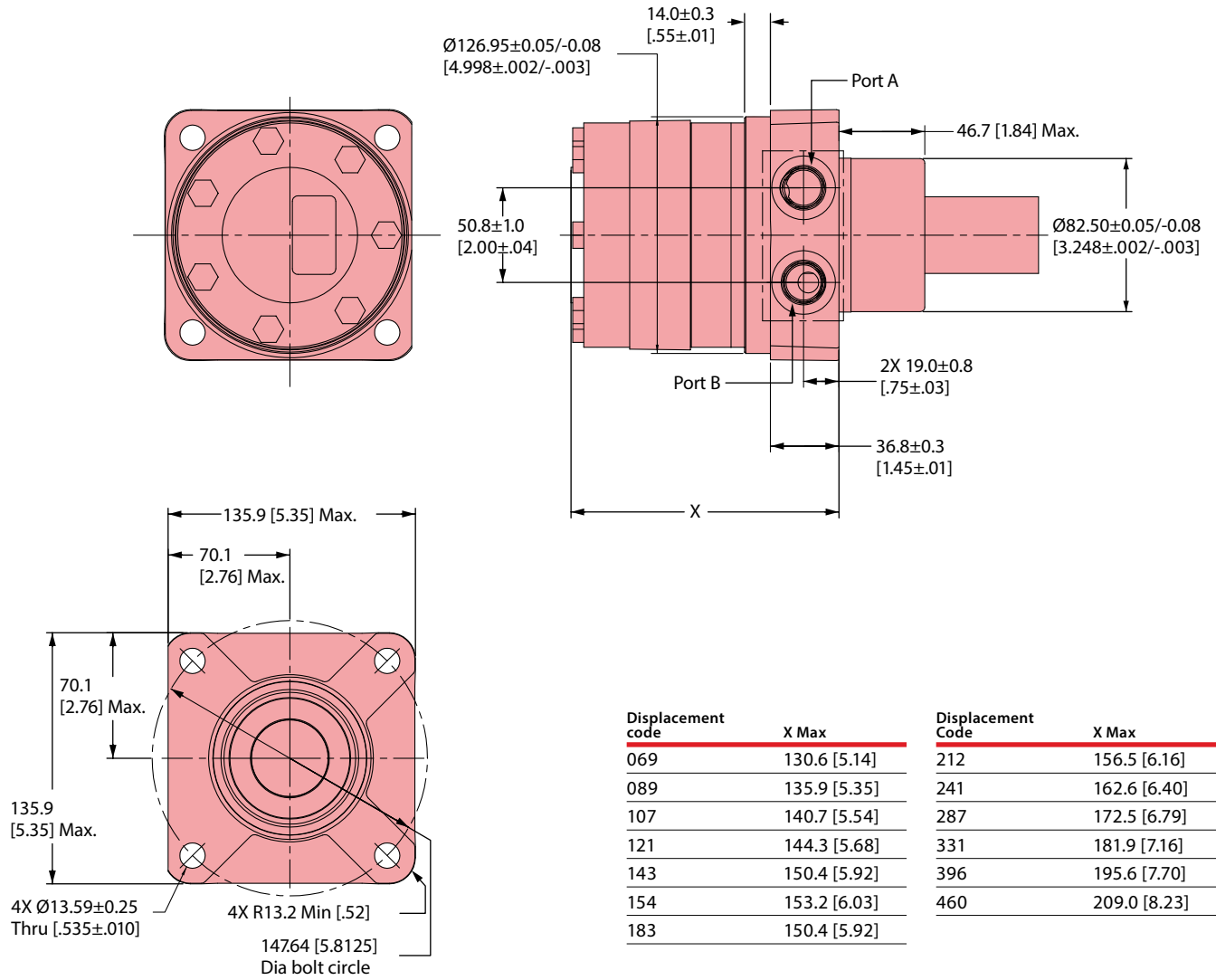
Ports

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

Standard rotation viewed from shaft end

Port A pressurized — CCW
Port B pressurized — CW

C-3



Displacement code	X Max	Displacement Code	X Max
069	130.6 [5.14]	212	156.5 [6.16]
089	135.9 [5.35]	241	162.6 [6.40]
107	140.7 [5.54]	287	172.5 [6.79]
121	144.3 [5.68]	331	181.9 [7.16]
143	150.4 [5.92]	396	195.6 [7.70]
154	153.2 [6.03]	460	209.0 [8.23]
183	150.4 [5.92]		

Standard mount

Ports

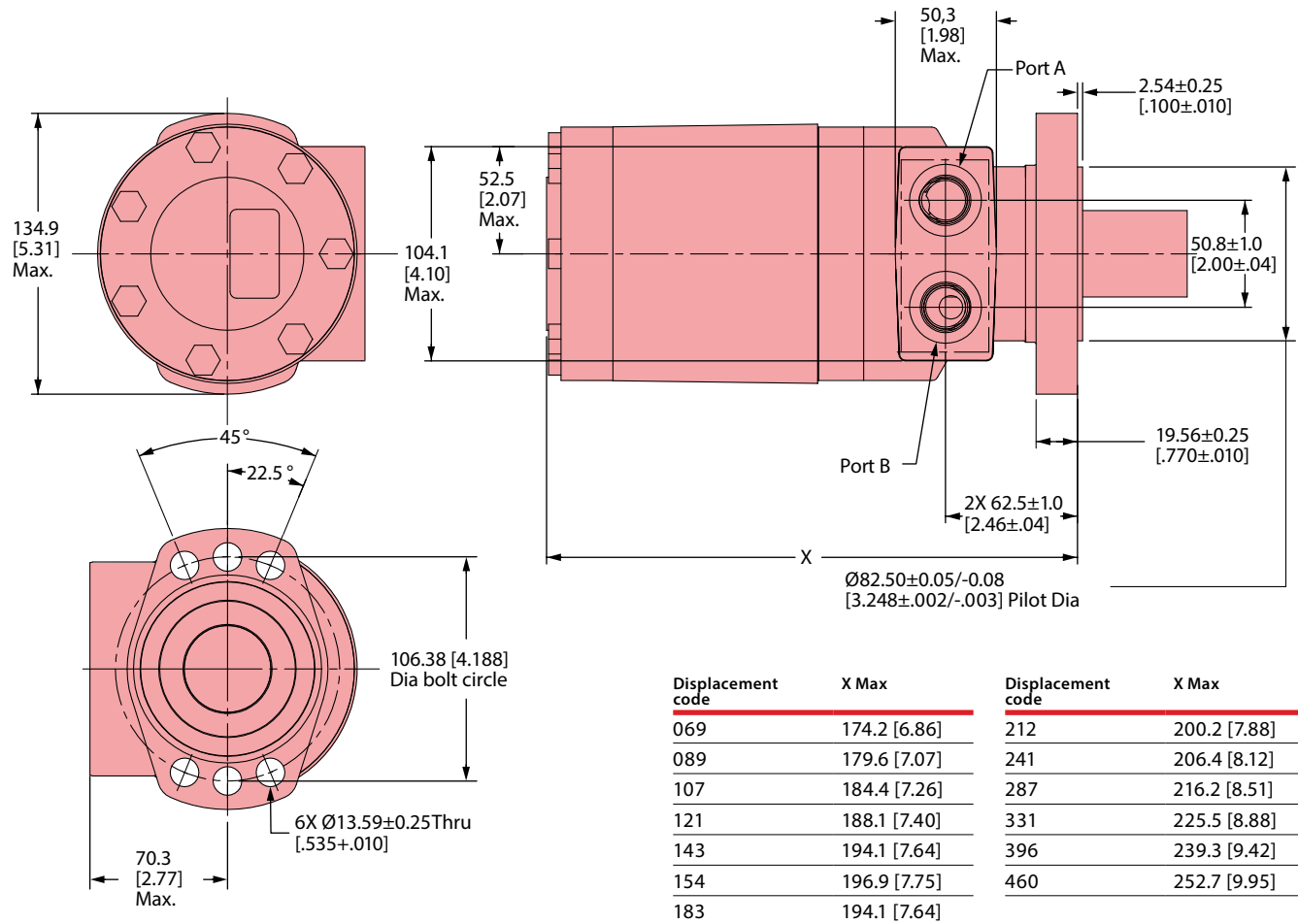
Code: AA 7/8-14 UNF-2B SAE O-ring ports

Code: AC G 1/2 (BSP) ports

Standard rotation viewed from shaft end

Port A pressurized — CCW

Port B pressurized — CW



C-3

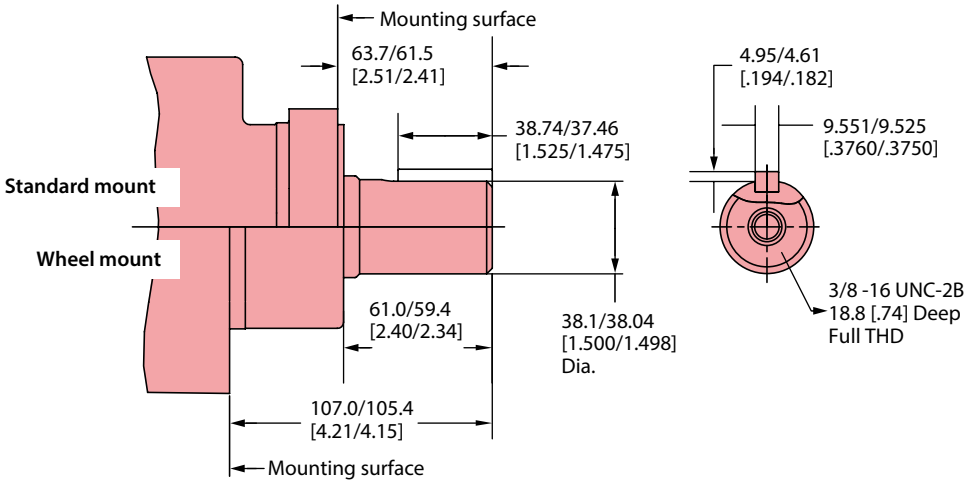
Displacement code	X Max	Displacement code	X Max
069	174.2 [6.86]	212	200.2 [7.88]
089	179.6 [7.07]	241	206.4 [8.12]
107	184.4 [7.26]	287	216.2 [8.51]
121	188.1 [7.40]	331	225.5 [8.88]
143	194.1 [7.64]	396	239.3 [9.42]
154	196.9 [7.75]	460	252.7 [9.95]
183	194.1 [7.64]		

Delta Series

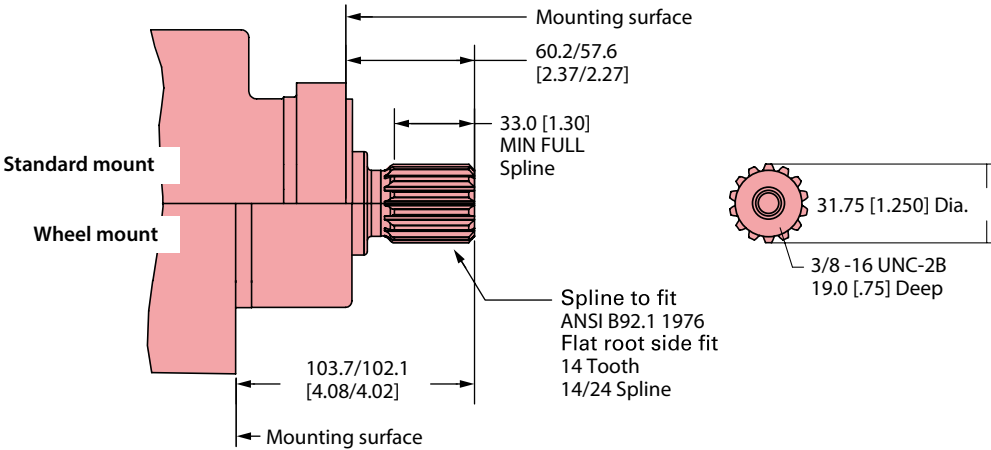
Dimensions

Shafts

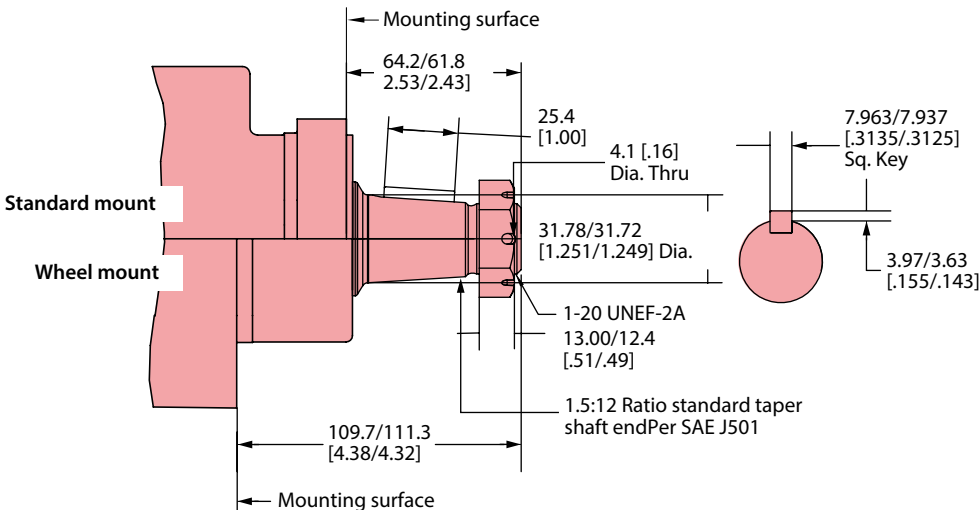
Code: 01 1½ Inch straight
972[8600] Max. Torque Nm [lb-in]



Code: 04 1¼ Inch 14 Tooth splined
768[6800] Max. Torque Nm [lb-in]



Code: 02 1¼ Inch tapered
768[6800] Max. Torque Nm [lb-in]

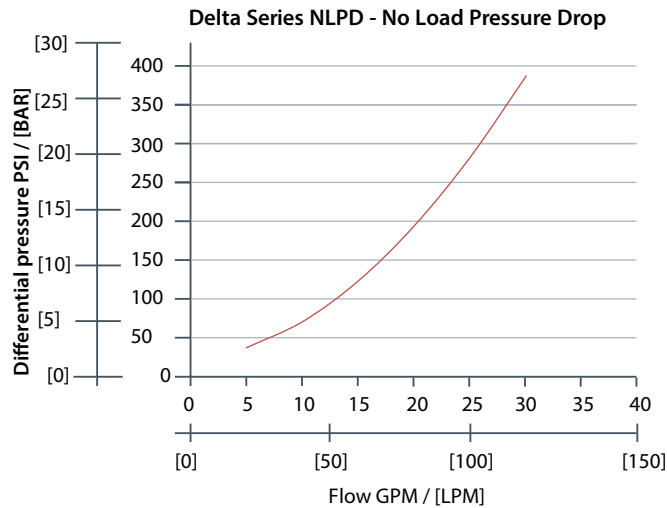


These curves indicate the radial load capacity on the motor shaft(s) at various locations.

Each curve is based on B10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

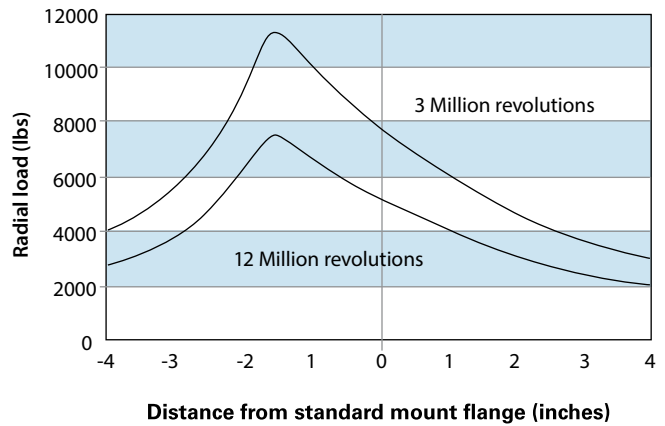
To determine radial load at speeds other than 100 RPM, multiply the load values given on the bearing curve by the factors in the chart below.

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



Side load chart for standard mount

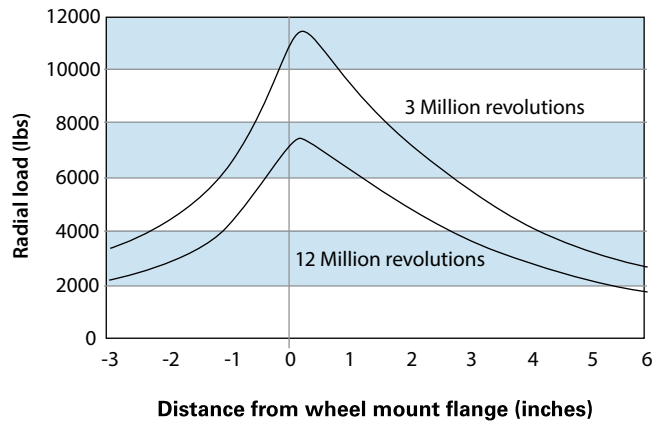
Allowable radial load, Delta Motor
L₁₀ Bearing life per ISO 281



C-3

Side load chart for wheel mount

Allowable radial load, delta motor
L₁₀ Bearing Life per ISO 281



Delta Series

Product numbers

Note: For Delta Series Motors with a configuration **not shown** in the charts below contact your Danfoss representative.

Mounting	Shaft	Port size	Time	Displacement cm ³ /r [in ³ /r] / Product number				
				113 [6.9]	146 [8.9]	198 [12.1]	234 [14.3]	
Wheel motor	1-1/4 Inch Tapered	7/8" O-ring	Standard -CCW	184-0005-002	184-0006-002	184-0002-002	184-0001-002	
			Standard -CW	184-0025-002	184-0026-002	184-0027-002	184-0028-002	
	1-1/2 Inch 17 T Splined	7/8" O-ring	Standard -CCW	184-0013-002	184-0014-002	184-0015-002	184-0016-002	
			Standard -CW	184-0037-002	184-0038-002	184-0039-002	184-0040-002	
					252 [15.4]	300 [18.3]	347 [21.2]	395 [24.1]
	1-1/4 Inch Tapered	7/8" O-ring	Standard -CCW	184-0003-002	184-0004-002	184-0007-002	184-0008-002	
			Standard -CW	184-0029-002	184-0030-002	184-0031-002	184-0032-002	
	1-1/2 Inch 17 T Splined	7/8" O-ring	Standard -CCW	184-0017-002	184-0018-002	184-0019-002	184-0020-002	
			Standard -CW	184-0041-002	184-0042-002	184-0043-002	184-0044-002	
					470 [28.7]	542 [33.1]	649 [39.6]	649 [46.0]
	1-1/4 Inch Tapered	7/8" O-ring	Standard -CCW	184-0009-002	184-0010-002	184-0011-002	184-0012-002	
			Standard -CW	184-0033-002	184-0034-002	184-0035-002	184-0036-002	
1-1/2 Inch 17 T Splined	7/8" O-ring	Standard -CCW	184-0021-002	184-0022-002	184-0023-002	184-0024-002		
		Standard -CW	184-0045-002	184-0046-002	184-0047-002	184-0048-002		

C-3

The following 26-digit coding system has been developed to identify all of the configuration options for the Delta low speed high torque motor. Use this model code to specify a motor with the desired features. All 26 digits of the code must be present when ordering.

M	DL	***	**	**	**	0	*	*	**	00	**	**	00	B
1	2 3	4 5 6	7 8	9 10	11 12	13	14	15	16 17	18 19	20 21	22 23	24 25	26

1	Product M Motor	11 12	Ports AA .875-14 UNF-2B SAE O-Ring AC G 1/2 BSP Straight Thread
2 3	Series DL Delta Series	13	Pressure/flow option 0 None
4 5 6	Displacement cm³/r [in³/r] 069 113 [6.9] 089 146 [8.9] 107 176 [10.7] 121 198 [12.1] 143 234 [14.3] 154 252 [15.4] 183 300 [18.3] 212 347 [21.2] 241 395 [24.1] 287 470 [28.7] 331 542 [33.1] 396 649 [39.6] 460 754 [46.0]	14	Geroler option 0 Standard B Tight fitting Geroler C Reduced Noise* *Option C required on all displacements higher than 20 CID
7 8	Mounting type AA Wheel, 4 Bolt: 82.6 [3.25] Pilot Dia. 13.59 [.535] Dia. Holes On 1476 [5.81] Dia. Bolt Circle. 1270 [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	15	Seal option 0 Standard 1 Viton 4 Seal guard 5 Viton with seal guard A Extreme duty seal guard
9 10	Output shaft 01 38.10 [1.500] Dia. Straight with .375-16 UNC-2B Thread, and 9.52 [.375] Sq x 38.10 [1.500] straight key 02 31.75 [1.250] Dia. .125:1 tapered shaft per SAE J501 with 1.000-20 UNEF-2A threaded shaft end and slotted hex nut, 7.938 [.3125] Sq x 25.40 [1.000] straight key 03 41.30 [1.626] Dia. .125:1 tapered shaft per SAE J501 with 1.250-18 UNEF-2A threaded shaft end and slotted hex nut, 11.125 [.4380] Sq x 34.04 [1.340] straight key 04 31.75 [1.250] Dia. Flat root side fit, 14 tooth, 12/24 DP 30 Deg. Involute spline with .375-16 UNC-2B thread in end, 33.0 [1.30] minimum full spline length 05 38.10 [1.500] Dia. Flat root side fit, 17 tooth, 12/24 DP 30 Deg. Involute spline, 31.8 [1.25] minimum full spline length, with .375-16 UNC-2B thread in end 06 38.10 [1.500] Dia. Tapered shaft per SAE J501 with 1.000-20 UNEF-2A thread in end, 7.938 [.3125] Sq x 31.75 [1.250] Key	16 17	Accessories 00 None 01 Spring applied pressure release brake
		18 19	Special features (hardware) 00 None
		20 21	Special features (assembly) 00 Standard rotation - CCW 01 Reverse rotation - CW
		22 23	Paint/packaging AA No paint, individual box AB Low gloss black primer, individual box AS Epoxy coated black, individual box AE No paint, bulk box AF Low gloss black primer, bulk box
		24 25	Customer identification 00 None
		26	Design code B Two

Delta Series with Parking Brake

Highlights

Description

Danfoss' offering in LSHT motor technology is the Delta series motor with parking brake. It utilizes brake pads that rotate at 6 times the speed of the output shaft, thereby giving the brake a 6-to-1 mechanical advantage. It has the same Geroler, and disc valve technologies as the standard Char-Lynn motors. In addition to providing dependable load-holding capability, Delta series motor with parking brake provides the same smooth, reliable operation, with similar performance, as the Delta series motor.

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

C-3



Features:

- Integrated, Compact, Patented Design
- Rear-mounted intergrated brake with 6:1 torque advantage
- Access port for manual brake release (for over-riding brake in the event of loss of release pressure)
- Available on all Delta series displacements

Benefits:

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

Specifications

Geroler elements	12 Displacements
Brake torque*	Min. to hold intermittent torque of motor
Release Pressure-bar[psi]	Min. 10 [150] Max. 69 [1000]

*Max brake torque is higher than motor intermittent torque rating / shaft torque rating. Make sure unit is not loaded beyond shaft torque rating.

Wheel Mount

Ports

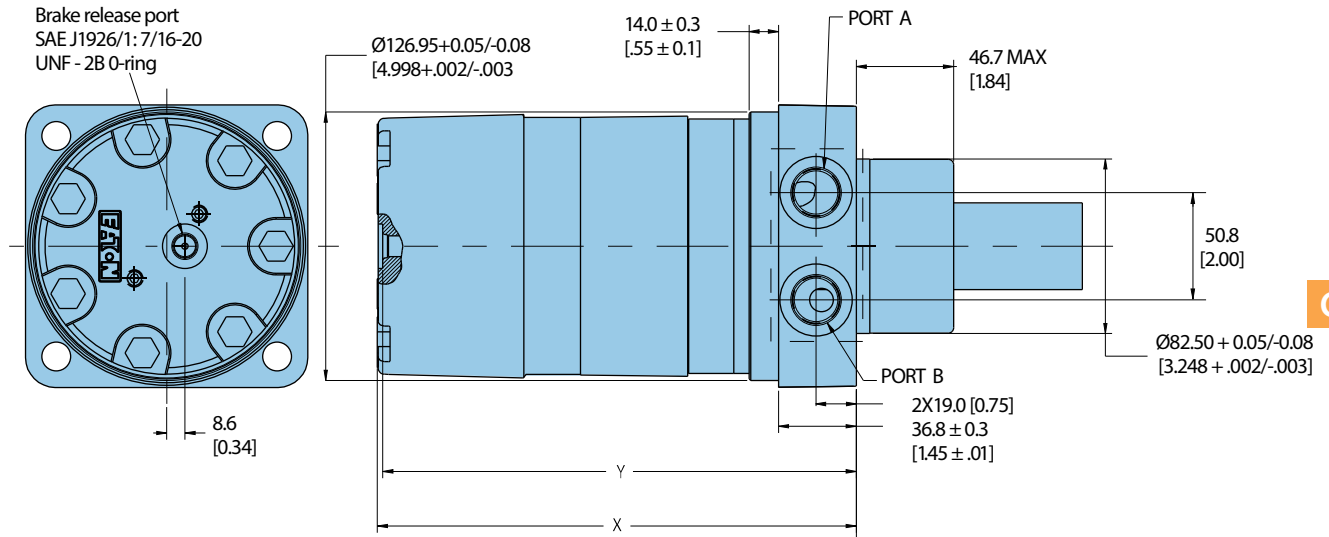
Code: AA 7/8-14 UNF-2B SAE O-ring ports

Code: AC G 1/2 (BSP) ports

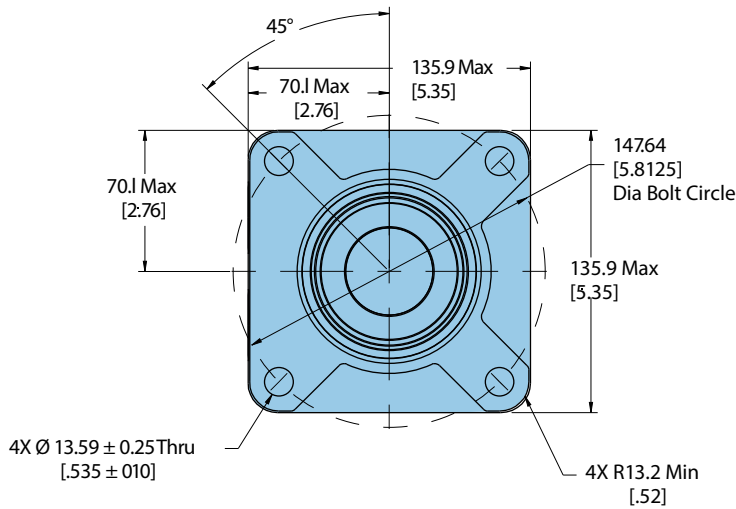
Standard Rotation Viewed from Shaft End

Port A Pressurized - CCW

Port B Pressurized - CW



C-3



Delta Series with parking brake dimensions

Displacement Code	X mm [inch]	Y mm [inch]
069	190.9 [7.52]	188.4 [7.42]
089	196.3 [7.73]	193.7 [7.63]
107	201.1 [7.92]	198.6 [7.82]
121	204.6 [8.06]	202.1 [7.96]
143	210.7 [8.30]	208.2 [8.20]
154	213.5 [8.41]	211.0 [8.31]
183	214.8 [8.46]	212.3 [8.36]
212	220.9 [8.70]	218.4 [8.60]
241	227.0 [8.94]	224.5 [8.84]
287	236.9 [9.33]	234.4 [9.23]
331	246.3 [9.70]	243.8 [9.60]
396	260.0 [10.24]	257.5 [10.14]
460	273.5 [10.17]	270.9 [10.67]

Delta Series Parking Brake

Dimensions

Standard Mount

Ports

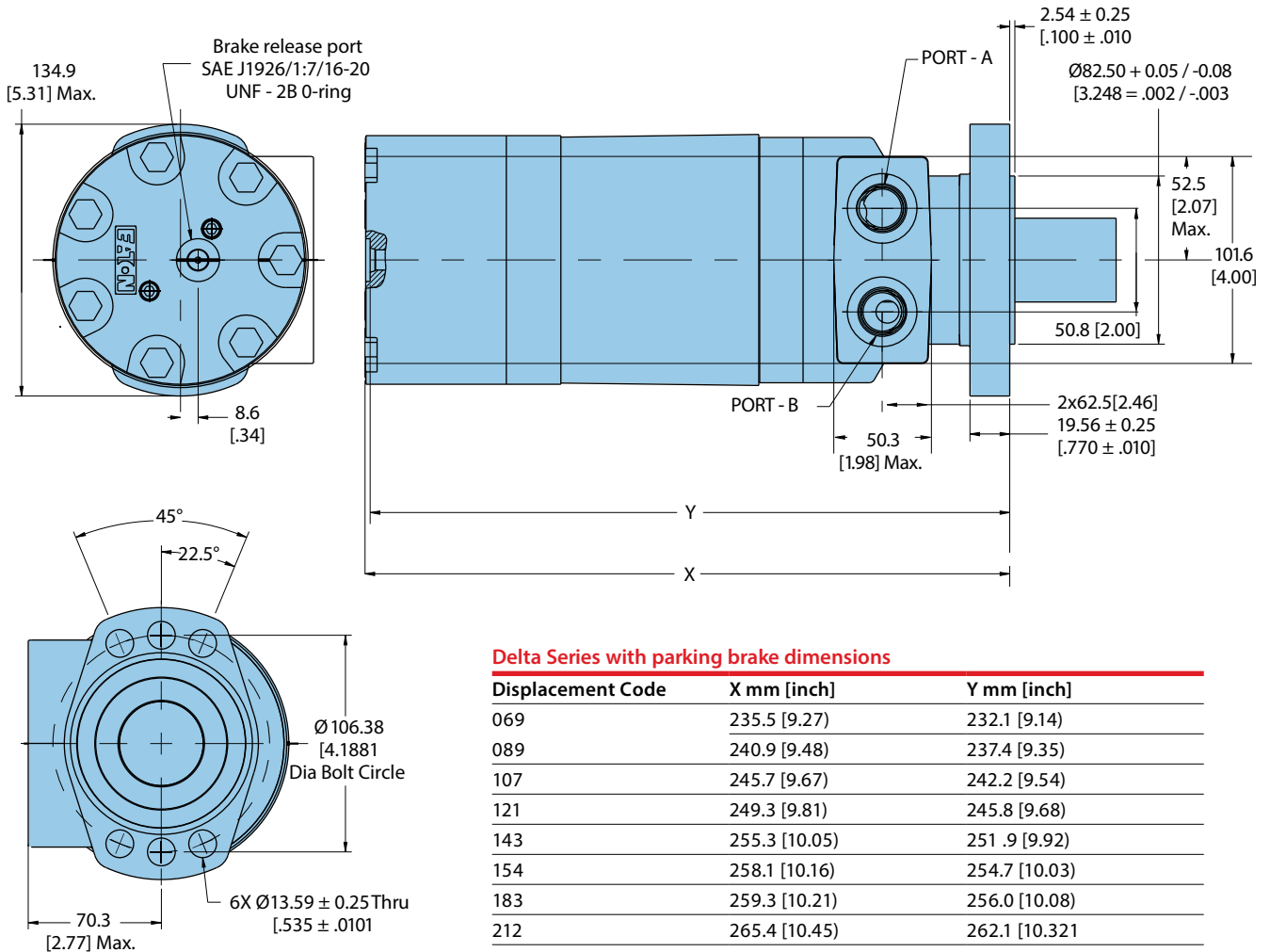
Code: AA 7/8-14 UNF-2B SAE O-ring ports

Code: AC G 1/2 (BSP) ports

Standard Rotation Viewed from Shaft End

Port A Pressurized - CCW

Port B Pressurized - CW



C-3

Delta Series with parking brake dimensions

Displacement Code	X mm [inch]	Y mm [inch]
069	235.5 [9.27]	232.1 [9.14]
089	240.9 [9.48]	237.4 [9.35]
107	245.7 [9.67]	242.2 [9.54]
121	249.3 [9.81]	245.8 [9.68]
143	255.3 [10.05]	251.9 [9.92]
154	258.1 [10.16]	254.7 [10.03]
183	259.3 [10.21]	256.0 [10.08]
212	265.4 [10.45]	262.1 [10.321]
241	271.5 [10.69]	268.1 [10.56]
287	281.4 [11.08]	278.1 [10.95]
331	290.8 [11.45]	287.5 [11.32]
396	304.5 [11.99]	301.2 [11.86]
460	318.0 [12.52]	314.6 [12.39]

Description:

The 4000 Series share the same architecture of the industry leading 2000 Series motor, but has a larger frame size for higher torques and flows. The 4000 Series offers up to 8600 in-lb of torque and 25 gpm (continuous ratings).

**Features:**

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

Benefits:

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

Applications:

- Mowing
- Snow removal
- Sprayer
- Trencher
- Wood products

C-4

4000 Series motors

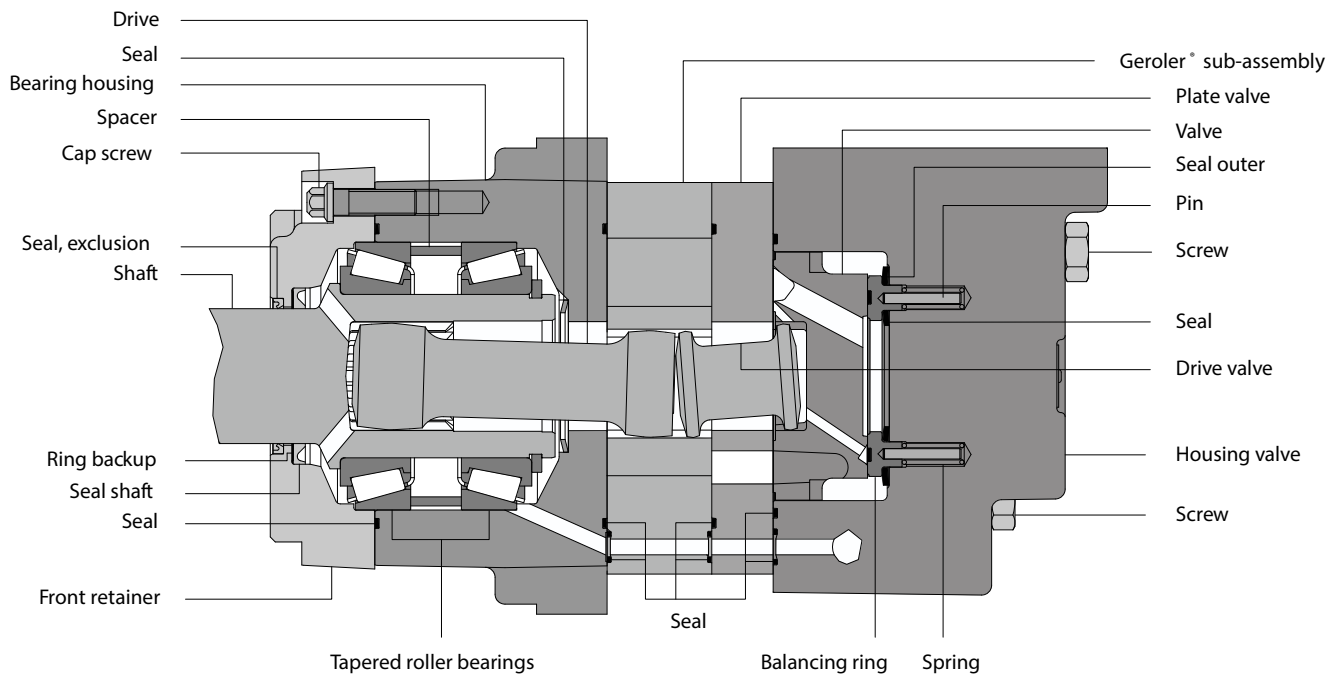
Geroler element	10 Displacements
Flow l/min [GPM]	95 [25] Continuous** 151 [40] Intermittent*
Speed RPM	722 Cont.** 868 Inter.*
Pressure bar [PSI]	207 [3000] Cont.** 310 [4500] Inter.*
Torque Nm [lb-in]	972 [8600] Cont.** 1181 [10450] Inter.*

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

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

4000 Series

Specifications



C-4

4000 series motors

		110	130	160	205	245	280	310	395	495	625
Displ. cm³/r [in³/rev]		110 [6.7]	130 [7.9]	160 [9.9]	205 [12.5]	245 [15.0]	280 [17.1]	310 [19.0]	395 [24.0]	495 [30.0]	625 [38.0]
Max speed (RPM) @ Flow	Continuous	626	722	582	459	383	336	303	239	191	151
	Intermittent	697	862	693	546	532	468	422	376	305	241
Flow l/min [GPM]	Continuous	75 [20]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]	95 [25]
	Intermittent	95 [25]	115 [30]	115 [30]	115 [30]	130 [35]	130 [35]	130 [35]	150 [40]	150 [40]	150 [40]
Torque* Nm [lb - in]	Continuous	322 [2850]	376 [3330]	485 [4290]	599 [5300]	705 [6240]	753 [6666]	851 [7530]	931 [8240]	946 [8375]	972 [8605]
	Intermittent	470 [4160]	558 [4940]	705 [6240]	802 [7100]	844 [7470]	957 [8471]	1064 [9420]	1183 [10470]	1169 [10350]	1181 [10450]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	190 [2750]	140 [2000]	115 [1700]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	240 [3500]	170 [2500]	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	295 [4250]	230 [3300]	180 [2600]
Weight kg [lb]	Standard or Wheel mount	17.9 [39.5]	18.1 [40.0]	18.1 [40.0]	18.4 [40.5]	18.6 [41.0]	19.1 [42.0]	19.5 [43.0]	20.4 [45.0]	21.8 [48.0]	23.1 [51.0]
	Bearingless	14.1 [31.0]	14.1 [31.0]	14.3 [31.5]	14.5 [32.0]	14.7 [32.5]	15.2 [33.5]	15.6 [34.5]	16.6 [36.5]	17.9 [39.5]	19.3 [42.5]

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

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

Maximum inlet pressure:

310 bars (4500 PSI)

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

Maximum return pressure:

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

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

Δ bar [Δ PSI]:

The true pressure difference between inlet port and outlet port

Continuous rating:

Motor may be run continuously at these ratings

Intermittent operation:

10% of every minute

Peak operation:

1% of every minute

Recommended fluids:

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

Recommended system operating temp:

-34°C to 82°C [-30°F to 180°F]

Recommended filtration:

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

Thermal shock warning:

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

Minimum delta pressure warning:

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

4000 Series

Performance data

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

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



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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
17	34	69	103	138	172	207	241	276	310

C-4

[0.5]	[150]	[390]	[850]	[1290]						
2	15	45	95	145						
	14	10	5	2						
[2]	[170]	[440]	[900]	[1380]	[1860]	[2270]	[2680]	[3110]		
8	20	50	100	155	210	255	305	350		
	34	33	31	28	25	22	18	11		
[4]	[180]	[450]	[910]	[1390]	[1860]	[2280]	[2700]	[3120]	[3450]	
15	20	50	105	155	210	260	305	355	390	
	68	67	62	56	50	44	36	28	18	
[6]	[190]	[460]	[940]	[1400]	[1870]	[2310]	[2730]	[3140]	[3560]	[3880]
23	20	50	105	160	210	260	310	355	400	440
	138	136	123	110	97	84	70	56	42	28
[8]	[200]	[470]	[960]	[1420]	[1880]	[2320]	[2760]	[3200]	[3640]	[3950]
30	25	55	110	160	210	260	310	360	410	445
	207	204	200	193	184	174	163	150	136	121
[10]	[190]	[460]	[950]	[1420]	[1880]	[2340]	[2790]	[3230]	[3670]	[4010]
38	20	50	105	160	210	265	315	365	415	445
	277	274	270	262	253	241	228	213	196	179
[12]	[180]	[460]	[950]	[1420]	[1890]	[2350]	[2820]	[3260]	[3700]	[4070]
45	20	50	105	160	215	265	320	370	420	460
	347	344	340	331	322	308	292	274	255	236
[14]	[160]	[450]	[940]	[1420]	[1880]	[2350]	[2820]	[3260]	[3710]	[4080]
53	20	50	105	160	210	265	320	370	420	460
	417	414	410	400	390	374	355	335	313	292
[16]	[140]	[440]	[930]	[1420]	[1880]	[2350]	[2830]	[3280]	[3730]	[4110]
61	15	50	105	160	210	265	320	370	420	465
	487	484	480	469	458	440	419	416	410	348
[18]	[130]	[440]	[920]	[1410]	[1870]	[2350]	[2840]	[3300]	[3750]	[4120]
68	15	50	105	160	210	265	320	375	425	465
	556	553	549	537	525	505	482	455	428	404
[20]	[100]	[440]	[910]	[1400]	[1870]	[2350]	[2840]	[3300]	[3770]	[4140]
76	10	50	105	160	210	265	320	375	425	465
	626	622	618	606	593	570	545	516	485	460
[25]	[80]	[430]	[900]	[1370]	[1860]	[2350]	[2850]	[3320]	[3790]	[4160]
95	10	50	100	155	210	265	320	375	430	470
	697	694	690	677	664	638	611	579	545	518

[430]
50 } Torque [lb-in]
694 } Nm
694 } 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 25 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.



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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
17	34	69	103	138	172	207	241	276	310

[0.5]	[310]	[510]	[1060]	[1590]						
2	35	60	120	180						
	12	9	5	2						
[1]	[290]	[530]	[1080]	[1600]	[2110]	[2640]	[3060]	[3450]		
4	35	60	120	180	240	300	345	390		
	30	28	25	19	14	13	12	4		
[2]	[280]	[530]	[1100]	[1620]	[2140]	[2660]	[3180]	[3600]	[4020]	[4080]
8	30	60	125	185	240	300	360	405	455	460
	57	56	53	47	42	40	38	29	20	12
[4]	[260]	[520]	[1100]	[1650]	[2200]	[2700]	[3210]	[3660]	[4100]	[4560]
15	30	60	125	185	250	305	365	415	465	515
	116	114	111	105	100	95	90	70	50	37
[6]	[240]	[510]	[1100]	[1650]	[2200]	[2720]	[3240]	[3710]	[4180]	[4660]
23	25	60	125	185	250	305	365	420	470	525
	173	170	167	161	156	149	142	123	104	91
[8]	[230]	[510]	[1080]	[1640]	[2210]	[2740]	[3270]	[3770]	[4270]	[4750]
30	25	60	120	185	250	310	370	425	480	535
	228	225	222	216	210	202	194	176	158	145
[10]	[210]	[510]	[1080]	[1640]	[2210]	[2750]	[3300]	[3820]	[4350]	[4840]
38	25	60	120	185	250	310	375	430	490	545
	283	285	278	272	266	256	246	229	212	189
[12]	[200]	[500]	[1070]	[1640]	[2220]	[2750]	[3300]	[3840]	[4370]	[4870]
45	25	55	120	185	250	310	375	435	495	550
	341	338	335	329	323	312	300	282	263	237
[14]	[180]	[490]	[1060]	[1640]	[2220]	[2750]	[3310]	[3860]	[4390]	[4890]
53	20	55	120	185	250	310	375	435	495	550
	400	396	392	386	380	368	355	335	311	286
[16]	[160]	[490]	[1050]	[1630]	[2220]	[2760]	[3310]	[3860]	[4400]	[4920]
61	20	55	120	185	250	310	375	435	495	555
	457	453	449	443	437	424	410	388	366	335
[18]	[130]	[480]	[1050]	[1630]	[2220]	[2760]	[3320]	[3870]	[4420]	[4940]
68	15	55	120	185	250	310	375	435	500	560
	516	511	506	500	494	480	465	442	418	384
[20]	[110]	[470]	[1040]	[1620]	[2210]	[2760]	[3330]	[3890]	[4440]	
76	10	55	120	185	250	310	375	440	500	
	574	569	564	559	551	536	520	495	470	
[22]	[70]	[450]	[1020]	[1610]	[2190]	[2750]	[3320]	[3880]	[4440]	
83	10	50	115	180	245	310	375	440	500	
	633	628	624	615	606	590	573	547	520	
[25]	[50]	[430]	[1000]	[1580]	[2160]	[2720]	[3300]	[3860]	[4430]	
95	5	50	115	180	245	305	375	435	500	
	722	718	714	702	690	672	653	625	595	
[30]		[400]	[940]	[1500]	[2080]	[2670]	[3200]	[3740]		
114		45	105	170	235	300	360	425		
		862	855	842	827	806	783	749		

4000 Series

Performance data

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

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



**Δ Pressure bar [PSI]
160 cm³/r [9.9 in³/r]**

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
17	34	69	103	138	172	207	241	276	310

C-4

[0.5]	[300]	[680]	[1320]	[2050]	[2750]					
2	35	75	150	230	310					
	8	7	5	3	1					
[1]	[320]	[700]	[1350]	[2070]	[2780]	[3300]	[3940]	[4410]	[4950]	
4	35	80	155	235	315	375	445	500	560	
	23	22	20	19	18	16	15	8	2	
[2]	[330]	[700]	[1360]	[2080]	[2790]	[3340]	[3970]	[4530]	[5090]	[5590]
8	35	80	155	235	315	375	450	510	575	630
	46	45	41	40	37	32	29	27	25	13
[4]	[320]	[710]	[1400]	[2100]	[2820]	[3420]	[4020]	[4620]	[5220]	[5730]
15	35	80	160	240	320	385	455	520	590	645
	93	92	90	88	84	76	73	62	51	35
[6]	[300]	[710]	[1420]	[2140]	[2850]	[3510]	[4180]	[4760]	[5340]	[5870]
23	35	80	160	240	320	395	470	540	605	665
	137	135	134	131	126	120	114	90	75	57
[8]	[280]	[720]	[1450]	[2180]	[2900]	[3560]	[4230]	[4850]	[5470]	[6010]
30	30	80	165	245	330	400	480	550	620	680
	184	182	180	176	171	163	154	138	122	100
[10]	[260]	[720]	[1480]	[2220]	[2950]	[3610]	[4290]	[4920]	[5560]	[6160]
38	30	80	165	250	335	410	485	555	630	695
	232	229	226	221	216	206	194	182	169	142
[12]	[240]	[700]	[1450]	[2190]	[2920]	[3590]	[4280]	[4920]	[5570]	[6180]
45	25	80	165	245	330	405	485	555	630	700
	277	274	272	266	260	250	238	224	209	182
[14]	[220]	[680]	[1420]	[2160]	[2890]	[3570]	[4270]	[4920]	[5580]	[6200]
53	25	75	160	245	325	405	480	555	630	700
	321	319	318	311	304	294	282	266	249	222
[16]	[200]	[670]	[1400]	[2130]	[2860]	[3550]	[4260]	[4920]	[5590]	[6220]
61	25	75	160	240	325	400	480	555	630	705
	366	364	362	356	348	338	326	308	289	262
[18]	[180]	[650]	[1360]	[2100]	[2830]	[3530]	[4250]	[4910]	[5600]	[6240]
68	20	75	155	235	320	400	480	555	635	705
	410	409	407	401	392	382	370	350	329	302
[20]	[150]	[630]	[1340]	[2070]	[2800]	[3510]	[4240]	[4910]	[5610]	
76	15	70	150	235	315	395	480	555	635	
	460	458	456	448	440	429	417	396	373	
[22]	[120]	[620]	[1330]	[2060]	[2790]	[3500]	[4220]	[4910]	[5600]	
83	15	70	150	235	315	395	475	555	635	
	509	506	502	494	484	473	461	438	413	
[25]	[70]	[600]	[1320]	[2050]	[2780]	[3480]	[4210]	[4900]	[5590]	
95	10	70	150	230	315	395	475	555	630	
	582	578	573	563	552	540	526	501	474	
[30]		[560]	[1280]	[1990]	[2700]	[3430]	[3970]	[4640]		
114		65	145	225	305	390	450	525		
		693	687	675	661	647	630	600		

[1990] } Torque [lb-in]
225 } Nm
675 } 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 25 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.



**Δ Pressure bar [PSI]
205 cm³/r [12.5 in³/r]**

	[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
	17	34	69	103	138	172	207	241	276	310
[0.5]	[400]	[810]	[1500]							
2	45 8	90 5	170 1							
[1]	[410]	[830]	[1590]	[2220]	[2860]	[3860]	[4560]	[5390]	[5510]	
4	45 17	95 17	180 16	250 15	325 14	435 12	515 11	610 9	625 3	
[2]	[420]	[850]	[1680]	[2410]	[3140]	[4060]	[4800]	[5420]	[6000]	[6210]
8	45 36	95 35	190 34	270 32	355 29	460 27	540 25	610 22	680 16	700 8
[4]	[430]	[870]	[1770]	[2590]	[3140]	[4260]	[5040]	[5730]	[6340]	[6740]
15	50 73	100 73	200 71	295 70	355 68	480 61	570 57	645 45	715 35	760 23
[6]	[430]	[880]	[1800]	[2620]	[3530]	[4370]	[5170]	[5900]	[6590]	[7100]
23	50 107	100 106	205 105	295 103	400 101	495 98	585 90	665 81	745 74	800 65
[8]	[410]	[870]	[1820]	[2660]	[3560]	[4410]	[5240]	[6020]	[6770]	
30	45 144	100 143	205 142	300 138	400 136	500 132	590 125	680 116	765 109	
[10]	[390]	[860]	[1820]	[2700]	[3580]	[4460]	[5300]	[6110]	[6890]	
38	45 182	95 180	205 179	305 174	405 170	505 166	600 160	690 152	780 143	
[12]	[350]	[850]	[1810]	[2690]	[3570]	[4440]	[5300]	[6120]		
45	40 217	95 216	205 215	305 211	405 202	500 200	600 194	690 185		
[14]	[330]	[840]	[1790]	[2670]	[3560]	[4430]	[5290]	[6120]		
53	35 256	95 254	200 252	300 248	400 243	500 237	600 229	690 219		
[16]	[290]	[820]	[1770]	[2650]	[3540]	[4410]	[5280]	[6120]		
61	35 291	95 290	200 289	300 284	400 280	500 272	595 264	690 253		
[18]	[270]	[810]	[1750]	[2640]	[3520]	[4400]	[5270]	[6120]		
68	30 329	90 327	200 325	300 321	400 316	495 308	595 298	690 287		
[20]	[230]	[800]	[1730]	[2620]	[3510]	[4380]	[5270]	[6120]		
76	25 366	90 364	195 362	295 358	395 353	495 345	595 334	690 321		
[22]	[190]	[780]	[1690]	[2600]	[3500]	[4370]	[5260]			
83	20 402	90 400	190 398	295 394	395 389	495 380	595 368			
[25]	[150]	[750]	[1640]	[2560]	[3480]	[4360]	[5240]			
95	15 459	85 456	185 453	290 448	395 442	495 434	590 421			
[30]		[710]	[1540]	[2510]	[3350]	[4190]	[5030]			
114		80 546	175 542	285 537	380 529	475 520	570 504			

C-4

4000 Series

Performance data

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

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



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

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
17	34	52	69	86	103	121	138	155	172	190	207	224	241	259

C-4

[0.5]	[460]	[980]																
2	50	110																
	5	2																
[1]	[480]	[990]	[1490]	[1990]	[2480]	[2970]	[3400]	[3830]	[4250]	[4680]	[5020]							
4	55	110	170	225	280	335	385	435	480	530	565							
	14	14	14	13	13	12	12	11	11	10	4							
[2]	[500]	[1000]	[1520]	[2040]	[2540]	[3050]	[3420]	[3930]	[4440]	[4900]	[5320]	[5740]	[6160]	[6640]	[7150]			
8	55	115	170	230	285	345	385	445	500	555	600	650	695	750	810			
	30	30	29	29	28	27	26	24	23	22	20	18	16	14	11			
[4]	[510]	[1030]	[1560]	[2080]	[2600]	[3130]	[3630]	[4130]	[4630]	[5120]	[5570]	[6030]	[6480]	[6870]	[7340]			
15	60	115	175	235	295	355	410	465	525	580	630	680	730	775	830			
	61	61	60	60	59	59	58	56	53	49	47	44	42	39	36			
[6]	[510]	[1040]	[1570]	[2100]	[2620]	[3160]	[3660]	[4200]	[4710]	[5220]	[5690]	[6140]	[6620]	[7050]	[7430]			
23	60	120	175	235	295	355	415	475	530	590	645	695	750	795	840			
	91	90	90	89	88	88	86	83	80	75	72	70	67	63	59			
[8]	[500]	[1020]	[1560]	[2110]	[2630]	[3150]	[3680]	[4210]	[4740]	[5250]	[5720]	[6200]	[6670]	[7090]	[7470]			
30	55	115	176	240	295	355	415	475	535	595	645	700	755	800	845			
	121	121	120	119	118	117	115	113	111	106	103	99	96	91	87			
[10]	[470]	[1000]	[1540]	[2100]	[2620]	[3150]	[3690]	[4230]	[4770]	[5290]	[5670]	[6240]	[6710]	[7140]				
38	55	115	175	235	295	355	415	480	540	600	640	705	760	805				
	152	151	150	148	148	147	145	143	141	137	133	129	125	120				
[12]	[450]	[980]	[1530]	[2080]	[2610]	[3140]	[3680]	[4220]	[4760]	[5280]	[5750]	[6230]	[6700]					
45	50	110	175	235	295	355	415	475	540	595	650	705	755					
	183	182	180	179	178	178	176	173	170	166	161	157	152					
[14]	[420]	[960]	[1520]	[2060]	[2600]	[3130]	[3670]	[4200]	[4740]	[5260]	[5740]	[6220]						
53	45	110	170	235	295	355	415	475	535	595	650	705						
	213	212	211	210	209	208	206	203	200	195	190	185						
[16]	[400]	[950]	[1500]	[2040]	[2580]	[3120]	[3660]	[4190]	[4730]	[5250]	[5730]	[6210]						
61	45	105	170	230	290	355	415	475	535	595	645	700						
	244	243	242	241	240	239	236	232	229	225	219	213						
[18]	[380]	[930]	[1480]	[2020]	[2560]	[3110]	[3650]	[4180]	[4710]	[5230]	[5720]	[6200]						
68	45	105	165	230	290	350	410	470	530	590	645	700						
	275	274	273	272	270	269	266	262	259	254	248	241						
[20]	[350]	[910]	[1460]	[2000]	[2550]	[3100]	[3640]	[4170]	[4700]	[5220]	[5710]							
76	40	105	165	225	290	350	410	470	530	590	645							
	305	305	304	303	302	300	296	292	288	283	276							
[22]	[310]	[870]	[1420]	[1970]	[2500]	[3050]	[3590]	[4140]	[4680]	[5200]	[5680]							
83	35	100	160	225	280	345	405	470	530	590	640							
	337	336	335	334	332	330	326	323	319	313	306							
[25]	[260]	[820]	[1380]	[1930]	[2460]	[2980]	[3540]	[4090]	[4640]	[5180]								
95	30	95	155	220	280	335	400	460	525	585								
	383	382	381	380	378	376	372	369	365	357								
[30]		[680]	[1250]	[1860]	[2390]	[2900]	[3430]	[3960]	[4460]	[4950]								
114		75	140	210	270	330	390	445	505	560								
		457	456	455	453	450	445	442	437	427								
[35]			[1110]	[1740]	[2270]	[2790]	[3340]	[3910]	[4400]									
132			125	195	255	315	375	440	495									
			532	531	528	525	519	515	509									

[3440] } Torque [lb-in]
375 } Nm
519 } Speed RPM

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

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

	Continuous		Peak
	Intermittent		No operation

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

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
17	34	52	69	86	103	121	138	155	172	190	207	224	241	259

[0.5]	[533]	[1074]														
2	60	121														
	4	2														
[1]	[553]	[1136]	[1714]	[2287]	[2841]	[3394]	[3868]	[4389]	[4895]	[5380]	[5870]	[6368]	[6811]	[7239]	[7654]	
4	62	128	194	258	321	384	437	496	553	608	663	720	770	818	865	
	12	12	12	11	11	11	10	10	10	8	6	6	6	5	4	
[2]	[568]	[1146]	[1740]	[2328]	[2902]	[3461]	[3955]	[4524]	[4922]	[5630]	[6146]	[6666]	[7191]	[7749]	[8323]	
8	64	130	197	263	328	391	447	511	556	636	694	753	813	876	940	
	26	26	25	25	24	24	23	22	21	20	19	17	17	15	13	
[4]	[579]	[1167]	[1771]	[2374]	[2962]	[3557]	[4139]	[4712]	[5285]	[5848]	[6395]	[6946]	[7502]	[8020]	[8471]	
15	65	132	200	268	335	402	468	532	597	661	722	785	848	906	957	
	53	53	52	52	51	51	50	49	47	45	44	42	41	40	38	
[6]	[583]	[1177]	[1781]	[2395]	[2987]	[3601]	[4193]	[4793]	[5376]	[5959]	[6521]	[7082]	[7607]	[8097]		
23	66	133	201	271	338	407	474	542	607	673	737	800	859	915		
	79	79	78	78	77	77	76	74	72	69	67	66	65	64		
[8]	[573]	[1167]	[1780]	[2404]	[3007]	[3610]	[4218]	[4812]	[5411]	[5994]	[6556]	[7022]	[7518]			
30	65	132	201	272	340	408	477	544	611	677	741	793	849			
	106	106	105	105	104	104	102	101	99	96	94	92	90			
[10]	[547]	[1146]	[1765]	[2395]	[2997]	[3629]	[4238]	[4837]	[5442]	[6035]	[6601]	[7022]	[7518]			
38	62	130	199	271	339	410	479	547	615	682	746	793	849			
	134	133	133	131	131	130	129	127	126	122	119	115	111			
[12]	[527]	[1126]	[1745]	[2369]	[2991]	[3609]	[4228]	[4832]	[5441]	[6034]	[6586]	[6940]				
45	60	127	197	268	338	408	478	546	615	682	744	784				
	161	160	166	158	157	157	156	154	152	148	144	141				
[14]	[497]	[1106]	[1730]	[2344]	[2972]	[3585]	[4213]	[4816]	[5430]	[6028]	[6511]	[6940]				
53	56	125	195	265	336	405	476	544	614	681	736	784				
	187	187	186	186	185	184	182	180	178	174	170	166				
[16]	[472]	[1096]	[1715]	[2324]	[2947]	[3565]	[4203]	[4811]	[5420]	[5919]	[6436]					
61	53	124	194	263	333	403	475	544	612	669	727					
	214	214	213	212	211	210	208	206	203	199	195					
[18]	[437]	[1075]	[1690]	[2299]	[2917]	[3541]	[4188]	[4801]	[5400]	[5919]	[6362]					
68	49	121	191	260	330	400	473	542	610	669	719					
	241	241	240	239	237	236	234	231	229	224	219					
[20]	[402]	[1055]	[1669]	[2274]	[2898]	[3521]	[4178]	[4791]	[5394]	[5851]						
76	45	119	189	257	327	398	472	541	609	661						
	268	268	268	267	266	264	261	258	255	249						
[22]	[366]	[1005]	[1629]	[2257]	[2856]	[3480]	[4136]	[4756]	[5205]							
83	41	114	184	255	323	393	467	537	588							
	296	295	295	294	292	290	288	285	279							
[25]	[301]	[940]	[1588]	[2231]	[2825]	[3419]	[4086]	[4710]	[5205]							
95	34	106	179	252	319	386	462	532	588							
	336	336	335	334	333	331	328	325	314							
[30]		[845]	[1480]	[2151]	[2759]	[3328]	[3984]	[4573]	[5021]							
114		96	167	243	312	376	450	517	567							
		402	401	400	398	396	392	389	377							
[35]			[1348]	[2057]	[2623]	[3183]	[3883]	[4354]								
132			152	232	296	360	439	492								
			468	466	464	463	457	449								

4000 Series

Performance data

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

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



**Δ Pressure bar [PSI]
310 cm³/r [19.0 in³/r]**

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
17	34	52	69	86	103	121	138	155	172	190	207	224	241	259

C-4

[0.5]	[600]	[1150]																		
2	70	130																		
	4	2																		
[1]	[620]	[1270]	[1920]	[2560]	[3170]	[3780]	[4290]	[4900]	[5490]	[6080]	[6670]	[7270]	[7880]	[8490]	[9080]					
4	70	145	215	290	360	425	485	555	620	685	755	820	890	960	1025					
	11	11	11	10	10	10	9	9	9	8	8	7	7	6	5					
[2]	[630]	[1280]	[1940]	[2590]	[3230]	[3830]	[4450]	[5070]	[5680]	[6300]	[6910]	[7530]	[8160]	[8790]	[9420]					
8	70	145	220	295	365	435	505	575	640	710	780	850	920	995	1065					
	23	23	22	22	21	21	20	20	19	18	18	17	17	16	15					
[4]	[640]	[1290]	[1960]	[2640]	[3290]	[3940]	[4600]	[5240]	[5880]	[6510]	[7150]	[7790]	[8450]	[9100]						
15	70	145	220	300	370	445	520	590	665	735	810	880	955	1030						
	47	47	46	46	45	45	44	44	43	42	42	41	41	40						
[6]	[650]	[1300]	[1970]	[2660]	[3320]	[4000]	[4680]	[5330]	[5980]	[6630]	[7280]	[7940]								
23	75	145	225	300	375	450	530	600	675	750	825	895								
	71	71	70	70	69	69	68	67	66	64	64	63								
[8]	[640]	[1300]	[1980]	[2670]	[3350]	[4030]	[4710]	[5360]	[6020]	[6670]	[7320]									
30	70	145	225	300	380	455	530	605	680	755	825									
	96	96	95	95	94	94	93	92	91	89	88									
[10]	[620]	[1280]	[1970]	[2660]	[3340]	[4070]	[4740]	[5390]	[6050]	[6710]	[7370]									
38	70	145	225	300	375	460	535	610	685	760	835									
	121	120	120	119	119	118	117	116	115	112	109									
[12]	[600]	[1260]	[1940]	[2630]	[3340]	[4040]	[4730]	[5390]	[6060]	[6720]										
45	70	140	220	295	375	455	535	610	685	760										
	145	144	144	143	142	142	141	140	139	135										
[14]	[570]	[1240]	[1920]	[2600]	[3310]	[4000]	[4710]	[5380]	[6060]	[6730]										
53	65	140	215	295	375	450	530	610	685	760										
	169	169	168	168	167	167	165	164	163	159										
[16]	[540]	[1230]	[1900]	[2580]	[3280]	[3970]	[4700]	[5380]	[6050]											
61	60	140	215	290	370	450	530	610	685											
	193	193	192	192	190	189	188	187	185											
[18]	[490]	[1210]	[1880]	[2550]	[3240]	[3930]	[4680]	[5370]	[6040]											
68	55	135	210	290	365	445	530	605	680											
	217	217	216	216	214	213	211	209	207											
[20]	[450]	[1190]	[1860]	[2520]	[3210]	[3900]	[4670]	[5360]	[6030]											
76	50	135	210	285	365	440	530	605	680											
	242	242	242	241	240	238	236	234	232											
[22]	[420]	[1130]	[1820]	[2520]	[3180]	[3870]	[4640]	[5320]												
83	45	130	205	285	360	435	525	600												
	267	266	266	265	264	262	260	258												
[25]	[340]	[1050]	[1780]	[2510]	[3160]	[3820]	[4590]	[5280]												
95	40	120	200	285	355	430	520	595												
	303	303	302	301	300	299	296	293												
[30]		[1010]	[1700]	[2420]	[3100]	[3720]	[4500]	[5140]												
114		115	190	275	350	420	510	580												
		363	362	360	359	358	354	351												
[35]			[1580]	[2360]	[2950]	[3540]	[4390]													
132			180	265	335	400	495													
			422	420	419	418	413													

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

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

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



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

	[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]
	17	34	52	69	86	103	121	138	155	172	190	207	224	241
[0.5] 2	[700]	[1340]												
	80	150												
[1] 4	[750]	[1430]	[2110]	[2770]	[3460]	[4170]	[4890]	[5610]	[6310]	[7010]	[7700]			
	85	160	240	315	390	470	550	635	715	790	870			
[2] 8	[800]	[1550]	[2290]	[3030]	[3850]	[4620]	[5310]	[6000]	[6750]	[7010]	[7700]			
	90	175	260	340	435	520	600	680	765	790	870			
[4] 15	[860]	[1630]	[2470]	[3310]	[4120]	[4900]	[5640]	[6390]	[7190]	[7490]	[8240]	[8990]	[9730]	[10470]
	95	185	280	375	465	555	635	720	810	845	930	1015	1100	1185
[6] 23	[860]	[1690]	[2540]	[3410]	[4180]	[4980]	[5780]	[6580]	[7400]	[7890]	[8780]			
	95	190	285	385	470	565	655	745	835	890	990			
[8] 30	[840]	[1680]	[2550]	[3400]	[4260]	[5090]	[5870]	[6650]	[7480]	[8220]				
	95	190	290	385	480	575	665	750	845	930				
[10] 38	[800]	[1680]	[2550]	[3400]	[4260]	[5100]	[5920]	[6730]	[7560]					
	90	190	290	385	480	575	670	760	855					
[12] 45	[760]	[1660]	[2520]	[3380]	[4270]	[5110]	[5900]	[6690]						
	85	190	285	380	480	575	665	755						
[14] 53	[740]	[1640]	[2490]	[3370]	[4260]	[5100]	[5880]	[6650]						
	85	185	280	380	480	575	665	750						
[16] 61	[710]	[1620]	[2460]	[3350]	[4240]	[5080]	[5840]							
	80	185	280	380	480	575	660							
[18] 68	[680]	[1600]	[2430]	[3340]	[4220]	[5060]	[5810]							
	75	180	275	375	475	570	655							
[20] 76	[610]	[1580]	[2400]	[3320]	[4210]	[5040]	[5780]							
	70	180	270	375	475	570	655							
[22] 83	[570]	[1490]	[2340]	[3220]	[4160]	[5010]	[5740]							
	65	170	265	365	470	565	650							
[25] 95	[490]	[1350]	[2250]	[3080]	[4070]	[4960]	[5700]							
	55	155	255	350	460	560	645							
[30] 114		[1080]	[1650]	[2270]	[3020]	[3850]								
		120	185	255	340	435								
[35] 132			[1520]	[2120]	[2870]	[3760]								
			170	240	325	425								
[40] 151				[2050]	[2790]	[3620]								
				230	315	410								

4000 Series

Performance data

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

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



**Δ Pressure bar [PSI]
495 cm³/r [30 in³/r]**

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]
17	34	52	69	86	103	121	138	155	172

C-4

[0.5]	[800]	[1750]	[1750]							
2	90	200	200							
	3	1	1							
[1]	[880]	[1875]	[2875]	[3825]	[4775]	[5720]	[6670]	[7600]		
4	100	210	325	430	540	645	755	860		
	7	6	6	5	4	3	2	1		
[2]	[905]	[1940]	[2975]	[3990]	[5010]	[6010]	[7010]	[8000]	[8980]	
8	100	220	335	450	565	680	790	905	1015	
	18	17	17	16	15	12	11	10	8	
[4]	[935]	[2005]	[3075]	[4160]	[5245]	[6300]	[7355]	[8375]	[9400]	[10350]
15	105	225	345	470	595	710	830	945	1060	1170
	30	29	28	27	26	23	21	19	17	14
[6]	[920]	[2010]	[3100]	[4185]	[5265]	[6345]	[7420]	[8445]	[9465]	
23	105	225	350	475	595	715	840	955	1070	
	45	44	43	42	40	37	35	32	30	
[8]	[905]	[2015]	[3125]	[4205]	[5290]	[6385]	[7485]	[8510]		
30	100	230	355	475	600	720	845	960		
	61	60	59	57	55	52	49	46		
[10]	[880]	[1995]	[3095]	[4205]	[5295]	[6390]	[7480]	[8525]		
38	100	225	350	475	600	720	845	960		
	76	75	74	72	70	66	63	59		
[12]	[860]	[1975]	[3095]	[4200]	[5305]	[6390]	[7475]			
45	95	225	350	475	600	720	845			
	91	90	89	87	85	81	77			
[14]	[830]	[1945]	[3055]	[4165]	[5275]	[6360]	[7445]			
53	95	220	345	470	595	720	840			
	106	105	104	102	100	96	92			
[16]	[805]	[1910]	[3020]	[4130]	[5245]	[6330]	[7420]			
61	90	215	340	465	595	715	840			
	122	120	119	117	115	111	107			
[18]	[740]	[1860]	[2980]	[4105]	[5235]	[6305]	[7380]			
68	85	210	335	465	590	715	835			
	137	136	134	132	130	125	121			
[20]	[680]	[1810]	[2940]	[4085]	[5225]	[6285]				
76	75	205	330	460	590	710				
	153	152	150	147	145	140				
[25]	[570]	[1665]	[2800]	[4005]	[5210]	[6135]				
95	65	190	315	455	590	695				
	191	189	187	184	182	177				
[30]		[1520]	[2645]	[3765]	[4885]	[5985]				
114		170	300	425	550	675				
		228	226	223	220	215				
[35]			[2400]	[3510]						
132			270	395						
			265	263						
[40]			[2155]	[3260]						
151			245	370						
			305	303						

[2155] } Torque [lb-in]
245 } Nm
305 } 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 25 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.



Δ Pressure bar [PSI]
625 cm³/r [38 in³/r]

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1600]	[1700]	[1800]	[2000]
17	34	52	69	86	103	110	117	124	138

Flow LPM [GPM]	[0.5]	[1000]									
	2	115									
	[1]	[1080]	[2340]	[3600]	[4850]	[6100]	[7350]	[7820]	[8290]	[8760]	
	4	120	265	405	550	690	830	885	935	990	
	[2]	[1085]	[2380]	[3675]	[5010]	[6350]	[7625]	[8115]	[8605]	[9095]	[10075]
	8	125	270	415	565	715	860	915	970	1030	1140
	[4]	[1090]	[2420]	[3750]	[5175]	[6600]	[7900]	[8410]	[9000]	[9590]	[10450]
	15	125	275	425	585	745	895	950	1015	1085	1180
	[6]	[1095]	[2460]	[3825]	[5220]	[6620]	[7950]	[8430]	[8910]	[9490]	
	23	125	280	430	590	750	900	950	1005	1070	
	[8]	[1100]	[2500]	[3900]	[5270]	[6640]	[7990]	[8460]	[8925]		
	30	125	280	440	595	750	905	955	1010		
	[10]	[1130]	[2550]	[3975]	[5320]	[6670]	[8045]	[8595]	[9150]		
	38	130	290	450	600	755	910	970	1035		
	[12]	[1160]	[2600]	[4050]	[5375]	[6700]	[8100]	[8660]			
	45	130	295	460	605	755	915	980			
	[14]	[1105]	[2535]	[3965]	[5325]	[6685]	[8065]	[8620]			
	53	125	285	450	600	755	910	975			
	[16]	[1050]	[2465]	[3880]	[5275]	[6670]	[8035]	[8580]			
	61	120	280	440	595	755	910	970			
[18]	[990]	[2405]	[3825]	[5240]	[6655]	[7345]					
68	110	270	430	590	750	830					
[20]	[930]	[2350]	[3770]	[5205]	[6640]						
76	105	265	425	590	750						
[25]	[750]	[2175]	[3600]	[5000]	[6400]						
95	85	245	405	565	725						
[30]	[550]	[1975]	[3400]	[4800]	[6200]						
114	60	225	385	542	700						
[35]			[3125]	[4545]							
132			355	515							
[40]			[2850]	[4295]							
151			320	485							
			241	239							

4000 Series

Dimensions

Standard mount

Ports

- 1 1/16 -12 UN-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 4 Bolt 3/4 inch split flange ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 3/4 (BSP) Staggered ports (2)
- G 1/4 (BSP) Case drain port (1)

Standard rotation viewed from shaft end

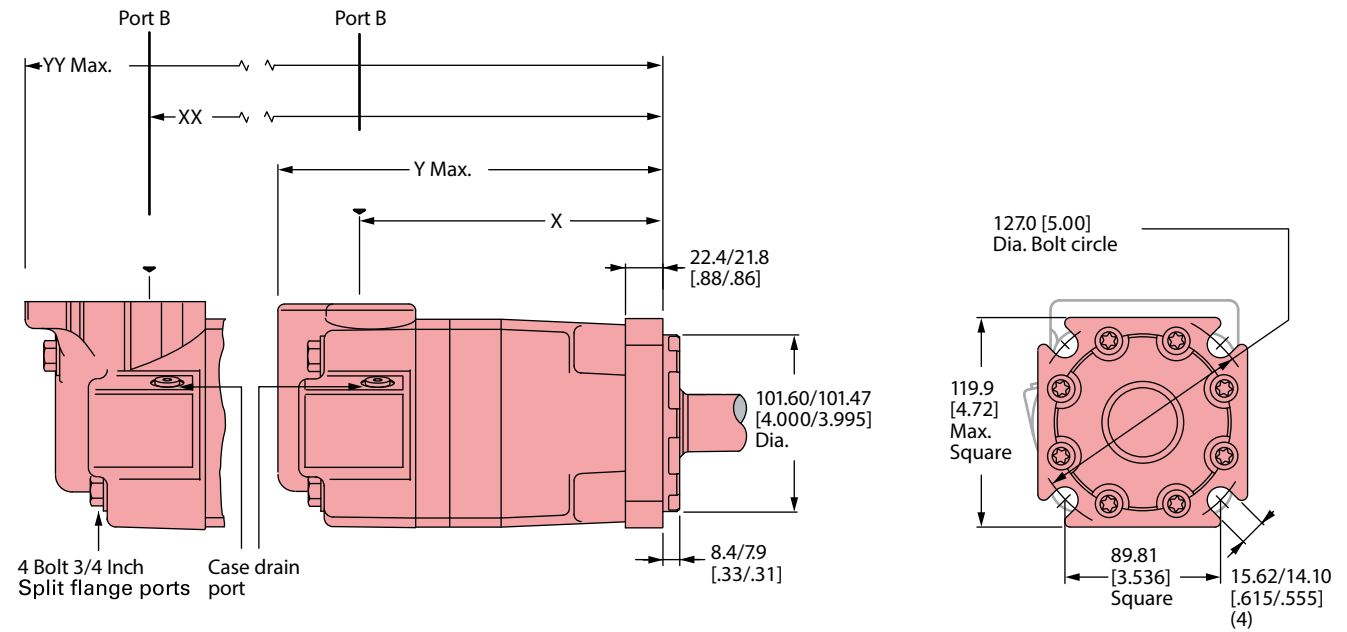
- Port A pressurized — CW
- Port B pressurized — CCW

Standard mount motor dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	158.3 [6.23]	214.4 [8.44]	167.3 [6.59]	246.3 [9.70]
130 [7.9]	162.3 [6.39]	218.4 [8.60]	171.5 [6.75]	250.4 [9.86]
160 [9.9]	168.7 [6.64]	224.7 [8.85]	177.7 [7.00]	256.7 [10.11]
205 [12.5]	177.2 [6.98]	233.2 [9.18]	186.2 [7.33]	265.2 [10.44]
245 [15.0]	168.7 [6.64]	224.7 [8.85]	177.7 [7.00]	256.7 [10.11]
310 [19.0]	177.2 [6.98]	233.2 [9.18]	186.2 [7.33]	265.2 [10.44]
395 [24.0]	187.9 [7.40]	243.9 [9.60]	196.9 [7.75]	275.9 [10.86]
495 [30.0]	200.7 [7.90]	256.8 [10.11]	209.7 [8.26]	288.8 [11.37]
625 [38.0]	217.8 [8.58]	273.9 [10.78]	226.7 [8.93]	305.9 [12.04]

Standard mount

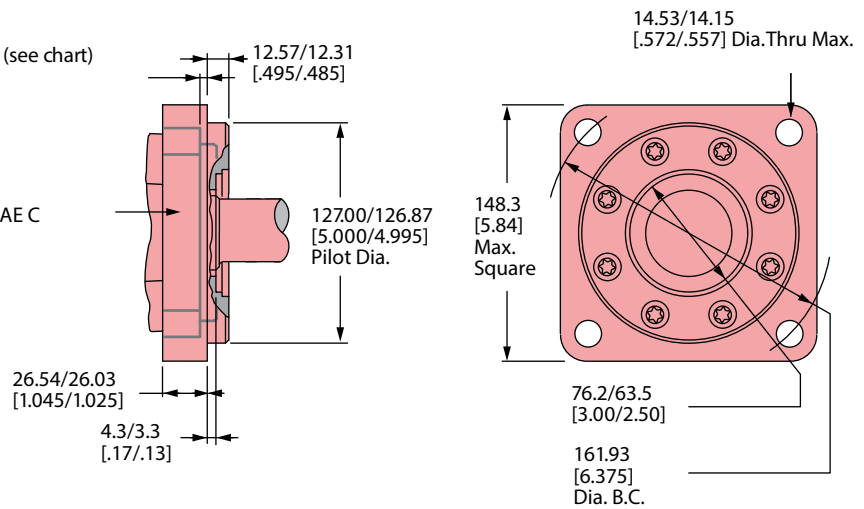
C-4



SAE C Flange

Add 4.3 [.17] to X and Y dim. (see chart)

Flange comparison SAE B/ SAE C



Wheel mount

Ports

- 1 1/16 -12 UN-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 4 Bolt 3/4 inch split flange ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 3/4 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)

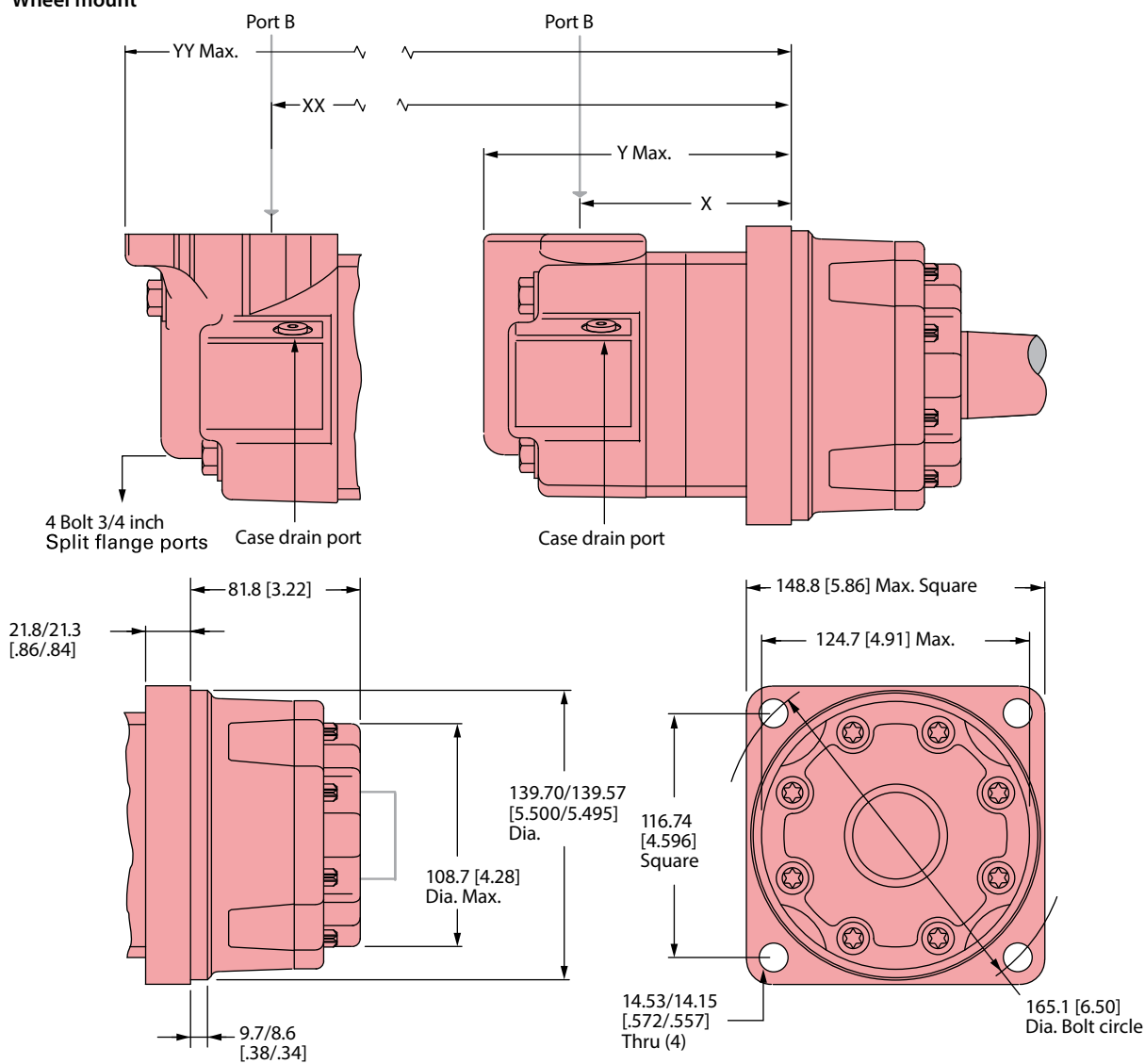
Standard rotation viewed from shaft end

- Port A pressurized — CW
- Port B pressurized — CCW

Wheel mount motor dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	87.5 [3.45]	143.3 [5.64]	96.4 [3.80]	175.3 [6.90]
130 [7.9]	91.6 [3.61]	147.3 [5.80]	100.5 [3.96]	179.3 [7.06]
160 [9.9]	97.8 [3.85]	153.7 [6.05]	106.8 [4.21]	185.7 [7.31]
205 [12.5]	106.4 [4.19]	162.3 [6.39]	115.6 [4.55]	194.3 [7.65]
245 [15.0]	97.8 [3.85]	153.7 [6.05]	106.8 [4.21]	185.7 [7.31]
310 [19.0]	106.4 [4.19]	162.3 [6.39]	115.6 [4.55]	194.3 [7.65]
395 [24.0]	117.1 [4.61]	172.8 [6.81]	126.1 [4.97]	205.0 [8.07]
495 [30.0]	129.9 [5.12]	185.7 [7.31]	138.8 [5.47]	217.7 [8.57]
625 [38.0]	147.1 [5.79]	202.9 [7.99]	156.0 [6.14]	235.0 [9.25]

Wheel mount



C-4

4000 Series

Dimensions

Bearingless

Ports

- 1 1/16 -12 UN-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 4 Bolt 3/4 inch split flange ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 3/4 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)

Standard rotation viewed from drive end

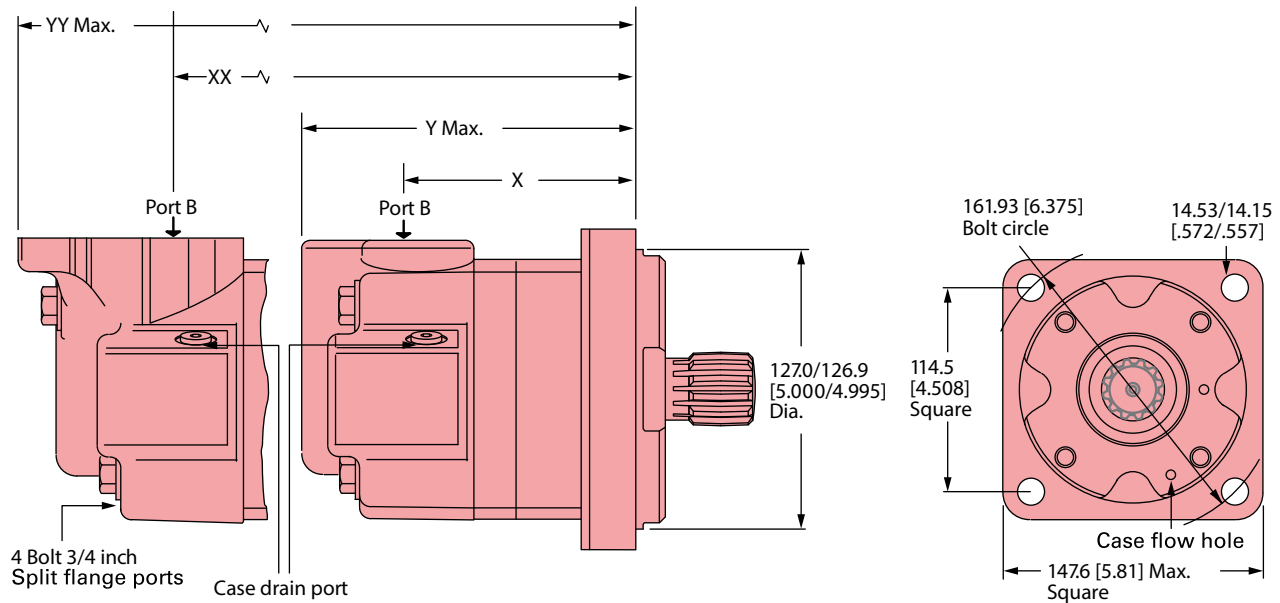
- Port A pressurized — CW
- Port B pressurized — CCW

Wheel mount motor dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]	XX mm [inch]	YY mm [inch]
110 [6.7]	91.0 [3.58]	146.8 [5.78]	100.1 [3.94]	178.8 [7.04]
130 [7.9]	95.0 [3.74]	150.8 [5.94]	104.1 [4.10]	182.9 [7.20]
160 [9.9]	101.6 [4.00]	157.1 [6.19]	110.5 [4.35]	189.2 [7.45]
205 [12.5]	109.9 [4.33]	165.7 [6.52]	118.9 [4.68]	197.6 [7.78]
245 [15.0]	101.6 [4.00]	157.1 [6.19]	110.5 [4.35]	189.2 [7.45]
310 [19.0]	109.9 [4.33]	165.7 [6.52]	118.9 [4.68]	197.6 [7.78]
395 [24.0]	120.6 [4.75]	176.3 [6.94]	129.5 [5.10]	208.3 [8.20]
495 [30.0]	133.5 [5.26]	189.2 [7.45]	142.5 [5.61]	221.2 [8.71]
625 [38.0]	150.5 [5.93]	206.3 [8.12]	159.5 [6.28]	238.3 [9.38]

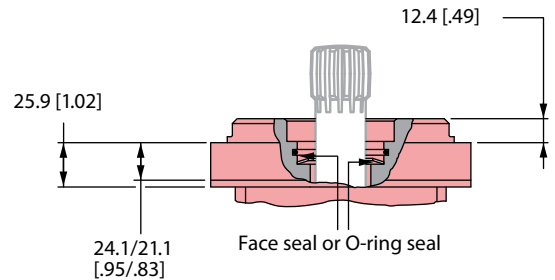
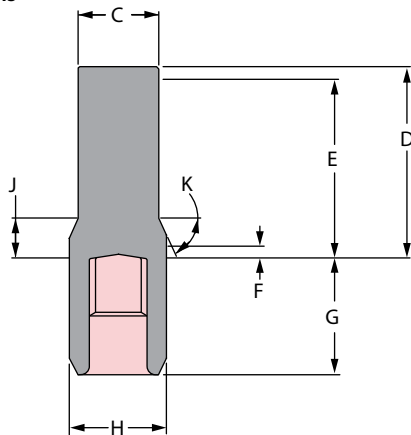
Bearingless

C-4



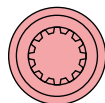
Shaft blank dimensions

- C 472 [1.86] Dia.
- D 112.5 [4.43] Max.
- E 107.4 [4.23]
Full form dia.
- F 74 [.29] Min.
Full form dia.
- G 68.8 [2.71] Max.
- H 56.9 [2.24] Dia.
- J 18.29 [.720]
- K 38°



For 4000 Series bearingless motor application information contact your Danfoss representative (mating coupling blanks available from Danfoss).

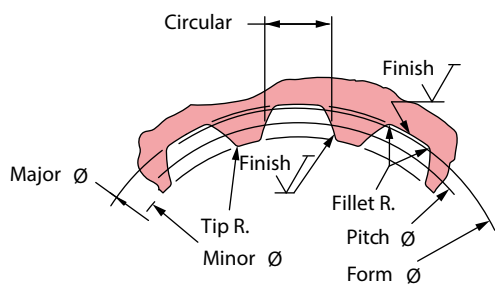
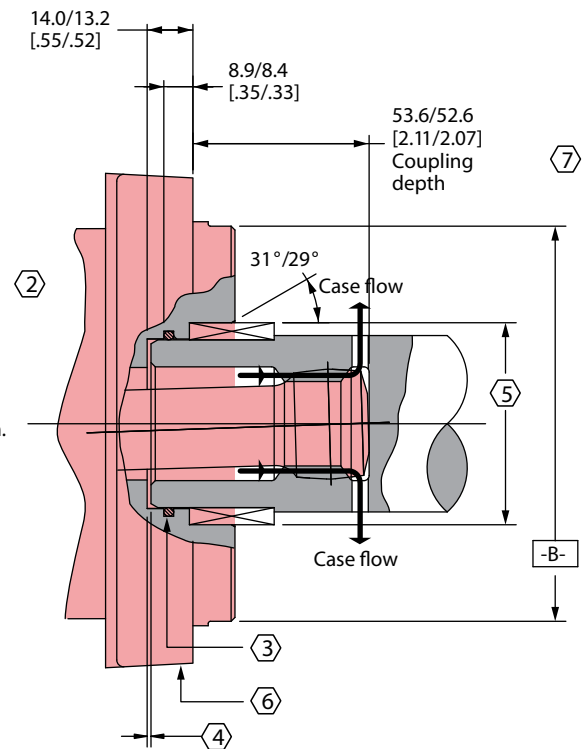
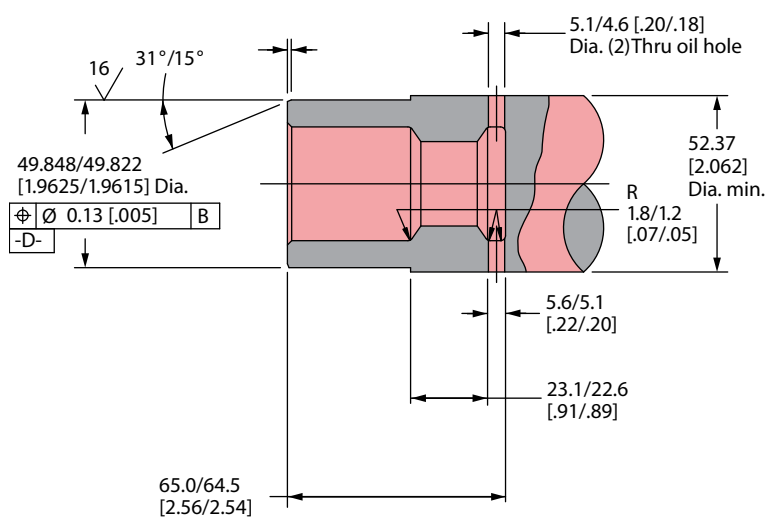
Mating coupling blank
Danfoss Part no. 12745-003



Bearingless

1. Internal spline in mating part to be as follows: Material to be ASTM A304, 8620H. Carbonize to a hardness of 60-64 HRC with case depth (to 50HRC) of 0.076 - 1.27 [.030 - .050] (dimensions apply after heat treat).
2. Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
3. Seal to be furnished with motor for proper oil circulation thru splines.
4. Some means of maintaining clearance between shaft and mounting flange must be provided.
5. Counterbore designed to adapt to a standard sleeve bearing 50.010 - 50.040 [1.9689 - 1.9700] ID by 60.050 - 60.080 [2.3642 - 2.3653] (Oilite bronze sleeve bearing).

6. Similar to SAE "C" Four Bolt Flange.
7. 52.8 [2.08] Max. dimension to be maintained when assembling shipping and installing unit to insure valve drive engagement with valve (this is required on displacement code number 24 only).



Spline pitch	10/20
Pressure angle	30°
Number of teeth	12
Class of fit	Ref. 5
Type of fit	Side
Pitch diameter	Ref. 30.480000 [1.2000000]
Base diameter	Ref. 26.396455 [1.039230] $\pm 0.21 [0.008] D$
Major diameter	33.43 [1.316] Max. 33.23 [1.308] Min.
Minor diameter	28.40 - 25.58 [1.118 - 1.125]
Form diameter, Min	32.59 [1.283]
Fillet radius	0.63 - 0.76 [0.25 - .030]
Tip radius	0.26 - 0.51 [0.10 - .020]

Finish	1.6 (63)
Involute profile variation	+0.000 -0.025 [+0.0000 -0.010]
Total index variation	0.038 [0.015]
Lead variation	0.013 [0.0005]
Circular space width:	
Maximum actual	5.045 [1.986]
Minimum effective	4.995 [1.951]
Maximum effective	Ref. 5.009 [1.972]
Minimum actual	Ref. 4.986 [1.963]
Dimension between two pins	Ref. 22.783 - 22.929 [8970 - .9027]
Pin diameter	5.334 [2.100] Pins to Have 3.73 [1.47]
	Wide flat for root clearance

C-4

4000 Series

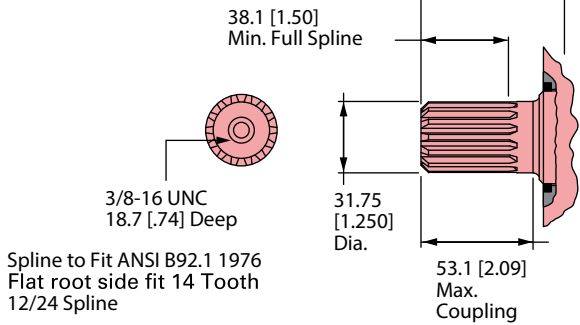
Dimensions

Shafts

Code: 03 1 1/4 -14 Tooth splined

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

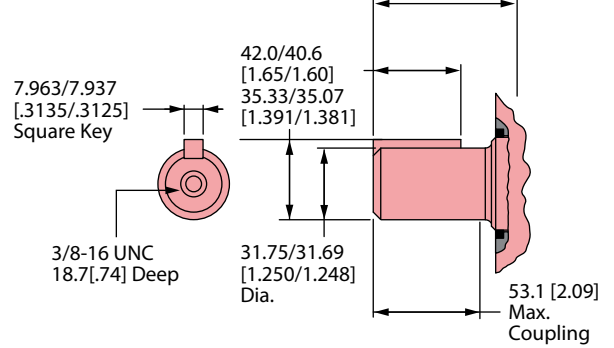
70.9/68.5 [2.79/2.70] End of Shaft
to Mounting surface (Std)



Code: 01 1 1/4 Inch straight

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

70.9/68.6 [2.79/2.70] End of Shaft
to Mounting Surface (Std)

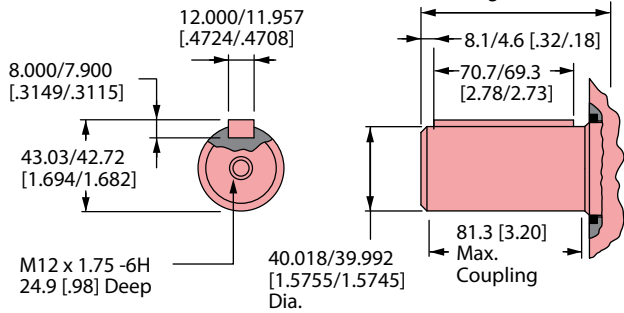


C-4

Code: 11 40 mm Straight

972 [8600] Max.
Torque Nm [lb-in]

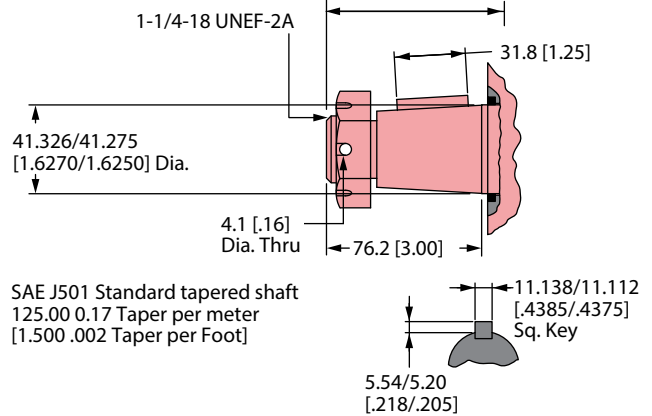
93.88/92.00 [3.696/3.622]
End of Shaft to
Mounting surface (Std)



Code: 02 1 5/8 Tapered

972 [8600] Max.
Torque Nm [lb-in]

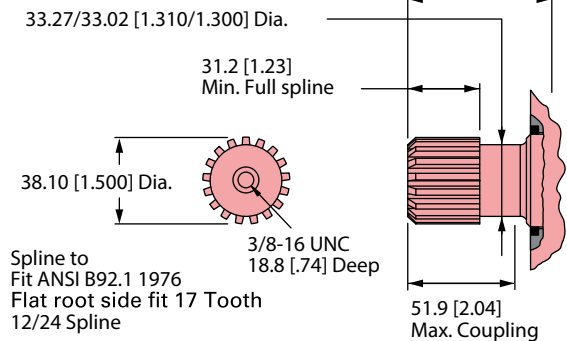
164.8/162.0 [6.49/6.38] End of Shaft
to Mounting surface (Whl)



Code: 10 1 1/2 Inch 17-Tooth splined

972 [8600] Max.
Torque Nm [lb-in]

62.7/60.7 [2.47/2.39] End of Shaft
to Mounting surface (Std)



Tapered shaft hub data

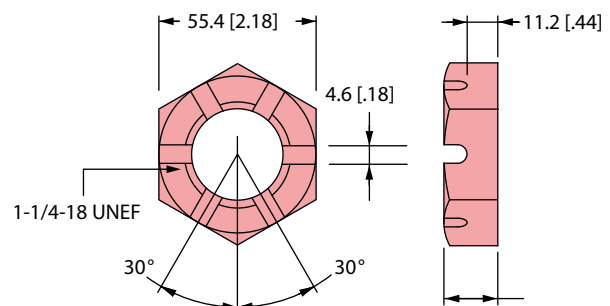
59.1/56.8 [2.325/2.235]

Recommended torque :
(645 Nm [475 lb-ft] Dry)
(510 Nm [375 lb-ft] Lub)

Hub

Plus Torque required to
align the slotted nut with
the Shaft crosshole.

Slotted hexagon nut

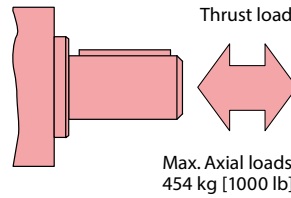


These curves indicate the radial load capacity on the motor shaft(s) at various locations with an allowable external thrust load of 454 kg [1000 lb].

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

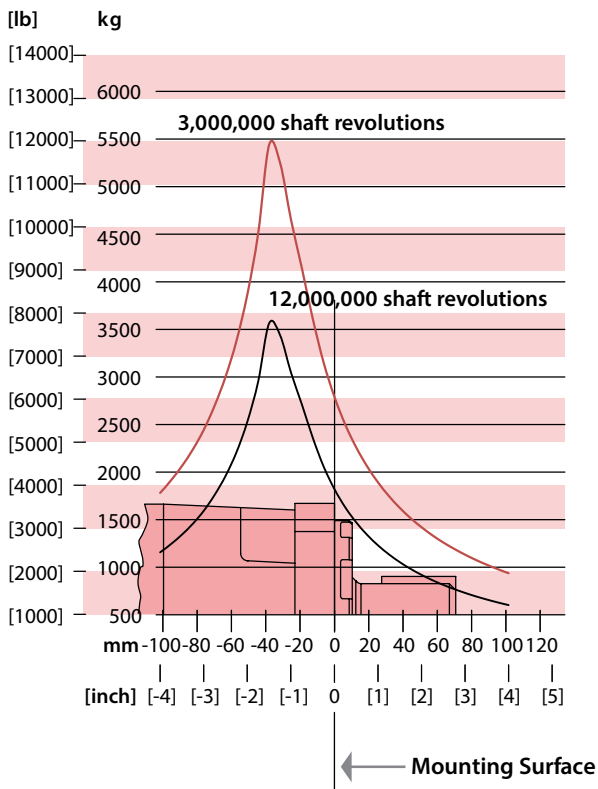
Each curve is based on B10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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

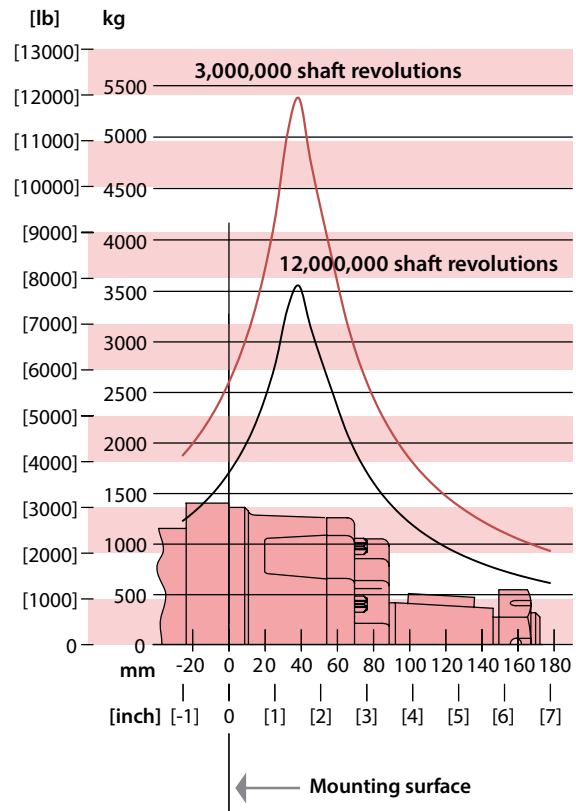


RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

Standard Motor Straight and Splined Shafts



Wheel motor tapered shaft



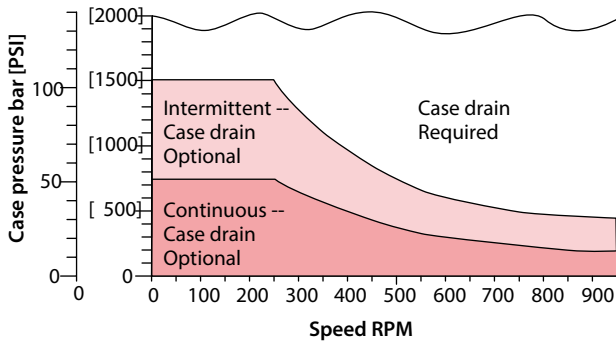
4000 Series

Case pressure and case port

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

Standard shaft seal

Case pressure seal limitation



Case porting advantage

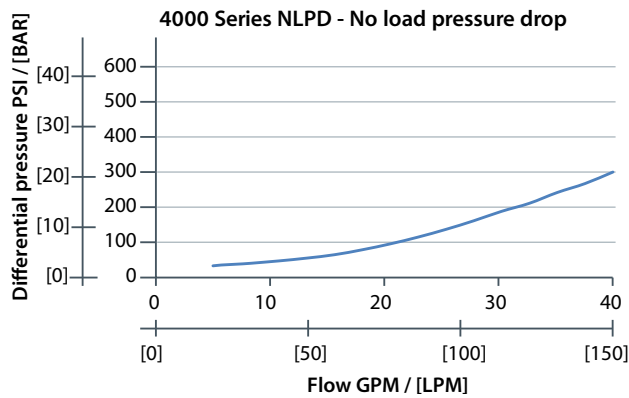
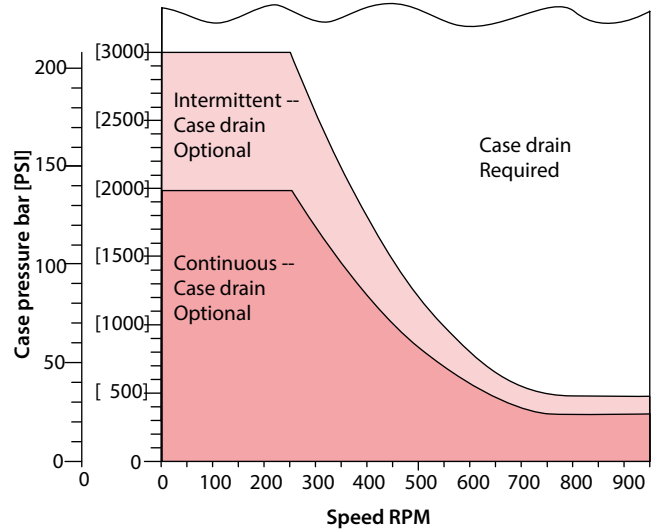
Contamination control — flushing the motor case.

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.

High pressure shaft seal

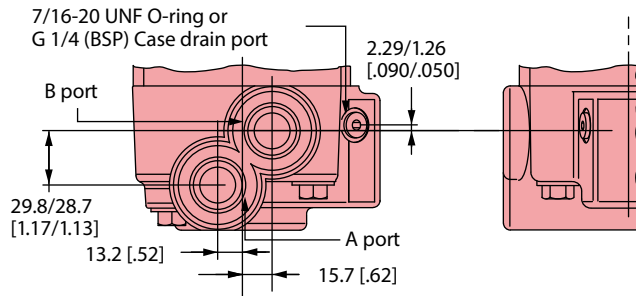
Case pressure seal limitation



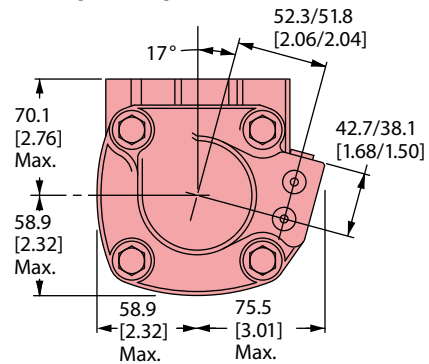
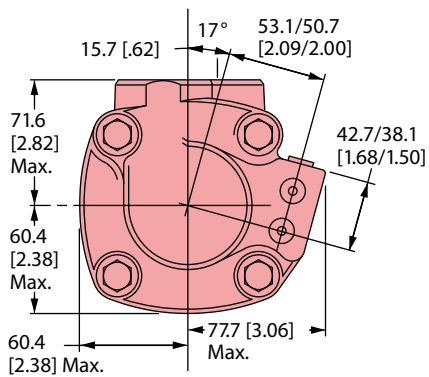
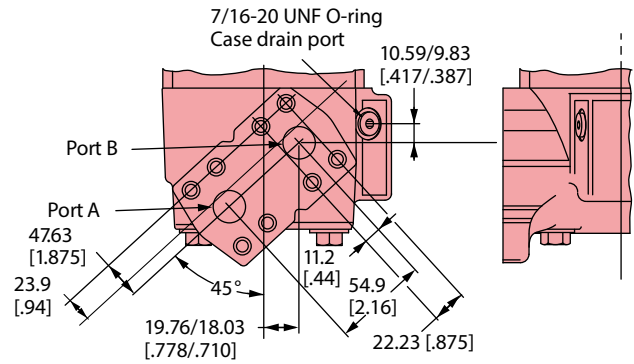
C-4

Ports

Code: AB 1-1/16-12 O-ring ports
Code: AC G 3/4 (BSP) ports

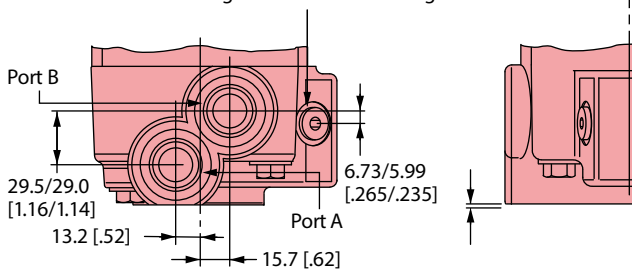


Code: AD Four Bolt 3/4 inch split flange SAE J518c (code 61)

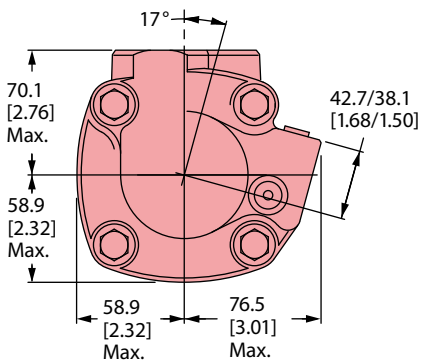


Code: AA 7/8-14 O-ring ports
Code: AE M22 x 1.5-6H ports

9/16-18 UNF O-ring or M12 x 1.5-6H O-ring Case Drain Port



6.9 [.27] Material Removed from this Housing for 7/8-14 O-ring Ports and M22 x 1.5-6H Ports



4000 Series

Product numbers

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

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

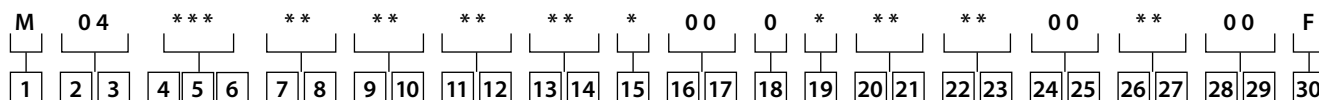
Orders will not be accepted without three digit prefix.

Mounting	Shaft	Port size	Port size displ. 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	-1103	-1094	-1105	-1106	-1212	-1215
		3/4 inch Split flange	109-1001	-1054	-1002	-1003	-1055	—	-1056	-1057	—	—
	1 5/8 Inch Tapered	1 1/16 O-ring	109-1107	-1108	-1109	-1110	-1111	—	-1112	-1113	-1479	-1455
		3/4 inch Split flange	109-1006	—	—	-1008	-1059	—	-1402	-1061	—	—
	1 1/4 Inch 14 T Splined	1 1/16 O-ring	109-1114	-1115	-1116	-1117	-1118	—	-1119	-1120	—	—
		3/4 inch Split flange	109-1011	-1062	-1012	-1013	-1063	—	-1064	-1065	—	—
Standard SAE C-Mount	40 mm Straight	G 3/4 (BSP)	109-1184	-1185	-1227	-1224	-1225	—	-1189	-1190	—	—
	1 1/4 Inch 17 T Splined	G 3/4 (BSP)	109-1191	-1192	-1193	-1194	-1195	—	-1196	—	—	—
Wheel motor	1 1/4 Inch straight	1 1/16 O-ring	110-1074	-1075	-1076	-1077	-1078	—	-1079	-1080	—	-1122
		3/4 inch Split flange	—	—	-1002	—	—	—	—	—	—	—
	40 mm Straight	G 3/4 (BSP)	—	-1109	-1110	-1111	-1112	—	-1113	-1125	—	—
	1 5/8 Inch Tapered	1 1/16 O-ring	110-1081	-1082	-1083	-1084	-1085	—	-1086	-1087	1116	-1117
		3/4 inch Split flange	110-1006	-1044	-1007	—	—	—	—	-1047	—	—
	1 1/4 Inch 14 T Splined	1 1/16 O-ring	110-1088	-1089	-1090	-1091	-1092	—	-1093	-1094	—	—
3/4 inch Split flange		—	—	—	—	—	—	—	—	—	—	
Bearingless		1 1/16 O-ring	111-1033	-1034	-1035	-1036	-1037	—	-1038	-1039	-1062	-1063
		3/4 inch Split flange	111-1044	-1015	-1045	-1046	-1016	—	-1017	-1018	—	—
		G 3/4 (BSP)	111-1052	-1053	-1054	-1055	-1056	—	-1057	-1058	—	—

↑
111-1057

C-4

The following 30-digit coding system has been developed to identify all of the configuration options for the 4000 Series motor. Use this model code to specify a motor with the desired features. All 30 digits of the code must be present when ordering.



1 Product
M Motor

2 3 Series
04 4000 Series

4 5 6 Displacement cm³/r [in³/r]
 067 109.8 cm³/r [6.70 in³/r]
 080 130.3 cm³/r [7.95 in³/r]
 099 162.2 cm³/r [9.90 in³/r]
 125 205.5 cm³/r [12.54 in³/r]
 150 246.3 cm³/r [15.03 in³/r]
 171 280.1 cm³/r [17.09 in³/r]
 190 311.8 cm³/r [19.03 in³/r]
 225 369.0 cm³/r [22.52 in³/r]
 240 393.9 cm³/r [24.04 in³/r]
 301 492.6 cm³/r [30.06 in³/r]
 342 560.2 cm³/r [34.18 in³/r]
 381 623.9 cm³/r [38.07 in³/r]

7 8 Mounting type
 AA Bearingless, 4 Bolt: 12700 [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 12700 [5.000] Dia. Bolt Circle. (SAE B)
 AC Wheel, 4 Bolt: 139.70 [5.500] Pilot Dia. 14.27 [.562] Dia. Holes on 165.10 [6.500] Dia. Bolt circle.
 AD Wheel, 4 Bolt: 12700 [5.000] Pilot Dia. .500-13 UNC-2B Threaded Holes on 147.62 [5.812] Dia. Bolt circle.
 AF Standard, 4 Bolt: 12700 [5.000] Pilot Dia. 14.27 [.562] Dia. Holes on 161.92 [6.375] Dia. Bolt circle. (SAE C)
 AH Standard: ISO Flange 125 B4hw (ISO 3019/2) 124.97 [4.920] Pilot Dia. 14.27 [.562] Dia. Holes on 160.00 [6.299] Dia. Bolt circle

9 10 Output shaft
 00 None (Bearingless)
 01 31.75 [1.250] Dia. Straight With .375-16UNC- 2B Thread, 53.1 [2.09] Max Coupling Length, 7938 [.3125] Sq x 41.27 [1.625] Straight Key
 02 41.28 [1.625] Dia. Tapered with 11.112 [.4375] Sq x 31.75 [1.250] Straight Key, 1.250-18UNEF-2A Thread with Slotted Hex Nut
 03 31.75 [1.250] Dia. Flat root side fit, 14 tooth, 12/24 DP 30° involute spline, 38.1 [1.50] minimum full spline length with .375-16UNC-2B thread
 10 38.10 [1.500] Dia. Flat root side fit, 17 tooth, 12/24 DP 30°. Involute spline, 31.2 [1.23] minimum full spline length, with .375-16 UNC-2B thread in end
 11 40.00 [1.575] Dia. Straight with M12 x 1.75-6H Thread, 7.955 [.3132] x 11.979 [.4716] Wide X 69.98 [2.755] straight key

11 12 Ports
 AA .875-14 UNF-2B SAE O-Ring ports - staggered ports
 AB 1.0625-12 UN-2B SAE O-Ring ports - staggered ports
 AC G 3/4 Ports - Staggered ports
 AD 19.05 [.750] 4 bolt split flange staggered ports standard pressure series (Code 61)

13 14 Case flow options
 00 None
 01 .5625-18 UNF-2B SAE O-Ring port with shuttle
 02 .4375-20 UNF-2B SAE O-Ring port with check valve
 03 G 1/4 BSP Straight thread with check valve
 06 .4375-20 UNF-2B SAE O-ring port with reverse flow shuttle

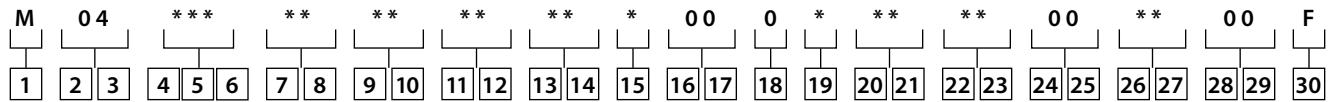
15 Low pressure relief
 0 None
 A Set at 4.5 Bar [65 lbf/in²]
 B Set at 15.2 Bar [220 lbf/in²]

16 17 Pressure/Flow option
 00 None

18 Geroler option
 0 Standard

4000 Series

Model code



19	Seal option
0	Standard
1	Viton
3	Viton Shaft Seal
7	Extreme Duty Seal guard
B	High pressure Shaft Seal

20 21	Accessories
00	None
AC	M12 threaded connector, long body digital speed and direction pickup (two 36 pulse signals in quadrature per revolution pin 1=power supply, pin 2=output signal 1, pin 3=common, pin 4=output signal 2)
AD	M12 Threaded connector, digital speed and direction pickup (one 72 pulse per rev speed signal and one directional signal (pin 1=power, pin 2=direction, pin 3=common, pin 4=speed))

22 23	Special features (hardware)
00	None
17	Low noise valve plate

24 25	Special features (assembly)
00	None

26 27	Paint/packaging
00	No paint, individual box
AA	Low gloss black primer, individual box
AB	Epoxy coated (frost gray), individual box

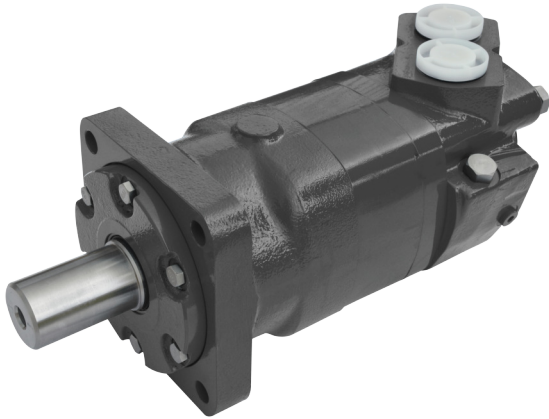
28 29	Customer Identification
00	None

30	Design code
F	Sixth

C-4

Description:

With torque up to 1685 Nm [15,000 in-lbs] and 150 lpm [40 gpm] continuous, this motor is packed with power operates very smoothly.



Features:

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

Benefits:

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

Applications:

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

Specifications

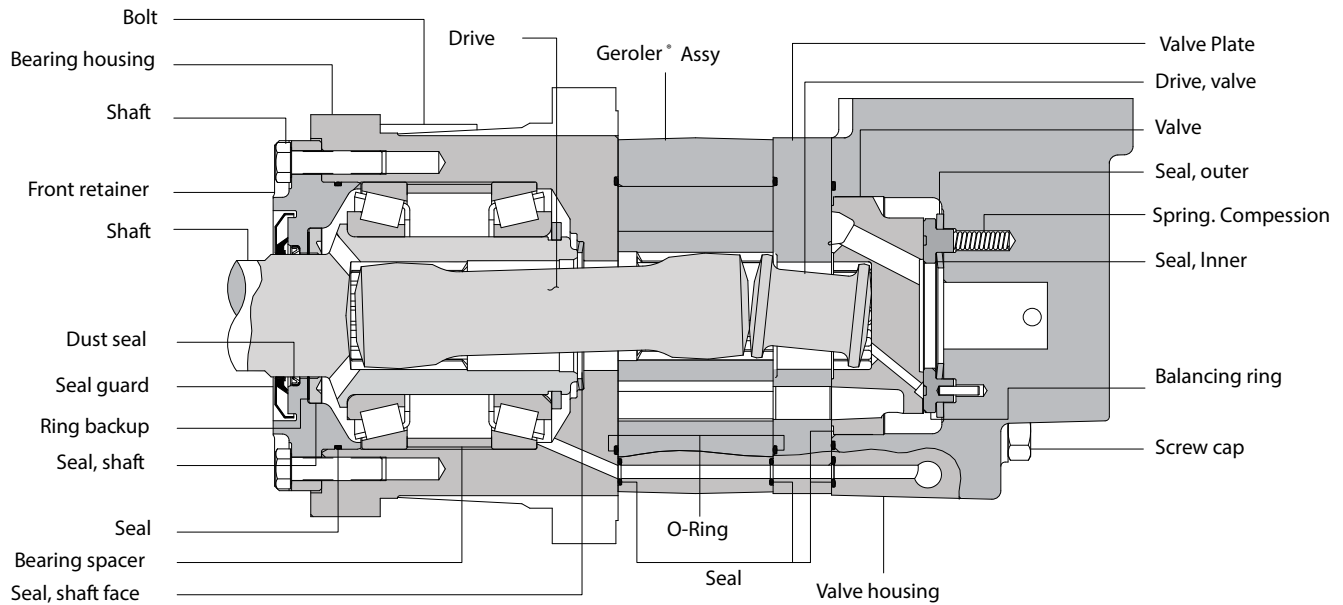
Geroler element	9 Displacements
Flow l/min [GPM]	150 [40] Continuous**
	225 [60] Intermittent*
Speed RPM	775 Cont.**
	866 Inter.*
Pressure bar [PSI]	200 [3000] Cont.**
	300 [4500] Inter.*
Torque Nm [lb-in]	1685 [14920] Cont.**
	1875 [16580] Inter.*

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

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

6000 Series

Specifications



C-5

6000 series motors

Displ. cm ³ /r [in ³ /rev]	195 [11.9]	245 [15.0]	310 [19.0]	390 [23.9]	490 [30.0]	625 [38.0]	735 [45.0]	805 [49.0]	985 [60.0]	
Max speed (RPM) @ Flow	Continuous	775	615	485	387	307	241	203	187	153
	Intermittent	866	834	698	570	454	353	303	280	230
Flow l/min [GPM]	Continuous	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]
	Intermittent	170 [45]	210 [55]	225 [60]	225 [60]	225 [60]	225 [60]	225 [60]	225 [60]	225 [60]
Torque* Nm [lb - in]	Continuous	575 [5100]	735 [6510]	930 [8230]	1155 [10230]	1445 [12800]	1480 [13100]	1378 [12192]	1582 [14004]	1685 [14920]
	Intermittent	860 [7620]	1100 [9740]	1355 [11990]	1635 [14490]	1885 [16670]	1898 [16800]	1699 [15040]	1850 [16377]	1875 [16580]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	170 [2500]	140 [2000]	140 [2000]	140 [2000]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	275 [4000]	221 [3200]	170 [2500]	170 [2500]	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	240 [3500]	205 [3000]	170 [2500]	170 [2500]
Weight kg [lb]	Standard or Wheel mount	24.9 [55.0]	25.2 [55.5]	25.6 [56.5]	26.3 [58.0]	27.0 [59.5]	27.9 [61.5]	28.6 [63.0]	29 [64.0]	30.4 [67.0]
	Bearingless	20.2 [44.5]	20.4 [45.0]	20.9 [46.0]	21.5 [47.5]	22.2 [49.0]	23.1 [51.0]	23.8 [52.5]	24.3 [53.5]	25.6 [56.5]

Maximum case pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

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

Maximum inlet pressure:

310 bars (4500 PSI)

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

Maximum return pressure:

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

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

Δ bar [Δ PSI]:

The true pressure difference between inlet port and outlet port

Continuous rating:

Motor may be run continuously at these ratings

Intermittent operation:

10% of every minute

Peak operation:

1% of every minute

Recommended fluids:

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

Recommended system operating temp.:

-34°C to 82°C
[-30°F to 180°F]

Recommended filtration:

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

Thermal shock warning:

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

Minimum delta pressure warning:

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

6000 Series

Performance data

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

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

Continuous
Intermittent

Peak
No operation

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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
17	34	69	103	138	172	207	241	276	310

[0.5]	[280]	[650]	[1450]	[2290]						
2	30	75	165	260						
	9	7	5	2						
[2]	[290]	[680]	[1500]	[2340]	[3100]	[3880]	[4140]			
8	35	75	170	265	350	440	470			
	38	37	35	34	30	26	18			
[4]	[300]	[710]	[1500]	[2390]	[3200]	[4030]	[4600]	[5200]	[5790]	
15	35	80	170	270	360	455	520	590	655	
	77	76	74	72	66	62	46	32	18	
[8]	[310]	[740]	[1590]	[2450]	[3280]	[4120]	[4810]	[5530]	[6250]	[6900]
30	35	85	180	275	370	465	545	625	705	780
	154	153	148	144	131	119	116	99	83	65
[14]	[320]	[750]	[1610]	[2480]	[3330]	[4190]	[4990]	[5810]	[6630]	[7320]
53	35	85	180	280	375	475	565	655	750	825
	232	230	225	221	212	203	186	167	148	118
[16]	[300]	[730]	[1600]	[2470]	[3340]	[4210]	[5090]	[5900]	[6710]	[7470]
61	35	80	180	280	375	475	575	665	760	845
	309	307	303	300	291	283	258	236	214	181
[20]	[270]	[720]	[1590]	[2460]	[3350]	[4240]	[5100]	[5950]	[6800]	[7620]
76	30	80	180	280	380	480	575	670	770	860
	387	384	379	374	365	356	332	306	280	247
[24]	[240]	[700]	[1570]	[2440]	[3330]	[4220]	[5080]	[5940]	[6810]	
91	25	80	175	275	375	475	575	670	770	
	465	462	456	450	440	429	413	388	363	
[28]	[190]	[660]	[1530]	[2400]	[3300]	[4200]	[5060]	[5940]	[6810]	
106	20	75	175	270	375	475	570	670	770	
	542	539	532	526	514	502	476	448	421	
[32]	[160]	[630]	[1500]	[2370]	[3270]	[4160]	[5040]	[5920]	[6790]	
121	20	70	170	270	370	470	570	670	765	
	620	617	609	602	589	576	542	511	480	
[36]	[120]	[620]	[1480]	[2350]	[3240]	[4130]	[5000]	[5880]	[6760]	
136	15	70	165	265	365	465	565	665	765	
	697	692	683	674	659	645	601	564	527	
[40]	[80]	[610]	[1450]	[2320]	[3210]	[4100]	[4960]	[5840]		
151	10	70	165	260	365	465	560	660		
	775	770	759	749	733	718	666	624		
[45]		[590]	[1410]	[2280]	[3170]	[4060]	[4920]	[5790]		
170		65	160	260	360	460	555	655		
		866	854	843	825	808	749	702		

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

C-5

6000 Series

Performance data

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

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



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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
17	34	69	103	138	172	207	241	276	310

[0.5]	[430]	[860]	[1890]							
2	50	95	215							
	7	4	1							
[2]	[440]	[900]	[1940]	[2990]	[3960]	[4920]	[5425]	[5930]		
8	50	100	220	340	445	555	615	670		
	30	29	26	24	21	17	11	6		
[4]	[460]	[940]	[2000]	[3060]	[4080]	[5090]	[5680]	[6630]	[7570]	[8520]
15	50	105	225	345	460	575	640	750	855	965
	61	60	56	54	48	42	39	30	12	6
[8]	[470]	[960]	[2060]	[3150]	[4210]	[5260]	[6180]	[7100]	[8020]	[9020]
30	55	110	235	355	475	595	700	800	905	1020
	122	120	116	113	104	95	81	67	53	37
[14]	[480]	[970]	[2080]	[3180]	[4270]	[5360]	[6390]	[7420]	[8450]	[9510]
53	55	110	235	360	480	605	720	840	955	1075
	183	182	178	174	165	157	141	125	109	92
[16]	[450]	[960]	[2070]	[3180]	[4290]	[5420]	[6480]	[7490]	[8480]	[9540]
61	50	110	235	360	485	610	730	845	960	1080
	245	244	240	236	228	221	202	184	165	145
[20]	[420]	[940]	[2050]	[3160]	[4290]	[5440]	[6510]	[7580]	[8660]	[9740]
76	45	105	230	355	485	615	735	855	980	1100
	307	306	301	297	287	277	257	238	218	197
[24]	[380]	[920]	[2020]	[3120]	[4260]	[5400]	[6490]	[7590]	[8680]	
91	45	105	230	355	480	610	735	860	980	
	368	365	361	358	348	338	316	294	271	
[28]	[330]	[870]	[1980]	[3100]	[4240]	[5380]	[6480]	[7580]	[8670]	
106	35	100	225	350	480	610	730	855	980	
	430	426	421	416	404	376	358	340	322	
[32]	[290]	[800]	[1920]	[3050]	[4170]	[5290]	[6410]	[7520]	[8640]	
121	35	90	215	345	470	600	725	850	975	
	491	489	481	475	461	448	423	398	373	
[36]	[250]	[730]	[1850]	[2980]	[4060]	[5150]	[6300]	[7440]		
136	30	80	210	335	460	580	710	840		
	556	549	543	537	524	509	482	456		
[40]	[200]	[690]	[1790]	[2940]	[4010]	[5130]	[6190]	[7100]		
151	25	80	200	330	455	580	700	800		
	615	612	606	599	585	570	540	510		
[45]		[570]	[1760]	[2860]	[3960]	[5070]	[6080]	[6690]		
170		65	200	325	445	575	685	755		
		688	682	674	658	641	608	574		
[50]			[1720]	[2800]	[3890]	[4920]	[5940]			
189			195	315	440	555	670			
			758	749	731	712	676			
[55]			[1670]	[2740]	[3820]	[4890]	[5880]			
208			190	310	430	550	665			
			834	824	804	783	744			

C-5

Flow LPM [GPM]

6000 Series

Performance data

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

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

Continuous
Intermittent

Peak
No operation

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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
17	34	69	103	138	172	207	241	276	310

Flow LPM [GPM]	[0.5]	[530]	[1120]	[2440]																	
	2	60	125	275																	
		6	4	1																	
	[2]	[540]	[1150]	[2460]	[3620]	[4780]	[5690]	[6670]	[7780]												
	8	60	130	280	410	540	645	755	880												
		24	23	22	20	17	14	10	4												
	[4]	[550]	[1180]	[2560]	[3800]	[5030]	[6050]	[7070]	[8260]	[9070]	[9530]										
	15	60	135	290	430	570	685	800	935	1025	1075										
		48	47	45	42	38	32	24	17	10	3										
	[8]	[560]	[1250]	[2650]	[3970]	[5280]	[6480]	[7710]	[8740]	[9770]	[10990]										
	30	65	140	300	450	595	730	870	985	1105	1240										
		96	95	91	87	81	73	64	55	46	35										
	[14]	[570]	[1260]	[2690]	[4050]	[5420]	[6730]	[8040]	[9260]	[10490]	[11800]										
	53	65	140	305	460	610	760	910	1045	1185	1335										
		144	143	140	135	129	121	111	99	88	76										
	[16]	[540]	[1230]	[2660]	[4060]	[5450]	[6800]	[8150]	[9400]	[10660]	[11990]										
	61	60	140	300	460	615	770	920	1060	1205	1355										
		193	192	188	184	178	167	156	141	126	109										
	[20]	[510]	[1200]	[2630]	[4040]	[5450]	[6820]	[8190]	[9520]	[10840]											
76	60	135	295	455	615	770	925	1075	1225												
	242	241	236	232	226	216	201	184	167												
[24]	[480]	[1160]	[2600]	[4020]	[5440]	[6840]	[8230]	[9560]	[10900]												
91	55	130	295	455	615	775	930	1080	1230												
	290	289	282	279	273	260	248	232	215												
[28]	[420]	[1130]	[2570]	[3990]	[5420]	[6820]	[8220]	[9520]	[10840]												
106	45	130	290	450	610	770	930	1075	1225												
	339	336	333	328	320	308	295	276	257												
[32]	[360]	[1100]	[2510]	[3920]	[5330]	[6750]	[8170]	[9440]													
121	40	125	285	445	600	765	925	1065													
	388	384	381	375	368	354	341	320													
[36]	[300]	[1060]	[2440]	[3830]	[5220]	[6660]	[8100]	[9330]													
136	35	120	275	435	590	750	915	1055													
	436	430	421	416	410	396	383	360													
[40]	[270]	[1020]	[2400]	[3780]	[5150]	[6580]	[8020]	[9220]													
151	30	115	270	425	580	745	905	1040													
	485	478	466	461	456	441	427	403													
[50]		[982]	[2180]	[3420]	[4660]	[6050]	[7440]														
189		110	245	385	525	685	840														
		597	582	576	570	551	534														
[60]			[1960]	[3250]	[4540]	[5750]	[7080]														
227			220	365	515	650	800														
			698	691	684	661	641														

[5750] } Torque [lb-in]
650 } Nm
661 } Speed RPM

C-5

6000 Series

Performance data

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

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



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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]	[4500]
17	34	69	103	138	172	207	241	276	310

[1]	[760]	[1570]	[3230]									
4	85	175	365									
	4	2	1									
[2]	[780]	[1610]	[3270]	[4910]	[6440]	[7760]	[9080]	[10590]				
8	90	180	370	555	730	875	1025	1195				
	19	18	17	16	14	12	9	4				
[4]	[800]	[1640]	[3300]	[4970]	[6570]	[8160]	[9570]	[11270]	[12880]	[14490]		
15	90	185	375	560	740	920	1080	1275	1455	1635		
	38	38	37	35	33	29	22	14	5	1		
[8]	[810]	[1650]	[3370]	[5080]	[6740]	[8430]	[10050]	[11620]	[12880]	[14480]		
30	90	185	380	575	760	950	1135	1315	1455	1635		
	77	76	74	72	68	65	55	45	33	21		
[14]	[800]	[1620]	[3390]	[5130]	[6810]	[8520]	[10190]	[11860]	[13640]			
53	90	185	385	580	770	965	1150	1340	1540			
	115	115	112	109	105	100	91	81	79			
[16]	[750]	[1600]	[3380]	[5120]	[6820]	[8560]	[10230]	[11920]				
61	85	180	380	580	770	965	1155	1345				
	154	154	151	147	143	132	126	116				
[20]	[680]	[1580]	[3360]	[5120]	[6840]	[8590]	[10280]	[11980]				
76	75	180	380	580	775	970	1160	1355				
	193	193	189	187	182	175	162	152				
[24]	[620]	[1520]	[3280]	[5060]	[6780]	[8530]	[10240]					
91	70	170	370	570	765	965	1155					
	232	230	229	225	220	212	204					
[28]	[570]	[1460]	[3210]	[5000]	[6730]	[8480]	[10200]					
106	65	165	365	565	760	960	1150					
	270	268	266	261	256	248	236					
[32]	[530]	[1420]	[3140]	[4930]	[6640]	[8380]	[10120]					
121	60	160	355	555	750	945	1145					
	309	306	304	299	292	282	269					
[36]	[450]	[1370]	[3010]	[4840]	[6500]	[8250]	[10000]					
136	50	155	340	545	735	930	1130					
	348	346	340	336	329	317	301					
[40]	[380]	[1320]	[2880]	[4740]	[6460]	[8120]						
151	45	150	325	535	730	915						
	387	386	380	375	368	359						
[50]		[1140]	[2650]	[4540]	[6440]	[8050]						
189		130	300	515	730	910						
		482	475	469	460	449						
[60]			[2460]	[4430]	[6360]	[7860]						
227			280	500	720	890						
			570	562	552	538						

C-5

6000 Series

Performance data


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

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

 Continuous

 Peak

 Intermittent

 No operation

**Δ Pressure bar [PSI]
490 cm³/r [30.0 in³/r]**

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]
17	34	69	103	138	172	207	241	276

Flow LPM [GPM]	[1]	[1010]	[2200]	[4260]	[6140]															
	4	115	235	480	695															
		7	7	5	3															
	[2]	[1020]	[2110]	[4270]	[6280]	[8350]	[10420]	[12140]												
	8	115	240	480	710	945	1175	1370												
		15	14	13	12	11	8	3												
	[4]	[1030]	[2100]	[4280]	[6410]	[8500]	[10590]	[12500]	[14580]	[16670]										
	15	115	235	485	725	960	1195	1410	1645	1885										
		30	30	29	28	27	25	21	17	12										
	[8]	[1020]	[2090]	[4290]	[6490]	[8620]	[10740]	[12800]	[14930]											
	30	115	235	485	735	975	1215	1445	1685											
		60	60	59	57	54	51	45	38											
	[14]	[1000]	[2080]	[4290]	[6500]	[8650]	[10800]	[12890]												
	53	115	235	485	735	975	1220	1455												
		91	91	89	87	84	79	71												
	[16]	[1100]	[2060]	[4260]	[6480]	[8650]	[10820]	[12900]												
61	124	235	480	730	975	1220	1460													
	122	122	121	118	114	109	100													
[20]	[900]	[1980]	[4180]	[6420]	[8620]	[10820]														
76	100	225	470	725	975	1220														
	153	152	150	147	144	139														
[24]	[850]	[1930]	[4150]	[6390]	[8580]	[10770]														
91	95	220	470	720	970	1215														
	184	184	181	180	176	171														
[28]	[740]	[1840]	[4070]	[6290]	[8500]	[10720]														
106	85	210	460	710	960	1210														
	215	214	211	208	204	198														
[32]	[690]	[1710]	[3970]	[6190]	[8420]	[10660]														
121	80	195	450	700	950	1205														
	245	244	241	237	232	226														
[36]	[670]	[1560]	[3860]	[6080]	[8340]	[10420]														
136	75	175	435	685	940	1175														
	276	275	272	265	260	255														
[40]	[570]	[1400]	[3750]	[5970]	[8140]	[10180]														
151	65	160	425	675	920	1150														
	307	306	303	295	290	284														
[50]		[1140]	[3240]	[5220]	[7620]															
189		130	365	590	860															
		382	379	369	362															
[60]			[2860]	[4860]	[7140]															
227			325	550	805															
			454	442	435															

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

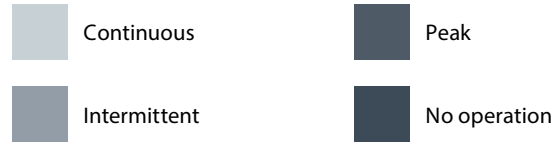
C-5

6000 Series

Performance data

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

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



Δ Pressure bar [PSI]
 $625 \text{ cm}^3/\text{r}$ [38.0 in³/r]

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3200]
17	34	69	103	138	172	207	221

Flow LPM [GPM]	[1]	[1060]	[2205]	[4515]	[6690]				
	4	120	250	510	755				
		5	5	4	2				
	[2]	[1090]	[2300]	[4720]	[7025]	[9360]			
	8	125	260	535	795	1060			
		12	12	12	10	6			
	[4]	[1145]	[2450]	[5052]	[7520]	[10090]	[12700]		
	15	130	275	570	850	1140	1434		
		24	24	24	21	16	13		
	[8]	[1195]	[2600]	[5350]	[8195]	[11220]	[13100]	[15800]	[16800]
	30	135	295	605	925	1270	1480	1785	1898
		45	45	44	42	37	35	32	30
	[14]	[1200]	[2600]	[5390]	[8145]	[10570]	[13000]	[15700]	
	53	135	295	610	920	1195	1469	1774	
		72	72	71	68	64	60	56	
	[16]	[1120]	[2530]	[5340]	[8105]	[10530]	[13000]		
61	125	285	605	915	1190	1469			
	94	94	92	89	85	83			
[20]	[1050]	[2465]	[5285]	[8080]	[11725]				
76	120	280	595	915	1325				
	120	119	117	115	110				
[24]	[950]	[2365]	[5180]	[7990]	[11705]				
91	105	265	585	905	1320				
	144	143	140	138	132				
[28]	[855]	[2255]	[5080]	[7915]	[11640]				
106	95	255	575	895	1315				
	169	168	165	162	156				
[32]	[730]	[2140]	[4960]	[7775]	[11505]				
121	80	240	560	880	1300				
	193	192	188	185	179				
[36]	[555]	[1965]	[4780]	[7585]					
136	65	220	540	855					
	217	216	213	210					
[40]	[380]	[1790]	[4600]	[7395]					
151	45	200	520	835					
	241	240	238	236					
[50]			[4180]	[6985]					
189			470	790					
			296	290					
[60]			[3800]	[6600]					
227			430	745					
			353	345					

C-5

6000 Series

Performance data

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

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

Continuous
 Intermittent

Peak
 No operation

Δ Pressure bar [PSI]
 $735 \text{ cm}^3/\text{r}$ [45.0 in³/r]

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]
17	34	52	69	86	103	121	138	155	172

Flow LPM [GPM]	[1]	[1311]	[2775]	[4200]	[5480]	[7000]													
	4	148	314	475	619	791													
		4	4	3	3	2													
	[2]	[1340]	[2856]	[4535]	[6020]	[7551]	[8685]	[10182]	[11121]										
	8	151	323	512	680	853	981	1150	1257										
		10	10	10	10	9	7	6	5										
	[4]	[1253]	[2854]	[4363]	[5813]	[7272]	[8714]	[10135]	[11537]	[12970]	[15040]								
	15	142	322	493	657	822	985	1145	1303	1465	1699								
		20	20	19	18	17	16	14	13	11	11								
	[8]	[1290]	[2889]	[4540]	[6130]	[7703]	[9202]	[10666]	[12192]	[13713]									
	30	146	326	513	693	870	1040	1205	1378	1549									
		40	39	38	38	37	37	35	33	32									
	[14]	[1277]	[2821]	[4528]	[6180]	[7795]	[9338]	[10877]	[12419]										
	53	144	319	512	698	881	1055	1229	1403										
		61	60	59	58	57	56	54	52										
	[16]	[1196]	[2753]	[4478]	[6148]	[7768]	[9376]	[10984]											
	61	135	311	506	695	878	1059	1241											
		82	80	79	78	77	76	74											
	[20]	[1092]	[2794]	[4320]	[6021]	[7697]	[9311]	[10907]											
76	123	316	488	680	870	1052	1232												
	102	101	101	99	97	96	93												
[24]	[1206]	[2556]	[4162]	[5871]	[7564]	[9289]													
91	136	289	470	663	855	1049													
	123	122	120	119	118	116													
[28]	[1083]	[2338]	[4040]	[5666]	[7365]	[9022]													
106	122	264	456	640	832	1019													
	145	142	141	139	137	135													
[32]	[950]	[2110]	[3795]	[5457]	[7122]	[8828]													
121	107	238	429	617	805	997													
	163	162	162	159	159	156													
[36]	[726]	[1845]	[3517]	[5223]	[6853]														
136	82	208	397	590	774														
	184	183	182	181	179														
[40]	[515]	[2227]	[3270]	[4965]	[6672]														
151	58	252	369	561	754														
	203	202	202	201	199														
[50]			[3869]	[4870]	[5850]														
189			437	550	661														
			254	252	250														
[60]				[4856]	[6604]														
227				549	746														
				303	301														

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

C-5

6000 Series

Performance data

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

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



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

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]
17	34	52	69	86	103	121	138	155	172

C-5

Flow LPM [GPM]

[1]	[1455]	[3100]	[4680]	[6031]	[7799]					
4	164	350	529	681	881					
	4	4	2	2	1					
[2]	[1483]	[3173]	[5121]	[6432]	[8510]	[9633]	[11319]	[12127]		
8	168	359	579	727	961	1088	1279	1370		
	9	9	9	8	7	6	5	5		
[4]	[1547]	[3331]	[5292]	[7000]	[8714]	[10075]	[11352]	[12965]	[14564]	[16377]
15	175	376	598	790	984	1138	1283	1465	1645	1850
	19	19	18	17	16	15	14	12	11	10
[8]	[1599]	[3473]	[5415]	[7170]	[8934]	[10629]	[12300]	[14004]	[15441]	
30	181	392	612	810	1009	1201	1390	1582	1745	
	35	35	34	33	32	31	29	29	28	
[14]	[1599]	[3469]	[5415]	[7093]	[9024]	[10658]	[12283]	[13726]		
53	181	392	612	801	1020	1204	1388	1551		
	56	56	55	53	53	52	50	50		
[16]	[1543]	[3395]	[5357]	[7032]	[8983]	[10640]	[12010]			
61	174	384	605	794	1015	1202	1357			
	73	73	72	70	69	68	67			
[20]	[1457]	[3312]	[5292]	[6968]	[8943]	[10583]	[12146]			
76	165	374	598	787	1010	1196	1372			
	93	92	91	89	88	87	86			
[24]	[1352]	[3183]	[5088]	[6811]	[8812]	[10411]				
91	153	360	575	769	996	1176				
	112	112	111	110	108	106				
[28]	[1213]	[3055]	[5047]	[6713]	[8681]	[10411]				
106	137	345	570	758	981	1176				
	131	131	131	129	128	127				
[32]	[1075]	[2907]	[4884]	[6546]	[8395]	[10060]				
121	121	328	552	740	949	1137				
	150	149	149	146	145	144				
[36]	[823]	[2692]	[4663]	[6320]	[8118]					
136	93	304	527	714	917					
	168	168	168	167	165					
[40]	[592]	[2477]	[4426]	[6085]	[7832]					
151	67	280	500	688	885					
	187	186	186	185	184					
[50]		[2730]	[4214]	[5849]	[7603]					
189		308	476	661	859					
		234	233	231	230					
[60]			[3806]	[5459]	[7407]					
227			430	617	837					
			280	277	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 25 cSt [120 SUS]. Actual data may vary slightly from unit to unit in production.

 Continuous

 Peak

 Intermittent

 No operation

**Δ Pressure bar [PSI]
985 cm³/r [60.0 in³/r]**

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]
17	34	52	69	86	103	121	138

Flow LPM [GPM]	[1]	[1890]	[4110]	[5730]	[7640]	[9550]			
	4	215	465	645	865	1080			
		3	3	2	2	1			
	[2]	[1910]	[4140]	[6270]	[8300]	[10420]	[12500]	[13860]	[14920]
	8	215	470	710	940	1175	1410	1565	1685
		8	8	7	7	6	5	4	3
	[4]	[1980]	[4290]	[6480]	[8540]	[10670]	[12800]	[13900]	[15850]
	15	225	485	730	965	1205	1445	1570	1790
		15	15	15	14	14	13	13	12
	[8]	[2030]	[4400]	[6630]	[8790]	[10940]	[13090]	[14500]	[16580]
	30	230	495	750	995	1235	1480	1640	1875
		30	30	30	29	28	27	26	25
	[14]	[2020]	[4390]	[6630]	[8860]	[11050]	[13240]	[15040]	
	53	230	495	750	1000	1250	1495	1700	
		45	45	45	44	43	42	41	
	[16]	[2010]	[4320]	[6560]	[8790]	[11000]	[13260]		
	61	225	490	740	995	1245	1500		
		61	61	61	60	59	58		
	[20]	[1910]	[4220]	[6480]	[8720]	[10950]	[13160]		
	76	215	475	730	985	1235	1485		
	77	77	76	76	75	74			
[24]	[1810]	[4060]	[6230]	[8500]	[10790]	[12990]			
91	205	460	705	960	1220	1470			
	92	92	92	91	90	89			
[28]	[1620]	[3920]	[6180]	[8420]	[10630]	[12820]			
106	185	445	700	950	1200	1450			
	107	107	107	106	105	103			
[32]	[1480]	[3740]	[5980]	[8200]	[10280]				
121	165	425	675	925	1160				
	123	123	122	121	120				
[36]	[1140]	[3490]	[5710]	[7930]	[9940]				
136	130	395	645	895	1125				
	138	138	138	137	135				
[40]	[850]	[3240]	[5420]	[7640]	[9590]				
151	95	365	610	865	1085				
	153	153	152	151	150				
[50]		[2960]	[5160]	[7350]	[9310]				
189		325	585	830	1050				
		191	190	189	188				
[60]			[4660]	[7160]	[9070]				
227			525	810	1025				
			230	229	226				

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

C-5

6000 Series

Dimensions

Standard mount

Ports

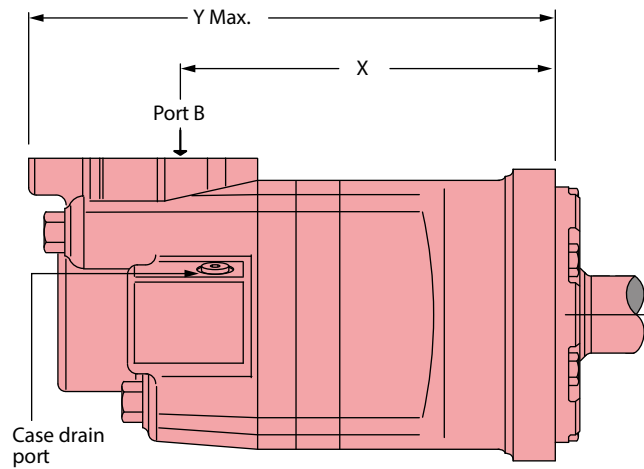
1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
 7/16 -20 UNF-2B SAE O-ring case drain port (1)

4 Bolt 3/4 inch Split flange ports (2)
 7/16 -20 UNF-2B SAE O-ring case drain port (1)

G 1 (BSP) Staggered ports (2)
 G 1/4 (BSP) Case drain port (1)

1 5/16 UN-2B SAE O-ring staggered ports (2) with shuttle
 9/16 -20 UNF-2B SAE O-ring case drain port (1)

Standard mount



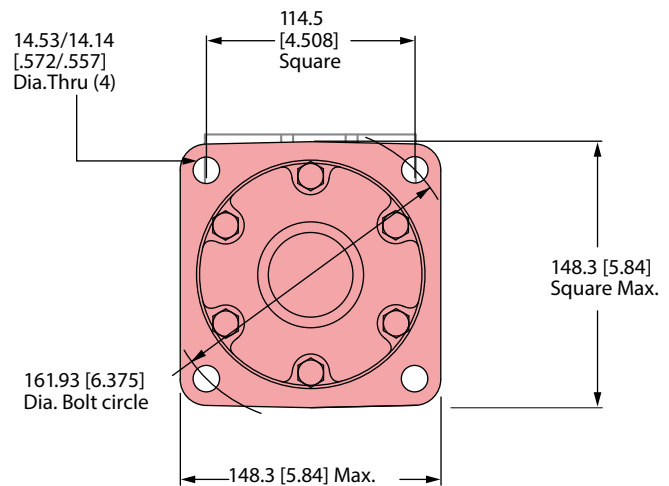
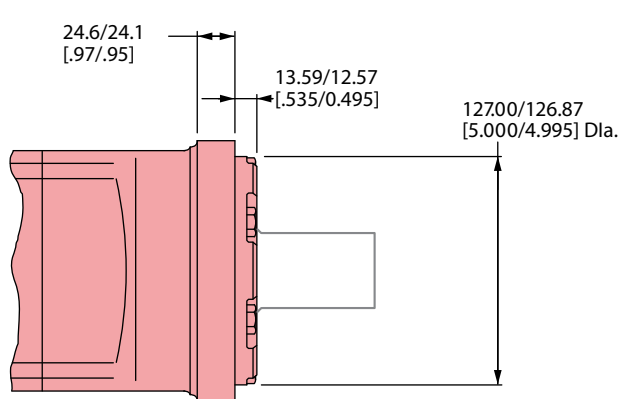
Standard rotation viewed from shaft end

Port A pressurized — CW
 Port B pressurized — CCW

Standard motor mount dimensions

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]
195 [11.9]	187.7 [7.39]	270.4 [10.65]
245 [15.0]	193.3 [7.61]	276.0 [10.87]
310 [19.0]	200.7 [7.9]	283.3 [11.15]
390 [23.9]	209.3 [8.24]	292.1 [11.50]
490 [30.0]	220.5 [8.68]	303.2 [11.94]
625 [38.0]	235.0 [9.25]	317.9 [12.52]
735 [45.0]	247.5 [9.74]	330.5 [13.01]
805 [49]	254.89 [10.035]	337.8 [13.30]
985 [60.0]	274.9 [10.82]	357.6 [14.08]

Standard SAE CC Flange



Wheel mount

Ports

- 1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 4 Bolt 3/4 inch split flange ports (2)
- 7/16 -20 UNF-2B SAE O-ring Case drain port (1)
- G 1 (BSP) Staggered ports (2)
- G 1/4 (BSP) Case drain port (1)
- 1 5/16 UN-2B SAE O-ring staggered ports (2) with shuttle
- 9/16 -20 UNF-2B SAE O-ring case drain port (1)

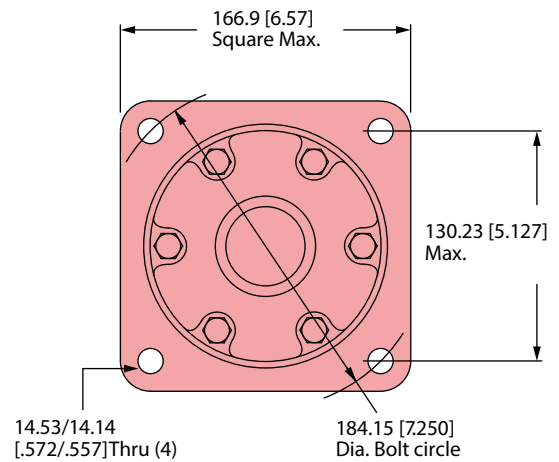
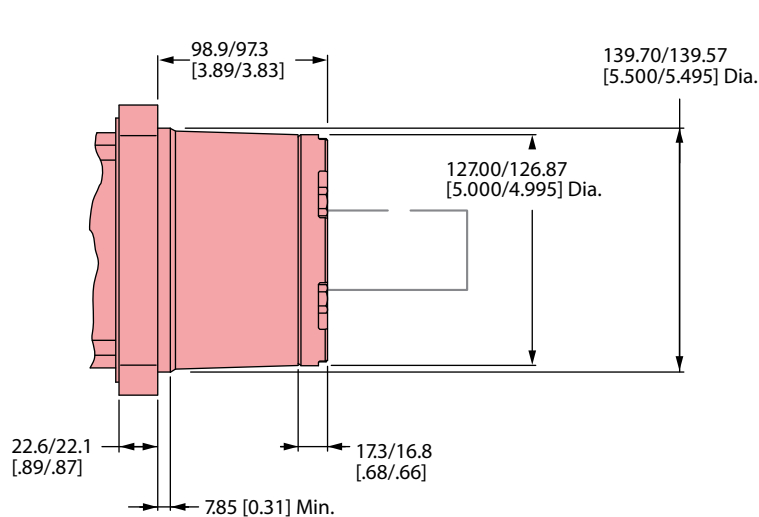
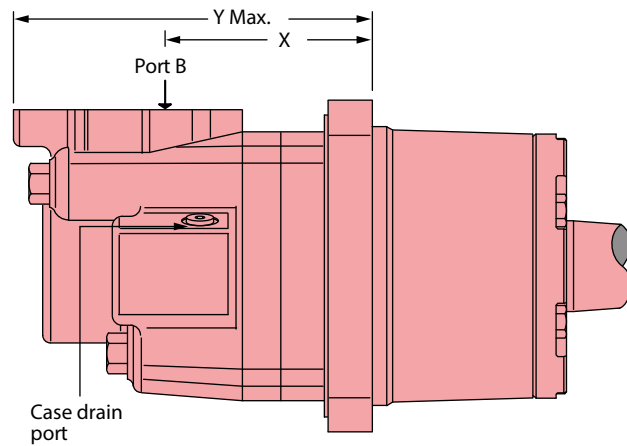
Standard rotation viewed from shaft end

- Port A pressurized — CW
- Port B pressurized — CCW

Wheel mount

Wheel mount motor dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
195 [11.9]	102.6 [4.04]	185.6 [7.31]
245 [15.0]	108.2 [4.26]	191.3 [7.53]
310 [19.0]	115.6 [4.55]	198.5 [7.82]
390 [23.9]	124.5 [4.90]	207.3 [8.16]
490 [30.0]	135.4 [5.33]	218.4 [8.60]
625 [38.0]	150.1 [5.91]	233.1 [9.18]
735 [45]	162.8 [6.41]	245.7 [9.67]
805 [49]	169.9 [6.9]	253 [9.96]
985 [60.0]	189.7 [7.47]	272.8 [10.74]



6000 Series

Dimensions

Global mount (ISO)

Ports

- 1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 4 Bolt 3/4 inch Split flange ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 1 (BSP) Staggered ports (2)
- G 1/4 (BSP) Case drain port (1)
- 1 5/16 UN-2B SAE O-ring staggered ports (2) with shuttle
- 9/16 -20 UNF-2B SAE O-ring case drain port (1)

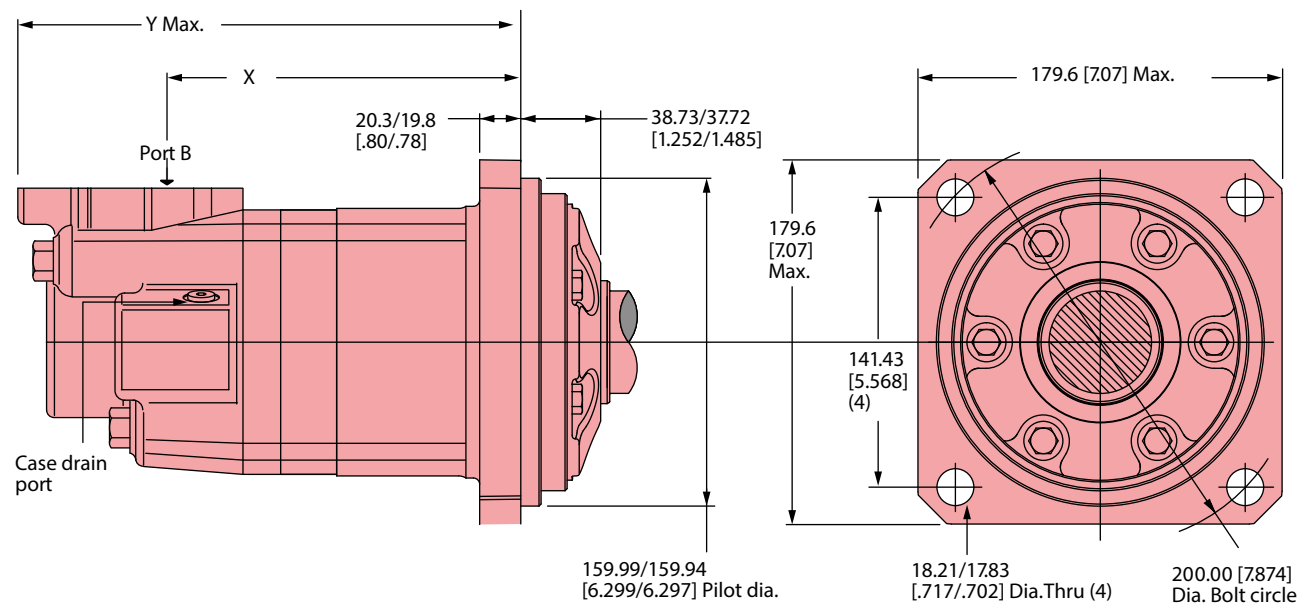
Global mount motor dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
310 [19.0]	182.4 [7.18]	264.9 [10.43]
390 [24.0]	191.0 [7.52]	273.6 [10.77]
490 [30.0]	202.2 [7.96]	284.7 [11.21]
625 [38.0]	216.9 [8.54]	299.5 [11.79]
800 [45.0]	229.4 [9.03]	312.2 [12.29]
800 [49.0]	236.7 [9.32]	319.3 [12.57]
985 [60.0]	256.5 [10.10]	339.1 [13.35]

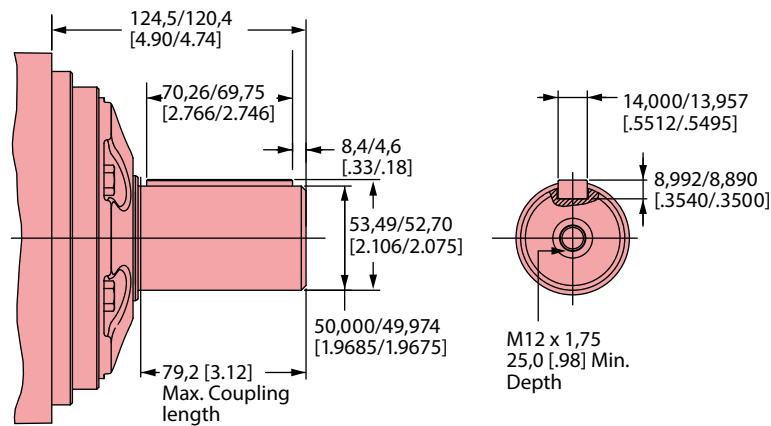
Standard rotation viewed from shaft end

- Port A pressurized — CW
- Port B pressurized — CCW

Global mount (ISO)



50 mm Dia. Straight shaft



C-5

Bearingless

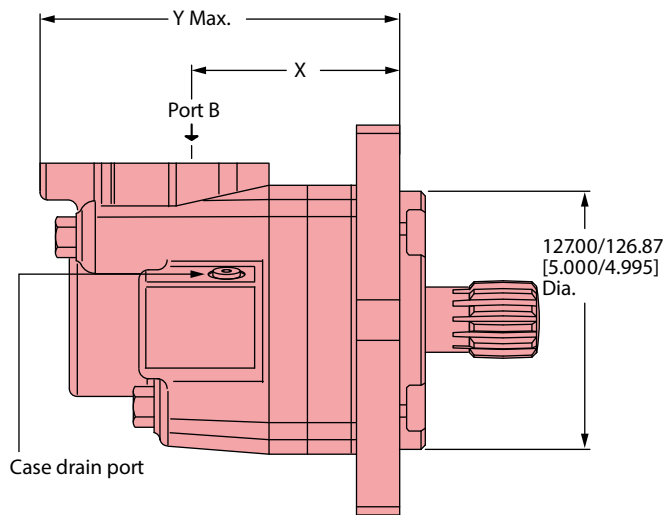
Ports

- 1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- 4 Bolt 3/4 inch split flange ports (2)
- 7/16 -20 UNF-2B SAE O-ring case drain port (1)
- G 1 (BSP) staggered ports (2)
- G 1/4 (BSP) case drain port (1)
- 1 5/16 UN-2B SAE O-ring staggered ports (2) with shuttle
- 9/16 -20 UNF-2B SAE O-ring case drain port (1)

Standard rotation viewed from drive end

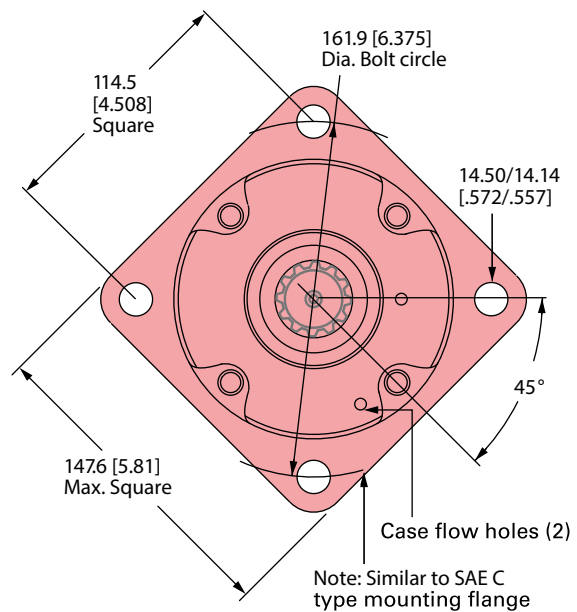
- Port A pressurized — CW
- Port B pressurized — CCW

Bearingless

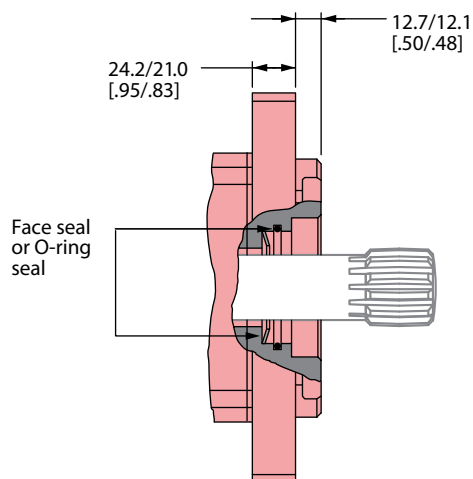


Bearingless motor dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
195 [11.9]	105.4 [4.15]	188.0 [7.40]
245 [15.0]	111.0 [4.37]	193.5 [7.62]
310 [19.0]	118.4 [4.66]	200.7 [7.90]
390 [23.9]	127.3 [5.01]	209.6 [8.25]
490 [30.0]	138.2 [5.44]	220.7 [8.69]
625 [38.0]	152.9 [6.02]	235.5 [9.27]
735 [45]	166.1 [6.54]	248.2 [9.77]
805 [49]	172.85 [6.805]	255.3 [10.05]
985 [60.0]	192.8 [7.59]	275.1 [10.83]

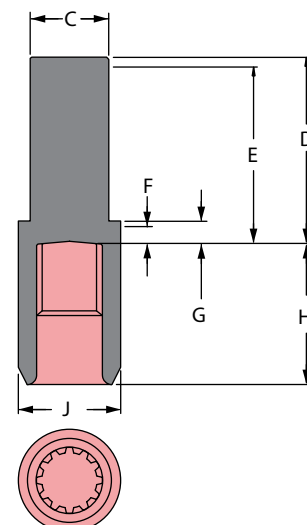


For 6000 bearingless motor application information, contact your Danfoss representative (mating coupling blanks available from Danfoss).



Bearingless blank dimensions

- C 47.2 [1.86] Dia.
- D 112.5 [4.39] Max.
- E 106.4 [4.19]
- Full form dia.
- F 6.9 [.27] Min.
- Full form dia.
- G 10.2 [.40] Max.
- H 86.1 [3.39] Max.
- J 66.5 [2.62] Dia.

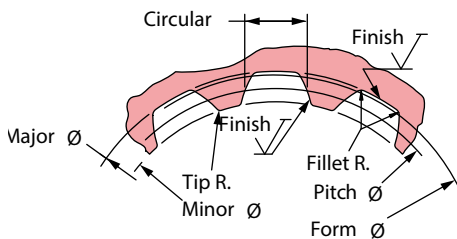
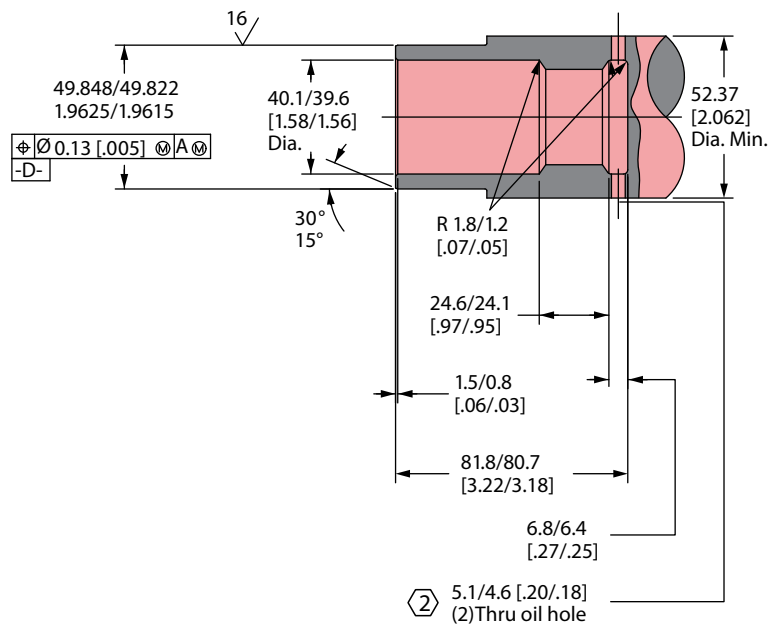
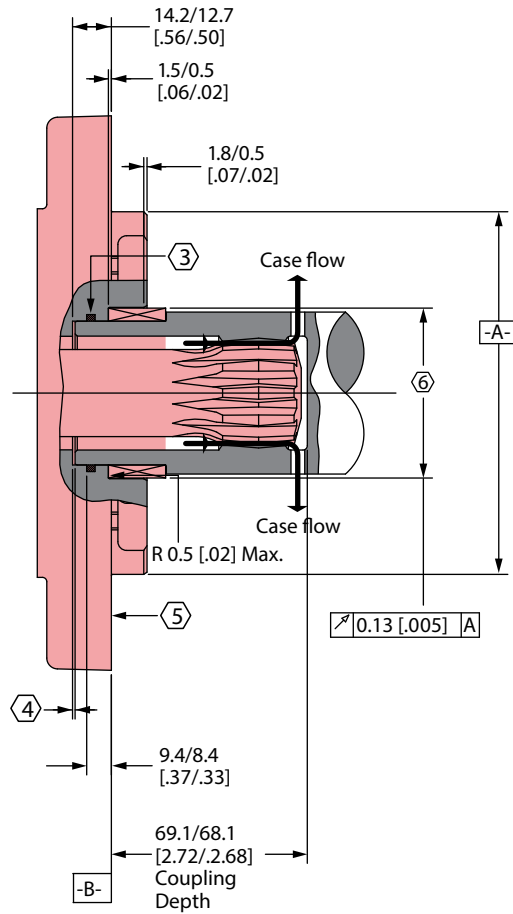


Mating coupling blank Danfoss Part no. 12778-002

6000 Series

Installation information

Bearingless



- 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).
- Mating part to have critical dimensions as shown. Oil holes must be provided and open for proper oil circulation.
- Seal to be furnished with motor for proper oil circulation thru splines.
- Some means of maintaining clearance between shaft and mounting flange must be provided.
- Similar to SAE "C" Four Bolt Flange.
- Counterbore designed to adapt to a standard sleeve bearing 50.010 - 50.038 [1.9689 - 1.9700] ID by 60.051 - 60.079 [2.3642 - 2.3653] O.D. (Oilite bronze sleeve bearing).

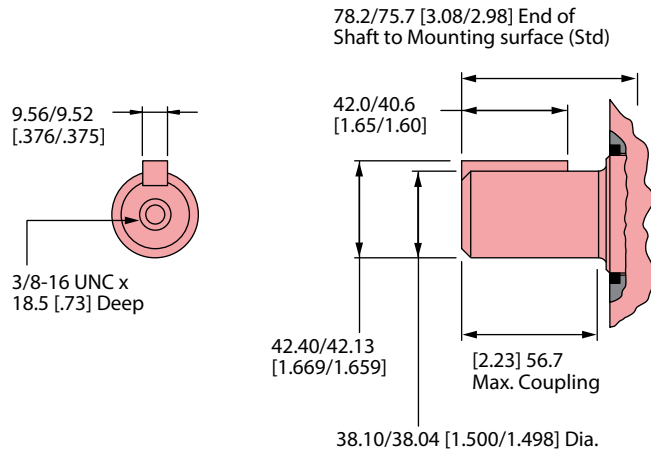
Spline pitch	8.5/17
Pressure angle	30°
Number of teeth	12
Class of fit	Ref. 5
Type of fit	Side
Pitch diameter	Ref. 35.858823 [1.4117647]
Base diameter	Ref. 31.054652 [1.222624] 0.21 [.008] D
Major diameter	39.17 [1.542] Max. 38.97 [1.534] Min.
Min. Minor diameter	33.30 - 33.48 [1.311 - 1.318]
Form diameter, Min	38.33 [1.509]
Fillet radius	0.64 - 0.76 [.025 - .030]
Tip radius	0.25 - 0.51 [.010 - .020]
Finish	1.6 (63)
Involute profile variation	+0.000 -0.025 [+0.0000 -0.0010]
Total index variation	0.038 [.0015]
Lead variation	0.038 [.0015]
Circular space width:	
Maximum actual	5.898 [.2322]
Minimum effective	5.804 [.2285]
Maximum effective	Ref. 5.857 [.2306]
Minimum actual	Ref. 5.834 [.2297]
Dimension between two pins	Ref. 26.929 - 27.084 [1.0602 - 1.0663]
Pin diameter	6.223 [.2450] Pins to Have 4.0 [.160]
	Wide flat for root clearance

C-5

Shafts splined

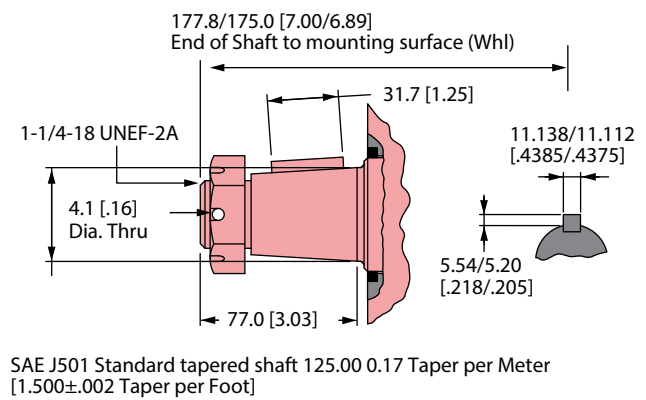
Code: 01 1 1/2 Inch Straight

1328 [11750] Max. Torque Nm [lb-in]



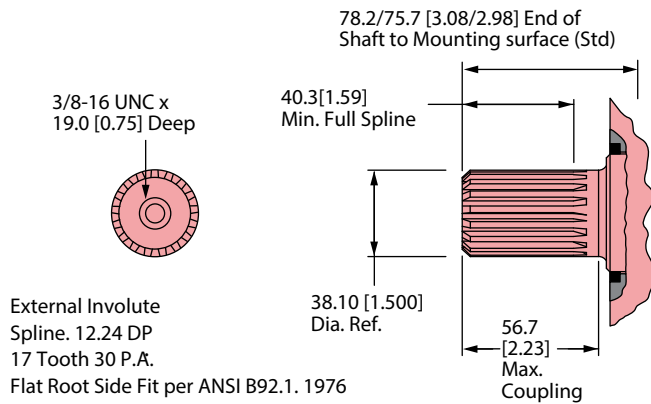
Code: 02 1 3/4 Inch tapered

2107 [18650] Max. Torque Nm [lb-in]

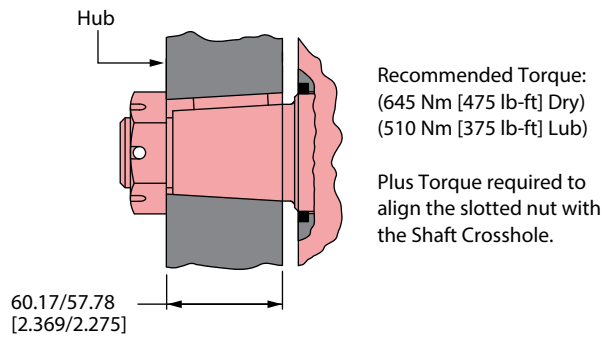


Code: 03 1 1/2 Inch 17 Tooth splined

1328 [11750] Max. Torque Nm [lb-in]

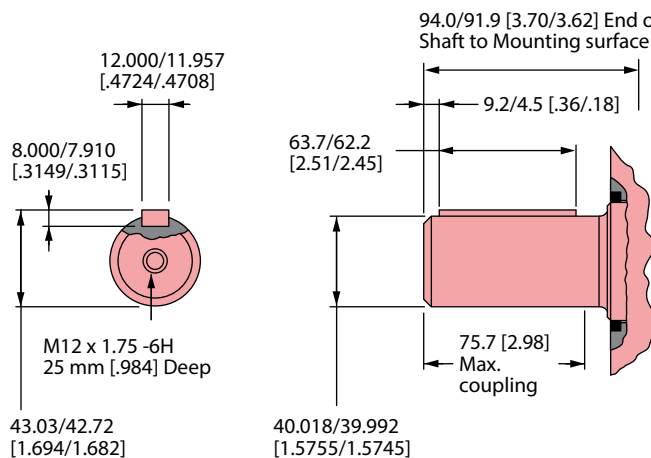


Tapered shaft hub data

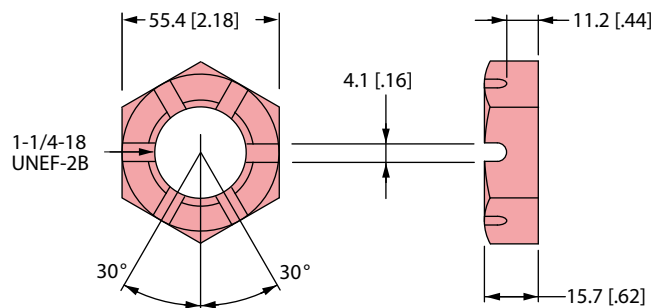


Code: 04 40 mm Straight

1328 [11750] Max. Torque Nm [lb-in]



Slotted hexagon nut



6000 Series

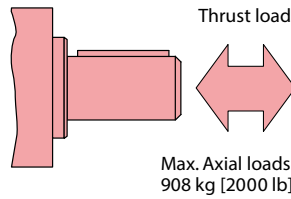
Shaft side load capacity

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

Note: Case pressure will increase the allowable inward thrust load and decrease the allowable outward thrust load. Case pressure will push outward on the shaft at 109 kg/7 Bar [241 lb/100 PSI].

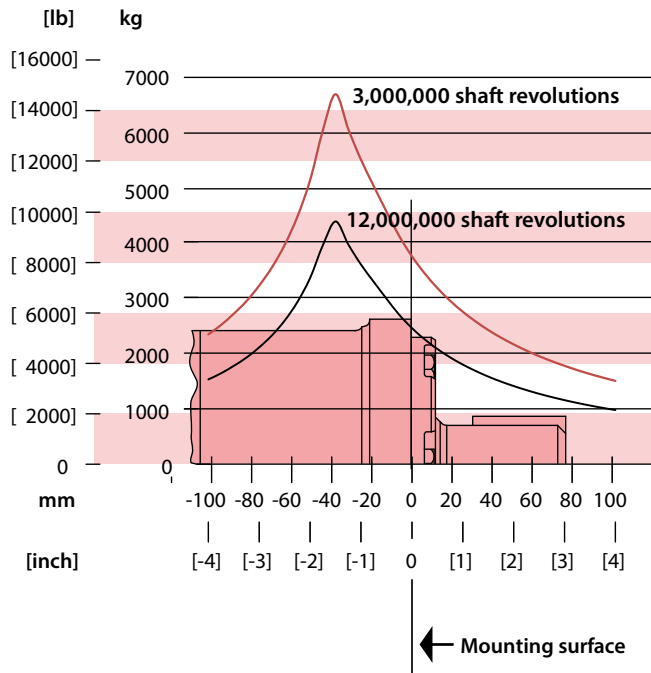
Each curve is based on B10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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

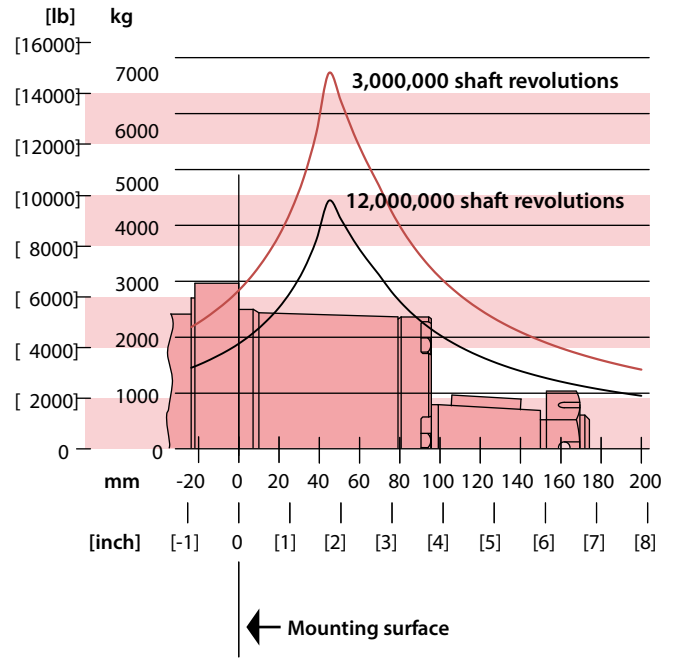


RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

Standard motor straight and splined shafts



Wheel motor tapered shaft



C-5

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

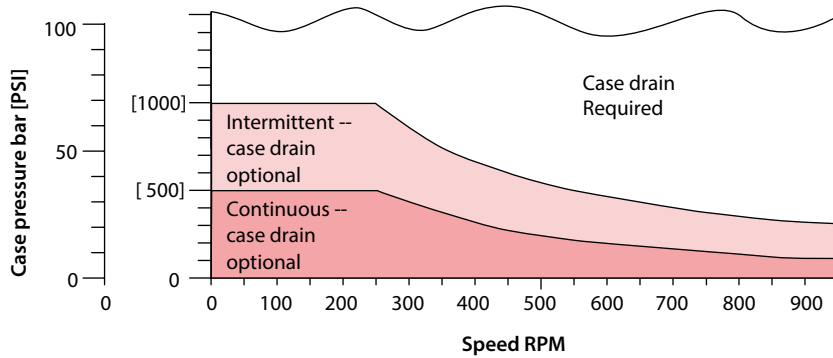
Case porting advantage

Contamination control — flushing the motor case.

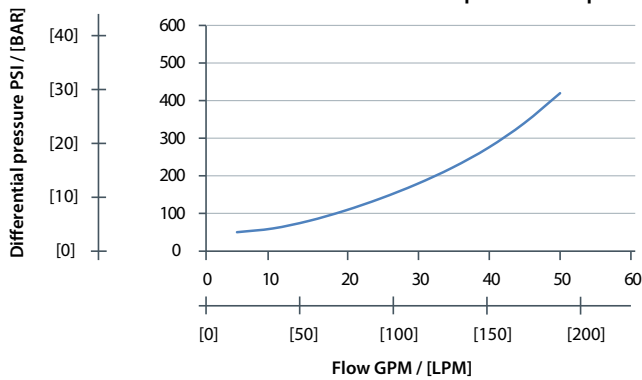
Cooler motor — exiting oil draws motor heat away.

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

Case pressure seal limitation



6000 Series NLPD - No load pressure drop



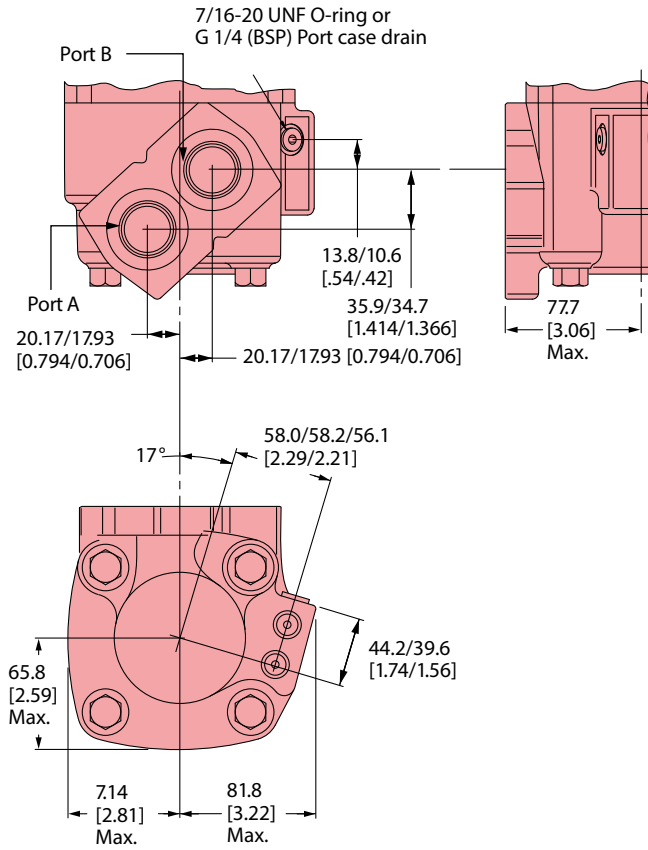
6000 Series

Dimensions

Ports

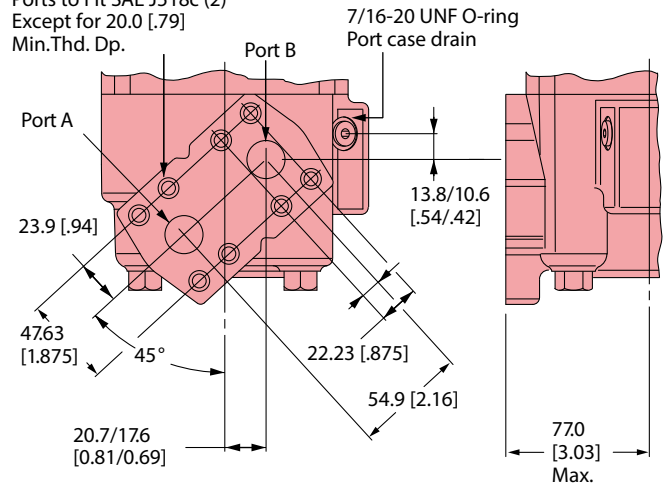
Code: AA 1-5/16-12 O-ring ports

Code: AC G 1 (BSP) ports

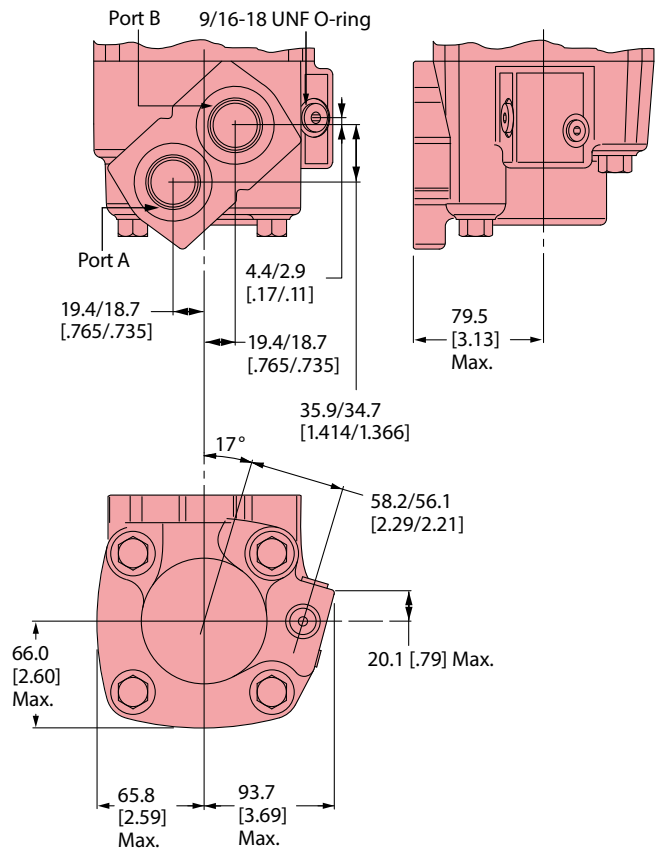


Code: AB 4 Bolt 3/4 Inch split flange

Ports to Fit SAE J518c (2)
Except for 20.0 [.79]
Min.Thd. Dp.



Code: AA 1 5/16 -12 O-ring ports (2) with shuttle



C-5

Note: For 6000 Series Motors with a configuration Not Shown in the charts above: Use model code number system on the next page to specify product in detail.

Use digit prefix — 112-, 113-, or 114 - plus four digit number from charts for complete product number— Example 114-1047.

Orders will not be accepted without three digit prefix.

Mounting	Shaft	Port size	Displ. 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	1 5/16 O-ring	112-1058	-1059	-1060	-1061	-1062	-1109	-1163	—	-1063
	17 T Splined	G 1 (BSP)	112-1088	-1089	-1090	-1091	-1092	—	—	—	-1093
Wheel motor	40 mm Straight	G 1 (BSP)	113-1082	-1083	-1084	-1085	-1086	-1100	—	—	-1087
	1-3/4 Inch Tapered	1 5/16 O-ring	113-1070	-1071	-1072	-1073	-1074	-1093	—	—	-1075
Bearingless		1 5/16 O-ring	114-1031	-1032	-1033	-1034	-1035	-1055	—	—	-1036
		G 1 (BSP)	114-1043	-1044	-1045	-1046	-1047	—	—	—	-1048

*New release

↑
114-1047

Mounting type - Standard (Code AH), 4 Bolt:

- 160.0 [6.30] Pilot Dia.
- 18.01 [.709] Dia. Mounting holes
- 200.0 [7.87] Dia. Bolt circle

Use digit prefix — 112- plus four digit number from charts for complete product number— Example 112-1215.

Orders will not be accepted without three digit prefix.

C-5

Output shaft - straight (code 12)

Ports - G1 (BSP) staggered G 1/4 case drain Code: (AC & 03)

Paint - Low gloss black (code AA)

Mounting	Shaft	Port size	Displ. cm ³ /r [in ³ /r] / product number						
			310 [19.0]	390 [23.9]	490 [30.0]	625 [38.0]	735 [45.0]	805 [49.0]	985 [60.0]
Standard	50 mm Straight	G 1 (BSP)	112-1217	-1218	-1215	-1216	-1247	-1219	-1220

↑
112-1215

6000 Series

Model code

The following 30-digit coding system has been developed to identify all of the configuration options for the 6000 Series motor. Use this model code to specify a motor with the desired features. All 30-digits of the code must be present when ordering.

M	06	***	**	**	**	**	**	*	00	*	*	00	00	**	**	00	F												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

1	Product
M	Motor

2	3	Series
06		6000 Series

4	5	6	Displacement cm³/r [in³/r]
120	195.8		[11.95]
150	246.5		[15.04]
190	312.0		[19.04]
239	391.7		[23.90]
300	491.4		[29.99]
381	624.2		[38.09]
450	737.4		[45.00]
490	803.4		[49.03]
600	982.7		[59.97]

7	8	Mounting type
AA		Bearingless, 4 Bolt: 127,0 [5.00] Pilot Dia. and 14,35 [.565] Dia. Holes 162,0 [6.38] Dia. Bolt circle
AB		Standard, 4 bolt (SAE CC): 127,0 [5.00] pilot Dia. and 14,35 [.565] Dia. Holes on 162,0 [6.38] Dia. B.C.
AC		Wheel, 4 Bolt 139,7 [5.50] Pilot Dia. and 14,35 [.565] Dia. Holes on 184,2 [7.25] Dia. Bolt circle
AH		Standard, 4 Bolt: 160,0 [6.30] pilot Dia. 18,01 [.709] Dia. Holes on 200,0 [7.87] Dia. Bolt circle.
AL		Wheel, 4 Bolt: 160,0 [6.30] Pilot Dia. with 5.8 [.23] pilot length and 18,00 [.709] Dia. Holes on 200,0 [7.874] Bolt circle (ISO compatible)

9	10	Output shaft description
00		None (Bearingless)
01		38,10 [1.50] Dia. Straight shaft with .375-16 UNC-2B Thread in End, 9,52 [.375] Sq x 41,28 [1.625] straight key
02		44,45 [1.75] Dia. .125:1 tapered shaft per SAE J501 with 1.25-18 UNEF-2A threaded shaft end, 11,11 [.4375] Sq. x 31,8 [1.25] straight key
03		38,10 [1.50] Dia. Flat root side fit, 17 tooth, 12/24 DP 30 DEG. Involute spline with .375-16 UNC-2B thread in end 40.4 [1.59] minimum full spline length
04		40,00 [1.575] Dia. Straight shaft with M12 x 1.75-6H thread in end, 12W x 8H x 63L [.472W x .313H x 2.480L] Key
12		49,99 [1.968] Dia. Straight shaft with M12 x 1.75-6H thread in End, 14W x 9H x 70L [.550W x .354H x 2.756L] Key

11	12	Ports description
AA		1.3125-12 UNF-2B SAE O-Ring ports--staggered ports
AB		SAE 19.05 [.750] Dia. 4-Bolt split flange - staggered ports
AC		G 1 Staggered Ports
AG		.750-16 UNF-2B SAE O-ring ports - staggered

13	14	Case flow
00		None
02		.4375-20 UNF-2B SAE O-Ring port with check valve
03		G 1/4 BSP straight thread port with check valve
06		.5625-18 UNF-2B SAE O-Ring port with shuttle valve

15	Low pressure relief
0	None
A	Set at 4.5 [65 lbf/in ²]
B	Set at 15.2 [220 lbf/in ²]

16	17	Pressure/flow option
00		None

18	Geroler option
0	Standard
2	Tight fitting

19	Seal option
0	Standard
1	Viton
2	Viton Shaft Seal
3	Seal Guard
5	Heavy Duty Seal Guard
6	Extreme Duty Seal Guard

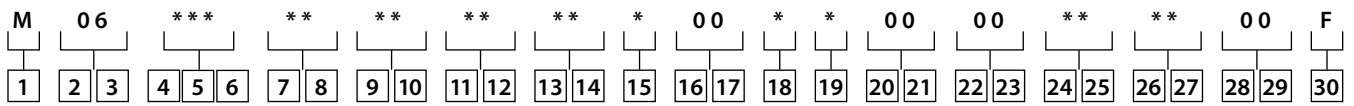
20	21	Accessories
00		None

22	23	Special features (hardware)
00		None

24	25	Special features (assembly)
00		None
AA		Reverse rotation

6000 Series

Model code



26	27	Paint/Packaging
00		No Paint, Individual box
AA		Low gloss black primer
AD		No Paint, Bulk box option
AE		Low gloss black primer, Bulk box option
AK		Epoxy coated black
28	29	Customer ID
00		None
30		Design code
F		Sixth

10,000 Series

Highlights

Description:

This is the biggest disc valve motor of our line with up to 170 lpm [45 gpm] and 2700 Nm [23,910 in-lbs] in-lb of torque in continuous mode, this motor is powerful and yet provides exceptional efficiency and side-load capability.



Features:

- High torque and flow
- Speed sensing capability
- Low pressure loss even in higher flows

Benefits:

- High power density for demanding mobile and industrial applications
- Large front bearing pack

Applications:

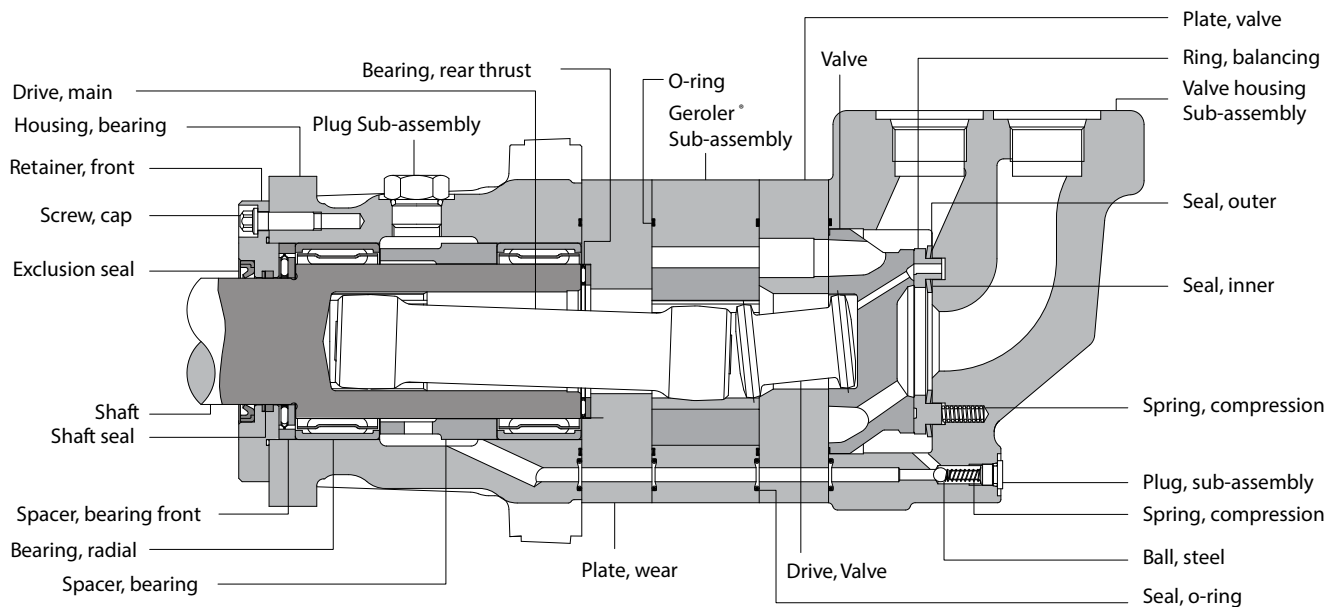
- Boring
- Industrial
- Metal forming
- Port equipment
- Saw mill

Specifications

Geroler element	4 Displacements
Flow l/min [GPM]	170 [45] Continuous**
	265 [70] Intermittent*
Speed RPM	501 Cont.**
	784 Inter.*
Pressure bar [PSI]	205 [3000] Cont.**
	275 [4000] Inter.*
Torque Nm [lb-in]	2700 [23910] Cont.**
	3440 [30460] Inter.*

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

C-6



10,000 series motors

Displ. cm ³ /r [in ³ /rev]		345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]
Max speed (RPM) @ Flow	Continuous	501	354	254	179
	Intermittent	784	552	396	279
Flow l/min [GPM]	Continuous	170 [45]	170 [45]	170 [45]	170 [45]
	Intermittent	265 [70]	265 [70]	265 [70]	265 [70]
Torque* Nm [lb - in]	Continuous	1040 [9220]	1475 [13050]	2085 [18450]	2700 [23910]
	Intermittent	1390 [12310]	1965 [17410]	2610 [23080]	3440 [30460]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	190 [2750]
	Intermittent	275 [4000]	275 [4000]	260 [3750]	240 [3500]
	Peak	275 [4000]	275 [4000]	275 [4000]	260 [3750]
Weight kg [lb]	Standard or wheel mount	43.5 [96.0]	45.4 [100.0]	46.3 [100.0]	47.2 [104.0]
	Bearingless	31.3 [69.0]	33.1 [73.0]	33.1 [73.0]	34.9 [77.0]

*See shaft torque ratings for limitations..

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

Maximum inlet pressure:

275 bar [4000 PSI]

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

Maximum return pressure:

275 bar [4000 PSI] with case drain line installed.

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

Maximum case pressure:

20 bar [300 PSI]

Δ bar [Δ PSI]:

The true pressure difference between inlet port and outlet port

Continuous rating:

Motor may be run continuously at these ratings

Intermittent operation:

10% of every minute

Peak operation:

1% of every minute

Recommended fluids:

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

Recommended system operating temp.:

-34°C to 82°C
[-30°F to 180°F]

Recommended filtration:

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

Thermal shock warning:

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

Minimum delta pressure warning:

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

10,000 Series

Performance data

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

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



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

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]
17	34	69	103	138	172	207	241	276

[1]	[600]	[1310]							
4	70	150							
	3	1							
[2]	[740]	[1510]	[3050]	[4600]	[6140]	[7680]			
8	85	170	345	520	695	870			
	21	19	15	11	8	4			
[4]	[730]	[1500]	[3040]	[4590]	[6140]	[7680]	[9220]	[10770]	[12310]
15	80	170	345	520	695	870	1040	1215	1390
	43	41	37	33	30	26	22	18	14
[8]	[720]	[1490]	[3030]	[4580]	[6120]	[7670]	[9210]	[10750]	[12300]
30	80	170	340	515	690	865	1040	1215	1390
	87	86	82	78	74	70	66	62	58
[12]	[700]	[1470]	[3020]	[4560]	[6100]	[7650]	[9190]	[10740]	[12280]
45	80	165	340	515	690	865	1040	1215	1385
	131	130	127	123	118	114	110	106	102
[16]	[680]	[1450]	[3000]	[4540]	[6080]	[7630]	[9170]	[10720]	[12260]
61	75	165	340	515	685	860	1035	1210	1385
	176	175	172	167	163	158	154	149	145
[20]	[660]	[1430]	[2970]	[4520]	[6060]	[7600]	[9150]	[10690]	[12230]
76	75	160	335	510	685	860	1035	1210	1380
	221	220	217	212	207	202	198	193	189
[24]	[630]	[1400]	[2950]	[4490]	[6030]	[7580]	[9120]	[10660]	[12210]
91	70	160	335	505	680	855	1030	1205	1380
	266	265	261	256	252	246	242	237	232
[28]	[600]	[1370]	[2920]	[4460]	[6000]	[7550]	[9090]	[10640]	[12180]
106	70	155	330	505	680	855	1025	1200	1375
	310	309	306	301	296	291	286	280	275
[32]	[570]	[1340]	[2890]	[4430]	[5970]	[7520]	[9060]	[10610]	[12150]
121	65	150	325	500	675	850	1025	1200	1375
	356	355	351	346	340	335	329	324	319
[36]	[540]	[1310]	[2850]	[4400]	[5940]	[7480]	[9030]	[10570]	[12120]
136	60	150	320	495	670	845	1020	1195	1370
	400	399	396	390	384	379	373	368	362
[40]	[500]	[1270]	[2820]	[4360]	[5910]	[7450]	[8990]	[10540]	
151	55	145	320	495	670	840	1015	1190	
	445	444	441	435	429	423	417	412	
[45]	[460]	[1220]	[2760]	[4300]	[5840]	[7380]	[8910]	[10450]	
170	50	140	310	485	660	835	1005	1180	
	501	500	498	492	486	480	473	467	
[60]		[1080]	[2620]	[4160]	[5710]	[7250]	[8800]		
227		120	295	470	645	820	995		
		668	665	658	651	644	637		
[70]		[960]	[2510]	[4050]	[5590]	[7140]	[8680]		
265		110	285	460	630	805	980		
		784	777	769	761	754	746		

[2510] } Torque [lb-in]
285 } Nm
777 } Speed RPM

10,000 Series

Performance data

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

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

Continuous
Intermittent

Peak
No operation

**Δ Pressure bar [PSI]
480 cm³/r [29.3 in³/r]**

[250]	[500]	[1000]	[1500]	[2000]	[2500]	[3000]	[3500]	[4000]
17	34	69	103	138	172	207	241	276

[1]	[760]	[1540]	[3120]	[4640]					
4	85	175	355	525					
	6	5	4	2					
[2]	[1040]	[2140]	[4320]	[6500]	[8690]	[10870]			
8	120	240	490	735	980	1230			
	15	13	11	8	5	2			
[4]	[1040]	[2130]	[4310]	[6490]	[8680]	[10860]	[13050]	[15230]	[17410]
15	120	240	485	735	980	1225	1475	1720	1965
	31	29	27	24	21	18	16	13	10
[8]	[1020]	[2110]	[4290]	[6480]	[8660]	[10840]	[13030]	[15210]	[17390]
30	115	240	485	730	980	1225	1470	1720	1965
	62	61	58	55	53	50	47	44	42
[12]	[990]	[2080]	[4270]	[6450]	[8630]	[10820]	[13000]	[15180]	[17370]
45	110	235	480	730	975	1220	1470	1715	1965
	94	93	90	87	84	81	78	75	73
[16]	[960]	[2060]	[4240]	[6420]	[8600]	[10790]	[12970]	[15150]	[17340]
61	110	235	480	725	970	1220	1465	1710	1960
	125	124	122	119	116	113	110	107	104
[20]	[930]	[2020]	[4200]	[6390]	[8570]	[10750]	[12940]	[15120]	[17300]
76	105	230	475	720	970	1215	1460	1710	1955
	157	156	154	150	147	144	141	138	135
[24]	[890]	[1980]	[4170]	[6350]	[8530]	[10720]	[12900]	[15080]	
91	100	225	470	715	965	1210	1460	1705	
	189	188	185	182	179	175	172	169	
[28]	[850]	[1940]	[4130]	[6310]	[8490]	[10680]	[12860]	[15040]	
106	95	220	465	715	960	1205	1455	1700	
	221	220	217	214	210	207	203	200	
[32]	[810]	[1900]	[4080]	[6270]	[8450]	[10630]	[12820]	[15000]	
121	90	215	460	710	955	1200	1450	1695	
	252	251	249	245	242	238	235	231	
[36]	[760]	[1850]	[4040]	[6220]	[8400]	[10590]	[12770]		
136	85	210	455	705	950	1195	1445		
	282	281	280	277	273	270	266		
[40]	[710]	[1800]	[3990]	[6170]	[8350]	[10540]	[12720]		
151	80	205	450	695	945	1190	1435		
	318	316	312	308	305	301	297		
[45]	[647]	[1740]	[3920]	[6110]	[8290]	[10470]	[12660]		
170	75	195	445	690	935	1185	1430		
	354	353	351	348	344	340	336		
[60]	[430]	[1520]	[3710]	[5890]	[8070]	[10260]	[12440]		
227	50	170	420	665	910	1160	1405		
	474	473	471	467	462	458	454		
[70]		[1360]	[3540]	[5730]	[7910]	[10100]	[12280]		
265		155	400	645	895	1140	1385		
		552	550	546	541	536	532		

C-6

10,000 Series

Performance data

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

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



**Δ Pressure bar [PSI]
665 cm³/r [40.6 in³/r]**

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]	[3750]
17	34	52	69	86	103	121	138	155	172	190	207	224	241	259

Flow LPM [GPM]	[1]	[1470]	[3010]	[4550]	[6100]	[7630]													
	4	165	340	515	690	860													
		4	3	3	2	1													
	[2]	[1480]	[3020]	[4560]	[6110]	[7650]	[9200]	[10740]	[12280]	[13830]	[15370]	[16910]							
	8	165	340	515	690	865	1040	1215	1385	1565	1735	1910							
		10	9	8	7	7	6	5	4	3	2	1							
	[4]	[1470]	[3010]	[4550]	[6100]	[7640]	[9190]	[10730]	[12270]	[13820]	[15360]	[16900]	[18450]	[19990]	[21540]	[23080]			
	15	165	340	515	690	865	1040	1210	1385	1560	1735	1910	2085	2260	2435	2610			
		22	21	20	19	18	17	16	15	14	13	12	11	10	9	8			
	[8]	[1440]	[2980]	[4530]	[6070]	[7610]	[9160]	[10700]	[12250]	[13790]	[15330]	[16880]	[18420]	[19960]	[21510]	[23050]			
	30	165	335	510	685	860	1035	1210	1385	1560	1730	1905	2080	2255	2430	2605			
		44	43	42	41	40	39	38	37	36	35	34	33	32	32	31			
	[12]	[1400]	[2950]	[4490]	[6040]	[7580]	[9120]	[10670]	[12210]	[13750]	[15300]	[16840]	[18380]	[19930]	[21470]	[23020]			
	45	160	335	505	680	855	1030	1205	1380	1555	1730	1905	2075	2250	2425	2600			
		67	66	65	64	63	62	61	60	59	58	57	56	55	54	53			
	[16]	[1360]	[2910]	[4450]	[5990]	[7540]	[9080]	[10620]	[12170]	[13710]	[15260]	[16800]	[18340]	[19890]	[21440]				
	61	155	330	505	675	850	1025	1200	1375	1550	1725	1900	2070	2245	2420				
	89	88	87	86	85	84	83	82	81	80	79	78	77	76					
[20]	[1310]	[2860]	[4400]	[5940]	[7490]	[9030]	[10580]	[12120]	[13660]	[15210]	[16750]	[18300]	[19840]						
76	150	375	495	670	845	1020	1195	1370	1545	1720	1890	2070	2240						
	112	111	110	109	108	107	106	104	103	102	101	100	99						
[24]	[1260]	[2800]	[4350]	[5890]	[7440]	[8980]	[10520]	[12070]	[13610]	[15150]	[16700]	[18240]							
91	140	315	490	665	840	1015	1190	1365	1540	1710	1885	2060							
	135	134	132	131	130	129	128	127	126	124	123	122							
[28]	[1200]	[2750]	[4290]	[5840]	[7380]	[8920]	[10470]	[12010]	[13550]	[15100]	[16640]								
106	135	310	485	660	835	1010	1185	1355	1530	1705	1880								
	157	156	155	154	153	151	150	149	148	147	146								
[32]	[1140]	[2690]	[4230]	[5770]	[7320]	[8860]	[10400]	[11950]	[13490]	[15040]	[16580]								
121	130	305	480	650	825	1000	1175	1350	1525	1700	1875								
	180	179	177	176	175	174	173	172	170	169	168								
[36]	[1080]	[2620]	[4160]	[5710]	[7250]	[8800]	[10340]	[11880]	[13430]	[14970]	[16510]								
136	120	295	470	645	820	995	1170	1340	1515	1690	1865								
	202	201	200	199	198	196	195	194	193	191	190								
[40]	[1010]	[2550]	[4100]	[5640]	[7180]	[8730]	[10270]	[11810]	[13360]	[14900]	[16440]								
151	115	290	465	635	810	985	1160	1335	1510	1685	1855								
	225	224	222	221	220	219	217	216	215	214	212								
[45]	[920]	[2460]	[4000]	[5550]	[7090]	[8630]	[10180]	[11720]	[13260]	[14810]									
170	105	280	450	625	800	975	1150	1325	1500	1675									
	254	252	251	249	248	247	245	244	243	242									
[60]	[610]	[2150]	[3700]	[5240]	[6780]	[8330]	[9870]	[11420]	[12960]										
227	70	245	420	590	765	940	1115	1290	1465										
	338	336	335	334	332	331	329	328	327										
[70]	[380]	[1930]	[3470]	[5010]	[6560]	[8100]	[9640]	[11190]											
265	45	220	390	565	740	915	1090	1265											
	396	393	391	390	388	387	385	384											

[3470] } Torque [lb-in]
390 } Nm
391 } Speed RPM

10,000 Series

Performance data


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

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

 Continuous

 Intermittent

 Peak

 No operation

**Δ Pressure bar [PSI]
940 cm³/r [57.4 in³/r]**

[250]	[500]	[750]	[1000]	[1250]	[1500]	[1750]	[2000]	[2250]	[2500]	[2750]	[3000]	[3250]	[3500]
17	34	52	69	86	103	121	138	155	172	190	207	224	241

Flow LPM [GPM]	[1]	[2080]	[4260]	[6440]															
	4	235	480	730															
		3	2	1															
	[2]	[2090]	[4270]	[6450]	[8640]	[10820]	[13000]	[15190]	[17370]										
	8	235	480	730	975	1220	1470	1715	1965										
		7	6	5	5	4	3	2	1										
	[4]	[2080]	[4260]	[6440]	[8620]	[10810]	[12990]	[15170]	[17360]	[19540]	[21720]	[23910]	[26090]	[28270]	[30460]				
	15	235	480	730	975	1220	1470	1715	1960	2210	2455	2700	2950	3195	3440				
		15	14	13	13	12	11	10	9	8	7	7	6	5	4				
	[8]	[2040]	[4220]	[6400]	[8590]	[10770]	[12950]	[15140]	[17320]	[19500]	[21690]	[23870]							
	30	230	475	725	970	1215	1465	1710	1955	2205	2450	2695							
		31	30	29	28	28	27	26	25	24	23	22							
	[12]	[1990]	[4170]	[6350]	[8540]	[10720]	[12900]	[15090]	[17270]	[19450]	[21640]								
	45	225	470	715	965	1210	1460	1705	1950	2200	2445								
		47	46	45	44	43	43	42	41	40	39								
	[16]	[1930]	[4110]	[6290]	[8480]	[10660]	[12840]	[15030]	[17210]	[19390]									
	61	220	465	710	960	1205	1450	1700	1945	2190									
		63	62	61	60	59	58	58	57	56									
	[20]	[1860]	[4040]	[6220]	[8410]	[10590]	[12770]	[14960]	[17140]	[19320]									
76	210	455	705	950	1195	1445	1690	1935	2185										
	79	78	77	76	75	74	73	72	72										
[24]	[1780]	[3970]	[6150]	[8330]	[10520]	[12700]	[14880]	[17080]											
91	200	450	695	940	1190	1435	1680	1930											
	95	94	93	92	91	90	89	88											
[28]	[1700]	[3890]	[6070]	[8250]	[10440]	[12620]	[14800]	[16990]											
106	190	440	685	930	1180	1425	1675	1920											
	111	110	109	108	107	106	105	104											
[32]	[1620]	[3800]	[5980]	[8160]	[10350]	[12530]	[14720]												
121	185	430	675	920	1170	1415	1665												
	127	126	125	124	123	122	121												
[36]	[1520]	[3710]	[5890]	[8070]	[10260]	[12440]	[14620]												
136	170	420	665	910	1160	1405	1650												
	143	142	141	140	139	138	137												
[40]	[1420]	[3610]	[5790]	[7970]	[10160]	[12340]	[14520]												
151	160	410	655	900	1150	1395	1640												
	159	158	157	156	155	154	153												
[45]	[1290]	[3480]	[5660]	[7840]	[10020]	[12210]	[14400]												
170	145	395	640	885	1130	1380	1625												
	179	178	177	176	174	174	173												
[60]	[860]	[3040]	[5230]	[7410]	[9600]	[11780]													
227	95	345	590	835	1085	1330													
	239	238	236	235	234	233													
[70]	[540]	[2720]	[4910]	[7090]	[9270]	[11460]													
265	60	305	555	800	1045	1295													
	279	278	276	275	274	273													

C-6

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)
- 4 Bolt 11/4 inch split flange ports (2)
- 9/16 -18 UNF-2B SAE O-ring case drain port (1)

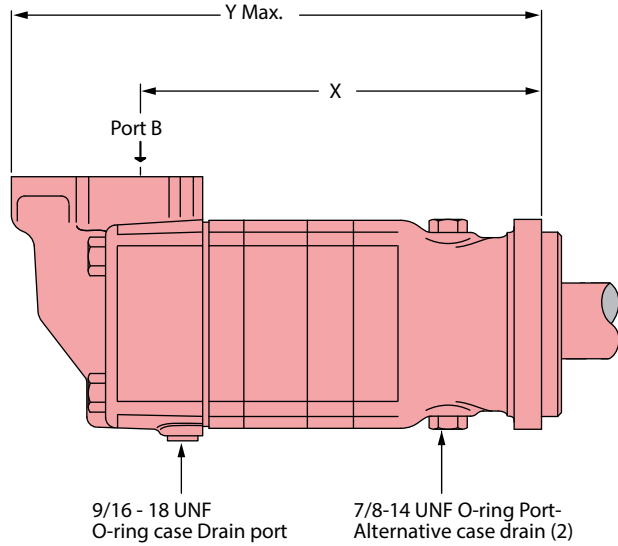
Standard rotation viewed from shaft end

- Port A pressurized — CW
- Port B pressurized — CCW

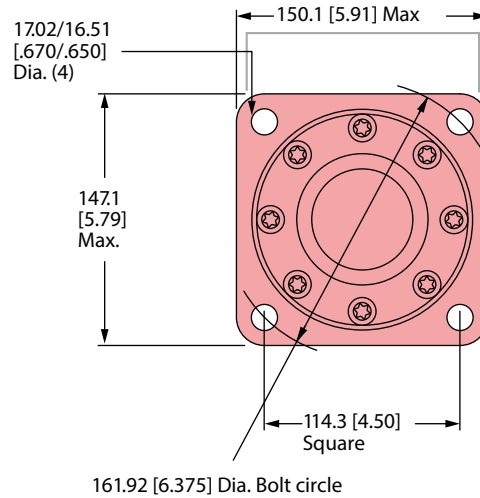
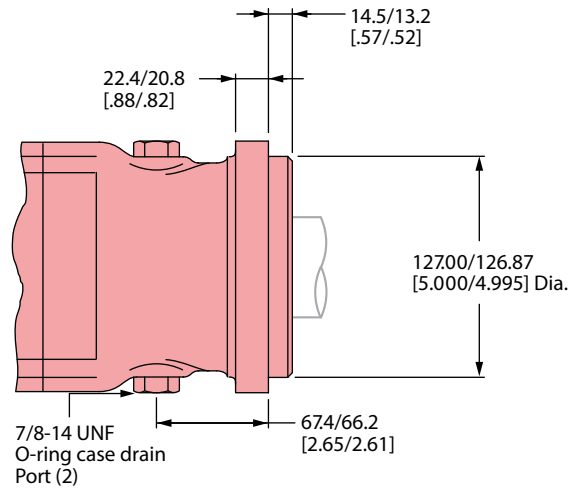
Standard mount motor dimensions

Displacement cm^3/r [in^3/r]	X mm [inch]	Y mm [inch]
345 [21.0]	282.4 [11.12]	380.9 [15]
480 [29.2]	295.1 [11.62]	393.6 [15.50]
585 [35.6]	304.9 [11.99]	403.3 [15.88]
665 [40.6]	295.1 [11.62]	393.6 [15.50]
940 [57.4]	313.4 [12.34]	412.1 [16.22]

Standard mount



C-6



Ports

- 1 5/16 -12 UN-2B SAE O-ring staggered ports (2)
- 9/16 -18 UNF-2B SAE O-ring case drain port (1)
- 4 Bolt 1 1/4 inch split flange ports (2)
- 9/16 -18 UNF-2B SAE O-ring case drain port (1)

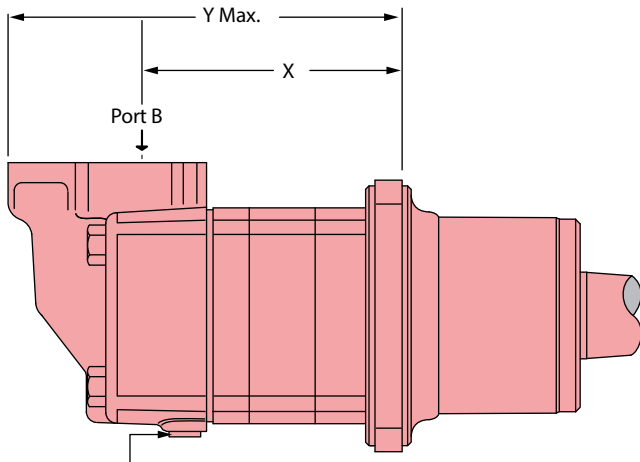
Standard rotation viewed from shaft end

- Port A pressurized — CW
- Port B pressurized — CCW

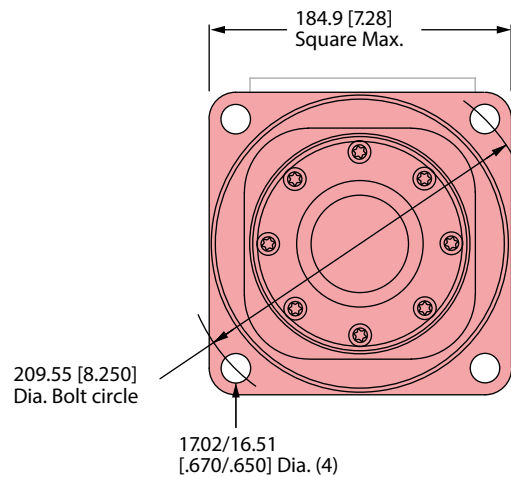
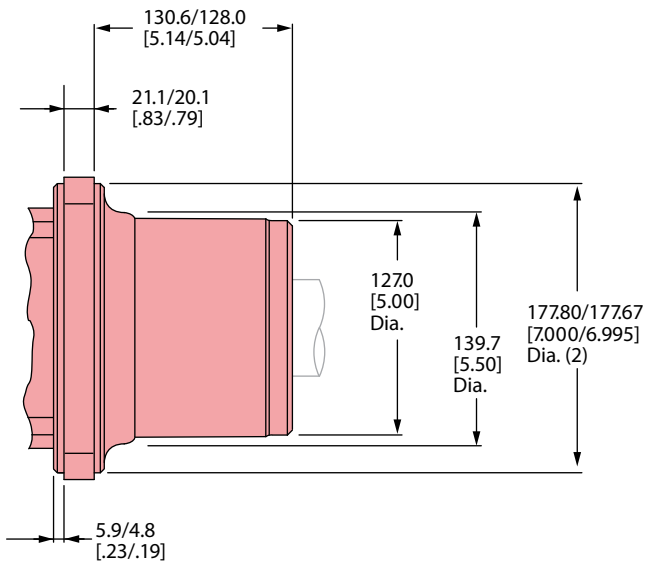
Wheel mount motor dimensions

Displacement cm ³ /r [in ³ /r]	X mm [inch]	Y mm [inch]
345 [21.0]	166.9 [6.57]	265.9 [10.47]
480 [29.2]	179.6 [7.07]	278.6 [10.97]
585 [35.6]	179.3 [7.06]	288.4 [35.6]
665 [40.6]	179.6 [7.07]	278.6 [10.97]
940 [57.4]	197.8 [7.79]	297.2 [11.70]

Wheel mount



9/16 - 18 UNC O-ring case drain port



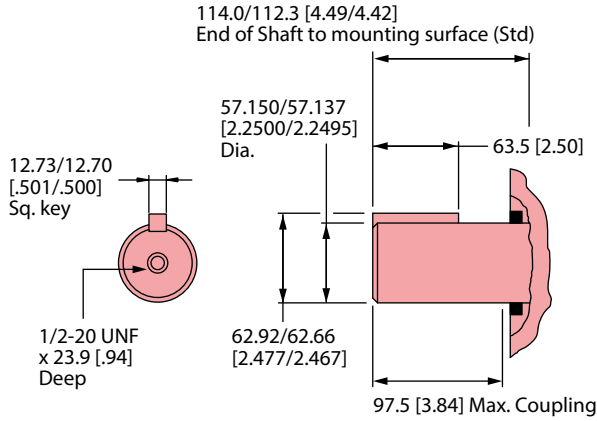
10,000 Series

Dimensions

Shafts

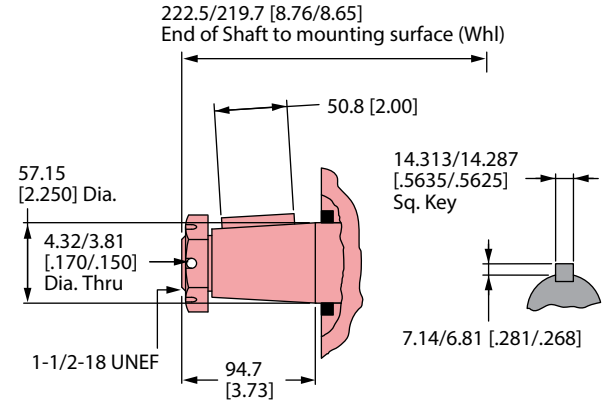
Code: 01 2 1/4 Inch straight

2712 [24000] Max. Torque Nm [lb-in]



Code: 02 2 1/4 Inch tapered

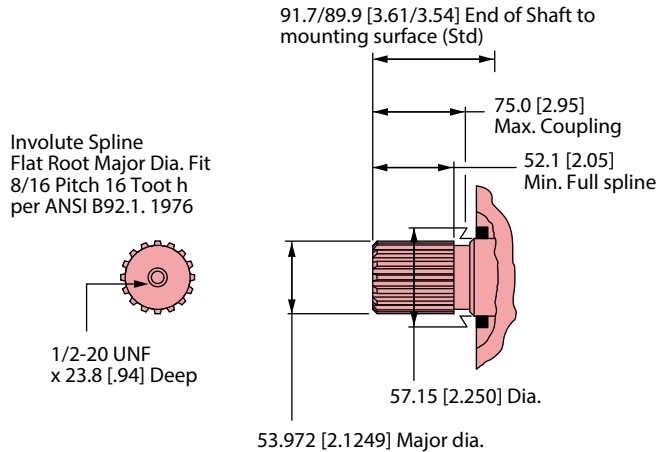
2712 [24000] Max. Torque Nm [lb-in]



SAE J501 Standard tapered shaft 125.00 0.17 Taper per Meter [1.500±.002 Taper per Foot]

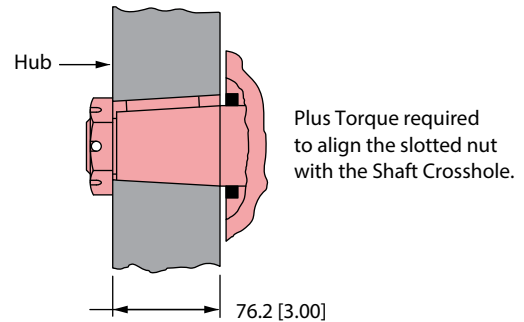
Code: 03 2 1/8 Inch 16 Tooth splined

2712 [24000] Max. Torque Nm [lb-in]

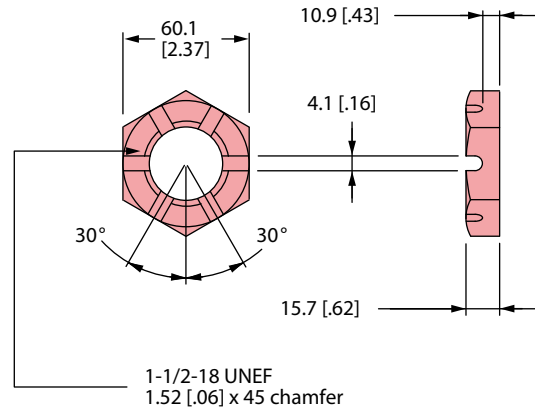


Tapered shaft hub data

Recommended torque:
(1150 Nm [850 lb-ft] Dry)
(880 Nm [650 lb-ft] Lub)



Slotted hexagon nut



10,000 Series

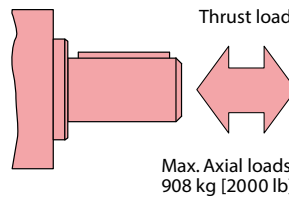
Side shaft load capacity

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].

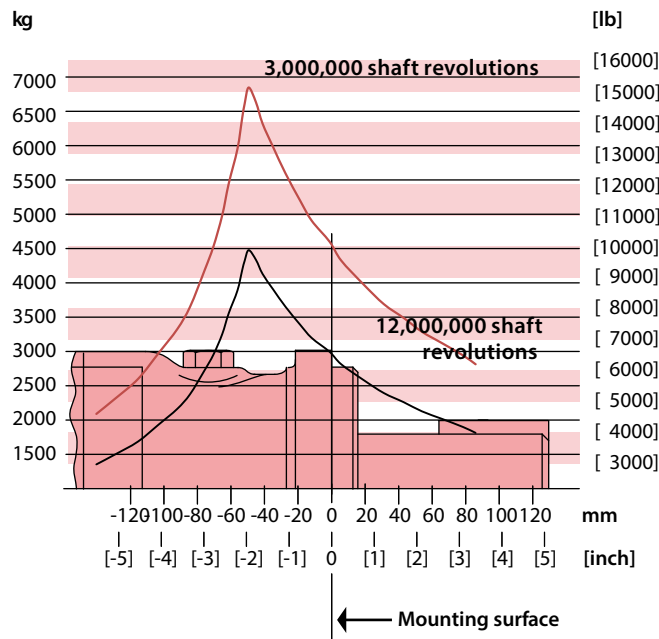
Each curve is based on B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

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.

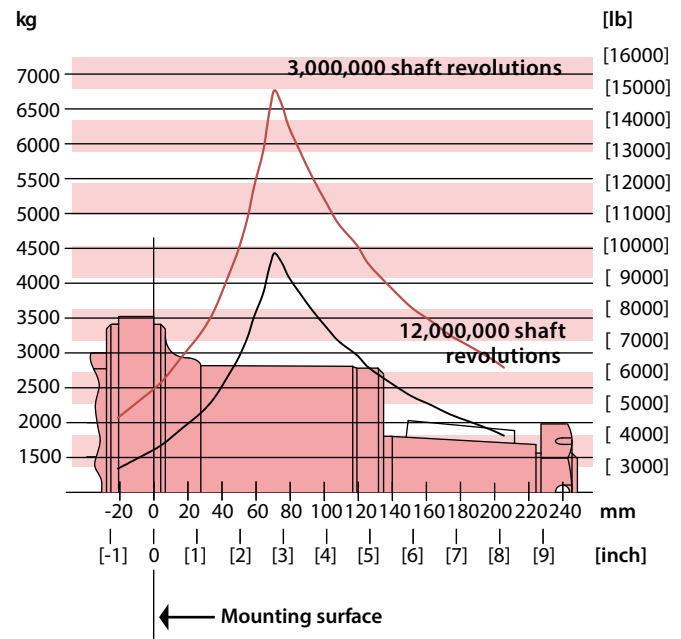


RPM	Multiplication factor
50	1.23
100	1.00
200	0.81
300	0.72
400	0.66
500	0.62
600	0.58
700	0.56
800	0.54

Standard motor straight and splined shaft



Wheel motor tapered shaft



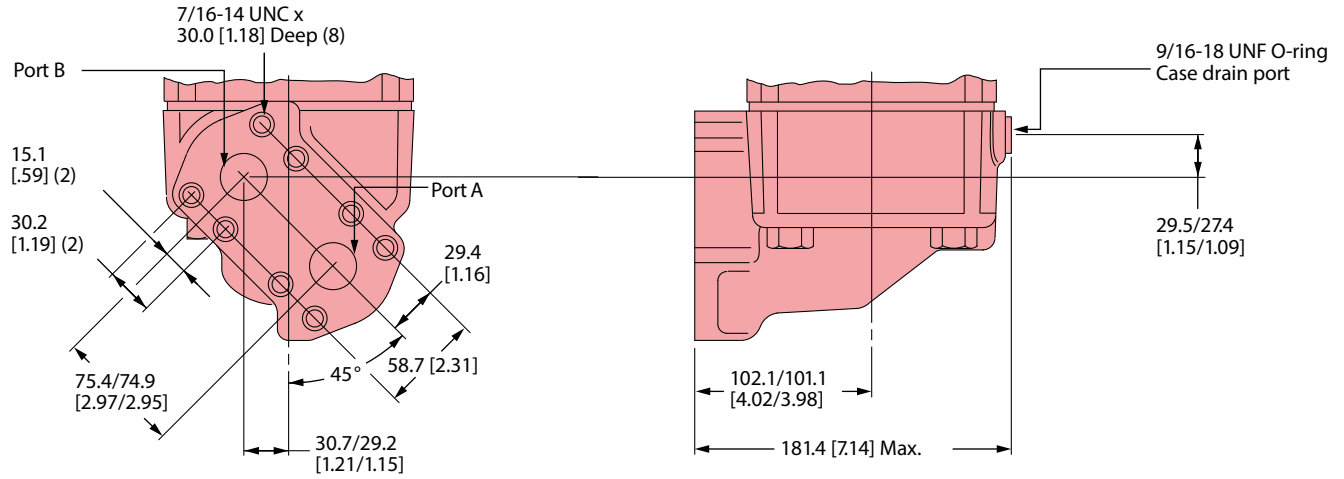
C-6

10,000 Series

Dimensions

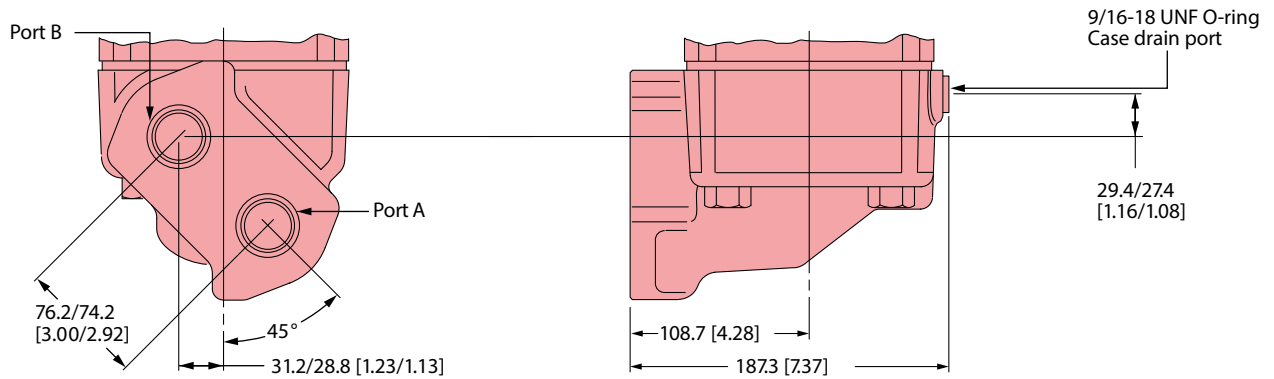
Ports

Code: AB 1 1/4 inch split flange ports (2)

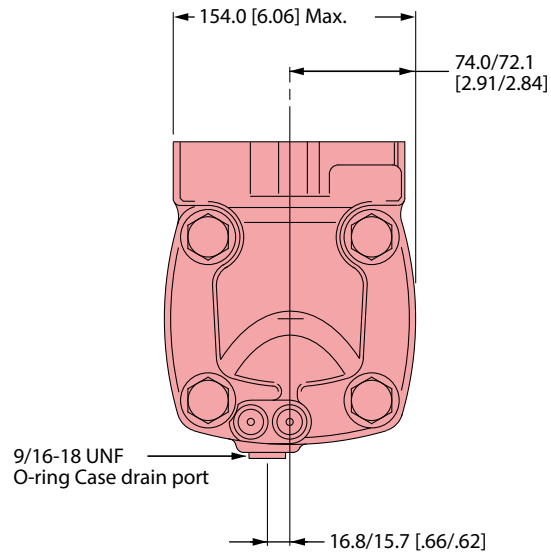


C-6

Code: AA 1 5/16-12 O-ring ports (2)



EndView 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- or 120- plus four digit number from charts for complete product number— Example 120-1014

Orders will not be accepted without three digit prefix.

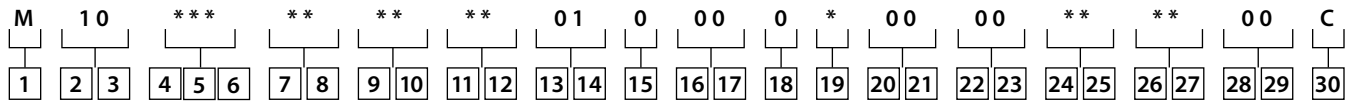
Mounting	Shaft	Port size	Displ. cm ³ /r [in ³ /r] / product number				
			345 [21.0]	480 [29.3]	665 [40.6]	940 [57.4]	
Standard SAE C-Mount	2 1/4 Inch Straight	1 5/16 O-ring	119-1028	-1029	-1030	-1031	
		1 1/4 inch Split flange	119-1040	-1041	-1042	-1043	
	2 1/8 Inch 16 T Splined	1 5/16 O-ring	119-1032	-1033	-1034	-1035	
		1 1/4 inch Split flange	119-1044	-1045	-1045	-1047	
	2 1/4 Inch Tapered	1 5/16 O-ring	119-1036	-1037	-1038	-1039	
		1 1/4 inch Split flange	119-1048	-1049	-1050	-1051	
	Wheel motor	2 1/4 Inch straight	1 5/16 O-ring	–	-1006	-1007	-1008
			1 1/4 inch Split flange	–	–	–	-1020
2 1/8 Inch 16 T Splined		1 5/16 O-ring	–	–	-1011	-1012	
		1 1/4 inch Split flange	–	–	–	–	
2 1/4 Inch Tapered		1 5/16 O-ring	120-1013	-1014	-1015	-1016	
		1 1/4 inch Split flange	–	-1029	-1027	-1028	

C-6

10,000 Series

Model code

The following 30-digit coding system has been developed to identify all of the configuration options for the 10,000 Series motor. Use this model code to specify a motor with the desired features. All 30-digits of the code must be present when ordering.



1	Product	M Motor	15	Low pressure relief	0 None
2 3	Series	10 10,000 Series	16 17	Pressure/flow option	00 None
4 5 6	Displacement cm³/r [in³/r]	210 343.8 [20.98] 293 479.5 [29.26] 406 665.3 [40.60] 574 940.8 [57.41]	18	Geroler option	0 Standard
7 8	Mounting description	AA Standard, 4 Bolt: 12,70 [5.00] Pilot Dia. 16,76 [6.60] Dia. Holes on 161,92 [6.375] Dia. Bolt circle AB Wheel, 4 Bolt: 16,76 [6.60] Dia. Holes on 209,55 [8.250] Dia. Bolt circle	19	Seal option	0 Standard 4 Seal guard
9 10	Output shaft description	01 57,15 [2.250] Dia. Straight with .500-20 UNF-2B thread in end, 12,7 [50] square x 63,5 [2.50] straight end 02 57,15 [2.250] Dia. .125:1 tapered shaft per SAE J512 with 1.500-18 UNEF-2A threaded shaft end and slotted hex nut, 14,288 [5.625] square x 50,8 [2.00] straight key 03 53,98 [2.125] Dia. flat root, major dia. Fit, 16 tooth, 8/16 DP 30 degree involute spline with .500-20 UNF-20 thread in End. 52,07 [2.050] minimum full spline length	20 21	Accessories	00 None
11 12	Ports	AA 1.3125 -12 UNF-2B O-Ring staggered ports AB 31,75 [1.250] Dia. 4 Bolt split flange staggered ports with .4375-15 UNC-2B Tapped mounting holes	22 23	Special features (hardware)	00 None
13 14	Case flow options	01 .5625-18 UNF-2B Case Drain SAE O-Ring Port	24 25	Special features (assembly)	00 None AA Reverse rotation
			26 27	Paint/packaging	00 None AA Low gloss black primer
			28 29	Customer identification	00 None
			30	Design code	C Third

Char-Lynn Specialty Motors

Orbit motor



Introduction

D-1

With over 45 years of manufacturing in Kameoka, Japan, Danfoss' global suite of low speed high torque motors are customers first choice for swing and track drive applications. With industry leading control and efficiency, these motors are

tuned for use at very low flows and speeds. Their compact integrated design, allows for substantial space savings and integrated propel valves and brake packages simplify systems and offer valuable solutions.

Table of Contents

Brake Motors

S Series with Pin Brake

Characteristics & Advantages.....	252
Specifications.....	252
Circuit Diagram.....	252
Model code.....	253
Dimensions and installation data.....	254

S Series with Mechanical Brake

Characteristics & Advantages.....	255
Specifications.....	255
Circuit Diagram.....	255
Model code.....	256
Dimensions and installation data.....	257

2000 Series with Mechanical Brake (Brake torque 98-196 Nm)

Characteristics & Advantages.....	258
Specifications.....	258
Circuit Diagram.....	258
Model code.....	259
Dimensions and installation data.....	260

2000 Series with Mechanical Brake (Brake torque 294-392 Nm)

Specifications.....	262
Model code.....	263
Dimensions and installation data.....	264

Swing Motors

General Introduction.....	266
---------------------------	-----

S Series for Swing

Characteristics & Advantages.....	267
Specifications.....	267
Circuit Diagram.....	267
Model code.....	267
Dimensions and installation data.....	268
Side load capacity.....	269

2K Series for Swing

Characteristics & Advantages.....	270
Specifications.....	270
Circuit Diagram.....	270
Model code.....	270

Pinion gear dimensions.....	270
Dimensions and installation data.....	270

2.5K Series for Swing

Characteristics & Advantages.....	274
Specifications.....	274
Circuit Diagram.....	274
Model code.....	274
Pinion gear dimensions.....	275
Dimensions and installation data.....	275

4K Series for Swing

Characteristics & Advantages.....	278
Specifications.....	278
Circuit Diagram.....	278
Model code.....	278
Pinion gear dimensions.....	279
Dimensions and installation data.....	279

4.5K Series for Swing

Characteristics & Advantages.....	280
Specifications.....	280
Circuit Diagram.....	280
Model code.....	280
Dimensions and installation data.....	281

Traction Motors

General Introduction.....	283
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K-D Series for Traction

Characteristics & Advantages.....	284
Specifications.....	284
Circuit Diagram.....	284
Model code.....	284
Dimensions and installation data.....	285

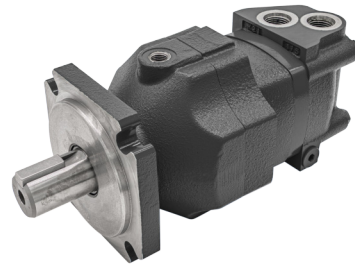
TRB Series for Traction

Characteristics & Advantages.....	286
Circuit Diagram.....	286
Model code.....	286
Specification.....	287
Dimensions and installation data.....	287

Orbit Motor, Optional products line 290

Char-Lynn Low speed high torque orbit motor for brake application

S Series with pin brake, S Series with mechanical brake
and 2000 Series with mechanical brake



S Series Motor with Pin Brake

D-1

Characteristics & Advantages

The S series Motor with a pin brake offers an easy parking brake option within the Spool Motor category. The simple design provides a reliable and cost effective solution.

These motors can be chosen with an external or internal pilot system.



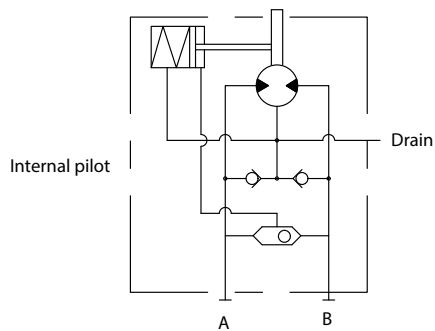
Specifications

Series	Brake torque	Brake release pressure	Brake release system
SBP	5.9 Nm [52.22 lb-in]	5 bar [73 psi]	Internal Pilot
SBR	5.9 Nm [52.22 lb-in]	5 bar [73 psi]	External Pilot

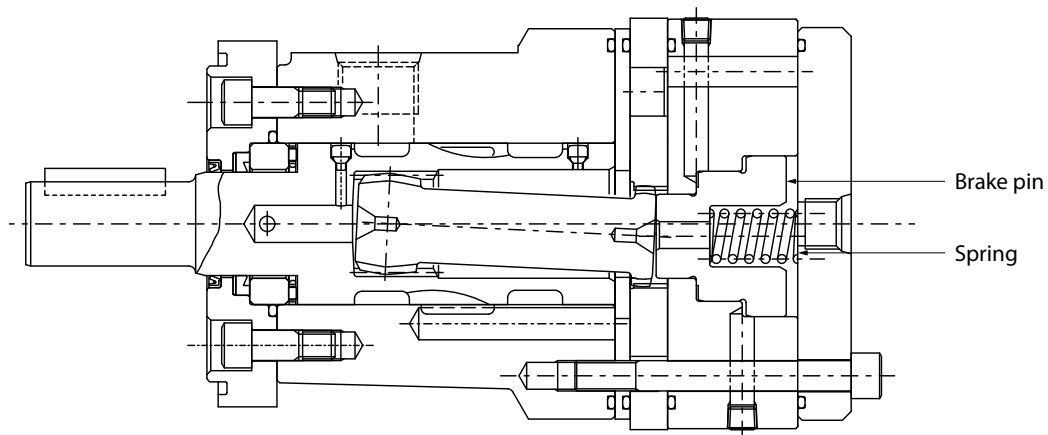
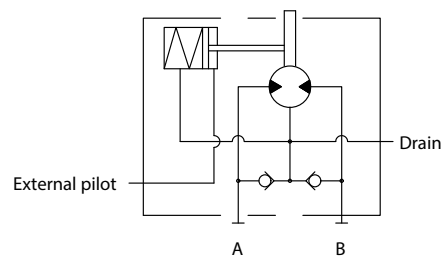
Note:

1. Must use an external drain line
2. Do not operate the pin brake in dynamic conditions
3. Output shaft is locked at a position of 60°

SBP Series



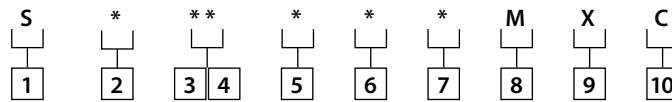
SBR Series



S Series Motor with Pin Brake

Model code

D-1



1	Series	S S Series motor with pin brake
2	Brake specifications	P Internal Pilot, 5.9Nm [52.22 lb-in] R External Pilot, 5.9Nm [52.22 lb-in]
3 4	Displacement	05 58cm ³ /r [3.5 in ³ /r] 07 76cm ³ /r [4.6 in ³ /r] 10 93cm ³ /r [5.7 in ³ /r] 12 120cm ³ /r [7.3 in ³ /r] 14 144cm ³ /r [8.8 in ³ /r]
5	Port	A G1/2 O-ring port B Manifold mount C 1/2NPTF port D Rc1/2 port E 7/8UNF O-ring port

6	Shaft	B Ø1" SAE 6B Splined shaft C Ø1" Straight with Woodruff key D Ø25 Straight with Parallel key, 8mm
7	Flange mounting	2 2 Bolt 4 4 Bolt
8	Special features (none of standard motor)	B Special seal for phosphate ester fluid M Metric mounting holes
9	Drain port	X Standard, with Drain port
10	Design code	

S Series Motor with Pin Brake

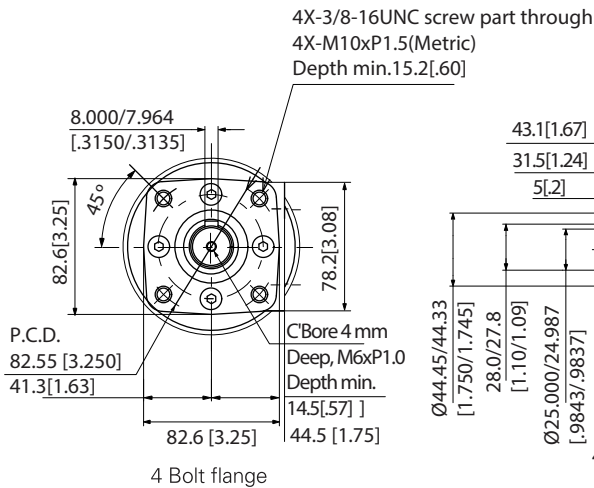
D-1

Dimension and mounting data

- Rotation: Viewed from shaft end
- CW: Port A pressurized
- CCW: Port B pressurized

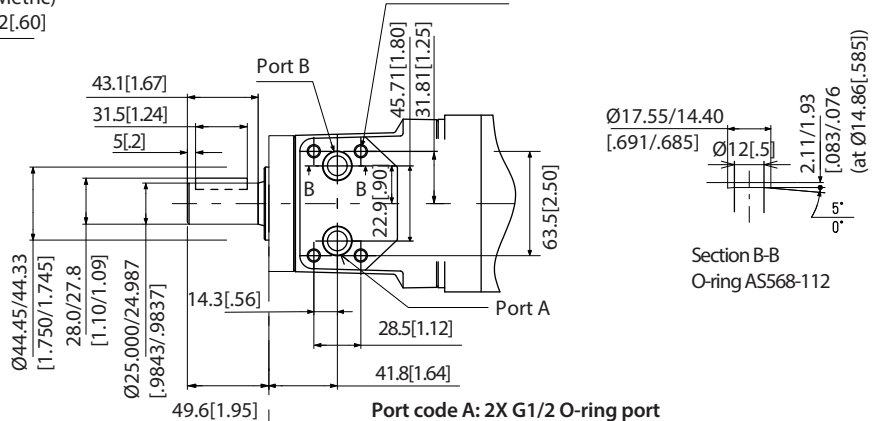
Model	X: Length mm [inch]	Y: Length mm [inch]
SB-05	5.30[134.7]	6.76[171.7]
SB-07	5.39[137.0]	6.85[174.0]
SB-10	5.48[139.2]	6.94[176.2]
SB-12	5.62[142.7]	7.07[179.7]
SB-14	5.74[145.8]	7.20[182.8]

Shaft code: D Ø25 Straight shaft
with Parallel key, 8 mm
Max.Torque: 350 N-m [3098 lb-in]



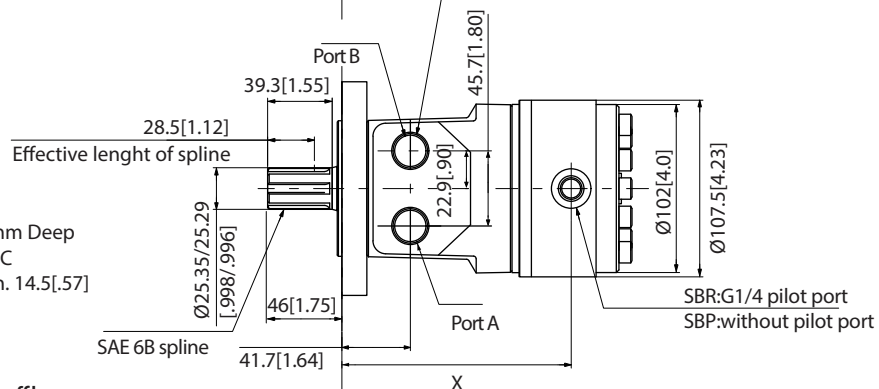
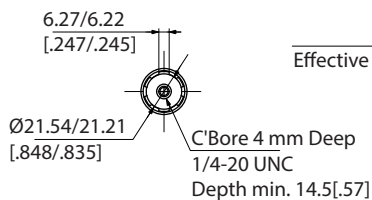
Port code B: Manifold mount

4X-5/16-18UNC
4X-M8xP1.25(Metric coarse screw threads)
12.7 DP.

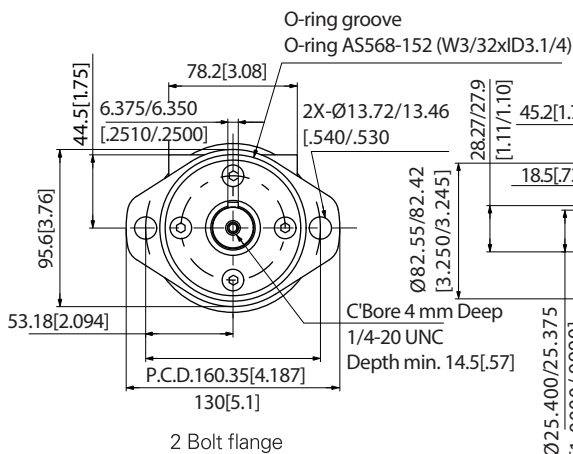


Port code A: 2X G1/2 O-ring port
Port code C: 2X 1/2-14NPTF port
Port code D: 2X Rc 1/2 port
Port code E: 2X 7/8UNF O-ring port

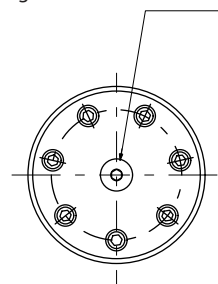
Shaft code: B Ø25 SAE 6B Splined shaft



Shaft code: C Ø25 Straight shaft with Woodruff key
Max.Torque: 350 N-m [3098 lb-in]



G1/4 O-ring boss
drain plug(JIS B2351)
must remove thendtain
plug and connect the drain line



Characteristics & Advantages

The S series Motor with mechanical brake utilizes a compact parking brake integrated into the motor. This motor has many uses in construction, winches, marine, and industrial vehicles.

Braking is applied when the pilot pressure is not supplied. The mechanical release of the brake is possible for the SBD and SBE series.



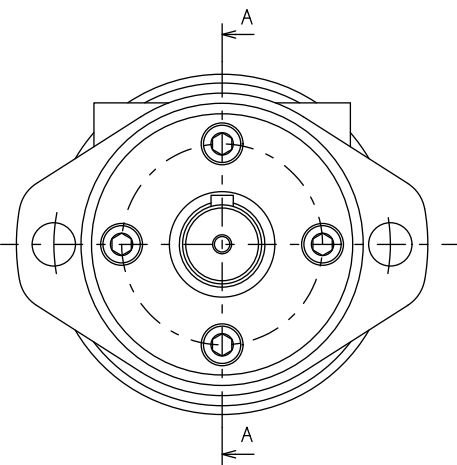
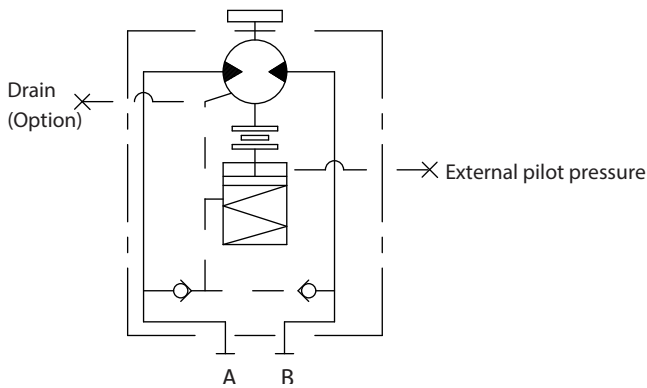
Specifications

Series	Brake torque	Brake release pressure	Brake release system
SBA	98Nm [868 lb-in]	10 bar [145 psi]	External Pilot
SBD	98Nm [868 lb-in]	10 bar [145 psi]	External Pilot + Mechanical System
SBE	157Nm [1,390 lb-in]	16 bar [232 psi]	External Pilot + Mechanical System
SBF	157Nm [1,390 lb-in]	16 bar [232 psi]	External Pilot

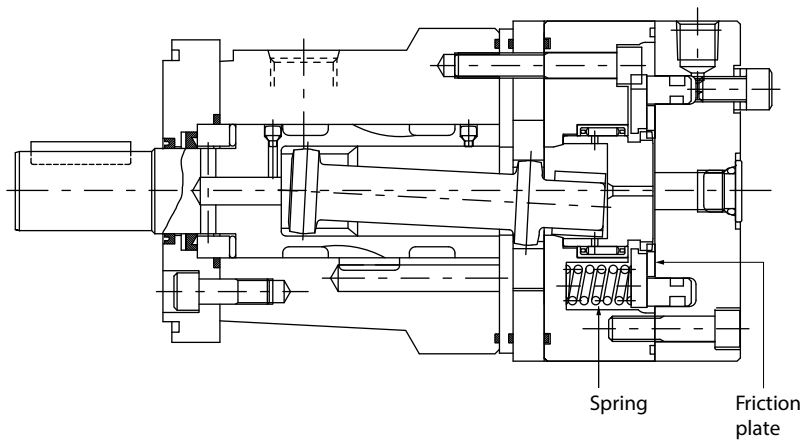
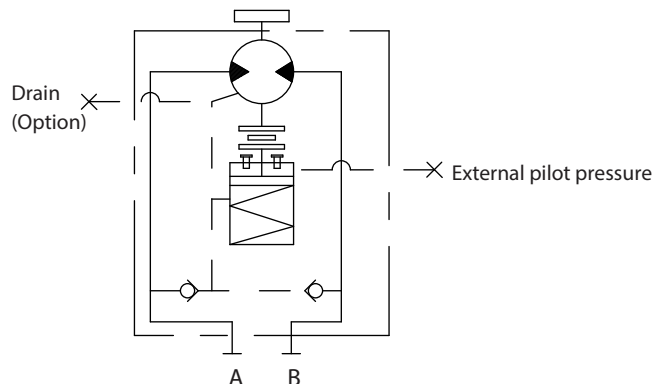
Note:

1. Other specifications are same as Standard S Series motor.
2. Fire resistant fluid need special specification motor. Please contact your Danfoss representative.
3. This Brake can be used as a Parking Brake only. In case of dynamic brake application, Please contact your Danfoss representative.
4. This is not a full capacity brake, but is a limited capacity brake, designed to hold loads from moving when no pressure is applied to the circuit.

SBA,SBF Series

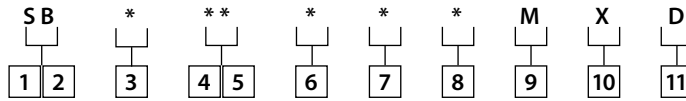


SBD,SBE Series



S Series Motor with Mechanical Brake

Model code



D-2

1 2	Series	SB S Series motor with mechanical brake
3	Brake specifications	<p>A External pilot, 98Nm [868 lb-in]</p> <p>D External pilot + Mechanical release system, 98Nm [868 lb-in]</p> <p>E External pilot + Mechanical release system, 157Nm [1,390 lb-in]</p> <p>F External Pilot, 157Nm [1,390 lb-in]</p>
4 5	Displacement	<p>05 58cm³/r [3.5 in³/r]</p> <p>07 76cm³/r [4.6 in³/r]</p> <p>10 93cm³/r [5.7 in³/r]</p> <p>12 120cm³/r [7.3 in³/r]</p> <p>14 144cm³/r [8.8 in³/r]</p> <p>16 165cm³/r [10.1 in³/r]</p> <p>19 186cm³/r [11.3 in³/r]</p> <p>22 224cm³/r [13.6 in³/r]</p> <p>30 299cm³/r [18.2 in³/r]</p> <p>38 371cm³/r [22.6 in³/r]</p>

6	Port	<p>A G1/2 O-ring port</p> <p>B Manifold mount</p> <p>C 1/2-14NPTF port</p> <p>D Rc1/2 port</p> <p>E 7/8-14 UNF O-ring port</p>
7	Shaft	<p>B Ø1" SAE 6B Splined shaft</p> <p>C Ø1" Straight with Woodruff key</p> <p>D Ø25 Straight with Parallel key, 8mm</p>
8	Flange mounting	<p>2 2 Bolt</p> <p>4 4 Bolt</p>
9	Special features (none of standard motor)	<p>M Metric mounting holes</p>
10	Drain port	<p>X Standard, with Drain port</p>
11	Design code	

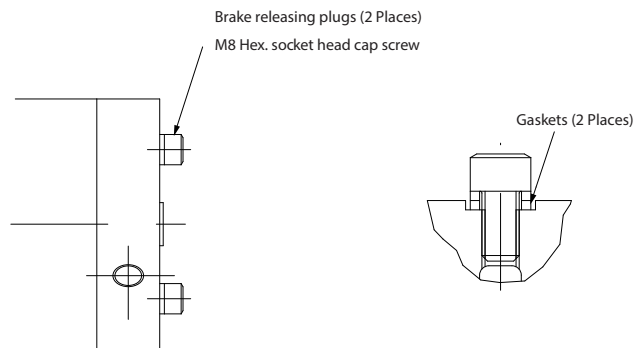
How to release the brake mechanically

The SBD and SBE Series are provided with a mechanical type brake releasing mechanism.

Remove the (2) gaskets and alternately tighten two brake releasing plugs. The brake will be released mechanically.

To restore braking, insert the gaskets and tighten the brake releasing plugs at a torque of 25.5~31.4N·m [225.69~277.91 lb-in] (At this time, clean the surface of sealing).

More specific features (Displacements, etc) are available on request, please contact with sales.

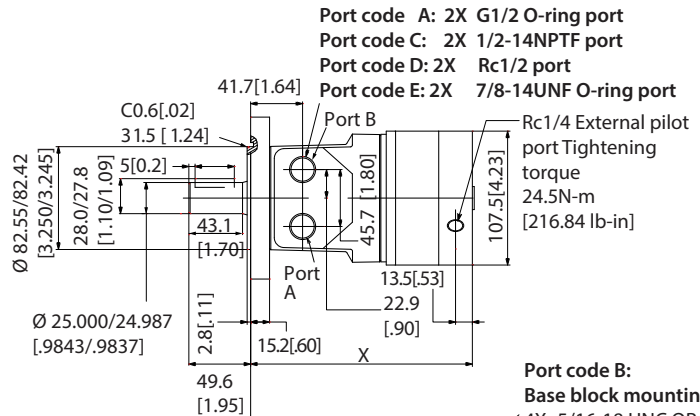
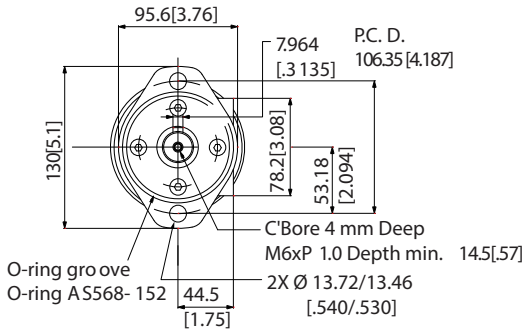


Dimension and mounting data

- Rotation: Viewed from shaft end
 - CW: Port A pressurized
 - CCW: Port B pressurized
- Need to select the port code B with metric 4-M8 thread
- A change coupler of Rc3/8 is available (AH0039A)

Model	X: Length mm [inch]	Model	X: Length mm [inch]
SB-05	177.0 [6.97]	SB-16	190.7 [7.51]
SB-07	179.3 [7.06]	SB-19	193.4 [7.61]
SB-10	181.5 [7.14]	SB-22	198.3 [7.81]
SB-12	184.9 [7.28]	SB-30	208.0 [8.19]
SB-14	188.1 [7.41]	SB-38	217.3 [8.56]

Shaft code: D Ø25 Straight shaft with Parallel key, 8 mm
Max. Torque: 350 N-m [3098 lb-in]

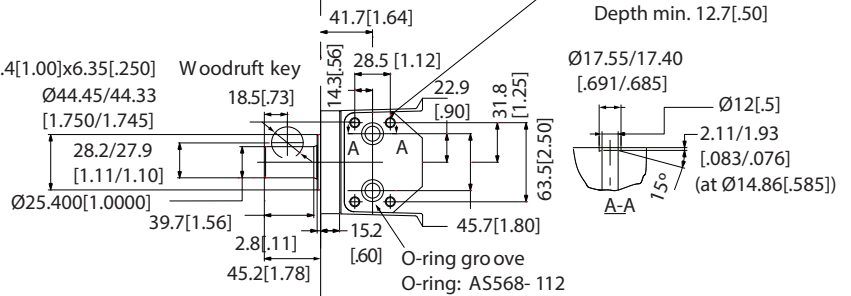
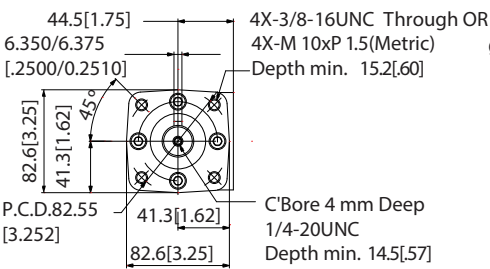


Port code A: 2X G1/2 O-ring port
Port code C: 2X 1/2-14NPTF port
Port code D: 2X Rc1/2 port
Port code E: 2X 7/8-14UNF O-ring port

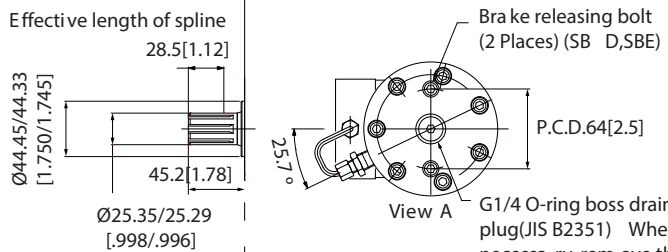
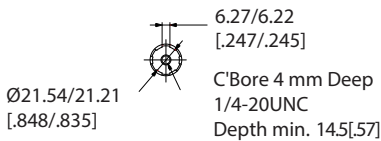
Rc1/4 External pilot port Tightening torque 24.5N-m [216.84 lb-in]

Port code B: Base block mounting 4X- 5/16-18 UNC OR 4X- M8 x P1.25(Metric) Depth min. 12.7[.50]

Shaft code: C Ø25 Straight shaft with Woodruff key
Max. Torque: 350 N-m [3098 lb-in]

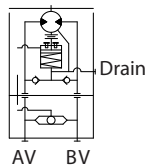


Shaft code: B Ø25 SAE 6B Splined shaft

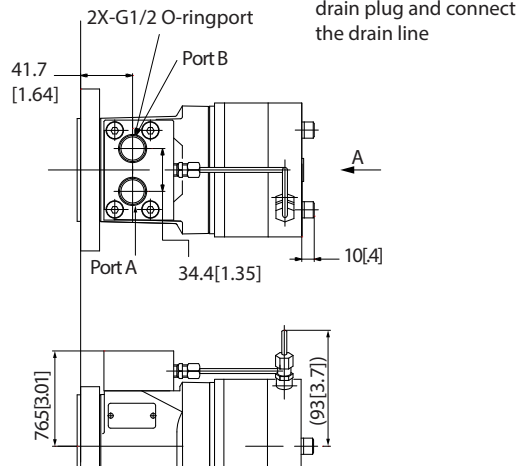


Internal pilot with shuttle valve (VSDD4A+PIPE KET)

Motor with brake



Shuttle valve



2000 Series Motor with Mechanical Brake (Brake Torque 98-196N-m [867-1,735 lb-in])

Characteristics & Advantages

The 2K series motor with mechanical brake utilizes a pressure-release mechanical brake built into the motor. This parking brake can be used in applications such as winches, fishing equipment, industrial vehicles, industrial machinery, and much more.

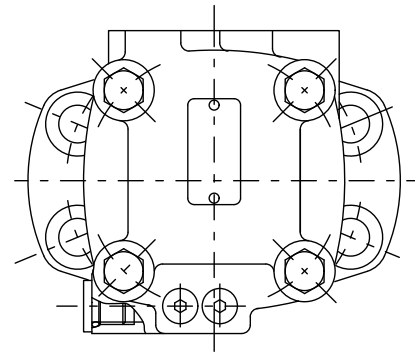
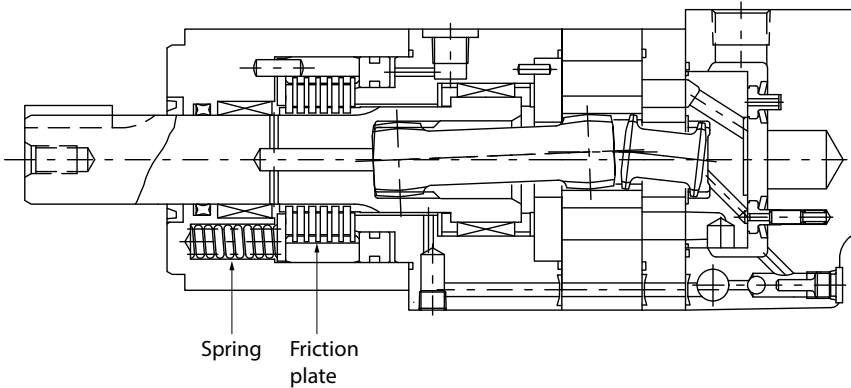
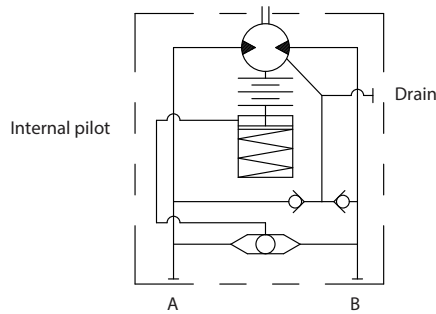
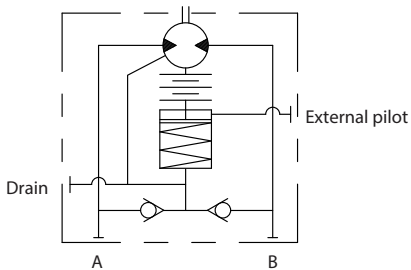
D-3

Note: This is not a full capacity brake, but is a limited capacity brake, designed to hold loads from moving when no pressure is applied to the circuit.



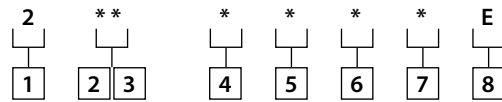
Specifications

Model Code	Brake Torque	Brake Release Pressure	Brake Release System
2-□□□K□□	98N-m [867lb-in]	9.8bar [142psi]	External Pilot
2-□□□L□□	196N-m[1735lb-in]	9.6bar[284psi]	External Pilot
2-□□□M□□	98N-m [867lb-in]	9.8bar [142psi]	Internal Pilot
2-□□□N□□	196N-m[1735lb-in]	9.6bar[284psi]	Internal Pilot



2000 Series Motor with Mechanical Brake (Brake Torque 98-196N-m [867-1,735 lb-in])

Model code



D-3

1	Series	2 2000 series																		
2 3	Displacement	<table border="0"> <tr><td>08</td><td>78cm³/r [4.8in³/r]</td></tr> <tr><td>10</td><td>97cm³/r [5.9in³/r]</td></tr> <tr><td>12</td><td>123cm³/r [7.5in³/r]</td></tr> <tr><td>16</td><td>158cm³/r [9.6in³/r]</td></tr> <tr><td>20</td><td>195cm³/r [11.9in³/r]</td></tr> <tr><td>25</td><td>244cm³/r [14.9in³/r]</td></tr> <tr><td>29</td><td>288cm³/r [17.6in³/r]</td></tr> <tr><td>31</td><td>306cm³/r [18.7in³/r]</td></tr> <tr><td>39</td><td>393cm³/r [24.0in³/r]</td></tr> </table>	08	78cm ³ /r [4.8in ³ /r]	10	97cm ³ /r [5.9in ³ /r]	12	123cm ³ /r [7.5in ³ /r]	16	158cm ³ /r [9.6in ³ /r]	20	195cm ³ /r [11.9in ³ /r]	25	244cm ³ /r [14.9in ³ /r]	29	288cm ³ /r [17.6in ³ /r]	31	306cm ³ /r [18.7in ³ /r]	39	393cm ³ /r [24.0in ³ /r]
08	78cm ³ /r [4.8in ³ /r]																			
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39	393cm ³ /r [24.0in ³ /r]																			
4	Brake specifications [in-lb] Brake Torque	<table border="0"> <tr><td>K</td><td>98N-m[867lb-in], External pilot</td></tr> <tr><td>M</td><td>196N-m[1,735 lb-in], External pilot</td></tr> <tr><td>L</td><td>98N-m[867lb-in], Internal pilot</td></tr> <tr><td>N</td><td>196N-m[1,735 lb-in], Internal pilot</td></tr> </table>	K	98N-m[867lb-in], External pilot	M	196N-m[1,735 lb-in], External pilot	L	98N-m[867lb-in], Internal pilot	N	196N-m[1,735 lb-in], Internal pilot										
K	98N-m[867lb-in], External pilot																			
M	196N-m[1,735 lb-in], External pilot																			
L	98N-m[867lb-in], Internal pilot																			
N	196N-m[1,735 lb-in], Internal pilot																			

5	Shaft	<table border="0"> <tr><td>A</td><td>Ø32 Straight with 10x8x31.5 Key</td></tr> <tr><td>B</td><td>Ø1-1/4" Splined</td></tr> <tr><td>D</td><td>Ø1-1/4" Straight with 5/16" Square key</td></tr> <tr><td>F</td><td>Ø1" Straight with 1/4" Key</td></tr> </table>	A	Ø32 Straight with 10x8x31.5 Key	B	Ø1-1/4" Splined	D	Ø1-1/4" Straight with 5/16" Square key	F	Ø1" Straight with 1/4" Key
A	Ø32 Straight with 10x8x31.5 Key									
B	Ø1-1/4" Splined									
D	Ø1-1/4" Straight with 5/16" Square key									
F	Ø1" Straight with 1/4" Key									
6	Flange Mounting	<table border="0"> <tr><td>2</td><td>2 Bolt</td></tr> <tr><td>4</td><td>4 Bolt (unequally spaced)</td></tr> </table>	2	2 Bolt	4	4 Bolt (unequally spaced)				
2	2 Bolt									
4	4 Bolt (unequally spaced)									
7	Port Connection	<table border="0"> <tr><td>None</td><td>G1/2 O-ring port</td></tr> <tr><td>A</td><td>7/8UNF O-ring port (External pilot only)</td></tr> <tr><td>C</td><td>Rc1/2 port</td></tr> <tr><td>U</td><td>7/8UNF O-ring port (pitch 50.8mm)</td></tr> </table>	None	G1/2 O-ring port	A	7/8UNF O-ring port (External pilot only)	C	Rc1/2 port	U	7/8UNF O-ring port (pitch 50.8mm)
None	G1/2 O-ring port									
A	7/8UNF O-ring port (External pilot only)									
C	Rc1/2 port									
U	7/8UNF O-ring port (pitch 50.8mm)									
8	Design Code									

More specific features (Displacements, etc) are available on request, please contact with sales.

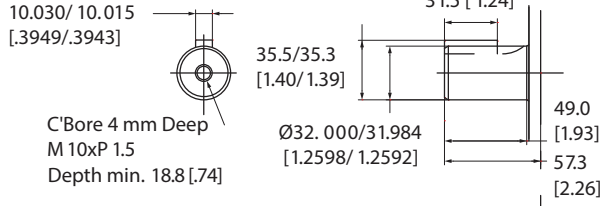
2000 Series Motor with Mechanical Brake (Brake Torque 98-196N-m [867-1,735 lb-in])

Dimension and mounting data

External pilot

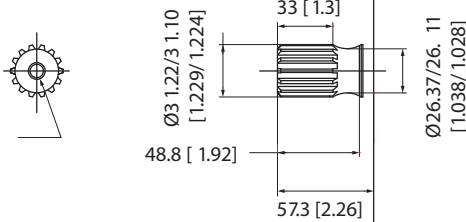
D-3

Shaft code: A Ø32 Straight shaft



C'Bore 4 mm Deep
M10xP1.5
Depth min. 18.8 [0.74]

Shaft code: B Ø1-1/4" Involute splined shaft



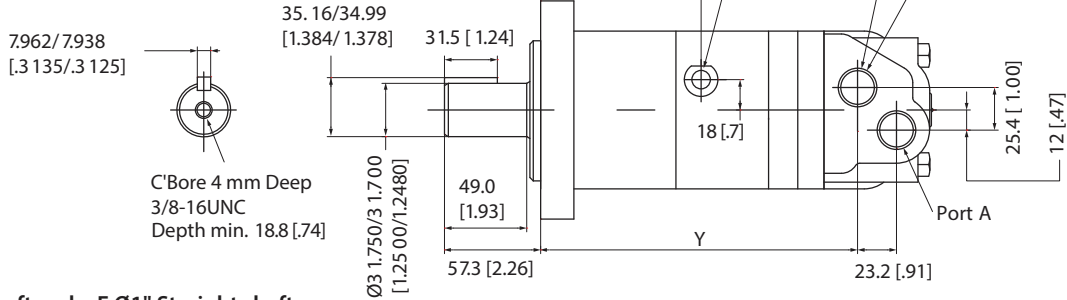
C'Bore 4 mm Deep
M10xP1.5
Depth min. 18.8 [0.74]

Rotation: Viewed from shaft end

- CW: Port A pressurized
- CCW: Port B pressurized

Model	X mm [inch]	Y mm [inch]	1-1/4" SAE Involute Spline (External)	
2-080	229 [9.0]	186 [7.3]	D.P	12/24
2-100	232 [9.1]	189 [7.4]	Number of teeth	14
2-125	237 [9.3]	194 [7.6]	Pitch Dia.	29.634 [1.1667]
2-160	243 [9.6]	200 [7.9]	Base Dia.	25.664 [1.0104]
2-200	250 [9.8]	207 [8.1]	Pressure angle	30°
2-250	259 [10.2]	216 [8.5]	Type of fit	Side fit
2-290	267 [10.5]	224 [8.8]	Class of fit	II
2-315	271 [10.7]	228 [9.0]	Major Dia.	31.22/31.10 [1.229/1.224]
2-390	286 [11.3]	243 [9.6]	Minor Dia.	26.99/26.66 [1.063/1.050]
			Form Dia.	Max. 27.488 [1.0822]
			Fillet radius	Max. 0.39 [0.015]
			Dimension over two pins	35.797/35.750 [1.4093/1.4075]
			Pin Dia.	4.064 [0.1600]

Shaft code: D Ø1-1/4" Straight shaft



C'Bore 4 mm Deep
3/8-16UNC
Depth min. 18.8 [0.74]

Rc1/4 External pilot port

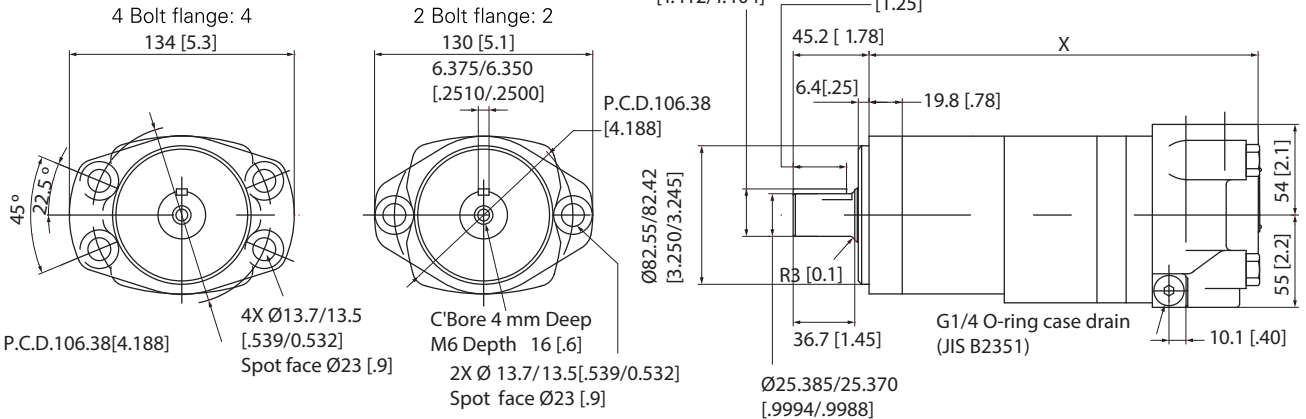
Port B

Port code None: 2X G1/2 O-ring port
Port code C: 2X Rc1/2 port
Port code A: 2X 7/8UNF O-ring port

Port A

Shaft code: F Ø1" Straight shaft

Max. Torque: 395 N-m [3496]



2000 Series Motor with Mechanical Brake (Brake Torque 98-196N-m [867-1,735 lb-in])

Dimension and mounting data

Internal pilot

Rotation: Viewed from shaft end

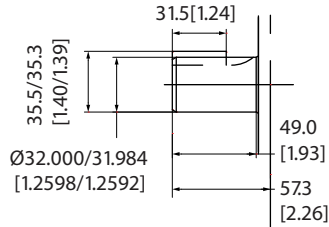
- CW: Port A pressurized
- CCW: Port B pressurized

Shaft code: A Ø32 Straight shaft

10.030/10.015
[.3949/.3943]



C'Bore 4 mm Deep
M10xP1.5
Depth min.18.8 [.74]

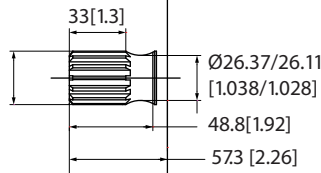


Shaft code: B Ø1-1/4" Involute splined shaft



Ø31.22/31.10
[1.229/1.224]

C'Bore 4 mm Deep
M10xP1.5
Depth min.18.8 [.74]

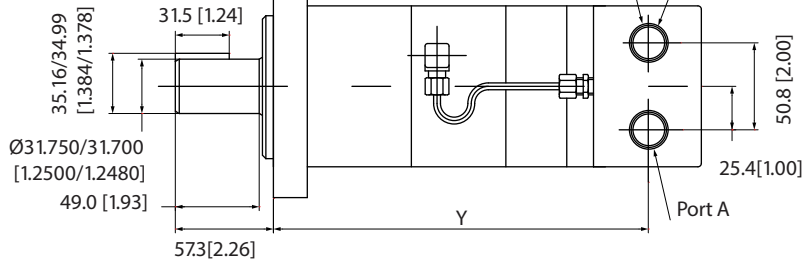


Shaft code: D Ø1-1/4" Straight shaft

7.962/7.938
[.3135/.3125]



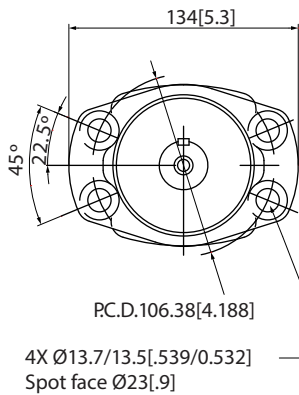
C'Bore 4 mm Deep
3/8-16UNC
Depth min.18.8 [.74]



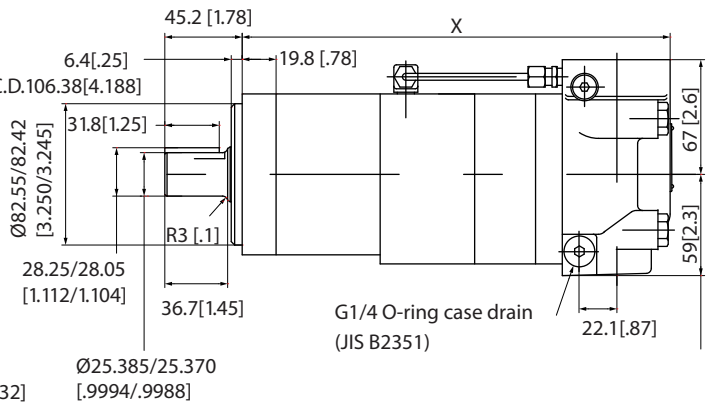
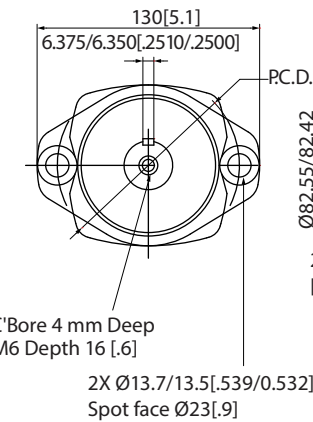
Shaft code: F Ø1" Straight shaft

Max. Torque: 395 N-m [3496]

4 Bolt flange



2 Bolt flange



Model	X mm [inch]	Y mm [inch]	1-1/4" SAE Involute Spline (External)	
2-080	229[9.0]	186[7.3]	D.P	12/24
2-100	232[9.1]	189[7.4]	Number of teeth	14
2-125	237[9.3]	194[7.6]	Pitch Dia.	29.634[1.1667]
2-160	243[9.6]	200[7.9]	Base Dia.	25.664[1.0104]
2-200	250[9.8]	207[8.1]	Pressure angle	Ø°
2-250	259[10.2]	216[8.5]	Type of fit	Side fit
2-290	267[10.5]	224[8.8]	Class of fit	II
2-315	271[10.7]	228[9.0]	Major Dia.	31.22/31.10[1.229/1.224]
2-390	286[11.3]	243[9.6]	Minor Dia.	26.99/26.66[1.063/1.050]
			Form Dia.	Max. 27.488[1.0822]
			Fillet radius	Max. 0.39[0.015]
			Dimension over two pins	35.797/35.750 [1.4093/1.4075]
			Pin Dia.	4.064[1600]

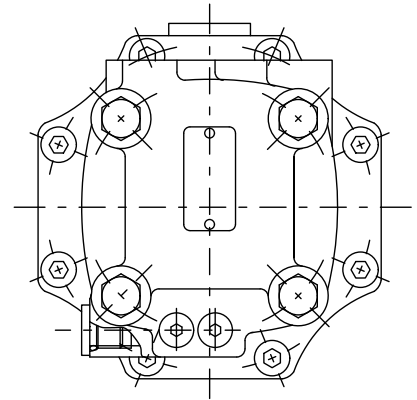
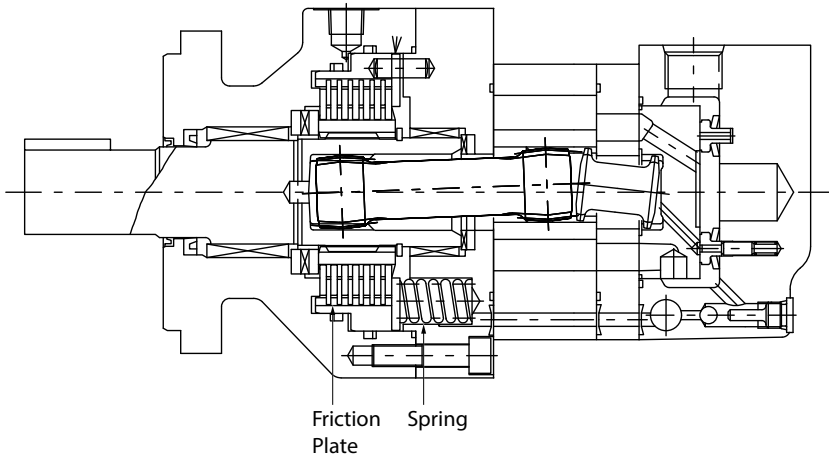
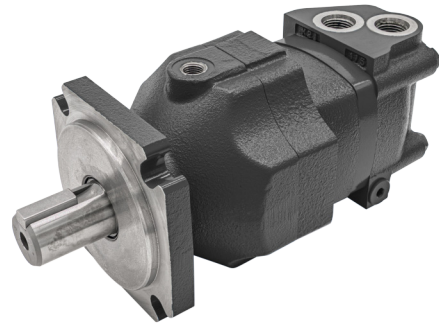
Port code None: 2X G1/2 O-ring port
Port code C: 2X Rc1/2 port
Port code U: 2X 7/8UNF O-ring port

2000 Series Motor with Mechanical Brake (Brake Torque 294-392N-m [2,602-3,470 lb-in])

Specifications

Model code	Brake torque	Brake release pressure	Brake release system
2BE□□A□4-B	294N-m [2602lb-in]	20bar [290psi]	External Pilot
2BF□□A□4-B	392N-m [3470lb-in]	25bar [363psi]	External Pilot

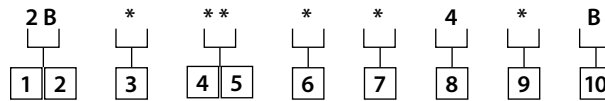
Note: 1. This Brake can be used as a Parking Brake only. In case of dynamic brake application, please contact Danfoss.



D-4

2000 Series Motor with Mechanical Brake (Brake Torque 294-392N-m [2,602-3,470 lb-in])

Model code



1	2	Series	2B 2000 Series with mechanical brake
3		Brake Torque	E 294N-m, External pilot F 392N-m, External pilot
4	5	Displacement	08 78cm ³ /r [4.8in ³ /r] 10 97cm ³ /r [5.9in ³ /r] 12 123cm ³ /r [7.5in ³ /r] 16 158cm ³ /r [9.6in ³ /r] 20 195cm ³ /r [11.9in ³ /r] 25 244cm ³ /r [14.9in ³ /r] 29 288cm ³ /r [17.6in ³ /r] 31 306cm ³ /r [18.7in ³ /r] 39 393cm ³ /r [24.0in ³ /r]
6		Motor type	A Standard

7	Shaft	A Ø32 Straight with 10x8x31.5 Key B Ø1-1/4" Splined C Ø1-1/4" Tapered D Ø1-1/4" Straight with 5/16" Square key
8	Flange mounting	4 4 Bolt (P.C.D. 127)
9	Port connections	- G1/2 O-ring port A 7/8UNF O-ring port C Rc1/2 port
10	Design code	

More specific features (Displacements, etc) are available on request, please contact with sales.

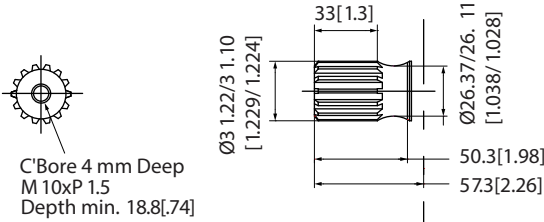
D-4

2000 Series Motor with Mechanical Brake (Brake Torque [294-392N-m [2,602-3,470 lb-in)])

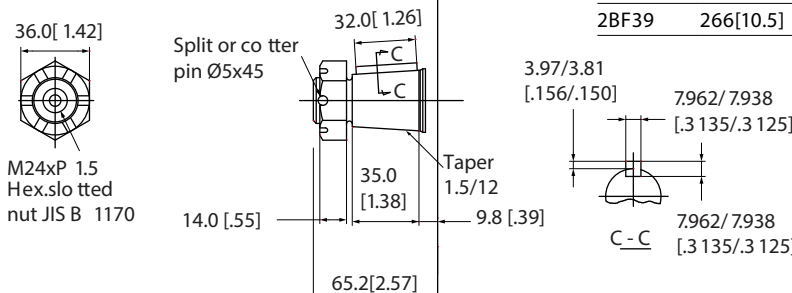
Dimension and mounting data

D-4

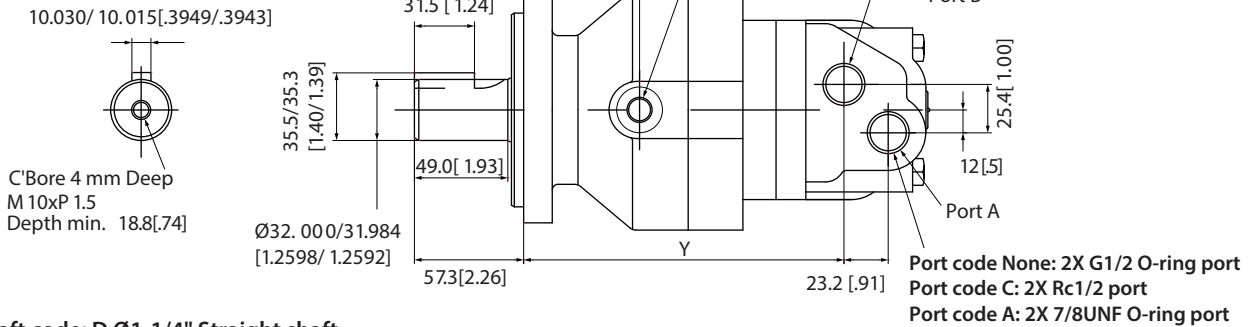
Shaft code: B Ø1-1/4" Involute splined shaft



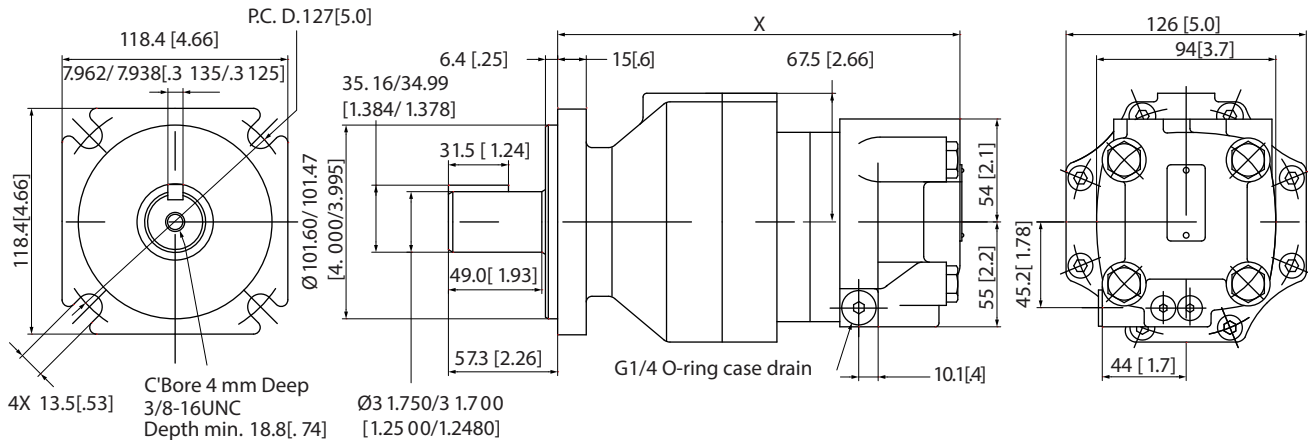
Shaft code: C Ø1-1/4" Tapered shaft



Shaft code: A Ø32 Straight shaft



Shaft code: D Ø1-1/4" Straight shaft



Rotation: Viewed from shaft end

- CW: Port A pressurized
- CCW: Port B pressurized

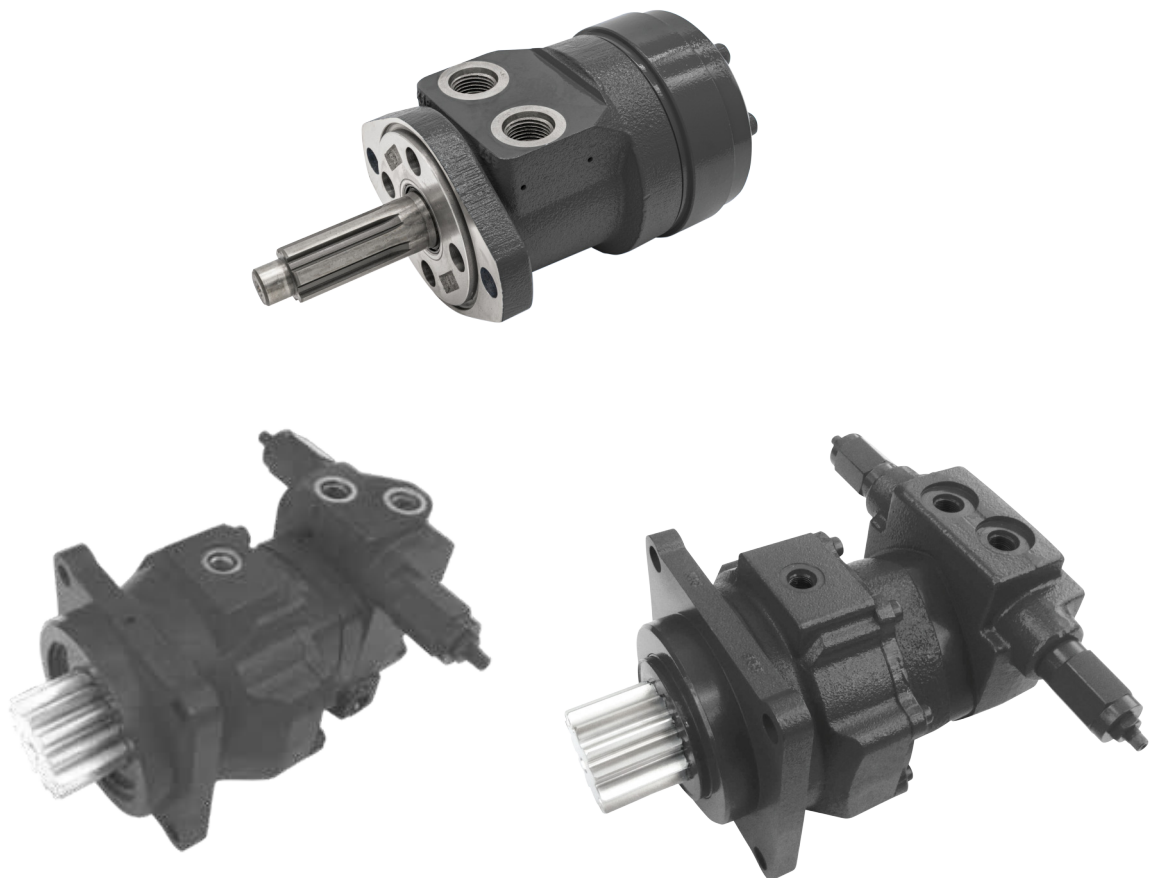
Model	X mm [inch]	Y mm [inch]
2BF08	208[8.2]	165[6.5]
2BF10	211[8.3]	168[6.6]
2BF12	216[8.5]	173[6.8]
2BF16	223[8.8]	180[7.1]
2BF20	229[9.0]	186[7.3]
2BF25	238[9.4]	195[7.7]
2BF29	246[9.7]	203[8.0]
2BF31	250[9.8]	207[8.1]
2BF39	266[10.5]	223[8.8]

1-1/4" SAE involute spline (External)

D.P	12/24
Number of 14 teeth	
Pitch Dia.	29.634[1.1667]
Base Dia.	25.664[1.0104]
Pressure angle	30°
Type of fit	Side fit
Class of fit	II
Major Dia.	31.22/31.10 [1.229/1.224]
Minor Dia.	26.99/26.66 [1.063/1.050]
Form Dia.	Max. 27.488 [1.0822]
Fillet radius	Max. 0.39 [0.15]
Dimension over two pins	35.797/35.750 [1.4093/1.4075]
Pin Dia.	4.064 [1.600]

Char-Lynn Low speed high torque orbit motors for swing drive

S series, 2K series, 2.5K series, 4K series, 4.5K series swing motors



General Introduction

Features

- Low speed high torque Char-Lynn motor for Swing
- Direct drive (no reduction gear)
- Displacement from 165cm³/rev[10.1in³/rev] to 393 cm³/rev [24.0 in³/rev], maximum pressure up to 196bar[2843psi]
- Optionally integrate mechanical parking brake, time delay valve and shock less relief valve

D-5

Benefits

- Maintenance cost saving cause no reduction gear oil required
- Cost competitive due to simple structure design
- Reduced energy consuming attributed to higher mechanical and volumetric efficiency
- Less mechanical shocks by smooth and precise control
- Proven performance by 30+ years experience

Typical application

- Mini excavator
- Excavator attachment
- General swing application

Typical mini excavator weight (ton)

0.5	0.7	1.0	1.5	2.0	2.5	3.0	3.5	Model
								S-160
								S-190
								S-220
								S-300
								2P*16
								2P*20
								2P*25
								25P*16
								25P*20
								25P*25
								4P*25
								4P*31
								4P*39
								45P*31
								45P*33
								45P*39

Recommendation fluids: ISO VG32, 46, 56, 68 mineral oil

Recommended system operation temperature: -30°C to 80°C
[-22°F to 176°F]

Recommended oil viscosity: 24 to 50 cSt[120 to 233 SUS]

Recommended cleanliness: ISO 18/13

Characteristics & Advantages

S series motor is special designed spool valve Char-Lynn motor which can work on radial load.

Compact dimension and cost competitive are the key benefits for S series motor.

S series motor specifically fit for Swing drive of mini-excavators which tonnage less than 1 ton.

Pinion gear and valve can be easily assembled on the S series motor directly.



D-5

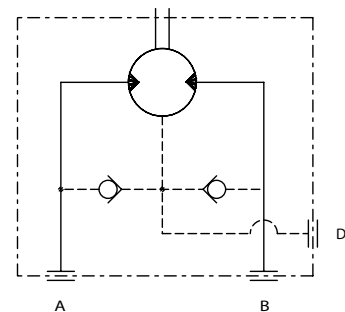
Specification

Model	S-160	S-190	S-220	S-300
Motor displacement cm^3/r	165	186	224	299
$[\text{in}^3/\text{r}]$	[10.1]	[11.4]	[13.7]	[18.3]
Max output Torque N-m	180	203	242	323
$[\text{lb-in}]$	[1593]	[1797]	[2141.9]	[2858.8]
Max pressure bar	68	68	68	68
$[\text{psi}]$	[986.3]	[986.3]	[986.3]	[986.3]
Max speed rpm	80	80	80	80
Mass kg $[\text{lb}]$	7.4[16.3]	7.6[16.8]	7.9[17.4]	8.4[18.5]

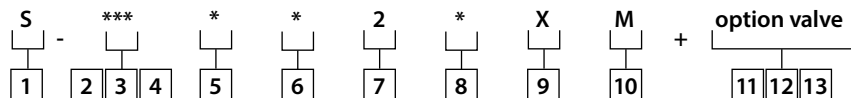
Note:

1. Drain line recommended
2. Back pressure should be max 20bar[290.1psi]

Circuit diagram



Model Code



1	Series	S	S Series swing motor
2 3 4	Displacement	160	165cm ³ /r [10.1in ³ /r]
		190	186cm ³ /r [11.4in ³ /r]
		220	224cm ³ /r [13.7in ³ /r]
		300	299cm ³ /r [18.3in ³ /r]
5	Port	A	G1/2 O-ring port
		E	7/8UNF O-ring port
		G	G1/4 O-ring port
6	Output shaft	K	1 inch 6B spline
		M	Ø25 straight shaft long type
		S	1 inch 6B spline with bearing support
7	Flange	2	2 bolt flange

8	Special requirement	H	Geroler load holding
		N	Low noise
		V	Low leakage
9	X:With drain port (plugged)		
10	Design code		
11 12 13	Option valve	VSE	Relief valve
		VSW	Counter balance valve with relief
			Keep blank for no optional valve required

Model code and relief setting pressure are required in order sheet.

*More displacement/Port are optional based on customer request

*For any special requirement please contact with sales.

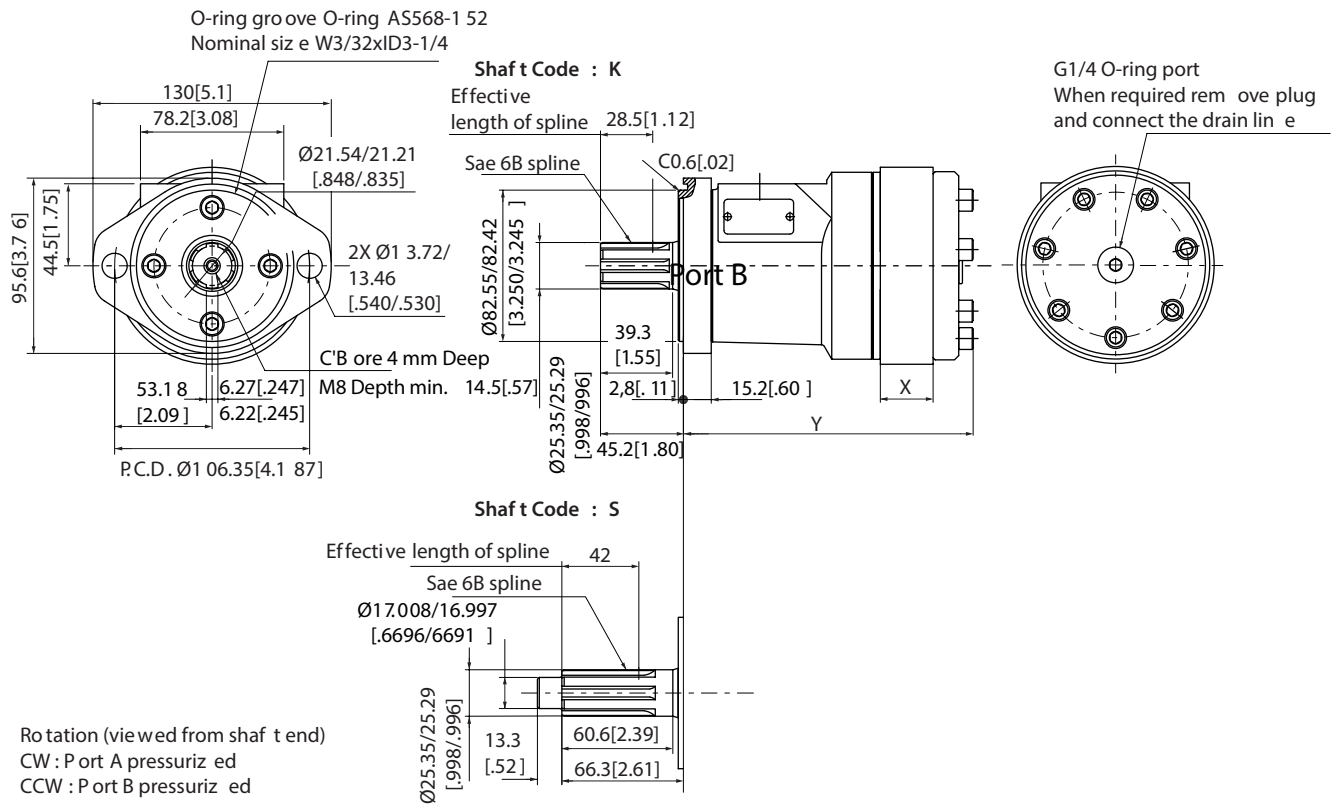
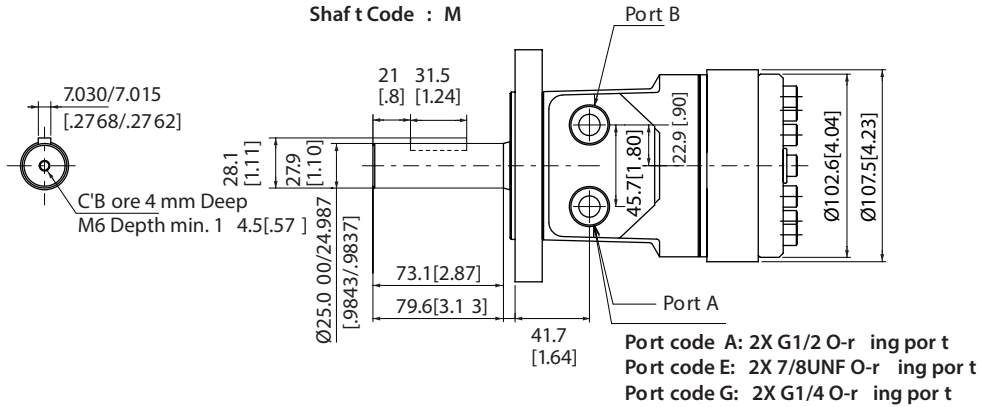
For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify. (see end cover)

S series

Swing motor

Installation dimension

D-5



Model	X mm [inch]	Y mm [inch]
S-160	21.3 [0.84]	150.5 [5.93]
S-190	24.0 [0.95]	153.2 [6.03]
S-220	28.9 [1.14]	158.1 [6.22]
S-300	38.5 [1.52]	167.8 [6.61]

Note: Please prepare the pinion gear, bearing, and bearing case at the customer's site. Please calculate the radial and follow the allowable radial load diagram.

Side load Capacity

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

RPM Allowable shaft side load — Kg [lb]

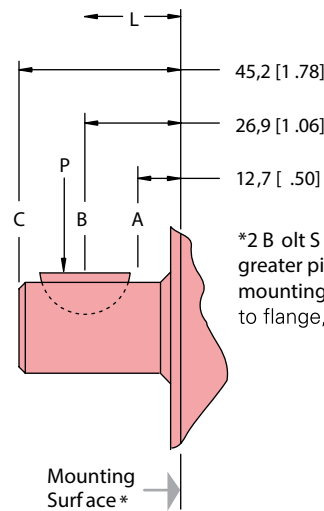
	A	B	C
900	154 [339]	136 [300]	118 [261]
625	205 [452]	181 [400]	158 [348]
500	256 [565]	227 [500]	197 [435]
400	307 [678]	272 [600]	237 [522]
300	410 [904]	363 [800]	316 [696]
200	718 [1582]	635 [1400]	552 [1216]

D-5

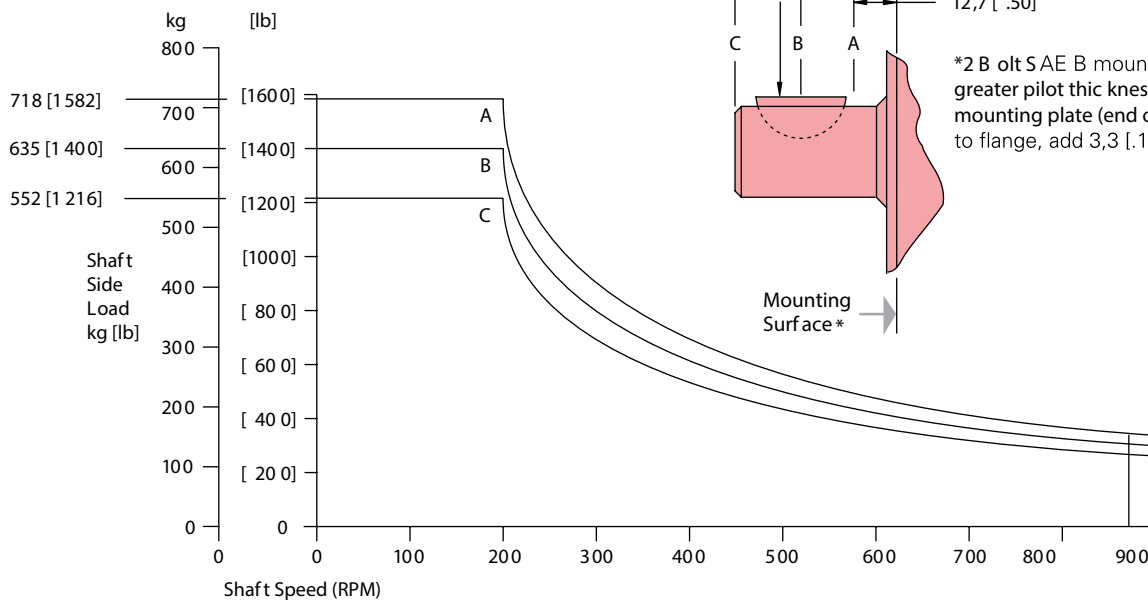
$$\text{Sideload P kg} = \frac{900}{N} \left(\frac{16800}{L + 96,3} \right) \text{ for 200-900 RPM}$$

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

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



*2 Bolt SAE B mounting flange has a greater pilot thickness and a thinner mounting plate (end of shaft to flange, add 3,3 [1.13]).



2K Series

Swing motor

Characteristics & Advantages

2K series motor is disc valve Char-Lynn motor which can work with low leakage under high pressure.

The integrated pinion gear and big capacity bearing ensured the 2K series motor high reliability even under high radial load.

Specifically fitting for Swing drive on mini-excavators which tonnage less than 1.5 ton.

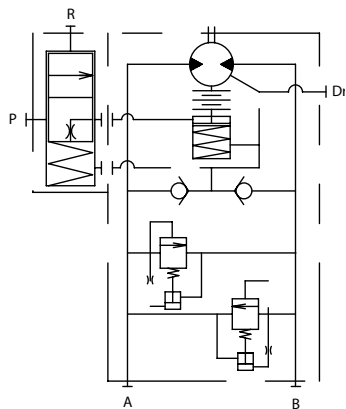
Integrated relief valve (or other required valves) can be easily assembled on the 2K series motor directly.



D-6

Circuit diagram

This hydraulic circuit includes time delay valve and shockless relief valve (option)



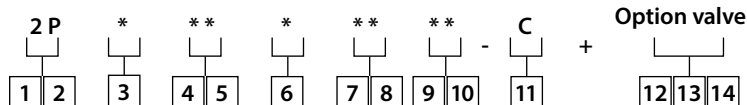
Specification

Model	2P*16	2P*20	2P*25
Motor displacement	158	195	244
[cm ³ /rev]	[9.6]	[11.9]	[14.9]
Max output torque	308	411	420
[N-m]	[2726.0]	[3637.6]	[3717.3]
Max pressure	123	132	108
[bar]	[1784]	[1915]	[1566]
Max speed	80	80	80
[rpm]			
Mechanical brake torque	441[3903.2]		
[N-m]			
			(Min. release pressure: 20bar[290psi], Max release pressure: 49bar[711psi])
Mass	21.0[46.3]	21.5[47.4]	22.0[48.5]
[kg]			

Note:

1. Max pressure is relief valve setting pressure
2. Need drain line (Back pressure should be max 20bar [290psi]).

Model Code



1	2	Series 2P 2K Series swing motor
3		Brake specification N Without mechanical brake C With mechanical brake
4	5	Displacement 16 158cm ³ /r[9.6in ³ /r] 20 195cm ³ /r[11.9in ³ /r] 25 244cm ³ /r[14.9in ³ /r]
6		Load holding spec. A Geroler Load holding (Middle) B Geroler Load holding (Light)
7	8	Port 11 G3/8 O-ring port with shockless relief valve 31 G3/8 O-ring port with relief valve

9	10	Output pinion shaft 15 m4 z11 34 m4 z13	
11		Design code	
12	13	14	Option valve VNS Shockless relief valve V2T Time delay valve VSW Counter balance valve with relief Keep blank for no optional valve required

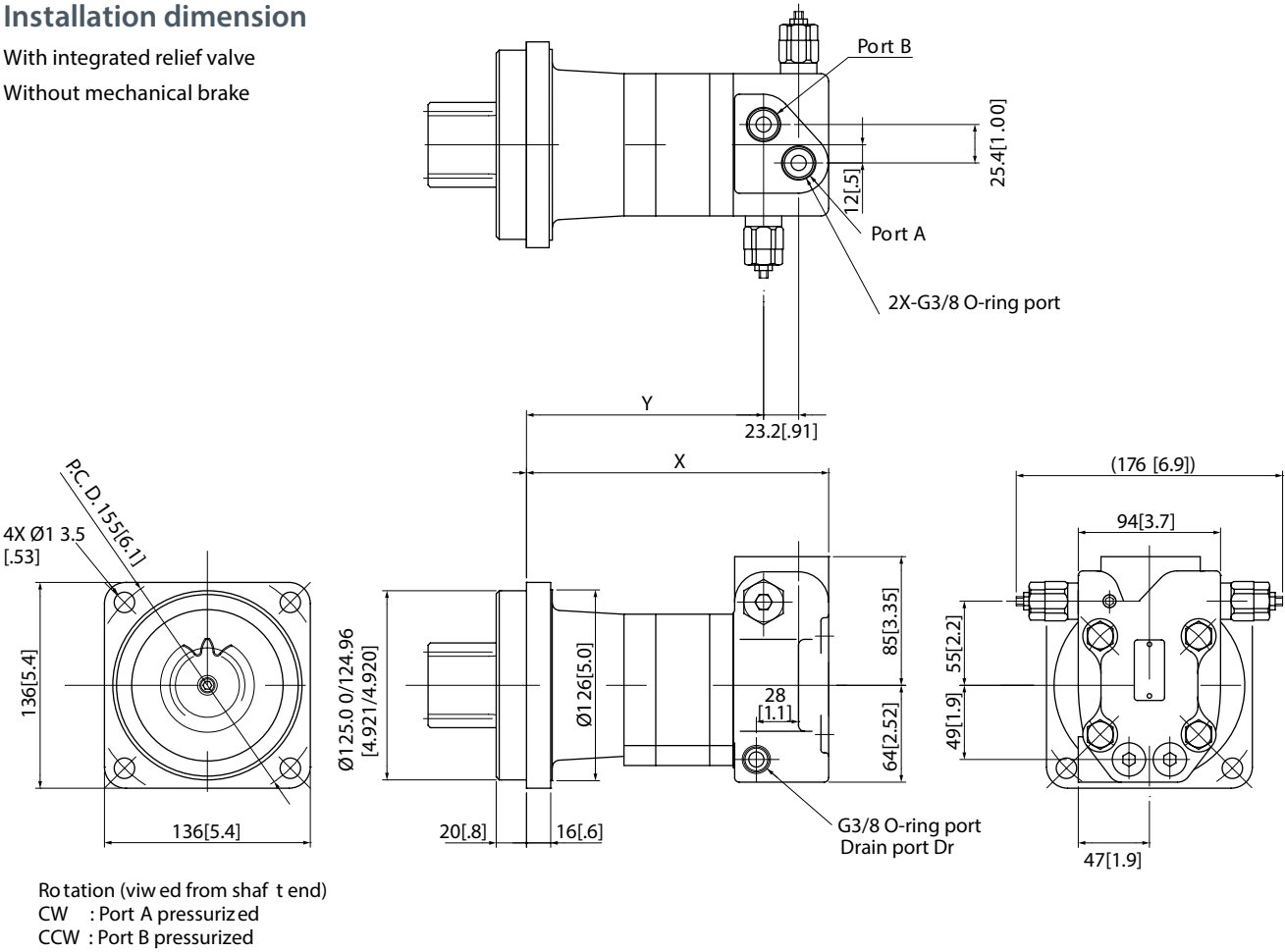
Model code and relief setting pressure are required in order sheet.

*More displacement/Port are optional based on customer request

For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify. (see end cover)

Installation dimension

With integrated relief valve
Without mechanical brake



Rotation (viewed from shaft end)
CW : Port A pressurized
CCW : Port B pressurized

Pinion Gear Dimension (Reference)

Module	4	4	4.5	4.5
Number of teeth	11	13	11	12
Pressure angle	20	20	20	20
Pitch diameter mm [inch]	52 [2.1]	52 [2.1]	49.5 [1.95]	54 [2.1]
Add modification coefficient	0.55	0.6	0.5	0.4

Model	X mm [inch]	Y mm [inch]
2PN16	193 [7.6]	150 [5.9]
2PN20	200 [7.9]	157 [6.2]
2PN25	209 [8.2]	166 [6.5]

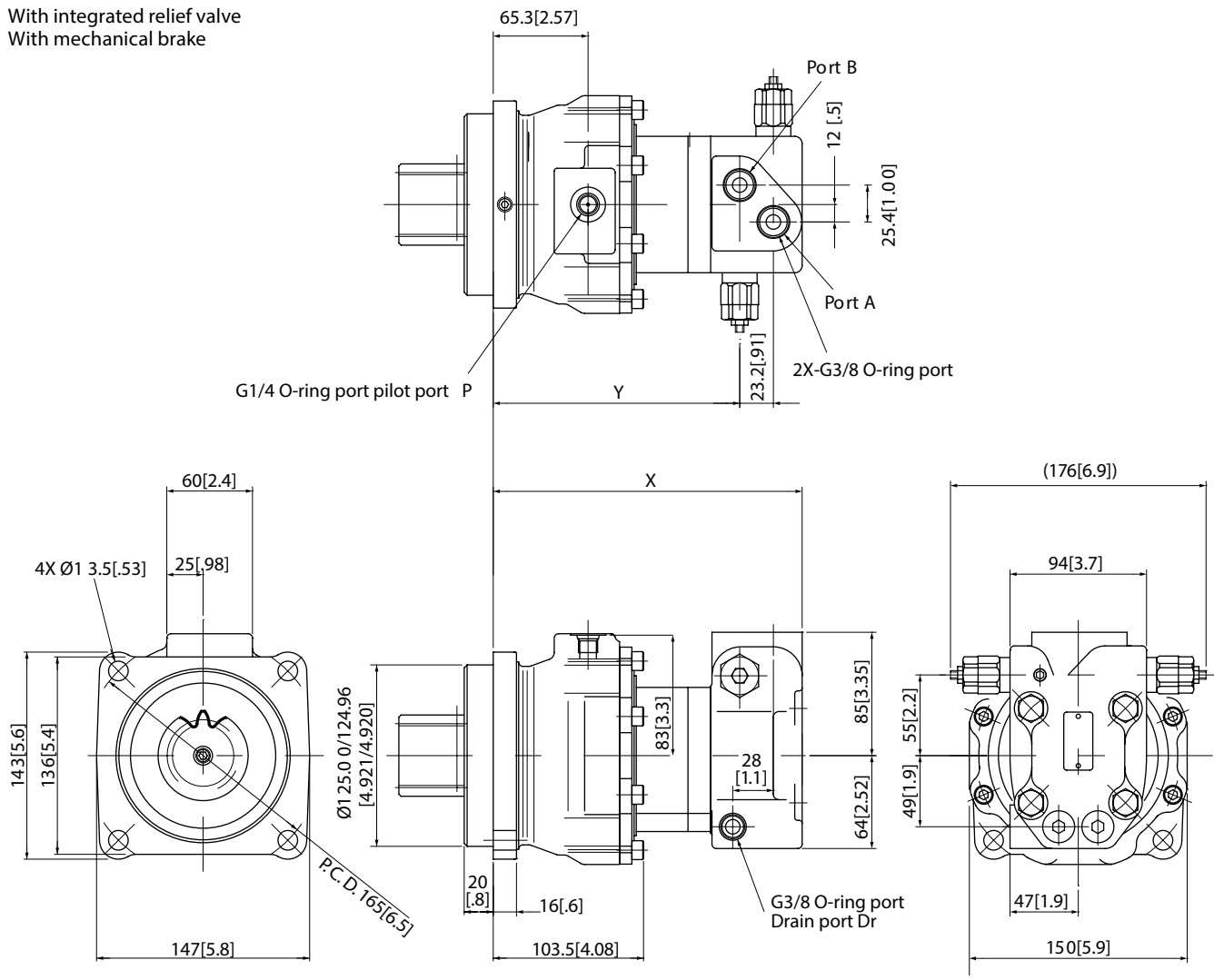
Note: as per JIS standard Output torque is limited depending on pinion dimension In case of small pinion, output torque is limited less than spec..

2K Series

Swing Motor

With integrated relief valve
With mechanical brake

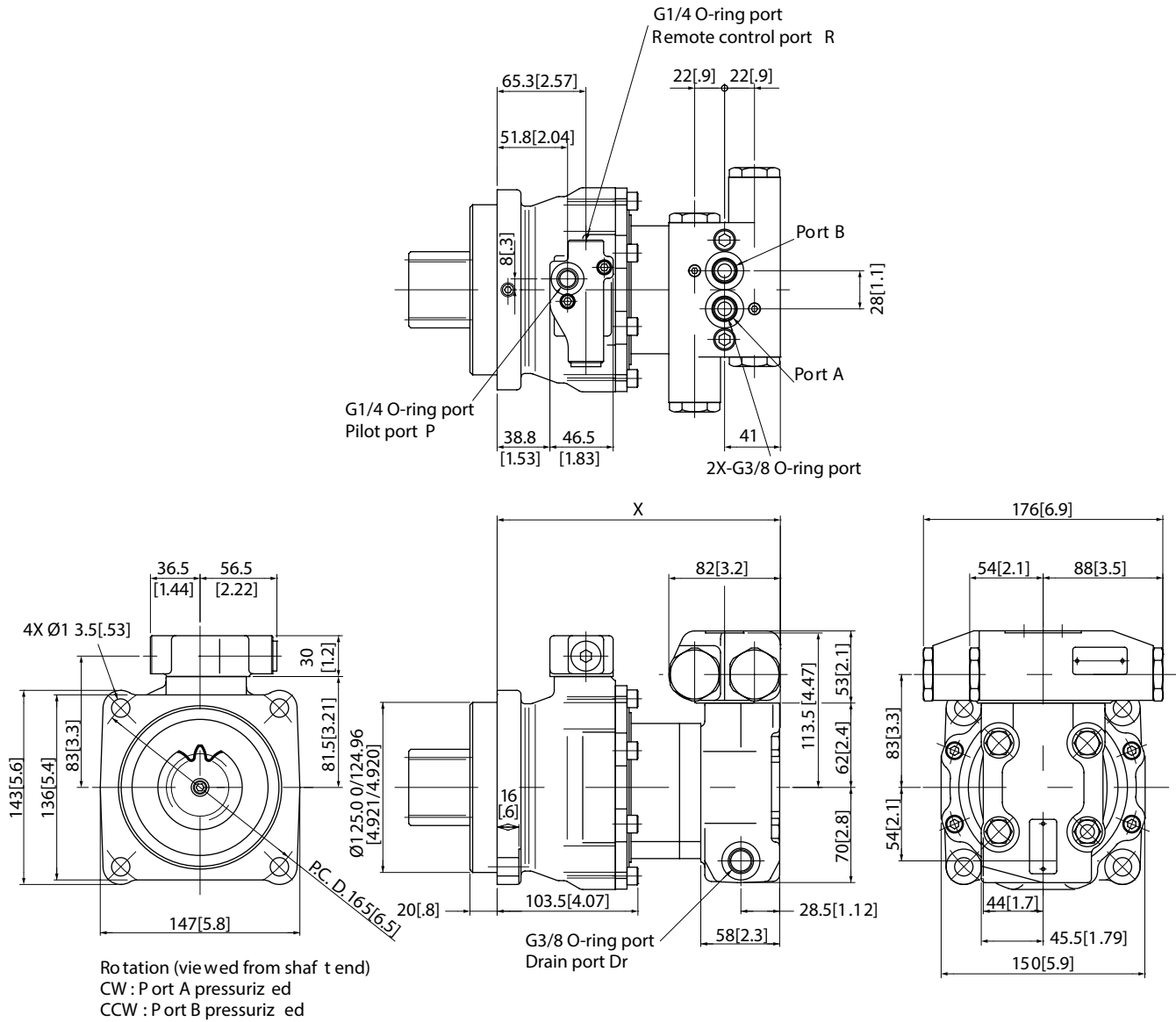
D-6



Rotation (viewed from shaft end)
CW : Port A pressurized
CCW : Port B pressurized

Model	X mm [inch]	Y mm [inch]
2PC16	206[8.1]	163[6.4]
2PC20	213[8.4]	170[6.7]
2PC25	222[8.7]	179[7.0]

With Shockless relief valve and time delay valve option.
With mechanical brake



Model	X mm [inch]
2PC16	206 [8.1]
2PC20	213 [8.4]
2PC25	222 [8.7]

2.5K Series

Swing motor

Characteristics & Advantages

2.5K series motor is disc valve Char-Lynn motor which can work with low leakage under high pressure.

The integrated pinion gear and big capacity bearing ensured the 2.5K series motor high reliability even under high radial load.

Specifically fitting for Swing drive on mini-excavators which tonnage less than 2 ton.

Integrated relief valve (or other required valves) can be easily assembled on the 2.5K series motor directly/

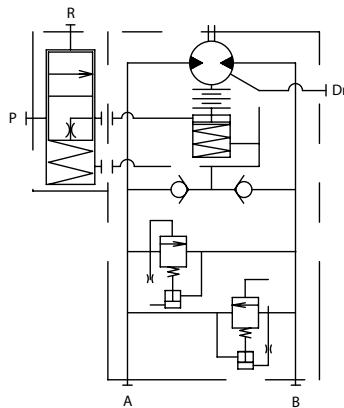
2.5K series is a motor used with heavier duty specifications than 2K series.



D-7

Circuit diagram

This hydraulic circuit includes time delay valve and shockless relief valve (option)



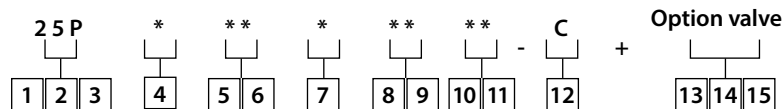
Specification

Model	25P*16	25P*20	25P*25
Motor displacement	158 [9.6]	195 [11.9]	244 [14.9]
Max output torque	369 [3265.9]	472 [4177.6]	515 [4558.1]
Max pressure	147 [2132]	152 [2205]	132 [1915]
Max speed	80	80	80
Mechanical brake torque	441[3903.2] (Min. release pressure: 20bar[290psi], Max release pressure: 49bar[711psi])		
Mass	21.0[46.3]	21.5[47.4]	22.0[48.5]

Note:

1. Max pressure is relief valve setting pressure
2. Need drain line (Back pressure should be max 20bar [290psi]).

Model Code



1 2 3	Series	25P 2.5K Series swing motor
4	Brake specification	N Without mechanical brake C With mechanical brake
5 6	Displacement	16 158cm ³ /r[9.6in ³ /r] 20 195cm ³ /r[11.9in ³ /r] 25 244cm ³ /r[14.9in ³ /r]
7	Load holding spec.	A Geroler Load holding (Middle) B Geroler Load holding (Light)
8 9	Port	11 G3/8 O-ring port with shockless relief valve 31 G3/8 O-ring port with relief valve

10 11	Output pinion shaft	15 m4 z11 34 m4 z13
12	Design code	
13 14 15	Option valve	VNS Shockless relief valve V2T Time delay valve VSW Counter balance valve with relief Keep blank for no optional valve required

Model code and relief setting pressure are required in order sheet.

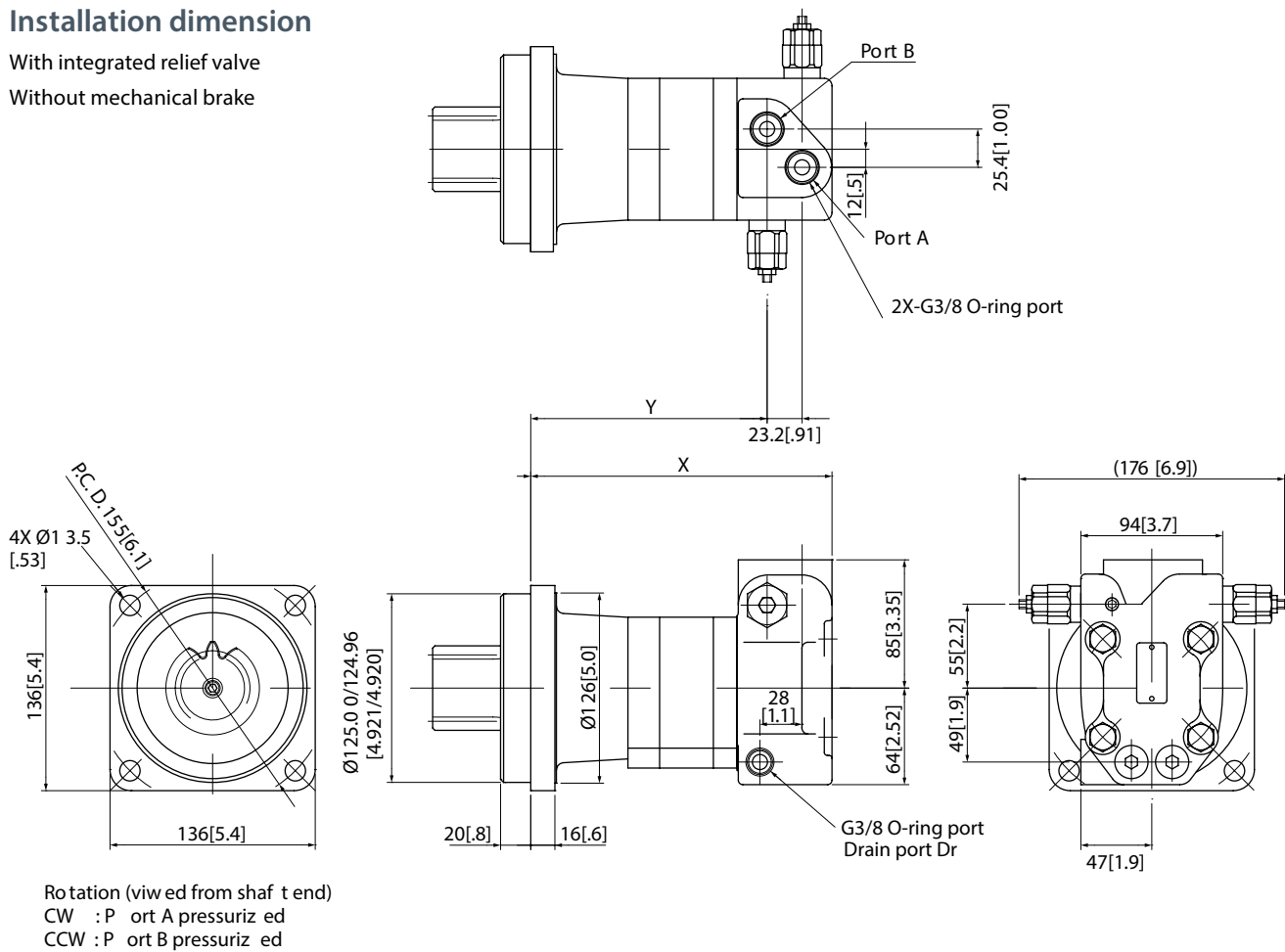
*More displacement/Port are optional based on customer request

For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify. (see end cover)

Installation dimension

With integrated relief valve

Without mechanical brake



D-7

Pinion Gear Dimension (Reference)

Module	4	4	4.5	4.5
Number of teeth	11	13	11	12
Pressure angle	20	20	20	20
Pitch diameter mm [inch]	44 [1.7]	52 [2.1]	49.5 [1.95]	54 [2.1]
Add modification coefficient	0.55	0.6	0.5	0.4

Model	X mm [inch]	Y mm [inch]
25PN16	193 [7.6]	150 [5.9]
25PN20	200 [7.9]	157 [6.2]
25PN25	209 [8.2]	166 [6.5]

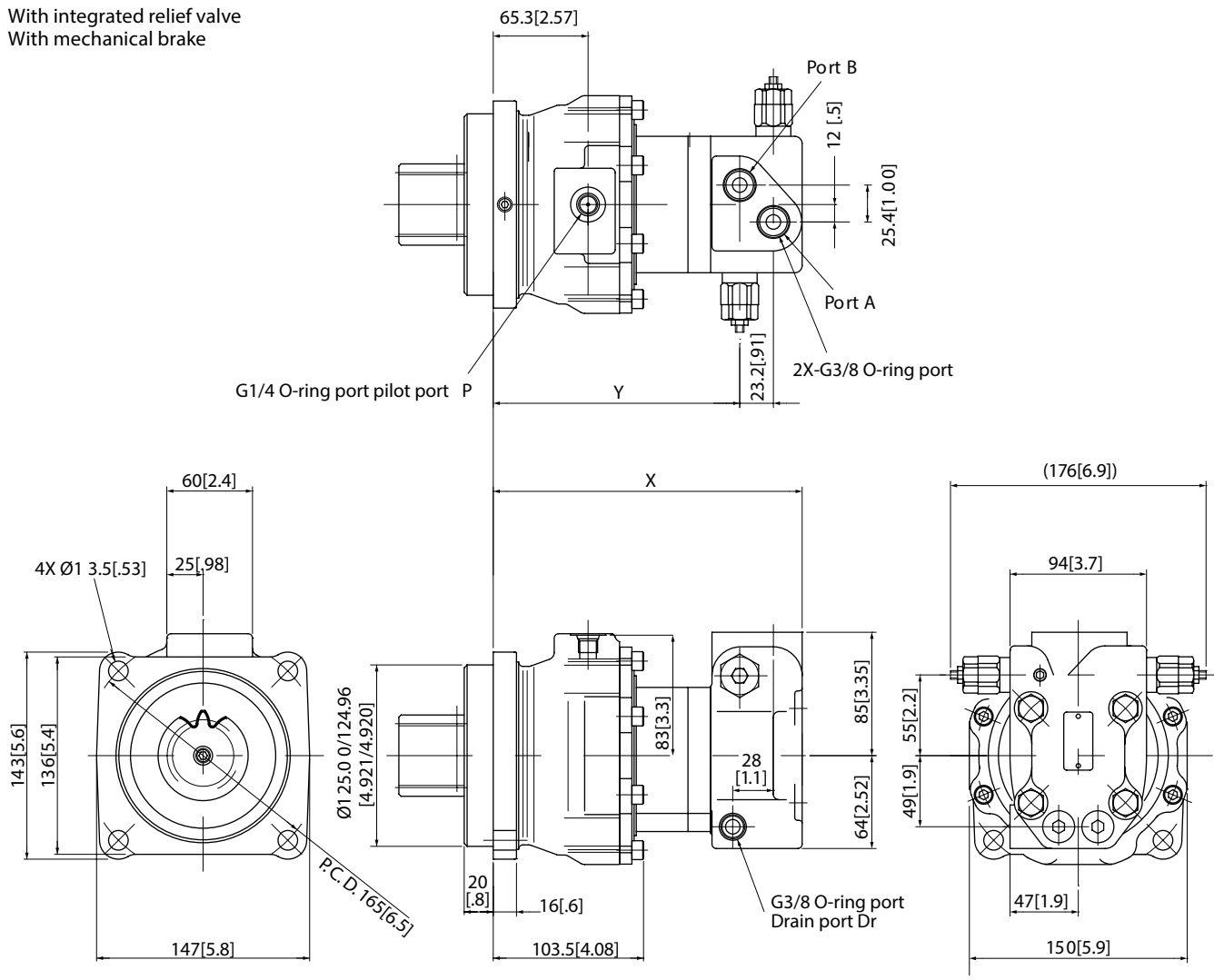
Note: as per JIS standard Output torque is limited depending on pinion dimension In case of small pinion, output torque is limited less than spec..

2.5K Series

Swing Motor

With integrated relief valve
With mechanical brake

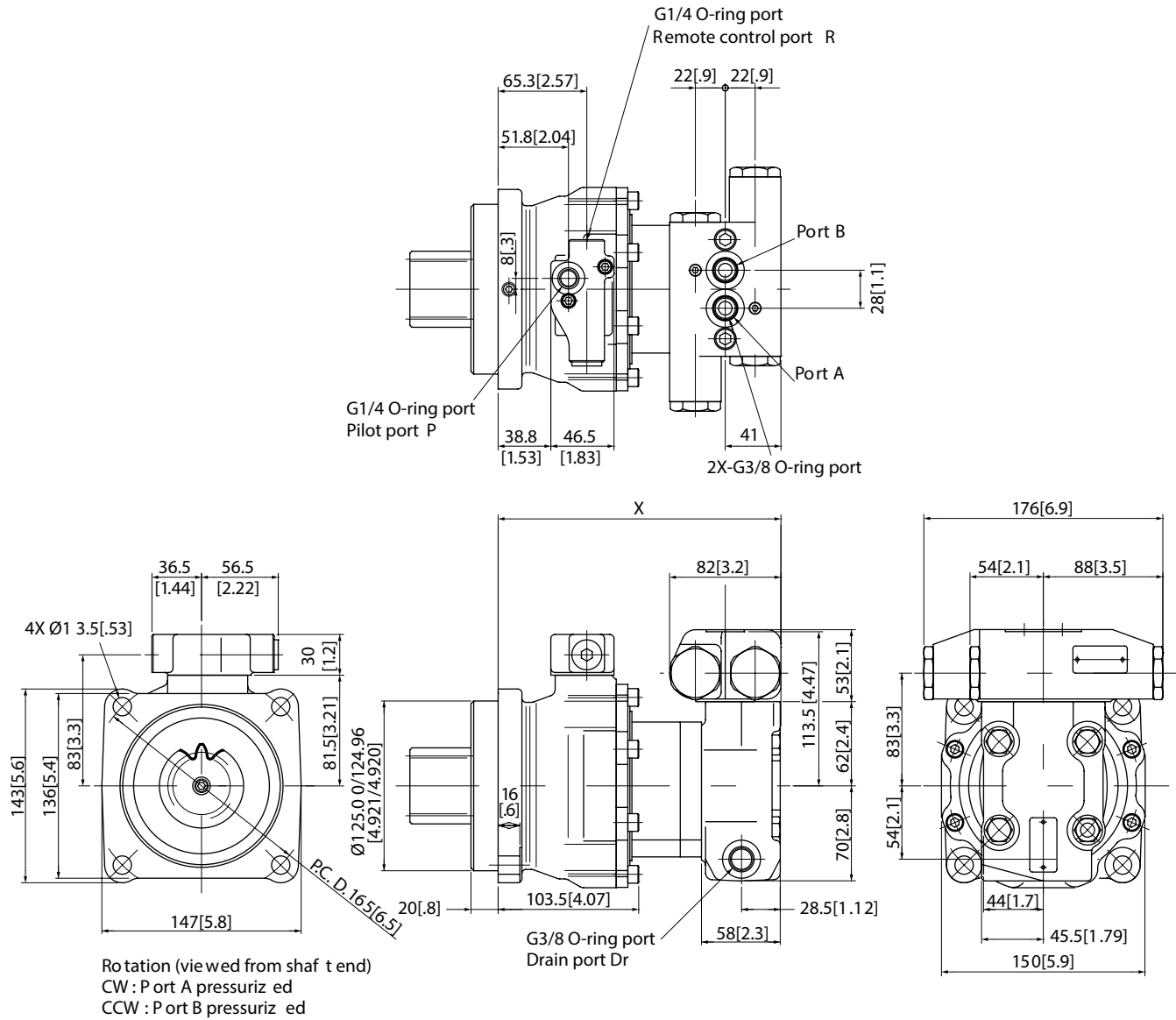
D-7



Rotation (viewed from shaft end)
CW : Port A pressurized
CCW : Port B pressurized

Model	X mm [inch]	Y mm [inch]
25PC16	206[8.1]	163[6.4]
25PC20	213[8.4]	170[6.7]
25PC25	222[8.7]	179[7.0]

With Shockless relief valve and time delay valve option.
With mechanical brake



D-7

Model	X mm [inch]
25PC16	206[8.1]
25PC20	213[8.4]
25PC25	222[8.7]

4K series

Swing motor

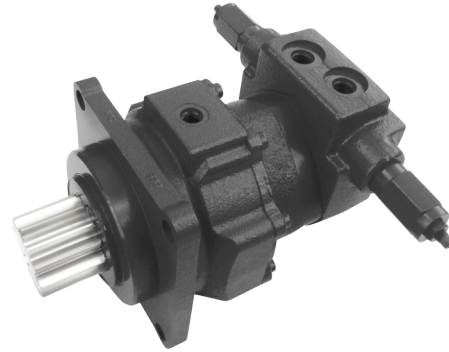
Characteristics & Advantages

4K series motor is disc valve Char-Lynn motor which can work with low leakage under high pressure.

The integrated pinion gear and big capacity bearing ensured the 4K series motor high reliability even under high radial load.

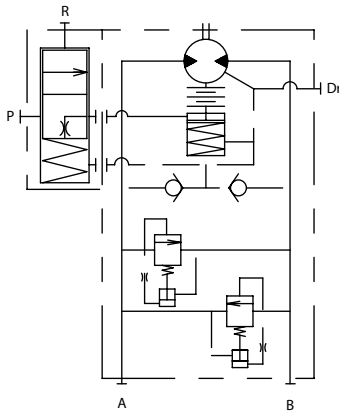
Specifically fitting for Swing drive on mini-excavators which tonnage less than 2.5 ton.

Integrated relief valve (or other required valves) can be easily assembled on the 4K series motor directly.



Circuit diagram

This hydraulic circuit includes time delay valve.



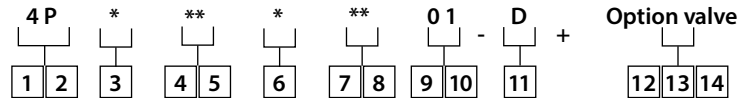
Specification

Model	4P*25	4P*31	4P*39
Motor displacement	246	311	393
	[15.0]	[19.0]	[24.0]
Max output torque	691	850	859
	[6115.8]	[7523.1]	[7602.8]
Max pressure	177	172	137
	[2567]	[2495]	[1987]
Max speed	80	80	80
Mechanical brake	N-m (Minimum release pressure: 20bar[290psi], Max release pressure: 39bar[566psi])		
	[lb-in]		
Mass	28.5	29.0	30.0
	[62.8]	[63.9]	[66.1]

Note:

1. Max pressure is relief valve setting pressure.
2. Need drain line (Back pressure should be max 20bar[290psi]).

Model Code



1 2	Series 4P 4K Series swing motor
3	Brake specification M Without mechanical brake H With mechanical brake
4 5	Displacement 25 246cm ³ /r [15.0in ³ /r] 31 311cm ³ /r [19.0in ³ /r] 39 393cm ³ /r [24.0in ³ /r]
6	Load holding spec. C Geroler Load holding (Light) F Geroler Load holding (Middle)
7 8	Port 23 G3/8 O-ring port with shockless relief valve 24 Manifold (valve mount type)

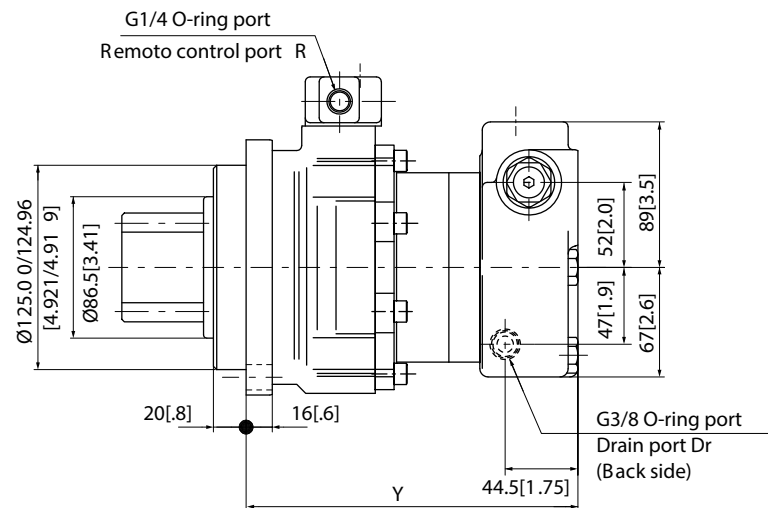
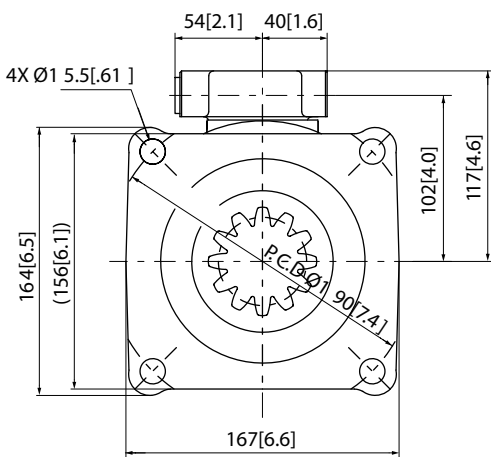
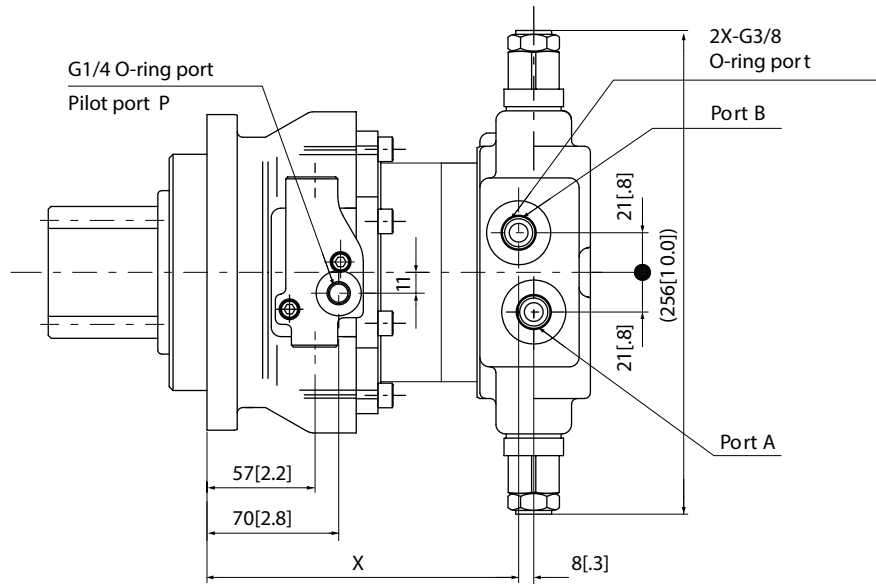
9 10	Output pinion shaft 01 Module 4 (Module 4 is standard option, other available shaft in Page 12)
11	Design code
12 13 14	Option valve V2T Time delay valve Keep blank for no optional valve required

*More displacement/Port are optional based on customer request
For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify.(see end cover)

Installation Dimension

With integrated shockless relief valve and time delay valve (option)

With mechanical brake



Rotation (viewed from shaft end)

CW : Port A pressurized

CCW : Port B pressurized

Pinion gear dimension (reference)

Module	4	4.5	5	6
Number of teeth	13	11	12	11
Pressure angle	20	20	20	20
Pitch diameter mm [inch]	52[2.05]	49.5[1.95]	60[2.4]	66[2.6]
Add modification coefficient	0.45	0.55	0.5	0.55

Model	X mm [inch]	Y mm [inch]
4PH25	165 [6.5]	203 [8.0]
4PH31	173.5 [6.83]	211.5 [8.33]
4PH39	184 [7.2]	222 [8.7]

Note: as per JIS standard output torque is limited depending on pinion dimension

4.5K series

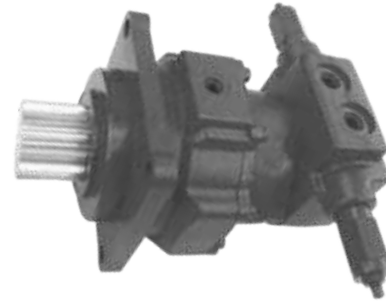
Swing motor

Characteristics & Advantages

4.5K series motor is disc valve Char-Lynn® motor which can work with low leakage under high pressure.

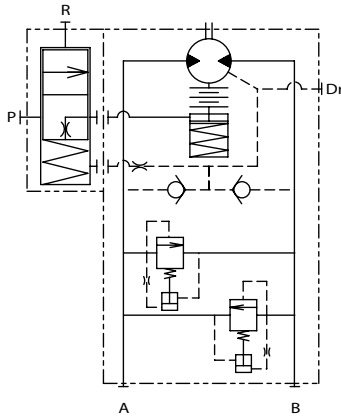
The integrated pinion gear and big capacity bearing ensured the 4.5K series motor high reliability even under high radial load. Specifically fitting for Swing drive on mini-excavators which tonnage less than 3.5 ton.

Integrated relief valve (or other required valves) can be easily assembled on the 4.5K series motor directly.



Circuit diagram

This hydraulic circuit includes time delay valve.



D-9

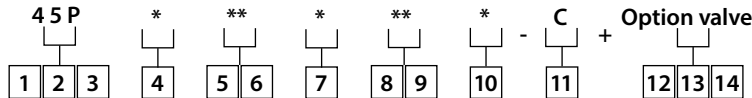
Specification

Model	45P*31	45P*33	45P*39
Motor displacement[cm ³ /rev]	311 [19.0]	333 [20.3]	393 [24.0]
Max output torque	898 N-m [7948.0] lb-in	996 N-m [8815.3] lb-in	951 N-m [8417.1] lb-in
Max pressure	181 bar [2625] psi	177 bar [2567] psi	152 bar [2205] psi
Max speed	80 rpm	80 rpm	80 rpm
Mass	32.0 kg [70.6] lb	32.5 kg [71.6] lb	33.0 kg [72.8] lb

Note:

1. Max pressure is relief valve setting pressure.
2. Need drain line (Back pressure should be max 20bar [290psi]).

Model code



1 2 3	Series 45P 4.5K Series swing motor
4	Brake specification M Without mechanical brake C With mechanical brake
5 6	Displacement 31 311cm ³ /r[19.0in ³ /r] 33 333cm ³ /r[20.3in ³ /r] 39 393cm ³ /r[24.0in ³ /r]
7	Load holding spec. A Geroler Load holding (Light) H Geroler Load holding (Middle)
8 9	Port 23 G3/8 O-ring port with shockless relief valve 24 Manifold (valve mount type)

10	Output pinion shaft Please check with our sales
11	Design code
12 13 14	Option valve V2T Time delay valve Keep blank for no optional valve required

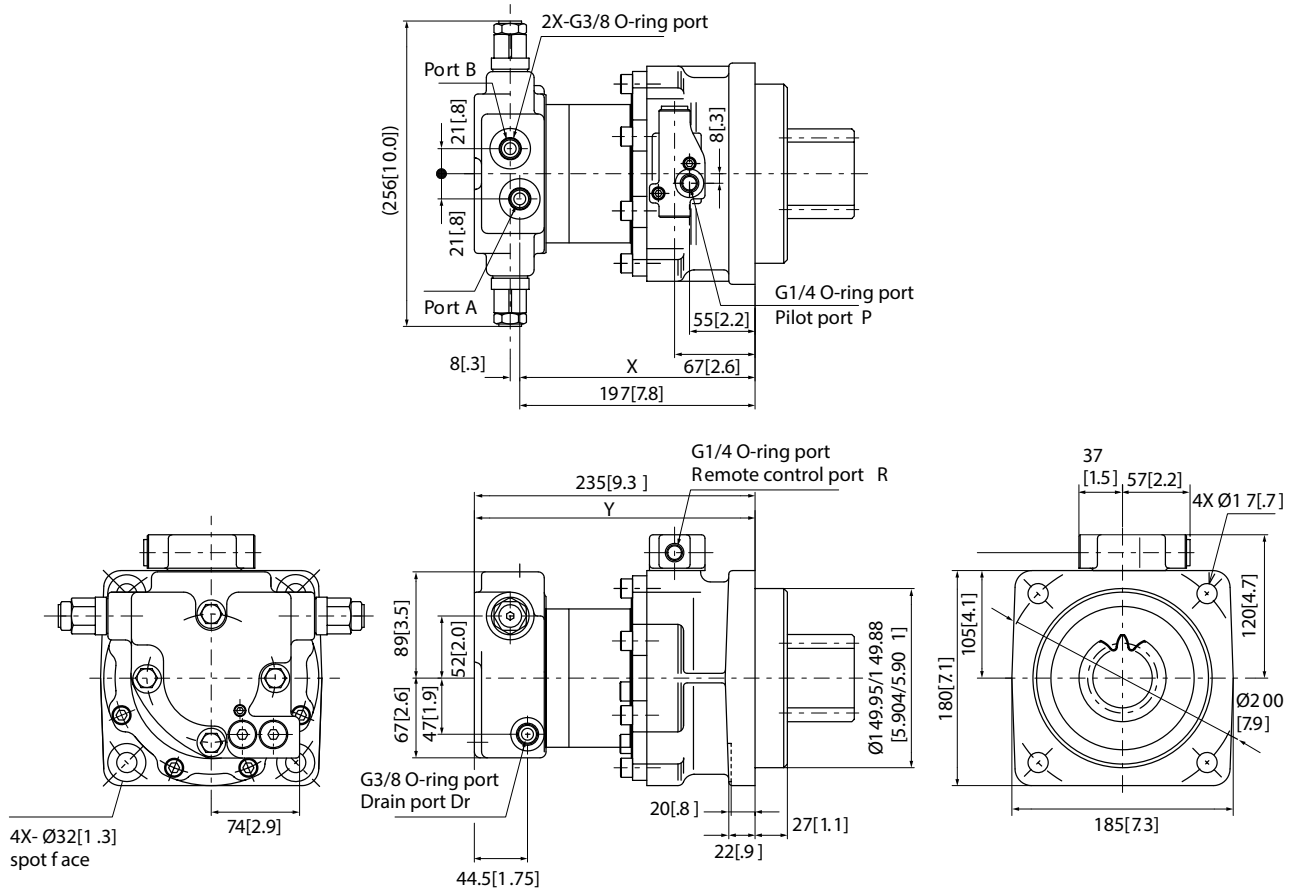
*More displacement/Port are optional based on customer request
For all the relief valve setting pressure and other special requirements besides above model code listed, please submit additional order sheet to clarify.(see end cover)

Note: Pre-Production

Installation Dimension

With integrated shockless relief valve and time delay valve (option)

With mechanical brake



Rotation (viewed from shaft end)

CW : Port A pressurized

CCW : Port B pressurized

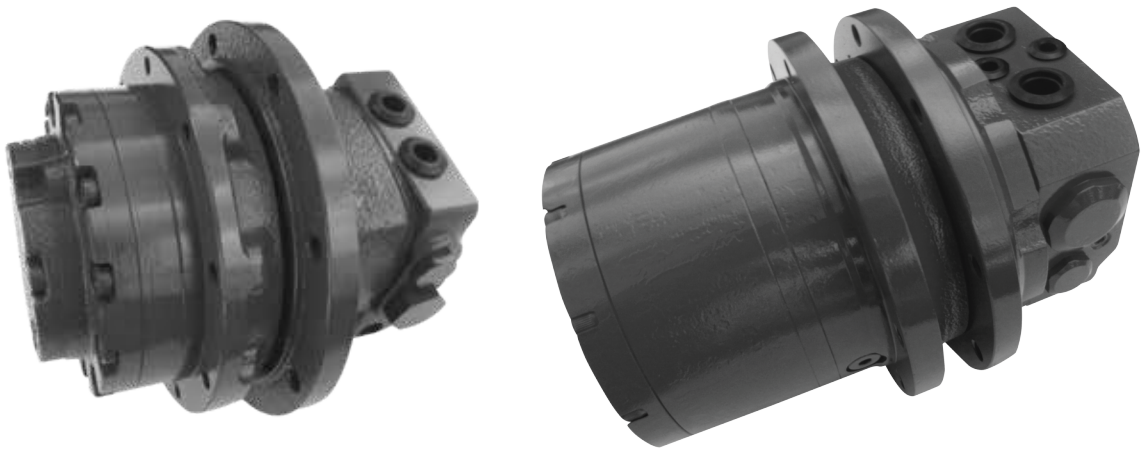
Model	X mm [inch]	Y mm [inch]
45P*31	186[7.3]	224[8.8]
45P*33	189[7.4]	227[8.9]
45P*39	197[7.8]	235[9.3]

Pinion Gear Dimension

Please contact us

Char-Lynn Low speed high torque orbit motor for traction drive

K-D, and TRB traction motors



Features

- Low speed high torque Char-Lynn® motor for Traction
- Direct drive (no reduction gear)
- Displacement from 180cm³/rev [11.0in³/rev] to 490cm³/rev[29.9in³/rev], maximum pressure up to 206bar[2988psi]
- Integrated counter balance valve

Benefits

- Reduced energy consuming attributed to higher mechanical and volumetric efficiency
- Less mechanical shocks by smooth and precise control
- Cost competitive due to simple structure design
- Proven performance by 20+ years experience
- No reduction gear oil to change/maintain

Typical application

- Mini excavator
- Belt conveyor
- General traction application
- Harvester
- Winch
- Paver

Typical mini excavator weight (ton)

0.5	0.8	1.0	1.5	1.7	Model
					K-D18
					TRBF20
					TRBF31
					TRBV31
					TRBV35
					TRBV39
					TRBV44
					TRBV49

Recommendation fluids: ISO VG32, 46, 56, 68 mineral oil

Recommended system operation temperature: -30°C to 80°C
[-22°F to 176°F]

Recommended oil viscosity: 24 to 50 cSt[120 to 233 SUS]

Recommended cleanliness: ISO 18/13

K-D series

Traction Motor

Characteristics & Advantages

K-D series motor designed based on 2000 series Char-Lynn motor. The disc valve in the K-D series motor is more compact and efficient. This allows a shorter package and better performance at low speeds.

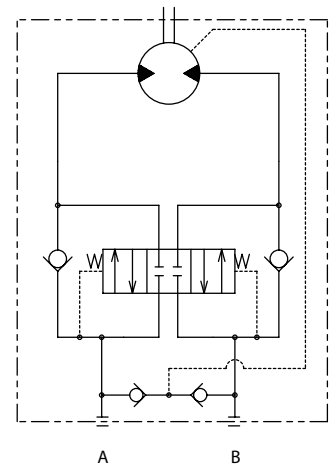


D-10

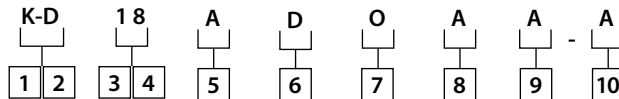
Specification

Model	K-D18	
Motor displacement	cm ³ /rev [in ³ /rev]	180 [11.0]
Max output torque	N-m [lb-in]	470 [4159.8]
Max pressure	bar [psi]	167 [2422]
Max flow	l/min [GPM]	10 [2.6]
Max case pressure	bar [psi]	20 [290]
Mass weight	kg[lb]	13.5[29.8]

Circuit diagram



Model code

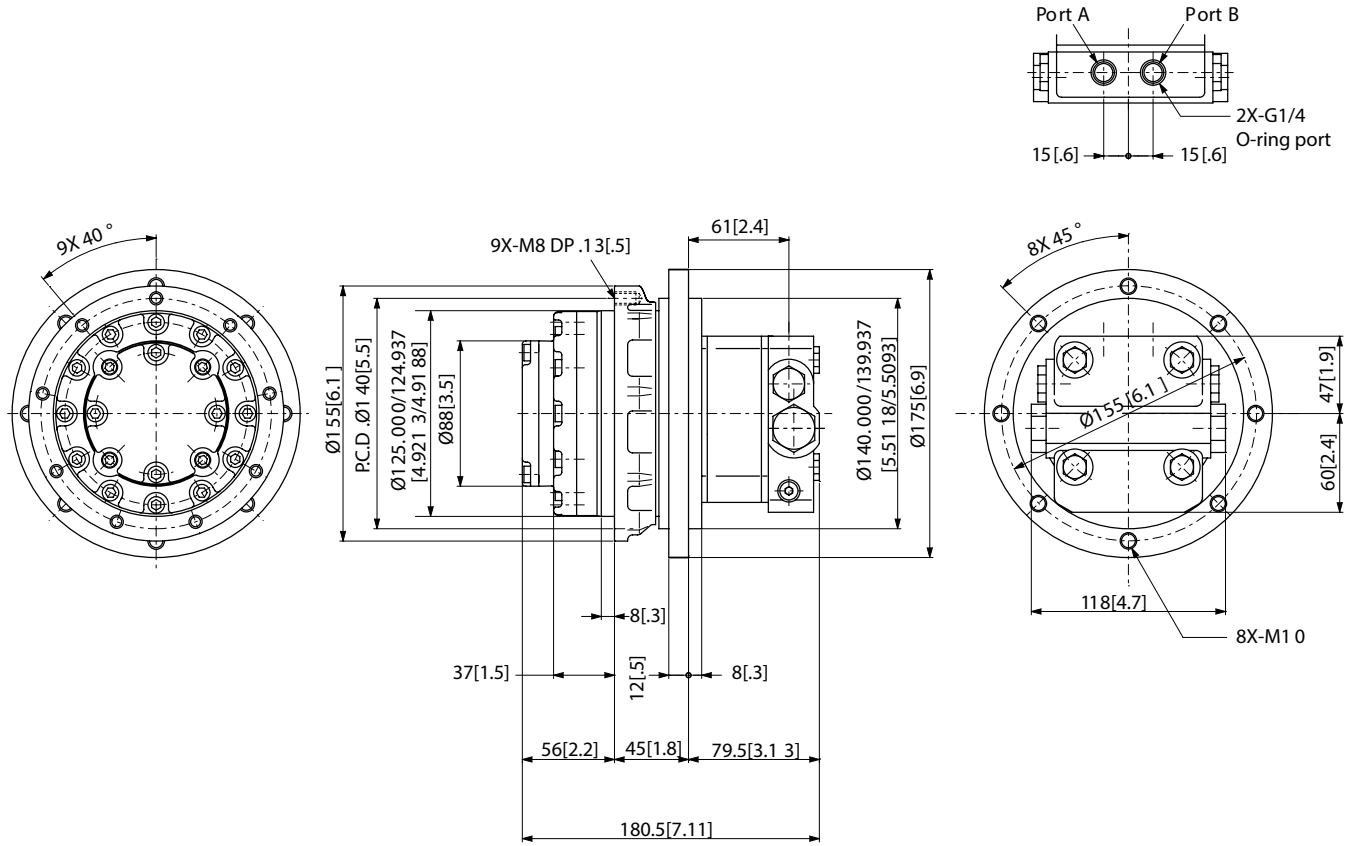


1 2	Series K-D K-D Series Traction motor
3 4	Displacement 18 180cm ³ /r [11.0in ³ /r]
5	End-Cover spec. A G1/4 O-ring port, integrated counter balance valve
6	Wheel type D Pilot dia. Ø125, Bolt P.C.D. 140, 9-M8

7	Flange type O Pilot dia. Ø140, Bolt P.C.D. 155, 8-M8
8	Load holding spec. A Tight fitting, Low leakage
9	Special feature A None
10	Design Code

More specific features (Displacements, etc) are available on request, please contact with sales.

Installation Dimension



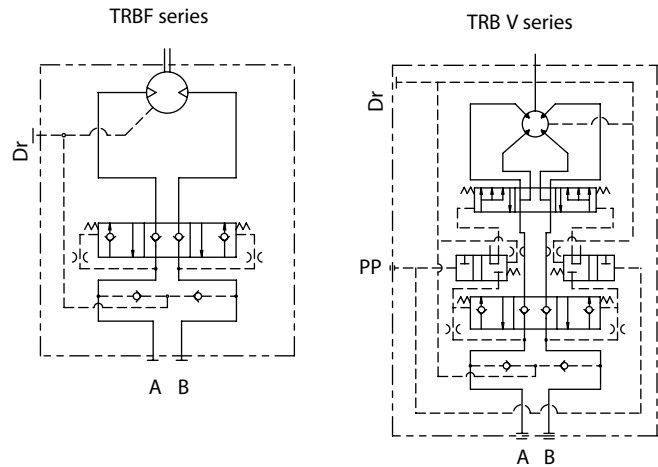
D-10

TRB Series

Traction motor

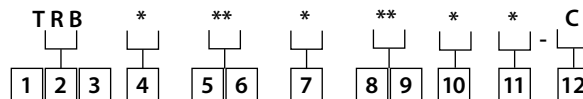
Characteristics & Advantages

TRB series motor designed based on 6000 series Char-Lynn motor. By using Danfoss' special disc valve design, the TRB motor is very compact and very efficient at high pressures. This allows superior performance at low speeds. Also to increase machine performance two speed options are available.



D-11

Model Code



1 2 3 **Series**
TRB TRB Series traction motor

4 **Two speed spec.**
F Fixed displacement
V Variable displacement (2 speed motor)
S Auto 2 speed

5 6 **Displacement**
31 310cm³/r [18.9in³/r]
35 350cm³/r [21.4in³/r]
39 390cm³/r [23.8in³/r]
44 440cm³/r [26.9in³/r]
49 490cm³/r [29.9in³/r]

7 **Load holding spec.**
A Tight fitting (Medium)
C Tight fitting (Light)

8 9 **End-cover spec**
11 Fixed displacement, G1/4 O-ring port, integrated counter balance valve
12 Variable displacement, G1/4 O-ring port, integrated counter balance valve
21 Fixed displacement, G3/8 O-ring port, integrated counter balance valve
22 Variable displacement, G3/8 O-ring port, integrated counter balance valve

10 **Special feature**
0 Standard
3 High temperature/ High pressure

11 **Wheel and Flange spec.**
1 Wheel Pilot dia. Ø140, Bolt P.C.D. 157, 8-M10
Flange Pilot dia. Ø140, Bolt P.C.D. 157, 8-M10
4 Wheel Pilot dia. Ø160, Bolt P.C.D. 180, 9-M10
Flange Pilot dia. Ø155, Bolt P.C.D. 175, 8-M10
8 Wheel Pilot dia. Ø140, Bolt P.C.D. 155, 9-M10
Flange Pilot dia. Ø140, Bolt P.C.D. 155, 8-M10

12 **Design Code**

More specific features (Displacements, etc) are available on request, please contact with sales.

*High temperature/high pressure

Intermittent oil temperature is 100°C[212°F]

Intermittent pressure is 235[3408] bar[psi]

Specification

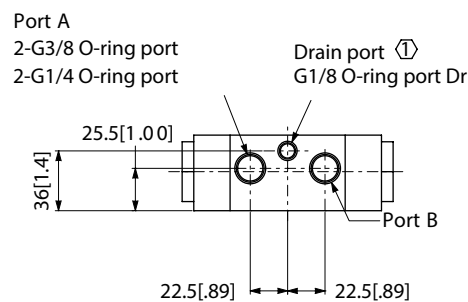
Model		TRB20	TRB31	TRB35	TRB39	TRB44	TRB49
Motor displacement	cm ³ /rev	195[11.9]	310[18.9]	350[21.4]	390[23.8]	440[26.9]	490[29.9]
Fixed(Variable)	[in ³ /rev]	97.5[5.95]	(155[9.5])	(175[10.7])	(195[11.9])	(220[13.4])	(245[15.0])
Max output torque	N-m [lb-in]	518 [4584.7]	1020 [9027.7]	1148 [10160.6]	1279 [11320.0]	1443 [12771.6]	1607 [14223.1]
Max pressure	bar [psi]	167 [2422]	206 [2988]	206 [2988]	206 [2988]	206 [2988]	206 [2988]
Max flow	l/min[GPM]	20 [5.1]	20 [5.1]	20 [5.1]	20 [5.1]	20 [5.1]	20 [5.1]
Max case pressure	bar[psi]	TRBV: 5[73] TRBF: 20[290]	TRBV; 5[73] TRBF; 20[290]	TRBV; 5[73] TRBF; 20[290]	TRBV; 5[73] TRBF; 20[290]	TRBV; 5[73] TRBF; 20[290]	TRBV; 5[73] TRBF; 20[290]
2 speed pilot pressure	bar[psi]	14 [203]	14 [203]	14 [203]	14 [203]	14 [203]	14 [203]
Mass weight	kg[lb]	20[44.1]	22.0[48.5]	22.5[49.6]	23.0[50.7]	23.5[51.8]	24.0[52.9]

Installation dimension

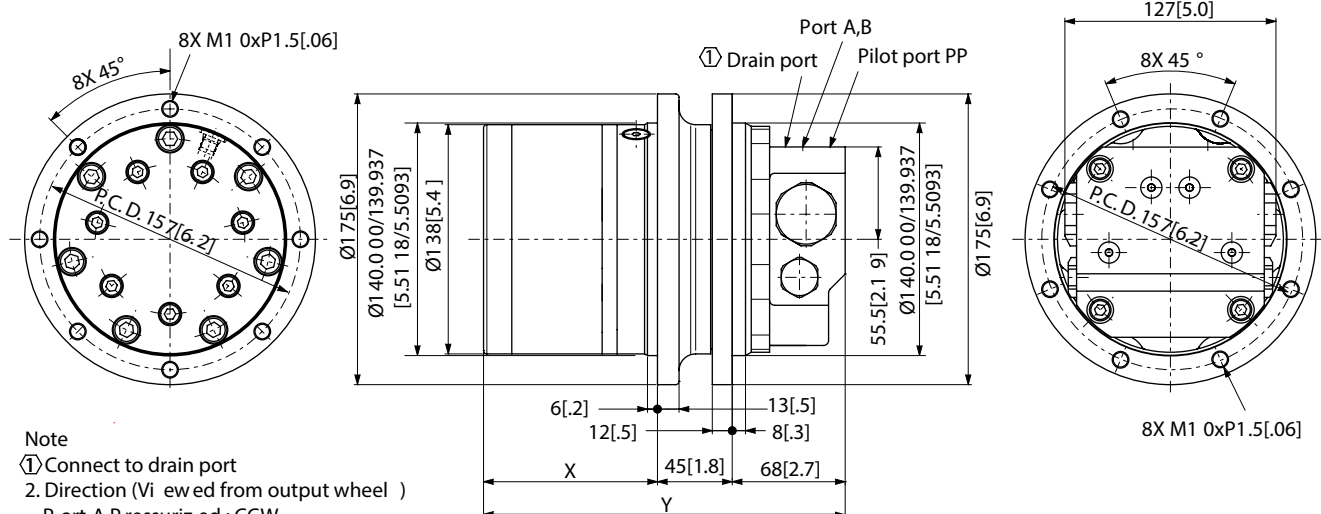
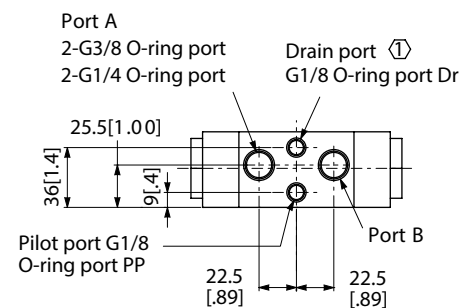
Wheel and Flange 1 type

Model	X mm [inch]	Y mm [inch]
TRB20	72.1 [2.84]	185.1 [7.29]
TRB31	85.0 [3.35]	198.0 [7.80]
TRB35	89.4 [3.52]	202.4 [7.97]
TRB39	93.7 [3.69]	206.7 [8.14]
TRB44	99.1 [3.90]	212.1 [8.35]
TRB49	104.7 [4.12]	217.7 [8.57]

TRBF; Fix ed Displacem



TRBV; Va riable displacement



Note

① Connect to drain port

2. Direction (Viewed from output wheel)

Port A Pressurized: CCW

Port B Pressurized: CW

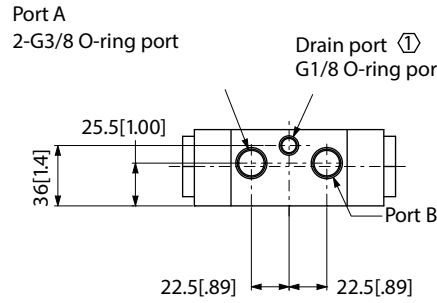
TRB series

Traction Motor

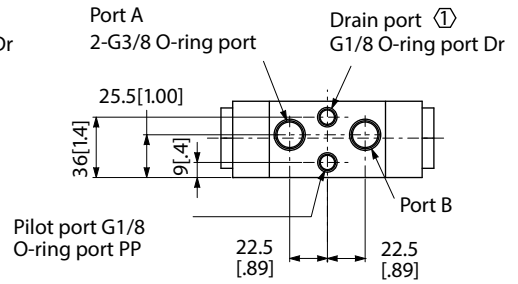
Wheel and Flange 4 type

Model	X mm [inch]	Y mm [inch]
TRB39	108.3 [4.26]	223.1 [8.78]
TRB44	113.8 [4.48]	228.6 [9.00]
TRB49	119.3 [4.70]	234.1 [9.22]

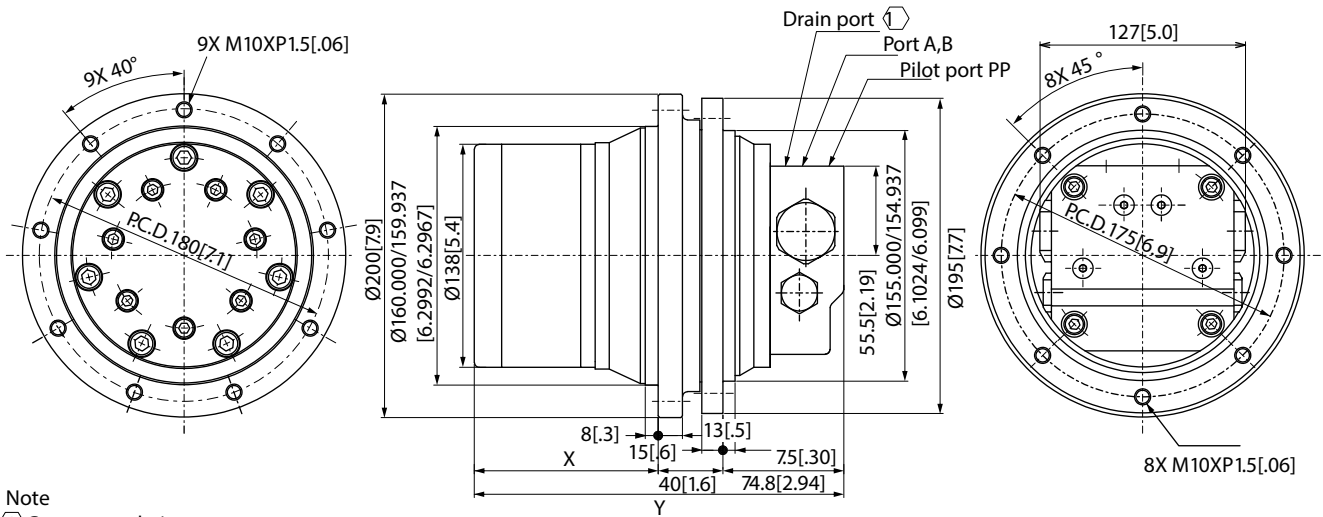
TRBF;Fixed Displacment



TRBV;Variable displacement



D-11



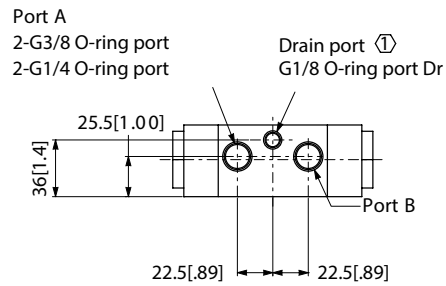
Note

- ① Connect to drain port
- 2. Direction (Viewed from output wheel)
 Port A Pressurized : CCW
 Port B Pressurized : CW

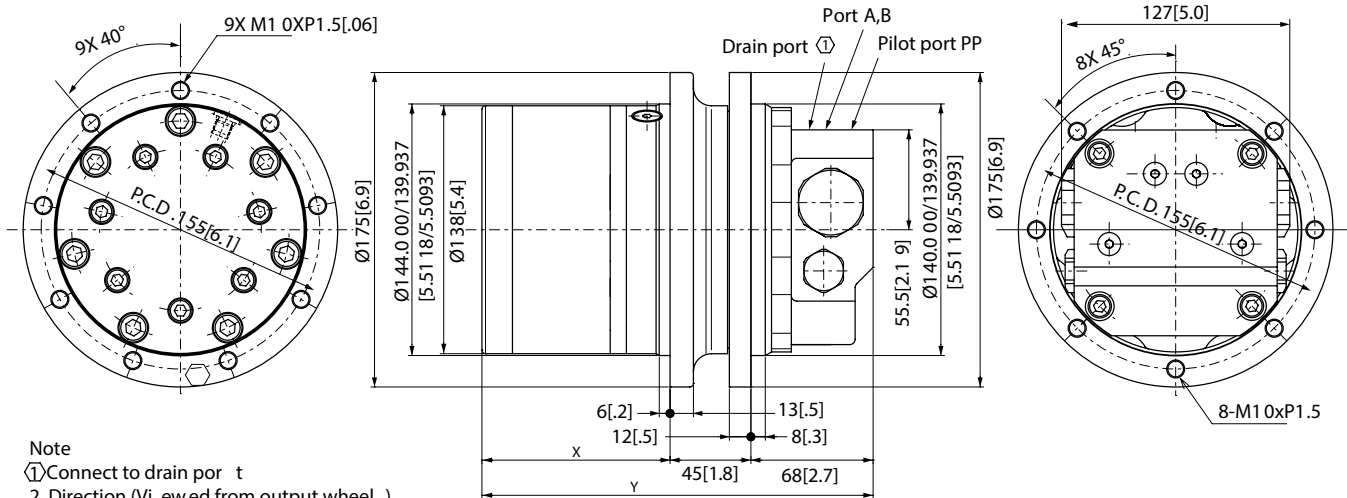
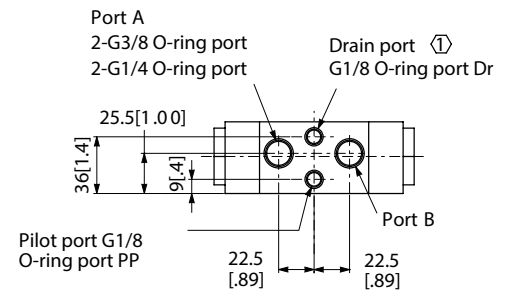
Wheel and Flange 8 type

Model	X mm [inch]	Y mm [inch]
TRB20	72.1 [2.84]	185.1 [7.29]
TRB31	85.0 [3.35]	198.0 [7.80]
TRB35	89.4 [3.52]	202.4 [7.97]
TRB39	93.7 [3.69]	206.7 [8.14]
TRB44	99.1 [3.90]	212.1 [8.35]
TRB49	104.7 [4.12]	217.7 [8.57]

TRBF; Fix ed Displacment



TRB V; Va riable displacement



Note

- ① Connect to drain port
- 2. Direction (Viewed from output wheel)
 - Port A Pressurized : CCW
 - Port B Pressurized : CW

Orbit Motor, Optional Products

S Series motor with rotation detecting shaft

- This series of motors are suited in combination with a tachometer or encoder. Motor comes with a rear output shaft that spins at motor shaft speed for use in applications with precise speed control.
- Applications: Plastic Injection Machine, Industrial Machine and Mobile



2000 Series motor with rotation detecting shaft

- By the rotation detecting shaft, these motors are especially adapted to combination with tachometers. This series of motors are suited in combination with a tachometer or encoder. Motor comes with a rear output shaft that spins at motor speed. In particular, Injection molding machines needing rpm detection will find the most convenient.
- Applications: Plastic Injection Machine, Industrial Machine and Mobile



D-11

Orbit motor with GJ type planetary-gear reducer

- The motors of this series are combinations of H, S, 2000 Series Motor and planetary-gear reducer. The reducer shaft, not frame, is the driving member.
- Applications: Industrial Machines, Fishing Machines



Orbit motor with GW type planetary-gear reducer

- The motors of this series are intended for use driving travelling mechanism and winches, each being a combination of 2000 Series Motor and planetary-gear reducer. The reducer frame is the driving member.
- Applications: Construction Machines, Agricultural and Forestry Machines, Fishing Machines

Please reach out to your Danfoss representative for more information on these products.

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- Cartridge valves
- DCV directional control valves
- Electric converters
- Electric machines
- Electric motors
- Gear motors
- Gear pumps
- Hydraulic integrated circuits (HICs)
- Hydrostatic motors
- Hydrostatic pumps
- Orbital motors
- PLUS+1® controllers
- PLUS+1® displays
- PLUS+1® joysticks and pedals
- PLUS+1® operator interfaces
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- PLUS+1® software
- PLUS+1® software services, support and training
- Position controls and sensors
- PVG proportional valves
- Steering components and systems
- Telematics

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